



# ***ENDMILL***

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# ***CATALOG***

**Vol.16.2 2016.7~**



## Descrizione delle Icone Description of Icons

### Dati tecnici Technical Data

Materiale costruttivo dell'utensile



**Carburo Micro Grana**  
Micro Grain Carbide



**Carburo Super Micro Grana**  
Super Micro Grain Carbide



**Carburo Grana Standard**  
Regular Grain Carbide



**CBN**  
Cubic Boron Nitride



**Diamante Monocristallino**  
Monocrystalline Diamond



**PCD (Diamante Policristallino)**  
Polycrystalline Diamond

### Rivestimento Coating

Tipologie di Rivestimenti



**MUGEN-COATING PREMIUM**  
MUGEN-COATING PREMIUM



**MUGEN-COATING**  
MUGEN-COATING



**MUGEN MICRO-COATING**  
MUGEN MICRO COATING



**X-COATING TiCN**  
X-COATING



**Rivestimento Diamante**  
DIAMOND COATING



**DLC**  
DLC COATING

### Numero di Taglienti Number of Flutes

Taglienti dell'Utensile



**1 Tagliente**  
1 Flute



**2 Taglienti**  
2 Flute



**3 Taglienti**  
3 Flute



**4 Taglienti**  
4 Flute



**6 Taglienti**  
6 Flute



**8 Taglienti**  
8 Flute



**10 Taglienti**  
10 Flute

### Angolo d'elica Helix Angle

Angoli d'elica degli utensili



**20° sinistro**  
Left 20°



**30°**



**11° sinistro**  
Left 11°



**35°**



**0°**



**35°/38°**



**12°**



**40°**



**20°**



**40°/42°**



**25°**



**45°**

### Affilatura di testa Corner Shape

Tipo di Affilatura



**Spigolo Vivo**  
Sharp Edge



**Raggio Torico**  
Corner Radius

### Durezza dei materiali lavorabili Cutting Possibility of Work

Durezza HRC



**Fino a 55HRC**  
Possible to cut up to 55HRC



**Fino a 62HRC**  
Possible to cut up to 62HRC



**Fino a 65HRC Italiano**  
Possible to cut up to 65HRC



**Fino a 68HRC Italiano**  
Possible to cut up to 68HRC

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**INDICE PER MODELLO**  
MODEL INDEX

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**CBN** Nitruro Cubico di Boro  
Cubic Boron  
Nitride

**Diamante**  
Diamond

**Piane**  
Square

**Rivestite**  
Coating

**Scaricate Piane**  
Long Neck Square

**Non Rivestite**  
Non-Coating

**Sferiche**  
Ball

**Rivestite**  
Coating

**Scaricate Sferiche**  
Long Neck Ball

**Non Rivestite**  
Non-Coating

**Coniche**  
Taper

**Rivestite**  
Coating

**Coniche Sferiche**  
Taper Ball

**Non Rivestite**  
Non-Coating

**Toriche**  
Corner R

**Rivestite**  
Coating

**Scaricate Toriche**  
Long Neck Corner R

**Non Rivestite**  
Non-Coating

**Frese Sagomate**  
Formed Cutter

**Rivestite**  
Coating

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
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# Come utilizzare il catalogo

How to make use of this catalogue.



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Ricerca per Diametro

Search from Diameter.

Ricerca del tipo di fresa dall'Indice

Search number of mill type from index.

**Frese 3 Tagli plane forate**

Diamante  
Diamond

Plane Squin  
Scaricabile  
Piano  
Long Neck  
Butt

- Il nuovo design dell'elica conferisce alla fresa
- Grande efficienza in lavoro sia per realizzare
- New flute design brought a remarkable shaving
- High efficient machining is realized both for plating

Codice (NS) No.	(D) Dia. (mm)	(L) Length tagliante Length of Cut (mm)	(Y) Angolo V-cut Angle (°)
NS-00133-00100	1	1.5	9°
NS-00133-00110	1.1	1.7	9°
NS-00133-00120	1.2	1.8	9°
NS-00133-00130	1.3	2	9°
NS-00133-00140	1.4	2.1	9°
NS-00133-00150	1.5	2.3	9°
NS-00133-00160	1.6	2.4	9°
NS-00133-00170	1.7	2.6	9°
NS-00133-00180	1.8	2.7	9°
NS-00133-00190	1.9	2.9	9°

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Ricerca per Tipo di Fresa

Search from end mill type.

Ricerca per Serie

Search from series name.

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**MSZ345**

Fresa 3 Tagli piano Power 2° serie MODERNA

Codice	(D) Dia.	(L) Lunghezza	(Y) Angolo
MSZ345-001	1	1.5	9°
MSZ345-002	1.1	1.7	9°
MSZ345-003	1.2	1.8	9°
MSZ345-004	1.3	2	9°
MSZ345-005	1.4	2.1	9°
MSZ345-006	1.5	2.3	9°
MSZ345-007	1.6	2.4	9°
MSZ345-008	1.7	2.6	9°
MSZ345-009	1.8	2.7	9°
MSZ345-010	1.9	2.9	9°

**MSZ345**

Codice	(D) Dia.	(L) Lunghezza	(Y) Angolo
MSZ345-011	2	3	9°
MSZ345-012	2.1	3.1	9°
MSZ345-013	2.2	3.2	9°
MSZ345-014	2.3	3.3	9°
MSZ345-015	2.4	3.4	9°
MSZ345-016	2.5	3.5	9°
MSZ345-017	2.6	3.6	9°
MSZ345-018	2.7	3.7	9°
MSZ345-019	2.8	3.8	9°
MSZ345-020	2.9	3.9	9°

# Rivestimenti originali NS

## NS Original Coating

### Rivestimento MUGEN PREMIUM MUGEN-COATING PREMIUM

Il rivestimento Mugen Premium ha reso possibile l'estensione della durata dell'utensile durante le lavorazioni di acciai temprati. È adatto per acciai temprati da 48 a 65 HRC, grazie all'elevata durezza di 3600 Hv e alla temperatura di ossidazione di 1.300 °C.

Mugen Coating Premium has brought the tool life extension for the machining of high hardened steels. It is suited for hardened steels from 48 to 65 HRC with high coating hardness: 3,600HV and oxidation onset temperature: 1,300deg. C.

### Rivestimento MUGEN MUGEN-COATING

Il rivestimento Mugen consiste in TiAlN (Nitrato di titanio e alluminio) con durezza di 3.400 Hv ed una temperatura di ossidazione di 1.100 °C. Gran resistenza all'usura, e capacità lubrificante, è adatto ad una vasta gamma di materiali come acciai temprati, acciai pretemprati, acciai al carbonio e rame.

Mugen Coating consists of TiAlN (Titanium Aluminum Nitride) with coating hardness: 3,400HV and oxidation onset temperature: 1,100deg. C.

It covers wide range of work materials such as hardened steels, pre-hardened steels, raw materials and even coppers as being strong tool wear resistance and lubricating ability.

### Rivestimento X-Coating X-COATING

Il rivestimento X-coating consiste in TiCN (Carbo Nitrato di Titanio) con una durezza di 3.000 HV e un'alta adesione al substrato. È consigliato per un uso generale su svariati materiali con velocità di taglio inferiore a 100m/min con lubrorefrigerante.

X Coating consists of TiCN (Titanium Carbon Nitride) with coating hardness: 3,000HV and high adhesion. It is recommended for general use of various materials at less than 100m/min cutting speed with coolant fluid.

### Rivestimento DLC DLC COATING

Il rivestimento DLC (Diamond like Carbon) è un rivestimento al carbonio simile al rivestimento in diamante. Consente di realizzare ottime superfici nella lavorazione dell'alluminio, grazie alla sua durezza di 6.000 Hv, al basso coefficiente di attrito di 0.1µm e alla resistenza all'adesione grazie alla sua bassa rugosità di Ra 0.02µm.

DLC (Diamond like Carbon) is a carbon coating similar to diamond coating.

It is suited for the high accurate surface milling of Aluminum by the features of high coating hardness: 6,000HV, low friction coefficient: 0.1micro meter and strong welding resistance by smooth surface: Ra0.02 micro meter.

### Rivestimento Diamante DIAMOND COATING

Qualità stabile, grazie ad un'ottima resistenza all'usura e alle caratteristiche del diamante puro, libero da leganti e da impurità.

Stable quality brought by strong wear-resistance and stickiness of pure diamond free from bond and impurity.

## Tabella delle applicazioni dei rivestimenti in funzione dei materiali

Coating application chart by materials

Rivestimento Coating		Mugen Premium MUGEN Premium	Rivest. Mugen MUGEN Coating	X-Coating X Coating	Rivest. DLC DLC Coating	Rivest. Diamante Diamond Coating
Materiali Materials	56~65HC	◎	◎			
	45~55HRC	◎	◎	○		
	<b>Acciai Pretemprati</b> Pre-hardened Steels	◎	◎	◎		
	<b>Acciai dolci</b> Soft Irons	◎	◎	◎		
	<b>Rame</b> Copper	○	◎	◎	◎	
	<b>Alluminio</b> Aluminum	○	○	◎	◎	
	<b>Materiali fragili</b> Brittle Materials					◎
	<b>Grafite</b> Graphite					◎

# Nuovi prodotti

## **NEW** Frese in diamante policristallino

► P. 87

Polycrystalline diamond end mill

### PCDSE

Ø 0.1~1 Totale 8 misure  
Total 8 sizes



- Frese piane in PCD.
- Mantenimento della precisione della superficie di taglio e livello microscopico.  
Square End Mill by PCD.  
Nano level cutting surface is accurately maintained.

## **NEW** Frese piane in CBN

► P. 60

CBN Square End Mill

### SSE400/600

Ø 0.1~1 Totale 16 misure  
Total 16 sizes



- È possibile realizzare raggi di R0.02 mm. o inferiori, su acciai temprati.
- Alta resistenza all'abrasione, grazie allo speciale design del tagliente.  
Minimum fillet radius R0.02mm or below on hardened steels is realized.  
High abrasion resistance by special flute design.

## **NEW** Frese 3 Tagli sferiche lunghe per nervature con sforno conico rivestite Mugen Premium

► P. 312

MUGEN-COATING PREMIUM 3-Flute Long Taper Neck Ball End Mill

### MRBTNH345

R0.5~R2 Totale 69 misure  
Total 69 sizes



- Il design ottimizzato delle eliche e dello sforno conico previene le scheggiature del tagliente e offre una fresatura ad alta efficienza.  
Optimized flute design and taper neck design to realize chipping prevention on cutting edge and high efficient milling.

## **NEW** Frese piane rivestite Mugen Premium

► P. 93

MUGEN-COATING PREMIUM Square End Mill

### MXH

Ø 0.1~6 Totale 222 misure  
Total 222 sizes



- Il rivestimento Mugen Premium è utilizzato sulle frese serie MXH.
- Adatto per lavorazioni di acciaio inox, titanio e materiali di difficile lavorabilità.  
MUGEN-COATING PREMIUM adoption to reputable model of MX series.  
Applicable for SUS, Ti and hard-to-machine materials.

## **NEW** Frese piane per materiali duri e fragili

► P. 156

End Mill for Hard Brittle Materials

### DCMS

Ø 0.3~2 Totale 14 misure  
Total 14 sizes



- Per lavorazioni di materiali duri e fragili come metallo duro e ceramica
- Il design ad alta rigidità lo rende adatto alla lavorazione di materiali duri e fragili  
Machineable on hard brittle materials such as cemented carbide and ceramic.  
Large tool core design for high rigidity to machine hard brittle materials.

## NEW Frese sferiche per materiali duri e fragili

► P. 280

Ball End Mill for Hard Brittle Materials

### DCMB

**R0.1~R1** Totale **12 misure**  
Total 12 sizes



- Frese sferiche ad elica rivestite diamante di ultimo sviluppo.  
Spiral ball shape adopted newly developed Diamond coating.

## NEW Frese sferiche PCD

► P. 89

PCD Ball End Mill

### PCDRB

**R0.05~R1** Totale **10 misure**  
Total 10 sizes



- La geometria esclusiva della fresa garantisce costanza nella qualità delle superfici.
- La rugosità nanometrica ottenuta con la finitura riduce i tempi di lucidatura.  
Unique tool geometry makes stable surface.  
Polish-less machining become reality nano-level roughness on profiling finish.

## NEW Frese per micro-filetti

► P. 440

Micro thread milling tool

### MMTS

**S0.1~S1.4** Totale **13 misure**  
Total 13 sizes



- Per la realizzazione di filetti di 0.1 mm.
- Il dia. dell'utensile è più piccolo del foro da lavorare e quindi di facile rimozione dopo la rottura.  
Realize threaded size 0.1 mm.  
Smaller tool dia. than pilot hole to easily restart operation by removing broken tool.

## NEW Frese per filetti metrici M

► P. 442

M-Thread Cutting Tool

### MMTM

**M1~M6** Totale **11 misure**  
Total 11 sizes



- Nuove frese migliorate sull'affilatura per consentire una maggiore precisione nel taglio.
- Il rivestimento Mugen Coating migliora la durata della fresa.  
Improvement of cutting accuracy by adoption of tool design focusing on sharpness.  
Mugen-Coating realized long tool life.

## NEW Frese per filetti in pollici UNC/UNF

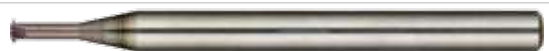
► P. 444

M-Thread Cutting Tool

### MMTU

**0-80UNF~1/4-28UNF**

Totale **21 misure**  
Total 21 sizes



- Nuove frese migliorate sull'affilatura per consentire una maggiore precisione nel taglio.
- Il rivestimento Mugen Coating migliora la durata della fresa.  
Improvement of cutting accuracy by adoption of tool design focusing on sharpness.  
Mugen-Coating realized long tool life.

# Nuovi prodotti

## **NEW** Frese per resina

► P. 251

End Mill for Resin

### **RSES230**

Ø 0.1~6 Totale 155 misure  
Total 155 sizes



- Nuova linea ad eliche corte aggiunta alla linea "Clear Cut" per resine.  
Short flute type added to "Clear Cut" series for resin.

## **NEW** Frese 3 tagli per smussi rivestite MUGEN

► P. 446

CHAMPION SOLID 2-Flute Long End Mill

### **NCSV-M / NCSV**

Ø 4~6 Totale 4 misure  
Total 4 sizes



- Facilità di lavorazione sugli angoli.  
It can be cut at the corner easily.
- Il rivestimento Mugen conferisce lunga durata alla fresa.  
Tool life is exceptional as Mugen-Coating.

## **NEW** Frese sferiche elicoidali CBN "CBN Super Spiral Ball"

► P. 63

CBN Super Finish Ball End Mill

### **SSPB220**

R0.1~R1 Totale 22 misure  
Total 22 sizes



- Il profilo elicoidale della fresa rende i taglienti più affilati.  
Adopting spiral ball shape to improve sharpness of cutting edge.
- Il profilo dei taglienti li rende più resistenti alle scheggiature.  
Adopting cutting edge shape to improve the chipping resistance of cutting edge.

## **NEW** Frese sferiche elicoidali CBN "CBN Super Spiral Ball" per nervature serie lunga

► P. 64

CBN Super Spiral Long Neck Ball End Mill

### **SSPBL220**

R0.1~R1 Totale 27 misure  
Total 27 sizes



- Il profilo elicoidale della fresa rende i taglienti più affilati.  
Adopting spiral ball shape to improve sharpness of cutting edge.
- Il profilo dei taglienti li rende più resistenti alle scheggiature.  
Adopting cutting edge shape to improve the chipping resistance of cutting edge.

## **NEW** Frese sferiche elicoidali CBN "CBN Super Spiral Ball" con sforno conico lunghe

► P. 65

CBN Super Spiral Long Taper Neck Ball End Mill

### **SSPBTN220**

R0.1~R1 Totale 64 misure  
Total 64 sizes



- Il profilo elicoidale della fresa rende i taglienti più affilati.  
Adopting spiral ball shape to improve sharpness of cutting edge.
- Il profilo dei taglienti li rende più resistenti alle scheggiature.  
Adopting cutting edge shape to improve the chipping resistance of cutting edge.



## NEW Frese Serie AL

► P. 234

AL Series

### AL4D-2



- **Frese 2 Tagli piane medie per Alluminio.**  
2-Flute medium end mill for Aluminium.

### AL2D-2DLC



- **Frese 2 Tagli piane per Alluminio rivestite DLC.**  
DLC-Coating 2-Flute end mill for Aluminium.

### AL4D-2DLC



- **Frese 2 Tagli piane medie per Alluminio rivestite DLC.**  
DLC-Coating 2-Flute medium end mill for Aluminium.

### AL5D-2DLC



- **Frese 2 Tagli piane lunghe per Alluminio rivestite DLC.**  
DLC-Coating 2-Flute long end mill for Aluminium.

### ALZ345-DLC



- **Frese 3 Tagli piane foranti per Alluminio Power "Z" rivestite DLC.**  
DLC-Coating 3-Flute Power "Z" medium end mill for Aluminium.

### ALB225-DLC



- **Frese sferiche per Alluminio rivestite DLC.**  
DLC-Coating ball end mill for Aluminium.

Ø 1~Ø 12 R0.3~R6 **Totale 107 misure**  
Total 107 sizes

## NEW Punte piane rivestite MUGEN

► P. 470

MUGEN-COATING Flat Drill

### MFD

Ø 1~6 **Totale 61 misure**  
Total 61 sizes



- **Per forature stabili anche su superfici inclinate o curve.**
- **Molto efficienti in operazioni di allargatura dei fori**  
Stable drilling is realized as inclined and curved surface.  
High efficient counter boring.

## NEW Frese toriche CBN "CBN High Efficient Radius"

► P. 73

CBN

### SHR320

Ø 0.5~2 **Totale 14 misure**  
Total 14 sizes



- **Elevata precisione ed efficienza grazie ai 3 taglienti e al raggio del profilo elicoidale.**  
Realized high accuracy and high efficiency machining by adopting 3 flutes and corner with spiral shape.

## NEW Frese toriche PCD

► P. 91

PCD Radius End Mill

### PCDRS

Ø 0.3~1 **Totale 10 misure**  
Total 10 sizes



- **Su grande richiesta è stata aggiunta alla serie di frese PCD anche la versione torica.**
- **Il raggio torico ad elevata precisione consente elevate prestazioni di taglio su superfici piane e curve.**  
Added a much-needed corner radius type PCD series.  
Ultimate high quality surface is realized in the corner radius shape with superior cutting performance on curved and plane surface.

**Specifiche**  
Specification

**Materiale di lavoro** Work Material

**Foto**  
Photo





**Modello**  
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Acciaio al Carbonio Carbon Steels	Acciaio Legato e da utensili Alloy Steels - Tool Steels	Acciaio pretemprato Prehardened Steels	Acciaio Temprato Hardened Steels -SSHRc	SSHRc	Acciaio Inox Stainless Steels	Leghe di Titanio Titanium Alloy	Alluminio Aluminum	Copper Rame	Plastica Plastic
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**Frese Piane** **Square End Mill**


Frese serie CBN CBN End Mill Series

	Frese Piane CBN "Micro Edge Z" "CBN MICRO EDGE Z"	<b>SMEZ120</b>	p.58	○	○	◎	◎	◎						
	Frese Toriche CBN "CBN Super Surface" CBN Super Surface End Mill	<b>SSF120</b>	p.74	○	○	◎	◎	◎						
	Frese Piane CBN CBN Square End Mill	<b>SSE400</b>	p.60	○	○	◎	◎	◎						
	Frese CBN Piatte CBN Square End Mill	<b>SSE600</b>	p.60	○	○	◎	◎	◎						

Frese in Diamante Monocristallino Monocrystalline Diamond End Mill

	Frese in Diamante Monocristallino "CLEAR EDGE" Monocrystalline Diamond End Mill "CLEAR EDGE"	<b>CED100</b>	p.86	○	○	○	○							
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Frese in Diamante Policristallino Polycrystalline Diamond End Mill

	Frese in Diamante Policristallino Polycrystalline Diamond End Mill	<b>PCDSE</b>	p.87	◎	○									
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Frese serie rivestimento MUGEN PREMIUM MUGEN-COATING PREMIUM End Mill Series

	Frese 2 Tagli Piane eliche 25° rivestite MUGEN PREMIUM MUGEN-COATING PREMIUM 2-Flute LEAD25 End Mill	<b>MXH225</b>	p.93	◎	◎	◎	◎	○	◎	◎	○	○	○	○
	Frese 2 Tagli LEAD30 rivestite MUGEN PREMIUM MUGEN-COATING PREMIUM 2-Flute LEAD30 End Mill	<b>MXH230</b>	p.94	◎	◎	◎	◎	○	◎	◎	○	○	○	○
	Frese 2 Tagli LEAD35 rivestite MUGEN PREMIUM MUGEN-COATING PREMIUM 2-Flute LEAD35 End Mill	<b>MXH235</b>	p.95	◎	◎	◎	◎	○	◎	◎	○	○	○	○
	Frese 2 Tagli LEAD40 rivestite MUGEN PREMIUM MUGEN-COATING PREMIUM 2-Flute LEAD40 End Mill	<b>MXH240</b>	p.96	◎	◎	◎	◎		◎	◎	○	○	○	○
	Frese 2 Tagli LEAD45 rivestite MUGEN PREMIUM MUGEN-COATING PREMIUM 2-Flute LEAD45 End Mill	<b>MXH245</b>	p.96	◎	◎	◎	◎		◎	◎	○	○	○	○
	Frese 2 Tagli LEAD25 con tagliente affilato rivestite MUGEN PREMIUM MUGEN-COATING PREMIUM 2-Flute Sharp Edge LEAD25 End Mill	<b>MXH225P</b>	p.97	◎	◎	◎	◎		◎	◎	○	○	○	○
	Frese 2 Tagli LEAD30 con tagliente affilato rivestite MUGEN PREMIUM MUGEN-COATING PREMIUM 2-Flute Sharp Edge LEAD30 End Mill	<b>MXH230P</b>	p.98	◎	◎	◎	◎		◎	◎	○	○	○	○
	Frese 2 Tagli LEAD35 con tagliente affilato rivestite MUGEN PREMIUM MUGEN-COATING PREMIUM 2-Flute Sharp Edge LEAD35 End Mill	<b>MXH235P</b>	p.99	◎	◎	◎	◎		◎	◎	○	○	○	○
	Frese 4 Tagli piane per acciai temprati 4-Flute Square End Mill for Hardened Steels	<b>MHDH445</b>	p.149	◎	◎	◎	◎	◎	○	○	○	○	○	○
	Frese 6 Tagli piane per acciai temprati 6-Flute Square End Mill for Hardened Steels	<b>MHDH645</b>	p.149	◎	◎	◎	◎	◎	○	○	○	○	○	○
	Frese 2 Tagli Toriche scaricate per nervature per acciai temprati 2-Flute Long Neck End Mill for Hardened Steels	<b>MHRH230</b>	p.160	◎	◎	◎	◎	◎	○	○	○	○	○	○
	Frese 4 Tagli Toriche scaricate per nervature per acciai temprati 4-Flute Long Neck End Mill for Hardened Steels	<b>MHRH430</b>	p.163	◎	◎	◎	◎	◎	○	○	○	○	○	○

Frese serie rivestimento MUGEN MUGEN-COATING End Mill Series

	Frese 2 Tagli LEAD25 rivestite MUGEN MUGEN-COATING 2-Flute LEAD25 End Mill	<b>MX225</b>	p.108	◎	◎	◎	◎		◎	◎	○	○	○	○
	Frese 2 Tagli LEAD30 rivestite MUGEN MUGEN-COATING 2-Flute LEAD30 End Mill	<b>MX230</b>	p.108	◎	◎	◎	◎		◎	◎	○	○	○	○

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Alluminio  
Aluminum

Rame  
Copper






Plastica  
Plastic

**Frese Piane**

**Square End Mill**

Frese serie rivestimento MUGEN

MUGEN-COATING End Mill Series

	Frese 2 Tagli LEAD35 rivestite MUGEN MUGEN-COATING 2-Flute LEAD35 End Mill	<b>MX235</b>	p.110	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli LEAD40 rivestite MUGEN MUGEN-COATING 2-Flute LEAD40 End Mill	<b>MX240</b>	p.111	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli LEAD45 rivestite MUGEN MUGEN-COATING 2-Flute LEAD45 End Mill	<b>MX245</b>	p.112	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli LEAD25 rivestite MUGEN MUGEN-COATING 4-Flute LEAD25 End Mill	<b>MX425</b>	p.118	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli LEAD30 rivestite MUGEN MUGEN-COATING 4-Flute LEAD30 End Mill	<b>MX430</b>	p.118	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli LEAD35 rivestite MUGEN MUGEN-COATING 4-Flute LEAD35 End Mill	<b>MX435</b>	p.119	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli LEAD40 rivestite MUGEN MUGEN-COATING 4-Flute LEAD40 End Mill	<b>MX440</b>	p.119	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli LEAD45 rivestite MUGEN MUGEN-COATING 4-Flute LEAD45 End Mill	<b>MX445</b>	p.120	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli extra corte 2-Flute Super Short End Mill	<b>MSE230SS</b>	p.126	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli con tagliente affilato 2-Flute Sharp Edge Short End Mill	<b>MSES230P</b>	p.127	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli 2-Flute End Mill	<b>MSE230</b>	p.127	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli con diametro misurato 2-Flute End Mill with measured diameter	<b>MSE230M</b>	p.129	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli medie 2-Flute Medium End Mill	<b>MSEM230</b>	p.129	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli con tagliente affilato 4-Flute Sharp Edge End Mill	<b>MSE430P</b>	p.134	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli 4-Flute End Mill	<b>MSE430</b>	p.132	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli medie 4-Flute Medium End Mill	<b>MSEM430</b>	p.133	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 tagli 2-Flute End Mill	<b>MSE245</b>	p.136	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 3 Tagli 3-Flute End Mill	<b>MSE345</b>	p.136	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli 4-Flute End Mill	<b>MSE445</b>	p.137	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 3 Tagli "Power Z" 3-Flute Power "Z" End Mill	<b>MSZ345</b>	p.144	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli "Power" 4-Flute Power End Mill	<b>MSX440</b>	p.147	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli per acciai temprati 4-Flute End Mill for Hardened Steels	<b>MHD445</b>	p.149	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 6 Tagli per acciai temprati 6-Flute End Mill for Hardened Steels	<b>MHD645</b>	p.149	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli per nervature 2-Flute End Mill for Deep Rib with Long Neck	<b>MHR230</b>	p.160	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉

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**Frese Piane**

**Square End Mill**




Frese serie rivestimento MUGEN

MUGEN-COATING End Mill Series

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	Frese Cilindriche per materiali fragili End Mill for Hard Brittle Materials	<b>DCMS</b>	p.156	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli serie lunga Long Neck Square End Mill	<b>DCHR230</b>	p.188	☉	☉	☉	☉	☉	☉	☉	☉	☉















Frese serie rivestimento X-COATING

X-COATING End Mill Series

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Frese in Metallo Duro

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	Microfrese Sferiche "MICRO EDGE" Micro End Mill "MICRO EDGE"	<b>NSME100</b>	p.192	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Microfrese Sferiche "MICRO EDGE" Micro End Mill "MICRO EDGE"	<b>NSME230</b>	p.192	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese LEAD25 LEAD 25 End Mill	<b>NX-25</b>	p.193	☉	☉	☉	☉	☉	☉	☉	☉	☉
	iFrese LEAD30 LEAD 30 End Mill	<b>NX-30</b>	p.195	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese LEAD35 LEAD 35 End Mill	<b>NX-35</b>	p.197	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese LEAD40 LEAD 40 End Mill	<b>NX-40</b>	p.199	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese LEAD45 LEAD 45 End Mill	<b>NX-45</b>	p.201	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli CHAMPION SOLID CHAMPION SOLID 2-Flute End Mill	<b>NC-2</b>	p.208	☉	☉	☉	☉	☉	☉	☉	☉	☉
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	Frese 2 Tagli lunghe CHAMPION SOLID CHAMPION SOLID 2-Flute Long End Mill	<b>NCL-2</b>	p.210	☉	☉	☉	☉	☉	☉	☉	☉	☉
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Specifiche Specification			Materiale di lavoro Work Material									
Foto Photo	Modello Model	Pagina Page	Acciaio al Carbonio Carbon Steels	Acciaio Legato e da utensili Alloy Steels - Tool Steels	Acciaio temprato Hardened Steels	Acciaio preformato Prehardened Steels	Acciaio Inox Stainless Steels	Leghe di Titanio Titanium Alloy	Alluminio Aluminum	Rame Copper	Plastica Plastic	

## Frese Sferiche Ball End Mill








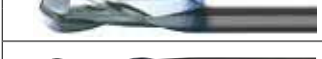



Frese serie Rivestimento MUGEN MUGEN-COATING End Mill Series

	Frese 2 Tagli Sferiche Extra Lunghe 2-Flute Extra Long Ball End Mill <b>MSBXL230</b>	p.279	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 3 Tagli Sferiche 3-Flute Ball End Mill <b>MSB345</b>	p.277	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche Scaricate per Nervature con Gambo Corto 2-Flute Long Neck Ball End Mill with Short Shank <b>MRB230SF</b>	p.295	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche Scaricate per Nervature 2-Flute Long Neck Ball End Mill <b>MRB230</b>	p.299	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche Scaricate per Nervature (Gambo Dia. 6) 2-Flute Long Neck Ball End Mill (Shank Dia. 6) <b>MRBLN230-6</b>	p.311	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche Lunghe per Nervature con Sforno Conico 2-Flute Long Taper Neck Ball End Mill <b>MRBTN230</b>	p.316	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche Extra Lunghe per Nervature con Sforno Conico 2-Flute Extra Long Taper Neck Ball End Mill <b>MRBTN230L</b>	p.325	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese Sferiche Scaricate rivestite DIAMANTE DIAMOND COATING Long Neck Ball End Mill <b>DCRB230</b>	p.329	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese Sferiche per materiali duri e fragili Ball End Mill for Hard Brittle Materials <b>DCMB</b>	p.280	☉	☉	☉	☉	☉	☉	☉	☉	☉

Frese Serie Rivestimento X-COATING X-COATING End Mill Series

	Frese 2 Tagli Sferiche per Miniature 2-Flute Miniature Ball End Mill <b>NCB-2X</b>	p.282	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche 2-Flute Ball End Mill <b>NSB-2X</b>	p.283	☉	☉	☉	☉	☉	☉	☉	☉	☉

Frese in Metallo Duro Solid Carbide End Mill Series

	Microfrese Sferiche "Micro Ball" End Mill <b>NSMB100</b>	p.331	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche per Miniature 2-Flute Miniature Ball End Mill <b>NCB-2</b>	p.333	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche 2-Flute Ball End Mill <b>NSB-2</b>	p.333	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche Lunghe 2-Flute Long Ball End Mill <b>NSBL-2</b>	p.335	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche Extra Lunghe 2-Flute Extra Long Ball End Mill <b>NLBL-2</b>	p.336	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche Scaricate per Nervature 2-Flute Long Neck Ball End Mill <b>NHB-2</b>	p.337	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese Sferiche per Alluminio Ball End Mill for Aluminum <b>ALB225</b>	p.340	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese sferiche per alluminio rivestite DLC DLC-Coating Ball End Mill for Aluminum <b>ALB225-DLC</b>	p.341	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese Sferiche per Resine Ball End Mill for Resin <b>RSB230</b>	p.343	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche per Materiali non Ferrosi 2-Flute Ball End Mill for Nonferrous <b>DB</b>	p.345	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Sferiche Scaricate per Nervature per Materiali Non Ferrosi 2-Flute Long Neck Ball End Mill for Nonferrous <b>DHB</b>	p.346	☉	☉	☉	☉	☉	☉	☉	☉	☉

## Specifiche Specification

## Materiale di lavoro Work Material

**Foto**  
Photo

**Modello**  
Model

**Pagina**  
Page

Acciaio al Carbonio  
Carbon Steels

Acciaio Legato e da utensili  
Alloy Steels - Tool Steels

Acciaio temprato  
Hardened Steels

Acciaio inox  
Stainless Steels

Leghe di Titanio  
Titanium Alloy

Alluminio  
Aluminum

Rame  
Copper



Plastica  
Plastic

## Frese Coniche

## Taper End Mill




Frese serie Rivestimento MUGEN

MUGEN-COATING End Mill Series

	Frese 2 Tagli Coniche 2-Flute Taper End Mill	<b>MTE230</b>	p.349	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli Coniche per Nervature Profonde 4-Flute Taper End Mill for Deep Rib	<b>MRT425</b>	p.355	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉





Frese Serie Rivestimento X-COATING

X-COATING End Mill Series

	Frese 2 Tagli Coniche 2-Flute Taper End Mill	<b>NTE-2X</b>	p.361	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli Coniche 4-Flute Taper End Mill	<b>NTE-4X</b>	p.362	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli Coniche Medie 2-Flute Medium Taper End Mill	<b>NTEM-2X</b>	p.364	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉

Frese in Metallo Duro

Solid Carbide End Mill Series






	Frese 2 Tagli Coniche per Canalini 2-Flute Taper End Mill for Runner	<b>NER-2</b>	p.372	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Coniche 2-Flute Taper End Mill	<b>NTE-2</b>	p.373	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Coniche Medie 2-Flute Medium Taper End Mill	<b>NTEM-2</b>	p.375	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Coniche Lunghe 2-Flute Long Taper End Mill	<b>NTEL-2</b>	p.376	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉

## Frese Coniche

## Taper End Mill

Frese in Metallo Duro Integrale

Solid Carbide End Mill Series


	Frese 4 Tagli Coniche 4-Flute Taper End Mill	<b>NTE-4</b>	p.377	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli Coniche lunghe 4-Flute Long Taper End Mill	<b>NTEL-4</b>	p.379	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli Coniche per Nervature Profonde 4-Flute Taper End Mill for Deep Rib	<b>NRF-4</b>	p.384	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Coniche per Materiali non Ferrosi 2-Flute Taper End Mill for Nonferrous	<b>DTE</b>	p.387	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Coniche per Materiali non Ferrosi 2-Flute Long Taper End Mill for Nonferrous	<b>DTEL</b>	p.389	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉

## Frese Coniche Sferiche

## Taper Ball End Mill



Frese serie Rivestimento MUGEN

MUGEN-COATING End Mill Series

	Frese 2 Tagli Coniche Sferiche 2-Flute Taper Ball End Mill	<b>MTB230</b>	p.359	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
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Frese in Metallo Duro

Solid Carbide End Mill Series



	Frese 2 Tagli Coniche Sferiche 2-Flute Taper Ball End Mill	<b>NTB-2</b>	p.391	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Coniche Sferiche per Canalini 2-Flute Taper Ball End Mill for Runner	<b>NERB-2</b>	p.392	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉

## Frese

## Taper Radius End Mill

Frese serie Rivestimento X-COATING

X-COATING End Mill Series

	Frese 2 Tagli per Canalini 2-Flute Taper Radius End Mill for Runner	<b>NERR-2X</b>	p.366	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli 2-Flute Taper Radius End Mill	<b>NTER-2X</b>	p.368	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉



Specifiche Specification			Materiale di lavoro Work Material									
Foto Photo	Modello Model	Pagina Page	Acciaio al Carbonio Carbon Steels	Acciaio Legato e da utensili Alloy Steels - Tool Steels	Acciaio temprato Hardened Steels	Acciaio inox Stainless Steels	Leghe di Titanio Titanium Alloy	Alluminio Aluminum	Rame Copper	Plastica Plastic		

## Frese Toriche Corner Radius End Mill

Frese serie in CBN CBN End Mill Series

	Frese CBN Toriche "CBN Super Sped Radius" CBN Super Speed Radius End Mill	<b>SSR200</b>	p.69	○	○	◎	◎	◎												
<b>New</b>	Frese Toriche PCD PCD Radius End Mill	<b>PCDRS</b>	p.91	◎	○															
<b>New</b>	Frese toriche CBN "CBN High Efficient Radius" CBN End Mill	<b>SHR320</b>	p.73	○	○	◎	◎	◎												

Frese serie Rivestimento MUGEN PREMIUM MUGEN-COATING PREMIUM End Mill Series

<b>New</b>	Frese Toriche "POWER" Power Radius End Mill	<b>MSXH440R</b>	p.396	◎	◎	◎	◎	◎	◎	◎	○	○	○	○						
	Frese 4 Tagli Toriche per Acciai Temprati 4-Flute Radius End Mill for Hardened Steel	<b>MHDH445R</b>	p.398	◎	◎	◎	◎	◎	○	○	○	○	○	○						
	Frese 6 Tagli Toriche per Acciai Temprati 6-Flute Radius End Mill for Hardened Steel	<b>MHDH645R</b>	p.398	◎	◎	◎	◎	◎	◎	○	○	○	○	○						
	Frese 2 Tagli Toriche scaricate per Nervature per Materiali Temprati 2-Flute Long Neck Radius End Mill for Hardened Steel	<b>MHRH230R</b>	p.400	◎	◎	◎	◎	◎	◎	○	○	○	○	○						
	Frese 4 Tagli Toriche scaricate per Nervature per Materiali Temprati 4-Flute Long Neck Radius End Mill for Hardened Steel	<b>MHRH430R</b>	p.402	◎	◎	◎	◎	◎	◎	○	○	○	○	○						

Frese serie Rivestimento MUGEN MUGEN-COATING End Mill Series

	Frese 2 Tagli Toriche 2-Flute Radius End Mill	<b>MSRS230</b>	p.393	◎	◎	◎	◎		◎	○	○	○	○	○						
	Frese 4 Tagli Toriche 4-Flute Radius End Mill	<b>MSRS430</b>	p.394	◎	◎	◎	◎		◎	○	○	○	○	○						
	Frese 2 Tagli Toriche per Nervature 2-Flute Long Neck Radius End Mill	<b>MHR230R</b>	p.411	◎	◎	◎	◎		◎	○	○	◎	◎							
	Frese 4 Tagli Toriche per Nervature 4-Flute Long Neck Radius End Mill	<b>MHR430R</b>	p.422	◎	◎	◎	◎		◎	○	○	◎	◎							

## Frese Toriche Corner Radius End Mill

Frese serie Rivestimento MUGEN MUGEN-COATING End Mill Series

	Frese 2 Tagli Toriche con Sforno Conico per Nervature 2-Flute Long Taper Neck Radius End Mill	<b>MSTNR230</b>	p.431	◎	◎	◎	◎		◎	○	○	◎	◎							
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Frese serie in Metallo Duro Solid Carbide End Mill Series

	Frese 2 Tagli Toriche 2-Flute Radius End Mill	<b>NSR-2</b>	p.438	◎	◎	◎			◎	◎	◎									
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## Frese Sagomate Formed Cutter

Frese serie Rivestimento MUGEN MUGEN-COATING End Mill Series

	Frese 2 Tagli con Raggio Concavo rivestite MUGEN MUGEN-COATING 2-Flute Inner Radius Cutter	<b>MIR200</b>	p.448	◎	◎	◎	◎		◎	○	○	◎	◎							
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Frese serie Rivestimento X-COATING X-COATING End Mill Series

	Frese 2 Tagli con Raggio Concavo 2-Flute Inner Radius Cutter	<b>NCR-2X</b>	p.450	◎	◎	◎	○		◎	○	○									
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Frese in Metallo Duro Solid Carbide End Mill Series

	Frese 2 Tagli con Raggio Concavo 2-Flute Inner Radius Cutter	<b>NCR-2</b>	p.452	◎	◎	◎			◎	◎	◎									
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Frese in Metallo Duro per Rame, Alluminio e Plastica Cutter Series for Copper Electrode, Aluminum & Plastic

	Frese 2 Tagli con Raggio Concavo per Materiali non Ferrosi 2-Flute Inner Radius Cutter for Nonferrous	<b>DIR</b>	p.454									◎	◎	◎							
	Frese 3 tagli per smussi rivestite MUGEN CHAMPION SOLID 2-Flute Long End Mill	<b>NCSV-M</b>	p.446	◎	◎	◎	○		◎	○	○	○	○	○							
	Frese 3 tagli per smussi CHAMPION SOLID 2-Flute Long Shank End Mill	<b>NCSV</b>	p.446																◎	◎	◎

Specifiche Specification			Materiale di lavoro Work Material									
Foto Photo	Modello Model	Pagina Page	Acciaio al Carbonio Carbon Steels	Acciaio Legato e da utensili Alloy Steels - Tool Steels	Acciaio temprato Hardened Steels	Acciaio inox Stainless Steels	Leghe di Titanio Titanium Alloy	Alluminio Aluminum	Rame Copper	Plastica Plastic		

## Frese Sagomate Formed Cutter

Frese per Microfiletti			MUGEN-COATING End Mill Series									
	Frese per Microfiletti <b>MMTS</b>	Micro Thread Cutting Tool p.440	☉	☉	☉	○		☉	☉	☉	☉	☉
	Frese per filetti metrici M <b>MMTM</b>	M-Thread cutting Tool p.442	☉	☉	☉	○		☉	☉	☉	☉	☉
	Frese per filetti in pollici UNC/UNF <b>MMTU</b>	M-Thread cutting Tool p.444	☉	☉	☉	○		☉	☉	☉	☉	☉

## Punte Drill

Micropunte			Micro Drill									
	Punte piatte rivestite MUGEN <b>MFD</b>	MUGEN-COATING Flat Drill p.470	☉	☉				☉		○		
	Micropunte <b>NSMD</b>	Micro Drill p.456	○	○	○			○	○	○	☉	☉
	Micropunte corte <b>NSMD-S</b>	Micro Drill Short p.457	○	○	○			○	○	○	☉	☉
	Micropunte da Centri <b>NSPD</b>	Micro Point Drill p.458	○	○	○			○	○	☉	☉	☉
Punte serie Rivestimento MUGEN Micro			MUGEN MICRO COATING									
	Micropunte corte rivestite MUGEN Micro <b>NSMD-M</b>	MUGEN Micro Coating Micro Drill p.459	☉	☉	☉			☉	☉	○	○	○
	Micropunte corte rivestite MUGEN Micro <b>NSMD-MS</b>	MUGEN Micro Coating Micro Drill Short p.460	☉	☉	☉			☉	☉	○	○	○
	Micropunte da Centri rivestite MUGEN Micro <b>NSPD-M</b>	MUGEN Micro Coating Micro Point Drill p.461	☉	☉	☉			☉	☉	○	○	○
Punte serie Rivestimento MUGEN			MUGEN-COATING Series									
	Punte per Miniature rivestimento MUGEN <b>MDR-R</b>	MUGEN-COATING Miniature Drill p.463	☉	☉	☉			☉	○	○	○	○
	Punte da Centri e per Fori Guida rivestite MUGEN <b>MDR-PD</b>	Drill for guide hole MUGEN-COATING Point Drill p.466	☉	☉	☉			☉	○	○	○	○
Punte serie Rivestimento MUGEN PREMIUM			MUGEN-COATING PREMIUM Series									
	Punte di Precisione per Acciaio Temprato <b>MSDH</b>	Precision drill for Hardened Steels p.468	☉	☉	☉	☉	☉	○	☉	○	○	○

## Mandrini Chuck

Mandrini ASHINAGA in Metallo Duro			Solid Carbide ASHINAGA CHUCK									
	Mandrini ASHINAGA <b>NPC</b>	ASHINAGA CHUCK p.473	-	-	-	-	-	-	-	-	-	-



Specifiche Specification			Materiale di lavoro Work Material									
Foto Photo	Modello Model	Pagina Page	Acciaio al Carbonio	Acciaio Legato e da utensili	Acciaio temprato	Acciaio inox	Leghe di Titanio	Alluminio	Rame	Plastica		
			Carbon Steels	Alloy Steels - Tool Steels	Hardened Steels	Stainless Steels	Titanium Alloy	Aluminum	Copper	Plastic		
	Frese 2 Tagli LEAD35 rivestite MUGEN PREMIUM	MUGEN-COATING PREMIUM 2-Flute LEAD35 End Mill										
	<b>MXH235</b>	p.95	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 2 Tagli LEAD40 rivestite MUGEN PREMIUM	MUGEN-COATING PREMIUM 2-Flute LEAD40 End Mill										
	<b>MXH240</b>	p.96	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 2 Tagli LEAD45 rivestite MUGEN PREMIUM	MUGEN-COATING PREMIUM 2-Flute LEAD45 End Mill										
	<b>MXH245</b>	p.96	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 2 Tagli LEAD25 con tagliente affilato rivestite MUGEN PREMIUM	MUGEN-COATING PREMIUM 2-Flute Sharp Edge LEAD25 End Mill										
	<b>MXH225P</b>	p.97	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 2 Tagli LEAD30 con tagliente affilato rivestite MUGEN PREMIUM	MUGEN-COATING PREMIUM 2-Flute Sharp Edge LEAD30 End Mill										
	<b>MXH230P</b>	p.98	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 2 Tagli LEAD35 con tagliente affilato rivestite MUGEN PREMIUM	MUGEN-COATING PREMIUM 2-Flute Sharp Edge LEAD35 End Mill										
	<b>MXH235P</b>	p.99	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 4 Tagli Piatte per Acciai Temprati	4-Flute Square End Mill for Hardened Steel										
	<b>MHDH445</b>	p.149	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 6 Tagli Piatte per Acciai Temprati	6-Flute Square End Mill for Hardened Steel										
	<b>MHDH645</b>	p.149	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 2 Tagli Toriche Scaricate per Nervature per Acciai Temprati	2-Flute Long Neck End Mill for Hardened Steel										
	<b>MHRH230</b>	p.160	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 4 Tagli Toriche Scaricate per Nervature per Acciai Temprati	4-Flute Long Neck End Mill for Hardened Steel										
	<b>MHRH430</b>	p.163	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
<b>Frese Sferiche</b>			<b>Ball End Mill</b>									
	Frese 2 Tagli Sferiche per Acciai Temprati	2-Flute Ball End Mill for Hardened Steel										
	<b>MSBH230</b>	p.264	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 3 Tagli Sferiche per Acciai Temprati	3-Flute Ball End Mill for Hardened Steel										
	<b>MSBH345</b>	p.265	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese Sferiche Scaricate serie "HARD" (per acciai temprati)	Long Neck Ball Hard (for Hardened Steel)										
	<b>MRBH230</b>	p.286	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 3 Tagli Coniche Scaricate rivestite MUGEN PREMIUM	MUGEN-COATING PREMIUM 3-Flute Long Taper Neck Ball End Mill										
	<b>MRBTH345</b>	p.312	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
<b>Frese Toriche</b>			<b>Corner Radius End Mill</b>									
	Frese Toriche "Power" Power Radius End Mill											
	<b>MSXH440R</b>	p.396	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 4 Tagli Toriche per Acciai Temprati	4-Flute Radius End Mill for Hardened Steel										
	<b>MHDH445R</b>	p.398	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 6 Tagli Toriche per Acciai Temprati	6-Flute Radius End Mill for Hardened Steel										
	<b>MHDH645R</b>	p.398	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 2 Tagli Toriche Scaricate per Nervature per Acciai Temprati	2-Flute Long Neck Radius End Mill for Hardened Steel										
	<b>MHRH230R</b>	p.400	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese 4 Tagli Toriche Scaricate per Nervature per Acciai Temprati	4-Flute Long Neck Radius End Mill for Hardened Steel										
	<b>MHRH430R</b>	p.402	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese per filetti in pollici UNC/UNF	M-Thread cutting Tool										
	<b>MMTU</b>	p.444	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
<b>Punte</b>			<b>Drill</b>									
	Punte di Precisione per Acciai Temprati	Precision drill for Hardened Steel										
	<b>MSDH</b>	p.468	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
<b>Frese serie Rivestimento MUGEN</b>			<b>MUGEN-COATING Series</b>									
<b>Frese Piane</b>			<b>Square End Mill</b>									
	Frese LEAD25 rivestite MUGEN	MUGEN-COATING LEAD25 End Mill										
	<b>MX225</b>	p.108	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
	Frese LEAD30 rivestite MUGEN	MUGEN-COATING LEAD30 End Mill										
	<b>MX230</b>	p.108	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	

**Specifiche**  
Specification

**Materiale di Lavoro** Work Material

**Foto**  
Photo

**Modello**  
Model

**Pagina**  
Page

Acciaio al Carbonio  
Carbon Steels

Acciaio Legato e da utensili  
Alloy Steels - Tool Steels

Acciaio temprato  
Hardened Steels

Acciaio Inox  
Stainless Steels

Leghe di Titanio  
Titanium Alloy

Alluminio  
Aluminum

Rame  
Copper













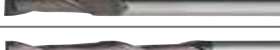
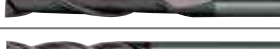








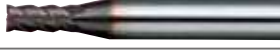



Plastica  
Plastic

**Frese serie Rivestimento MUGEN**

**MUGEN-COATING Series**

Frese Piane

Square End Mill

Foto	Modello	Pagina	Acciaio al Carbonio	Acciaio Legato e da utensili	Acciaio temprato	Acciaio Inox	Leghe di Titanio	Alluminio	Rame	Plastica
	Frese LEAD35 rivestite MUGEN MUGEN-COATING LEAD35 End Mill <b>MX235</b>	p.110	☉	☉	☉	☉	☉	☉	☉	☉
	Frese LEAD40 rivestite MUGEN MUGEN-COATING LEAD40 End Mill <b>MX240</b>	p.111	☉	☉	☉	☉	☉	☉	☉	☉
	Frese LEAD45 rivestite MUGEN MUGEN-COATING LEAD45 End Mill <b>MX245</b>	p.112	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli LEAD25 rivestite MUGEN MUGEN-COATING 4-Flute LEAD25 End Mill <b>MX425</b>	p.118	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli LEAD30 rivestite MUGEN MUGEN-COATING 4-Flute LEAD30 End Mill <b>MX430</b>	p.118	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli LEAD35 rivestite MUGEN MUGEN-COATING 4-Flute LEAD35 End Mill <b>MX435</b>	p.119	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli LEAD40 rivestite MUGEN MUGEN-COATING 4-Flute LEAD40 End Mill <b>MX440</b>	p.119	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli LEAD45 rivestite MUGEN MUGEN-COATING 4-Flute LEAD45 End Mill <b>MX445</b>	p.120	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Extra Corte 2-Flute Super Short End Mill <b>MSE230SS</b>	p.126	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli con Tagliente Affilato 2-Flute Sharp Edge Short End Mill <b>MSE230P</b>	p.127	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli 2-Flute End Mill <b>MSE230</b>	p.127	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli con Diametro Misurato 2-Flute End Mill with measured diameter <b>MSE230M</b>	p.129	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Medie 2-Flute Medium End Mill <b>MSEM230</b>	p.129	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli con Tagliente Affilato 4-Flute Sharp Edge End Mill <b>MSE430P</b>	p.132	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli 4-Flute End Mill <b>MSE430</b>	p.132	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli Medie 4-Flute Medium End Mill <b>MSEM430</b>	p.133	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli 2-Flute End Mill <b>MSE245</b>	p.136	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 3 Tagli 3-Flute End Mill <b>MSE345</b>	p.136	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli 4-Flute End Mill <b>MSE445</b>	p.137	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 3 Tagli Power "Z" 3-Flute Power "Z" End Mill <b>MSZ345</b>	p.144	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli Power 4-Flute Power End Mill <b>MSX440</b>	p.147	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli per Acciai Temprati 4-Flute End Mill for Hardened Steels <b>MHD445</b>	p.149	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 6 Tagli per Acciai Temprati 6-Flute End Mill for Hardened Steels <b>MHD645</b>	p.149	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli per Nervature Profonde 2-Flute End Mill for Deep Rib with Long Neck <b>MHR230</b>	p.170	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 4 Tagli per Nervature Profonde 4-Flute Long Neck End Mill <b>MHR430</b>	p.176	☉	☉	☉	☉	☉	☉	☉	☉
	Frese 2 Tagli Scaricate Lunghe Per Nervature (Gambo dia. 6) 2-Flute Long Neck End Mill (Shank Dia. 6) <b>MHRLN230-6</b>	p.187	☉	☉	☉	☉	☉	☉	☉	☉

I N D I C E P E R S E R I E I N D E X S E R I E S

**Specifiche**  
Specification

**Materiale di lavoro** Work Material

**Foto**  
Photo

**Modello**  
Model

**Pagina**  
Page

Acciaio al Carbonio  
Carbon Steels

Acciaio Legno e da utensili  
Alloy Steels - Tool Steels

Acciaio temprato  
Hardened Steels

Acciaio Inox  
Stainless Steels

Leghe di Titanio  
Titanium Alloy

Alluminio  
Aluminum

Rame  
Copper















Plastica  
Plastic

**Frese serie Rivestimento MUGEN**

**MUGEN-COATING Series**



**Frese Sferiche**

**Ball End Mill**

	Frese 2 Tagli Sferiche con Gambo Corto per Acciai Temprati <b>MACH225SF</b>	p.267	○	○	○	◎	◎	○	○	○	○	○	○	○	○	○	○	○	○
	Frese 2 Tagli per Acciai Temprati <b>MACH225</b>	p.268	○	○	○	◎	◎	○	○	○	○	○	○	○	○	○	○	○	○
	Frese Sferiche di Precisione <b>MSB230G2</b>	p.270	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 2 Tagli Sferiche Corte <b>MSB230S</b>	p.270	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 2 Tagli Sferiche con Gambo Corto <b>MSB230SF</b>	p.271	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 2 Tagli Sferiche <b>MSB230</b>	p.272	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 2 Tagli Sferiche <b>MSBL230</b>	p.274	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 2 Tagli Extra Lunghe <b>MSBXL230</b>	p.279	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 3 Tagli Sferiche <b>MSB345</b>	p.277	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 2 Tagli Sferiche Scaricate per Nervature con Gambo Corto <b>MRB230SF</b>	p.295	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 2 Tagli Sferiche Scaricate per Nervature <b>MRB230</b>	p.299	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 2 Tagli Sferiche Scaricate per Nervature (Gambo Dia. 6) <b>MRBLN230-6</b>	p.311	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 2 Tagli Sferiche Lunghe per Nervature con Sforno Conico <b>MRBTN230</b>	p.316	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 2 Tagli Sferiche Extra Lunghe con Sforno Conico <b>MRBTN230L</b>	p.325	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎


**Frese Coniche**

**Taper End Mill**

	Frese 2 Tagli Coniche <b>MTE230</b>	p.349	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 4 Tagli Coniche per Nervature Profonde <b>MRT425</b>	p.355	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎






**Frese Coniche Sferiche**

**Taper Ball End Mill**

	Frese 2 Tagli Coniche Sferiche <b>MTB230</b>	p.359	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
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**Frese Toriche**

**Corner Radius End Mill**

	Frese 2 Tagli Toriche <b>MSRS230</b>	p.393	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 4 Tagli Toriche <b>MSRS430</b>	p.394	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 2 Tagli Toriche per Nervature <b>MHR230R</b>	p.411	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 4 Tagli Toriche per Nervature <b>MHR430R</b>	p.422	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Frese 2 Tagli Toriche con Sforno Conico per Nervature <b>MSTNR230</b>	p.431	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

**Frese con Raggio Concavo**



**Inner Radius Cutter**

	Frese 2 Tagli con Raggio Concavo <b>MIR200</b>	p.448	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
---	---	-------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---



Specifiche Specification			Materiale di Lavoro Work Material									
Foto Photo	Modello Model	Pagina Page	Acciaio al Carbonio Carbon Steels	Acciaio Legato e da utensili Alloy Steels - Tool Steels	Acciaio temprato Hardened Steels	Acciaio inossidabile Stainless Steels	Leghe di Titanio Titanium Alloy	Alluminio Aluminum	Rame Copper	Plastica Plastic		

### Frese serie Rivestimento MUGEN MUGEN-COATING Series

Frese per Microfiletti Micro Thread Cutting Tool


	Frese per Microfiletti Micro Thread Cutting Tool	<b>MMTS</b>	p.440	☉	☉	☉	○	☉	☉	○	○	○	○
	Frese per filetti metrici M M-Thread cutting Tool	<b>MMTM</b>	p.442	☉	☉	☉	○	☉	☉	○	○	○	○

Punte Drill

	Punte per Miniature Rivestite MUGEN MUGEN-COATING Miniature Drill	<b>MDR-R</b>	p.463	☉	☉	☉	○	○	○	○	○	○	○
	Punte da Centri e per Fori Guida rivestite MUGEN Drill for guide hole MUGEN-COATING Point Drill	<b>MDR-PD</b>	p.466	☉	☉	☉	○	☉	○	○	○	○	○



### Serie Rivestimento DIAMANTE DIAMOND COATING Series

Frese Piane Square End Mill



	Frese 2 Tagli Piane rivestite DIAMANTE DIAMOND COATING 2-Flute Square End Mill	<b>DCSE235</b>	p.154	☉	○	○	○	○	○	○	○	○	○
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### Serie Rivestimento DIAMANTE DIAMOND COATING Series

Frese per Materiali Duri e Fragili End Mill for Hard Brittle Materials


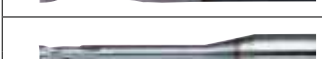
	Frese per Materiali Duri e Fragili End Mill for Hard Brittle Materials	<b>DCMS</b>	p.156	☉	☉	☉	○	○	○	○	○	○	○
	Frese 2 Tagli Lunghe Rivestite DIAMANTE DIAMOND COATING Long Neck Square End Mill	<b>DCHR230</b>	p.188	☉	○	○	○	○	○	○	○	○	○

Frese Sferiche Ball End Mill



	Frese Sferiche Scaricate Rivestite DIAMANTE DIAMOND COATING Long Neck Ball End Mill	<b>DCRB230</b>	p.329	☉	○	○	○	○	○	○	○	○	○
	Frese Sferiche per materiali duri e fragili Ball End Mill for Hard Brittle Materials	<b>DCMB</b>	p.280	☉	○	○	○	○	○	○	○	○	○

### Frese serie Rivestimento X-COATING X-COATING End Mill Series




Frese Piane Square End Mill

	Frese 2 Tagli 2-Flute End Mill	<b>NX-30X</b>	p.158	☉	☉	☉	○	○	○	○	○	○	○
	Frese 2 Tagli Scaricate per Nervature 2-Flute End Mill for Deep Rib with Long Neck	<b>NHR-2X</b>	p.190	☉	☉	☉	○	○	○	○	○	○	○

Frese Sferiche Ball End Mill

	Frese 2 Tagli Sferiche per Miniature 2-Flute Miniature Ball End Mill	<b>NCB-2X</b>	p.282	☉	☉	○	○	○	○	○	○	○	○
	Frese 2 Tagli Sferiche 2-Flute Ball End Mill	<b>NSB-2X</b>	p.283	☉	☉	○	○	○	○	○	○	○	○

Frese Coniche Taper End Mill




	Frese 2 Tagli Coniche 2-Flute Taper End Mill	<b>NTE-2X</b>	p.361	☉	☉	☉	○	○	○	○	○	○	○
	Frese 4 Tagli Coniche 4-Flute Taper End Mill	<b>NTE-4X</b>	p.362	☉	☉	☉	○	○	○	○	○	○	○
	Frese 2 Tagli Coniche Medie 2-Flute Medium Taper End Mill	<b>NTEM-2X</b>	p.364	☉	☉	☉	○	○	○	○	○	○	○

**Specifiche**  
Specification



















**Materiale di lavoro** Work Material

<b>Foto</b> Photo	<b>Modello</b> Model	<b>Pagina</b> Page	<b>Acciaio al Carbonio</b> Carbon Steels	<b>Acciaio Legno e da utensili</b> Austenitic Steels - Tool Steels	<b>Acciaio pretemperato</b> Prehardened Steels	<b>Acciaio Temprato</b> Hardened Steels	<b>Acciaio Inox</b> Stainless Steels	<b>Leghe di Titanio</b> Titanium Alloy	<b>Alluminio</b> Aluminum	<b>Rame</b> Copper	<b>Plastica</b> Plastic
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**Frese serie Rivestimento X-COATING X-COATING End Mill Series**

<b>Frese Coniche Toriche</b> Taper Radius End Mill											
	Frese 2 Tagli Coniche Toriche per Canalini 2-Flute Taper Radius End Mill for Runner										
	<b>NERR-2X</b>	p.366	☉	☉	☉	○	○	○	○	○	○
	Frese 2 Tagli Coniche Toriche 2-Flute Taper Radius End Mill										
	<b>NTER-2X</b>	p.368	☉	☉	☉	○	○	○	○	○	○
<b>Frese con Raggio Concavo</b> Inner Radius Cutter											
	Frese 2 Tagli con Raggio Concavo 2-Flute Inner Radius Cutter										
	<b>NCR-2X</b>	p.450	☉	☉	☉	○	○	○	○	○	○

**Frese serie in Metallo Duro Solid Carbide End Mill Series**

<b>Frese Piane</b> Square End Mill											
	Microfrese Sferiche "MICRO EDGE" Micro End Mill "MICRO EDGE"										
	<b>NSME100</b>	p.192	☉	☉	☉	○	○	○	○	○	○
	iMicrofrese Sferiche "MICRO EDGE" Micro End Mill "MICRO EDGE"										
	<b>NSME230</b>	p.192	☉	☉	☉	○	○	○	○	○	○
	Frese LEAD25 LEAD 25 End Mill										
	<b>NX-25</b>	p.193	☉	☉	☉	○	○	○	○	○	○
	Frese LEAD30 LEAD 30 End Mill										
	<b>NX-30</b>	p.195	☉	☉	☉	○	○	○	○	○	○
	Frese LEAD35 LEAD 35 End Mill										
	<b>NX-35</b>	p.197	☉	☉	☉	○	○	○	○	○	○
	Frese LEAD40 LEAD 40 End Mill										
	<b>NX-40</b>	p.199	☉	☉	☉	○	○	○	○	○	○
	Frese LEAD45 LEAD 45 End Mill										
	<b>NX-45</b>	p.201	☉	☉	☉	○	○	○	○	○	○
	Frese 2 Tagli CHAMPION SOLID CHAMPION SOLID 2-Flute End Mill										
	<b>NC-2</b>	p.208	☉	☉	☉	○	○	○	○	○	○
	Frese 2 Tagli Medie CHAMPION SOLID CHAMPION SOLID 2-Flute Medium End Mill										
	<b>NCM-2</b>	p.209	☉	☉	☉	○	○	○	○	○	○
	Frese 2 Tagli Lunghe CHAMPION SOLID CHAMPION SOLID 2-Flute Long End Mill										
	<b>NCL-2</b>	p.210	☉	☉	☉	○	○	○	○	○	○
	Frese 2 Tagli Gambo Lungo CHAMPION SOLID CHAMPION SOLID 2-Flute Long Shank End Mill										
	<b>NC-LS-2</b>	p.210	☉	☉	☉	○	○	○	○	○	○
	Frese 4 Tagli CHAMPION SOLID CHAMPION SOLID 4-Flute End Mill										
	<b>NC-4</b>	p.214	☉	☉	☉	○	○	○	○	○	○
	Frese 4 Tagli Medie CHAMPION SOLID CHAMPION SOLID 4-Flute Medium End Mill										
	<b>NCM-4</b>	p.216	☉	☉	☉	○	○	○	○	○	○
	Frese 4 Tagli Lunghe CHAMPION SOLID CHAMPION SOLID 4-Flute Long End Mill										
	<b>NCL-4</b>	p.216	☉	☉	☉	○	○	○	○	○	○
	Frese 2 Tagli POWER SOLID POWER SOLID 2-Flute End Mill										
	<b>NE-2</b>	p.220	☉	☉	☉	○	○	○	○	○	○
	Frese 3 Tagli POWER SOLID POWER SOLID 3-Flute End Mill										
	<b>NE-3</b>	p.220	☉	☉	☉	○	○	○	○	○	○
	Frese 4 Tagli POWER SOLID POWER SOLID 4-Flute End Mill										
	<b>NE-4</b>	p.221	☉	☉	☉	○	○	○	○	○	○
	Frese 3 Tagli Lunghe POWER SOLID POWER SOLID 3-Flute Long End Mill										
	<b>NEL-3</b>	p.221	☉	☉	☉	○	○	○	○	○	○



**Specifiche**  
Specification

**Materiale di Lavoro** Work Material

**Foto**  
Photo

**Modello**  
Model

**Pagina**  
Page

Acciaio al Carbonio  
Carbon Steels

Acciaio Legato e da utensili  
Alloy Steels - Tool Steels

Acciaio preformato  
Prehardened Steels

Acciaio Temprato  
Hardened Steels

Acciaio Inox  
Stainless Steels

Leghe di Titanio  
Titanium Alloy

Alluminio  
Aluminum

Rame  
Copper



Plastica  
Plastic

**Frese serie in Metallo Duro**

**Solid Carbide End Mill Series**

**Frese Piane**

Square End Mill

	Frese Tagli Diritti per Profilatura Straight End Mill for Reforming																			
<b>NSL-2</b>	p.225	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Frese 2 Tagli Scaricate per Nervature 2-Flute Long Neck End Mill																			
<b>NHR-2</b>	p.260	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>







**Frese Sferiche**

Ball End Mill

	Microfrese Sferiche "Micro Ball" End Mill																			
<b>NSMB100</b>	p.331	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 2 Tagli Sferiche per Miniature 2-Flute Miniature Ball End Mill																			
<b>NCB-2</b>	p.333	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 2 Tagli Sferiche 2-Flute Ball End Mill																			
<b>NSB-2</b>	p.333	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 2 Tagli Sferiche Lunghe 2-Flute Long Ball End Mill																			
<b>NSBL-2</b>	p.335	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 2 Tagli Sferiche Extra Lunghe 2-Flute Extra Long Ball End Mill																			
<b>NLBL-2</b>	p.336	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 2 Tagli Sferiche Scaricate per Nervature 2-Flute Long Neck Ball End Mill																			
<b>NHB-2</b>	p.337	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



**Frese Coniche**

Taper End Mill

	Frese 2 Tagli Coniche per Canalini 2-Flute Taper End Mill for Runner																			
<b>NER-2</b>	p.372	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 2 Tagli Coniche 2-Flute Taper End Mill																			
<b>NTE-2</b>	p.373	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 2 Tagli Coniche Medie 2-Flute Medium Taper End Mill																			
<b>NTEM-2</b>	p.375	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 2 Tagli Coniche Lunghe 2-Flute Long Taper End Mill																			
<b>NTEL-2</b>	p.376	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 4 Tagli Coniche 4-Flute Taper End Mill																			
<b>NTE-4</b>	p.377	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 4 Tagli Coniche Lunghe 4-Flute Long Taper End Mill																			
<b>NTEL-4</b>	p.379	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 4 Tagli Coniche per Nervature Profonde 4-Flute Taper End Mill for Deep Rib																			
<b>NRF-4</b>	p.384	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



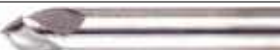
**Frese Coniche Sferiche**

Taper Ball End Mill

	Frese 2 Tagli Coniche Sferiche 2-Flute Taper Ball End Mill																			
<b>NTB-2</b>	p.391	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 2 Tagli Coniche Sferiche per Canalini 2-Flute Taper Ball End Mill for Runner																			
<b>NERB-2</b>	p.392	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>


**Frese Toriche**

Corner Radius End Mill

	Frese 2 Tagli Toriche 2-Flute Radius End Mill																			
<b>NSR-2</b>	p.438	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 3 Tagli per smussi rivestite MUGEN CHAMPION SOLID 2-Flute Long End Mill																			
<b>NCSV-M</b>	p.446	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Frese 3 Tagli per smussi CHAMPION SOLID 2-Flute Long Shank End Mill																			
<b>NCSV</b>	p.446	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**Frese con Raggio Concavo**

Inner Radius Cutter

	Frese 2 Tagli con Raggio Concavo 2-Flute Inner Radius Cutter																			
<b>NCR-2</b>	p.452	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

New

New

I N D I C E P E R S E R I E I N D E X S E R I E S

**Specifiche**  
Specification

**Materiale di lavoro** Work Material









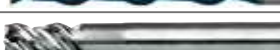

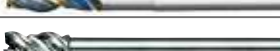

<b>Foto</b> Photo	<b>Modello</b> Model	<b>Pagina</b> Page	Acciaio al Carbonio Carbon Steels	Acciaio Legato e da utensili Alloy Steels - Tool Steels	Acciaio temprato Hardened Steels	Acciaio pretemperato Prehardened Steels	Acciaio Inox Stainless Steels	Leghe di Titanio Titanium Alloy	Alluminio Aluminum	Rame Copper	Plastica Plastic
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**Frese per Alluminio**

**End Mill for Aluminum**



**Frese Piane**

**Square End Mill**

	Frese 2 Tagli per Alluminio 2-Flute End Mill for Aluminum <b>AL2D-2</b> p.233										☉	○	○
	Frese 2 Tagli Medie per Alluminio 2-Flute Medium End Mill for Aluminum <b>AL3D-2</b> p.234										☉	○	○
<b>New</b> 	Frese 2 Tagli piane medie per alluminio 2-Flute Medium End Mill for Aluminum <b>AL4D-2</b> p.234										☉	○	○
	Frese 2 Tagli Lunghe per Alluminio 2-Flute Long End Mill for Aluminum <b>AL5D-2</b> p.235										☉	○	○
<b>New</b> 	Frese 2 Tagli piane per alluminio rivestite DLC DLC-COATING 2-Flute End Mill for Aluminum <b>AL2D-2DLC</b> p.235										☉	○	○
	Frese 2 Tagli per Alluminio rivestite DLC Diamante DLC-COATING 2-Flute End Mill for Aluminum <b>AL3D-2DLC</b> p.236										☉	○	○
<b>New</b> 	Frese 2 Tagli piane medie per alluminio rivestite DLC DLC-COATING 2-Flute Medium End Mill for Aluminum <b>AL4D-2DLC</b> p.236										☉	○	○
<b>New</b> 	Frese 2 Tagli piane lunghe per alluminio rivestite DLC DLC-COATING 2-Flute Long End Mill for Aluminum <b>AL5D-2DLC</b> p.237										☉	○	○
	Frese 3 Tagli Foranti per Alluminio Power "Z" 3-Flute Power "Z" End Mill for Aluminum <b>ALZ345</b> p.238										☉	○	○
<b>New</b> 	Frese 3 Tagli piane foranti per alluminio "POWER Z" rivestite DLC DLC-Coating 3-Flute Power "Z" End Mill for Aluminum <b>ALZ345-DLC</b> p.242										☉	○	○
	Frese 3 Tagli per Alluminio Gambo Lungo 3-Flute Long Shank End Mill for Aluminum <b>AL-3LS</b> p.243										☉		
	Frese 2 Tagli per Alluminio 2-Flute End Mill for Aluminum <b>NEA-2</b> p.243										☉	☉	

**Frese Sferiche**

**Ball End Mill**



	Frese Sferiche per Alluminio Ball End Mill for Aluminum <b>ALB225</b> p.340										☉		○
<b>New</b> 	Frese sferiche per alluminio rivestite DLC DLC-Coating Ball End Mill for Aluminum <b>ALB225-DLC</b> p.341										☉		○

**Frese per Resine**

**End Mill for Resin**


**Frese Piane**

**Square End Mill**

<b>New</b> 	Frese Taglienti Corti per Resine Short Flute End Mill for Resin <b>RSE230</b> p.251										☉	☉	☉
	Frese per Resine End Mill for Resin <b>RSE230</b> p.256										☉	☉	☉

**Frese Sferiche**

**Ball End Mill**




	Frese Sferiche per Resine Ball End Mill for Resin <b>RSB230</b> p.343										☉	☉	☉
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**Frese per Elettrodi di Rame, Alluminio e Plastica**

**Cutter Series for Copper Electrode, Aluminum & Plastic**

**Frese Piane**

**Square End Mill**

	Frese 2 Tagli per Materiali non Ferrosi 2-Flute End Mill for Nonferrous <b>DX</b> p.225										☉	☉	☉
	Frese 2 Tagli Medie per Materiali non Ferrosi 2-Flute Medium End Mill for Nonferrous <b>DXM</b> p.227										☉	☉	☉
	Frese 2 Tagli Lunghe per Materiali non Ferrosi 2-Flute Long End Mill for Nonferrous <b>DXL</b> p.227										☉	☉	☉



Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>Ø 0.1</b>				
MXH225	0.1	0.1	45	93
MXH230	0.1	0.2	45	94
MXH235	0.1	0.3	45	95
MXH225P	0.1	0.1	45	97
MXH230P	0.1	0.2	45	98
MXH235P	0.1	0.3	45	99
MX230	0.1	0.2	45	108
MX235	0.1	0.3	45	110
MSE230SS	0.1	0.1	45	126
MSES230P	0.1	0.15	45	127
MSE230	0.1	0.15	45	127
MSE230M	0.1	0.15	45	129
RSES230	0.1	0.15	50	251
RSE230	0.1	0.3	45	256
PCDSE	0.1x0.1	0.02	45	87
SSE400	0.1x0.2	0.2	53	60
MHRH230	0.1x0.3	0.08	45	160
MHR230	0.1x0.3	0.15	45	170
RSES230	0.1x0.3	0.15	50	251
SSE400	0.1x0.5	0.5	53	60
MHRH230	0.1x0.5	0.08	45	160
MHR230	0.1x0.5	0.15	45	170
RSES230	0.1x0.5	0.15	50	251
MHRH230	0.1x0.75	0.08	45	160
MHR230	0.1x0.75	0.15	45	170
RSES230	0.1x0.8	0.15	50	251
RSE230	0.1x0.8	0.3	45	256
MHRH230	0.1x1	0.08	45	160
MHR230	0.1x1	0.15	45	170
RSES230	0.1x1	0.15	50	251
RSE230	0.1x1	0.3	45	256
<b>Ø 0.15</b>				
MSE230SS	0.15	0.15	45	126
MSES230P	0.15	0.2	45	127
MSE230	0.15	0.2	45	127
RSES230	0.15	0.23	50	251
RSE230	0.15	0.45	45	256
MHRH230	0.15x0.3	0.12	45	160
MHR230	0.15x0.3	0.2	45	170
MHRH230	0.15x0.5	0.12	45	160
MHR230	0.15x0.5	0.2	45	170
RSES230	0.15x0.5	0.23	50	251
MHRH230	0.15x0.75	0.12	45	160
MHR230	0.15x0.75	0.2	45	170
RSES230	0.15x0.8	0.23	50	251
MHRH230	0.15x1	0.12	45	160
MHR230	0.15x1	0.2	45	170
RSES230	0.15x1	0.23	50	251
RSE230	0.15x1	0.45	45	256
MHRH230	0.15x1.5	0.12	45	160
MHR230	0.15x1.5	0.2	45	170
RSES230	0.15x1.5	0.23	50	251
RSE230	0.15x1.5	0.45	45	256
<b>Ø 0.2</b>				
MXH225	0.2	0.2	45	93
MXH230	0.2	0.4	45	94
MXH235	0.2	0.6	45	95
MXH225P	0.2	0.2	45	97
MXH230P	0.2	0.4	45	98
MXH235P	0.2	0.6	45	99
MX230	0.2	0.4	45	108
MX235	0.2	0.6	45	110
MSE230SS	0.2	0.2	45	126
MSES230P	0.2	0.3	45	127
MSE230	0.2	0.4	45	127
MSE230M	0.2	0.4	45	129
RSE230	0.2	0.6	45	256

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
RSE230	0.2	1	45	256
RSES230	0.2	0.3	50	251
PCDSE	0.2x0.2	0.04	45	87
SSE600	0.2x0.4	0.08	53	60
MHRH230	0.2x0.5	0.15	45	160
MHR230	0.2x0.5	0.3	45	170
RSES230	0.2x0.6	0.3	50	251
MHRH230	0.2x0.75	0.15	45	160
MHR230	0.2x0.75	0.3	45	170
SSE600	0.2x1	0.08	53	60
MHRH230	0.2x1	0.15	45	160
MHR230	0.2x1	0.3	45	170
RSES230	0.2x1	0.3	50	251
RSE230	0.2x1	0.6	45	256
MHRH230	0.2x1.5	0.15	45	160
MHR230	0.2x1.5	0.3	45	170
RSES230	0.2x1.5	0.3	50	251
RSE230	0.2x1.5	0.6	45	256
MHRH230	0.2x2	0.15	45	160
MHR230	0.2x2	0.3	45	170
RSES230	0.2x2	0.3	50	251
RSE230	0.2x2	0.6	45	256
MHRH230	0.2x2.5	0.15	45	160
MHR230	0.2x2.5	0.3	45	170
RSES230	0.2x2.5	0.3	50	251
MHRH230	0.2x3	0.15	45	160
MHR230	0.2x3	0.3	45	170
RSES230	0.2x3	0.3	50	251
MHR230	0.2x3.5	0.3	45	170
RSES230	0.2x3.5	0.3	50	251
MHR230	0.2x4	0.3	45	170
RSES230	0.2x4	0.3	50	251
<b>Ø 0.25</b>				
MSES230P	0.25	0.3	45	127
MSE230	0.25	0.5	45	127
<b>Ø 0.3</b>				
MXH225	0.3	0.3	45	93
MXH230	0.3	0.6	45	94
MXH235	0.3	0.9	45	95
MXH240	0.3	1.2	45	96
MXH245	0.3	1.5	45	96
MXH225P	0.3	0.3	45	97
MXH230P	0.3	0.6	45	98
MXH235P	0.3	0.9	45	99
MX225	0.3	0.3	45	108
MX230	0.3	0.6	45	108
MX235	0.3	0.9	45	110
MX240	0.3	1.2	45	111
MX245	0.3	1.5	45	112
MSE230SS	0.3	0.3	45	126
MSES230P	0.3	0.4	45	127
MSE230	0.3	0.6	45	127
MSE230M	0.3	0.6	45	129
RSES230	0.3	0.45	50	251
RSE230	0.3	0.9	45	256
RSE230	0.3	1.5	45	256
RSE230	0.3	2	45	256
PCDSE	0.3x0.3	0.06	45	87
SSE600	0.3x0.5	0.12	49	60
DCMS	0.3x0.6	0.15	45	156
MHRH230	0.3x1	0.25	45	160
MHR230	0.3x1	0.4	45	170
RSES230	0.3x1	0.45	50	251
DCMS	0.3x1.2	0.15	45	156
SSE600	0.3x1.5	0.12	50	60
MHRH230	0.3x1.5	0.25	45	160
MHR230	0.3x1.5	0.4	45	170
RSES230	0.3x1.5	0.45	50	251

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
RSE230	0.3x1.5	0.9	45	256
MHRH230	0.3x2	0.25	45	160
MHR230	0.3x2	0.4	45	170
RSES230	0.3x2	0.45	50	251
RSE230	0.3x2	0.9	45	256
MHRH230	0.3x2.5	0.25	45	160
MHR230	0.3x2.5	0.4	45	170
RSES230	0.3x2.5	0.45	50	251
RSE230	0.3x2.5	0.9	45	256
MHRH230	0.3x3	0.25	45	160
MHR230	0.3x3	0.4	45	170
MHRLN230-6	0.3x3	0.4	60	187
RSES230	0.3x3	0.45	50	251
RSE230	0.3x3	0.9	45	256
MHR230	0.3x4	0.4	45	170
RSES230	0.3x4	0.45	50	251
MHR230	0.3x5	0.4	45	170
RSES230	0.3x5	0.45	50	251
MHR230	0.3x6	0.4	45	170
RSES230	0.3x6	0.45	50	251
MHR230	0.3x9	0.4	45	170
RSES230	0.3x9	0.45	50	251
<b>Ø 0.35</b>				
MSES230P	0.35	0.4	45	127
MSE230	0.35	0.7	45	127
<b>Ø 0.4</b>				
MXH225	0.4	0.4	45	93
MXH230	0.4	0.8	45	94
MXH235	0.4	1.2	45	95
MXH240	0.4	1.6	45	96
MXH245	0.4	2	45	96
MXH225P	0.4	0.4	45	97
MXH230P	0.4	0.8	45	98
MXH235P	0.4	1.2	45	99
MX225	0.4	0.4	45	108
MX230	0.4	0.8	45	108
MX235	0.4	1.2	45	110
MX240	0.4	1.6	45	111
MX245	0.4	2	45	112
MSE230SS	0.4	0.4	45	126
MSES230P	0.4	0.6	45	127
MSE230	0.4	0.8	45	127
MSE230M	0.4	0.8	45	129
RSES230	0.4	0.6	60	251
RSE230	0.4	1.2	45	256
RSE230	0.4	2	45	256
RSE230	0.4	3	45	256
PCDSE	0.4x0.4	0.08	45	87
DCMS	0.4x0.8	0.2	45	156
SSE600	0.4x0.8	0.16	49	60
MHRH230	0.4x1	0.3	45	160
MHR230	0.4x1	0.6	45	170
MHRH230	0.4x1.5	0.3	45	160
MHR230	0.4x1.5	0.6	45	170
RSES230	0.4x1.5	0.6	60	251
DCMS	0.4x1.6	0.2	45	156
MHRH230	0.4x2	0.3	45	160
MHR230	0.4x2	0.6	45	170
RSES230	0.4x2	0.6	60	251
RSE230	0.4x2	1.2	45	256
SSE600	0.4x2	0.16	50	60
MHRH230	0.4x2.5	0.3	45	160
MHR230	0.4x2.5	0.6	45	170
RSES230	0.4x2.5	0.6	60	251
RSE230	0.4x2.5	1.2	45	256
MHRH230	0.4x3	0.3	45	160
MHR230	0.4x3	0.6	45	170
MHRLN230-6	0.4x3	0.6	60	187

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
RSES230	0.4x3	0.6	60	251
RSE230	0.4x3	1.2	45	256
MHRH230	0.4x3.5	0.3	45	160
MHR230	0.4x3.5	0.6	45	170
RSES230	0.4x3.5	0.6	60	251
MHRH230	0.4x4	0.3	45	160
MHR230	0.4x4	0.6	45	170
MHRLN230-6	0.4x4	0.6	60	187
RSES230	0.4x4	0.6	60	251
RSE230	0.4x4	1.2	45	256
MHRH230	0.4x5	0.3	45	160
MHR230	0.4x5	0.6	45	170
MHRLN230-6	0.4x5	0.6	60	187
RSE230	0.4x5	1.2	45	256
MHRH230	0.4x6	0.3	45	160
MHR230	0.4x6	0.6	45	170
RSES230	0.4x6	0.6	60	251
MHR230	0.4x7	0.6	45	170
MHRH230	0.4x8	0.3	45	160
MHR230	0.4x8	0.6	45	170
RSES230	0.4x8	0.6	60	251
MHR230	0.4x9	0.6	45	170
MHRH230	0.4x10	0.3	45	160
MHR230	0.4x10	0.6	45	170
RSES230	0.4x10	0.6	60	251
MHR230	0.4x12	0.6	45	170
RSES230	0.4x12	0.6	60	251
<b>Ø 0.45</b>				
MSES230P	0.45	0.6	45	127
MSE230	0.45	0.9	45	127
<b>Ø 0.5</b>				
MXH225	0.5	0.5	45	93
MXH230	0.5	1	45	94
MXH235	0.5	1.5	45	95
MXH240	0.5	2	45	96
MXH245	0.5	2.5	45	96
MXH225P	0.5	0.5	45	97
MXH230P	0.5	1	45	98
MXH235P	0.5	1.5	45	99
MX225	0.5	0.5	45	108
MX230	0.5	1	45	108
MX235	0.5	1.5	45	110
MX240	0.5	2	45	111
MX245	0.5	2.5	45	112
MSE230SS	0.5	0.5	45	126
MSES230P	0.5	0.7	45	127
MSE230	0.5	1.25	45	127
MSE230M	0.5	1.25	45	129
MSEM230	0.5	2	50	129
NX-25	0.5	0.5	40	193
NX-30	0.5	1	40	195
NX-35	0.5	1.5	40	197
NX-40	0.5	2	40	199
NX-45	0.5	2.5	40	201
NC-2	0.5	1	35	208
NCM-2	0.5	1.5	35	209
DCSE235	0.5	1.5	45	154
DX	0.5	1	45	225
AL2D-2	0.5	1	45	233
AL2D-2DLC	0.5	1	45	235
RSES230	0.5	0.75	60	251
RSE230	0.5	1.5	45	256
RSE230	0.5	2.5	45	256
RSE230	0.5	5	45	256
PCDSE	0.5x0.5	0.1	45	87
SSE600	0.5x1	0.2	49	60
DCMS	0.5x1	0.25	45	156
MHRH230	0.5x1	0.4	45	160

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MHR230	0.5x1	0.7	45	170
MHRH230	0.5x1.5	0.4	45	160
MHR230	0.5x1.5	0.7	45	170
DCMS	0.5x2	0.25	45	156
MHRH230	0.5x2	0.4	45	160
MHR230	0.5x2	0.7	45	170
NHR-2X	0.5x2	0.7	35	190
NHR-2	0.5x2	0.7	35	260
RSES230	0.5x2	0.75	60	251
DCHR230	0.5x2	1	45	188
SSE600	0.5x2.5	0.2	50	60
MHRH230	0.5x2.5	0.4	45	160
MHR230	0.5x2.5	0.7	45	170
MHRH230	0.5x3	0.4	45	160
MHR230	0.5x3	0.7	45	170
RSES230	0.5x3	0.75	60	251
RSE230	0.5x3	1.5	45	256
MHRH230	0.5x3.5	0.4	45	160
MHR230	0.5x3.5	0.7	45	170
MHRH230	0.5x4	0.4	45	160
MHR230	0.5x4	0.7	45	170
MHRLN230-6	0.5x4	0.7	60	187
NHR-2X	0.5x4	0.7	35	190
NHR-2	0.5x4	0.7	35	260
RSES230	0.5x4	0.75	60	251
RSE230	0.5x4	1.5	45	256
DCHR230	0.5x4	1	45	188
MHRH230	0.5x4.5	0.4	45	160
MHR230	0.5x4.5	0.7	45	170
MHRH230	0.5x5	0.4	45	160
MHR230	0.5x5	0.7	45	170
MHRLN230-6	0.5x5	0.7	60	187
MHRH230	0.5x6	0.4	45	160
MHR230	0.5x6	0.7	45	170
MHRLN230-6	0.5x6	0.7	60	187
NHR-2X	0.5x6	0.7	35	190
NHR-2	0.5x6	0.7	35	260
RSES230	0.5x6	0.75	60	251
RSE230	0.5x6	1.5	45	256
DCHR230	0.5x6	1	45	188
MHRH230	0.5x7	0.4	45	160
MHR230	0.5x7	0.7	45	170
MHRH230	0.5x8	0.4	50	160
MHR230	0.5x8	0.7	50	170
RSES230	0.5x8	0.75	60	251
RSE230	0.5x8	1.5	50	256
MHRH230	0.5x9	0.4	50	160
MHR230	0.5x9	0.7	50	170
MHRH230	0.5x10	0.4	50	160
MHR230	0.5x10	0.7	50	170
RSES230	0.5x10	0.75	60	251
RSE230	0.5x10	1.5	50	256
MHR230	0.5x12	0.7	50	170
RSES230	0.5x12	0.75	60	251
RSE230	0.5x12	1.5	50	256
MHR230	0.5x15	0.7	50	170
RSES230	0.5x15	0.75	60	251
RSE230	0.5x15	1.5	50	256
RSES230	0.5x18	0.75	60	251
RSES230	0.5x20	0.75	60	251
RSE230	0.5x20	1.5	60	256
<b>Ø 0.55</b>				
MSE230	0.55	1.3	45	127
<b>Ø 0.6</b>				
MXH225	0.6	0.6	45	93
MXH230	0.6	1.2	45	94
MXH235	0.6	1.8	45	95
MXH225P	0.6	0.6	45	97

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MXH230P	0.6	1.2	45	98
MXH235P	0.6	1.8	45	99
MX230	0.6	1.2	45	108
MX235	0.6	1.8	45	110
MX240	0.6	2.4	45	111
MSE230SS	0.6	0.6	45	116
MSES230P	0.6	1	45	127
MSE230	0.6	1.5	45	127
MSEM230	0.6	2.4	50	129
NX-25	0.6	0.6	40	193
NX-30	0.6	1.2	40	195
NX-35	0.6	1.8	40	197
NX-40	0.6	2.4	40	199
NX-45	0.6	3	40	201
NC-2	0.6	1.2	35	208
NCM-2	0.6	1.8	35	209
AL2D-2	0.6	1.2	45	233
AL2D-2DLC	0.6	1.2	45	235
RSES230	0.6	0.9	60	251
RSE230	0.6	1.8	45	256
RSE230	0.6	3	45	256
RSE230	0.6	4	45	256
PCDSE	0.6x0.6	0.12	45	87
SSE600	0.6x1.2	0.24	49	60
MHRH230	0.6x1.5	0.5	45	160
MHR230	0.6x1.5	0.9	45	170
MHRH230	0.6x2	0.5	45	160
MHR230	0.6x2	0.9	45	170
NHR-2X	0.6x2	0.9	35	190
NHR-2	0.6x2	0.9	35	260
SSE600	0.6x3	0.24	50	60
MHRH230	0.6x3	0.5	45	160
MHR230	0.6x3	0.9	45	170
RSES230	0.6x3	0.9	60	251
MHRH230	0.6x4	0.5	45	160
MHR230	0.6x4	0.9	45	170
MHRLN230-6	0.6x4	0.9	60	187
NHR-2X	0.6x4	0.9	35	190
NHR-2	0.6x4	0.9	35	260
RSES230	0.6x4	0.9	60	251
RSE230	0.6x4	1.8	45	256
MHRH230	0.6x5	0.5	45	160
MHR230	0.6x5	0.9	45	170
MHRH230	0.6x6	0.5	45	160
MHR230	0.6x6	0.9	45	170
MHRLN230-6	0.6x6	0.9	60	187
NHR-2X	0.6x6	0.9	35	190
RSES230	0.6x6	0.9	60	251
RSE230	0.6x6	1.8	45	256
NHR-2	0.6x6	0.9	35	260
MHR230	0.6x7	0.9	45	170
MHR230	0.6x8	0.9	50	170
RSES230	0.6x8	0.9	60	251
RSE230	0.6x8	1.8	50	256
MHR230	0.6x9	0.9	50	170
MHR230	0.6x10	0.9	50	170
RSES230	0.6x10	0.9	60	251
RSE230	0.6x10	1.8	50	256
MHR230	0.6x12	0.9	50	170
RSES230	0.6x12	0.9	60	251
RSE230	0.6x12	1.8	50	256
MHR230	0.6x15	0.9	50	170
RSES230	0.6x15	0.9	60	251
MHR230	0.6x18	0.9	50	170
RSES230	0.6x18	0.9	60	251
<b>Ø 0.65</b>				
MSE230	0.65	1.5	45	127

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>Ø 0.7</b>				
<b>MXH225</b>	0.7	0.7	45	93
<b>MXH230</b>	0.7	1.4	45	94
<b>MXH235</b>	0.7	2.1	45	95
<b>MXH225P</b>	0.7	0.7	45	97
<b>MXH230P</b>	0.7	1.4	45	98
<b>MXH235P</b>	0.7	2.1	45	99
<b>MX230</b>	0.7	1.4	45	108
<b>MX235</b>	0.7	2.1	45	110
<b>MX240</b>	0.7	2.8	45	111
<b>MSE230SS</b>	0.7	0.7	45	126
<b>MSE230</b>	0.7	1.8	45	127
<b>MSES230P</b>	0.7	1.2	45	127
<b>NX-25</b>	0.7	0.7	40	193
<b>NX-30</b>	0.7	1.4	40	195
<b>NX-35</b>	0.7	2.1	40	197
<b>NX-40</b>	0.7	2.8	40	199
<b>NX-45</b>	0.7	3.5	40	201
<b>NC-2</b>	0.7	1.4	35	208
<b>NCM-2</b>	0.7	2.1	35	209
<b>AL2D-2</b>	0.7	1.4	45	233
<b>AL2D-2DLC</b>	0.7	1.4	45	235
<b>RSES230</b>	0.7	1.05	60	251
<b>MHRH230</b>	0.7x2	0.55	45	160
<b>MHR230</b>	0.7x2	1	45	170
<b>NHR-2X</b>	0.7x2	1	45	190
<b>NHR-2</b>	0.7x2	1	45	260
<b>MHRH230</b>	0.7x4	0.55	45	160
<b>MHR230</b>	0.7x4	1	45	170
<b>NHR-2X</b>	0.7x4	1	45	190
<b>NHR-2</b>	0.7x4	1	45	260
<b>RSES230</b>	0.7x4	1.05	60	251
<b>MHRH230</b>	0.7x6	0.55	45	160
<b>MHR230</b>	0.7x6	1	45	170
<b>NHR-2X</b>	0.7x6	1	45	190
<b>NHR-2</b>	0.7x6	1	45	260
<b>RSES230</b>	0.7x6	1.05	60	251
<b>MHRH230</b>	0.7x8	0.55	50	160
<b>MHR230</b>	0.7x8	1	50	170
<b>RSES230</b>	0.7x8	1.05	60	251
<b>MHRH230</b>	0.7x10	0.55	50	160
<b>MHR230</b>	0.7x10	1	50	170
<b>RSES230</b>	0.7x10	1.05	60	251
<b>RSES230</b>	0.7x12	1.05	60	251
<b>RSES230</b>	0.7x14	1.05	60	251
<b>Ø 0.75</b>				
<b>MSE230</b>	0.75	1.8	45	127
<b>Ø 0.8</b>				
<b>MXH225</b>	0.8	0.8	45	93
<b>MXH230</b>	0.8	1.6	45	94
<b>MXH235</b>	0.8	2.4	45	95
<b>MXH240</b>	0.8	3.2	45	96
<b>MXH245</b>	0.8	4	45	96
<b>MXH225P</b>	0.8	0.8	45	97
<b>MXH230P</b>	0.8	1.6	45	98
<b>MXH235P</b>	0.8	2.4	45	99
<b>MX225</b>	0.8	0.8	45	108
<b>MX230</b>	0.8	1.6	45	108
<b>MX235</b>	0.8	2.4	45	110
<b>MX240</b>	0.8	3.2	45	111
<b>MX245</b>	0.8	4	45	112
<b>MSE230SS</b>	0.8	0.8	45	126
<b>MSE230</b>	0.8	2	45	127
<b>MSES230P</b>	0.8	1.5	45	127
<b>MSEM230</b>	0.8	3.2	50	129
<b>MSE230M</b>	0.8	2	45	129
<b>NX-25</b>	0.8	0.8	40	193
<b>NX-30</b>	0.8	1.6	40	195

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>NX-35</b>	0.8	2.4	40	197
<b>NX-40</b>	0.8	3.2	40	199
<b>NX-45</b>	0.8	4	40	201
<b>NC-2</b>	0.8	1.6	35	208
<b>NCM-2</b>	0.8	2.4	35	209
<b>DX</b>	0.8	1.6	45	225
<b>AL2D-2</b>	0.8	1.6	45	233
<b>AL2D-2DLC</b>	0.8	1.6	45	235
<b>RSES230</b>	0.8	1.2	60	251
<b>RSE230</b>	0.8	2.4	45	256
<b>RSE230</b>	0.8	4	45	256
<b>RSE230</b>	0.8	6	45	256
<b>PCDSE</b>	0.8x0.8	0.16	45	87
<b>SSE600</b>	0.8x1.5	0.32	49	60
<b>DCMS</b>	0.8x1.6	0.4	45	156
<b>MHRH230</b>	0.8x3	0.65	45	160
<b>MHR230</b>	0.8x3	1.2	45	170
<b>DCMS</b>	0.8x3.2	0.4	45	156
<b>SSE600</b>	0.8x4	0.32	52	60
<b>MHRH230</b>	0.8x4	0.65	45	160
<b>MHR230</b>	0.8x4	1.2	45	170
<b>NHR-2X</b>	0.8x4	1.2	45	190
<b>NHR-2</b>	0.8x4	1.2	45	260
<b>RSES230</b>	0.8x4	1.2	60	251
<b>MHRH230</b>	0.8x5	0.65	45	160
<b>MHR230</b>	0.8x5	1.2	45	170
<b>MHRH230</b>	0.8x6	0.65	45	160
<b>MHR230</b>	0.8x6	1.2	45	170
<b>NHR-2X</b>	0.8x6	1.2	45	190
<b>NHR-2</b>	0.8x6	1.2	45	260
<b>RSE230</b>	0.8x6	1.2	60	251
<b>RSE230</b>	0.8x6	2.4	45	256
<b>MHRH230</b>	0.8x8	0.65	50	160
<b>MHR230</b>	0.8x8	1.2	50	170
<b>MHRLN230-6</b>	0.8x8	1.2	60	187
<b>NHR-2X</b>	0.8x8	1.2	45	190
<b>RSES230</b>	0.8x8	1.2	60	251
<b>RSE230</b>	0.8x8	2.4	50	256
<b>NHR-2</b>	0.8x8	1.2	45	260
<b>MHRH230</b>	0.8x10	0.65	50	160
<b>MHR230</b>	0.8x10	1.2	50	170
<b>RSES230</b>	0.8x10	1.2	60	251
<b>RSE230</b>	0.8x10	2.4	60	256
<b>MHRH230</b>	0.8x12	0.65	50	160
<b>MHR230</b>	0.8x12	1.2	50	170
<b>RSE230</b>	0.8x12	1.2	60	251
<b>RSE230</b>	0.8x12	2.4	50	256
<b>MHR230</b>	0.8x14	1.2	50	170
<b>RSES230</b>	0.8x14	1.2	60	251
<b>MHR230</b>	0.8x16	1.2	50	170
<b>RSES230</b>	0.8x16	1.2	60	251
<b>RSES230</b>	0.8x18	1.2	60	251
<b>MHR230</b>	0.8x20	1.2	60	170
<b>RSES230</b>	0.8x20	1.2	60	251
<b>MHR230</b>	0.8x24	1.2	60	170
<b>RSES230</b>	0.8x24	1.2	60	251
<b>Ø 0.85</b>				
<b>MSE230</b>	0.85	2	45	127
<b>Ø 0.9</b>				
<b>MXH225</b>	0.9	0.9	45	93
<b>MXH230</b>	0.9	1.8	45	94
<b>MXH235</b>	0.9	2.7	45	95
<b>MXH225P</b>	0.9	0.9	45	97
<b>MXH230P</b>	0.9	1.8	45	98
<b>MXH235P</b>	0.9	2.7	45	99
<b>MX230</b>	0.9	1.8	45	108
<b>MX235</b>	0.9	2.7	45	110
<b>MX240</b>	0.9	3.6	45	111

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MSE230SS	0.9	0.9	45	126
MSE230	0.9	2	45	127
NX-25	0.9	0.9	40	193
NX-30	0.9	1.8	40	195
NX-35	0.9	2.7	40	197
NX-40	0.9	3.6	40	199
NX-45	0.9	4.5	40	201
NC-2	0.9	1.8	35	208
NCM-2	0.9	2.7	35	209
AL2D-2	0.9	1.8	45	233
AL2D-2DLC	0.9	1.8	45	235
RSES230	0.9	1.35	60	251
MHR230	0.9x4	1.4	45	170
MHR230	0.9x6	1.4	45	170
NHR-2X	0.9x6	1.35	45	190
NHR-2	0.9x6	1.35	45	260
RSES230	0.9x6	1.35	60	251
MHR230	0.9x8	1.4	50	170
NHR-2X	0.9x8	1.35	45	190
NHR-2	0.9x8	1.35	45	260
RSES230	0.9x8	1.35	60	251
MHR230	0.9x10	1.4	50	170
NHR-2X	0.9x10	1.35	45	190
NHR-2	0.9x10	1.35	45	260
RSES230	0.9x10	1.35	60	251
MHR230	0.9x12	1.4	50	170
RSES230	0.9x12	1.35	60	251
MHR230	0.9x15	1.4	60	170
RSES230	0.9x16	1.35	60	251
RSES230	0.9x18	1.35	60	251
<b>Ø 0.95</b>				
MSE230	0.95	2	45	127
<b>Ø 1</b>				
MFD	1	2	55	470
MXH225	1	1	45	93
MXH230	1	2	45	94
MXH235	1	3	45	95
MXH240	1	4	45	96
MXH245	1	5	45	96
MXH225P	1	1	45	97
MXH230P	1	2	45	98
MXH235P	1	3	45	99
MX225	1	1	45	108
MX230	1	2	45	108
MX235	1	3	45	110
MX240	1	4	45	111
MX245	1	5	45	112
MX425	1	1	45	118
MX430	1	2	45	118
MX435	1	3	45	119
MX440	1	4	45	119
MX445	1	5	45	120
MSE230SS	1	1	45	126
MSES230P	1	2	45	127
MSE230	1	2.5	45	127
MSE230M	1	2.5	45	129
MSEM230	1	4	50	129
MSE430P	1	2.5	45	132
MSE430	1	2.5	45	132
MSEM430	1	4	50	133
MSZ345	1	1.5	45	144
MHDH445	1	2	60	149
MHD445	1	1.5	60	151
NX-30X	1	2	40	158
NX-25	1	1	40	193
NX-30	1	2	40	195
NX-35	1	3	45	197
NX-40	1	4	45	199

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NX-45	1	5	45	201
NC-2	1	2	45	208
NCM-2	1	3	45	209
NCL-2	1	4	45	233
NC-LS-2	1	2	100	210
NC-4	1	2	45	214
NCM-4	1	3	45	216
NE-2	1	2.5	45	220
NSL-2	1	2	45	225
DCSE235	1	3	45	154
DX	1	2	45	225
AL2D-2	1	2	45	233
AL3D-2	1	3	45	234
AL4D-2	1	3	45	234
AL5D-2	1	5	50	235
AL2D-2DLC	1	2	45	235
AL3D-2DLC	1	3	45	236
AL4D-2DLC	1	3	45	236
AL5D-2DLC	1	3	45	237
RSES230	1	1.5	70	251
RSE230	1	3	45	256
RSE230	1	5	50	256
RSE230	1	7.5	50	256
RSE230	1	10	50	256
PCDSE	1x1	0.2	45	87
DSF	1x1	0.5	60	228
SSE600	1x2	0.4	49	60
DCMS	1x2	0.5	45	156
MHRH230	1x2	0.8	50	160
MHR230	1x2	1.5	50	170
MHRH230	1x3	0.8	50	160
MHR230	1x3	1.5	50	170
MHRLN230-6	1x3	1.5	60	187
ALZ345	1x3	1.5	45	238
DCMS	1x4	0.5	45	156
DCHR230	1x4	2	50	188
MHRH230	1x4	0.8	50	160
MHRH430	1x4	0.8	50	163
MHR230	1x4	1.5	50	170
MHR430	1x4	1.5	50	176
RSES230	1x4	1.5	70	251
SSE600	1x5	0.4	52	60
MHRH230	1x5	0.8	50	160
MHR230	1x5	1.5	50	170
MHRH230	1x6	0.8	50	160
MHRH430	1x6	0.8	50	163
MHR230	1x6	1.5	50	170
MHR430	1x6	1.5	50	176
MHRLN230-6	1x6	1.5	60	187
NHR-2X	1x6	1.5	45	190
NHR-2	1x6	1.5	45	260
DCHR230	1x6	2	50	188
RSES230	1x6	1.5	70	251
RSE230	1x6	3	50	256
MHRH230	1x7	0.8	50	160
MHR230	1x7	1.5	50	170
MHRH230	1x8	0.8	50	160
MHRH430	1x8	0.8	50	163
MHR230	1x8	1.5	50	170
MHR430	1x8	1.5	50	176
MHRLN230-6	1x8	1.5	60	187
NHR-2X	1x8	1.5	45	190
NHR-2	1x8	1.5	45	260
DCHR230	1x8	2	50	188
RSES230	1x8	1.5	70	251
RSE230	1x8	3	50	256
MHRH230	1x9	0.8	50	160
MHR230	1x9	1.5	50	170



Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MHRH230	1x10	0.8	50	160
MHRH430	1x10	0.8	50	163
MHR230	1x10	1.5	50	170
MHR430	1x10	1.5	50	176
MHRLN230-6	1x10	1.5	60	187
NHR-2X	1x10	1.5	45	190
DCHR230	1x10	2	50	188
RSES230	1x10	1.5	70	251
RSE230	1x10	3	50	256
NHR-2	1x10	1.5	45	260
MHRH230	1x12	0.8	50	160
MHR230	1x12	1.5	50	170
MHR430	1x12	1.5	50	422
NHR-2X	1x12	1.5	45	190
RSES230	1x12	1.5	70	251
RSE230	1x12	3	50	256
NHR-2	1x12	1.5	45	260
MHRH230	1x14	0.8	50	160
MHR230	1x14	1.5	50	170
RSES230	1x14	1.5	70	251
RSES230	1x15	1.5	70	251
RSE230	1x15	3	60	256
MHRH230	1x16	0.8	60	160
MHR230	1x16	1.5	60	170
MHR430	1x16	1.5	50	176
MHRH230	1x18	0.8	60	160
MHR230	1x18	1.5	60	170
RSES230	1x18	1.5	70	251
MHRH230	1x20	0.8	60	160
MHR230	1x20	1.5	60	170
RSES230	1x20	1.5	70	251
RSE230	1x20	3	60	256
MHRH230	1x22	0.8	60	160
MHR230	1x22	1.5	60	170
MHR230	1x25	1.5	70	170
RSES230	1x25	1.5	70	251
RSE230	1x25	3	70	256
MHR230	1x30	1.5	70	170
RSES230	1x30	1.5	70	251
RSE230	1x30	3	70	256
RSES230	1x35	1.5	70	251
RSE230	1x35	3	80	256
<b>Ø 1.05</b>				
MSE230	1.05	2.5	45	127
<b>Ø 1.1</b>				
MFD	1.1	2.2	55	470
MXH225	1.1	1.1	45	93
MXH230	1.1	2.2	45	94
MXH235	1.1	3.3	45	95
MXH225P	1.1	1.1	45	97
MXH230P	1.1	2.2	45	98
MXH235P	1.1	3.3	45	99
MX230	1.1	2.2	45	108
MX235	1.1	3.3	45	110
MX240	1.1	4.4	45	111
MSE230SS	1.1	1.1	45	126
MSE230	1.1	2.5	45	127
MSZ345	1.1	1.7	45	144
NX-25	1.1	1.1	40	193
NX-30	1.1	2.2	40	195
NX-35	1.1	3.3	45	197
NX-40	1.1	4.4	45	199
NX-45	1.1	5.5	50	201
NC-2	1.1	2	45	208
NCM-2	1.1	3.5	45	209
NC-4	1.1	2.2	45	214
AL2D-2	1.1	2.2	45	233
ALZ345	1.1x3.3	1.7	45	238

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MHR430	1.1x6	1.7	50	176
MHR430	1.1x10	1.7	50	176
MHR430	1.1x16	1.7	60	176
<b>Ø 1.15</b>				
MSE230	1.15	2.5	45	127
<b>Ø 1.2</b>				
MFD	1.2	2.4	55	470
MXH225	1.2	1.2	45	93
MXH230	1.2	2.4	45	94
MXH235	1.2	3.6	45	95
MXH240	1.2	4.8	45	96
MXH245	1.2	6	45	96
MXH225P	1.2	1.2	45	97
MXH230P	1.2	2.4	45	98
MXH235P	1.2	3.6	45	99
MX225	1.2	1.2	45	108
MX230	1.2	2.4	45	108
MX235	1.2	3.6	45	110
MX240	1.2	4.8	45	111
MX245	1.2	6	45	112
MSE230SS	1.2	1.2	45	126
MSE230P	1.2	2.5	45	127
MSE230	1.2	3	45	127
MSZ345	1.2	1.8	45	144
NX-25	1.2	1.2	40	193
NX-30	1.2	2.4	40	195
NX-35	1.2	3.6	45	197
NX-40	1.2	4.8	45	199
NX-45	1.2	6	50	201
NC-2	1.2	2.5	45	208
NCM-2	1.2	3.5	45	209
NC-4	1.2	2.4	45	214
AL2D-2	1.2	2.4	45	233
ALZ345	1.2x3.6	1.8	45	238
MHR230	1.2x4	1.8	50	170
MHRH230	1.2x6	1	50	160
MHRH430	1.2x6	1	50	163
MHR230	1.2x6	1.8	50	170
MHR430	1.2x6	1.8	50	176
NHR-2X	1.2x6	1.8	45	190
NHR-2	1.2x6	1.8	45	260
MHRH230	1.2x8	1	50	160
MHRH430	1.2x8	1	50	163
MHR230	1.2x8	1.8	50	170
MHR430	1.2x8	1.8	50	176
NHR-2X	1.2x8	1.8	45	190
NHR-2	1.2x8	1.8	45	260
MHRH230	1.2x10	1	50	160
MHRH430	1.2x10	1	50	163
MHR230	1.2x10	1.8	50	160
MHR430	1.2x10	1.8	50	176
NHR-2X	1.2x10	1.8	45	190
NHR-2	1.2x10	1.8	45	260
MHRH230	1.2x12	1	50	160
MHRH430	1.2x12	1	50	163
MHR230	1.2x12	1.8	50	170
MHR430	1.2x12	1.8	50	176
NHR-2X	1.2x12	1.8	45	190
NHR-2	1.2x12	1.8	45	260
MHRH230	1.2x16	1	60	160
MHR230	1.2x16	1.8	60	170
MHR430	1.2x16	1.8	60	176
MHR230	1.2x20	1.8	60	170
<b>Ø 1.25</b>				
MSE230	1.25	3	45	127
<b>Ø 1.3</b>				
MFD	1.3	2.6	55	470
MXH225	1.3	1.3	45	93

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>MXH230</b>	1.3	2.6	45	94
<b>MXH235</b>	1.3	3.9	45	95
<b>MXH225P</b>	1.3	1.3	45	97
<b>MXH230P</b>	1.3	2.6	45	98
<b>MXH235P</b>	1.3	3.9	45	99
<b>MX230</b>	1.3	2.6	45	108
<b>MX235</b>	1.3	3.9	45	110
<b>MX240</b>	1.3	5.2	45	111
<b>MSE230SS</b>	1.3	1.3	45	126
<b>MSE230</b>	1.3	3	45	127
<b>MSZ345</b>	1.3	2	45	144
<b>NX-25</b>	1.3	1.3	40	193
<b>NX-30</b>	1.3	2.6	40	195
<b>NX-35</b>	1.3	3.9	45	197
<b>NX-40</b>	1.3	5.2	45	199
<b>NX-45</b>	1.3	6.5	50	201
<b>NC-2</b>	1.3	2.5	45	208
<b>NCM-2</b>	1.3	4	45	209
<b>NC-4</b>	1.3	2.6	45	214
<b>AL2D-2</b>	1.3	2.6	45	233
<b>ALZ345</b>	1.3x3.9	2	45	238
<b>MHR430</b>	1.3x6	1.9	50	176
<b>MHR430</b>	1.3x12	1.9	50	176
<b>MHR430</b>	1.3x18	1.9	60	176
<b>Ø 1.35</b>				
<b>MSE230</b>	1.35	3	45	127
<b>Ø 1.4</b>				
<b>MFD</b>	1.4	2.8	55	470
<b>MXH225</b>	1.4	1.4	45	93
<b>MXH230</b>	1.4	2.8	45	94
<b>MXH235</b>	1.4	4.2	45	95
<b>MXH225P</b>	1.4	1.4	45	97
<b>MXH230P</b>	1.4	2.8	45	98
<b>MXH235P</b>	1.4	4.2	45	99
<b>MX230</b>	1.4	2.8	45	108
<b>MX235</b>	1.4	4.2	45	110
<b>MX240</b>	1.4	5.6	45	111
<b>MSE230SS</b>	1.4	1.4	45	126
<b>MSE230</b>	1.4	3.5	45	127
<b>MSZ345</b>	1.4	2.1	45	144
<b>NX-25</b>	1.4	1.4	40	193
<b>NX-30</b>	1.4	2.8	40	195
<b>NX-35</b>	1.4	4.2	45	197
<b>NX-40</b>	1.4	5.6	45	199
<b>NX-45</b>	1.4	7	50	201
<b>NC-2</b>	1.4	3	45	208
<b>NCM-2</b>	1.4	4.5	45	209
<b>NC-4</b>	1.4	2.8	45	214
<b>AL2D-2</b>	1.4	2.8	45	233
<b>ALZ345</b>	1.4x4.2	2.1	45	238
<b>MHRH230</b>	1.4x6	1.1	50	160
<b>MHR230</b>	1.4x6	2.1	50	170
<b>MHR430</b>	1.4x6	2.1	50	176
<b>NHR-2X</b>	1.4x6	2.1	45	190
<b>NHR-2</b>	1.4x6	2.1	45	260
<b>MHR230</b>	1.4x8	2.1	50	170
<b>MHR430</b>	1.4x8	2.1	50	176
<b>NHR-2X</b>	1.4x8	2.1	45	190
<b>NHR-2</b>	1.4x8	2.1	45	260
<b>MHR230</b>	1.4x10	2.1	50	170
<b>MHR430</b>	1.4x10	2.1	50	176
<b>NHR-2X</b>	1.4x10	2.1	45	190
<b>NHR-2</b>	1.4x10	2.1	45	260
<b>MHRH230</b>	1.4x12	1.1	50	160
<b>MHR230</b>	1.4x12	2.1	50	170
<b>MHR430</b>	1.4x12	2.1	50	176
<b>NHR-2X</b>	1.4x12	2.1	45	190
<b>NHR-2</b>	1.4x12	2.1	45	260

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>MHR230</b>	1.4x14	2.1	60	170
<b>MHR430</b>	1.4x14	2.1	60	176
<b>NHR-2X</b>	1.4x14	2.1	50	190
<b>NHR-2</b>	1.4x14	2.1	50	260
<b>MHR230</b>	1.4x16	2.1	60	170
<b>MHR430</b>	1.4x16	2.1	60	176
<b>NHR-2X</b>	1.4x16	2.1	50	190
<b>NHR-2</b>	1.4x16	2.1	50	260
<b>MHR230</b>	1.4x22	2.1	60	170
<b>MHR430</b>	1.4x22	2.1	60	176
<b>Ø 1.45</b>				
<b>MSE230</b>	1.45	3.5	45	127
<b>Ø 1.5</b>				
<b>MFD</b>	1.5	3	55	470
<b>MXH225</b>	1.5	1.5	45	93
<b>MXH230</b>	1.5	3	45	94
<b>MXH235</b>	1.5	4.5	45	95
<b>MXH240</b>	1.5	6	45	96
<b>MXH245</b>	1.5	7.5	45	96
<b>MXH225P</b>	1.5	1.5	45	97
<b>MXH230P</b>	1.5	3	45	98
<b>MXH235P</b>	1.5	4.5	45	99
<b>MX225</b>	1.5	1.5	45	108
<b>MX230</b>	1.5	3	45	108
<b>MX235</b>	1.5	4.5	45	110
<b>MX240</b>	1.5	6	45	111
<b>MX245</b>	1.5	7.5	45	112
<b>MX425</b>	1.5	1.5	45	118
<b>MX430</b>	1.5	3	45	118
<b>MX435</b>	1.5	4.5	45	119
<b>MX440</b>	1.5	6	45	119
<b>MX445</b>	1.5	7.5	45	120
<b>MSE230SS</b>	1.5	1.5	45	126
<b>MSZ345</b>	1.5	3	45	127
<b>MSE230</b>	1.5	4	45	127
<b>MSE230M</b>	1.5	4	45	129
<b>MSEM230</b>	1.5	6	50	129
<b>MSE430P</b>	1.5	4	45	132
<b>MSE430</b>	1.5	4	45	132
<b>MSEM430</b>	1.5	6	50	133
<b>MSZ345</b>	1.5	2.3	45	144
<b>MHDH445</b>	1.5	3	60	149
<b>MHD445</b>	1.5	2.5	60	151
<b>NX-30X</b>	1.5	3	40	158
<b>NX-25</b>	1.5	1.5	40	193
<b>NX-30</b>	1.5	3	40	195
<b>NX-35</b>	1.5	4.5	45	197
<b>NX-40</b>	1.5	6	45	199
<b>NX-45</b>	1.5	7.5	50	201
<b>NC-2</b>	1.5	3	45	208
<b>NCM-2</b>	1.5	4.5	45	209
<b>NCL-2</b>	1.5	6	45	233
<b>NC-LS-2</b>	1.5	3	100	210
<b>NC-4</b>	1.5	3	45	214
<b>NCM-4</b>	1.5	4.5	45	216
<b>NE-2</b>	1.5	3	45	220
<b>NSL-2</b>	1.5	3	45	225
<b>DCSE235</b>	1.5	4.5	45	154
<b>DX</b>	1.5	3	45	225
<b>AL2D-2</b>	1.5	3	45	233
<b>AL3D-2</b>	1.5	4.5	45	234
<b>AL4D-2</b>	1.5	4	50	234
<b>AL5D-2</b>	1.5	7.5	50	235
<b>AL2D-2DLC</b>	1.5	3	45	235
<b>AL3D-2DLC</b>	1.5	4.5	45	236
<b>AL4D-2DLC</b>	1.5	4.5	45	236
<b>AL5D-2DLC</b>	1.5	4.5	45	237
<b>RSES230</b>	1.5	2.25	70	251

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
RSE230	1.5	4.5	45	256
RSE230	1.5	7.5	50	256
RSE230	1.5	15	60	256
DCMS	1.5x3	0.75	45	156
MHRLN230-6	1.5x3	2.3	60	187
MHRH230	1.5x4	1.2	50	160
MHR230	1.5x4	2.3	50	170
ALZ345	1.5x4.5	2.3	45	238
ALZ345-DLC	1.5x4.5	2.3	45	242
MHRLN230-6	1.5x5	2.3	60	187
DCHR230	1.5x6	3	50	188
DCMS	1.5x6	0.75	45	156
MHRH230	1.5x6	1.2	50	160
MHRH430	1.5x6	1.2	50	163
MHR230	1.5x6	2.3	50	170
MHR430	1.5x6	2.3	50	176
NHR-2X	1.5x6	2.3	45	190
NHR-2	1.5x6	2.3	45	260
RSES230	1.5x6	2.25	70	251
MHRH230	1.5x8	1.2	50	160
MHRH430	1.5x8	1.2	50	163
MHR230	1.5x8	2.3	50	170
MHR430	1.5x8	2.3	50	176
NHR-2X	1.5x8	2.3	45	190
NHR-2	1.5x8	2.3	45	260
RSES230	1.5x8	2.25	70	251
MHRH230	1.5x10	1.2	50	160
MHRH430	1.5x10	1.2	50	163
MHR230	1.5x10	2.3	50	170
MHR430	1.5x10	2.3	50	176
MHRLN230-6	1.5x10	2.3	60	187
NHR-2X	1.5x10	2.3	45	190
NHR-2	1.5x10	2.3	45	260
RSES230	1.5x10	2.25	70	251
RSE230	1.5x10	4.5	50	256
MHRH230	1.5x12	1.2	50	160
MHRH430	1.5x12	1.2	50	163
MHR230	1.5x12	2.3	50	170
MHR430	1.5x12	2.3	50	176
NHR-2X	1.5x12	2.3	45	190
NHR-2	1.5x12	2.3	45	260
DCHR230	1.5x12	3	50	188
RSES230	1.5x12	2.25	70	251
RSE230	1.5x12	4.5	50	256
MHRH230	1.5x14	1.2	60	160
MHRH430	1.5x14	1.2	50	163
MHR230	1.5x14	2.3	60	170
MHR430	1.5x14	2.3	60	176
NHR-2X	1.5x14	2.3	50	190
NHR-2	1.5x14	2.3	50	260
MHRLN230-6	1.5x15	2.3	60	187
RSES230	1.5x15	2.25	70	251
RSE230	1.5x15	4.5	60	256
MHRH230	1.5x16	1.2	60	160
MHRH430	1.5x16	1.2	50	163
MHR230	1.5x16	2.3	60	170
MHR430	1.5x16	2.3	60	176
NHR-2X	1.5x16	2.3	50	190
NHR-2	1.5x16	2.3	50	260
MHRH230	1.5x18	1.2	60	160
MHR230	1.5x18	2.3	60	170
MHR430	1.5x18	2.3	60	176
NHR-2X	1.5x18	2.3	55	190
RSES230	1.5x18	2.25	70	251
RSE230	1.5x18	4.5	60	256
NHR-2	1.5x18	2.3	55	260
MHRH230	1.5x20	1.2	60	160
MHR230	1.5x20	2.3	60	170

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MHR430	1.5x20	2.3	60	176
NHR-2X	1.5x20	2.3	55	190
NHR-2	1.5x20	2.3	55	260
DCHR230	1.5x20	3	60	188
RSES230	1.5x20	2.25	70	251
RSES230	1.5x23	2.25	70	251
RSE230	1.5x23	4.5	70	256
MHRH230	1.5x25	1.2	70	160
MHR230	1.5x25	2.3	70	170
RSES230	1.5x25	2.25	70	251
MHRH230	1.5x30	1.2	70	160
MHR230	1.5x30	2.3	70	170
RSES230	1.5x30	2.25	70	251
RSE230	1.5x30	4.5	70	256
MHRH230	1.5x35	1.2	80	160
MHR230	1.5x35	2.3	80	170
RSES230	1.5x35	2.25	70	251
MHR230	1.5x38	2.3	80	170
RSE230	1.5x38	4.5	80	256
MHR230	1.5x40	2.3	80	170
RSES230	1.5x40	2.25	100	251
MHR230	1.5x45	2.3	80	170
RSES230	1.5x45	2.25	100	251
RSE230	1.5x45	4.5	90	256
RSES230	1.5x53	2.25	100	251
RSE230	1.5x53	4.5	90	256
<b>Ø 1.55</b>				
MSE230	1.55	4	45	127
<b>Ø 1.6</b>				
MFD	1.6	3.2	55	470
MXH225	1.6	1.6	45	93
MXH230	1.6	3.2	45	94
MXH235	1.6	4.8	45	95
MXH225P	1.6	1.6	45	97
MXH230P	1.6	3.2	45	98
MXH235P	1.6	4.8	45	99
MX230	1.6	3.2	45	108
MX235	1.6	4.8	45	110
MX240	1.6	6.4	45	111
MSE230SS	1.6	1.6	45	126
MSES230P	1.6	3	45	127
MSE230	1.6	4	45	127
MSZ345	1.6	2.4	45	144
NX-25	1.6	1.6	40	193
NX-30	1.6	3.2	40	195
NX-35	1.6	4.8	45	197
NX-40	1.6	6.4	50	199
NX-45	1.6	8	50	201
NC-2	1.6	3	45	208
NCM-2	1.6	5	45	209
NC-4	1.6	3.2	45	214
AL2D-2	1.6	3.2	45	233
ALZ345	1.6x4.8	2.4	45	238
MHRH230	1.6x6	1.3	50	160
MHR230	1.6x6	2.4	50	170
MHR430	1.6x6	2.4	50	176
NHR-2X	1.6x6	2.4	45	190
NHR-2	1.6x6	2.4	45	260
MHRH230	1.6x8	1.3	50	160
MHR230	1.6x8	2.4	50	170
MHR430	1.6x8	2.4	50	176
NHR-2X	1.6x8	2.4	45	190
NHR-2	1.6x8	2.4	45	260
MHR230	1.6x10	2.4	50	170
MHR430	1.6x10	2.4	50	176
NHR-2X	1.6x10	2.4	45	190
NHR-2	1.6x10	2.4	45	260
MHR230	1.6x12	2.4	50	170

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MHR430	1.6x12	2.4	50	176
NHR-2X	1.6x12	2.4	45	190
NHR-2	1.6x12	2.4	45	260
MHR230	1.6x14	2.4	60	170
MHR430	1.6x14	2.4	60	176
NHR-2X	1.6x14	2.4	50	190
NHR-2	1.6x14	2.4	50	260
MHR230	1.6x16	2.4	60	170
MHR430	1.6x16	2.4	60	176
NHR-2X	1.6x16	2.4	50	190
NHR-2	1.6x16	2.4	50	260
MHR230	1.6x18	2.4	60	170
MHR430	1.6x18	2.4	60	176
NHR-2X	1.6x18	2.4	55	190
NHR-2	1.6x18	2.4	55	260
MHR230	1.6x20	2.4	60	170
MHR430	1.6x20	2.4	60	176
NHR-2X	1.6x20	2.4	55	190
NHR-2	1.6x20	2.4	55	260
MHR230	1.6x26	2.4	60	170
MHR430	1.6x26	2.4	70	176
<b>Ø 1.65</b>				
MSE230	1.65	4	45	127
<b>Ø 1.7</b>				
MFD	1.7	3.4	55	470
MXH225	1.7	1.7	45	93
MXH230	1.7	3.4	45	94
MXH235	1.7	5.1	45	95
MXH225P	1.7	1.7	45	97
MXH230P	1.7	3.4	45	98
MXH235P	1.7	5.1	45	99
MX230	1.7	3.4	45	108
MX235	1.7	5.1	45	110
MX240	1.7	6.8	45	111
MSE230SS	1.7	1.7	45	126
MSE230	1.7	4.5	45	127
MSZ345	1.7	2.6	45	144
NX-25	1.7	1.7	40	193
NX-30	1.7	3.4	40	195
NX-35	1.7	5.1	45	197
NX-40	1.7	6.8	50	199
NX-45	1.7	8.5	50	201
NC-2	1.7	4	45	208
NCM-2	1.7	5	45	209
NC-4	1.7	3.4	45	214
AL2D-2	1.7	3.4	45	233
ALZ345	1.7x5.1	2.6	45	238
MHR430	1.7x6	2.5	50	176
MHR430	1.7x14	2.5	60	176
MHR430	1.7x24	2.5	70	176
<b>Ø 1.75</b>				
MSE230	1.75	4.5	45	127
<b>Ø 1.8</b>				
MFD	1.8	3.6	55	470
MXH225	1.8	1.8	45	93
MXH230	1.8	3.6	45	94
MXH235	1.8	5.4	45	95
MXH240	1.8	7.2	45	96
MXH245	1.8	9	50	96
MXH225P	1.8	1.8	45	97
MXH230P	1.8	3.6	45	98
MXH235P	1.8	5.4	45	99
MX225	1.8	1.8	45	108
MX230	1.8	3.6	45	108
MX235	1.8	5.4	45	110
MX240	1.8	7.2	45	111
MX245	1.8	9	50	112
MSE230SS	1.8	1.8	45	126

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MSE230P	1.8	3.5	45	127
MSE230	1.8	4.5	45	127
MSZ345	1.8	2.7	45	144
NX-25	1.8	1.8	40	193
NX-30	1.8	3.6	40	195
NX-35	1.8	5.4	45	197
NX-40	1.8	7.2	50	199
NX-45	1.8	9	50	201
NC-2	1.8	4	45	208
NCM-2	1.8	5.5	45	209
NC-4	1.8	3.6	45	214
AL2D-2	1.8	3.6	45	233
ALZ345	1.8x5.4	2.7	45	238
MHRH230	1.8x6	1.4	50	160
MHRH430	1.8x6	1.4	50	163
MHR230	1.8x6	2.7	50	170
MHR430	1.8x6	2.7	50	176
NHR-2X	1.8x6	2.7	45	190
NHR-2	1.8x6	2.7	45	260
MHRH230	1.8x8	1.4	50	160
MHRH430	1.8x8	1.4	50	163
MHR230	1.8x8	2.7	50	170
MHR430	1.8x8	2.7	50	176
NHR-2X	1.8x8	2.7	45	190
NHR-2	1.8x8	2.7	45	260
MHRH230	1.8x10	1.4	50	160
MHRH430	1.8x10	1.4	50	163
MHR230	1.8x10	2.7	50	170
MHR430	1.8x10	2.7	50	176
NHR-2X	1.8x10	2.7	45	130
NHR-2	1.8x10	2.7	45	260
MHRH230	1.8x12	1.4	50	160
MHRH430	1.8x12	1.4	50	163
MHR230	1.8x12	2.7	50	170
MHR430	1.8x12	2.7	50	176
NHR-2X	1.8x12	2.7	45	190
NHR-2	1.8x12	2.7	45	260
MHRH230	1.8x14	1.4	50	160
MHRH430	1.8x14	1.4	50	163
MHR230	1.8x14	2.7	50	170
MHR430	1.8x14	2.7	60	176
NHR-2X	1.8x14	2.7	50	190
NHR-2	1.8x14	2.7	50	260
MHRH230	1.8x16	1.4	60	160
MHRH430	1.8x16	1.4	50	163
MHR230	1.8x16	2.7	60	170
MHR430	1.8x16	2.7	60	176
NHR-2X	1.8x16	2.7	50	190
NHR-2	1.8x16	2.7	50	260
MHRH230	1.8x18	1.4	60	160
MHRH430	1.8x18	1.4	50	163
MHR230	1.8x18	2.7	60	170
MHR430	1.8x18	2.7	60	176
NHR-2X	1.8x18	2.7	55	190
NHR-2	1.8x18	2.7	55	260
MHR230	1.8x20	2.7	60	170
MHR430	1.8x20	2.7	60	176
NHR-2X	1.8x20	2.7	55	190
NHR-2	1.8x20	2.7	55	260
MHR230	1.8x25	2.7	70	170
MHR430	1.8x25	2.7	70	176
<b>Ø 1.85</b>				
MSE230	1.85	4.5	45	127
<b>Ø 1.9</b>				
MFD	1.9	3.8	55	470
MXH225	1.9	1.9	45	93
MXH230	1.9	3.8	45	94
MXH235	1.9	5.7	45	95

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>MXH225P</b>	1.9	1.9	45	97
<b>MXH230P</b>	1.9	3.8	45	98
<b>MXH235P</b>	1.9	5.7	45	99
<b>MX230</b>	1.9	3.8	45	108
<b>MX235</b>	1.9	5.7	45	110
<b>MX240</b>	1.9	7.6	45	111
<b>MSE230SS</b>	1.9	1.9	45	126
<b>MSE230</b>	1.9	5	45	127
<b>MSZ345</b>	1.9	2.9	45	144
<b>NX-25</b>	1.9	1.9	40	193
<b>NX-30</b>	1.9	3.8	40	195
<b>NX-35</b>	1.9	5.7	45	197
<b>NX-40</b>	1.9	7.6	50	199
<b>NX-45</b>	1.9	9.5	50	201
<b>NC-2</b>	1.9	4	45	208
<b>NCM-2</b>	1.9	6	45	209
<b>NC-4</b>	1.9	3.8	45	216
<b>AL2D-2</b>	1.9	3.8	45	233
<b>ALZ345</b>	1.9x5.7	2.9	45	238
<b>MHR430</b>	1.9x6	2.8	50	176
<b>MHR430</b>	1.9x16	2.8	60	176
<b>MHR430</b>	1.9x28	2.8	70	176
<b>Ø 1.95</b>				
<b>MSE230</b>	1.95	5	45	127
<b>Ø 2</b>				
<b>MFD</b>	2	4	55	470
<b>MXH225</b>	2	2	45	93
<b>MXH230</b>	2	4	45	94
<b>MXH235</b>	2	6	45	95
<b>MXH240</b>	2	8	45	96
<b>MXH245</b>	2	10	50	96
<b>MXH225P</b>	2	2	45	97
<b>MXH230P</b>	2	4	45	98
<b>MXH235P</b>	2	6	45	99
<b>MX225</b>	2	2	45	108
<b>MX230</b>	2	4	45	108
<b>MX235</b>	2	6	45	110
<b>MX240</b>	2	8	45	111
<b>MX245</b>	2	10	50	112
<b>MX425</b>	2	2	45	118
<b>MX430</b>	2	4	45	118
<b>MX435</b>	2	6	45	119
<b>MX440</b>	2	8	45	119
<b>MX445</b>	2	10	50	120
<b>MSE230SS</b>	2	2	45	126
<b>MSES230P</b>	2	4	45	127
<b>MSE230</b>	2	5	45	127
<b>MSE230M</b>	2	5	45	129
<b>MSEM230</b>	2	8	50	129
<b>MSE430</b>	2	5	45	132
<b>MSE430P</b>	2	5	45	132
<b>MSEM430</b>	2	8	50	133
<b>MSE245</b>	2	5	45	136
<b>MSE445</b>	2	5	45	137
<b>MSZ345</b>	2	3	45	144
<b>MHDH445</b>	2	4	60	149
<b>MHD445</b>	2	4	60	151
<b>NX-30X</b>	2	4	40	158
<b>NX-25</b>	2	2	40	193
<b>NX-30</b>	2	4	40	195
<b>NX-35</b>	2	6	45	197
<b>NX-40</b>	2	8	50	199
<b>NX-45</b>	2	10	50	201
<b>NC-2</b>	2	4	45	208
<b>NCM-2</b>	2	6	45	209
<b>NCL-2</b>	2	10	50	233
<b>NC-LS-2</b>	2	4	100	210
<b>NC-4</b>	2	4	45	214

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>NCM-4</b>	2	6	45	216
<b>NCL-4</b>	2	10	50	216
<b>NE-2</b>	2	6	45	220
<b>NSL-2</b>	2	4	45	225
<b>DCSE235</b>	2	6	45	154
<b>DX</b>	2	4	45	225
<b>AL2D-2</b>	2	4	45	233
<b>AL3D-2</b>	2	6	45	234
<b>AL4D-2</b>	2	8	50	234
<b>AL5D-2</b>	2	10	50	235
<b>AL2D-2DLC</b>	2	4	45	235
<b>AL3D-2DLC</b>	2	6	45	236
<b>AL4D-2DLC</b>	2	8	50	236
<b>AL5D-2DLC</b>	2	10	50	237
<b>RSES230</b>	2	3	60	251
<b>RSE230</b>	2	6	50	256
<b>RSE230</b>	2	10	50	256
<b>RSE230</b>	2	15	60	256
<b>RSE230</b>	2	20	60	256
<b>DSF</b>	2x2	1	60	228
<b>MHRH230</b>	2x4	1.6	50	160
<b>MHR230</b>	2x4	3	50	170
<b>DCMS</b>	2x4	1	45	156
<b>MHRH230</b>	2x6	1.6	50	160
<b>MHRH430</b>	2x6	1.6	50	163
<b>MHR230</b>	2x6	3	50	170
<b>MHR430</b>	2x6	3	50	176
<b>NHR-2X</b>	2x6	3	45	190
<b>ALZ345</b>	2x6	3	45	238
<b>ALZ345-DLC</b>	2x6	3	45	242
<b>DCHR230</b>	2x6	4	50	188
<b>NHR-2</b>	2x6	3	45	260
<b>RSES230</b>	2x6	3	60	251
<b>MHRH230</b>	2x8	1.6	50	160
<b>MHRH430</b>	2x8	1.6	50	163
<b>MHR230</b>	2x8	3	50	170
<b>MHR430</b>	2x8	3	50	176
<b>NHR-2X</b>	2x8	3	45	190
<b>NHR-2</b>	2x8	3	45	260
<b>DCMS</b>	2x8	1	45	156
<b>RSES230</b>	2x8	3	60	251
<b>MHRH230</b>	2x10	1.6	50	160
<b>MHRH430</b>	2x10	1.6	50	163
<b>MHR230</b>	2x10	3	50	170
<b>MHR430</b>	2x10	3	50	176
<b>NHR-2X</b>	2x10	3	45	190
<b>NHR-2</b>	2x10	3	45	260
<b>DCHR230</b>	2x10	4	50	188
<b>RSES230</b>	2x10	3	60	251
<b>MHRH230</b>	2x12	1.6	50	160
<b>MHRH430</b>	2x12	1.6	50	163
<b>MHR230</b>	2x12	3	50	170
<b>MHR430</b>	2x12	3	50	176
<b>NHR-2X</b>	2x12	3	45	190
<b>NHR-2</b>	2x12	3	45	260
<b>RSES230</b>	2x12	3	60	251
<b>RSE230</b>	2x12	6	60	256
<b>MHRH230</b>	2x14	1.6	60	160
<b>MHRH430</b>	2x14	1.6	60	163
<b>MHR230</b>	2x14	3	60	170
<b>MHR430</b>	2x14	3	60	176
<b>NHR-2X</b>	2x14	3	50	190
<b>NHR-2</b>	2x14	3	50	260
<b>RSES230</b>	2x15	3	60	251
<b>RSE230</b>	2x15	6	60	256
<b>MHRH230</b>	2x16	1.6	60	160
<b>MHRH430</b>	2x16	1.6	60	163
<b>MHR230</b>	2x16	3	60	170

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MHR430	2x16	3	60	176
NHR-2X	2x16	3	50	190
NHR-2	2x16	3	50	260
DCHR230	2x16	4	60	188
MHRH230	2x18	1.6	60	160
MHRH430	2x18	1.6	60	163
MHR230	2x18	3	60	170
MHR430	2x18	3	60	176
NHR-2X	2x18	3	55	190
NHR-2	2x18	3	55	260
MHRH230	2x20	1.6	60	160
MHRH430	2x20	1.6	60	163
MHR230	2x20	3	60	170
MHR430	2x20	3	60	176
MHRLN230-6	2x20	3	60	187
NHR-2X	2x20	3	55	190
RSES230	2x20	3	80	251
RSE230	2x20	6	60	256
NHR-2	2x20	3	55	260
DCHR230	2x20	4	60	188
RSES230	2x24	3	80	251
RSE230	2x24	6	70	256
MHRH230	2x25	1.6	70	160
MHR230	2x25	3	70	170
MHR430	2x25	3	70	176
MHRH230	2x30	1.6	70	160
MHR230	2x30	3	70	170
MHR430	2x30	3	70	176
RSES230	2x30	3	80	251
RSE230	2x30	6	80	256
MHRH230	2x35	1.6	80	160
MHR230	2x35	3	80	170
MHRH230	2x40	1.6	90	160
MHR230	2x40	3	90	170
RSES230	2x40	3	100	251
RSE230	2x40	6	90	256
MHRH230	2x50	1.6	100	160
MHR230	2x50	3	100	170
RSES230	2x50	3	100	251
RSE230	2x50	6	110	256
MHR230	2x60	3	110	170
RSES230	2x60	3	120	251
RSE230	2x60	6	110	256
RSES230	2x70	3	150	251
RSE230	2x70	6	110	256
<b>Ø 2.05</b>				
MSE230	2.05	5	45	127
<b>Ø 2.1</b>				
MFD	2.1	4.2	60	470
MXH230	2.1	4.2	45	94
MXH235	2.1	6.3	45	95
MXH230P	2.1	4.2	45	98
MXH235P	2.1	6.3	45	99
MX230	2.1	4.2	45	108
MX235	2.1	6.3	45	110
MX240	2.1	8.4	45	111
MSE230SS	2.1	2.1	45	126
MSE230	2.1	5.5	45	127
MSZ345	2.1	3.2	45	144
NX-25	2.1	2.1	40	193
NX-30	2.1	4.2	40	195
NX-35	2.1	6.3	45	197
NX-40	2.1	8.4	50	199
NX-45	2.1	10.5	50	201
NC-4	2.1	4.2	45	214
AL2D-2	2.1	4.2	45	233
ALZ345	2.1x6.3	3.2	45	238

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>Ø 2.15</b>				
MSE230	2.15	5.5	45	127
<b>Ø 2.2</b>				
MFD	2.2	4.4	60	470
MXH230	2.2	4.4	45	94
MXH235	2.2	6.6	45	95
MXH230P	2.2	4.4	45	98
MXH235P	2.2	6.6	45	99
MX230	2.2	4.4	45	108
MX235	2.2	6.6	45	110
MX240	2.2	8.8	45	111
MSE230SS	2.2	2.2	45	126
MSE230	2.2	5.5	45	127
MSZ345	2.2	3.3	45	144
NX-25	2.2	2.2	40	193
NX-30	2.2	4.4	40	195
NX-35	2.2	6.6	45	197
NX-40	2.2	8.8	50	199
NX-45	2.2	11	50	201
NC-4	2.2	4.4	45	214
AL2D-2	2.2	4.4	45	233
ALZ345	2.2x6.6	3.3	45	238
<b>Ø 2.25</b>				
MSE230	2.25	5.5	45	127
<b>Ø 2.3</b>				
MFD	2.3	4.6	60	470
MXH230	2.3	4.6	45	94
MXH235	2.3	6.9	45	95
MXH230P	2.3	4.6	45	98
MXH235P	2.3	6.9	45	99
MX230	2.3	4.6	45	108
MX235	2.3	6.9	45	110
MX240	2.3	9.2	45	111
MSE230SS	2.3	2.3	45	126
MSE230	2.3	6	45	127
MSZ345	2.3	3.5	45	144
NX-25	2.3	2.3	40	193
NX-30	2.3	4.6	40	195
NX-35	2.3	6.9	45	197
NX-40	2.3	9.2	50	199
NX-45	2.3	11.5	50	201
NC-4	2.3	4.6	45	214
AL2D-2	2.3	4.6	45	233
ALZ345	2.3x6.9	3.5	45	238
<b>Ø 2.35</b>				
MSE230	2.35	6	45	127
<b>Ø 2.4</b>				
MFD	2.4	4.8	60	470
MXH230	2.4	4.8	45	94
MXH235	2.4	7.2	45	95
MXH230P	2.4	4.8	45	98
MXH235P	2.4	7.2	45	99
MX230	2.4	4.8	45	108
MX235	2.4	7.2	45	110
MX240	2.4	9.6	45	111
MSE230SS	2.4	2.4	45	126
MSE230	2.4	6	45	127
MSZ345	2.4	3.6	45	144
NX-25	2.4	2.4	40	193
NX-30	2.4	4.8	40	195
NX-35	2.4	7.2	45	197
NX-40	2.4	9.6	50	199
NX-45	2.4	12	50	201
NC-4	2.4	4.8	45	214
AL2D-2	2.4	4.8	45	233
ALZ345	2.4x7.2	3.6	45	238

Modello Model	Dia. (x Lugh. Utile) Dia.(xEffective Length)	Lugh. tagl. Length of Cut	Lugh. totale Overall Length	Pagina Page
<b>Ø 2.45</b>				
MSE230	2.45	6	45	127
<b>Ø 2.5</b>				
MFD	2.5	5	60	470
MXH225	2.5	2.5	45	93
MXH230	2.5	5	45	94
MXH235	2.5	7.5	45	95
MXH240	2.5	10	45	96
MXH245	2.5	12.5	50	96
MXH225P	2.5	2.5	45	97
MXH230P	2.5	5	45	98
MXH235P	2.5	7.5	45	99
MX225	2.5	2.5	45	108
MX230	2.5	5	45	108
MX235	2.5	7.5	45	110
MX240	2.5	10	45	111
MX245	2.5	12.5	50	112
MX425	2.5	2.5	45	118
MX430	2.5	5	45	118
MX435	2.5	7.5	45	119
MX440	2.5	10	45	119
MX445	2.5	12.5	50	120
MSE230SS	2.5	2.5	45	126
MSES230P	2.5	5	45	127
MSE230	2.5	7	45	127
MSE230M	2.5	7	45	129
MSEM230	2.5	10	50	129
MSE430P	2.5	7	45	132
MSE430	2.5	7	45	132
MSEM430	2.5	10	50	133
MSE245	2.5	7	45	136
MSE445	2.5	7	45	137
MSZ345	2.5	3.8	45	144
NX-30X	2.5	5	40	158
NX-25	2.5	2.5	40	193
NX-30	2.5	5	40	195
NX-35	2.5	7.5	45	197
NX-40	2.5	10	50	199
NX-45	2.5	12.5	50	201
NC-2	2.5	5	45	208
NCM-2	2.5	8	45	209
NCL-2	2.5	12	50	210
NC-LS-2	2.5	5	100	210
NC-4	2.5	5	45	214
NCM-4	2.5	8	45	216
NE-2	2.5	8	45	220
NSL-2	2.5	5	45	225
DX	2.5	5	45	225
AL2D-2	2.5	5	45	233
AL3D-2	2.5	7.5	45	234
AL4D-2	2.5	10	50	234
AL5D-2	2.5	12.5	50	235
AL2D-2DLC	2.5	5	45	235
AL3D-2DLC	2.5	7.5	45	236
AL4D-2DLC	2.5	10	50	236
AL5D-2DLC	2.5	12.5	50	237
ALZ345	2.5	7.5	45	238
ALZ345-DLC	2.5	7.5	45	242
MHRH230	2.5x8	2	50	160
MHRH430	2.5x8	2	50	163
MHR230	2.5x8	3.7	50	170
MHR430	2.5x8	3.7	50	176
NHR-2X	2.5x8	3.7	45	190
NHR-2	2.5x8	3.7	45	260
MHR230	2.5x10	3.7	50	170
MHRH230	2.5x12	2	50	160
MHRH430	2.5x12	2	50	163
MHR230	2.5x12	3.7	50	170

Modello Model	Dia. (x Lugh. Utile) Dia.(xEffective Length)	Lugh. tagl. Length of Cut	Lugh. totale Overall Length	Pagina Page
MHR430	2.5x12	3.7	50	176
NHR-2X	2.5x12	3.7	45	190
NHR-2	2.5x12	3.7	45	260
MHR230	2.5x14	3.7	50	170
MHRH230	2.5x16	2	60	160
MHRH430	2.5x16	2	60	163
MHR230	2.5x16	3.7	60	170
MHR430	2.5x16	3.7	60	176
NHR-2X	2.5x16	3.7	55	190
NHR-2	2.5x16	3.7	55	260
MHR230	2.5x18	3.7	60	170
MHRH230	2.5x20	2	60	160
MHRH430	2.5x20	2	60	163
MHR230	2.5x20	3.7	60	170
MHR430	2.5x20	3.7	60	176
NHR-2X	2.5x20	3.7	60	190
NHR-2	2.5x20	3.7	60	260
MHRH430	2.5x25	2	70	163
MHR230	2.5x25	3.7	70	170
MHR430	2.5x25	3.7	70	176
MHR230	2.5x30	3.7	70	170
MHRH230	2.5x30	2	70	160
MHR230	2.5x40	3.7	90	170
MHRH230	2.5x40	2	90	160
MHR230	2.5x50	3.7	100	170
MHRH230	2.5x50	2	100	160
<b>Ø 2.55</b>				
MSE230	2.55	7	45	127
<b>Ø 2.6</b>				
MFD	2.6	5.2	60	470
MXH230	2.6	5.2	45	94
MXH235	2.6	7.8	45	95
MXH230P	2.6	5.2	45	98
MXH235P	2.6	7.8	45	99
MX230	2.6	5.2	45	108
MX235	2.6	7.8	45	110
MX240	2.6	10.4	50	111
MSE230SS	2.6	2.6	45	126
MSE230	2.6	7	45	127
MSZ345	2.6	3.9	45	144
NX-25	2.6	2.6	40	193
NX-30	2.6	5.2	45	195
NX-35	2.6	7.8	45	197
NX-40	2.6	10.4	50	199
NX-45	2.6	13	55	201
NC-4	2.6	5.2	45	214
AL2D-2	2.6	5.2	45	233
ALZ345	2.6x7.8	3.9	55	238
<b>Ø 2.65</b>				
MSE230	2.65	7	45	127
<b>Ø 2.7</b>				
MFD	2.7	5.4	60	470
MXH230	2.7	5.4	45	94
MXH235	2.7	8.1	45	95
MXH230P	2.7	5.4	45	98
MXH235P	2.7	8.1	45	99
MX230	2.7	5.4	45	108
MX235	2.7	8.1	45	110
MX240	2.7	10.8	50	111
MSE230SS	2.7	2.7	45	126
MSE230	2.7	7	45	127
MSZ345	2.7	4.1	45	144
NX-25	2.7	2.7	40	193
NX-30	2.7	5.4	45	195
NX-35	2.7	8.1	45	197
NX-40	2.7	10.8	50	199
NX-45	2.7	13.5	55	201
NC-4	2.7	5.4	45	214

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagli. Length of Cut	Lungh. totale Overall Length	Pagina Page
AL2D-2	2.7	5.4	45	233
ALZ345	2.7x8.1	4.1	55	238
<b>Ø 2.75</b>				
MSE230	2.75	7	45	127
<b>Ø 2.8</b>				
MFD	2.8	5.6	60	470
MXH230	2.8	5.6	45	94
MXH235	2.8	8.4	45	95
MXH230P	2.8	5.6	45	98
MXH235P	2.8	8.4	45	99
MX230	2.8	5.6	45	108
MX235	2.8	8.4	45	110
MX240	2.8	11.2	50	111
MSE230SS	2.8	2.8	45	126
MSE230	2.8	7	45	127
MSZ345	2.8	4.2	45	144
NX-25	2.8	2.8	40	193
NX-30	2.8	5.6	45	195
NX-35	2.8	8.4	45	197
NX-40	2.8	11.2	50	199
NX-45	2.8	14	55	201
NC-4	2.8	5.6	45	214
AL2D-2	2.8	5.6	45	233
ALZ345	2.8x8.4	4.2	55	238
<b>Ø 2.85</b>				
MSE230	2.85	8	50	127
<b>Ø 2.9</b>				
MFD	2.9	5.8	60	470
MXH230	2.9	5.8	45	94
MXH235	2.9	8.7	45	95
MXH230P	2.9	5.8	45	98
MXH235P	2.9	8.7	45	99
MX230	2.9	5.8	45	108
MX235	2.9	8.7	45	110
MX240	2.9	11.6	50	111
MSE230SS	2.9	2.9	50	126
MSE230	2.9	8	50	127
MSZ345	2.9	4.5	45	144
NX-25	2.9	2.9	40	193
NX-30	2.9	5.8	45	195
NX-35	2.9	8.7	45	197
NX-40	2.9	11.6	50	199
NX-45	2.9	14.5	55	201
NC-4	2.9	5.8	45	214
AL2D-2	2.9	5.8	50	233
ALZ345	2.9x8.7	4.4	55	238
<b>Ø 2.95</b>				
MSE230	2.95	8	50	127
<b>Ø 3</b>				
MFD	3	6	60	470
MXH225	3	3	45	93
MXH230	3	6	45	94
MXH235	3	9	45	95
MXH240	3	12	50	96
MXH245	3	15	55	96
MXH225P	3	3	45	97
MXH230P	3	6	45	98
MXH235P	3	9	45	99
MX225	3	3	45	108
MX230	3	6	45	108
MX235	3	9	45	110
MX240	3	12	50	111
MX245	3	15	55	112
MX425	3	3	45	118
MX430	3	6	45	118
MX435	3	9	45	119
MX440	3	12	50	119
MX445	3	15	55	120

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagli. Length of Cut	Lungh. totale Overall Length	Pagina Page
MSE230SS	3	3	50	126
MSES230P	3	6	50	127
MSE230	3	8	50	127
MSE230M	3	8	50	129
MSEM230	3	12	55	129
MSE430	3	8	50	132
MSE430P	3	8	50	132
MSEM430	3	12	55	133
MSE245	3	8	50	136
MSE345	3	8	50	136
MSE445	3	8	50	137
MSZ345	3	6	50	144
MSX440	3	8	55	147
MHDH445	3	6	60	149
MHD445	3	6	60	151
NX-30X	3	6	45	158
NX-25	3	3	40	193
NX-30	3	6	45	195
NX-35	3	9	45	197
NX-40	3	12	50	199
NX-45	3	15	55	201
NC-2	3	6	45	208
NCM-2	3	10	45	209
NCL-2	3	18	60	210
NC-LS-2	3	6	120	210
NC-4	3	6	45	214
NCL-4	3	18	60	216
NCM-4	3	10	45	216
NE-2	3	8	45	220
NE-3	3	8	45	220
NE-4	3	8	45	221
NSL-2	3	6	45	225
DX	3	6	50	225
DXM	3	12	60	227
DXL	3	15	70	227
AL2D-2	3	6	50	233
AL3D-2	3	9	50	234
AL4D-2	3	12	55	234
AL5D-2	3	15	55	235
AL2D-2DLC	3	6	50	235
AL3D-2DLC	3	9	50	236
AL4D-2DLC	3	12	55	236
AL5D-2DLC	3	15	55	237
NEA-2	3	10	50	243
NEA-2	3	15	55	243
NEA-2	3	20	60	243
RSES230	3	4.5	80	251
RSE230	3	9 (3)	100	256
RSE230	3	9 (6)	50	256
RSE230	3	15	60	256
RSE230	3	15	100	256
RSE230	3	20	60	256
RSE230	3	25	70	256
RSE230	3	30	70	256
DCSE235	3	9	45	154
DSF	3x3	1.5	60	228
MHRH230	3x8	4.5	50	160
MHRH430	3x8	4.5	50	163
MHR230	3x8	4.5	50	170
MHR430	3x8	4.5	50	176
NHR-2X	3x8	4.5	45	190
NHR-2	3x8	4.5	45	260
ALZ345	3x9	4.5	55	238
ALZ345-DLC	3x9	4.5	55	242
MHR230	3x10	4.5	50	170
RSES230	3x10	4.5	80	251
MHRH230	3x12	4.5	50	160
MHRH430	3x12	4.5	50	163



Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MHR230	3x12	4.5	50	160
MHR430	3x12	4.5	50	176
NHR-2X	3x12	4.5	45	190
NHR-2	3x12	4.5	45	260
RSES230	3x12	4.5	80	251
MHR230	3x14	4.5	50	170
RSES230	3x15	4.5	80	251
RSE230	3x15	9	60	256
MHRH230	3x16	4.5	60	160
MHRH430	3x16	4.5	60	163
MHR230	3x16	4.5	60	170
MHR430	3x16	4.5	60	176
NHR-2X	3x16	4.5	55	190
NHR-2	3x16	4.5	55	260
DCHR230	3x16	6	60	188
MHR230	3x18	4.5	60	170
MHRH230	3x20	4.5	60	160
MHRH430	3x20	4.5	60	163
MHR230	3x20	4.5	60	170
MHR430	3x20	4.5	60	176
NHR-2X	3x20	4.5	60	190
NHR-2	3x20	4.5	60	260
RSES230	3x20	4.5	80	251
RSE230	3x20	9	60	256
RSES230	3x24	4.5	80	251
RSE230	3x24	9	70	256
MHRH230	3x25	4.5	70	160
MHRH430	3x25	4.5	70	163
MHR230	3x25	4.5	70	170
MHR430	3x25	4.5	70	176
NHR-2X	3x25	4.5	65	190
NHR-2	3x25	4.5	65	260
MHRH230	3x30	4.5	70	160
MHRH430	3x30	4.5	70	163
MHR230	3x30	4.5	70	170
MHR430	3x30	4.5	70	176
DCHR230	3x30	6	70	188
RSES230	3x30	4.5	80	251
RSE230	3x30	9	70	256
MHR230	3x35	4.5	80	170
RSES230	3x36	4.5	80	251
RSE230	3x36	9	80	256
MHR230	3x40	4.5	90	170
RSES230	3x45	4.5	100	251
RSE230	3x45	9	90	256
MHR230	3x50	4.5	100	170
RSES230	3x60	4.5	120	251
RSE230	3x60	9	110	256
RSES230	3x75	4.5	150	251
RSE230	3x75	9	120	256
<b>Ø 3.1</b>				
MFD	3.1	6.2	60	470
MX230	3.1	6.2	45	108
MX235	3.1	9.3	45	110
MX240	3.1	12.4	50	111
MSE230SS	3.1	3.1	50	126
MSE230	3.1	8	50	127
MSZ345	3.1	6.2	50	144
NX-25	3.1	3.1	40	193
NX-30	3.1	6.2	45	195
NX-35	3.1	9.3	50	197
NX-40	3.1	12.4	55	199
NX-45	3.1	15.5	60	201
NC-4	3.1	6.2	45	214
ALZ345	3.1x9.3	4.7	55	238
<b>Ø 3.2</b>				
MFD	3.2	6.4	60	470
MX230	3.2	6.4	45	108

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MX235	3.2	9.6	45	110
MX240	3.2	12.8	50	111
MSE230SS	3.2	3.2	50	126
MSE230	3.2	8	50	127
MSZ345	3.2	6.4	50	144
NX-25	3.2	3.2	40	193
NX-30	3.2	6.4	45	195
NX-35	3.2	9.6	50	197
NX-40	3.2	12.8	55	199
NX-45	3.2	16	60	201
NC-4	3.2	6.4	45	214
ALZ345	3.2x9.6	4.8	55	238
<b>Ø 3.3</b>				
MFD	3.3	6.6	60	470
MX230	3.3	6.6	45	108
MX235	3.3	9.9	45	110
MX240	3.3	13.2	50	111
MSE230SS	3.3	3.3	50	126
MSE230	3.3	9	50	127
MSZ345	3.3	6.6	50	144
NX-25	3.3	3.3	40	193
NX-30	3.3	6.6	45	195
NX-35	3.3	9.9	50	197
NX-40	3.3	13.2	55	199
NX-45	3.3	16.5	60	201
NC-4	3.3	6.6	45	214
ALZ345	3.3x9.9	5	55	238
<b>Ø 3.4</b>				
MFD	3.4	6.8	60	470
MX230	3.4	6.8	45	108
MX235	3.4	10.2	45	110
MX240	3.4	13.6	50	111
MSE230SS	3.4	3.4	50	126
MSE230	3.4	9	50	127
MSZ345	3.4	6.8	50	144
NX-25	3.4	3.4	40	193
NX-30	3.4	6.8	45	195
NX-35	3.4	10.2	50	197
NX-40	3.4	13.6	55	199
NX-45	3.4	17	60	201
NC-4	3.4	6.8	45	214
ALZ345	3.4x10.2	5.1	55	238
<b>Ø 3.5</b>				
MFD	3.5	7	60	470
MXH230	3.5	7	45	94
MXH235	3.5	10.5	45	95
MXH230P	3.5	7	45	98
MXH235P	3.5	10.5	45	99
MX230	3.5	7	45	108
MX235	3.5	10.5	45	110
MX240	3.5	14	50	111
MX425	3.5	3.5	45	118
MX430	3.5	7	45	118
MX435	3.5	10.5	45	119
MX440	3.5	14	50	119
MX445	3.5	17.5	60	120
MSE230SS	3.5	3.5	50	126
MSE230	3.5	9	50	127
MSE430	3.5	9	50	132
MSZ345	3.5	7	50	144
NX-25	3.5	3.5	40	193
NX-30	3.5	7	45	195
NX-35	3.5	10.5	50	197
NX-40	3.5	14	55	199
NX-45	3.5	17.5	60	201
NC-2	3.5	7	45	208
NCM-2	3.5	11	50	209
NC-4	3.5	7	45	214

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NCM-4	3.5	11	50	216
NE-2	3.5	9	45	220
NE-3	3.5	10	45	220
AL2D-2	3.5	7	50	233
AL2D-2DLC	3.5	7	50	235
ALZ345	3.5x10.5	5.3	55	238
ALZ345-DLC	3.5x10.5	5.3	55	242
NHR-2X	3.5x12	5.25	45	190
NHR-2	3.5x12	5.25	45	260
MHR430	3.5x15	5.5	60	176
NHR-2X	3.5x16	5.25	55	190
NHR-2	3.5x16	5.25	55	260
NHR-2X	3.5x20	5.25	60	190
NHR-2	3.5x20	5.25	60	260
MHR430	3.5x25	5.5	70	176
NHR-2X	3.5x25	5.25	65	190
NHR-2	3.5x25	5.25	65	260
NHR-2X	3.5x30	5.25	75	190
NHR-2	3.5x30	5.25	75	260
MHR430	3.5x35	5.5	80	175
<b>Ø 3.6</b>				
MFD	3.6	7.2	60	470
MX230	3.6	7.2	45	108
MX235	3.6	10.8	45	110
MX240	3.6	14.4	50	111
MSE230SS	3.6	3.6	50	126
MSE230	3.6	9	50	127
MSZ345	3.6	7.2	50	144
NX-25	3.6	3.6	40	193
NX-30	3.6	7.2	45	195
NX-35	3.6	10.8	50	197
NX-40	3.6	14.4	55	199
NX-45	3.6	18	60	201
NC-4	3.6	7.2	45	214
ALZ345	3.6x10.8	5.4	55	238
<b>Ø 3.7</b>				
MFD	3.7	7.4	60	470
MX230	3.7	7.4	45	108
MX235	3.7	11.1	45	110
MX240	3.7	14.8	50	111
MSE230SS	3.7	3.7	50	126
MSE230	3.7	10	50	127
MSZ345	3.7	7.4	50	144
NX-25	3.7	3.7	40	193
NX-30	3.7	7.4	45	195
NX-35	3.7	11.1	50	197
NX-40	3.7	14.8	55	199
NX-45	3.7	18.5	60	201
NC-4	3.7	7.4	45	214
ALZ345	3.7x11.1	5.6	55	238
<b>Ø 3.8</b>				
MFD	3.8	7.6	60	470
MX230	3.8	7.6	45	108
MX235	3.8	11.4	45	110
MX240	3.8	15.2	50	111
MSE230SS	3.8	3.8	50	126
MSE230	3.8	10	50	127
MSZ345	3.8	7.6	50	144
NX-25	3.8	3.8	40	193
NX-30	3.8	7.6	45	195
NX-35	3.8	11.4	50	197
NX-40	3.8	15.2	55	199
NX-45	3.8	19	60	201
NC-4	3.8	7.6	45	214
ALZ345	3.8x11.4	5.7	55	238
<b>Ø 3.9</b>				
MFD	3.9	7.8	60	470
MX230	3.9	7.8	45	108

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MX235	3.9	11.7	45	110
MX240	3.9	15.6	50	111
MSE230SS	3.9	3.9	50	126
MSE230	3.9	10	50	127
MSZ345	3.9	7.8	50	144
NX-25	3.9	3.9	40	193
NX-30	3.9	7.8	45	195
NX-35	3.9	11.7	50	197
NX-40	3.9	15.6	55	199
NX-45	3.9	19.5	60	201
NC-4	3.9	7.8	45	214
ALZ345	3.9x11.7	5.9	55	238
<b>Ø 4</b>				
MFD	4	8	60	470
MXH225	4	4	45	93
MXH230	4	8	45	94
MXH235	4	12	50	95
MXH240	4	16	55	96
MXH245	4	20	60	96
MXH225P	4	4	45	97
MXH230P	4	8	45	98
MXH235P	4	12	50	99
MX225	4	4	45	108
MX230	4	8	45	108
MX235	4	12	50	110
MX240	4	16	55	111
MX245	4	20	60	112
MX425	4	4	45	118
MX430	4	8	45	118
MX435	4	12	50	119
MX440	4	16	55	119
MX445	4	20	60	120
MSE230SS	4	4	50	126
MSES230P	4	8	50	127
MSE230	4	10	50	127
MSE230M	4	10	50	129
MSEM230	4	16	60	129
MSE430P	4	10	50	132
MSE430	4	10	50	132
MSEM430	4	16	60	133
MSE245	4	10	50	136
MSE345	4	10	50	136
MSE445	4	10	50	137
MSZ345	4	8	50	144
MSX440	4	11	55	147
MHDH445	4	8	60	149
MHD445	4	8	60	151
NX-30X	4	8	45	158
NX-25	4	4	40	193
NX-30	4	8	45	195
NX-35	4	12	50	197
NX-40	4	16	55	199
NX-45	4	20	60	201
NC-2	4	8	45	208
NCM-2	4	12	50	209
NCL-2	4	22	60	210
NC-LS-2	4	8	120	210
NC-4	4	8	45	214
NCM-4	4	12	50	216
NCL-4	4	22	60	216
NE-2	4	10	45	220
NE-3	4	10	45	220
NE-4	4	10	45	221
NSL-2	4	8	45	225
DCSE235	4	12	50	154
DX	4	8	50	225
DXM	4	16	60	227
DXL	4	20	70	227

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
AL2D-2	4	8	50	233
AL3D-2	4	12	50	234
AL4D-2	4	16	60	234
AL5D-2	4	20	60	235
AL2D-2DLC	4	8	50	235
AL3D-2DLC	4	12	50	236
AL4D-2DLC	4	16	60	236
AL5D-2DLC	4	20	60	237
NEA-2	4	12	50	243
NEA-2	4	16	55	243
NEA-2	4	22	60	243
RSES230	4	6(4)	80	251
RSES230	4	6(6)	80	251
RSE230	4	12(4)	120	256
RSE230	4	12(6)	50	256
RSE230	4	20(6)	60	256
RSE230	4	20	120	256
RSE230	4	30	70	256
RSE230	4	40	90	256
DSF	4x4	2	60	228
RSES230	4x10	6	80	251
MHRH430	4x12	6	50	163
MHR230	4x12	6	50	170
MHR430	4x12	6	50	176
NHR-2X	4x12	6	45	190
ALZ345	4x12	6	55	238
ALZ345-DLC	4x12	6	55	242
NHR-2	4x12	6	45	260
RSES230	4x15	6	80	251
MHRH430	4x16	6	60	163
MHR230	4x16	6	60	170
MHR430	4x16	6	60	176
NHR-2X	4x16	6	55	190
NHR-2	4x16	6	55	260
MHRH430	4x20	6	60	163
MHR230	4x20	6	60	170
MHR430	4x20	6	60	176
NHR-2X	4x20	6	60	190
NHR-2	4x20	6	60	260
DCHR230	4x20	8	60	188
RSES230	4x20	6	80	251
RSE230	4x20	12	60	256
MHRH430	4x25	6	70	163
MHR230	4x25	6	70	170
MHR430	4x25	6	70	176
NHR-2X	4x25	6	65	190
NHR-2	4x25	6	65	190
MHRH430	4x30	6	70	163
MHR230	4x30	6	70	170
MHR430	4x30	6	70	176
NHR-2X	4x30	6	70	190
RSES230	4x30	6	80	251
RSE230	4x30	12	70	256
NHR-2	4x30	6	70	260
MHRH430	4x35	6	80	163
MHR230	4x35	6	80	170
MHR430	4x35	6	80	176
NHR-2X	4x35	6	75	190
NHR-2	4x35	6	75	260
MHRH430	4x40	6	90	163
MHR230	4x40	6	90	170
MHR430	4x40	6	90	176
DCHR230	4x40	8	90	188
RSES230	4x40	6	100	251
RSE230	4x40	12	90	256
MHR230	4x45	6	90	170
MHR430	4x45	6	90	176
MHR230	4x50	6	100	170

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MHR430	4x50	6	100	176
RSES230	4x55	6	120	251
RSE230	4x55	12	110	256
MHR230	4x60	6	110	170
RSES230	4x70	6	150	251
RSE230	4x70	12	120	256
<b>Ø 4.1</b>				
MFD	4.1	8.2	60	470
MX230	4.1	8.2	45	108
MX235	4.1	12.3	50	110
MX240	4.1	16.4	55	111
MSE230SS	4.1	4.1	50	126
MSE230	4.1	11	50	127
MSZ345	4.1	8.2	50	144
NX-25	4.1	4.1	45	193
NX-30	4.1	8.2	50	195
NX-35	4.1	12.3	55	197
NX-40	4.1	16.4	60	199
NX-45	4.1	20.5	65	201
NC-4	4.1	8.2	45	214
ALZ345	4.1x12.3	6.2	55	238
<b>Ø 4.2</b>				
MFD	4.2	8.4	60	470
MX230	4.2	8.4	45	108
MX235	4.2	12.6	50	110
MX240	4.2	16.8	55	111
MSE230SS	4.2	4.2	50	126
MSE230	4.2	11	50	127
MSZ345	4.2	8.4	50	144
NX-25	4.2	4.2	45	193
NX-30	4.2	8.4	50	195
NX-35	4.2	12.6	55	197
NX-40	4.2	16.8	60	199
NX-45	4.2	21	65	201
NC-4	4.2	8.4	45	214
ALZ345	4.2x12.6	6.3	55	238
<b>Ø 4.3</b>				
MFD	4.3	8.6	60	470
MX230	4.3	8.6	45	108
MX235	4.3	12.9	50	110
MX240	4.3	17.2	55	111
MSE230SS	4.3	4.3	50	126
MSE230	4.3	11	50	127
MSZ345	4.3	8.6	50	144
NX-25	4.3	4.3	45	193
NX-30	4.3	8.6	50	195
NX-35	4.3	12.9	55	197
NX-40	4.3	17.2	60	199
NX-45	4.3	21.5	65	201
NC-4	4.3	8.6	45	214
ALZ345	4.3x12.9	6.5	55	238
<b>Ø 4.4</b>				
MFD	4.4	8.8	60	470
MX230	4.4	8.8	45	108
MX235	4.4	13.2	50	110
MX240	4.4	17.6	55	111
MSE230SS	4.4	4.4	50	126
MSE230	4.4	11	50	127
MSZ345	4.4	8.8	50	144
NX-25	4.4	4.4	45	193
NX-30	4.4	8.8	50	195
NX-35	4.4	13.2	55	197
NX-40	4.4	17.6	60	199
NX-45	4.4	22	65	201
NC-4	4.4	8.8	45	214
ALZ345	4.4x13.2	6.6	55	238
<b>Ø 4.5</b>				
MFD	4.5	9	60	470

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>MXH230</b>	4.5	9	50	94
<b>MXH235</b>	4.5	13.5	50	95
<b>MXH230P</b>	4.5	9	50	98
<b>MXH235P</b>	4.5	13.5	50	99
<b>MX230</b>	4.5	9	50	108
<b>MX235</b>	4.5	13.5	50	110
<b>MX240</b>	4.5	18	55	111
<b>MX425</b>	4.5	4.5	50	118
<b>MX430</b>	4.5	9	50	118
<b>MX435</b>	4.5	13.5	50	119
<b>MX440</b>	4.5	18	55	119
<b>MX445</b>	4.5	22.5	65	120
<b>MSE230SS</b>	4.5	4.5	55	126
<b>MSE230</b>	4.5	12	55	127
<b>MSE430</b>	4.5	12	55	132
<b>MSZ345</b>	4.5	9	50	144
<b>NX-25</b>	4.5	4.5	45	193
<b>NX-30</b>	4.5	9	50	195
<b>NX-35</b>	4.5	13.5	55	197
<b>NX-40</b>	4.5	18	60	199
<b>NX-45</b>	4.5	22.5	65	201
<b>NC-2</b>	4.5	9	45	208
<b>NCM-2</b>	4.5	14	55	209
<b>NC-4</b>	4.5	9	45	214
<b>NCM-4</b>	4.5	14	55	216
<b>NE-2</b>	4.5	13	50	220
<b>NE-3</b>	4.5	13	50	220
<b>NE-4</b>	4.5	13	50	221
<b>AL2D-2</b>	4.5	9	55	233
<b>AL2D-2DLC</b>	4.5	9	55	235
<b>ALZ345</b>	4.5x13.5	6.8	55	238
<b>ALZ345-DLC</b>	4.5x13.5	6.8	55	242
<b>Ø 4.6</b>				
<b>MFD</b>	4.6	9.2	60	470
<b>MX230</b>	4.6	9.2	50	108
<b>MX235</b>	4.6	13.8	55	110
<b>MX240</b>	4.6	18.4	55	111
<b>MSE230SS</b>	4.6	4.6	55	126
<b>MSE230</b>	4.6	12	55	127
<b>MSZ345</b>	4.6	9.2	50	144
<b>NX-25</b>	4.6	4.6	45	193
<b>NX-30</b>	4.6	9.2	50	195
<b>NX-35</b>	4.6	13.8	55	197
<b>NX-40</b>	4.6	18.4	60	199
<b>NX-45</b>	4.6	23	65	201
<b>NC-4</b>	4.6	9.2	50	214
<b>ALZ345</b>	4.6x13.8	6.9	55	238
<b>Ø 4.7</b>				
<b>MFD</b>	4.7	9.4	60	470
<b>MX230</b>	4.7	9.4	50	108
<b>MX235</b>	4.7	14.1	55	110
<b>MX240</b>	4.7	18.8	55	111
<b>MSE230SS</b>	4.7	4.7	55	126
<b>MSE230</b>	4.7	12	55	127
<b>MSZ345</b>	4.7	9.4	50	144
<b>NX-25</b>	4.7	4.7	45	193
<b>NX-30</b>	4.7	9.4	50	195
<b>NX-35</b>	4.7	14.1	55	197
<b>NX-40</b>	4.7	18.8	60	199
<b>NX-45</b>	4.7	23.5	65	201
<b>NC-4</b>	4.7	9.4	50	214
<b>ALZ345</b>	4.7x14.1	7.1	55	238
<b>Ø 4.8</b>				
<b>MFD</b>	4.8	9.6	60	470
<b>MX230</b>	4.8	9.6	50	108
<b>MX235</b>	4.8	14.4	55	110
<b>MX240</b>	4.8	19.2	55	111
<b>MSE230SS</b>	4.8	4.8	55	126

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>MSE230</b>	4.8	12	55	127
<b>MSZ345</b>	4.8	9.6	50	144
<b>NX-25</b>	4.8	4.8	45	193
<b>NX-30</b>	4.8	9.6	50	195
<b>NX-35</b>	4.8	14.4	55	197
<b>NX-40</b>	4.8	19.2	60	199
<b>NX-45</b>	4.8	24	65	201
<b>NC-4</b>	4.8	9.6	50	214
<b>ALZ345</b>	4.8x14.4	7.2	55	238
<b>Ø 4.9</b>				
<b>MFD</b>	4.9	9.8	60	470
<b>MX230</b>	4.9	9.8	50	108
<b>MX235</b>	4.9	14.7	55	110
<b>MX240</b>	4.9	19.6	55	111
<b>MSE230SS</b>	4.9	4.9	55	126
<b>MSE230</b>	4.9	13	55	127
<b>MSZ345</b>	4.9	9.8	50	144
<b>NX-25</b>	4.9	4.9	45	193
<b>NX-30</b>	4.9	9.8	50	195
<b>NX-35</b>	4.9	14.7	55	197
<b>NX-40</b>	4.9	19.6	60	199
<b>NX-45</b>	4.9	24.5	65	201
<b>NC-4</b>	4.9	9.8	50	214
<b>ALZ345</b>	4.9x14.7	7.4	55	238
<b>Ø 5</b>				
<b>MX230</b>	5	10	60	108
<b>MXH225</b>	5	5	50	93
<b>MXH230</b>	5	10	50	94
<b>MXH235</b>	5	15	55	95
<b>MXH240</b>	5	20	60	111
<b>MXH245</b>	5	25	65	96
<b>MXH225P</b>	5	5	50	97
<b>MXH230P</b>	5	10	50	98
<b>MXH235P</b>	5	15	55	99
<b>MX225</b>	5	5	50	108
<b>MX230</b>	5	10	50	108
<b>MX235</b>	5	15	55	110
<b>MX240</b>	5	20	60	111
<b>MX245</b>	5	25	65	112
<b>MX425</b>	5	5	50	118
<b>MX430</b>	5	10	50	118
<b>MX435</b>	5	15	55	119
<b>MX440</b>	5	20	60	119
<b>MX445</b>	5	25	65	120
<b>MSE230SS</b>	5	5	55	126
<b>MSES230P</b>	5	10	55	127
<b>MSE230</b>	5	13	55	127
<b>MSE230M</b>	5	13	55	129
<b>MSEM230</b>	5	20	65	129
<b>MSE430P</b>	5	13	55	132
<b>MSE430</b>	5	13	55	132
<b>MSEM430</b>	5	20	65	133
<b>MSE245</b>	5	13	55	136
<b>MSE345</b>	5	13	55	136
<b>MSE445</b>	5	13	55	137
<b>MSZ345</b>	5	10	50	144
<b>MSX440</b>	5	13	55	147
<b>MHDH645</b>	5	10	60	149
<b>MHDH645</b>	5	15	65	149
<b>MHD645</b>	5	10	60	151
<b>NX-30X</b>	5	10	50	158
<b>NX-25</b>	5	5	45	193
<b>NX-30</b>	5	10	50	195
<b>NX-35</b>	5	15	55	197
<b>NX-40</b>	5	20	60	199
<b>NX-45</b>	5	25	65	201
<b>NC-2</b>	5	10	50	208
<b>NCM-2</b>	5	15	55	209

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NCL-2	5	25	65	210
NC-LS-2	5	10	130	210
NC-4	5	10	50	214
NCM-4	5	15	55	216
NCL-4	5	25	65	216
NE-2	5	13	50	220
NE-3	5	13	50	220
NE-4	5	13	50	221
NSL-2	5	10	50	225
DX	5	10	60	225
DXM	5	20	70	227
DXL	5	25	80	227
AL2D-2	5	10	55	233
AL3D-2	5	15	55	234
AL4D-2	5	20	65	234
AL5D-2	5	25	65	235
AL2D-2DLC	5	10	55	235
AL3D-2DLC	5	15	55	236
AL4D-2DLC	5	20	65	236
AL5D-2DLC	5	25	65	237
NEA-2	5	14	55	243
NEA-2	5	22	60	243
NEA-2	5	28	65	243
AL-3LS	5	7.5	80	243
RSES230	5	7.5	80	251
RSE230	5	10	60	256
RSE230	5	15	70	256
RSE230	5	25	80	256
RSE230	5	35	90	256
RSE230	5	40	100	256
DCSE235	5	15	55	154
DSF	5x5	2.5	60	228
ALZ345	5x15	7.5	55	238
ALZ345-DLC	5x15	7.5	55	242
MHRH430	5x16	7.5	60	163
MHR230	5x16	7.5	60	170
MHR430	5x16	7.5	60	176
NHR-2X	5x16	7.5	55	190
NHR-2	5x16	7.5	55	260
MHR230	5x20	7.5	60	170
NHR-2X	5x20	7.5	60	190
NHR-2	5x20	7.5	60	260
MHRH430	5x25	7.5	70	163
MHR230	5x25	7.5	70	170
MHR430	5x25	7.5	70	176
NHR-2X	5x25	7.5	65	190
NHR-2	5x25	7.5	65	260
MHR230	5x30	7.5	80	170
NHR-2X	5x30	7.5	75	190
NHR-2	5x30	7.5	75	260
RSES230	5x30	7.5	80	251
RSE230	5x30	15	90	256
MHRH430	5x35	7.5	80	163
MHR230	5x35	7.5	80	170
MHR430	5x35	7.5	80	176
NHR-2X	5x35	7.5	80	190
NHR-2	5x35	7.5	80	260
MHR230	5x40	7.5	90	170
NHR-2X	5x40	7.5	90	190
NHR-2	5x40	7.5	90	260
RSES230	5x40	7.5	100	251
RSE230	5x40	15	100	256
MHRH430	5x50	7.5	110	163
MHR230	5x50	7.5	110	170
MHR430	5x50	7.5	110	176
RSES230	5x55	7.5	120	251
RSE230	5x55	15	120	256
MHR230	5x60	7.5	120	170

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
RSES230	5x70	7.5	150	251
RSE230	5x70	15	130	256
<b>Ø 5.1</b>				
MFD	5.1	10.2	60	470
MX230	5.1	10.2	50	108
MX235	5.1	15.3	55	110
MX240	5.1	20.4	60	111
MSE230SS	5.1	5.1	55	126
MSE230	5.1	13	55	127
MSZ345	5.1	10.2	55	144
NX-25	5.1	5.1	50	193
NX-30	5.1	10.2	50	195
NX-35	5.1	15.3	60	197
NX-40	5.1	20.4	65	199
NX-45	5.1	25.5	75	201
NC-4	5.1	10.2	50	214
ALZ345	5.1x15.3	7.7	55	238
<b>Ø 5.2</b>				
MFD	5.2	10.4	60	470
MX230	5.2	10.4	50	108
MX235	5.2	15.6	55	110
MX240	5.2	20.8	60	111
MSE230SS	5.2	5.2	55	126
MSE230	5.2	13	55	127
MSZ345	5.2	10.4	55	144
NX-25	5.2	5.2	50	193
NX-30	5.2	10.4	50	195
NX-35	5.2	15.6	60	197
NX-40	5.2	20.8	65	199
NX-45	5.2	26	75	201
NC-4	5.2	10.4	50	214
ALZ345	5.2x15.6	7.8	55	238
<b>Ø 5.3</b>				
MFD	5.3	10.6	60	470
MX230	5.3	10.6	50	108
MX235	5.3	15.9	55	110
MX240	5.3	21.2	60	111
MSE230SS	5.3	5.3	55	126
MSE230	5.3	14	55	127
MSZ345	5.3	10.6	55	144
NX-25	5.3	5.3	50	193
NX-30	5.3	10.6	50	195
NX-35	5.3	15.9	60	197
NX-40	5.3	21.2	65	199
NX-45	5.3	26.5	75	201
NC-4	5.3	10.6	50	214
ALZ345	5.3x15.9	8	55	238
<b>Ø 5.4</b>				
MFD	5.4	10.8	60	470
MX230	5.4	10.8	50	108
MX235	5.4	16.2	55	110
MX240	5.4	21.6	60	111
MSE230SS	5.4	5.4	55	126
MSE230	5.4	14	55	127
MSZ345	5.4	10.8	55	144
NX-25	5.4	5.4	50	193
NX-30	5.4	10.8	50	195
NX-35	5.4	16.2	60	197
NX-40	5.4	21.6	65	199
NX-45	5.4	27	75	201
NC-4	5.4	10.8	50	214
ALZ345	5.4x16.2	8.1	55	238
<b>Ø 5.5</b>				
MFD	5.5	11	60	470
MXH230	5.5	11	50	108
MXH235	5.5	16.5	60	110
MXH230P	5.5	11	50	98
MXH235P	5.5	16.5	60	99

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MX230	5.5	11	50	108
MX235	5.5	16.5	60	110
MX240	5.5	22	65	111
MX425	5.5	5.5	50	118
MX430	5.5	11	50	118
MX435	5.5	16.5	60	119
MX440	5.5	22	65	119
MX445	5.5	27.5	75	120
MSE230SS	5.5	5.5	55	126
MSE230	5.5	14	55	127
MSE430	5.5	14	55	132
MSZ345	5.5	11.2	55	144
NX-25	5.5	5.5	50	193
NX-30	5.5	11	50	195
NX-35	5.5	16.5	60	197
NX-40	5.5	22	65	199
NX-45	5.5	27.5	75	201
NC-2	5.5	11	50	208
NCM-2	5.5	17	55	209
NC-4	5.5	11	50	214
NCM-4	5.5	17	55	216
NE-2	5.5	13	50	220
NE-3	5.5	13	50	220
AL2D-2	5.5	11	55	233
AL2D-2DLC	5.5	11	55	235
ALZ345	5.5x16.5	8.3	55	238
ALZ345-DLC	5.5x16.5	8.3	55	242
<b>Ø 5.6</b>				
MFD	5.6	11.2	60	470
MX230	5.6	11.2	50	108
MX235	5.6	16.8	60	110
MX240	5.6	22.4	65	111
MSE230SS	5.6	5.6	55	126
MSE230	5.6	14	55	127
MSZ345	5.6	11.4	55	144
NX-25	5.6	5.6	50	193
NX-30	5.6	11.2	50	195
NX-35	5.6	16.8	60	197
NX-40	5.6	22.4	65	199
NX-45	5.6	28	75	201
NC-4	5.6	11.2	55	214
ALZ345	5.6x16.8	8.6	55	238
<b>Ø 5.7</b>				
MFD	5.7	11.4	60	470
MX230	5.7	11.4	50	108
MX235	5.7	17.1	60	110
MX240	5.7	22.8	65	111
MSE230SS	5.7	5.7	55	126
MSE230	5.7	15	55	127
MSZ345	5.7	11.6	55	144
NX-25	5.7	5.7	50	193
NX-30	5.7	11.4	50	195
NX-35	5.7	17.1	60	197
NX-40	5.7	22.8	65	199
NX-45	5.7	28.5	75	201
NC-4	5.7	11.4	55	214
ALZ345	5.7x17.1	8.6	55	238
<b>Ø 5.8</b>				
MFD	5.8	11.6	60	470
MX230	5.8	11.6	50	108
MX235	5.8	17.4	60	110
MX240	5.8	23.2	65	111
MSE230SS	5.8	5.8	55	126
MSE230	5.8	15	55	127
MSZ345	5.8	12	55	144
NX-25	5.8	5.8	50	193
NX-30	5.8	11.6	50	195
NX-35	5.8	17.4	60	197

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NX-40	5.8	23.2	65	199
NX-45	5.8	29	75	201
NC-4	5.8	11.6	55	214
ALZ345	5.8x17.4	8.7	55	238
<b>Ø 5.9</b>				
MFD	5.9	11.8	60	470
MX230	5.9	11.8	50	108
MX235	5.9	17.7	60	110
MX240	5.9	23.6	65	111
MSE230SS	5.9	5.9	55	126
MSE230	5.9	15	55	127
MSZ345	5.9	12.4	55	144
NX-25	5.9	5.9	50	193
NX-30	5.9	11.8	50	195
NX-35	5.9	17.7	60	197
NX-40	5.9	23.6	65	199
NX-45	5.9	29.5	75	201
NC-4	5.9	11.8	55	214
ALZ345	5.9x17.7	8.9	55	238
<b>Ø 6</b>				
MFD	6	12	60	470
MXH225	6	6	50	93
MXH230	6	12	50	94
MXH235	6	18	60	95
MXH240	6	24	65	96
MXH245	6	30	75	96
MXH225P	6	6	50	97
MXH230P	6	12	50	98
MXH235P	6	18	60	99
MX225	6	6	50	108
MX230	6	12	50	108
MX235	6	18	60	110
MX240	6	24	65	111
MX245	6	30	75	112
MX425	6	6	50	118
MX430	6	12	50	118
MX435	6	18	60	119
MX440	6	24	65	119
MX445	6	30	75	120
MSE230SS	6	6	55	126
MSES230P	6	12	55	127
MSE230	6	15	55	127
MSE230M	6	15	55	129
MSEM230	6	24	75	129
MSE430P	6	15	55	132
MSE430	6	15	55	132
MSEM430	6	24	75	133
MSE245	6	15	55	136
MSE345	6	15	55	136
MSE445	6	15	55	137
MSZ345	6	13	55	144
MSX440	6	13	55	147
MHDH645	6	12	60	149
MHDH645	6	18	65	149
MHD645	6	15	60	151
NX-30X	6	12	50	158
NX-25	6	6	50	193
NX-30	6	12	50	195
NX-35	6	18	60	197
NX-40	6	24	65	199
NX-45	6	30	75	201
NC-2	6	12	55	208
NCM-2	6	18	60	209
NCL-2	6	25	65	210
NC-LS-2	6	12	130	210
NC-4	6	12	55	214
NCM-4	6	18	60	216
NCL-4	6	25	65	216

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NE-2	6	13	50	220
NE-3	6	13	50	220
NE-4	6	13	50	221
NEL-3	6	25	75	221
NSL-2	6	12	55	225
DX	6	12	60	225
DXM	6	24	70	227
DXL	6	30	80	227
DHS	6	15	70	228
AL2D-2	6	12	55	233
AL3D-2	6	18	60	234
AL4D-2	6	24	75	234
AL5D-2	6	30	75	235
AL2D-2DLC	6	12	55	235
AL3D-2DLC	6	18	60	236
AL4D-2DLC	6	24	75	236
AL5D-2DLC	6	30	75	237
NEA-2	6	16	55	243
NEA-2	6	22	60	243
NEA-2	6	30	70	243
AL-3LS	6	9	80	243
RSES230	6	9	90	251
RSE230	6	12	70	256
RSE230	6	18	80	256
RSE230	6	25	80	256
RSE230	6	30	90	256
RSE230	6	40	100	256
RSE230	6	50	120	256
DCSE235	6	18	60	154
DSF	6x5	3	60	228
ALZ345	6x18	9	60	238
ALZ345-DLC	6x18	9	60	242
MHRH430	6x20	9	80	163
MHR230	6x20	9	80	170
MHR430	6x20	9	80	176
MHRH430	6x30	9	90	163
MHR230	6x30	9	90	170
MHR430	6x30	9	90	176
DCHR230	6x30	12	90	188
MHRH430	6x40	9	100	163
MHR230	6x40	9	100	170
MHR430	6x40	9	100	176
RSES230	6x40	9	90	251
RSE230	6x40	18	100	256
MHRH430	6x50	9	110	163
MHR230	6x50	9	110	170
MHR430	6x50	9	110	176
MHR230	6x60	9	120	170
RSES230	6x60	9	120	251
RSE230	6x60	18	120	256
RSES230	6x80	9	150	251
RSE230	6x80	18	130	256
<b>Ø 6.1</b>				
MSZ345	6.1	13	65	144
NX-25	6.1	6.1	55	193
NX-30	6.1	12.2	60	195
NX-35	6.1	18.3	70	197
NX-40	6.1	24.4	80	199
NX-45	6.1	30.5	90	201
NC-4	6.1	12.2	55	214
ALZ345	6.1x18.3	9.2	70	238
<b>Ø 6.2</b>				
MSZ345	6.2	13	65	144
NX-25	6.2	6.2	55	193
NX-30	6.2	12.4	60	195
NX-35	6.2	18.6	70	197
NX-40	6.2	24.8	80	199
NX-45	6.2	31	90	201

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NC-4	6.2	12.4	55	214
ALZ345	6.2x18.6	8.3	70	238
<b>Ø 6.3</b>				
MSZ345	6.3	13.5	65	144
NX-25	6.3	6.3	55	193
NX-30	6.3	12.6	60	195
NX-35	6.3	18.9	70	197
NX-40	6.3	25.2	80	199
NX-45	6.3	31.5	90	201
NC-4	6.3	12.6	55	214
ALZ345	6.3x18.9	9.5	70	238
<b>Ø 6.4</b>				
MSZ345	6.4	13.5	65	144
NX-25	6.4	6.4	55	193
NX-30	6.4	12.8	60	195
NX-35	6.4	19.2	70	197
NX-40	6.4	25.6	80	199
NX-45	6.4	32	90	201
NC-4	6.4	12.8	55	214
ALZ345	6.4x19.2	9.8	70	238
<b>Ø 6.5</b>				
MSE230	6.5	17	60	127
MSE430	6.5	17	60	132
MSZ345	6.5	13.5	65	144
NX-25	6.5	6.5	55	193
NX-30	6.5	13	60	195
NX-35	6.5	19.5	70	197
NX-40	6.5	26	80	199
NX-45	6.5	32.5	90	201
NC-2	6.5	13	55	208
NCM-2	6.5	20	65	209
NC-4	6.5	13	55	214
NCM-4	6.5	20	65	216
NE-2	6.5	18	60	220
NE-3	6.5	18	60	220
ALZ345	6.5x19.5	9.8	70	238
<b>Ø 6.6</b>				
MSZ345	6.6	14	65	144
NX-25	6.6	6.6	55	193
NX-30	6.6	13.2	60	195
NX-35	6.6	19.8	70	197
NX-40	6.6	26.4	80	199
NX-45	6.6	33	90	201
NC-4	6.6	13.2	60	214
ALZ345	6.6x18.8	9.9	70	238
<b>Ø 6.7</b>				
MSZ345	6.7	14	65	144
NX-25	6.7	6.7	55	193
NX-30	6.7	13.4	60	195
NX-35	6.7	20.1	70	197
NX-40	6.7	26.8	80	199
NX-45	6.7	33.5	90	201
NC-4	6.7	13.4	60	214
ALZ345	6.7x20.1	10.1	70	238
<b>Ø 6.8</b>				
MSZ345	6.8	15	65	144
NX-25	6.8	6.8	55	193
NX-30	6.8	13.6	60	195
NX-35	6.8	20.4	70	197
NX-40	6.8	27.2	80	199
NX-45	6.8	34	90	201
NC-4	6.8	13.6	60	214
ALZ345	6.8x20.4	10.2	70	238
<b>Ø 6.9</b>				
MSZ345	6.9	15	65	144
NX-25	6.9	6.9	55	193
NX-30	6.9	13.8	60	195
NX-35	6.9	20.7	70	197

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NX-40	6.9	27.6	80	199
NX-45	6.9	34.5	90	201
NC-4	6.9	13.8	60	214
ALZ345	6.9x20.7	10.4	70	238
<b>Ø 7</b>				
MX225	7	7	65	108
MX230	7	14	65	108
MX235	7	21	65	110
MX240	7	28	90	111
MX245	7	35	90	112
MSE230	7	18	65	127
MSE430	7	18	65	132
MSZ345	7	16	65	144
MSX440	7	19	60	147
NX-25	7	7	55	193
NX-30	7	14	60	195
NX-35	7	21	70	197
NX-40	7	28	80	199
NX-45	7	35	90	201
NC-2	7	14	60	208
NCM-2	7	21	65	209
NC-LS-2	7	14	140	210
NC-4	7	14	60	214
NCM-4	7	21	65	216
NE-2	7	18	60	220
NE-3	7	18	60	220
NE-4	7	18	60	221
NSL-2	7	14	60	225
AL2D-2	7	14	70	233
AL3D-2	7	21	70	234
AL4D-2	7	28	70	234
AL5D-2	7	35	90	235
AL2D-2DLC	7	14	70	235
AL3D-2DLC	7	21	70	236
AL4D-2DLC	7	28	90	236
AL5D-2DLC	7	35	90	237
ALZ345	7x21	10.5	70	238
ALZ345-DLC	7x21	10.5	70	242
<b>Ø 7.1</b>				
MSZ345	7.1	16	65	144
NX-25	7.1	7.1	55	193
NX-30	7.1	14.2	60	195
NX-35	7.1	21.3	70	197
NX-40	7.1	28.4	80	199
NX-45	7.1	35.5	90	201
NC-4	7.1	14.2	60	214
ALZ345	7.1x21.3	10.7	70	238
<b>Ø 7.2</b>				
MSZ345	7.2	16	65	144
NX-25	7.2	7.2	55	193
NX-30	7.2	14.4	60	195
NX-35	7.2	21.6	70	197
NX-40	7.2	28.8	80	199
NX-45	7.2	36	90	201
NC-4	7.2	14.4	60	214
ALZ345	7.2x21.6	10.8	70	238
<b>Ø 7.3</b>				
MSZ345	7.3	16	65	144
NX-25	7.3	7.3	55	193
NX-30	7.3	14.6	60	195
NX-35	7.3	21.9	70	197
NX-40	7.3	29.2	80	199
NX-45	7.3	36.5	90	201
NC-4	7.3	14.6	60	214
ALZ345	7.3x21.9	11	70	238
<b>Ø 7.4</b>				
MSZ345	7.4	16	65	144
NX-25	7.4	7.4	55	193

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NX-30	7.4	14.8	60	195
NX-35	7.4	22.2	70	197
NX-40	7.4	29.6	80	199
NX-45	7.4	37	90	201
NC-4	7.4	14.8	60	214
ALZ345	7.4x22.2	11.1	70	238
<b>Ø 7.5</b>				
MSE230	7.5	19	65	127
MSE430	7.5	19	65	132
MSZ345	7.5	16	65	144
NX-25	7.5	7.5	55	193
NX-30	7.5	15	60	195
NX-35	7.5	22.5	70	197
NX-40	7.5	30	80	199
NX-45	7.5	37.5	90	201
NC-2	7.5	15	60	208
NCM-2	7.5	23	70	209
NC-4	7.5	15	60	214
NCM-4	7.5	23	70	216
NE-2	7.5	18	60	220
NE-3	7.5	18	60	220
ALZ345	7.5x21.5	11.3	70	238
<b>Ø 7.6</b>				
MSZ345	7.6	17	65	144
NX-25	7.6	7.6	55	193
NX-30	7.6	15.2	60	195
NX-35	7.6	22.8	70	197
NX-40	7.6	30.4	80	199
NX-45	7.6	38	90	201
NC-4	7.6	15.2	60	214
ALZ345	7.6x22.8	11.4	70	238
<b>Ø 7.7</b>				
MSZ345	7.7	17	65	144
NX-25	7.7	7.7	55	193
NX-30	7.7	15.4	60	195
NX-35	7.7	23.1	70	197
NX-40	7.7	30.8	80	199
NX-45	7.7	38.5	90	201
NC-4	7.7	15.4	60	214
ALZ345	7.7x23.1	11.6	70	238
<b>Ø 7.8</b>				
MSZ345	7.8	17	65	144
NX-25	7.8	7.8	55	193
NX-30	7.8	15.6	60	195
NX-35	7.8	23.4	70	197
NX-40	7.8	31.2	80	199
NX-45	7.8	39	90	201
NC-4	7.8	15.6	60	214
ALZ345	7.8x23.4	11.7	70	238
<b>Ø 7.9</b>				
MSZ345	7.9	17	65	144
NX-25	7.9	7.9	55	193
NX-30	7.9	15.8	60	195
NX-35	7.9	23.7	70	197
NX-40	7.9	31.6	80	199
NX-45	7.9	39.5	90	201
NC-4	7.9	15.8	60	214
ALZ345	7.9x23.7	11.9	70	238
<b>Ø 8</b>				
MX225	8	8	65	108
MX230	8	16	65	108
MX235	8	24	65	110
MX240	8	32	90	111
MX245	8	40	90	112
MX425	8	8	65	118
MX430	8	16	65	118
MX435	8	24	65	119
MX440	8	32	90	119



Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MX445	8	40	90	120
MSES230P	8	16	65	127
MSE230	8	20	65	127
MSEM230	8	32	90	129
MSE430P	8	20	65	132
MSE430	8	20	65	132
MSEM430	8	32	90	133
MSE245	8	20	65	136
MSE345	8	20	65	136
MSE445	8	20	65	137
MSZ345	8	19	65	144
MSX440	8	19	60	147
MHDH645	8	16	65	149
MHDH645	8	24	70	149
MHD645	8	20	65	151
NX-30X	8	16	60	158
NX-25	8	8	55	193
NX-30	8	16	60	195
NX-35	8	24	70	197
NX-40	8	32	80	199
NX-45	8	40	90	201
NC-2	8	16	60	208
NCM-2	8	24	70	209
NCL-2	8	35	80	210
NC-LS-2	8	16	140	210
NC-4	8	16	60	214
NCL-4	8	35	80	216
NCM-4	8	24	70	216
NE-2	8	18	60	220
NE-3	8	18	60	220
NE-4	8	18	60	221
NEL-3	8	35	90	221
NSL-2	8	16	60	225
DX	8	16	70	225
DXM	8	32	90	227
DXL	8	40	100	227
DHS	8	20	80	228
AL2D-2	8	16	70	233
AL3D-2	8	24	70	234
AL4D-2	8	32	90	234
AL5D-2	8	40	90	235
AL2D-2DLC	8	16	70	235
AL3D-2DLC	8	24	70	236
AL4D-2DLC	8	32	90	236
AL5D-2DLC	8	40	90	237
NEA-2	8	22	70	243
NEA-2	8	28	75	243
NEA-2	8	36	90	243
AL-3LS	8	12	110	243
DSF	8x8	4	70	228
ALZ345	8x24	12	70	238
ALZ345-DLC	8x24	12	70	242
MHR430	8x30	12	100	176
MHR430	8x50	12	120	176
MHR430	8x60	12	130	176
<b>Ø 8.1</b>				
MSZ345	8.1	18	75	144
NX-25	8.1	8.1	65	193
NX-30	8.1	16.2	70	195
NX-35	8.1	24.3	80	197
NX-40	8.1	32.4	100	199
NX-45	8.1	40.5	100	201
NC-4	8.1	16.2	60	214
ALZ345	8.1x24.3	12.2	75	238
<b>Ø 8.2</b>				
MSZ345	8.2	18	75	144
NX-25	8.2	8.2	65	193
NX-30	8.2	16.4	70	195

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NX-35	8.2	24.6	80	197
NX-40	8.2	32.8	100	199
NX-45	8.2	41	100	201
NC-4	8.2	16.4	60	214
ALZ345	8.2x24.6	12.3	75	238
<b>Ø 8.3</b>				
MSZ345	8.3	18	75	144
NX-25	8.3	8.3	65	193
NX-30	8.3	16.6	70	195
NX-35	8.3	24.9	80	197
NX-40	8.3	33.2	100	199
NX-45	8.3	41.5	100	201
NC-4	8.3	16.6	60	214
ALZ345	8.3x26.9	12.5	75	238
<b>Ø 8.4</b>				
MSZ345	8.4	18	75	144
NX-25	8.4	8.4	65	193
NX-30	8.4	16.8	70	195
NX-35	8.4	25.2	80	197
NX-40	8.4	33.6	100	199
NX-45	8.4	42	100	201
NC-4	8.4	16.8	60	214
ALZ345	8.4x25.2	12.6	75	238
<b>Ø 8.5</b>				
MSE230	8.5	22	70	127
MSE430	8.5	22	70	132
MSZ345	8.5	18	75	144
NX-25	8.5	8.5	65	193
NX-30	8.5	17	70	195
NX-35	8.5	25.5	80	197
NX-40	8.5	34	100	199
NX-45	8.5	42.5	100	201
NC-2	8.5	17	60	208
NCM-2	8.5	25	70	209
NC-4	8.5	17	60	214
NCM-4	8.5	25	70	216
NE-2	8.5	20	65	220
NE-3	8.5	20	65	220
ALZ345	8.5x25.5	12.8	75	238
<b>Ø 8.6</b>				
MSZ345	8.6	19	75	144
NX-25	8.6	8.6	65	193
NX-30	8.6	17.2	70	195
NX-35	8.6	25.8	80	197
NX-40	8.6	34.4	100	199
NX-45	8.6	43	100	201
NC-4	8.6	17.2	65	214
ALZ345	8.6x25.8	12.9	75	238
<b>Ø 8.7</b>				
MSZ345	8.7	19	75	144
NX-25	8.7	8.7	65	193
NX-30	8.7	17.4	70	195
NX-35	8.7	26.1	80	197
NX-40	8.7	34.8	100	199
NX-45	8.7	43.5	100	201
NC-4	8.7	17.4	65	214
ALZ345	8.7x26.1	13.4	75	238
<b>Ø 8.8</b>				
MSZ345	8.8	19	75	144
NX-25	8.8	8.8	65	193
NX-30	8.8	17.6	70	195
NX-35	8.8	26.4	80	197
NX-40	8.8	35.2	100	199
NX-45	8.8	44	100	201
NC-4	8.8	17.6	65	214
ALZ345	8.8x25.8	12.9	75	238
<b>Ø 8.9</b>				
MSZ345	8.9	19	75	144

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>NX-25</b>	8.9	8.9	65	193
<b>NX-30</b>	8.9	17.8	70	195
<b>NX-35</b>	8.9	26.7	80	197
<b>NX-40</b>	8.9	35.6	100	199
<b>NX-45</b>	8.9	44.5	100	201
<b>NC-4</b>	8.9	17.8	65	214
<b>ALZ345</b>	8.9x26.7	13.2	75	238
<b>Ø 9</b>				
<b>MX225</b>	9	9	75	108
<b>MX230</b>	9	18	75	108
<b>MX235</b>	9	27	75	110
<b>MX240</b>	9	36	100	111
<b>MX245</b>	9	45	100	112
<b>MSE230</b>	9	23	70	127
<b>MSE430</b>	9	23	70	132
<b>MSZ345</b>	9	19	75	136
<b>MSX440</b>	9	22	70	147
<b>NX-25</b>	9	9	65	193
<b>NX-30</b>	9	18	70	195
<b>NX-35</b>	9	27	80	197
<b>NX-40</b>	9	36	100	199
<b>NX-45</b>	9	45	100	201
<b>NC-2</b>	9	18	65	208
<b>NCM-2</b>	9	27	75	209
<b>NC-LS-2</b>	9	18	150	210
<b>NC-4</b>	9	18	65	214
<b>NCM-4</b>	9	27	75	216
<b>NE-2</b>	9	20	65	220
<b>NE-3</b>	9	20	65	220
<b>NSL-2</b>	9	18	65	225
<b>AL2D-2</b>	9	18	75	233
<b>AL3D-2</b>	9	27	75	234
<b>AL4D-2</b>	9	36	100	234
<b>AL5D-2</b>	9	45	100	235
<b>AL2D-2DLC</b>	9	18	75	235
<b>AL3D-2DLC</b>	9	27	75	236
<b>AL4D-2DLC</b>	9	36	100	236
<b>AL5D-2DLC</b>	9	45	100	237
<b>ALZ345</b>	9x27	13.5	75	238
<b>ALZ345-DLC</b>	9x27	13.5	75	242
<b>Ø 9.1</b>				
<b>MSZ345</b>	9.1	20	75	144
<b>NX-25</b>	9.1	9.1	65	193
<b>NX-30</b>	9.1	18.2	70	195
<b>NX-35</b>	9.1	27.3	80	197
<b>NX-40</b>	9.1	36.4	100	199
<b>NX-45</b>	9.1	45.5	100	201
<b>NC-4</b>	9.1	18.2	65	214
<b>ALZ345</b>	9.1x27.3	13.7	75	238
<b>Ø 9.2</b>				
<b>MSZ345</b>	9.2	20	75	144
<b>NX-25</b>	9.2	9.2	65	193
<b>NX-30</b>	9.2	18.4	70	195
<b>NX-35</b>	9.2	27.6	80	197
<b>NX-40</b>	9.2	36.8	100	199
<b>NX-45</b>	9.2	46	100	201
<b>NC-4</b>	9.2	18.4	65	214
<b>ALZ345</b>	9.2x27.6	13.8	75	238
<b>Ø 9.3</b>				
<b>MSZ345</b>	9.3	20	75	144
<b>NX-25</b>	9.3	9.3	65	193
<b>NX-30</b>	9.3	18.6	70	195
<b>NX-35</b>	9.3	27.9	80	197
<b>NX-40</b>	9.3	37.2	100	199
<b>NX-45</b>	9.3	46.5	100	201
<b>NC-4</b>	9.3	18.6	65	214
<b>ALZ345</b>	9.3x27.9	14.1	75	238

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>Ø 9.4</b>				
<b>MSZ345</b>	9.4	20	75	144
<b>NX-25</b>	9.4	9.4	65	193
<b>NX-30</b>	9.4	18.8	70	195
<b>NX-35</b>	9.4	28.2	80	197
<b>NX-40</b>	9.4	37.6	100	199
<b>NX-45</b>	9.4	47	100	201
<b>NC-4</b>	9.4	18.8	65	214
<b>ALZ345</b>	9.4x28.5	14.3	75	238
<b>Ø 9.5</b>				
<b>MSE230</b>	9.5	24	75	127
<b>MSE430</b>	9.5	24	75	132
<b>MSZ345</b>	9.5	20	75	144
<b>NX-25</b>	9.5	9.5	65	193
<b>NX-30</b>	9.5	19	70	195
<b>NX-35</b>	9.5	28.5	80	197
<b>NX-40</b>	9.5	38	100	199
<b>NX-45</b>	9.5	47.5	100	201
<b>NC-2</b>	9.5	19	65	208
<b>NCM-2</b>	9.5	28	75	209
<b>NC-4</b>	9.5	19	65	214
<b>NCM-4</b>	9.5	28	75	216
<b>NE-2</b>	9.5	20	65	220
<b>NE-3</b>	9.5	20	65	220
<b>ALZ345</b>	9.5x28.5	14.3	75	238
<b>Ø 9.6</b>				
<b>MSZ345</b>	9.6	21	75	144
<b>NX-25</b>	9.6	9.6	65	193
<b>NX-30</b>	9.6	19.2	70	195
<b>NX-35</b>	9.6	28.8	80	197
<b>NX-40</b>	9.6	38.4	100	199
<b>NX-45</b>	9.6	48	100	201
<b>NC-4</b>	9.6	19.2	70	214
<b>ALZ345</b>	9.6x28.8	14.4	75	238
<b>Ø 9.7</b>				
<b>MSZ345</b>	9.7	21	75	144
<b>NX-25</b>	9.7	9.7	65	193
<b>NX-30</b>	9.7	19.4	70	195
<b>NX-35</b>	9.7	29.1	80	197
<b>NX-40</b>	9.7	38.8	100	199
<b>NX-45</b>	9.7	48.5	100	201
<b>NC-4</b>	9.7	19.4	70	214
<b>ALZ345</b>	9.7x29.1	14.6	75	238
<b>Ø 9.8</b>				
<b>MSZ345</b>	9.8	21	75	144
<b>NX-25</b>	9.8	9.8	65	193
<b>NX-30</b>	9.8	19.6	70	195
<b>NX-35</b>	9.8	29.4	80	197
<b>NX-40</b>	9.8	39.2	100	199
<b>NX-45</b>	9.8	49	100	201
<b>NC-4</b>	9.8	19.6	70	214
<b>ALZ345</b>	9.8x29.4	14.7	75	238
<b>Ø 9.9</b>				
<b>MSZ345</b>	9.9	21	75	144
<b>NX-25</b>	9.9	9.9	65	193
<b>NX-30</b>	9.9	19.8	70	195
<b>NX-35</b>	9.9	29.7	80	197
<b>NX-40</b>	9.9	39.6	100	199
<b>NX-45</b>	9.9	49.5	100	201
<b>NC-4</b>	9.9	19.8	70	214
<b>ALZ345</b>	9.9x29.7	14.9	75	238
<b>Ø 10</b>				
<b>MX225</b>	10	10	75	108
<b>MX230</b>	10	20	75	108
<b>MX235</b>	10	30	75	110
<b>MX240</b>	10	40	100	111
<b>MX245</b>	10	50	100	112
<b>MX425</b>	10	10	75	118

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
MX430	10	20	75	118
MX435	10	30	75	119
MX440	10	40	100	119
MX445	10	50	100	120
MSES230P	10	20	75	127
MSE230	10	25	75	127
MSEM230	10	40	100	129
MSE430P	10	25	75	132
MSE430	10	25	75	132
MSEM430	10	40	100	133
MSE245	10	25	75	136
MSE345	10	25	75	136
MSE445	10	25	75	137
MSZ345	10	22	75	144
MSX440	10	22	70	147
MHDH645	10	20	75	149
MHDH645	10	30	80	149
MHD645	10	25	75	151
NX-30X	10	20	70	158
NX-25	10	10	65	193
NX-30	10	20	70	195
NX-35	10	30	80	197
NX-40	10	40	100	199
NX-45	10	50	100	201
NC-2	10	20	70	208
NCM-2	10	30	80	209
NCL-2	10	42	100	210
NC-LS-2	10	20	150	210
NC-4	10	20	70	214
NCM-4	10	30	80	216
NCL-4	10	42	100	216
NE-2	10	20	65	220
NE-3	10	20	65	220
NE-4	10	20	65	221
NEL-3	10	45	110	221
NSL-2	10	20	70	225
DX	10	20	80	225
DXM	10	40	100	227
DXL	10	50	110	227
DHS	10	25	90	228
AL2D-2	10	20	75	233
AL3D-2	10	30	75	234
AL4D-2	10	40	100	234
AL5D-2	10	50	100	235
AL2D-2DLC	10	20	75	235
AL3D-2DLC	10	30	75	236
AL4D-2DLC	10	40	100	236
AL5D-2DLC	10	50	100	237
AL-3LS	10	15	130	243
NEA-2	10	26	75	243
NEA-2	10	36	85	243
NEA-2	10	46	95	243
DSF	10x10	5	80	228
ALZ345	10x30	15	75	238
ALZ345-DLC	10x30	15	75	242
MHR430	10x40	15	110	176
MHR430	10x60	15	130	176
MHR430	10x80	15	150	176
<b>Ø 10.1</b>				
MSZ345	10.1	22	80	144
NX-25	10.1	10.1	70	193
NX-30	10.1	20.2	75	195
NX-35	10.1	30.3	80	197
NX-40	10.1	40.4	105	199
NX-45	10.1	50.5	110	201
NC-4	10.1	20.2	75	214
ALZ345	10.1x30.3	15.2	80	238

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
<b>Ø 10.2</b>				
MSZ345	10.2	22	80	144
NX-25	10.2	10.2	70	193
NX-30	10.2	20.4	75	195
NX-35	10.2	30.6	80	197
NX-40	10.2	40.8	105	199
NX-45	10.2	51	110	201
NC-4	10.2	20.4	75	214
ALZ345	10.2x30.6	15.3	80	238
<b>Ø 10.3</b>				
MSZ345	10.3	22	80	144
NX-25	10.3	10.3	70	193
NX-30	10.3	20.6	75	195
NX-35	10.3	30.9	80	197
NX-40	10.3	41.2	105	199
NX-45	10.3	51.5	110	201
NC-4	10.3	20.6	75	214
ALZ345	10.3x30.9	15.5	80	238
<b>Ø 10.4</b>				
MSZ345	10.4	22	80	144
NX-25	10.4	10.4	70	193
NX-30	10.4	20.8	75	195
NX-35	10.4	31.2	80	197
NX-40	10.4	41.6	105	199
NX-45	10.4	52	110	201
NC-4	10.4	20.8	75	214
ALZ345	10.4x31.2	15.6	80	238
<b>Ø 10.5</b>				
MSE230	10.5	27	80	127
MSZ345	10.5	22	80	144
NX-25	10.5	10.5	70	193
NX-30	10.5	21	75	195
NX-35	10.5	31.5	80	197
NX-40	10.5	42	105	199
NX-45	10.5	52.5	110	201
NC-4	10.5	21	75	214
ALZ345	10.5x31.5	15.8	80	238
<b>Ø 10.6</b>				
MSZ345	10.6	22	80	144
NX-25	10.6	10.6	70	193
NX-30	10.6	21.2	75	195
NX-35	10.6	31.8	80	197
NX-40	10.6	42.4	105	199
NX-45	10.6	53	110	201
NC-4	10.6	21.2	75	214
ALZ345	10.6x31.8	15.9	80	238
<b>Ø 10.7</b>				
MSZ345	10.7	22	80	144
NX-25	10.7	10.7	70	193
NX-30	10.7	21.4	75	195
NX-35	10.7	32.1	80	197
NX-40	10.7	42.8	105	199
NX-45	10.7	53.5	110	201
NC-4	10.7	21.4	75	214
ALZ345	10.7x34.1	16.1	80	238
<b>Ø 10.8</b>				
MSZ345	10.8	22	80	144
NX-25	10.8	10.8	70	193
NX-30	10.8	21.6	75	195
NX-35	10.8	32.4	80	197
NX-40	10.8	43.2	105	199
NX-45	10.8	54	110	201
NC-4	10.8	21.6	75	214
ALZ345	10.8x32.4	16.2	80	238
<b>Ø 10.9</b>				
MSZ345	10.9	22	80	144
NX-25	10.9	10.9	70	193
NX-30	10.9	21.8	75	195

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NX-35	10.9	32.7	80	197
NX-40	10.9	43.6	105	199
NX-45	10.9	54.5	110	201
NC-4	10.9	21.8	75	214
ALZ345	10.9x32.7	16.4	80	238
<b>Ø 11</b>				
MSE230	11	28	80	127
MSZ345	11	22	80	144
MSX440	11	26	80	147
NX-25	11	11	70	193
NX-30	11	22	75	195
NX-35	11	33	80	197
NX-40	11	44	105	199
NX-45	11	55	110	201
NC-2	11	22	75	208
NCM-2	11	33	80	209
NC-LS-2	11	22	170	210
NC-4	11	22	75	214
NCM-4	11	33	80	216
NE-2	11	23	70	220
NE-3	11	23	70	220
NSL-2	11	22	75	225
AL2D-2	11	22	80	233
AL3D-2	11	33	90	234
AL5D-2	11	55	110	235
AL3D-2DLC	11	33	90	236
ALZ345	11x33	16.5	80	238
ALZ345-DLC	11x33	16.5	80	242
<b>Ø 11.1</b>				
MSZ345	11.1	25	80	144
NX-25	11.1	11.1	70	193
NX-30	11.1	22.2	75	195
NX-35	11.1	33.3	80	197
NX-40	11.1	44.4	105	199
NX-45	11.1	55.5	110	201
NC-4	11.1	22.2	75	214
ALZ345	11.1x33.3	16.7	80	238
<b>Ø 11.2</b>				
MSZ345	11.2	25	80	144
NX-25	11.2	11.2	70	193
NX-30	11.2	22.4	75	195
NX-35	11.2	33.6	80	197
NX-40	11.2	44.8	105	199
NX-45	11.2	56	110	201
NC-4	11.2	22.4	75	214
ALZ345	11.2x33.6	16.8	80	238
<b>Ø 11.3</b>				
MSZ345	11.3	25	80	144
NX-25	11.3	11.3	70	193
NX-30	11.3	22.6	75	195
NX-35	11.3	33.9	80	197
NX-40	11.3	45.2	105	199
NX-45	11.3	56.5	110	201
NC-4	11.3	22.6	75	214
ALZ345	11.3x33.9	17	80	238
<b>Ø 11.4</b>				
MSZ345	11.4	25	80	144
NX-25	11.4	11.4	70	193
NX-30	11.4	22.8	75	195
NX-35	11.4	34.2	80	197
NX-40	11.4	45.6	105	199
NX-45	11.4	57	110	201
NC-4	11.4	22.8	75	214
ALZ345	11.4x34.2	17.1	80	238
<b>Ø 11.5</b>				
MSE230	11.5	29	80	127
MSZ345	11.5	25	80	144
NX-25	11.5	11.5	70	193

Modello Model	Dia. (x Lungh. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NX-30	11.5	23	75	195
NX-35	11.5	34.5	80	197
NX-40	11.5	46	105	199
NX-45	11.5	57.5	110	201
NC-4	11.5	23	75	214
ALZ345	11.5x34.5	17.3	80	238
<b>Ø 11.6</b>				
MSZ345	11.6	25	80	144
NX-25	11.6	11.6	70	193
NX-30	11.6	23.2	75	195
NX-35	11.6	34.8	80	197
NX-40	11.6	46.4	105	199
NX-45	11.6	58	110	201
NC-4	11.6	23.2	75	214
ALZ345	11.6x34.8	17.4	80	238
<b>Ø 11.7</b>				
MSZ345	11.7	25	80	144
NX-25	11.7	11.7	70	193
NX-30	11.7	23.4	75	195
NX-35	11.7	35.1	80	197
NX-40	11.7	46.8	105	199
NX-45	11.7	58.5	110	201
NC-4	11.7	23.4	75	214
ALZ345	11.7x35.1	17.6	80	238
<b>Ø 11.8</b>				
MSZ345	11.8	25	80	144
NX-25	11.8	11.8	70	193
NX-30	11.8	23.6	75	195
NX-35	11.8	35.4	80	197
NX-40	11.8	47.2	105	199
NX-45	11.8	59	110	201
NC-4	11.8	23.6	75	214
ALZ345	11.8x35.4	17.7	80	238
<b>Ø 11.9</b>				
MSZ345	11.9	25	80	144
NX-25	11.9	11.9	70	193
NX-30	11.9	23.8	75	195
NX-35	11.9	35.7	80	197
NX-40	11.9	47.6	105	199
NX-45	11.9	59.5	110	201
NC-4	11.9	23.8	75	214
ALZ345	11.9x35.7	17.9	80	238
<b>Ø 12</b>				
MX225	12	12	80	108
MX230	12	24	80	108
MX235	12	36	80	110
MX240	12	48	105	111
MX245	12	60	105	112
MX425	12	12	80	118
MX430	12	24	80	118
MX435	12	36	80	119
MX440	12	48	105	119
MX445	12	60	105	120
MSES230P	12	24	80	127
MSE230	12	30	80	127
MSEM230	12	48	110	129
MSE430P	12	30	80	132
MSE430	12	30	80	132
MSEM430	12	48	110	133
MSE245	12	30	80	136
MSE345	12	30	80	136
MSE445	12	30	80	137
MSZ345	12	26	80	144
MSX440	12	26	80	147
MHDH645	12	24	80	149
MHDH645	12	36	90	149
MHD645	12	30	80	151
NX-30X	12	24	75	158

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NX-25	12	12	70	193
NX-30	12	24	75	195
NX-35	12	36	85	197
NX-40	12	48	105	199
NX-45	12	60	110	201
NC-2	12	24	75	208
NCM-2	12	36	85	209
NCL-2	12	45	100	210
NC-LS-2	12	24	170	210
NC-4	12	24	75	214
NCM-4	12	36	85	216
NCL-4	12	45	100	216
NE-2	12	23	70	220
NE-3	12	23	70	220
NE-4	12	23	70	221
NEL-3	12	55	120	221
NSL-2	12	24	75	225
DX	12	24	80	225
DXM	12	48	110	227
DXL	12	60	120	227
DHS	12	30	90	228
AL2D-2	12	24	80	233
AL3D-2	12	36	90	234
AL4D-2	12	48	110	234
AL5D-2	12	60	110	235
AL2D-2DLC	12	24	80	235
AL3D-2DLC	12	36	90	236
AL4D-2DLC	12	48	110	236
AL5D-2DLC	12	60	110	237
AL-3LS	12	18	150	243
NEA-2	12	28	80	243
NEA-2	12	38	90	243
NEA-2	12	48	100	243
DSF	12x12	6	80	228
ALZ345	12x36	18	80	238
ALZ345-DLC	12x36	18	80	242
<b>Ø 13</b>				
MSX440	13	26	90	147
NE-3	13	30	85	220
<b>Ø 14</b>				
MSE430	14	35	100	132
MSX440	14	26	90	147
NC-2	14	28	85	208
NCM-2	14	42	100	209
NC-4	14	28	85	214
NCM-4	14	42	100	216
NE-2	14	30	85	220
NE-3	14	30	85	220
NE-4	14	30	85	221
NEL-3	14	65	140	221
<b>Ø 15</b>				
MSE430	15	40	110	132
MSX440	15	32	90	147
NC-2	15	30	100	208
NCM-2	15	45	110	209
NC-4	15	30	100	214
NCM-4	15	45	110	216
NE-2	15	35	90	220

Modello Model	Dia. (x Lung. Utile) Dia.(xEffective Length)	Lungh. tagl. Length of Cut	Lungh. totale Overall Length	Pagina Page
NE-3	15	35	90	220
NE-4	15	35	90	221
<b>Ø 16</b>				
MSE430	16	40	110	132
MSEM430	16	64	130	133
MSE345	16	40	110	136
MSE445	16	40	110	137
MSX440	16	32	90	147
NC-2	16	32	100	208
NCM-2	16	50	110	209
NC-4	16	32	100	214
NCM-4	16	50	110	216
NE-2	16	35	90	220
NE-3	16	35	90	220
NE-4	16	35	90	221
NEL-3	16	65	140	221
DX	16	32	100	225
DXM	16	64	140	227
DXL	16	80	160	227
DHS	16	40	100	228
NEA-2	16	40	100	243
NEA-2	16	65	130	243
DSF	16x16	8	100	228
<b>Ø 18</b>				
MSE430	18	45	120	132
MSX440	18	32	105	147
NC-2	18	36	110	208
NCM-2	18	55	130	209
NC-4	18	36	110	214
NCM-4	18	55	130	216
NE-2	18	40	100	220
NE-3	18	40	100	220
NE-4	18	40	100	221
NEL-3	18	75	155	221
<b>Ø 20</b>				
MSE430	20	50	135	132
MSEM430	20	80	140	133
MSE345	20	50	135	136
MSE445	20	50	135	137
MSX440	20	38	105	147
NC-2	20	40	115	208
NCM-2	20	60	135	209
NC-4	20	40	115	214
NCM-4	20	60	135	216
NE-2	20	45	110	220
NE-3	20	45	110	220
NE-4	20	45	110	221
NEL-3	20	85	165	221
DX	20	40	120	225
DXM	20	80	160	227
DXL	20	100	190	227
DHS	20	50	120	228
NEA-2	20	45	110	243
NEA-2	20	80	140	243
DSF	20x20	10	120	228
<b>Ø 25</b>				
NEA-2	25	50	120	243

<b>Codice</b> Code No.	<b>Modello</b> Model	<b>Pagina</b> Page
<b>01-</b>		
01-00001	NSME100	192
01-00002	NSME230	192
01-00003	NSMB100	331
01-00025	NX-25	193
01-00030	NX-30	195
01-00031	NX-30X	158
01-00035	NX-35	197
01-00040	NX-40	199
01-00045	NX-45	201
01-00112	NE-2	220
01-00113	NE-3	220
01-00114	NE-4	221
01-00116	NEL-3	221
01-00212	NC-2	208
01-00222	NCL-2	210
01-00224	NCL-4	216
01-00232	NCM-2	209
01-00234	NCM-4	216
01-00242	NC-LS-2	210
01-00244	NC-4	214
01-00312	NTE-2	373
01-00313		
01-00314	NTE-4	377
01-00315		
01-00316	NTE-2X	361
01-00317	NTE-4X	362
01-00322	NTEL-2	376
01-00323		
01-00324	NTEL-4	379
01-00325		
01-00332	NTEM-2	375
01-00336	NTEM-2X	364
01-00352	NTB-2	391
01-00362	NTER-2X	368
01-00412	NHR-2	260
01-00413	NHR-2X	190
01-00425	NRF-4	384
01-00432	NHB-2	337
01-00440	SSE400	60
01-00450	SSE600	60
01-00460	SMB120	59
01-00470	SSF120	74
01-00480	SMEZ120	58
01-00490	SSR200	69
01-00495	SHR320	73
01-00500	SFB200	62
01-00505	SSPB220	63
01-00506	SSPBL220	64
01-00507	SSPBTN220	65

<b>Codice</b> Code No.	<b>Modello</b> Model	<b>Pagina</b> Page
01-00510	SSB200	67
01-00511	SSBL200	68
01-00512	NCB-2	333
01-00513	NCB-2X	282
01-00522	NSB-2	333
01-00523	NSB-2X	283
01-00528	NLBL-2	336
01-00530	NSBL-2	335
01-00622	NEA-2	243
01-00631	AL2D-2	233
01-00632	AL3D-2	234
01-00633	AL4D-2	234
01-00634	AL5D-2	235
01-00635	AL3D-2DLC	236
01-00636	ALZ345	238
01-00637	AL-3LS	243
01-00638	ALB225	340
01-00640	RSES230	251
01-00644	RSE230	256
01-00654	RSB230	343
01-00661	AL2D-2DLC	235
01-00663	AL4D-2DLC	236
01-00664	AL5D-2DLC	237
01-00666	ALZ345-DLC	242
01-00668	ALB225-DLC	341
01-00712	NER-2	372
01-00722	NERB-2	392
01-00732	NERR-2X	366
01-00772	NSR-2	438
01-00812	NSL-2	225
01-00912	NCR-2	452
01-00913	NCR-2X	450
01-00996	NPC	473
<b>04-</b>		
04-00001	NSMD	456
04-00002	NSMD-M	459
04-00005	NSMD-S	457
04-00006	NSMD-MS	460
04-00010	NSPD	458
04-00012	NSPD-M	461
04-00050	MSDH	468
04-00100	CED100	86
04-00200	MDR-R	463
04-00210	MDR-PD	466
04-00230	MFD	470
04-00250	NCSV	446
04-00260	NCSV-M	446
04-00300	PCDSE	87
04-00500	PCDRB	89
04-00700	PCDRS	91

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<b>05-</b>		
05-00035	DCSE235	154
05-00100	DCMS	156
05-00200	DCHR230	188
05-00500	DCMB	280
05-00520	DCRB230	329
<b>06-</b>		
06-00001	MMTS	440
06-00002	MMTM	442
06-00003	MMTU	444
<b>07-</b>		
07-00001	DSF	228
07-00036	DX	225
07-00040	DXM	227
07-00045	DXL	227
07-00313	DTE	387
07-00322	DTEL	389
07-00333	DHS	228
<b>07-</b>		
07-00432	DHB	346
07-00523	DB	347
07-00913	DIR	454
<b>08-</b>		
08-00005	MXH225	93
08-00006	MXH230	94
08-00007	MXH235	95
08-00008	MXH240	96
08-00009	MXH245	96
08-00015	MXH225P	97
08-00016	MXH230P	98
08-00017	MXH235P	99
08-00025	MX225	108
08-00030	MX230	108
08-00035	MX235	110
08-00040	MX240	111
08-00045	MX245	112
08-00075	MX425	118
08-00080	MX430	118
08-00085	MX435	119
08-00090	MX440	119
08-00095	MX445	120
08-00100	MSE230	127
08-00101	MSEM230	129
08-00102	MSES230P	127
08-00103	MSE230SS	126
08-00105	MSE230M	129
08-00110	MSE430	132
08-00111	MSEM430	133
08-00112	MSE430P	132
08-00120	MSE245	136

<b>Codice</b> Code No.	<b>Modello</b> Model	<b>Pagina</b> Page
08-00130	MSE345	136
08-00133	MSZ345	144
08-00140	MSE445	137
08-00144	MSX440	147
08-00150	MSXH440R	396
08-00200	MHR230	411
08-00202	MHRLN230-6	187
08-00207	MHRH230	160
08-00210	MHR430	422
08-00217	MHRH430	163
08-00220	MHR230R	411
08-00227	MHRH230R	400
08-00230	MHR430R	422
08-00237	MHRH430R	402
08-00300	MTE230	349
08-00310	MRT425	355
08-00400	MHD445	151
08-00410	MHD645	151
08-00427	MHDH445	149
<b>08-</b>		
08-00428	MHDH645	149
08-00437	MHDH445R	398
08-00438	MHDH645R	398
08-00500	MSB230	272
08-00501		
08-00504	MSB230SF	271
08-00505	MSB230G2	270
08-00507	MSBH230	264
08-00510	MSBL230	274
08-00511	MSBXL230	279
08-00520	MRB230	299
08-00521		
08-00522	MRBLN230-6	311
08-00525	MRB230SF	295
08-00527	MRBH230	286
08-00530	MSB230S	270
08-00540	MTB230	359
08-00554	MACH225SF	267
08-00555	MACH225	268
08-00570	MRBTN230	316
08-00580	MRBTN230L	325
08-00590	MRBTN345	312
08-00600	MSB345	277
08-00607	MSBH345	265
08-00700	MSRS230	393
08-00710	MSRS430	394
08-00770	MSTNR230	431
08-00900	MIR200	448

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<b>A</b>		
AL2D-2	01-00631	233
AL2D-2DLC	01-00661	235
AL3D-2	01-00632	234
AL3D-2DLC	01-00635	236
AL4D-2	01-00633	234
AL4D-2DLC	01-00663	236
AL5D-2	01-00634	235
AL5D-2DLC	01-00664	237
AL-3LS	01-00637	243
ALB225	01-00638	340
ALB225-DLC	01-00668	341
ALZ345	01-00636	238
ALZ345-DLC	01-00666	242
<b>C</b>		
CED100	04-00100	86
<b>D</b>		
DB	07-00523	345
<b>DC</b>		
DCHR230	05-00200	188
DCMB	05-00500	280
DCMS	05-00100	156
DCRB230	05-00520	329
DCSE235	05-00035	154
<b>DH</b>		
DHB	07-00432	346
DHS	07-00333	228
<b>DI</b>		
DIR	07-00913	454
<b>DS</b>		
DSF	07-00001	228
<b>DT</b>		
DTE	07-00313	387
DTL	07-00322	389
<b>DX</b>		
DX	07-00036	225
DXL	07-00045	227
DXM	07-00040	227
<b>M</b>		
MACH225	08-00555	268
MACH225SF	08-00554	267
<b>MF</b>		
MFD	04-00230	470
<b>MD</b>		
MDR-PD	04-00210	466
MDR-R	04-00200	463
<b>MH</b>		
MHD445	08-00400	151
MHD645	08-00410	151
MHDH445	08-00427	149
MHDH445R	08-00437	398
MHDH645	08-00428	149
MHDH645R	08-00438	398
MHR230	08-00200	170
MHR230R	08-00220	411
	08-00221	411

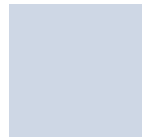
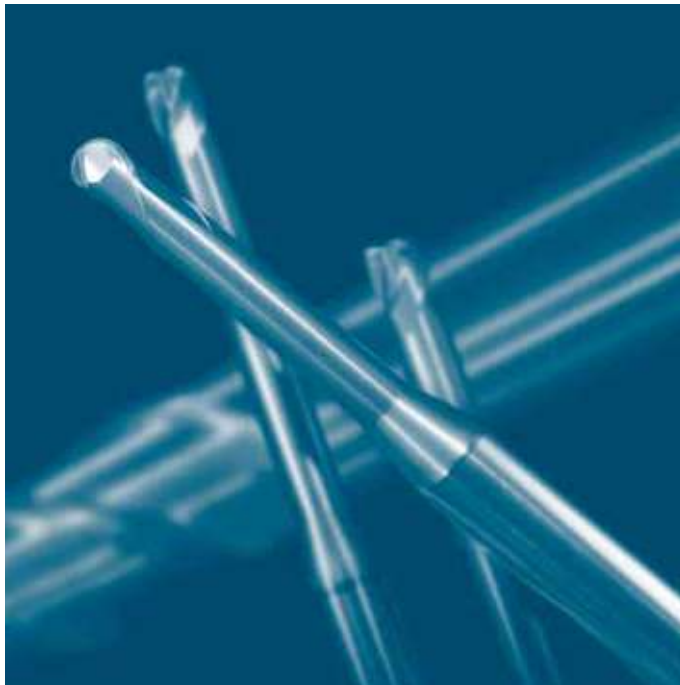
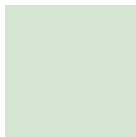
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MHR430	08-00210	176
MHR430R	08-00230	422
MHRH230	08-00207	160
MHRH230R	08-00227	400
MHRH430	08-00217	163
MHRH430R	08-00237	402
MHRLN230-6	08-00202	187
<b>MI</b>		
MIR200	08-00900	448
<b>MM</b>		
MMTS	06-00001	440
MMTM	06-00002	442
MMTU	06-00003	444
<b>MR</b>		
MRB230	08-00520	299
	08-00521	299
MRB230SF	08-00525	295
MRBH230	08-00527	286
MRBLN230-6	08-00522	311
MRBTN230	08-00570	316
MRBTN230L	08-00580	325
MRBTNH345	08-00590	312
MRT425	08-00310	355
<b>MS</b>		
MSB230	08-00500	272
	08-00501	272
MSB230G2	08-00505	270
MSB230S	08-00530	270
MSB230SF	08-00504	271
MSB345	08-00600	277
MSBH230	08-00507	264
MSBH345	08-00607	265
MSBL230	08-00510	274
MSBXL230	08-00511	279
MSDH	04-00050	468
MSE230	08-00100	127
MSE230M	08-00105	129
MSE230SS	08-00103	126
MSE245	08-00120	136
MSE345	08-00130	136
MSE430	08-00110	132
MSE430P	08-00112	132
MSE445	08-00140	137
MSEM230	08-00101	129
MSEM430	08-00111	133
MSES230P	08-00102	127
MSRS230	08-00700	393
MSRS430	08-00710	394
MSTNR230	08-00770	431
MSX440	08-00144	147
MSXH440R	08-00150	396
MSZ345	08-00133	144
<b>MT</b>		
MTB230	08-00540	359
MTE230	08-00300	349



Modello Model	Codice Code No.	Pagina Page
<b>MX</b>		
MXH225	08-00005	93
MXH230	08-00006	94
MXH235	08-00007	95
MXH240	08-00008	96
MXH245	08-00009	96
MXH225P	08-00015	97
MXH230P	08-00016	98
MXH235P	08-00017	99
MX225	08-00025	108
MX230	08-00030	108
MX235	08-00035	110
MX240	08-00040	111
MX245	08-00045	112
MX425	08-00075	118
MX430	08-00080	118
MX435	08-00085	119
MX440	08-00090	119
MX445	08-00095	120
<b>NC</b>		
NC-2	01-00212	208
NC-4	01-00244	214
NCB-2	01-00512	333
NCB-2X	01-00513	282
NCL-2	01-00222	210
NCL-4	01-00224	216
NC-LS-2	01-00242	210
NCM-2	01-00232	209
NCM-4	01-00234	216
NCR-2	01-00912	452
NCR-2X	01-00913	450
<b>NE</b>		
NE-2	01-00112	220
NE-3	01-00113	220
NE-4	01-00114	221
NEA-2	01-00622	243
NEL-3	01-00116	221
NER-2	01-00712	372
NERB-2	01-00722	392
NERR-2X	01-00732	366
<b>NH</b>		
NHB-2	01-00432	337
NHR-2	01-00412	260
NHR-2X	01-00413	190
<b>NL</b>		
NLBL-2	01-00528	336
<b>NP</b>		
NPC	01-00996	473
<b>NR</b>		
NRF-4	01-00425	384
<b>NS</b>		
NSB-2	01-00522	333
NSB-2X	01-00523	283
NSBL-2	01-00530	335
NSL-2	01-00812	225
NSMB100	01-00003	331

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NSMD	04-00001	456
NSMD-M	04-00002	459
NSMD-MS	04-00006	460
NSMD-S	04-00005	457
NSME100	01-00001	192
NSME230	01-00002	192
NSPD	04-00010	458
NSPD-M	04-00012	461
NSR-2	01-00772	438
<b>NT</b>		
NTB-2	01-00352	391
NTE-2	01-00312	373
NTE-2	01-00313	373
NTE-2X	01-00316	361
NTE-4	01-00314	377
NTE-4	01-00315	377
NTE-4X	01-00317	362
NTEL-2	01-00322	376
NTEL-2	01-00323	376
NTEL-4	01-00324	379
NTEL-4	01-00325	379
NTEM-2	01-00332	395
NTEM-2X	01-00336	364
NTER-2X	01-00362	368
<b>NX</b>		
NX-25	01-00025	193
NX-30	01-00030	195
NX-30X	01-00031	158
NX-35	01-00035	197
NX-40	01-00040	199
NX-45	01-00045	201
<b>P</b>		
PCDSE	04-00300	87
PCDRB	04-00500	89
PCDRS	04-00700	91
<b>RS</b>		
RSB230	01-00654	343
RSE230	01-00644	256
RSES230	01-00640	251
<b>SH</b>		
SHR320	01-00495	73
<b>SF</b>		
SFB200	01-00500	62
<b>SM</b>		
SMB120	01-00460	59
SMEZ120	01-00480	58
<b>SS</b>		
SSB200	01-00510	67
SSBL200	01-00511	68
SSE400	01-00440	60
SSE600	01-00450	60
SSF120	01-00470	74
SSPB220	01-00505	63
SSPBL220	01-00506	64
SSPBTN220	01-00507	65
SSR200	01-00490	69





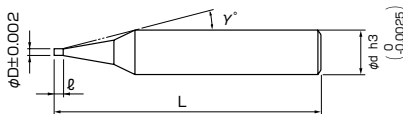
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<b>Diamante</b> .....	p. 86
Diamond	
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**CBN**  
Nitruro Cubico di Boro

# SMEZ120

CBN "MICRO EDGE Z"

## Frese Piane CBN "MICRO EDGE Z"



- Spigolo vivo realizzato con la tecnologia avanzata NS e materiale CBN selezionato.
- La tolleranza del diametro del tagliente è  $\pm 2\mu\text{m}$ .
- La tolleranza del gambo è h3 (0~-0.0025).
- NS engineering technology and selected CBN material realize sharp edge.
- Tolerance of flute diameter is  $\pm 2\mu\text{m}$ .
- Tolerance of shank diameter is h3 (0~-0.0025).



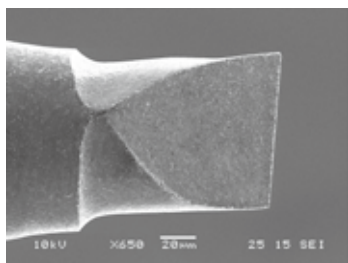
Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(l) Lunghezza tagliente Length of Cut	( $\gamma$ ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lunghezza totale Overall Length
01-00480-00030	0.03	0.03	15°	4	50
01-00480-00040	0.04	0.04	15°	4	50
01-00480-00050	0.05	0.05	15°	4	50
01-00480-00060	0.06	0.06	15°	4	50
01-00480-00070	0.07	0.07	15°	4	50
01-00480-00080	0.08	0.08	15°	4	50
01-00480-00090	0.09	0.09	15°	4	50
01-00480-00100	0.1	0.1	15°	4	50

### Attenzione

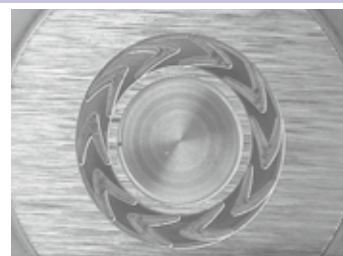
Quando ordinate, indicate SMEZ120 (D). ※ ( $\gamma$ ) è un valore di riferimento.  
When you order, indicate CBE120 (D). ※ ( $\gamma$ ) is reference value.

SMEZ120



L'originale design del tagliente delle frese CBN Micro Edge Z.  
CBN Micro Edge Z original flute design.

### Dati Tecnici Technical Data



L'originale design del tagliente conferisce alta rigidità e lunga durata alla vita utensile e un'eccelsa finitura superficiale.

- ※Speciale design del tagliente.
- ※Il raggio del tagliente è inferiore a R5 $\mu\text{m}$ .

NS original flute design realizes both high rigidity and long life of the tool, and excels in fine finishing surface.

- ※Special design at cutting edge.
- ※Corner radius on the edge at smaller than R5 $\mu\text{m}$ .

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

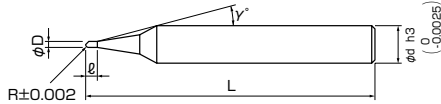
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

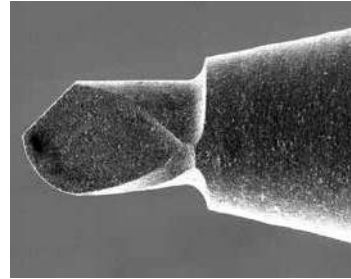
# SMB120

CBN Ball End Mill for precision machining "CBN Micro Ball"

## Frese sferiche CBN per lavorazioni di precisione "CBN Micro Ball"



- La prima microfresa CBN sferica al mondo.
- La microfresa sferica in CBN rende possibili nuove lavorazioni di elevata precisione.
- Misure standard a partire da R0.01.
- La nuova geometria di taglio sfrutta al massimo le potenzialità del CBN.
- Sono possibili lunghe lavorazioni su acciai pretemprati e temprati (60HRC~).
- The world's first CBN Micro Ball End Mill.
- CBN Micro Ball develops new machining capability in high-precision technology.
- Standardized sizes from R0.01.
- Realized sharp edge by maximizing features of CBN.
- Long machining on pre-hardened to high-hardened steels (60HRC~).



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(L) Lunghezza tagliente Length of Cut	(D) Diametro Dia.	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lunghezza totale Overall Length
01-00460-00010	R0.01	0.02	0.02	15°	4	50
01-00460-00015	R0.015	0.03	0.03	15°	4	50
01-00460-00020	R0.02	0.04	0.04	15°	4	50
01-00460-00025	R0.025	0.05	0.05	15°	4	50
01-00460-00030	R0.03	0.06	0.06	15°	4	50
01-00460-00040	R0.04	0.08	0.08	15°	4	50
01-00460-00050	R0.05	0.1	0.1	15°	4	50

### Attenzione

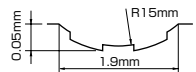
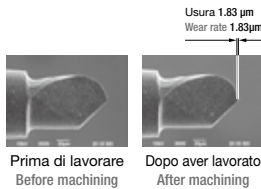
Quando ordinate, indicate SMB120 (R).  
When you order, indicate SMB120 (R).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio, consultare la pag. 75.
- Milling condition is recommended on page 75.

### Dati Tecnici 1 Technical Data 1

#### R0.05 Logo NS NS Logo

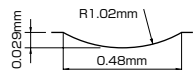
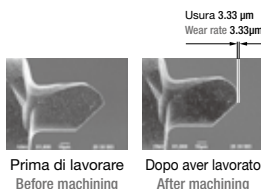


Materiale Work Material	STAVAX 52HRC	
Numero giri Spindle Speed	60,000min <sup>-1</sup>	
Avanzamento Feed	Sgrossatura: 200mm/min Roughing	Finitura: 50mm/min Finishing
Profondità Depth of Cut	Sgrossatura: 2μm×5μm Roughing: (ap×ae)	Finitura: 1μm×2μm Finishing: (ap×ae)
Tempo Time	1 ora 50 min. 1hr 50min	
Lungh.fresatura Cutting Length	7.7m	
Lubrificante Coolant	Minimale Oil Mist	

- L'intero pezzo con un solo utensile  
Full process done by one tool.
- ※ ap: profondità assiale  
ae: profondità radiale  
ap: Axial Depth of Cut,  
ae: Radial Depth of Cut.

### Dati Tecnici 2 Technical Data 2

#### R0.03 Lenti lenticolari Lens Array Model



Materiale Work Material	PD613 60HRC	
Numero giri Spindle Speed	60,000min <sup>-1</sup>	
Avanzamento Feed	Sgrossatura: 50mm/min Roughing	Finitura: 30mm/min Finishing
Profondità Depth of Cut	Sgrossatura: 1μm×2μm Roughing: (ap×ae)	Finitura: 1μm×1μm Finishing: (ap×ae)
Tempo Time	4 ore 4hr	
Lungh.fresatura Cutting Length	10.4m	
Lubrificante Coolant	Minimale Oil Mist	

- L'intero pezzo con un solo utensile  
Full process done by one tool.
- ※ ap: profondità assiale  
ae: profondità radiale  
ap: Axial Depth of Cut,  
ae: Radial Depth of Cut.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

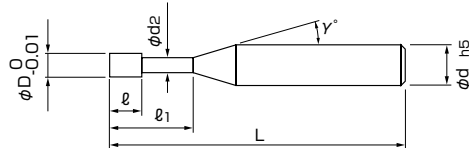
Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Frese Piane CBN



- Consente di ottenere lo spigolo vivo nella lavorazione di acciai temprati.
- Resistenza all'usura incrementata, grazie all'originale design NS del tagliente.
- Possible to machine the corner edge of hardened steels.
- Intensified wear resistance by NS original design of cutting edge.
- **NUOVO** NEW



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell$ ) Lungh. tagliente Length of Cut	( $d_2$ ) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00440-01002	0.1	0.2	0.04	0.075	15°	4	53
01-00440-01005		0.5	0.04	0.08	15°	4	53

**Attenzione** Quando ordinate, indicate SSE400 (D)×( $\ell_1$ ).  
When you order, indicate SSE400 (D)×( $\ell_1$ ).

※ ( $\gamma$ ) è un valore di riferimento.  
※ ( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 61.
- Milling condition is recommended on page 61.

## Frese Piane CBN

- Consente di ottenere lo spigolo vivo nella lavorazione di acciai temprati.
- Resistenza all'usura incrementata, grazie all'originale design NS del tagliente.
- Possible to machine the corner edge of hardened steels.
- Intensified wear resistance by NS original design of cutting edge.
- **NUOVO** NEW

Dati tecnici P481



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell$ ) Lungh. tagliente Length of Cut	( $d_2$ ) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00450-02004	0.2	0.4	0.08	0.175	15°	4	53
01-00450-02010		1	0.08	0.175	15°	4	53
01-00450-03005	0.3	0.5	0.12	0.275	15°	4	49
01-00450-03015		1.5	0.12	0.275	15°	4	50
01-00450-04008	0.4	0.8	0.16	0.37	15°	4	49
01-00450-04020		2	0.16	0.37	15°	4	50
01-00450-05010	0.5	1	0.2	0.46	15°	4	49
01-00450-05025		2.5	0.2	0.46	15°	4	50
01-00450-06012	0.6	1.2	0.24	0.56	15°	4	49
01-00450-06030		3	0.24	0.56	15°	4	50
01-00450-08015	0.8	1.5	0.32	0.76	15°	4	49
01-00450-08040		4	0.32	0.76	15°	4	52
01-00450-10020	1	2	0.4	0.95	15°	4	49
01-00450-10050		5	0.4	0.95	15°	4	52

**Attenzione** Quando ordinate, indicate SSE600(D)×( $\ell_1$ ).  
When you order, indicate SSE600 (D)×( $\ell_1$ ).

※ ( $\gamma$ ) è un valore di riferimento.  
※ ( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 61.
- Milling condition is recommended on page 61.

# Parametri di taglio raccomandati

## Recommended Milling Conditions

# SSE400 / SSE600

**CBN**  
Nitruro Cubico di Boro

Materiale Work Material		Acciaio temprato Hardened Steels 1.2738 • STAVAX • 1.2343 (~55HRC)				Acciaio temprato Hardened Steels 1.2379 • ELMAX (~62HRC)				Acciaio super rapido High speed tool steels ASP • M2 • 1.3343 (~65HRC)			
Diametro Dia.	Lungh. effettiva Effective Length	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità Depth of Cut		Avanzamento Feed	Giri Spindle Speed
		$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>
0.1	0.2	0.001	0.002	250	40,000	0.001	0.002	200	40,000	0.001	0.002	150	40,000
	0.5	0.001	0.002	200	40,000	0.001	0.002	150	40,000	0.001	0.001	100	40,000
0.2	0.4	0.003	0.002	400	40,000	0.002	0.002	300	40,000	0.002	0.002	200	40,000
	1	0.003	0.002	300	40,000	0.002	0.002	200	40,000	0.002	0.002	100	40,000
0.3	0.5	0.005	0.003	600	40,000	0.004	0.003	400	40,000	0.003	0.003	400	40,000
	1.5	0.005	0.002	500	40,000	0.004	0.002	300	40,000	0.003	0.002	200	40,000
0.4	0.8	0.007	0.004	700	40,000	0.005	0.003	600	40,000	0.003	0.003	600	40,000
	2	0.007	0.003	600	40,000	0.005	0.002	400	40,000	0.003	0.002	400	40,000
0.5	1	0.01	0.005	800	40,000	0.007	0.003	700	40,000	0.005	0.003	600	40,000
	2.5	0.01	0.004	800	40,000	0.007	0.002	500	40,000	0.005	0.002	400	40,000
0.6	1.2	0.01	0.005	800	40,000	0.007	0.003	700	40,000	0.005	0.003	600	40,000
	3	0.01	0.004	800	40,000	0.007	0.002	500	40,000	0.005	0.002	400	40,000
0.8	1.5	0.01	0.005	800	40,000	0.007	0.004	800	40,000	0.005	0.004	700	40,000
	3.5	0.01	0.004	800	40,000	0.007	0.003	600	40,000	0.005	0.003	500	40,000
1	2	0.01	0.006	800	40,000	0.007	0.006	800	40,000	0.005	0.006	800	40,000
	5	0.01	0.005	800	40,000	0.007	0.005	600	40,000	0.005	0.005	600	40,000

Note  
Notes

- ※La profondità di taglio è il massimo valore effettivo per la lavorazione di contornatura.
- ※ $a_p$  = Profondità di taglio assiale;  $a_e$  = profondità di taglio radiale.
- ※Utilizzare lubrificazione minimale.
- ※Ridurre il più possibile la lunghezza della fresa.
- ※La concentricità del mandrino deve essere la più precisa possibile.
- ※Per il valore di riferimento, nel processo di finitura dei piani, ridurre l'avanzamento approssimativamente del 50% rispetto ai parametri di taglio raccomandati e la profondità di taglio ( $a_p$ ): 0,001mm per dia. 0.1 mm, fino a 0,002 mm per dia. 0,2 mm e 0,3 mm, fino a 0,003 mm per dia. da 0,4 mm a 1 mm.
- ※Depth of Cut is the maximum effective value for the contour line tool path.
- ※ $a_p$ : Axial Depth of Cut,  $a_e$ : Radial Depth of Cut.
- ※Recommended oil mist coolant.
- ※Minimize a possible tool overhang length.
- ※Minimize chucking runout. (Recommend to measure actual runout of activated spindle speed.)
- ※For the reference value, when finishing process of bottom surface, reduce the feed approx. 50% of the recommended milling conditions and Depth of Cut ( $a_p$ ): 0.001mm for Dia. 0.1mm, up to 0.002mm for Dia. 0.2mm and 0.3mm, for Dia. 0.4 to 1mm, up to 0.003mm, ( $a_e$ ): Dia. x 0.05mm.

Diamante

Diamond

Piane

Square

Scaricate

Piane

Long Neck

Square

Sferiche

Ball

Scaricate

Sferiche

Long Neck

Ball

Coniche

Taper

Coniche

Sferiche

Taper Ball

Toriche

Corner R

Scaricate

Toriche

Long Neck

Corner R

Frese

Sagomate

Formed

Cutter

Punte

Drill

Altro

Others

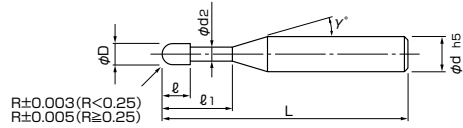
Dati tecnici

Technical Data

Guida tecnica

Technical Guidance

## Frese sferiche CBN "CBN Super Finish Ball"



- L'affilatura continua al centro garantisce una elevata precisione anche sui piani.
- Sono garantite 10 ore continue di lavoro su acciai temprati HRC 60.
- La lunga durata garantisce una bassa rugosità Rz1.0µm.
- Grande risparmio di tempo nelle operazioni di lucidatura.
- Vi raccomandiamo di usare la lubrificazione minimale.
- Sharpened edge at R-center improves shearing ability.
- Continuous 10 hours machining on hardened steel of HRC60.
- Long-lasting high surface accuracy Rz1.0µm.
- Save significant time at polishing process.
- We recommend using oil mist coolant.

**Dati tecnici** P482



\*Nuove misure

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Diametro Dia.	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00500-00100	R0.1	0.5	0.15	0.2	0.18	12°	4	50
*01-00500-00200	R0.2	1	0.3	0.4	0.37	12°	4	50
*01-00500-00250	R0.25	1.25	0.38	0.5	0.46	12°	4	50
*01-00500-00300	R0.3	1.5	0.5	0.6	0.56	12°	4	50
*01-00500-00400	R0.4	2	0.6	0.8	0.76	12°	4	50
*01-00500-00500	R0.5	2.5	0.7	1	0.95	12°	4	50
*01-00500-00600	R0.6	3	0.8	1.2	1.15	12°	4	50
*01-00500-00700	R0.7	3.5	1	1.4	1.35	12°	4	52
*01-00500-00750	R0.75	3.8	1	1.5	1.45	12°	4	52
*01-00500-00800	R0.8	4	1	1.6	1.55	12°	4	52
*01-00500-00900	R0.9	4.5	1.2	1.8	1.75	12°	4	52
*01-00500-01000	R1	5	1.2	2	1.94	12°	4	52

### Attenzione

Quando ordinate, indicate SFB200 (R).  
When you order, indicate SFB 200 (R).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 75.
- Milling condition is recommended on page 75.

SFB200



L'affilatura continua del tagliente garantisce una lunga e costante precisione e finitura.  
Sharp tooth edge guarantees long and consistent accuracy.

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

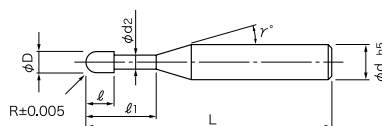
Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance



## Frese sferiche elicoidali CBN "CBN Super Spiral Ball"



- Il profilo elicoidale della sfera rende i taglienti più affilati.
- Il profilo dei taglienti li rende più resistenti alle scheggiature.
- Quando i taglienti periferici vanno in contatto con la superficie del pezzo da lavorare, si creano vibrazioni che influiscono sulla durata della fresa e sulla qualità del pezzo. Questo problema è stato risolto con l'adozione di uno scarico posteriore (Back-draft).
- Adopted spiral ball shape to improve sharpness of cutting edge.
- Adopted cutting edge shape to improve the chipping resistance of cutting edge.
- When peripheral cutting edge makes contact with cutting surface, vibration occurs by an increase in cutting resistance and it affects tool life and cutting surface quality. The influence can be reduced by adoption of the strong back taper shape.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell$ ) Lungh. tagliente Length of Cut	(D) Diametro Dia.	( $d_2$ ) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
● 01-00505-00101	R0.1	0.3	0.15	0.2	0.18	15°	4	50
01-00505-00100		0.6	0.15	0.2	0.18	15°	4	50
● 01-00505-00150	R0.15	0.3	0.23	0.3	0.28	15°	4	50
● 01-00505-00151		0.5	0.23	0.3	0.28	15°	4	50
● 01-00505-00152	R0.2	0.75	0.23	0.3	0.28	15°	4	50
● 01-00505-00201		0.5	0.3	0.4	0.37	15°	4	50
● 01-00505-00202	R0.2	0.75	0.3	0.4	0.37	15°	4	50
● 01-00505-00203		1	0.3	0.4	0.37	15°	4	50
01-00505-00200	R0.25	1.2	0.3	0.4	0.37	15°	4	50
● 01-00505-00251		1	0.38	0.5	0.46	15°	4	50
● 01-00505-00301	R0.3	1.2	0.5	0.6	0.56	15°	4	50
01-00505-00300		1.5	0.5	0.6	0.56	15°	4	50
● 01-00505-00401	R0.4	1.6	0.6	0.8	0.76	15°	4	50
01-00505-00400		2	0.6	0.8	0.76	15°	4	50
● 01-00505-00501	R0.5	2	0.7	1	0.95	15°	4	50
01-00505-00500		2.5	0.7	1	0.95	15°	4	50
● 01-00505-00601	R0.6	2.4	0.8	1.2	1.15	15°	4	50
01-00505-00600		3	0.8	1.2	1.15	15°	4	50
● 01-00505-00751	R0.75	3	1	1.5	1.45	15°	4	52
01-00505-00750		3.8	1	1.5	1.45	15°	4	52
01-00505-01000	R1	4	1.2	2	1.94	15°	4	52
01-00505-01001		5	1.2	2	1.94	15°	4	52

### Attenzione

Quando ordinate, indicate SSPB220 (R) x (L).  
When you order, indicate SSPB220 (R) x (L).

※ ( $\gamma$ ) è un valore di riferimento.  
※ ( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 77.
- Milling condition is recommended on page 77.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

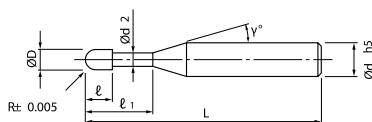
**CBN**  
Nitruro Cubico di Boro

# SSPBL220

Novità

CBN Super Spiral Long Neck Ball End Mill

## Frese sferiche elicoidali CBN "CBN Super Spiral Ball" per nervature serie lunga



- Aumentata la lunghezza effettiva rispetto alla serie SPB220.
- Fresature più profonde grazie al profilo elicoidale e lo scarico posteriore (Back-draft) che migliorano il taglio e la resistenza alla scheggiatura.
- Added longer effective length type to SSPB220 series.
- Realized deeper milling by adoption of spiral ball shape and strong back taper shape to improve both sharpness and the chipping resistance of cutting edges.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Diametro Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00506-00101	R0.1	1	0.15	0.2	0.18	15°	4	50
01-00506-00151	R0.15	0.9	0.23	0.3	0.28	15°	4	50
01-00506-00152		1.5	0.23	0.3	0.28	15°	4	50
01-00506-00201	R0.2	2	0.3	0.4	0.37	15°	4	50
01-00506-00202		3	0.3	0.4	0.37	15°	4	52
01-00506-00251	R0.25	1.5	0.38	0.5	0.46	15°	4	50
01-00506-00252		2.5	0.38	0.5	0.46	15°	4	50
01-00506-00253		3.5	0.38	0.5	0.46	15°	4	52
01-00506-00301	R0.3	3	0.5	0.6	0.56	15°	4	50
01-00506-00302		4	0.5	0.6	0.56	15°	4	53
01-00506-00303		5	0.5	0.6	0.56	15°	4	53
01-00506-00304		6	0.5	0.6	0.56	15°	4	53
01-00506-00401	R0.4	4	0.6	0.8	0.76	15°	4	53
01-00506-00402		6	0.6	0.8	0.76	15°	4	53
01-00506-00501	R0.5	4	0.7	1	0.95	15°	4	51
01-00506-00502		6	0.7	1	0.95	15°	4	53
01-00506-00503		8	0.7	1	0.95	15°	4	53
01-00506-00504		10	0.7	1	0.95	15°	4	53
01-00506-00601	R0.6	6	0.8	1.2	1.15	15°	4	53
01-00506-00751	R0.75	7.5	1	1.5	1.45	15°	4	52
01-00506-00752		10	1	1.5	1.45	15°	4	52
01-00506-00753		15	1	1.5	1.45	15°	4	52
01-00506-01001	R1	6	1.2	2	1.94	15°	4	53
01-00506-01002		8	1.2	2	1.94	15°	4	53
01-00506-01003		10	1.2	2	1.94	15°	4	53
01-00506-01004		14	1.2	2	1.94	15°	4	53
01-00506-01005		20	1.2	2	1.94	15°	4	53

**Attenzione** Quando ordinate, indicate SSPBL220 (R) x (ℓ<sub>1</sub>).  
When you order, indicate SSPB220 (R) x (ℓ<sub>1</sub>).

※ (γ) è un valore di riferimento. Per evitare interferenze con il pezzo da lavorare, misurare l'utensile

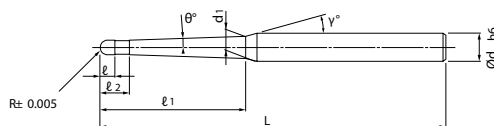
- Per i parametri di taglio vedi pagina 79.
- Milling condition is recommended on page 79

※ (γ) is reference value. Tool measurement required in order to avoid interference to the work material.

# SSPBTN220 Novità

CBN Super Spiral Long Taper Neck Ball End Mill

## Frese sferiche elicoidali CBN "CBN Super Spiral Ball" con sforno conico lunghe



- Frese sferiche CBN scaricate coniche per una maggiore rigidità.
- Lo scarico conico e il profilo elicoidale migliorano il taglio nei processi di finitura ad elevate profondità.
- To realized more rigid, CBN long neck ball end mill with taper neck are adopted.
- Both efficiency and accuracy are increasing by taper neck design and spiral ball shape with improved sharpness in finish processing on deep milling.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(Θ) Angolo scarico Neck Taper Angle	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(α) Angolo utile effettivo Effective Wall Gradient Angle	(d <sub>1</sub> ) Dia. scarico Neck Dia.	(ℓ) Lungh.zza tagliente Length of Cut	(D) Diametro Dia.	(ℓ <sub>2</sub> ) Lungh. sotto scarico Under Neck Taper Length	(γ) <sub>2</sub> Angolo scarico 2 Neck Taper Angle 2	(d) Diametro gambo Shank Dia.	(L) Lungh.zza totale Overall Length	
01-00507-01020	R0.1	30°	1.5	0°15'	0.22	0.15	0.2	0.25	15°	4	50	
01-00507-01021			2	0°15'	0.22	0.15	0.2	0.25	15°	4	50	
01-00507-01030		1°	1.5	0°45'	0.24	0.15	0.2	0.25	15°	4	50	
01-00507-01031			2	0°45'	0.25	0.15	0.2	0.25	15°	4	50	
01-00507-01040		1°30'	1.5	1°15'	0.27	0.15	0.2	0.25	15°	4	50	
01-00507-01041			2	1°15'	0.29	0.15	0.2	0.25	15°	4	50	
01-00507-01050		2°	1.5	1°45'	0.29	0.15	0.2	0.25	15°	4	50	
01-00507-01051			2	1°45'	0.32	0.15	0.2	0.25	15°	4	50	
01-00507-01520		R0.15	30°	2	0°16'	0.32	0.23	0.3	0.38	15°	4	50
01-00507-01521				3	0°16'	0.33	0.23	0.3	0.38	15°	4	52
01-00507-01530	1°		2	0°46'	0.35	0.23	0.3	0.38	15°	4	50	
01-00507-01531			3	0°46'	0.38	0.23	0.3	0.38	15°	4	52	
01-00507-01540	1°30'		2	1°16'	0.39	0.23	0.3	0.38	15°	4	50	
01-00507-01541			3	1°16'	0.43	0.23	0.3	0.38	15°	4	52	
01-00507-01550	2°		2	1°46'	0.42	0.23	0.3	0.38	15°	4	50	
01-00507-01551			3	1°46'	0.48	0.23	0.3	0.38	15°	4	52	
01-00507-02020	R0.2		30°	3	0°18'	0.43	0.3	0.4	0.5	15°	4	50
01-00507-02021				4	0°18'	0.44	0.3	0.4	0.5	15°	4	52
01-00507-02030		1°	3	0°48'	0.48	0.3	0.4	0.5	15°	4	50	
01-00507-02031			4	0°48'	0.51	0.3	0.4	0.5	15°	4	52	
01-00507-02040		1°30'	3	1°18'	0.53	0.3	0.4	0.5	15°	4	50	
01-00507-02041			4	1°18'	0.58	0.3	0.4	0.5	15°	4	52	
01-00507-02050		2°	3	1°48'	0.58	0.3	0.4	0.5	15°	4	50	
01-00507-02051			4	1°48'	0.64	0.3	0.4	0.5	15°	4	52	
01-00507-02520		R0.25	30°	4	0°18'	0.54	0.38	0.5	0.62	15°	4	52
01-00507-02521				5	0°18'	0.55	0.38	0.5	0.62	15°	4	52
01-00507-02530	1°		4	0°48'	0.61	0.38	0.5	0.62	15°	4	52	
01-00507-02531			5	0°48'	0.64	0.38	0.5	0.62	15°	4	52	
01-00507-02540	1°30'		4	1°18'	0.67	0.38	0.5	0.62	15°	4	52	
01-00507-02541			5	1°18'	0.72	0.38	0.5	0.62	15°	4	52	
01-00507-02550	2°		4	1°48'	0.74	0.38	0.5	0.62	15°	4	52	
01-00507-02551			5	1°48'	0.8	0.38	0.5	0.62	15°	4	52	

### Attenzione

Quando ordinate, indicate SSPBTN220 (R) x (Θ) x (ℓ<sub>1</sub>).  
When you order, indicate SSPBTN220 (R) x (Θ) x (ℓ<sub>1</sub>).

- Per i parametri di taglio vedi pagina 80.
- Milling condition is recommended on page 80.

※ (γ) è un valore di riferimento. Per evitare interferenze con il pezzo da lavorare, misurare l'utensile

※ (γ) is reference value. Tool measurement required in order to avoid interference to the work material.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

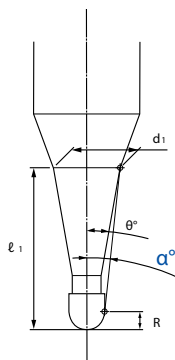
**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



(a) Angolo utile effettivo  
Effective Wall Gradient Angle

●NUOVO NEW

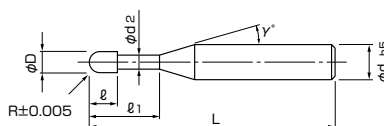
Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(θ) Angolo scarico Neck Taper Angle	(l <sub>1</sub> ) Lunghezza effettiva Effective Length	(a) Angolo utile effettivo Effective Wall Gradient Angle	(d <sub>1</sub> ) Dia. scarico Neck Dia.	(l) Lunghezza tagliente Length of Cut	(D) Diametro Dia.	(l <sub>2</sub> ) Lunghezza sotto scarico Under Neck Taper Length	(γ/2) Angolo scarico 2 Neck Taper Angle 2	(d) Diametro gambo Shank Dia.	(L) Lunghezza totale Overall Length	
●01-00507-03020	R0.3	30°	5	0°18'	0.65	0.5	0.6	0.75	15°	4	53	
●01-00507-03021			6	0°18'	0.66	0.5	0.6	0.75	15°	4	53	
●01-00507-03030		1°	5	0°48'	0.74	0.5	0.6	0.75	15°	4	53	
●01-00507-03031			6	0°48'	0.76	0.5	0.6	0.75	15°	4	53	
●01-00507-03040		1°30'	5	1°18'	0.82	0.5	0.6	0.75	15°	4	53	
●01-00507-03041			6	1°18'	0.86	0.5	0.6	0.75	15°	4	53	
●01-00507-03050		2°	5	1°48'	0.9	0.5	0.6	0.75	15°	4	53	
●01-00507-03051			6	1°48'	0.96	0.5	0.6	0.75	15°	4	53	
●01-00507-05020		R0.5	30°	8	0°21'	1.1	0.7	1	1.25	15°	4	53
●01-00507-05021				10	0°21'	1.12	0.7	1	1.25	15°	4	53
●01-00507-05030			1°	8	0°51'	1.23	0.7	1	1.25	15°	4	53
●01-00507-05031				10	0°51'	1.29	0.7	1	1.25	15°	4	53
●01-00507-05040	1°30'		8	1°21'	1.36	0.7	1	1.25	15°	4	53	
●01-00507-05041			10	1°21'	1.45	0.7	1	1.25	15°	4	53	
●01-00507-05050	2°		8	1°51'	1.49	0.7	1	1.25	15°	4	53	
●01-00507-05051			10	1°51'	1.62	0.7	1	1.25	15°	4	53	
●01-00507-07520	R0.75		30°	10	0°22'	1.62	1	1.5	1.9	15°	4	52
●01-00507-07521				15	0°22'	1.69	1	1.5	1.9	15°	4	52
●01-00507-07530			1°	10	0°52'	1.78	1	1.5	1.9	15°	4	52
●01-00507-07531				15	0°52'	1.94	1	1.5	1.9	15°	4	52
●01-00507-07540		1°30'	10	1°22'	1.95	1	1.5	1.9	15°	4	52	
●01-00507-07541			15	1°22'	2.18	1	1.5	1.9	15°	4	52	
●01-00507-07550		2°	10	1°52'	2.11	1	1.5	1.9	15°	4	52	
●01-00507-07551			15	1°52'	2.43	1	1.5	1.9	15°	4	52	
●01-00507-10020		R1	30°	16	0°24'	2.21	1.2	2	2.5	15°	4	53
●01-00507-10021				20	0°24'	2.27	1.2	2	2.5	15°	4	53
●01-00507-10030			1°	16	0°54'	2.48	1.2	2	2.5	15°	4	53
●01-00507-10031				20	0°54'	2.6	1.2	2	2.5	15°	4	53
●01-00507-10040	1°30'		16	1°24'	2.74	1.2	2	2.5	15°	4	53	
●01-00507-10041			20	1°24'	2.93	1.2	2	2.5	15°	4	53	
●01-00507-10050	2°		16	1°54'	3	1.2	2	2.5	15°	4	53	
●01-00507-10051			20	1°54'	3.26	1.2	2	2.5	15°	4	53	

# SSB200

CBN Super Speed Ball End Mill

## Frese sferiche CBN "CBN Super Speed Ball"



- Queste frese CBN sono realizzate per offrire i vantaggi sia del CBN che del metallo duro integrale.
- La profondità di taglio è stata incrementata ed è equivalente a quella del metallo duro integrale.
- L'affilatura continua del tagliente con una precisione  $\pm 0.005$  previene scheggiature!
- Il tagliente dolce grazie all'affilatura continua.
- Utilizzabile su materiali duri oltre i 68 HRC!
- Vi raccomandiamo di usare la lubrificazione minima.
- This CBN Ball End Mill has realized both advantages of CBN and Carbide.
- Depth of Cut can be increased at the equivalent level to Carbide.
- Unique flute design with R-accuracy  $\pm 0.005$  prevents chipping!
- Flute is smoothly tangent from straight line to R-curve.
- Applicable for hardened materials up to 68HRC.
- We recommend using oil mist coolant.

Dati tecnici P483



★ Nuove misure

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell_2$ ) Lungh. tagliente Length of Cut	(D) Diametro Dia.	(d2) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
★01-00510-00300	R0.3	1.5	0.5	0.6	0.56	15°	4	50
★01-00510-00400	R0.4	2	0.6	0.8	0.76	15°	4	50
★01-00510-00500	R0.5	2.5	0.7	1	0.95	15°	4	50
★01-00510-00600	R0.6	3	0.8	1.2	1.15	15°	4	50
★01-00510-00750	R0.75	3.8	1	1.5	1.45	15°	4	52
★01-00510-01001	R1	4	1.2	2	1.94	15°	4	52
★01-00510-01000		5	1.2	2	1.94	15°	4	52

### Attenzione

Quando ordinate, indicate SSB200 (R)×( $\ell_1$ ).  
When you order, indicate SSB200 (R)×( $\ell_1$ ).

※ ( $\gamma$ ) è un valore di riferimento.  
※ ( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 76.
- Milling condition is recommended on page 76.

SSB200



Una maggiore profondità di taglio è possibile grazie ad una migliore evacuazione del truciolo.  
Bigger cutting depth was realized with better chip disposal.

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane Square  
Rivestite Coating  
Non Rivestite Non-Coating  
Scaricate Plane Long Neck Square

Sferiche Ball  
Rivestite Coating  
Non Rivestite Non-Coating  
Scaricate Sferiche Long Neck Ball

Coniche Taper  
Rivestite Coating  
Non Rivestite Non-Coating  
Coniche Sferiche Taper Ball

Toriche Corner R  
Rivestite Coating  
Non Rivestite Non-Coating  
Scaricate Toriche Long Neck Corner R

Frese Sagomate Formed Cutter  
Rivestite Coating  
Non Rivestite Non-Coating

Punte Drill

Altro Others

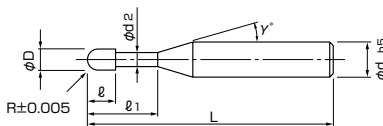
Dati tecnici Technical Data

Guida tecnica Technical Guidance

# SSBL200

CBN Super Speed Long Neck Ball End Mill

## Frese CBN sferiche lunghe "CBN Super Speed Ball"



- Frese in CBN scaricate per fresature profonde, disponibili in 25 misure.
- È possibile fresare a maggiori profondità rispetto alla concorrenza, grazie a un utile effettivo massimo di 10 mm.
- È possibile ottenere lunghe durate ed elevate finiture anche nelle operazioni di fresatura di nervature.
- Misure standard a partire da R0.05
- L'affilatura continua del tagliente  $R\pm 0.005$  garantisce costante precisione.
- Vi raccomandiamo di usare lubrificazione minimale.
- Lineup of CBN tool with long neck applicable to deep milling, available 25 sizes in total.
- Enables milling more deeply by long effective length up to 10mm comparing with conventional CBN tools.
- Enables wider application for milling by long neck in addition to long life and accurate finishing.
- Standardized in R0.05 at smallest.
- Unique flute design with R-accuracy  $\pm 0.005$  prevents chipping!
- We recommend using oil mist coolant.
- **NUOVO NEW**

Dati tecnici P483



★Nuove misure

Unità di misura: mm Unit size: mm

Code No.	(R) Raggio Radius	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Diametro Dia.	(d2) Diametro scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00511-00051	R0.05	0.3	0.08	0.1	0.085	15°	4	50
01-00511-00052		0.5	0.08	0.1	0.085	15°	4	50
●01-00511-00075	R0.075	0.45	0.12	0.15	0.13	15°	4	50
●01-00511-00076		0.75	0.12	0.15	0.13	15°	4	50
01-00511-00101	R0.1	0.6	0.15	0.2	0.18	15°	4	50
01-00511-00102		1	0.15	0.2	0.18	15°	4	50
01-00511-00151	R0.15	0.9	0.23	0.3	0.28	15°	4	50
01-00511-00152		1.5	0.23	0.3	0.28	15°	4	50
★01-00511-00201	R0.2	1.2	0.3	0.4	0.37	15°	4	50
★01-00511-00202		2	0.3	0.4	0.37	15°	4	50
★01-00511-00251	R0.25	1.5	0.38	0.5	0.46	15°	4	50
★01-00511-00252		2.5	0.38	0.5	0.46	15°	4	50
★01-00511-00301	R0.3	3	0.5	0.6	0.56	15°	4	50
★01-00511-00302		4	0.5	0.6	0.56	15°	4	52
★01-00511-00303		5	0.5	0.6	0.56	15°	4	52
★01-00511-00401	R0.4	4	0.6	0.8	0.76	12°	4	53
★01-00511-00501	R0.5	4	0.7	1	0.95	12°	4	53
★01-00511-00502		5	0.7	1	0.95	12°	4	53
★01-00511-00504		6	0.7	1	0.95	15°	4	53
★01-00511-00506		8	0.7	1	0.95	15°	4	53
★01-00511-00508		10	0.7	1	0.95	15°	4	53
★01-00511-00751	R0.75	7.5	1	1.5	1.45	15°	4	52
★01-00511-01001	R1	6	1.2	2	1.94	15°	4	52
★01-00511-01003		8	1.2	2	1.94	15°	4	52
★01-00511-01005		10	1.2	2	1.94	15°	4	52

### Attenzione

Quando ordinate, indicate SSBL200 (R)×(ℓ1).  
When you order, indicate SSBL 200 (R)×(ℓ1).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 82.
- Milling condition is recommended on page 82.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici

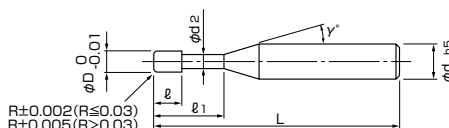
Technical Data

Guida tecnica  
Technical Guidance

# SSR200

CBN Super Speed Radius End Mill

## Frese CBN toriche "CBN Super Speed Radius"



- Frese toriche per lavorazioni ad elevato rendimento, grazie all'eccellente resistenza all'usura del CBN.
- Sono possibili eccellenti rugosità superficiali, grazie al tagliente dolce (precisione del  $R\pm 5\mu\text{m}$ ).
- Utilizzabile su acciai temprati e cementati (maggiori di HRC 68).
- Vi raccomandiamo di usare la lubrificazione minima.
- Realized high efficient machining with radius flute along with excellent wear resistance of CBN.
- Realized excellent surface roughness by introducing smooth tangent on all over flute. (corner accuracy:  $\pm 5\mu\text{m}$ )
- Applicable for work materials from tempered steel to hardened steel (up to 68 HRC).
- We recommend using oil mist coolant.

**Dati tecnici** P484



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(R) Raggio Corner Radius	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00490-02021	0.2	R0.02	0.5	0.08	0.18	15°	4	50	
01-00490-02022			1	0.08	0.18	15°	4	50	
01-00490-02031		R0.03	0.5	0.08	0.18	15°	4	50	
01-00490-02032			1	0.08	0.18	15°	4	50	
01-00490-02051		R0.05	0.5	0.08	0.18	15°	4	50	
01-00490-02052			1	0.08	0.18	15°	4	50	
01-00490-03021	0.3	R0.02	0.5	0.13	0.28	15°	4	50	
01-00490-03022			1	0.13	0.28	15°	4	50	
01-00490-03023			1.5	0.13	0.28	15°	4	50	
01-00490-03024			2	0.13	0.28	15°	4	50	
01-00490-03031		R0.03	0.5	0.13	0.28	15°	4	50	
01-00490-03032			1	0.13	0.28	15°	4	50	
01-00490-03033			1.5	0.13	0.28	15°	4	50	
01-00490-03034			2	0.13	0.28	15°	4	50	
01-00490-03051		R0.05	0.5	0.13	0.28	15°	4	50	
01-00490-03052			1	0.13	0.28	15°	4	50	
01-00490-03053			1.5	0.13	0.28	15°	4	50	
01-00490-03054			2	0.13	0.28	15°	4	50	
01-00490-04021		0.4	R0.02	0.5	0.24	0.37	15°	4	50
01-00490-04022				1	0.24	0.37	15°	4	50
01-00490-04023				1.5	0.24	0.37	15°	4	50
01-00490-04024				2	0.24	0.37	15°	4	50
01-00490-04031			R0.03	0.5	0.24	0.37	15°	4	50
01-00490-04032				1	0.24	0.37	15°	4	50
01-00490-04033	1.5			0.24	0.37	15°	4	50	
01-00490-04034	2			0.24	0.37	15°	4	50	
01-00490-04051	R0.05		0.5	0.24	0.37	15°	4	50	
01-00490-04052			1	0.24	0.37	15°	4	50	
01-00490-04053			1.5	0.24	0.37	15°	4	50	
01-00490-04054			2	0.24	0.37	15°	4	50	
01-00490-04101	R0.1		0.5	0.24	0.37	15°	4	50	
01-00490-04102			1	0.24	0.37	15°	4	50	
01-00490-04103			1.5	0.24	0.37	15°	4	50	
01-00490-04104			2	0.24	0.37	15°	4	50	

### Attenzione

Quando ordinate, indicate SSR200 (D)×(R)×(ℓ1).  
When you order, indicate SSR200 (D)×(R)×(ℓ1).

※ (γ) è un valore di riferimento.  
※ γ is reference value.

- Per i parametri di taglio vedi pagina 83.
- Milling condition is recommended on page 83.

**CBN**  
Nitrato Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate**  
Plane

**Sferiche**  
Ball

**Scaricate**  
Sferiche

**Coniche**  
Taper

**Coniche**  
Sferiche

**Toriche**  
Corner R

**Scaricate**  
Toriche

**Frese**  
Sagomate

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square  
Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball  
Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper  
Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R  
Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

★Nuove misure

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
*01-00490-05020	0.5	R0.02	0.5	0.3	0.46	15°	4	48
*01-00490-05022			1	0.3	0.46	15°	4	50
*01-00490-05021			1.5	0.3	0.46	15°	4	50
*01-00490-05023		R0.03	0.5	0.3	0.46	15°	4	50
*01-00490-05030			1	0.3	0.46	15°	4	50
*01-00490-05031			1.5	0.3	0.46	15°	4	50
*01-00490-05033		R0.05	0.5	0.3	0.46	15°	4	48
*01-00490-05050			1	0.3	0.46	15°	4	50
*01-00490-05051			1.5	0.3	0.46	15°	4	50
*01-00490-05053		R0.1	0.5	0.3	0.46	15°	4	48
*01-00490-05100			1	0.3	0.46	15°	4	50
*01-00490-05101			1.5	0.3	0.46	15°	4	50
*01-00490-05103	0.6	R0.02	0.5	0.3	0.56	15°	4	48
*01-00490-06021			1	0.3	0.56	15°	4	50
*01-00490-06022			1.5	0.3	0.56	15°	4	50
*01-00490-06023		R0.03	0.5	0.3	0.56	15°	4	48
*01-00490-06031			1	0.3	0.56	15°	4	50
*01-00490-06032			1.5	0.3	0.56	15°	4	50
*01-00490-06033		R0.05	0.5	0.3	0.56	15°	4	48
*01-00490-06034			1	0.3	0.56	15°	4	50
*01-00490-06051			1.5	0.3	0.56	15°	4	50
*01-00490-06052		R0.1	0.5	0.3	0.56	15°	4	50
*01-00490-06053			1	0.3	0.56	15°	4	50
*01-00490-06054			1.5	0.3	0.56	15°	4	50
*01-00490-06101	0.8	R0.02	0.5	0.3	0.56	15°	4	48
*01-00490-06102			1	0.3	0.56	15°	4	50
*01-00490-06103			1.5	0.3	0.56	15°	4	50
*01-00490-06104		R0.03	0.5	0.3	0.56	15°	4	50
*01-00490-08021			1.5	0.3	0.56	15°	4	50
*01-00490-08022			2.5	0.3	0.56	15°	4	50
*01-00490-08023		R0.05	0.5	0.3	0.56	15°	4	50
*01-00490-08031			1.5	0.3	0.56	15°	4	50
*01-00490-08032			2.5	0.3	0.56	15°	4	50
*01-00490-08033		R0.1	0.5	0.3	0.56	15°	4	50
*01-00490-08051			1.5	0.3	0.56	15°	4	50
*01-00490-08052			2.5	0.3	0.56	15°	4	50
*01-00490-08053	R0.1	0.5	0.3	0.56	15°	4	50	
*01-00490-08101		1.5	0.3	0.56	15°	4	50	
*01-00490-08102		2.5	0.3	0.56	15°	4	50	
*01-00490-08103			5	0.56	0.76	15°	4	53



Diamante

Diamond

★ Nuove misure

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. effettiva Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
★01-00490-10020	1	R0.02	1	0.7	0.95	15°	4	49
★01-00490-10022			2	0.7	0.95	15°	4	50
★01-00490-10021			3	0.7	0.95	15°	4	49
★01-00490-10023			5	0.7	0.95	15°	4	53
★01-00490-10030			R0.03	1	0.7	0.95	15°	4
★01-00490-10032		2		0.7	0.95	15°	4	50
★01-00490-10031		3		0.7	0.95	15°	4	50
★01-00490-10033		5		0.7	0.95	15°	4	53
★01-00490-10050		R0.05		1	0.7	0.95	15°	4
★01-00490-10052			2	0.7	0.95	15°	4	50
★01-00490-10051			3	0.7	0.95	15°	4	50
★01-00490-10053			5	0.7	0.95	15°	4	53
★01-00490-10100			R0.1	1	0.7	0.95	15°	4
★01-00490-10102		2		0.7	0.95	15°	4	50
★01-00490-10101		3		0.7	0.95	15°	4	50
★01-00490-10103		5		0.7	0.95	15°	4	53
★01-00490-10200		R0.2		1	0.7	0.95	15°	4
★01-00490-10202			2	0.7	0.95	15°	4	50
★01-00490-10201			3	0.7	0.95	15°	4	50
★01-00490-10203			5	0.7	0.95	15°	4	53
★01-00490-10300	R0.3		1	0.7	0.95	15°	4	49
★01-00490-10302		2	0.7	0.95	15°	4	50	
★01-00490-10301		3	0.7	0.95	15°	4	50	
★01-00490-10303		5	0.7	0.95	15°	4	53	
★01-00490-15020		1.5	R0.02	3	1	1.45	15°	4
★01-00490-15021	4.5			1	1.45	15°	4	52
★01-00490-15023	7.5			1	1.45	15°	4	52
★01-00490-15030	R0.03		3	1	1.45	15°	4	52
★01-00490-15031			4.5	1	1.45	15°	4	52
★01-00490-15033			7.5	1	1.45	15°	4	52
★01-00490-15050	R0.05		3	1	1.45	15°	4	52
★01-00490-15051			4.5	1	1.45	15°	4	52
★01-00490-15053			7.5	1	1.45	15°	4	52
★01-00490-15100	R0.1		3	1	1.45	15°	4	52
★01-00490-15101			4.5	1	1.45	15°	4	52
★01-00490-15103			7.5	1	1.45	15°	4	52
★01-00490-15200	R0.2		3	1	1.45	15°	4	52
★01-00490-15201			4.5	1	1.45	15°	4	52
★01-00490-15203			7.5	1	1.45	15°	4	52
★01-00490-15300	R0.3		3	1	1.45	15°	4	52
★01-00490-15301			4.5	1	1.45	15°	4	52
★01-00490-15303			7.5	1	1.45	15°	4	52

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Frese CBN toriche "CBN Super Speed Radius"

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

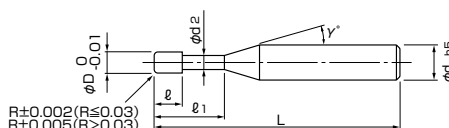
Guida tecnica  
Technical Guidance

★Nuove misure

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
★01-00490-20020	2	R0.02	4	1.2	1.94	15°	4	53
★01-00490-20021			6	1.2	1.94	15°	4	53
★01-00490-20023			10	1.2	1.94	15°	4	53
★01-00490-20030		R0.03	4	1.2	1.94	15°	4	53
★01-00490-20031			6	1.2	1.94	15°	4	53
★01-00490-20033			10	1.2	1.94	15°	4	53
★01-00490-20050		R0.05	4	1.2	1.94	15°	4	53
★01-00490-20051			6	1.2	1.94	15°	4	53
★01-00490-20053			10	1.2	1.94	15°	4	53
★01-00490-20100		R0.1	4	1.2	1.94	15°	4	53
★01-00490-20101			6	1.2	1.94	15°	4	52
★01-00490-20103			10	1.2	1.94	15°	4	52
★01-00490-20200		R0.2	4	1.2	1.94	15°	4	53
★01-00490-20201			6	1.2	1.94	15°	4	52
★01-00490-20203			10	1.2	1.94	15°	4	52
★01-00490-20300		R0.3	4	1.2	1.94	15°	4	53
★01-00490-20301			6	1.2	1.94	15°	4	52
★01-00490-20303			10	1.2	1.94	15°	4	52
★01-00490-20500		R0.5	4	1.2	1.94	15°	4	53
★01-00490-20501			6	1.2	1.94	15°	4	52
★01-00490-20503	10		1.2	1.94	15°	4	52	

## Frese toriche CBN "CBN High Efficient Radius"



- Elevata precisione ed efficienza grazie ai 3 taglienti e al raggio dal profilo elicoidale.
- Realized high accuracy and high efficiency machining by adopting 3 flutes and corner R with spiral shape.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(R) Raggio Corner Radius	(L) Lungh. effettiva Effective Length	(l) Lungh. tagliente Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00495-05011	0.5	R0.1	1.5	0.25	0.46	15°	4	50
01-00495-05012		R0.1	2.5	0.25	0.46	15°	4	50
01-00495-10011	1	R0.1	3	0.5	0.95	15°	4	50
01-00495-10012		R0.1	5	0.5	0.95	15°	4	52
01-00495-10021		R0.2	3	0.5	0.95	15°	4	50
01-00495-10022		R0.2	5	0.5	0.95	15°	4	52
01-00495-15011	1.5	R0.1	4.5	0.75	1.45	15°	4	52
01-00495-15012		R0.1	7.5	0.75	1.45	15°	4	52
01-00495-15021		R0.2	4.5	0.75	1.45	15°	4	52
01-00495-15022		R0.2	7.5	0.75	1.45	15°	4	52
01-00495-20011	2	R0.1	6	1	1.94	15°	4	52
01-00495-20012		R0.1	10	1	1.94	15°	4	52
01-00495-20031		R0.3	6	1	1.94	15°	4	52
01-00495-20032		R0.3	10	1	1.94	15°	4	52

### Attenzione

Quando ordinate, indicate SHR320 (D). \* (γ) è un valore di riferimento.  
When you order, indicate SHR320 (D). \* (γ) is reference value.

- Per i parametri di taglio vedi pagina 84.
- Milling condition is recommended on page 84.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

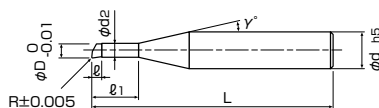
Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Frese Toriche CBN "CBN Super Surface"



- Specifiche per lavorazioni di piani ad elevata precisione.
- L'originale design NS del tagliente e del raggio torico R permettono eccellenti finiture.
- Vi raccomandiamo di usare la lubrificazione minimale.
- Appropriate for datum plane machining on precision machining.
- NS original design and corner R to realize stable machining surface.
- We recommend using oil mist coolant.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(R) Raggio Corner Radius	(l) Lungh. tagliente Length of Cut	(l1) Lungh. effettiva Effective Length	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00470-00020	0.2	R0.05	0.1	0.5	0.18	15°	4	50
01-00470-00030	0.3	R0.05	0.15	0.75	0.28	15°	4	50
01-00470-00040	0.4	R0.05	0.2	1	0.37	15°	4	50
01-00470-00050	0.5	R0.05	0.25	1.25	0.46	15°	4	50
01-00470-00060	0.6	R0.05	0.3	1.5	0.56	15°	4	50
01-00470-00080	0.8	R0.05	0.4	2	0.76	15°	4	50
01-00470-00100	1	R0.1	0.5	2.5	0.95	15°	4	50
01-00470-00150	1.5	R0.1	0.75	3.8	1.45	15°	4	52
01-00470-00200	2	R0.1	1	5	1.94	15°	4	52

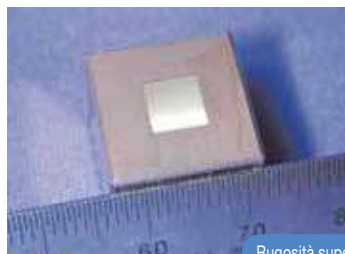
**Attenzione** Quando ordinate, indicate SSF120 (D). ※ (γ) è un valore di riferimento.  
When you order, indicate SSF120 (D). ※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 85.
- Milling condition is recommended on page 85.

### Dati Tecnici 1 Technical Data 1

1.2379 60HRC

Fresa Tool SSF120 Ø0.5



Rugosità superficiale: Rz 16.3nm  
Surface Roughness: Rz16.3nm

(1nm=0.001µm)



Condizioni di lavoro (finitura) Conditions (Finishing Process)

Numero giri Spindle Speed	120,000min <sup>-1</sup>
Avanzamento Feed	300mm/min
Profondità di taglio Depth of Cut	2µm×5µm ap×ae
Lubrificante Coolant	Minimale Oil Mist
Tempo Time	30min 30min

Utilizzata macchina Sodick Nano CNC AZ150  
Sodick Nano Machining Center AZ150

Utilizzato rugosimetro Taylor Hobson "Talysurf"  
Taylor Hobson Talysurf Measurement System

### Dati Tecnici 2 Technical Data 2

1.2379 60HRC

Fresa Tool  
SSF120 Ø0.8

Misure del pezzo Work Size  
10mm×6mm×2mm



Rugosità superficiale: Rz 70nm  
Surface Roughness: Rz70nm

(1nm = 0.001µm)

Condizioni di lavoro (finitura) Conditions (Finishing Process)

	Piano Bottom face milling	Contornatura Side milling
Numero giri Spindle Speed	35,000min <sup>-1</sup>	
Avanzamento Feed	150mm/min	
Profondità di taglio Depth of Cut	3µm×8µm ap×ae	10µm×10µm ap×ae
Lubrificante Coolant	Minimale Oil Mist	
Tempo Time	1hr 36 min 1hr 36min	

Utilizzato rugosimetro Taylor Hobson "Talysurf"  
Taylor Hobson Talysurf Measurement System

## Parametri di taglio raccomandati

# SMB120

**CBN**  
Nitruro Cubico di Boro

### Recommended Milling Conditions

Materiale Work Material	Acciai temprati Hardened Steels STAVAX • 1.2379 (~62HRC)				
	Profondità di taglio Depth of Cut		Avanzamento Feed	Avanzamento iniziale Approaching Feed	Giri Spindle Speed
	$a_p$ mm	$a_e$ mm	mm/min	mm/min	min <sup>-1</sup>
R- Raggio Radius					
0.01	0.0005	0.001	5	3	80,000
0.02	0.001	0.001	30	5	80,000
0.03	0.001	0.002	70	10	80,000
0.04	0.002	0.003	100	30	80,000
0.05	0.002	0.005	200	30	80,000
Note Notes	<p>※Profondità di taglio: <math>a_p</math> = profondità assiale, <math>a_e</math> = profondità radiale.                      ※Maneggiare con cura durante il montaggio e il presettaggio.                      ※Vi raccomandiamo di usare la lubrificazione minimale.                      ※Minimizzare l'eccentricità del serraggio.                      (Raccomandiamo di misurare l'eccentricità durante la rotazione del mandrino.                      ※Utilizzare l'approccio a rampa con angolo 3° o inferiore.                      ※Incrementare la profondità di taglio può provocare la rottura dell'utensile, in particolare porre attenzione alla profondità di taglio assiale.                      ※Depth of Cut; <math>a_p</math>=Axial Depth of Cut / <math>a_e</math>=Radial Depth of Cut.                      ※Handle with care when exchanging and presetting tool.                      ※We recommend using oil mist coolant.                      ※Minimize chucking runout.                      (Recommend to measure actual runout at activated spindle speed.)                      ※Tool approaching angle must be 3 degrees or below.                      ※Increase of depth of cut may cause a tool breakage, especially careful for Axial Depth of Cut.</p>				

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

## Parametri di taglio raccomandati

# SFB200

### Recommended Milling Conditions

Materiale Work Material	Acciaio pretemprato-acciaio temprato-acciaio super rapido Prehardened Steels • Hardened Steels • High Speed Tool Steels 1.2311 • 1.2738 • 1.2379 • ASP • M2 • 1.3343 (~68HRC)					
	Profondità di taglio Depth of Cut		Alta velocità High Speed		Altissima velocità Super High Speed	
	$a_p$ mm	$a_e$ mm	Giri Spindle Speed min <sup>-1</sup>	Avanzamento Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	Avanzamento Feed mm/min
R- Raggio Radius						
0.1~0.2	0.005	0.01	20,000	600	50,000	1,500
0.25~0.3	0.01	0.01		800		2,000
0.4~0.6	0.01	0.02		1,200		3,000
0.7~0.8	0.01	0.02		1,600		4,000
0.9~1	0.02	0.05		2,000		5,000
Note Notes	<p>※Le frese SFB200 sono frese sferiche per super finitura; ne raccomandiamo l'uso dopo la finitura eseguita con frese in metallo duro integrale.                      ※La profondità di taglio deve essere regolata in accordo al percorso utensile e alle condizioni di lavoro.                      ※Fate attenzione al percorso e alle condizioni di taglio in prossimità di raggi e spigoli.                      ※Vi raccomandiamo di usare lubrificazione minimale.                      ※Macchine e mandrino portafrese devono essere precisi.                      ※SFB200 is a Super-Finish Ball End Mill recommended to use after the finish process of carbide end mill.                      ※Cutting depth must be fixed all through the milling process according to the recommended milling conditions.                      ※Pay a special attention when choosing tool path and deciding a milling condition for corner milling.                      ※We recommend using oil mist coolant.                      ※Machine, tool chuck must be sufficiently accurate.</p>					

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

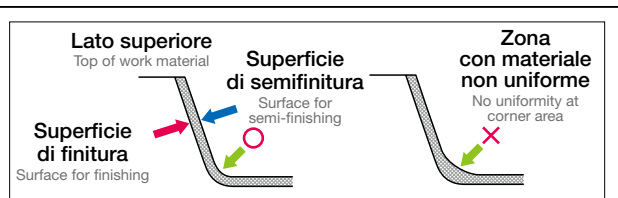
**Punte**  
Drill

**Altro**  
Others

**Punti principali per assicurare un utilizzo efficiente delle frese CBN**  
Main points to ensure an effective use of cBN End Mill.

**E' importante uniformare il materiale da asportare, per una migliore precisione, durata, in special modo negli angoli.**

Uniforming removal stock is important for machining accuracy and tool life, especially at corner area.



**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Materiale Work Material		Acciaio pretemprato-acciaio temprato Prehardened Steels • Hardened Steels 1.2738 • STAVAX • 1.2343 (~52HRC)				Acciaio temprato Hardened Steels 1.2379 • ELMAX (~62HRC)			Acciaio super rapido High Speed Tool Steels ASP • M2 • 1.3343 (~68HRC)							
R-Raggio Radius	Lunghezza effettiva Effective Length	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed			
		$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>			
<b>0.3</b>	<b>1.5</b>	0.02	0.03	2,000	50,000	0.01	0.02	2,000	50,000	0.01	0.02	1,500	50,000			
<b>0.4</b>	<b>2</b>	0.03	0.05	2,000		0.02	0.03	2,000		0.01	0.03	1,500				
<b>0.5</b>	<b>2.5</b>	0.05	0.05	3,000		0.03	0.05	3,000		0.02	0.03	2,000				
<b>0.6</b>	<b>3</b>	0.05	0.05	3,000		0.03	0.05	3,000		0.02	0.03	2,000				
<b>0.75</b>	<b>3.8</b>	0.05	0.1	4,000		0.05	0.05	4,000		0.02	0.05	3,000				
<b>1</b>	<b>4</b>	0.1	0.1	5,000		0.05	0.05	5,000		0.03	0.05	3,000				
	<b>5</b>	0.1	0.1	5,000		0.05	0.05	5,000		0.03	0.05	3,000				
Note Notes		※Le profondità di taglio indicate sono il massimo valore per semi-finitura e finitura. ※Profondità di taglio: $a_p$ = profondità assiale, $a_e$ = profondità radiale. ※Raccomandiamo di usare lubrificazione minima. ※Regolate i parametri di taglio in accordo con la profondità di taglio e la rigidità della macchina. ※Regolate con la stessa proporzione giri e avanzamento. ※La sporgenza dell'utensile fuori dal mandrino deve essere la minore possibile. ※Depth of Cut shows the maximum value for semi-finishing and finishing. ※Depth of Cut, $a_p$ = Axial Depth of Cut / $a_e$ = Radial Depth of Cut. ※We recommend using oil mist coolant. ※Adjust milling conditions according to the volume of depth of cut and rigidity of machine. ※Adjust both spindle speed and feed at the same rate. ※Length of tool overhang must be as short as possible.														

Diamante

Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte

Drill

Altro

Others

Dati tecnici

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Guida tecnica

Technical Guidance

# Parametri di taglio raccomandati

## Recommended Milling Conditions

# SSPB220

**CBN**  
Nitruro Cubico di Boro

Materiale Work Material		Acciaio pretemprato-acciaio temprato Prehardened Steels • Hardened Steels 1.2311 • STAVAX • 1.2343 (~52HRC)				Acciaio temprato Hardened Steels 1.2379 • ELMAX (~62HRC)			Acciaio super rapido High Speed Tool Steels ASP • M2 • 1.3343 (~68HRC)				
R-Raggio Radius	Lunghezza effettiva Effective Length	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
		a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>	a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>	a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>
0.1	0.3	0.005	0.005	600	50.000	0.005	0.005	450	50.000	0.003	0.003	300	50.000
	0.6	0.005	0.005	500		0.005	0.005	350		0.003	0.003	250	
0.15	0.3	0.005	0.005	800		0.005	0.005	600		0.003	0.003	450	
	0.5	0.005	0.005	750		0.005	0.005	550		0.003	0.003	400	
0.2	0.5	0.005	0.01	1.200		0.005	0.01	900		0.005	0.005	600	
	0.75	0.005	0.01	1.100		0.005	0.01	850		0.005	0.005	550	
	1	0.005	0.01	1.000		0.005	0.01	800		0.005	0.005	500	
	1.2	0.005	0.01	1.000		0.005	0.01	800		0.005	0.005	500	
0.25	1	0.01	0.01	1.200		0.01	0.01	1.000		0.005	0.005	700	
0.3	1.2	0.01	0.02	1.800		0.01	0.02	1.500		0.005	0.01	1.000	
	1.5	0.01	0.02	1.500		0.01	0.02	1.200		0.005	0.01	800	
0.4	1.6	0.01	0.02	1.800		0.01	0.02	1.500		0.005	0.01	1.000	
	2	0.01	0.02	1.500		0.01	0.02	1.200		0.005	0.01	800	
0.5	2	0.02	0.04	2.500		0.02	0.03	1.800		0.01	0.02	1.200	
	2.5	0.02	0.04	2.000		0.02	0.03	1.500		0.01	0.02	1.000	
0.6	2.4	0.02	0.04	3.000		0.02	0.03	2.500		0.01	0.02	1.800	
	3	0.02	0.04	2.500		0.02	0.03	2.000		0.01	0.02	1.500	
0.75	3	0.03	0.05	3.000		0.03	0.05	3.000		0.02	0.03	2.500	
	3.8	0.03	0.05	3.000		0.03	0.05	3.000		0.02	0.03	2.000	
1	4	0.05	0.1	3.000		0.03	0.05	3.000		0.03	0.03	2.000	
	5	0.05	0.1	3.000	0.03	0.05	3.000	0.03	0.03	2.000			
Note Notes	<p>※Le profondità di taglio indicate valgono per operazioni di semifinitura e finitura. Regolare i parametri di taglio in accordo alla rigidità della macchina e alla precisione richiesta.</p> <p>※Lasciare alla fine della semifinitura uno strato di sovrametallo uniforme.</p> <p>※E' importante una programmazione dei dati di taglio, del percorso utensile, ecc., molto accurata, soprattutto negli angoli dove si sviluppano dei sovraccarichi.</p> <p>※Si consiglia di usare lubrificazione minima.</p> <p>※Regolate con la stessa proporzione giri e avanzamento.</p> <p>※Max depth of Cut for semi-finishing and finishing. Adjust milling conditions depending on the rigidity of the machine and desired accuracy.</p> <p>※Obtain uniform stock amount on the cutting surface in the pre-stage cutting (semi-finishing).</p> <p>※Required careful set up of milling conditions, tool path and etc. at cutting parts, such as corners where will become overloaded.</p> <p>※Oil mist coolant is recommended.</p> <p>※Adjust both spindle speed and feed at the same rate.</p>												

Diamante

Diamond

Piane

Square

Scaricate

Piane

Long Neck

Square

Sferiche

Ball

Scaricate

Sferiche

Long Neck

Ball

Coniche

Taper

Coniche

Sferiche

Taper Ball

Toriche

Corner R

Scaricate

Toriche

Long Neck

Corner R

Frese

Sagomate

Formed

Cutter

Punte

Drill

Altro

Others

Dati tecnici

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Technical Guidance

Materiale Work Material		Acciaio pretemprato-acciaio temprato Prehardened Steels • Hardened Steels 1.2311 • STAVAX • 1.2343 (~52HRC)				Acciaio temprato Hardened Steels 1.2379 • ELMAX (~62HRC)			Acciaio super rapido High Speed Tool Steels ASP • M2 • 1.3343 (~68HRC)				
		Profondità di taglio Depth of Cut		Avanzamento Feed		Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed
R-Raggio Radius	Lunghezza effettiva Effective Length	a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>	a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>	a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>
		0.1	0.3	0.003	0.003	450	50.000	0.002	0.002	350	50.000	0.002	0.002
0.6	0.003		0.003	400	0.002	0.002		300	0.002	0.002		200	
0.15	0.3	0.004	0.004	550	0.002	0.002		400	0.002	0.002		300	
	0.5	0.004	0.004	500	0.002	0.002		350	0.002	0.002		250	
0.2	0.5	0.005	0.005	700	0.003	0.003		500	0.003	0.003		400	
	0.75	0.005	0.005	650	0.003	0.003		450	0.003	0.003		350	
	1	0.005	0.005	600	0.003	0.003		400	0.003	0.003		300	
	1.2	0.005	0.005	600	0.003	0.003		400	0.003	0.003		300	
0.25	1	0.007	0.007	700	0.004	0.004		500	0.004	0.004		400	
	1.2	0.01	0.01	800	0.005	0.005		600	0.005	0.005		500	
0.3	1.5	0.01	0.01	700	0.005	0.005		500	0.005	0.005		400	
	1.6	0.01	0.01	1.000	0.005	0.005		800	0.005	0.005		600	
0.4	2	0.01	0.01	800	0.005	0.005		600	0.005	0.005		500	
	2	0.02	0.02	1.200	0.01	0.01		1.000	0.01	0.01		800	
0.5	2.5	0.02	0.02	1.000	0.01	0.01		800	0.01	0.01		600	
	2.4	0.02	0.02	1.500	0.01	0.01		1.200	0.01	0.01		1.000	
0.6	3	0.02	0.02	1.200	0.01	0.01		1.000	0.01	0.01		800	
	3	0.02	0.02	1.800	0.01	0.01		1.500	0.01	0.01		1.200	
0.75	3.8	0.02	0.02	1.500	0.01	0.01		1.200	0.01	0.01		1.000	
	4	0.03	0.03	2.000	0.02	0.02		1.500	0.02	0.02		1.200	
1	5	0.03	0.03	2.000	0.02	0.02	1.500	0.02	0.02	1.200			

Diamante

Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte

Drill

Altro

Others

Dati tecnici

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# Parametri di taglio raccomandati

## Recommended Milling Conditions

# SSPBL220

**CBN**  
Nitrato Cubico di Boro

Materiale Work Material		Acciaio pretemprato-acciaio temprato Prehardened Steels • Hardened Steels 1.2311 • STAVAX • 1.2343 (~52HRC)				Acciaio temprato Hardened Steels 1.2379 • ELMAX (~62HRC)				Acciaio super rapido High Speed Tool Steels ASP • M2 • 1.3343 (~68HRC)			
R-Raggio Radius	Lunghezza effettiva Effective Length	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
		ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>
0.1	1	0.005	0.005	200	40.000	0.005	0.005	150	40.000	0.003	0.003	100	40.000
0.15	0.9	0.005	0.005	600	40.000	0.005	0.005	400	40.000	0.003	0.005	300	40.000
	1.5	0.005	0.005	320	40.000	0.005	0.005	240	40.000	0.003	0.005	160	40.000
0.2	2	0.005	0.005	500	40.000	0.005	0.01	400	40.000	0.005	0.005	320	40.000
	3	0.005	0.005	250	40.000	0.005	0.005	200	40.000	0.003	0.005	120	40.000
0.25	1.5	0.01	0.01	1.200	40.000	0.01	0.01	1.000	40.000	0.005	0.01	600	40.000
	2.5	0.01	0.01	720	40.000	0.01	0.01	600	40.000	0.005	0.01	480	40.000
	3.5	0.01	0.01	400	36.000	0.005	0.01	320	36.000	0.005	0.005	240	36.000
0.3	3	0.01	0.02	1.200	40.000	0.01	0.02	800	40.000	0.01	0.01	600	40.000
	4	0.01	0.01	540	36.000	0.01	0.01	400	36.000	0.005	0.01	320	36.000
	5	0.01	0.01	360	30.000	0.005	0.01	320	30.000	0.005	0.005	240	30.000
0.4	6	0.005	0.005	240	24.000	0.005	0.005	200	24.000	0.003	0.003	160	24.000
	4	0.01	0.015	1.000	40.000	0.01	0.015	800	40.000	0.005	0.01	600	40.000
0.5	6	0.005	0.01	720	30.000	0.005	0.01	540	30.000	0.005	0.005	400	30.000
	4	0.02	0.03	1.600	40.000	0.02	0.02	1.200	40.000	0.01	0.015	800	40.000
	6	0.015	0.02	1.200	30.000	0.015	0.015	900	30.000	0.01	0.01	600	30.000
	8	0.01	0.015	720	20.000	0.01	0.01	540	20.000	0.005	0.01	400	20.000
0.6	10	0.01	0.01	540	16.000	0.005	0.01	400	16.000	0.005	0.005	300	16.000
	6	0.02	0.02	1.400	32.000	0.015	0.02	1.000	32.000	0.01	0.015	720	32.000
	7.5	0.02	0.03	1.600	32.000	0.015	0.03	1.400	32.000	0.01	0.01	1.000	32.000
0.75	10	0.015	0.02	900	20.000	0.01	0.02	720	20.000	0.01	0.01	540	20.000
	15	0.01	0.02	480	12.000	0.01	0.01	400	12.000	0.005	0.01	300	12.000
	6	0.03	0.05	2.400	40.000	0.03	0.03	2.000	40.000	0.02	0.02	1.600	40.000
1	8	0.03	0.03	2.000	36.000	0.02	0.03	1.400	36.000	0.01	0.02	1.000	36.000
	10	0.02	0.03	1.600	32.000	0.015	0.03	800	32.000	0.01	0.015	600	32.000
	14	0.02	0.02	900	20.000	0.01	0.02	720	20.000	0.01	0.01	540	20.000
	20	0.02	0.02	360	8.000	0.01	0.02	320	8.000	0.01	0.01	240	8.000

Note  
Notes

- \*Le profondità di taglio indicate valgono per operazioni di semifinitura e finitura. Regolare i parametri di taglio in accordo alla rigidità della macchina e alla precisione richiesta.
- \*Lasciare alla fine della semifinitura uno strato di sovrametallo uniforme.
- \*E' importante una programmazione dei dati di taglio, del percorso utensile, ecc., molto accurata, soprattutto negli angoli dove si sviluppano dei sovraccarichi.
- \*Si consiglia di usare lubrificazione minimale.
- \*Regolate con la stessa proporzione giri e avanzamento.
- \*Max depth of Cut for semi-finishing and finishing. Adjust milling conditions depending on the rigidity of the machine and desired accuracy.
- \*Obtain uniform stock amount on the cutting surface in the pre-stage cutting (semi-finishing).
- \*Required careful set up of milling conditions, tool path and etc. at cutting parts, such as corners where will become overloaded.
- \*Coolant supply and chip disposal in the deep portion are very important.
- \*Oil mist coolant is recommended.

Diamante

Diamond

Piane

Square

Scaricate

Piane

Long Neck

Square

Sferiche

Ball

Scaricate

Sferiche

Long Neck

Ball

Coniche

Taper

Coniche

Sferiche

Taper Ball

Toriche

Corner R

Scaricate

Toriche

Long Neck

Corner R

Frese

Sagomate

Formed

Cutter

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

Guida tecnica

Technical Guidance

**Parametri di taglio raccomandati**

**SSPBTN220**

*Recommended Milling Conditions*

Materiale Work Material			Acciaio pretemprato-acciaio temprato Prehardened Steels • Hardened Steels 1.2311 • STAVAX • 1.2343 (~52HRC)				Acciaio temprato Hardened Steels 1.2379 • ELMAX (~62HRC)				Acciaio super rapido High Speed Tool Steels ASP • M2 • 1.3343 (~68HRC)			
R Raggio Radius	Angolo scarico Neck Taper Angle	Lunghezza effettiva Effective Length	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
			ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>
0.1	30°	1.5	0.003	0.005	140	40.000	0.003	0.003	120	40.000	0.002	0.003	100	40.000
		2	0.003	0.003	120	40.000	0.002	0.003	100	40.000	0.002	0.002	80	40.000
	1°	1.5	0.003	0.005	160	40.000	0.003	0.003	140	40.000	0.002	0.003	120	40.000
		2	0.003	0.003	140	40.000	0.002	0.003	120	40.000	0.002	0.002	90	40.000
	1°30'	1.5	0.003	0.005	200	40.000	0.003	0.003	160	40.000	0.002	0.003	140	40.000
		2	0.003	0.003	160	40.000	0.002	0.003	140	40.000	0.002	0.002	100	40.000
	2°	1.5	0.003	0.005	240	40.000	0.003	0.003	200	40.000	0.002	0.003	160	40.000
		2	0.003	0.003	200	40.000	0.002	0.003	160	40.000	0.002	0.002	120	40.000
0.15	30°	2	0.005	0.005	200	40.000	0.005	0.005	160	40.000	0.003	0.005	120	40.000
		3	0.003	0.005	160	40.000	0.003	0.003	120	40.000	0.002	0.003	100	40.000
	1°	2	0.005	0.005	240	40.000	0.005	0.005	200	40.000	0.003	0.005	160	40.000
		3	0.003	0.005	200	40.000	0.003	0.003	160	40.000	0.002	0.003	120	40.000
	1°30'	2	0.005	0.005	320	40.000	0.005	0.005	240	40.000	0.003	0.005	200	40.000
		3	0.003	0.005	240	40.000	0.003	0.003	200	40.000	0.002	0.003	160	40.000
	2°	2	0.005	0.005	400	40.000	0.005	0.005	300	40.000	0.003	0.005	240	40.000
		3	0.003	0.005	300	40.000	0.003	0.003	240	40.000	0.002	0.003	180	40.000
0.2	30°	3	0.007	0.01	320	40.000	0.005	0.01	240	40.000	0.005	0.005	160	40.000
		4	0.005	0.005	240	36.000	0.005	0.005	180	36.000	0.003	0.005	120	36.000
	1°	3	0.007	0.01	400	40.000	0.005	0.01	300	40.000	0.005	0.005	200	40.000
		4	0.005	0.005	320	36.000	0.005	0.005	240	36.000	0.003	0.005	160	36.000
	1°30'	3	0.007	0.01	480	40.000	0.005	0.01	360	40.000	0.005	0.005	240	40.000
		4	0.005	0.005	400	36.000	0.005	0.005	320	36.000	0.003	0.005	200	36.000
	2°	3	0.007	0.01	540	40.000	0.005	0.01	400	40.000	0.005	0.005	300	40.000
		4	0.005	0.005	480	36.000	0.005	0.005	360	36.000	0.003	0.005	240	36.000
0.25	30°	4	0.01	0.01	400	36.000	0.005	0.01	320	36.000	0.005	0.005	240	36.000
		5	0.005	0.01	320	32.000	0.005	0.005	240	32.000	0.003	0.005	160	32.000
	1°	4	0.01	0.01	480	36.000	0.005	0.01	400	36.000	0.005	0.005	300	36.000
		5	0.005	0.01	400	32.000	0.005	0.005	320	32.000	0.003	0.005	240	32.000
	1°30'	4	0.01	0.01	640	36.000	0.005	0.01	480	36.000	0.005	0.005	360	36.000
		5	0.005	0.01	540	32.000	0.005	0.005	400	32.000	0.003	0.005	300	32.000
	2°	4	0.01	0.01	720	36.000	0.005	0.01	540	36.000	0.005	0.005	400	36.000
		5	0.005	0.01	640	32.000	0.005	0.005	480	32.000	0.003	0.005	360	32.000
0.3	30°	5	0.01	0.01	480	36.000	0.005	0.01	400	36.000	0.005	0.005	300	36.000
		6	0.005	0.01	400	32.000	0.005	0.005	360	32.000	0.003	0.005	240	32.000
	1°	5	0.01	0.01	640	36.000	0.005	0.01	480	36.000	0.005	0.005	400	36.000
		6	0.005	0.01	540	32.000	0.005	0.005	400	32.000	0.003	0.005	300	32.000
	1°30'	5	0.01	0.01	800	36.000	0.005	0.01	640	36.000	0.005	0.005	480	36.000
		6	0.005	0.01	720	32.000	0.005	0.005	540	32.000	0.003	0.005	400	32.000
	2°	5	0.01	0.01	900	36.000	0.005	0.01	720	36.000	0.005	0.005	540	36.000
		6	0.005	0.01	800	32.000	0.005	0.005	640	32.000	0.003	0.005	480	32.000

Materiale Work Material			Acciaio pretemprato-acciaio temprato Prehardened Steels • Hardened Steels 1.2311 • STAVAX • 1.2343 (~52HRC)				Acciaio temprato Hardened Steels 1.2379 • ELMAX (~62HRC)				Acciaio super rapido High Speed Tool Steels ASP • M2 • 1.3343 (~68HRC)			
R Raggio Radius	Angolo scarico Neck Taper Angle	Lunghezza effettiva Effective Length	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
			a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>	a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>	a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>
0.5	30°	8	0.01	0.02	900	20.000	0.01	0.02	800	20.000	0.01	0.01	640	20.000
		10	0.01	0.02	720	16.000	0.005	0.01	640	16.000	0.005	0.005	480	16.000
	1°	8	0.01	0.02	1.000	20.000	0.01	0.02	900	20.000	0.01	0.01	800	20.000
		10	0.01	0.02	800	16.000	0.005	0.01	720	16.000	0.005	0.005	640	16.000
	1°30'	8	0.01	0.02	1.200	20.000	0.01	0.02	1.000	20.000	0.01	0.01	900	20.000
		10	0.01	0.02	900	16.000	0.005	0.01	800	16.000	0.005	0.005	720	16.000
2°	8	0.01	0.02	1.400	20.000	0.01	0.02	1.200	20.000	0.01	0.01	1.000	20.000	
	10	0.01	0.02	1.000	16.000	0.005	0.01	900	16.000	0.005	0.005	800	16.000	
0.75	30°	10	0.02	0.02	800	16.000	0.015	0.02	900	16.000	0.01	0.015	600	16.000
		15	0.01	0.02	540	12.000	0.01	0.01	480	12.000	0.005	0.01	400	12.000
	1°	10	0.02	0.02	900	16.000	0.015	0.02	1.000	16.000	0.01	0.015	720	16.000
		15	0.01	0.02	680	12.000	0.01	0.01	600	12.000	0.005	0.01	540	12.000
	1°30'	10	0.02	0.02	1.200	20.000	0.015	0.02	1.000	20.000	0.01	0.015	900	20.000
		15	0.01	0.02	900	16.000	0.01	0.01	800	16.000	0.005	0.01	720	16.000
2°	10	0.02	0.02	1.400	20.000	0.015	0.02	1.200	20.000	0.01	0.015	1.000	20.000	
	15	0.01	0.02	1.000	16.000	0.01	0.01	900	16.000	0.005	0.01	800	16.000	
1	30°	16	0.02	0.03	720	12.000	0.015	0.03	540	12.000	0.01	0.02	400	12.000
		20	0.02	0.02	400	8.000	0.01	0.02	360	8.000	0.01	0.01	240	8.000
	1°	16	0.02	0.03	1.000	16.000	0.015	0.03	800	16.000	0.01	0.02	600	16.000
		20	0.02	0.02	600	12.000	0.01	0.02	540	12.000	0.01	0.01	400	12.000
	1°30'	16	0.02	0.03	1.200	20.000	0.015	0.03	1.000	20.000	0.01	0.02	800	20.000
		20	0.02	0.02	900	16.000	0.01	0.02	800	16.000	0.01	0.01	600	16.000
2°	16	0.02	0.03	1.400	20.000	0.015	0.03	1.200	20.000	0.01	0.02	1.000	20.000	
	20	0.02	0.02	1.000	16.000	0.01	0.02	900	16.000	0.01	0.01	800	16.000	
Note Notes			<p>※Le profondità di taglio indicate valgono per operazioni di semifinitura e finitura. Regolare i parametri di taglio in accordo alla rigidità della macchina e alla precisione richiesta.</p> <p>※Lasciare alla fine della semifinitura uno strato di sovrametallo uniforme.</p> <p>※E' importante una programmazione dei dati di taglio, del percorso utensile, ecc., molto accurata, soprattutto negli angoli dove si sviluppano dei sovraccarichi.</p> <p>※Si consiglia di usare lubrificazione minimale.</p> <p>※Regolate con la stessa proporzione giri e avanzamento.</p> <p>※Max depth of Cut for semi-finishing and finishing. Adjust milling conditions depending on the rigidity of the machine and desired accuracy.</p> <p>※Obtain uniform stock amount on the cutting surface in the pre-stage cutting (semi-finishing).</p> <p>※Required careful set up of milling conditions, tool path and etc. at cutting parts, such as corners where will become overloaded.</p> <p>※Coolant supply and chip disposal in the deep portion are very important.</p> <p>※Oil mist coolant is recommended.</p>											

Diamante

Diamond

Piane

Square

Scaricate

Piane

Long Neck

Square

Sferiche

Ball

Scaricate

Sferiche

Long Neck

Ball

Coniche

Taper

Coniche

Sferiche

Taper Ball

Toriche

Corner R

Scaricate

Toriche

Long Neck

Corner R

Frese

Sagomate

Formed

Cutter

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

Guida tecnica

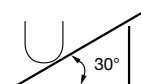
Technical Guidance

Materiale Work Material		Acciaio pretemprato • acciaio temprato Prehardened Steels • Hardened Steels 1.2738 • STAVAX • 1.2343 (~52HRC)				Acciaio temprato Hardened Steels 1.2738 • STAVAX • 1.2343 (~62HRC)				Acciaio super rapido High Speed Tool Steels ASP • M2 • 1.3343 (~68HRC)					
		R- Raggio Radius	Lunghezza effettiva Effective Length	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
				$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>
Piane Square	Scaricate Piane Long Neck Square	0.05	0.3	0.005	0.005	200	50,000	0.003	0.005	150	50,000	0.002	0.003	120	50,000
			0.5	0.003	0.003	120	50,000	0.003	0.003	100	50,000	0.002	0.003	80	50,000
Sferiche Ball	Scaricate Sferiche Long Neck Ball	0.075	0.45	0.005	0.005	300	50,000	0.003	0.005	200	50,000	0.002	0.003	150	50,000
			0.75	0.003	0.003	200	50,000	0.003	0.003	150	50,000	0.002	0.003	100	50,000
Coniche Taper	Scaricate Coniche Long Neck Taper	0.1	0.6	0.005	0.005	500	50,000	0.005	0.005	380	50,000	0.003	0.003	280	50,000
			1	0.005	0.005	300	50,000	0.005	0.005	260	50,000	0.003	0.003	120	50,000
Coniche Sferiche Taper Ball	Scaricate Sferiche Long Neck Ball	0.15	0.9	0.005	0.005	800	50,000	0.005	0.005	460	50,000	0.003	0.005	360	50,000
			1.5	0.005	0.005	480	50,000	0.005	0.005	320	50,000	0.003	0.005	280	50,000
Toriche Corner R	Scaricate Toriche Long Neck Corner R	0.2	1.2	0.005	0.01	1,200	50,000	0.005	0.01	820	50,000	0.005	0.005	580	50,000
			2	0.005	0.01	620	50,000	0.005	0.01	580	50,000	0.005	0.005	380	50,000
Frese Sagomate Formed Cutter	Scaricate Sferiche Long Neck Ball	0.25	1.5	0.01	0.01	1,500	50,000	0.01	0.01	1,200	50,000	0.005	0.01	860	50,000
			2.5	0.01	0.01	800	50,000	0.01	0.01	680	50,000	0.005	0.01	540	50,000
Punte Drill	Scaricate Toriche Long Neck Corner R	0.3	3	0.01	0.02	1,600	40,000	0.01	0.02	1,200	40,000	0.01	0.01	920	40,000
			4	0.01	0.01	1,200	30,000	0.01	0.01	960	30,000	0.005	0.01	640	30,000
Altro Others	Scaricate Toriche Long Neck Corner R	0.3	5	0.01	0.01	800	30,000	0.005	0.01	680	30,000	0.005	0.005	480	30,000
			4	0.01	0.03	1,500	30,000	0.01	0.02	1,200	30,000	0.01	0.01	920	30,000
Punte Drill	Scaricate Toriche Long Neck Corner R	0.4	4	0.03	0.05	2,400	40,000	0.02	0.03	2,400	40,000	0.02	0.02	1,500	40,000
			5	0.02	0.05	2,000	32,000	0.02	0.03	2,000	32,000	0.01	0.02	1,200	32,000
			6	0.02	0.03	1,500	25,000	0.01	0.02	1,500	25,000	0.01	0.01	1,000	25,000
			8	0.01	0.03	1,200	16,000	0.01	0.02	1,000	16,000	0.01	0.01	840	16,000
Punte Drill	Scaricate Toriche Long Neck Corner R	0.5	10	0.01	0.02	800	12,000	0.005	0.01	720	12,000	0.005	0.005	620	12,000
			4	0.02	0.05	2,400	40,000	0.02	0.03	2,400	40,000	0.02	0.02	1,500	40,000
Punte Drill	Scaricate Toriche Long Neck Corner R	0.75	7.5	0.02	0.03	2,000	32,000	0.01	0.03	1,800	32,000	0.01	0.01	1,200	32,000
			6	0.05	0.05	4,000	40,000	0.03	0.03	4,000	40,000	0.02	0.03	2,600	40,000
Punte Drill	Scaricate Toriche Long Neck Corner R	1	8	0.03	0.05	3,000	32,000	0.02	0.03	2,600	32,000	0.01	0.02	1,800	32,000
			10	0.02	0.03	2,000	24,000	0.01	0.03	1,600	24,000	0.01	0.02	1,200	24,000

Note  
Notes

- ※Le profondità di taglio indicate sono il massimo valore per semi finitura e finitura.
- ※Profondità di taglio:  $a_p$  = profondità assiale,  $a_e$  = profondità radiale.
- ※Vi raccomandiamo di usare lubrificazione minima.
- ※Regolate con la stessa proporzione giri e avanzamento.
- ※Regolate i parametri di taglio in accordo con la profondità di taglio e la rigidità della macchina.
- ※La sporgenza dell'utensile fuori dal mandrino deve essere la minore possibile.
- ※Depth of Cut shows the maximum value for semi-finishing and finishing.
- ※Depth of Cut:  $a_p$  = Axial Depth of Cut /  $a_e$  = Radial Depth of Cut.
- ※We recommend using oil mist coolant.
- ※Adjust both spindle speed and feed at the same rate.
- ※Adjust milling conditions according to the volume of depth of cut and rigidity of machine.
- ※Length of tool overhang must be as short as possible.

※Quando la lunghezza effettiva di lavoro è uguale o superiore a 5xD: valutare la possibilità di inclinare la superficie di lavoro o la fresa di circa 30°.



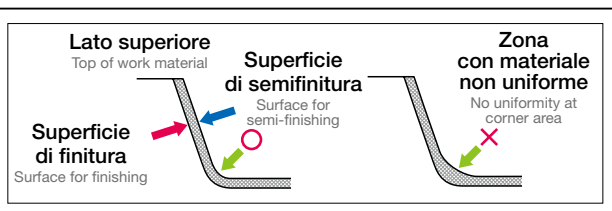
※Effective length is 5D or more: Values are reference as a target for milling surface inclined at less than 30 degree angle.

**Punti principali per assicurare un utilizzo efficiente delle frese CBN**

Main points to ensure an effective use of cBN End Mill.

**E' importante uniformare il materiale da asportare, per una migliore precisione, durata, in special modo negli angoli.**

Uniforming removal stock is important for machining accuracy and tool life, especially at corner area.



# Parametri di taglio raccomandati

## Recommended Milling Conditions

# SSR200

**CBN**  
Nitruro Cubico di Boro

Materiale Work Material			Acciaio pretemprato-acciaio temprato Prehardened Steels • Hardened Steels 1.2738 • STAVAX • 1.2343 (~52HRC)				Acciaio temprato Hardened Steels 1.2379 • ELMAX (~62HRC)				Acciaio super rapido High Speed Tool Steels ASP • M2 • 1.3343 (~68HRC)				
Dia Dia.	Raggio Corner Radius	Lunghezza effettiva Effective Length	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	
			ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	
0.2	0.02 - 0.03 - 0.05	0.5	0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.002	0.02	200	50,000	
		1	0.003	0.02	200	50,000	0.003	0.02	200	50,000	0.002	0.01	100	50,000	
0.3	0.02 - 0.03 - 0.05	0.5 - 1	0.003	0.05	500	50,000	0.003	0.05	400	50,000	0.002	0.03	300	50,000	
		1.5 - 2	0.003	0.03	400	50,000	0.003	0.03	300	50,000	0.002	0.02	200	50,000	
0.4	0.02 - 0.03 - 0.05 - 0.1	0.5 - 1	0.005	0.1	700	50,000	0.005	0.1	600	50,000	0.003	0.03	400	50,000	
		1.5 - 2	0.005	0.05	500	50,000	0.005	0.05	400	50,000	0.003	0.02	300	50,000	
0.5	0.02 - 0.03	0.5 - 1 - 1.5	0.005	0.2	600	50,000	0.005	0.2	600	50,000	0.003	0.1	500	50,000	
		2.5	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.003	0.05	500	50,000	
	0.05	0.5 - 1 - 1.5	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.005	0.2	500	50,000	
		2.5	0.01	0.1	600	50,000	0.01	0.1	600	50,000	0.005	0.1	500	50,000	
0.6	0.02 - 0.03	0.5 - 1 - 1.5	0.005	0.2	600	50,000	0.005	0.2	600	50,000	0.003	0.1	500	50,000	
		2.5	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.003	0.05	500	50,000	
	0.05	0.5 - 1 - 1.5	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.005	0.2	500	50,000	
		2.5	0.01	0.1	600	50,000	0.01	0.1	600	50,000	0.005	0.1	500	50,000	
0.8	0.02 - 0.03	0.5 - 1 - 1.5	0.005	0.2	600	50,000	0.005	0.2	600	50,000	0.003	0.1	500	50,000	
		2.5	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.003	0.05	500	50,000	
	0.05	1.5 - 2.5	0.005	0.2	800	50,000	0.005	0.2	800	50,000	0.003	0.1	600	40,000	
		5	0.005	0.1	800	50,000	0.005	0.1	800	50,000	0.003	0.05	600	40,000	
1	0.02 - 0.03	1.5 - 2.5	0.02	0.3	1,000	50,000	0.02	0.2	1,000	50,000	0.01	0.1	700	40,000	
		5	0.01	0.2	1,000	50,000	0.01	0.1	1,000	50,000	0.01	0.05	700	40,000	
	0.05	1.5 - 2.5	0.02	0.3	1,400	50,000	0.02	0.2	1,200	50,000	0.01	0.1	1,000	40,000	
		5	0.01	0.2	1,400	50,000	0.01	0.1	1,200	50,000	0.01	0.05	1,000	40,000	
1.5	0.02 - 0.03	1 - 2	0.005	0.4	800	48,000	0.005	0.3	800	48,000	0.005	0.2	600	32,000	
			0.01	0.4	1,000	48,000	0.01	0.3	1,000	48,000	0.01	0.2	800	32,000	
	0.1 - 0.2 - 0.3	3 - 5	0.03	0.4	1,500	48,000	0.03	0.3	1,200	48,000	0.01	0.2	1,000	32,000	
			0.005	0.3	800	48,000	0.005	0.2	800	48,000	0.005	0.1	600	32,000	
	1.5	0.02 - 0.03	3 - 4.5	0.01	0.3	1,000	48,000	0.01	0.2	1,000	48,000	0.01	0.1	800	32,000
				0.02	0.3	1,500	48,000	0.02	0.2	1,200	48,000	0.01	0.1	1,000	32,000
0.05		7.5	0.04	0.7	2,000	32,000	0.04	0.6	1,500	32,000	0.01	0.3	1,200	20,000	
			0.005	0.5	1,000	32,000	0.005	0.4	1,000	32,000	0.005	0.2	800	20,000	
2	0.02 - 0.03	4 - 6	0.02	0.5	1,000	32,000	0.01	0.4	1,000	32,000	0.01	0.2	800	20,000	
			0.03	0.5	2,000	32,000	0.03	0.4	1,500	32,000	0.01	0.2	1,200	20,000	
	0.05	10	0.005	0.8	1,000	24,000	0.005	0.7	1,000	24,000	0.005	0.5	800	16,000	
			0.02	0.8	2,000	24,000	0.01	0.7	1,000	24,000	0.01	0.5	800	16,000	
2	0.1 - 0.3 - 0.5	10	0.05	0.8	1,000	24,000	0.05	0.7	1,500	24,000	0.01	0.5	1,200	16,000	
			0.005	0.6	1,000	24,000	0.005	0.5	1,000	24,000	0.005	0.3	800	16,000	
	0.02 - 0.03	10	0.02	0.6	1,000	24,000	0.01	0.5	1,000	24,000	0.01	0.3	800	16,000	
			0.03	0.6	2,000	24,000	0.03	0.5	1,500	24,000	0.01	0.3	1,200	16,000	

Note  
Notes

- ※Le profondità di taglio indicate sono il massimo valore per semi finitura e finitura.
- ※Profondità di taglio: ap = profondità assiale; ae = profondità radiale.
- ※Raccomandiamo di usare lubrificazione minimale.
- ※Regolare con la stessa proporzione giri e avanzamento
- ※Regolare i parametri di taglio in accordo con la profondità di taglio e la rigidità della macchina.
- ※La sporgenza dell'utensile fuori dal mandrino deve essere la minore possibile.
- ※Macchina e mandrino portafresa devono essere precisi.
- ※Depth of Cut shows the maximum value for semi-finishing and finishing.
- ※Depth of Cut: ap = Axial Depth of Cut / ae = Radial Depth of Cut.
- ※We recommend using oil mist coolant.
- ※Adjust both spindle speed and feed at the same rate.
- ※Adjust milling conditions according to the volume of depth of cut and rigidity of machine.
- ※Length of tool overhang must be as short as possible.
- ※Machine, tool chuck must be sufficiently accurate.

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Materiale Work Material			Acciaio pretemprato-acciaio temprato Prehardened Steels • Hardened Steels 1.2738 • STAVAX • 1.2343 (~52HRC)				Acciaio temprato Hardened Steels 1.2379 • ELMAX (~62HRC)				Acciaio super rapido High Speed Tool Steels ASP • M2 • 1.3343 (~68HRC)			
Dia Dia.	Raggio Corner Radius	Lunghezza effettiva Effective Length	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
			ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>
0.5	0.1	1.5	0.008	0.2	1.500	50.000	0.005	0.15	800	50.000	0.003	0.1	600	50.000
		2.5	0.006	0.15	1.000	40.000	0.005	0.1	500	40.000	0.003	0.05	300	40.000
1.0	0.1	3	0.012	0.4	2.000	40.000	0.007	0.25	1.000	40.000	0.006	0.15	800	35.000
		5	0.008	0.3	1.500	30.000	0.005	0.15	800	30.000	0.004	0.1	400	25.000
1.5	0.1	4.5	0.015	0.6	2.500	35.000	0.008	0.4	1.200	35.000	0.007	0.2	1.000	30.000
		7.5	0.012	0.4	1.800	25.000	0.006	0.3	1.000	25.000	0.005	0.15	500	20.000
2.0	0.1	6	0.02	0.8	3.000	30.000	0.01	0.6	1.500	30.000	0.008	0.3	1.200	25.000
		10	0.015	0.6	2.000	20.000	0.008	0.4	1.000	20.000	0.006	0.2	600	18.000
Note Notes			<p>※Le profondità di taglio si riferiscono a operazioni di contornitura. Regolare i parametri di taglio in accordo alla rigidità della macchina e alla programmazione.</p> <p>※Si consiglia di avvicinarsi con un angolo di 3° o minore.</p> <p>※Lasciare alla fine della semifinitura uno strato di sovrametallo uniforme.</p> <p>※Fare attenzione nella programmazione del percorso utensile e ai parametri di taglio soprattutto in sezioni di elevato carico o profili complessi.</p> <p>※Regolare numero di giri e avanzamento con la stessa proporzione.</p> <p>※Si consiglia di usare lubrificazione minimale.</p> <p>※Depth of Cut is for contour line milling as the value of reference. Please adjust it depending on machine rigidity and processing method.</p> <p>※Ramping approach with angle 3° or smaller is recommended.</p> <p>※Recommended leaving uniform finishing allowance on the machined surface in the pre-stage cutting (semi-finishing).</p> <p>※When cutting high load sections or complex shapes, it requires attention to condition setting and tool path.</p> <p>※Adjust both spindle speed and feed at the same rate.</p> <p>※Oil mist coolant is recommended.</p>											

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square  
Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball  
Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper  
Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R  
Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Parametri di taglio raccomandati

# SSF120

### Recommended Milling Conditions

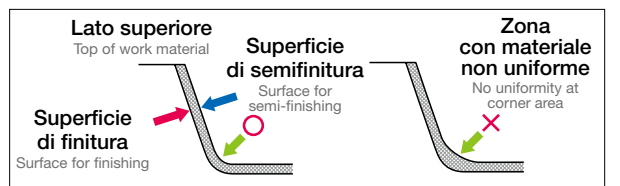
Materiale Work Material	Acciaio temprato • Acciaio super rapido Hardened Steels • High Speed tool Steels STAVAX • 1.2379 • ASP • M2 • 1.3343 (~65HRC)			
	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>
0.2	0.002	0.003	50	60,000
0.3	0.002	0.003	100	60,000
0.4	0.002	0.003	150	60,000
0.5	0.003	0.005	200	60,000
0.6	0.003	0.005	240	60,000
0.8	0.003	0.008	280	60,000
1	0.005	0.01	300	60,000
1.5	0.005	0.02	400	60,000
2	0.005	0.03	500	60,000
Note Notes	※Profondità di taglio: $a_p$ = profondità assiale; $a_e$ = profondità radiale. ※Vi raccomandiamo di usare la lubrificazione minimale. ※Macchina e mandrino portafresa devono essere precisi. ※La sporgenza dell'utensile fuori dal mandrino deve essere la minore possibile. ※Depth of Cut: $a_p$ =Axial Depth of Cut / $a_e$ =Radial Depth of Cut. ※We recommend using oil mist coolant. ※Machine, tool chuck must be sufficiently accurate. ※Length of tool overhang must be as short as possible.			

### Punti principali per assicurare un utilizzo efficiente delle frese CBN

Main points to ensure an effective use of cBN End Mill.

E' importante uniformare il materiale da asportare, per una migliore precisione, durata, in special modo negli angoli.

Uniforming removal stock is important for machining accuracy and tool life, especially at corner area.



**CBN**  
Nitruro Cubico di Boro

Diamante

Diamond

Piane  
Square

Coating

Non Rivestite

Non-Coating

Scaricate Piane

Long Neck Square

Sferiche

Coating

Rivestite

Non Rivestite

Non-Coating

Scaricate Sferiche

Long Neck Ball

Coniche

Coating

Rivestite

Non Rivestite

Non-Coating

Coniche Sferiche

Taper Ball

Toriche

Coating

Rivestite

Non Rivestite

Non-Coating

Scaricate Toriche

Long Neck Corner R

Frese Sagomate

Coating

Rivestite

Non Rivestite

Non-Coating

Formed Cutter

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

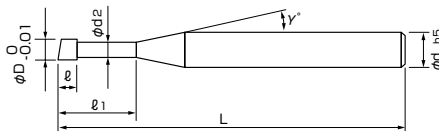
Guida tecnica

Technical Guidance

# CED100

Monocrystalline Diamond End Mill "CLEAR EDGE"

## Frese Piane in diamante Monocristallino "CLEAR EDGE"



- Si può lavorare direttamente il metallo duro.
- Consente di lavorare con grande precisione materiali fragili.
- Il design del tagliente massimizza le performance del diamante monocristallino.
- Direct machining to cemented carbide, hard metal.
- Enable high-accurate machining to brittle materials.
- Unique design to maximize performance of monocrystalline diamond.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia	(l) Lungh. tagliente Length of Cut	(l <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00100-00050	0.05	0.025	0.1	0.045	15°	4	40
04-00100-00100	0.1	0.05	0.2	0.09	15°	4	40
04-00100-00200	0.2	0.1	0.4	0.18	15°	4	40
04-00100-00300	0.3	0.15	0.6	0.27	15°	4	40
04-00100-00400	0.4	0.2	0.8	0.36	15°	4	40
04-00100-00500	0.5	0.25	1	0.46	15°	4	40
04-00100-01000	1	0.5	2	0.9	15°	4	40
04-00100-01200	1.2	0.6	2.4	1.08	15°	4	40
04-00100-01500	1.5	0.75	3	1.42	15°	4	40
04-00100-02000	2	1	4	1.9	15°	4	40

### Attenzione

Quando ordinate, indicate CED100 (D)×(l<sub>1</sub>)  
When you order, indicate CED100 (D)×(l<sub>1</sub>).

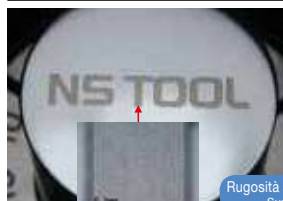
※ (γ) è un valore di riferimento  
※ (γ) is reference value.

### Dati Tecnici 1 Technical Data 1

**Materiale: metallo duro (95HRA)**  
Work Material: Cemented Carbide (95HRA)

**Fresa: Ø 0.1**  
Tool Size

Misure pezzo: Ø10mm, Prof. di taglio: 0.03mm  
Work Size



Rugosità superficiale (Rz): 1µm  
Surface Roughness

Giri Spindle Speed	12,000 min <sup>-1</sup>
Avanzamento Feed	6 mm/min
Prof. di taglio Depth of Cut	0.002 mm×0.03 mm (ap×ae)
Lungh. fresatura Cutting length	2.7m
Tempo Time	7hr 30 min 7hrs 30 min
Lubrificazione Coolant	Minimale Oil Mist

### Dati Tecnici 3 Technical Data 3

**Materiale: ceramica monocristallina**  
Work Material: Monocrystal silicon

**Fresa: Ø 0.5**  
Tool Size

Misure pezzo: 45×20×0.7 mm  
Work Size



Rugosità superficiale (Rz): 1.4µm  
Surface Roughness

Giri Spindle Speed	20,000 min <sup>-1</sup>
Avanzamento Feed	100 mm/min
Prof. di taglio Depth of Cut	0.0025 mm×0.125 mm (ap×ae)
Lungh. fresatura Cutting length	21.2m
Tempo Time	3 hr 30 min 3hrs 30min
Lubrificazione Coolant	Minimale Oil Mist

Rugosità metro utilizzato: KEYENCE VK9500  
Measuring Instrument: VK9500

- Non possono essere utilizzati presetting elettro-conduttivi.
- Si sconsiglia di eseguire fresature in spallamento.
- CLEAR EDGE è un marchio sotto licenza.

### Dati Tecnici 2 Technical Data 2

**Materiale: cristallo al quarzo**  
Work Material: Quartz glass

**Fresa: Ø 0.3**  
Tool Size

Misure pezzo: 75×25×1mm, Prof. di taglio: 0.05mm  
Work Size



Rugosità superficiale (Rz): 2µm  
Surface Roughness

Giri Spindle Speed	40,000 min <sup>-1</sup>
Avanzamento Feed	15 mm/min
Prof. di taglio Depth of Cut	0.001 mm ap
Lungh. fresatura Cutting length	3.2 m
Tempo Time	4 hr 4 hrs
Lubrificazione Coolant	Minimale Oil Mist

### Dati Tecnici 4 Technical Data 4

**Materiale: strato laminato NiP (nickel fosforo)**  
Work Material: No-electrolytic NiP-plated layer

**Fresa: Ø 0.1**  
Tool Size

Misure pezzo: 30×10mm  
Work Size



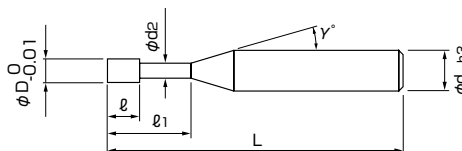
Rugosità superficiale (Rz): 1µm  
Surface Roughness

Giri Spindle Speed	12,000 min <sup>-1</sup>
Avanzamento Feed	200 mm/min
Prof. di taglio Depth of Cut	0.003 mm×0.1 mm (ap×ae)
Lungh. fresatura Cutting length	5.5 m
Tempo Time	5 hr 5 hrs
Lubrificazione Coolant	Minimale Oil Mist

- Electro-conductive tool presetter can not be used due to characteristic of the diamond.
- Machining by use of outer flute is not recommended.
- CLEAR EDGE is under license production.



## Frese Piane in diamante policristallino



- Elevata e stabile finitura nella lavorazione del metallo duro.
- Possibile ottenere una rugosità nanometrica, richiesta su lavorazioni di altissima precisione.
- Il design unico dei taglienti NS conferisce una forte resistenza all'usura e alle scheggiature.
- Fine and stable milling surface realized on cemented carbide material.
- Possible to get the nano-level surface roughness required on ultra-high precision machining.
- NS original flute design of cutting edge enabled a strong resistance against wear and chipping.
- **NUOVO NEW**

Dati tecnici P505



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	N° di eliche Number of Flutes
04-00300-00100	0.1	0.02	0.1	0.09	15°	4	48	2
04-00300-00200	0.2	0.04	0.2	0.18	15°	4	48	2
04-00300-00300	0.3	0.06	0.3	0.27	15°	4	48	2
04-00300-00400	0.4	0.08	0.4	0.36	15°	4	48	6
04-00300-00500	0.5	0.1	0.5	0.45	15°	4	48	6
04-00300-00600	0.6	0.12	0.6	0.54	15°	4	48	6
04-00300-00800	0.8	0.16	0.8	0.72	15°	4	48	6
04-00300-01000	1	0.2	1	0.9	15°	4	48	6

### Attenzione

Quando ordinate, indicate PCDSE(D).  
When you order, indicate PCDSE (D).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 88.
- Milling condition is recommended on page 88.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese  
Sagomate

Formed  
Cutter

Punte  
Drill

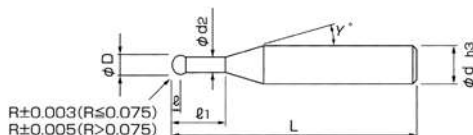
Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

Materiale Work Material	Metallo duro sinterizzato Cemeted Carbide		
	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of cut
Diametro Dia.	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm
0.1	40,000	25	0.0002
0.2	40,000	25	0.0002
0.3	40,000	25	0.0002
0.4	40,000	50	0.0005
0.5	40,000	50	0.0005
0.6	40,000	50	0.0005
0.8	40,000	50	0.0005
1	40,000	50	0.0005
Note Notes	※Richiesto il minor runout per evitare la rottura della fresa e per migliorare la precisione del lavoro. ※Data l'impostazione minima della profondità di passata (a <sub>p</sub> ) si raccomanda di controllare le caratteristiche della macchina, prima di usare la fresa. ※Si consiglia l'utilizzo di olio intero. ※Minimum tool runout is required to avoid the tool breakage and to increase the work accuracy. ※Due to infinitesimal depth of cut (a <sub>p</sub> ), recommend to assess the machine characters, such as expansion of the spindle and others before using the tool. ※Water-insoluble cutting fluid is recommended.		

## Frese sferiche PCD



- La geometria esclusiva della fresa garantisce costanza nella qualità delle superfici.
- La rugosità nanometrica ottenuta con la finitura riduce i tempi di lucidatura.
- Unique tool geometry makes stable surface.
- Polish-less machining become reality by nano-level roughness on profiling finish.

Dati tecnici P506



●NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell$ ) Lungh. tagliente Length of Cut	(D) Diametro Dia.	(d2) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00500-00501	0.05	0.15	0.5	0.1	0.09	15°	4	48
04-00500-00502	0.05	0.25	0.5	0.1	0.09	15°	4	48
04-00500-00751	0.075	0.23	0.75	0.15	0.14	15°	4	48
04-00500-00752	0.075	0.38	0.75	0.15	0.14	15°	4	48
04-00500-01001	0.1	0.5	0.1	0.2	0.18	15°	4	48
04-00500-02001	0.2	1	0.2	0.4	0.37	15°	4	48
04-00500-03001	0.3	1.5	0.3	0.6	0.56	15°	4	48
04-00500-05001	0.5	2.5	0.5	1	0.95	15°	4	48
04-00500-07501	0.75	3.8	0.75	1.5	1.45	15°	4	48
04-00500-10001	1	5	1	2	1.94	15°	4	48

### Attenzione

Quando ordinate, indicate PCDRB (R) x ( $\ell_1$ ).  
When you order, indicate PCDRB (R) x ( $\ell_1$ ).

※ ( $\gamma$ ) è un valore di riferimento.  
※ ( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 90.
- Milling condition is recommended on page 90.

### Dati Tecnici 1 Technical Data 1

Lavorazione 3D per ottenere una superficie a specchio  
3D machining for mirror surface

Materiale: Metallo duro sinterizzato (92.5HRA)  
Work Material: Cemented Carbide (92.5HRA)

Refrigerante: Olio da taglio non solubile in acqua  
Coolant: Water-insoluble Cutting Oil

Dimensioni del pezzo lavorato:  $\phi 15$  mm

Work Size:

Prof. di taglio: 1.3 mm  
Depth of Cut:



Fresa Tool	PCDRB R0.5 x x2.5
Giri Spindle Speed	60.000 min <sup>-1</sup>
Avanzamento Feed	150 mm/min
Prof. di taglio Depth of Cut	0.0015 mm x 0.001 mm ( $\Delta p \times \Delta e$ )
Sovrametallo Stock allowance	0.001 mm
Lungh. lavorata Cutting length	51 m
Tempo di lavorazione Time	5hr 40 min 5hrs 40 min



Mappa della distribuzione degli angoli delle superfici curve  
Angle of curved surface distribution map

Risultati della rugosità superficiale  
Result in surface roughness

Misurazione Measurement	Rz $\mu$ m	Ra $\mu$ m
Circa 5 gradi Around 5 degree	0.132	0.012
Circa 10 gradi Around 10 degree	0.195	0.029
Circa 20 gradi Around 20 degree	0.251	0.030

Misurazioni effettuate con strumento  
Mitaka Kohki NH-3SP

Measuring Instrument: Mitaka Kohki NH-3SP

La finitura è durata 5 ore e 40 minuti ottenendo una rugosità superficiale inferiore a Ra 0,03 $\mu$ m.

Finishing cutting time is 5hr and 40 min, and obtained surface roughness below Ra 0,03 $\mu$ m

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

Materiale Work Material		Acciai pretemprati - Temprati - Acciai per utensili (~68HRC) Prehardened Steels - Hardened Steels - High Speed Tool Steels (~68HRC)					Metallo duro sinterizzato Cemeted Carbide				
Raggio Radius	Lunghezza effettiva Effective length	Giri Spindle Speed	Avanzamento Feed	Sovrametallo Feed	Profondità di passata Depth of cut		Giri Spindle Speed	Avanzamento Feed	Sovrametallo Feed	Profondità di passata Depth of cut	
		min <sup>-1</sup>	mm/min	mm	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	mm	a <sub>p</sub> mm	a <sub>e</sub> mm
0.05	0.15	40,000	50	0.001	0.001	0.001	40,000	50	0.001	0.001	0.001
	0.25	40,000	25	0.001	0.001	0.001	40,000	25	0.001	0.001	0.001
0.075	0.23	40,000	100	0.001	0.001	0.001	40,000	100	0.001	0.001	0.001
	0.38	40,000	50	0.001	0.001	0.001	40,000	50	0.001	0.001	0.001
0.1	0.5	40,000	100	0.001	0.001	0.001	40,000	100	0.001	0.001	0.001
0.2	1	40,000	200	0.002	0.002	0.002	40,000	150	0.002	0.002	0.002
0.3	1.5	40,000	400	0.003	0.003	0.003	40,000	200	0.002	0.002	0.002
0.5	2.5	40,000	500	0.005	0.005	0.005	40,000	300	0.003	0.003	0.003
0.75	3.8	40,000	600	0.005	0.005	0.005	40,000	400	0.004	0.004	0.004
1	5	40,000	800	0.005	0.005	0.005	40,000	500	0.005	0.005	0.005
Note Notes		<p>*a<sub>p</sub>: profondità assiale, a<sub>e</sub>: profondità radiale</p> <p>*La profondità di passata indicata è il valore massimo. Regolare a seconda della rigidità della macchina, dell'attacco e della precisione richiesta.</p> <p>*Nelle fasi di lavorazione precedenti (semifinitura) lasciare uno spessore di sovrametallo uniforme.</p> <p>*Portare il refrigerante sempre direttamente sui taglienti per una migliore lubrificazione ed evacuazione del truciolo.</p> <p>*Porre particolare attenzione alle condizioni di taglio e al percorso utensile, soprattutto nel caso di lavorazioni con grandi forze di taglio specie negli angoli e nelle cave.</p> <p>*Si consiglia olio da taglio non solubile in acqua.</p> <p>*a<sub>p</sub>: Axial Depth of Cut. a<sub>e</sub>: Radial Depth of Cut.</p> <p>*Described depth of cut is max value. Adjust it depending on machine rigidity, main spindle rigidity and required precision.</p> <p>*Obtain uniform stock amount on the cutting surface in the pre-stage cutting (semi-finishing).</p> <p>*In order to perform lubricity and chip flow well, coolant must be always reached cutting points.</p> <p>*Careful set up for milling condition and tool path are required especially when operate with high cutting load such as corner area and slotting.</p> <p>*Water-insoluble cutting fluid is recommended.</p>									

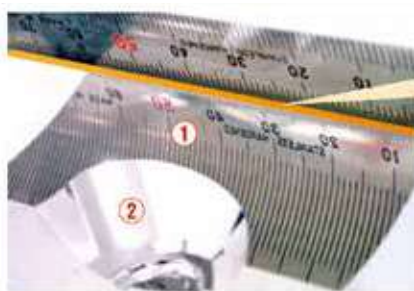
**Dati Tecnici 1**    **Technical Data 1**    **Esempio: 1.2311 40HRC**    Machining data: NAK80 40HRC

**Dimensioni del pezzo lavorato (Work Size): 60 x 40 mm**  
**Prof. di taglio (Cutting Depth): 19,48 mm**



**La riga metrica si riflette sulla superficie come fosse uno specchio.**  
**Alta qualità superficiale costante dopo 11 ore di lavoro**  
Scale is reflected on machined surface like a mirror.  
Stable high quality surface after 11 hrs cutting time.

**La riga metrica si riflette sulla superficie come fosse uno specchio.**  
Scale is reflected on machined surface like a mirror.



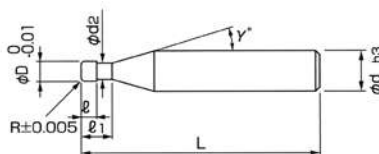
**Linea di separazione tra la riga metrica e il pezzo lavorato**  
Border line between work and scale.

**Rugosità**  
Roughness

Punto di Misurazione Measuring point	Rz μ m
① Circa 25 gradi Around 25 degree	0.014
② Circa 55 gradi Around 55 degree	0.031

Lavorazione - Process	Sgrossatura - Roughing	Semi-finitura - Semi-finishing	Finitura - Finishing
Fresa - Tool	MRB230 R1x6	SSPB220 R1x5	PCDRB R1x5
Numero Giri - Spindle Speed	25.000 min <sup>-1</sup>	40.000 min <sup>-1</sup>	40.000 min <sup>-1</sup>
Avanzamento - Feed	2.500 mm/min	1.000 mm/min	1.000 mm/min
Prof.di passata - Depth of Cut	0.25 mm×0.5 mm (a <sub>p</sub> ×a <sub>e</sub> )	0.02 mm×0.02 mm (a <sub>p</sub> ×a <sub>e</sub> )	0.005 mm×0.005 mm (a <sub>p</sub> ×a <sub>e</sub> )
Sovrametallo - Stock	0.025 mm	0.005 mm	-
Refrigerante - Coolant	Olio da taglio non solubile in acqua - Water-insoluble fluid		
Tempo di lavorazione - Time	1h 3min - 1hrs 3min	2h 56min - 2hrs 56min	1h 42min - 1hrs 42min
	15h 41min (Total) - 15hrs 41min (Total)		

## Frese toriche PCD



- Su grande richiesta è stata aggiunta alla serie di frese in PCD anche la versione torica
- Il raggio torico è ultimato con una superficie di alta qualità che consente elevate prestazioni di taglio su superfici curve e piane.
- Added a much-needed corner radius type in PCD series!
- Ultimate high quality surface is realized in the corner radius shape with superior cutting performance on curved and plane surface!



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(R) Raggio Radius	(L <sub>1</sub> ) Lungh. effettiva Effective Length	(L) Lungh. tagliante Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	Nr. taglianti Number of Flutes
04-00700-03050	0.3	0.05	0.3	0.09	0.27	15°	4	48	2
04-00700-04050	0.4	0.05	0.4	0.12	0.36	15°	4	48	4
04-00700-05050	0.5	0.05	0.5	0.15	0.45	15°	4	48	4
04-00700-05100	0.5	0.01	0.5	0.15	0.45	15°	4	48	4
04-00700-06050	0.6	0.05	0.6	0.18	0.54	15°	4	48	6
04-00700-06100	0.6	0.1	0.6	0.18	0.54	15°	4	48	6
04-00700-08050	0.8	0.05	0.8	0.24	0.72	15°	4	48	6
04-00700-08100	0.8	0.1	0.8	0.24	0.72	15°	4	48	6
04-00700-10050	1	0.05	1	0.3	0.9	15°	4	48	6
04-00700-10100	1	0.1	1	0.3	0.9	15°	4	48	6

### Attenzione

Quando ordinate, indicate PCDRS (D) x (R) x (L<sub>1</sub>).  
When you order, indicate PCDRB (D) x (R) x (L<sub>1</sub>).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 92.
- Milling condition is recommended on page 92.

### Dati Tecnici 1 Technical Data 1

**Materiale: Metallo duro sinterizzato (92.5HRA)**

Work Material: Cemented Carbide (92.5HRA)

**Dimensioni della fresa: Ø0,3 x R0,05 x 0,3**

Tool size: Ø0.3 x R0.05 x 0.3

**Dimensioni del pezzo: Ø15 mm**

Work Size: Ø15 mm

**Profondità di lavorazione: 0,924 mm**

Machining depth: 0.924 mm



Rugosità  
superficiale:  
0.0192 μm  
Surface Roughness

Applicazione Process	Finitura Finishing	
	Contornitura Contour Line Milling	Scansione piano Scanning Line Milling
Giri Spindle Speed	40.000 min <sup>-1</sup>	
Avanzamento Feed	70 mm/min	
Profondità di taglio Depth of Cut	0.002 ~ 0.006 x 0.002 a <sub>p</sub> x a <sub>e</sub> (mm)	0.001 ~ 0.005 x 0.01 a <sub>p</sub> x a <sub>e</sub> (mm)
Sovrametallo concesso Stock allowance	0.002 mm	0.001 mm
Lunghezza lavorata Cutting length	28 m	12 m
Tempo di lavorazione Time	6hr 23 min 6hrs 23 min	3hr 25 min 3hrs 25 min
Refrigerante Coolant	Olio da taglio non solubile in acqua Water-insoluble Cutting Oil	

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scariate  
Plane  
Long Neck  
Square

Sferiche  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scariate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scariate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**Diamante**

Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Frese  
Sagomate  
Formed  
Cutter

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

Technical Data

**Guida tecnica**

Technical Guidance

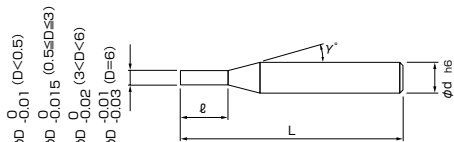
Materiale Work Material			Metallo duro sinterizzato Cemeted Carbide			
Diametro Dia.	Raggio Radius	Lunghezza effettiva Effective length	Giri Spindle Speed	Avanzamento Feed	Profondità di passata Depth of cut	
			min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm
0.3	0.05	0.3	50,000	50	0.001	0.0005
0.4	0.05	0.4	50,000	100	0.001	0.01
0.5	0.05	0.5	50,000	100	0.001	0.01
	0.1	0.5	50,000	150	0.001	0.015
0.6	0.05	0.6	50,000	100	0.001	0.01
	0.1	0.6	50,000	150	0.001	0.015
0.8	0.05	0.8	50,000	150	0.001	0.015
	0.1	0.8	50,000	200	0.001	0.03
1	0.05	1	50,000	150	0.001	0.015
	0.1	1	50,000	200	0.001	0.03
Note Notes			※Richiesto il minor runout per evitare la rottura della fresa e per migliorare la precisione del lavoro. ※Data l'impostazione minima della profondità di passata (a <sub>p</sub> ) si raccomanda di controllare le caratteristiche della macchina, prima di usare la fresa. ※Si consiglia l'utilizzo di olio intero. ※Minimum tool runout is required to avoid the tool breakage and to increase the work accuracy. ※Due to infinitesimal depth of cut (a <sub>p</sub> ), recommend to assess the machine characters, such as expansion of the spindle ※and others before using the tool. ※Water-insoluble cutting fluid is recommended.			

# MXH225

Novità

MUGEN-COATING PREMIUM 2-Flute LEAD25 End Mill

## Frese 2 Tagli piane elica 25° rivestite MUGEN PREMIUM



- Grazie al rivestimento MUGEN-PREMIUM, adatta per la lavorazione di leghe termoresistenti come acciai inossidabili e leghe di titanio.
- Il rapporto  $L/D = 1$  e l'elica a  $25^\circ$  migliorano la rigidità della fresa consentendo lavorazioni efficienti.
- Eliminano vibrazioni e flessioni in lavorazioni di cave.
- Applicable for heat resistance alloy such as stainless steels and titanium alloy by MUGEN-COATING PREMIUM.
- $L/D=1$  and helix  $25^\circ$  to increase rigidity and realize high efficient machining.
- Suppress chattering and deflection in slotting process.



● NUOVO NEW

Unità di misura: mm Unit size : mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
● 08-00005-00010	0.1	0.1	12°	4	45
● 08-00005-00020	0.2	0.2	12°	4	45
● 08-00005-00030	0.3	0.3	12°	4	45
● 08-00005-00040	0.4	0.4	12°	4	45
● 08-00005-00050	0.5	0.5	12°	4	45
● 08-00005-00060	0.6	0.6	12°	4	45
● 08-00005-00070	0.7	0.7	12°	4	45
● 08-00005-00080	0.8	0.8	12°	4	45
● 08-00005-00090	0.9	0.9	12°	4	45
● 08-00005-00100	1	1	12°	4	45
● 08-00005-00110	1.1	1.1	12°	4	45
● 08-00005-00120	1.2	1.2	12°	4	45
● 08-00005-00130	1.3	1.3	12°	4	45
● 08-00005-00140	1.4	1.4	12°	4	45
● 08-00005-00150	1.5	1.5	12°	4	45
● 08-00005-00160	1.6	1.6	12°	4	45
● 08-00005-00170	1.7	1.7	12°	4	45
● 08-00005-00180	1.8	1.8	12°	4	45
● 08-00005-00190	1.9	1.9	12°	4	45
● 08-00005-00200	2	2	12°	4	45
● 08-00005-00250	2.5	2.5	12°	4	45
● 08-00005-00300	3	3	12°	6	45
● 08-00005-00400	4	4	12°	6	45
● 08-00005-00500	5	5	12°	6	50
● 08-00005-00600	6	6	—	6	50

### Attenzione

Quando ordinate, indicate MXH225 (D).  
When you order, indicate MXH225 (D).

- Per i parametri di taglio vedi pagina 100.
- Milling condition is recommended on page 100.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Non Rivestite  
Non-Coating

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Non Rivestite  
Non-Coating

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Non Rivestite  
Non-Coating

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Non Rivestite  
Non-Coating

Frese  
Sagomate  
Formed  
Cutter

Rivestite  
Coating

Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# MXH230

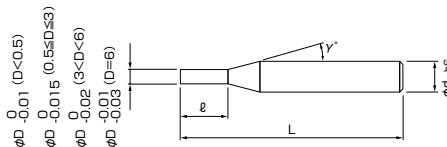
Novità

MUGEN-COATING PREMIUM 2-Flute LEAD30 End Mill

## Frese 2 Tagli piane elica 30° rivestite MUGEN- PREMIUM



- Grazie al rivestimento MUGEN PREMIUM, adatta per la lavorazione di leghe termoresistenti come acciai inossidabili e leghe di titanio.
- Il rapporto L/D = 2 e l'elica a 30° tipo standard, adatta sia per la lavorazione di cave che per contornatura.
- Applicable for heat resistance alloy such as stainless steels and titanium alloy by MUGEN-COATING PREMIUM.
- L/D=2 and helix 30° standard type, applicable for both slotting and side milling.
- NUOVO NEW



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00006-00010	0.1	0.2	12°	4	45
08-00006-00020	0.2	0.4	12°	4	45
08-00006-00030	0.3	0.6	12°	4	45
08-00006-00040	0.4	0.8	12°	4	45
08-00006-00050	0.5	1	12°	4	45
08-00006-00060	0.6	1.2	12°	4	45
08-00006-00070	0.7	1.4	12°	4	45
08-00006-00080	0.8	1.6	12°	4	45
08-00006-00090	0.9	1.8	12°	4	45
08-00006-00100	1	2	12°	4	45
08-00006-00110	1.1	2.2	12°	4	45
08-00006-00120	1.2	2.4	12°	4	45
08-00006-00130	1.3	2.6	12°	4	45
08-00006-00140	1.4	2.8	12°	4	45
08-00006-00150	1.5	3	12°	4	45
08-00006-00160	1.6	3.2	12°	4	45
08-00006-00170	1.7	3.4	12°	4	45
08-00006-00180	1.8	3.6	12°	4	45
08-00006-00190	1.9	3.8	12°	4	45
08-00006-00200	2	4	12°	4	45
08-00006-00210	2.1	4.2	12°	4	45
08-00006-00220	2.2	4.4	12°	4	45
08-00006-00230	2.3	4.6	12°	4	45
08-00006-00240	2.4	4.8	12°	4	45
08-00006-00250	2.5	5	12°	4	45
08-00006-00260	2.6	5.2	12°	4	45
08-00006-00270	2.7	5.4	12°	4	45
08-00006-00280	2.8	5.6	12°	4	45
08-00006-00290	2.9	5.8	12°	4	45

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00006-00300	3	6	12°	6	45
08-00006-00350	3.5	7	12°	6	45
08-00006-00400	4	8	12°	6	45
08-00006-00450	4.5	9	12°	6	50
08-00006-00500	5	10	12°	6	50
08-00006-00550	5.5	11	12°	6	50
08-00006-00600	6	12	-	6	50

**Attenzione** Quando ordinate, indicate MXH230 (D).  
When you order, indicate MXH230 (D).

- Per i parametri di taglio vedi pagina 101.
- Milling condition is recommended on page 101.



# MXH235

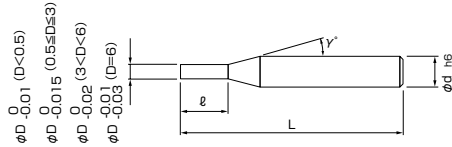
Novità

MUGEN-COATING PREMIUM 2-Flute LEAD35 End Mill

## Frese 2 Tagli piane elica 35° rivestite MUGEN PREMIUM



- Grazie al rivestimento MUGEN PREMIUM, adatta per la lavorazione di leghe termoresistenti come acciai inossidabili e leghe di titanio.
- Il rapporto L/D = 3 e l'elica a 35° assicurano una lunghezza del tagliente sufficiente per evitare difficoltà nella scelta della fresa.
- Applicable for heat resistance alloy such as stainless steels and titanium alloy by MUGEN-COATING PREMIUM.
- L/D=3 and helix 35° for appropriate length of cut to avoid the inconveniences in size selection.
- NUOVO NEW



Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00007-00010	0.1	0.3	12°	4	45
08-00007-00020	0.2	0.6	12°	4	45
08-00007-00030	0.3	0.9	12°	4	45
08-00007-00040	0.4	1.2	12°	4	45
08-00007-00050	0.5	1.5	12°	4	45
08-00007-00060	0.6	1.8	12°	4	45
08-00007-00070	0.7	2.1	12°	4	45
08-00007-00080	0.8	2.4	12°	4	45
08-00007-00090	0.9	2.7	12°	4	45
08-00007-00100	1	3	12°	4	45
08-00007-00110	1.1	3.3	12°	4	45
08-00007-00120	1.2	3.6	12°	4	45
08-00007-00130	1.3	3.9	12°	4	45
08-00007-00140	1.4	4.2	12°	4	45
08-00007-00150	1.5	4.5	12°	4	45
08-00007-00160	1.6	4.8	12°	4	45
08-00007-00170	1.7	5.1	12°	4	45
08-00007-00180	1.8	5.4	12°	4	45
08-00007-00190	1.9	5.7	12°	4	45
08-00007-00200	2	6	12°	4	45
08-00007-00210	2.1	6.3	12°	4	45
08-00007-00220	2.2	6.6	12°	4	45
08-00007-00230	2.3	6.9	12°	4	45
08-00007-00240	2.4	7.2	12°	4	45
08-00007-00250	2.5	7.5	12°	4	45
08-00007-00260	2.6	7.8	12°	4	45
08-00007-00270	2.7	8.1	12°	4	45
08-00007-00280	2.8	8.4	12°	4	45
08-00007-00290	2.9	8.7	12°	4	45

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00007-00300	3	9	12°	6	45
08-00007-00350	3.5	10.5	12°	6	45
08-00007-00400	4	12	12°	6	50
08-00007-00450	4.5	13.5	12°	6	50
08-00007-00500	5	15	12°	6	55
08-00007-00550	5.5	16.5	12°	6	60
08-00007-00600	6	18	-	6	60

### Attenzione

Quando ordinate, indicate MXH235 (D).  
When you order, indicate MXH235 (D).

- Per i parametri di taglio vedi pagina 102.
- Milling condition is recommended on page 102.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Scaricate  
Plane  
Long Neck  
Square

Sferiche  
Ball  
Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

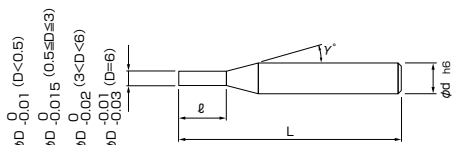
**Guida tecnica**  
Technical Guidance

# MXH240

Novità

MUGEN-COATING PREMIUM 2-Flute LEAD40 End Mill

## Frese 2 Tagli piane elica 40° rivestite MUGEN PREMIUM



- Grazie al rivestimento MUGEN PREMIUM, adatta per la lavorazione di leghe termoresistenti come acciai inossidabili e leghe di titanio.
- Il rapporto L/D = 4 e l'elica a 40°; adatte per lavorazioni profonde con minime flessioni.
- Applicable for heat resistance alloy such as stainless steels and titanium alloy by MUGEN-COATING PREMIUM.
- L/D=4 and helix 40° is suitable for deep machining with minimum deflection of cutting up-right surface.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
● 08-00008-00030	0.3	1.2	12°	4	45
● 08-00008-00040	0.4	1.6	12°	4	45
● 08-00008-00050	0.5	2	12°	4	45
● 08-00008-00080	0.8	3.2	12°	4	45
● 08-00008-00100	1	4	12°	4	45
● 08-00008-00120	1.2	4.8	12°	4	45
● 08-00008-00150	1.5	6	12°	4	45
● 08-00008-00180	1.8	7.2	12°	4	45
● 08-00008-00200	2	8	12°	4	45
● 08-00008-00250	2.5	10	12°	4	45
● 08-00008-00300	3	12	12°	6	50
● 08-00008-00400	4	16	12°	6	55
● 08-00008-00500	5	20	12°	6	60
● 08-00008-00600	6	24	-	6	65

**Attenzione** Quando ordinate, indicate MXH240 (D).  
When you order, indicate MXH240 (D).

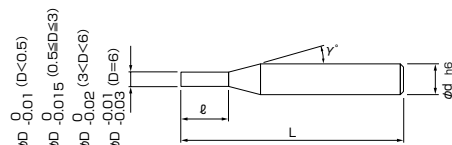
- Per i parametri di taglio, vedi pagina 103.
- Milling condition is recommended on page 103.

# MXH245

Novità

MUGEN-COATING PREMIUM 2-Flute LEAD45 End Mill

## Frese 2 Tagli piane elica 45° rivestite MUGEN PREMIUM



- Grazie al rivestimento MUGEN PREMIUM, adatta per la lavorazione di leghe termoresistenti come acciai inossidabili e leghe di titanio.
- Il rapporto L/D = 5 e l'elica a 45° minimizzano le flessioni della fresa nonostante la lunghezza del tagliente.
- Applicable for heat resistance alloy such as stainless steels and titanium alloy by MUGEN-COATING PREMIUM.
- L/D=5 and helix 45° to minimize the milling deflection even though the long cutting length design.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
● 08-00009-00030	0.3	1.5	12°	4	45
● 08-00009-00040	0.4	2	12°	4	45
● 08-00009-00050	0.5	2.5	12°	4	45
● 08-00009-00080	0.8	4	12°	4	45
● 08-00009-00100	1	5	12°	4	45
● 08-00009-00120	1.2	6	12°	4	45
● 08-00009-00150	1.5	7.5	12°	4	45
● 08-00009-00180	1.8	9	12°	4	50
● 08-00009-00200	2	10	12°	4	50
● 08-00009-00250	2.5	12.5	12°	4	50
● 08-00009-00300	3	15	12°	6	55
● 08-00009-00400	4	20	12°	6	60
● 08-00009-00500	5	25	12°	6	65
● 08-00009-00600	6	30	-	6	75

**Attenzione** Quando ordinate, indicate MXH245 (D).  
When you order, indicate MXH245 (D).

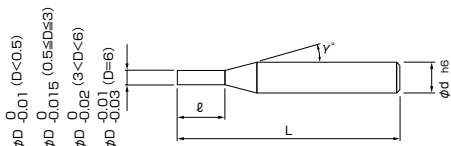
- Per i parametri di taglio, vedi pagina 104.
- Milling condition is recommended on page 104.

# MXH225P

Novità

MUGEN-COATING PREMIUM 2-Flute Sharp Edge LEAD25 End Mill

## Frese 2 Tagli piane elica 25° a spigolo vivo rivestite MUGEN PREMIUM



- Grazie al rivestimento MUGEN PREMIUM, adatta per la lavorazione di leghe termoresistenti come acciai inossidabili e leghe di titanio.
- Il rapporto L/D = 1 e l'elica a 25°.
- Applicable for heat resistance alloy such as stainless steels and titanium alloy by MUGEN-COATING PREMIUM with sharp edge type.
- L/D=1 and helix 25°.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia Dia.	(ℓ) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
08-00015-00010	0.1	0.1	12°	4	45
08-00015-00020	0.2	0.2	12°	4	45
08-00015-00030	0.3	0.3	12°	4	45
08-00015-00040	0.4	0.4	12°	4	45
08-00015-00050	0.5	0.5	12°	4	45
08-00015-00060	0.6	0.6	12°	4	45
08-00015-00070	0.7	0.7	12°	4	45
08-00015-00080	0.8	0.8	12°	4	45
08-00015-00090	0.9	0.9	12°	4	45
08-00015-00100	1	1	12°	4	45
08-00015-00110	1.1	1.1	12°	4	45
08-00015-00120	1.2	1.2	12°	4	45
08-00015-00130	1.3	1.3	12°	4	45
08-00015-00140	1.4	1.4	12°	4	45
08-00015-00150	1.5	1.5	12°	4	45
08-00015-00160	1.6	1.6	12°	4	45
08-00015-00170	1.7	1.7	12°	4	45
08-00015-00180	1.8	1.8	12°	4	45
08-00015-00190	1.9	1.9	12°	4	45
08-00015-00200	2	2	12°	4	45
08-00015-00250	2.5	2.5	12°	4	45
08-00015-00300	3	3	12°	6	45
08-00015-00400	4	4	12°	6	45
08-00015-00500	5	5	12°	6	50
08-00015-00600	6	6	-	6	50

### Attenzione

Quando ordinate, indicate MXH225P (D).  
When you order, indicate MXH225P (D).

- Per i parametri di taglio vedi pagina 105.
- Milling condition is recommended on page 105.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Frese  
Sagomate  
Formed  
Cutter

Rivestite  
Coating  
Non-Rivestite  
Non-Coating

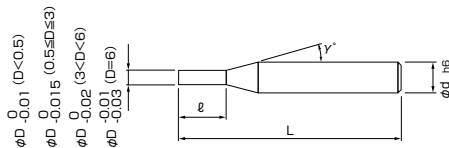
Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Frese 2 Tagli piane elica 30° a spigolo vivo rivestite MUGEN PREMIUM



- Grazie al rivestimento MUGEN-PREMIUM ed al tagliente affilato, adatta per la lavorazione di leghe termoresistenti come acciai inossidabili e leghe di titanio.
- Il rapporto L/D = 2 e l'elica a 30°.
- Applicable for heat resistance alloy such as stainless steels and titanium alloy by MUGEN-COATING PREMIUM with sharp edge type.
- L/D=2 and helix 30°.
- **NUOVO NEW**



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. Totale Overall Length
● 08-00016-00010	0.1	0.2	12°	4	45
● 08-00016-00020	0.2	0.4	12°	4	45
● 08-00016-00030	0.3	0.6	12°	4	45
● 08-00016-00040	0.4	0.8	12°	4	45
● 08-00016-00050	0.5	1	12°	4	45
● 08-00016-00060	0.6	1.2	12°	4	45
● 08-00016-00070	0.7	1.4	12°	4	45
● 08-00016-00080	0.8	1.6	12°	4	45
● 08-00016-00090	0.9	1.8	12°	4	45
● 08-00016-00100	1	2	12°	4	45
● 08-00016-00110	1.1	2.2	12°	4	45
● 08-00016-00120	1.2	2.4	12°	4	45
● 08-00016-00130	1.3	2.6	12°	4	45
● 08-00016-00140	1.4	2.8	12°	4	45
● 08-00016-00150	1.5	3	12°	4	45
● 08-00016-00160	1.6	3.2	12°	4	45
● 08-00016-00170	1.7	3.4	12°	4	45
● 08-00016-00180	1.8	3.6	12°	4	45
● 08-00016-00190	1.9	3.8	12°	4	45
● 08-00016-00200	2	4	12°	4	45
● 08-00016-00210	2.1	4.2	12°	4	45
● 08-00016-00220	2.2	4.4	12°	4	45
● 08-00016-00230	2.3	4.6	12°	4	45
● 08-00016-00240	2.4	4.8	12°	4	45
● 08-00016-00250	2.5	5	12°	4	45
● 08-00016-00260	2.6	5.2	12°	4	45
● 08-00016-00270	2.7	5.4	12°	4	45
● 08-00016-00280	2.8	5.6	12°	4	45
● 08-00016-00290	2.9	5.8	12°	4	45

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. Totale Overall Length
● 08-00016-00300	3	6	12°	6	45
● 08-00016-00350	3.5	7	12°	6	45
● 08-00016-00400	4	8	12°	6	45
● 08-00016-00450	4.5	9	12°	6	50
● 08-00016-00500	5	10	12°	6	50
● 08-00016-00550	5.5	11	12°	6	50
● 08-00016-00600	6	12	-	6	50

**Attenzione** Quando ordinate, indicate MXH230P (D).  
When you order, indicate MXH230P (D).

- Per i parametri di taglio vedi pagina 106.
- Milling condition is recommended on page 106.

Diamante  
Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

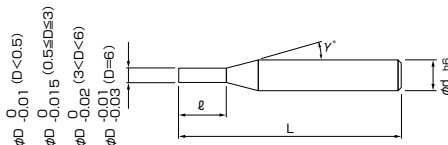
Guida tecnica  
Technical Guidance

# MXH235P

Novità

MUGEN-COATING PREMIUM 2-Flute Sharp Edge LEAD35 End Mill

## Frese 2 Tagli piane elica 35° a spigolo vivo rivestite MUGEN PREMIUM



- Grazie al rivestimento MUGEN-PREMIUM ed al tagliente affilato, adatta per la lavorazione di leghe termoresistenti come acciai inossidabili e leghe di titanio.
- Il rapporto L/D = 3 e l'elica a 35°.
- Applicable for heat resistance alloy such as stainless steels and titanium alloy by MUGEN-COATING PREMIUM with sharp edge type.
- L/D=3 and helix 35°.
- NUOVO NEW



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia Dia.	(l) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. Totale Overall Length
● 08-00017-00010	0.1	0.3	12°	4	45
● 08-00017-00020	0.2	0.6	12°	4	45
● 08-00017-00030	0.3	0.9	12°	4	45
● 08-00017-00040	0.4	1.2	12°	4	45
● 08-00017-00050	0.5	1.5	12°	4	45
● 08-00017-00060	0.6	1.8	12°	4	45
● 08-00017-00070	0.7	2.1	12°	4	45
● 08-00017-00080	0.8	2.4	12°	4	45
● 08-00017-00090	0.9	2.7	12°	4	45
● 08-00017-00100	1	3	12°	4	45
● 08-00017-00110	1.1	3.3	12°	4	45
● 08-00017-00120	1.2	3.6	12°	4	45
● 08-00017-00130	1.3	3.9	12°	4	45
● 08-00017-00140	1.4	4.2	12°	4	45
● 08-00017-00150	1.5	4.5	12°	4	45
● 08-00017-00160	1.6	4.8	12°	4	45
● 08-00017-00170	1.7	5.1	12°	4	45
● 08-00017-00180	1.8	5.4	12°	4	45
● 08-00017-00190	1.9	5.7	12°	4	45
● 08-00017-00200	2	6	12°	4	45
● 08-00017-00210	2.1	6.3	12°	4	45
● 08-00017-00220	2.2	6.6	12°	4	45
● 08-00017-00230	2.3	6.9	12°	4	45
● 08-00017-00240	2.4	7.2	12°	4	45
● 08-00017-00250	2.5	7.5	12°	4	45
● 08-00017-00260	2.6	7.8	12°	4	45
● 08-00017-00270	2.7	8.1	12°	4	45
● 08-00017-00280	2.8	8.4	12°	4	45
● 08-00017-00290	2.9	8.7	12°	4	45

Codice Code No.	(D) Dia Dia.	(l) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. Totale Overall Length
● 08-00017-00300	3	9	12°	6	45
● 08-00017-00350	3.5	10.5	12°	6	45
● 08-00017-00400	4	12	12°	6	50
● 08-00017-00450	4.5	13.5	12°	6	50
● 08-00017-00500	5	15	12°	6	55
● 08-00017-00550	5.5	16.5	12°	6	60
● 08-00017-00600	6	18	-	6	60

### Attenzione

Quando ordinate, indicate MXH235P (D).  
When you order, indicate MXH235P (D).

- Per i parametri di taglio vedi pagina 107.
- Milling condition is recommended on page 107.

CBN

Nitruro Cubico di Boro

Diamante

Diamond

Piane Square

Scaricate Piane

Long Neck Square

Sferiche Ball

Scaricate Sferiche

Long Neck Ball

Coniche Taper

Coniche Sferiche

Taper Ball

Toriche Corner R

Scaricate Toriche

Long Neck Corner R

Frese Sagomate

Formed Cutter

Punte Drill


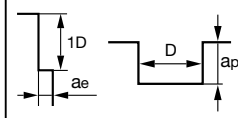
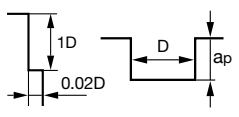
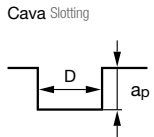
Altro Others

Dati tecnici

Technical Data

Guida tecnica

Technical Guidance

Materiale Work Material	Acciai inox Stainless Steels AISI304			Lega di Titanio Titanium Alloy Ti-6Al-4V			Lega resistente al calore Heat Resistance Alloy inconel®718			Acciai temprati Hardened Steels 1.2343 (~52HRC)			
	Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
			Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting
0.1	50,000	30	15	48,000	30	15	25,000	10	10	50,000	-	15	
0.2	50,000	50	25	48,000	50	25	25,000	15	10	47,700	-	20	
0.3	50,000	90	35	48,000	90	35	25,000	30	15	31,800	-	20	
0.4	47,700	130	50	45,000	130	50	23,000	40	20	23,900	50	25	
0.5	38,200	130	50	37,000	130	50	19,000	40	20	19,100	60	30	
0.6	34,000	130	50	33,000	130	50	17,000	40	20	16,000	60	30	
0.7	30,000	130	50	29,000	130	50	15,000	40	20	13,700	60	30	
0.8	26,000	140	50	25,000	140	50	13,000	45	20	12,000	60	30	
0.9	22,000	140	55	21,000	140	55	11,000	45	25	10,700	60	30	
1	19,100	150	55	18,000	150	55	9,500	50	25	9,500	75	40	
1.1	17,500	150	55	16,000	150	55	8,500	50	25	8,700	75	40	
1.2	16,000	150	55	15,000	150	55	8,000	50	25	8,000	75	40	
1.3	14,500	150	55	13,500	150	55	7,200	50	25	7,400	75	40	
1.4	13,000	150	55	12,500	150	55	6,500	50	25	6,900	75	40	
1.5	12,700	150	55	12,000	150	55	6,200	50	25	6,400	75	40	
1.6	11,900	150	55	11,500	150	55	6,000	50	25	6,000	75	40	
1.7	11,300	160	55	10,900	160	55	5,500	50	25	5,700	75	40	
1.8	10,700	160	55	10,300	160	55	5,200	50	25	5,300	75	40	
1.9	10,100	170	60	9,700	170	60	5,000	55	30	5,000	75	40	
2	9,500	170	60	9,100	170	60	4,800	55	30	4,800	75	40	
2.5	7,600	180	65	7,200	180	65	3,800	60	30	3,800	75	40	
3	6,400	190	70	6,000	190	70	3,200	65	35	3,200	80	40	
4	4,800	190	70	4,400	190	70	2,400	65	35	2,400	95	50	
5	3,800	230	75	3,400	230	75	1,900	75	40	1,900	95	50	
6	3,200	260	85	2,800	260	85	1,600	80	40	1,600	100	50	
Profondità di taglio Depth of Cut	<b>Contornatura Side Milling</b>  $a_e$ $\varnothing 0.1 \sim 0.8 = 0.05D$ $\varnothing 1 \sim 2.5 = 0.1D$ $\varnothing 3 \sim 6 = 0.2D$			<b>Contornatura Side Milling Cava Slotting</b>  $a_e$ $\varnothing 0.1 \sim 0.8 = 0.01D$ $\varnothing 1 \sim 2.5 = 0.02D$ $\varnothing 3 \sim 6 = 0.04D$			<b>Contornatura Side Milling Cava Slotting</b>  $a_p$ $\varnothing 0.1 \sim 0.4 = 0.05D$ $\varnothing 0.5 \sim 1.2 = 0.1D$ $\varnothing 1.5 \sim 3 = 0.3D$ $\varnothing 4 \sim 6 = 0.5D$						
	<b>Cava Slotting</b>  $a_p$ $\varnothing 0.1 \sim 0.4 = 0.05D$ $\varnothing 0.5 \sim 1.2 = 0.2D$ $\varnothing 1.5 \sim 3 = 0.7D$ $\varnothing 4 \sim 6 = 1D$			$a_p$ $\varnothing 0.1 \sim 0.4 = 0.01D$ $\varnothing 0.5 \sim 1.2 = 0.1D$ $\varnothing 1.5 \sim 3 = 0.3D$ $\varnothing 4 \sim 6 = 0.5D$			$a_p$ $\varnothing 0.1 \sim 0.4 = 0.05D$ $\varnothing 0.5 \sim 6 = 0.2D$						
(D) Dia. Dia.													
Note	<p>※Regolate le condizioni di fresatura in accordo alla rigidità della macchina e allo staffaggio del pezzo.          ※Usare la lubrorefrigerazione.          ※Usare un mandrino rigido e preciso.          ※Se fresate con refrigerante solubile in acqua, regolare i dati di taglio facendo attenzione all'evacuazione del truciolo e alla formazione fumo.          ※Adjust milling condition conforming to machine rigidity and clamping condition.          ※Use cutting fluid with smoke retardant.          ※Use rigid and precise machine and chuck holder.          ※Adjust milling condition with caution for chip evacuation and smoke generation when milling with water-insoluble cutting fluid.</p>												

# Parametri di taglio raccomandati


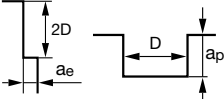
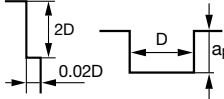
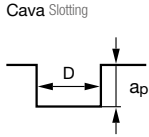
## Recommended Milling Conditions

# MXH230

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

Materiale Work Material	Acciai inox Stainless Steels AISI304			Lega di Titanio Titanium Alloy Ti-6Al-4V			Lega resistente al calore Heat Resistance Alloy Inconel®718			Acciai temprati Hardened Steels 1.2343 (~52HRC)			
	Dia Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
		min <sup>-1</sup>	mm/min			min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min
	Contornatura Side Milling		Cava Slotting	Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling
0.1	50,000	30	15	48,000	30	15	25,000	10	10	50,000	-	15	
0.2	50,000	50	25	48,000	50	25	25,000	15	10	47,700	-	20	
0.3	50,000	90	35	48,000	90	35	25,000	30	15	31,800	-	20	
0.4	47,700	130	50	45,000	130	50	23,000	40	20	23,900	50	25	
0.5	38,200	130	50	37,000	130	50	19,000	40	20	19,100	60	30	
0.6	34,500	130	50	32,000	130	50	17,000	40	20	16,000	60	30	
0.7	30,500	130	50	28,000	130	50	15,000	40	20	13,700	60	30	
0.8	26,000	140	50	24,000	140	50	13,000	45	20	12,000	60	30	
0.9	22,000	140	55	20,000	140	55	11,000	45	25	10,700	60	30	
1	19,100	150	55	18,000	150	55	9,500	50	25	9,500	75	40	
1.1	17,500	150	55	16,000	150	55	8,700	50	25	8,700	75	40	
1.2	16,300	150	55	15,000	150	55	8,100	50	25	8,000	75	40	
1.3	15,100	150	55	14,000	150	55	7,500	50	25	7,400	75	40	
1.4	13,900	150	55	13,000	150	55	7,000	50	25	6,900	75	40	
1.5	12,700	150	55	12,000	150	55	6,200	50	25	6,400	75	40	
1.6	12,000	150	55	11,500	150	55	6,000	50	25	6,000	75	40	
1.7	11,300	160	55	10,900	160	55	5,500	50	25	5,700	75	40	
1.8	10,600	160	55	10,200	160	55	5,300	50	25	5,300	75	40	
1.9	9,900	170	60	9,500	170	60	5,000	55	30	5,000	75	40	
2	9,500	170	60	9,100	170	60	4,800	55	30	4,800	75	40	
2.1	9,100	170	60	8,700	170	60	4,500	55	30	4,600	75	40	
2.2	8,700	170	60	8,300	170	60	4,300	55	30	4,400	75	40	
2.3	8,300	170	60	7,900	170	60	4,100	55	30	4,200	75	40	
2.4	7,900	180	65	7,500	180	65	4,000	60	30	4,000	75	40	
2.5	7,600	180	65	7,200	180	65	3,800	60	30	3,800	75	40	
2.6	7,400	180	65	7,000	180	65	3,700	60	30	3,700	75	40	
2.7	7,200	180	65	6,800	180	65	3,600	60	30	3,600	75	40	
2.8	7,000	180	65	6,500	180	65	3,500	60	30	3,500	75	40	
2.9	6,700	190	70	6,200	190	70	3,300	60	30	3,300	75	40	
3	6,400	190	70	6,000	190	70	3,200	65	35	3,200	80	40	
3.5	5,500	190	70	5,100	190	70	2,700	65	35	2,700	85	45	
4	4,800	190	70	4,400	190	70	2,400	65	35	2,400	95	50	
4.5	4,200	210	75	3,800	210	75	2,100	70	35	2,100	95	50	
5	3,800	230	75	3,400	230	75	1,900	75	40	1,900	95	50	
5.5	3,500	240	80	3,100	240	80	1,700	75	40	1,700	95	50	
6	3,200	260	85	2,800	260	85	1,600	80	40	1,600	100	50	

Profondità di taglio Depth of Cut	 <p><b>Contornatura Side Milling</b></p> <p><math>a_e</math>  <math>\varnothing 0.1 \sim 0.9 = 0.05D</math>  <math>\varnothing 1 \sim 2.9 = 0.07D</math>  <math>\varnothing 3 \sim 6 = 0.15D</math></p>	 <p><b>Contornatura Side Milling Cava Slotting</b></p> <p><math>a_e</math>  <math>\varnothing 0.1 \sim 0.9 = 0.01D</math>  <math>\varnothing 1 \sim 2.9 = 0.015D</math>  <math>\varnothing 3 \sim 6 = 0.03D</math></p>	 <p><b>Contornatura Side Milling Cava Slotting</b></p> <p><math>a_p</math>  <math>\varnothing 0.1 \sim 0.4 = 0.05D</math>  <math>\varnothing 0.5 \sim 6 = 0.15D</math></p>
	(D) Dia. Dia.	 <p><b>Cava Slotting</b></p> <p><math>a_p</math>  <math>\varnothing 0.1 \sim 0.4 = 0.05D</math>  <math>\varnothing 0.5 \sim 1.4 = 0.15D</math>  <math>\varnothing 1.5 \sim 3.9 = 0.5D</math>  <math>\varnothing 4 \sim 6 = 0.75D</math></p>	<p><math>a_p</math>  <math>\varnothing 0.1 \sim 0.4 = 0.02D</math>  <math>\varnothing 0.5 \sim 1.4 = 0.07D</math>  <math>\varnothing 1.5 \sim 3.9 = 0.2D</math>  <math>\varnothing 4 \sim 6 = 0.3D</math></p>

**Note**

- ※Regolate le condizioni di fresatura in accordo alla rigidità della macchina e allo staffaggio del pezzo.
- ※Usare lubrificante con ritardanti di fumo.
- ※Usare un mandrino rigido e preciso.
- ※Se fresate con refrigerante solubile in acqua, regolare i dati di taglio facendo attenzione all'evacuazione del truciolo e alla formazione di fumo.
- ※Adjust milling condition conforming to machine rigidity and clamping condition.
- ※Use cutting fluid with smoke retardant.
- ※Use rigid and precise machine and chuck holder.
- ※Adjust milling condition with caution for chip evacuation and smoke generation when milling with water-insoluble cutting fluid.

**Piane Square**  
Square

**Scaricate Plane**  
Long Neck Square

**Sferiche Ball**

**Scaricate Sferiche**  
Long Neck Ball

**Coniche Taper**

**Coniche Sferiche**  
Taper Ball

**Toriche Corner R**

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate Formed Cutter**

**Punte Drill**

**Altro Others**

**Dati tecnici Technical Data**

**Guida tecnica Technical Guidance**

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite Coating  
Piane Square

Non Rivestite Non-Coating  
Scaricate Piane  
Long Neck Square

Rivestite Coating  
Sferiche Ball

Non Rivestite Non-Coating  
Scaricate Sferiche  
Long Neck Ball

Rivestite Coating  
Coniche Taper

Non Rivestite Non-Coating  
Coniche Sferiche  
Taper Ball

Rivestite Coating  
Toriche Corner R

Non Rivestite Non-Coating  
Scaricate Toriche  
Long Neck Corner R

Rivestite Coating  
Frese Sagomate  
Formed Cutter

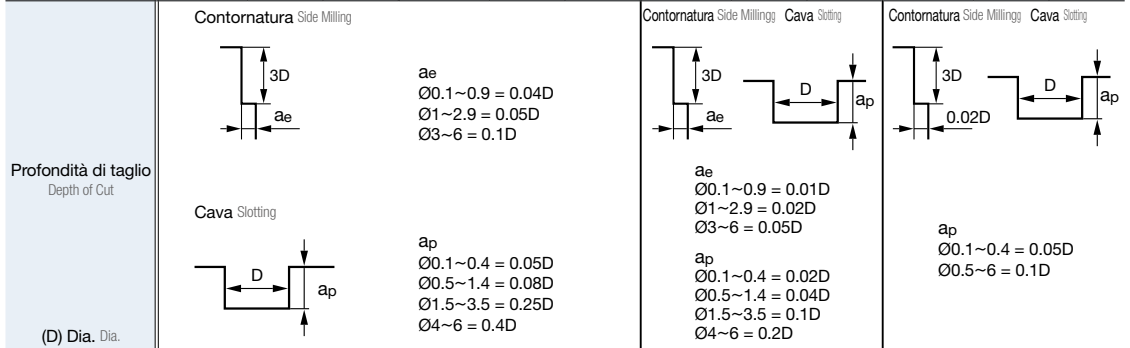
Rivestite Coating  
Punte Drill

Altro Others

Dati tecnici Technical Data

Guida tecnica Technical Guidance

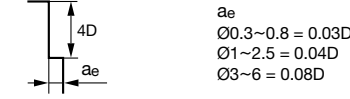
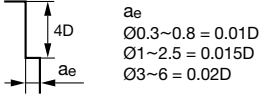
Materiale Work Material	Acciai inox Stainless Steels AISI304			Leghe di Titanio Titanium Alloy Ti-6Al-4V			Leghe resistenti al calore Heat Resistance Alloy Inconel®718			Acciai temprati Hardened Steels 1.2343 (~52HRC)		
	Dia. Dia.	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
		mm/min			mm/min			mm/min			mm/min	
		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting
0.1	50,000	30	15	40,000	30	15	25,000	10	10	50,000	-	15
0.2	50,000	50	25	40,000	50	25	25,000	15	10	39,800	-	20
0.3	50,000	90	35	40,000	90	35	25,000	30	15	26,500	-	20
0.4	43,800	120	50	35,000	120	50	22,000	40	20	19,900	-	20
0.5	35,000	120	50	28,000	120	50	17,000	40	20	15,900	50	25
0.6	31,500	120	50	25,000	120	50	15,000	40	20	13,300	50	25
0.7	28,000	120	50	22,500	120	50	14,000	40	20	11,400	50	25
0.8	24,500	130	50	19,600	130	50	12,000	45	20	10,000	50	25
0.9	21,000	130	50	17,000	130	50	10,500	45	20	8,900	50	25
1	17,500	140	50	14,000	140	50	8,700	45	20	8,000	65	30
1.1	16,400	140	50	13,000	140	50	8,200	45	20	7,300	65	30
1.2	15,300	140	50	12,000	140	50	7,500	45	20	6,700	65	30
1.3	14,100	140	50	11,000	140	50	7,000	45	20	6,200	65	30
1.4	12,900	140	50	10,000	140	50	6,400	45	20	5,700	65	30
1.5	11,700	140	50	9,400	140	50	5,800	45	20	5,300	65	30
1.6	11,200	140	50	8,900	140	50	5,500	45	20	5,000	65	30
1.7	10,600	140	50	8,500	140	50	5,300	45	20	4,700	65	30
1.8	10,000	150	50	8,000	150	50	5,000	50	20	4,500	65	30
1.9	9,400	160	55	7,500	160	55	4,700	50	25	4,200	65	30
2	8,800	160	55	7,000	160	55	4,400	50	25	4,000	65	30
2.1	8,500	160	55	6,800	160	55	4,200	50	25	3,800	65	30
2.2	8,100	160	55	6,500	160	55	4,000	50	25	3,700	65	30
2.3	7,800	160	55	6,200	160	55	3,900	50	25	3,500	65	30
2.4	7,400	160	55	5,900	160	55	3,700	50	25	3,300	65	30
2.5	7,000	170	60	5,600	170	60	3,500	55	30	3,200	70	35
2.6	6,700	170	60	5,400	170	60	3,300	55	30	3,100	70	35
2.7	6,400	170	60	5,100	170	60	3,200	55	30	3,000	70	35
2.8	6,200	170	60	4,900	170	60	3,100	55	30	2,900	70	35
2.9	6,000	170	60	4,800	170	60	3,000	55	30	2,800	70	35
3	5,800	170	60	4,600	170	60	2,900	55	30	2,700	70	35
3.5	5,000	180	60	4,000	180	60	2,500	60	30	2,300	75	35
4	4,400	180	60	3,500	180	60	2,200	60	30	2,000	80	40
4.5	3,900	200	65	3,100	200	65	1,900	65	30	1,800	80	40
5	3,500	210	70	2,800	210	70	1,700	70	35	1,600	80	40
5.5	3,200	220	70	2,500	220	70	1,600	75	35	1,400	80	40
6	2,900	230	75	2,300	230	75	1,400	75	35	1,300	80	40



**Note**

- \*Regolate le condizioni di fresatura in accordo alla rigidità della macchina e allo staffaggio del pezzo.
- \*Usare lubrificante con ritardanti di fumo.
- \*Usare un mandrino rigido e preciso
- \*Se fresate con refrigerante solubile in acqua, regolare i dati di taglio facendo attenzione all'evacuazione del truciolo e alla formazione di fumo.
- \*Adjust milling condition conforming to machine rigidity and clamping condition.
- \*Use cutting fluid with smoke retardant.
- \*Use rigid and precise machine and chuck holder.
- \*Adjust milling condition with caution for chip evacuation and smoke generation when milling with water-insoluble cutting fluid.



Materiale Work Material	Acciai inox Stainless Steels AISI304		Lega di Titanio Titanium Alloy Ti-6Al-4V		Lega resistente al calore Heat Resistance Alloy inconel®718	
	Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
Dia. Dia.	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.3	21,200	40	20,000	40	10,500	20
0.4	15,900	45	14,000	40	8,000	20
0.5	12,700	45	11,000	40	6,300	20
0.8	9,600	45	8,000	40	4,800	20
1	6,400	50	4,400	50	3,200	25
1.2	4,800	50	3,300	50	2,400	25
1.5	4,200	50	2,900	50	2,100	25
1.8	3,700	55	2,600	50	1,800	25
2	3,200	60	2,200	55	1,600	30
2.5	2,500	60	1,700	55	1,200	30
3	2,100	60	1,600	60	1,000	30
4	1,600	65	1,100	65	800	35
5	1,300	80	900	80	750	40
6	1,100	90	700	90	600	45
Profondità di taglio Depth of Cut	<p>Contornatura Side Milling</p> 				<p>Contornatura Side Milling</p> 	
(D) Dia. Dia.						
Note Notes	<p>※Regolate le condizioni di fresatura in accordo alla rigidità della macchina e allo staffaggio del pezzo.                  ※Usare lubrificante con ritardanti di fumo.                  ※Usare un mandrino rigido e preciso.                  ※Adatta solo per lavorazioni laterali.                  ※Adjust milling condition conforming to machine rigidity and clamping condition.                  ※Use cutting fluid with smoke retardant.                  ※Use a rigid and precise machine and chuck holder.                  ※Available only for side cutting.</p>					

**Piane Square**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Scaricate Piane Long Neck Square**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Sferiche Ball**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Scaricate Sferiche Long Neck Ball**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Coniche Taper**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Coniche Sferiche Taper Ball**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Toriche Corner R**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Scaricate Toriche Long Neck Corner R**  
Coating: Rivestite  
Non-Coating: Non Rivestite



**Frese Sagomate Formed Cutter**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Punte Drill**

**Altro Others**

**Dati tecnici Technical Data**

**Guida tecnica Technical Guidance**

Materiale Work Material	Acciai inox Stainless Steels AISI304		Lega di Titanio Titanium Alloy Ti-6Al-4V		Lega resistente al calore Heat Resistance Alloy Inconel®718	
	Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
Dia. Dia.	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.3	15,900	30	14,000	30	8,000	15
0.4	11,900	35	10,000	35	6,000	15
0.5	9,500	35	8,000	35	4,700	15
0.8	7,100	35	6,000	35	3,500	15
1	4,800	40	3,400	40	2,400	20
1.2	4,000	40	2,800	40	2,000	20
1.5	3,200	40	2,200	40	1,600	20
1.8	2,800	40	1,900	40	1,400	20
2	2,400	45	1,700	45	1,200	20
2.5	1,900	45	1,300	45	950	20
3	1,600	50	1,100	50	800	25
4	1,200	50	840	50	600	25
5	1,000	60	700	60	500	30
6	800	65	550	65	400	30
Profondità di taglio Depth of Cut	<p>Contornatura Side Milling</p>  <p><math>a_e</math>  <math>\varnothing 0.3 \sim 0.8 = 0.02D</math>  <math>\varnothing 1 \sim 2.5 = 0.03D</math>  <math>\varnothing 3 \sim 6 = 0.06D</math></p>			<p>Contornatura Side Milling</p>  <p><math>a_e</math>  <math>\varnothing 0.3 \sim 0.8 = 0.005D</math>  <math>\varnothing 1 \sim 2.5 = 0.007D</math>  <math>\varnothing 3 \sim 6 = 0.015D</math></p>		
(D) Dia. Dia.						
Note	<p>※Regolate le condizioni di fresatura in accordo alla rigidità della macchina e allo staffaggio del pezzo.                  ※Usare lubrificante con ritardanti di fumo.                  ※Usare un mandrino rigido e preciso.                  ※Adatta solo per lavorazioni laterali.                  ※Adjust milling condition conforming to machine rigidity and clamping condition.                  ※Use cutting fluid with smoke retardant.                  ※Use a rigid and precise machine and chuck holder.                  ※Available only for side cutting.</p>					

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter



Non Rivestite  
Non-Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

Materiale Work Material	Acciai inox Stainless Steels AISI304		Lega di Titanio Titanium Alloy Ti-6Al-4V		Lega resistente al calore Heat Resistance Alloy inconel®718	
	Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
Dia. Dia.	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.1	50,000	30	48,000	30	25,000	10
0.2	50,000	50	48,000	50	25,000	15
0.3	50,000	90	48,000	90	25,000	30
0.4	47,700	130	45,000	130	23,000	40
0.5	38,200	130	37,000	130	19,000	40
0.6	34,000	130	33,000	130	17,000	40
0.7	30,000	130	29,000	130	15,000	40
0.8	26,000	140	25,000	140	13,000	45
0.9	22,000	140	21,000	140	11,000	45
1	19,100	150	18,000	150	9,500	50
1.1	17,500	150	16,000	150	8,500	50
1.2	16,000	150	15,000	150	8,000	50
1.3	14,500	150	13,500	150	7,200	50
1.4	13,000	150	12,500	150	6,500	50
1.5	12,700	150	12,000	150	6,200	50
1.6	11,900	150	11,500	150	6,000	50
1.7	11,300	160	10,900	160	5,500	50
1.8	10,700	160	10,300	160	5,200	50
1.9	10,100	170	9,700	170	5,000	55
2	9,500	170	9,100	170	4,800	55
2.5	7,600	180	7,200	180	3,800	60
3	6,400	190	6,000	190	3,200	65
4	4,800	190	4,400	190	2,400	65
5	3,800	230	3,400	230	1,900	75
6	3,200	260	2,800	260	1,600	80
Profondità di taglio Depth of Cut	Contornatura Side Milling  $a_e$ $\varnothing 0.1 \sim 0.8 = 0.05D$ $\varnothing 1 \sim 2.5 = 0.1D$ $\varnothing 3 \sim 6 = 0.2D$				Contornatura Side Milling  $a_e$ $\varnothing 0.1 \sim 0.8 = 0.01D$ $\varnothing 1 \sim 2.5 = 0.02D$ $\varnothing 3 \sim 6 = 0.04D$	
(D) Dia. Dia.						
Note Notes	*Regolate le condizioni di fresatura in accordo alla rigidità della macchina e allo staffaggio del pezzo. *Usare lubrificante con ritardanti di fumo. *Usare un mandrino rigido e preciso. *Adatta solo per lavorazioni laterali. *Adjust milling condition conforming to machine rigidity and clamping condition. *Use cutting fluid with smoke retardant. *Use a rigid and precise machine and chuck holder. *Available only for side cutting.					

**Piane Square**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Scaricate Piane Long Neck Square**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Sferiche Ball**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Scaricate Sferiche Long Neck Ball**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Coniche Taper**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Coniche Sferiche Taper Ball**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Toriche Corner R**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Scaricate Toriche Long Neck Corner R**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Frese Sagomate Formed Cutter**  
Coating: Rivestite  
Non-Coating: Non Rivestite

**Punte Drill**

**Altro Others**



**Dati tecnici Technical Data**



**Guida tecnica Technical Guidance**

# Parametri di taglio raccomandati

# MXH230P

## Recommended Milling Conditions

Materiale Work Material	Acciai inox Stainless Steels AISI304		Lega di Titanio Titanium Alloy Ti-6Al-4V		Lega resistente al calore Heat Resistance Alloy Inconel®718	
	Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
Dia Dia.	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.1	50,000	30	48,000	30	25,000	10
0.2	50,000	50	48,000	50	25,000	15
0.3	50,000	90	48,000	90	25,000	30
0.4	47,700	130	45,000	130	23,000	40
0.5	38,200	130	37,000	130	19,000	40
0.6	34,500	130	32,000	130	17,000	40
0.7	30,500	130	28,000	130	15,000	40
0.8	26,000	140	24,000	140	13,000	45
0.9	22,000	140	20,000	140	11,000	45
1	19,100	150	18,000	150	9,500	50
1.1	17,500	150	16,000	150	8,700	50
1.2	16,300	150	15,000	150	8,100	50
1.3	15,100	150	14,000	150	7,500	50
1.4	13,900	150	13,000	150	7,000	50
1.5	12,700	150	12,000	150	6,200	50
1.6	12,000	150	11,500	150	6,000	50
1.7	11,300	160	10,900	160	5,500	50
1.8	10,600	160	10,200	160	5,300	50
1.9	9,900	170	9,500	170	5,000	55
2	9,500	170	9,100	170	4,800	55
2.1	9,100	170	8,700	170	4,500	55
2.2	8,700	170	8,300	170	4,300	55
2.3	8,300	170	7,900	170	4,100	55
2.4	7,900	180	7,500	180	4,000	60
2.5	7,600	180	7,200	180	3,800	60
2.6	7,400	180	7,000	180	3,700	60
2.7	7,200	180	6,800	180	3,600	60
2.8	7,000	180	6,500	180	3,500	60
2.9	6,700	190	6,200	190	3,300	60
3	6,400	190	6,000	190	3,200	65
3.5	5,500	190	5,100	190	2,700	65
4	4,800	190	4,400	190	2,400	65
4.5	4,200	210	3,800	210	2,100	70
5	3,800	230	3,400	230	1,900	75
5.5	3,500	240	3,100	240	1,700	75
6	3,200	260	2,800	260	1,600	80
Profondità di taglio Depth of Cut	Contornatura Side Milling  $a_e$ $\varnothing 0.1 \sim 0.9 = 0.05D$ $\varnothing 1 \sim 2.9 = 0.07D$ $\varnothing 3 \sim = 0.15D$			Contornatura Side Milling  $a_e$ $\varnothing 0.1 \sim 0.9 = 0.01D$ $\varnothing 1 \sim 2.9 = 0.015D$ $\varnothing 3 \sim 6 = 0.03D$		
	(D) Dia. Dia.					
Note	※Regolate le condizioni di fresatura in accordo alla rigidità della macchina e allo staffaggio del pezzo. ※Usare lubrificante con ritardanti di fumo. ※Usare un mandrino rigido e preciso. ※Adatta solo per lavorazioni laterali. ※Adjust milling condition conforming to machine rigidity and clamping condition. ※Use cutting fluid with smoke retardant. ※Use a rigid and precise machine and chuck holder. ※Available only for side cutting.					

Materiale Work Material	Acciaio inox Stainless Steels AISI304		Legia di Titanio Titanium Alloy Ti-6Al-4V		Legia resistente al calore Heat Resistance Alloy Inconel®718	
	Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
Dia. Dia.	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.1	50,000	30	40,000	30	25,000	10
0.2	50,000	50	40,000	50	25,000	15
0.3	50,000	90	40,000	90	25,000	30
0.4	43,800	120	35,000	120	22,000	40
0.5	35,000	120	28,000	120	17,000	40
0.6	31,500	120	25,000	120	15,000	40
0.7	28,000	120	22,500	120	14,000	40
0.8	24,500	130	19,600	130	12,000	45
0.9	21,000	130	17,000	130	10,500	45
1	17,500	140	14,000	140	8,700	45
1.1	16,400	140	13,000	140	8,200	45
1.2	15,300	140	12,000	140	7,500	45
1.3	14,100	140	11,000	140	7,000	45
1.4	12,900	140	10,000	140	6,400	45
1.5	11,700	140	9,400	140	5,800	45
1.6	11,200	140	8,900	140	5,500	45
1.7	10,600	140	8,500	140	5,300	45
1.8	10,000	150	8,000	150	5,000	50
1.9	9,400	160	7,500	160	4,700	50
2	8,800	160	7,000	160	4,400	50
2.1	8,500	160	6,800	160	4,200	50
2.2	8,100	160	6,500	160	4,000	50
2.3	7,800	160	6,200	160	3,900	50
2.4	7,400	160	5,900	160	3,700	50
2.5	7,000	170	5,600	170	3,500	55
2.6	6,700	170	5,400	170	3,300	55
2.7	6,400	170	5,100	170	3,200	55
2.8	6,200	170	4,900	170	3,100	55
2.9	6,000	170	4,800	170	3,000	55
3	5,800	170	4,600	170	2,900	55
3.5	5,000	180	4,000	180	2,500	60
4	4,400	180	3,500	180	2,200	60
4.5	3,900	200	3,100	200	1,900	65
5	3,500	210	2,800	210	1,700	70
5.5	3,200	220	2,500	220	1,600	75
6	2,900	230	2,300	230	1,400	75
Profondità di taglio Depth of Cut	Contornatura Side Milling  $a_e$ $\varnothing 0.1 \sim 0.9 = 0.04D$ $\varnothing 1 \sim 2.9 = 0.05D$ $\varnothing 3 \sim 6 = 0.1D$			Contornatura Side Milling  $a_e$ $\varnothing 0.1 \sim 0.9 = 0.01D$ $\varnothing 1 \sim 2.9 = 0.02D$ $\varnothing 3 \sim 6 = 0.05D$		
	(D) Dia. Dia.					
Note Notes	※Regolate le condizioni di fresatura in accordo alla rigidità della macchina e allo staffaggio del pezzo. ※Usare lubrorefrigerante con ritardanti di fumo. ※Usare un mandrino rigido e preciso. ※Adatta solo per lavorazioni laterali. ※Adjust milling condition conforming to machine rigidity and clamping condition. ※Use cutting fluid with smoke retardant. ※Use a rigid and precise machine and chuck holder. ※Available only for side cutting.					

**Piane Square**  
Rivestite Coating  
Non Rivestite Non-Coating

**Scaricate Piane Long Neck Square**  
Rivestite Coating  
Non Rivestite Non-Coating

**Sferiche Ball**  
Rivestite Coating  
Non Rivestite Non-Coating

**Scaricate Sferiche Long Neck Ball**  
Rivestite Coating  
Non Rivestite Non-Coating

**Coniche Taper**  
Rivestite Coating  
Non Rivestite Non-Coating

**Coniche Sferiche Taper Ball**  
Rivestite Coating  
Non Rivestite Non-Coating

**Toriche Corner R**  
Rivestite Coating  
Non Rivestite Non-Coating

**Scaricate Toriche Long Neck Corner R**  
Rivestite Coating  
Non Rivestite Non-Coating

**Frese Sagomate Formed Cutter**  
Rivestite Coating  
Non Rivestite Non-Coating

**Punte Drill**

**Altro Others**

**Dati tecnici Technical Data**

**Guida tecnica Technical Guidance**

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

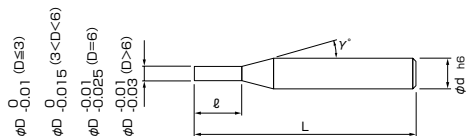
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MX225

MUGEN-COATING 2-Flute LEAD25 End Mill

## Frese 2 Tagli piane elica 25° rivestite MUGEN



- Il rapporto L/D = 1 e l'elica a 25° per incrementare la rigidità ed ottenere lavorazioni molto efficienti.
- Eliminano vibrazioni e flessioni in lavorazioni di cave.
- L/D=1 and helix 25° to increase rigidity and realize high efficient machining.
- Suppress chattering and deflection in slotting process.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. Tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00025-00030	0.3	0.3	12°	4	45
08-00025-00040	0.4	0.4	12°	4	45
08-00025-00050	0.5	0.5	12°	4	45
08-00025-00080	0.8	0.8	12°	4	45
08-00025-00100	1	1	12°	4	45
08-00025-00120	1.2	1.2	12°	4	45
08-00025-00150	1.5	1.5	12°	4	45
08-00025-00180	1.8	1.8	12°	4	45
08-00025-00200	2	2	12°	4	45
08-00025-00250	2.5	2.5	12°	4	45
08-00025-00300	3	3	12°	6	45
08-00025-00400	4	4	12°	6	45
08-00025-00500	5	5	12°	6	50
08-00025-00600	6	6	-	6	50
08-00025-00700	7	7	12°	8	65
08-00025-00800	8	8	-	8	65
08-00025-00900	9	9	12°	10	75
08-00025-01000	10	10	-	10	75
08-00025-01200	12	12	-	12	80

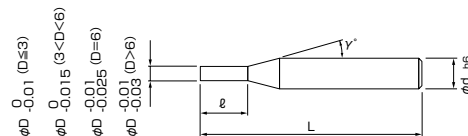
**Attenzione** Quando ordinate, indicate MX225 (D).  
When you order, indicate MX225 (D).

- Per i parametri di taglio vedi pagina 113.
- Milling condition is recommended on page 113.

# MX230

MUGEN-COATING 2-Flute LEAD30 End Mill

## Frese 2 Tagli piane elica 30° rivestite MUGEN



- Il rapporto L/D e l'elica a 30° di tipo standard la rende adatta sia per lavorazioni di scanalatura che di fresatura laterale
- L/D=2 and helix 30° standard type, applicable for both slotting and side milling.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. Tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00030-00010	0.1	0.2	12°	4	45
08-00030-00020	0.2	0.4	12°	4	45
08-00030-00030	0.3	0.6	12°	4	45
08-00030-00040	0.4	0.8	12°	4	45
08-00030-00050	0.5	1	12°	4	45
08-00030-00060	0.6	1.2	12°	4	45
08-00030-00070	0.7	1.4	12°	4	45
08-00030-00080	0.8	1.6	12°	4	45
08-00030-00090	0.9	1.8	12°	4	45
08-00030-00100	1	2	12°	4	45
08-00030-00110	1.1	2.2	12°	4	45
08-00030-00120	1.2	2.4	12°	4	45
08-00030-00130	1.3	2.6	12°	4	45
08-00030-00140	1.4	2.8	12°	4	45
08-00030-00150	1.5	3	12°	4	45
08-00030-00160	1.6	3.2	12°	4	45
08-00030-00170	1.7	3.4	12°	4	45
08-00030-00180	1.8	3.6	12°	4	45
08-00030-00190	1.9	3.8	12°	4	45
08-00030-00200	2	4	12°	4	45
08-00030-00210	2.1	4.2	12°	4	45
08-00030-00220	2.2	4.4	12°	4	45
08-00030-00230	2.3	4.6	12°	4	45
08-00030-00240	2.4	4.8	12°	4	45

**Attenzione** Quando ordinate, indicate MX230 (D).  
When you order, indicate MX230 (D).

- Per i parametri di taglio vedi pagina 114.
- Milling condition is recommended on page 114.

# MX230

MUGEN-COATING 2-Flute LEAD30 End Mill

## Frese 2 Tagli piane elica 30° rivestite MUGEN

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00030-00250	2.5	5	12°	4	45
08-00030-00260	2.6	5.2	12°	4	45
08-00030-00270	2.7	5.4	12°	4	45
08-00030-00280	2.8	5.6	12°	4	45
08-00030-00290	2.9	5.8	12°	4	45
08-00030-00300	3	6	12°	6	45
08-00030-00310	3.1	6.2	12°	6	45
08-00030-00320	3.2	6.4	12°	6	45
08-00030-00330	3.3	6.6	12°	6	45
08-00030-00340	3.4	6.8	12°	6	45
08-00030-00350	3.5	7	12°	6	45
08-00030-00360	3.6	7.2	12°	6	45
08-00030-00370	3.7	7.4	12°	6	45
08-00030-00380	3.8	7.6	12°	6	45
08-00030-00390	3.9	7.8	12°	6	45
08-00030-00400	4	8	12°	6	45
08-00030-00410	4.1	8.2	12°	6	45
08-00030-00420	4.2	8.4	12°	6	45
08-00030-00430	4.3	8.6	12°	6	45
08-00030-00440	4.4	8.8	12°	6	45
08-00030-00450	4.5	9	12°	6	50
08-00030-00460	4.6	9.2	12°	6	50
08-00030-00470	4.7	9.4	12°	6	50
08-00030-00480	4.8	9.6	12°	6	50

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00030-00490	4.9	9.8	12°	6	50
08-00030-00500	5	10	12°	6	50
08-00030-00510	5.1	10.2	12°	6	50
08-00030-00520	5.2	10.4	12°	6	50
08-00030-00530	5.3	10.6	12°	6	50
08-00030-00540	5.4	10.8	12°	6	50
08-00030-00550	5.5	11	12°	6	50
08-00030-00560	5.6	11.2	12°	6	50
08-00030-00570	5.7	11.4	12°	6	50
08-00030-00580	5.8	11.6	12°	6	50
08-00030-00590	5.9	11.8	12°	6	50
08-00030-00600	6	12	-	6	50
08-00030-00700	7	14	12°	8	65
08-00030-00800	8	16	-	8	65
08-00030-00900	9	18	12°	10	75
08-00030-01000	10	20	-	10	75
08-00030-01200	12	24	-	12	80

**Attenzione** Quando ordinate, indicate MX230 (D).  
When you order, indicate MX230 (D).

- Per i parametri di taglio vedi pagina 114.
- Milling condition is recommended on page 114.

**CBN**  
Nitrato Cubico  
di Boro

**Diamante**  
Diamond

**Piane Square**  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Piane Long Neck Square**  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Sferiche Ball**  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Sferiche Long Neck Ball**  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche Taper**  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche Sferiche Taper Ball**  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Toriche Corner R**  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Toriche Long Neck Corner R**  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Frese Sagomate Formed Cutter**  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Punte Drill**

**Altro Others**

**Dati tecnici Technical Data**

**Guida tecnica Technical Guidance**

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

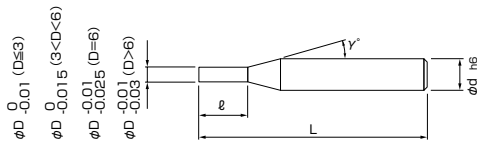
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MX235

MUGEN-COATING 2-Flute LEAD35 End Mill

## Frese 2 Tagli piane elica 35° rivestite MUGEN



- Il rapporto L/D = 3 e l'elica a 35° assicurano una lunghezza del tagliente sufficiente, per evitare difficoltà nella scelta della fresa.
- L/D=3 and helix 35° for appropriate length of cut to avoid the inconveniences in size selection.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00035-00010	0.1	0.3	12°	4	45
08-00035-00020	0.2	0.6	12°	4	45
08-00035-00030	0.3	0.9	12°	4	45
08-00035-00040	0.4	1.2	12°	4	45
08-00035-00050	0.5	1.5	12°	4	45
08-00035-00060	0.6	1.8	12°	4	45
08-00035-00070	0.7	2.1	12°	4	45
08-00035-00080	0.8	2.4	12°	4	45
08-00035-00090	0.9	2.7	12°	4	45
08-00035-00100	1	3	12°	4	45
08-00035-00110	1.1	3.3	12°	4	45
08-00035-00120	1.2	3.6	12°	4	45
08-00035-00130	1.3	3.9	12°	4	45
08-00035-00140	1.4	4.2	12°	4	45
08-00035-00150	1.5	4.5	12°	4	45
08-00035-00160	1.6	4.8	12°	4	45
08-00035-00170	1.7	5.1	12°	4	45
08-00035-00180	1.8	5.4	12°	4	45
08-00035-00190	1.9	5.7	12°	4	45
08-00035-00200	2	6	12°	4	45
08-00035-00210	2.1	6.3	12°	4	45
08-00035-00220	2.2	6.6	12°	4	45
08-00035-00230	2.3	6.9	12°	4	45
08-00035-00240	2.4	7.2	12°	4	45
08-00035-00250	2.5	7.5	12°	4	45
08-00035-00260	2.6	7.8	12°	4	45
08-00035-00270	2.7	8.1	12°	4	45
08-00035-00280	2.8	8.4	12°	4	45
08-00035-00290	2.9	8.7	12°	4	45
08-00035-00300	3	9	12°	6	45
08-00035-00310	3.1	9.3	12°	6	45
08-00035-00320	3.2	9.6	12°	6	45
08-00035-00330	3.3	9.9	12°	6	45

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00035-00340	3.4	10.2	12°	6	45
08-00035-00350	3.5	10.5	12°	6	45
08-00035-00360	3.6	10.8	12°	6	45
08-00035-00370	3.7	11.1	12°	6	45
08-00035-00380	3.8	11.4	12°	6	45
08-00035-00390	3.9	11.7	12°	6	45
08-00035-00400	4	12	12°	6	50
08-00035-00410	4.1	12.3	12°	6	50
08-00035-00420	4.2	12.6	12°	6	50
08-00035-00430	4.3	12.9	12°	6	50
08-00035-00440	4.4	13.2	12°	6	50
08-00035-00450	4.5	13.5	12°	6	50
08-00035-00460	4.6	13.8	12°	6	55
08-00035-00470	4.7	14.1	12°	6	55
08-00035-00480	4.8	14.4	12°	6	55
08-00035-00490	4.9	14.7	12°	6	55
08-00035-00500	5	15	12°	6	55
08-00035-00510	5.1	15.3	12°	6	55
08-00035-00520	5.2	15.6	12°	6	55
08-00035-00530	5.3	15.9	12°	6	55
08-00035-00540	5.4	16.2	12°	6	55
08-00035-00550	5.5	16.5	12°	6	60
08-00035-00560	5.6	16.8	12°	6	60
08-00035-00570	5.7	17.1	12°	6	60
08-00035-00580	5.8	17.4	12°	6	60
08-00035-00590	5.9	17.7	12°	6	60
08-00035-00600	6	18	-	6	60
08-00035-00700	7	21	12°	8	65
08-00035-00800	8	24	-	8	65
08-00035-00900	9	27	12°	10	75
08-00035-01000	10	30	-	10	75
08-00035-01200	12	36	-	12	80

**Attenzione** Quando ordinate, indicate MX235 (D).  
When you order, indicate MX235 (D).

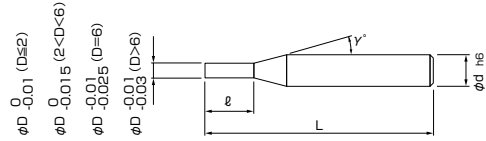
- Per i parametri di taglio vedi pagina 115.
- Milling condition is recommended on page 115.



# MX240

MUGEN-COATING 2-Flute LEAD40 End Mill

## Frese 2 Tagli piane elica 40° rivestite MUGEN



- Il rapporto L/D e l'elica a 40° la rende adatta a lavorazioni profonde con minime flessioni.
- L/D=4 and helix 40° is suitable for deep machining with minimum deflection of cutting up-right surface.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00040-00030	0.3	1.2	12°	4	45
08-00040-00040	0.4	1.6	12°	4	45
08-00040-00050	0.5	2	12°	4	45
08-00040-00060	0.6	2.4	12°	4	45
08-00040-00070	0.7	2.8	12°	4	45
08-00040-00080	0.8	3.2	12°	4	45
08-00040-00090	0.9	3.6	12°	4	45
08-00040-00100	1	4	12°	4	45
08-00040-00110	1.1	4.4	12°	4	45
08-00040-00120	1.2	4.8	12°	4	45
08-00040-00130	1.3	5.2	12°	4	45
08-00040-00140	1.4	5.6	12°	4	45
08-00040-00150	1.5	6	12°	4	45
08-00040-00160	1.6	6.4	12°	4	45
08-00040-00170	1.7	6.8	12°	4	45
08-00040-00180	1.8	7.2	12°	4	45
08-00040-00190	1.9	7.6	12°	4	45
08-00040-00200	2	8	12°	4	45
08-00040-00210	2.1	8.4	12°	4	45
08-00040-00220	2.2	8.8	12°	4	45
08-00040-00230	2.3	9.2	12°	4	45
08-00040-00240	2.4	9.6	12°	4	45
08-00040-00250	2.5	10	12°	4	45
08-00040-00260	2.6	10.4	12°	4	50
08-00040-00270	2.7	10.8	12°	4	50
08-00040-00280	2.8	11.2	12°	4	50
08-00040-00290	2.9	11.6	12°	4	50
08-00040-00300	3	12	12°	6	50
08-00040-00310	3.1	12.4	12°	6	50
08-00040-00320	3.2	12.8	12°	6	50
08-00040-00330	3.3	13.2	12°	6	50
08-00040-00340	3.4	13.6	12°	6	50

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00040-00350	3.5	14	12°	6	50
08-00040-00360	3.6	14.4	12°	6	50
08-00040-00370	3.7	14.8	12°	6	50
08-00040-00380	3.8	15.2	12°	6	50
08-00040-00390	3.9	15.6	12°	6	50
08-00040-00400	4	16	12°	6	55
08-00040-00410	4.1	16.4	12°	6	55
08-00040-00420	4.2	16.8	12°	6	55
08-00040-00430	4.3	17.2	12°	6	55
08-00040-00440	4.4	17.6	12°	6	55
08-00040-00450	4.5	18	12°	6	55
08-00040-00460	4.6	18.4	12°	6	55
08-00040-00470	4.7	18.8	12°	6	55
08-00040-00480	4.8	19.2	12°	6	55
08-00040-00490	4.9	19.6	12°	6	55
08-00040-00500	5	20	12°	6	60
08-00040-00510	5.1	20.4	12°	6	60
08-00040-00520	5.2	20.8	12°	6	60
08-00040-00530	5.3	21.2	12°	6	60
08-00040-00540	5.4	21.6	12°	6	60
08-00040-00550	5.5	22	12°	6	65
08-00040-00560	5.6	22.4	12°	6	65
08-00040-00570	5.7	22.8	12°	6	65
08-00040-00580	5.8	23.2	12°	6	65
08-00040-00590	5.9	23.6	12°	6	65
08-00040-00600	6	24	-	6	65
08-00040-00700	7	28	12°	8	90
08-00040-00800	8	32	-	8	90
08-00040-00900	9	36	12°	10	100
08-00040-01000	10	40	-	10	100
08-00040-01200	12	48	-	12	105

**Attenzione** Quando ordinate, indicate MX240 (D).  
When you order, indicate MX240 (D).

- Per i parametri di taglio vedi pagina 116.
- Milling condition is recommended on page 116.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Piane**  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Sferiche**  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
**Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Toriche**  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
**Sagomate**  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

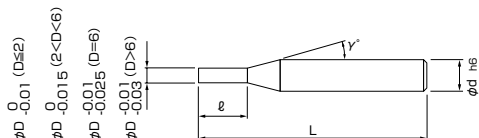
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MX245

MUGEN-COATING 2-Flute LEAD45 End Mill

## Frese 2 Tagli piane elica 45° rivestite MUGEN



- Il rapporto L/D = 5 e l'elica a 45° minimizzano le flessioni della fresa nonostante la lunghezza del tagliente.
- L/D=5 and helix 45° to minimize the milling deflection even though the long cutting length design.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00045-00030	0.3	1.5	12°	4	45
08-00045-00040	0.4	2	12°	4	45
08-00045-00050	0.5	2.5	12°	4	45
08-00045-00080	0.8	4	12°	4	45
08-00045-00100	1	5	12°	4	45
08-00045-00120	1.2	6	12°	4	45
08-00045-00150	1.5	7.5	12°	4	45
08-00045-00180	1.8	9	12°	4	50
08-00045-00200	2	10	12°	4	50
08-00045-00250	2.5	12.5	12°	4	50
08-00045-00300	3	15	12°	6	55
08-00045-00400	4	20	12°	6	60
08-00045-00500	5	25	12°	6	65
08-00045-00600	6	30	-	6	75
08-00045-00700	7	35	12°	8	90
08-00045-00810	8	40	-	8	90
08-00045-00900	9	45	12°	10	100
08-00045-01000	10	50	-	10	100
08-00045-01200	12	60	-	12	105

**Attenzione** Quando ordinate, indicate MX245 (D).  
When you order, indicate MX245 (D).

- Per i parametri di taglio vedi pagina 117.
- Milling condition is recommended on page 117.

# Parametri di taglio raccomandati

# MX225

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane Square**  
Rivestite Coating  
Scaricate Plane Non Rivestite Non-Coating  
Long Neck Square

**Sferiche Ball**  
Rivestite Coating  
Scaricate Sferiche Non Rivestite Non-Coating  
Long Neck Ball

**Coniche Taper**  
Rivestite Coating  
Coniche Sferiche Non Rivestite Non-Coating  
Taper Ball

**Toriche Corner R**  
Rivestite Coating  
Scaricate Toriche Non Rivestite Non-Coating  
Long Neck Corner R

**Frese Sagomate Formed Cutter**  
Rivestite Coating  
Non Rivestite Non-Coating

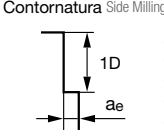
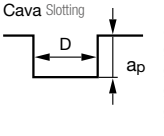
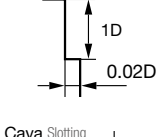
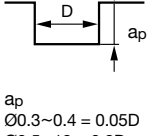
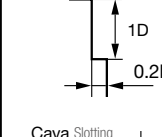
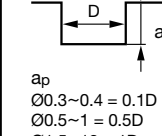
**Punte Drill**

**Altro Others**

**Dati tecnici Technical Data**

**Guida tecnica Technical Guidance**

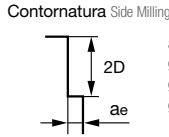
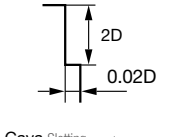
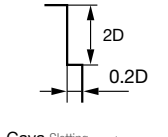
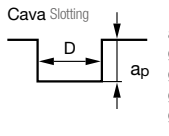
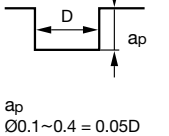
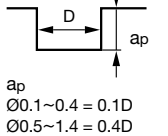
## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304			Acciai pretemprati Prehardened Steels 1.2311•1.2738			Acciai temprati Hardened Steels 1.2343 (~52HRC)			Rame Copper			
Velocità di taglio Cutting Speed	50~80m/min			50~70m/min			40~60m/min			20~40m/min			60~80m/min			
Dia. Dia.	Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed	
	min <sup>-1</sup>		mm/min		min <sup>-1</sup>		mm/min		min <sup>-1</sup>		mm/min		min <sup>-1</sup>		mm/min	
	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting
0.3	50,000	100	50	50,000	90	35	50,000	85	40	31,800	-	20	50,000	150	60	
0.4	50,000	150	75	47,700	130	50	39,800	110	55	23,900	50	25	50,000	200	80	
0.5	41,400	170	85	38,200	130	50	31,800	110	55	19,100	60	30	44,600	220	90	
1	20,700	210	100	19,100	150	55	15,900	130	65	9,500	75	40	22,300	270	95	
1.5	13,800	210	100	12,700	150	55	10,600	130	65	6,400	75	40	14,900	300	100	
2	10,300	210	100	9,500	170	60	8,000	150	75	4,800	75	40	11,100	330	120	
2.5	8,300	250	120	7,600	180	65	6,400	160	80	3,800	75	40	8,900	360	120	
3	6,900	280	140	6,400	190	70	5,300	170	85	3,200	80	40	7,400	370	130	
4	5,200	310	160	4,800	190	70	4,000	170	85	2,400	95	50	5,600	390	130	
5	4,100	330	160	3,800	230	75	3,200	210	110	1,900	95	50	4,500	410	130	
6	3,400	340	170	3,200	260	85	2,700	240	120	1,600	100	50	3,700	410	130	
7	3,000	330	170	2,700	250	80	2,300	230	120	1,400	100	50	3,200	380	130	
8	2,600	320	160	2,400	240	75	2,000	220	110	1,200	100	50	2,800	360	120	
9	2,300	310	150	2,100	230	75	1,800	220	110	1,100	100	50	2,500	350	120	
10	2,100	300	150	1,900	230	75	1,600	210	100	1,000	100	50	2,200	330	110	
12	1,700	270	140	1,600	220	70	1,300	200	100	800	100	50	1,900	320	110	
Profondità di taglio Depth of Cut	<p>Contornatura Side Milling</p>  <p><math>a_e</math>  <math>\varnothing 0.3 \sim 0.8 = 0.05D</math>  <math>\varnothing 1 \sim 2.5 = 0.1D</math>  <math>\varnothing 3 \sim 6 = 0.2D</math>  <math>\varnothing 7 \sim 12 = 0.25D</math></p> <p>Cava Slotting</p>  <p><math>a_p</math>  <math>\varnothing 0.3 \sim 0.4 = 0.05D</math>  <math>\varnothing 0.5 \sim 1.2 = 0.2D</math>  <math>\varnothing 1.5 \sim 3 = 0.7D</math>  <math>\varnothing 4 \sim 12 = 1D</math></p>						<p>Contornatura Side Milling</p>  <p>Cava Slotting</p>  <p><math>a_p</math>  <math>\varnothing 0.3 \sim 0.4 = 0.05D</math>  <math>\varnothing 0.5 \sim 12 = 0.2D</math></p>			<p>Contornatura Side Milling</p>  <p>Cava Slotting</p>  <p><math>a_p</math>  <math>\varnothing 0.3 \sim 0.4 = 0.1D</math>  <math>\varnothing 0.5 \sim 1 = 0.5D</math>  <math>\varnothing 1.5 \sim 12 = 1D</math></p>						
(D) Dia. Dia.																
Note	<p>※Usare lubrorefrigerante.                  ※Usare lubrorefrigerante con ritardanti di fumo.                  ※Vi raccomandiamo di usare lubrificazioni minimale per la lavorazione di acciai temprati.                  ※Regolare nella stessa proporzione giri e avanzamento.                  ※Regolate le condizioni di fresatura in accordo con la profondità                  ※Use cutting fluid.                  ※Use cutting fluid with smoke retardant.                  ※Recommend to use oil mist coolant for machining hardened steels.                  ※Adjust both spindle speed and feed at the same rate.                  ※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</p>															

# Parametri di taglio raccomandati

# MX230

## Recommended Milling Conditions

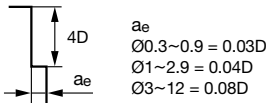
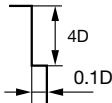
Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AIS1304			Acciai pretemprati Prehardened Steels 1.2311•1.2738			Acciai temprati Hardened Steels 1.2343 (~52HRC)			Rame Copper		
Velocità di taglio Cutting Speed	50~80m/min			50~70m/min			40~60m/min			20~40m/min			60~80m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting
0.1	50,000	-	25	50,000	-	15	50,000	-	20	50,000	-	15	50,000	60	25
0.2	50,000	-	40	50,000	-	25	50,000	-	30	47,700	-	20	50,000	90	35
0.3	50,000	100	50	50,000	90	35	50,000	85	40	31,800	-	20	50,000	150	60
0.4	50,000	150	75	47,700	130	50	39,800	110	55	23,900	50	25	50,000	200	80
0.5	41,400	170	85	38,200	130	50	31,800	110	55	19,100	60	30	44,600	220	90
1	20,700	210	100	19,100	150	55	15,900	130	65	9,500	75	40	22,300	270	95
1.5	13,800	210	100	12,700	150	55	10,600	130	65	6,400	75	40	14,900	300	100
2	10,300	210	100	9,500	170	60	8,000	150	75	4,800	75	40	11,100	330	120
2.5	8,300	250	120	7,600	180	65	6,400	160	80	3,800	75	40	8,900	360	120
3	6,900	280	140	6,400	190	70	5,300	170	85	3,200	80	40	7,400	370	130
3.5	5,900	300	150	5,500	190	70	4,500	170	85	2,700	85	45	6,400	380	130
4	5,200	310	160	4,800	190	70	4,000	170	85	2,400	95	50	5,600	390	130
4.5	4,600	320	160	4,200	210	75	3,500	190	95	2,100	95	50	5,000	400	130
5	4,100	330	160	3,800	230	75	3,200	210	110	1,900	95	50	4,500	410	130
5.5	3,800	330	160	3,500	240	80	2,900	220	110	1,700	95	50	4,100	410	130
6	3,400	340	170	3,200	260	85	2,700	240	120	1,600	100	50	3,700	410	130
7	3,000	330	170	2,700	250	80	2,300	230	120	1,400	100	50	3,200	380	130
8	2,600	320	160	2,400	240	75	2,000	220	110	1,200	100	50	2,800	360	120
9	2,300	310	150	2,100	230	75	1,800	220	110	1,100	100	50	2,500	350	120
10	2,100	300	150	1,900	230	75	1,600	210	100	1,000	100	50	2,200	330	110
12	1,700	270	140	1,600	220	70	1,300	200	100	800	100	50	1,900	320	110
Profondità di taglio Depth of Cut	 <p>Contornatura Side Milling</p> <p><math>ae</math>  <math>\varnothing 0.3 \sim 0.9 = 0.05D</math>  <math>\varnothing 1 \sim 2.9 = 0.07D</math>  <math>\varnothing 3 \sim 12 = 0.15D</math></p>			 <p>Contornatura Side Milling</p> <p><math>ae</math>  <math>\varnothing 0.3 \sim 0.9 = 0.05D</math>  <math>\varnothing 1 \sim 2.9 = 0.07D</math>  <math>\varnothing 3 \sim 12 = 0.15D</math></p>			 <p>Contornatura Side Milling</p> <p><math>ae</math>  <math>\varnothing 0.3 \sim 0.9 = 0.05D</math>  <math>\varnothing 1 \sim 2.9 = 0.07D</math>  <math>\varnothing 3 \sim 12 = 0.15D</math></p>								
	 <p>Cava Slotting</p> <p><math>ap</math>  <math>\varnothing 0.1 \sim 0.4 = 0.05D</math>  <math>\varnothing 0.5 \sim 1.4 = 0.15D</math>  <math>\varnothing 1.5 \sim 3.9 = 0.5D</math>  <math>\varnothing 4 \sim 12 = 0.75D</math></p>			 <p>Cava Slotting</p> <p><math>ap</math>  <math>\varnothing 0.1 \sim 0.4 = 0.05D</math>  <math>\varnothing 0.5 \sim 1.4 = 0.15D</math>  <math>\varnothing 1.5 \sim 12 = 0.75D</math></p>			 <p>Cava Slotting</p> <p><math>ap</math>  <math>\varnothing 0.1 \sim 0.4 = 0.1D</math>  <math>\varnothing 0.5 \sim 1.4 = 0.4D</math>  <math>\varnothing 1.5 \sim 12 = 0.75D</math></p>								
(D) Dia. Dia.															
Note	<ul style="list-style-type: none"> <li>※Usare lubrificante.</li> <li>※Usare lubrificante con ritardanti di fumo.</li> <li>※Raccomandiamo di usare lubrificazione minima per la lavorazione di acciai temprati.</li> <li>※Regolate nella stessa proporzione giri e avanzamento.</li> <li>※Regolate le condizioni di fresatura in accordo con la profondità di taglio e la rigidità della macchina.</li> <li>※Use cutting fluid.</li> <li>※Use cutting fluid with smoke retardant.</li> <li>※Recommend to use oil mist coolant for machining hardened steels.</li> <li>※Adjust both spindle speed and feed at the same rate.</li> <li>※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</li> </ul>														

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304			Acciai pretemprati Prehardened Steels 1.2311•1.2738			Acciai temprati Hardened Steels 1.2343 (~52HRC)			Rame Copper					
Velocità di taglio Cutting Speed	45~75m/min			45~65m/min			35~55m/min			15~35m/min			55~75m/min					
Dia. Dia.	Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed			
	min <sup>-1</sup>		mm/min		min <sup>-1</sup>		mm/min		min <sup>-1</sup>		mm/min		min <sup>-1</sup>		mm/min			
	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting		
0.1	50,000	-	25	50,000	-	15	50,000	-	20	50,000	-	15	50,000	60	25			
0.2	50,000	-	40	50,000	-	25	50,000	-	30	39,800	-	20	50,000	90	40			
0.3	50,000	100	50	50,000	90	35	47,700	80	40	26,500	-	20	50,000	150	60			
0.4	47,700	140	70	43,800	120	50	35,800	100	50	19,900	-	20	50,000	200	80			
0.5	38,200	150	75	35,000	120	50	28,600	100	50	15,900	50	25	41,400	210	85			
1	19,100	190	95	17,500	140	50	14,300	110	60	8,000	65	30	20,700	250	90			
1.5	12,700	190	95	11,700	140	50	9,500	110	60	5,300	65	30	13,800	280	100			
2	9,500	190	95	8,800	160	55	7,200	140	70	4,000	65	30	10,300	310	110			
2.5	7,600	230	110	7,000	170	60	5,700	140	70	3,200	70	35	8,300	330	120			
3	6,400	260	130	5,800	170	60	4,800	150	80	2,700	70	35	6,900	350	120			
3.5	5,500	270	135	5,000	180	60	4,100	150	80	2,300	75	35	5,900	350	120			
4	4,800	280	140	4,400	180	60	3,600	150	80	2,000	80	40	5,200	360	120			
4.5	4,200	290	145	3,900	200	65	3,200	170	90	1,800	80	40	4,600	360	120			
5	3,800	300	150	3,500	210	70	2,900	190	95	1,600	80	40	4,100	370	120			
5.5	3,500	310	155	3,200	220	70	2,600	200	100	1,400	80	40	3,800	370	120			
6	3,200	320	160	2,900	230	75	2,400	210	110	1,300	80	40	3,400	370	120			
7	2,700	300	150	2,500	220	70	2,000	200	100	1,100	80	40	3,000	360	120			
8	2,400	280	140	2,200	220	70	1,800	200	100	1,000	80	40	2,600	340	110			
9	2,100	270	135	1,900	210	65	1,600	190	95	900	80	40	2,300	330	100			
10	1,900	260	130	1,800	210	65	1,400	180	90	800	80	40	2,100	320	100			
12	1,600	260	130	1,500	210	65	1,200	170	85	700	80	40	1,700	290	95			
Profondità di taglio Depth of Cut																		
	(D) Dia.																	
Note	<p>※Usare lubrorefrigerante.                  ※Usare lubrorefrigerante con ritardanti di fumo.                  ※Raccomandiamo di usare lubrificazione minimale per la lavorazione di acciai temprati.                  ※Regolate nella stessa proporzione giri e avanzamento.                  ※Regolate le condizioni di fresatura in accordo con la profondità di taglio e la rigidità della macchina.                  ※Use cutting fluid.                  ※Use cutting fluid with smoke retardant.                  ※Recommend to use oil mist coolant for machining hardened steels.                  ※Adjust both spindle speed and feed at the same rate.                  ※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</p>																	

# Parametri di taglio raccomandati

# MX240

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciaio pretemprati Prehardened Steels 1.2311•1.2738		Rame Copper	
Velocità di taglio Cutting Speed	20~30m/min		15~25m/min		15~20m/min		20~40m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.3	26,500	50	21,200	40	18,600	30	31,800	100
0.4	19,900	60	15,900	45	13,900	40	23,900	100
0.5	15,900	65	12,700	45	11,100	40	19,100	100
1	8,000	80	6,400	50	5,600	45	9,500	110
1.5	5,300	80	4,200	50	3,700	45	6,400	130
2	4,000	80	3,200	60	2,800	50	4,800	140
2.5	3,200	100	2,500	60	2,200	55	3,800	150
3	2,700	110	2,100	60	1,900	60	3,200	160
3.5	2,300	120	1,800	60	1,600	60	2,700	170
4	2,000	120	1,600	65	1,400	60	2,400	170
4.5	1,800	130	1,400	70	1,200	65	2,100	170
5	1,600	130	1,300	80	1,100	70	1,900	170
5.5	1,400	130	1,200	90	1,000	80	1,700	180
6	1,300	130	1,100	90	900	80	1,600	180
7	1,100	120	900	90	800	80	1,400	170
8	1,000	120	800	80	700	75	1,200	160
9	900	110	700	80	650	75	1,100	155
10	800	110	600	70	600	75	1,000	150
12	700	110	500	70	500	75	800	140
Profondità di taglio Depth of Cut  (D) Dia. Dia.	Contornatura Side Milling 				Contornatura Side Milling 			
Note Notes	<ul style="list-style-type: none"> <li>※ Utilizzare lubrorefrigerante.</li> <li>※ Utilizzare lubrorefrigerante con ritardanti di fumo.</li> <li>※ Regolare nella stessa proporzione giri e avanzamento.</li> <li>※ Adatta solo per contornatura.</li> <li>※ Regolare le condizioni di fresatura in accordo con le profondità di taglio e la rigidità della macchina.</li> <li>※ Use cutting fluid.</li> <li>※ Use cutting fluid with smoke retardant.</li> <li>※ Adjust both spindle speed and feed at the same rate.</li> <li>※ Available only for side cutting.</li> <li>※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</li> </ul>							

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

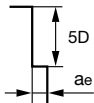
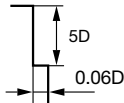
Dati tecnici  
Technical Data

Guida tecnica  
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# Parametri di taglio raccomandati

# MX245

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciaio pretemprati Prehardened Steels 1.2311•1.2738		Rame Copper		
Velocità di taglio Cutting Speed	15~25m/min		10~20m/min		10~15m/min		15~35m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	
0.3	21,200	40	15,900	30	13,300	25	26,500	80	
0.4	15,900	50	11,900	35	9,900	30	19,900	80	
0.5	12,700	50	9,500	35	8,000	30	15,900	80	
1	6,400	65	4,800	40	4,000	35	8,000	100	
1.5	4,200	65	3,200	40	2,700	35	5,300	110	
2	3,200	65	2,400	45	2,000	40	4,000	120	
2.5	2,500	75	1,900	45	1,600	40	3,200	130	
3	2,100	85	1,600	50	1,300	45	2,700	140	
4	1,600	95	1,200	50	1,000	45	2,000	140	
5	1,300	100	1,000	60	800	55	1,600	140	
6	1,100	110	800	65	700	60	1,300	140	
7	900	100	700	60	600	55	1,100	135	
8	800	95	600	60	500	55	1,000	130	
9	700	90	550	60	450	50	900	125	
10	600	85	500	60	400	50	800	120	
12	500	80	400	55	300	45	700	120	
Profondità di taglio Depth of Cut	Contornatura Side Milling  $a_e$ $\varnothing 0.3 \sim 0.8 = 0.02D$ $\varnothing 1 \sim 2.5 = 0.03D$ $\varnothing 3 \sim 12 = 0.06D$					Contornatura Side Milling  $0.06D$			
(D) Dia. Dia.									
Note Notes	※Utilizzare lubrorefrigerante. ※Utilizzare lubrorefrigerante con ritardanti di fumo. ※Regolare nella stessa proporzione giri e avanzamento. ※Adatta solo per contornatura. ※Regolare le condizioni di fresatura in accordo con le profondità di taglio e la rigidità della macchina. ※Use cutting fluid. ※Use cutting fluid with smoke retardant. ※Adjust both spindle speed and feed at the same rate. ※Available only for side cutting. ※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.								

CBN  
Nitrato Cubico di Boro

Diamante

Diamond

Piane  
Square

Scaricate  
Plane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper  
Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese  
Sagomate

Formed  
Cutter

Punte

Drill

Altro

Others

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**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
**Long Neck**  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
**Long Neck**  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
**Taper Ball**

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
**Long Neck**  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
**Formed**  
Cutter

**Non Rivestite**  
Non-Coating  
**Frese**  
Sagomate  
**Formed**  
Cutter

**Punte**  
Drill

**Altro**  
Others

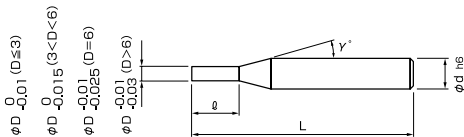
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MX425

MUGEN-COATING 4-Flute LEAD25 End Mill

## Frese 4 Tagli piane elica 25° rivestite MUGEN



- Il rapporto L/D = 1 e l'elica a 25° incrementa la rigidità, elimina le vibrazioni e minimizza le flessioni.
- L/D=1 and helix 25° type, increased the rigidity to suppress chattering and minimized milling deflection.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00075-00100	1	1	12°	4	45
08-00075-00150	1.5	1.5	12°	4	45
08-00075-00200	2	2	12°	4	45
08-00075-00250	2.5	2.5	12°	4	45
08-00075-00300	3	3	12°	6	45
08-00075-00350	3.5	3.5	12°	6	45
08-00075-00400	4	4	12°	6	45
08-00075-00450	4.5	4.5	12°	6	50
08-00075-00500	5	5	12°	6	50
08-00075-00550	5.5	5.5	12°	6	50
08-00075-00600	6	6	-	6	50
08-00075-00800	8	8	-	8	65
08-00075-01000	10	10	-	10	75
08-00075-01200	12	12	-	12	80

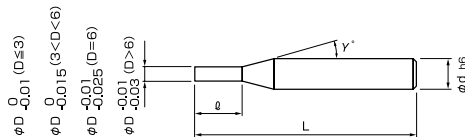
**Attenzione** Quando ordinate, indicate MX425(D).  
When you order, indicate MX425 (D).

- Per i parametri di taglio vedi pagina 121.
- Milling condition is recommended on page 121.

# MX430

MUGEN-COATING 4-Flute LEAD30 End Mill

## Frese 4 Tagli piane elica 30° rivestite MUGEN



- Il rapporto L/D = 2 e l'elica a 30° di tipo standard la rende adatta a tutte le lavorazioni di fresatura.
- L/D=2 and helix 30° standard type, applicable to any milling process.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00080-00100	1	2	12°	4	45
08-00080-00150	1.5	3	12°	4	45
08-00080-00200	2	4	12°	4	45
08-00080-00250	2.5	5	12°	4	45
08-00080-00300	3	6	12°	6	45
08-00080-00350	3.5	7	12°	6	45
08-00080-00400	4	8	12°	6	45
08-00080-00450	4.5	9	12°	6	50
08-00080-00500	5	10	12°	6	50
08-00080-00550	5.5	11	12°	6	50
08-00080-00600	6	12	-	6	50
08-00080-00800	8	16	-	8	65
08-00080-01000	10	20	-	10	75
08-00080-01200	12	24	-	12	80

**Attenzione** Quando ordinate, indicate MX430 (D).  
When you order, indicate MX430 (D).

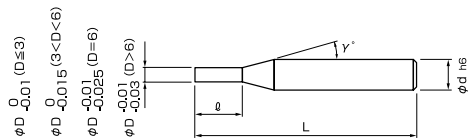
- Per i parametri di taglio vedi pagina 122.
- Milling condition is recommended on page 122.



# MX435

MUGEN-COATING 4-Flute LEAD35 End Mill

## Frese 4 Tagli plane elica 35° rivestite MUGEN



- Il rapporto L/D = 3 e l'elica a 35° assicurano una lunghezza del tagliente sufficiente per evitare difficoltà nella scelta della fresea.
- L/D=3 and helix 35° for appropriate length of cut to avoid the inconveniences in size selection.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00085-00100	1	3	12°	4	45
08-00085-00150	1.5	4.5	12°	4	45
08-00085-00200	2	6	12°	4	45
08-00085-00250	2.5	7.5	12°	4	45
08-00085-00300	3	9	12°	6	45
08-00085-00350	3.5	10.5	12°	6	45
08-00085-00400	4	12	12°	6	50
08-00085-00450	4.5	13.5	12°	6	50
08-00085-00500	5	15	12°	6	55
08-00085-00550	5.5	16.5	12°	6	60
08-00085-00600	6	18	-	6	60
08-00085-00800	8	24	-	8	65
08-00085-01000	10	30	-	10	75
08-00085-01200	12	36	-	12	80

### Attenzione

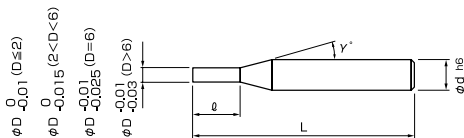
Quando ordinate, indicate MX435 (D).  
When you order, indicate MX435 (D).

- Per i parametri di taglio vedi pagina 123.
- Milling condition is recommended on page 123.

# MX440

MUGEN-COATING 4-Flute LEAD40 End Mill

## Frese 4 Tagli plane elica 40° rivestite MUGEN



- Il rapporto L/D = 4 e l'elica a 40° la rende adatta a lavorazioni profonde con minime flessioni.
- L/D=4 and helix 40° is suitable for deep machining with minimum deflection of cutting up-right surface.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00090-00100	1	4	12°	4	45
08-00090-00150	1.5	6	12°	4	45
08-00090-00200	2	8	12°	4	45
08-00090-00250	2.5	10	12°	4	45
08-00090-00300	3	12	12°	6	50
08-00090-00350	3.5	14	12°	6	50
08-00090-00400	4	16	12°	6	55
08-00090-00450	4.5	18	12°	6	55
08-00090-00500	5	20	12°	6	60
08-00090-00550	5.5	22	12°	6	65
08-00090-00600	6	24	-	6	65
08-00090-00800	8	32	-	8	90
08-00090-01000	10	40	-	10	100
08-00090-01200	12	48	-	12	105

### Attenzione

Quando ordinate, indicate MX440 (D).  
When you order, indicate MX440 (D).

- Per i parametri di taglio vedi pagina 124.
- Milling condition is recommended on page 124.

CBN

Nitruro Cubico di Boro

Diamante

Diamond

Piane Square

Scaricate Piane Long Neck Square

Sferiche Ball

Scaricate Sferiche Long Neck Ball

Coniche Taper

Coniche Sferiche Taper Ball

Toriche Corner R

Scaricate Toriche Long Neck Corner R

Frese Sagomate Formed Cutter

Punte Drill

Altro Others

Dati tecnici Technical Data

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**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

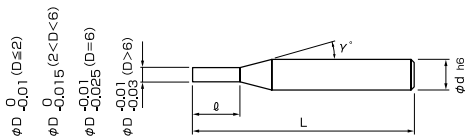
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MX445

MUGEN-COATING 4-Flute LEAD45 End Mill

## Frese 4 Tagli piane elica 45° rivestite MUGEN



- Il rapporto L/D = 5 e l'elica a 45° minimizzano le flessioni della fresa nonostante la lunghezza del tagliente.
- L/D=5 and helix 45° to minimize the milling deflection even though the long cutting length design.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Lungh. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00095-00100	1	5	12°	4	45
08-00095-00150	1.5	7.5	12°	4	45
08-00095-00200	2	10	12°	4	50
08-00095-00250	2.5	12.5	12°	4	50
08-00095-00300	3	15	12°	6	55
08-00095-00350	3.5	17.5	12°	6	60
08-00095-00400	4	20	12°	6	60
08-00095-00450	4.5	22.5	12°	6	65
08-00095-00500	5	25	12°	6	65
08-00095-00550	5.5	27.5	12°	6	75
08-00095-00600	6	30	—	6	75
08-00095-00800	8	40	—	8	90
08-00095-01000	10	50	—	10	100
08-00095-01200	12	60	—	12	105

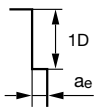
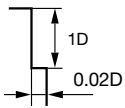
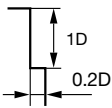
**Attenzione** Quando ordinate, indiate MX445 (D).  
When you order, indicate MX445 (D).

- Per i parametri di taglio vedi pagina 125.
- Milling condition is recommended on page 125.

# Parametri di taglio raccomandati

# MX425

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciai pretemprati Prehardened Steels 1.2311•1.2738		Acciai temprati Hardened Steels 1.2343 (~52HRC)		Rame Copper	
Velocità di taglio Cutting Speed	50~80m/min		50~70m/min		40~60m/min		20~40m/min		60~80m/min	
Dia. Dia.	Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	20,700	320	19,100	230	15,900	200	9,500	120	22,300	410
1.5	13,800	320	12,700	230	10,600	200	6,400	120	14,900	450
2	10,300	320	9,500	260	8,000	230	4,800	120	11,100	500
2.5	8,300	380	7,600	270	6,400	240	3,800	120	8,900	540
3	6,900	420	6,400	290	5,300	260	3,200	120	7,400	560
3.5	5,900	450	5,500	290	4,500	260	2,700	130	6,400	570
4	5,200	530	4,800	320	4,000	290	2,400	160	5,600	660
4.5	4,600	540	4,200	360	3,500	320	2,100	160	5,000	680
5	4,100	560	3,800	390	3,200	360	1,900	160	4,500	700
5.5	3,800	560	3,500	410	2,900	370	1,700	160	4,100	700
6	3,400	580	3,200	440	2,700	410	1,600	170	3,700	700
8	2,600	540	2,400	410	2,000	370	1,200	170	2,800	610
10	2,100	510	1,900	390	1,600	360	1,000	170	2,200	560
12	1,700	460	1,600	370	1,300	340	800	170	1,900	540
Profondità di taglio Depth of Cut	Contornatura Side Milling  $ae$ $\emptyset 1 \sim 2.5 = 0.1D$ $\emptyset 3 \sim 6 = 0.2D$ $\emptyset 8 \sim 12 = 0.25D$					Contornatura Side Milling  $0.02D$		Contornatura Side Milling  $0.2D$		
(D) Dia. Dia.										
Note Notes	※ Usare lubrorefrigerante con ritardanti di fumo. ※ Vi raccomandiamo di usare la lubrificazione minima per lavorare acciai temprati. ※ Adatta solo per la lavorazione di contornatura. ※ Regolare con la stessa proporzione giri e avanzamento. ※ Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina. ※ Use cutting fluid with smoke retardant. ※ Recommend to use oil mist coolant for machining hardened steels. ※ Available only for side cutting. ※ Adjust both spindle speed and feed at the same rate. ※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.									

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Scaricate Plane  
Long Neck Square

Sferiche Ball  
Scaricate Sferiche  
Long Neck Ball

Coniche Taper  
Coniche Sferiche  
Taper Ball

Toriche Corner R  
Scaricate Toriche  
Long Neck Corner R

Frese Sagomate Formed Cutter

Punte  
Drill

Altro  
Others

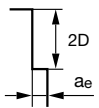
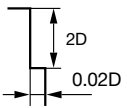
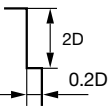
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# Parametri di taglio raccomandati

# MX430

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AIS1304		Acciai pretemprati Prehardened Steels 1.2311•1.2738		Acciai temprati Hardened Steels 1.2343 (~52HRC)		Rame Copper	
Velocità di taglio Cutting Speed	50~80m/min		50~70m/min		40~60m/min		20~40m/min		60~80m/min	
Dia. Dia.	Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
<b>1</b>	20,700	320	19,100	230	15,900	200	9,500	120	22,300	410
<b>1.5</b>	13,800	320	12,700	230	10,600	200	6,400	120	14,900	450
<b>2</b>	10,300	320	9,500	260	8,000	230	4,800	120	11,100	500
<b>2.5</b>	8,300	380	7,600	270	6,400	240	3,800	120	8,900	540
<b>3</b>	6,900	420	6,400	290	5,300	260	3,200	120	7,400	560
<b>3.5</b>	5,900	450	5,500	290	4,500	260	2,700	130	6,400	570
<b>4</b>	5,200	530	4,800	320	4,000	290	2,400	160	5,600	660
<b>4.5</b>	4,600	540	4,200	360	3,500	320	2,100	160	5,000	680
<b>5</b>	4,100	560	3,800	390	3,200	360	1,900	160	4,500	700
<b>5.5</b>	3,800	560	3,500	410	2,900	370	1,700	160	4,100	700
<b>6</b>	3,400	580	3,200	440	2,700	410	1,600	170	3,700	700
<b>8</b>	2,600	540	2,400	410	2,000	370	1,200	170	2,800	610
<b>10</b>	2,100	510	1,900	390	1,600	360	1,000	170	2,200	560
<b>12</b>	1,700	460	1,600	370	1,300	340	800	170	1,900	540
Profondità di taglio Depth of Cut	Contornatura Side Milling 				Contornatura Side Milling 		Contornatura Side Milling 			
Dia. Dia.	$ae$ $\varnothing 1 \sim 2.5 = 0.07D$ $\varnothing 3 \sim 6 = 0.15D$ $\varnothing 8 \sim 12 = 0.2D$									
Note Notes	<ul style="list-style-type: none"> <li>※Usare lubrificante con ritardanti di fumo.</li> <li>※Vi raccomandiamo di usare la lubrificazione minima per lavorare acciai temprati.</li> <li>※Adatta solo per la lavorazione di contornatura.</li> <li>※Regolare con la stessa proporzione giri e avanzamento.</li> <li>※Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.</li> <li>※Use cutting fluid with smoke retardant.</li> <li>※Recommend to use oil mist coolant for machining hardened steels.</li> <li>※Available only for side cutting.</li> <li>※Adjust both spindle speed and feed at the same rate.</li> <li>※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</li> </ul>									

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

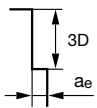
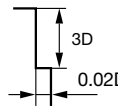
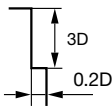
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# Parametri di taglio raccomandati

# MX435

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciai pretemprati Prehardened Steels 1.2311•1.2738		Acciai temprati Hardened Steels 1.2343 (~52HRC)		Rame Copper	
Velocità di taglio Cutting Speed	45~75m/min		45~65m/min		35~55m/min		15~35m/min		55~75m/min	
Dia. Dia.	Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	19,100	290	17,500	210	14,300	170	8,000	100	20,700	380
1.5	12,700	290	11,700	210	9,500	170	5,300	100	13,800	420
2	9,500	290	8,800	240	7,200	210	4,000	100	10,300	470
2.5	7,600	350	7,000	260	5,700	210	3,200	110	8,300	500
3	6,400	390	5,800	260	4,800	230	2,700	110	6,900	530
3.5	5,500	410	5,000	270	4,100	230	2,300	120	5,900	530
4	4,800	480	4,400	310	3,600	260	2,000	140	5,200	610
4.5	4,200	490	3,900	340	3,200	290	1,800	140	4,600	610
5	3,800	510	3,500	360	2,900	320	1,600	140	4,100	630
5.5	3,500	530	3,200	370	2,600	340	1,400	140	3,800	630
6	3,200	540	2,900	390	2,400	360	1,300	140	3,400	630
8	2,400	480	2,200	370	1,800	340	1,000	140	2,600	580
10	1,900	440	1,800	360	1,400	310	800	140	2,100	540
12	1,600	440	1,500	360	1,200	290	700	140	1,700	490
Profondità di taglio Depth of Cut	Contornatura Side Milling  $ae$ $\varnothing 1 \sim 2.5 = 0.05D$ $\varnothing 3 \sim 6 = 0.1D$ $\varnothing 8 \sim 12 = 0.15D$				Contornatura Side Milling  $0.02D$		Contornatura Side Milling  $0.2D$			
(D) Dia. Dia.										
Note Notes	※ Usare lubrorefrigerante con ritardanti di fumo. ※ Vi raccomandiamo di usare la lubrificazione minima per lavorare acciai temprati. ※ Adatta solo per la lavorazione di contornatura. ※ Regolare con la stessa proporzione giri e avanzamento. ※ Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina. ※ Use cutting fluid with smoke retardant. ※ Recommend to use oil mist coolant for machining hardened steels. ※ Available only for side cutting. ※ Adjust both spindle speed and feed at the same rate. ※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.									

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Scaricate Plane  
Long Neck Square

Sferiche Ball  
Scaricate Sferiche  
Long Neck Ball

Coniche Taper  
Coniche Sferiche  
Taper Ball

Toriche Corner R  
Scaricate Toriche  
Long Neck Corner R

Frese Sagomate Formed Cutter

Punte Drill

Altro Others

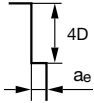
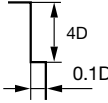
Dati tecnici Technical Data

Guida tecnica Technical Guidance

## Parametri di taglio raccomandati

# MX440

### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciai pretemprati Prehardened Steels 1.2311•1.2738		Rame Copper	
Velocità di taglio Cutting Speed	20~30m/min		15~25m/min		15~20m/min		20~40m/min	
Dia. Dia.	Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	8,000	120	6,400	80	5,600	70	9,500	170
1.5	5,300	120	4,200	80	3,700	70	6,400	200
2	4,000	120	3,200	90	2,800	75	4,800	210
2.5	3,200	150	2,500	90	2,200	85	3,800	230
3	2,700	170	2,100	90	1,900	90	3,200	240
3.5	2,300	180	1,800	90	1,600	90	2,700	260
4	2,000	200	1,600	110	1,400	100	2,400	290
4.5	1,800	220	1,400	120	1,200	110	2,100	290
5	1,600	220	1,300	140	1,100	120	1,900	290
5.5	1,400	220	1,200	150	1,000	140	1,700	310
6	1,300	220	1,100	150	900	140	1,600	310
8	1,000	200	800	140	700	130	1,200	270
10	800	190	600	120	600	130	1,000	260
12	700	190	500	120	500	130	800	240
Profondità di taglio Depth of Cut	Contornatura Side Milling  $\begin{aligned} ae \\ \varnothing 1\sim 2.5 = 0.04D \\ \varnothing 3\sim 6 = 0.08D \\ \varnothing 8\sim 12 = 0.1D \end{aligned}$						Contornatura Side Milling 	
(D) Dia. Dia.								
Note	※Usare lubrificante con ritardanti di fumo. ※Adatta solo per la lavorazione di contornatura. ※Regolare con la stessa proporzione giri e avanzamento. ※Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina. ※Use cutting fluid with smoke retardant. ※Available only for side cutting. ※Adjust both spindle speed and feed at the same rate. ※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.							

CBN

Nitruro Cubico di Boro

Diamante

Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

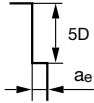
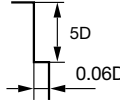
Guida tecnica

Technical Guidance

# Parametri di taglio raccomandati

# MX445

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738		Rame Copper		
Velocità di taglio Cutting Speed	15~25m/min		10~20m/min		10~15m/min		15~35m/min		
Dia. Dia.	Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling		
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	
1	6,400	100	4,800	60	4,000	55	8,000	150	
1.5	4,200	100	3,200	60	2,700	55	5,300	170	
2	3,200	100	2,400	70	2,000	60	4,000	190	
2.5	2,500	120	1,900	70	1,600	60	3,200	200	
3	2,100	130	1,600	75	1,300	70	2,700	210	
3.5	1,800	140	1,400	75	1,100	70	2,300	210	
4	1,600	160	1,200	90	1,000	80	2,000	240	
4.5	1,400	170	1,100	90	900	85	1,800	240	
5	1,300	170	1,000	100	800	90	1,600	240	
5.5	1,200	170	900	100	700	95	1,400	240	
6	1,100	190	800	110	700	100	1,300	240	
8	800	160	600	100	500	90	1,000	220	
10	600	150	500	100	400	85	800	200	
12	500	140	400	90	300	80	700	200	
Profondità di taglio Depth of Cut	Contornatura Side Milling  $ae$ $\varnothing 1 \sim 2.5 = 0.03D$ $\varnothing 3 \sim 6 = 0.06D$ $\varnothing 8 \sim 12 = 0.08D$					Contornatura Side Milling  $0.06D$			
(D) Dia. Dia.									
Note Notes	※Usare lubrificante con ritardanti di fumo. ※Adatta solo per contornatura. ※Regolare con la stessa proporzione giri e avanzamento. ※Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina. ※Use cutting fluid with smoke retardant. ※Available only for side cutting. ※Adjust both spindle speed and feed at the same rate. ※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.								

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Scaricate Plane  
Long Neck Square

Sferiche Ball  
Scaricate Sferiche  
Long Neck Ball

Coniche Taper  
Coniche Sferiche  
Taper Ball

Toriche Corner R  
Scaricate Toriche  
Long Neck Corner R

Frese Sagomate Formed Cutter

Punte Drill

Altro Others

Dati tecnici Technical Data

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**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

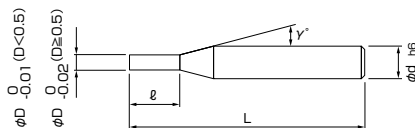
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MSE230SS

MUGEN-COATING 2-Flute Super Short End Mill

## Frese 2 Tagli piane extra-corta rivestite MUGEN



- Articolo semi-standard; prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00103-00010	0.1	0.1	9°	4	45
08-00103-00015	0.15	0.15	9°	4	45
08-00103-00020	0.2	0.2	9°	4	45
08-00103-00030	0.3	0.3	9°	4	45
08-00103-00040	0.4	0.4	9°	4	45
08-00103-00050	0.5	0.5	9°	4	45
08-00103-00060	0.6	0.6	9°	4	45
08-00103-00070	0.7	0.7	9°	4	45
08-00103-00080	0.8	0.8	9°	4	45
08-00103-00090	0.9	0.9	9°	4	45
08-00103-00100	1	1	9°	4	45
08-00103-00110	1.1	1.1	9°	4	45
08-00103-00120	1.2	1.2	9°	4	45
08-00103-00130	1.3	1.3	9°	4	45
08-00103-00140	1.4	1.4	9°	4	45
08-00103-00150	1.5	1.5	9°	4	45
08-00103-00160	1.6	1.6	9°	4	45
08-00103-00170	1.7	1.7	9°	4	45
08-00103-00180	1.8	1.8	9°	4	45
08-00103-00190	1.9	1.9	9°	4	45
08-00103-00200	2	2	9°	4	45
08-00103-00210	2.1	2.1	9°	4	45
08-00103-00220	2.2	2.2	9°	4	45
08-00103-00230	2.3	2.3	9°	4	45
08-00103-00240	2.4	2.4	9°	4	45
08-00103-00250	2.5	2.5	9°	4	45
08-00103-00260	2.6	2.6	9°	4	45
08-00103-00270	2.7	2.7	9°	4	45
08-00103-00280	2.8	2.8	9°	4	45
08-00103-00290	2.9	2.9	9°	6	50
08-00103-00300	3	3	9°	6	50

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00103-00310	3.1	3.1	9°	6	50
08-00103-00320	3.2	3.2	9°	6	50
08-00103-00330	3.3	3.3	9°	6	50
08-00103-00340	3.4	3.4	9°	6	50
08-00103-00350	3.5	3.5	9°	6	50
08-00103-00360	3.6	3.6	9°	6	50
08-00103-00370	3.7	3.7	9°	6	50
08-00103-00380	3.8	3.8	9°	6	50
08-00103-00390	3.9	3.9	9°	6	50
08-00103-00400	4	4	9°	6	50
08-00103-00410	4.1	4.1	9°	6	50
08-00103-00420	4.2	4.2	9°	6	50
08-00103-00430	4.3	4.3	9°	6	50
08-00103-00440	4.4	4.4	9°	6	50
08-00103-00450	4.5	4.5	9°	6	55
08-00103-00460	4.6	4.6	9°	6	55
08-00103-00470	4.7	4.7	9°	6	55
08-00103-00480	4.8	4.8	9°	6	55
08-00103-00490	4.9	4.9	9°	6	55
08-00103-00500	5	5	9°	6	55
08-00103-00510	5.1	5.1	9°	6	55
08-00103-00520	5.2	5.2	9°	6	55
08-00103-00530	5.3	5.3	9°	6	55
08-00103-00540	5.4	5.4	9°	6	55
08-00103-00550	5.5	5.5	9°	6	55
08-00103-00560	5.6	5.6	9°	6	55
08-00103-00570	5.7	5.7	9°	6	55
08-00103-00580	5.8	5.8	9°	6	55
08-00103-00590	5.9	5.9	9°	6	55
08-00103-00600	6	6	-	6	55

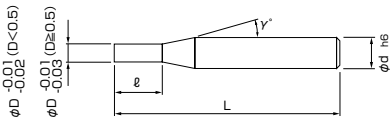
**Attenzione** Quando ordinate, indichiate MSE230SS(D).  
When you order, indicate MSE230SS (D).



# MSES230P

MUGEN-COATING 2-Flute Sharp Edge Short End Mill

## Frese 2 Tagli piane a spigolo vivo rivestite MUGEN



- Particolarmente adatta per lavorazioni ad alte velocità, grazie al tagliente corto e rigido.
- Il profilo affilato del tagliente garantisce un'elevata capacità di taglio.
- It is very suitable for high speed cutting due to the length of cut is short and rigid.
- Sharp edge profile guarantees high shearing ability.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(L) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
08-00102-00010	0.1	0.15	9°	4	45
08-00102-00015	0.15	0.2	9°	4	45
08-00102-00020	0.2	0.3	9°	4	45
08-00102-00025	0.25	0.3	9°	4	45
08-00102-00030	0.3	0.4	9°	4	45
08-00102-00035	0.35	0.4	9°	4	45
08-00102-00040	0.4	0.6	9°	4	45
08-00102-00045	0.45	0.6	9°	4	45
08-00102-00050	0.5	0.7	9°	4	45
08-00102-00060	0.6	1	9°	4	45
08-00102-00070	0.7	1.2	9°	4	45
08-00102-00080	0.8	1.5	9°	4	45
08-00102-00100	1	2	9°	4	45
08-00102-00120	1.2	2.5	9°	4	45
08-00102-00150	1.5	3	9°	4	45
08-00102-00160	1.6	3	9°	4	45
08-00102-00180	1.8	3.5	9°	4	45
08-00102-00200	2	4	9°	4	45
08-00102-00250	2.5	5	9°	4	45
08-00102-00300	3	6	9°	4	50
08-00102-00400	4	8	-	4	50
08-00102-00500	5	10	9°	6	55
08-00102-00600	6	12	-	6	55
08-00102-00800	8	16	-	8	65
08-00102-01000	10	20	-	10	75
08-00102-01200	12	24	-	12	80

### Attenzione

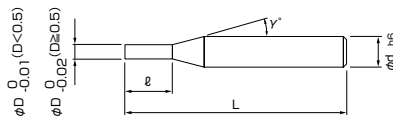
Quando ordinate, indicate MSES230P (D).  
When you order, indicate MSES230P (D).

- Per i parametri di taglio vedi pagina 130.
- Milling condition is recommended on page 130.

# MSE230

MUGEN-COATING 2-Flute End Mill

## Frese 2 Tagli piane rivestite MUGEN



- Le due eliche sono state rivestite con il nostro rivestimento originale MUGEN.
- Copre tutti i tipi di lavorazione dalla sgrossatura alla finitura.
- Our original MUGEN-COATING has been put on 2-flute end mill.
- It covers all-round cutting from roughing to finishing.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(L) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
08-00100-00010	0.1	0.15	9°	4	45
08-00100-00015	0.15	0.2	9°	4	45
08-00100-00020	0.2	0.4	9°	4	45
08-00100-00025	0.25	0.5	9°	4	45
08-00100-00030	0.3	0.6	9°	4	45
08-00100-00035	0.35	0.7	9°	4	45
08-00100-00040	0.4	0.8	9°	4	45
08-00100-00045	0.45	0.9	9°	4	45
08-00100-00050	0.5	1.25	9°	4	45
08-00100-00055	0.55	1.3	9°	4	45
08-00100-00060	0.6	1.5	9°	4	45
08-00100-00065	0.65	1.5	9°	4	45
08-00100-00070	0.7	1.8	9°	4	45
08-00100-00075	0.75	1.8	9°	4	45
08-00100-00080	0.8	2	9°	4	45
08-00100-00085	0.85	2	9°	4	45
08-00100-00090	0.9	2	9°	4	45
08-00100-00095	0.95	2	9°	4	45
08-00100-00100	1	2.5	9°	4	45
08-00100-00105	1.05	2.5	9°	4	45
08-00100-00110	1.1	2.5	9°	4	45
08-00100-00115	1.15	2.5	9°	4	45
08-00100-00120	1.2	3	9°	4	45
08-00100-00125	1.25	3	9°	4	45
08-00100-00130	1.3	3	9°	4	45
08-00100-00135	1.35	3	9°	4	45

### Attenzione

Quando ordinate, indicate MSE230 (D).  
When you order, indicate MSE230 (D).

- Per i parametri di taglio vedi pagina 130.
- Milling condition is recommended on page 130.
- \* Articolo semi-standard; siete pregati di richiedere prezzo e consegna
- Semi-standard item, please inquire for price and delivery.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane Square  
Scaricate Plane  
Long Neck Square

Sferiche Ball  
Scaricate Sferiche  
Long Neck Ball

Coniche Taper  
Coniche Sferiche  
Taper Ball

Toriche Corner R  
Scaricate Toriche  
Long Neck Corner R

Frese Sagomate Formed Cutter

Punte Drill

Altro Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**

Nitruro Cubico di Boro

**Diamante**

Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

Altro

Others

**Dati tecnici**

Technical Data

**Guida tecnica**

Technical Guidance

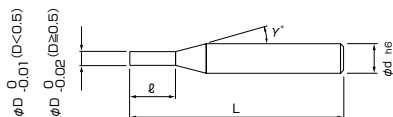
Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00100-00140	1.4	3.5	9°	4	45
08-00100-00145	1.45	3.5	9°	4	45
08-00100-00150	1.5	4	9°	4	45
08-00100-00155	1.55	4	9°	4	45
08-00100-00160	1.6	4	9°	4	45
08-00100-00165	1.65	4	9°	4	45
08-00100-00170	1.7	4.5	9°	4	45
08-00100-00175	1.75	4.5	9°	4	45
08-00100-00180	1.8	4.5	9°	4	45
08-00100-00185	1.85	4.5	9°	4	45
08-00100-00190	1.9	5	9°	4	45
08-00100-00195	1.95	5	9°	4	45
08-00100-00200	2	5	9°	4	45
08-00100-00205	2.05	5	9°	4	45
08-00100-00210	2.1	5.5	9°	4	45
08-00100-00215	2.15	5.5	9°	4	45
08-00100-00220	2.2	5.5	9°	4	45
08-00100-00225	2.25	5.5	9°	4	45
08-00100-00230	2.3	6	9°	4	45
08-00100-00235	2.35	6	9°	4	45
08-00100-00240	2.4	6	9°	4	45
08-00100-00245	2.45	6	9°	4	45
08-00100-00250	2.5	7	9°	4	45
08-00100-00255	2.55	7	9°	4	45
08-00100-00260	2.6	7	9°	4	45
08-00100-00265	2.65	7	9°	4	45
08-00100-00270	2.7	7	9°	4	45
08-00100-00275	2.75	7	9°	4	45
08-00100-00280	2.8	7	9°	4	45
08-00100-00285	2.85	8	9°	4	50
08-00100-00290	2.9	8	9°	6	50
08-00100-00295	2.95	8	9°	4	50
08-00100-00300	3	8	9°	6	50
08-00100-00310	3.1	8	9°	6	50
08-00100-00320	3.2	8	9°	6	50
08-00100-00330	3.3	9	9°	6	50
08-00100-00340	3.4	9	9°	6	50
08-00100-00350	3.5	9	9°	6	50

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00100-00360	3.6	9	9°	6	50
08-00100-00370	3.7	10	9°	6	50
08-00100-00380	3.8	10	9°	6	50
08-00100-00390	3.9	10	9°	6	50
08-00100-00400	4	10	9°	6	50
08-00100-00410	4.1	11	9°	6	50
08-00100-00420	4.2	11	9°	6	50
08-00100-00430	4.3	11	9°	6	50
08-00100-00440	4.4	11	9°	6	50
08-00100-00450	4.5	12	9°	6	55
08-00100-00460	4.6	12	9°	6	55
08-00100-00470	4.7	12	9°	6	55
08-00100-00480	4.8	12	9°	6	55
08-00100-00490	4.9	13	9°	6	55
08-00100-00500	5	13	9°	6	55
08-00100-00510	5.1	13	9°	6	55
08-00100-00520	5.2	13	9°	6	55
08-00100-00530	5.3	14	9°	6	55
08-00100-00540	5.4	14	9°	6	55
08-00100-00550	5.5	14	9°	6	55
08-00100-00560	5.6	14	9°	6	55
08-00100-00570	5.7	15	9°	6	55
08-00100-00580	5.8	15	9°	6	55
08-00100-00590	5.9	15	9°	6	55
08-00100-00600	6	15	-	6	55
08-00100-00650	6.5	17	9°	8	60
08-00100-00700	7	18	9°	8	65
08-00100-00750	7.5	19	9°	8	65
08-00100-00800	8	20	-	8	65
08-00100-00850	8.5	22	9°	10	70
08-00100-00900	9	23	9°	10	70
08-00100-00950	9.5	24	9°	10	75
08-00100-01000	10	25	-	10	75
08-00100-01050	10.5	27	9°	12	80
08-00100-01100	11	28	9°	12	80
08-00100-01150	11.5	29	9°	12	80
08-00100-01200	12	30	-	12	80

# MSE230M

MUGEN-COATING 2-Flute End Mill with measured diameter

## Frese 2 Tagli piane con misura del diametro reale rivestite MUGEN



- Stampa misura reale del diametro in micron.
- Printed actual measurement of diameter in micron.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lung. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
08-00105-00010	0.1	0.15	9°	4	45
08-00105-00020	0.2	0.4	9°	4	45
08-00105-00030	0.3	0.6	9°	4	45
08-00105-00040	0.4	0.8	9°	4	45
08-00105-00050	0.5	1.25	9°	4	45
08-00105-00080	0.8	2	9°	4	45
08-00105-00100	1	2.5	9°	4	45
08-00105-00150	1.5	4	9°	4	45
08-00105-00200	2	5	9°	4	45
08-00105-00250	2.5	7	9°	4	45
08-00105-00300	3	8	9°	6	50
08-00105-00400	4	10	9°	6	50
08-00105-00500	5	13	9°	6	55
08-00105-00600	6	15	-	6	55

**Attenzione** Quando ordinate, indicate MSE230M (D).  
When you order, indicate MSE230M (D).

- Per i parametri di taglio vedi pagina 130.
- Milling condition is recommended on page 130.

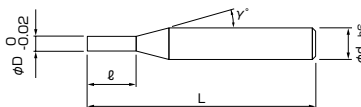
※(Re) La stampa della misura del diametro indicata sulla fresa corrisponde alla reale misura rilevata, ma la fresa deve essere ordinata con il suo codice descrittivo indicato in tabella.

※(Re) Only to show the measurement, not to order the specification.

# MSEM230

MUGEN-COATING 2-Flute Medium End Mill

## Frese 2 Tagli piane medie rivestite MUGEN



- Il rapporto L/D = 4 e l'elica a 30°.
- L/D=4 and helix 30°.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lung. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
08-00101-00050	0.5	2	9°	4	50
08-00101-00060	0.6	2.4	9°	4	50
08-00101-00080	0.8	3.2	9°	4	50
08-00101-00100	1	4	9°	4	50
08-00101-00150	1.5	6	9°	4	50
08-00101-00200	2	8	9°	4	50
08-00101-00250	2.5	10	9°	4	50
08-00101-00300	3	12	9°	6	55
08-00101-00400	4	16	9°	6	60
08-00101-00500	5	20	9°	6	65
08-00101-00600	6	24	-	6	75
08-00101-00800	8	32	-	8	90
08-00101-01000	10	40	-	10	100
08-00101-01200	12	48	-	12	110

**Attenzione** Quando ordinate, indicate MSEM230(D).  
When you order, indicate MSEM230 (D).

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Piane Square  
Scaricate Plane  
Long Neck Square

Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Sferiche Ball  
Scaricate Sferiche  
Long Neck Ball

Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Coniche Taper  
Coniche Sferiche  
Taper Ball

Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Toriche Corner R  
Scaricate Toriche  
Long Neck Corner R

Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Frese Sagomate Formed Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# Parametri di taglio raccomandati

MSE230P • MSE230 • MSE230M

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3 • AISI304			Acciai pretemprati Prehardened Steels 1.2311 • 1.2738		
Velocità di taglio Cutting Speed	50~80m/min			50~70m/min			40~60m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
		mm/min			mm/min			mm/min	
	min <sup>-1</sup>	Contornatura Side Milling	Cave Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cave Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cave Slotting
0.1	50,000	–	25	50,000	–	15	50,000	–	20
0.2	50,000	–	40	50,000	–	25	50,000	–	30
0.3	50,000	100	50	50,000	90	35	50,000	85	40
0.4	50,000	150	75	47,700	130	50	39,800	110	55
0.5	41,400	170	85	38,200	130	50	31,800	110	55
0.8	25,900	210	100	23,900	150	55	19,900	130	65
1	20,700	210	100	19,100	150	55	15,900	130	65
1.5	13,800	210	100	12,700	150	55	10,600	130	65
2	10,300	210	100	9,500	170	60	8,000	150	75
2.5	8,300	250	120	7,600	180	65	6,400	160	80
3	6,900	280	140	6,400	190	70	5,300	170	85
3.5	5,900	300	150	5,500	190	70	4,500	170	85
4	5,200	310	160	4,800	190	70	4,000	170	85
5	4,100	330	160	3,800	230	75	3,200	210	110
6	3,400	340	170	3,200	260	85	2,700	240	120
7	3,000	330	170	2,700	240	80	2,300	230	120
8	2,600	310	160	2,400	240	80	2,000	220	110
9	2,300	300	150	2,100	230	80	1,800	220	110
10	2,100	290	150	1,900	230	75	1,600	210	100
11	1,900	290	140	1,700	220	75	1,400	200	100
12	1,700	270	140	1,600	220	75	1,300	200	100
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> <p>1.5D ae</p> <p>ae Ø0.3~0.9 = 0.05D Ø1~2.5 = 0.07D Ø2.6~6 = 0.1D Ø6.5~12 = 0.15D</p> </div> <div style="text-align: center;"> <p>Contornatura Slotting</p> <p>D ap</p> <p>ap Ø0.1~0.4 = 0.05D Ø0.5~1.2 = 0.1D Ø1.5~3.5 = 0.35D Ø4~12 = 0.5D</p> </div> </div>								
(D) Dia. Dia.									
Note	<ul style="list-style-type: none"> <li>※Usare lubrorefrigerante con ritardanti di fumo.</li> <li>※Regolate con la stessa proporzione giri e avanzamento.</li> <li>※Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.</li> <li>※Use cutting fluid with smoke retardant.</li> <li>※Adjust both spindle speed and feed at the same rate.</li> <li>※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</li> </ul>								

# Parametri di taglio raccomandati

MSE230P • MSE230 • MSE230M

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane Square  
Rivestite Coating  
Non Rivestite Non-Coating

Sferiche Ball  
Rivestite Coating  
Non Rivestite Non-Coating

Coniche Taper  
Rivestite Coating  
Non Rivestite Non-Coating

Toriche Corner R  
Rivestite Coating  
Non Rivestite Non-Coating

Frese Sagomate Formed Cutter  
Rivestite Coating  
Non Rivestite Non-Coating

Punte Drill

Altro Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Recommended Milling Conditions

Materiale Work Material	Acciai temprati Hardened Steels 1.2343 (~52HRC)			Alluminio Aluminum			Rame Copper		
Velocità di taglio Cutting Speed	20~40m/min			100~200m/min			60~80m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Contornatura Side Milling	Cave Slotting		Contornatura Side Milling	Cave Slotting		Contornatura Side Milling	Cave Slotting
0.1	50,000	-	15	50,000	60	25	50,000	60	25
0.2	47,700	-	20	50,000	90	35	50,000	90	35
0.3	31,800	-	20	50,000	150	60	50,000	150	60
0.4	23,900	50	25	50,000	200	80	50,000	200	80
0.5	19,100	60	30	50,000	250	100	44,600	220	90
0.8	11,900	70	35	50,000	450	180	27,900	250	95
1	9,500	75	40	47,700	570	200	22,300	270	95
1.5	6,400	75	40	31,800	640	220	14,900	300	100
2	4,800	75	40	23,900	720	250	11,100	330	120
2.5	3,800	75	40	19,100	760	270	8,900	360	120
3	3,200	80	40	15,900	800	270	7,400	370	130
3.5	2,700	85	45	13,600	820	270	6,400	380	130
4	2,400	95	50	11,900	830	270	5,600	390	130
5	1,900	95	50	9,500	860	280	4,500	410	130
6	1,600	100	50	8,000	880	290	3,700	410	130
7	1,400	100	50	6,800	820	270	3,200	380	130
8	1,200	100	50	6,000	780	260	2,800	360	120
9	1,100	100	50	5,300	740	240	2,500	350	120
10	1,000	100	50	4,800	720	240	2,200	330	110
11	900	100	50	4,300	690	230	2,000	320	110
12	800	100	50	4,000	680	220	1,900	320	110
Profondità di taglio Depth of Cut  (D) Dia. Dia.	<p>Contornatura Side Milling    Cave Slotting</p> <p><math>ap</math>  <math>\varnothing 0.1 \sim 0.4 = 0.05D</math>  <math>\varnothing 0.5 \sim 12 = 0.1D</math></p>			<p>Contornatura Side Milling    Cave Slotting</p> <p><math>ap</math>  <math>\varnothing 0.1 \sim 0.4 = 0.05D</math>  <math>\varnothing 0.5 \sim 1.2 = 0.3D</math>  <math>\varnothing 1.5 \sim 12 = 0.5D</math></p>					
Note	<p>※ Usare lubrorefrigerante con ritardanti di fumo.                  ※ Vi raccomandiamo di usare la lubrificazione minima per la lavorazione di acciai temprati.                  ※ Regolate con la stessa proporzione giri e avanzamento.                  ※ Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.                  ※ Use cutting fluid with smoke retardant.                  ※ Recommend to use oil mist coolant for machining hardened steels.                  ※ Adjust both spindle speed and feed at the same rate.                  ※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</p>								

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

Technical Data

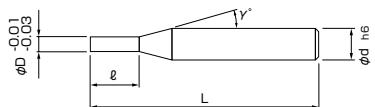
**Guida tecnica**

Technical Guidance

# MSE430P

MUGEN-COATING 4-Flute Sharp Edge End Mill

## Frese 4 Tagli piane a spigolo vivo rivestite MUGEN



- Grazie ai taglienti affilati è adatta ad un'ampia gamma di materiali: dai non ferrosi agli acciai.
- Finiture precise con minima flessione della fresa.
- It can be cut from nonferrous to steels due to the sharp edges.
- Minimize tool deflection for accurate finishing.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
08-00112-00100	1	2.5	9°	4	45
08-00112-00150	1.5	4	9°	4	45
08-00112-00200	2	5	9°	4	45
08-00112-00250	2.5	7	9°	4	45
08-00112-00300	3	8	9°	4	50
08-00112-00400	4	10	–	4	50
08-00112-00500	5	13	9°	6	55
08-00112-00600	6	15	–	6	55
08-00112-00800	8	20	–	8	65
08-00112-01000	10	25	–	10	75
08-00112-01200	12	30	–	12	80

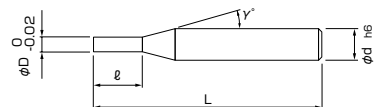
**Attenzione** Quando ordinate, indicate MSE430P (D).  
When you order, indicate MSE430P (D).

- Per i parametri di taglio vedi pagina 134.
- Milling condition is recommended on page 134.

# MSE430

MUGEN-COATING 4-Flute End Mill

## Frese 4 Tagli piane rivestite MUGEN



- Il nostro originale rivestimento MUGEN è stato applicato alle frese a 4 Tagli.
- Si possono eseguire lavorazioni con materiali temprati e non temprati.
- Our original MUGEN-COATING has been put on 4-flute end mill.
- It can be cut from non-hardened materials to hardened materials.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
08-00110-00100	1	2.5	9°	4	45
08-00110-00150	1.5	4	9°	4	45
08-00110-00200	2	5	9°	4	45
08-00110-00250	2.5	7	9°	4	45
08-00110-00300	3	8	9°	6	50
08-00110-00350	3.5	9	9°	6	50
08-00110-00400	4	10	9°	6	50
08-00110-00450	4.5	12	9°	6	55
08-00110-00500	5	13	9°	6	55
08-00110-00550	5.5	14	9°	6	55
08-00110-00600	6	15	–	6	55
08-00110-00650	6.5	17	9°	8	60
08-00110-00700	7	18	9°	8	65
08-00110-00750	7.5	19	9°	8	65
08-00110-00800	8	20	–	8	65
08-00110-00850	8.5	22	9°	10	70
08-00110-00900	9	23	9°	10	70
08-00110-00950	9.5	24	9°	10	75
08-00110-01000	10	25	–	10	75
08-00110-01200	12	30	–	12	80
08-00110-01400	14	35	–	12	100
08-00110-01500	15	40	9°	16	110
08-00110-01600	16	40	–	16	110
08-00110-01800	18	45	–	16	120
08-00110-02000	20	50	–	20	135

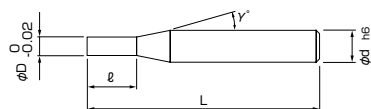
**Attenzione** Quando ordinate, indicate MSE430 (D).  
When you order, indicate MSE430 (D).

- Per i parametri di taglio vedi pagina 134.
- Milling condition is recommended on page 134.

# MSEM430

MUGEN-COATING 4-Flute Medium End Mill

## Frese 4 Tagli piane medie rivestite MUGEN



- Il rapporto L/D = 4 e l'elica a 30°.
- Particolarmente adatta per la finitura di contornatura.
- L/D=4 and helix 30°.
- It is very suitable for finishing side milling.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00111-00100	1	4	9°	4	50
08-00111-00150	1.5	6	9°	4	50
08-00111-00200	2	8	9°	4	50
08-00111-00250	2.5	10	9°	4	50
08-00111-00300	3	12	9°	6	55
08-00111-00400	4	16	9°	6	60
08-00111-00500	5	20	9°	6	65
08-00111-00600	6	24	–	6	75
08-00111-00800	8	32	–	8	90
08-00111-01000	10	40	–	10	100
08-00111-01200	12	48	–	12	110
08-00111-01600	16	64	–	16	130
08-00111-02000	20	80	–	20	140

### Attenzione

Quando ordinate, indicate MSEM430(D).  
When you order, indicate MSEM430 (D).

CBN

Nitrato Cubico  
di Boro

Diamante

Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Non Rivestite  
Non-Coating

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Non Rivestite  
Non-Coating

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Non Rivestite  
Non-Coating

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Non Rivestite  
Non-Coating

Frese  
Sagomate  
Formed  
Cutter

Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

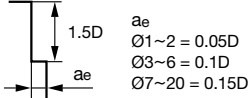
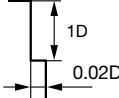
Guida tecnica

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# Parametri di taglio raccomandati

# MSE430P • MSE430

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3 • AISI304		Acciai pretemprati Prehardened Steels 1.2311 • 1.2738		Acciai temprati Hardened Steels 1.2343 (~52HRC)	
Velocità di taglio Cutting Speed	60~100m/min		50~70m/min		35~60m/min		20~40m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	20,700	330	19,100	210	14,300	150	9,600	160
2	10,300	330	9,600	270	7,200	160	4,800	180
3	6,900	440	6,400	320	4,800	180	3,200	210
4	5,200	500	4,800	380	3,600	180	2,400	230
5	4,100	520	3,800	380	2,900	200	1,900	250
6	3,400	540	3,200	380	2,400	200	1,600	250
7	3,000	530	2,700	380	2,000	200	1,400	250
8	2,700	520	2,400	380	1,800	200	1,200	250
9	2,300	480	2,100	380	1,600	200	1,100	250
10	2,100	470	1,900	380	1,400	200	1,000	250
12	1,700	440	1,600	380	1,200	200	800	250
14	1,500	430	1,400	360	1,000	190	700	230
15	1,400	430	1,300	350	1,000	180	600	210
16	1,300	420	1,200	330	900	160	600	200
18	1,150	400	1,100	330	800	160	500	200
20	1,050	400	1,000	330	700	160	500	200
Profondità di taglio Depth of Cut	Contornatura Side Milling 						Contornatura Side Milling 	
(D) Dia Dia.								
Note Notes	※ Usare lubrificante con ritardanti di fumo. ※ Vi raccomandiamo di usare la lubrificazione minima per la lavorazione di acciai temprati. ※ Adatto solo per la lavorazione di contornatura. ※ Regolate con la stessa proporzione giri e avanzamento. ※ Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina. ※ Use cutting fluid with smoke retardant. ※ Recommend to use oil mist coolant for machining hardened steels. ※ Available only for side cutting. ※ Adjust both spindle speed and feed at the same rate. ※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.							

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

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Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3 • AISI304		Acciai pretemprati Prehardened Steels 1.2311 • 1.2738		Acciai temprati Hardened Steels 1.2343 (~52HRC)		
Velocità di taglio Cutting Speed	250m/min		200m/min		160m/min		80m/min		
Dia Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	
6	13,300	2,600	10,600	2,000	8,500	1,600	4,200	500	
8	10,000	2,600	8,000	2,000	6,400	1,600	3,200	500	
10	8,000	2,600	6,400	2,000	5,100	1,600	2,500	500	
12	6,600	2,600	5,300	2,000	4,200	1,600	2,100	500	
16	5,000	2,000	4,000	1,500	3,200	1,200	1,600	380	
20	4,000	2,000	3,200	1,500	2,500	1,200	1,300	380	
Profondità di taglio Depth of Cut  (D) Dia Dia.	Contornatura Side Milling Ø6~9.5                      Ø10~20						Contornatura Side Milling		
Note Notes	※Usare lubrificante con ritardanti di fumo. ※Vi raccomandiamo di usare la lubrificazione minima per la lavorazione di acciai temprati. ※Adatta solo per la lavorazione di contornatura. ※Regolate con la stessa proporzione giri e avanzamento. ※Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina. ※Use cutting fluid with smoke retardant. ※Recommend to use oil mist coolant for machining hardened steels. ※Available only for side cutting. ※Adjust both spindle speed and feed at the same rate. ※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.								

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Rivestite Coating  
Non Rivestite Non-Coating

Sferiche Ball  
Rivestite Coating  
Non Rivestite Non-Coating

Coniche Taper  
Rivestite Coating  
Non Rivestite Non-Coating

Toriche Corner R  
Rivestite Coating  
Non Rivestite Non-Coating

Frese Sagomate Formed Cutter  
Rivestite Coating  
Non Rivestite Non-Coating

Punte Drill  
Rivestite Coating  
Non Rivestite Non-Coating

Altro Others

Dati tecnici Technical Data

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**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

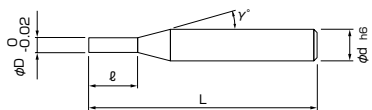
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MSE245

MUGEN-COATING 2-Flute End Mill

## Frese 2 Tagli piane rivestite MUGEN



- Il nostro originale rivestimento MUGEN è stato applicato alle frese 2 Tagli.
- Rispetto alle normali frese con elica a 30°, queste frese hanno una ridotta forza radiale.
- Our original MUGEN-COATING has been put on 2-flute end mill.
- Compared with 30°helix angle, it can be reduced cutting resistance.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. Tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00120-00200	2	5	9°	4	45
08-00120-00250	2.5	7	9°	4	45
08-00120-00300	3	8	9°	6	50
08-00120-00400	4	10	9°	6	50
08-00120-00500	5	13	9°	6	55
08-00120-00600	6	15	–	6	55
08-00120-00800	8	20	–	8	65
08-00120-01000	10	25	–	10	75
08-00120-01200	12	30	–	12	80

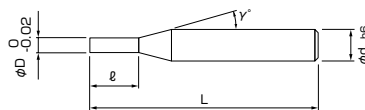
**Attenzione** Quando ordinate, indicate MSE245 (D).  
When you order, indicate MSE245 (D).

- Per i parametri di taglio vedi pagina 138.
- Milling condition is recommended on page 138.

# MSE345

MUGEN-COATING 3-Flute End Mill

## Frese 3 Tagli piane rivestite MUGEN



- Il nostro originale rivestimento MUGEN è stato applicato alle frese 3 Tagli.
- Rispetto alle normali frese con elica a 30°, queste frese hanno una ridotta forza radiale.
- Our original MUGEN-COATING has been put on 3-flute end mill.
- Compared with 30°helix angle, it can be reduced cutting resistance.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. Tagliante Length of Cut	(γ) Angolo Neck Taper Angle	d) Dia. attacco Shank Dia.	(L) Lungh. totale Overall Length
08-00130-00300	3	8	9°	6	50
08-00130-00400	4	10	9°	6	50
08-00130-00500	5	13	9°	6	55
08-00130-00600	6	15	–	6	55
08-00130-00800	8	20	–	8	65
08-00130-01000	10	25	–	10	75
08-00130-01200	12	30	–	12	80
08-00130-01600	16	40	–	16	110
08-00130-02000	20	50	–	20	135

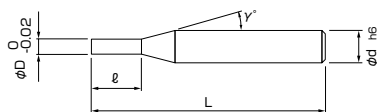
**Attenzione** Quando ordinate, indicate MSE345(D).  
When you order, indicate MSE345 (D).

- Per i parametri di taglio vedi pagina 140.
- Milling condition is recommended on page 140.

# MSE445

MUGEN-COATING 4-Flute End Mill

## Frese 4 Tagli piane rivestite MUGEN



- Il nostro originale rivestimento MUGEN è stato applicato alle frese 4 Tagli.
- Rispetto alle normali frese con elica a 30°, queste frese hanno una ridotta forza radiale.
- Our original MUGEN-COATING has been put on 4-flute end mill.
- Compared with 30°helix angle, it can be reduced cutting resistance.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. Tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00140-00200	2	5	9°	4	45
08-00140-00250	2.5	7	9°	4	45
08-00140-00300	3	8	9°	6	50
08-00140-00400	4	10	9°	6	50
08-00140-00500	5	13	9°	6	55
08-00140-00600	6	15	-	6	55
08-00140-00800	8	20	-	8	65
08-00140-01000	10	25	-	10	75
08-00140-01200	12	30	-	12	80
08-00140-01600	16	40	-	16	110
08-00140-02000	20	50	-	20	135

### Attenzione

Quando ordinate, indicate MSE445 (D).  
When you order, indicate MSE445 (D).

- Per i parametri di taglio vedi pagina 142.
- Milling condition is recommended on page 142.

CBN

Nitruro Cubico di Boro

Diamante

Diamond

Piane Square

Scaricate Piane

Long Neck Square

Sferiche Ball

Scaricate Sferiche

Long Neck Ball

Coniche Taper

Coniche Sferiche

Taper Ball

Toriche Corner R

Scaricate Toriche

Long Neck Corner R

Frese Sagomate

Formed Cutter

Punte

Drill

Altro

Others

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# Parametri di taglio raccomandati

# MSE245

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3 • AISI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738		
Velocità di taglio Cutting Speed	60~100m/min			50~70m/min			40~60m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting
2	12,700	330	160	9,600	250	80	8,000	130	65
2.5	10,200	400	200	7,600	250	80	6,400	130	65
3	8,500	440	220	6,400	300	100	5,300	170	85
4	6,400	500	250	4,800	300	100	4,000	170	85
5	5,100	530	260	3,800	360	120	3,200	220	110
6	4,200	550	270	3,200	360	120	2,700	220	110
8	3,200	500	250	2,400	360	120	2,000	220	110
10	2,500	460	230	1,900	360	120	1,600	220	110
12	2,100	440	220	1,600	360	120	1,300	220	110
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> <p><math>1.5D</math></p> <p><math>a_e</math></p> <p><math>\varnothing 2 \sim 2.5 = 0.1D</math> <math>\varnothing 3 \sim 6 = 0.15D</math> <math>\varnothing 8 \sim 12 = 0.2D</math></p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> <p><math>D</math></p> <p><math>a_p</math></p> <p><math>a_p</math></p> <p><math>a_p</math> <math>\varnothing 2 \sim 3 = 0.35D</math> <math>\varnothing 4 \sim 12 = 0.5D</math></p> </div> </div>								
(D) Dia. Dia.									
Note Notes	<ul style="list-style-type: none"> <li>※Usare lubrorefrigerante con ritardanti di fumo.</li> <li>※Regolate con la stessa proporzione giri e avanzamento.</li> <li>※Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.</li> <li>※Use cutting fluid with smoke retardant.</li> <li>※Adjust both spindle speed and feed at the same rate.</li> <li>※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</li> </ul>								

CBN  
Nitruro Cubico di Boro

Diamante

Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte

Drill

Altro

Others

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Materiale Work Material	Acciai temprati Hardened Steels 1.2343 (~52HRC)			Leghe resistenti al calore Heat Resistance Alloys			Alluminio Aluminum			Rame Copper		
Velocità di taglio Cutting Speed	20~40m/min			15~25m/min			100~200m/min			80~150m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting
2	4,800	100	50	3,200	60	30	31,800	1,300	450	24,000	1,200	400
2.5	3,800	100	50	2,500	60	30	25,400	1,300	450	19,000	1,200	400
3	3,200	130	65	2,100	70	35	21,200	1,300	450	16,000	1,200	400
4	2,400	130	65	1,600	70	35	16,000	1,300	450	12,000	1,200	400
5	1,900	150	75	1,300	80	40	12,700	1,300	450	9,600	1,200	400
6	1,600	150	75	1,100	80	40	10,600	1,300	450	8,000	1,200	400
8	1,200	150	75	800	80	40	8,000	1,100	380	6,000	1,200	400
10	1,000	150	75	600	80	40	6,300	1,000	350	4,800	1,200	400
12	800	150	75	500	80	40	5,300	1,000	350	4,000	1,200	400
Profondità di taglio Depth of Cut  (D) Dia. Dia.							<p>ap Ø2~3 = 0.3D Ø4~12 = 6.5D</p>					
Note Notes	<p>※ Usare lubrorefrigerante con ritardanti di fumo.                  ※ Vi raccomandiamo di usare la lubrificazione minimale per la lavorazione di acciai temprati.                  ※ Regolate con la stessa proporzione giri e avanzamento.                  ※ Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.                  ※ Use cutting fluid with smoke retardant.                  ※ Recommend to use oil mist coolant for machining hardened steels.                  ※ Adjust both spindle speed and feed at the same rate.                  ※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</p>											

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Rivestite Coating  
Non Rivestite Non-Coating

Sferiche Ball  
Rivestite Coating  
Non Rivestite Non-Coating

Coniche Taper  
Rivestite Coating  
Non Rivestite Non-Coating

Toriche Corner R  
Rivestite Coating  
Non Rivestite Non-Coating

Frese Sagomate Formed Cutter  
Rivestite Coating  
Non Rivestite Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

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Technical Guidance

# Parametri di taglio raccomandati

# MSE345

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3 • AISI304			Acciai pretemprati Prehardened Steels 1.2311 • 1.2738		
Velocità di taglio Cutting Speed	60~100m/min			50~70m/min			40~60m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
		mm/min			mm/min			mm/min	
	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting
3	8,500	510	250	6,400	340	110	5,300	220	100
4	6,400	690	340	4,800	340	110	4,000	220	100
5	5,100	730	360	3,800	410	140	3,200	250	115
6	4,200	750	370	3,200	410	140	2,700	250	115
8	3,200	690	340	2,400	410	140	2,000	250	115
10	2,500	630	310	1,900	410	140	1,600	250	115
12	2,100	600	300	1,600	410	140	1,300	250	115
16	1,600	570	280	1,200	340	110	1,000	220	100
20	1,300	560	280	1,000	340	110	800	220	100
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> </div>								
(D) Dia. Dia.									
Note Notes	<ul style="list-style-type: none"> <li>※Usare lubrorefrigerante con ritardanti di fumo.</li> <li>※Regolate con la stessa proporzione firi e avanzamento.</li> <li>※Usare un mandrino rigido e preciso.</li> <li>※Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.</li> <li>※Use cutting fluid with smoke retardant.</li> <li>※Adjust both spindle speed and feed at the same rate.</li> <li>※Use rigid and precise machine and chuck holder.</li> <li>※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</li> </ul>								

CBN  
Nitruro Cubico di Boro

Diamante

Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte

Drill

Altro

Others

Dati tecnici

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Materiale Work Material	Acciaio temprato Hardened Steels 1.2343 (~52HRC)			Leghe resistenti al calore Heat Resistance Alloys			Alluminio Aluminum			Rame Copper		
Velocità di taglio Cutting Speed	20~40m/min			15~25m/min			150~200m/min			80~150m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting
3	3,200	190	85	2,100	80	40	21,200	1,900	650	15,900	1,500	500
4	2,400	190	85	1,600	80	40	16,000	1,900	650	11,900	1,500	500
5	1,900	220	110	1,300	100	50	12,700	1,900	650	9,600	1,500	500
6	1,600	220	110	1,100	100	50	10,600	1,900	650	8,000	1,500	500
8	1,200	220	110	800	100	50	8,000	1,700	600	6,000	1,500	500
10	1,000	220	110	600	100	50	6,300	1,500	520	4,800	1,500	500
12	800	220	110	500	100	50	5,300	1,400	500	4,000	1,500	500
16	600	190	85	400	80	40	4,000	1,200	420	3,000	1,500	500
20	500	190	85	300	80	40	3,200	1,200	420	2,400	1,500	500
Profondità di taglio Depth of Cut  (D) Dia. Dia.										$a_p$ $\varnothing 3 = 0.3D$ $\varnothing 4 \sim 20 = 0.5D$		
Note Notes	<p>※ Usare lubrificante con ritardanti di fumo.                  ※ Vi raccomandiamo di usare la lubrificazione minima per la lavorazione di acciai temprati.                  ※ Regolate con la stessa proporzione giri e avanzamento.                  ※ Usare un mandrino rigido e preciso.                  ※ Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.                  ※ Use cutting fluid with smoke retardant.                  ※ Recommend to use oil mist coolant for machining hardened steels.                  ※ Adjust both spindle speed and feed at the same rate.                  ※ Use rigid and precise machine and chuck holder.                  ※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</p>											

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Rivestite Coating  
Non Rivestite Non-Coating

Sferiche Ball  
Rivestite Coating  
Non Rivestite Non-Coating

Coniche Taper  
Rivestite Coating  
Non Rivestite Non-Coating

Toriche Corner R  
Rivestite Coating  
Non Rivestite Non-Coating

Frese Sagomate Formed Cutter  
Rivestite Coating  
Non Rivestite Non-Coating

Punte  
Drill

Altro  
Others

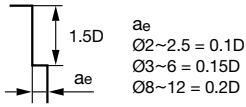
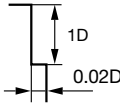
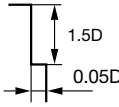
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# Parametri di taglio raccomandati

# MSE445

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciai pretemprati Prehardened Steels 1.2311•1.2738		Acciai temprati Hardened Steels 1.2343 (~52HRC)		Leghe resistenti al calore Heat Resistance Alloys	
Velocità di taglio Cutting Speed	60~100m/min		50~70m/min		40~60m/min		20~40m/min		15~25m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
2	12,700	560	9,600	325	8,000	220	4,800	210	3,200	100
2.5	10,200	670	7,600	325	6,400	220	3,800	210	2,500	100
3	8,500	750	6,400	390	5,300	240	3,200	260	2,100	130
4	6,400	840	4,800	390	4,000	240	2,400	260	1,600	130
5	5,100	900	3,800	470	3,200	260	1,900	300	1,300	150
6	4,200	920	3,200	470	2,700	260	1,600	300	1,100	150
8	3,200	840	2,400	470	2,000	260	1,200	300	800	150
10	2,500	770	1,900	470	1,600	260	1,000	300	600	150
12	2,100	740	1,600	470	1,300	260	800	300	500	150
16	1,600	700	1,200	390	1,000	220	600	260	400	130
20	1,300	690	1,000	390	800	220	500	260	300	130
Profondità di taglio Depth of Cut  (D) Dia. Dia.	Contornatura Side Milling 						Contornatura Side Milling 		Contornatura Side Milling 	
Note	※Usare lubrorefrigerante con ritardanti di fumo. ※Vi raccomandiamo di usare la lubrificazione minima per la lavorazione di acciai temprati. ※Adatto solo per la lavorazione di contornatura. ※Regolate con la stessa proporzione giri e avanzamento. ※Regolate le condizioni di fresatura in accordo alla profondità di taglio ed alla rigidità della macchina. ※Use cutting fluid with smoke retardant. ※Recommend to use oil mist coolant for machining hardened steels. ※Available only for side cutting. ※Adjust both spindle speed and feed at the same rate. ※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.									

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

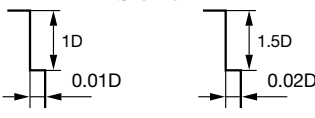
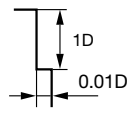
Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

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Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciai pretemprati Prehardened Steels 1.2311•1.2738		Acciai temprati Hardened Steels 1.2343 (~52HRC)	
Velocità di taglio Cutting Speed	250m/min		200m/min		160m/min		80m/min	
Dia Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
6	13,300	2,900	10,600	2,250	8,500	1,800	4,250	600
8	10,000	2,900	8,000	2,250	6,400	1,800	3,200	600
10	8,000	2,900	6,400	2,250	5,100	1,800	2,550	600
12	6,600	2,900	5,300	2,250	4,200	1,800	2,100	600
16	5,000	2,300	4,000	1,700	3,200	1,350	1,600	450
20	4,000	2,300	3,200	1,700	2,500	1,350	1,300	450
Profondità di taglio Depth of Cut  (D) Dia. Dia.	Contornatura Side Milling Ø6~8                      Ø10~20 						Contornatura Side Milling 	
Note Notes	※Usare lubrorefrigerante con ritardanti di fumo. ※Vi raccomandiamo di usare la lubrificazione minimale per la lavorazione di acciai temprati. ※Adatto solo per la lavorazione di contornatura. ※Regolate con la stessa proporzione giri e avanzamento. ※Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina. ※Use cutting fluid with smoke retardant. ※Recommend to use oil mist coolant for machining hardened steels. ※Available only for side cutting. ※Adjust both spindle speed and feed at the same rate. ※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.							

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane Square  
Rivestite Coating  
Non Rivestite Non-Coating  
Scaricate Plane  
Long Neck Square

Sferiche Ball  
Rivestite Coating  
Non Rivestite Non-Coating  
Scaricate Sferiche  
Long Neck Ball

Coniche Taper  
Rivestite Coating  
Non Rivestite Non-Coating  
Coniche Sferiche  
Taper Ball

Toriche Corner R  
Rivestite Coating  
Non Rivestite Non-Coating  
Scaricate Toriche  
Long Neck Corner R

Frese Sagomate Formed Cutter  
Rivestite Coating  
Non Rivestite Non-Coating

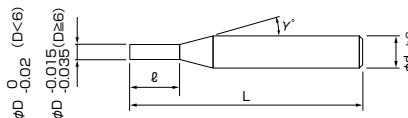
Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Frese 3 Tagli piane foranti "POWER Z" rivestite MUGEN



**Dati tecnici** P494



- Il nuovo design dell'elica conferisce alla fresa una notevole capacità di taglio.
- Grande efficienza in lavoro sia per realizzare lavorazioni a tuffo che cave dal pieno!
- New flute design brought a remarkable shearing ability.
- High efficient machining is realized both for plunge cutting and slotting.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00133-00100	1	1.5	9°	4	45
08-00133-00110	1.1	1.7	9°	4	45
08-00133-00120	1.2	1.8	9°	4	45
08-00133-00130	1.3	2	9°	4	45
08-00133-00140	1.4	2.1	9°	4	45
08-00133-00150	1.5	2.3	9°	4	45
08-00133-00160	1.6	2.4	9°	4	45
08-00133-00170	1.7	2.6	9°	4	45
08-00133-00180	1.8	2.7	9°	4	45
08-00133-00190	1.9	2.9	9°	4	45
08-00133-00200	2	3	9°	4	45
08-00133-00210	2.1	3.2	9°	4	45
08-00133-00220	2.2	3.3	9°	4	45
08-00133-00230	2.3	3.5	9°	4	45
08-00133-00240	2.4	3.6	9°	4	45
08-00133-00250	2.5	3.8	9°	4	45
08-00133-00260	2.6	3.9	9°	4	45
08-00133-00270	2.7	4.1	9°	4	45
08-00133-00280	2.8	4.2	9°	4	45
08-00133-00290	2.9	4.5	9°	4	45
08-00133-00300	3	6	9°	6	50
08-00133-00310	3.1	6.2	9°	6	50
08-00133-00320	3.2	6.4	9°	6	50
08-00133-00330	3.3	6.6	9°	6	50
08-00133-00340	3.4	6.8	9°	6	50
08-00133-00350	3.5	7	9°	6	50

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00133-00360	3.6	7.2	9°	6	50
08-00133-00370	3.7	7.4	9°	6	50
08-00133-00380	3.8	7.6	9°	6	50
08-00133-00390	3.9	7.8	9°	6	50
08-00133-00400	4	8	9°	6	50
08-00133-00410	4.1	8.2	9°	6	50
08-00133-00420	4.2	8.4	9°	6	50
08-00133-00430	4.3	8.6	9°	6	50
08-00133-00440	4.4	8.8	9°	6	50
08-00133-00450	4.5	9	9°	6	50
08-00133-00460	4.6	9.2	9°	6	50
08-00133-00470	4.7	9.4	9°	6	50
08-00133-00480	4.8	9.6	9°	6	50
08-00133-00490	4.9	9.8	9°	6	50
08-00133-00500	5	10	9°	6	50
08-00133-00510	5.1	10.2	9°	6	55
08-00133-00520	5.2	10.4	9°	6	55
08-00133-00530	5.3	10.6	9°	6	55
08-00133-00540	5.4	10.8	9°	6	55
08-00133-00550	5.5	11.2	9°	6	55
08-00133-00560	5.6	11.4	9°	6	55
08-00133-00570	5.7	11.6	9°	6	55
08-00133-00580	5.8	12	9°	6	55
08-00133-00590	5.9	12.4	9°	6	55
08-00133-00600	6	13	-	6	55

**Attenzione** Quando ordinate, indicate MSZ345 (D).  
When you order, indicate MSZ345 (D).

- Per i parametri di taglio vedi pagina 146.
- Milling condition is recommended on page 146.
- \*\*: articolo semi-standard, su richiesta prezzo e consegna.
- \*\*: Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00133-00610	6.1	13	9°	8	65
08-00133-00620	6.2	13	9°	8	65
08-00133-00630	6.3	13.5	9°	8	65
08-00133-00640	6.4	13.5	9°	8	65
08-00133-00650	6.5	13.5	9°	8	65
08-00133-00660	6.6	14	9°	8	65
08-00133-00670	6.7	14	9°	8	65
08-00133-00680	6.8	15	9°	8	65
08-00133-00690	6.9	15	9°	8	65
08-00133-00700	7	16	9°	8	65
08-00133-00710	7.1	16	9°	8	65
08-00133-00720	7.2	16	9°	8	65
08-00133-00730	7.3	16	9°	8	65
08-00133-00740	7.4	16	9°	8	65
08-00133-00750	7.5	16	9°	8	65
08-00133-00760	7.6	17	9°	8	65
08-00133-00770	7.7	17	9°	8	65
08-00133-00780	7.8	17	9°	8	65
08-00133-00790	7.9	17	9°	8	65
08-00133-00800	8	19	—	8	65
08-00133-00810	8.1	18	9°	10	75
08-00133-00820	8.2	18	9°	10	75
08-00133-00830	8.3	18	9°	10	75
08-00133-00840	8.4	18	9°	10	75
08-00133-00850	8.5	18	9°	10	75
08-00133-00860	8.6	19	9°	10	75
08-00133-00870	8.7	19	9°	10	75
08-00133-00880	8.8	19	9°	10	75
08-00133-00890	8.9	19	9°	10	75
08-00133-00900	9	19	9°	10	75

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00133-00910	9.1	20	9°	10	75
08-00133-00920	9.2	20	9°	10	75
08-00133-00930	9.3	20	9°	10	75
08-00133-00940	9.4	20	9°	10	75
08-00133-00950	9.5	20	9°	10	75
08-00133-00960	9.6	21	9°	10	75
08-00133-00970	9.7	21	9°	10	75
08-00133-00980	9.8	21	9°	10	75
08-00133-00990	9.9	21	9°	10	75
08-00133-01000	10	22	—	10	75
08-00133-01010	10.1	22	9°	12	80
08-00133-01020	10.2	22	9°	12	80
08-00133-01030	10.3	22	9°	12	80
08-00133-01040	10.4	22	9°	12	80
08-00133-01050	10.5	22	9°	12	80
08-00133-01060	10.6	22	9°	12	80
08-00133-01070	10.7	22	9°	12	80
08-00133-01080	10.8	22	9°	12	80
08-00133-01090	10.9	22	9°	12	80
08-00133-01100	11	22	9°	12	80
08-00133-01110	11.1	25	9°	12	80
08-00133-01120	11.2	25	9°	12	80
08-00133-01130	11.3	25	9°	12	80
08-00133-01140	11.4	25	9°	12	80
08-00133-01150	11.5	25	9°	12	80
08-00133-01160	11.6	25	9°	12	80
08-00133-01170	11.7	25	9°	12	80
08-00133-01180	11.8	25	9°	12	80
08-00133-01190	11.9	25	9°	12	80
08-00133-01200	12	26	—	12	80

# Parametri di taglio raccomandati

# MSZ345

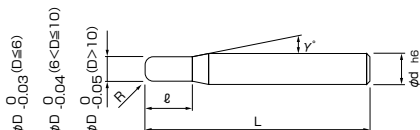
## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50				Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3				Acciaio inossidabile Stainless Steels AISI304				Acciai pretemprati Prehardened Steels 1.2311•1.2738			
Velocità di taglio Cutting Speed	90m/min				50m/min				35m/min				55m/min			
Dia Dia.	Giri Spindle Speed	Avanzamento Feed			Giri Spindle Speed	Avanzamento Feed			Giri Spindle Speed	Avanzamento Feed			Giri Spindle Speed	Avanzamento Feed		
		Foratura Drilling	Cava Slotting	Contornatura Side Milling		Foratura Drilling	Cava Slotting	Contornatura Side Milling		Foratura Drilling	Cava Slotting	Contornatura Side Milling		Foratura Drilling	Cava Slotting	Contornatura Side Milling
		min <sup>-1</sup>	mm/min			min <sup>-1</sup>	mm/min			min <sup>-1</sup>	mm/min			min <sup>-1</sup>	mm/min	
1	15,000	70	200	400	15,000	40	100	210	10,000	20	70	200	15,000	50	100	200
1.5	13,000	70	250	500	13,000	40	120	270	7,000	20	70	250	13,000	50	130	250
2	11,000	100	300	600	8,000	50	140	290	5,000	20	75	250	10,000	70	150	300
2.5	10,000	100	400	700	7,000	60	160	330	4,000	20	75	250	8,000	90	170	350
3	9,600	200	550	800	5,300	80	200	400	3,600	20	100	250	5,800	100	250	400
4	7,200	210	650	900	4,000	100	250	400	2,800	30	100	250	4,400	110	250	400
5	5,700	260	700	1,000	3,200	100	250	450	2,200	40	120	300	3,500	120	300	500
6	4,800	300	720	1,200	2,700	130	300	450	1,800	40	120	300	3,000	130	330	600
7	4,100	300	740	1,100	2,300	120	300	450	1,600	40	120	300	2,500	110	330	600
8	3,600	300	760	1,000	2,000	100	300	400	1,400	30	120	300	2,200	100	330	600
9	3,200	300	770	900	1,800	80	250	380	1,200	20	100	300	1,900	90	250	500
10	3,000	300	800	900	1,600	80	200	350	1,100	20	100	300	1,700	80	200	400
11	2,800	300	760	850	1,500	80	200	350	1,000	20	100	280	1,600	80	200	400
12	2,600	280	740	850	1,400	70	180	340	900	20	100	270	1,500	70	180	340
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> </div> <p style="text-align: right;"> <math>a_p</math>  <math>\varnothing 1 \sim 2.5 = 0.5D</math> (SKD•SCM•SUS304 = 0.25D)  <math>\varnothing 3 \sim 12 = 1D</math> (SKD•SCM•SUS304 = 0.5D)         </p>															
(D) Dia. Dia.	<p>※Regolate la profondità di taglio in accordo alla rigidità della macchina.                  ※Le condizioni di fresatura variano in funzione del profilo, dello stato e dell'utilizzo della macchina.                  ※Regolate con la stessa proporzione giri e avanzamento.                  ※Si raccomanda di utilizzare aria.                  ※Per la lavorazione di acciaio inox si raccomanda lubrorefrigerante.                  ※Per la foratura di acciaio inox si raccomanda di eseguire la lavorazione a step.                  ※È importante eseguire il corretto smaltimento del truciolo.                  ※Usare un mandrino rigido e preciso.                  ※La sporgenza della fresa fuori dal mandrino deve essere la minore possibile.                  ※Adjust depth of cut according to machine rigidity.                  ※Final milling conditions are subject to machining profile, purpose and machine status.                  ※Adjust both spindle speed and feed at the same rate.                  ※Air blow is recommended.                  ※Non-water cutting fluid is recommended for cutting stainless steels.                  ※Step machining is recommended for drilling stainless steels.                  ※Chip disposal is important.                  ※Use a rigid and precise machine and chuck holder.                  ※Overhang of end mill should be as short as possible from spindle nose.</p>															
Note Notes																

# MSX440

MUGEN-COATING 4-Flute POWER End Mill

## Frese 4 Tagli piane POWER rivestite MUGEN



- Particolarmente adatta per sgrossatura e semifinitura di acciaio inox e materiali tenaci, grazie ai taglienti differenziati.
- Grandi prestazioni nel ridurre i tempi di sgrossatura.
- It is very suitable for roughing and semi-finishing on stainless steels and tough materials by unequal flute design.
- High performance for reducing roughing time



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliente Length of Cut	(R) Raggio Corner Radius	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00144-00300	3	8	R0.2	12°	6	55
08-00144-00400	4	11	R0.2	12°	6	55
08-00144-00500	5	13	R0.2	12°	6	55
08-00144-00600	6	13	R0.3	—	6	55
08-00144-00700	7	19	R0.3	12°	8	60
08-00144-00800	8	19	R0.3	—	8	60
08-00144-00900	9	22	R0.3	12°	10	70
08-00144-01000	10	22	R0.3	—	10	70
08-00144-01100	11	26	R0.3	12°	12	80
08-00144-01200	12	26	R0.3	—	12	80
08-00144-01300	13	26	R0.7	12°	16	90
08-00144-01400	14	26	R0.7	12°	16	90
08-00144-01500	15	32	R1	12°	16	90
08-00144-01600	16	32	R1	—	16	90
08-00144-01800	18	32	R1	12°	20	105
08-00144-02000	20	38	R1	—	20	105

### Attenzione

Quando ordinate, indicate MSX440 (D).  
When you order, indicate MSX440 (D).

- Per i parametri di taglio vedi pagina 148.
- Milling condition is recommended on page 148.

**CBN**  
Nitrato Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate**  
Piane  
Long Neck  
Square

**Sferiche**  
Ball

**Scaricate**  
Sferiche  
Long Neck  
Ball

**Coniche**  
Taper

**Coniche**  
Sferiche  
Taper Ball

**Toriche**  
Corner R

**Scaricate**  
Toriche  
Long Neck  
Corner R

**Frese**  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# Parametri di taglio raccomandati

# MSX440

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio • Acciaio pretemprato Carbon Steels • Prehardened Steels C50 • 1.2311 • 1.2738 • 1.2343				Acciaio inox Stainless Steels AISI304			
Velocità di taglio Cutting Speed	100~150m/min		50~70m/min		50~70m/min		30~55m/min	
Dia. Dia.	Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
3	16,000	1,300	7,000	300	8,500	680	5,600	100
4	12,000	1,400	5,300	300	6,400	770	4,000	100
5	9,500	1,500	4,200	300	5,000	800	3,000	100
6	8,000	2,200	3,500	400	4,200	840	2,800	100
8	6,000	1,800	2,600	400	3,200	630	1,800	150
10	4,800	1,300	2,000	400	2,500	560	1,600	150
12	4,000	1,000	1,700	400	2,100	470	1,200	150
14	3,400	900	1,500	300	1,800	400	1,000	120
16	3,000	800	1,400	300	1,600	390	800	120
18	2,600	700	950	250	1,400	350	800	100
20	2,400	650	950	250	1,200	330	700	100
Profondità di taglio Depth of Cut  (D) Dia. Dia.	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> <div style="text-align: left;"> <p><b>ap</b>            Ø3~5 = 0.5D (SUS: Ø3~6 = 0.5D)            Ø6~12 = 1D (SUS: Ø8~12 = 1D)            Ø13~16 = 0.5D            Ø18~20 = 0.3D</p> </div> </div>							
Note	<ul style="list-style-type: none"> <li>※ Regolare la profondità di taglio in accordo alla rigidità della macchina.</li> <li>※ Le condizioni di fresatura variano in funzione del profilo, dello stato e dell'utilizzo della macchina.</li> <li>※ Regolate con la stessa proporzione giri e avanzamento.</li> <li>※ Per la lavorazione di acciaio inox si raccomanda di utilizzare liquido refrigerante.</li> <li>※ È molto importante il corretto smaltimento del truciolo durante la lavorazione di cave.</li> <li>※ Usare un mandrino rigido e preciso.</li> <li>※ La sporgenza della fresa fuori dal mandrino deve essere la minore possibile.</li> <li>※ Adjust depth of cut according to machine rigidity.</li> <li>※ Final milling conditions are subject to machining profile, purpose and machine status.</li> <li>※ Adjust both spindle speed and feed at the same rate.</li> <li>※ Non-water cutting fluid is recommended for cutting stainless steels.</li> <li>※ Chip disposal is important for slotting.</li> <li>※ Use a rigid and precise machine and chuck holder.</li> <li>※ Overhang of end mill should be as short as possible from spindle nose.</li> </ul>							

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite Coating  
Non Rivestite Non-Coating  
Piane Square  
Scaricate Plane  
Long Neck Square

Sferiche Ball  
Scaricate Sferiche  
Long Neck Ball

Rivestite Coating  
Non Rivestite Non-Coating  
Coniche Taper  
Scaricate Coniche Sferiche  
Taper Ball

Toriche Corner R  
Scaricate Toriche  
Long Neck Corner R

Rivestite Coating  
Non Rivestite Non-Coating  
Frese Sagomate Formed Cutter

Punte Drill

Altro Others

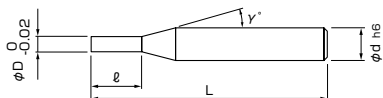
Dati tecnici Technical Data

Guida tecnica Technical Guidance

# MHDH445

4-Flute Square End Mill for Hardened Steel

## Frese 4 Tagli piane per acciai temprati



- Grande stabilità e lunga durata nella lavorazione di acciai temprati (48~65HRC).
- Migliorata rigidità e precisione, grazie all'avanzato design dell'elica.
- Realized stably long tool life against high hardened steels (48~65HRC).
- Improved milling deflection and accuracy by advanced flute design.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d)Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00427-00100	1	2	12°	6	60
08-00427-00150	1.5	3	12°	6	60
08-00427-00200	2	4	12°	6	60
● 08-00427-00300	3	6	12°	6	60
● 08-00427-00400	4	8	12°	6	60

### Attenzione

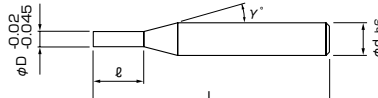
Quando ordinate, indicate MHDH445 (D).  
When you order, indicate MHDH445 (D).

- Per i parametri di taglio vedi pagina 150.
- Milling condition is recommended on page 150.

# MHDH645

6-Flute Square End Mill for Hardened Steel

## Frese 6 Tagli piane per acciai temprati



- Il rapporto L/D = 2 e L/D = 3 - selezione della lunghezza di taglio.
- Grande stabilità e lunga durata nella lavorazione di acciai temprati (48~65HRC).
- Migliorata rigidità e precisione, grazie all'avanzato design dell'elica.
- L/D=2 and L/D=3 length of cut selection.
- Realized stably long tool life against high hardened steels (48~65HRC).
- Improved milling deflection and accuracy by advanced flute design.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
● 08-00428-00500	5	10	12°	6	60
● 08-00428-00501		15	12°	6	65
● 08-00428-00600	6	12	—	6	60
● 08-00428-00601		18	—	6	65
● 08-00428-00800	8	16	—	8	65
● 08-00428-00801		24	—	8	70
● 08-00428-01000	10	20	—	10	75
● 08-00428-01001		30	—	10	80
● 08-00428-01200	12	24	—	12	80
● 08-00428-01201		36	—	12	90

### Attenzione

Quando ordinate, indicate MHDH645 (D)×(ℓ).  
When you order, indicate MHDH645 (D)×(ℓ).

- Per i parametri di taglio vedi pagina 150.
- Milling condition is recommended on page 150.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Rivestite  
Coating  
Non-Rivestite  
Non-Coating  
Piane  
Square  
Scaricate  
Plane  
Long Neck  
Square

Rivestite  
Coating  
Non-Rivestite  
Non-Coating  
Sferiche  
Ball  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Non-Rivestite  
Non-Coating  
Coniche  
Taper  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Non-Rivestite  
Non-Coating  
Toriche  
Corner R  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Non-Rivestite  
Non-Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Parametri di taglio raccomandati

**MHDX445 · MHDX645**

### Recommended Milling Conditions

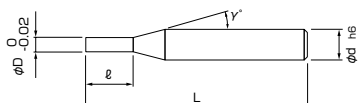
Materiale Work Material		Acciai temprati Hardened Steels 1.2311 • STAVAX • 1.2344 (~55HRC)				Acciai temprati Hardened Steels 1.2379 (~62HRC)				Acciaio super rapido da utensili High Speed Tool Steels ASP • M2 • 1.3343 (~65HRC)			
Dia Dia.	Lunghezza di taglio Length of Cut	Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting	
		Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
		min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	2	30,000	800	24,000	400	25,000	500	20,000	300	20,000	240	16,000	120
1.5	3	20,000	860	16,000	460	16,000	560	12,000	380	14,000	330	10,000	160
2	4	15,000	920	12,000	500	12,000	630	10,000	420	10,000	480	8,000	240
3	6	10,000	1,000	8,000	580	8,000	700	7,500	500	7,000	560	6,000	280
4	8	8,500	1,200	7,500	620	7,000	800	6,000	540	6,000	600	5,000	300
5	10	7,600	1,600	6,800	900	6,200	1,200	5,600	600	5,300	800	4,800	350
	15	6,800	1,400	6,000	600	5,600	1,000	5,000	400	4,800	600	4,200	200
6	12	6,400	1,800	5,800	950	5,300	1,200	4,800	600	4,600	800	4,200	350
	18	5,800	1,600	5,000	600	4,800	1,000	4,200	400	4,200	600	3,600	200
	24	4,800	2,000	4,300	1,000	4,000	1,400	3,600	700	3,400	1,000	3,000	400
8	16	4,800	2,000	4,300	1,000	4,000	1,400	3,600	700	3,400	1,000	3,000	400
	24	4,300	1,800	3,800	700	3,600	1,200	3,200	500	3,000	800	2,700	250
10	20	3,800	2,000	3,400	1,000	3,200	1,600	2,800	800	2,600	1,000	2,300	500
	30	3,400	1,800	3,000	800	2,800	1,400	2,500	600	2,300	800	2,000	300
12	24	3,200	2,000	2,800	1,000	2,600	1,600	2,300	800	2,200	1,000	2,000	500
	36	2,800	1,800	2,500	800	2,300	1,400	2,000	600	2,000	800	1,800	300
Profondità di taglio Depth of Cut  (D) Dia. Dia.		Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting	
Note		<p>※ Usare un mandrino rigido e preciso</p> <p>※ Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina</p> <p>※ Regolate con la stessa proporzione giri e avanzamento</p> <p>※ Utilizzare lubrificazione minimale di olio (spray misti) o aria compressa</p> <p>※ Use a rigid and precise machine and chuck holder.</p> <p>※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</p> <p>※ Adjust both spindle speed and feed at the same rate.</p> <p>※ Use oilmist coolant or air blow.</p>											



# MHD445

MUGEN-COATING 4-Flute End Mill for Hardened Steels

## Frese 4 Tagli piane per acciai temprati rivestite MUGEN



- Adatta per la lavorazione di acciai temprati (48~65HRC).
- Per finiture di alta precisione, grazie all'elevata rigidità.
- Machineable to high hardened steels (48~65HRC).
- Realized high precision finishing without the deflection.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00400-00100	1	1.5	12°	6	60
08-00400-00150	1.5	2.5	12°	6	60
08-00400-00200	2	4	12°	6	60
08-00400-00300	3	6	12°	6	60
08-00400-00400	4	8	12°	6	60

### Attenzione

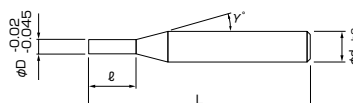
Quando ordinate, indicate MHD445 (D).  
When you order, indicate MHD445 (D).

- Per i parametri di taglio vedi pagina 152.
- Milling condition is recommended on page 152.

# MHD645

MUGEN-COATING 6-Flute End Mill for Hardened Steels

## Frese 6 Tagli piane per acciai temprati rivestite MUGEN



- Adatta per la lavorazione di acciai temprati (48~65HRC).
- Per finiture di alta precisione, grazie all'elevata rigidità.
- Machineable to high hardened steels (48~65HRC).
- Realized high precision finishing without the deflection.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00410-00500	5	10	12°	6	60
08-00410-00600	6	15	—	6	60
08-00410-00800	8	20	—	8	65
08-00410-01000	10	25	—	10	75
08-00410-01200	12	30	—	12	80

### Attenzione

Quando ordinate, indicate MHD645 (D).  
When you order, indicate MHD645 (D).

- Per i parametri di taglio vedi pagina 152.
- Milling condition is recommended on page 152.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

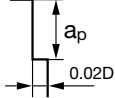
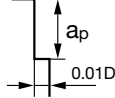
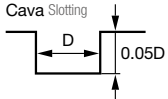
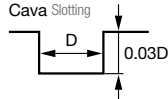
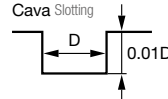
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Technical Data

Guida tecnica  
Technical Guidance

# Parametri di taglio raccomandati

# MHD445 · MHD645

## Recommended Milling Conditions

Materiale Work Material	Acciai temprati Hardened Steels 1.2343 (45~50HRC)				Acciai temprati Hardened Steels 1.2343•STAVAX•1.2311 (50~55HRC)				Acciai temprati Hardened Steels 1.2379 (55~62HRC)			
	Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
Dia. Dia.	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	6,400	280	3,200	140	5,400	240	2,700	120	4,800	200	2,400	100
1.5	4,200	300	2,100	150	3,600	230	1,800	120	3,200	180	1,600	90
2	3,200	320	1,600	160	2,700	230	1,400	120	2,400	180	1,200	90
3	3,700	520	1,900	260	3,200	380	1,600	140	2,600	260	1,300	130
4	2,800	450	1,400	230	2,400	360	1,200	180	2,000	260	1,000	130
5	5,100	1,200	2,600	600	4,500	1,000	2,300	500	3,800	800	1,900	400
6	4,200	1,300	2,500	780	3,700	1,100	2,200	660	3,200	680	1,600	340
8	3,200	1,500	1,900	900	2,800	1,300	1,700	780	2,400	750	1,200	380
10	2,600	1,500	1,600	900	2,200	1,300	1,300	780	1,900	900	950	450
12	2,100	1,300	1,300	780	1,900	1,100	1,150	660	1,600	960	800	480
Profondità di taglio Depth of Cut	Contornatura Side Milling  $a_p$ $\varnothing 1 \sim 2 = 1D$ $\varnothing 3 \sim 12 = 1.5D$						Contornatura Side Milling  $a_p$ $\varnothing 1 \sim 2 = 1D$ $\varnothing 3 \sim 12 = 1.5D$					
	Cava Slotting  $0.05D$				Cava Slotting  $0.03D$				Cava Slotting  $0.01D$			
	(D) Dia. Dia.											
Note Notes	※Usare un mandrino rigido e preciso. ※Regolare le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina. ※Regolate con la stessa proporzione giri e avanzamento. ※Utilizzare lubrificazione minimale o aria. ※Use a rigid and precise machine and chuck holder. ※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine. ※Adjust both spindle speed and feed at the same rate. ※Use oilmist coolant or air blow.											

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite Coating  
Non Rivestite Non-Coating  
Piane Square  
Scaricate Plane  
Long Neck Square

Rivestite Coating  
Non Rivestite Non-Coating  
Sferiche Ball  
Scaricate Sferiche  
Long Neck Ball

Rivestite Coating  
Non Rivestite Non-Coating  
Coniche Taper  
Coniche Sferiche  
Taper Ball

Rivestite Coating  
Non Rivestite Non-Coating  
Toriche Corner R  
Scaricate Toriche  
Long Neck Corner R

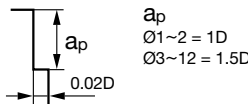
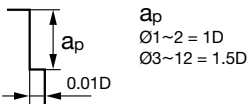
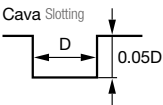
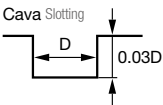
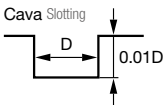
Rivestite Coating  
Non Rivestite Non-Coating  
Frese Sagomate  
Formed Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

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Technical Guidance

Materiale Work Material	Acciai temprati Hardened Steels 1.2343 (45~50HRC)				Acciai temprati Hardened Steels 1.2343•STAVAX•1.2311 (50~55HRC)				Acciai temprati Hardened Steels 1.2379 (55~62HRC)			
	Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
Dia. Dia.	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	20,000	950	10,000	480	17,500	770	8,800	390	12,700	510	6,400	260
1.5	13,800	1,000	6,900	500	11,700	750	5,900	380	8,500	480	4,300	240
2	10,400	1,000	5,200	500	8,700	730	4,400	370	6,400	460	3,200	230
3	10,600	1,500	5,300	750	9,500	1,100	4,800	550	7,400	740	3,700	370
4	8,000	1,300	4,000	650	7,200	1,100	3,600	550	5,600	740	2,800	370
5	8,900	2,100	4,500	1,100	7,600	1,800	3,800	900	5,100	1,100	2,600	550
6	7,400	2,200	4,500	1,320	6,400	1,900	3,900	1,150	5,300	1,100	2,700	550
8	5,600	2,600	3,400	1,560	4,800	2,200	2,900	1,320	4,000	1,300	2,000	650
10	4,500	2,600	2,700	1,560	3,800	2,200	2,300	1,320	3,200	1,500	1,600	750
12	3,700	2,200	2,200	1,320	3,200	1,900	2,000	1,150	2,600	1,600	1,300	800
Profondità di taglio Depth of Cut	<p>Contornatura Side Milling</p>  <p><math>a_p</math> Ø1~2 = 1D Ø3~12 = 1.5D</p>						<p>Contornatura Side Milling</p>  <p><math>a_p</math> Ø1~2 = 1D Ø3~12 = 1.5D</p>					
	<p>Cava Slotting</p>  <p>0.05D</p>				<p>Cava Slotting</p>  <p>0.03D</p>				<p>Cava Slotting</p>  <p>0.01D</p>			
(D) Dia. Dia.												
Note Notes	<p>※ Usare un mandrino rigido e preciso.                  ※ Regolare le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.                  ※ Regolare con la stessa proporzione giri e avanzamento.                  ※ Utilizzare lubrificazione minima o aria.                  ※ Use a rigid and precise machine and chuck holder.                  ※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.                  ※ Adjust both spindle speed and feed at the same rate.                  ※ Use oilmist coolant or air blow.</p>											

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane Square  
Coating  
Non Rivestite Non-Coating

Scaricate Plane  
Long Neck Square

Sferiche Ball  
Coating  
Non Rivestite Non-Coating

Scaricate Sferiche  
Long Neck Ball

Coniche Taper  
Coating  
Non Rivestite Non-Coating

Coniche Sferiche  
Taper Ball

Toriche Corner R  
Coating  
Non Rivestite Non-Coating

Scaricate Toriche  
Long Neck Corner R

Frese Sagomate Formed Cutter  
Coating  
Non Rivestite Non-Coating

Punte Drill

Altro Others

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**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

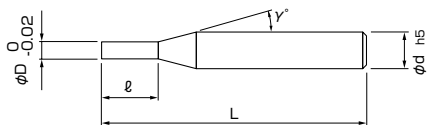
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# DCSE235

Diamond Coating 2-Flute End Mill

## Frese 2 Tagli piane rivestite "Diamante"



- Lo speciale rivestimento in diamante garantisce una lunga durata nelle lavorazioni di grafite, leghe di alluminio ad alto contenuto di silicio e materiali fragili.
- Geometria piana L/D = 3; adatta per la lavorazione di cavità strette e profonde.
- Original Diamond Coating realized a long tool life for the machining of graphite, silicon-aluminum alloy and brittle materials.
- Square design of L/D=3 is suited for the machining of narrow and deep area.

**Dati tecnici** P. 497



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. attacco Shank Dia.	(L) Lungh. totale Overall Length
05-00035-00050	0.5	1.5	12°	4	45
05-00035-00100	1	3	12°	4	45
05-00035-00150	1.5	4.5	12°	4	45
05-00035-00200	2	6	12°	4	45
05-00035-00300	3	9	12°	6	45
05-00035-00400	4	12	12°	6	50
05-00035-00500	5	15	12°	6	55
05-00035-00600	6	18	-	6	60

**Attenzione** Quando ordinate, indicate DCSE235 (D).  
When you order, indicate DCSE235 (D).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 155.
- Milling condition is recommended on page 155.

## Parametri di taglio consigliati

# DCSE235

### Recommended Milling Conditions

Materiale Work Material	Grafito Graphite						Leghe di Alluminio ADC12							
	Contornatura Side Milling			Cava Slotting			Contornatura Side Milling			Cava Slotting				
	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Prof. di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Prof. di taglio Depth of Cut		
Dia. Dia.	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm
0.5	30,000	1,000	1.5	0.03	30,000	800	0.05	20,000	600	1.5	0.01	20,000	500	0.03
1	30,000	1,200	3	0.05	30,000	1,000	0.1	20,000	1,000	3	0.02	20,000	800	0.1
1.5	25,000	1,500	4.5	0.07	25,000	1,200	0.2	20,000	1,000	4.5	0.05	20,000	800	0.2
2	25,000	2,000	6	0.1	25,000	1,500	0.3	20,000	1,500	6	0.07	20,000	1,200	0.3
3	20,000	2,500	9	0.1	20,000	1,500	0.4	20,000	1,500	9	0.07	20,000	1,200	0.4
4	18,000	2,500	12	0.2	18,000	2,000	0.5	18,000	2,000	12	0.15	18,000	1,500	0.5
5	14,000	3,000	15	0.2	14,000	2,000	0.7	14,000	2,500	15	0.15	14,000	2,000	0.7
6	12,000	3,000	18	0.3	12,000	2,000	1	12,000	2,500	18	0.2	12,000	2,000	1
Note Notes	<p>                     ※La grafito deve essere lavorata utilizzando la macchina specificatamente progettata per la lavorazione di grafito.                      ※Durante la lavorazione della grafito è consigliato proteggersi dalla polvere generata.                      ※Per la lavorazione di grafito si consiglia di utilizzare refrigerazione a getto d'aria.                      ※Per lavorazioni di precisione diminuire l'avanzamento, per evitare la scheggiatura del pezzo.                      ※In caso di vibrazioni regolate con la stessa proporzione giri e avanzamento.                      ※Graphite should be machined by the machining center designed for graphite machining.                      ※When handling with graphite material, dust collector and respirator are recommended to protect against graphite dust.                      ※Air blow cooling is recommended for the machining of graphite.                      ※Slow down the feed for high accurate machining to avoid breakage of work piece.                      ※Adjust both spindle speed and feed at the same rate when chattering.                 </p>													

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane Square**  
Rivestite Coating  
Non Rivestite Non-Coating

**Scaricate Piane Long Neck Square**  
Rivestite Coating  
Non Rivestite Non-Coating

**Sferiche Ball**  
Rivestite Coating  
Non Rivestite Non-Coating

**Scaricate Sferiche Long Neck Ball**  
Rivestite Coating  
Non Rivestite Non-Coating

**Coniche Taper**  
Rivestite Coating  
Non Rivestite Non-Coating

**Coniche Sferiche Taper Ball**  
Rivestite Coating  
Non Rivestite Non-Coating

**Toriche Corner R**  
Rivestite Coating  
Non Rivestite Non-Coating

**Scaricate Toriche Long Neck Corner R**  
Rivestite Coating  
Non Rivestite Non-Coating

**Frese Sagomate Formed Cutter**  
Rivestite Coating  
Non Rivestite Non-Coating

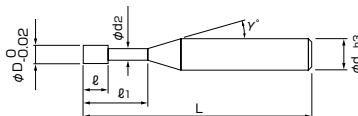
**Punte Drill**

**Altro Others**

**Dati tecnici Technical Data**

**Guida tecnica Technical Guidance**

## Frese piane per materiali fragili



- Adatte alla lavorazione di materiali duri, ma fragili come ceramica e metallo duro.
- Un rivestimento diamantato ad alta durezza prolunga la durata della fresa.
- Machinable on hard brittle materials such as cemented carbide and ceramic.
- High adhered diamond coating makes tool life long.
- **NUOVO NEW**



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell$ ) Lungh. tagliente Length of Cut	( $d_2$ ) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. attacco Shank Dia.	(L) Lungh. totale Overall Length	N° Tagli Number of Flutes
● 05-00100-03006	0.3	0.6	0.15	0.28	12°	4	45	6
● 05-00100-03012		1.2	0.15	0.28	12°	4	45	6
● 05-00100-04008	0.4	0.8	0.2	0.38	12°	4	45	6
● 05-00100-04016		1.6	0.2	0.38	12°	4	45	6
● 05-00100-05010	0.5	1	0.25	0.46	12°	4	45	8
● 05-00100-05020		2	0.25	0.46	12°	4	45	8
● 05-00100-08016	0.8	1.6	0.4	0.76	12°	4	45	8
● 05-00100-08032		3.2	0.4	0.76	12°	4	45	8
● 05-00100-10020	1	2	0.5	0.95	12°	4	45	10
● 05-00100-10040		4	0.5	0.95	12°	4	45	10
● 05-00100-15030	1.5	3	0.75	1.45	12°	4	45	10
● 05-00100-15060		6	0.75	1.45	12°	4	45	10
● 05-00100-20040	2	4	1	1.94	12°	4	45	10
● 05-00100-20080		8	1	1.94	12°	4	45	10

### Attenzione

Quando ordinate, indicate DCMS (D)×( $\ell_1$ ).  
When you order, indicate DCMS (D)×( $\ell_1$ ).

※( $\gamma^{\circ}$ ) è un valore di riferimento.  
※( $\gamma^{\circ}$ ) is reference Value.

- Per i parametri di taglio vedi pagina 157.
- Milling condition is recommended on page 157.

Materiale Work Material		Metallo duro Cemented Carbide				Al2O3 Al <sub>2</sub> O <sub>3</sub>				Vetro resistente al calore Heat-resistance Glass			
Dia. Dia.	Lungh. effettiva Effective Length	Giri	Avanzamento	Profondità di taglio		Giri	Avanzamento	Profondità di taglio		Giri	Avanzamento	Profondità di taglio	
		Spindle Speed min <sup>-1</sup>	Feed mm/min	ap mm	ae mm	Spindle Speed min <sup>-1</sup>	Feed mm/min	ap mm	ae mm	Spindle Speed min <sup>-1</sup>	Feed mm/min	ap mm	ae mm
0.3	0.6	40,000	50	0.001	0.15	40,000	80	0.002	0.15	40,000	80	0.002	0.15
	1.2	40,000	50	0.001	0.15	40,000	80	0.002	0.15	40,000	80	0.002	0.15
0.4	0.8	30,000	50	0.001	0.25	30,000	80	0.002	0.25	30,000	80	0.002	0.25
	1.6	30,000	50	0.001	0.25	30,000	80	0.002	0.25	30,000	80	0.002	0.25
0.5	1	20,000	80	0.001	0.3	20,000	120	0.002	0.3	20,000	120	0.002	0.3
	2	20,000	80	0.001	0.3	20,000	120	0.002	0.3	20,000	120	0.002	0.3
0.8	1.6	20,000	80	0.001	0.5	20,000	120	0.002	0.5	20,000	120	0.002	0.5
	3.2	20,000	80	0.001	0.5	20,000	120	0.002	0.5	20,000	120	0.002	0.5
1	2	20,000	100	0.001	0.6	20,000	150	0.002	0.6	20,000	150	0.002	0.6
	4	20,000	100	0.001	0.6	20,000	150	0.002	0.6	20,000	150	0.002	0.6
1.5	3	20,000	100	0.001	0.9	20,000	150	0.002	0.9	20,000	150	0.002	0.9
	6	15,000	100	0.001	0.9	15,000	150	0.002	0.9	15,000	150	0.002	0.9
2	4	20,000	100	0.001	1.2	20,000	150	0.002	1.2	20,000	150	0.002	1.2
	8	15,000	100	0.001	1.2	15,000	150	0.002	1.2	15,000	150	0.002	1.2
Note Notes		※Seguire i parametri di taglio consigliati, per evitare rotture ed una precoce usura. ※Ridurre il run-out e la precisione di rotazione, per prevenire la rottura della fresa. ※Verificare che le caratteristiche della macchina e del mandrino siano idonee per lavorazioni con bassissime profondità di passate. ※Consigliato l'utilizzo di olio intero. ※Follow the recommended milling conditions to prevent possible tool breakage and coating flake. ※Minimize tool rotation runout for machining accuracy and to prevent tool breakage. ※Control characteristic of machine and spindle extension amount for such small cutting depth(ap) process. ※Recommend use water-insoluble cutting oil.											

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

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**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

Technical Data

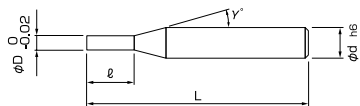
**Guida tecnica**

Technical Guidance

# NX-30X

2-Flute End Mill

## Frese piane a 2 Tagli



- Per articoli semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. di taglio Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. attacco Shank Dia.	(L) Lungh. totale Overall Length
01-00031-00100	1	2	9°	4	40
01-00031-00150	1.5	3	9°	4	40
01-00031-00200	2	4	9°	4	40
01-00031-00250	2.5	5	9°	4	40
01-00031-00300	3	6	9°	6	45
01-00031-00400	4	8	9°	6	45
01-00031-00500	5	10	9°	6	50
01-00031-00600	6	12	—	6	50
01-00031-00800	8	16	—	8	60
01-00031-01000	10	20	—	10	70
01-00031-01200	12	24	—	12	75

**Attenzione** Quando ordinate, indicate NX-30X (D).  
When you order, indicate NX-30X (D)

- Per i parametri di taglio vedi pagina 159.
- Milling condition is recommended on page 159.



# Parametri di taglio raccomandati

# NX-30X

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304			Acciai pretemprati Prehardened Steels 1.2311•1.2738			Alluminio Aluminum			Rame Copper				
Velocità di taglio Cutting Speed	40~50m/min			35~45m/min			25~35m/min			60~100m/min			40~80m/min				
Dia Dia.	Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		
	mm/min		mm/min		mm/min		mm/min		mm/min		mm/min		mm/min		mm/min		
	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling
1	14,300	150	60	12,700	100	50	9,600	90	45	25,500	300	120	19,100	220	100		
1.5	9,600	150	60	8,500	100	50	6,400	90	45	17,000	300	120	12,700	220	100		
2	7,200	150	60	6,400	100	50	4,800	90	45	12,700	300	120	9,600	220	100		
2.5	5,700	150	60	5,100	100	50	3,800	90	45	10,200	300	120	7,600	220	100		
3	4,800	180	70	4,200	130	55	3,200	100	50	8,500	350	150	6,400	250	110		
4	3,600	180	70	3,200	130	55	2,400	100	50	6,400	350	150	4,800	250	110		
5	2,900	200	80	2,500	150	60	1,900	120	55	5,100	400	180	3,800	300	130		
6	2,400	200	80	2,100	150	60	1,600	120	55	4,200	400	180	3,200	300	130		
8	1,800	200	80	1,600	150	60	1,200	120	55	3,200	400	180	2,400	300	130		
10	1,400	200	80	1,300	150	60	1,000	120	55	2,500	400	180	1,900	300	130		
12	1,200	200	80	1,100	150	60	800	120	55	2,100	400	180	1,600	300	130		
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> <div style="text-align: center;"> <p><math>a_p</math>  <math>\varnothing 1 \sim 2.5 = 0.5D</math>  <math>\varnothing 3 \sim 12 = 1D</math></p> </div> </div>																
(D) Dia. Dia.																	
Note	※ Usare lubrorefrigerante. ※ Regolate con la stessa proporzione giri ed avanzamento. ※ Use cutting fluid. ※ Adjust both spindle speed and feed at the same rate.																

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane Square**  
Rivestite Coating  
Non Rivestite Non-Coating

**Scaricate Plane**  
Long Neck Square

**Sferiche Ball**  
Rivestite Coating  
Non Rivestite Non-Coating

**Scaricate Sferiche**  
Long Neck Ball

**Coniche Taper**  
Rivestite Coating

**Coniche Sferiche**  
Taper Ball  
Non Rivestite Non-Coating

**Toriche Corner R**  
Rivestite Coating

**Scaricate Toriche**  
Long Neck Corner R  
Non Rivestite Non-Coating

**Frese Sagomate**  
Formed Cutter  
Rivestite Coating  
Non Rivestite Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

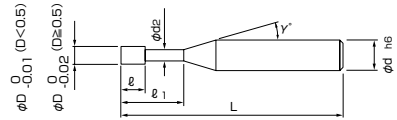
**Guida tecnica**  
Technical Guidance

## NUOVE MISURE

# MHRH230

2-Flute Long Neck End Mill for Hardened Steel

## Frese 2 Tagli piane scaricate per acciai temprati



- Il rivestimento MUGEN PREMIUM migliora la precisione e la durata nella lavorazione di acciai temprati!
- 134 misure totali!
- MUGEN-COATING PREMIUM to improve accuracy and tool life on machining hardened steels!
- Total 134 sizes!
- NUOVO NEW



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
								30'	1°	1° 30'	2°	3°
08-00207-01003	0.1	0.3	0.08	0.085	12°	4	45	0.35	0.37	0.38	0.40	0.45
08-00207-01005		0.5					45	0.56	0.58	0.61	0.64	0.71
08-00207-01007		0.75					45	0.82	0.86	0.90	0.94	1.05
08-00207-01010		1					45	1.08	1.13	1.18	1.24	1.38
08-00207-01503	0.15	0.3	0.12	0.13	12°	4	45	0.36	0.38	0.40	0.42	0.46
08-00207-01505		0.5					45	0.57	0.60	0.62	0.66	0.73
08-00207-01507		0.75					45	0.83	0.87	0.91	0.96	1.06
08-00207-01510		1					45	1.09	1.14	1.20	1.25	1.39
08-00207-01515	0.2	1.5	0.15	0.18	12°	4	45	1.61	1.69	1.77	1.85	2.06
08-00207-02005		0.5					45	0.57	0.60	0.62	0.66	0.73
08-00207-02007		0.75					45	0.83	0.87	0.91	0.96	1.06
08-00207-02010		1					45	1.09	1.14	1.20	1.25	1.39
08-00207-02015	0.3	1.5	0.25	0.28	12°	4	45	1.61	1.69	1.77	1.85	2.06
08-00207-02020		2					45	2.13	2.23	2.34	2.45	2.72
● 08-00207-02025		2.5					45	2.66	2.78	2.91	3.05	3.39
● 08-00207-02030		3					45	3.18	3.32	3.48	3.65	4.06
08-00207-03010	0.4	1	0.3	0.37	12°	4	45	1.12	1.17	1.22	1.28	1.43
08-00207-03015		1.5					45	1.64	1.71	1.79	1.88	2.09
08-00207-04030		3					45	3.20	3.35	3.50	3.68	4.09
08-00207-04035		3.5					45	3.72	3.89	4.08	4.28	4.75
08-00207-04040	0.5	4	0.4	0.46	12°	4	45	4.25	4.44	4.65	4.88	5.42
● 08-00207-04050		5					45	5.29	5.53	5.79	6.08	6.75
● 08-00207-04060		6					45	6.33	6.62	6.93	7.27	8.08
● 08-00207-04080		8					45	8.42	8.80	9.21	9.67	10.74
● 08-00207-04100	10	45	10.50	10.98	11.49	12.07	13.40					
08-00207-05010	0.5	1	0.4	0.46	12°	4	45	1.14	1.19	1.25	1.31	1.46
08-00207-05015		1.5					45	1.66	1.74	1.82	1.91	2.12
08-00207-05020		2					45	2.18	2.28	2.39	2.51	2.79
08-00207-05025		2.5					45	2.71	2.83	2.96	3.11	3.45
08-00207-05030	0.5	3	0.4	0.46	12°	4	45	3.23	3.37	3.53	3.71	4.12
● 08-00207-05035		3.5					45	3.75	3.92	4.10	4.31	4.78
08-00207-05040		4					45	4.27	4.46	4.67	4.91	5.45
● 08-00207-05045		4.5					45	4.79	5.01	5.24	5.50	6.12

**Attenzione** Quando ordinate, indicate MHRH230 (D) $\times$ (ℓ).  
When you order, indicate MHRH230 (D) $\times$ (ℓ).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 165.
- Milling condition is recommended on page 165.

●NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
								30'	1°	1° 30'	2°	3°
08-00207-05050	0.5	5	0.4	0.46	12°	4	45	5.31	5.55	5.81	6.10	6.78
● 08-00207-05060		6					45	6.36	6.64	6.96	7.30	8.11
● 08-00207-05070		7					45	7.40	7.73	8.10	8.50	9.44
● 08-00207-05080		8					50	8.44	8.82	9.24	9.70	10.77
● 08-00207-05090		9					50	9.48	9.91	10.38	10.90	12.10
● 08-00207-05100		10					50	10.53	11.00	11.52	12.09	13.44
08-00207-06015	0.6	1.5	0.5	0.56	12°	4	45	1.66	1.74	1.82	1.91	2.12
08-00207-06020		2					45	2.18	2.28	2.39	2.51	2.79
08-00207-06030		3					45	3.23	3.37	3.53	3.71	4.12
08-00207-06040		4					45	4.27	4.46	4.67	4.91	5.45
08-00207-06050		5					45	5.31	5.55	5.81	6.10	6.78
08-00207-06060		6					45	6.36	6.64	6.96	7.30	8.11
● 08-00207-07020	0.7	2	0.55	0.66	12°	4	45	2.18	2.28	2.39	2.51	2.79
● 08-00207-07040		4					45	4.27	4.46	4.67	4.91	5.45
● 08-00207-07060		6					45	6.36	6.64	6.96	7.30	8.11
● 08-00207-07080		8					50	8.44	8.82	9.24	9.70	10.77
● 08-00207-07100		10					50	10.53	11.00	11.52	12.09	13.44
● 08-00207-08030		0.8					3	0.65	0.76	12°	4	45
08-00207-08040	4		45	4.27	4.46	4.67	4.91					5.45
● 08-00207-08050	5		45	5.31	5.55	5.81	6.10					6.78
08-00207-08060	6		45	6.36	6.64	6.96	7.30					8.11
08-00207-08080	8		50	8.44	8.82	9.24	9.70					10.77
● 08-00207-08100	10		50	10.53	11.00	11.52	12.09					13.44
● 08-00207-08120	12	50	12.61	13.18	13.80	14.49	16.10					
● 08-00207-10020	1	2	0.8	0.95	12°	4	50	2.21	2.31	2.42	2.54	2.82
08-00207-10030		3					50	3.25	3.40	3.56	3.74	4.15
08-00207-10040		4					50	4.29	4.49	4.70	4.93	5.48
● 08-00207-10050		5					50	5.34	5.58	5.84	6.13	6.81
08-00207-10060		6					50	6.38	6.67	6.98	7.33	8.14
● 08-00207-10070		7					50	7.42	7.76	8.12	8.53	9.47
08-00207-10080		8					50	8.47	8.85	9.27	9.73	10.80
● 08-00207-10090		9					50	9.51	9.94	10.41	10.92	12.14
08-00207-10100		10					50	10.55	11.03	11.55	12.12	13.47
● 08-00207-10120		12					50	12.64	13.21	13.83	14.52	16.13
● 08-00207-10140		14					50	14.72	15.39	16.11	16.91	18.79
● 08-00207-10160		16					60	16.81	17.57	18.40	19.31	21.45
● 08-00207-10180		18					60	18.89	19.74	20.68	21.71	24.11
● 08-00207-10200		20					60	20.98	21.92	22.96	24.10	26.78
● 08-00207-10220		22					60	23.07	24.10	25.24	26.50	Free
08-00207-12060		1.2					6	1	1.15	12°	4	50
08-00207-12080	8		50	8.47	8.85	9.27	9.73					10.80
08-00207-12100	10		50	10.55	11.03	11.55	12.12					13.47
08-00207-12120	12		50	12.64	13.21	13.83	14.52					16.13
● 08-00207-12160	16		60	16.81	17.57	18.40	19.31					21.45
● 08-00207-14060	1.4		6	1.1	1.35	12°	4					50
● 08-00207-14120		12	50					12.64	13.21	13.83	14.52	16.13
08-00207-15040	1.5	4	1.2	1.45	12°	4	50	4.29	4.49	4.70	4.93	5.48
08-00207-15060		6					50	6.38	6.67	6.98	7.33	8.14
08-00207-15080		8					50	8.47	8.85	9.27	9.73	10.80
08-00207-15100		10					50	10.55	11.03	11.55	12.12	13.47

**Attenzione** Quando ordinate, indicate MHRH230 (D)×(ℓ).  
When you order, indicate MHRH230 (D)×(ℓ).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 165.
- Milling condition is recommended on page 165.

Piastre  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Sferiche  
Ball  
Scaricate  
Sferiche  
Long Neck  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Coniche  
Taper  
Coniche  
Sferiche  
Taper Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Toriche  
Corner R  
Scaricate  
Toriche  
Long Neck  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill  
Altro  
Others

Dati tecnici  
Technical Data  
Guida tecnica  
Technical Guidance

● NUOVO NEW

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.									
								30'	1°	1° 30'	2°	3°					
08-00207-15120	1.5	12	1.2	1.45	12°	4	50	12.64	13.21	13.83	14.52	16.13					
08-00207-15140		14					60	14.72	15.39	16.11	16.91	18.79					
08-00207-15160		16					60	16.81	17.57	18.40	19.31	21.45					
● 08-00207-15180		18					60	18.89	19.74	20.68	21.71	24.11					
● 08-00207-15200		20					60	20.98	21.92	22.96	24.10	Free					
● 08-00207-15250		25					70	26.20	27.37	28.67	30.09	Free					
● 08-00207-15300		30					70	31.41	32.82	34.37	36.08	Free					
● 08-00207-15350		35					80	36.62	38.27	40.08	Free	Free					
● 08-00207-16060		1.6					6	1.3	1.55	12°	4	50	6.38	6.67	6.98	7.33	8.14
● 08-00207-16080							8					50	8.47	8.85	9.27	9.73	10.80
08-00207-18060	1.8	6	1.4	1.75	12°	4	50	6.38	6.67	6.98	7.33	8.14					
08-00207-18080		8					50	8.47	8.85	9.27	9.73	10.80					
08-00207-18100		10					50	10.55	11.03	11.55	12.12	13.47					
08-00207-18120		12					50	12.64	13.21	13.83	14.52	16.13					
08-00207-18140		14					50	14.72	15.39	16.11	16.91	18.79					
08-00207-18160		16					60	16.81	17.57	18.40	19.31	21.45					
08-00207-18180		18					60	18.89	19.74	20.68	21.71	24.11					
● 08-00207-20040		4					50	4.32	4.51	4.73	4.96	5.51					
08-00207-20060		6					50	6.40	6.69	7.01	7.36	8.17					
08-00207-20080		8					50	8.49	8.87	9.29	9.75	10.84					
08-00207-20100	10	50	10.58	11.05	11.57	12.15	13.50										
08-00207-20120	2	12	1.6	1.94	12°	4	50	12.66	13.23	13.86	14.55	16.16					
08-00207-20140		14					60	14.75	15.41	16.14	16.94	18.82					
08-00207-20160		16					60	16.83	17.59	18.42	19.34	Free					
08-00207-20180		18					60	18.92	19.77	20.71	21.73	Free					
08-00207-20200		20					60	21.01	21.95	22.99	24.13	Free					
● 08-00207-20250		25					70	26.22	27.40	28.69	Free	Free					
● 08-00207-20300		30					70	31.43	32.85	34.40	Free	Free					
● 08-00207-20350		35					80	36.65	38.30	Free	Free	Free					
● 08-00207-20400		40					90	41.86	43.75	Free	Free	Free					
● 08-00207-20500		50					100	52.29	54.64	Free	Free	Free					
08-00207-25080	2.5	8	2	2.4	12°	4	50	8.59	8.98	9.40	9.87	10.96					
08-00207-25120		12					50	12.76	13.33	13.97	14.66	Free					
08-00207-25160		16					60	16.93	17.69	18.53	19.45	Free					
08-00207-25200		20					60	21.10	22.05	23.10	Free	Free					
● 08-00207-25300		30					70	31.53	32.95	Free	Free	Free					
● 08-00207-25400		40					90	41.96	43.85	Free	Free	Free					
● 08-00207-25500		50					100	52.39	54.75	Free	Free	Free					
08-00207-30080		3					8	4.5	2.85	12°	6	50	8.71	9.10	9.53	10.01	11.12
08-00207-30120							12					50	12.88	13.46	14.10	14.80	16.44
08-00207-30160							16					60	17.05	17.82	18.67	19.59	21.77
08-00207-30200	20		60	21.23	22.18	23.23	24.39					27.09					
08-00207-30250	25		70	26.44	27.63	28.94	30.38					Free					
08-00207-30300	30		70	31.66	33.08	34.64	36.37					Free					

**Attenzione** Quando ordinate, indicate MHRH230 (D)×(ℓ<sub>1</sub>).  
When you order, indicate MHRH230 (D)×(ℓ<sub>1</sub>).

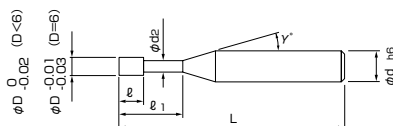
※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 165.
- Milling condition is recommended on page 165.

# MHRH430

4-Flute Long Neck End Mill for Hardened Steel

## Frese 4 Tagli piane scaricate per acciai temprati



- Il rivestimento MUGEN PREMIUM migliora la precisione e la durata, nella lavorazione di acciai temprati!
- Migliore rigidità della fresa per lavorazioni di precisione!
- 55 misure in totale.
- MUGEN-COATING PREMIUM to improve accuracy and tool life on machining hardened steels!
- Improve tool rigidity for precision machining!
- Total 55 sizes!



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l <sub>1</sub> ) Lungh. effettiva Effective Length	(l) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00217-01004	1	4	0.8	0.95	12°	4	50
08-00217-01006		6					50
08-00217-01008		8					50
08-00217-01010		10					50
08-00217-01206	1.2	6	1	1.15	12°	4	50
08-00217-01208		8					50
08-00217-01210		10					50
08-00217-01212		12					50
08-00217-01506	1.5	6	1.2	1.45	12°	4	50
08-00217-01508		8					50
08-00217-01510		10					50
08-00217-01512		12					50
08-00217-01514		14					50
08-00217-01516		16					50
08-00217-01806	1.8	6	1.4	1.74	12°	4	50
08-00217-01808		8					50
08-00217-01810		10					50
08-00217-01812		12					50
08-00217-01814		14					50
08-00217-01816		16					50
08-00217-01818		18					50
08-00217-02006		2					6
08-00217-02008	8		50				
08-00217-02010	10		50				
08-00217-02012	12		50				
08-00217-02014	14		60				
08-00217-02016	16		60				
08-00217-02018	18		60				
08-00217-02020	20		60				

### Attenzione

Quando ordinate, indicate MHRH430 (D)×(l<sub>1</sub>).  
When you order, indicate MHRH430 (D)×(l<sub>1</sub>).

- Per i parametri di taglio vedi pagina 168.
- Milling condition is recommended on page 168.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Scaricate Plane  
Long Neck Square

Sferiche Ball  
Scaricate Sferiche  
Long Neck Ball

Coniche Taper  
Coniche Sferiche  
Taper Ball

Toriche Corner R  
Scaricate Toriche  
Long Neck Corner R

Frese Sagomate Formed Cutter

Punte Drill

Altro Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piastre**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Code Code No.	(D) Dia. Dia.	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00217-02508	2.5	8	2	2.4	12°	4	50
08-00217-02512		12					50
08-00217-02516		16					60
08-00217-02520		20					60
08-00217-02525		25					70
08-00217-03008	3	8	4.5	2.85	12°	6	50
08-00217-03012		12					50
08-00217-03016		16					60
08-00217-03020		20					60
08-00217-03025		25					70
08-00217-03030	30	70					
08-00217-04012	4	12	6	3.8	12°	6	50
08-00217-04016		16					60
08-00217-04020		20					60
08-00217-04025		25					70
08-00217-04030		30					70
08-00217-04035	35	80					
08-00217-04040	40	90					
08-00217-05016	5	16	7.5	4.8	12°	6	60
08-00217-05025		25					70
08-00217-05035		35					80
08-00217-05050		50					110
08-00217-06020	6	20	9	5.8	-	6	80
08-00217-06030		30					90
08-00217-06040		40					100
08-00217-06050		50					110

### Attenzione

Quando ordinate, indicate MHRH430 (D)×(ℓ<sub>1</sub>).  
When you order, indicate MHRH430 (D)×(ℓ<sub>1</sub>).

- Per i parametri di taglio vedi pagina 168.
- Milling condition is recommended on page 168.

# Parametri di taglio raccomandati

# MHRH230

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

## Recommended Milling Conditions

Materiale Work Material		Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Preharder Steels C50•1.2311•1.2343 (~43HRC)				Acciai temprati Hardened Steels 1.2343•STAVAX•1.2344 (~55HRC)				Acciai temprati Hardened Steels 1.2379•AIS1430 (~62HRC)				Acciaio super rapido da utensili High Speed Tool Steels ASP•M2•1.3343 (~65HRC)			
Dia Dia.	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
		min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm
0.1	0.3	40,000	150	0.005	0.06	40,000	120	0.003	0.05	40,000	100	0.002	0.04	40,000	70	0.002	0.03
	0.5	40,000	100	0.005	0.06	40,000	80	0.003	0.05	40,000	60	0.002	0.04	40,000	50	0.002	0.03
	0.75	40,000	80	0.003	0.06	40,000	70	0.002	0.05	40,000	50	0.001	0.04	40,000	30	0.001	0.03
	1	40,000	60	0.002	0.06	40,000	50	0.001	0.05	40,000	40	0.001	0.04	40,000	20	0.001	0.03
0.15	0.3	40,000	180	0.005	0.09	40,000	150	0.003	0.07	40,000	120	0.002	0.06	40,000	100	0.002	0.04
	0.5	40,000	150	0.005	0.09	40,000	120	0.003	0.07	40,000	100	0.002	0.06	40,000	80	0.002	0.04
	0.75	40,000	120	0.003	0.09	40,000	100	0.002	0.07	40,000	80	0.001	0.06	40,000	60	0.001	0.04
	1	40,000	100	0.002	0.09	40,000	80	0.001	0.07	40,000	60	0.001	0.06	40,000	40	0.001	0.04
0.2	0.5	30,000	240	0.005	0.12	30,000	200	0.003	0.1	30,000	160	0.003	0.08	30,000	120	0.003	0.06
	0.75	30,000	200	0.005	0.12	30,000	180	0.003	0.1	30,000	140	0.003	0.08	30,000	100	0.003	0.06
	1	30,000	180	0.005	0.12	30,000	150	0.003	0.1	30,000	120	0.003	0.08	30,000	80	0.003	0.06
	1.5	30,000	120	0.003	0.12	30,000	100	0.002	0.1	30,000	80	0.002	0.08	30,000	60	0.002	0.06
	2	30,000	80	0.003	0.12	30,000	50	0.002	0.1	30,000	40	0.002	0.08	30,000	30	0.002	0.06
0.3	2.5	30,000	60	0.002	0.12	30,000	50	0.001	0.1	25,000	40	0.001	0.08	25,000	30	0.001	0.06
	3	30,000	40	0.002	0.12	25,000	40	0.001	0.1	25,000	30	0.001	0.08	22,000	20	0.001	0.06
	1	30,000	350	0.007	0.18	30,000	300	0.003	0.15	30,000	250	0.003	0.12	30,000	200	0.003	0.09
	1.5	30,000	260	0.007	0.18	30,000	200	0.003	0.15	30,000	160	0.003	0.12	30,000	120	0.003	0.09
	2	30,000	180	0.005	0.18	30,000	150	0.003	0.15	30,000	120	0.003	0.12	25,000	100	0.003	0.09
0.4	2.5	30,000	150	0.004	0.18	25,000	100	0.002	0.15	25,000	80	0.002	0.12	20,000	60	0.002	0.09
	3	30,000	70	0.004	0.18	25,000	50	0.002	0.15	25,000	40	0.002	0.12	20,000	30	0.002	0.09
	1	30,000	450	0.01	0.24	30,000	400	0.005	0.2	30,000	350	0.005	0.16	25,000	300	0.005	0.12
	1.5	30,000	400	0.01	0.24	30,000	360	0.005	0.2	30,000	330	0.005	0.16	25,000	250	0.005	0.12
	2	30,000	360	0.01	0.24	30,000	320	0.005	0.2	25,000	280	0.005	0.16	25,000	220	0.005	0.12
	2.5	30,000	340	0.008	0.24	25,000	280	0.005	0.2	25,000	250	0.004	0.16	20,000	200	0.004	0.12
	3	30,000	320	0.008	0.24	25,000	260	0.004	0.2	20,000	220	0.003	0.16	18,000	180	0.003	0.12
	3.5	30,000	280	0.007	0.24	25,000	220	0.004	0.2	20,000	180	0.003	0.16	18,000	150	0.002	0.12
	4	30,000	250	0.006	0.24	25,000	200	0.003	0.2	20,000	160	0.002	0.16	18,000	120	0.002	0.12
	5	25,000	250	0.005	0.24	22,000	180	0.003	0.2	20,000	150	0.002	0.16	18,000	90	0.002	0.12
0.5	6	25,000	200	0.004	0.24	22,000	150	0.002	0.2	18,000	130	0.002	0.16	16,000	70	0.001	0.12
	8	20,000	150	0.002	0.24	16,000	120	0.001	0.2	14,000	90	0.001	0.16	12,000	40	0.001	0.12
	10	16,000	100	0.002	0.24	13,000	80	0.001	0.2	12,000	50	0.001	0.16	10,000	20	0.001	0.12
	1	30,000	550	0.02	0.3	25,000	500	0.01	0.25	23,000	450	0.007	0.2	20,000	400	0.005	0.15
	1.5	30,000	520	0.02	0.3	25,000	450	0.01	0.25	23,000	400	0.007	0.2	20,000	360	0.005	0.15
	2	30,000	500	0.02	0.3	25,000	420	0.01	0.25	23,000	380	0.007	0.2	20,000	320	0.005	0.15
	2.5	30,000	480	0.015	0.3	25,000	400	0.008	0.25	23,000	360	0.006	0.2	20,000	300	0.004	0.15
	3	30,000	420	0.015	0.3	25,000	350	0.007	0.25	23,000	320	0.005	0.2	20,000	280	0.003	0.15
	3.5	25,000	400	0.012	0.3	25,000	320	0.006	0.25	23,000	280	0.003	0.2	20,000	240	0.003	0.15
	4	25,000	380	0.01	0.3	25,000	280	0.005	0.25	23,000	240	0.003	0.2	20,000	200	0.002	0.15
0.5	4.5	25,000	350	0.008	0.3	25,000	230	0.004	0.25	20,000	200	0.003	0.2	18,000	160	0.002	0.15
	5	25,000	320	0.007	0.3	20,000	200	0.003	0.25	18,000	150	0.003	0.2	16,000	100	0.002	0.15
	6	25,000	300	0.005	0.3	20,000	200	0.003	0.25	18,000	150	0.002	0.2	16,000	100	0.002	0.15
	7	20,000	250	0.005	0.3	16,000	180	0.003	0.25	14,000	140	0.002	0.2	14,000	80	0.002	0.15
	8	20,000	200	0.005	0.3	16,000	160	0.002	0.25	14,000	130	0.002	0.2	12,000	60	0.001	0.15
	9	20,000	200	0.003	0.3	16,000	150	0.002	0.25	14,000	120	0.001	0.2	12,000	50	0.001	0.15
	10	16,000	170	0.003	0.3	13,000	130	0.002	0.25	12,000	110	0.001	0.2	10,000	40	0.001	0.15

**Piane**  
Square

**Scaricate**  
Plane

**Long Neck**  
Square

**Sferiche**  
Ball

**Scaricate**  
Sferiche

**Long Neck**  
Ball

**Coniche**  
Taper

**Coniche**  
Sferiche

**Taper**  
Ball

**Toriche**  
Corner R

**Scaricate**  
Toriche

**Long Neck**  
Corner R

**Frese**  
Sagomate

**Formed**  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Dia. Dia.	Lungh. effettiva Effective Length	Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Preharder Steels C50•1.2311•1.2343 (~43HRC)				Acciai temprati Hardened Steels 1.2343•STAVAX•1.2344 (~55HRC)				Acciai temprati Hardened Steels 1.2379•AISI430 (~62HRC)				Acciaio super rapido da utensili High Speed Tool Steels ASP•M2•1.3343 (~65HRC)			
		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
		min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm
0.6	1.5	30,000	650	0.02	0.35	25,000	550	0.01	0.3	23,000	450	0.007	0.25	20,000	400	0.005	0.18
	2	30,000	550	0.02	0.35	25,000	500	0.01	0.3	23,000	400	0.007	0.25	20,000	350	0.005	0.18
	3	30,000	500	0.015	0.35	25,000	450	0.007	0.3	23,000	350	0.005	0.25	20,000	300	0.003	0.18
	4	25,000	450	0.01	0.35	25,000	400	0.005	0.3	23,000	300	0.003	0.25	20,000	250	0.002	0.18
	5	25,000	400	0.007	0.35	20,000	350	0.003	0.3	18,000	250	0.003	0.25	16,000	200	0.002	0.18
	6	25,000	350	0.001	0.35	20,000	300	0.002	0.3	18,000	200	0.002	0.25	16,000	150	0.001	0.18
0.7	2	30,000	750	0.04	0.4	25,000	600	0.03	0.35	23,000	450	0.02	0.28	20,000	400	0.012	0.21
	4	25,000	690	0.03	0.4	25,000	560	0.02	0.35	23,000	400	0.015	0.28	20,000	320	0.007	0.21
	6	25,000	550	0.02	0.4	20,000	410	0.015	0.35	18,000	300	0.012	0.28	16,000	240	0.007	0.21
	8	20,000	430	0.012	0.4	16,000	330	0.01	0.35	14,000	230	0.007	0.28	12,000	180	0.005	0.21
	10	16,000	300	0.008	0.4	13,000	200	0.005	0.35	12,000	180	0.003	0.28	10,000	120	0.002	0.21
0.8	3	25,000	850	0.04	0.45	25,000	780	0.03	0.4	23,000	650	0.02	0.32	20,000	550	0.012	0.24
	4	25,000	800	0.03	0.45	25,000	700	0.025	0.4	23,000	600	0.015	0.32	20,000	500	0.007	0.24
	5	25,000	700	0.03	0.45	23,000	630	0.02	0.4	20,000	530	0.012	0.32	18,000	450	0.006	0.24
	6	20,000	620	0.025	0.45	20,000	550	0.02	0.4	18,000	450	0.01	0.32	16,000	350	0.005	0.24
	8	16,000	500	0.015	0.45	16,000	400	0.007	0.4	14,000	300	0.005	0.32	12,000	200	0.003	0.24
	10	16,000	400	0.012	0.45	16,000	350	0.007	0.4	12,000	180	0.005	0.32	10,000	150	0.003	0.24
	12	16,000	300	0.007	0.45	13,000	220	0.005	0.4	12,000	120	0.003	0.32	10,000	120	0.002	0.24
1	2	25,000	1,200	0.07	0.6	23,000	1,000	0.06	0.5	18,000	900	0.05	0.4	14,000	600	0.035	0.3
	3	25,000	1,200	0.06	0.6	23,000	1,000	0.05	0.5	18,000	900	0.04	0.4	14,000	600	0.03	0.3
	4	25,000	1,000	0.05	0.6	23,000	900	0.04	0.5	18,000	800	0.03	0.4	14,000	500	0.02	0.3
	5	22,000	1,000	0.04	0.6	20,000	800	0.03	0.5	16,000	700	0.02	0.4	12,000	450	0.012	0.3
	6	20,000	900	0.03	0.6	18,000	700	0.02	0.5	14,000	600	0.01	0.4	10,000	400	0.007	0.3
	7	20,000	900	0.03	0.6	18,000	650	0.02	0.5	14,000	550	0.01	0.4	10,000	370	0.006	0.3
	8	18,000	800	0.03	0.6	16,000	600	0.02	0.5	12,000	500	0.01	0.4	8,000	340	0.005	0.3
	9	18,000	700	0.02	0.6	16,000	550	0.015	0.5	12,000	450	0.007	0.4	8,000	300	0.005	0.3
	10	16,000	600	0.02	0.6	14,000	500	0.01	0.5	10,000	400	0.007	0.4	6,000	250	0.005	0.3
	12	16,000	500	0.02	0.6	13,000	400	0.01	0.5	10,000	300	0.005	0.4	6,000	180	0.004	0.3
	14	16,000	450	0.015	0.6	13,000	360	0.008	0.5	10,000	280	0.005	0.4	5,500	160	0.004	0.3
	16	14,000	400	0.012	0.6	12,000	320	0.006	0.5	9,000	250	0.004	0.4	5,500	150	0.003	0.3
	18	14,000	300	0.01	0.6	12,000	240	0.006	0.5	8,000	200	0.004	0.4	5,000	120	0.002	0.3
	20	12,000	200	0.007	0.6	10,000	160	0.005	0.5	7,000	130	0.003	0.4	4,500	90	0.001	0.3
22	12,000	180	0.005	0.6	10,000	150	0.003	0.5	6,000	100	0.002	0.4	4,200	60	0.001	0.3	
1.2	6	20,000	900	0.04	0.7	18,000	700	0.03	0.6	14,000	600	0.02	0.5	10,000	400	0.01	0.4
	8	18,000	800	0.04	0.7	16,000	600	0.02	0.6	12,000	500	0.01	0.5	8,000	340	0.007	0.4
	10	16,000	600	0.03	0.7	12,000	500	0.02	0.6	10,000	430	0.01	0.5	8,000	300	0.005	0.4
	12	14,000	600	0.02	0.7	10,000	500	0.01	0.6	9,000	400	0.007	0.5	7,000	250	0.005	0.4
1.5	4	23,000	1,200	0.07	0.9	20,000	900	0.05	0.75	18,000	800	0.04	0.6	14,000	600	0.03	0.45
	6	23,000	1,000	0.06	0.9	20,000	800	0.04	0.75	18,000	700	0.03	0.6	14,000	500	0.02	0.45
	8	20,000	900	0.06	0.9	18,000	600	0.03	0.75	14,000	600	0.03	0.6	10,000	380	0.01	0.45
	10	20,000	800	0.04	0.9	16,000	500	0.03	0.75	14,000	500	0.02	0.6	10,000	350	0.01	0.45
	12	16,000	700	0.04	0.9	14,000	500	0.02	0.75	12,000	430	0.02	0.6	8,000	310	0.007	0.45
	14	14,000	600	0.03	0.9	12,000	400	0.02	0.75	10,000	380	0.01	0.6	7,500	250	0.007	0.45
16	12,000	500	0.02	0.9	10,000	360	0.01	0.75	9,000	300	0.007	0.6	6,800	200	0.005	0.45	



Materiale Work Material		Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Preharder Steels C50•1.2311•1.2343 (~43HRC)				Acciai temprati Hardened Steels 1.2343•STAVAX•1.2344 (~55HRC)				Acciai temprati Hardened Steels 1.2379•AIS1430 (~62HRC)				Acciaio super rapido da utensili High Speed Tool Steels ASP•M2•1.3343 (~65HRC)			
Dia Dia.	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
		min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm
1.8	6	20,000	1,000	0.07	1	18,000	900	0.05	0.9	15,000	750	0.04	0.7	12,000	600	0.03	0.5
	8	18,000	900	0.06	1	16,000	800	0.04	0.9	12,000	600	0.03	0.7	9,500	500	0.02	0.5
	10	16,000	800	0.06	1	14,000	700	0.04	0.9	12,000	500	0.03	0.7	9,500	450	0.02	0.5
	12	14,000	700	0.05	1	12,000	600	0.03	0.9	10,000	500	0.02	0.7	8,200	400	0.01	0.5
	14	14,000	700	0.05	1	12,000	600	0.03	0.9	10,000	430	0.02	0.7	8,200	360	0.01	0.5
	18	10,000	500	0.04	1	9,200	410	0.02	0.9	8,500	370	0.01	0.7	6,000	320	0.007	0.5
2	6	20,000	1,000	0.08	1.2	18,000	900	0.06	1	15,000	750	0.05	0.8	12,000	600	0.03	0.6
	8	18,000	900	0.07	1.2	16,000	800	0.05	1	12,000	600	0.04	0.8	9,500	500	0.02	0.6
	10	16,000	800	0.06	1.2	14,000	700	0.05	1	12,000	500	0.04	0.8	9,500	450	0.02	0.6
	12	14,000	700	0.05	1.2	12,000	600	0.04	1	10,000	500	0.03	0.8	8,200	400	0.01	0.6
	14	14,000	700	0.04	1.2	12,000	600	0.03	1	10,000	430	0.02	0.8	8,200	360	0.007	0.6
	18	10,000	500	0.03	1.2	9,200	410	0.02	1	8,500	370	0.01	0.8	6,000	320	0.005	0.6
2.5	8	16,000	1,000	0.08	1.5	14,000	800	0.07	1.25	10,000	700	0.05	1	8,000	500	0.03	0.75
	12	14,000	800	0.07	1.5	12,000	700	0.06	1.25	9,600	600	0.04	1	7,500	480	0.02	0.75
	16	12,000	700	0.06	1.5	10,000	600	0.05	1.25	8,500	500	0.02	1	7,000	400	0.01	0.75
	20	10,000	600	0.06	1.5	8,200	500	0.05	1.25	7,500	500	0.02	1	5,000	400	0.01	0.75
3	8	16,000	1,000	0.15	1.8	14,000	900	0.1	1.5	10,000	800	0.07	1.2	8,000	600	0.05	0.9
	12	14,000	900	0.1	1.8	12,000	800	0.08	1.5	9,200	700	0.06	1.2	7,200	500	0.04	0.9
	16	12,000	800	0.08	1.8	10,000	700	0.07	1.5	8,500	600	0.05	1.2	6,500	400	0.03	0.9
	20	10,000	800	0.08	1.8	9,000	700	0.07	1.5	7,800	600	0.04	1.2	5,800	400	0.02	0.9
	30	9,000	700	0.07	1.8	8,200	600	0.06	1.5	7,000	500	0.03	1.2	5,000	360	0.01	0.9
30	8,000	700	0.05	1.8	7,000	600	0.03	1.5	6,500	500	0.02	1.2	4,500	330	0.007	0.9	
Note Notes	<p>※ I Parametri di taglio raccomandati sono solo di riferimento e devono essere regolati compatibilmente con la forma del pezzo ed il tipo di macchina.                      ※ ap: Profondità assiale, ae: profondità radiale.                      ※ Vi raccomandiamo di usare la lubrificazione minimale per la lavorazione di acciai temprati.                      ※ Si consiglia di applicare la lavorazione in rampa o elicoidale per entrare nel pezzo in maniera assiale.                      ※ Per una fresatura stabile, nella lavorazione di contornature profonde, quando il rapporto L/D è superiore a 8, ridurre l'avanzamento del 50% e la profondità (ae) del 30%.                      ※ Per cave dal pieno si consiglia fresatura bidirezionale e di dimezzare l'avanzamento e la profondità (ap) rispetto ai parametri di taglio consigliati.                      ※ Ridurre il numero di giri e l'avanzamento nello stesso rapporto, per eliminare vibrazioni o in caso di limitato numero di giri della macchina.                      ※ Per cave molto profonde con rapporto L/D = 5, utilizzare nella prima fase di lavorazione una fresa corta e poi proseguire con quella lunga.                      ※ Per frese di diam. inferiore a 0.5 mm. o con rapporto L/D = 15, regolare i parametri di taglio in maniera adeguata, per evitare rotture.                      ※ These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape and machine type.                      ※ ap: Axial depth of cutting, ae: Radial depth of cutting.                      ※ Recommend to use oil mist coolant for machining hardened steel.                      ※ Recommend to apply helical or ramping for approaching into axial direction.                      ※ Adjust feed rate 50% lower and cutting depth (ae) 30% lower for milling deep wall area. When L/D exceeds 8 for stable milling.                      ※ For slotting, recommend reciprocating milling by adjusting feed &amp; ap in below 50% of recommended milling condition.                      ※ Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.                      ※ Recommend guide slotting process with short neck tool before milling with L/D 5 time or longer neck tool.                      ※ Major adjustment of milling conditions appropriately on milling profile, machine tool and etc. required for the tools smaller than dia. 0.5mm, or L/D 15 times longer.</p>																

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Frese Sagomate**  
Formed Cutter

Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Dia. Dia.	Lungh. effettiva Effective Length	Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Preharder Steel C50•1.2311•1.2343 (~43HRC)				Acciai temprati Hardened Steels 1.2343•STAVAX•1.2344 (~55HRC)				Acciai temprati Hardened Steels 1.2379•AISI430 (~62HRC)				Acciaio super rapido da utensili High Speed Tool Steels ASP•M2•1.3343 (~65HRC)			
		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
		min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm
1	4	25,000	2,000	0.05	0.6	23,000	1,800	0.04	0.5	18,000	1,600	0.03	0.4	14,000	1,000	0.02	0.3
	6	20,000	1,800	0.03	0.6	18,000	1,400	0.02	0.5	14,000	1,200	0.01	0.4	10,000	800	0.007	0.3
	8	18,000	1,600	0.03	0.6	16,000	1,200	0.02	0.5	12,000	1,000	0.01	0.4	8,000	680	0.005	0.3
	10	16,000	1,200	0.02	0.6	14,000	1,000	0.01	0.5	10,000	800	0.007	0.4	6,000	500	0.005	0.3
1.2	6	20,000	1,800	0.04	0.7	18,000	1,400	0.03	0.6	14,000	1,200	0.02	0.5	10,000	800	0.01	0.4
	8	18,000	1,600	0.04	0.7	16,000	1,200	0.02	0.6	12,000	1,000	0.01	0.5	8,000	680	0.007	0.4
	10	16,000	1,200	0.03	0.7	12,000	1,000	0.02	0.6	10,000	850	0.01	0.5	8,000	600	0.005	0.4
	12	14,000	1,200	0.02	0.7	10,000	1,000	0.01	0.6	9,000	800	0.007	0.5	7,000	500	0.005	0.4
1.5	6	23,000	2,000	0.06	0.9	20,000	1,600	0.04	0.75	18,000	1,400	0.03	0.6	14,000	1,000	0.02	0.45
	8	20,000	1,800	0.06	0.9	18,000	1,200	0.03	0.75	14,000	1,200	0.03	0.6	10,000	750	0.01	0.45
	10	20,000	1,600	0.04	0.9	16,000	1,000	0.03	0.75	14,000	1,000	0.02	0.6	10,000	700	0.01	0.45
	12	16,000	1,400	0.04	0.9	14,000	1,000	0.02	0.75	12,000	850	0.02	0.6	8,000	620	0.007	0.45
	14	14,000	1,200	0.03	0.9	12,000	800	0.02	0.75	10,000	750	0.01	0.6	7,500	500	0.007	0.45
1.8	6	20,000	2,000	0.07	1	18,000	1,800	0.05	0.9	15,000	1,500	0.04	0.7	12,000	1,200	0.03	0.5
	8	18,000	1,800	0.06	1	16,000	1,600	0.04	0.9	12,000	1,200	0.03	0.7	9,500	1,000	0.02	0.5
	10	16,000	1,600	0.06	1	14,000	1,400	0.04	0.9	12,000	1,000	0.03	0.7	9,500	900	0.02	0.5
	12	14,000	1,400	0.05	1	12,000	1,200	0.03	0.9	10,000	1,000	0.02	0.7	8,200	800	0.01	0.5
	14	14,000	1,400	0.05	1	12,000	1,200	0.03	0.9	10,000	860	0.02	0.7	8,200	720	0.01	0.5
	16	12,000	1,200	0.04	1	10,000	1,000	0.02	0.9	9,200	800	0.01	0.7	7,500	680	0.007	0.5
	18	10,000	1,000	0.04	1	9,200	820	0.02	0.9	8,500	740	0.01	0.7	6,000	640	0.007	0.5
2	6	20,000	2,000	0.08	1.2	18,000	1,800	0.06	1	15,000	1,500	0.05	0.8	12,000	1,200	0.03	0.6
	8	18,000	1,800	0.07	1.2	16,000	1,600	0.05	1	12,000	1,200	0.04	0.8	9,500	1,000	0.02	0.6
	10	16,000	1,600	0.06	1.2	14,000	1,400	0.05	1	12,000	1,000	0.04	0.8	9,500	900	0.02	0.6
	12	14,000	1,400	0.05	1.2	12,000	1,200	0.04	1	10,000	1,000	0.03	0.8	8,200	800	0.01	0.6
	14	14,000	1,400	0.04	1.2	12,000	1,200	0.03	1	10,000	860	0.02	0.8	8,200	720	0.007	0.6
	16	12,000	1,200	0.04	1.2	10,000	1,000	0.03	1	9,200	800	0.02	0.8	7,500	680	0.007	0.6
	18	10,000	1,000	0.03	1.2	9,200	820	0.02	1	8,500	740	0.01	0.8	6,000	640	0.005	0.6
	20	10,000	800	0.03	1.2	9,200	760	0.02	1	8,500	680	0.01	0.8	6,000	520	0.005	0.6
2.5	8	16,000	2,000	0.08	1.5	14,000	1,600	0.07	1.25	10,000	1,400	0.05	1	8,000	1,000	0.03	0.75
	12	14,000	1,600	0.07	1.5	12,000	1,400	0.06	1.25	9,600	1,200	0.04	1	7,500	960	0.02	0.75
	16	12,000	1,400	0.06	1.5	10,000	1,200	0.05	1.25	8,500	1,000	0.02	1	7,000	800	0.01	0.75
	20	10,000	1,200	0.06	1.5	8,200	1,000	0.05	1.25	7,500	1,000	0.02	1	5,000	800	0.01	0.75
	25	8,000	1,000	0.05	1.5	7,000	800	0.03	1.25	6,500	680	0.01	1	4,500	550	0.005	0.75

**Diamante**  
Diamond

**Rivestite**  
Coating

Plane  
Square

**Non Rivestite**  
Non-Coating

Scaricate  
Plane  
Long Neck  
Square

**Rivestite**  
Coating

Sferiche  
Ball

**Non Rivestite**  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating

Coniche  
Taper

**Non Rivestite**  
Non-Coating

Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating

Toriche  
Corner R

**Non Rivestite**  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating

Frese  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Materiale Work Material		Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Preharderded Steels C50•1.2311•1.2343 (~43HRC)				Acciai temprati Hardened Steels 1.2343•STAVAX•1.2344 (~55HRC)				Acciai temprati Hardened Steels 1.2379•AIS1430 (~62HRC)				Acciaio super rapido da utensili High Speed Tool Steels ASP•M2•1.3343 (~65HRC)			
Dia Dia.	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
		min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm
3	8	16,000	2,000	0.15	1.8	14,000	1,800	0.1	1.5	10,000	1,600	0.07	1.2	8,000	1,200	0.05	0.9
	12	14,000	1,800	0.1	1.8	12,000	1,600	0.08	1.5	9,200	1,400	0.06	1.2	7,200	1,000	0.04	0.9
	16	12,000	1,600	0.08	1.8	10,000	1,400	0.07	1.5	8,500	1,200	0.05	1.2	6,500	800	0.03	0.9
	20	10,000	1,600	0.08	1.8	9,000	1,400	0.07	1.5	7,800	1,200	0.04	1.2	5,800	800	0.02	0.9
	25	9,000	1,400	0.07	1.8	8,200	1,200	0.06	1.5	7,000	1,000	0.03	1.2	5,000	720	0.01	0.9
	30	8,000	1,400	0.05	1.8	7,000	1,200	0.03	1.5	6,500	1,000	0.02	1.2	4,500	650	0.007	0.9
4	12	12,000	2,000	0.2	2.5	9,500	2,000	0.15	2	8,000	1,600	0.08	1.6	7,000	1,000	0.06	1.2
	16	10,000	2,000	0.15	2.5	8,000	1,800	0.1	2	7,000	1,400	0.06	1.6	6,000	1,200	0.05	1.2
	20	8,500	1,800	0.12	2.5	7,000	1,600	0.08	2	6,500	1,200	0.05	1.6	5,500	1,000	0.04	1.2
	25	8,000	1,600	0.1	2.5	6,000	1,400	0.07	2	5,200	1,200	0.04	1.6	4,500	1,000	0.03	1.2
	30	6,800	1,400	0.08	2.5	4,800	1,000	0.05	2	4,200	850	0.03	1.6	3,500	620	0.02	1.2
	35	5,500	1,000	0.07	2.5	4,200	880	0.04	2	3,800	720	0.02	1.6	3,000	550	0.01	1.2
5	40	4,000	860	0.05	2.5	3,600	720	0.03	2	3,000	600	0.01	1.6	2,500	400	0.007	1.2
	16	10,000	2,000	0.2	3	7,000	1,800	0.12	2.5	5,500	1,600	0.08	2	4,500	1,000	0.06	1.5
	25	8,000	1,600	0.15	3	5,800	1,400	0.07	2.5	4,200	1,200	0.05	2	3,000	800	0.03	1.5
	35	6,000	1,200	0.1	3	4,200	900	0.05	2.5	3,500	800	0.03	2	2,500	600	0.02	1.5
6	50	3,500	750	0.07	3	2,800	620	0.03	2.5	2,500	500	0.02	2	1,500	350	0.01	1.5
	20	8,000	2,000	0.25	4	6,500	1,600	0.18	3	4,500	1,400	0.08	2.4	3,500	920	0.06	1.8
	30	7,000	1,600	0.2	4	4,500	1,200	0.12	3	3,500	1,000	0.06	2.4	2,500	660	0.04	1.8
	40	4,500	1,200	0.15	4	3,000	1,000	0.08	3	2,500	800	0.03	2.4	2,000	550	0.02	1.8
6	50	3,000	850	0.1	4	2,500	700	0.05	3	2,000	500	0.02	2.4	1,500	380	0.01	1.8

Note  
Notes

- ※ I parametri di taglio consigliati sono solo di riferimento e devono essere regolati secondo il tipo di macchina ed il pezzo da lavorare.
- ※ ap: profondità assiale; ae: profondità radiale.
- ※ Vi raccomandiamo di usare la lubrificazione minima per la lavorazione di acciai temprati.
- ※ Si consiglia di applicare la lavorazione in rampa o elicoidale, per entrare nel pezzo in maniera assiale.
- ※ Per una fresatura stabile, nelle lavorazioni di contornatura profonde, quando il rapporto L/D è superiore a 8, ridurre l'avanzamento del 50% e la profondità (ae) del 30%.
- ※ Per cave dal pieno, si consiglia fresatura bidirezionale e di ridurre del 50% l'avanzamento e la profondità (ap) rispetto ai parametri di taglio consigliati.
- ※ Ridurre il numero di giri e l'avanzamento nello stesso rapporto, per eliminare vibrazioni o in caso di limitato numero di giri della macchina.
- ※ These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape and machine type.
- ※ ap: Axial depth of cutting, ae: Radial depth of cutting.
- ※ Recommend to use oil mist coolant for machining hardened steel.
- ※ Recommend to apply herical or ramping for approaching into axial direction.
- ※ Adjust feed rate 50% lower and cutting depth (ae) 30% lower for milling deep wall area. When L/D exceeds 8 for stable milling.
- ※ For slotting, recommend reciprocating milling by adjusting feed & ap in below 50% of recommended milling condition.
- ※ Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

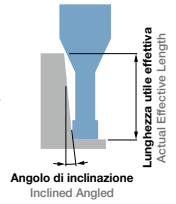
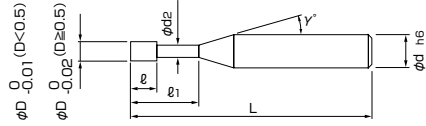
**Guida tecnica**  
Technical Guidance

NUOVE MISURE

# MHR230

MUGEN-COATING 2 -Flute Long Neck End Mill

## Frese 2 Tagli piane scaricate rivestite MUGEN



- Il rivestimento MUGEN è stato applicato alle nostre originali frese per nervature profonde.
- Particolarmente indicato per lavorazioni di nervature strette e profonde con con frese lunghe.
- 217 misure in totale!
- MUGEN-COATING has been put on our original end mill for deep rib.
- It is very suitable for cutting on narrow and deep rib by long neck end mill.
- Total 217 sizes!
- NUOVO NEW



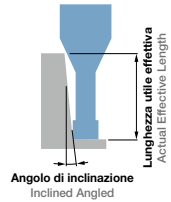
Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
							30°	1°	1° 30'	2°	3°
08-00200-01003	0.1	0.3	0.15	12°	4	45	0.34	0.36	0.38	0.40	0.44
08-00200-01005		0.5				45	0.55	0.58	0.61	0.64	0.71
● 08-00200-01007		0.75				45	0.82	0.86	0.90	0.94	1.05
08-00200-01010		1				45	1.07	1.12	1.18	1.23	1.37
● 08-00200-01503	0.15	0.3	0.2	12°	4	45	0.36	0.38	0.40	0.42	0.46
● 08-00200-01505		0.5				45	0.57	0.60	0.62	0.66	0.73
● 08-00200-01507		0.75				45	0.83	0.87	0.91	0.96	1.06
● 08-00200-01510		1				45	1.09	1.14	1.20	1.25	1.39
● 08-00200-01515	1.5	45	1.61	1.69	1.77	1.85	2.06				
08-00200-02005	0.2	0.5	0.3	12°	4	45	0.57	0.59	0.62	0.65	0.72
● 08-00200-02007		0.75				45	0.83	0.87	0.91	0.96	1.06
08-00200-02010		1				45	1.09	1.14	1.19	1.25	1.38
08-00200-02015		1.5				45	1.61	1.68	1.76	1.85	2.05
08-00200-02020	2	45	2.13	2.23	2.33	2.44	2.71				
08-00200-02025	2.5	45	2.65	2.77	2.90	3.04	3.38				
08-00200-02030	3	45	3.17	3.31	3.47	3.64	4.04				
08-00200-02035	3.5	45	3.69	3.86	4.04	4.24	4.70				
08-00200-02040	4	45	4.22	4.40	4.61	4.84	5.37				
08-00200-03010	0.3	1	0.4	12°	4	45	1.09	1.14	1.19	1.25	1.38
08-00200-03015		1.5				45	1.61	1.68	1.76	1.85	2.05
08-00200-03020		2				45	2.13	2.23	2.33	2.44	2.71
08-00200-03025		2.5				45	2.65	2.77	2.90	3.04	3.38
08-00200-03030	3	45	3.17	3.31	3.47	3.64	4.04				
08-00200-03040	4	45	4.22	4.40	4.61	4.84	5.37				
08-00200-03050	5	45	5.26	5.49	5.75	6.03	6.69				
08-00200-03060	6	45	6.30	6.58	6.89	7.23	8.02				
08-00200-03090	9	45	9.43	9.85	10.31	10.82	12.00				
08-00200-04010	0.4	1	0.6	12°	4	45	1.11	1.16	1.22	1.28	1.42
● 08-00200-04015		1.5				45	1.64	1.71	1.79	1.88	2.09
08-00200-04020		2				45	2.15	2.25	2.36	2.47	2.74
● 08-00200-04025		2.5				45	2.68	2.80	2.93	3.08	3.42
08-00200-04030	3	45	3.20	3.34	3.50	3.67	4.07				
● 08-00200-04035	3.5	45	3.72	3.89	4.08	4.28	4.75				
08-00200-04040	4	45	4.24	4.43	4.64	4.87	5.40				
08-00200-04050	5	45	5.28	5.52	5.78	6.06	6.72				
08-00200-04060	6	45	6.33	6.61	6.92	7.26	8.05				

**Attenzione** Quando ordinate, indicate MHR230 (D)×(ℓ<sub>1</sub>).  
When you order, indicate MHR230 (D)×(ℓ<sub>1</sub>).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 179.
- Milling condition is recommended on page 179.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.								
							30'	1°	1° 30'	2°	3°				
08-00200-04070	0.4	7	0.6	12°	4	45	7.37	7.70	8.06	8.46	9.38				
08-00200-04080		8				45	8.41	8.79	9.20	9.65	10.71				
08-00200-04090		9				45	9.45	9.88	10.34	10.85	12.03				
08-00200-04100		10				45	10.50	10.97	11.48	12.05	13.36				
08-00200-04120		12				45	12.58	13.15	13.76	14.44	16.02				
08-00200-05010	0.5	1	0.7	12°	4	45	1.14	1.19	1.24	1.30	1.45				
● 08-00200-05015		1.5				45	1.66	1.74	1.82	1.91	2.12				
08-00200-05020		2				45	2.18	2.28	2.38	2.50	2.77				
● 08-00200-05025		2.5				45	2.71	2.83	2.96	3.11	3.45				
08-00200-05030		3				45	3.22	3.37	3.52	3.70	4.10				
● 08-00200-05035		3.5				45	3.75	3.92	4.10	4.31	4.78				
08-00200-05040		4				45	4.26	4.46	4.66	4.89	5.43				
● 08-00200-05045		4.5				45	4.79	5.01	5.24	5.50	6.12				
08-00200-05050		5				45	5.31	5.54	5.80	6.09	6.76				
08-00200-05060		6				45	6.35	6.63	6.95	7.29	8.08				
08-00200-05070		7				45	7.39	7.72	8.09	8.48	9.41				
08-00200-05080		8				50	8.44	8.81	9.23	9.68	10.74				
08-00200-05090		9				50	9.48	9.90	10.37	10.88	12.07				
08-00200-05100		10				50	10.52	10.99	11.51	12.07	13.39				
08-00200-05120		12				50	12.61	13.17	13.79	14.47	16.05				
08-00200-05150		15				50	15.74	16.44	17.21	18.06	20.03				
● 08-00200-06015		0.6				1.5	0.9	12°	4	45	1.66	1.74	1.82	1.91	2.12
08-00200-06020						2				45	2.18	2.28	2.38	2.50	2.77
08-00200-06030						3				45	3.22	3.37	3.52	3.70	4.10
08-00200-06040						4				45	4.26	4.46	4.66	4.89	5.43
08-00200-06050	5		45	5.31	5.54	5.80				6.09	6.76				
08-00200-06060	6		45	6.35	6.63	6.95				7.29	8.08				
08-00200-06070	7		45	7.39	7.72	8.09				8.48	9.41				
08-00200-06080	8		50	8.44	8.81	9.23				9.68	10.74				
● 08-00200-06090	9		50	9.48	9.91	10.38				10.90	12.10				
08-00200-06100	10		50	10.52	10.99	11.51				12.07	13.39				
08-00200-06120	12		50	12.61	13.17	13.79				14.47	16.05				
08-00200-06150	15		50	15.74	16.44	17.21				18.06	20.03				
08-00200-06180	18		50	18.86	19.71	20.63				21.65	24.01				
08-00200-07020	0.7		2	1	12°	4				45	2.18	2.28	2.38	2.50	2.77
08-00200-07040			4							45	4.26	4.46	4.66	4.89	5.43

## Attenzione

Quando ordinate, indicate MHR230 (D)×(ℓ<sub>1</sub>).  
When you order, indicate MHR230 (D)×(ℓ<sub>1</sub>).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 179.
- Milling condition is recommended on page 179.

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Plane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

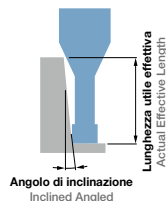
**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating  
Punte  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



● NUOVO NEW

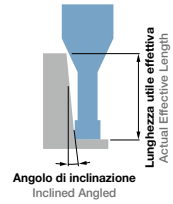
Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
							30°	1°	1° 30'	2°	3°
08-00200-07060	0.7	6	1	12°	4	45	6.35	6.63	6.95	7.29	8.08
08-00200-07080		8				50	8.44	8.81	9.23	9.68	10.74
08-00200-07100		10				50	10.52	10.99	11.51	12.07	13.39
● 08-00200-08030	0.8	3	1.2	12°	4	45	3.23	3.37	3.53	3.71	4.12
08-00200-08040		4				45	4.26	4.46	4.66	4.89	5.43
● 08-00200-08050		5				45	5.31	5.55	5.81	6.10	6.78
08-00200-08060		6				45	6.35	6.63	6.95	7.29	8.08
08-00200-08080		8				50	8.44	8.81	9.23	9.68	10.74
08-00200-08100		10				50	10.52	10.99	11.51	12.07	13.39
08-00200-08120		12				50	12.61	13.17	13.79	14.47	16.05
08-00200-08140		14				50	14.69	15.35	16.07	16.86	18.70
08-00200-08160		16				50	16.78	17.53	18.35	19.25	21.36
08-00200-08200		20				60	20.95	21.89	22.91	24.04	26.66
08-00200-08240	24	60	25.12	26.24	27.47	28.83	Free				
08-00200-09040	0.9	4	1.4	12°	4	45	4.26	4.46	4.66	4.89	5.43
08-00200-09060		6				45	6.35	6.63	6.95	7.29	8.08
08-00200-09080		8				50	8.44	8.81	9.23	9.68	10.74
08-00200-09100		10				50	10.52	10.99	11.51	12.07	13.39
● 08-00200-09120		12				50	12.61	13.18	13.80	14.49	16.10
08-00200-09150		15				60	15.74	16.44	17.21	18.06	20.03
● 08-00200-10020	1	2	1.5	12°	4	50	2.21	2.31	2.42	2.54	2.82
08-00200-10030		3				50	3.25	3.39	3.55	3.73	4.13
08-00200-10040		4				50	4.29	4.48	4.69	4.92	5.46
08-00200-10050		5				50	5.33	5.57	5.83	6.12	6.79
08-00200-10060		6				50	6.37	6.66	6.97	7.32	8.11
08-00200-10070		7				50	7.42	7.75	8.11	8.51	9.44
08-00200-10080		8				50	8.46	8.84	9.25	9.71	10.77
08-00200-10090		9				50	9.50	9.93	10.39	10.91	12.10
08-00200-10100		10				50	10.55	11.02	11.53	12.10	13.42
08-00200-10120		12				50	12.63	13.20	13.82	14.49	16.08
08-00200-10140		14				50	14.72	15.38	16.10	16.89	18.73
08-00200-10160		16				60	16.80	17.55	18.38	19.28	21.39
08-00200-10180		18				60	18.89	19.73	20.66	21.67	24.04
08-00200-10200		20				60	20.97	21.91	22.94	24.07	26.70
08-00200-10220		22				60	23.06	24.09	25.22	26.46	Free
08-00200-10250	25	70	26.19	27.36	28.64	30.05	Free				

**Attenzione** Quando ordinate, indicate MHR230 (D)×(ℓ<sub>1</sub>).  
When you order, indicate MHR230 (D)×(ℓ<sub>1</sub>).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 179.
- Milling condition is recommended on page 179.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
							30°	1°	1° 30'	2°	3°
08-00200-10300	1	30	1.5	12°	4	70	31.40	32.81	34.34	36.03	Free
08-00200-12040	1.2	4	1.8	12°	4	50	4.29	4.48	4.69	4.92	5.46
08-00200-12060		6				50	6.37	6.66	6.97	7.32	8.11
08-00200-12080		8				50	8.46	8.84	9.25	9.71	10.77
08-00200-12100		10				50	10.55	11.02	11.53	12.10	13.42
08-00200-12120		12				50	12.63	13.20	13.82	14.49	16.08
08-00200-12160		16				60	16.80	17.55	18.38	19.28	21.39
08-00200-12200	20	60	20.97	21.91	22.94	24.07	26.70				
08-00200-14060	1.4	6	2.1	12°	4	50	6.37	6.66	6.97	7.32	8.11
08-00200-14080		8				50	8.46	8.84	9.25	9.71	10.77
08-00200-14100		10				50	10.55	11.02	11.53	12.10	13.42
08-00200-14120		12				50	12.63	13.20	13.82	14.49	16.08
08-00200-14140		14				60	14.72	15.38	16.10	16.89	18.73
08-00200-14160		16				60	16.80	17.55	18.38	19.28	21.39
08-00200-14220		22				60	23.06	24.09	25.22	26.46	Free
08-00200-15040		4				50	4.29	4.48	4.69	4.92	5.46
08-00200-15060	6	50	6.37	6.66	6.97	7.32	8.11				
08-00200-15080	8	50	8.46	8.84	9.25	9.71	10.77				
08-00200-15100	10	50	10.55	11.02	11.53	12.10	13.42				
08-00200-15120	12	50	12.63	13.20	13.82	14.49	16.08				
08-00200-15140	14	60	14.72	15.38	16.10	16.89	18.73				
08-00200-15160	16	60	16.80	17.55	18.38	19.28	21.39				
08-00200-15180	18	60	18.89	19.73	20.66	21.67	24.04				
08-00200-15200	20	60	20.97	21.91	22.94	24.07	Free				
08-00200-15250	25	70	26.19	27.36	28.64	30.05	Free				
08-00200-15300	30	70	31.40	32.81	34.34	36.03	Free				
08-00200-15350	35	80	36.62	38.25	40.05	Free	Free				
08-00200-15380	38	80	39.74	41.52	43.47	Free	Free				
08-00200-15400	40	80	41.83	43.70	45.75	Free	Free				
08-00200-15450	45	80	47.04	49.15	Free	Free	Free				
08-00200-16060	1.6	6	2.4	12°	4	50	6.37	6.66	6.97	7.32	8.11
08-00200-16080		8				50	8.46	8.84	9.25	9.71	10.77
08-00200-16100		10				50	10.55	11.02	11.53	12.10	13.42
08-00200-16120		12				50	12.63	13.20	13.82	14.49	16.08
08-00200-16140		14				60	14.72	15.38	16.10	16.89	18.73
08-00200-16160		16				60	16.80	17.55	18.38	19.28	21.39

**Attenzione**

Quando ordinate, indicate MHR230 (D)×(ℓ1).  
When you order, indicate MHR230 (D)×(ℓ1).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 179.
- Milling condition is recommended on page 179.

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Plane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

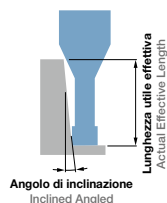
**Non Rivestite**  
Non-Coating  
Frese  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



● **NUOVO** NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.								
							30°	1°	1° 30'	2°	3°				
08-00200-16180	1.6	18	2.4	12°	4	60	18.89	19.73	20.66	21.67	Free				
08-00200-16200		20				60	20.97	21.91	22.94	24.07	Free				
08-00200-16260		26				60	27.23	28.45	29.78	31.25	Free				
08-00200-18060		6				50	6.37	6.66	6.97	7.32	8.11				
08-00200-18080	1.8	8	2.7	12°	4	50	8.46	8.84	9.25	9.71	10.77				
08-00200-18100		10				50	10.55	11.02	11.53	12.10	13.42				
08-00200-18120		12				50	12.63	13.20	13.82	14.49	16.08				
08-00200-18140		14				50	14.72	15.38	16.10	16.89	18.73				
08-00200-18160		16				60	16.80	17.55	18.38	19.28	21.39				
08-00200-18180		18				60	18.89	19.73	20.66	21.67	Free				
08-00200-18200		20				60	20.97	21.91	22.94	24.07	Free				
08-00200-18250		25				70	26.19	27.36	28.64	30.05	Free				
● 08-00200-20040		2				4	3	12°	4	50	4.32	4.51	4.73	4.96	5.51
08-00200-20060						6				50	6.40	6.69	7.00	7.34	8.15
08-00200-20080	8		50	8.48	8.86	9.28				9.74	10.80				
08-00200-20100	10		50	10.57	11.04	11.56				12.13	13.45				
08-00200-20120	12		50	12.66	13.22	13.84				14.52	16.11				
08-00200-20140	14		60	14.74	15.40	16.12				16.92	18.76				
08-00200-20160	16		60	16.83	17.58	18.40				19.31	Free				
08-00200-20180	18		60	18.91	19.76	20.69				21.70	Free				
08-00200-20200	20		60	21.00	21.94	22.97				24.10	Free				
08-00200-20250	25		70	26.21	27.39	28.67				Free	Free				
08-00200-20300	30		70	31.43	32.83	34.37				Free	Free				
08-00200-20350	35		80	36.64	38.28	Free				Free	Free				
08-00200-20400	40		90	41.85	43.73	Free				Free	Free				
08-00200-20500	50		100	52.28	54.62	Free				Free	Free				
08-00200-20600	60		110	62.71	Free	Free				Free	Free				
08-00200-25080	2.5		8	3.7	12°	4				50	8.58	8.97	9.39	9.85	10.93
08-00200-25100		10	50				10.67	11.15	11.67	12.24	13.58				
08-00200-25120		12	50				12.75	13.32	13.95	14.64	Free				
08-00200-25140		14	50				14.84	15.50	16.23	17.03	Free				
08-00200-25160		16	60				16.93	17.68	18.51	19.42	Free				
08-00200-25180		18	60				19.01	19.86	20.79	21.82	Free				
08-00200-25200		20	60				21.10	22.04	23.07	Free	Free				
08-00200-25250		25	70				26.31	27.49	28.78	Free	Free				
08-00200-25300		30	70				31.52	32.94	Free	Free	Free				

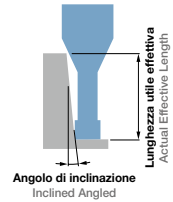
### Attenzione

Quando ordinate, indicate MHR230 (D)×(ℓ<sub>1</sub>).  
When you order, indicate MHR230 (D)×(ℓ<sub>1</sub>).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 179.
- Milling condition is recommended on page 179.





● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.								
							30'	1°	1° 30'	2°	3°				
08-00200-25400	2.5	40	3.7	12°	4	90	41.95	43.83	Free	Free	Free				
08-00200-25500		50				100	52.38	Free	Free	Free	Free				
08-00200-30080	3	8	4.5	12°	6	50	8.71	9.10	9.52	9.99	11.08				
08-00200-30100		10				50	10.79	11.27	11.80	12.38	13.74				
08-00200-30120		12				50	12.88	13.45	14.08	14.78	16.39				
08-00200-30140		14				50	14.96	15.63	16.36	17.17	19.04				
08-00200-30160		16				60	17.05	17.81	18.65	19.56	21.70				
08-00200-30180		18				60	19.13	19.99	20.93	21.96	24.35				
08-00200-30200		20				60	21.22	22.17	23.21	24.35	27.01				
08-00200-30250		25				70	26.43	27.62	28.91	30.33	Free				
08-00200-30300		30				70	31.65	33.06	34.61	36.31	Free				
08-00200-30350		35				90	36.86	38.51	40.32	42.30	Free				
08-00200-30400		40				90	42.08	43.96	46.02	Free	Free				
08-00200-30500		50				100	52.50	54.85	57.42	Free	Free				
08-00200-40120	4	12	6	12°	6	50	13.00	13.58	14.22	14.92	16.55				
08-00200-40160		16				60	17.17	17.94	18.78	19.70	Free				
08-00200-40200		20				60	21.34	22.30	23.34	24.49	Free				
08-00200-40250		25				70	26.56	27.74	29.04	Free	Free				
08-00200-40300		30				70	31.77	33.19	34.75	Free	Free				
08-00200-40350		35				80	36.98	38.64	Free	Free	Free				
08-00200-40400		40				90	42.20	44.09	Free	Free	Free				
08-00200-40450		45				90	47.41	49.53	Free	Free	Free				
08-00200-40500		50				100	52.63	54.98	Free	Free	Free				
08-00200-40600		60				110	63.05	Free	Free	Free	Free				
08-00200-50160		5				16	7.5	12°	6	60	17.17	17.94	18.78	Free	Free
08-00200-50200						20				60	21.34	22.30	Free	Free	Free
08-00200-50250	25		70	26.56	27.74	Free				Free	Free				
08-00200-50300	30		80	31.77	Free	Free				Free	Free				
08-00200-50350	35		80	36.98	Free	Free				Free	Free				
08-00200-50400	40		90	42.20	Free	Free				Free	Free				
08-00200-50500	50		110	52.63	Free	Free				Free	Free				
08-00200-50600	60		120	Free	Free	Free				Free	Free				
08-00200-60200	6		20	9		6				80	Free	Free	Free	Free	Free
08-00200-60300			30							90	Free	Free	Free	Free	Free
08-00200-60400			40							100	Free	Free	Free	Free	Free
08-00200-60500			50							110	Free	Free	Free	Free	Free
08-00200-60600		60	120				Free	Free	Free	Free	Free				

**Attenzione**

Quando ordinate, indicate MHR230 (D)×(ℓ<sub>1</sub>).  
When you order, indicate MHR230 (D)×(ℓ<sub>1</sub>).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 179.
- Milling condition is recommended on page 179.

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Non Rivestite  
Non-Coating  
**Plane Square**

**Scaricate Plane**  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

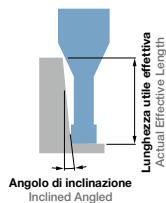
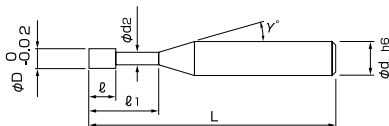
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MHR430

MUGEN-COATING 4-Flute Long Neck End Mill

## Frese 4 Tagli piane scaricate rivestite MUGEN



- Il rivestimento MUGEN è stato applicato alle nostre originali frese per nervature profonde.
- Particolarmente adatta alla lavorazione di nervature strette e profonde, grazie alla lunghezza della parte scaricata della fresa.
- MUGEN-COATING has been put on our original end mill for deep rib.
- It is very suitable for cutting on narrow and deep rib by long neck end mill.



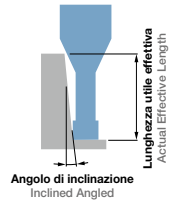
Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(<math>\ell_1</math>) Lungh. effettiva Effective Length	(<math>\ell</math>) Lungh. tagliante Length of Cut	(d2) Dia. scarico Neck Dia.	(<math>\gamma</math>) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece:				
								30'	1°	1° 30'	2°	3°
08-00210-01004	1	4	1.5	0.95	12°	4	50	4.29	4.48	4.69	4.92	5.46
08-00210-01006		6					50	6.37	6.66	6.97	7.32	8.11
08-00210-01008		8					50	8.46	8.84	9.25	9.71	10.77
08-00210-01010		10					50	10.55	11.02	11.53	12.10	13.42
08-00210-01012		12					50	12.63	13.20	13.82	14.49	16.08
08-00210-01016		16					50	16.80	17.55	18.38	19.28	21.39
08-00210-01106	1.1	6	1.7	1.05	12°	4	50	6.37	6.66	6.97	7.32	8.11
08-00210-01110		10					50	10.55	11.02	11.53	12.10	13.42
08-00210-01116		16					60	16.80	17.55	18.38	19.28	21.39
08-00210-01206	1.2	6	1.8	1.15	12°	4	50	6.37	6.66	6.97	7.32	8.11
08-00210-01208		8					50	8.46	8.84	9.25	9.71	10.77
08-00210-01210		10					50	10.55	11.02	11.53	12.10	13.42
08-00210-01212		12					50	12.63	13.20	13.82	14.49	16.08
08-00210-01216	16	60	16.80	17.55	18.38	19.28	21.39					
08-00210-01306	1.3	6	1.9	1.25	12°	4	50	6.37	6.66	6.97	7.32	8.11
08-00210-01312		12					50	12.63	13.20	13.82	14.49	16.08
08-00210-01318		18					60	18.89	19.73	20.66	21.67	24.04
08-00210-01406	1.4	6	2.1	1.35	12°	4	50	6.37	6.66	6.97	7.32	8.11
08-00210-01408		8					50	8.46	8.84	9.25	9.71	10.77
08-00210-01410		10					50	10.55	11.02	11.53	12.10	13.42
08-00210-01412		12					50	12.63	13.20	13.82	14.49	16.08
08-00210-01414		14					60	14.72	15.38	16.10	16.89	18.73
08-00210-01416		16					60	16.80	17.55	18.38	19.28	21.39
08-00210-01422		22					60	23.06	24.09	25.22	26.46	Free
08-00210-01506		6					50	6.37	6.66	6.97	7.32	8.11
08-00210-01508	8	50	8.46	8.84	9.25	9.71	10.77					
08-00210-01510	10	50	10.55	11.02	11.53	12.10	13.42					
08-00210-01512	1.5	12	2.3	1.45	12°	4	50	12.63	13.20	13.82	14.49	16.08
08-00210-01514		14					60	14.72	15.38	16.10	16.89	18.73
08-00210-01516		16					60	16.80	17.55	18.38	19.28	21.39
08-00210-01518		18					60	18.89	19.73	20.66	21.67	24.04
08-00210-01520		20					60	20.97	21.91	22.94	24.07	Free
08-00210-01606		6					50	6.37	6.66	6.97	7.32	8.11
08-00210-01608	8	50	8.46	8.84	9.25	9.71	10.77					
08-00210-01610	10	50	10.55	11.02	11.53	12.10	13.42					

**Attenzione** Quando ordinate, indicate MHR430 (D)×(<math>\ell\_1</math>).  
When you order, indicate MHR430 (D)×(<math>\ell\_1</math>).

※ (<math>\gamma</math>) è un valore di riferimento.  
※ (<math>\gamma</math>) is reference value.

- Per i parametri di taglio vedi pagina 184.
- Milling condition is recommended on page 184.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ <sub>1</sub> ) Lunghezza effettiva Effective Length	(ℓ) Lunghezza tagliante Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lunghezza totale Overall Length	La lunghezza utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
								30°	1°	1° 30'	2°	3°
08-00210-01612	1.6	12	2.4	1.55	12°	4	50	12.63	13.20	13.82	14.49	16.08
08-00210-01614		14					60	14.72	15.38	16.10	16.89	18.73
08-00210-01616		16					60	16.80	17.55	18.38	19.28	21.39
08-00210-01618		18					60	18.89	19.73	20.66	21.67	Free
08-00210-01620		20					60	20.97	21.91	22.94	24.07	Free
08-00210-01626		26					70	27.23	28.45	29.78	31.25	Free
08-00210-01706	1.7	6	2.5	1.65	12°	4	50	6.37	6.66	6.97	7.32	8.11
08-00210-01714		14					60	14.72	15.38	16.10	16.89	18.73
08-00210-01724		24					70	25.15	26.27	27.50	28.85	Free
08-00210-01806	1.8	6	2.7	1.74	12°	4	50	6.37	6.66	6.97	7.32	8.11
08-00210-01808		8					50	8.46	8.84	9.25	9.71	10.77
08-00210-01810		10					50	10.55	11.02	11.53	12.10	13.42
08-00210-01812		12					50	12.63	13.20	13.82	14.49	16.08
08-00210-01814		14					60	14.72	15.38	16.10	16.89	18.73
08-00210-01816		16					60	16.80	17.55	18.38	19.28	21.39
08-00210-01818		18					60	18.89	19.73	20.66	21.67	Free
08-00210-01820		20					60	20.97	21.91	22.94	24.07	Free
08-00210-01825		25					70	26.19	27.36	28.64	30.05	Free
08-00210-01906		1.9					6	2.8	1.84	12°	4	50
08-00210-01916	16		60	16.83	17.58	18.40	19.31					Free
08-00210-01928	28		70	29.34	30.65	32.09	Free					Free
08-00210-02006	2	6	3	1.94	12°	4	50	6.40	6.69	7.00	7.34	8.15
08-00210-02008		8					50	8.48	8.86	9.28	9.74	10.80
08-00210-02010		10					50	10.57	11.04	11.56	12.13	13.45
08-00210-02012		12					50	12.66	13.22	13.84	14.52	16.11
08-00210-02014		14					60	14.74	15.40	16.12	16.92	18.76
08-00210-02016		16					60	16.83	17.58	18.40	19.31	Free
08-00210-02018		18					60	18.91	19.76	20.69	21.70	Free
08-00210-02020		20					60	21.00	21.94	22.97	24.10	Free
08-00210-02025		25					70	26.21	27.39	28.67	Free	Free
08-00210-02030		30					70	31.43	32.83	34.37	Free	Free
08-00210-02508	2.5	8	3.7	2.4	12°	4	50	8.58	8.97	9.39	9.85	10.93
08-00210-02512		12					50	12.75	13.32	13.95	14.64	Free
08-00210-02516		16					60	16.93	17.68	18.51	19.42	Free
08-00210-02520		20					60	21.10	22.04	23.07	Free	Free

**Attenzione** Quando ordinate, indicate MHR430 (D)×(ℓ<sub>1</sub>).  
When you order, indicate MHR430 (D)×(ℓ<sub>1</sub>).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 184.
- Milling condition is recommended on page 184.

**Piastre**  
Square  
Coating  
Non Rivestite  
Non Rivestite  
Long Neck  
Square

**Sferiche**  
Ball  
Coating  
Non Rivestite  
Non Rivestite  
Long Neck  
Ball

**Coniche**  
Taper  
Coating  
Non Rivestite  
Non Rivestite  
Taper Ball

**Toriche**  
Corner R  
Coating  
Non Rivestite  
Non Rivestite  
Long Neck  
Corner R

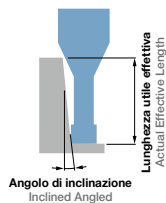
**Frese**  
Sagomate  
Formed  
Cutter  
Coating  
Non Rivestite  
Non Rivestite

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



Codice Code No.	(D) Dia. Dia.	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece:				
								30'	1°	1° 30'	2°	3°
08-00210-02525	2.5	25	3.7	2.4	12°	4	70	26.31	27.49	28.78	Free	Free
08-00210-03008	3	8	4.5	2.85	12°	6	50	8.71	9.10	9.52	9.99	11.08
08-00210-03012		12					50	12.88	13.45	14.08	14.78	16.39
08-00210-03016		16					60	17.05	17.81	18.65	19.56	21.70
08-00210-03020		20					60	21.22	22.17	23.21	24.35	27.01
08-00210-03025		25					70	26.43	27.62	28.91	30.33	Free
08-00210-03030		30					70	31.65	33.06	34.61	36.31	Free
08-00210-03515	3.5	15	5.5	3.35	12°	6	60	16.01	16.72	17.50	18.37	20.37
08-00210-03525		25					70	26.43	27.62	28.91	30.33	Free
08-00210-03535		35					80	36.86	38.51	40.32	Free	Free
08-00210-04012	4	12	6	3.8	12°	6	50	13.00	13.58	14.22	14.92	16.55
08-00210-04016		16					60	17.17	17.94	18.78	19.70	Free
08-00210-04020		20					60	21.34	22.30	23.34	24.49	Free
08-00210-04025		25					70	26.56	27.74	29.04	Free	Free
08-00210-04030		30					70	31.77	33.19	34.75	Free	Free
08-00210-04035		35					80	36.98	38.64	Free	Free	Free
08-00210-04040		40					90	42.20	44.09	Free	Free	Free
08-00210-04045		45					90	47.41	49.53	Free	Free	Free
08-00210-04050		50					100	52.63	54.98	Free	Free	Free
08-00210-05016		5					16	7.5	4.8	12°	6	60
08-00210-05025	25		70	26.56	27.74	Free	Free					Free
08-00210-05035	35		80	36.98	Free	Free	Free					Free
08-00210-05050	50		110	52.63	Free	Free	Free					Free
08-00210-06020	6	20	9	5.8	-	6	80	Free	Free	Free	Free	Free
08-00210-06030		30					90	Free	Free	Free	Free	Free
08-00210-06040		40					100	Free	Free	Free	Free	Free
08-00210-06050		50					110	Free	Free	Free	Free	Free
08-00210-08030	8	30	12	7.8	-	8	100	Free	Free	Free	Free	Free
08-00210-08050		50					120	Free	Free	Free	Free	Free
08-00210-08060		60					130	Free	Free	Free	Free	Free
08-00210-10040		10					40	15	9.8	-	10	110
08-00210-10060	60		130	Free	Free	Free	Free					Free
08-00210-10080	80		150	Free	Free	Free	Free					Free

**Attenzione** Quando ordinate, indicate MHR430 (D)×(ℓ1).  
When you order, indicate MHR430 (D)×(ℓ1).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 184.
- Milling condition is recommended on page 184.

# Parametri di taglio raccomandati

# MHR230

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

## Recommended Milling Conditions

Materiale Work Material		Acciaio al carbonio•Acciaio legato <sub>S41</sub> •Acciaio inox <sub>S41</sub> Carbon Steels•Alloy Steels <sub>S41</sub> •Stainless Steels <sub>S41</sub> C50•42CrMo4•39NiCrMo3•AISI304			Acciai pretemprati Prehardened Steels 1.2311•STAVAX•1.2343 (~43HRC)			Rame•Alluminio Copper•Aluminum		
Dia. Dia.	Lunghezza effettiva Effective Length	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut
		min <sup>-1</sup>	mm/min	ap mm	min <sup>-1</sup>	mm/min	ap mm	min <sup>-1</sup>	mm/min	ap mm
0.1	0.3	40,000	150	0.005	40,000	120	0.004	40,000	150	0.006
	0.5	40,000	100	0.004	40,000	75	0.003	40,000	100	0.005
	0.75	40,000	60	0.003	40,000	50	0.002	40,000	60	0.003
	1	40,000	40	0.002	40,000	30	0.002	40,000	40	0.002
0.15	0.3	40,000	200	0.005	40,000	150	0.004	40,000	200	0.008
	0.5	40,000	150	0.005	40,000	120	0.004	40,000	150	0.008
	0.75	40,000	100	0.004	40,000	90	0.003	40,000	100	0.006
	1	40,000	80	0.003	40,000	60	0.002	40,000	80	0.004
0.15	1.5	40,000	50	0.002	35,000	40	0.002	40,000	50	0.003
	0.5	40,000	330	0.01	40,000	250	0.007	40,000	330	0.012
	0.75	40,000	280	0.008	40,000	220	0.006	40,000	280	0.01
	1	40,000	250	0.007	40,000	180	0.005	40,000	250	0.008
0.2	1.5	40,000	180	0.005	35,000	120	0.004	40,000	180	0.006
	2	40,000	100	0.003	35,000	65	0.002	40,000	100	0.004
	2.5	35,000	80	0.003	30,000	50	0.002	40,000	90	0.003
	3	30,000	60	0.002	25,000	40	0.002	35,000	70	0.002
0.2	3.5	25,000	40	0.002	22,000	30	0.002	30,000	50	0.002
	4	23,000	30	0.001	20,000	20	0.001	25,000	35	0.001
	1	40,000	400	0.02	35,000	260	0.015	40,000	400	0.024
	1.5	40,000	350	0.015	35,000	230	0.01	40,000	350	0.018
0.3	2	35,000	300	0.01	30,000	180	0.007	40,000	320	0.012
	2.5	30,000	250	0.007	25,000	160	0.005	35,000	280	0.008
	3	30,000	200	0.005	25,000	130	0.004	35,000	250	0.006
	4	25,000	120	0.004	22,000	80	0.003	30,000	150	0.004
0.3	5	22,000	80	0.003	20,000	55	0.002	25,000	90	0.003
	6	20,000	60	0.002	18,000	40	0.002	22,000	65	0.002
	9	18,000	30	0.001	16,000	20	0.001	20,000	35	0.001
	1	35,000	500	0.025	30,000	330	0.018	40,000	600	0.03
0.4	1.5	35,000	450	0.02	30,000	280	0.014	40,000	500	0.026
	2	35,000	400	0.02	30,000	260	0.014	40,000	450	0.024
	2.5	30,000	350	0.015	25,000	230	0.01	40,000	400	0.02
	3	30,000	300	0.015	25,000	190	0.01	35,000	350	0.018
0.4	3.5	25,000	250	0.01	25,000	160	0.008	35,000	280	0.015
	4	25,000	200	0.01	22,000	140	0.007	30,000	240	0.012
	5	22,000	160	0.008	20,000	110	0.005	25,000	180	0.01
	6	20,000	120	0.005	18,000	80	0.003	22,000	130	0.006
0.4	7	18,000	100	0.003	16,000	70	0.002	20,000	110	0.003
	8	18,000	80	0.002	16,000	60	0.002	20,000	85	0.002
	9	18,000	70	0.002	16,000	50	0.002	20,000	75	0.002
	10	18,000	60	0.002	16,000	40	0.002	20,000	65	0.002
0.4	12	18,000	40	0.002	16,000	30	0.002	20,000	45	0.002
	1	30,000	550	0.03	25,000	350	0.022	35,000	650	0.036
	1.5	30,000	520	0.028	25,000	330	0.02	35,000	630	0.033
	2	30,000	500	0.025	25,000	320	0.018	35,000	600	0.03
0.5	2.5	30,000	470	0.023	25,000	290	0.016	35,000	580	0.027
	3	30,000	450	0.02	25,000	280	0.014	35,000	550	0.024
	3.5	30,000	420	0.018	22,000	250	0.012	30,000	500	0.021
	4	25,000	350	0.015	22,000	230	0.01	30,000	420	0.018
0.5	4.5	25,000	320	0.013	20,000	200	0.008	30,000	380	0.015
	5	25,000	300	0.01	20,000	180	0.007	30,000	350	0.012

\*1 Per lavorazioni di acciaio legato e acciaio inox, i valori di riferimento sono l'80% delle condizioni di taglio consigliate.

\*1 Reference value for Alloy and Stainless Steels are 80% of recommended cutting conditions.

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Materiale Work Material		Acciaio al carbonio•Acciaio legato <sub>1</sub> •Acciaio inox <sub>1</sub> Carbon Steels•Alloy Steels <sub>1</sub> •Stainless Steels <sub>1</sub> C50•42CrMo4•39NiCrMo3•AISI304			Acciai pretemprati Prehardened Steels 1.2311•STAVAX•1.2343 (~43HRC)			Rame•Alluminio Copper•Aluminum		
Dia. Dia.	Lunghezza effettiva Effective Length	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut
		min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm
0.5	6	20,000	200	0.008	18,000	140	0.005	25,000	250	0.01
	7	20,000	180	0.005	16,000	110	0.003	22,000	200	0.006
	8	18,000	150	0.003	14,000	90	0.002	20,000	160	0.003
	9	16,000	120	0.003	14,000	80	0.002	18,000	135	0.003
	10	16,000	100	0.002	14,000	65	0.002	18,000	110	0.002
	12	16,000	80	0.002	14,000	50	0.002	18,000	90	0.002
0.6	15	16,000	50	0.002	14,000	35	0.002	18,000	55	0.002
	1.5	30,000	600	0.035	25,000	400	0.025	35,000	700	0.04
	2	30,000	600	0.035	25,000	380	0.025	35,000	700	0.04
	3	30,000	550	0.03	25,000	350	0.02	35,000	650	0.035
	4	25,000	450	0.025	22,000	300	0.018	30,000	550	0.03
	5	25,000	400	0.02	20,000	240	0.014	30,000	480	0.024
	6	20,000	300	0.015	18,000	200	0.01	25,000	380	0.018
	7	20,000	250	0.012	16,000	150	0.008	22,000	280	0.014
	8	18,000	200	0.01	15,000	130	0.007	20,000	230	0.012
	9	18,000	180	0.008	15,000	110	0.005	20,000	200	0.009
0.7	10	16,000	150	0.005	14,000	100	0.003	18,000	170	0.006
	12	14,000	120	0.003	12,000	80	0.002	16,000	130	0.003
	15	14,000	90	0.002	12,000	60	0.002	16,000	100	0.002
	18	14,000	60	0.002	12,000	40	0.002	16,000	70	0.002
	2	30,000	650	0.04	25,000	400	0.03	35,000	750	0.05
	4	25,000	500	0.03	22,000	330	0.02	30,000	600	0.04
	6	20,000	350	0.02	18,000	240	0.015	25,000	450	0.03
	8	18,000	280	0.015	15,000	180	0.01	22,000	350	0.02
0.8	10	16,000	220	0.008	14,000	150	0.005	20,000	280	0.01
	3	25,000	700	0.05	22,000	500	0.03	35,000	850	0.06
	4	25,000	600	0.045	22,000	400	0.03	30,000	720	0.055
	5	22,000	500	0.035	20,000	350	0.025	30,000	650	0.05
	6	20,000	450	0.03	18,000	300	0.02	25,000	560	0.04
	8	18,000	350	0.02	15,000	240	0.015	22,000	430	0.025
	10	16,000	300	0.01	14,000	200	0.007	20,000	380	0.012
	12	14,000	250	0.008	12,000	170	0.005	16,000	290	0.01
	14	12,000	200	0.005	10,000	140	0.003	14,000	230	0.006
	16	12,000	150	0.003	10,000	110	0.002	14,000	170	0.003
0.9	20	12,000	120	0.002	10,000	80	0.002	14,000	140	0.002
	24	12,000	80	0.002	10,000	50	0.002	14,000	90	0.002
	4	25,000	900	0.05	22,000	600	0.035	30,000	1,000	0.06
	6	20,000	600	0.04	18,000	400	0.03	25,000	750	0.05
	8	18,000	500	0.03	16,000	330	0.02	22,000	620	0.04
	10	16,000	400	0.02	14,000	260	0.015	20,000	500	0.025
	12	14,000	300	0.01	12,000	200	0.008	16,000	400	0.015
	15	12,000	250	0.008	10,000	160	0.005	14,000	300	0.01
1	2	25,000	1,500	0.07	22,000	1,000	0.06	30,000	1,800	0.08
	3	25,000	1,200	0.06	22,000	800	0.05	30,000	1,500	0.07
	4	25,000	1,100	0.055	22,000	700	0.045	30,000	1,300	0.065
	5	22,000	900	0.05	20,000	600	0.04	27,000	1,100	0.06
	6	20,000	800	0.045	18,000	500	0.035	25,000	1,000	0.055
	7	20,000	800	0.04	18,000	500	0.03	25,000	1,000	0.05
	8	18,000	700	0.035	15,000	400	0.025	22,000	850	0.045
	9	18,000	700	0.03	15,000	400	0.02	22,000	850	0.04

Materiale Work Material		Acciaio al carbonio•Acciaio legato <sub>1</sub> •Acciaio inox <sub>1</sub> Carbon Steels•Alloy Steels <sub>1</sub> •Stainless Steels <sub>1</sub> C50•42CrMo4•39NiCrMo3•AISI304			Acciai pretemprati Prehardened Steels 1.2311•STAVAX•1.2343 (~43HRC)			Rame•Alluminio Copper•Aluminum		
Dia. Dia.	Lunghezza effettiva Effective Length	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut
		min <sup>-1</sup>	mm/min	ap mm	min <sup>-1</sup>	mm/min	ap mm	min <sup>-1</sup>	mm/min	ap mm
1	10	16,000	600	0.025	14,000	350	0.018	20,000	750	0.03
	12	14,000	500	0.02	12,000	300	0.014	18,000	650	0.025
	14	13,000	400	0.015	11,000	250	0.01	15,000	450	0.018
	16	12,000	300	0.01	10,000	200	0.007	14,000	350	0.012
	18	12,000	250	0.008	10,000	150	0.005	14,000	300	0.01
	20	11,000	200	0.005	9,000	120	0.003	13,000	230	0.006
	22	11,000	160	0.003	9,000	100	0.002	13,000	190	0.003
	25	10,000	120	0.002	8,500	80	0.002	12,000	140	0.002
1.2	30	10,000	80	0.002	8,500	50	0.002	12,000	100	0.002
	4	23,000	1,200	0.06	20,000	800	0.05	27,000	1,400	0.07
	6	20,000	900	0.05	18,000	600	0.04	25,000	1,200	0.06
	8	18,000	800	0.04	15,000	500	0.03	22,000	1,000	0.05
	10	16,000	700	0.03	14,000	450	0.02	20,000	850	0.04
	12	14,000	600	0.025	12,000	350	0.018	17,000	700	0.03
	16	12,000	400	0.015	10,000	250	0.01	14,000	450	0.02
	20	10,000	300	0.01	8,000	180	0.007	12,000	360	0.012
1.4	6	20,000	1,200	0.07	16,000	720	0.06	24,000	1,500	0.08
	8	18,000	1,000	0.06	14,000	580	0.05	22,000	1,300	0.07
	10	16,000	850	0.05	13,000	520	0.04	20,000	1,100	0.06
	12	14,000	700	0.04	12,000	450	0.03	17,000	850	0.05
	14	13,000	600	0.035	11,000	350	0.025	15,000	700	0.04
	16	12,000	500	0.025	10,000	300	0.018	13,000	550	0.03
1.5	22	10,000	350	0.015	8,000	210	0.01	10,000	350	0.012
	4	22,000	1,400	0.09	18,000	860	0.08	26,000	1,700	0.1
	6	20,000	1,200	0.08	16,000	720	0.07	24,000	1,500	0.09
	8	18,000	1,000	0.07	14,000	580	0.06	22,000	1,300	0.08
	10	16,000	850	0.06	13,000	520	0.05	20,000	1,100	0.07
	12	14,000	700	0.05	12,000	450	0.04	17,000	850	0.06
	14	13,000	600	0.04	11,000	380	0.03	16,000	750	0.05
	16	12,000	500	0.035	10,000	320	0.025	15,000	650	0.04
	18	11,000	450	0.03	9,000	280	0.02	13,000	530	0.035
	20	10,000	400	0.02	8,000	240	0.014	12,000	480	0.025
	25	9,000	350	0.015	7,000	200	0.01	9,000	350	0.018
	30	8,000	300	0.008	6,000	170	0.005	8,000	300	0.01
	35	7,000	200	0.005	5,500	130	0.003	7,000	200	0.006
	38	6,700	170	0.003	5,200	110	0.002	6,700	170	0.003
	40	6,500	150	0.002	5,000	90	0.002	6,500	150	0.002
	45	6,000	100	0.002	4,500	60	0.002	6,000	100	0.002
1.6	6	20,000	1,200	0.09	16,000	720	0.08	24,000	1,500	0.1
	8	18,000	1,000	0.08	14,000	580	0.07	22,000	1,300	0.09
	10	16,000	850	0.07	13,000	520	0.06	20,000	1,100	0.08
	12	14,000	700	0.06	12,000	450	0.05	18,000	900	0.07
	14	13,000	600	0.05	11,000	380	0.04	16,000	750	0.06
	16	12,000	500	0.04	10,000	320	0.03	14,000	620	0.05
	18	11,000	450	0.03	9,000	280	0.025	13,000	530	0.035
	20	10,000	400	0.025	8,000	240	0.018	12,000	480	0.03
26	9,000	350	0.02	7,000	200	0.014	9,000	350	0.025	

\*1 Per lavorazioni di acciaio legato e acciaio inox, i valori di riferimento sono l'80% delle condizioni di taglio consigliate.

\*1 Reference value for Alloy and Stainless Steels are 80% of recommended cutting conditions.

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

Rivestite Coating  
Non Rivestite Non-Coating

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

Rivestite Coating  
Non Rivestite Non-Coating

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

Rivestite Coating  
Non Rivestite Non-Coating

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

Rivestite Coating  
Non Rivestite Non-Coating

**Frese Sagomate**  
Formed Cutter

Rivestite Coating  
Non Rivestite Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Materiale Work Material		Acciaio al carbonio•Acciaio legato <sub>SAE</sub> •Acciaio inox <sub>AISI</sub> Carbon Steels•Alloy Steels <sub>SAE</sub> •Stainless Steels <sub>AISI</sub> C50•42CrMo4•39NiCrMo3•AISI304			Acciai pretemprati Prehardened Steels 1.2311•STAVAX•1.2343 (~43HRC)			Rame•Alluminio Copper•Aluminum		
Dia. Dia.	Lunghezza effettiva Effective Length	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut
		min <sup>-1</sup>	mm/min	ap mm	min <sup>-1</sup>	mm/min	ap mm	min <sup>-1</sup>	mm/min	ap mm
1.8	6	18,000	1,300	0.1	14,000	760	0.09	22,000	1,600	0.12
	8	18,000	1,100	0.09	14,000	640	0.08	22,000	1,400	0.11
	10	16,000	900	0.08	13,000	550	0.07	20,000	1,200	0.1
	12	14,000	750	0.07	12,000	480	0.06	17,000	900	0.085
	14	13,000	650	0.06	11,000	420	0.05	16,000	800	0.07
	16	12,000	550	0.05	10,000	350	0.04	15,000	700	0.06
	18	11,000	500	0.04	9,000	310	0.03	13,000	600	0.05
	20	10,000	450	0.035	8,000	270	0.025	12,000	540	0.04
2	25	9,000	400	0.025	7,000	230	0.018	11,000	480	0.03
	4	16,000	1,500	0.13	13,000	900	0.12	20,000	1,850	0.15
	6	16,000	1,400	0.12	13,000	850	0.1	20,000	1,750	0.14
	8	16,000	1,300	0.11	13,000	800	0.09	20,000	1,650	0.13
	10	16,000	1,200	0.1	13,000	750	0.08	20,000	1,500	0.12
	12	14,000	1,000	0.09	12,000	650	0.07	17,000	1,200	0.11
	14	13,000	900	0.08	11,000	570	0.06	16,000	1,100	0.1
	16	12,000	800	0.07	10,000	500	0.05	15,000	1,000	0.085
	18	11,000	700	0.06	9,000	430	0.04	13,000	800	0.07
	20	10,000	600	0.05	8,000	360	0.035	12,000	720	0.06
	25	9,000	500	0.03	7,000	300	0.02	11,000	600	0.035
	30	8,000	400	0.02	6,000	220	0.014	9,000	450	0.025
	35	7,000	300	0.01	5,500	180	0.007	7,000	300	0.012
	40	6,000	200	0.005	5,000	140	0.003	6,000	200	0.006
	50	5,000	150	0.003	4,000	90	0.002	5,000	150	0.003
	2.5	60	4,500	100	0.002	3,500	60	0.002	4,500	100
8		13,000	1,400	0.15	11,000	900	0.12	16,000	1,700	0.18
10		13,000	1,300	0.14	11,000	800	0.11	16,000	1,600	0.17
12		13,000	1,200	0.13	11,000	750	0.1	16,000	1,500	0.16
14		12,000	1,000	0.12	10,000	650	0.09	14,000	1,200	0.15
16		11,000	900	0.1	9,000	550	0.07	13,000	1,100	0.12
18		10,000	800	0.09	8,000	480	0.06	12,000	950	0.11
20		9,000	700	0.08	7,000	400	0.05	11,000	850	0.1
25		8,000	600	0.05	6,000	330	0.035	10,000	750	0.06
30		7,000	500	0.03	5,500	280	0.02	8,500	600	0.035
3	40	6,000	300	0.015	4,500	180	0.01	6,000	300	0.018
	50	5,000	200	0.01	4,000	120	0.007	5,000	200	0.012
	8	11,000	1,500	0.2	9,000	1,000	0.16	13,000	1,800	0.24
	10	11,000	1,400	0.18	9,000	900	0.14	13,000	1,700	0.22
	12	11,000	1,300	0.16	9,000	800	0.12	13,000	1,600	0.2
	14	11,000	1,200	0.14	9,000	700	0.1	13,000	1,400	0.17
	16	10,000	1,000	0.12	8,000	600	0.09	12,000	1,200	0.15
	18	10,000	900	0.11	8,000	550	0.08	12,000	1,100	0.13
	20	9,000	800	0.1	7,000	450	0.07	11,000	1,000	0.12
	25	8,000	700	0.08	6,000	380	0.06	10,000	900	0.1
	30	7,000	600	0.06	5,000	300	0.045	8,500	730	0.07
	35	6,000	500	0.03	4,500	260	0.02	7,200	600	0.035
40	5,000	400	0.025	4,000	220	0.018	6,000	480	0.03	
50	4,500	300	0.015	3,500	180	0.01	4,500	300	0.018	



Materiale Work Material		Acciaio al carbonio•Acciaio legato <sub>st1</sub> •Acciaio inox <sub>st1</sub> Carbon Steels•Alloy Steels <sub>st1</sub> •Stainless Steels <sub>st1</sub> C50•42CrMo4•39NiCrMo3•AISI304			Acciai pretemprati Prehardened Steels 1.2311•STAVAX•1.2343 (~43HRC)			Rame•Alluminio Copper•Aluminum		
Dia. Dia.	Lunghezza effettiva Effective Length	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut
		min <sup>-1</sup>	mm/min	ap mm	min <sup>-1</sup>	mm/min	ap mm	min <sup>-1</sup>	mm/min	ap mm
4	12	8,000	1,500	0.3	6,000	850	0.25	10,000	1,900	0.36
	16	8,000	1,400	0.25	6,000	800	0.2	10,000	1,800	0.3
	20	8,000	1,300	0.2	6,000	730	0.15	10,000	1,600	0.24
	25	7,000	1,100	0.15	5,000	600	0.1	8,500	1,300	0.18
	30	7,000	1,000	0.12	5,000	540	0.08	8,500	1,200	0.15
	35	6,000	800	0.1	4,500	450	0.07	7,200	1,000	0.12
	40	5,000	600	0.08	4,000	360	0.06	6,000	720	0.1
	45	4,500	500	0.06	3,500	300	0.04	5,400	600	0.07
5	50	4,000	400	0.04	3,000	220	0.03	4,800	480	0.05
	60	3,500	300	0.02	2,500	160	0.014	4,200	360	0.025
	16	6,000	1,400	0.35	4,500	800	0.3	7,200	1,700	0.42
	20	6,000	1,300	0.3	4,500	730	0.25	7,200	1,600	0.36
	25	6,000	1,200	0.25	4,500	680	0.2	7,200	1,500	0.3
	30	5,000	900	0.2	4,000	540	0.15	6,000	1,100	0.24
	35	5,000	800	0.15	3,500	420	0.1	6,000	1,000	0.18
	40	4,000	600	0.1	3,000	340	0.07	4,800	720	0.12
6	50	3,500	450	0.07	2,500	240	0.05	4,200	540	0.085
	60	3,000	350	0.04	2,200	200	0.03	3,600	420	0.05
	20	5,000	1,200	0.4	3,500	630	0.35	6,000	1,500	0.48
	30	4,000	900	0.35	3,000	500	0.3	4,800	1,100	0.42
	40	3,500	650	0.25	2,700	380	0.2	4,200	780	0.3
	50	3,000	500	0.15	2,200	280	0.1	3,600	600	0.18
	60	2,700	400	0.05	2,000	220	0.04	3,200	480	0.06

**Note**  
Notes

- \*1 Per lavorazioni di acciaio legato e acciaio inox, i valori di riferimento sono l'80% delle condizioni di taglio di consigliate.
- \*1 Reference value for Alloy and Stainless Steels are 80% of recommended cutting conditions
- \*I parametri di taglio consigliati sono solo di riferimento e devono essere regolati secondo il tipo di macchina ed il pezzo da lavorare.
- \***ap**: profondità di taglio assiale.
- \*Scegliere il fluido refrigerante più appropriato in base a materiale da lavorare, forma della fresa e tipo di lavorazione.
- \*Nelle lavorazioni profonde, la corretta adduzione del refrigerante e la corretta evacuazione del truciolo sono molto importanti.
- \*Si consiglia di applicare la lavorazione in rampa per entrare nel pezzo in maniera assiale.
- \*Si consiglia di eseguire fresatura bidirezionale.
- \*Per cave molto profonde con rapporto L/D = 5, utilizzare nella prima fase di lavorazione una fresa corta e poi proseguire con quella lunga.
- \*Ridurre il numero di giri e l'avanzamento nello stesso rapporto, per eliminare vibrazioni o in caso di limitato numero di giri della macchina.
- \*Per frese di diam. inferiore a 0.5 mm. con rapporto L/D = 15, regolare i parametri di taglio in maniera adeguata, per evitare rotture.
- \*Qualora la lunghezza della fresa superasse le 5 x D., è molto importante regolare velocità ed avanzamento nello stesso rapporto, per evitare impatti sulla precisione di rotazione del mandrino e della fresa.
- \*These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape and machine type.
- \***ap**: Axial depth of cutting.
- \*Select a cutting fluid appropriate to work material, milling shape and machining content.
- \*Coolant supply and chip disposal in the deep portion are very important.
- \*Recommend to apply ramping for approaching into axial direction.
- \*Recommend reciprocating cutting.
- \*Recommend guide slotting process with short neck tool before milling with L/D 5 time or longer neck tool.
- \*Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.
- \*Major adjustment of milling conditions appropriately on milling profile, machine tool and etc. required for the tools smaller than dia. 0.5mm, or L/D 15 times longer.
- \*Major adjustment of milling conditions, e.g. adjust spindle and feed speed at same rate, required on condition of a tool overhang length exceeding a shank diameter 5 times due to possible accuracy impact by chuck runout etc.

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

Rivestite  
Coating

Non Rivestite  
Non-Coating

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

Rivestite  
Coating

Non Rivestite  
Non-Coating

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

Rivestite  
Coating

Non Rivestite  
Non-Coating

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

Rivestite  
Coating

Non Rivestite  
Non-Coating

**Frese Sagomate**  
Formed Cutter

Rivestite  
Coating

Non Rivestite  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# Parametri di taglio raccomandati

# MHR430

## Recommended Milling Conditions

Materiale Work Material		Acciaio al carbonio•Acciaio legato*1•Acciaio inox*1 Carbon Steels•Alloy Steels*1•Stainless Steels*1 C50•42CrMo4•39NiCrMo3•AISI304				Acciai pretemprati Prehardened Steels 1.2311•STAVAX•1.2343 (~43HRC)			
Dia. Dia.	Lunghezza effettiva Effective Length	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	
		min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm
1	4	25,000	1,700	0.055	0.6	22,000	1,100	0.045	0.6
	6	20,000	1,200	0.045	0.6	18,000	750	0.035	0.6
	8	18,000	1,050	0.035	0.6	15,000	600	0.025	0.6
	10	16,000	900	0.025	0.6	14,000	520	0.018	0.6
	12	14,000	750	0.02	0.6	12,000	450	0.014	0.6
1.1	16	12,000	450	0.01	0.6	10,000	300	0.007	0.6
	6	20,000	1,300	0.05	0.66	18,000	820	0.04	0.66
	10	16,000	1,000	0.03	0.66	14,000	600	0.02	0.66
1.2	16	12,000	550	0.015	0.66	10,000	330	0.01	0.66
	6	20,000	1,400	0.05	0.72	18,000	900	0.04	0.72
	8	18,000	1,200	0.04	0.72	15,000	750	0.03	0.72
1.3	10	16,000	1,050	0.03	0.72	14,000	670	0.02	0.72
	12	14,000	900	0.025	0.72	12,000	530	0.018	0.72
	16	12,000	600	0.015	0.72	10,000	380	0.01	0.72
1.4	6	20,000	1,500	0.06	0.78	17,000	1,000	0.05	0.78
	12	14,000	1,000	0.03	0.78	12,000	600	0.025	0.78
	18	11,000	600	0.015	0.78	9,000	380	0.01	0.78
1.5	6	20,000	1,800	0.07	0.84	16,000	1,100	0.06	0.84
	8	18,000	1,500	0.06	0.84	14,000	900	0.05	0.84
	10	16,000	1,300	0.05	0.84	13,000	780	0.04	0.84
	12	14,000	1,050	0.04	0.84	12,000	670	0.03	0.84
	14	13,000	900	0.035	0.84	11,000	530	0.025	0.84
	16	12,000	750	0.025	0.84	10,000	450	0.018	0.84
1.6	22	10,000	550	0.015	0.84	8,000	320	0.01	0.84
	6	20,000	1,800	0.08	0.9	16,000	1,100	0.07	0.9
	8	18,000	1,500	0.07	0.9	14,000	900	0.06	0.9
	10	16,000	1,300	0.06	0.9	13,000	780	0.05	0.9
	12	14,000	1,050	0.05	0.9	12,000	670	0.04	0.9
	14	13,000	900	0.04	0.9	11,000	570	0.03	0.9
1.7	16	12,000	750	0.035	0.9	10,000	480	0.025	0.9
	18	11,000	680	0.03	0.9	9,000	420	0.02	0.9
	20	10,000	600	0.02	0.9	8,000	360	0.014	0.9
	6	20,000	1,800	0.09	0.96	16,000	1,100	0.08	0.96
	8	18,000	1,500	0.08	0.96	14,000	900	0.07	0.96
	10	16,000	1,300	0.07	0.96	13,000	780	0.06	0.96
1.7	12	14,000	1,050	0.06	0.96	12,000	670	0.05	0.96
	14	13,000	900	0.05	0.96	11,000	570	0.04	0.96
	16	12,000	750	0.04	0.96	10,000	480	0.03	0.96
	18	11,000	680	0.03	0.96	9,000	420	0.025	0.96
	20	10,000	600	0.025	0.96	8,000	360	0.018	0.96
	26	9,000	530	0.02	0.96	7,000	300	0.014	0.96
1.7	6	19,000	1,900	0.095	1.02	15,000	1,150	0.085	1.02
	14	13,000	950	0.055	1.02	11,000	630	0.045	1.02
	24	9,000	550	0.025	1.02	7,000	330	0.018	1.02

\*1 Per lavorazioni di acciaio legato e acciaio inox, i valori di riferimento sono l'80% delle condizioni di taglio consigliate.

\*1 Reference value for Alloy and Stainless Steels are 80% of recommended cutting conditions.

Materiale Work Material		Acciaio al carbonio•Acciaio legato <sub>*1</sub> •Acciaio inox <sub>*1</sub> Carbon Steels•Alloy Steels <sub>*1</sub> •Stainless Steels <sub>*1</sub> C50•42CrMo4•39NiCrMo3•AISI304				Acciai pretemprati Prehardened Steels 1.2311•STAVAX•1.2343 (~43HRC)			
Dia. Dia.	Lunghezza effettiva Effective Length	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	
		min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm
1.8	6	18,000	2,000	0.1	1.08	14,000	1,200	0.09	1.08
	8	18,000	1,700	0.09	1.08	14,000	1,000	0.08	1.08
	10	16,000	1,400	0.08	1.08	13,000	850	0.07	1.08
	12	14,000	1,100	0.07	1.08	12,000	720	0.06	1.08
	14	13,000	1,000	0.06	1.08	11,000	630	0.05	1.08
	16	12,000	850	0.05	1.08	10,000	530	0.04	1.08
	18	11,000	750	0.04	1.08	9,000	470	0.03	1.08
1.9	20	10,000	680	0.035	1.08	8,000	400	0.025	1.08
	25	9,000	600	0.025	1.08	7,000	340	0.018	1.08
	6	17,000	2,100	0.11	1.14	14,000	1,250	0.095	1.14
1.9	16	12,000	1,000	0.06	1.14	10,000	630	0.045	1.14
	28	8,000	550	0.02	1.14	6,000	300	0.014	1.14
2	6	16,000	2,100	0.12	1.2	13,000	1,300	0.1	1.2
	8	16,000	2,000	0.11	1.2	13,000	1,200	0.09	1.2
	10	16,000	1,800	0.1	1.2	13,000	1,100	0.08	1.2
	12	14,000	1,500	0.09	1.2	12,000	1,000	0.07	1.2
	14	13,000	1,350	0.08	1.2	11,000	850	0.06	1.2
	16	12,000	1,200	0.07	1.2	10,000	750	0.05	1.2
	18	11,000	1,000	0.06	1.2	9,000	650	0.04	1.2
	20	10,000	900	0.05	1.2	8,000	550	0.035	1.2
	25	9,000	750	0.03	1.2	7,000	450	0.02	1.2
2	30	8,000	600	0.02	1.2	6,000	330	0.014	1.2
	8	13,000	2,100	0.15	1.5	11,000	1,400	0.12	1.5
	12	13,000	1,800	0.13	1.5	11,000	1,100	0.1	1.5
	16	11,000	1,400	0.1	1.5	9,000	850	0.07	1.5
2.5	20	9,000	1,100	0.08	1.5	7,000	600	0.05	1.5
	25	8,000	900	0.05	1.5	6,000	500	0.035	1.5
	8	11,000	2,300	0.2	1.8	9,000	1,500	0.16	1.8
	12	11,000	2,000	0.16	1.8	9,000	1,200	0.12	1.8
3	16	10,000	1,500	0.12	1.8	8,000	900	0.09	1.8
	20	9,000	1,200	0.1	1.8	7,000	680	0.07	1.8
	25	8,000	1,050	0.08	1.8	6,000	570	0.06	1.8
	30	7,000	900	0.06	1.8	5,000	450	0.045	1.8
3.5	15	9,000	2,000	0.18	2.1	7,000	1,200	0.15	2.1
	25	7,500	1,500	0.12	2.1	6,000	850	0.08	2.1
	35	6,000	1,000	0.07	2.1	4,500	520	0.05	2.1
4	12	8,000	2,200	0.3	2.4	6,000	1,300	0.25	2.4
	16	8,000	2,100	0.25	2.4	6,000	1,200	0.2	2.4
	20	8,000	2,000	0.2	2.4	6,000	1,100	0.15	2.4
	25	7,000	1,700	0.15	2.4	5,000	900	0.1	2.4
	30	7,000	1,500	0.12	2.4	5,000	800	0.08	2.4
	35	6,000	1,200	0.1	2.4	4,500	670	0.07	2.4
	40	5,000	900	0.08	2.4	4,000	540	0.06	2.4
	45	4,500	750	0.06	2.4	3,500	450	0.04	2.4
5	50	4,000	600	0.04	2.4	3,000	330	0.03	2.4
	16	6,000	2,100	0.35	3	4,500	1,200	0.3	3
	25	6,000	1,800	0.25	3	4,500	1,000	0.2	3
	35	5,000	1,200	0.15	3	3,500	630	0.1	3
5	50	3,500	680	0.07	3	2,500	360	0.05	3

\*1 Per lavorazioni di acciaio legato e acciaio inox, i valori di riferimento sono l'80% delle condizioni di taglio consigliate.

\*1 Reference value for Alloy and Stainless Steels are 80% of recommended cutting conditions.

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

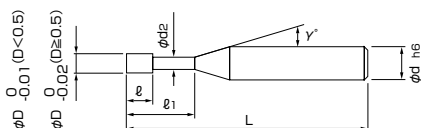
**Guida tecnica**  
Technical Guidance

Materiale Work Material		Acciaio al carbonio•Acciaio legato <sub>41</sub> •Acciaio inox <sub>41</sub> Carbon Steels•Alloy Steels <sub>41</sub> •Stainless Steels <sub>41</sub> C50•42CrMo4•39NiCrMo3•AISI304				Acciai pretemprati Prehardened Steels 1.2311•STAVAX•1.2343 (~43HRC)			
Dia. Dia.	Lunghezza effettiva Effective Length	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	
		min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm
6	20	5,000	1,800	0.4	3.6	3,500	1,000	0.35	3.6
	30	4,000	1,400	0.35	3.6	3,000	750	0.3	3.6
	40	3,500	1,000	0.25	3.6	2,700	570	0.2	3.6
	50	3,000	750	0.15	3.6	2,200	420	0.1	3.6
8	30	3,800	1,400	0.6	4.8	2,800	900	0.45	4.8
	50	2,800	820	0.4	4.8	2,100	600	0.3	4.8
	60	2,400	680	0.3	4.8	1,800	450	0.2	4.8
10	40	3,000	1,200	0.8	6	2,200	750	0.55	6
	60	2,200	750	0.6	6	1,600	520	0.45	6
	80	1,800	520	0.4	6	1,300	360	0.3	6
Note Notes		<p>※ 1 Per lavorazioni di acciai legati e acciaio è raccomandato utilizzare l'80% dei parametri di taglio di riferimento. ※ 1 Reference value for Alloy and Stainless Steels are 80% of recommended cutting conditions.</p> <p>※ I parametri di taglio consigliati sono solo di riferimento e devono essere regolati secondo il tipo di macchina ed il pezzo da lavorare. ※ a<sub>p</sub>: profondità di taglio assiale. ※ Scegliere il fluido refrigerante più appropriato in base a materiale da lavorare, forma della fresa e tipo di lavorazione. ※ Nelle lavorazioni profonde, la corretta adduzione del refrigerante e la corretta evacuazione del truciolo sono molto importanti. ※ Si consiglia di applicare la lavorazione in rampa o elicoidale per entrare nel pezzo in maniera assiale. ※ Per cave dal pieno si consiglia di utilizzare l'80% dei parametri di taglio di riferimento. ※ Per la lavorazione di cave dal pieno si consiglia fresatura bidirezionale e di ridurre del 20% l'avanzamento rispetto ai parametri di taglio consigliati. ※ Per cave molto profonde con rapporto L/D = 5 utilizzare nella prima fase di lavorazione una fresa corta e poi proseguire con quella lunga. ※ Ridurre la velocità e l'avanzamento nello stesso rapporto per eliminare vibrazioni o in caso di limitato numero di giri della macchina. ※ Qualora la lunghezza della fresa superasse le 5 x d., è molto importante regolare velocità ed avanzamento nello stesso rapporto, per evitare impatti sulla precisione di rotazione del mandrino e della fresa. ※ These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape and machine type. ※ a<sub>p</sub>: Axial depth of cutting, a<sub>e</sub>: Radial depth of cutting. ※ Select a cutting fluid appropriate to work material, milling shape and machining content. ※ Coolant supply and chip disposal in the deep portion are very important. ※ Recommend to apply herical or ramping for approaching into axial direction. ※ Reduction of feed and depth of cut to reduce machining load around side wall. ※ For slotting, recommend reciprocating milling by adjusting feed at 80% of recommended milling conditions as a reference value. ※ Recommend guide slotting process with short neck tool before milling with L/D 5 time or longer neck tool. ※ Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine. ※ Major adjustment of milling conditions, e.g. adjust spindle and feed speed at same rate, required on condition of a tool overhang length exceeding a shank diameter 5 times due to possible accuracy impact by chuck runout etc.</p>							

# MHRLN230-6

MUGEN-COATING 2-Flute Long Neck End Mill (Shank Dia. 6)

## Frese 2 Tagli piane scaricate (Gambo dia. 6) rivestite MUGEN



- Articolo semi standard; prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size : mm

Codice Code No.	(D) Dia. Dia.	(l <sub>1</sub> ) Lungh. effettiva Effective Length	(l <sub>2</sub> ) Lungh. tagliante Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00202-03030	0.3	3	0.4	0.28	15°	6	60
08-00202-04030	0.4	3	0.6	0.37	15°	6	60
08-00202-04040		4	0.6	0.37	15°	6	60
08-00202-04050		5	0.6	0.37	15°	6	60
08-00202-05040	0.5	4	0.7	0.46	15°	6	60
08-00202-05050		5	0.7	0.46	15°	6	60
08-00202-05060		6	0.7	0.46	15°	6	60
08-00202-06040	0.6	4	0.9	0.56	15°	6	60
08-00202-06060		6	0.9	0.56	15°	6	60
08-00202-08080	0.8	8	1.2	0.76	15°	6	60
08-00202-10030	1	3	1.5	0.95	15°	6	60
08-00202-10060		6	1.5	0.95	15°	6	60
08-00202-10080		8	1.5	0.95	15°	6	60
08-00202-10100		10	1.5	0.95	15°	6	60
08-00202-15030	1.5	3	2.3	1.45	15°	6	60
08-00202-15050		5	2.3	1.45	15°	6	60
08-00202-15100		10	2.3	1.45	15°	6	60
08-00202-15150		15	2.3	1.45	15°	6	60
08-00202-20200	2	20	3	1.94	15°	6	60

### Attenzione

Quando ordinate, indicate MHRLN230-6(D)×(l<sub>1</sub>).  
When you order, indicate MHRLN230-6 (D)×(l<sub>1</sub>).

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square  
Non Rivestite  
Non-Coating  
Scaricate  
Long Neck  
Piane  
Square

Rivestite  
Coating  
Sferiche  
Ball  
Non Rivestite  
Non-Coating  
Scaricate  
Long Neck  
Sferiche  
Ball

Rivestite  
Coating  
Coniche  
Taper  
Non Rivestite  
Non-Coating  
Coniche  
Taper  
Sferiche  
Ball

Rivestite  
Coating  
Toriche  
Corner R  
Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Formed  
Sagomate  
Cutter  
Non Rivestite  
Non-Coating

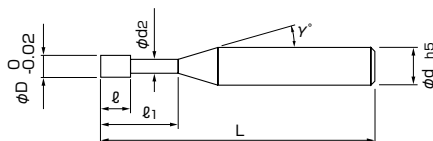
Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Frese 2 Tagli piane scaricate rivestite Diamante



- Lo speciale rivestimento in diamante garantisce una lunga durata nelle lavorazioni di grafite, leghe di alluminio ad alto contenuto di silicio e materiali fragili.
- La lunghezza della parte scaricata della fresa la rende adatta per la lavorazione di aree strette e profonde.
- Original Diamond Coating realized a long tool life for the machining of Graphite, silicon-aluminum alloy and brittle materials.
- Long neck design is suited for the machining of narrow and deep area.

**Dati tecnici** P. 497



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	( $\ell_1$ ) Lunghezza effettiva Effective Length	( $\ell$ ) Lunghezza tagliente Length of Cut	( $d_2$ ) Diametro scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lunghezza totale Overall Length
05-00200-00502	0.5	2	1	0.46	12°	4	45
05-00200-00504		4	1	0.46	12°	4	45
05-00200-00506		6	1	0.46	12°	4	45
05-00200-01004	1	4	2	0.95	12°	4	50
05-00200-01006		6	2	0.95	12°	4	50
05-00200-01008		8	2	0.95	12°	4	50
05-00200-01010		10	2	0.95	12°	4	50
05-00200-01506	1.5	6	3	1.45	12°	4	50
05-00200-01512		12	3	1.45	12°	4	50
05-00200-01520		20	3	1.45	12°	4	60
05-00200-02006	2	6	4	1.94	12°	4	50
05-00200-02010		10	4	1.94	12°	4	50
05-00200-02016		16	4	1.94	12°	4	60
05-00200-02020		20	4	1.94	12°	4	60
05-00200-03016	3	16	6	2.85	12°	6	60
05-00200-03030		30	6	2.85	12°	6	70
05-00200-04020	4	20	8	3.8	12°	6	60
05-00200-04040		40	8	3.8	12°	6	90
05-00200-06030	6	30	12	5.8	-	6	90

### Attenzione

Quando ordinate, indicate DCHR230 (D)×( $\ell_1$ ).  
When you order, indicate MHR430 (D)×( $\ell_1$ ).

※ ( $\gamma$ ) è un valore di riferimento.  
※ ( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 189.
- Milling condition is recommended on page 189.

Diamante  
Diamond

Rivestite  
Coating  
Plane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# Parametri di taglio raccomandati

# DCHR230

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

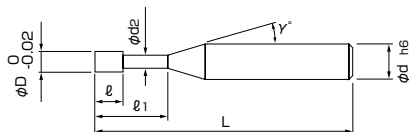
## Recommended Milling Conditions

Materiale Work Material		Grafite Graphite						Leghe di Alluminio ADC12							
		Contornatura-Sgrossatura Contour Line Roughing			Cava Slotting			Contornatura-Sgrossatura Contour Line Roughing			Cava Slotting				
Dia. Dia.	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Prof. di taglio Depth of Cut	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Prof. di taglio Depth of Cut
		min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm
0.5	2	30,000	1,200	0.1	0.3	30,000	800	0.1	20,000	1,000	0.03	0.3	20,000	500	0.03
	4	30,000	1,000	0.05	0.3	30,000	600	0.05	20,000	800	0.01	0.3	20,000	400	0.01
	6	25,000	800	0.03	0.3	25,000	500	0.03	20,000	600	0.01	0.3	20,000	300	0.01
1	4	30,000	2,500	0.2	0.6	30,000	1,500	0.2	20,000	2,000	0.15	0.6	20,000	1,200	0.15
	6	25,000	2,000	0.2	0.6	25,000	1,200	0.2	20,000	1,500	0.1	0.6	20,000	1,000	0.1
	8	20,000	1,500	0.1	0.6	20,000	1,000	0.1	20,000	1,000	0.07	0.6	20,000	700	0.07
	10	20,000	1,000	0.1	0.6	20,000	600	0.1	20,000	800	0.05	0.6	20,000	500	0.05
1.5	6	25,000	2,500	0.3	1	25,000	1,600	0.3	20,000	2,000	0.2	1	20,000	1,500	0.2
	12	16,000	1,800	0.2	1	16,000	1,000	0.2	16,000	1,500	0.05	1	16,000	1,000	0.05
	20	12,000	1,000	0.1	1	12,000	600	0.1	12,000	800	0.02	1	12,000	500	0.02
2	6	20,000	3,000	0.5	1.2	20,000	2,000	0.5	20,000	2,000	0.5	1.2	20,000	1,500	0.5
	10	20,000	2,500	0.5	1.2	20,000	1,600	0.5	20,000	1,500	0.3	1.2	20,000	1,000	0.3
	16	18,000	1,800	0.3	1.2	18,000	1,200	0.3	15,000	1,200	0.07	1.2	15,000	800	0.07
	20	15,000	1,200	0.2	1.2	15,000	800	0.2	10,000	1,000	0.03	1.2	10,000	600	0.03
3	16	20,000	3,000	0.5	2	20,000	2,000	0.5	18,000	2,000	0.5	2	18,000	1,500	0.5
	30	15,000	1,500	0.3	2	15,000	1,000	0.3	10,000	1,000	0.2	2	10,000	600	0.2
4	20	18,000	3,000	0.8	2.5	18,000	2,000	0.8	16,000	2,000	0.8	2.5	16,000	1,500	0.8
	40	9,000	1,500	0.4	2.5	9,000	1,000	0.4	8,000	1,000	0.4	2.5	8,000	600	0.4
6	30	16,000	3,000	1	4	16,000	2,000	1	12,000	2,000	1	4	12,000	1,500	1
Note Notes		<p>※La grafite dovrebbe essere lavorata con una macchina espressamente progettata per la lavorazione di grafite.                      ※Durante la lavorazione della grafite si raccomanda di utilizzare un aspiratore, per proteggersi dalla polvere generata.                      ※Per la lavorazione della grafite si raccomanda di utilizzare un refrigerante ad aria.                      ※Per lavorazioni molto precise ridurre l'avanzamento, per evitare la rottura del pezzo.                      ※Regolate con la stessa proporzione giri e avanzamento in caso di vibrazioni.                      ※Graphite should be machined by the machining center designed for graphite machining.                      ※When handling with graphite material, dust collector and respirator are recommended to protect against graphite dust.                      ※Air blow cooling is recommended for the machining of graphite.                      ※Slow down the feed for high accurate machining to avoid breakage of work piece.                      ※Adjust both spindle speed and feed at the same rate when chattering.</p>													

# NHR-2X

2-Flute Long Neck End Mill

## Frese 2 Tagli piane scaricate



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00413-00502	0.5	2	0.7	0.46	12°	3	35
01-00413-00504		4	0.7	0.46	12°	3	35
01-00413-00506		6	0.7	0.46	12°	3	35
01-00413-00602	0.6	2	0.9	0.56	12°	3	35
01-00413-00604		4	0.9	0.56	12°	3	35
01-00413-00606	0.7	6	0.9	0.56	12°	3	35
01-00413-00702		2	1	0.66	12°	4	45
01-00413-00704		4	1	0.66	12°	4	45
01-00413-00706	0.8	6	1	0.66	12°	4	45
01-00413-00804		4	1.2	0.76	12°	4	45
01-00413-00806		6	1.2	0.76	12°	4	45
01-00413-00808	0.9	8	1.2	0.76	12°	4	45
01-00413-00906		6	1.35	0.86	12°	4	45
01-00413-00908		8	1.35	0.86	12°	4	45
01-00413-00910	1	10	1.35	0.86	12°	4	45
01-00413-01006		6	1.5	0.95	12°	4	45
01-00413-01008		8	1.5	0.95	12°	4	45
01-00413-01010	1.2	10	1.5	0.95	12°	4	45
01-00413-01012		12	1.5	0.95	12°	4	45
01-00413-01206		1.4	6	1.8	1.15	12°	4
01-00413-01208	8		1.8	1.15	12°	4	45
01-00413-01210	10		1.8	1.15	12°	4	45
01-00413-01212	1.5	12	1.8	1.15	12°	4	45
01-00413-01406		6	2.1	1.35	12°	4	45
01-00413-01408		8	2.1	1.35	12°	4	45
01-00413-01410	1.8	10	2.1	1.35	12°	4	45
01-00413-01412		12	2.1	1.35	12°	4	45
01-00413-01414		14	2.1	1.35	12°	4	50
01-00413-01416	2.0	16	2.1	1.35	12°	4	50
01-00413-01506		6	2.3	1.45	12°	4	45
01-00413-01508		8	2.3	1.45	12°	4	45
01-00413-01510	2.5	10	2.3	1.45	12°	4	45
01-00413-01512		12	2.3	1.45	12°	4	45

Codice Code No.	(D) Dia. Dia.	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00413-01514	1.5	14	2.3	1.45	12°	4	50
01-00413-01516		16	2.3	1.45	12°	4	50
01-00413-01518		18	2.3	1.45	12°	4	55
01-00413-01520		20	2.3	1.45	12°	4	55
01-00413-01606	1.6	6	2.4	1.55	12°	4	45
01-00413-01608		8	2.4	1.55	12°	4	45
01-00413-01610		10	2.4	1.55	12°	4	45
01-00413-01612		12	2.4	1.55	12°	4	45
01-00413-01614		14	2.4	1.55	12°	4	50
01-00413-01616		16	2.4	1.55	12°	4	50
01-00413-01618	1.8	18	2.4	1.55	12°	4	55
01-00413-01620		20	2.4	1.55	12°	4	55
01-00413-01806		6	2.7	1.74	12°	4	45
01-00413-01808		8	2.7	1.74	12°	4	45
01-00413-01810	2.0	10	2.7	1.74	12°	4	45
01-00413-01812		12	2.7	1.74	12°	4	45
01-00413-01814		14	2.7	1.74	12°	4	50
01-00413-01816		16	2.7	1.74	12°	4	50
01-00413-01818		18	2.7	1.74	12°	4	55
01-00413-01820		20	2.7	1.74	12°	4	55
01-00413-02006	2.5	6	3	1.94	12°	4	45
01-00413-02008		8	3	1.94	12°	4	45
01-00413-02010		10	3	1.94	12°	4	45
01-00413-02012		12	3	1.94	12°	4	45
01-00413-02014		14	3	1.94	12°	4	50
01-00413-02016		16	3	1.94	12°	4	50
01-00413-02018	3.0	18	3	1.94	12°	4	55
01-00413-02020		20	3	1.94	12°	4	55
01-00413-02508		8	3.7	2.4	12°	4	45
01-00413-02512		12	3.7	2.4	12°	4	45
01-00413-02516	4.0	16	3.7	2.4	12°	4	55
01-00413-02520		20	3.7	2.4	12°	4	60

**Attenzione** Quando ordinate, indicate NHR-2X (D)×(ℓ1).  
When you order, indicate NHR-2X (D)×(ℓ1).

- Per i parametri di taglio vedi pagina 191.
- Milling condition is recommended on page 191.



# NHR-2X

2-Flute Long Neck End Mill

## Frese 2 Tagli piane scaricate

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00413-03008	3	8	4.5	2.85	12°	6	45
01-00413-03012		12	4.5	2.85	12°	6	45
01-00413-03016		16	4.5	2.85	12°	6	55
01-00413-03020		20	4.5	2.85	12°	6	60
01-00413-03025		25	4.5	2.85	12°	6	65
01-00413-03512	3.5	12	5.25	3.35	12°	6	45
01-00413-03516		16	5.25	3.35	12°	6	55
01-00413-03520		20	5.25	3.35	12°	6	60
01-00413-03525		25	5.25	3.35	12°	6	65
01-00413-03530		30	5.25	3.35	12°	6	75

Codice Code No.	(D) Dia. Dia.	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00413-04012	4	12	6	3.8	12°	6	45
01-00413-04016		16	6	3.8	12°	6	55
01-00413-04020		20	6	3.8	12°	6	60
01-00413-04025		25	6	3.8	12°	6	65
01-00413-04030		30	6	3.8	12°	6	70
01-00413-04035	5	35	6	3.8	12°	6	75
01-00413-05016		16	7.5	4.8	12°	6	55
01-00413-05020		20	7.5	4.8	12°	6	60
01-00413-05025		25	7.5	4.8	12°	6	65
01-00413-05030		30	7.5	4.8	12°	6	75
01-00413-05035	5	35	7.5	4.8	12°	6	80
01-00413-05040		40	7.5	4.8	12°	6	90

### Attenzione

Quando ordinate, indicate NHR-2X (D)×(ℓ<sub>1</sub>).  
When you order, indicate NHR-2X (D)×(ℓ<sub>1</sub>).

- Per i parametri di taglio vedi pagina 191.
- Milling condition is recommended on page 191.

## Parametri di taglio raccomandati

# NHR-2X

### Recommended Milling Conditions

Materiale Work Material		Acciaio al carbonio•Acciaio legato• Acciaio pretemprato Carbon Steels•Alloy Steels•Prehardened Steels C50•42CrMo4•39NiCrMo3•AlSi304•1.2738		Alluminio Aluminum		Rame Copper		Plastica Plastics	
Velocità di taglio Cutting Speed		30~50m/min		100~200m/min		50~150m/min		50~80m/min	
Dia. Dia.	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	mm	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.5	0.003~0.05	19,100~31,800	200~500	50,000~	200~1,000	31,800~	200~1,000	31,800~	200~400
0.6	0.006~0.06	15,900~26,500	200~500	50,000~	200~1,250	26,500~	200~1,000	26,500~42,500	200~400
0.7	0.01 ~0.07	13,600~22,700	200~500	45,500~	200~1,250	22,700~	200~1,000	22,700~36,400	200~400
0.8	0.01 ~0.06	11,900~19,900	200~500	39,800~	200~1,500	19,900~	200~1,250	19,900~31,800	200~400
0.9	0.009~0.03	10,600~17,700	200~500	35,400~	200~2,000	17,700~	200~1,500	17,700~28,300	200~400
1	0.01 ~0.06	9,600~15,900	200~650	31,800~	200~2,600	15,900~47,800	200~1,950	15,900~25,500	200~400
1.2	0.016~0.12	8,000~13,300	200~550	26,500~	200~2,200	13,300~39,800	200~1,650	13,300~21,200	200~400
1.4	0.012~0.15	6,800~11,400	200~450	22,700~45,500	200~1,800	11,400~34,100	200~1,350	11,400~18,200	200~400
1.5	0.008~0.17	6,400~10,600	200~450	21,200~42,500	200~1,800	10,600~31,800	200~1,350	10,600~17,000	200~400
1.6	0.012~0.2	6,000~10,000	200~450	19,900~39,800	200~1,800	10,000~29,900	200~1,350	10,000~15,900	200~400
1.8	0.02 ~0.22	5,300~ 8,800	200~350	17,700~35,400	200~1,400	8,800~26,500	200~1,050	8,800~14,200	200~400
2	0.03 ~0.25	4,800~ 8,000	200~350	15,900~31,800	200~1,400	8,000~23,900	200~1,050	8,000~12,700	200~400
2.5	0.08 ~0.25	3,800~ 6,400	150~250	12,700~25,500	150~1,000	6,400~19,100	150~ 750	6,400~10,200	150~300
3	0.09 ~0.25	3,200~ 5,300	130~250	10,600~21,200	130~1,000	5,300~15,900	130~ 750	5,300~ 8,500	130~260
3.5	0.09 ~0.25	2,700~ 4,500	110~220	9,100~18,200	110~ 900	4,500~13,600	110~ 650	4,500~ 7,300	110~220
4	0.1 ~0.25	2,400~ 4,000	100~200	8,000~15,900	100~ 800	4,000~11,900	100~ 600	4,000~ 6,400	100~200
5	0.18 ~0.25	1,900~ 3,200	80~200	6,400~12,700	80~ 800	3,200~ 9,600	80~ 600	3,200~ 5,100	80~160

Note  
Notes

- ※ Regolate la profondità di taglio, i giri e l'avanzamento in base alla lunghezza effettiva.
- ※ Usare lubrificante refrigerante con ritardanti di fumo.
- ※ Si consiglia di eseguire fresatura bidirezionale.
- ※ Adjust depth of cut, spindle speed and feed according to effective length.
- ※ Use cutting fluid with smoke retardant.
- ※ Recommend reciprocating cutting.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

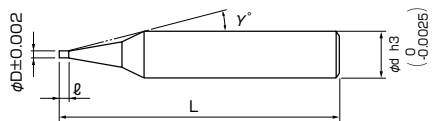
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NSME100

Micro End Mill "MICRO EDGE"

## Microfresse piane "MICRO EDGE"



- Grazie alle tolleranze di  $\pm 2\mu\text{m}$  sul dia. dei taglianti e h3 sul dia. del gambo, viene garantita un'altissima precisione (circolarità 0.1 $\mu\text{m}$ ).
- Un'elica dritta, 5 misure di frese da  $\phi 0.01$  a  $\phi 0.05$ .
- Ultra-high-precision accuracy is guaranteed with  $\pm 2\mu\text{m}$  tolerance of flute diameter and h3 tolerance of shank diameter (circularity 0.1 $\mu\text{m}$ ).
- One straight flute, 5 items from 0.01 to 0.05mm diameter.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	( $\ell$ ) Lungh. tagliante Length of Cut	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00001-00010	0.01	0.01	15°	4	45
01-00001-00020	0.02	0.02	15°	4	45
01-00001-00030	0.03	0.03	15°	4	45
01-00001-00040	0.04	0.04	15°	4	45
01-00001-00050	0.05	0.05	15°	4	45

### Attenzione

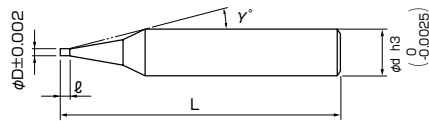
Quando ordinate, indicate NSME100 (D).  
When you order, indicate NSME100 (D).

※( $\gamma$ ) è un valore di riferimento.  
※( $\gamma$ ) is reference value.

# NSME230

Micro End Mill "MICRO EDGE"

## Microfresse piane "MICRO EDGE"



- Grazie alle tolleranze di  $\pm 2\mu\text{m}$  sul dia. dei taglianti e h3 sul dia. del gambo, viene garantita un'altissima precisione (circolarità 0.1 $\mu\text{m}$ ).
- Due eliche a 30°, 7 misure di frese da  $\phi 0.03$  a  $\phi 0.09$ .
- Ultra-high-precision accuracy is guaranteed with  $\pm 2\mu\text{m}$  tolerance of flute diameter and h3 tolerance of shank diameter (circularity 0.1 $\mu\text{m}$ ).
- Two flutes in 30 deg. 7 items from 0.03 to 0.09mm diameter.



Unità di misura: mm Unit size: mm

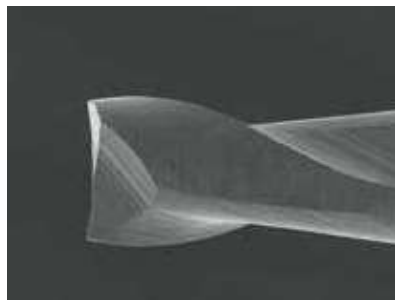
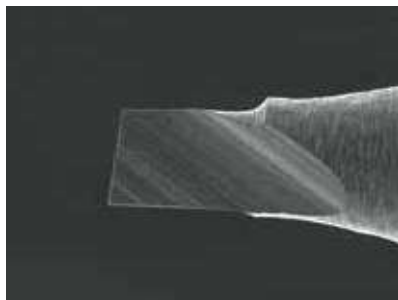
Codice Code No.	(D) Dia. Dia.	( $\ell$ ) Lungh. tagliante Length of Cut	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00002-00030	0.03	0.045	15°	4	45
01-00002-00040	0.04	0.060	15°	4	45
01-00002-00050	0.05	0.075	15°	4	45
01-00002-00060	0.06	0.090	15°	4	45
01-00002-00070	0.07	0.105	15°	4	45
01-00002-00080	0.08	0.120	15°	4	45
01-00002-00090	0.09	0.135	15°	4	45

### Attenzione

Quando ordinate, indicate NSME230 (D).  
When you order, indicate NSME230 (D).

※( $\gamma$ ) è un valore di riferimento.  
※( $\gamma$ ) is reference value.

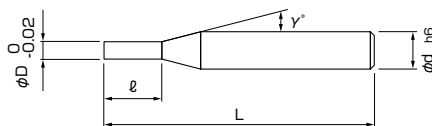
IMMAGINI (SCANSIONE AL MICROSCOPIO ELETTRONICO) SEM 600 INGRANDIMENTI



# NX-25

LEAD 25 End Mill

## Frese 2 Tagli piane elica 25°



- Il rapporto L/D = 1 e l'elica a 25°; l'elica con basso angolo di taglio riduce la flessione del pezzo da lavorare.
- L/D=1 and helix angle 25°, Low helix angle minimize the milling deflection of work piece.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00025-00050	0.5	0.5	9°	4	40
01-00025-00060	0.6	0.6	9°	4	40
01-00025-00070	0.7	0.7	9°	4	40
01-00025-00080	0.8	0.8	9°	4	40
01-00025-00090	0.9	0.9	9°	4	40
01-00025-00100	1	1	9°	4	40
01-00025-00110	1.1	1.1	9°	4	40
01-00025-00120	1.2	1.2	9°	4	40
01-00025-00130	1.3	1.3	9°	4	40
01-00025-00140	1.4	1.4	9°	4	40
01-00025-00150	1.5	1.5	9°	4	40
01-00025-00160	1.6	1.6	9°	4	40
01-00025-00170	1.7	1.7	9°	4	40
01-00025-00180	1.8	1.8	9°	4	40
01-00025-00190	1.9	1.9	9°	4	40
01-00025-00200	2	2	9°	4	40
01-00025-00210	2.1	2.1	9°	4	40
01-00025-00220	2.2	2.2	9°	4	40
01-00025-00230	2.3	2.3	9°	4	40
01-00025-00240	2.4	2.4	9°	4	40
01-00025-00250	2.5	2.5	9°	4	40
01-00025-00260	2.6	2.6	9°	6	40
01-00025-00270	2.7	2.7	9°	6	40
01-00025-00280	2.8	2.8	9°	6	40
01-00025-00290	2.9	2.9	9°	6	40
01-00025-00300	3	3	9°	6	40
01-00025-00310	3.1	3.1	9°	6	40
01-00025-00320	3.2	3.2	9°	6	40
01-00025-00330	3.3	3.3	9°	6	40
01-00025-00340	3.4	3.4	9°	6	40
01-00025-00350	3.5	3.5	9°	6	40

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00025-00360	3.6	3.6	9°	6	40
01-00025-00370	3.7	3.7	9°	6	40
01-00025-00380	3.8	3.8	9°	6	40
01-00025-00390	3.9	3.9	9°	6	40
01-00025-00400	4	4	9°	6	40
01-00025-00410	4.1	4.1	9°	6	45
01-00025-00420	4.2	4.2	9°	6	45
01-00025-00430	4.3	4.3	9°	6	45
01-00025-00440	4.4	4.4	9°	6	45
01-00025-00450	4.5	4.5	9°	6	45
01-00025-00460	4.6	4.6	9°	6	45
01-00025-00470	4.7	4.7	9°	6	45
01-00025-00480	4.8	4.8	9°	6	45
01-00025-00490	4.9	4.9	9°	6	45
01-00025-00500	5	5	9°	6	45
01-00025-00510	5.1	5.1	9°	6	50
01-00025-00520	5.2	5.2	9°	6	50
01-00025-00530	5.3	5.3	9°	6	50
01-00025-00540	5.4	5.4	9°	6	50
01-00025-00550	5.5	5.5	9°	6	50
01-00025-00560	5.6	5.6	9°	6	50
01-00025-00570	5.7	5.7	9°	6	50
01-00025-00580	5.8	5.8	9°	6	50
01-00025-00590	5.9	5.9	9°	6	50
01-00025-00600	6	6	-	6	50
01-00025-00610	6.1	6.1	9°	8	55
01-00025-00620	6.2	6.2	9°	8	55
01-00025-00630	6.3	6.3	9°	8	55
01-00025-00640	6.4	6.4	9°	8	55
01-00025-00650	6.5	6.5	9°	8	55
01-00025-00660	6.6	6.6	9°	8	55
01-00025-00670	6.7	6.7	9°	8	55
01-00025-00680	6.8	6.8	9°	8	55
01-00025-00690	6.9	6.9	9°	8	55

### Attenzione

Quando ordinate, indicate NX-25 (D).  
When you order, indicate NX-25 (D).

- Per i parametri di taglio vedi pagina 203.
- Milling condition is recommended on page 203.
- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

CBN

Nitruro Cubico  
di Boro

Diamante

Diamond

Piane  
Square

Scaricate  
Piane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese  
Sagomate

Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**

Nitruro Cubico di Boro

**Diamante**

Diamond

Rivestite  
Coating

**Piane**  
Square

Non Rivestite  
Non-Coating

**Scaricate**  
Piane  
Long Neck  
Square

Rivestite  
Coating

**Sferiche**  
Ball

Non Rivestite  
Non-Coating

**Scaricate**  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

**Coniche**  
Taper

Non Rivestite  
Non-Coating

**Coniche**  
Sferiche  
Taper Ball

Rivestite  
Coating

**Toriche**  
Corner R

Non Rivestite  
Non-Coating

**Scaricate**  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

**Frese**  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

Technical Data

**Guida tecnica**

Technical Guidance

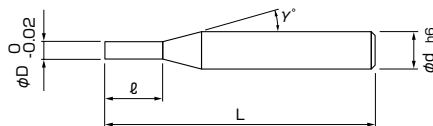
Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00025-00700	7	7	9°	8	55
01-00025-00710	7.1	7.1	9°	8	55
01-00025-00720	7.2	7.2	9°	8	55
01-00025-00730	7.3	7.3	9°	8	55
01-00025-00740	7.4	7.4	9°	8	55
01-00025-00750	7.5	7.5	9°	8	55
01-00025-00760	7.6	7.6	9°	8	55
01-00025-00770	7.7	7.7	9°	8	55
01-00025-00780	7.8	7.8	9°	8	55
01-00025-00790	7.9	7.9	9°	8	55
01-00025-00800	8	8	–	8	55
01-00025-00810	8.1	8.1	9°	10	65
01-00025-00820	8.2	8.2	9°	10	65
01-00025-00830	8.3	8.3	9°	10	65
01-00025-00840	8.4	8.4	9°	10	65
01-00025-00850	8.5	8.5	9°	10	65
01-00025-00860	8.6	8.6	9°	10	65
01-00025-00870	8.7	8.7	9°	10	65
01-00025-00880	8.8	8.8	9°	10	65
01-00025-00890	8.9	8.9	9°	10	65
01-00025-00900	9	9	9°	10	65
01-00025-00910	9.1	9.1	9°	10	65
01-00025-00920	9.2	9.2	9°	10	65
01-00025-00930	9.3	9.3	9°	10	65
01-00025-00940	9.4	9.4	9°	10	65
01-00025-00950	9.5	9.5	9°	10	65
01-00025-00960	9.6	9.6	9°	10	65
01-00025-00970	9.7	9.7	9°	10	65
01-00025-00980	9.8	9.8	9°	10	65
01-00025-00990	9.9	9.9	9°	10	65
01-00025-01000	10	10	–	10	65

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00025-01010	10.1	10.1	9°	12	70
01-00025-01020	10.2	10.2	9°	12	70
01-00025-01030	10.3	10.3	9°	12	70
01-00025-01040	10.4	10.4	9°	12	70
01-00025-01050	10.5	10.5	9°	12	70
01-00025-01060	10.6	10.6	9°	12	70
01-00025-01070	10.7	10.7	9°	12	70
01-00025-01080	10.8	10.8	9°	12	70
01-00025-01090	10.9	10.9	9°	12	70
01-00025-01100	11	11	9°	12	70
01-00025-01110	11.1	11.1	9°	12	70
01-00025-01120	11.2	11.2	9°	12	70
01-00025-01130	11.3	11.3	9°	12	70
01-00025-01140	11.4	11.4	9°	12	70
01-00025-01150	11.5	11.5	9°	12	70
01-00025-01160	11.6	11.6	9°	12	70
01-00025-01170	11.7	11.7	9°	12	70
01-00025-01180	11.8	11.8	9°	12	70
01-00025-01190	11.9	11.9	9°	12	70
01-00025-01200	12	12	–	12	70

# NX-30

LEAD 30 End Mill

## Frese 2 Tagli piane elica 30°



- Il rapporto L/D = 2 e l'elica a 30°- tipo standard adatta a lavorazioni dalla sgrossatura alla finitura.
- L/D=2 and helix angle 30° Standard type applicable from roughing to finishing process.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00030-00050	0.5	1	9°	4	40
01-00030-00060	0.6	1.2	9°	4	40
01-00030-00070	0.7	1.4	9°	4	40
01-00030-00080	0.8	1.6	9°	4	40
01-00030-00090	0.9	1.8	9°	4	40
01-00030-00100	1	2	9°	4	40
01-00030-00110	1.1	2.2	9°	4	40
01-00030-00120	1.2	2.4	9°	4	40
01-00030-00130	1.3	2.6	9°	4	40
01-00030-00140	1.4	2.8	9°	4	40
01-00030-00150	1.5	3	9°	4	40
01-00030-00160	1.6	3.2	9°	4	40
01-00030-00170	1.7	3.4	9°	4	40
01-00030-00180	1.8	3.6	9°	4	40
01-00030-00190	1.9	3.8	9°	4	40
01-00030-00200	2	4	9°	4	40
01-00030-00210	2.1	4.2	9°	4	40
01-00030-00220	2.2	4.4	9°	4	40
01-00030-00230	2.3	4.6	9°	4	40
01-00030-00240	2.4	4.8	9°	4	40
01-00030-00250	2.5	5	9°	4	40
01-00030-00260	2.6	5.2	9°	6	45
01-00030-00270	2.7	5.4	9°	6	45
01-00030-00280	2.8	5.6	9°	6	45
01-00030-00290	2.9	5.8	9°	6	45
01-00030-00300	3	6	9°	6	45
01-00030-00310	3.1	6.2	9°	6	45
01-00030-00320	3.2	6.4	9°	6	45
01-00030-00330	3.3	6.6	9°	6	45
01-00030-00340	3.4	6.8	9°	6	45
01-00030-00350	3.5	7	9°	6	45

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00030-00360	3.6	7.2	9°	6	45
01-00030-00370	3.7	7.4	9°	6	45
01-00030-00380	3.8	7.6	9°	6	45
01-00030-00390	3.9	7.8	9°	6	45
01-00030-00400	4	8	9°	6	45
01-00030-00410	4.1	8.2	9°	6	50
01-00030-00420	4.2	8.4	9°	6	50
01-00030-00430	4.3	8.6	9°	6	50
01-00030-00440	4.4	8.8	9°	6	50
01-00030-00450	4.5	9	9°	6	50
01-00030-00460	4.6	9.2	9°	6	50
01-00030-00470	4.7	9.4	9°	6	50
01-00030-00480	4.8	9.6	9°	6	50
01-00030-00490	4.9	9.8	9°	6	50
01-00030-00500	5	10	9°	6	50
01-00030-00510	5.1	10.2	9°	6	50
01-00030-00520	5.2	10.4	9°	6	50
01-00030-00530	5.3	10.6	9°	6	50
01-00030-00540	5.4	10.8	9°	6	50
01-00030-00550	5.5	11	9°	6	50
01-00030-00560	5.6	11.2	9°	6	50
01-00030-00570	5.7	11.4	9°	6	50
01-00030-00580	5.8	11.6	9°	6	50
01-00030-00590	5.9	11.8	9°	6	50
01-00030-00600	6	12	-	6	50
01-00030-00610	6.1	12.2	9°	8	60
01-00030-00620	6.2	12.4	9°	8	60
01-00030-00630	6.3	12.6	9°	8	60
01-00030-00640	6.4	12.8	9°	8	60
01-00030-00650	6.5	13	9°	8	60
01-00030-00660	6.6	13.2	9°	8	60
01-00030-00670	6.7	13.4	9°	8	60
01-00030-00680	6.8	13.6	9°	8	60
01-00030-00690	6.9	13.8	9°	8	60

### Attenzione

Quando ordinate, indicate NX-30(D).  
When you order, indicate NX-30 (D).

- Per i parametri di taglio vedi pagina 204.
- Milling condition is recommended on page 204.
- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

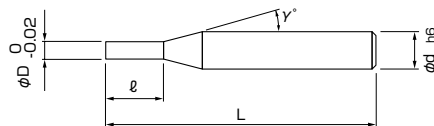
Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00030-00700	7	14	9°	8	60
01-00030-00710	7.1	14.2	9°	8	60
01-00030-00720	7.2	14.4	9°	8	60
01-00030-00730	7.3	14.6	9°	8	60
01-00030-00740	7.4	14.8	9°	8	60
01-00030-00750	7.5	15	9°	8	60
01-00030-00760	7.6	15.2	9°	8	60
01-00030-00770	7.7	15.4	9°	8	60
01-00030-00780	7.8	15.6	9°	8	60
01-00030-00790	7.9	15.8	9°	8	60
01-00030-00800	8	16	-	8	60
01-00030-00810	8.1	16.2	9°	10	70
01-00030-00820	8.2	16.4	9°	10	70
01-00030-00830	8.3	16.6	9°	10	70
01-00030-00840	8.4	16.8	9°	10	70
01-00030-00850	8.5	17	9°	10	70
01-00030-00860	8.6	17.2	9°	10	70
01-00030-00870	8.7	17.4	9°	10	70
01-00030-00880	8.8	17.6	9°	10	70
01-00030-00890	8.9	17.8	9°	10	70
01-00030-00900	9	18	9°	10	70
01-00030-00910	9.1	18.2	9°	10	70
01-00030-00920	9.2	18.4	9°	10	70
01-00030-00930	9.3	18.6	9°	10	70
01-00030-00940	9.4	18.8	9°	10	70
01-00030-00950	9.5	19	9°	10	70
01-00030-00960	9.6	19.2	9°	10	70
01-00030-00970	9.7	19.4	9°	10	70
01-00030-00980	9.8	19.6	9°	10	70
01-00030-00990	9.9	19.8	9°	10	70
01-00030-01000	10	20	-	10	70

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00030-01010	10.1	20.2	9°	12	75
01-00030-01020	10.2	20.4	9°	12	75
01-00030-01030	10.3	20.6	9°	12	75
01-00030-01040	10.4	20.8	9°	12	75
01-00030-01050	10.5	21	9°	12	75
01-00030-01060	10.6	21.2	9°	12	75
01-00030-01070	10.7	21.4	9°	12	75
01-00030-01080	10.8	21.6	9°	12	75
01-00030-01090	10.9	21.8	9°	12	75
01-00030-01100	11	22	9°	12	75
01-00030-01110	11.1	22.2	9°	12	75
01-00030-01120	11.2	22.4	9°	12	75
01-00030-01130	11.3	22.6	9°	12	75
01-00030-01140	11.4	22.8	9°	12	75
01-00030-01150	11.5	23	9°	12	75
01-00030-01160	11.6	23.2	9°	12	75
01-00030-01170	11.7	23.4	9°	12	75
01-00030-01180	11.8	23.6	9°	12	75
01-00030-01190	11.9	23.8	9°	12	75
01-00030-01200	12	24	-	12	75

# NX-35

LEAD 35 End Mill

## Frese 2 Tagli piane elica 35°



- Il rapporto L/D = 3 e l'elica a 35°; taglio più efficiente rispetto all'angolo elicoidale standard.
- L/D=3 and helix angle 35°, Higher efficient cutting is possible compared with standard helix angle.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
01-00035-00050	0.5	1.5	9°	4	40
01-00035-00060	0.6	1.8	9°	4	40
01-00035-00070	0.7	2.1	9°	4	40
01-00035-00080	0.8	2.4	9°	4	40
01-00035-00090	0.9	2.7	9°	4	40
01-00035-00100	1	3	9°	4	45
01-00035-00110	1.1	3.3	9°	4	45
01-00035-00120	1.2	3.6	9°	4	45
01-00035-00130	1.3	3.9	9°	4	45
01-00035-00140	1.4	4.2	9°	4	45
01-00035-00150	1.5	4.5	9°	4	45
01-00035-00160	1.6	4.8	9°	4	45
01-00035-00170	1.7	5.1	9°	4	45
01-00035-00180	1.8	5.4	9°	4	45
01-00035-00190	1.9	5.7	9°	4	45
01-00035-00200	2	6	9°	4	45
01-00035-00210	2.1	6.3	9°	4	45
01-00035-00220	2.2	6.6	9°	4	45
01-00035-00230	2.3	6.9	9°	4	45
01-00035-00240	2.4	7.2	9°	4	45
01-00035-00250	2.5	7.5	9°	4	45
01-00035-00260	2.6	7.8	9°	6	45
01-00035-00270	2.7	8.1	9°	6	45
01-00035-00280	2.8	8.4	9°	6	45
01-00035-00290	2.9	8.7	9°	6	45
01-00035-00300	3	9	9°	6	45
01-00035-00310	3.1	9.3	9°	6	50
01-00035-00320	3.2	9.6	9°	6	50
01-00035-00330	3.3	9.9	9°	6	50
01-00035-00340	3.4	10.2	9°	6	50
01-00035-00350	3.5	10.5	9°	6	50

Codice Code No.	(D) Dia. Dia.	(ℓ) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
01-00035-00360	3.6	10.8	9°	6	50
01-00035-00370	3.7	11.1	9°	6	50
01-00035-00380	3.8	11.4	9°	6	50
01-00035-00390	3.9	11.7	9°	6	50
01-00035-00400	4	12	9°	6	50
01-00035-00410	4.1	12.3	9°	6	55
01-00035-00420	4.2	12.6	9°	6	55
01-00035-00430	4.3	12.9	9°	6	55
01-00035-00440	4.4	13.2	9°	6	55
01-00035-00450	4.5	13.5	9°	6	55
01-00035-00460	4.6	13.8	9°	6	55
01-00035-00470	4.7	14.1	9°	6	55
01-00035-00480	4.8	14.4	9°	6	55
01-00035-00490	4.9	14.7	9°	6	55
01-00035-00500	5	15	9°	6	55
01-00035-00510	5.1	15.3	9°	6	60
01-00035-00520	5.2	15.6	9°	6	60
01-00035-00530	5.3	15.9	9°	6	60
01-00035-00540	5.4	16.2	9°	6	60
01-00035-00550	5.5	16.5	9°	6	60
01-00035-00560	5.6	16.8	9°	6	60
01-00035-00570	5.7	17.1	9°	6	60
01-00035-00580	5.8	17.4	9°	6	60
01-00035-00590	5.9	17.7	9°	6	60
01-00035-00600	6	18	-	6	60
01-00035-00610	6.1	18.3	9°	8	70
01-00035-00620	6.2	18.6	9°	8	70
01-00035-00630	6.3	18.9	9°	8	70
01-00035-00640	6.4	19.2	9°	8	70
01-00035-00650	6.5	19.5	9°	8	70
01-00035-00660	6.6	19.8	9°	8	70
01-00035-00670	6.7	20.1	9°	8	70
01-00035-00680	6.8	20.4	9°	8	70
01-00035-00690	6.9	20.7	9°	8	70

### Attenzione

Quando ordinate, indicate NX-35 (D).  
When you order, indicate NX-35 (D).

- Per i parametri di taglio vedi pagina 205.
- Milling condition is recommended on page 205.
- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese  
Sagomate

Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite Coating**  
**Piane Square**

**Non Rivestite Non-Coating**  
**Scaricate Piane Long Neck Square**

**Rivestite Coating**  
**Sferiche Ball**

**Non Rivestite Non-Coating**  
**Scaricate Sferiche Long Neck Ball**

**Rivestite Coating**  
**Coniche Taper**

**Non Rivestite Non-Coating**  
**Coniche Sferiche Taper Ball**

**Rivestite Coating**  
**Toriche Corner R**

**Non Rivestite Non-Coating**  
**Scaricate Toriche Long Neck Corner R**

**Rivestite Coating**  
**Frese Sagomate Formed Cutter**

**Non Rivestite Non-Coating**

**Punte Drill**

**Altro Others**

**Dati tecnici Technical Data**

**Guida tecnica Technical Guidance**

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00035-00700	7	21	9°	8	70
01-00035-00710	7.1	21.3	9°	8	70
01-00035-00720	7.2	21.6	9°	8	70
01-00035-00730	7.3	21.9	9°	8	70
01-00035-00740	7.4	22.2	9°	8	70
01-00035-00750	7.5	22.5	9°	8	70
01-00035-00760	7.6	22.8	9°	8	70
01-00035-00770	7.7	23.1	9°	8	70
01-00035-00780	7.8	23.4	9°	8	70
01-00035-00790	7.9	23.7	9°	8	70
01-00035-00800	8	24	-	8	70
01-00035-00810	8.1	24.3	9°	10	80
01-00035-00820	8.2	24.6	9°	10	80
01-00035-00830	8.3	24.9	9°	10	80
01-00035-00840	8.4	25.2	9°	10	80
01-00035-00850	8.5	25.5	9°	10	80
01-00035-00860	8.6	25.8	9°	10	80
01-00035-00870	8.7	26.1	9°	10	80
01-00035-00880	8.8	26.4	9°	10	80
01-00035-00890	8.9	26.7	9°	10	80
01-00035-00900	9	27	9°	10	80
01-00035-00910	9.1	27.3	9°	10	80
01-00035-00920	9.2	27.6	9°	10	80
01-00035-00930	9.3	27.9	9°	10	80
01-00035-00940	9.4	28.2	9°	10	80
01-00035-00950	9.5	28.5	9°	10	80
01-00035-00960	9.6	28.8	9°	10	80
01-00035-00970	9.7	29.1	9°	10	80
01-00035-00980	9.8	29.4	9°	10	80
01-00035-00990	9.9	29.7	9°	10	80
01-00035-01000	10	30	-	10	80

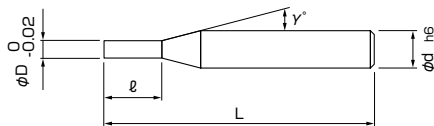
Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00035-01010	10.1	30.3	9°	12	80
01-00035-01020	10.2	30.6	9°	12	80
01-00035-01030	10.3	30.9	9°	12	80
01-00035-01040	10.4	31.2	9°	12	80
01-00035-01050	10.5	31.5	9°	12	80
01-00035-01060	10.6	31.8	9°	12	80
01-00035-01070	10.7	32.1	9°	12	80
01-00035-01080	10.8	32.4	9°	12	80
01-00035-01090	10.9	32.7	9°	12	80
01-00035-01100	11	33	9°	12	80
01-00035-01110	11.1	33.3	9°	12	80
01-00035-01120	11.2	33.6	9°	12	80
01-00035-01130	11.3	33.9	9°	12	80
01-00035-01140	11.4	34.2	9°	12	80
01-00035-01150	11.5	34.5	9°	12	80
01-00035-01160	11.6	34.8	9°	12	80
01-00035-01170	11.7	35.1	9°	12	80
01-00035-01180	11.8	35.4	9°	12	80
01-00035-01190	11.9	35.7	9°	12	80
01-00035-01200	12	36	-	12	85



# NX-40

LEAD 40 End Mill

## Frese 2 Tagli piane elica 40°



- Il rapporto L/D = 4 e l'elica a 40°, i trucioli sono facilmente rimossi, grazie alle eliche con alto angolo di taglio.
- L/D=4 and helix angle 40°. Chips are easily removed by high helix angle.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00040-00050	0.5	2	9°	4	40
01-00040-00060	0.6	2.4	9°	4	40
01-00040-00070	0.7	2.8	9°	4	40
01-00040-00080	0.8	3.2	9°	4	40
01-00040-00090	0.9	3.6	9°	4	40
01-00040-00100	1	4	9°	4	45
01-00040-00110	1.1	4.4	9°	4	45
01-00040-00120	1.2	4.8	9°	4	45
01-00040-00130	1.3	5.2	9°	4	45
01-00040-00140	1.4	5.6	9°	4	45
01-00040-00150	1.5	6	9°	4	45
01-00040-00160	1.6	6.4	9°	4	50
01-00040-00170	1.7	6.8	9°	4	50
01-00040-00180	1.8	7.2	9°	4	50
01-00040-00190	1.9	7.6	9°	4	50
01-00040-00200	2	8	9°	4	50
01-00040-00210	2.1	8.4	9°	4	50
01-00040-00220	2.2	8.8	9°	4	50
01-00040-00230	2.3	9.2	9°	4	50
01-00040-00240	2.4	9.6	9°	4	50
01-00040-00250	2.5	10	9°	4	50
01-00040-00260	2.6	10.4	9°	6	50
01-00040-00270	2.7	10.8	9°	6	50
01-00040-00280	2.8	11.2	9°	6	50
01-00040-00290	2.9	11.6	9°	6	50
01-00040-00300	3	12	9°	6	50
01-00040-00310	3.1	12.4	9°	6	55
01-00040-00320	3.2	12.8	9°	6	55
01-00040-00330	3.3	13.2	9°	6	55
01-00040-00340	3.4	13.6	9°	6	55
01-00040-00350	3.5	14	9°	6	55

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00040-00360	3.6	14.4	9°	6	55
01-00040-00370	3.7	14.8	9°	6	55
01-00040-00380	3.8	15.2	9°	6	55
01-00040-00390	3.9	15.6	9°	6	55
01-00040-00400	4	16	9°	6	55
01-00040-00410	4.1	16.4	9°	6	60
01-00040-00420	4.2	16.8	9°	6	60
01-00040-00430	4.3	17.2	9°	6	60
01-00040-00440	4.4	17.6	9°	6	60
01-00040-00450	4.5	18	9°	6	60
01-00040-00460	4.6	18.4	9°	6	60
01-00040-00470	4.7	18.8	9°	6	60
01-00040-00480	4.8	19.2	9°	6	60
01-00040-00490	4.9	19.6	9°	6	60
01-00040-00500	5	20	9°	6	60
01-00040-00510	5.1	20.4	9°	6	65
01-00040-00520	5.2	20.8	9°	6	65
01-00040-00530	5.3	21.2	9°	6	65
01-00040-00540	5.4	21.6	9°	6	65
01-00040-00550	5.5	22	9°	6	65
01-00040-00560	5.6	22.4	9°	6	65
01-00040-00570	5.7	22.8	9°	6	65
01-00040-00580	5.8	23.2	9°	6	65
01-00040-00590	5.9	23.6	9°	6	65
01-00040-00600	6	24	-	6	65
01-00040-00610	6.1	24.4	9°	8	80
01-00040-00620	6.2	24.8	9°	8	80
01-00040-00630	6.3	25.2	9°	8	80
01-00040-00640	6.4	25.6	9°	8	80
01-00040-00650	6.5	26	9°	8	80
01-00040-00660	6.6	26.4	9°	8	80
01-00040-00670	6.7	26.8	9°	8	80
01-00040-00680	6.8	27.2	9°	8	80
01-00040-00690	6.9	27.6	9°	8	80

### Attenzione

Quando ordinate, indicate NX-40 (D).  
When you order, indicate NX-40 (D).

- Per i parametri di taglio vedi pagina 205.
- Milling condition is recommended on page 205.
- \* articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**

Nitruro Cubico di Boro

**Diamante**

Diamond

Rivestite Coating  
Piane Square

Non Rivestite Non-Coating  
Scaricate Piane Long Neck Square

Rivestite Coating  
Sferiche Ball

Non Rivestite Non-Coating  
Scaricate Sferiche Long Neck Ball

Rivestite Coating  
Coniche Taper

Non Rivestite Non-Coating  
Coniche Sferiche Taper Ball

Rivestite Coating  
Toriche Corner R

Non Rivestite Non-Coating  
Scaricate Toriche Long Neck Corner R

Rivestite Coating  
Frese Sagomate Formed Cutter

Non Rivestite Non-Coating

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

Technical Data

**Guida tecnica**

Technical Guidance

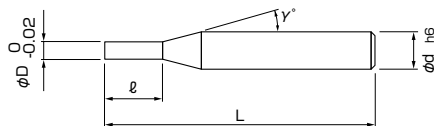
Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. di taglio Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00040-00700	7	28	9°	8	80
01-00040-00710	7.1	28.4	9°	8	80
01-00040-00720	7.2	28.8	9°	8	80
01-00040-00730	7.3	29.2	9°	8	80
01-00040-00740	7.4	29.6	9°	8	80
01-00040-00750	7.5	30	9°	8	80
01-00040-00760	7.6	30.4	9°	8	80
01-00040-00770	7.7	30.8	9°	8	80
01-00040-00780	7.8	31.2	9°	8	80
01-00040-00790	7.9	31.6	9°	8	80
01-00040-00800	8	32	-	8	80
01-00040-00810	8.1	32.4	9°	10	100
01-00040-00820	8.2	32.8	9°	10	100
01-00040-00830	8.3	33.2	9°	10	100
01-00040-00840	8.4	33.6	9°	10	100
01-00040-00850	8.5	34	9°	10	100
01-00040-00860	8.6	34.4	9°	10	100
01-00040-00870	8.7	34.8	9°	10	100
01-00040-00880	8.8	35.2	9°	10	100
01-00040-00890	8.9	35.6	9°	10	100
01-00040-00900	9	36	9°	10	100
01-00040-00910	9.1	36.4	9°	10	100
01-00040-00920	9.2	36.8	9°	10	100
01-00040-00930	9.3	37.2	9°	10	100
01-00040-00940	9.4	37.6	9°	10	100
01-00040-00950	9.5	38	9°	10	100
01-00040-00960	9.6	38.4	9°	10	100
01-00040-00970	9.7	38.8	9°	10	100
01-00040-00980	9.8	39.2	9°	10	100
01-00040-00990	9.9	39.6	9°	10	100
01-00040-01000	10	40	-	10	100

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. di taglio Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00040-01010	10.1	40.4	9°	12	105
01-00040-01020	10.2	40.8	9°	12	105
01-00040-01030	10.3	41.2	9°	12	105
01-00040-01040	10.4	41.6	9°	12	105
01-00040-01050	10.5	42	9°	12	105
01-00040-01060	10.6	42.4	9°	12	105
01-00040-01070	10.7	42.8	9°	12	105
01-00040-01080	10.8	43.2	9°	12	105
01-00040-01090	10.9	43.6	9°	12	105
01-00040-01100	11	44	9°	12	105
01-00040-01110	11.1	44.4	9°	12	105
01-00040-01120	11.2	44.8	9°	12	105
01-00040-01130	11.3	45.2	9°	12	105
01-00040-01140	11.4	45.6	9°	12	105
01-00040-01150	11.5	46	9°	12	105
01-00040-01160	11.6	46.4	9°	12	105
01-00040-01170	11.7	46.8	9°	12	105
01-00040-01180	11.8	47.2	9°	12	105
01-00040-01190	11.9	47.6	9°	12	105
01-00040-01200	12	48	-	12	105

# NX-45

LEAD 45 End Mill

## Frese 2 Tagli piane elica 45°



- Il rapporto L/D = 5 e l'elica a 45°, è possibile eseguire lavorazioni di contornatura a grosse profondità, grazie ai taglienti molto affilati.
- L/D=5 and helix angle 45°, Deep side milling is available by sharp cutting edge.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
01-00045-00050	0.5	2.5	9°	4	40
01-00045-00060	0.6	3	9°	4	40
01-00045-00070	0.7	3.5	9°	4	40
01-00045-00080	0.8	4	9°	4	40
01-00045-00090	0.9	4.5	9°	4	40
01-00045-00100	1	5	9°	4	45
01-00045-00110	1.1	5.5	9°	4	50
01-00045-00120	1.2	6	9°	4	50
01-00045-00130	1.3	6.5	9°	4	50
01-00045-00140	1.4	7	9°	4	50
01-00045-00150	1.5	7.5	9°	4	50
01-00045-00160	1.6	8	9°	4	50
01-00045-00170	1.7	8.5	9°	4	50
01-00045-00180	1.8	9	9°	4	50
01-00045-00190	1.9	9.5	9°	4	50
01-00045-00200	2	10	9°	4	50
01-00045-00210	2.1	10.5	9°	4	50
01-00045-00220	2.2	11	9°	4	50
01-00045-00230	2.3	11.5	9°	4	50
01-00045-00240	2.4	12	9°	4	50
01-00045-00250	2.5	12.5	9°	4	50
01-00045-00260	2.6	13	9°	6	55
01-00045-00270	2.7	13.5	9°	6	55
01-00045-00280	2.8	14	9°	6	55
01-00045-00290	2.9	14.5	9°	6	55
01-00045-00300	3	15	9°	6	55
01-00045-00310	3.1	15.5	9°	6	60
01-00045-00320	3.2	16	9°	6	60
01-00045-00330	3.3	16.5	9°	6	60
01-00045-00340	3.4	17	9°	6	60
01-00045-00350	3.5	17.5	9°	6	60

Codice Code No.	(D) Dia. Dia.	(l) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
01-00045-00360	3.6	18	9°	6	60
01-00045-00370	3.7	18.5	9°	6	60
01-00045-00380	3.8	19	9°	6	60
01-00045-00390	3.9	19.5	9°	6	60
01-00045-00400	4	20	9°	6	60
01-00045-00410	4.1	20.5	9°	6	65
01-00045-00420	4.2	21	9°	6	65
01-00045-00430	4.3	21.5	9°	6	65
01-00045-00440	4.4	22	9°	6	65
01-00045-00450	4.5	22.5	9°	6	65
01-00045-00460	4.6	23	9°	6	65
01-00045-00470	4.7	23.5	9°	6	65
01-00045-00480	4.8	24	9°	6	65
01-00045-00490	4.9	24.5	9°	6	65
01-00045-00500	5	25	9°	6	65
01-00045-00510	5.1	25.5	9°	6	75
01-00045-00520	5.2	26	9°	6	75
01-00045-00530	5.3	26.5	9°	6	75
01-00045-00540	5.4	27	9°	6	75
01-00045-00550	5.5	27.5	9°	6	75
01-00045-00560	5.6	28	9°	6	75
01-00045-00570	5.7	28.5	9°	6	75
01-00045-00580	5.8	29	9°	6	75
01-00045-00590	5.9	29.5	9°	6	75
01-00045-00600	6	30	-	6	75
01-00045-00610	6.1	30.5	9°	8	90
01-00045-00620	6.2	31	9°	8	90
01-00045-00630	6.3	31.5	9°	8	90
01-00045-00640	6.4	32	9°	8	90
01-00045-00650	6.5	32.5	9°	8	90
01-00045-00660	6.6	33	9°	8	90
01-00045-00670	6.7	33.5	9°	8	90
01-00045-00680	6.8	34	9°	8	90
01-00045-00690	6.9	34.5	9°	8	90

### Attenzione

Quando ordinate, indicate NX-45 (D).  
When you order, indicate NX-45 (D).

- Per i parametri di taglio vedi pagina 207.
- Milling condition is recommended on page 207.
- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Coniche  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Toriche  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**

Nitruro Cubico di Boro

**Diamante**

Diamond

Rivestite  
Coating

**Piane**  
Square

Non Rivestite  
Non-Coating

**Scaricate**  
Plane  
Long Neck  
Square

Rivestite  
Coating

**Sferiche**  
Ball

Non Rivestite  
Non-Coating

**Scaricate**  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

**Coniche**  
Taper

Non Rivestite  
Non-Coating

**Coniche**  
Sferiche  
Taper Ball

Rivestite  
Coating

**Toriche**  
Corner R

Non Rivestite  
Non-Coating

**Scaricate**  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

**Frese**  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

**Punte**  
Drill

**Altro**

Others

**Dati tecnici**

Technical Data

**Guida tecnica**

Technical Guidance

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00045-00700	7	35	9°	8	90
01-00045-00710	7.1	35.5	9°	8	90
01-00045-00720	7.2	36	9°	8	90
01-00045-00730	7.3	36.5	9°	8	90
01-00045-00740	7.4	37	9°	8	90
01-00045-00750	7.5	37.5	9°	8	90
01-00045-00760	7.6	38	9°	8	90
01-00045-00770	7.7	38.5	9°	8	90
01-00045-00780	7.8	39	9°	8	90
01-00045-00790	7.9	39.5	9°	8	90
01-00045-00800	8	40	–	8	90
01-00045-00810	8.1	40.5	9°	10	100
01-00045-00820	8.2	41	9°	10	100
01-00045-00830	8.3	41.5	9°	10	100
01-00045-00840	8.4	42	9°	10	100
01-00045-00850	8.5	42.5	9°	10	100
01-00045-00860	8.6	43	9°	10	100
01-00045-00870	8.7	43.5	9°	10	100
01-00045-00880	8.8	44	9°	10	100
01-00045-00890	8.9	44.5	9°	10	100
01-00045-00900	9	45	9°	10	100
01-00045-00910	9.1	45.5	9°	10	100
01-00045-00920	9.2	46	9°	10	100
01-00045-00930	9.3	46.5	9°	10	100
01-00045-00940	9.4	47	9°	10	100
01-00045-00950	9.5	47.5	9°	10	100
01-00045-00960	9.6	48	9°	10	100
01-00045-00970	9.7	48.5	9°	10	100
01-00045-00980	9.8	49	9°	10	100
01-00045-00990	9.9	49.5	9°	10	100
01-00045-01000	10	50	–	10	100

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00045-01010	10.1	50.5	9°	12	110
01-00045-01020	10.2	51	9°	12	110
01-00045-01030	10.3	51.5	9°	12	110
01-00045-01040	10.4	52	9°	12	110
01-00045-01050	10.5	52.5	9°	12	110
01-00045-01060	10.6	53	9°	12	110
01-00045-01070	10.7	53.5	9°	12	110
01-00045-01080	10.8	54	9°	12	110
01-00045-01090	10.9	54.5	9°	12	110
01-00045-01100	11	55	9°	12	110
01-00045-01110	11.1	55.5	9°	12	110
01-00045-01120	11.2	56	9°	12	110
01-00045-01130	11.3	56.5	9°	12	110
01-00045-01140	11.4	57	9°	12	110
01-00045-01150	11.5	57.5	9°	12	110
01-00045-01160	11.6	58	9°	12	110
01-00045-01170	11.7	58.5	9°	12	110
01-00045-01180	11.8	59	9°	12	110
01-00045-01190	11.9	59.5	9°	12	110
01-00045-01200	12	60	–	12	110

# Parametri di taglio raccomandati

# NX-25

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane Square**

**Scaricate Piane**

Long Neck Square

**Sferiche Ball**

**Scaricate Sferiche**

Long Neck Ball

**Coniche Taper**

**Coniche Sferiche**

Taper Ball

**Toriche Corner R**

**Scaricate Toriche**

Long Neck Corner R

**Frese Sagomate Formed Cutter**

**Punte Drill**

**Altro Others**

**Dati tecnici Technical Data**

**Guida tecnica Technical Guidance**

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738			Alluminio Aluminum			Rame Copper		
Velocità di taglio Cutting Speed	40~50m/min			35~45m/min			25~35m/min			100~200m/min			60~80m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting
<b>1</b>	14,300	140	70	12,700	100	35	9,500	80	40	47,700	570	200	22,300	270	95
<b>1.5</b>	9,500	140	70	8,500	100	35	6,400	80	40	31,800	640	220	14,900	300	100
<b>2</b>	7,200	140	70	6,400	120	40	4,800	90	45	23,900	720	250	11,100	330	120
<b>2.5</b>	5,700	170	85	5,100	120	45	3,800	95	50	19,100	760	270	8,900	360	120
<b>3</b>	4,800	190	95	4,200	130	45	3,200	100	50	15,900	800	270	7,400	370	130
<b>4</b>	3,600	220	110	3,200	130	45	2,400	100	50	11,900	830	270	5,600	390	130
<b>5</b>	2,900	230	120	2,500	150	50	1,900	130	65	9,500	860	280	4,500	410	130
<b>6</b>	2,400	240	120	2,100	170	55	1,600	140	70	8,000	880	290	3,700	410	130
<b>8</b>	1,800	220	110	1,600	160	50	1,200	130	65	6,000	780	260	2,800	360	120
<b>10</b>	1,400	200	100	1,300	160	50	1,000	130	65	4,800	720	240	2,200	330	110
<b>12</b>	1,200	190	95	1,100	150	50	800	120	60	4,000	680	220	1,900	320	110
Profondità di taglio Depth of Cut															
(D) Dia. Dia.															
Note Notes	<p>※ Usare lubrificante.                  ※ Regolate con la stessa proporzione giri ed avanzamento.                  ※ Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.                  ※ Use cutting fluid.                  ※ Adjust both spindle speed and feed at the same rate.                  ※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</p>														

# Parametri di taglio raccomandati

# NX-30

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738			Alluminio Aluminum			Rame Copper		
Velocità di taglio Cutting Speed	40~50m/min			35~45m/min			25~35m/min			100~200m/min			60~80m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting
1	14,300	140	70	12,700	100	35	9,500	80	40	47,700	570	200	22,300	270	95
1.5	9,500	140	70	8,500	100	35	6,400	80	40	31,800	640	220	14,900	300	100
2	7,200	140	70	6,400	120	40	4,800	90	45	23,900	720	250	11,100	330	120
2.5	5,700	170	85	5,100	120	40	3,800	95	50	19,100	760	270	8,900	360	120
3	4,800	190	95	4,200	130	45	3,200	100	50	15,900	800	270	7,400	370	130
4	3,600	220	110	3,200	130	45	2,400	100	50	11,900	830	270	5,600	390	130
5	2,900	230	120	2,500	150	50	1,900	130	65	9,500	860	280	4,500	410	130
6	2,400	240	120	2,100	170	55	1,600	140	70	8,000	880	290	3,700	410	130
8	1,800	220	110	1,600	160	50	1,200	130	65	6,000	780	260	2,800	360	120
10	1,400	200	100	1,300	160	50	1,000	130	65	4,800	720	240	2,200	330	110
12	1,200	190	95	1,100	150	50	800	120	60	4,000	680	220	1,900	320	110
Profondità di taglio Depth of Cut	<p>Contornatura Side Milling</p> <p>Cava Slotting</p>						<p>Contornatura Side Milling</p> <p>Cava Slotting</p>								
(D) Dia. Dia.															
Note	<p>※Usare lubrificante.                  ※Regolate con la stessa proporzione giri ed avanzamento.                  ※Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.                  ※Use cutting fluid.                  ※Adjust both spindle speed and feed at the same rate.                  ※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</p>														

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite Coating  
Piane Square

Non Rivestite Non-Coating  
Scaricate Piane Long Neck Square

Rivestite Coating  
Sferiche Ball

Non Rivestite Non-Coating  
Scaricate Sferiche Long Neck Ball

Rivestite Coating  
Coniche Taper

Non Rivestite Non-Coating  
Coniche Sferiche Taper Ball

Rivestite Coating  
Toriche Corner R

Non Rivestite Non-Coating  
Scaricate Toriche Long Neck Corner R

Rivestite Coating  
Frese Sagomate Formed Cutter

Non Rivestite Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738			Alluminio Aluminum			Rame Copper		
Velocità di taglio Cutting Speed	35~45m/min			30~40m/min			20~30m/min			70~150m/min			55~75m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting
1	12,700	130	65	11,100	90	30	8,000	65	30	38,200	460	160	20,700	250	90
1.5	8,500	130	65	7,400	90	30	5,300	65	30	25,500	510	180	13,800	280	100
2	6,400	130	65	5,600	100	35	4,000	75	40	19,100	570	200	10,300	310	110
2.5	5,100	150	75	4,500	110	40	3,200	80	40	15,300	610	210	8,300	330	120
3	4,200	170	85	3,700	110	40	2,700	85	40	12,700	640	220	6,900	350	120
4	3,200	190	95	2,800	110	40	2,000	85	40	9,500	670	220	5,200	360	120
5	2,500	200	100	2,200	130	45	1,600	110	50	7,600	680	230	4,100	370	120
6	2,100	210	110	1,900	150	50	1,300	110	60	6,400	700	230	3,400	370	120
8	1,600	190	95	1,400	140	45	1,000	110	55	4,800	620	210	2,600	340	110
10	1,300	180	90	1,100	130	40	800	100	50	3,800	570	190	2,100	320	100
12	1,100	180	90	900	130	40	700	100	50	3,200	540	180	1,700	290	95
Profondità di taglio Depth of Cut	<p>Contornatura Side Milling</p> <p>Cava Slotting</p>						<p>Contornatura Side Milling</p> <p>Cava Slotting</p>								
Note	<p>※ Usare lubrorefrigerante.                  ※ Regolate con la stessa proporzione giri ed avanzamento.                  ※ Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.                  ※ Use cutting fluid.                  ※ Adjust both spindle speed and feed at the same rate.                  ※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</p>														

## Parametri di taglio raccomandati

# NX-40

### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738		Alluminio Aluminum		Rame Copper	
Velocità di taglio Cutting Speed	20~30m/min		15~25m/min		15~20m/min		60~80m/min		20~40m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	8,000	80	6,400	50	5,600	45	22,300	270	9,500	110
1.5	5,300	80	4,200	50	3,700	45	14,900	300	6,400	130
2	4,000	80	3,200	60	2,800	50	11,100	330	4,800	140
2.5	3,200	100	2,500	60	2,200	55	8,900	360	3,800	150
3	2,700	110	2,100	60	1,900	60	7,400	370	3,200	160
4	2,000	120	1,600	65	1,400	60	5,600	390	2,400	170
5	1,600	130	1,300	80	1,100	70	4,500	410	1,900	170
6	1,300	130	1,100	90	900	80	3,700	410	1,600	180
8	1,000	120	800	80	700	75	2,800	360	1,200	160
10	800	110	600	70	600	75	2,200	330	1,000	150
12	700	110	500	70	500	75	1,900	320	800	140
Profondità di taglio Depth of Cut  (D) Dia. Dia.	<p>Contornatura Side Milling</p>						<p>Contornatura Side Milling</p>			
Note	<ul style="list-style-type: none"> <li>※Usare lubrorefrigerante.</li> <li>※Adatta solo per lavorazioni di contornatura.</li> <li>※Regolate con la stessa proporzione giri e avanzamento.</li> <li>※Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.</li> <li>※Use cutting fluid.</li> <li>※It is available only for side milling.</li> <li>※Adjust both spindle speed and feed at the same rate.</li> <li>※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.</li> </ul>									

CBN  
Nitruro Cubico di Boro

Diamante

Diamond

Rivestite Coating  
Non Rivestite Non-Coating  
Piane Square

Rivestite Coating  
Non Rivestite Non-Coating  
Scaricate Piane Long Neck Square

Rivestite Coating  
Non Rivestite Non-Coating  
Sferiche Ball

Rivestite Coating  
Non Rivestite Non-Coating  
Scaricate Sferiche Long Neck Ball

Rivestite Coating  
Non Rivestite Non-Coating  
Coniche Taper

Rivestite Coating  
Non Rivestite Non-Coating  
Coniche Sferiche Taper Ball

Rivestite Coating  
Non Rivestite Non-Coating  
Toriche Corner R

Rivestite Coating  
Non Rivestite Non-Coating  
Scaricate Toriche Long Neck Corner R

Rivestite Coating  
Non Rivestite Non-Coating  
Frese Sagomate Formed Cutter

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

Guida tecnica

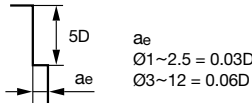
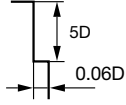
Technical Guidance



# Parametri di taglio raccomandati

# NX-45

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738		Alluminio Aluminum		Rame Copper		
Velocità di taglio Cutting Speed	15~25m/min		10~20m/min		10~15m/min		55~65m/min		15~35m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	
1	6,400	65	4,800	40	4,000	35	19,100	230	8,000	100	
1.5	4,200	65	3,200	40	2,700	35	12,700	250	5,300	110	
2	3,200	65	2,400	45	2,000	40	9,500	290	4,000	120	
2.5	2,500	75	1,900	45	1,600	40	7,600	300	3,200	130	
3	2,100	85	1,600	50	1,300	45	6,400	320	2,700	140	
4	1,600	95	1,200	50	1,000	45	4,800	340	2,000	140	
5	1,300	100	1,000	60	800	55	3,800	340	1,600	140	
6	1,100	110	800	65	700	60	3,200	350	1,300	140	
8	800	95	600	60	500	55	2,400	310	1,000	130	
10	600	85	500	60	400	50	1,900	290	800	120	
12	500	80	400	55	300	45	1,600	270	700	120	
Profondità di taglio Depth of Cut	Contornatura Side Milling 						Contornatura Side Milling 				
	(D) Dia. Dia.										
Note Notes	※ Usare lubrorefrigerante. ※ Adatta solo per lavorazioni di contornatura. ※ Regolate con la stessa proporzione giri e avanzamento. ※ Regolate le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina. ※ Use cutting fluid. ※ It is available only for side milling. ※ Adjust both spindle speed and feed at the same rate. ※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.										

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Scaricate Plane  
Long Neck Square

Sferiche Ball  
Scaricate Sferiche Long Neck Ball

Coniche Taper  
Coniche Sferiche Taper Ball

Toriche Corner R  
Scaricate Toriche Long Neck Corner R

Frese Sagomate Formed Cutter

Punte Drill

Altro Others

Dati tecnici Technical Data

Guida tecnica Technical Guidance

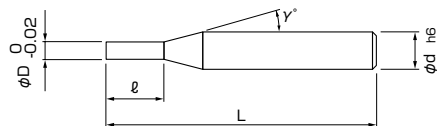
CBN  
Nitruro Cubico  
di Boro

# NC-2

CHAMPION SOLID 2-Flute End Mill

Diamante  
Diamond

## Frese 2 Tagli piane "CHAMPION SOLID"



Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00212-00050	0.5	1	9°	3	35
01-00212-00060	0.6	1.2	9°	3	35
01-00212-00070	0.7	1.4	9°	3	35
01-00212-00080	0.8	1.6	9°	3	35
01-00212-00090	0.9	1.8	9°	3	35
01-00212-00100	1	2	9°	4	45
01-00212-00110	1.1	2	9°	4	45
01-00212-00120	1.2	2.5	9°	4	45
01-00212-00130	1.3	2.5	9°	4	45
01-00212-00140	1.4	3	9°	4	45
01-00212-00150	1.5	3	9°	4	45
01-00212-00160	1.6	3	9°	4	45
01-00212-00170	1.7	4	9°	4	45
01-00212-00180	1.8	4	9°	4	45
01-00212-00190	1.9	4	9°	4	45
01-00212-00200	2	4	9°	4	45
01-00212-00250	2.5	5	9°	4	45
01-00212-00300	3	6	9°	6	45
01-00212-00350	3.5	7	9°	6	45
01-00212-00400	4	8	9°	6	45

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00212-00450	4.5	9	9°	6	45
01-00212-00500	5	10	9°	6	50
01-00212-00550	5.5	11	9°	6	50
01-00212-00600	6	12	-	6	55
01-00212-00650	6.5	13	-	6	55
01-00212-00700	7	14	9°	8	60
01-00212-00750	7.5	15	9°	8	60
01-00212-00800	8	16	-	8	60
01-00212-00850	8.5	17	-	8	60
01-00212-00900	9	18	9°	10	65
01-00212-00950	9.5	19	9°	10	65
01-00212-01000	10	20	-	10	70
01-00212-01100	11	22	9°	12	75
01-00212-01200	12	24	-	12	75
01-00212-01400	14	28	-	12	85
01-00212-01500	15	30	9°	16	100
01-00212-01600	16	32	-	16	100
01-00212-01800	18	36	9°	20	110
01-00212-02000	20	40	-	20	115

**Attenzione** Quando ordinate, indicate NC-2 (D).  
When you order, indicate NC-2 (D).

- Per i parametri di taglio vedi pagina 211.
- Milling condition is recommended on page 211.

Punte  
Drill

Altro  
Others

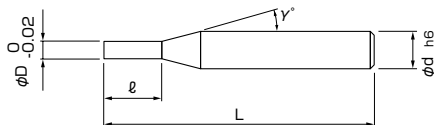
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# NCM-2

CHAMPION SOLID 2-Flute Medium End Mill

## Frese 2 Tagli piane medie "CHAMPION SOLID"



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00232-00050	0.5	1.5	9°	3	35
01-00232-00060	0.6	1.8	9°	3	35
01-00232-00070	0.7	2.1	9°	3	35
01-00232-00080	0.8	2.4	9°	3	35
01-00232-00090	0.9	2.7	9°	3	35
01-00232-00100	1	3	9°	4	45
01-00232-00110	1.1	3.5	9°	4	45
01-00232-00120	1.2	3.5	9°	4	45
01-00232-00130	1.3	4	9°	4	45
01-00232-00140	1.4	4.5	9°	4	45
01-00232-00150	1.5	4.5	9°	4	45
01-00232-00160	1.6	5	9°	4	45
01-00232-00170	1.7	5	9°	4	45
01-00232-00180	1.8	5.5	9°	4	45
01-00232-00190	1.9	6	9°	4	45
01-00232-00200	2	6	9°	4	45
01-00232-00250	2.5	8	9°	4	45
01-00232-00300	3	10	9°	6	45
01-00232-00350	3.5	11	9°	6	50
01-00232-00400	4	12	9°	6	50

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00232-00450	4.5	14	9°	6	55
01-00232-00500	5	15	9°	6	55
01-00232-00550	5.5	17	9°	6	55
01-00232-00600	6	18	-	6	60
01-00232-00650	6.5	20	-	6	65
01-00232-00700	7	21	9°	8	65
01-00232-00750	7.5	23	9°	8	70
01-00232-00800	8	24	-	8	70
01-00232-00850	8.5	25	-	8	70
01-00232-00900	9	27	9°	10	75
01-00232-00950	9.5	28	9°	10	75
01-00232-01000	10	30	-	10	80
01-00232-01100	11	33	9°	12	80
01-00232-01200	12	36	-	12	85
01-00232-01400	14	42	-	12	100
01-00232-01500	15	45	9°	16	110
01-00232-01600	16	50	-	16	110
01-00232-01800	18	55	9°	20	130
01-00232-02000	20	60	-	20	135

### Attenzione

Quando ordinate, indicate NCM-2 (D).  
When you order, indicate NCM-2 (D).

- Per i parametri di taglio vedi pagina 212.
- Milling condition is recommended on page 212.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate Piane  
Long Neck Square

Sferiche Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate Sferiche  
Long Neck Ball

Coniche Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Coniche Sferiche  
Taper Ball

Toriche Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate Toriche  
Long Neck Corner R

Frese Sagomate Formed Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
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**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

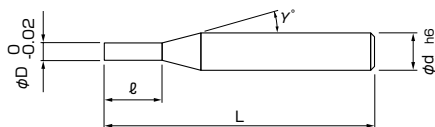
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NCL-2

CHAMPION SOLID 2-Flute Long End Mill

## Frese 2 Tagli piane lunghe "CHAMPION SOLID"



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00222-00100	1	4	9°	4	45
01-00222-00150	1.5	6	9°	4	45
01-00222-00200	2	10	9°	4	50
01-00222-00250	2.5	12	9°	4	50
01-00222-00300	3	18	9°	6	60
01-00222-00400	4	22	9°	6	60
01-00222-00500	5	25	9°	6	65
01-00222-00600	6	25	-	6	65
01-00222-00800	8	35	-	8	80
01-00222-01000	10	42	-	10	100
01-00222-01200	12	45	-	12	100

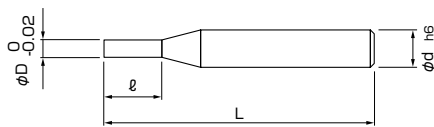
**Attenzione** Quando ordinate, indicate NCL-2 (D).  
When you order, indicate NCL-2 (D).

- Per i parametri di taglio vedi pagina 213.
- Milling condition is recommended on page 213.

# NC-LS-2

CHAMPION SOLID 2-Flute Long Shank End Mill

## Frese 2 Tagli piane gambo lungo "CHAMPION SOLID"



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliente Length of Cut	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00242-00100	1	2	4	100
01-00242-00150	1.5	3	4	100
01-00242-00200	2	4	4	100
01-00242-00250	2.5	5	4	100
01-00242-00300	3	6	6	120
01-00242-00400	4	8	6	120
01-00242-00500	5	10	6	130
01-00242-00600	6	12	6	130
01-00242-00700	7	14	8	140
01-00242-00800	8	16	8	140
01-00242-00900	9	18	10	150
01-00242-01000	10	20	10	150
01-00242-01100	11	22	12	170
01-00242-01200	12	24	12	170

**Attenzione** Quando ordinate, indicate NC-LS-2 (D).  
When you order, indicate NC-LS-2 (D).

# Parametri di taglio raccomandati

# NC-2

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738			Alluminio Aluminum			Rame Copper				
Velocità di taglio Cutting Speed	40~50m/min			35~45m/min			25~35m/min			60~100m/min			40~80m/min				
Dia. Dia.	Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		
	mm/min		mm/min		mm/min		mm/min		mm/min		mm/min		mm/min		mm/min		
	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling
0.5	28,700	130	60	25,500	100	50	19,100	90	45	50,000	250	100	38,200	180	80		
0.8	17,900	130	60	15,900	100	50	11,900	90	45	50,000	250	100	23,900	180	80		
1	14,300	150	60	12,700	100	50	9,600	90	45	25,500	300	120	19,100	220	100		
1.5	9,600	150	60	8,500	100	50	6,400	90	45	17,000	300	120	12,700	220	100		
2	7,200	150	60	6,400	100	50	4,800	90	45	12,700	300	120	9,600	220	100		
3	4,800	180	70	4,200	130	55	3,200	100	50	8,500	350	150	6,400	250	110		
4	3,600	180	70	3,200	130	55	2,400	100	50	6,400	350	150	4,800	250	110		
5	2,900	200	80	2,500	150	60	1,900	120	55	5,100	400	180	3,800	300	130		
6	2,400	200	80	2,100	150	60	1,600	120	55	4,200	400	180	3,200	300	130		
7	2,000	200	80	1,800	150	60	1,400	120	55	3,600	400	180	2,700	300	130		
8	1,800	200	80	1,600	150	60	1,200	120	55	3,200	400	180	2,400	300	130		
9	1,600	200	80	1,400	150	60	1,100	120	55	2,800	400	180	2,100	300	130		
10	1,400	200	80	1,300	150	60	1,000	120	55	2,500	400	180	1,900	300	130		
11	1,300	200	80	1,200	150	60	870	120	55	2,300	400	180	1,700	300	130		
12	1,200	200	80	1,100	150	60	800	120	55	2,100	400	180	1,600	300	130		
14	1,020	200	80	910	150	60	680	120	55	1,800	400	180	1,400	300	130		
15	960	200	80	850	150	60	640	120	55	1,700	400	180	1,300	300	130		
16	900	200	80	800	150	60	600	120	55	1,600	400	180	1,200	300	130		
18	800	200	80	710	150	60	530	120	55	1,400	400	180	1,100	300	130		
20	720	200	80	640	150	60	480	120	55	1,300	400	180	1,000	300	130		
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> <div style="text-align: left;"> <p><math>a_p</math>  <math>\varnothing 0.5 \sim 0.9 = 0.25D</math>  <math>\varnothing 1 \sim 2.5 = 0.5D</math>  <math>\varnothing 3 \sim 20 = 1D</math></p> </div> </div>																
(D) Dia. Dia.																	
Note Notes	※ Usare lubrorefrigerante. ※ Regolate con la stessa proporzione giri ed avanzamento. ※ Use cutting fluid. ※ Adjust both spindle speed and feed at the same rate.																

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane Square**  
Coating  
Non Rivestite Non-Coating

**Scaricate Steriche**  
Long Neck Square  
Coating  
Non Rivestite Non-Coating

**Sferiche Ball**  
Coating  
Non Rivestite Non-Coating

**Coniche Taper**  
Coating  
Non Rivestite Non-Coating

**Scaricate Steriche**  
Long Neck Corner R  
Coating  
Non Rivestite Non-Coating

**Toriche Corner R**  
Coating  
Non Rivestite Non-Coating

**Frese Sagomate**  
Formed Cutter  
Coating  
Non Rivestite Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# Parametri di taglio raccomandati

# NCM-2

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738			Alluminio Aluminum			Rame Copper		
Velocità di taglio Cutting Speed	40~50m/min			35~45m/min			25~35m/min			60~100m/min			40~80m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting
0.5	28,700	130	50	25,500	90	40	19,100	80	35	50,000	200	80	38,200	150	60
0.8	17,900	130	50	15,900	90	40	11,900	80	35	50,000	200	80	23,900	150	60
1	14,300	130	50	12,700	90	40	9,600	80	35	25,500	250	100	19,100	180	80
1.5	9,600	130	50	8,500	90	40	6,400	80	35	17,000	250	100	12,700	180	80
2	7,200	130	50	6,400	90	40	4,800	80	35	12,700	250	100	9,600	180	80
3	4,800	150	60	4,200	120	50	3,200	90	40	8,500	250	100	6,400	180	80
4	3,600	150	60	3,200	120	50	2,400	90	40	6,400	300	130	4,800	220	100
5	2,900	170	70	2,500	140	55	1,900	110	45	5,100	300	130	3,800	220	100
6	2,400	170	70	2,100	140	55	1,600	110	45	4,200	350	150	3,200	250	120
7	2,000	170	70	1,800	140	55	1,400	110	45	3,600	350	150	2,700	250	120
8	1,800	170	70	1,600	140	55	1,200	110	45	3,200	350	150	2,400	250	120
9	1,600	170	70	1,400	140	55	1,100	110	45	2,800	350	150	2,100	250	120
10	1,400	170	70	1,300	140	55	1,000	110	45	2,500	350	150	1,900	250	120
11	1,300	170	70	1,200	140	55	900	110	45	2,300	350	150	1,700	250	120
12	1,200	170	70	1,100	140	55	800	110	45	2,100	350	150	1,600	250	120
14	1,020	170	70	910	140	55	680	110	45	1,800	350	150	1,400	250	120
15	960	170	70	850	140	55	640	110	45	1,700	350	150	1,300	250	120
16	900	170	70	800	140	55	600	110	45	1,600	350	150	1,200	250	120
18	800	170	70	710	140	55	530	110	45	1,400	350	150	1,100	250	120
20	720	170	70	640	140	55	480	110	45	1,300	350	150	1,000	250	120
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> <div style="text-align: left;"> <p><b>ap</b>                      Ø0.5~0.9 = 0.25D                      Ø1~2.5 = 0.5D                      Ø3~20 = 1D</p> </div> </div>														
(D) Dia. Dia.															
Note	※Usare lubrorefrigerante. ※Regolate con la stessa proporzione giri e avanzamento. ※Use cutting fluid. ※Adjust both spindle speed and feed at the same rate.														

# Parametri di taglio raccomandati

# NCL-2

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738		Alluminio Aluminum		Rame Copper	
Velocità di taglio Cutting Speed	20~30m/min		15~25m/min		15~20m/min		50~70m/min		40~60m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	8,000	100	6,400	85	5,600	60	19,100	200	15,900	150
1.5	5,300	100	4,200	85	3,700	60	12,700	200	10,600	150
2	4,000	100	3,200	85	2,800	60	9,600	200	8,000	150
2.5	3,200	100	2,500	85	2,200	60	7,600	200	6,400	170
3	2,700	110	2,100	90	1,900	65	6,400	220	5,300	170
4	2,000	110	1,600	90	1,400	65	4,800	220	4,000	170
5	1,600	120	1,300	95	1,100	70	3,800	250	3,200	200
6	1,300	120	1,100	95	930	70	3,200	250	2,700	200
8	1,000	120	800	95	700	70	2,400	250	2,000	200
10	800	120	640	95	560	70	1,900	250	1,600	200
12	660	120	530	95	460	70	1,600	250	1,300	200
Profondità di taglio Depth of Cut	<p>Contornatura Side Milling</p> <p><math>a_p</math> Ø1~10 = 4D Ø12 = 45mm</p>									
(D) Dia. Dia.										
Note Notes	<p>※ Usare lubrorefrigerante.                  ※ Regolate con la stessa proporzione giri e avanzamento.                  ※ Use cutting fluid.                  ※ Adjust both spindle speed and feed at the same rate.</p>									

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane Square**  
Coating  
Non Rivestite Non-Coating

**Sferiche Ball**  
Rivestite Coating  
Non Rivestite Non-Coating

**Coniche Taper**  
Rivestite Coating  
Non Rivestite Non-Coating

**Toriche Corner R**  
Rivestite Coating  
Non Rivestite Non-Coating

**Frese Sagomate Formed Cutter**  
Rivestite Coating  
Non Rivestite Non-Coating

**Punte Drill**

**Altro Others**

**Dati tecnici Technical Data**

**Guida tecnica Technical Guidance**

**CBN**  
Nitruro Cubico  
di Boro

# NC-4

CHAMPION SOLID 4-Flute End Mill

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

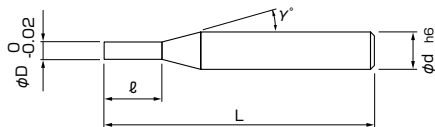
**Altro**  
Others

**Dati tecnici**

Technical Data

**Guida tecnica**  
Technical Guidance

## Fresa 4 Tagli piane "CHAMPION SOLID"



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00244-00100	1	2	9°	4	45
01-00244-00110	1.1	2.2	9°	4	45
01-00244-00120	1.2	2.4	9°	4	45
01-00244-00130	1.3	2.6	9°	4	45
01-00244-00140	1.4	2.8	9°	4	45
01-00244-00150	1.5	3	9°	4	45
01-00244-00160	1.6	3.2	9°	4	45
01-00244-00170	1.7	3.4	9°	4	45
01-00244-00180	1.8	3.6	9°	4	45
01-00244-00190	1.9	3.8	9°	4	45
01-00244-00200	2	4	9°	4	45
01-00244-00210	2.1	4.2	9°	4	45
01-00244-00220	2.2	4.4	9°	4	45
01-00244-00230	2.3	4.6	9°	4	45
01-00244-00240	2.4	4.8	9°	4	45
01-00244-00250	2.5	5	9°	4	45
01-00244-00260	2.6	5.2	9°	6	45
01-00244-00270	2.7	5.4	9°	6	45
01-00244-00280	2.8	5.6	9°	6	45
01-00244-00290	2.9	5.8	9°	6	45
01-00244-00300	3	6	9°	6	45
01-00244-00310	3.1	6.2	9°	6	45
01-00244-00320	3.2	6.4	9°	6	45
01-00244-00330	3.3	6.6	9°	6	45
01-00244-00340	3.4	6.8	9°	6	45
01-00244-00350	3.5	7	9°	6	45
01-00244-00360	3.6	7.2	9°	6	45
01-00244-00370	3.7	7.4	9°	6	45
01-00244-00380	3.8	7.6	9°	6	45
01-00244-00390	3.9	7.8	9°	6	45

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00244-00400	4	8	9°	6	45
01-00244-00410	4.1	8.2	9°	6	45
01-00244-00420	4.2	8.4	9°	6	45
01-00244-00430	4.3	8.6	9°	6	45
01-00244-00440	4.4	8.8	9°	6	45
01-00244-00450	4.5	9	9°	6	45
01-00244-00460	4.6	9.2	9°	6	50
01-00244-00470	4.7	9.4	9°	6	50
01-00244-00480	4.8	9.6	9°	6	50
01-00244-00490	4.9	9.8	9°	6	50
01-00244-00500	5	10	9°	6	50
01-00244-00510	5.1	10.2	9°	6	50
01-00244-00520	5.2	10.4	9°	6	50
01-00244-00530	5.3	10.6	9°	6	50
01-00244-00540	5.4	10.8	9°	6	50
01-00244-00550	5.5	11	9°	6	50
01-00244-00560	5.6	11.2	9°	6	55
01-00244-00570	5.7	11.4	9°	6	55
01-00244-00580	5.8	11.6	9°	6	55
01-00244-00590	5.9	11.8	9°	6	55
01-00244-00600	6	12	-	6	55
01-00244-00610	6.1	12.2	-	6	55
01-00244-00620	6.2	12.4	-	6	55
01-00244-00630	6.3	12.6	-	6	55
01-00244-00640	6.4	12.8	-	6	55
01-00244-00650	6.5	13	-	6	55
01-00244-00660	6.6	13.2	9°	8	60
01-00244-00670	6.7	13.4	9°	8	60
01-00244-00680	6.8	13.6	9°	8	60
01-00244-00690	6.9	13.8	9°	8	60

### Attenzione

Quando ordinate, indicate NC-4 (D).  
When you order, indicate NC-4 (D).

- Per i parametri di taglio vedi pagina 217.
- Milling condition is recommended on page 217.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00244-00700	7	14	9°	8	60
01-00244-00710	7.1	14.2	9°	8	60
01-00244-00720	7.2	14.4	9°	8	60
01-00244-00730	7.3	14.6	9°	8	60
01-00244-00740	7.4	14.8	9°	8	60
01-00244-00750	7.5	15	9°	8	60
01-00244-00760	7.6	15.2	9°	8	60
01-00244-00770	7.7	15.4	9°	8	60
01-00244-00780	7.8	15.6	9°	8	60
01-00244-00790	7.9	15.8	9°	8	60
01-00244-00800	8	16	-	8	60
01-00244-00810	8.1	16.2	-	8	60
01-00244-00820	8.2	16.4	-	8	60
01-00244-00830	8.3	16.6	-	8	60
01-00244-00840	8.4	16.8	-	8	60
01-00244-00850	8.5	17	-	8	60
01-00244-00860	8.6	17.2	9°	10	65
01-00244-00870	8.7	17.4	9°	10	65
01-00244-00880	8.8	17.6	9°	10	65
01-00244-00890	8.9	17.8	9°	10	65
01-00244-00900	9	18	9°	10	65
01-00244-00910	9.1	18.2	9°	10	65
01-00244-00920	9.2	18.4	9°	10	65
01-00244-00930	9.3	18.6	9°	10	65
01-00244-00940	9.4	18.8	9°	10	65
01-00244-00950	9.5	19	9°	10	65
01-00244-00960	9.6	19.2	9°	10	70
01-00244-00970	9.7	19.4	9°	10	70
01-00244-00980	9.8	19.6	9°	10	70
01-00244-00990	9.9	19.8	9°	10	70

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00244-01000	10	20	-	10	70
01-00244-01010	10.1	20.2	9°	12	75
01-00244-01020	10.2	20.4	9°	12	75
01-00244-01030	10.3	20.6	9°	12	75
01-00244-01040	10.4	20.8	9°	12	75
01-00244-01050	10.5	21	9°	12	75
01-00244-01060	10.6	21.2	9°	12	75
01-00244-01070	10.7	21.4	9°	12	75
01-00244-01080	10.8	21.6	9°	12	75
01-00244-01090	10.9	21.8	9°	12	75
01-00244-01100	11	22	9°	12	75
01-00244-01110	11.1	22.2	9°	12	75
01-00244-01120	11.2	22.4	9°	12	75
01-00244-01130	11.3	22.6	9°	12	75
01-00244-01140	11.4	22.8	9°	12	75
01-00244-01150	11.5	23	9°	12	75
01-00244-01160	11.6	23.2	9°	12	75
01-00244-01170	11.7	23.4	9°	12	75
01-00244-01180	11.8	23.6	9°	12	75
01-00244-01190	11.9	23.8	9°	12	75
01-00244-01200	12	24	-	12	75
01-00244-01400	14	28	-	12	85
01-00244-01500	15	30	9°	16	100
01-00244-01600	16	32	-	16	100
01-00244-01800	18	36	9°	20	110
01-00244-02000	20	40	-	20	115

### Attenzione

Quando ordinate, indicate NC-4 (D).  
When you order, indicate NC-4 (D).

- Per i parametri di taglio vedi pagina 217.
- Milling condition is recommended on page 217.

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

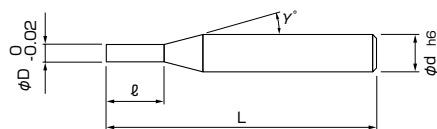
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NCM-4

CHAMPION SOLID 4-Flute Medium End Mill

## Frese 4 Tagli piane medie "CHAMPION SOLID"



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lung. di taglio Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. attacco Shank Dia.	(L) Lung. totale Overall Length
01-00234-00100	1	3	9°	4	45
01-00234-00150	1.5	4.5	9°	4	45
01-00234-00200	2	6	9°	4	45
01-00234-00250	2.5	8	9°	4	45
01-00234-00300	3	10	9°	6	45
01-00234-00350	3.5	11	9°	6	50
01-00234-00400	4	12	9°	6	50
01-00234-00450	4.5	14	9°	6	55
01-00234-00500	5	15	9°	6	55
01-00234-00550	5.5	17	9°	6	55
01-00234-00600	6	18	-	6	60
01-00234-00650	6.5	20	-	6	65
01-00234-00700	7	21	9°	8	65
01-00234-00750	7.5	23	9°	8	70
01-00234-00800	8	24	-	8	70
01-00234-00850	8.5	25	-	8	70
01-00234-00900	9	27	9°	10	75
01-00234-00950	9.5	28	9°	10	75
01-00234-01000	10	30	-	10	80
01-00234-01100	11	33	9°	12	80
01-00234-01200	12	36	-	12	85
01-00234-01400	14	42	-	12	100
01-00234-01500	15	45	9°	16	110
01-00234-01600	16	50	-	16	110
01-00234-01800	18	55	9°	20	130
01-00234-02000	20	60	-	20	135

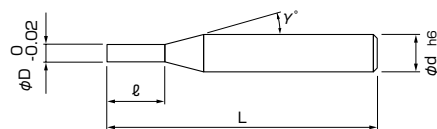
**Attenzione** NCM-4 Dia.(D) Quando ordinate, indicate.  
When you order, indicate NCM-4 (D).

- Per i parametri di taglio vedi pagina 218.
- Milling condition is recommended on page 218.

# NCL-4

CHAMPION SOLID 4-Flute Long End Mill

## Frese 4 Tagli piane lunghe "CHAMPION SOLID"



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lung. di taglio Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. attacco Shank Dia.	(L) Lung. totale Overall Length
01-00224-00200	2	10	9°	4	50
01-00224-00300	3	18	9°	6	60
01-00224-00400	4	22	9°	6	60
01-00224-00500	5	25	9°	6	65
01-00224-00600	6	25	-	6	65
01-00224-00800	8	35	-	8	80
01-00224-01000	10	42	-	10	100
01-00224-01200	12	45	-	12	100

**Attenzione** Quando ordinate, indicate NCL-4(D).  
When you order, indicate NCL-4 (D).

- Per i parametri di taglio vedi pagina 219.
- Milling condition is recommended on page 219.

# Parametri di taglio raccomandati

# NC-4

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738	
Velocità di taglio Cutting Speed	40~50m/min		35~45m/min		25~35m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	14,300	250	12,700	220	9,600	190
2	7,200	250	6,400	220	4,800	190
3	4,800	270	4,200	240	3,200	210
4	3,600	270	3,200	240	2,400	210
5	2,900	300	2,500	260	1,900	230
6	2,400	300	2,100	260	1,600	230
7	2,000	300	1,800	260	1,400	230
8	1,800	300	1,600	260	1,200	230
9	1,600	300	1,400	260	1,100	230
10	1,400	300	1,300	260	1,000	230
11	1,300	300	1,200	260	870	230
12	1,200	300	1,100	260	800	230
14	1,020	300	910	260	680	230
15	960	300	850	260	640	230
16	900	300	800	260	600	230
18	800	300	710	260	530	230
20	720	300	640	260	480	230
Profondità di taglio Depth of Cut	<p>Contornatura Side Milling</p>					
(D) Dia. Dia.						
Note Notes	<p>※ Usare lubrificante.                  ※ Adatta solo per la lavorazione di contornatura.                  ※ Regolate nella stessa proporzione giri ed avanzamento.                  ※ Use cutting fluid.                  ※ It is available only for side milling.                  ※ Adjust both spindle speed and feed at the same rate.</p>					

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane Square**

**Scaricate Piane**  
Long Neck Square

**Sferiche Ball**

**Scaricate Sferiche**  
Long Neck Ball

**Coniche Taper**

**Coniche Sferiche**  
Taper Ball

**Toriche Corner R**

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

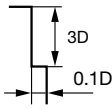
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# Parametri di taglio raccomandati

# NCM-4

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738	
Velocità di taglio Cutting Speed	40~50m/min		35~45m/min		25~35m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	14,300	180	12,700	160	9,600	140
2	7,200	180	6,400	160	4,800	140
3	4,800	190	4,200	170	3,200	150
4	3,600	190	3,200	170	2,400	150
5	2,900	210	2,500	190	1,900	170
6	2,400	210	2,100	190	1,600	170
7	2,000	210	1,800	190	1,400	170
8	1,800	210	1,600	190	1,200	170
9	1,600	210	1,400	190	1,100	170
10	1,400	210	1,300	190	1,000	170
11	1,300	210	1,200	190	870	170
12	1,200	210	1,100	190	800	170
14	1,020	210	910	190	680	170
15	960	210	850	190	640	170
16	900	210	800	190	600	170
18	800	210	710	190	530	170
20	720	210	640	190	480	170
Profondità di taglio Depth of Cut	Contornatura Side Milling 					
(D) Dia. Dia.						
Note Notes	※Usare lubrorefrigerante. ※Adatta solo per la lavorazione di contornatura. ※Regolate nella stessa proporzione giri ed avanzamento. ※Use cutting fluid. ※It is available only for side milling. ※Adjust both spindle speed and feed at the same rate.					

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite Coating  
Piane Square  
Non Rivestite Non-Coating  
Scaricate Plane  
Long Neck Square

Rivestite Coating  
Sferiche Ball  
Non Rivestite Non-Coating  
Scaricate Sferiche  
Long Neck Ball

Rivestite Coating  
Coniche Taper  
Non Rivestite Non-Coating  
Coniche Sferiche  
Taper Ball

Rivestite Coating  
Toriche Corner R  
Non Rivestite Non-Coating  
Scaricate Toriche  
Long Neck Corner R

Rivestite Coating  
Frese Sagomate  
Formed Cutter  
Non Rivestite Non-Coating

Punte  
Drill

Altro  
Others

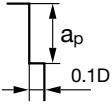
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Parametri di taglio raccomandati

# NCL-4

### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738	
Velocità di taglio Cutting Speed	20~25m/min		15~20m/min		10~15m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
2	3,200	120	2,800	100	2,400	90
3	2,100	130	1,900	110	1,600	100
4	1,600	130	1,400	110	1,200	100
5	1,300	140	1,100	120	1,000	110
6	1,100	140	930	120	800	110
8	800	140	700	120	600	110
10	640	140	560	120	480	110
12	530	140	460	120	400	110
Profondità di taglio Depth of Cut  (D) Dia. Dia.	<p>Contornatura Side Milling</p>  <p><math>a_p</math>  <math>\varnothing 2 \sim 10 = 4D</math>  <math>\varnothing 12 = 45mm</math></p>					
Note Notes	<ul style="list-style-type: none"> <li>※ Usare lubrificante.</li> <li>※ Adatta solo per la lavorazione di contornatura.</li> <li>※ Regolare nella stessa proporzione giri ed avanzamento.</li> <li>※ Use cutting fluid.</li> <li>※ It is available only for side milling.</li> <li>※ Adjust both spindle speed and feed at the same rate.</li> </ul>					

**CBN**

Nitruro Cubico di Boro

**Diamante**

Diamond

**Piane Square**
**Scaricate Plane**

Long Neck Square

**Sferiche Ball**
**Scaricate Sferiche**

Long Neck Ball

**Coniche Taper**
**Coniche Sferiche**

Taper Ball

**Toriche Corner R**
**Scaricate Toriche**

Long Neck Corner R

**Frese Sagomate**

Formed Cutter

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

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**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

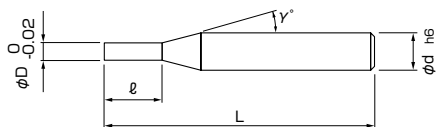
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NE-2

POWER SOLID 2-Flute End Mill

## Frese 2 Tagli piane "POWER SOLID"



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lung. totale Overall Length
01-00112-00100	1	2.5	9°	4	45
01-00112-00150	1.5	3	9°	4	45
01-00112-00200	2	6	9°	4	45
01-00112-00250	2.5	8	9°	4	45
01-00112-00300	3	8	9°	6	45
01-00112-00350	3.5	9	9°	6	45
01-00112-00400	4	10	9°	6	45
01-00112-00450	4.5	13	9°	6	50
01-00112-00500	5	13	9°	6	50
01-00112-00550	5.5	13	9°	6	50
01-00112-00600	6	13	-	6	50
01-00112-00650	6.5	18	9°	8	60
01-00112-00700	7	18	9°	8	60
01-00112-00750	7.5	18	9°	8	60
01-00112-00800	8	18	-	8	60
01-00112-00850	8.5	20	9°	10	65
01-00112-00900	9	20	9°	10	65
01-00112-00950	9.5	20	9°	10	65
01-00112-01000	10	20	-	10	65
01-00112-01100	11	23	9°	12	70
01-00112-01200	12	23	-	12	70
01-00112-01400	14	30	9°	16	85
01-00112-01500	15	35	9°	16	90
01-00112-01600	16	35	-	16	90
01-00112-01800	18	40	9°	20	100
01-00112-02000	20	45	-	20	110

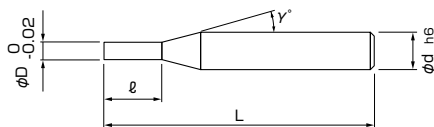
**Attenzione** Quando ordinate, indicate NE-2(D).  
When you order, indicate NE-2 (D).

- Per i parametri di taglio vedi pagina 222.
- Milling condition is recommended on page 222.

# NE-3

POWER SOLID 3-Flute End Mill

## Frese 3 Tagli piane "POWER SOLID"



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lung. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lung. totale Overall Length
01-00113-00300	3	8	9°	6	45
01-00113-00350	3.5	10	9°	6	45
01-00113-00400	4	10	9°	6	45
01-00113-00450	4.5	13	9°	6	50
01-00113-00500	5	13	9°	6	50
01-00113-00550	5.5	13	9°	6	50
01-00113-00600	6	13	-	6	50
01-00113-00650	6.5	18	9°	8	60
01-00113-00700	7	18	9°	8	60
01-00113-00750	7.5	18	9°	8	60
01-00113-00800	8	18	-	8	60
01-00113-00850	8.5	20	9°	10	65
01-00113-00900	9	20	9°	10	65
01-00113-00950	9.5	20	9°	10	65
01-00113-01000	10	20	-	10	65
01-00113-01100	11	23	9°	12	70
01-00113-01200	12	23	-	12	70
01-00113-01300	13	30	9°	16	85
01-00113-01400	14	30	9°	16	85
01-00113-01500	15	35	9°	16	90
01-00113-01600	16	35	-	16	90
01-00113-01800	18	40	9°	20	100
01-00113-02000	20	45	-	20	110

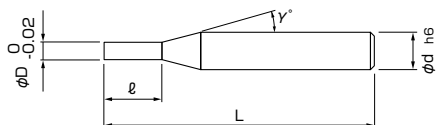
**Attenzione** Quando ordinate, indicate NE-3 (D).  
When you order, indicate NE-3 (D).

- Per i parametri di taglio vedi pagina 223.
- Milling condition is recommended on page 223.

# NE-4

POWER SOLID 4-Flute End Mill

## Frese 4 Tagli piane "POWER SOLID"



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Lungh. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00114-00300	3	8	9°	6	45
01-00114-00400	4	10	9°	6	45
01-00114-00450	4,5	13	9°	6	50
01-00114-00500	5	13	9°	6	50
01-00114-00600	6	13	-	6	50
01-00114-00700	7	18	9°	8	60
01-00114-00800	8	18	-	8	60
01-00114-01000	10	20	-	10	65
01-00114-01200	12	23	-	12	70
01-00114-01400	14	30	9°	16	85
01-00114-01500	15	35	9°	16	90
01-00114-01600	16	35	-	16	90
01-00114-01800	18	40	9°	20	100
01-00114-02000	20	45	-	20	110

### Attenzione

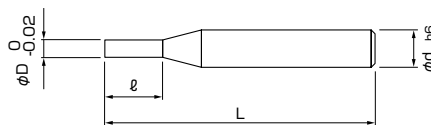
Quando ordinate, indicate NE-4 Dia.(D).  
When you order, indicate NE-4 (D).

- Per i parametri di taglio vedi pagina 224.
- Milling condition is recommended on page 224.

# NEL-3

POWER SOLID 3-Flute Long End Mill

## Frese 3 Tagli piane lunghe "POWER SOLID"



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(d) Lungh. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00116-00600	6	25	6	75
01-00116-00800	8	35	8	90
01-00116-01000	10	45	10	110
01-00116-01200	12	55	12	120
01-00116-01400	14	65	16	140
01-00116-01600	16	65	16	140
01-00116-01800	18	75	20	155
01-00116-02000	20	85	20	165

### Attenzione

Quando ordinate, indicate NEL-3 Dia.(D).  
When you order, indicate NEL-3 (D).

CBN

Nitruro Cubico  
di Boro

Diamante

Diamond

Piane  
Square

Scaricate  
Plane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese  
Sagomate

Formed  
Cutter

Punte

Drill

Altro

Others

Dati tecnici

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# Parametri di taglio raccomandati

# NE-2

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738			Alluminio Aluminum			Rame Copper			
Velocità di taglio Cutting Speed	40~50m/min			35~45m/min			25~35m/min			60~100m/min			40~80m/min			
Dia. Dia.	Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed	
	min <sup>-1</sup>		mm/min		min <sup>-1</sup>		mm/min		min <sup>-1</sup>		mm/min		min <sup>-1</sup>		mm/min	
	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	Cava Slotting
1	14,300	200	80	12,700	150	60	9,600	110	40	25,500	400	150	19,100	250	130	
1.5	9,600	200	80	8,500	150	60	6,400	110	40	17,000	400	150	12,700	250	130	
2	7,200	200	80	6,400	150	60	4,800	110	40	12,700	400	150	9,600	250	130	
2.5	5,700	200	80	5,100	150	60	3,800	110	40	10,200	400	150	7,600	250	130	
3	4,800	230	90	4,200	180	70	3,200	130	50	8,500	450	180	6,400	300	160	
4	3,600	230	90	3,200	180	70	2,400	130	50	6,400	450	180	4,800	300	160	
5	2,900	250	100	2,500	200	80	1,900	150	60	5,100	500	220	3,800	350	180	
6	2,400	250	100	2,100	200	80	1,600	150	60	4,200	500	220	3,200	350	180	
7	2,000	250	100	1,800	200	80	1,400	150	60	3,600	500	220	2,700	350	180	
8	1,800	250	100	1,600	200	80	1,200	150	60	3,200	500	220	2,400	350	180	
9	1,600	250	100	1,400	200	80	1,100	150	60	2,800	500	220	2,100	350	180	
10	1,400	250	100	1,300	200	80	1,000	150	60	2,500	500	220	1,900	350	180	
11	1,300	250	100	1,200	200	80	870	150	60	2,300	500	220	1,700	350	180	
12	1,200	250	100	1,100	200	80	800	150	60	2,100	500	220	1,600	350	180	
14	1,020	250	100	910	200	80	680	150	60	1,800	500	220	1,400	350	180	
15	960	250	100	850	200	80	640	150	60	1,700	500	220	1,300	350	180	
16	900	250	100	800	200	80	600	150	60	1,600	500	220	1,200	350	180	
18	800	250	100	710	200	80	530	150	60	1,400	500	220	1,100	350	180	
20	720	250	100	640	200	80	480	150	60	1,300	500	220	1,000	350	180	
Profondità di taglio Depth of Cut  (D) Dia. Dia.	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> <div style="text-align: left;"> <p><math>a_p</math>  <math>\varnothing 1 \sim 2.5 = 0.5D</math>  <math>\varnothing 3 \sim 20 = 1D</math></p> </div> </div>															
Note	<ul style="list-style-type: none"> <li>※Usare lubrorefrigerante.</li> <li>※Regolare con la stessa proporzione giri ed avanzamento.</li> <li>※Usare un mandrino molto rigido.</li> <li>※Use cutting fluid.</li> <li>※Adjust both spindle speed and feed at the same rate.</li> <li>※Use high rigid holder.</li> </ul>															



# Parametri di taglio raccomandato

# NE-3

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738			Alluminio Aluminum			Rame Copper				
Velocità di taglio Cutting Speed	40~50m/min			35~45m/min			25~35m/min			60~100m/min			40~80m/min				
Dia. Dia.	Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		Giri Spindle Speed		Avanzamento Feed		
	mm/min		mm/min		mm/min		mm/min		mm/min		mm/min		mm/min		mm/min		
	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling
6	2,400	330	110	2,100	260	90	1,600	200	70	4,200	600	250	3,200	450	200		
8	1,800	330	110	1,600	260	90	1,200	200	70	3,200	600	250	2,400	450	200		
10	1,400	330	110	1,300	260	90	1,000	200	70	2,500	600	250	1,900	450	200		
12	1,200	330	110	1,100	260	90	800	200	70	2,100	600	250	1,600	450	200		
14	1,020	330	110	910	260	90	680	200	70	1,800	600	250	1,400	450	200		
15	960	330	110	850	260	90	640	200	70	1,700	600	250	1,300	450	200		
16	900	330	110	800	260	90	600	200	70	1,600	600	250	1,200	450	200		
18	800	330	110	710	260	90	530	200	70	1,400	600	250	1,100	450	200		
20	720	330	110	640	260	90	480	200	70	1,300	600	250	1,000	450	200		
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> </div>																
(D) Dia. Dia.																	
Note Notes	<ul style="list-style-type: none"> <li>※ Usare lubrificante.</li> <li>※ Regolare con la stessa proporzione giri ed avanzamento.</li> <li>※ Usare un mandrino molto rigido.</li> <li>※ Use cutting fluid.</li> <li>※ Adjust both spindle speed and feed at the same rate.</li> <li>※ Use high rigid holder.</li> </ul>																

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Sferiche  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Coniche  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Toriche  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# Parametri di taglio raccomandati

# NE-4

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738	
Velocità di taglio Cutting Speed	40~50m/min		35~45m/min		25~35m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
3	4,800	340	4,200	270	3,200	250
4	3,600	340	3,200	270	2,400	250
5	2,900	370	2,500	300	1,900	280
6	2,400	370	2,100	300	1,600	280
8	1,800	370	1,600	300	1,200	280
10	1,400	370	1,300	300	1,000	280
12	1,200	370	1,100	300	800	280
14	1,020	370	910	300	680	280
15	960	370	850	300	640	280
16	900	370	800	300	600	280
18	800	370	710	300	530	280
20	720	370	640	300	480	280
Profondità di taglio Depth of Cut  (D) Dia. Dia.	<p>Contornatura Side Milling</p>					
Note Notes	<ul style="list-style-type: none"> <li>※Usare lubrificante.</li> <li>※Adatta solo per la lavorazione di contornatura.</li> <li>※Regolare con la stessa proporzione giri ed avanzamento.</li> <li>※Usare un mandrino molto rigido.</li> <li>※Use cutting fluid.</li> <li>※It is available only for side cutting.</li> <li>※Adjust both spindle speed and feed at the same rate.</li> <li>※Use high rigid holder.</li> </ul>					

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

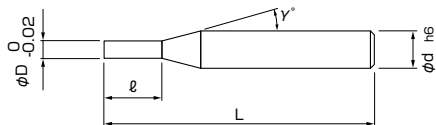
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# NSL-2

Straight End Mill for Reforming

## Frese 2 Tagli piane diritte per profilatura



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Lungh. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00812-00100	1	2	9°	4	45
01-00812-00150	1.5	3	9°	4	45
01-00812-00200	2	4	9°	4	45
01-00812-00250	2.5	5	9°	4	45
01-00812-00300	3	6	9°	6	45
01-00812-00400	4	8	9°	6	45
01-00812-00500	5	10	9°	6	50
01-00812-00600	6	12	-	6	55
01-00812-00700	7	14	9°	8	60
01-00812-00800	8	16	-	8	60
01-00812-00900	9	18	9°	10	65
01-00812-01000	10	20	-	10	70
01-00812-01100	11	22	9°	12	75
01-00812-01200	12	24	-	12	75

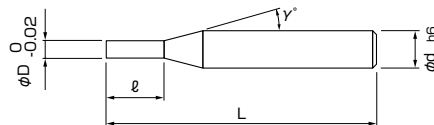
### Attenzione

Quando ordinate, indicate NSL-2 Dia.(D).  
When you order, indicate NSL-2 (D).

# DX

2-Flute End Mill for Nonferrous

## Frese 2 Tagli piane per materiali non ferrosi



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Lungh. gambo Shank Dia.	(L) Lungh. totale Overall Length
07-00036-00050	0.5	1	12°	4	45
07-00036-00080	0.8	1.6	12°	4	45
07-00036-00100	1	2	9°	4	45
07-00036-00150	1.5	3	9°	4	45
07-00036-00200	2	4	9°	4	45
07-00036-00250	2.5	5	9°	4	45
07-00036-00300	3	6	9°	6	50
07-00036-00400	4	8	9°	6	50
07-00036-00500	5	10	9°	6	60
07-00036-00600	6	12	-	6	60
07-00036-00800	8	16	-	8	70
07-00036-01000	10	20	-	10	80
07-00036-01200	12	24	-	12	80
07-00036-01600	16	32	-	16	100
07-00036-02000	20	40	-	20	120

### Attenzione

Quando ordinate, indicate DX Dia.(D).  
When you order, indicate DX (D).

- Per i parametri di taglio vedi pagina 226.
- Milling condition is recommended on page 226.

CBN

Nitruro Cubico di Boro

Diamante

Diamond

Piane Square

Scaricate Piane

Long Neck Square

Sferiche Ball

Scaricate Sferiche

Long Neck Ball

Coniche Taper

Coniche Sferiche

Taper Ball

Toriche Corner R

Scaricate Toriche

Long Neck Corner R

Frese Sagomate

Formed Cutter

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

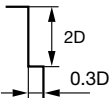
Guida tecnica

Technical Guidance

## Parametri di taglio raccomandati

**DX**

### Recommended Milling Conditions

Materiale Work Material	Rame Copper		Alluminio Aluminum	
Velocità di taglio Cutting Speed	60m/min		80~150m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.5	38,000	150	50,000	520
0.8	24,000	150	50,000	520
1	19,000	150	48,000	800
1.5	13,000	150	32,000	1,000
2	9,600	150	24,000	1,000
2.5	7,700	200	19,000	1,000
3	6,400	200	16,000	1,000
4	4,800	200	12,000	1,000
5	3,800	200	9,600	1,000
6	3,200	200	8,000	1,000
8	2,400	200	6,000	1,000
10	1,900	200	4,800	1,000
12	1,600	200	4,000	1,000
16	1,200	200	3,000	1,000
20	960	200	2,400	1,000
Profondità di taglio Depth of Cut	Contornatura Side Milling 			
(D) Dia. Dia.				
Note Notes	※Usare lubrorefrigerante. ※Regolare con la stessa proporzione giri ed avanzamento. ※Non utilizzare per il taglio di acciaio. ※Use cutting fluid. ※Adjust both spindle speed and feed at the same rate. ※Don't use for cutting steels.			

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite Coating**  
Piane Square

**Non Rivestite Non-Coating**  
Scaricate Piane Long Neck Square

**Rivestite Coating**  
Sferiche Ball

**Non Rivestite Non-Coating**  
Scaricate Sferiche Long Neck Ball

**Rivestite Coating**  
Coniche Taper

**Non Rivestite Non-Coating**  
Coniche Sferiche Taper Ball

**Rivestite Coating**  
Toriche Corner R

**Non Rivestite Non-Coating**  
Scaricate Toriche Long Neck Corner R

**Rivestite Coating**  
Frese Sagomate Formed Cutter

**Non Rivestite Non-Coating**  
Frese Sagomate Formed Cutter

**Punte**  
Drill

**Altro**  
Others

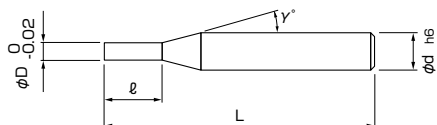
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# DXM

2-Flute Medium End Mill for Nonferrous

## Frese 2 Tagli piane medie per materiali non ferrosi



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
07-00040-00300	3	12	9°	6	60
07-00040-00400	4	16	9°	6	60
07-00040-00500	5	20	9°	6	70
07-00040-00600	6	24	—	6	70
07-00040-00800	8	32	—	8	90
07-00040-01000	10	40	—	10	100
07-00040-01200	12	48	—	12	110
07-00040-01600	16	64	—	16	140
07-00040-02000	20	80	—	20	160

### Attenzione

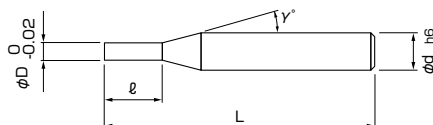
Quando ordinate, indicate DXM Dia.(D).  
When you order, indicate DXM (D).

- Per i parametri di taglio vedi pagina 229.
- Milling condition is recommended on page 229.

# DXL

2-Flute Long End Mill for Nonferrous

## Frese 2 Tagli piane lunghe per materiali non ferrosi



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
07-00045-00300	3	15	9°	6	70
07-00045-00400	4	20	9°	6	70
07-00045-00500	5	25	9°	6	80
07-00045-00600	6	30	—	6	80
07-00045-00800	8	40	—	8	100
07-00045-01000	10	50	—	10	110
07-00045-01200	12	60	—	12	120
07-00045-01600	16	80	—	16	160
07-00045-02000	20	100	—	20	190

### Attenzione

Quando ordinate, indicate DXL Dia.(D).  
When you order, indicate DXL (D).

- Per i parametri di taglio vedi pagina 230.
- Milling condition is recommended on page 230.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

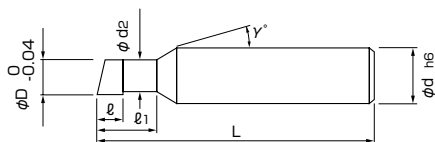
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# DSF

Surface End Mill for Nonferrous

## Frese piane per finitura piani materiali non ferrosi



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Angolo Neck Dia.	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
07-00001-00100	1	0.5	0.9	1	12°	6	60
07-00001-00200	2	1	1.8	2	12°	6	60
07-00001-00300	3	1.5	2.7	3	12°	6	60
07-00001-00400	4	2	3.6	4	12°	6	60
07-00001-00500	5	2.5	4.5	5	12°	6	60
07-00001-00600	6	3	5.4	6	-	6	60
07-00001-00800	8	4	7.2	8	-	8	70
07-00001-01000	10	5	9	10	-	10	80
07-00001-01200	12	6	10.8	12	-	12	80
07-00001-01600	16	8	14.4	16	-	16	100
07-00001-02000	20	10	18	20	-	20	120

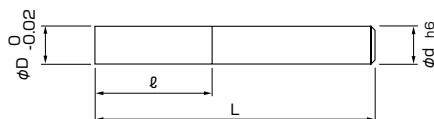
**Attenzione** Quando ordinate, indicate DSF Dia.(D).  
When you order, indicate DSF (D).

- Per i parametri di taglio vedi pagina 231.
- Milling condition is recommended on page 231.

# DHS

3-Flute Semi-finishing End Mill for Nonferrous

## Frese 3 Tagli piane per semifinitura materiali non ferrosi



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
07-00333-00600	6	15	6	70
07-00333-00800	8	20	8	80
07-00333-01000	10	25	10	90
07-00333-01200	12	30	12	90
07-00333-01600	16	40	16	100
07-00333-02000	20	50	20	120

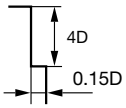
**Attenzione** Quando ordinate, indicate DHS Dia.(D).  
When you order, indicate DHS (D).

- Per i parametri di taglio vedi pagina 232.
- Milling condition is recommended on page 232.

## Parametri di taglio raccomandati

# DXM

### Recommended Milling Conditions

Materiale Work Material	Rame Copper		Alluminio Aluminum	
Velocità di taglio Cutting Speed	40m/min		50~100m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
3	4,300	130	10,000	660
4	3,200	130	8,000	660
5	2,600	130	6,400	660
6	2,100	130	5,300	660
8	1,600	130	4,000	660
10	1,300	130	3,200	660
12	1,000	130	2,600	660
16	800	130	2,000	660
20	640	130	1,200	660
Profondità di taglio Depth of Cut	Contornatura Side Milling 			
(D) Dia. Dia.				
Note Notes	※ Usare lubrorefrigerante. ※ Regolare con la stessa proporzione giri ed avanzamento. ※ Non utilizzare per il taglio di acciaio. ※ Use cutting fluid. ※ Adjust both spindle speed and feed at the same rate. ※ Don't use for cutting steels.			

**CBN**

Nitruro Cubico di Boro

**Diamante**

Diamond

**Piane Square**
**Scaricate Plane**

Long Neck Square

**Sferiche Ball**
**Scaricate Sferiche**

Long Neck Ball

**Coniche Taper**
**Coniche Sferiche**

Taper Ball

**Toriche Corner R**
**Scaricate Toriche**

Long Neck Corner R

**Frese Sagomate**

Formed Cutter

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

Technical Data

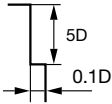
**Guida tecnica**

Technical Guidance

# Parametri di taglio raccomandati

**DXL**

## Recommended Milling Conditions

Materiale Work Material	Rame Copper		Alluminio Aluminum	
Velocità di taglio Cutting Speed	30m/min		40~80m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
3	3,200	100	8,000	500
4	2,400	100	6,000	500
5	1,900	100	4,800	500
6	1,600	100	4,000	500
8	1,200	100	3,000	500
10	1,000	100	2,400	500
12	800	100	2,000	500
16	600	100	1,500	500
20	500	100	1,200	500
Profondità di taglio Depth of Cut	Contornatura Side Milling 			
(D) Dia. Dia.				
Note Notes	※Usare lubrificante. ※Regolare con la stessa proporzione giri ed avanzamento. ※Non utilizzare per il taglio di acciaio. ※Use cutting fluid. ※Adjust both spindle speed and feed at the same rate. ※Don't use for cutting steels.			

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

Rivestite Coating  
Non Rivestite Non-Coating  
**Piastre Square**

Rivestite Coating  
Non Rivestite Non-Coating  
**Scaricate Piastre**  
Long Neck Square

Rivestite Coating  
Non Rivestite Non-Coating  
**Sferiche**  
Ball

Rivestite Coating  
Non Rivestite Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

Rivestite Coating  
Non Rivestite Non-Coating  
**Coniche**  
Taper

Rivestite Coating  
Non Rivestite Non-Coating  
**Coniche Sferiche**  
Taper Ball

Rivestite Coating  
Non Rivestite Non-Coating  
**Toriche**  
Corner R

Rivestite Coating  
Non Rivestite Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

Rivestite Coating  
Non Rivestite Non-Coating  
**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



Materiale Work Material	Rame Copper		Alluminio Aluminum	
Velocità di taglio Cutting Speed	80m/min		80~150m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	26,000	220	48,000	480
2	13,000	220	24,000	480
3	8,500	220	16,000	480
4	6,400	220	12,000	480
5	5,100	220	9,600	480
6	4,200	220	8,000	480
8	3,200	220	6,000	480
10	2,600	220	4,800	480
12	2,100	220	4,000	480
16	1,600	220	3,000	480
20	1,300	220	2,400	480
Profondità di taglio Depth of Cut  (D) Dia. Dia.	<p>Cava Slotting</p> <p>0.02~0.05mm</p>			
Note Notes	※Usare lubrificante. ※Regolare con la stessa proporzione giri ed avanzamento. ※Non utilizzare per il taglio di acciaio. ※Use cutting fluid. ※Adjust both spindle speed and feed at the same rate. ※Don't use for cutting steels.			

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Piane Square**  
Coating  
Non Rivestite  
Non-Coating

**Sferiche Ball**  
Coating  
Non Rivestite  
Non-Coating

**Coniche Taper**  
Coating  
Non Rivestite  
Non-Coating

**Toriche Corner R**  
Coating  
Non Rivestite  
Non-Coating

**Frese Sagomate Formed Cutter**  
Coating  
Non Rivestite  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# Parametri di taglio raccomandati

**DHS**

## Recommended Milling Conditions

Materiale Work Material	Rame Copper		Alluminio Aluminum	
Velocità di taglio Cutting Speed	80m/min		80~150m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
6	4,200	320	8,000	1,200
8	3,200	320	6,000	1,200
10	2,600	320	4,800	1,200
12	2,100	320	4,000	1,200
16	1,600	320	3,000	1,200
20	1,300	320	2,400	1,200
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> </div>			
(D) Dia. Dia.				
Note Notes	<ul style="list-style-type: none"> <li>※Usare lubrificante.</li> <li>※Regolare con la stessa proporzione giri ed avanzamento.</li> <li>※Non utilizzare per il taglio di acciaio.</li> <li>※Use cutting fluid.</li> <li>※Adjust both spindle speed and feed at the same rate.</li> <li>※Don't use for cutting steels.</li> </ul>			

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite Coating**  
Piane Square

**Non Rivestite Non-Coating**  
Scaricate Piane Long Neck Square

**Rivestite Coating**  
Sferiche Ball

**Non Rivestite Non-Coating**  
Scaricate Sferiche Long Neck Ball

**Rivestite Coating**  
Coniche Taper

**Non Rivestite Non-Coating**  
Coniche Sferiche Taper Ball

**Rivestite Coating**  
Toriche Corner R

**Non Rivestite Non-Coating**  
Scaricate Toriche Long Neck Corner R

**Rivestite Coating**  
Frese Sagomate Formed Cutter

**Punte**  
Drill

**Altro**  
Others

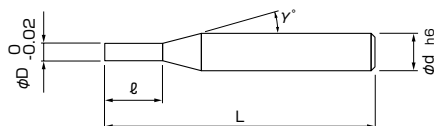
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# AL2D-2

2-Flute End Mill for Aluminum

## Frese 2 Tagli piane per alluminio



- Le frese serie AL realizzano fresature efficienti e stabili.
- Il rapporto  $L/D = 2$ ; aumenta la rigidità e permette di realizzare migliori prestazioni in termini di costi.
- AL-series realized a stable and high efficient machining.
- $L/D=2$  to increase rigidity and realize best cost performance.



Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00631-00050	0.5	1	9°	4	45
01-00631-00060	0.6	1.2	9°	4	45
01-00631-00070	0.7	1.4	9°	4	45
01-00631-00080	0.8	1.6	9°	4	45
01-00631-00090	0.9	1.8	9°	4	45
01-00631-00100	1	2	9°	4	45
01-00631-00110	1.1	2.2	9°	4	45
01-00631-00120	1.2	2.4	9°	4	45
01-00631-00130	1.3	2.6	9°	4	45
01-00631-00140	1.4	2.8	9°	4	45
01-00631-00150	1.5	3	9°	4	45
01-00631-00160	1.6	3.2	9°	4	45
01-00631-00170	1.7	3.4	9°	4	45
01-00631-00180	1.8	3.6	9°	4	45
01-00631-00190	1.9	3.8	9°	4	45
01-00631-00200	2	4	9°	4	45
01-00631-00210	2.1	4.2	9°	4	45
01-00631-00220	2.2	4.4	9°	4	45
01-00631-00230	2.3	4.6	9°	4	45
01-00631-00240	2.4	4.8	9°	4	45
01-00631-00250	2.5	5	9°	4	45
01-00631-00260	2.6	5.2	9°	4	45
01-00631-00270	2.7	5.4	9°	4	45
01-00631-00280	2.8	5.6	9°	4	45
01-00631-00290	2.9	5.8	9°	6	50
01-00631-00300	3	6	9°	6	50
01-00631-00350	3.5	7	9°	6	50

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00631-00400	4	8	9°	6	50
01-00631-00450	4.5	9	9°	6	55
01-00631-00500	5	10	9°	6	55
01-00631-00550	5.5	11	9°	6	55
01-00631-00600	6	12	-	6	55
01-00631-00700	7	14	9°	8	70
01-00631-00800	8	16	-	8	70
01-00631-00900	9	18	9°	10	75
01-00631-01000	10	20	-	10	75
01-00631-01100	11	22	9°	12	80
01-00631-01200	12	24	-	12	80

**Attenzione** Quando ordinate, indicate AL2D-2 Dia. (D).  
When you order, indicate AL2D-2 (D).

- Per i parametri di taglio vedi pagina 244.
- Milling condition is recommended on page 244.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Coating Non Rivestite

Scaricate Piane Long Neck Square  
Coating Non Rivestite

Sferiche Ball  
Coating Rivestite

Scaricate Sferiche Long Neck Ball  
Coating Non Rivestite

Coniche Taper  
Coating Rivestite

Coniche Sferiche Taper Ball  
Coating Non Rivestite

Toriche Corner R  
Coating Rivestite

Scaricate Toriche Long Neck Corner R  
Coating Non Rivestite

Frese Sagomate Formed Cutter  
Coating Rivestite

Punte Drill  
Coating Non Rivestite

Altro Others

Dati tecnici Technical Data

Guida tecnica Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

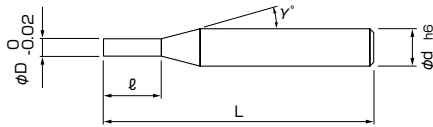
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# AL3D-2

2-Flute Medium End Mill for Aluminum

**Frese 2 Tagli piane medie per alluminio**



- Le frese serie AL realizzano fresature efficienti e stabili.
- Permette eccellenti finiture su ampie superfici, senza che si inneschino vibrazioni nelle lavorazioni in HSC.
- AL-series realized a stable and high efficient machining.
- It exhibits stable excellent surface on a wide area and no chattering occurs even during high speed cutting.

**Dati tecnici** P499



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00632-00100	1	3	9°	4	45
01-00632-00150	1.5	4.5	9°	4	45
01-00632-00200	2	6	9°	4	45
01-00632-00250	2.5	7.5	9°	4	45
01-00632-00300	3	9	9°	6	50
01-00632-00400	4	12	9°	6	50
01-00632-00500	5	15	9°	6	55
01-00632-00600	6	18	-	6	60
01-00632-00700	7	21	9°	8	70
01-00632-00800	8	24	-	8	70
01-00632-00900	9	27	9°	10	75
01-00632-01000	10	30	-	10	75
01-00632-01100	11	33	9°	12	90
01-00632-01200	12	36	-	12	90

**Attenzione** Quando ordinate, indicate AL3D-2 Dia. (D).  
When you order, indicate AL3D-2 (D).

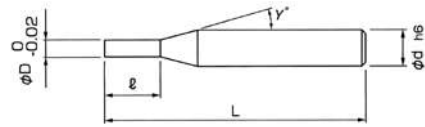
- Per i parametri di taglio vedi pagina 245.
- Milling condition is recommended on page 245.

# AL4D-2

**Novità**

2-Flute Medium End Mill for Aluminum

**Frese 2 Tagli piane medie per alluminio**



- Le frese serie AL realizzano fresature efficienti e stabili.
- Permette eccellenti finiture su ampie superfici, senza che si inneschino vibrazioni nelle lavorazioni in HSC.
- AL-series realized a stable and high efficient machining.
- It exhibits stable excellent surface on a wide area and no chattering occurs even during high speed cutting.

● **NUOVO** NEW



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
● 01-00633-00100	1	4	9°	4	50
● 01-00633-00150	1.5	6	9°	4	50
● 01-00633-00200	2	8	9°	4	50
● 01-00633-00250	2.5	10	9°	4	50
● 01-00633-00300	3	12	9°	6	55
● 01-00633-00400	4	16	9°	6	60
● 01-00633-00500	5	20	9°	6	65
● 01-00633-00600	6	24	-	6	75
● 01-00633-00700	7	28	9°	8	90
● 01-00633-00800	8	32	-	8	90
● 01-00633-00900	9	36	9°	10	100
● 01-00633-01000	10	40	-	10	100
● 01-00633-01100	11	44	9°	12	110
● 01-00633-01200	12	48	-	12	110

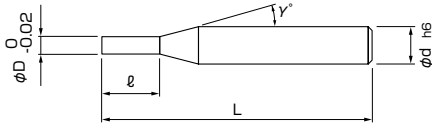
**Attenzione** Quando ordinate, indicate AL4D-2 Dia. (D).  
When you order, indicate AL4D-2 (D).

- Per i parametri di taglio vedi pagina 246.
- Milling condition is recommended on page 246.

# AL5D-2

2-Flute Long End Mill for Aluminum

## Frese 2 Tagli piane lunghe per alluminio



- Le frese serie AL realizzano fresature efficienti e stabili.
- Permette eccellenti finiture su ampie superfici, senza che si inneschino vibrazioni nelle lavorazioni in HSC.
- AL-series realized a stable and high efficient machining.
- It exhibits stable excellent surface on a wide area and no chattering occurs even during high speed cutting.

**Dati tecnici** P498



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00634-00100	1	5	9°	4	50
01-00634-00150	1.5	7.5	9°	4	50
01-00634-00200	2	10	9°	4	50
01-00634-00250	2.5	12.5	9°	4	50
01-00634-00300	3	15	9°	6	55
01-00634-00400	4	20	9°	6	60
01-00634-00500	5	25	9°	6	65
01-00634-00600	6	30	-	6	75
01-00634-00700	7	35	9°	8	90
01-00634-00800	8	40	-	8	90
01-00634-00900	9	45	9°	10	100
01-00634-01000	10	50	-	10	100
01-00634-01100	11	55	9°	12	110
01-00634-01200	12	60	-	12	110

**Attenzione** Quando ordinate, indicate AL5D-2 Dia. (D).  
When you order, indicate AL5D-2 (D).

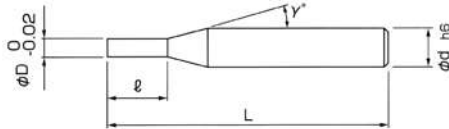
- Per i parametri di taglio vedi pagina 247.
- Milling condition is recommended on page 247.

# AL2D-2DLC

DLC-COATING 2-Flute End Mill for Aluminum

## Frese 2 Tagli piane per alluminio rivestite DLC

**Novità**



- Le frese serie AL realizzano fresature efficienti e stabili.
- Il nostro originale rivestimento DLC è adatto per lavorazioni di lunga durata.
- AL-series realized a stable and high efficient machining.
- Our original DLC coating are adopted, it is suitable for cutting for long time.

● NUOVO NEW



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. di taglio Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
● 01-00661-00050	0.5	1	9°	4	45
● 01-00661-00060	0.6	1.2	9°	4	45
● 01-00661-00070	0.7	1.4	9°	4	45
● 01-00661-00080	0.8	1.6	9°	4	45
● 01-00661-00090	0.9	1.8	9°	4	45
● 01-00661-00100	1	2	9°	4	45
● 01-00661-00150	1.5	3	9°	4	45
● 01-00661-00200	2	4	9°	4	45
● 01-00661-00250	2.5	5	9°	4	45
● 01-00661-00300	3	6	9°	6	50
● 01-00661-00350	3.5	7	9°	6	50
● 01-00661-00400	4	8	9°	6	50
● 01-00661-00450	4.5	9	9°	6	55
● 01-00661-00500	5	10	9°	6	55
● 01-00661-00550	5.5	11	9°	6	55
● 01-00661-00600	6	12	-	6	55
● 01-00661-00700	7	14	9°	8	70
● 01-00661-00800	8	16	-	8	70
● 01-00661-00900	9	18	9°	10	75
● 01-00661-01000	10	20	-	10	75
● 01-00661-01100	11	22	9°	12	80
● 01-00661-01200	12	24	-	12	80

**Attenzione** Quando ordinate, indicate AL2D-2DLC Dia. (D).  
When you order, indicate AL2D-2DLC (D).

- Per i parametri di taglio vedi pagina 244.
- Milling condition is recommended on page 244.

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Taper Ball

Toriche  
Corner R

Scaricate  
Long Neck  
Corner R

Frese  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

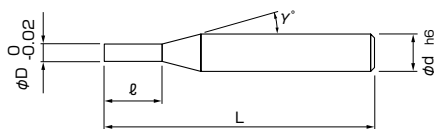
Guida tecnica  
Technical Guidance

CBN  
Cubic Boron  
Nitride

# AL3D-2DLC

DLC-COATING 2-Flute Medium End Mill for Aluminum

## Frese 2 Tagli piane medie per alluminio rivestite DLC



- Le frese serie AL realizzano fresature efficienti e stabili.
- Il nostro rivestimento originale DLC è adatto per lavorazioni di lunga durata.
- AL-series realized a stable and high efficient machining.
- Our original DLC coating are adopted, it is suitable for cutting for long time.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lung. di taglio Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
01-00635-00100	1	3	9°	4	45
01-00635-00150	1.5	4.5	9°	4	45
01-00635-00200	2	6	9°	4	45
01-00635-00250	2.5	7.5	9°	4	45
01-00635-00300	3	9	9°	6	50
01-00635-00400	4	12	9°	6	50
01-00635-00500	5	15	9°	6	55
01-00635-00600	6	18	—	6	60
01-00635-00700	7	21	9°	8	70
01-00635-00800	8	24	—	8	70
01-00635-00900	9	27	9°	10	75
01-00635-01000	10	30	—	10	75
01-00635-01100	11	33	9°	12	90
01-00635-01200	12	36	—	12	90

**Attenzione** Quando ordinate, indicate AL3D-2DLC Dia. (D).  
When you order, indicate AL3D-2DLC (D).

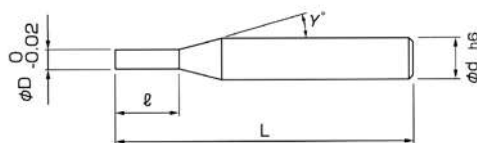
- Per i parametri di taglio vedi pagina 245.
- Milling condition is recommended on page 245.

# AL4D-2DLC

DLC-COATING 2-Flute Medium End Mill for Aluminum

## Frese 2 Tagli piane medie per alluminio rivestite DLC

Novità



- Le frese serie AL realizzano fresature efficienti e stabili.
- Il nostro originale rivestimento DLC è adatto per lavorazioni di lunga durata.
- AL-series realized a stable and high efficient machining.
- Our original DLC coating are adopted, it is suitable for cutting for long time.



Unità di misura: mm Unit size: mm

● NUOVO NEW

Codice Code No.	(D) Dia. Dia.	(ℓ) Lung. di taglio Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
● 01-00663-00100	1	4	9°	4	50
● 01-00663-00150	1.5	6	9°	4	50
● 01-00663-00200	2	8	9°	4	50
● 01-00663-00250	2.5	10	9°	4	50
● 01-00663-00300	3	12	9°	6	55
● 01-00663-00400	4	16	9°	6	60
● 01-00663-00500	5	20	9°	6	65
● 01-00663-00600	6	24	—	6	75
● 01-00663-00700	7	28	9°	8	90
● 01-00663-00800	8	32	—	8	90
● 01-00663-00900	9	36	9°	10	100
● 01-00663-01000	10	40	—	10	100
● 01-00663-01100	11	44	9°	12	110
● 01-00663-01200	12	48	—	12	110

**Attenzione** Quando ordinate, indicate AL4D-2DLC Dia. (D).  
When you order, indicate AL4D-2DLC (D).

- Per i parametri di taglio vedi pagina 246.
- Milling condition is recommended on page 246.

ダイヤモンド  
Diamond

スクエア  
Square

ロングネック  
スクエア  
Long Neck  
Square

ボール  
Ball

ロングネック  
ボール  
Long Neck  
Ball

テーパ  
Taper

テーパ  
ボール  
Taper Ball

ラジラス  
Corner R

ロングネック  
ラジラス  
Long Neck  
Corner R

総型  
Formed  
Cutter

ドリル  
Drill

その他  
Others

技術資料  
Technical Data

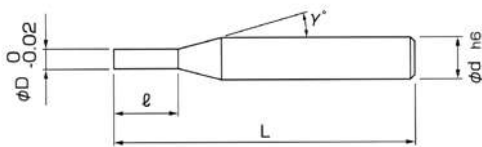
参考資料  
Technical Guidance

# AL5D-2DLC

DLC-COATING 2-Flute Long End Mill for Aluminum

## Frese 2 Tagli piane lunghe per alluminio rivestite DLC

Novità



- Le frese serie AL realizzano fresature efficienti e stabili.
- Il nostro originale rivestimento DLC è adatto per lavorazioni di lunga durata.
- AL-series realized a stable and high efficient machining.
- Our original DLC coating are adopted, it is suitable for cutting for long time.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. di taglio Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh totale Overall Length
● 01-00664-00100	1	5	9°	4	50
● 01-00664-00150	1.5	7.5	9°	4	50
● 01-00664-00200	2	10	9°	4	50
● 01-00664-00250	2.5	12.5	9°	4	50
● 01-00664-00300	3	15	9°	6	55
● 01-00664-00400	4	20	9°	6	60
● 01-00664-00500	5	25	9°	6	65
● 01-00664-00600	6	30	–	6	75
● 01-00664-00700	7	35	9°	8	90
● 01-00664-00800	8	40	–	8	90
● 01-00664-00900	9	45	9°	10	100
● 01-00664-01000	10	50	–	10	100
● 01-00664-01100	11	55	9°	12	110
● 01-00664-01200	12	60	–	12	110

### Attenzione

Quando ordinate, indicate AL5D-2DLC Dia. (D).  
When you order, indicate AL5D-2DLC (D).

- Per i parametri di taglio vedi pagina 247.
- Milling condition is recommended on page 247.

CBN

Nitrato Cubico  
di Boro

Diamante

Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

Guida tecnica

Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Piane**  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Sferiche**  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
**Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Toriche**  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
**Sagomate**  
Formed  
Cutter

**Non Rivestite**  
Non-Coating  
**Frese**  
**Sagomate**  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

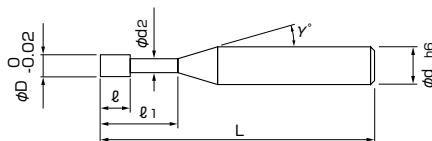
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# ALZ345

3-Flute Power "Z" End Mill for Aluminum

## Frese 3 Tagli piane foranti per alluminio "POWER Z"



- Le frese serie AL realizzano fresature efficienti e stabili.
- Incrementa la capacità forante.
- Grandi performance in lavorazioni pesanti grazie all'ottima evacuazione del truciolo.
- AL-series realized a stable and high efficient machining.
- Improved drilling capacity!
- High performance, heavy machining with better chip disposal.

**Dati tecnici** P498



Unità di misura: mm Unit size: mm

Code Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00636-00100	1	1.5	3	0.95	12°	4	45
01-00636-00110	1.1	1.7	3.3	1.05	12°	4	45
01-00636-00120	1.2	1.8	3.6	1.15	12°	4	45
01-00636-00130	1.3	2	3.9	1.25	12°	4	45
01-00636-00140	1.4	2.1	4.2	1.35	12°	4	45
01-00636-00150	1.5	2.3	4.5	1.45	12°	4	45
01-00636-00160	1.6	2.4	4.8	1.55	12°	4	45
01-00636-00170	1.7	2.6	5.1	1.65	12°	4	45
01-00636-00180	1.8	2.7	5.4	1.74	12°	4	45
01-00636-00190	1.9	2.9	5.7	1.84	12°	4	45
01-00636-00200	2	3	6	1.94	12°	4	45
01-00636-00210	2.1	3.2	6.3	2	12°	4	45
01-00636-00220	2.2	3.3	6.6	2.1	12°	4	45
01-00636-00230	2.3	3.5	6.9	2.2	12°	4	45
01-00636-00240	2.4	3.6	7.2	2.3	12°	4	45
01-00636-00250	2.5	3.8	7.5	2.4	12°	4	45
01-00636-00260	2.6	3.9	7.8	2.45	12°	6	55
01-00636-00270	2.7	4.1	8.1	2.55	12°	6	55
01-00636-00280	2.8	4.2	8.4	2.65	12°	6	55
01-00636-00290	2.9	4.4	8.7	2.75	12°	6	55
01-00636-00300	3	4.5	9	2.85	12°	6	55
01-00636-00310	3.1	4.7	9.3	2.95	12°	6	55
01-00636-00320	3.2	4.8	9.6	3.05	12°	6	55
01-00636-00330	3.3	5	9.9	3.15	12°	6	55
01-00636-00340	3.4	5.1	10.2	3.25	12°	6	55
01-00636-00350	3.5	5.3	10.5	3.35	12°	6	55
01-00636-00360	3.6	5.4	10.8	3.45	12°	6	55
01-00636-00370	3.7	5.6	11.1	3.55	12°	6	55
01-00636-00380	3.8	5.7	11.4	3.65	12°	6	55
01-00636-00390	3.9	5.9	11.7	3.75	12°	6	55
01-00636-00400	4	6	12	3.8	12°	6	55

**Attenzione** Quando ordinate, indicate ALZ345 Dia. (D).  
When you order, indicate ALZ345 Dia. (D).

- Per i parametri di taglio vedi pagina 248.
- Milling condition is recommended on page 248.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00636-00410	4.1	6.2	12.3	3.9	12°	6	55
01-00636-00420	4.2	6.3	12.6	4	12°	6	55
01-00636-00430	4.3	6.5	12.9	4.1	12°	6	55
01-00636-00440	4.4	6.6	13.2	4.2	12°	6	55
01-00636-00450	4.5	6.8	13.5	4.3	12°	6	55
01-00636-00460	4.6	6.9	13.8	4.4	12°	6	55
01-00636-00470	4.7	7.1	14.1	4.5	12°	6	55
01-00636-00480	4.8	7.2	14.4	4.6	12°	6	55
01-00636-00490	4.9	7.4	14.7	4.7	12°	6	55
01-00636-00500	5	7.5	15	4.8	12°	6	55
01-00636-00510	5.1	7.7	15.3	4.9	12°	6	55
01-00636-00520	5.2	7.8	15.6	5	12°	6	55
01-00636-00530	5.3	8	15.9	5.1	12°	6	55
01-00636-00540	5.4	8.1	16.2	5.2	12°	6	55
01-00636-00550	5.5	8.3	16.5	5.3	12°	6	55
01-00636-00560	5.6	8.4	16.8	5.4	12°	6	55
01-00636-00570	5.7	8.6	17.1	5.5	12°	6	55
01-00636-00580	5.8	8.7	17.4	5.6	12°	6	55
01-00636-00590	5.9	8.9	17.7	5.7	12°	6	55
01-00636-00600	6	9	18	5.8	-	6	60
01-00636-00610	6.1	9.2	18.3	5.9	12°	8	70
01-00636-00620	6.2	9.3	18.6	6	12°	8	70
01-00636-00630	6.3	9.5	18.9	6.1	12°	8	70
01-00636-00640	6.4	9.6	19.2	6.2	12°	8	70
01-00636-00650	6.5	9.8	19.5	6.3	12°	8	70
01-00636-00660	6.6	9.9	19.8	6.4	12°	8	70
01-00636-00670	6.7	10.1	20.1	6.5	12°	8	70
01-00636-00680	6.8	10.2	20.4	6.6	12°	8	70
01-00636-00690	6.9	10.4	20.7	6.7	12°	8	70
01-00636-00700	7	10.5	21	6.8	12°	8	70

### Attenzione

Quando ordinate, indicate ALZ345 Dia. (D).  
When you order, indicate ALZ345 (D).

- Per i parametri di taglio vedi pagina 248.
- Milling condition is recommended on page 248.

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

Rivestite  
Coating  
**Piane**  
Square

Non Rivestite  
Non-Coating  
**Scaricate**  
Plane  
Long Neck  
Square

Rivestite  
Coating  
**Sferiche**  
Ball

Non Rivestite  
Non-Coating  
**Scaricate**  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
**Coniche**  
Taper

Non Rivestite  
Non-Coating  
**Coniche**  
Sferiche  
Taper Ball

Rivestite  
Coating  
**Toriche**  
Corner R

Non Rivestite  
Non-Coating  
**Scaricate**  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
**Frese**  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating  
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00636-00710	<b>7.1</b>	10.7	21.3	6.9	12°	8	70
01-00636-00720	<b>7.2</b>	10.8	21.6	7	12°	8	70
01-00636-00730	<b>7.3</b>	11	21.9	7.1	12°	8	70
01-00636-00740	<b>7.4</b>	11.1	22.2	7.2	12°	8	70
01-00636-00750	<b>7.5</b>	11.3	22.5	7.3	12°	8	70
01-00636-00760	<b>7.6</b>	11.4	22.8	7.4	12°	8	70
01-00636-00770	<b>7.7</b>	11.6	23.1	7.5	12°	8	70
01-00636-00780	<b>7.8</b>	11.7	23.4	7.6	12°	8	70
01-00636-00790	<b>7.9</b>	11.9	23.7	7.7	12°	8	70
01-00636-00800	<b>8</b>	12	24	7.8	–	8	70
01-00636-00810	<b>8.1</b>	12.2	24.3	7.9	12°	10	75
01-00636-00820	<b>8.2</b>	12.3	24.6	8	12°	10	75
01-00636-00830	<b>8.3</b>	12.5	24.9	8.1	12°	10	75
01-00636-00840	<b>8.4</b>	12.6	25.2	8.2	12°	10	75
01-00636-00850	<b>8.5</b>	12.8	25.5	8.3	12°	10	75
01-00636-00860	<b>8.6</b>	12.9	25.8	8.4	12°	10	75
01-00636-00870	<b>8.7</b>	13.1	26.1	8.5	12°	10	75
01-00636-00880	<b>8.8</b>	13.2	26.4	8.6	12°	10	75
01-00636-00890	<b>8.9</b>	13.4	26.7	8.7	12°	10	75
01-00636-00900	<b>9</b>	13.5	27	8.8	12°	10	75
01-00636-00910	<b>9.1</b>	13.7	27.3	8.9	12°	10	75
01-00636-00920	<b>9.2</b>	13.8	27.6	9	12°	10	75
01-00636-00930	<b>9.3</b>	14	27.9	9.1	12°	10	75
01-00636-00940	<b>9.4</b>	14.1	28.2	9.2	12°	10	75
01-00636-00950	<b>9.5</b>	14.3	28.5	9.3	12°	10	75
01-00636-00960	<b>9.6</b>	14.4	28.8	9.4	12°	10	75
01-00636-00970	<b>9.7</b>	14.6	29.1	9.5	12°	10	75
01-00636-00980	<b>9.8</b>	14.7	29.4	9.6	12°	10	75
01-00636-00990	<b>9.9</b>	14.9	29.7	9.7	12°	10	75
01-00636-01000	<b>10</b>	15	30	9.8	–	10	75

**Attenzione** Quando ordinate, indicate ALZ345 Dia. (D).  
When you order, indicate ALZ345 (D).

- Per i parametri di taglio vedi pagina 248.
- Milling condition is recommended on page 248.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00636-01010	10.1	15.2	30.3	9.9	12°	12	80
01-00636-01020	10.2	15.3	30.6	10	12°	12	80
01-00636-01030	10.3	15.5	30.9	10.1	12°	12	80
01-00636-01040	10.4	15.6	31.2	10.2	12°	12	80
01-00636-01050	10.5	15.8	31.5	10.3	12°	12	80
01-00636-01060	10.6	15.9	31.8	10.4	12°	12	80
01-00636-01070	10.7	16.1	32.1	10.5	12°	12	80
01-00636-01080	10.8	16.2	32.4	10.6	12°	12	80
01-00636-01090	10.9	16.4	32.7	10.7	12°	12	80
01-00636-01100	11	16.5	33	10.8	12°	12	80
01-00636-01110	11.1	16.7	33.3	10.9	12°	12	80
01-00636-01120	11.2	16.8	33.6	11	12°	12	80
01-00636-01130	11.3	17	33.9	11.1	12°	12	80
01-00636-01140	11.4	17.1	34.2	11.2	12°	12	80
01-00636-01150	11.5	17.3	34.5	11.3	12°	12	80
01-00636-01160	11.6	17.4	34.8	11.4	12°	12	80
01-00636-01170	11.7	17.6	35.1	11.5	12°	12	80
01-00636-01180	11.8	17.7	35.4	11.6	12°	12	80
01-00636-01190	11.9	17.9	35.7	11.7	12°	12	80
01-00636-01200	12	18	36	11.8	-	12	80

## Attenzione

Quando ordinate, indiate ALZ345 Dia. (D).  
When you order, indicate ALZ345 (D).

- Per i parametri di taglio vedi pagina 248.
- Milling condition is recommended on page 248.

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

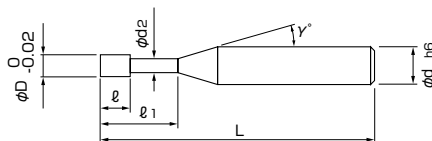
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# ALZ345-DLC Novità

DLC-Coating 3-Flute Power "Z" End Mill for Aluminum

## Frese 3 Tagli piane foranti per alluminio "POWER Z" rivestite DLC



- Il nostro originale rivestimento DLC è adatto per lavorazioni di lunga durata.
- Our original DLC coating are adopted, it is suitable for cutting for long time.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	( $\ell$ ) Lungh. tagliente Length of Cut	( $\ell_1$ ) Lungh. effettiva Effective Length	(d2) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
● 01-00666-00100	1	1.5	3	0.95	12°	4	45
● 01-00666-00150	1.5	2.3	4.5	1.45	12°	4	45
● 01-00666-00200	2	3	6	1.94	12°	4	45
● 01-00666-00250	2.5	3.8	7.5	2.4	12°	4	45
● 01-00666-00300	3	4.5	9	2.85	12°	6	55
● 01-00666-00350	3.5	5.3	10.5	3.35	12°	6	55
● 01-00666-00400	4	6	12	3.8	12°	6	55
● 01-00666-00450	4.5	6.8	13.5	4.3	12°	6	55
● 01-00666-00500	5	7.5	15	4.8	12°	6	55
● 01-00666-00550	5.5	8.3	16.5	5.3	12°	6	55
● 01-00666-00600	6	9	18	5.8	-	6	60
● 01-00666-00700	7	10.5	21	6.8	12°	8	70
● 01-00666-00800	8	12	24	7.8	-	8	70
● 01-00666-00900	9	13.5	27	8.8	12°	10	75
● 01-00666-01000	10	15	30	9.8	-	10	75
● 01-00666-01100	11	16.5	33	10.8	12°	12	80
● 01-00666-01200	12	18	36	11.8	-	12	80

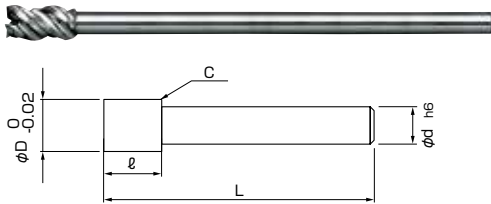
**Attenzione** Quando ordinate, indicate ALZ345-DLC Dia. (D).  
When you order, indicate ALZ345-DLC (D).

- Per i parametri di taglio vedi pagina 248.
- Milling condition is recommended on page 248.

# AL-3LS

3-Flute Long Shank End Mill for Aluminun

## Frese 3 Tagli piane gambo ribassato per alluminio



- Gambo totalmente ribassato, adatto per contornatura.
- Il raggio posteriore C a fine tagliente consente di ottenere un'ottima finitura parete.
- Slimmed shank suits side milling.
- Corner-C at flute end effects an accurate side step milling.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00637-00500	5	7.5	4	80
01-00637-00600	6	9	4	80
01-00637-00800	8	12	6	110
01-00637-01000	10	15	8	130
01-00637-01200	12	18	10	150

### Attenzione

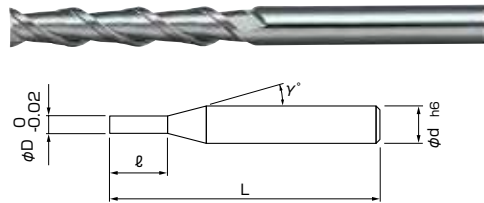
Quando ordinate, indicate AL-3LS Dia. (D).  
When you order, indicate AL-3LS (D).

- Per i parametri di taglio vedi pagina 249.
- Milling condition is recommended on page 249.

# NEA-2

2-Flute End Mill for Aluminum

## Frese 2 Tagli piane per alluminio



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00622-00310	3	10	9°	6	50
01-00622-00315		15	9°	6	55
01-00622-00320		20	9°	6	60
01-00622-00412	4	12	9°	6	50
01-00622-00416		16	9°	6	55
01-00622-00422		22	9°	6	60
01-00622-00514	5	14	9°	6	55
01-00622-00522		22	9°	6	60
01-00622-00528		28	9°	6	65
01-00622-00616	6	16	-	6	55
01-00622-00622		22	-	6	60
01-00622-00630		30	-	6	70
01-00622-00822	8	22	-	8	70
01-00622-00828		28	-	8	75
01-00622-00836		36	-	8	90
01-00622-01026	10	26	-	10	75
01-00622-01036		36	-	10	85
01-00622-01046		46	-	10	95
01-00622-01228	12	28	-	12	80
01-00622-01238		38	-	12	90
01-00622-01248		48	-	12	100
01-00622-01640	16	40	-	16	100
01-00622-01665		65	-	16	130
01-00622-02045	20	45	-	20	110
01-00622-02080		80	-	20	140
01-00622-02550		25	-	25	120

### Attenzione

Quando ordinate, indicate NEA-2 Dia. (D)×(ℓ).  
When you order, indicate NEA-2 (D)×(ℓ).

- Per i parametri di taglio vedi pagina 250.
- Milling condition is recommended on page 250.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Coating  
Non Rivestite  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

Sferiche  
Ball  
Coating  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Coating  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Coating  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter  
Coating  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Parametri di taglio raccomandati

# AL2D-2 · AL2D-2DLC

### Recommended Milling Conditions

Materiale Work Material	Alluminio Aluminum 1070				Legia di Alluminio Aluminum Alloy 2017•5052•7075				Fusioni di Alluminio Aluminum Cast AC8C			
Velocità di taglio Cutting Speed	340m/min		270m/min		380m/min		300m/min		280m/min		200m/min	
Dia. Dia.	Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.5	20,000	400	20,000	200	20,000	400	20,000	300	20,000	400	20,000	300
1	20,000	700	20,000	400	20,000	700	20,000	400	20,000	700	20,000	400
1.5	20,000	800	20,000	500	20,000	800	20,000	500	20,000	800	20,000	500
2	20,000	1,000	20,000	600	20,000	1,000	20,000	600	20,000	1,000	20,000	600
2.5	20,000	1,200	20,000	700	20,000	1,200	20,000	700	20,000	1,200	20,000	700
3	20,000	1,300	20,000	800	20,000	1,500	20,000	900	20,000	1,500	20,000	800
4	20,000	1,500	20,000	900	20,000	1,700	20,000	1,100	20,000	1,700	15,900	800
5	20,000	1,700	17,200	900	20,000	2,000	19,100	1,300	17,800	1,700	12,700	800
6	18,000	1,800	14,300	900	20,000	2,200	15,900	1,300	14,900	1,700	10,600	800
7	15,500	1,800	12,300	900	17,300	2,300	13,600	1,300	12,700	1,700	9,100	800
8	13,500	1,800	10,700	1,000	15,100	2,400	11,900	1,300	11,100	1,800	8,000	800
9	12,000	1,800	9,600	1,000	13,400	2,400	10,600	1,300	9,900	1,800	7,100	800
10	10,800	1,800	8,600	1,000	12,100	2,400	9,600	1,300	8,900	1,800	6,400	800
11	9,800	1,900	7,800	1,000	11,000	2,500	8,700	1,300	8,100	1,800	5,800	800
12	9,000	2,000	7,200	1,100	10,100	2,500	8,000	1,400	7,400	1,800	5,300	900
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> </div>											
(D) Dia. Dia.												
Note Notes	<p>※Regolare con la stessa proporzione giri ed avanzamento. (Quando utilizzate velocità pari o superiori a 20.000, stessa proporzione.)</p> <p>※Usare un mandrino rigido e preciso.</p> <p>※Regolare le condizioni di taglio quando si producono vibrazioni o suoni anomali; questo dipende dalla rigidità della macchina, del mandrino e dello staffaggio.</p> <p>※Si consiglia l'utilizzo di lubrificante.</p> <p>※Adjust both the spindle speed and feed at the same rate. (When using spindle speed 20,000 or more, the same adjustment is required.)</p> <p>※Use a rigid and precise machine and chuck holder.</p> <p>※Adjust milling conditions when vibration and abnormal sounds occur according to the rigidity of the machine and the chuck holder, or work clamping condition.</p> <p>※Water soluble cutting fluid is recommended.</p>											

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate**  
Plane  
Long Neck  
Square

**Sferiche**  
Ball

**Scaricate**  
Sferiche  
Long Neck  
Ball

**Coniche**  
Taper

**Coniche**  
Sferiche  
Taper Ball

**Toriche**  
Corner R

**Scaricate**  
Toriche  
Long Neck  
Corner R

**Frese**  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

## Parametri di taglio raccomandati

### Recommended Milling Conditions

# AL3D-2 · AL3D-2DLC

Materiale Work Material	Alluminio Aluminum 1070				Leghe di Alluminio Aluminum Alloy 2017•5052•7075				Fusioni di Alluminio Aluminum Cast AC8C			
	300m/min		220m/min		330m/min		240m/min		250m/min		160m/min	
Velocità di taglio Cutting Speed	Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	20,000	400	20,000	300	20,000	400	20,000	300	20,000	400	20,000	300
1.5	20,000	500	20,000	400	20,000	500	20,000	400	20,000	500	20,000	400
2	20,000	600	20,000	400	20,000	600	20,000	400	20,000	600	20,000	400
2.5	20,000	700	20,000	500	20,000	700	20,000	500	20,000	700	20,000	500
3	20,000	900	20,000	600	20,000	900	20,000	600	20,000	900	17,000	500
4	20,000	1,000	17,500	700	20,000	1,000	19,000	750	20,000	1,000	13,000	500
5	19,000	1,000	14,000	700	20,000	1,200	15,500	750	16,000	1,000	10,000	500
6	16,000	1,100	11,500	700	17,500	1,400	12,500	750	13,500	1,000	8,500	500
7	13,500	1,100	10,000	750	15,000	1,500	11,000	800	11,500	1,100	7,300	500
8	12,000	1,100	8,800	750	13,000	1,600	9,600	800	9,900	1,200	6,400	500
9	11,000	1,100	7,800	750	11,700	1,600	8,500	800	8,800	1,200	5,700	500
10	9,600	1,100	7,000	800	10,500	1,700	7,600	850	8,000	1,300	5,100	550
11	8,700	1,100	6,400	800	9,600	1,700	6,900	850	7,200	1,300	4,600	550
12	8,000	1,200	5,800	800	8,800	1,700	6,400	900	6,600	1,300	4,200	600
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> </div>											
(D) Dia. Dia.												
Note	<p>※Regolare con la stessa proporzione giri ed avanzamento. (Quando utilizzate velocità pari o superiori a 20.000 giri, stessa proporzione.)</p> <p>※Usare un mandrino rigido e preciso.</p> <p>※Regolare le condizioni di taglio quando si producono vibrazioni o suoni anomali; questo dipende dalla rigidità della macchina, del mandrino e dello staffaggio.</p> <p>※Si consiglia l'utilizzo di lubrorefrigerante.</p> <p>※Adjust both spindle speed and feed at the same rate. (When using spindle speed 20,000 or more, the same adjustment is required.)</p> <p>※Use a rigid and precise machine and chuck holder.</p> <p>※Adjust milling conditions when vibration and abnormal sounds occur by the conditions of the machine, chuck holder and work clamping.</p> <p>※Water soluble cutting fluid is recommended.</p>											

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane Square**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche Ball**

**Scaricate Sferiche**  
Long Neck Ball

**Coniche Taper**

**Coniche Sferiche**  
Taper Ball

**Toriche Corner R**

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

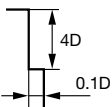
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

## Parametri di taglio raccomandati

# AL4D-2 · AL4D-2DLC

### Recommended Milling Conditions

Materiale Work Material	Alluminio Aluminum 1070		Leghe di Alluminio Aluminum Alloy 2017•5052•7075		Fusioni di Alluminio Aluminum Cast AC8C	
Velocità di taglio Cutting Speed	190m/min		280m/min		150m/min	
Dia. Dia.	Contornatura Side Milling		Contornatura Side Milling		Contornatura Side Milling	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
<b>1</b>	20,000	220	20,000	220	20,000	220
<b>1.5</b>	20,000	270	20,000	270	20,000	320
<b>2</b>	20,000	320	20,000	320	20,000	340
<b>2.5</b>	20,000	430	20,000	430	18,500	400
<b>3</b>	20,000	570	20,000	570	15,000	520
<b>4</b>	15,500	650	20,000	840	11,500	520
<b>5</b>	12,000	840	17,500	900	9,100	520
<b>6</b>	10,200	840	14,500	1,050	7,700	520
<b>7</b>	8,800	840	12,600	1,150	6,600	580
<b>8</b>	7,700	840	11,000	1,150	5,800	650
<b>9</b>	6,800	900	9,700	1,300	5,200	720
<b>10</b>	6,100	900	8,800	1,300	4,600	720
<b>11</b>	5,500	980	8,000	1,450	4,200	720
<b>12</b>	5,200	1,050	7,300	1,450	3,800	780
Profondità di taglio Depth of Cut	<p>Contornatura Side Milling</p> 					
(D) Dia. Dia.						
Note	<p>※Regolare con la stessa proporzione giri ed avanzamento. (Quando utilizzate velocità pari o superiori a 20.000 giri, stessa proporzione.)</p> <p>※Usare un mandrino rigido e preciso.</p> <p>※Regolare le condizioni di taglio quando si producono vibrazioni o suoni anomali; questo dipende dalla rigidità della macchina, del mandrino e dello staffaggio.</p> <p>※Si consiglia l'utilizzo di lubrorefrigerante.</p> <p>※Adjust both spindle speed and feed at the same rate. (When using spindle speed 20,000 or more, the same adjustment is required.)</p> <p>※Use a rigid and precise machine and chuck holder.</p> <p>※Adjust milling conditions when vibration and abnormal sounds occur by the conditions of the machine, chuck holder and work clamping.</p> <p>※Water soluble cutting fluid is recommended.</p>					

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating  
Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

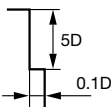
Guida tecnica  
Technical Guidance



## Parametri di taglio raccomandati

### Recommended Milling Conditions

# AL5D-2 · AL5D-2DLC

Materiale Work Material	Alluminio Aluminum 1070	Leghe di Alluminio Aluminum Alloy 2017•5052•7075	Fusioni di Alluminio Aluminum Cast AC8C
Velocità di taglio Cutting Speed	160m/min		120m/min
Dia. Dia.	Contornatura Side Milling		Contornatura Side Milling
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed
	min <sup>-1</sup>	mm/min	mm/min
<b>1</b>	20,000	200	200
<b>1.5</b>	20,000	250	300
<b>2</b>	20,000	300	300
<b>2.5</b>	20,000	400	300
<b>3</b>	17,000	450	400
<b>4</b>	12,700	500	400
<b>5</b>	10,000	650	400
<b>6</b>	8,500	650	400
<b>7</b>	7,300	650	400
<b>8</b>	6,400	650	400
<b>9</b>	5,700	700	400
<b>10</b>	5,100	700	400
<b>11</b>	4,600	750	400
<b>12</b>	4,300	800	400
Profondità di taglio Depth of Cut	<p>Contornatura Side Milling</p> 		
(D) Dia. Dia.			
Note	<p>※Regolare con la stessa proporzione giri ed avanzamento. (Quando utilizzate velocità pari o superiori a 20.000 giri, stessa proporzione.)</p> <p>※Usare un mandrino rigido e preciso.</p> <p>※Regolare le condizioni di taglio quando si producono vibrazioni o suoni anomali; questo dipende dalla rigidità della macchina, del mandrino e dello staffaggio.</p> <p>※Si consiglia l'utilizzo di lubrorefrigerante.</p> <p>※Adjust both spindle speed and feed at the same rate. (When using spindle speed 20,000 or more, the same adjustment is required.)</p> <p>※Use a rigid and precise machine and chuck holder.</p> <p>※Adjust milling conditions when vibration and abnormal sounds occur by the conditions of the machine, chuck holder and work clamping.</p> <p>※Water soluble cutting fluid is recommended.</p>		

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane Square**

**Scaricate Piane Long Neck Square**

**Sferiche Ball**

**Scaricate Sferiche Long Neck Ball**

**Coniche Taper**

**Coniche Sferiche Taper Ball**

**Toriche Corner R**

**Scaricate Toriche Long Neck Corner R**

**Frese Sagomate Formed Cutter**

**Punte Drill**

**Altro Others**

**Dati tecnici Technical Data**

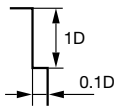
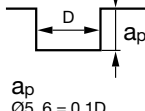
**Guida tecnica Technical Guidance**

Materiale Work Material	Alluminio Aluminum 1070				Leghe di Alluminio Aluminum Alloy 2017•5052•7075				Fusioni di Alluminio Aluminum Cast AC8C			
Velocità di taglio Cutting Speed	310m/min				350m/min				230m/min			
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed			Giri Spindle Speed	Avanzamento Feed			Giri Spindle Speed	Avanzamento Feed		
		Foratura Drilling	Cava Slotting	Contornatura Side Milling		Foratura Drilling	Cava Slotting	Contornatura Side Milling		Foratura Drilling	Cava Slotting	Contornatura Side Milling
	min <sup>-1</sup>	mm/min			min <sup>-1</sup>	mm/min			min <sup>-1</sup>	mm/min		
1	20,000	200	600	1,100	20,000	200	600	1,100	20,000	150	600	1,100
2	20,000	300	900	1,500	20,000	300	900	1,500	20,000	250	900	1,500
3	20,000	300	1,200	2,000	20,000	300	1,400	2,200	20,000	250	1,200	2,200
4	20,000	300	1,400	2,200	20,000	400	1,800	2,500	18,300	200	1,400	2,300
5	19,700	300	1,500	2,500	20,000	400	2,200	3,100	14,600	150	1,400	2,100
6	16,500	300	1,600	2,500	18,600	400	2,500	3,500	12,200	150	1,400	2,100
7	14,100	200	1,600	2,500	15,900	400	2,500	3,500	10,500	140	1,400	2,100
8	12,300	200	1,700	2,500	13,900	400	2,600	3,500	9,200	120	1,400	2,200
9	11,000	200	1,700	2,500	12,400	300	2,600	3,500	8,100	120	1,400	2,200
10	9,900	100	1,700	2,500	11,100	300	2,600	3,800	7,300	80	1,400	2,200
11	9,000	100	1,800	2,600	10,100	300	2,600	4,100	6,700	80	1,400	2,200
12	8,200	100	1,900	2,700	9,300	300	2,600	4,100	6,100	60	1,500	2,200
Profondità di taglio Depth of Cut  (D) Dia. Dia.	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> </div>											
Note Notes	<p>※Regolare con la stessa proporzione giri ed avanzamento. (Quando utilizzate velocità pari o superiori a 20.000 giri, stessa proporzione.)</p> <p>※Usare un mandrino rigido e preciso.</p> <p>※Regolare le condizioni di taglio quando si producono vibrazioni o suoni anomali; questo dipende dalla rigidità della macchina, del mandrino e dello staffaggio.</p> <p>※Quando si ha la tendenza all'inceppamento del truciolo nella foratura, si consiglia la lavorazione di fresatura a step.</p> <p>※Si consiglia l'utilizzo di lubrorefrigerante.</p> <p>※Adjust both spindle speed and feed at the same rate. (When using spindle speed 20,000 or more, the same adjustment is required.)</p> <p>※Use a rigid and precise machine and chuck holder.</p> <p>※Adjust milling conditions when vibration and abnormal sounds occur by the conditions of the machine, chuck holder and work clamping.</p> <p>※When tending to have chip packing during drilling, step milling is recommended.</p> <p>※Water soluble cutting fluid is recommended.</p>											

# Parametri di taglio raccomandati

## Recommended Milling Conditions

# AL-3LS

Materiale Work Material	Alluminio Aluminum 1070		Leghe di Alluminio Aluminum Alloy 2017•5052•7075		Fusioni di Alluminio Aluminum Cast AC8C																																
Velocità di taglio Cutting Speed	100~250m/min		150~300m/min		100~200m/min																																
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed																													
		Cava Slotting	Contornatura Side Milling		Cava Slotting	Contornatura Side Milling		Cava Slotting	Contornatura Side Milling																												
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min																													
5	16,000	1,200	1,700	19,000	1,700	2,300	13,000	1,200	1,600																												
6	13,000	1,000	1,400	16,000	1,400	1,900	10,600	900	1,100																												
8	10,000	1,350	1,800	12,000	2,000	2,500	8,000	1,200	1,500																												
10	8,000	1,450	1,900	9,500	1,850	2,500	6,300	1,200	1,700																												
12	6,600	1,400	1,700	7,900	1,750	2,800	5,300	1,200	1,600																												
Profondità di taglio Depth of Cut					<p>I parametri indicati in questa pagina sono calcolati con frese sporgenti 4xD Nella tabella sottostante sono indicati i valori per sporgenze superiori Above recommended milling conditions are based on 4D overhang. In case of more than 4D overhang, refer to the below table.</p> <table border="1"> <thead> <tr> <th rowspan="2">Sporgenza utensile Overhang</th> <th rowspan="2">Giri Spindle Speed</th> <th colspan="2">Avanzamento Feed</th> <th colspan="2">Profondità di taglio Depth of Cut</th> </tr> <tr> <th>Cava Slotting</th> <th>Contornatura Side Milling</th> <th>Cava Slotting</th> <th>Contornatura Side Milling</th> </tr> </thead> <tbody> <tr> <td>5D</td> <td>70%</td> <td>70%</td> <td>60%</td> <td>0.05D</td> <td>(solo 2e)</td> </tr> <tr> <td>6D</td> <td>50%</td> <td>50%</td> <td>40%</td> <td>0.03D</td> <td>(solo 2e)</td> </tr> <tr> <td>7D</td> <td>30%</td> <td>30%</td> <td>20%</td> <td>0.015D</td> <td>(solo 2e)</td> </tr> </tbody> </table>					Sporgenza utensile Overhang	Giri Spindle Speed	Avanzamento Feed		Profondità di taglio Depth of Cut		Cava Slotting	Contornatura Side Milling	Cava Slotting	Contornatura Side Milling	5D	70%	70%	60%	0.05D	(solo 2e)	6D	50%	50%	40%	0.03D	(solo 2e)	7D	30%	30%	20%	0.015D	(solo 2e)
	Sporgenza utensile Overhang	Giri Spindle Speed	Avanzamento Feed		Profondità di taglio Depth of Cut																																
Cava Slotting			Contornatura Side Milling	Cava Slotting	Contornatura Side Milling																																
5D	70%	70%	60%	0.05D	(solo 2e)																																
6D	50%	50%	40%	0.03D	(solo 2e)																																
7D	30%	30%	20%	0.015D	(solo 2e)																																
(D) Dia. Dia.	<p>Contornatura Side Milling      Cava Slotting</p> <p><math>a_p</math>  <math>\varnothing 5, 6 = 0.1D</math>  <math>\varnothing 8 = 0.2D</math>  <math>\varnothing 10, 12 = 0.3D</math></p>																																				
Note Notes	<p>※Regolare nella stessa proporzione giri ed avanzamento.                  ※Usare un mandrino rigido e preciso.                  ※Regolare le condizioni di taglio quando si producono vibrazioni o suoni anomali; questo dipende dalla rigidità della macchina, del mandrino e dello staffaggio.                  ※Si consiglia l'utilizzo di lubrificante.                  ※Adjust both spindle speed and feed at the same rate.                  ※Use a rigid and precise machine and chuck holder.                  ※Adjust milling conditions when vibration and abnormal sounds occur by the conditions of the machine, chuck holder and work clamping.                  ※Water soluble cutting fluid is recommended.</p>																																				

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane Square  
Square

Scaricate Plane  
Long Neck Square

Sferiche Ball

Scaricate Sferiche  
Long Neck Ball

Coniche Taper

Coniche Sferiche  
Taper Ball

Toriche Corner R

Scaricate Toriche  
Long Neck Corner R

Frese Sagomate Formed Cutter

Punte Drill

Altro Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# Parametri di taglio raccomandati

# NEA-2

## Recommended Milling Conditions

Materiale Work Material		Leghe di Alluminio Aluminum Alloy			Leghe di Rame Copper Alloy		
Velocità di taglio Cutting Speed		60~150m/min			40~60m/min		
Dia. Dia.	Lunghezza tagliente Length of Cut	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting			
3	10	16,000	800	330	8,500	250	100
	15	10,600	600	270	6,400	250	100
	20	6,400	600	270	4,200	250	100
4	12	12,000	800	330	6,400	250	100
	16	8,000	600	270	4,800	250	100
	22	4,800	600	270	3,200	250	100
5	14	9,600	800	330	5,100	300	130
	22	6,400	600	270	3,800	300	130
	28	3,800	600	270	2,500	300	130
6	16	8,000	800	330	4,200	300	130
	22	5,300	600	270	3,200	300	130
	30	3,200	600	270	2,700	300	130
8	22	6,000	800	330	3,200	300	130
	28	4,000	600	270	2,400	300	130
	36	2,400	600	270	2,000	300	130
10	26	4,800	800	330	2,500	300	130
	36	3,200	600	270	1,900	300	130
	46	1,900	600	270	1,600	300	130
12	28	4,000	800	330	2,100	300	130
	38	2,700	600	270	1,600	300	130
	48	1,600	600	270	1,300	300	130
16	40	2,000	800	330	1,600	300	130
	65	1,200	600	270	1,200	300	130
20	45	1,600	800	330	1,300	300	130
	80	1,000	600	270	960	300	130
25	50	1,300	800	330	760	300	130
Profondità di taglio Depth of Cut							
(D) Dia. Dia.							
Note		<p>※Si consiglia l'utilizzo di lubrorefrigerante.                  ※Regolare con la stessa proporzione giri ed avanzamento.                  ※Water soluble cutting fluid is recommended.                  ※Adjust both spindle speed and feed at the same rate.</p>					

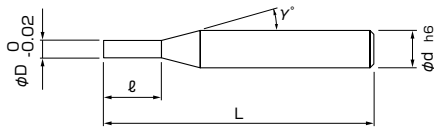
# RSES230 Novità

Short Flute End Mill for Resin

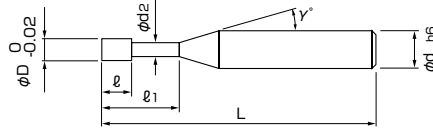
## Frese 2 Tagli piane corte per resine



Type I: normale



Type II: scaricata



**Dati tecnici** P501



- Utilizzabile su materiali non ferrosi come alluminio e rame.
- Eliminate il problema convenzionale dei taglienti lunghi.
- Applicable to nonferrous material such as Aluminum and copper.
- Eliminate the conventional problem of the long flute length.
- NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	Tipo Type	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00640-01000	0.1	0.15	-	I	-	9°	4	50
01-00640-01003			0.3	II	0.085	12°	4	50
01-00640-01005			0.5		0.085	12°	4	50
01-00640-01008			0.8		0.085	12°	4	50
01-00640-01010			1		0.085	12°	4	50
01-00640-01500	0.15	0.23	-	I	-	9°	4	50
01-00640-01505			0.5	II	0.13	12°	4	50
01-00640-01508			0.8		0.13	12°	4	50
01-00640-01510			1		0.13	12°	4	50
01-00640-01515			1.5		0.13	12°	4	50
01-00640-02000	0.2	0.3	-	I	-	9°	4	50
01-00640-02006			0.6	II	0.18	12°	4	50
01-00640-02010			1		0.18	12°	4	50
01-00640-02015			1.5		0.18	12°	4	50
01-00640-02020			2		0.18	12°	4	50
01-00640-02025			2.5		0.18	12°	4	50
01-00640-02030			3		0.18	12°	4	50
01-00640-02035			3.5		0.18	12°	4	50
01-00640-02040			4		0.18	12°	4	50
01-00640-03000	0.3	0.45	-	I	-	9°	4	50
01-00640-03010			1	II	0.28	12°	4	50
01-00640-03015			1.5		0.28	12°	4	50
01-00640-03020			2		0.28	12°	4	50
01-00640-03025			2.5		0.28	12°	4	50
01-00640-03030			3		0.28	12°	4	50
01-00640-03040			4		0.28	12°	4	50

**Attenzione**

Quando ordinate, indicate RSES230 (D) × (ℓ) [×(ℓ<sub>1</sub>)]. Scegliete il diametro del gambo (d) per il tipo I del dia. 3 e dia. 4.  
When you order, indicate RSES230 (D)×(ℓ) [×(ℓ<sub>1</sub>)]. Choose shank dia. (d) for type I of Dia. 3 and Dia. 4.

\* (γ) è un valore di riferimento.  
\* (γ) is reference value.

\* Articolo semi-standard, prezzo e consegna su richiesta.  
\* : Semi-standard item, please inquire for price and delivery.

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane Square  
Square  
Scaricate Piano Long Neck Square  
Non Rivestite Non-Coating

Sferiche Ball  
Rivestite Coating  
Scaricate Sferiche Long Neck Ball  
Non Rivestite Non-Coating

Coniche Taper  
Rivestite Coating  
Coniche Sferiche Taper Ball  
Non Rivestite Non-Coating

Toriche Corner R  
Rivestite Coating  
Scaricate Toriche Long Neck Corner R  
Non Rivestite Non-Coating

Frese Sagomate Formed Cutter  
Rivestite Coating  
Non Rivestite Non-Coating

Punte Drill

Altro Others

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**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Plane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating  
Frese  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

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Technical Data

**Guida tecnica**  
Technical Guidance

•NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliante Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	Tipo Type	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00640-03050	0.3	0.45	5	II	0.28	12°	4	50	
01-00640-03060			6		0.28	12°	4	50	
01-00640-03090			9		0.28	12°	4	50	
01-00640-04000	0.4	0.6	–	I	–	9°	4	60	
01-00640-04015			1.5	II	0.37	12°	4	60	
01-00640-04020			2		0.37	12°	4	60	
01-00640-04025			2.5		0.37	12°	4	60	
01-00640-04030			3		0.37	12°	4	60	
01-00640-04035			3.5		0.37	12°	4	60	
01-00640-04040			4		0.37	12°	4	60	
01-00640-04060			6		0.37	12°	4	60	
01-00640-04080			8		0.37	12°	4	60	
01-00640-04100			10		0.37	12°	4	60	
01-00640-04120			12		0.37	12°	4	60	
01-00640-05000			0.5		0.75	–	I	–	9°
01-00640-05020	2	II				0.46	12°	4	60
01-00640-05030	3			0.46		12°	4	60	
01-00640-05040	4			0.46		12°	4	60	
01-00640-05060	6			0.46		12°	4	60	
01-00640-05080	8			0.46		12°	4	60	
01-00640-05100	10			0.46		12°	4	60	
01-00640-05120	12			0.46		12°	4	60	
01-00640-05150	15			0.46		12°	4	60	
01-00640-05180	18			0.46		12°	4	60	
01-00640-05200	20			0.46		12°	4	60	
01-00640-06000	0.6			0.9		–	I	–	9°
01-00640-06030			3		II	0.56	12°	4	60
01-00640-06040		4	0.56			12°	4	60	
01-00640-06060		6	0.56			12°	4	60	
01-00640-06080		8	0.56			12°	4	60	
01-00640-06100		10	0.56			12°	4	60	
01-00640-06120		12	0.56			12°	4	60	
01-00640-06150		15	0.56			12°	4	60	
01-00640-06180		18	0.56			12°	4	60	

**Attenzione** Quando ordinate, indicate RSES230 (D) × (ℓ) [x(ℓ<sub>1</sub>)]. Scegliete il diametro del gambo (d) per il tipo I di dia. 3 e dia. 4.  
When you order, indicate RSES230 (D)×(ℓ) [x(ℓ<sub>1</sub>)]. Choose shank dia. (d) for type I of Dia. 3 and Dia. 4.

※ (γ) è un valore di riferimento.

※ (γ) is reference value.

※ Articolo semi standard, prezzo e consegna su richiesta.

※ : Semi-standard item, please inquire for price and delivery.

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Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	Tipo Type	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00640-07000	0.7	1.05	-	I	-	9°	4	60
01-00640-07040			4	II	0.66	12°	4	60
01-00640-07060			6		0.66	12°	4	60
01-00640-07080			8		0.66	12°	4	60
01-00640-07100			10		0.66	12°	4	60
01-00640-07120			12		0.66	12°	4	60
01-00640-07140			14		0.66	12°	4	60
01-00640-08000	0.8	1.2	-	I	-	9°	4	60
01-00640-08040			4	II	0.76	12°	4	60
01-00640-08060			6		0.76	12°	4	60
01-00640-08080			8		0.76	12°	4	60
01-00640-08100			10		0.76	12°	4	60
01-00640-08120			12		0.76	12°	4	60
01-00640-08140			14		0.76	12°	4	60
01-00640-08160			16		0.76	12°	4	60
01-00640-08180			18		0.76	12°	4	60
01-00640-08200			20		0.76	12°	4	60
01-00640-08240			24		0.76	12°	4	60
01-00640-09000	0.9	1.35	-	I	-	9°	4	60
01-00640-09060			6	II	0.86	12°	4	60
01-00640-09080			8		0.86	12°	4	60
01-00640-09100			10		0.86	12°	4	60
01-00640-09120			12		0.86	12°	4	60
01-00640-09160			16		0.86	12°	4	60
01-00640-09180	18	0.86	12°	4	60			
01-00640-10000	1	1.5	-	I	-	9°	4	70
01-00640-10040			4	II	0.95	12°	4	70
01-00640-10060			6		0.95	12°	4	70
01-00640-10080			8		0.95	12°	4	70
01-00640-10100			10		0.95	12°	4	70
01-00640-10120			12		0.95	12°	4	70
01-00640-10140			14		0.95	12°	4	70
01-00640-10150			15		0.95	12°	4	70
01-00640-10180	18	0.95	12°	4	70			

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite Coating**  
Plane Square

**Non Rivestite Non-Coating**  
Scaricate Plane Long Neck Square

**Rivestite Coating**  
Sferiche Ball

**Non Rivestite Non-Coating**  
Scaricate Sferiche Long Neck Ball

**Rivestite Coating**  
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Frese Sagomate Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
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Technical Guidance

•NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	Tipo Type	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00640-10200	1	1.5	20	II	0.95	12°	4	70	
01-00640-10250			25		0.95	12°	4	70	
01-00640-10300			30		0.95	12°	4	70	
01-00640-10350			35		0.95	12°	4	70	
01-00640-15000	1.5	2.25	–	I	–	9°	4	70	
01-00640-15060			6	II	1.45	12°	4	70	
01-00640-15080			8		1.45	12°	4	70	
01-00640-15100			10		1.45	12°	4	70	
01-00640-15120			12		1.45	12°	4	70	
01-00640-15150			15		1.45	12°	4	70	
01-00640-15180			18		1.45	12°	4	70	
01-00640-15200			20		1.45	12°	4	70	
01-00640-15230			23		1.45	12°	4	70	
01-00640-15250			25		1.45	12°	4	70	
01-00640-15300			30		1.45	12°	4	70	
01-00640-15350			35		1.45	12°	4	70	
01-00640-15400			40		1.45	12°	4	100	
01-00640-15450			45		1.45	12°	4	100	
01-00640-15530			53		1.45	12°	4	100	
01-00640-20000			2		3	–	I	–	9°
01-00640-20060	6	II				1.94	12°	4	60
01-00640-20080	8			1.94		12°	4	60	
01-00640-20100	10			1.94		12°	4	60	
01-00640-20120	12			1.94		12°	4	60	
01-00640-20150	15			1.94		12°	4	60	
01-00640-20200	20			1.94		12°	4	80	
01-00640-20240	24			1.94		12°	4	80	
01-00640-20300	30			1.94		12°	4	80	
01-00640-20400	40			1.94		12°	4	100	
01-00640-20500	50			1.94		12°	4	100	
01-00640-20600	60			1.94		12°	4	120	
01-00640-20700	70		1.94	12°	4	150			

**Attenzione** Quando ordinate, indicate RSES230 (D) × (ℓ) [x(ℓ<sub>1</sub>)]. Scegliete il diametro del gambo (d) per il tipo I del dia. 3 e dia. 4.  
When you order, indicate RSES230 (D)×(ℓ) [x(ℓ<sub>1</sub>)]. Choose shank dia. (d) for type I of Dia. 3 and Dia. 4.

\* (γ) è un valore di riferimento.  
\* (γ) is reference value.

\* Articolo semi-standard, prezzo e consegna su richiesta.  
\* : Semi-standard item, please inquire for price and delivery.



●NUOVO NEW

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	Tipo Type	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
● 01-00640-30000	3	4.5	–	I	–	9°	3	80	
● 01-00640-30100			10	II	2.85	12°	6	80	
● 01-00640-30120			12		2.85	12°	6	80	
● 01-00640-30150			15		2.85	12°	6	80	
● 01-00640-30200			20		2.85	12°	6	80	
● 01-00640-30240			24		2.85	12°	6	80	
● 01-00640-30300			30		2.85	12°	6	80	
● 01-00640-30360			36		2.85	12°	6	80	
● 01-00640-30450			45		2.85	12°	6	100	
● 01-00640-30600			60		2.85	12°	6	120	
● 01-00640-30750			75		2.85	12°	6	150	
● 01-00640-40000			4		6	–	I	–	9°
● 01-00640-40001	–	–				9°	6	80	
● 01-00640-40100	10	II		3.8		12°	6	80	
● 01-00640-40150	15			3.8		12°	6	80	
● 01-00640-40200	20			3.8		12°	6	80	
● 01-00640-40300	30			3.8		12°	6	80	
● 01-00640-40400	40			3.8		12°	6	100	
● 01-00640-40550	55			3.8		12°	6	120	
● 01-00640-40700	70			3.8		12°	6	150	
● 01-00640-50000	5			7.5		–	I	–	9°
● 01-00640-50300			30		II	4.8	12°	6	80
● 01-00640-50400			40			4.8	12°	6	100
● 01-00640-50550		55	4.8			12°	6	120	
● 01-00640-50700		70	4.8			12°	6	150	
● 01-00640-60000	6	9	–	I		–	–	6	90
● 01-00640-60400			40	II	5.8	–	6	90	
● 01-00640-60600			60		5.8	–	6	120	
● 01-00640-60800			80		5.8	–	6	150	

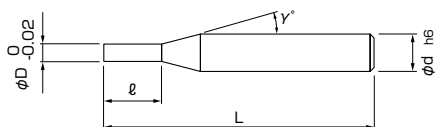
# RSE230

End Mill for Resin

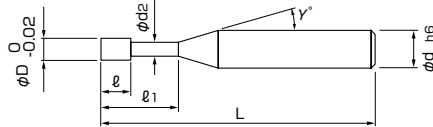
## Frese 2 Tagli piane per resine



Type I: normale



Type II: scaricata



- Scegliete quella giusta per il vostro lavoro (3D, 5D e 10D) con o senza scarico.
- Utilizzabile su materiali non ferrosi come alluminio e rame.
- 135 misure in totale!
- Available for the suitable L/D (3D, 5D and 10D) and with or without Effective Length.
- Applicable to nonferrous material such as Aluminum and copper.
- Total 135 size!
- NUOVO NEW



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(l) Lungh. tagliante Length of Cut	(l1) Lungh. effettiva Effective Length	Tipo Type	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
● 01-00644-00100	0.1	0.3	-	I	-	9°	4	45
● 01-00644-00108		0.3	0.8	II	0.085	12°	4	45
● 01-00644-00110		0.3	1	II	0.085	12°	4	45
● 01-00644-00150	0.15	0.45	-	I	-	9°	4	45
● 01-00644-00151		0.45	1	II	0.13	12°	4	45
● 01-00644-00152		0.45	1.5	II	0.13	12°	4	45
01-00644-00200	0.2	0.6	-	I	-	9°	4	45
01-00644-00201		1	-	I	-	10°	4	45
● 01-00644-00203		0.6	1	II	0.18	12°	4	45
● 01-00644-00204		0.6	1.5	II	0.18	12°	4	45
01-00644-00202		0.6	2	II	0.18	12°	4	45
01-00644-00300	0.3	0.9	-	I	-	9°	4	45
01-00644-00301		1.5	-	I	-	9°	4	45
● 01-00644-00302		2	-	I	-	9°	4	45
● 01-00644-00304		0.9	1.5	II	0.28	12°	4	45
● 01-00644-00305		0.9	2	II	0.28	12°	4	45
● 01-00644-00306		0.9	2.5	II	0.28	12°	4	45
01-00644-00303	0.9	3	II	0.28	12°	4	45	
01-00644-00400	0.4	1.2	-	I	-	9°	4	45
01-00644-00401		2	-	I	-	10°	4	45
● 01-00644-00402		3	-	I	-	9°	4	45
● 01-00644-00403		1.2	2	II	0.37	12°	4	45
● 01-00644-00406		1.2	2.5	II	0.37	12°	4	45
● 01-00644-00407		1.2	3	II	0.37	12°	4	45
01-00644-00404		1.2	4	II	0.37	12°	4	45
01-00644-00405	1.2	5	II	0.37	12°	4	45	
01-00644-00500	0.5	1.5	-	I	-	9°	4	45
01-00644-00501		2.5	-	I	-	9°	4	45

### Attenzione

Quando ordinate, indicate (D)×(l) [x(l1)]. Scegliete il dia. gambo (d) per il tipo I del Dia. 3 x 9 l e Dia. 4 x 12 l.  
When you order, indicate RSE230 (D)×(l) [x(l1)]. Choose shank dia. (d) for type I of Dia. 3×9l and Dia. 4×12l.

※ (γ) è un valore di riferimento.

※ (γ) is reference value.

●NUOVO NEW

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	Tipo Type	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length		
01-00644-00502	0.5	5	–	I	–	9°	4	45		
● 01-00644-00503		1.5	3	II	0.46	12°	4	45		
● 01-00644-00504		1.5	4		0.46	12°	4	45		
● 01-00644-00506		1.5	6		0.46	12°	4	45		
● 01-00644-00508		1.5	8		0.46	12°	4	50		
01-00644-00510		1.5	10		0.46	12°	4	50		
● 01-00644-00512		1.5	12		0.46	12°	4	50		
01-00644-00515		1.5	15		0.46	12°	4	50		
01-00644-00520		1.5	20		0.46	12°	4	50		
01-00644-00600		0.6	1.8		–	I	–	9°	4	45
01-00644-00601	3		–		I	–	9°	4	45	
● 01-00644-00602	4		–	–		9°	4	45		
● 01-00644-00604	1.8		4	0.56		12°	4	45		
01-00644-00606	1.8		6	0.56		12°	4	45		
● 01-00644-00608	1.8		8	0.56		12°	4	50		
01-00644-00610	1.8		10	0.56		12°	4	50		
● 01-00644-00612	1.8		12	0.56		12°	4	50		
01-00644-00800	0.8		2.4	–		I	–	9°	4	45
01-00644-00801			4	–		I	–	9°	4	45
● 01-00644-00802		6	–	–			9°	4	45	
● 01-00644-00806		2.4	6	0.76	12°		4	45		
01-00644-00808		2.4	8	0.76	12°		4	50		
● 01-00644-00810		2.4	10	0.76	12°		4	50		
01-00644-00812		2.4	12	0.76	12°		4	50		
● 01-00644-00816		2.4	16	0.76	12°		4	60		
01-00644-01000		1	3	–	I		–	9°	4	45
01-00644-01001			5	–			–	9°	4	50
● 01-00644-01003	7.5		–	–			9°	4	50	
01-00644-01002	10		–	–		9°	4	50		
● 01-00644-01006	3		6	II		0.95	12°	4	50	
● 01-00644-01008	3		8		0.95	12°	4	50		
01-00644-01010	3		10		0.95	12°	4	50		
01-00644-01012	3		12		0.95	12°	4	50		
01-00644-01015	3		15		0.95	12°	4	60		
01-00644-01020	3		20		0.95	12°	4	60		
01-00644-01025	3		25		0.95	12°	4	70		

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Plane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating  
Frese  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

•NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	Tipo Type	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00644-01030	1	3	30	II	0.95	12°	4	70
01-00644-01035		3	35		0.95	12°	4	80
01-00644-01500	1.5	4.5	–	I	–	9°	4	45
01-00644-01501		7.5	–		–	9°	4	50
01-00644-01502		15	–		–	9°	4	60
• 01-00644-01510		4.5	10	II	1.45	12°	4	50
• 01-00644-01512		4.5	12		1.45	12°	4	50
01-00644-01515		4.5	15		1.45	12°	4	60
01-00644-01518		4.5	18		1.45	12°	4	60
01-00644-01523		4.5	23		1.45	12°	4	70
01-00644-01530		4.5	30		1.45	12°	4	70
01-00644-01538		4.5	38		1.45	12°	4	80
01-00644-01545		4.5	45		1.45	12°	4	90
01-00644-01553		4.5	53		1.45	12°	4	90
01-00644-02000	2	6	–	I	–	9°	4	50
01-00644-02001		10	–		–	9°	4	50
• 01-00644-02003		15	–		–	9°	4	60
01-00644-02002		20	–		–	9°	4	60
• 01-00644-02012		6	12	II	1.94	12°	4	60
• 01-00644-02015		6	15		1.94	12°	4	60
01-00644-02020		6	20		1.94	12°	4	60
01-00644-02024		6	24		1.94	12°	4	70
01-00644-02030		6	30		1.94	12°	4	80
01-00644-02040		6	40		1.94	12°	4	90
01-00644-02050		6	50		1.94	12°	4	110
01-00644-02060		6	60		1.94	12°	4	110
01-00644-02070	6	70	1.94	12°	4	110		
01-00644-03000	3	9	–	I	–	–	3	100
01-00644-03001		9	–		–	9°	6	50
• 01-00644-03003		15	–		–	–	3	100
01-00644-03002		15	–		–	9°	6	60
• 01-00644-03004		20	–		–	9°	6	60
• 01-00644-03005		25	–		–	9°	6	70
• 01-00644-03006		30	–	–	9°	6	70	
• 01-00644-03015		9	15	II	2.85	12°	6	60
• 01-00644-03020		9	20		2.85	12°	6	60

### Attenzione

Quando ordinate, indicate RSE230 (D)×(ℓ) [×(ℓ<sub>1</sub>)]. Scegliete il dia. gambo (d) per il tipo I del Dia. 3 x 9 ℓ e Dia. 4 x 12 ℓ.  
When you order, indicate RSE230 (D)×(ℓ) [×(ℓ<sub>1</sub>)]. Choose shank dia. (d) for type I of Dia. 3×9ℓ and Dia. 4×12ℓ.

※ (γ) è un valore di riferimento.

※ (γ) is reference value.

●NUOVO NEW

Codice Code No.	(D) Dia. Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	Tipo Type	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length		
● 01-00644-03024	3	9	24	II	2.85	12°	6	70		
01-00644-03030		9	30		2.85	12°	6	70		
01-00644-03036		9	36		2.85	12°	6	80		
01-00644-03045		9	45		2.85	12°	6	90		
01-00644-03060		9	60		2.85	12°	6	110		
01-00644-03075		9	75		2.85	12°	6	120		
01-00644-04000	4	12	–	I	–	–	4	120		
01-00644-04001		12	–		–	9°	6	50		
● 01-00644-04003		20	–		–	–	4	120		
01-00644-04002		20	–		–	9°	6	60		
● 01-00644-04004		30	–		–	9°	6	70		
● 01-00644-04005		40	–		–	9°	6	90		
● 01-00644-04020		12	20	II	3.8	12°	6	60		
01-00644-04030		12	30		3.8	12°	6	70		
01-00644-04040		12	40		3.8	12°	6	90		
01-00644-04055		12	55		3.8	12°	6	110		
01-00644-04070		12	70		3.8	12°	6	120		
● 01-00644-05002		5	10		–	I	–	9°	6	60
01-00644-05000	15		–	–	9°		6	70		
01-00644-05001	25		–	–	9°		6	80		
● 01-00644-05003	35		–	–	9°		6	90		
● 01-00644-05004	40		–	–	9°		6	100		
● 01-00644-05030	15		30	II	4.8		12°	6	90	
● 01-00644-05040	15		40		4.8	12°	6	100		
● 01-00644-05055	15		55		4.8	12°	6	120		
● 01-00644-05070	15		70		4.8	12°	6	130		
● 01-00644-06002	6		12		–	I	–	–	6	70
01-00644-06000			18		–		–	–	6	80
● 01-00644-06003			25	–	–		–	6	80	
01-00644-06001		30	–	–	–		6	90		
● 01-00644-06004		40	–	–	–		6	100		
● 01-00644-06005		50	–	–	–		6	120		
01-00644-06040		18	40	II	5.8	–	6	100		
01-00644-06060		18	60		5.8	–	6	120		
01-00644-06080		18	80		5.8	–	6	130		

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Plane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating  
Frese  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

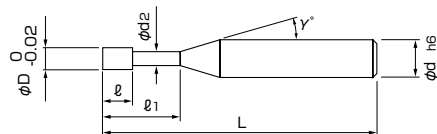
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NHR-2

2-Flute Long Neck End Mill

## Frese 2 Tagli piane scaricate



( $\phi D \geq 2.5$ )

- Adatta per fresature profonde o per nervature.
- Suitable for cutting in narrow and deep part by long neck end mill.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell$ ) Lungh. tagliente Length of Cut	(d2) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00412-00502	0.5	2	0.7	0.46	12°	3	35
01-00412-00504		4	0.7	0.46	12°	3	35
01-00412-00506		6	0.7	0.46	12°	3	35
01-00412-00602	0.6	2	0.9	0.56	12°	3	35
01-00412-00604		4	0.9	0.56	12°	3	35
01-00412-00606		6	0.9	0.56	12°	3	35
01-00412-00702	0.7	2	1	0.66	12°	4	45
01-00412-00704		4	1	0.66	12°	4	45
01-00412-00706		6	1	0.66	12°	4	45
01-00412-00804	0.8	4	1.2	0.76	12°	4	45
01-00412-00806		6	1.2	0.76	12°	4	45
01-00412-00808		8	1.2	0.76	12°	4	45
01-00412-00906	0.9	6	1.35	0.86	12°	4	45
01-00412-00908		8	1.35	0.86	12°	4	45
01-00412-00910		10	1.35	0.86	12°	4	45
01-00412-01006	1	6	1.5	0.95	12°	4	45
01-00412-01008		8	1.5	0.95	12°	4	45
01-00412-01010		10	1.5	0.95	12°	4	45
01-00412-01012	1.2	12	1.5	0.95	12°	4	45
01-00412-01206		6	1.8	1.15	12°	4	45
01-00412-01208		8	1.8	1.15	12°	4	45
01-00412-01210	1.4	10	1.8	1.15	12°	4	45
01-00412-01212		12	1.8	1.15	12°	4	45
01-00412-01406		1.5	6	2.1	1.35	12°	4
01-00412-01408	8		2.1	1.35	12°	4	45
01-00412-01410	10		2.1	1.35	12°	4	45
01-00412-01412	1.5	12	2.1	1.35	12°	4	45
01-00412-01414		14	2.1	1.35	12°	4	50
01-00412-01416		16	2.1	1.35	12°	4	50
01-00412-01506	1.5	6	2.3	1.45	12°	4	45
01-00412-01508		8	2.3	1.45	12°	4	45
01-00412-01510		10	2.3	1.45	12°	4	45
01-00412-01512		12	2.3	1.45	12°	4	45

**Attenzione** Quando ordinate, indiate NHR-2(D)×( $\ell_1$ ).  
When you order, indicate NHR-2 (D)×( $\ell_1$ ).

- ※ ( $\gamma$ ) è un valore di riferimento.
- ※ ( $\gamma$ ) is reference value.
- Per i parametri di taglio vedi pagina 263.
- Milling condition is recommended on page 263.

Codice Code No.	(D) Dia. Dia.	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00412-01514	1.5	14	2.3	1.45	12°	4	50
01-00412-01516		16	2.3	1.45	12°	4	50
01-00412-01518		18	2.3	1.45	12°	4	55
01-00412-01520		20	2.3	1.45	12°	4	55
01-00412-01606	1.6	6	2.4	1.55	12°	4	45
01-00412-01608		8	2.4	1.55	12°	4	45
01-00412-01610		10	2.4	1.55	12°	4	45
01-00412-01612		12	2.4	1.55	12°	4	45
01-00412-01614		14	2.4	1.55	12°	4	50
01-00412-01616		16	2.4	1.55	12°	4	50
01-00412-01618		18	2.4	1.55	12°	4	55
01-00412-01620		20	2.4	1.55	12°	4	55
01-00412-01806	1.8	6	2.7	1.74	12°	4	45
01-00412-01808		8	2.7	1.74	12°	4	45
01-00412-01810		10	2.7	1.74	12°	4	45
01-00412-01812		12	2.7	1.74	12°	4	45
01-00412-01814		14	2.7	1.74	12°	4	50
01-00412-01816		16	2.7	1.74	12°	4	50
01-00412-01818		18	2.7	1.74	12°	4	55
01-00412-01820		20	2.7	1.74	12°	4	55
01-00412-02006	2	6	3	1.94	12°	4	45
01-00412-02008		8	3	1.94	12°	4	45
01-00412-02010		10	3	1.94	12°	4	45
01-00412-02012		12	3	1.94	12°	4	45
01-00412-02014		14	3	1.94	12°	4	50
01-00412-02016		16	3	1.94	12°	4	50
01-00412-02018		18	3	1.94	12°	4	55
01-00412-02020		20	3	1.94	12°	4	55
01-00412-02508	2.5	8	3.7	2.4	12°	4	45
01-00412-02512		12	3.7	2.4	12°	4	45
01-00412-02516		16	3.7	2.4	12°	4	55
01-00412-02520		20	3.7	2.4	12°	4	60
01-00412-03008	3	8	4.5	2.85	12°	6	45

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Piane**  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Sferiche**  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
**Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Toriche**  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
**Sagomate**  
Formed  
Cutter

**Non Rivestite**  
Non-Coating  
**Frese**  
**Sagomate**  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00412-03012	3	12	4.5	2.85	12°	6	45
01-00412-03016		16	4.5	2.85	12°	6	55
01-00412-03020		20	4.5	2.85	12°	6	60
01-00412-03025		25	4.5	2.85	12°	6	65
01-00412-03512	3.5	12	5.25	3.35	12°	6	45
01-00412-03516		16	5.25	3.35	12°	6	55
01-00412-03520		20	5.25	3.35	12°	6	60
01-00412-03525		25	5.25	3.35	12°	6	65
01-00412-03530	4	30	5.25	3.35	12°	6	75
01-00412-04012		12	6	3.8	12°	6	45
01-00412-04016		16	6	3.8	12°	6	55
01-00412-04020		20	6	3.8	12°	6	60
01-00412-04025	5	25	6	3.8	12°	6	65
01-00412-04030		30	6	3.8	12°	6	70
01-00412-04035		35	6	3.8	12°	6	75
01-00412-05016		16	7.5	4.8	12°	6	55
01-00412-05020	5	20	7.5	4.8	12°	6	60
01-00412-05025		25	7.5	4.8	12°	6	65
01-00412-05030		30	7.5	4.8	12°	6	75
01-00412-05035		35	7.5	4.8	12°	6	80
01-00412-05040	5	40	7.5	4.8	12°	6	90

**Attenzione** Quando ordinate, indicate NHR-2 (D)×(ℓ<sub>1</sub>).

When you order, indicate NHR-2 (D)×(ℓ<sub>1</sub>).

※ (γ) è un valore di riferimento.

※ (γ) is reference value.

● Per i parametri di taglio vedi pagina 263.

● Milling condition is recommended on page 263.



# Parametri di taglio raccomandati

# NHR-2

## Recommended Milling Conditions

Materiale Work Material		Acciaio al carbonio•Acciaio legato• Acciaio pretemprato Carbon Steels•Alloy Steels•Prehardened Steels C50•42CrMo4•39NiCrMo3•AISI304• 1.2311•1.2738		Alluminio Aluminum		Rame Copper		Plastica Plastics	
Velocità di taglio Cutting Speed		30~50m/min		100~200m/min		50~150m/min		50~80m/min	
Dia. Dia.	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	mm	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.5	0.003~0.05	19,100~31,800	200~500	50,000~	200~1,000	31,800~	200~1,000	31,800~	200~400
0.6	0.006~0.06	15,900~26,500	200~500	50,000~	200~1,250	26,500~	200~1,000	26,500~42,500	200~400
0.7	0.01~0.07	13,600~22,700	200~500	45,500~	200~1,250	22,700~	200~1,000	22,700~36,400	200~400
0.8	0.01~0.06	11,900~19,900	200~500	39,800~	200~1,500	19,900~	200~1,250	19,900~31,800	200~400
0.9	0.009~0.03	10,600~17,700	200~500	35,400~	200~2,000	17,700~	200~1,500	17,700~28,300	200~400
1	0.01~0.06	9,600~15,900	200~650	31,800~	200~2,600	15,900~47,800	200~1,950	15,900~25,500	200~400
1.2	0.016~0.12	8,000~13,300	200~550	26,500~	200~2,200	13,300~39,800	200~1,650	13,300~21,200	200~400
1.4	0.012~0.15	6,800~11,400	200~450	22,700~45,500	200~1,800	11,400~34,100	200~1,350	11,400~18,200	200~400
1.5	0.008~0.17	6,400~10,600	200~450	21,200~42,500	200~1,800	10,600~31,800	200~1,350	10,600~17,000	200~400
1.6	0.012~0.2	6,000~10,000	200~450	19,900~39,800	200~1,800	10,000~29,900	200~1,350	10,000~15,900	200~400
1.8	0.02~0.22	5,300~8,800	200~350	17,700~35,400	200~1,400	8,800~26,500	200~1,050	8,800~14,200	200~400
2	0.03~0.25	4,800~8,000	200~350	15,900~31,800	200~1,400	8,000~23,900	200~1,050	8,000~12,700	200~400
2.5	0.08~0.25	3,800~6,400	150~250	12,700~25,500	150~1,000	6,400~19,100	150~750	6,400~10,200	150~300
3	0.09~0.25	3,200~5,300	130~250	10,600~21,200	130~1,000	5,300~15,900	130~750	5,300~8,500	130~260
3.5	0.09~0.25	2,700~4,500	110~220	9,100~18,200	110~900	4,500~13,600	110~650	4,500~7,300	110~220
4	0.1~0.25	2,400~4,000	100~200	8,000~15,900	100~800	4,000~11,900	100~600	4,000~6,400	100~200
5	0.18~0.25	1,900~3,200	80~200	6,400~12,700	80~800	3,200~9,600	80~600	3,200~5,100	80~160
Note Notes		※Regolare la profondità di taglio, i giri e l'avanzamento secondo la lunghezza effettiva. ※Usare un lubrificante con ritardanti di fumo. ※Si consiglia di eseguire fresatura bidirezionale. ※Adjust depth of cut, spindle speed and feed according to effective length. ※Use cutting fluid with smoke retardant. ※Recommend reciprocating cutting.							

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane Square**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche Ball**

**Scaricate Sferiche**  
Long Neck Ball

**Coniche Taper**

**Coniche Sferiche**  
Taper Ball

**Toriche Corner R**

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

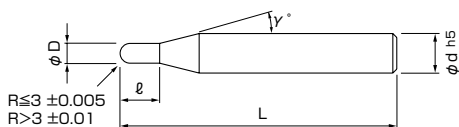
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# MSBH230

2-Flute Ball End Mill for Hardened Steels

## Frese 2 Tagli sferiche per acciai temprati



- Frese sferiche per acciai temprati, adatta anche per operazioni di finitura.
- Adatta per acciai temprati con durezza fino a 65HRC.
- Standard ball end mill for hardened steels and suitable for finishing process.
- Applicable for hardened steels up to 65HRC.

Dati tecnici P486



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ) Lungh. tagliante Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00507-00005	R0.05	0.1	0.1	12°	4	50
08-00507-00007	R0.075	0.15	0.15	12°	4	50
08-00507-00010	R0.1	0.2	0.2	12°	4	50
08-00507-00015	R0.15	0.3	0.3	12°	4	50
08-00507-00020	R0.2	0.6	0.4	12°	4	50
08-00507-00025	R0.25	0.8	0.5	12°	4	50
08-00507-00030	R0.3	0.9	0.6	12°	4	50
08-00507-00040	R0.4	1.2	0.8	12°	4	50
08-00507-00050	R0.5	1.5	1	12°	4	50
08-00507-00075	R0.75	2.3	1.5	12°	4	50
● 08-00507-00100	R1	3	2	12°	4	60
● 08-00507-00125	R1.25	3.8	2.5	12°	6	60
● 08-00507-00150	R1.5	5	3	12°	6	60
● 08-00507-00201	R2	6	4	—	4	70
● 08-00507-00200	R2	6	4	12°	6	70
● 08-00507-00250	R2.5	8	5	12°	6	70
● 08-00507-00300	R3	10	6	—	6	80
● 08-00507-00400	R4	12	8	—	8	90
● 08-00507-00500	R5	15	10	—	10	100
● 08-00507-00600	R6	20	12	—	12	100

**Attenzione** Quando ordinate, indicate MSBH230 (R)×(d).  
When you order, indicate MSBH230 (R)×(d).

※(γ) è un valore di riferimento

※(γ) is reference value.

● Per i parametri di taglio vedi pagina 266.

● Milling condition is recommended on page 266.

### Dati Tecnici 1 Technical Data 1

#### Modello 3D

3D Shape Model

**Materiale: STAVAX (52HRC)**

Material: STAVAX (52HRC)

**Totale tempo di lavorazione: 9h 23 min**

Total Cutting Time: 9hr 23 min

**Refrigerante: lubrificazione minima**

Coolant: Oil mist

**Dimensioni del pezzo lavorato: 100 x 100 mm (taglio 20 mm)**

Work Size: 100x100 mm (cutting 20 mm)

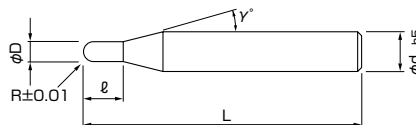


Applicazione Process	Sgrossatura Roughing	Semi-finitura Semi-finishing	Finitura Finishing
Fresa Tool	MSBH230 R3	MSBH230 R2	MSBH230 R2
Giri Spindle Speed	14.000 min <sup>-1</sup>	15.000 min <sup>-1</sup>	
Avanzamento Feed	3.000 mm/min	2.000 mm/min	1.800 mm/min
Prof. di taglio Depth of Cut	0.3 mm x 2 mm (Δp×Δe)	0.2 mm x 0.3 mm (Δp×Δe)	0.08 mm x 0.05 mm (Δp×Δe)
Tempo di lavorazione Cutting Time	2hr 30 min 2hrs 30 min	2hr 23 min 2hrs 23 min	4hr 30 min 4hrs 30 min

# MSBH345

3-Flute Ball End Mill for Hardened Steel

## Frese 3 Tagli sferiche per acciaio temprato



- Il rivestimento Muga Premium garantisce una lunga durata nella lavorazione di acciai temprati.
- L'originale design della fresa a 3 tagli con spaziatura differenziata elimina le vibrazioni e realizza lavorazioni molto efficienti.
- Muga Coating Premium realizes long tool life for machining on high-hardened steel.
- Original 3-flute design and unequal flute spacing to suppress chattering realize high efficient machining.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00607-00050	R0.5	1.5	1	12°	6	60
08-00607-00060	R0.6	2	1.2	12°	6	60
08-00607-00070	R0.7	3	1.4	12°	6	60
08-00607-00080	R0.8	3	1.6	12°	6	60
08-00607-00090	R0.9	3	1.8	12°	6	60
08-00607-00100	R1	3	2	12°	6	60
● 08-00607-00110	R1.1	3.5	2.2	12°	6	60
08-00607-00120	R1.2	4	2.4	12°	6	60
● 08-00607-00130	R1.3	4	2.6	12°	6	60
● 08-00607-00140	R1.4	5	2.8	12°	6	60
08-00607-00150	R1.5	5	3	12°	6	60
● 08-00607-00160	R1.6	5	3.2	12°	6	60
● 08-00607-00170	R1.7	6	3.4	12°	6	60
● 08-00607-00180	R1.8	6	3.6	12°	6	60
● 08-00607-00190	R1.9	6	3.8	12°	6	60
08-00607-00200	R2	6	4	12°	6	70
● 08-00607-00210	R2.1	7	4.2	12°	6	70
● 08-00607-00220	R2.2	7	4.4	12°	6	70
● 08-00607-00230	R2.3	7	4.6	12°	6	70
● 08-00607-00240	R2.4	8	4.8	12°	6	70
08-00607-00250	R2.5	8	5	12°	6	70
● 08-00607-00260	R2.6	8	5.2	12°	6	70
● 08-00607-00270	R2.7	9	5.4	12°	6	70
● 08-00607-00280	R2.8	9	5.6	12°	6	70
● 08-00607-00290	R2.9	9	5.8	12°	6	70
● 08-00607-00300	R3	10	6	-	6	80

### Attenzione

Quando ordinate, indicate MSBH345(R)  
When you order, indicate MSBH345 (R).

※(γ) è un valore di riferimento

※(γ) is reference value.

● Per i parametri di taglio vedi pagina 266.

● Milling condition is recommended on page 266.

\* Articolo semi standard, prezzo e consegna su richiesta

\* : Semi-standard item, please inquire for price and delivery.

### Dati Tecnici 1 Technical Data 1

Campione di attacco Binding sample



**Materiale: K340 60HRC**

Material: DC53 60HRC

**Tempo totale di lavoro: 15h 16 min**

Total Cutting Time: 15hr 16 min

**Refrigerante: Lubrificazione minima**

Coolant: Oil mist

**Dimensioni del pezzo lavorato:**

**100 x 100 mm (taglio 50 mm)**

Work Size: 100x100 mm (cutting 50 mm)

Applicazione Process	Sgrossatura Roughing	Semi-finitura Semi-finishing	Finitura Finishing	Materiale residuo Stock removing
Fresa Tool	MSBH345 R3	MSBH345 R2	MSBH345 R3	MSBH345 R2
Giri Spindle Speed	7.200 min <sup>-1</sup>			12.000 min <sup>-1</sup>
Avanzamento Feed	3.000 mm/min	3.000 mm/min	2.200 mm/min	2.200 mm/min
Prof.di taglio Depth of Cut	0.3 mm x 1.5 mm (apxΔe)	0.3 mm x 0.5 mm (apxΔe)	0.1 mm x 0.1 mm (apxΔe)	0.1 mm x 0.1 mm (apxΔe)
Tempo di lav. Cutting Time	6hr 40 min 6hrs 40 min	49 min 49 min	7hr 20 min 7hrs 20 min	27 min 27 min

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane  
Square

Scaricate Piane  
Long Neck Square

Sferiche  
Ball

Scaricate Sferiche  
Long Neck Ball

Coniche  
Taper

Coniche Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate Toriche  
Long Neck Corner R

Frese Sagomate  
Formed Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Parametri di taglio raccomandati

# MSBH230

### Recommended Milling Conditions

Materiale Work Material	Acciaio temprato Hardened Steels 1.2343•STAVAX•1.2344(~52HRC)				Acciaio temprato Hardened Steels 1.2379(~62HRC)				Acciaio super rapido da utensili High Speed Tool Steels ASP•M2•1.3343(~65HRC)			
	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>
<b>0.05</b>	0.005	0.005	150	40,000	0.003	0.005	100	40,000	0.002	0.005	60	40,000
<b>0.075</b>	0.005	0.005	180	40,000	0.003	0.005	150	40,000	0.002	0.005	100	40,000
<b>0.1</b>	0.01	0.02	360	40,000	0.01	0.01	320	40,000	0.003	0.005	240	40,000
<b>0.15</b>	0.01	0.03	420	40,000	0.01	0.02	360	40,000	0.005	0.01	300	40,000
<b>0.2</b>	0.02	0.06	1,000	40,000	0.02	0.05	820	40,000	0.01	0.02	480	40,000
<b>0.25</b>	0.03	0.07	1,200	40,000	0.025	0.05	1,000	40,000	0.015	0.03	600	40,000
<b>0.3</b>	0.05	0.1	1,600	40,000	0.03	0.06	1,200	40,000	0.02	0.05	720	30,000
<b>0.4</b>	0.1	0.15	2,200	40,000	0.07	0.1	1,800	40,000	0.05	0.1	1,200	30,000
<b>0.5</b>	0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000
<b>0.75</b>	0.15	0.3	3,000	30,000	0.1	0.3	2,500	30,000	0.1	0.2	2,000	25,000
<b>1</b>	0.2	0.5	3,000	25,000	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000
<b>1.25</b>	0.2	0.6	3,000	25,000	0.2	0.5	2,500	20,000	0.15	0.3	2,000	16,000
<b>1.5</b>	0.2	0.8	3,000	20,000	0.2	0.6	2,500	18,000	0.2	0.5	2,000	14,000
<b>2</b>	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000
<b>2.5</b>	0.3	1.5	3,000	18,000	0.2	1.2	2,500	12,000	0.2	0.7	2,000	9,200
<b>3</b>	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
<b>4</b>	0.5	2	2,500	10,000	0.4	1.2	1,800	7,000	0.3	1	1,200	5,000
<b>5</b>	0.7	2.5	2,000	7,000	0.5	1.5	1,500	5,000	0.4	1.2	1,000	4,000
<b>6</b>	1	3	1,500	5,000	0.6	2	1,200	4,000	0.5	1.5	800	3,000
<b>Note</b> Notes	※Profondità di taglio; $a_p$ =Profondità di taglio assiale, $a_e$ = profondità di taglio radiale. ※Raccomandiamo di utilizzare lubrificazione minimale. ※Regolate con la stessa proporzione giri ed avanzamento. ※Regolate le condizioni di fresatura in accordo alla profondità di taglio ed alla rigidità della macchina. ※La sporgenza dell'utensile fuori dal mandrino deve essere la minore possibile. ※Depth of Cut; $a_p$ =Axial Depth of Cut / $a_e$ =Radial Depth of Cut. ※We recommend using oil mist coolant. ※Adjust both spindle speed and feed at the same rate. ※Adjust milling conditions according to the volume of depth of cut and rigidity of machine. ※Length of tool overhang must be as short as possible.											

## Parametri di taglio raccomandati

# MSBH345

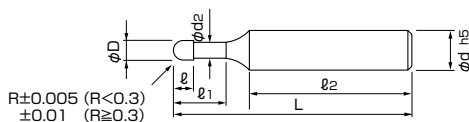
### Recommended Milling Conditions

Materiale Work Material	Acciaio temprato Hardened Steels 1.2343•STAVAX(~52HRC)				Acciaio temprato Hardened Steels 1.2379(~62HRC)				Acciaio super rapido da utensili High Speed Tool Steels ASP•M2•1.3343(~65HRC)			
	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>	$a_p$ mm	$a_e$ mm	mm/min	min <sup>-1</sup>
<b>0.5</b>	0.1	0.3	2,500	30,000	0.1	0.2	2,500	30,000	0.08	0.1	2,000	30,000
<b>1</b>	0.2	0.6	3,000	20,000	0.2	0.6	3,000	20,000	0.15	0.3	2,500	20,000
<b>1.5</b>	0.2	1	3,000	18,000	0.2	0.8	3,000	16,000	0.2	0.5	2,000	14,000
<b>2</b>	0.3	1.5	3,000	15,000	0.2	1	3,000	12,000	0.2	0.6	2,000	10,000
<b>2.5</b>	0.3	2	3,000	12,000	0.2	1.2	3,000	10,000	0.2	0.7	2,000	8,000
<b>3</b>	0.4	2	3,000	9,000	0.3	1.2	3,000	7,200	0.2	1	2,000	6,800
<b>Note</b> Notes	※Profondità di taglio; $a_p$ = Profondità di taglio assiale, $a_e$ = profondità di taglio radiale. ※Raccomandiamo di utilizzare lubrificazione minimale. ※Regolate con la stessa proporzione giri ed avanzamento. ※Regolate le condizioni di fresatura in accordo alla profondità di taglio ed alla rigidità della macchina. ※La sporgenza dell'utensile è 4 - 5 volte il dia. Nel caso fosse superiore a 4-5 volte il dia. regolare le condizioni sopra indicate. ※Depth of Cut; $a_p$ =Axial Depth of Cut / $a_e$ =Radial Depth of Cut. ※We recommend using oil mist coolant. ※Adjust both spindle speed and feed at the same rate. ※Adjust milling conditions according to the volume of depth of cut and rigidity of machine. ※Length of overhang is 4 to 5 times Dia. When it is longer than 4 to 5 times Dia., adjust the conditions listed above.											

# MACH225SF

MUGEN-COATING PREMIUM 2-Flute Ball End Mill with Short Shank For Hardened Steels

## Frese 2 Tagli sferiche con gambo corto per acciaio temprato rivestite MUGEN PREMIUM



- Specifiche per mandrini a calettamento a caldo.
- Fresa studiata per lavorazioni ad alta velocità (HSC) su materiali temprati.
- It fits for Shrink Chuck System.
- It is designed for high speed cutting of hardened steels.



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell$ ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	( $d_2$ ) Dia. scarico Neck Dia.	( $d$ ) Dia. gambo Shank Dia.	( $\ell_2$ ) Lungh gambo Shank Length	(L) Lungh. totale Overall Length
08-00554-01011	R0.1	0.5	0.2	0.2	0.175	4	28.2	35
08-00554-02011	R0.2	1	0.4	0.4	0.365	4	27.9	35
08-00554-03011	R0.3	1.5	0.6	0.6	0.56	4	27.6	35
08-00554-04011	R0.4	2	0.8	0.8	0.76	4	27.3	35
08-00554-05011	R0.5	2.5	1	1	0.95	4	32.1	40
08-00554-06011	R0.6	3	1.2	1.2	1.15	4	31.8	40
08-00554-07511	R0.75	3.8	1.5	1.5	1.45	4	31.3	40
08-00554-10011	R1	5	2	2	1.94	4	30.5	40
08-00554-15011	R1.5	8	3	3	2.85	4	28.7	40
08-00554-20012	R2	10	4	4	3.8	6	24.8	40
08-00554-25012	R2.5	12	5	5	4.8	6	30.1	45
08-00554-30012	R3	15	6	6	5.7	6	29	45

### Attenzione

Quando ordinate, indicate MACH225SF (R).  
When you order, indicate MACH225SF (R).

- Per i parametri di taglio vedi pagina 269.
- Milling condition is recommended on page 269.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating  
Frese Sagomate  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

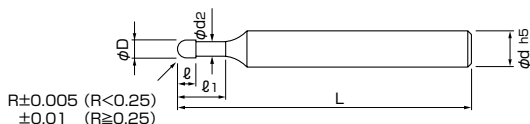
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MACH225

MUGEN-COATING PREMIUM 2-Flute Ball End Mill For Hardened Steels

## Frese 2 Tagli sferiche per acciaio temprato rivestite MUGEN PREMIUM



- Fresa studiata per lavorazioni ad alta velocità (HSC) su materiali temprati.
- Prestazioni efficienti nelle lavorazioni ad alti avanzamenti e a grandi profondità di taglio.
- It is designed for high speed cutting of hardened steels.
- Perform efficiently under high feed condition and able to take large depth of cut.



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00555-01011	R0.1	0.5	0.2	0.2	0.175	4	50
08-00555-01012		0.5	0.2	0.2	0.175	6	50
08-00555-02011	R0.2	1	0.4	0.4	0.365	4	50
08-00555-02012		1	0.4	0.4	0.365	6	50
08-00555-02511	R0.25	1.25	0.5	0.5	0.46	4	50
08-00555-02512		1.25	0.5	0.5	0.46	6	50
08-00555-03011	R0.3	1.5	0.6	0.6	0.56	4	50
08-00555-03012		1.5	0.6	0.6	0.56	6	50
08-00555-04011	R0.4	2	0.8	0.8	0.76	4	50
08-00555-04012		2	0.8	0.8	0.76	6	50
08-00555-05011	R0.5	2.5	1	1	0.95	4	50
08-00555-05012		2.5	1	1	0.95	6	50
08-00555-05021		4	1	1	0.95	6	50
08-00555-05022		6	1	1	0.95	6	50
08-00555-07511	R0.75	3.8	1.5	1.5	1.45	4	50
08-00555-07512		3.8	1.5	1.5	1.45	6	50
08-00555-10011	R1	5	2	2	1.94	4	50
08-00555-10012		5	2	2	1.94	6	50
08-00555-10022		6	2	2	1.94	6	50
08-00555-10032		8	2	2	1.94	6	50
08-00555-15012	R1.5	8	3	3	2.85	6	60
08-00555-15022		10	3	3	2.85	6	60
08-00555-15032		15	3	3	2.85	6	60
08-00555-20012	R2	10	4	4	3.8	6	60
08-00555-25012	R2.5	12	5	5	4.8	6	60
08-00555-30012	R3	15	6	6	5.7	6	60

**Attenzione** Quando ordinate, indicate MACH225 (R)×(ℓ<sub>1</sub>)×(d)  
When you order, indicate MACH225 (R)×(ℓ<sub>1</sub>)×(d).

- Per i parametri di taglio vedi pagina 269.
- Milling condition is recommended on page 269.

\* Articolo semi standard, prezzo e consegna su richiesta  
\*: Semi-standard item, please inquire for price and delivery.

# Parametri di taglio raccomandati

# MACH225 · MACH225SF

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio • Acciaio pretemprato Carbon Steels • Prehardened Steels C50 • 1.2311 • 1.2738 (~43HRC)					Acciaio temprato Hardened Steels 1.2343 • STAVAX • 1.2344 (~55HRC)					Acciaio temprato Hardened Steels 1.2379 (55~62HRC)				
	HSC High Speed Milling		Super HSC Super High Speed Milling		Profondità di taglio Depth of Cut $a_p \times a_e$	HSC High Speed Milling		Super HSC Super High Speed Milling		Profondità di taglio Depth of Cut $a_p \times a_e$	HSC High Speed Milling		Super HSC Super High Speed Milling		Profondità di taglio Depth of Cut $a_p \times a_e$
	Giri Spindle Speed min <sup>-1</sup>	Avanz. Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	Avanz. Feed mm/min		Giri Spindle Speed min <sup>-1</sup>	Avanz. Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	Avanz. Feed mm/min		Giri Spindle Speed min <sup>-1</sup>	Avanz. Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	Avanz. Feed mm/min	
<b>0.1</b>	20,000	400	50,000	800	0.01x0.02	20,000	250	50,000	500	0.01x0.02	20,000	250	50,000	500	0.01x0.02
<b>0.2</b>	20,000	600	50,000	1,000	0.02x0.05	20,000	320	50,000	680	0.02x0.05	20,000	320	50,000	680	0.02x0.05
<b>0.25</b>	20,000	800	50,000	1,200	0.03x0.05	20,000	400	50,000	800	0.02x0.05	20,000	400	50,000	800	0.02x0.05
<b>0.3</b>	20,000	1,200	50,000	2,000	0.05x0.1	20,000	460	50,000	1,000	0.03x0.05	20,000	460	50,000	1,000	0.03x0.05
<b>0.4</b>	20,000	1,600	50,000	2,500	0.1x0.2	20,000	580	50,000	1,200	0.05x0.1	20,000	580	50,000	1,200	0.05x0.1
<b>0.5</b>	20,000	2,000	50,000	5,000	0.2x0.3	20,000	1,200	50,000	3,000	0.1x0.2	20,000	800	50,000	2,000	0.1x0.2
<b>0.75</b>	20,000	2,000	50,000	5,000	0.2x0.3	20,000	1,600	42,000	3,000	0.1x0.2	20,000	1,200	32,000	2,000	0.1x0.2
<b>1</b>	20,000	3,200	50,000	8,000	0.3x0.5	20,000	2,500	32,000	3,500	0.2x0.5	20,000	2,000	24,000	2,400	0.2x0.5
<b>1.5</b>	16,000	2,800	32,000	6,000	0.3x0.5	16,000	2,500	21,000	3,500	0.2x0.5	13,000	2,000	16,000	2,400	0.2x0.5
<b>2</b>	12,000	2,400	24,000	5,000	0.5x1	12,000	2,000	16,000	3,000	0.2x0.7	9,600	1,600	12,000	2,000	0.2x0.7
<b>2.5</b>	9,600	2,000	20,000	5,000	0.5x1	9,600	2,000	13,000	3,000	0.2x0.7	7,600	1,300	9,600	1,600	0.2x0.7
<b>3</b>	8,000	2,000	16,000	4,000	0.5x1.5	8,000	1,600	10,000	2,500	0.2x1	6,400	1,000	8,000	1,300	0.2x1

- Note**  
Notes
- ※ Profondità di taglio:  $a_p$  = Profondità di taglio assiale,  $a_e$  = Profondità di taglio radiale.
  - ※ Raccomandiamo di utilizzare lubrificazione minima.
  - ※ Regolate con la stessa proporzione giri ed avanzamento.
  - ※ Regolate le condizioni di fresatura in accordo alla profondità di taglio ed alla rigidità della macchina.
  - ※ La sporgenza dell'utensile fuori dal mandrino deve essere la minore possibile.
  - ※ Depth of Cut :  $a_p$  = Axial Depth of Cut /  $a_e$  = Radial Depth of Cut.
  - ※ We recommend using oil mist coolant.
  - ※ Adjust milling conditions according to the volume of depth of cut and rigidity of machine.
  - ※ Adjust both spindle speed and feed at the same rate.
  - ※ Length of tool overhang must be as short as possible.

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate**  
Plane  
Long Neck  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Sferiche**  
Ball  
Scaricate  
Sferiche  
Long Neck  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche**  
Taper  
Coniche  
Sferiche  
Taper Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Toriche**  
Corner R  
Scaricate  
Toriche  
Long Neck  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Frese**  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating  
Frese  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

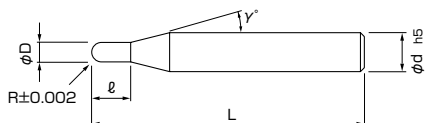
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MSB230G2

MUGEN-COATING Profit Ball End Mill

## Frese 2 Tagli sferiche di precisione rivestite MUGEN



- Massima precisione! R tolleranza  $\pm 2\mu\text{m}$ .
- Il rivestimento MUGEN garantisce lunghe lavorazioni.
- Utmost accuracy! R-tolerance  $\pm 2\mu\text{m}$ .
- Improved MUGEN-COATING guarantees long-lasting machining.

**Dati tecnici** P496



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00505-00005	R0.05	0.1	0.1	15°	4	50
08-00505-00010	R0.1	0.2	0.2	15°	4	50
08-00505-00015	R0.15	0.3	0.3	15°	4	50
08-00505-00020	R0.2	0.6	0.4	15°	4	50
08-00505-00025	R0.25	0.8	0.5	15°	4	50
08-00505-00030	R0.3	0.9	0.6	15°	4	50
08-00505-00040	R0.4	1.2	0.8	15°	4	50
08-00505-00050	R0.5	1.5	1	15°	4	50
08-00505-00075	R0.75	2.3	1.5	15°	4	50
08-00505-00100	R1	3	2	9°	4	60
08-00505-00150	R1.5	5	3	9°	6	60
08-00505-00200	R2	6	4	9°	6	70
08-00505-00250	R2.5	8	5	9°	6	70
08-00505-00300	R3	10	6	-	6	80

**Attenzione** Quando ordinate, indicate MSB230G2 (R).  
When you order, indicate MSB230G2 (R).

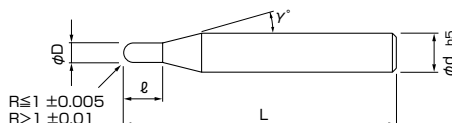
※(γ) è un valore di riferimento  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 275.
- Milling condition is recommended on page 275.

# MSB230S

MUGEN-COATING 2-Flute Short Flute Ball End Mill

## Frese 2 Tagli sferiche corte rivestite MUGEN



- La grande rigidità aumenta le performance in lavorazioni "HSC".
- High rigid design reduced chatter in high speed cutting.



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00530-00010	R0.1	0.2	0.2	9°	4	50
08-00530-00015	R0.15	0.3	0.3	9°	4	50
08-00530-00020	R0.2	0.4	0.4	9°	4	50
08-00530-00025	R0.25	0.5	0.5	9°	4	50
08-00530-00030	R0.3	0.6	0.6	9°	4	50
08-00530-00035	R0.35	0.7	0.7	9°	4	50
08-00530-00040	R0.4	0.8	0.8	9°	4	50
08-00530-00045	R0.45	0.9	0.9	9°	4	50
08-00530-00050	R0.5	1	1	9°	4	50
08-00530-00060	R0.6	1.2	1.2	9°	4	50
08-00530-00070	R0.7	1.4	1.4	9°	4	50
08-00530-00075	R0.75	1.5	1.5	9°	4	50
08-00530-00080	R0.8	1.6	1.6	9°	4	50
08-00530-00090	R0.9	1.8	1.8	9°	4	50
08-00530-00100	R1	2	2	9°	4	60
08-00530-00125	R1.25	2.5	2.5	9°	4	60
08-00530-00150	R1.5	3	3	9°	4	60
08-00530-00175	R1.75	3.5	3.5	9°	4	60
08-00530-00200	R2	4	4	9°	6	60
08-00530-00250	R2.5	5	5	9°	6	70
08-00530-00300	R3	6	6	-	6	80
08-00530-00400	R4	8	8	-	8	90
08-00530-00500	R5	10	10	-	10	100
08-00530-00600	R6	12	12	-	12	110

**Attenzione** Quando ordinate, indicate MSB230S (R).  
When you order, indicate MSB230S (R).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

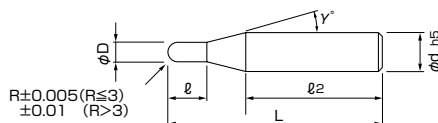
- Per i parametri di taglio vedi pagina 275.
- Milling condition is recommended on page 275.
- Dal R4 in su, la tolleranza del gambo è h6.
- R4 and above, tolerance of Shank Dia. is h6.



# MSB230SF

MUGEN-COATING 2-Flute Ball End Mill with Short Shank

## Frese 2 Tagli sferiche con gambo corto rivestite MUGEN



- Specifiche per mandrini a calettamento a caldo.
- It fits for Shrink Chuck System.

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(ℓ <sub>2</sub> ) Lungh.gambo Shank Length	(L) Lungh. totale Overall Length
08-00504-00010	R0.1	0.2	0.2	15°	4	27.3	35
08-00504-00020	R0.2	0.4	0.4	15°	4	27.2	35
08-00504-00030	R0.3	0.6	0.6	15°	4	27.3	35
08-00504-00040	R0.4	0.8	0.8	15°	4	27.4	35
08-00504-00050	R0.5	1	1	15°	4	32.5	40
08-00504-00060	R0.6	1.2	1.2	15°	4	32.5	40
08-00504-00075	R0.75	1.5	1.5	15°	4	32.6	40
08-00504-00100	R1	2	2	15°	4	30.1	40
08-00504-00150	R1.5	3	3	15°	4	31.8	40
08-00504-00200	R2	4	4	15°	6	27.6	40
08-00504-00250	R2.5	5	5	15°	6	39.8	50
08-00504-00300	R3	6	6	-	6	34.9	50
08-00504-00400	R4	8	8	-	8	41.1	60
08-00504-00500	R5	10	10	-	10	36.6	60
08-00504-00600	R6	12	12	-	12	33.6	60

**Attenzione** Quando ordinate, indicate MSB230SF(R).  
When you order, indicate MSB230SF (R).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 275.
- Milling condition is recommended on page 275.
- Dal R4 in su, la tolleranza del gambo è h6.
- R4 and above, tolerance of Shank Dia. is h6.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

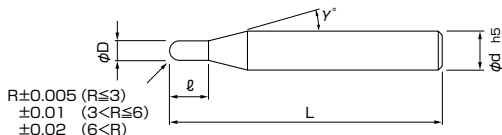
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MSB230

MUGEN-COATING 2-Flute Ball End Mill

## Frese 2 Tagli sferiche rivestite MUGEN



- È molto adatta per lavorazioni precise 3D in bassa e alta velocità.
- Suitable for precision three-dimensional cutting in the low to high speed range.

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ) Lungh. tagliante Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00501-00005	R0.05	0.1	0.1	15°	4	50
08-00500-00005	R0.05	0.1	0.1	15°	6	50
08-00501-00007	R0.075	0.15	0.15	15°	4	50
08-00500-00007	R0.075	0.15	0.15	15°	6	50
08-00501-00010	R0.1	0.2	0.2	15°	4	50
08-00500-00010	R0.1	0.2	0.2	15°	6	50
08-00501-00015	R0.15	0.3	0.3	15°	4	50
08-00500-00015	R0.15	0.3	0.3	15°	6	50
08-00501-00020	R0.2	0.6	0.4	15°	4	50
08-00500-00020	R0.2	0.6	0.4	15°	6	50
08-00501-00025	R0.25	0.8	0.5	15°	4	50
08-00500-00025	R0.25	0.8	0.5	15°	6	50
08-00501-00030	R0.3	0.9	0.6	15°	4	50
08-00500-00030	R0.3	0.9	0.6	15°	6	50
08-00500-00035	R0.35	1.1	0.7	15°	6	50
08-00501-00040	R0.4	1.2	0.8	15°	4	50
08-00500-00040	R0.4	1.2	0.8	15°	6	50
08-00500-00045	R0.45	1.4	0.9	15°	6	50
08-00501-00050	R0.5	1.5	1	15°	4	50
08-00500-00050	R0.5	1.5	1	15°	6	50
08-00500-00055	R0.55	1.7	1.1	15°	6	50
08-00501-00060	R0.6	1.8	1.2	15°	4	50
08-00500-00060	R0.6	1.8	1.2	15°	6	50
08-00500-00065	R0.65	2	1.3	15°	6	50
08-00501-00070	R0.7	2.1	1.4	15°	4	50
08-00500-00070	R0.7	2.1	1.4	15°	6	50
08-00501-00075	R0.75	2.3	1.5	15°	4	50
08-00500-00075	R0.75	2.3	1.5	15°	6	50
08-00501-00080	R0.8	2.4	1.6	15°	4	50
08-00500-00080	R0.8	2.4	1.6	15°	6	50

Codice Code No.	(R) Raggio Radius	(ℓ) Lungh. tagliante Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00500-00085	R0.85	2.6	1.7	15°	6	50
08-00500-00090	R0.9	2.7	1.8	15°	6	50
08-00500-00095	R0.95	2.9	1.9	15°	6	50
08-00501-00100	R1	3	2	9°	4	60
08-00500-00100	R1	3	2	9°	6	60
08-00500-00105	R1.05	3.2	2.1	9°	6	60
08-00500-00110	R1.1	3.3	2.2	9°	6	60
08-00500-00115	R1.15	3.5	2.3	9°	6	60
08-00500-00120	R1.2	3.6	2.4	9°	6	60
08-00501-00125	R1.25	3.8	2.5	9°	4	60
08-00500-00125	R1.25	3.8	2.5	9°	6	60
08-00500-00130	R1.3	3.9	2.6	9°	6	60
08-00500-00135	R1.35	4.1	2.7	9°	6	60
08-00500-00140	R1.4	4.2	2.8	9°	6	60
08-00500-00145	R1.45	4.4	2.9	9°	6	60
08-00501-00150	R1.5	5	3	9°	4	60
08-00500-00150	R1.5	5	3	9°	6	60
08-00500-00155	R1.55	5	3.1	9°	6	60
08-00500-00160	R1.6	5	3.2	9°	6	60
08-00500-00165	R1.65	5	3.3	9°	6	60
08-00500-00170	R1.7	5.1	3.4	9°	6	60
08-00500-00175	R1.75	5.3	3.5	9°	6	60
08-00500-00180	R1.8	5.4	3.6	9°	6	60
08-00500-00185	R1.85	5.6	3.7	9°	6	60
08-00500-00190	R1.9	5.7	3.8	9°	6	60
08-00500-00195	R1.95	5.9	3.9	9°	6	60
08-00500-00200	R2	6	4	9°	6	70
08-00500-00205	R2.05	6.2	4.1	9°	6	70
08-00500-00210	R2.1	6.3	4.2	9°	6	70
08-00500-00215	R2.15	6.5	4.3	9°	6	70

**Attenzione** Quando ordinate, indicate MSB230 (R) × (d).  
When you order, indicate MSB230 (R)×(d).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

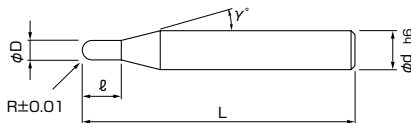
- Per i parametri di taglio vedi pagina 275.
- Milling condition is recommended on page 275.
- Dal R3.5 in su, la tolleranza del gambo è h6.
- R3.5 and above, tolerance of Shank Dia. is h6.

Codice Code No.	(R) Raggio Radius	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00500-00220	R2.2	6.6	4.4	9°	6	70
08-00500-00225	R2.25	6.8	4.5	9°	6	70
08-00500-00230	R2.3	6.9	4.6	9°	6	70
08-00500-00235	R2.35	7.1	4.7	9°	6	70
08-00500-00240	R2.4	7.2	4.8	9°	6	70
08-00500-00245	R2.45	7.4	4.9	9°	6	70
08-00500-00250	R2.5	8	5	9°	6	70
08-00500-00255	R2.55	8	5.1	9°	6	70
08-00500-00260	R2.6	8	5.2	9°	6	70
08-00500-00265	R2.65	8	5.3	9°	6	70
08-00500-00270	R2.7	8.1	5.4	9°	6	70
08-00500-00275	R2.75	8.3	5.5	9°	6	70
08-00500-00280	R2.8	8.4	5.6	9°	6	70
08-00500-00285	R2.85	8.6	5.7	9°	6	70
08-00500-00290	R2.9	8.7	5.8	9°	6	70
08-00500-00295	R2.95	8.9	5.9	9°	6	70
08-00500-00300	R3	10	6	–	6	80
08-00500-00350	R3.5	10.5	7	–	6	80
08-00500-00400	R4	12	8	–	8	90
08-00500-00450	R4.5	13.5	9	–	8	90
08-00500-00500	R5	15	10	–	10	100
08-00500-00550	R5.5	16.5	11	–	10	100
08-00500-00600	R6	20	12	–	12	110
08-00500-00700	R7	21	14	–	12	160
08-00500-00800	R8	25	16	–	16	160
08-00500-00900	R9	27	18	–	16	170
08-00500-01000	R10	30	20	–	20	170

# MSBL230

MUGEN-COATING 2-Flute Long Ball End Mill

## Frese 2 Tagli sferiche serie lunga rivestite MUGEN



- L'originale rivestimento MUGEN è stato applicato alla fresa sferica serie lunga.
- Le misure disponibili sono dal R0.1al R5.
- Grandi vantaggi grazie al gambo lungo.
- Our original MUGEN-COATING has been put on 2-flute long ball end mill.
- The available sizes are from radius 0.1 to 5.
- Take advantage of long shank feature.



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ) Lungh. tagliante Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00510-00010	R0.1	0.5	0.2	9°	3	70
08-00510-00015	R0.15	0.75	0.3	9°	3	70
08-00510-00020	R0.2	1	0.4	9°	3	70
08-00510-00025	R0.25	1.25	0.5	9°	3	70
08-00510-00030	R0.3	1.5	0.6	9°	3	70
08-00510-00035	R0.35	1.75	0.7	9°	3	70
08-00510-00040	R0.4	2	0.8	9°	3	70
08-00510-00045	R0.45	2.25	0.9	9°	3	70
08-00510-00050	R0.5	2.5	1	9°	3	70
08-00510-00055	R0.55	2.75	1.1	9°	3	70
08-00510-00060	R0.6	3	1.2	9°	3	70
08-00510-00065	R0.65	3.25	1.3	9°	3	70
08-00510-00070	R0.7	3.5	1.4	9°	3	70
08-00510-00075	R0.75	3.75	1.5	9°	3	70
08-00510-00080	R0.8	4	1.6	9°	3	70
08-00510-00085	R0.85	4.25	1.7	9°	3	70
08-00510-00090	R0.9	4.5	1.8	9°	3	70
08-00510-00095	R0.95	4.75	1.9	9°	3	70
08-00510-00100	R1	5	2	9°	3	70
08-00510-00110	R1.1	5.5	2.2	9°	3	80
08-00510-00120	R1.2	6	2.4	9°	3	80
08-00510-00125	R1.25	6.25	2.5	9°	3	80
08-00510-00130	R1.3	6.5	2.6	9°	3	80
08-00510-00140	R1.4	7	2.8	9°	3	80
08-00510-00150	R1.5	7.5	3	–	3	80
08-00510-00160	R1.6	8	3.2	–	3	120
08-00510-00170	R1.7	8.5	3.4	–	3	120
08-00510-00180	R1.8	9	3.6	9°	4	120
08-00510-00190	R1.9	9.5	3.8	9°	4	120

Codice Code No.	(R) Raggio Radius	(ℓ) Lungh. tagliante Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00510-00200	R2	10	4	–	4	120
08-00510-00210	R2.1	10.5	4.2	–	4	150
08-00510-00220	R2.2	11	4.4	–	4	150
08-00510-00230	R2.3	11.5	4.6	9°	6	150
08-00510-00240	R2.4	12	4.8	9°	6	150
08-00510-00250	R2.5	12.5	5	9°	6	150
08-00510-00260	R2.6	13	5.2	9°	6	150
08-00510-00270	R2.7	13.5	5.4	9°	6	150
08-00510-00280	R2.8	14	5.6	9°	6	150
08-00510-00290	R2.9	14.5	5.8	9°	6	150
08-00510-00300	R3	15	6	–	6	150
08-00510-00400	R4	20	8	–	8	160
08-00510-00500	R5	25	10	–	10	200

**Attenzione** Quando ordinate, indicate MSBL230 (R).  
When you order, indicate MSBL230 (R).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- \* Articolo semi-standard, prezzo e consegna su richiesta.
- \* : Semi-standard item, please inquire for price and delivery.

# Parametri di taglio raccomandati

## Recommended Milling Conditions

**MSB230S · MSB230 ·  
MSB230G2 · MSB230SF**

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Acciaio pretemprato Alloy Steels Prehardened Steels 42CrMo4·39NiCrMo3·AISI304· 1.2311·1.2738		Acciaio temprato Hardened Steels 1.2343 (~52HRC)		Alluminio Aluminum		Rame Copper	
Velocità di taglio Cutting Speed	150m/min		120~150m/min		80~100m/min		150~m/min		100~150m/min	
Raggio Radius	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.05	50,000	200	50,000	150	50,000	100	50,000	250	50,000	250
0.1	50,000	400	50,000	340	50,000	200	50,000	500	50,000	500
0.2	50,000	630	50,000	600	50,000	630	50,000	600	50,000	600
0.3	50,000	930	50,000	940	48,000	900	50,000	750	50,000	750
0.4	50,000	1,200	48,000	1,200	36,000	900	50,000	1,000	50,000	1,000
0.5	48,000	1,430	38,000	1,200	29,000	900	50,000	1,250	48,000	1,000
0.6	40,000	1,430	32,000	1,200	24,000	810	50,000	1,480	40,000	1,080
0.8	30,000	1,270	24,000	1,000	18,000	670	50,000	1,900	30,000	1,160
1	24,000	1,160	19,000	800	14,300	600	48,000	2,400	24,000	1,200
1.5	16,000	930	13,000	600	9,600	460	32,000	2,400	16,000	1,200
2	12,000	930	10,000	570	7,200	450	24,000	2,400	12,000	1,200
2.5	9,600	930	8,000	560	5,700	450	19,000	2,400	9,600	1,200
3	8,000	930	6,400	540	4,800	450	16,000	2,400	8,000	1,200
4	6,000	900	4,800	540	3,600	450	12,000	2,400	6,000	1,200
5	4,800	900	3,800	540	2,900	450	9,600	2,300	4,800	1,150
6	4,000	900	3,200	540	2,400	450	8,000	2,100	4,000	1,050
7	3,400	900	2,750	540	2,050	450	6,800	2,000	3,400	1,000
8	3,000	900	2,400	540	1,800	450	6,000	2,000	3,000	1,000
9	2,650	900	2,100	520	1,600	450	5,300	2,000	2,650	1,000
10	2,400	900	1,900	520	1,450	450	4,800	2,000	2,400	1,000
Profondità di taglio Depth of Cut	<p>~0.15xR R&lt;0.1 ~0.2xR 0.1≤R≤0.5 ~0.3xR R&gt;0.5</p> <p>0.1xR (~45HRC) ~0.08xR (~55HRC)</p> <p>~0.16xR R≤0.3 (~45HRC) ~0.25xR R≤3 (~45HRC) ~0.17xR R≤4 (~45HRC) ~0.05xR (~55HRC)</p>									
(R) Raggio Radius.										
Note	<p>※ Nella lavorazione di cave dal pieno, ridurre l'avanzamento al 60% dei valori sopra indicati.                  ※ Quando la lunghezza è 4 x D è considerata standard. Per lunghezze superiori, riducete le condizioni di taglio.                  ※ Consigliamo l'uso di lubrificazione minimale o aria compressa.                  ※ Regolare con la stessa proporzione giri ed avanzamento.                  ※ When slotting, reduce the feed by 60% from the above values.                  ※ Length of overhang is 4 times Dia. as standard. When it is longer than 4 times Dia., adjust the conditions listed above.                  ※ Recommended airflow or oil mist.                  ※ Adjust both spindle speed and feed at the same rate.</p>									

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**Parametri di taglio "HSC" raccomandati**

**MSB230S · MSB230 · MSB230G2 · MSB230SF**

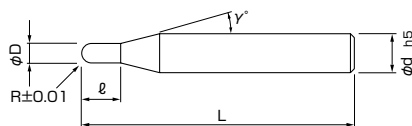
**Recommended High Speed Milling Conditions**

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738		Acciaio temprato Hardened Steels 1.2343 (~52HRC)	
Velocità di taglio Cutting Speed	250m/min		200m/min		180m/min		100m/min	
Raggio Radius	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.2	~50,000	~1,500	~50,000	~1,200	~50,000	~1,000	~50,000	600
0.3	~50,000	~1,500	~50,000	~1,200	~50,000	~1,000	~50,000	700
0.4	~50,000	~3,000	~50,000	~2,500	~50,000	~2,200	40,000	1,000
0.5	~50,000	~3,000	~50,000	~2,500	~50,000	~2,200	32,000	1,500
1	40,000	5,000	32,000	3,200	29,000	2,900	16,000	1,500
1.5	27,000	5,000	21,000	3,200	19,000	2,900	10,600	1,500
2	20,000	5,000	16,000	3,200	14,000	2,900	8,000	1,500
3	13,500	3,000	10,600	2,000	9,500	1,800	5,300	1,200
4	10,000	3,000	8,000	2,000	7,200	1,800	4,000	1,200
5	8,000	3,000	6,400	2,000	5,700	1,800	3,200	1,200
6	6,700	2,500	5,300	1,800	4,800	1,600	2,700	1,200
8	5,000	2,000	4,000	1,500	3,600	1,300	2,000	800
10	4,000	1,500	3,200	1,200	2,900	1,000	1,600	800
Profondità di taglio Depth of Cut  (R) Raggio Radius.								
Note Notes	<ul style="list-style-type: none"> <li>※Per la lavorazione di cave dal pieno, ridurre l'avanzamento al 60% dei valori sopra indicati.</li> <li>※Raccomandiamo l'uso di lubrificazione minimale o aria compressa.</li> <li>※Regolate con la stessa proporzione giri ed avanzamento.</li> <li>※Usare una macchina ed un mandrino rigido.</li> <li>※Regolate le condizioni di fresatura in accordo alla profondità di taglio ed alla rigidità della macchina.</li> <li>※When slotting, reduce the feed by 60% from the above values.</li> <li>※Recommended air blow or oil mist.</li> <li>※Adjust both spindle speed and feed at the same rate.</li> <li>※Use a rigid machine and chuck holder.</li> <li>※Adjust milling conditions according to the volume of depth of cut and rigidity of the machine.</li> </ul>							

# MSB345

MUGEN-COATING 3-Flute Ball End Mill

## Frese 3 Tagli sferiche rivestite MUGEN



● L'originale design della fresa a 3 tagli con spaziatura differenziata elimina le vibrazioni e realizza lavorazioni molto efficienti.

● Original 3-flute design and unequal flute spacing to suppress chattering realize high efficient machining.



● NUOVO NEW

Codice Code No.	(R) Raggio Radius	(l) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00600-00050	R0.5	1.5	1	12°	6	60
08-00600-00060	R0.6	2	1.2	12°	6	60
08-00600-00070	R0.7	3	1.4	12°	6	60
08-00600-00080	R0.8	3	1.6	12°	6	60
08-00600-00090	R0.9	3	1.8	12°	6	60
08-00600-00100	R1	3	2	12°	6	60
08-00600-00110	R1.1	3.5	2.2	12°	6	60
08-00600-00120	R1.2	4	2.4	12°	6	60
08-00600-00130	R1.3	4	2.6	12°	6	60
08-00600-00140	R1.4	5	2.8	12°	6	60
08-00600-00150	R1.5	5	3	12°	6	60
08-00600-00160	R1.6	5	3.2	12°	6	60
08-00600-00170	R1.7	6	3.4	12°	6	60
08-00600-00180	R1.8	6	3.6	12°	6	60
08-00600-00190	R1.9	6	3.8	12°	6	60
08-00600-00200	R2	6	4	12°	6	70
08-00600-00210	R2.1	7	4.2	12°	6	70
08-00600-00220	R2.2	7	4.4	12°	6	70
08-00600-00230	R2.3	7	4.6	12°	6	70
08-00600-00240	R2.4	8	4.8	12°	6	70
08-00600-00250	R2.5	8	5	12°	6	70
08-00600-00260	R2.6	8	5.2	12°	6	70
08-00600-00270	R2.7	9	5.4	12°	6	70
08-00600-00280	R2.8	9	5.6	12°	6	70
08-00600-00290	R2.9	9	5.8	12°	6	70
08-00600-00300	R3	10	6	-	6	80
08-00600-00310	R3.1	10	6.2	12°	8	90
08-00600-00320	R3.2	10	6.4	12°	8	90

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(l) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00600-00330	R3.3	10	6.6	12°	8	90
08-00600-00340	R3.4	11	6.8	12°	8	90
08-00600-00350	R3.5	11	7	12°	8	90
08-00600-00360	R3.6	11	7.2	12°	8	90
08-00600-00370	R3.7	12	7.4	12°	8	90
08-00600-00380	R3.8	12	7.6	12°	8	90
08-00600-00390	R3.9	12	7.8	12°	8	90
08-00600-00400	R4	12	8	-	8	90
08-00600-00410	R4.1	13	8.2	12°	10	100
08-00600-00420	R4.2	13	8.4	12°	10	100
08-00600-00430	R4.3	13	8.6	12°	10	100
08-00600-00440	R4.4	14	8.8	12°	10	100
08-00600-00450	R4.5	14	9	12°	10	100
08-00600-00460	R4.6	14	9.2	12°	10	100
08-00600-00470	R4.7	15	9.4	12°	10	100
08-00600-00480	R4.8	15	9.6	12°	10	100
08-00600-00490	R4.9	15	9.8	12°	10	100
08-00600-00500	R5	15	10	-	10	100
08-00600-00510	R5.1	16	10.2	12°	12	110
08-00600-00520	R5.2	16	10.4	12°	12	110
08-00600-00530	R5.3	16	10.6	12°	12	110
08-00600-00540	R5.4	17	10.8	12°	12	110
08-00600-00550	R5.5	17	11	12°	12	110
08-00600-00560	R5.6	17	11.2	12°	12	110
08-00600-00570	R5.7	18	11.4	12°	12	110
08-00600-00580	R5.8	18	11.6	12°	12	110
08-00600-00590	R5.9	18	11.8	12°	12	110
08-00600-00600	R6	20	12	-	12	110

**Attenzione** Quando ordinate, indicate MSB345 (R).  
When you order, indicate MSB345 (R).

\*(γ) è un valore di riferimento.  
\*(γ) is reference value.

- Per i parametri di taglio vedi pagina 278.  
● Milling condition is recommended on page 278.
- \* Articolo semi-standard, prezzo e consegna su richiesta.  
● \* :Semi-standard item, please inquire for price and delivery.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Rivestite Coating

Scaricate Piane Long Neck Square  
Non Rivestite Non-Coating

Sferiche Ball  
Rivestite Coating

Scaricate Sferiche Long Neck Ball  
Non Rivestite Non-Coating

Coniche Taper  
Rivestite Coating

Coniche Sferiche Taper Ball  
Non Rivestite Non-Coating

Toriche Corner R  
Rivestite Coating

Scaricate Toriche Long Neck Corner R  
Non Rivestite Non-Coating

Frese Sagomate Formed Cutter  
Rivestite Coating

Punte Drill  
Non Rivestite Non-Coating

Altro Others

Dati tecnici Technical Data

Guida tecnica Technical Guidance

## Parametri di taglio raccomandati

# MSB345

### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50				Acciaio legato•Acciaio pretemprato Alloy Steels•Prehardened Steels 42CrMo4•39NiCrMo3•1.2311•1.2738				Acciaio temprato Hardened Steels STAVAX•1.2343 (~52HRC)			
	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
	a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>	a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>	a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>
<b>0.5</b>	0.1	0.3	4,000	40,000	0.1	0.3	3,500	40,000	0.1	0.3	2,500	30,000
<b>1</b>	0.2	0.6	4,500	30,000	0.2	0.6	4,000	30,000	0.2	0.6	3,000	20,000
<b>1.5</b>	0.3	1	4,500	24,000	0.3	1	4,000	24,000	0.2	1	3,000	18,000
<b>2</b>	0.4	1.5	4,500	20,000	0.4	1.5	4,000	20,000	0.3	1.5	3,000	15,000
<b>2.5</b>	0.5	1.7	4,500	16,000	0.5	1.7	4,000	16,000	0.3	2	3,000	12,000
<b>3</b>	0.6	2	4,500	10,000	0.6	2	4,000	10,000	0.4	2	3,000	9,000
<b>4</b>	0.8	2.5	4,500	8,000	0.8	2.5	4,000	8,000	0.5	2	3,000	7,000
<b>5</b>	1.2	3	4,500	6,500	1.2	3	4,000	6,500	0.7	2.5	3,000	5,500
<b>6</b>	1.5	4	4,500	5,000	1.5	4	4,000	5,000	1	3	3,000	4,000
<b>Note</b> Notes	<p>※Profondità di taglio: <b>a<sub>p</sub></b> = Profondità di taglio assiale, <b>a<sub>e</sub></b> = Profondità di taglio radiale.</p> <p>※Regolate con la stessa proporzione giri ed avanzamento.</p> <p>※Regolate le condizioni di fresatura in accordo alla profondità di taglio ed alla rigidità della macchina.</p> <p>※Quando la lunghezza è 4 x D o 5 x D è considerata standard. Se è superiore, ridurre le condizioni di taglio.</p> <p>※Depth of Cut; <b>a<sub>p</sub></b>=Axial Depth of Cut / <b>a<sub>e</sub></b>=Radial Depth of Cut.</p> <p>※Adjust both spindle speed and feed at the same rate.</p> <p>※Adjust milling conditions according to the volume of depth of cut and rigidity of machine.</p> <p>※Length of overhang is 4 to 5 times Dia. as standard. When it is longer than 4 to 5 times Dia., adjust the conditions listed above.</p>											

CBN

Nitruro Cubico di Boro

Diamante

Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

Guida tecnica

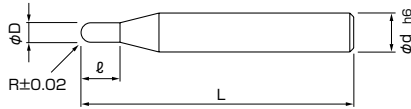
Technical Guidance



# MSBXL230

MUGEN-COATING 2-Flute Extra Long Ball End Mill

## Frese 2 Tagli sferiche serie extra lunga rivestite MUGEN



- Articolo semi standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ) Lungh. tagliante Length of Cut	(D) Dia. Dia.	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00511-00050	R0.5	2.5	1	3	100
08-00511-00100	R1	5	2	3	100
08-00511-00150	R1.5	7.5	3	3	120
08-00511-00200	R2	10	4	4	150
08-00511-00250	R2.5	12.5	5	6	180
08-00511-00300	R3	15	6	6	180
08-00511-00400	R4	20	8	8	200
08-00511-00500	R5	25	10	10	250

### Attenzione

Quando ordinate, indicate MSBXL230 (R).  
When you order, indicate MSBXL230 (R).

**CBN**  
Nitrato Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck  
Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck  
Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck  
Corner R

**Frese Sagomate**  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

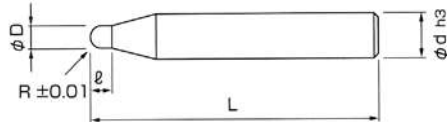
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

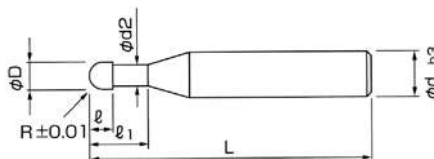
## Frese sferiche per materiali duri e fragili



Type I: normale



Type II: scaricata



(Profilo dello scarico)  
L'angolo nominale dello scarico dopo la lunghezza del tagliente è 12°. E' necessario verificare la misura reale per evitare interferenze tra la fresa e il pezzo.

(Neck profile)  
Reference value of interference angle after length of cut is 12°. Actual measurement required in order to avoid interference between tool and work material.

- Profilo sferico ad elica con il giusto bilanciamento della robustezza e affilatura del tagliente. Rivestimento al diamante di ultimo sviluppo con maggiori capacità di adesione.
- Spiral ball shape with balanced strength and sharpness of cutting edges. Adopted newly-developed diamond coating with enhanced sticking force.



Unità di misura: mm Unit size: mm

● NUOVO NEW

Codice Code No.	(R) Raggio Radius	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell$ ) Lungh. tagliente Length of Cut	Tipo Type	(d2) Dia. sotto scarico Under Neck Dia.	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
● 05-00500-00100	R0.1	–	0.15	I	–	4	45
● 05-00500-00101	R0.1	0.5	0.12	II	0.18	4	45
● 05-00500-00200	R0.2	–	0.3	I	–	4	45
● 05-00500-00201	R0.2	1	0.25	II	0.37	4	45
● 05-00500-00300	R0.3	–	0.45	I	–	4	45
● 05-00500-00301	R0.3	1.5	0.35	II	0.56	4	45
● 05-00500-00500	R0.5	–	0.75	I	–	4	45
● 05-00500-00501	R0.5	2.5	0.6	II	0.95	4	45
● 05-00500-00750	R0.75	–	1.1	I	–	4	45
● 05-00500-00751	R0.75	3.8	0.9	II	1.45	4	45
● 05-00500-01000	R1	–	1.5	I	–	4	45
● 05-00500-01001	R1	5	1.2	II	1.94	4	45

**Attenzione** Quando ordinate, indicate DCMB (R) x ( $\ell_1$ )  
When you order, indicate DCMB (R) x ( $\ell_1$ ).

- Per i parametri di taglio vedi pagina 281.
- Milling condition is recommended on page 281.

### Dati Tecnici 1 Technical Data 1

**Materiale: Metallo duro sinterizzato (89HRA)**

Material: Cemented Carbide (89HRA)

**Fresa: DCMB R1**

Tool



Giri Spindle Speed	20.000 min <sup>-1</sup>
Avanzamento Feed	200 mm/min
Profondità di taglio Depth of Cut	(ap) 0.005 mm × (ae) 0.01 mm
Tempo di lavorazione Cutting Time	3hr 55 min 3hrs 55 min
Refrigerante Coolant	Lubrificazione minima Oil Mist

**Dimensioni del pezzo lavorato: 20 x 20 x 10 mm**

Work Size: 20x20x10 mm

**Rugosità superficiale: (Rz) 0,51  $\mu$ m ~ 1.04  $\mu$ m**  
Surface Roughness

Materiale Work Material		Metallo duro			
R-Raggio Radius	Lungh. effettiva Effective Length	Numero di giri Spindle speed	Avanzamento Feed	Profondità di passata Depth of Cut	
		min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm
R0.1	–	30,000	100	0.004	0.004
	0.5	30,000	30	0.002	0.003
R0.2	–	30,000	150	0.008	0.03
	1	30,000	100	0.006	0.025
R0.3	–	30,000	200	0.01	0.05
	1.5	30,000	200	0.01	0.05
R0.5	–	30,000	300	0.02	0.10
	2.5	30,000	300	0.02	0.10
R0.75	–	30,000	300	0.03	0.15
	3.8	30,000	300	0.03	0.15
R1	–	20,000	300	0.04	0.15
	5	20,000	300	0.04	0.15
Note Notes		※Seguire i dati consigliati per prevenire rotture della fresa e il distacco del rivestimento. ※Necessario un runout minimo per evitare rotture della fresa e migliorare la precisione del lavoro. ※Si consiglia di verificare tutte le caratteristiche della macchina, quali l'allungamento del mandrino, ecc. prima di usare la fresa . ※Programmare con attenzione il percorso utensile nella fase di approccio, le impostazioni delle tolleranze, ecc. per ridurre il più possibile i carichi dovuti alle forze di taglio. ※Follow the recommended milling conditions to prevent tool breakage and coating peeling. ※Minimal tool runout is required to avoid the tool breakage and to increase the work accuracy. ※Recommended to assess the machine characters, such as expansion of the spindle and others before using the tool. ※Accurate tool path for approach method, tolerance setting and etc. is required to reduce the cutting load. ※Length of tool overhang must be as short as possible.			

**CBN**  
 Nitruro Cubico  
 di Boro

**Diamante**  
 Diamond

**Piane**  
 Square  
 Scaricate  
 Piane  
 Long Neck  
 Square

**Sferiche**  
 Ball  
 Scaricate  
 Sferiche  
 Long Neck  
 Ball

**Coniche**  
 Taper  
 Scaricate  
 Sferiche  
 Taper Ball

**Toriche**  
 Corner R  
 Scaricate  
 Toriche  
 Long Neck  
 Corner R

**Frese**  
 Sagomate  
 Formed  
 Cutter

**Punte**  
 Drill

**Altro**  
 Others

**Dati tecnici**  
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**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Piane**  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Sferiche**  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
**Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Toriche**  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
**Sagomate**  
Formed  
Cutter

**Non Rivestite**  
Non-Coating  
**Frese**  
**Sagomate**  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

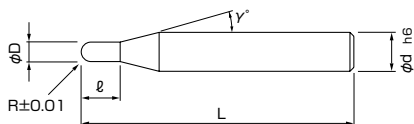
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NCB-2X

2-Flute Miniature Ball End Mill

## Frese 2 Tagli sferiche serie miniature



- Articolo semi standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	( $\ell$ ) Lungh. tagliante Length of Cut	(D) Dia. Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00513-00200	R0.2	0.8	0.4	9°	3	35
01-00513-00250	R0.25	1	0.5	9°	3	35
01-00513-00300	R0.3	1.2	0.6	9°	3	35
01-00513-00350	R0.35	1.4	0.7	9°	3	35
01-00513-00400	R0.4	1.6	0.8	9°	3	35
01-00513-00450	R0.45	1.8	0.9	9°	3	35
01-00513-00500	R0.5	2	1	9°	3	35
01-00513-00600	R0.6	2.4	1.2	9°	3	35
01-00513-00700	R0.7	2.8	1.4	9°	3	35
01-00513-00750	R0.75	3	1.5	9°	3	35
01-00513-00800	R0.8	3.2	1.6	9°	3	35
01-00513-00900	R0.9	3.6	1.8	9°	3	35

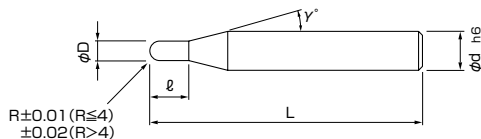
**Attenzione** Quando ordinate, indicate NCB-2X(R).  
When you order, indicate NCB-2X (R).

- Per i parametri di taglio vedi pagina 285.
- Milling condition is recommended on page 285.

# NSB-2X

2-Flute Ball End Mill

## Frese 2 Tagli sferiche



● Articolo semi standard, prezzo e consegna su richiesta.

● Semi-standard item, please inquire for price and delivery.

Codice Code No.	(R) Raggio Radius	(l) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(gamma) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00523-00100	R1	3	2	9°	4	60
01-00523-00105	R1.05	3.5	2.1	9°	4	60
01-00523-00110	R1.1	3.5	2.2	9°	4	60
01-00523-00115	R1.15	3.5	2.3	9°	4	60
01-00523-00120	R1.2	3.5	2.4	9°	4	60
01-00523-00125	R1.25	3.5	2.5	9°	4	60
01-00523-00130	R1.3	4	2.6	9°	6	60
01-00523-00135	R1.35	4	2.7	9°	6	60
01-00523-00140	R1.4	4	2.8	9°	6	60
01-00523-00145	R1.45	4	2.9	9°	6	60
01-00523-00150	R1.5	4	3	9°	6	60
01-00523-00155	R1.55	5	3.1	9°	6	60
01-00523-00160	R1.6	5	3.2	9°	6	60
01-00523-00165	R1.65	5	3.3	9°	6	60
01-00523-00170	R1.7	5	3.4	9°	6	60
01-00523-00175	R1.75	5	3.5	9°	6	60
01-00523-00180	R1.8	6	3.6	9°	6	60
01-00523-00185	R1.85	6	3.7	9°	6	60
01-00523-00190	R1.9	6	3.8	9°	6	60
01-00523-00195	R1.95	6	3.9	9°	6	60
01-00523-00200	R2	6	4	9°	6	60
01-00523-00205	R2.05	8	4.1	9°	6	60
01-00523-00210	R2.1	8	4.2	9°	6	60
01-00523-00215	R2.15	8	4.3	9°	6	60
01-00523-00220	R2.2	8	4.4	9°	6	60
01-00523-00225	R2.25	8	4.5	9°	6	60
01-00523-00230	R2.3	8	4.6	9°	6	60
01-00523-00235	R2.35	8	4.7	9°	6	60
01-00523-00240	R2.4	8	4.8	9°	6	60
01-00523-00245	R2.45	8	4.9	9°	6	60

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(l) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(gamma) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00523-00250	R2.5	8	5	9°	6	60
01-00523-00255	R2.55	10	5.1	9°	6	80
01-00523-00260	R2.6	10	5.2	9°	6	80
01-00523-00265	R2.65	10	5.3	9°	6	80
01-00523-00270	R2.7	10	5.4	9°	6	80
01-00523-00275	R2.75	10	5.5	9°	6	80
01-00523-00280	R2.8	10	5.6	9°	6	80
01-00523-00285	R2.85	10	5.7	9°	6	80
01-00523-00290	R2.9	10	5.8	9°	6	80
01-00523-00295	R2.95	10	5.9	9°	6	80
01-00523-00300	R3	10	6	-	6	80
01-00523-00310	R3.1	13	6.2	9°	8	90
01-00523-00320	R3.2	13	6.4	9°	8	90
01-00523-00330	R3.3	13	6.6	9°	8	90
01-00523-00340	R3.4	13	6.8	9°	8	90
01-00523-00350	R3.5	13	7	9°	8	90
01-00523-00360	R3.6	13	7.2	9°	8	90
01-00523-00370	R3.7	13	7.4	9°	8	90
01-00523-00380	R3.8	13	7.6	9°	8	90
01-00523-00390	R3.9	13	7.8	9°	8	90
01-00523-00400	R4	13	8	-	8	90
01-00523-00410	R4.1	15	8.2	9°	10	100
01-00523-00420	R4.2	15	8.4	9°	10	100
01-00523-00430	R4.3	15	8.6	9°	10	100
01-00523-00440	R4.4	15	8.8	9°	10	100
01-00523-00450	R4.5	15	9	9°	10	100
01-00523-00460	R4.6	15	9.2	9°	10	100
01-00523-00470	R4.7	15	9.4	9°	10	100
01-00523-00480	R4.8	15	9.6	9°	10	100
01-00523-00490	R4.9	15	9.8	9°	10	100

### Attenzione

Quando ordinate, indicate NSB-2X(R).  
When you order, indicate NSB-2X (R).

- Per i parametri di taglio vedi pagina 285.
- Milling condition is recommended on page 285.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Rivestite Coating  
Scaricate Plane Non Rivestite Non-Coating  
Long Neck Square

Sferiche Ball  
Rivestite Coating  
Scaricate Sferiche Non Rivestite Non-Coating  
Long Neck Ball

Coniche Taper  
Rivestite Coating  
Coniche Sferiche Non Rivestite Non-Coating  
Taper Ball

Toriche Corner R  
Rivestite Coating  
Scaricate Toriche Non Rivestite Non-Coating  
Long Neck Corner R

Frese Sagomate Formed Cutter  
Rivestite Coating  
Non Rivestite Non-Coating

Punte Drill

Altro Others

Dati tecnici Technical Data

Guida tecnica Technical Guidance

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Piane**  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Sferiche**  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
**Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Toriche**  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
**Sagomate**  
Formed  
Cutter

**Punte**

Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(l) Lungh. tagliante Length of Cut	(D) Dia. Dia.	(y) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00523-00500	<b>R5</b>	15	10	–	10	100
01-00523-00510	<b>R5.1</b>	15	10.2	9°	12	110
01-00523-00520	<b>R5.2</b>	15	10.4	9°	12	110
01-00523-00530	<b>R5.3</b>	15	10.6	9°	12	110
01-00523-00540	<b>R5.4</b>	15	10.8	9°	12	110
01-00523-00550	<b>R5.5</b>	15	11	9°	12	110
01-00523-00560	<b>R5.6</b>	15	11.2	9°	12	110
01-00523-00570	<b>R5.7</b>	15	11.4	9°	12	110
01-00523-00580	<b>R5.8</b>	15	11.6	9°	12	110
01-00523-00590	<b>R5.9</b>	15	11.8	9°	12	110
01-00523-00600	<b>R6</b>	15	12	–	12	110
01-00523-00650	<b>R6.5</b>	20	13	–	12	110
01-00523-00700	<b>R7</b>	20	14	9°	16	160
01-00523-00750	<b>R7.5</b>	20	15	9°	16	160
01-00523-00800	<b>R8</b>	20	16	–	16	160
01-00523-00850	<b>R8.5</b>	25	17	9°	20	170
01-00523-00900	<b>R9</b>	25	18	9°	20	170
01-00523-00950	<b>R9.5</b>	25	19	9°	20	170
01-00523-01000	<b>R10</b>	25	20	–	20	170

## Parametri di taglio raccomandati

# NCB-2X

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Piane**  
Long Neck  
Square

**Sferiche**  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Sferiche**  
Long Neck  
Ball

**Coniche**  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Toriche**  
Long Neck  
Corner R

**Frese Sagomate**  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

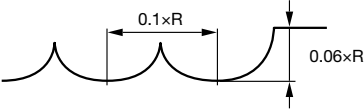
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

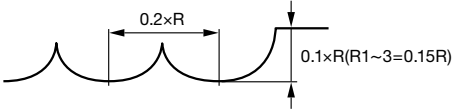
## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio • Acciaio legato • Acciaio pretemprato Carbon Steels • Alloy Steels • Prehardened Steels C50 • 42CrMo4 • 39NiCrMo3 • AISI304 • 1.2311	
Velocità di taglio Cutting Speed	60~80m/min	
Raggio Radius.	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min
0.2	50,000	800
0.25	50,000	800
0.3	42,500	870
0.4	32,000	930
0.5	25,500	930
0.75	17,000	930
0.8	16,000	930
Profondità di taglio Depth of Cut		
(R) Raggio Radius.		
Note Notes	※ Usare lubrorefrigerante. ※ Regolare nella stessa proporzione giri ed avanzamento. ※ Use cutting fluid. ※ Adjust both spindle speed and feed at the same rate.	

## Parametri di taglio raccomandati

# NSB-2X

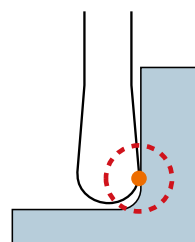
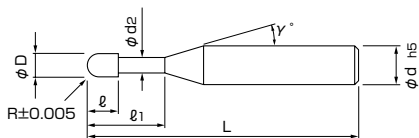
## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3 • AISI304		Acciaio pretemprato Prehardened Steels 1.2311 • 1.2738 (~45HRC)	
Velocità di taglio Cutting Speed	120m/min		100m/min		80m/min	
Raggio Radius.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	19,000	870	16,000	760	12,700	520
1.5	12,700	870	10,600	760	8,450	520
2	9,600	870	8,000	760	6,400	520
2.5	7,600	870	6,400	760	5,100	520
3	6,400	870	5,300	760	4,250	520
4	4,800	870	4,000	760	3,200	520
5	3,800	870	3,200	760	2,550	520
6	3,200	870	2,650	760	2,150	520
8	2,400	870	2,000	760	1,600	520
10	1,900	870	1,600	760	1,300	520
Profondità di taglio Depth of Cut						
(R) Raggio Radius.						
Note Notes	※ Usare lubrorefrigerante. ※ La tabella sopra indica i parametri di taglio in caso di superficie piana. In caso di superficie inclinata, regolare l'avanzamento. ※ I giri e l'avanzamento sono da regolare in funzione della lunghezza della fresa e della profondità di taglio. ※ Use cutting fluid. ※ This table shows milling conditions for flat surface. Adjust feed for inclined surface. ※ Spindle speed and feed are changed according to overhang length and depth of cut.					

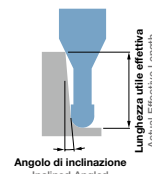
# MRBH230

2-Flute Long Neck Ball End Mill for Hardened Steels

## Frese 2 Tagli sferiche per acciai temprati



**Vibrazioni ridotte grazie ad un unico punto di contatto!**  
Suppress chattering by point milling



- Il rivestimento Mugen Premium e il nuovo design dell'affilatura prevengono le usure e le scheggiature garantendo un'eccellente finitura.
- Adatte per acciai temprati fino a 65HRC.
- In totale 190 misure.
- MUGEN-COATING PREMIUM for hardened steels and unique new design excel in chipping prevention and resolves chattering to realize excellent finished surface.
- Applicable for hardened steels up to 65HRC.
- Total 190 sizes!

**Dati tecnici** P486



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30°	1°	1° 30'	2°	3°
08-00527-00050	R0.05	0.2	0.07	0.1	0.085	12°	4	45	0.24	0.25	0.26	0.27	0.29
08-00527-00051		0.3	0.07	0.1	0.085	12°	4	45	0.34	0.36	0.37	0.39	0.42
08-00527-00053		0.5	0.07	0.1	0.085	12°	4	45	0.55	0.57	0.60	0.63	0.69
08-00527-00071	R0.075	0.3	0.1	0.15	0.13	12°	4	45	0.36	0.37	0.39	0.40	0.44
08-00527-00073		0.5	0.1	0.15	0.13	12°	4	45	0.57	0.59	0.61	0.64	0.70
08-00527-00075		1	0.1	0.15	0.13	12°	4	45	1.09	1.13	1.18	1.24	1.37
● 08-00527-00100	R0.1	0.3	0.15	0.2	0.18	12°	4	45	0.35	0.36	0.38	0.39	0.42
08-00527-00101		0.5	0.15	0.2	0.18	12°	4	45	0.56	0.58	0.61	0.63	0.69
08-00527-00102		0.75	0.15	0.2	0.18	12°	4	45	0.82	0.85	0.89	0.93	1.02
08-00527-00103	R0.15	1	0.15	0.2	0.18	12°	4	45	1.08	1.13	1.18	1.23	1.35
● 08-00528-00103		1	0.15	0.2	0.18	12°	6	45	1.08	1.13	1.18	1.23	1.35
08-00527-00104		1.25	0.15	0.2	0.18	12°	4	45	1.34	1.40	1.46	1.53	1.68
08-00527-00105	R0.1	1.5	0.15	0.2	0.18	12°	4	45	1.60	1.67	1.75	1.83	2.02
08-00527-00106		1.75	0.15	0.2	0.18	12°	4	45	1.86	1.94	2.03	2.13	2.35
08-00527-00107		2	0.15	0.2	0.18	12°	4	45	2.13	2.22	2.32	2.43	2.68
08-00527-00108	R0.15	2.5	0.15	0.2	0.18	12°	4	45	2.65	2.76	2.89	3.02	3.34
08-00527-00109		3	0.15	0.2	0.18	12°	4	45	3.17	3.31	3.46	3.62	4.01
08-00527-00162		0.5	0.2	0.3	0.28	12°	4	45	0.56	0.58	0.60	0.63	0.68
08-00527-00150	R0.15	0.6	0.2	0.3	0.28	12°	4	45	0.66	0.69	0.71	0.74	0.81
08-00527-00163		0.75	0.2	0.3	0.28	12°	4	45	0.82	0.86	0.89	0.93	1.01
08-00527-00151		1	0.2	0.3	0.28	12°	4	45	1.08	1.12	1.17	1.22	1.34
08-00527-00152	R0.15	1.25	0.2	0.3	0.28	12°	4	45	1.34	1.39	1.45	1.52	1.67
08-00527-00153		1.5	0.2	0.3	0.28	12°	4	45	1.60	1.67	1.74	1.82	2.00
● 08-00528-00153		1.5	0.2	0.3	0.28	12°	6	50	1.60	1.67	1.74	1.82	2.00
08-00527-00154	R0.15	1.75	0.2	0.3	0.28	12°	4	45	1.86	1.94	2.02	2.12	2.33
08-00527-00155		2	0.2	0.3	0.28	12°	4	45	2.12	2.21	2.31	2.42	2.66
08-00527-00156		2.25	0.2	0.3	0.28	12°	4	45	2.38	2.48	2.59	2.71	3.00
08-00527-00157	R0.15	2.5	0.2	0.3	0.28	12°	4	45	2.64	2.76	2.88	3.01	3.33
08-00527-00159		3	0.2	0.3	0.28	12°	4	45	3.17	3.30	3.45	3.61	3.99
08-00527-00160		3.5	0.2	0.3	0.28	12°	4	45	3.69	3.85	4.02	4.21	4.65
08-00527-00161	R0.15	4	0.2	0.3	0.28	12°	4	45	4.21	4.39	4.59	4.81	5.32

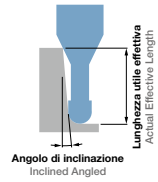
### Attenzione

Quando ordinate, indicate MRBH230 (R)×(ℓ1).  
When you order, indicate MRBH230 (R)×(ℓ1).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 291.
- Milling condition is recommended on page 291.





● NUOVO NEW

Unità di misura: mm Unit size: mm

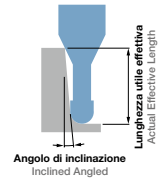
Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.					
									30'	1°	1° 30'	2°	3°	
08-00527-00211	R0.2	0.5	0.3	0.4	0.37	12°	4	45	0.59	0.60	0.62	0.64	0.69	
08-00527-00201		0.8	0.3	0.4	0.37	12°	4	45	0.89	0.93	0.96	1.00	1.09	
08-00527-00202		1	0.3	0.4	0.37	12°	4	45	1.10	1.14	1.19	1.24	1.35	
● 08-00528-00202		1	0.3	0.4	0.37	12°	6	50	1.10	1.14	1.19	1.24	1.35	
08-00527-00203		1.5	0.3	0.4	0.37	12°	4	45	1.62	1.69	1.76	1.84	2.02	
08-00527-00204		2	0.3	0.4	0.37	12°	4	45	2.15	2.23	2.33	2.43	2.68	
● 08-00528-00204		2	0.3	0.4	0.37	12°	6	50	2.15	2.23	2.33	2.43	2.68	
08-00527-00205		2.5	0.3	0.4	0.37	12°	4	45	2.67	2.78	2.90	3.03	3.34	
08-00527-00206		3	0.3	0.4	0.37	12°	4	45	3.19	3.32	3.47	3.63	4.01	
08-00527-00207		3.5	0.3	0.4	0.37	12°	4	45	3.71	3.87	4.04	4.23	4.67	
08-00527-00208		4	0.3	0.4	0.37	12°	4	45	4.23	4.41	4.61	4.83	5.33	
08-00527-00209		4.5	0.3	0.4	0.37	12°	4	45	4.75	4.96	5.18	5.43	6.00	
08-00527-00210		5	0.3	0.4	0.37	12°	4	45	5.27	5.50	5.75	6.02	6.66	
● 08-00527-00212		6	0.3	0.4	0.37	12°	4	45	6.33	6.60	6.90	7.23	8.00	
08-00527-00250		R0.25	1	0.35	0.5	0.46	12°	4	45	1.13	1.16	1.21	1.26	1.37
08-00527-00251			1.5	0.35	0.5	0.46	12°	4	45	1.65	1.71	1.78	1.85	2.03
08-00527-00252	2		0.35	0.5	0.46	12°	4	45	2.17	2.25	2.35	2.45	2.69	
08-00527-00253	2.5		0.35	0.5	0.46	12°	4	45	2.69	2.80	2.92	3.05	3.36	
08-00527-00254	3		0.35	0.5	0.46	12°	4	45	3.21	3.34	3.49	3.65	4.02	
08-00527-00255	3.5		0.35	0.5	0.46	12°	4	45	3.73	3.89	4.06	4.25	4.69	
08-00527-00256	4		0.35	0.5	0.46	12°	4	45	4.25	4.43	4.63	4.85	5.35	
08-00527-00257	4.5		0.35	0.5	0.46	12°	4	45	4.78	4.98	5.20	5.44	6.01	
08-00527-00258	5		0.35	0.5	0.46	12°	4	45	5.30	5.52	5.77	6.04	6.68	
08-00527-00259	5.5		0.35	0.5	0.46	12°	4	45	5.82	6.07	6.34	6.64	7.34	
08-00527-00260	6		0.35	0.5	0.46	12°	4	45	6.34	6.61	6.91	7.24	8.00	
08-00527-00262	8		0.35	0.5	0.46	12°	4	45	8.42	8.79	9.19	9.63	10.66	
● 08-00527-00264	10		0.35	0.5	0.46	12°	4	45	10.52	10.98	11.49	12.04	13.35	
08-00527-00300	R0.3		1	0.45	0.6	0.56	12°	4	45	1.12	1.16	1.20	1.25	1.35
08-00527-00301			1.5	0.45	0.6	0.56	12°	4	45	1.64	1.71	1.77	1.84	2.02
08-00527-00302			2	0.45	0.6	0.56	12°	4	45	2.17	2.25	2.34	2.44	2.68
● 08-00528-00302		2	0.45	0.6	0.56	12°	6	50	2.17	2.25	2.34	2.44	2.68	
08-00527-00303		2.5	0.45	0.6	0.56	12°	4	45	2.69	2.79	2.91	3.04	3.34	
08-00527-00304		3	0.45	0.6	0.56	12°	4	45	3.21	3.34	3.48	3.64	4.01	
● 08-00528-00304		3	0.45	0.6	0.56	12°	6	50	3.21	3.34	3.48	3.64	4.01	
08-00527-00305		3.5	0.45	0.6	0.56	12°	4	45	3.73	3.88	4.05	4.24	4.67	
08-00527-00306		4	0.45	0.6	0.56	12°	4	45	4.25	4.43	4.62	4.84	5.33	
● 08-00528-00306		4	0.45	0.6	0.56	12°	6	50	4.25	4.43	4.62	4.84	5.33	
08-00527-00321		4.5	0.45	0.6	0.56	12°	4	45	4.78	4.98	5.20	5.45	6.02	
08-00527-00308		5	0.45	0.6	0.56	12°	4	45	5.29	5.52	5.76	6.03	6.66	
08-00527-00322		5.5	0.45	0.6	0.56	12°	4	45	5.82	6.07	6.34	6.64	7.35	
08-00527-00310		6	0.45	0.6	0.56	12°	4	45	6.34	6.61	6.90	7.23	7.99	
08-00527-00312		7	0.45	0.6	0.56	12°	4	45	7.38	7.70	8.04	8.43	9.31	
08-00527-00314		8	0.45	0.6	0.56	12°	4	45	8.42	8.79	9.18	9.62	10.64	
08-00527-00316	9	0.45	0.6	0.56	12°	4	45	9.47	9.88	10.33	10.82	11.97		
08-00527-00318	10	0.45	0.6	0.56	12°	4	45	10.51	10.97	11.47	12.02	13.30		
08-00527-00320	12	0.45	0.6	0.56	12°	4	45	12.59	13.14	13.75	14.41	15.95		



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ <sub>2</sub> ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30'	1°	1° 30'	2°	3°
08-00527-00350	R0.35	2	0.5	0.7	0.66	12°	4	45	2.17	2.25	2.34	2.44	2.67
08-00527-00351		4	0.5	0.7	0.66	12°	4	45	4.25	4.43	4.62	4.84	5.33
08-00527-00352		6	0.5	0.7	0.66	12°	4	45	6.34	6.61	6.91	7.23	8.00
08-00527-00353		8	0.5	0.7	0.66	12°	4	45	8.43	8.79	9.19	9.63	10.66
08-00527-00401		2	0.6	0.8	0.76	12°	4	45	2.16	2.24	2.33	2.42	2.65
● 08-00528-00401	2	0.6	0.8	0.76	12°	6	50	2.16	2.24	2.33	2.42	2.65	
08-00527-00402	3	0.6	0.8	0.76	12°	4	45	3.20	3.33	3.47	3.62	3.97	
08-00527-00403	4	0.6	0.8	0.76	12°	4	45	4.25	4.42	4.61	4.82	5.30	
08-00527-00404	5	0.6	0.8	0.76	12°	4	45	5.29	5.51	5.75	6.01	6.63	
08-00527-00405	6	0.6	0.8	0.76	12°	4	45	6.33	6.60	6.89	7.21	7.96	
08-00527-00406	7	0.6	0.8	0.76	12°	4	45	7.38	7.69	8.03	8.41	9.28	
08-00527-00407	8	0.6	0.8	0.76	12°	4	45	8.42	8.78	9.17	9.60	10.61	
08-00527-00409	10	0.6	0.8	0.76	12°	4	45	10.50	10.96	11.45	12.00	13.26	
08-00527-00410	12	0.6	0.8	0.76	12°	4	45	12.59	13.14	13.73	14.39	15.92	
08-00527-00450	R0.45	2	0.65	0.9	0.86	12°	4	45	2.16	2.24	2.33	2.42	2.64
08-00527-00451		4	0.65	0.9	0.86	12°	4	45	4.25	4.42	4.61	4.82	5.30
08-00527-00452		6	0.65	0.9	0.86	12°	4	45	6.34	6.60	6.89	7.21	7.96
08-00527-00453		8	0.65	0.9	0.86	12°	4	45	8.42	8.78	9.17	9.61	10.62
08-00527-00500		2	0.75	1	0.95	12°	4	45	2.18	2.26	2.34	2.43	2.65
08-00527-00514	2.5	0.75	1	0.95	12°	4	45	2.71	2.81	2.92	3.04	3.32	
08-00527-00501	3	0.75	1	0.95	12°	4	45	3.22	3.35	3.48	3.63	3.97	
● 08-00528-00501	3	0.75	1	0.95	12°	6	50	3.22	3.35	3.48	3.63	3.97	
08-00527-00502	4	0.75	1	0.95	12°	4	45	4.27	4.44	4.62	4.83	5.30	
● 08-00528-00502	4	0.75	1	0.95	12°	6	50	4.27	4.44	4.62	4.83	5.30	
08-00527-00503	5	0.75	1	0.95	12°	4	45	5.31	5.53	5.76	6.02	6.63	
● 08-00528-00503	5	0.75	1	0.95	12°	6	50	5.31	5.53	5.76	6.02	6.63	
08-00527-00504	6	0.75	1	0.95	12°	4	45	6.35	6.62	6.90	7.22	7.96	
● 08-00528-00504	6	0.75	1	0.95	12°	6	50	6.35	6.62	6.90	7.22	7.96	
08-00527-00505	7	0.75	1	0.95	12°	4	45	7.40	7.71	8.04	8.42	9.28	
● 08-00528-00505	7	0.75	1	0.95	12°	6	50	7.40	7.71	8.04	8.42	9.28	
08-00527-00506	8	0.75	1	0.95	12°	4	45	8.44	8.79	9.18	9.61	10.61	
● 08-00528-00506	8	0.75	1	0.95	12°	6	50	8.44	8.79	9.18	9.61	10.61	
08-00527-00507	9	0.75	1	0.95	12°	4	45	9.48	9.88	10.32	10.81	11.94	
08-00527-00508	10	0.75	1	0.95	12°	4	45	10.52	10.97	11.46	12.01	13.26	
● 08-00528-00508	10	0.75	1	0.95	12°	6	50	10.52	10.97	11.46	12.01	13.26	
08-00527-00509	12	0.75	1	0.95	12°	4	45	12.61	13.15	13.75	14.40	15.92	
08-00527-00515	13	0.75	1	0.95	12°	4	45	13.66	14.25	14.90	15.62	17.29	
08-00527-00510	14	0.75	1	0.95	12°	4	50	14.70	15.33	16.03	16.79	18.57	
08-00527-00511	16	0.75	1	0.95	12°	4	50	16.78	17.51	18.31	19.18	21.23	
08-00527-00512	18	0.75	1	0.95	12°	4	55	18.87	19.69	20.59	21.58	23.88	
08-00527-00513	20	0.75	1	0.95	12°	4	55	20.95	21.87	22.87	23.97	26.54	
● 08-00528-00516	22	0.75	1	0.95	12°	6	60	22.82	23.59	24.43	25.33	27.34	
08-00527-00600	R0.6	2.4	0.9	1.2	1.15	12°	4	45	2.59	2.68	2.78	2.89	3.15
08-00527-00601		4	0.9	1.2	1.15	12°	4	45	4.26	4.43	4.61	4.81	5.27
08-00527-00602		6	0.9	1.2	1.15	12°	4	45	6.35	6.61	6.89	7.20	7.92
08-00527-00603		8	0.9	1.2	1.15	12°	4	45	8.43	8.79	9.17	9.59	10.58
08-00527-00604		10	0.9	1.2	1.15	12°	4	45	10.52	10.96	11.45	11.99	13.23
08-00527-00605		12	0.9	1.2	1.15	12°	4	45	12.61	13.14	13.73	14.38	15.89
● 08-00527-00606		14	0.9	1.2	1.15	12°	4	50	14.69	15.32	16.01	16.77	18.54
● 08-00527-00607		16	0.9	1.2	1.15	12°	4	50	16.78	17.50	18.29	19.17	21.20



• NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30'	1°	1° 30'	2°	3°
08-00527-00700	R0.7	8	1	1.4	1.35	12°	4	45	8.44	8.78	9.17	9.59	10.57
08-00527-00701		12	1	1.4	1.35	12°	4	50	12.61	13.14	13.73	14.38	15.90
08-00527-00702		16	1	1.4	1.35	12°	4	50	16.78	17.50	18.30	19.17	21.22
08-00527-00750	R0.75	3	1.1	1.5	1.45	12°	4	45	3.21	3.33	3.45	3.58	3.89
08-00527-00751		4	1.1	1.5	1.45	12°	4	45	4.26	4.41	4.59	4.78	5.22
08-00527-00753		6	1.1	1.5	1.45	12°	4	45	6.34	6.59	6.87	7.17	7.88
08-00528-00753		6	1.1	1.5	1.45	12°	6	50	6.34	6.59	6.87	7.17	7.88
08-00527-00755		8	1.1	1.5	1.45	12°	4	45	8.43	8.77	9.15	9.56	10.53
08-00528-00755		8	1.1	1.5	1.45	12°	6	50	8.43	8.77	9.15	9.56	10.53
08-00527-00757		10	1.1	1.5	1.45	12°	4	45	10.51	10.95	11.43	11.96	13.18
08-00527-00758		12	1.1	1.5	1.45	12°	4	45	12.60	13.13	13.71	14.35	15.84
08-00527-00759		14	1.1	1.5	1.45	12°	4	50	14.69	15.31	15.99	16.74	18.49
08-00527-00760		16	1.1	1.5	1.45	12°	4	50	16.77	17.49	18.27	19.14	21.15
08-00527-00761		18	1.1	1.5	1.45	12°	4	55	18.86	19.68	20.57	21.56	23.87
08-00527-00762		20	1.1	1.5	1.45	12°	4	55	20.94	21.85	22.84	23.92	Free
08-00527-00763		22	1.1	1.5	1.45	12°	4	60	23.03	24.02	25.12	26.32	Free
08-00527-00764		30	1.1	1.5	1.45	12°	4	70	31.37	32.74	34.24	35.89	Free
08-00527-00803		R0.8	8	1.2	1.6	1.55	12°	4	45	8.43	8.77	9.14	9.55
08-00527-00805	12		1.2	1.6	1.55	12°	4	45	12.60	13.13	13.70	14.34	15.82
08-00527-00807	16		1.2	1.6	1.55	12°	4	50	16.77	17.48	18.27	19.13	21.13
08-00527-00809	20	1.2	1.6	1.55	12°	4	55	20.94	21.84	22.83	23.91	Free	
08-00527-01001	R1	3	1.5	2	1.94	12°	4	45	3.23	3.33	3.44	3.56	3.85
08-00527-01002		4	1.5	2	1.94	12°	4	45	4.27	4.42	4.58	4.76	5.17
08-00528-01002		4	1.5	2	1.94	12°	6	50	4.27	4.42	4.58	4.76	5.17
08-00527-01004		6	1.5	2	1.94	12°	4	45	6.36	6.60	6.86	7.15	7.83
08-00528-01004		6	1.5	2	1.94	12°	6	50	6.36	6.60	6.86	7.15	7.83
08-00527-01006		8	1.5	2	1.94	12°	4	45	8.44	8.78	9.14	9.54	10.48
08-00528-01006		8	1.5	2	1.94	12°	6	50	8.44	8.78	9.14	9.54	10.48
08-00527-01008		10	1.5	2	1.94	12°	4	45	10.53	10.95	11.42	11.94	13.14
08-00528-01008		10	1.5	2	1.94	12°	6	50	10.53	10.95	11.42	11.94	13.14
08-00527-01010		12	1.5	2	1.94	12°	4	45	12.61	13.13	13.70	14.33	15.79
08-00527-01020		13	1.5	2	1.94	12°	4	45	13.66	14.23	14.86	15.55	17.16
08-00527-01011		14	1.5	2	1.94	12°	4	50	14.70	15.31	15.98	16.72	18.45
08-00527-01012		16	1.5	2	1.94	12°	4	50	16.78	17.49	18.27	19.12	Free
08-00528-01012		16	1.5	2	1.94	12°	6	60	16.78	17.49	18.27	19.12	Free
08-00527-01013		18	1.5	2	1.94	12°	4	55	18.87	19.67	20.55	21.51	Free
08-00527-01014	20	1.5	2	1.94	12°	4	55	20.96	21.85	22.83	23.90	Free	
08-00527-01015	22	1.5	2	1.94	12°	4	60	23.04	24.03	25.11	26.30	Free	
08-00527-01016	25	1.5	2	1.94	12°	4	65	26.17	27.30	28.53	29.89	Free	
08-00528-01016	25	1.5	2	1.94	12°	6	80	26.17	27.30	28.53	29.89	Free	
08-00527-01017	30	1.5	2	1.94	12°	4	70	31.38	32.74	34.23	Free	Free	
08-00527-01018	35	1.5	2	1.94	12°	4	70	36.60	38.19	39.93	Free	Free	
08-00527-01019	40	1.5	2	1.94	12°	4	90	41.81	43.64	Free	Free	Free	
08-00527-01250	R1.25	6	2.3	2.5	2.4	12°	4	45	6.45	6.68	6.94	7.22	7.89
08-00527-01251		8	2.3	2.5	2.4	12°	4	45	8.54	8.86	9.22	9.62	10.55
08-00527-01252		10	2.3	2.5	2.4	12°	4	45	10.62	11.04	11.49	12.00	13.18
08-00527-01253		15	2.3	2.5	2.4	12°	4	50	15.83	16.48	17.20	17.98	Free
08-00527-01254		20	2.3	2.5	2.4	12°	4	55	21.04	21.93	22.90	Free	Free
08-00527-01255		25	2.3	2.5	2.4	12°	4	65	26.26	27.38	28.60	Free	Free
08-00527-01256		30	2.3	2.5	2.4	12°	4	70	31.47	32.82	Free	Free	Free
08-00527-01257	35	2.3	2.5	2.4	12°	4	70	36.69	38.27	Free	Free	Free	

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MRBH230



• NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ <sub>2</sub> ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30'	1°	1° 30'	2°	3°
08-00527-01501	R1.5	6	2.5	3	2.85	12°	6	60	6.56	6.78	7.03	7.31	7.95
08-00527-01502		8	2.5	3	2.85	12°	6	60	8.64	8.96	9.31	9.70	10.60
08-00527-01503		10	2.5	3	2.85	12°	6	60	10.73	11.14	11.59	12.09	13.26
08-00527-01504		12	2.5	3	2.85	12°	6	60	12.81	13.32	13.88	14.49	15.91
08-00527-01505		14	2.5	3	2.85	12°	6	60	14.90	15.50	16.16	16.88	18.57
08-00527-01506		16	2.5	3	2.85	12°	6	60	16.98	17.68	18.44	19.27	21.22
08-00527-01508		20	2.5	3	2.85	12°	6	65	21.16	22.04	23.00	24.06	26.53
08-00527-01509		25	2.5	3	2.85	12°	6	65	26.37	27.48	28.70	30.04	Free
08-00527-01510		30	2.5	3	2.85	12°	6	70	31.58	32.93	34.40	36.03	Free
08-00527-01511		35	2.5	3	2.85	12°	6	80	36.80	38.38	40.11	42.01	Free
08-00527-01512	40	2.5	3	2.85	12°	6	90	42.01	43.83	45.81	Free	Free	
08-00527-01750	R1.75	15	2.8	3.5	3.35	12°	6	60	15.94	16.58	17.28	18.05	19.86
08-00527-01754		20	2.8	3.5	3.35	12°	6	65	21.14	22.01	22.96	24.01	Free
08-00527-01751		25	2.8	3.5	3.35	12°	6	65	26.37	27.47	28.69	30.03	Free
08-00527-01755		30	2.8	3.5	3.35	12°	6	70	31.57	32.91	34.37	35.98	Free
08-00527-01752		35	2.8	3.5	3.35	12°	6	80	36.79	38.37	40.10	Free	Free
08-00527-01756		40	2.8	3.5	3.35	12°	6	90	42.00	43.80	45.77	Free	Free
08-00527-01753	45	2.8	3.5	3.35	12°	6	90	47.22	49.27	Free	Free	Free	
08-00527-02000	R2	8	3	4	3.8	-	4	65	8.74	9.05	9.38	9.74	10.60
08-00527-02001		8	3	4	3.8	12°	6	65	8.74	9.05	9.38	9.74	10.60
08-00527-02002		10	3	4	3.8	12°	6	65	10.83	11.22	11.66	12.14	13.25
08-00527-02003		12	3	4	3.8	12°	6	65	12.91	13.40	13.94	14.53	15.91
08-00527-02101		14	3	4	3.8	12°	6	65	15.00	15.58	16.22	16.92	18.56
08-00527-02004		15	3	4	3.8	12°	6	65	16.04	16.67	17.36	18.12	19.89
08-00527-02006		20	3	4	3.8	12°	6	65	21.26	22.12	23.06	24.10	Free
08-00527-02008		25	3	4	3.8	12°	6	70	26.47	27.57	28.77	30.09	Free
08-00527-02010		30	3	4	3.8	12°	6	70	31.68	33.01	34.47	Free	Free
08-00527-02011		35	3	4	3.8	12°	6	80	36.90	38.46	40.17	Free	Free
08-00527-02012	40	3	4	3.8	12°	6	85	42.11	43.91	Free	Free	Free	
08-00527-02013	45	3	4	3.8	12°	6	90	47.33	49.36	Free	Free	Free	
08-00527-02014	50	3	4	3.8	12°	6	100	52.54	54.80	Free	Free	Free	
08-00527-02500	R2.5	10	3.5	5	4.8	12°	6	70	10.81	11.18	11.59	12.04	Free
08-00527-02501		15	3.5	5	4.8	12°	6	70	16.02	16.63	17.29	Free	Free
08-00527-02502		20	3.5	5	4.8	12°	6	70	21.24	22.08	Free	Free	Free
08-00527-02503		25	3.5	5	4.8	12°	6	70	26.45	27.52	Free	Free	Free
08-00527-02504		30	3.5	5	4.8	12°	6	80	31.66	Free	Free	Free	Free
08-00527-02506		40	3.5	5	4.8	12°	6	90	42.09	Free	Free	Free	Free
08-00527-03000	R3	10	6	6	5.8	-	6	70	Free	Free	Free	Free	Free
08-00527-03001		15	6	6	5.8	-	6	70	Free	Free	Free	Free	Free
08-00527-03002		20	6	6	5.8	-	6	70	Free	Free	Free	Free	Free
08-00527-03003		25	6	6	5.8	-	6	70	Free	Free	Free	Free	Free
08-00527-03004		30	6	6	5.8	-	6	80	Free	Free	Free	Free	Free
08-00527-03007		35	6	6	5.8	-	6	85	Free	Free	Free	Free	Free
08-00527-03005		40	6	6	5.8	-	6	90	Free	Free	Free	Free	Free
08-00527-03006		50	6	6	5.8	-	6	120	Free	Free	Free	Free	Free
08-00527-03008	60	6	6	5.8	-	6	120	Free	Free	Free	Free	Free	

Parametri di taglio raccomandati

Recommended Milling Conditions

**MRBH230**

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate**  
Plane  
Long Neck  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Sferiche**  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche**  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Toriche**  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Frese**  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Materiale Work Material			Acciaio temprato Hardened Steels 1.2343•STAVAX•1.2344 (~52HRC)				Acciaio temprato Hardened Steels 1.2379 (~62HRC)				Acciaio HSS High Speed Tool Steels ASP•M2•1.3343 (~65HRC)			
R-Raggio Radius	Lungh. effettiva Effective Length	Rapporto L/D	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
			ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>
0.05	0.2	2.0	0.003	0.005	120	40,000	0.002	0.005	100	40,000	0.002	0.003	70	40,000
	0.3	3.0	0.003	0.005	100	40,000	0.002	0.005	70	40,000	0.002	0.003	50	40,000
	0.5	5.0	0.002	0.003	70	40,000	0.001	0.003	50	40,000	0.001	0.002	30	40,000
0.075	0.3	2.0	0.003	0.005	180	40,000	0.002	0.005	150	40,000	0.002	0.003	100	40,000
	0.5	3.3	0.003	0.005	150	40,000	0.002	0.005	120	40,000	0.002	0.003	70	40,000
	1	6.7	0.002	0.003	70	40,000	0.001	0.003	50	40,000	0.001	0.002	30	40,000
0.1	0.3	1.5	0.01	0.01	350	40,000	0.006	0.005	300	40,000	0.003	0.003	200	40,000
	0.5	2.5	0.008	0.01	320	40,000	0.005	0.005	280	40,000	0.003	0.003	180	40,000
	0.75	3.8	0.005	0.01	280	40,000	0.003	0.005	200	40,000	0.002	0.003	150	40,000
	1	5.0	0.003	0.005	250	40,000	0.002	0.003	160	40,000	0.001	0.002	120	40,000
	1.25	6.3	0.003	0.005	180	40,000	0.002	0.003	140	40,000	0.001	0.002	100	40,000
	1.5	7.5	0.003	0.005	150	40,000	0.002	0.003	120	40,000	0.001	0.002	80	40,000
	1.75	8.8	0.002	0.003	120	40,000	0.001	0.002	100	40,000	0.001	0.002	60	40,000
	2	10.0	0.002	0.003	100	40,000	0.001	0.002	80	40,000	0.001	0.001	50	40,000
	2.5	12.5	0.001	0.002	70	40,000	0.001	0.001	60	40,000	0.001	0.001	40	40,000
	3	15.0	0.001	0.001	50	40,000	0.001	0.001	40	40,000	0.001	0.001	30	40,000
0.15	0.5	1.7	0.01	0.015	350	40,000	0.007	0.01	300	40,000	0.003	0.005	280	40,000
	0.6	2.0	0.007	0.01	350	40,000	0.005	0.007	300	40,000	0.003	0.005	250	40,000
	0.75	2.5	0.007	0.01	330	40,000	0.005	0.007	280	40,000	0.003	0.005	230	40,000
	1	3.3	0.007	0.01	320	40,000	0.005	0.007	250	40,000	0.003	0.005	200	40,000
	1.25	4.2	0.005	0.007	280	40,000	0.003	0.005	200	40,000	0.002	0.003	160	40,000
	1.5	5.0	0.005	0.007	230	40,000	0.003	0.005	180	40,000	0.002	0.003	120	40,000
	1.75	5.8	0.003	0.005	180	40,000	0.002	0.003	150	40,000	0.002	0.002	100	40,000
	2	6.7	0.003	0.005	150	40,000	0.002	0.003	120	40,000	0.002	0.002	90	40,000
	2.25	7.5	0.002	0.003	120	40,000	0.001	0.002	100	40,000	0.001	0.001	80	40,000
	2.5	8.3	0.002	0.003	100	40,000	0.001	0.002	80	40,000	0.001	0.001	70	40,000
	3	10.0	0.001	0.003	80	40,000	0.001	0.002	70	40,000	0.001	0.001	60	40,000
0.2	0.5	1.3	0.03	0.05	800	40,000	0.03	0.03	720	40,000	0.009	0.02	580	40,000
	0.8	2.0	0.02	0.05	800	40,000	0.02	0.03	720	40,000	0.008	0.02	580	40,000
	1	2.5	0.02	0.05	800	40,000	0.02	0.03	720	40,000	0.008	0.02	580	40,000
	1.5	3.8	0.01	0.03	620	40,000	0.01	0.02	500	40,000	0.005	0.01	400	40,000
	2	5.0	0.01	0.02	500	40,000	0.01	0.01	380	40,000	0.005	0.007	300	40,000
	2.5	6.3	0.007	0.01	420	40,000	0.005	0.007	300	40,000	0.003	0.005	260	40,000
	3	7.5	0.007	0.01	300	40,000	0.005	0.007	240	40,000	0.003	0.005	200	40,000
	3.5	8.8	0.005	0.007	230	40,000	0.003	0.005	160	40,000	0.002	0.003	120	40,000
	4	10.0	0.005	0.005	160	30,000	0.003	0.003	120	30,000	0.002	0.003	90	30,000
	4.5	11.3	0.003	0.005	100	30,000	0.002	0.003	80	30,000	0.001	0.002	60	30,000
0.25	1	2.0	0.03	0.05	1,000	40,000	0.02	0.03	860	40,000	0.01	0.02	650	40,000
	1.5	3.0	0.02	0.05	850	40,000	0.01	0.03	720	40,000	0.007	0.02	520	40,000
	2	4.0	0.02	0.03	720	40,000	0.01	0.02	650	40,000	0.007	0.01	400	40,000
	2.5	5.0	0.01	0.02	600	40,000	0.007	0.01	530	40,000	0.005	0.007	360	40,000
	3	6.0	0.01	0.02	500	40,000	0.007	0.01	420	40,000	0.005	0.007	320	40,000
	3.5	7.0	0.007	0.01	420	40,000	0.005	0.007	360	40,000	0.003	0.005	280	40,000
	4	8.0	0.007	0.01	350	40,000	0.005	0.007	300	40,000	0.003	0.005	260	40,000
	4.5	9.0	0.005	0.005	300	40,000	0.003	0.003	260	40,000	0.002	0.003	220	40,000
	5	10.0	0.005	0.005	240	40,000	0.003	0.003	200	40,000	0.002	0.003	180	40,000
	5.5	11.0	0.003	0.005	200	40,000	0.002	0.003	160	40,000	0.001	0.002	120	40,000
0.25	6	12.0	0.002	0.003	120	40,000	0.001	0.002	80	40,000	0.001	0.002	70	40,000
	8	16.0	0.002	0.002	75	40,000	0.001	0.002	60	40,000	0.001	0.002	50	40,000

Materiale Work Material			Acciaio temprato Hardened Steels 1.2343•STAVAX•1.2344 (~52HRC)				Acciaio temprato Hardened Steels 1.2379 (~62HRC)				Acciaio HSS High Speed Tool Steels ASP•M2•1.3343 (~65HRC)			
R-Raggio Radius	Lunghezza effettiva Effective Length	Rapporto L/D	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
			Radius	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>	a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>	a <sub>p</sub> mm	a <sub>e</sub> mm	mm/min	min <sup>-1</sup>
0.3	1	1.7	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000
	1.5	2.5	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000
	2	3.3	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000
	2.5	4.2	0.03	0.05	1,200	40,000	0.02	0.04	840	40,000	0.02	0.03	640	30,000
	3	5.0	0.03	0.05	1,200	40,000	0.02	0.04	840	40,000	0.02	0.03	640	30,000
	3.5	5.8	0.02	0.03	1,000	40,000	0.01	0.03	620	40,000	0.01	0.02	480	30,000
	4	6.7	0.02	0.03	1,000	40,000	0.01	0.03	620	40,000	0.01	0.02	480	30,000
	4.5	7.5	0.02	0.03	900	35,000	0.01	0.02	580	35,000	0.008	0.015	430	30,000
	5	8.3	0.01	0.02	720	30,000	0.007	0.015	500	30,000	0.007	0.01	400	30,000
	5.5	9.2	0.01	0.015	700	30,000	0.007	0.01	450	30,000	0.005	0.008	360	30,000
	6	10.0	0.007	0.01	500	30,000	0.005	0.007	380	30,000	0.004	0.006	320	30,000
	7	11.7	0.005	0.007	400	25,000	0.003	0.005	300	25,000	0.003	0.003	260	20,000
8	13.3	0.003	0.005	320	25,000	0.003	0.003	260	25,000	0.002	0.003	220	20,000	
9	15.0	0.003	0.003	280	25,000	0.003	0.002	220	25,000	0.001	0.002	160	20,000	
10	16.7	0.002	0.003	150	20,000	0.002	0.002	120	20,000	0.001	0.002	100	18,000	
12	20.0	0.002	0.002	80	20,000	0.002	0.002	60	20,000	0.001	0.002	50	18,000	
0.35	2	2.9	0.07	0.1	1,600	40,000	0.05	0.08	1,300	40,000	0.03	0.07	1,000	30,000
	4	5.7	0.04	0.06	1,300	40,000	0.03	0.04	820	40,000	0.015	0.02	600	30,000
	6	8.6	0.01	0.03	800	30,000	0.01	0.015	500	30,000	0.006	0.01	420	25,000
	8	11.4	0.006	0.01	520	25,000	0.005	0.006	380	30,000	0.004	0.006	250	20,000
0.4	2	2.5	0.1	0.15	2,000	40,000	0.07	0.1	1,600	40,000	0.05	0.1	1,200	30,000
	3	3.8	0.1	0.15	2,000	40,000	0.07	0.1	1,600	40,000	0.05	0.05	1,200	30,000
	4	5.0	0.05	0.1	1,600	40,000	0.05	0.05	1,200	40,000	0.03	0.05	860	30,000
	5	6.3	0.05	0.05	1,600	40,000	0.03	0.05	1,000	40,000	0.02	0.03	620	30,000
	6	7.5	0.03	0.05	1,200	30,000	0.02	0.03	760	30,000	0.01	0.02	560	25,000
	7	8.8	0.02	0.03	1,000	30,000	0.01	0.02	680	30,000	0.007	0.01	520	25,000
	8	10.0	0.01	0.02	820	30,000	0.007	0.01	600	30,000	0.005	0.01	480	25,000
	10	12.5	0.005	0.005	450	25,000	0.003	0.003	380	25,000	0.002	0.003	320	20,000
0.45	2	2.2	0.1	0.2	2,200	40,000	0.08	0.15	1,800	30,000	0.06	0.1	1,300	30,000
	4	4.4	0.05	0.12	1,800	40,000	0.04	0.08	1,400	30,000	0.03	0.05	900	25,000
	6	6.7	0.035	0.05	1,200	30,000	0.025	0.035	800	25,000	0.015	0.025	600	20,000
	8	8.9	0.025	0.04	1,000	30,000	0.015	0.025	700	23,000	0.008	0.015	500	20,000
0.5	2	2.0	0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000
	2.5	2.5	0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000
	3	3.0	0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000
	4	4.0	0.1	0.2	2,500	40,000	0.05	0.15	1,800	30,000	0.05	0.1	1,200	25,000
	5	5.0	0.05	0.15	2,000	30,000	0.04	0.1	1,600	25,000	0.03	0.05	920	20,000
	6	6.0	0.05	0.1	1,800	30,000	0.04	0.05	1,200	25,000	0.02	0.05	740	20,000
	7	7.0	0.04	0.06	1,200	30,000	0.03	0.04	950	25,000	0.02	0.03	680	20,000
	8	8.0	0.04	0.06	1,000	30,000	0.03	0.04	860	25,000	0.02	0.03	560	20,000
	9	9.0	0.03	0.05	820	25,000	0.02	0.03	750	20,000	0.01	0.02	500	18,000
	10	10.0	0.03	0.05	750	25,000	0.02	0.03	620	20,000	0.01	0.02	450	18,000
	12	12.0	0.01	0.03	600	20,000	0.007	0.02	520	18,000	0.005	0.01	400	16,000
	13	13.0	0.008	0.02	500	20,000	0.005	0.01	420	18,000	0.003	0.006	350	16,000
14	14.0	0.005	0.01	420	20,000	0.003	0.007	360	18,000	0.002	0.005	320	16,000	
16	16.0	0.005	0.005	300	18,000	0.003	0.005	250	16,000	0.002	0.003	200	14,000	
18	18.0	0.003	0.005	180	18,000	0.002	0.005	120	16,000	0.002	0.002	85	14,000	
20	20.0	0.003	0.003	100	16,000	0.002	0.003	75	14,000	0.002	0.002	60	12,000	

Materiale Work Material			Acciaio temprato Hardened Steels 1.2343•STAVAX•1.2344 (~52HRC)				Acciaio temprato Hardened Steels 1.2379 (~62HRC)				Acciaio HSS High Speed Tool Steels ASP•M2•1.3343 (~65HRC)			
R-Raggio Radius	Lungh. effettiva Effective Length	Rapporto L/D	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
			$\bar{a}_p$ mm	$\bar{a}_e$ mm	mm/min	min <sup>-1</sup>	$\bar{a}_p$ mm	$\bar{a}_e$ mm	mm/min	min <sup>-1</sup>	$\bar{a}_p$ mm	$\bar{a}_e$ mm	mm/min	min <sup>-1</sup>
0.6	2.4	2.0	0.1	0.3	2,500	30,000	0.1	0.2	2,000	30,000	0.05	0.1	1,600	25,000
	4	3.3	0.07	0.2	2,500	30,000	0.07	0.2	2,000	30,000	0.05	0.1	1,600	25,000
	6	5.0	0.07	0.1	2,000	30,000	0.05	0.1	1,600	25,000	0.03	0.07	1,200	20,000
	8	6.7	0.05	0.1	1,600	30,000	0.03	0.07	1,200	25,000	0.02	0.05	920	20,000
	10	8.3	0.03	0.07	1,200	20,000	0.02	0.05	860	20,000	0.01	0.03	680	18,000
0.7	12	10.0	0.02	0.05	860	20,000	0.01	0.03	620	20,000	0.007	0.02	480	18,000
	8	5.7	0.12	0.2	2,500	30,000	0.08	0.15	1,800	20,000	0.03	0.08	1,000	20,000
	12	8.6	0.07	0.12	1,400	20,000	0.04	0.08	1,100	18,000	0.015	0.05	700	18,000
0.75	16	11.4	0.02	0.05	700	17,000	0.01	0.03	600	17,000	0.008	0.02	450	16,000
	3	2.0	0.15	0.3	3,000	30,000	0.1	0.3	2,500	30,000	0.1	0.2	2,000	25,000
	4	2.7	0.15	0.3	3,000	30,000	0.1	0.3	2,500	30,000	0.1	0.2	2,000	25,000
	6	4.0	0.15	0.2	3,000	30,000	0.1	0.2	2,000	30,000	0.1	0.1	1,600	25,000
	8	5.3	0.1	0.2	2,500	25,000	0.05	0.2	1,600	25,000	0.05	0.1	1,200	20,000
	10	6.7	0.1	0.1	2,500	25,000	0.05	0.1	1,200	25,000	0.05	0.05	860	20,000
	12	8.0	0.05	0.1	1,800	20,000	0.03	0.1	920	20,000	0.02	0.05	780	18,000
	14	9.3	0.05	0.07	1,200	20,000	0.03	0.05	820	20,000	0.02	0.03	650	18,000
	16	10.7	0.03	0.05	720	18,000	0.02	0.03	650	18,000	0.01	0.02	580	16,000
	18	12.0	0.02	0.04	550	16,000	0.012	0.025	400	16,000	0.008	0.015	400	14,000
0.8	20	13.3	0.01	0.03	450	16,000	0.01	0.02	360	16,000	0.007	0.01	300	14,000
	8	5.0	0.1	0.2	2,500	25,000	0.07	0.15	2,000	20,000	0.05	0.1	1,600	18,000
	12	7.5	0.07	0.1	1,800	20,000	0.05	0.07	1,500	16,000	0.03	0.05	1,200	14,000
	16	10.0	0.03	0.05	720	16,000	0.02	0.03	600	14,000	0.015	0.02	480	12,000
1	20	12.5	0.01	0.03	500	14,000	0.01	0.02	380	12,000	0.01	0.01	300	10,000
	3	1.5	0.2	0.5	3,000	25,000	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000
	4	2.0	0.2	0.5	3,000	25,000	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000
	6	3.0	0.2	0.5	2,500	25,000	0.2	0.3	2,000	25,000	0.15	0.3	1,600	20,000
	8	4.0	0.2	0.3	2,000	20,000	0.1	0.2	1,600	18,000	0.1	0.2	1,200	16,000
	10	5.0	0.1	0.3	2,000	18,000	0.1	0.2	1,600	16,000	0.1	0.1	1,200	14,000
	12	6.0	0.1	0.2	1,600	16,000	0.1	0.1	1,200	14,000	0.05	0.1	940	12,000
	13	6.5	0.08	0.2	1,600	16,000	0.06	0.1	1,200	14,000	0.04	0.08	940	12,000
	14	7.0	0.07	0.15	1,600	16,000	0.05	0.08	1,200	14,000	0.03	0.07	940	12,000
	16	8.0	0.07	0.15	1,600	16,000	0.05	0.08	1,200	14,000	0.03	0.07	940	12,000
	18	9.0	0.05	0.1	1,400	14,000	0.03	0.05	1,000	12,000	0.02	0.03	850	10,000
	20	10.0	0.05	0.1	1,000	14,000	0.03	0.05	820	12,000	0.02	0.03	720	10,000
	22	11.0	0.03	0.08	850	14,000	0.02	0.06	700	12,000	0.02	0.02	600	10,000
	25	12.5	0.03	0.05	680	12,000	0.02	0.03	560	10,000	0.01	0.02	420	8,500
	30	15.0	0.02	0.03	360	12,000	0.01	0.02	300	10,000	0.008	0.01	240	8,500
	35	17.5	0.01	0.02	150	10,000	0.007	0.01	120	8,000	0.005	0.007	100	6,800
	40	20.0	0.005	0.01	100	10,000	0.003	0.005	80	8,000	0.002	0.003	50	6,800
	1.25	6	2.4	0.3	0.4	2,800	20,000	0.2	0.5	2,300	20,000	0.15	0.4	2,000
10		4.0	0.2	0.3	2,500	20,000	0.15	0.2	2,000	20,000	0.1	0.15	1,600	18,000
15		6.0	0.1	0.2	2,000	18,000	0.07	0.15	1,600	16,000	0.05	0.1	1,200	14,000
20		8.0	0.07	0.15	1,500	16,000	0.05	0.1	1,200	14,000	0.03	0.05	1,000	10,000
25		10.0	0.05	0.1	1,000	14,000	0.03	0.07	850	12,000	0.02	0.03	720	8,000
30		12.0	0.03	0.07	720	12,000	0.02	0.05	640	10,000	0.01	0.02	580	7,000
35	14.0	0.02	0.03	450	10,000	0.01	0.02	400	8,500	0.007	0.01	320	6,200	

Materiale Work Material			Acciaio temprato Hardened Steels 1.2343•STAVAX•1.2344 (~52HRC)				Acciaio temprato Hardened Steels 1.2379 (~62HRC)				Acciaio HSS High Speed Tool Steels ASP•M2•1.3343 (~65HRC)			
R-Raggio Radius	Lungh. effettiva Effective Length	Rapporto L/D L/D	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed
			ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>
1.5	6	2.0	0.2	0.8	3,000	20,000	0.2	0.6	2,500	18,000	0.2	0.5	2,000	14,000
	8	2.7	0.2	0.8	3,000	20,000	0.2	0.6	2,500	18,000	0.2	0.5	2,000	14,000
	10	3.3	0.2	0.6	2,500	20,000	0.2	0.4	2,000	18,000	0.1	0.3	1,500	14,000
	12	4.0	0.2	0.6	2,500	20,000	0.2	0.4	2,000	18,000	0.1	0.3	1,500	14,000
	14	4.7	0.1	0.4	2,000	18,000	0.1	0.3	1,600	16,000	0.1	0.2	1,200	12,000
	16	5.3	0.1	0.4	2,000	18,000	0.1	0.3	1,600	16,000	0.1	0.2	1,200	12,000
	20	6.7	0.1	0.3	1,600	18,000	0.1	0.2	1,200	16,000	0.1	0.1	960	12,000
	25	8.3	0.1	0.2	1,200	16,000	0.07	0.15	920	14,000	0.05	0.07	800	10,000
	30	10.0	0.07	0.1	750	14,000	0.05	0.07	640	12,000	0.03	0.05	600	8,600
	35	11.7	0.05	0.1	620	12,000	0.03	0.07	500	10,000	0.02	0.05	420	7,200
1.75	40	13.3	0.03	0.07	450	10,000	0.02	0.05	320	8,200	0.01	0.03	260	6,400
	15	4.3	0.25	1	3,000	20,000	0.15	0.5	2,300	16,000	0.13	0.4	1,500	14,000
	20	5.7	0.18	0.6	2,500	18,000	0.1	0.3	1,800	15,000	0.1	0.2	1,200	12,000
	25	7.1	0.12	0.35	1,800	16,000	0.1	0.2	1,600	14,000	0.06	0.12	1,000	10,000
	30	8.6	0.1	0.25	1,500	14,000	0.07	0.15	950	11,000	0.05	0.08	800	9,000
	35	10.0	0.08	0.2	1,200	13,000	0.07	0.12	800	10,000	0.03	0.06	650	7,500
2	40	11.4	0.07	0.1	800	11,000	0.04	0.07	720	9,000	0.02	0.05	450	7,000
	45	12.9	0.06	0.07	700	10,000	0.035	0.05	600	7,500	0.015	0.03	320	6,000
	8	2.0	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000
	10	2.5	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000
	12	3.0	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000
	14	3.5	0.3	1.5	3,000	20,000	0.2	0.8	2,000	16,000	0.2	0.6	1,600	12,000
	15	3.8	0.3	1.5	3,000	20,000	0.2	0.8	2,000	16,000	0.2	0.6	1,600	12,000
	20	5.0	0.2	1	2,400	16,000	0.1	0.6	1,800	14,000	0.1	0.4	1,400	10,000
	25	6.3	0.2	0.8	1,600	16,000	0.1	0.4	1,200	14,000	0.1	0.2	1,000	10,000
	30	7.5	0.1	0.3	1,600	14,000	0.07	0.2	1,200	10,000	0.05	0.15	1,000	8,200
2.5	35	8.8	0.1	0.2	1,200	14,000	0.07	0.15	1,000	10,000	0.05	0.1	820	8,200
	40	10.0	0.07	0.15	1,200	12,000	0.05	0.1	1,000	8,600	0.03	0.07	820	6,800
	45	11.3	0.07	0.1	750	12,000	0.05	0.07	620	8,600	0.03	0.05	500	6,800
	50	12.5	0.05	0.08	550	10,000	0.03	0.05	500	7,500	0.02	0.03	420	5,500
	10	2.0	0.3	1.5	3,000	18,000	0.2	1.2	2,500	12,000	0.2	0.7	2,000	9,200
	15	3.0	0.3	1.5	3,000	18,000	0.2	1.2	2,500	12,000	0.2	0.7	2,000	9,200
	20	4.0	0.3	1.2	3,000	15,000	0.2	1	2,000	10,000	0.15	0.5	1,600	8,000
	25	5.0	0.2	1	2,500	15,000	0.15	0.8	1,800	8,600	0.1	0.3	1,200	7,200
3	30	6.0	0.2	0.8	2,000	12,000	0.15	0.5	1,500	7,600	0.1	0.2	860	6,400
	40	8.0	0.1	0.2	1,200	10,000	0.07	0.15	1,000	6,800	0.05	0.1	650	5,500
	10	1.7	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
	15	2.5	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
	20	3.3	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
	25	4.2	0.3	1.5	3,000	16,000	0.2	1	2,000	8,000	0.15	0.7	1,500	7,000
Note	30	5.0	0.2	1.5	3,000	14,000	0.2	1	2,000	7,200	0.15	0.7	1,500	6,500
	40	6.7	0.2	1	1,800	12,000	0.15	0.6	1,200	6,400	0.1	0.4	1,000	5,200
	50	8.3	0.1	0.6	1,200	8,200	0.1	0.3	860	4,800	0.05	0.2	620	4,000

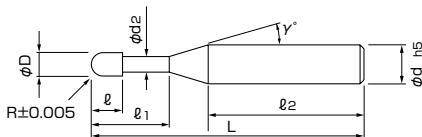
※Profondità di taglio: ap = Profondità di taglio assiale ae = Profondità di taglio radiale.  
 ※Vi raccomandiamo di usare lubrificazione minimale.  
 ※Regolare con la stessa proporzione giri ed avanzamento.  
 ※Regolare le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.  
 ※La sporgenza della fresa fuori dal mandrino deve essere la minore possibile.  
 ※Depth of Cut: ap=Axial Depth of Cut / ae=Radial Depth of Cut.  
 ※We recommend using oil mist coolant.  
 ※Adjust both spindle speed and feed at the same rate.  
 ※Adjust milling conditions according to the volume of depth of cut and rigidity of machine.  
 ※Length of tool overhang must be as short as possible.



# MRB230SF

MUGEN-COATING 2-Flute Long Neck Ball End Mill with Short Shank

## Frese 2 Tagli sferiche scaricate gambo corto rivestite MUGEN



- Specifiche per mandrini a calettamento a caldo.
- It fits for shrink chuck system.

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell$ ) Lungh. Tagliante Length of Cut	(D) Dia. Dia.	(d2) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	( $\ell_2$ ) Lungh. gambo Shank Length	(L) Lungh. totale Overall Length	La lunghezza utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
										30°	1°	1° 30'	2°	3°
08-00525-00103	R0.1	0.5	0.15	0.2	0.18	15°	4	27.3	35	0.55	0.56	0.58	0.60	0.64
08-00525-00105		0.75	0.15	0.2	0.18	15°	4	27.1	35	0.81	0.83	0.86	0.89	0.95
08-00525-00107		1	0.15	0.2	0.18	15°	4	26.8	35	1.06	1.10	1.13	1.17	1.26
08-00525-00109		1.25	0.15	0.2	0.18	15°	4	26.6	35	1.32	1.37	1.41	1.46	1.57
08-00525-00151	R0.15	0.5	0.2	0.3	0.28	15°	4	27.5	35	0.55	0.56	0.57	0.59	0.63
08-00525-00152		0.6	0.2	0.3	0.28	15°	4	27.4	35	0.65	0.67	0.69	0.71	0.75
08-00525-00153		0.75	0.2	0.3	0.28	15°	4	27.3	35	0.80	0.83	0.85	0.88	0.94
08-00525-00154		1	0.2	0.3	0.28	15°	4	27	35	1.06	1.09	1.13	1.17	1.25
08-00525-00155		1.25	0.2	0.3	0.28	15°	4	26.8	35	1.32	1.36	1.41	1.45	1.56
08-00525-00156		1.5	0.2	0.3	0.28	15°	4	26.5	35	1.58	1.63	1.68	1.74	1.87
08-00525-00157	1.75	0.2	0.3	0.28	15°	4	26.3	35	1.84	1.90	1.96	2.03	2.18	
08-00525-00202	R0.2	0.75	0.3	0.4	0.37	15°	4	27.4	35	0.82	0.84	0.87	0.89	0.95
08-00525-00203		1	0.3	0.4	0.37	15°	4	27.2	35	1.08	1.11	1.14	1.18	1.26
08-00525-00204		1.5	0.3	0.4	0.37	15°	4	26.7	35	1.60	1.65	1.70	1.75	1.88
08-00525-00205		2	0.3	0.4	0.37	15°	4	26.2	35	2.11	2.18	2.25	2.33	2.50
08-00525-00206		2.5	0.3	0.4	0.37	15°	4	25.7	35	2.63	2.72	2.81	2.90	3.13
08-00525-00251	R0.25	1	0.35	0.5	0.46	15°	4	27.3	35	1.10	1.13	1.16	1.19	1.27
08-00525-00252		1.5	0.35	0.5	0.46	15°	4	26.8	35	1.61	1.66	1.71	1.77	1.89
08-00525-00253		2	0.35	0.5	0.46	15°	4	26.3	35	2.13	2.20	2.27	2.34	2.51
08-00525-00254		2.5	0.35	0.5	0.46	15°	4	25.8	35	2.65	2.73	2.82	2.92	3.14
08-00525-00255		3	0.35	0.5	0.46	15°	4	25.3	35	3.16	3.27	3.38	3.49	3.76
08-00525-00301	R0.3	1.5	0.45	0.6	0.56	15°	4	27	35	1.61	1.66	1.71	1.76	1.88
08-00525-00302		2	0.45	0.6	0.56	15°	4	26.5	35	2.13	2.19	2.26	2.34	2.50
08-00525-00303		2.5	0.45	0.6	0.56	15°	4	26	35	2.65	2.73	2.82	2.91	3.12
08-00525-00304		3	0.45	0.6	0.56	15°	4	25.5	35	3.16	3.26	3.37	3.49	3.75
08-00525-00305		3.5	0.45	0.6	0.56	15°	4	25	35	3.68	3.80	3.92	4.06	4.37
08-00525-00306		4	0.45	0.6	0.56	15°	4	29.5	40	4.20	4.33	4.48	4.64	4.99
08-00525-00307		4.5	0.45	0.6	0.56	15°	4	29	40	4.71	4.87	5.03	5.21	5.61
08-00525-00308		5	0.45	0.6	0.56	15°	4	28.5	40	5.23	5.40	5.59	5.79	6.23
08-00525-00309		5.5	0.45	0.6	0.56	15°	4	28	40	5.75	5.94	6.14	6.36	6.85
08-00525-00310		6	0.45	0.6	0.56	15°	4	27.5	40	6.26	6.47	6.70	6.94	7.48
08-00525-00401	R0.4	2	0.6	0.8	0.76	15°	4	26.9	35	2.13	2.19	2.25	2.32	2.48
08-00525-00402		3	0.6	0.8	0.76	15°	4	25.9	35	3.16	3.26	3.36	3.47	3.72
08-00525-00403		4	0.6	0.8	0.76	15°	4	29.9	40	4.19	4.33	4.47	4.62	4.97
08-00525-00404		5	0.6	0.8	0.76	15°	4	28.9	40	5.23	5.40	5.58	5.77	6.21

### Attenzione

Quando ordinate, indicate MRB230SF (R)×( $\ell_1$ ).  
When you order, indicate MRB230SF (R)×( $\ell_1$ ).

\*( $\gamma$ ) è un valore di riferimento.  
\*( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 297.
- Milling condition is recommended on page 297.

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Plane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating  
Frese  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. Tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(ℓ <sub>2</sub> ) Lungh. gambo Shank Length	(L) Lungh. totale Overall Length	La lunghezza utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
										30'	1°	1° 30'	2°	3°
										08-00525-00501	R0.5	3	0.75	1
08-00525-00502	4	0.75	1	0.95	15°	4	25.3	35	4.21	4.34		4.48	4.63	4.97
08-00525-00503	5	0.75	1	0.95	15°	4	29.3	40	5.24	5.41		5.59	5.78	6.21
08-00525-00504	6	0.75	1	0.95	15°	4	28.3	40	6.28	6.48		6.69	6.93	7.45
08-00525-00505	8	0.75	1	0.95	15°	4	26.3	40	8.34	8.62		8.91	9.23	9.94
08-00525-00506	10	0.75	1	0.95	15°	4	24.3	40	10.41	10.76		11.13	11.53	12.42
08-00525-00751	R0.75	3	1.1	1.5	1.45	15°	4	27.2	35	3.17	3.25	3.34	3.44	3.66
08-00525-00752		4	1.1	1.5	1.45	15°	4	26.2	35	4.20	4.32	4.45	4.59	4.91
08-00525-00754		6	1.1	1.5	1.45	15°	4	29.2	40	6.27	6.46	6.67	6.89	7.39
08-00525-00755		8	1.1	1.5	1.45	15°	4	27.2	40	8.34	8.60	8.88	9.19	9.88
08-00525-00756		10	1.1	1.5	1.45	15°	4	25.2	40	10.40	10.74	11.10	11.49	12.36
08-00525-01001		R1	3	1.5	2	1.94	15°	4	28.1	35	3.18	3.25	3.34	3.43
08-00525-01002	4		1.5	2	1.94	15°	4	27.1	35	4.21	4.32	4.45	4.58	4.87
08-00525-01003	6		1.5	2	1.94	15°	4	25.1	35	6.28	6.46	6.66	6.88	7.36
08-00525-01004	8		1.5	2	1.94	15°	4	28.1	40	8.35	8.60	8.88	9.18	9.84
08-00525-01005	10		1.5	2	1.94	15°	4	26.1	40	10.41	10.74	11.10	11.48	12.33
08-00525-01006	12		1.5	2	1.94	15°	4	29.1	45	12.48	12.88	13.31	13.77	14.82
08-00525-01007	14		1.5	2	1.94	15°	4	27.1	45	14.55	15.02	15.53	16.07	17.30
08-00525-01008	16		1.5	2	1.94	15°	4	25.1	45	16.62	17.16	17.75	18.37	19.79
08-00525-01009	18		1.5	2	1.94	15°	4	28.1	50	18.68	19.30	19.96	20.67	Free
08-00525-01010	20		1.5	2	1.94	15°	4	26.1	50	20.75	21.44	22.18	22.97	Free
08-00525-01501	R1.5	6	2.5	3	2.85	15°	4	31.8	40	6.44	6.61	6.79	7.00	7.45
08-00525-01502		8	2.5	3	2.85	15°	4	29.8	40	8.50	8.75	9.01	9.29	9.93
08-00525-01503		10	2.5	3	2.85	15°	4	27.8	40	10.57	10.89	11.23	11.59	Free
08-00525-01504		12	2.5	3	2.85	15°	4	25.8	40	12.64	13.03	13.44	13.89	Free

# Parametri di taglio raccomandati

# MRB230SF

## Recommended Milling Conditions

Materiale Work Material		Acciaio al carbonio • Acciaio pretemprato Carbon Steels • Prehardened Steels C50 • 1.2311 • 1.2738 (~44HRC)				Acciaio temprato Hardened Steels 1.2343 • STAVAX • 1.2344 (46~55HRC)				Acciaio temprato Hardened Steels 1.2379 (56~62HRC)				Flame Copper			
R-Raggio Radius.	Lungh. effettiva Effective Length	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed
		ap mm	ae mm			ap mm	ae mm			ap mm	ae mm			ap mm	ae mm		
0.1	0.5	0.01	0.02	250	20,000~50,000	0.01	0.01	210	20,000~50,000	0.007	0.007	170	20,000~50,000	0.01	0.02	250	20,000~50,000
	0.75	0.007	0.01	250	20,000~50,000	0.005	0.01	210	20,000~50,000	0.004	0.007	170	20,000~50,000	0.01	0.015	250	20,000~50,000
	1	0.005	0.01	250	20,000~50,000	0.003	0.005	210	20,000~50,000	0.002	0.004	170	20,000~50,000	0.008	0.015	250	20,000~50,000
	1.25	0.003	0.01	150	20,000~50,000	0.003	0.005	120	20,000~50,000	0.002	0.004	100	20,000~50,000	0.005	0.015	150	20,000~50,000
0.15	0.5	0.01	0.02	250	20,000~50,000	0.01	0.015	210	20,000~50,000	0.007	0.01	170	20,000~50,000	0.012	0.025	250	20,000~50,000
	0.6	0.01	0.02	250	20,000~50,000	0.01	0.015	210	20,000~50,000	0.007	0.01	170	20,000~50,000	0.012	0.025	250	20,000~50,000
	0.75	0.008	0.02	250	20,000~50,000	0.007	0.012	210	20,000~50,000	0.005	0.008	170	20,000~50,000	0.011	0.02	250	20,000~50,000
	1	0.007	0.01	250	20,000~50,000	0.005	0.01	210	20,000~50,000	0.004	0.007	170	20,000~50,000	0.01	0.02	250	20,000~50,000
	1.25	0.005	0.01	250	20,000~50,000	0.005	0.005	210	20,000~50,000	0.004	0.004	170	20,000~50,000	0.008	0.015	250	20,000~50,000
0.2	0.75	0.02	0.05	800	20,000~50,000	0.02	0.03	650	20,000~50,000	0.015	0.02	560	20,000~50,000	0.03	0.07	800	20,000~50,000
	1	0.02	0.05	800	20,000~50,000	0.02	0.03	650	20,000~50,000	0.012	0.02	560	20,000~50,000	0.03	0.07	800	20,000~50,000
	1.5	0.02	0.03	700	20,000~50,000	0.01	0.02	600	20,000~50,000	0.007	0.015	490	20,000~50,000	0.03	0.05	700	20,000~50,000
	2	0.015	0.02	600	20,000~50,000	0.01	0.015	500	20,000~50,000	0.007	0.01	420	20,000~50,000	0.02	0.03	600	20,000~50,000
0.25	2.5	0.015	0.02	450	20,000~50,000	0.01	0.015	380	20,000~50,000	0.007	0.01	310	20,000~50,000	0.02	0.03	450	20,000~50,000
	1	0.03	0.05	800	20,000~50,000	0.02	0.05	680	20,000~50,000	0.015	0.035	560	20,000~50,000	0.045	0.07	800	20,000~50,000
	1.5	0.03	0.05	700	20,000~50,000	0.02	0.04	600	20,000~50,000	0.015	0.03	490	20,000~50,000	0.04	0.07	700	20,000~50,000
	2	0.02	0.04	600	20,000~50,000	0.02	0.03	510	20,000~50,000	0.015	0.02	420	20,000~50,000	0.03	0.06	600	20,000~50,000
0.3	2.5	0.015	0.04	600	20,000~50,000	0.01	0.03	510	20,000~50,000	0.007	0.02	420	20,000~50,000	0.02	0.06	600	20,000~50,000
	3	0.015	0.035	500	20,000~50,000	0.01	0.025	420	20,000~50,000	0.007	0.015	350	20,000~50,000	0.02	0.05	500	20,000~50,000
	1.5	0.05	0.1	1,200	20,000~50,000	0.05	0.07	1,000	20,000~50,000	0.035	0.05	840	20,000~50,000	0.07	0.12	1,200	20,000~50,000
	2	0.05	0.1	1,200	20,000~50,000	0.04	0.07	1,000	20,000~50,000	0.028	0.05	840	20,000~50,000	0.07	0.12	1,200	20,000~50,000
	2.5	0.035	0.1	1,200	20,000~50,000	0.03	0.06	1,000	20,000~50,000	0.02	0.04	840	20,000~50,000	0.05	0.12	1,200	20,000~50,000
	3	0.025	0.1	1,000	20,000~50,000	0.03	0.05	850	20,000~50,000	0.02	0.035	700	20,000~50,000	0.04	0.1	1,000	20,000~50,000
	3.5	0.025	0.08	1,000	20,000~50,000	0.02	0.05	850	20,000~50,000	0.015	0.035	700	20,000~50,000	0.04	0.1	1,000	20,000~50,000
	4	0.025	0.05	800	20,000~50,000	0.02	0.04	680	20,000~50,000	0.015	0.03	560	20,000~50,000	0.035	0.08	800	20,000~50,000
0.4	4.5	0.025	0.05	750	20,000~50,000	0.01	0.03	630	20,000~50,000	0.007	0.02	520	20,000~50,000	0.035	0.08	750	20,000~50,000
	5	0.02	0.04	500	20,000~30,000	0.01	0.02	420	20,000~30,000	0.007	0.015	350	20,000~30,000	0.03	0.06	500	20,000~30,000
	5.5	0.013	0.02	500	20,000~30,000	0.01	0.01	420	20,000~30,000	0.007	0.007	350	20,000~30,000	0.02	0.03	500	20,000~30,000
	6	0.01	0.02	450	20,000~30,000	0.005	0.01	380	20,000~30,000	0.004	0.007	310	20,000~30,000	0.015	0.03	450	20,000~30,000
0.4	2	0.1	0.15	2,000	20,000~50,000	0.1	0.12	1,700	20,000~50,000	0.07	0.085	1,400	14,000~35,000	0.15	0.2	2,000	20,000~50,000
	3	0.08	0.13	1,700	20,000~50,000	0.08	0.1	1,500	20,000~50,000	0.056	0.065	1,190	14,000~35,000	0.12	0.2	1,700	20,000~50,000
	4	0.05	0.12	1,500	20,000~50,000	0.05	0.08	1,300	20,000~50,000	0.035	0.055	1,000	14,000~35,000	0.1	0.2	1,500	20,000~50,000
	5	0.05	0.1	1,200	20,000~50,000	0.04	0.07	1,000	20,000~50,000	0.03	0.05	840	14,000~35,000	0.08	0.15	1,200	20,000~50,000

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**

Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

Technical Data

**Guida tecnica**

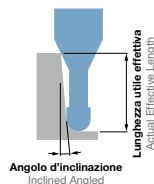
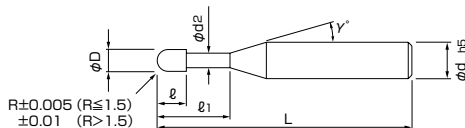
Technical Guidance

Materiale Work Material		Acciaio al carbonio • Acciaio pretemprato Carbon Steels • Prehardened Steels C50 • 1.2311 • 1.2738 (~44HRC)				Acciaio temprato Hardened Steels 1.2343 • STAVAX • 1.2344 (46~55HRC)				Acciaio temprato Hardened Steels 1.2379 (56~62HRC)				Rame Copper			
R-Raggio Radius	Lungh. effettiva Effective Length	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed
		ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>
0.5	3	0.2	0.3	3,000	20,000~50,000	0.12	0.3	2,500	20,000~50,000	0.08	0.21	2,100	14,000~35,000	0.25	0.4	3,000	20,000~50,000
	4	0.15	0.25	2,500	20,000~50,000	0.1	0.2	2,100	20,000~50,000	0.07	0.14	1,700	14,000~35,000	0.2	0.4	2,500	20,000~50,000
	5	0.1	0.25	2,000	20,000~50,000	0.08	0.17	1,700	20,000~50,000	0.055	0.12	1,400	14,000~35,000	0.15	0.35	2,000	20,000~50,000
	6	0.1	0.2	1,500	20,000~50,000	0.07	0.12	1,200	20,000~50,000	0.05	0.085	1,000	14,000~35,000	0.15	0.3	1,500	20,000~50,000
	8	0.05	0.1	1,200	20,000~30,000	0.05	0.08	1,000	20,000~30,000	0.035	0.055	840	14,000~21,000	0.08	0.15	1,200	20,000~30,000
0.75	10	0.03	0.05	800	20,000~30,000	0.03	0.05	680	20,000~30,000	0.02	0.035	560	14,000~21,000	0.05	0.08	800	20,000~30,000
	3	0.2	0.35	4,000	20,000~30,000	0.15	0.3	3,400	20,000~30,000	0.1	0.18	2,800	14,000~21,000	0.3	0.5	4,000	20,000~30,000
	4	0.2	0.3	4,000	20,000~30,000	0.15	0.25	3,400	20,000~30,000	0.09	0.15	2,800	14,000~21,000	0.3	0.45	4,000	20,000~30,000
	6	0.15	0.3	3,000	20,000~30,000	0.12	0.2	2,500	20,000~30,000	0.07	0.12	2,100	14,000~21,000	0.2	0.45	3,000	20,000~30,000
1	8	0.1	0.25	2,400	20,000~30,000	0.08	0.18	2,000	20,000~30,000	0.05	0.11	1,700	14,000~21,000	0.15	0.4	2,400	20,000~30,000
	10	0.08	0.2	1,800	20,000~30,000	0.06	0.12	1,500	20,000~30,000	0.035	0.07	1,200	14,000~21,000	0.12	0.3	1,800	20,000~30,000
	3	0.3	0.5	4,000	20,000~30,000	0.2	0.5	3,400	20,000~30,000	0.12	0.3	2,800	14,000~21,000	0.45	0.7	4,000	20,000~30,000
	4	0.3	0.5	4,000	20,000~30,000	0.2	0.45	3,400	20,000~30,000	0.12	0.27	2,800	14,000~21,000	0.45	0.7	4,000	20,000~30,000
	6	0.25	0.5	3,000	20,000~30,000	0.2	0.4	2,500	20,000~30,000	0.12	0.24	2,100	14,000~21,000	0.38	0.7	3,000	20,000~30,000
	8	0.2	0.3	2,500	16,000~20,000	0.15	0.3	2,100	16,000~20,000	0.09	0.18	1,700	11,200~14,000	0.3	0.45	2,500	16,000~20,000
	10	0.15	0.3	2,500	16,000~20,000	0.1	0.2	2,100	16,000~20,000	0.06	0.12	1,700	11,200~14,000	0.23	0.45	2,500	16,000~20,000
	12	0.13	0.2	1,800	12,000~16,000	0.1	0.15	1,500	12,000~16,000	0.06	0.09	1,300	8,400~11,200	0.2	0.3	1,800	12,000~16,000
	14	0.1	0.2	1,800	12,000~16,000	0.07	0.13	1,500	12,000~16,000	0.04	0.08	1,300	8,400~11,200	0.15	0.3	1,800	12,000~16,000
	16	0.1	0.15	1,600	10,000~14,000	0.06	0.11	1,400	10,000~14,000	0.035	0.065	1,100	7,000~9,800	0.15	0.25	1,600	10,000~14,000
1.5	18	0.07	0.12	1,600	10,000~14,000	0.05	0.1	1,400	10,000~14,000	0.03	0.06	1,100	7,000~9,800	0.1	0.2	1,600	10,000~14,000
	20	0.06	0.1	1,000	8,000~12,000	0.05	0.07	850	8,000~12,000	0.03	0.04	700	5,600~8,400	0.1	0.15	1,000	8,000~12,000
	6	0.35	0.6	4,000	16,000~20,000	0.25	0.5	3,400	16,000~20,000	0.15	0.3	2,800	11,200~14,000	0.5	1	4,000	16,000~20,000
	8	0.3	0.5	4,000	16,000~20,000	0.2	0.5	3,400	16,000~20,000	0.12	0.3	2,800	11,200~14,000	0.45	0.8	4,000	16,000~20,000
Note	※Profondità di taglio: ap = Profondità di taglio assiale, ae = Profondità di taglio radiale. ※Regolare con la stessa proporzione giri ed avanzamento. ※Si raccomanda l'uso di lubrificazione minimale per lavorare acciai temprati. ※Depth of Cut : ap=Axial Depth of Cut / ae=Radial Depth of Cut. ※Adjust both spindle speed and feed at the same rate. ※Oil mist coolant is recommended for the machining of hardened steels.																

# MRB230

MUGEN-COATING 2-Flute Long Neck Ball End Mill

## Frese 2 Tagli sferiche scaricate rivestite MUGEN



- È particolarmente adatta per fresature in profondità e per nervature profonde.
- È possibile ottenere profonde e precise lavorazioni 3D con basse e alte velocità di taglio.
- In totale 282 misure.
- It is very suitable for cutting on narrow and deep rib by long neck end mill.
- It is possible to have deep and precision three-dimensional cutting in the low to high speed range.
- Total 282 sizes!



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
08-00520-20051	R0.05	0.3	0.07	0.1	0.085	12°	4	45	0.34	0.36	0.37	0.39	0.42
08-00520-20052		0.5	0.07	0.1	0.085	12°	4	45	0.55	0.57	0.60	0.63	0.69
● 08-00520-40075	R0.075	0.3	0.1	0.15	0.13	12°	4	45	0.36	0.37	0.39	0.40	0.44
● 08-00520-40076		0.5	0.1	0.15	0.13	12°	4	45	0.57	0.59	0.61	0.64	0.70
● 08-00520-40077		1	0.1	0.15	0.13	12°	4	45	1.09	1.13	1.18	1.24	1.37
08-00520-00101	R0.1	0.5	0.15	0.2	0.18	12°	4	45	0.57	0.59	0.62	0.64	0.70
08-00521-00101		0.5	0.15	0.2	0.18	12°	6	50	0.57	0.59	0.62	0.64	0.70
08-00520-10101		0.75	0.15	0.2	0.18	12°	4	45	0.83	0.87	0.90	0.94	1.04
08-00520-00102		1	0.15	0.2	0.18	12°	4	45	1.09	1.14	1.19	1.24	1.37
08-00521-00102		1	0.15	0.2	0.18	12°	6	50	1.09	1.14	1.19	1.24	1.37
08-00520-10102		1.25	0.15	0.2	0.18	12°	4	45	1.36	1.41	1.47	1.54	1.70
08-00520-00103		1.5	0.15	0.2	0.18	12°	4	45	1.62	1.68	1.76	1.84	2.03
08-00521-00103		1.5	0.15	0.2	0.18	12°	6	50	1.62	1.68	1.76	1.84	2.03
08-00520-10103		1.75	0.15	0.2	0.18	12°	4	45	1.88	1.96	2.04	2.14	2.36
08-00520-00104		2	0.15	0.2	0.18	12°	4	45	2.14	2.23	2.33	2.44	2.70
08-00521-00104	2	0.15	0.2	0.18	12°	6	50	2.14	2.23	2.33	2.44	2.70	
08-00520-00105	R0.15	2.5	0.15	0.2	0.18	12°	4	45	2.66	2.77	2.90	3.04	3.36
08-00520-00106		3	0.15	0.2	0.18	12°	4	45	3.18	3.32	3.47	3.64	4.02
● 08-00520-40151		0.5	0.2	0.3	0.28	12°	4	45	0.56	0.58	0.60	0.63	0.68
08-00520-10151		0.6	0.2	0.3	0.28	12°	4	45	0.68	0.70	0.73	0.75	0.82
● 08-00520-40152		0.75	0.2	0.3	0.28	12°	4	45	0.82	0.86	0.89	0.93	1.01
08-00520-00151		1	0.2	0.3	0.28	12°	4	45	1.09	1.14	1.18	1.23	1.35
08-00521-00151		1	0.2	0.3	0.28	12°	6	50	1.09	1.14	1.18	1.23	1.35
08-00520-30153		1.25	0.2	0.3	0.28	12°	4	45	1.34	1.39	1.45	1.52	1.67
08-00520-10152		1.5	0.2	0.3	0.28	12°	4	45	1.61	1.68	1.75	1.83	2.02
08-00521-00152		1.5	0.2	0.3	0.28	12°	6	50	1.61	1.68	1.75	1.83	2.02
08-00520-30154	1.75	0.2	0.3	0.28	12°	4	45	1.86	1.94	2.02	2.12	2.33	
08-00520-00152	2	0.2	0.3	0.28	12°	4	45	2.14	2.22	2.32	2.43	2.68	
08-00521-00153	2	0.2	0.3	0.28	12°	6	50	2.14	2.22	2.32	2.43	2.68	
08-00520-30155	2.25	0.2	0.3	0.28	12°	4	45	2.38	2.48	2.59	2.71	3.00	
08-00520-10153	2.5	0.2	0.3	0.28	12°	4	45	2.66	2.77	2.89	3.03	3.34	
08-00520-30156	2.75	0.2	0.3	0.28	12°	4	45	2.91	3.03	3.16	3.31	3.66	
08-00520-10154	3	0.2	0.3	0.28	12°	4	45	3.18	3.31	3.46	3.63	4.01	
08-00520-30157	3.5	0.2	0.3	0.28	12°	4	45	3.69	3.85	4.02	4.21	4.65	
08-00520-20151	4	0.2	0.3	0.28	12°	4	45	4.21	4.39	4.59	4.81	5.32	
08-00520-30158	4.5	0.2	0.3	0.28	12°	4	45	4.73	4.94	5.16	5.41	5.98	
08-00520-20152	5	0.2	0.3	0.28	12°	4	45	5.25	5.48	5.73	6.01	6.65	

### Attenzione

Quando ordinate, indicate MRB230 (R)×(ℓ<sub>1</sub>)×(ℓ)×(d).  
When you order, indicate MRB230 (R)×(ℓ<sub>1</sub>)×(ℓ)×(d).

\*(γ) è un valore di riferimento.  
\*(γ) is reference value.

- Per i parametri di taglio vedi pagina 306.
- Per lunghezze totali da 80 in su, la tolleranza del dia. del gambo è h<sub>6</sub>.
- Milling condition is recommended on page 306.
- Overall Length 80 and above, tolerance of Shank Dia. is h<sub>6</sub>.

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Plane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese  
Sagomate

Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance



**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

Rivestite Coating  
Piane Square

Non Rivestite Non-Coating  
Scaricate Piane Long Neck Square

Rivestite Coating  
Sferiche Ball

Non Rivestite Non-Coating  
Scaricate Sferiche Long Neck Ball

Rivestite Coating  
Coniche Taper

Non Rivestite Non-Coating  
Coniche Sferiche Taper Ball

Rivestite Coating  
Toriche Corner R

Non Rivestite Non-Coating  
Scaricate Toriche Long Neck Corner R

Rivestite Coating  
Frese Sagomate Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.					
									30'	1°	1°30'	2°	3°	
● 08-00520-40201	R0.2	0.5	0.3	0.4	0.37	12°	4	45	0.59	0.60	0.62	0.64	0.69	
08-00520-10201		0.75	0.3	0.4	0.37	12°	4	45	0.85	0.88	0.92	0.95	1.04	
08-00520-00201		1	0.3	0.4	0.37	12°	4	45	1.12	1.16	1.20	1.25	1.37	
08-00521-00201		1	0.3	0.4	0.37	12°	6	50	1.12	1.16	1.20	1.25	1.37	
08-00520-00204		1.5	0.3	0.4	0.37	12°	4	45	1.64	1.70	1.77	1.85	2.03	
08-00521-00202		1.5	0.3	0.4	0.37	12°	6	50	1.64	1.70	1.77	1.85	2.03	
08-00520-00202		2	0.3	0.4	0.37	12°	4	45	2.16	2.25	2.34	2.45	2.70	
08-00521-00203		2	0.3	0.4	0.37	12°	6	50	2.16	2.25	2.34	2.45	2.70	
08-00520-00205		2.5	0.3	0.4	0.37	12°	4	45	2.68	2.79	2.91	3.05	3.36	
08-00521-00204		2.5	0.3	0.4	0.37	12°	6	50	2.68	2.79	2.91	3.05	3.36	
08-00520-00203		3	0.3	0.4	0.37	12°	4	45	3.20	3.34	3.48	3.64	4.02	
08-00521-00205		3	0.3	0.4	0.37	12°	6	50	3.20	3.34	3.48	3.64	4.02	
08-00520-10202		3.5	0.3	0.4	0.37	12°	4	45	3.72	3.88	4.05	4.24	4.69	
08-00520-00206		4	0.3	0.4	0.37	12°	4	45	4.24	4.42	4.62	4.84	5.35	
08-00520-10203		4.5	0.3	0.4	0.37	12°	4	45	4.76	4.97	5.19	5.44	6.01	
08-00520-00207		5	0.3	0.4	0.37	12°	4	45	5.29	5.51	5.76	6.04	6.68	
08-00520-10204		5.5	0.3	0.4	0.37	12°	4	45	5.81	6.06	6.33	6.64	7.34	
08-00520-10205		6	0.3	0.4	0.37	12°	4	45	6.33	6.60	6.90	7.23	8.00	
08-00520-30251		R0.25	1	0.35	0.5	0.46	12°	4	45	1.13	1.16	1.21	1.26	1.37
08-00520-10251			1.5	0.35	0.5	0.46	12°	4	45	1.65	1.71	1.78	1.85	2.03
08-00521-00251	1.5		0.35	0.5	0.46	12°	6	50	1.65	1.71	1.78	1.85	2.03	
08-00520-00251	2		0.35	0.5	0.46	12°	4	45	2.17	2.25	2.35	2.45	2.69	
08-00521-00252	2		0.35	0.5	0.46	12°	6	50	2.17	2.25	2.35	2.45	2.69	
08-00520-10252	2.5		0.35	0.5	0.46	12°	4	45	2.69	2.80	2.92	3.05	3.36	
08-00520-10253	3		0.35	0.5	0.46	12°	4	45	3.21	3.34	3.49	3.65	4.02	
08-00520-10254	3.5		0.35	0.5	0.46	12°	4	45	3.73	3.89	4.06	4.25	4.69	
08-00520-00252	4		0.35	0.5	0.46	12°	4	45	4.25	4.43	4.63	4.85	5.35	
08-00521-00253	4		0.35	0.5	0.46	12°	6	50	4.25	4.43	4.63	4.85	5.35	
08-00520-10255	4.5		0.35	0.5	0.46	12°	4	45	4.78	4.98	5.20	5.44	6.01	
08-00520-00255	5		0.35	0.5	0.46	12°	4	45	5.30	5.52	5.77	6.04	6.68	
08-00521-00254	5		0.35	0.5	0.46	12°	6	50	5.30	5.52	5.77	6.04	6.68	
08-00520-10256	5.5		0.35	0.5	0.46	12°	4	45	5.82	6.07	6.34	6.64	7.34	
08-00520-00253	6		0.35	0.5	0.46	12°	4	45	6.34	6.61	6.91	7.24	8.00	
08-00521-00255	6		0.35	0.5	0.46	12°	6	50	6.34	6.61	6.91	7.24	8.00	
08-00520-10257	7		0.35	0.5	0.46	12°	4	45	7.38	7.70	8.05	8.44	9.33	
08-00520-00254	8		0.35	0.5	0.46	12°	4	45	8.42	8.79	9.19	9.63	10.66	
08-00521-00256	8		0.35	0.5	0.46	12°	6	50	8.42	8.79	9.19	9.63	10.66	
08-00521-30251	9		0.35	0.5	0.46	12°	6	55	9.47	9.88	10.33	10.83	11.99	
08-00521-30252	10	0.35	0.5	0.46	12°	6	55	10.51	10.97	11.47	12.03	13.31		
● 08-00520-40301	R0.3	1	0.45	0.6	0.56	12°	4	45	1.13	1.17	1.21	1.25	1.36	
08-00520-10301		1.5	0.45	0.6	0.56	12°	4	45	1.64	1.71	1.77	1.84	2.02	
08-00520-00301		2	0.45	0.6	0.56	12°	4	45	2.17	2.25	2.34	2.44	2.68	
08-00521-00301		2	0.45	0.6	0.56	12°	6	50	2.17	2.25	2.34	2.44	2.68	
08-00520-10302		2.5	0.45	0.6	0.56	12°	4	45	2.69	2.79	2.91	3.04	3.34	



● **NUOVO NEW**

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30'	1°	1° 30'	2°	3°
08-00520-00305	R0.3	3	0.45	0.6	0.56	12°	4	45	3.21	3.34	3.48	3.64	4.01
08-00521-00302		3	0.45	0.6	0.56	12°	6	50	3.21	3.34	3.48	3.64	4.01
08-00520-10303		3.5	0.45	0.6	0.56	12°	4	45	3.73	3.88	4.05	4.24	4.67
08-00520-00302		4	0.45	0.6	0.56	12°	4	45	4.25	4.43	4.62	4.84	5.33
08-00521-00303		4	0.45	0.6	0.56	12°	6	50	4.25	4.43	4.62	4.84	5.33
08-00520-10304		4.5	0.45	0.6	0.56	12°	4	45	4.77	4.97	5.19	5.43	6.00
08-00520-00306		5	0.45	0.6	0.56	12°	4	45	5.23	5.40	5.59	5.79	6.23
08-00520-10305		5.5	0.45	0.6	0.56	12°	4	45	5.82	6.06	6.33	6.63	7.32
08-00520-00303		6	0.45	0.6	0.56	12°	4	45	6.34	6.61	6.90	7.23	7.99
08-00521-00304		6	0.45	0.6	0.56	12°	6	50	6.34	6.61	6.90	7.23	7.99
08-00520-10306		6.5	0.45	0.6	0.56	12°	4	45	6.86	7.15	7.47	7.83	8.65
08-00520-00307		7	0.45	0.6	0.56	12°	4	45	7.38	7.70	8.04	8.43	9.31
08-00520-10307		7.5	0.45	0.6	0.56	12°	4	45	7.90	8.24	8.61	9.02	9.98
08-00520-00304		8	0.45	0.6	0.56	12°	4	45	8.42	8.79	9.18	9.62	10.64
08-00521-00305		8	0.45	0.6	0.56	12°	6	50	8.42	8.79	9.18	9.62	10.64
08-00520-10308		8.5	0.45	0.6	0.56	12°	4	45	8.94	9.33	9.76	10.22	11.31
08-00520-10309		9	0.45	0.6	0.56	12°	4	45	9.47	9.88	10.33	10.82	11.97
08-00520-10310		9.5	0.45	0.6	0.56	12°	4	45	9.99	10.42	10.90	11.42	12.63
08-00520-10311		10	0.45	0.6	0.56	12°	4	45	10.51	10.97	11.47	12.02	13.30
08-00521-00306		10	0.45	0.6	0.56	12°	6	50	10.40	10.75	11.13	11.54	12.45
08-00520-10312	11	0.45	0.6	0.56	12°	4	45	11.55	12.06	12.61	13.21	14.62	
08-00520-10313	12	0.45	0.6	0.56	12°	4	45	12.59	13.14	13.75	14.41	15.95	
● 08-00520-40351	R0.35	2	0.5	0.7	0.66	12°	4	45	2.17	2.25	2.34	2.44	2.67
● 08-00520-40352		4	0.5	0.7	0.66	12°	4	45	4.25	4.43	4.62	4.84	5.33
● 08-00520-40353		6	0.5	0.7	0.66	12°	4	45	6.34	6.61	6.91	7.23	8.00
● 08-00520-40354		8	0.5	0.7	0.66	12°	4	45	8.43	8.79	9.19	9.63	10.66
08-00520-00400	R0.4	2	0.6	0.8	0.76	12°	4	45	2.16	2.24	2.33	2.42	2.65
08-00521-00401		2	0.6	0.8	0.76	12°	6	50	2.16	2.24	2.33	2.42	2.65
08-00520-10401		3	0.6	0.8	0.76	12°	4	45	3.20	3.33	3.47	3.62	3.97
08-00521-00402		3	0.6	0.8	0.76	12°	6	50	3.20	3.33	3.47	3.62	3.97
08-00520-00401		4	0.6	0.8	0.76	12°	4	45	4.25	4.42	4.61	4.82	5.30
08-00521-00403		4	0.6	0.8	0.76	12°	6	50	4.25	4.42	4.61	4.82	5.30
08-00520-00405		5	0.6	0.8	0.76	12°	4	45	5.29	5.51	5.75	6.01	6.63
08-00520-00402		6	0.6	0.8	0.76	12°	4	45	6.33	6.60	6.89	7.21	7.96
08-00521-00404		6	0.6	0.8	0.76	12°	6	50	6.33	6.60	6.89	7.21	7.96
08-00520-00406		7	0.6	0.8	0.76	12°	4	45	7.29	7.53	7.79	8.07	8.70
08-00520-00403		8	0.6	0.8	0.76	12°	4	45	8.42	8.78	9.17	9.60	10.61
08-00521-00405		8	0.6	0.8	0.76	12°	6	50	8.42	8.78	9.17	9.60	10.61

**Attenzione**

Quando ordinate, indicate MRB230 (R)×(ℓ<sub>1</sub>)×(d).  
When you order, indicate MRB230 (R)×(ℓ<sub>1</sub>)×(d).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 306.
- Milling condition is recommended on page 306.

- Per lunghezze totali da 80 in su, la tolleranza del dia. del gambo è h6.
- Overall Length 80 and above, tolerance of Shank Dia. is h6.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
08-00520-30401	R0.4	9	0.6	0.8	0.76	12°	4	45	9.46	9.87	10.31	10.80	11.94
08-00520-00404		10	0.6	0.8	0.76	12°	4	45	10.50	10.96	11.45	12.00	13.26
08-00521-00406		10	0.6	0.8	0.76	12°	6	50	10.40	10.74	11.12	11.52	12.42
08-00520-20401		12	0.6	0.8	0.76	12°	4	45	12.59	13.14	13.73	14.39	15.92
● 08-00520-40451	R0.45	2	0.65	0.9	0.86	12°	4	45	2.16	2.24	2.33	2.42	2.64
● 08-00520-40452		4	0.65	0.9	0.86	12°	4	45	4.25	4.42	4.61	4.82	5.30
● 08-00520-40453		6	0.65	0.9	0.86	12°	4	45	6.34	6.60	6.89	7.21	7.96
● 08-00520-40454		8	0.65	0.9	0.86	12°	4	45	8.42	8.78	9.17	9.61	10.62
● 08-00520-40501	R0.5	2	0.75	1	0.95	12°	4	45	2.19	2.26	2.35	2.44	2.65
● 08-00520-40502		2.5	0.75	1	0.95	12°	4	45	2.71	2.81	2.92	3.04	3.32
08-00520-00505		3	0.75	1	0.95	12°	4	45	3.22	3.35	3.48	3.63	3.97
08-00521-00501		3	0.75	1	0.95	12°	6	50	3.22	3.35	3.48	3.63	3.97
08-00520-00506		4	0.75	1	0.95	12°	4	45	4.27	4.44	4.62	4.83	5.30
08-00521-00502		4	0.75	1	0.95	12°	6	50	4.27	4.44	4.62	4.83	5.30
08-00520-00510		5	0.75	1	0.95	12°	4	45	5.24	5.41	5.59	5.78	6.21
08-00521-00503		5	0.75	1	0.95	12°	6	50	5.31	5.53	5.76	6.02	6.63
08-00520-00501		6	0.75	1	0.95	12°	4	45	6.35	6.62	6.90	7.22	7.96
08-00521-00504		6	0.75	1	0.95	12°	6	50	6.35	6.62	6.90	7.22	7.96
08-00520-00511	7	0.75	1	0.95	12°	4	45	7.40	7.71	8.04	8.42	9.28	
08-00520-00502	8	0.75	1	0.95	12°	4	45	8.44	8.79	9.18	9.61	10.61	
08-00521-00505	8	0.75	1	0.95	12°	6	50	8.44	8.79	9.18	9.61	10.61	
08-00520-00512	9	0.75	1	0.95	12°	4	45	9.48	9.88	10.32	10.81	11.94	
08-00520-00507	10	0.75	1	0.95	12°	4	45	10.52	10.97	11.46	12.01	13.26	
08-00521-00506	10	0.75	1	0.95	12°	6	50	10.41	10.76	11.13	11.53	12.42	
08-00520-00504	12	0.75	1	0.95	12°	4	45	12.61	13.15	13.75	14.40	15.92	
08-00521-00507	12	0.75	1	0.95	12°	6	50	12.61	13.15	13.75	14.40	15.92	
● 08-00520-40503	13	0.75	1	0.95	12°	4	45	13.66	14.25	14.90	15.62	17.29	
08-00520-00513	14	0.75	1	0.95	12°	4	50	14.70	15.33	16.03	16.79	18.57	
08-00520-00508	16	0.75	1	0.95	12°	4	50	16.78	17.51	18.31	19.18	21.23	
08-00521-00508	16	0.75	1	0.95	12°	6	60	16.78	17.51	18.31	19.18	21.23	
08-00520-00514	18	0.75	1	0.95	12°	4	55	18.87	19.69	20.59	21.58	23.88	
08-00520-00509	20	0.75	1	0.95	12°	4	55	20.95	21.87	22.87	23.97	26.54	
08-00521-00509	20	0.75	1	0.95	12°	6	60	20.95	21.87	22.87	23.97	26.54	
08-00521-00510	22	0.75	1	0.95	12°	6	60	22.82	23.59	24.43	25.33	27.34	
● 08-00520-40601	R0.6	2.4	0.9	1.2	1.15	12°	4	45	2.60	2.69	2.79	2.90	3.15
08-00520-20601		4	0.9	1.2	1.15	12°	4	45	4.26	4.43	4.61	4.81	5.27
08-00520-00600		6	0.9	1.2	1.15	12°	4	45	6.35	6.61	6.89	7.20	7.92
08-00521-00601		6	0.9	1.2	1.15	12°	6	50	6.35	6.61	6.89	7.20	7.92
08-00520-00601		8	0.9	1.2	1.15	12°	4	45	8.43	8.79	9.17	9.59	10.58
08-00521-00602		8	0.9	1.2	1.15	12°	6	50	8.43	8.79	9.17	9.59	10.58
08-00520-00602		10	0.9	1.2	1.15	12°	4	45	10.52	10.96	11.45	11.99	13.23
08-00521-00603		10	0.9	1.2	1.15	12°	6	50	10.41	10.75	11.12	11.51	12.40
08-00520-00603		12	0.9	1.2	1.15	12°	4	45	12.48	12.89	13.33	13.81	14.89
08-00521-00604		12	0.9	1.2	1.15	12°	6	50	12.48	12.89	13.33	13.81	14.89





• NUOVO NEW

Unità di misura: mm Unit size: mm

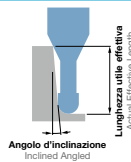
Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.					
									30'	1°	1°30'	2°	3°	
									08-00520-10601	R0.6	14	0.9	1.2	1.15
08-00520-10602	16	0.9	1.2	1.15	12°	4	50	16.78	17.50		18.29	19.17	21.20	
08-00521-00605	16	0.9	1.2	1.15	12°	6	60	16.78	17.50		18.29	19.17	21.20	
08-00520-20602	18	0.9	1.2	1.15	12°	4	55	18.86	19.68		20.58	21.56	23.85	
08-00520-30601	20	0.9	1.2	1.15	12°	4	55	20.95	21.86		22.86	23.95	26.50	
08-00520-20603	24	0.9	1.2	1.15	12°	4	60	25.12	26.22		27.42	28.74	Free	
08-00520-30701	R0.7	8	1	1.4	1.35	12°	4	45	8.43	8.78	9.16	9.57	10.55	
08-00520-30702		12	1	1.4	1.35	12°	4	50	12.60	13.13	13.72	14.36	15.85	
08-00520-30703		16	1	1.4	1.35	12°	4	50	16.77	17.49	18.28	19.15	21.16	
08-00520-30751	R0.75	3	1.1	1.5	1.45	12°	4	45	3.21	3.33	3.45	3.58	3.89	
08-00520-20751		4	1.1	1.5	1.45	12°	4	45	4.26	4.41	4.59	4.78	5.22	
08-00520-20752		6	1.1	1.5	1.45	12°	4	45	6.34	6.59	6.87	7.17	7.88	
08-00520-00751		8	1.1	1.5	1.45	12°	4	45	8.43	8.77	9.15	9.56	10.53	
08-00521-00751		8	1.1	1.5	1.45	12°	6	50	8.43	8.77	9.15	9.56	10.53	
08-00520-00752		10	1.1	1.5	1.45	12°	4	45	10.51	10.95	11.43	11.96	13.18	
08-00520-00753		12	1.1	1.5	1.45	12°	4	45	12.60	13.13	13.71	14.35	15.84	
08-00521-00752		12	1.1	1.5	1.45	12°	6	50	12.60	13.13	13.71	14.35	15.84	
08-00520-00754		14	1.1	1.5	1.45	12°	4	50	14.69	15.31	15.99	16.74	18.49	
08-00520-00755		16	1.1	1.5	1.45	12°	4	50	16.77	17.49	18.27	19.14	21.15	
08-00521-00755		16	1.1	1.5	1.45	12°	6	60	16.77	17.49	18.27	19.14	21.15	
08-00520-00756		18	1.1	1.5	1.45	12°	4	55	18.86	19.67	20.55	21.53	23.80	
08-00520-00757		20	1.1	1.5	1.45	12°	4	55	20.94	21.85	22.84	23.92	Free	
08-00521-00757		20	1.1	1.5	1.45	12°	6	60	20.94	21.85	22.84	23.92	26.46	
08-00520-10751		22	1.1	1.5	1.45	12°	4	55	23.03	24.02	25.12	26.32	Free	
08-00520-20753		30	1.1	1.5	1.45	12°	4	70	31.37	32.74	34.24	35.89	Free	
08-00520-20801		R0.8	4	1.2	1.6	1.55	12°	4	45	4.25	4.41	4.58	4.77	5.21
08-00520-00801			8	1.2	1.6	1.55	12°	4	45	8.43	8.77	9.14	9.55	10.51
08-00520-00803	12		1.2	1.6	1.55	12°	4	45	12.60	13.13	13.70	14.34	15.82	
08-00520-00805	16		1.2	1.6	1.55	12°	4	50	16.77	17.48	18.27	19.13	21.13	
08-00520-00807	20		1.2	1.6	1.55	12°	4	55	20.94	21.84	22.83	23.91	Free	
08-00520-30901	R0.9	8	1.3	1.8	1.75	12°	4	45	8.42	8.76	9.13	9.53	10.48	
08-00520-30902		12	1.3	1.8	1.75	12°	4	45	12.59	13.12	13.69	14.32	15.79	
08-00520-30903		16	1.3	1.8	1.75	12°	4	50	16.76	17.47	18.25	19.11	21.10	
08-00520-30904		20	1.3	1.8	1.75	12°	4	55	20.94	21.83	22.81	23.89	Free	
08-00520-31001	R1	3	1.5	2	1.94	12°	4	45	3.23	3.33	3.44	3.56	3.85	
08-00520-01000		4	1.5	2	1.94	12°	4	45	4.27	4.42	4.58	4.76	5.17	
08-00521-01000		4	1.5	2	1.94	12°	6	50	4.27	4.42	4.58	4.76	5.17	
08-00520-01001		6	1.5	2	1.94	12°	4	45	6.36	6.60	6.86	7.15	7.83	

**Attenzione**

Quando ordinate, indicate MRB230 (R)×(ℓ<sub>1</sub>)×(d).  
When you order, indicate MRB230 (R)×(ℓ<sub>1</sub>)×(d).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 306.
- Per lunghezze totali da 80 in su, la tolleranza del dia. del gambo è h6.
- Milling condition is recommended on page 306.
- Overall Length 80 and above, tolerance of Shank Dia. is h6.



**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate Piane  
Long Neck Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate Sferiche  
Long Neck Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate Toriche  
Long Neck Corner R

Rivestite  
Coating

Frese Sagomate  
Formed Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

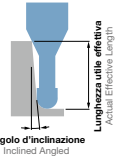
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.					
									30°	1°	1° 30'	2°	3°	
08-00521-01001	R1	6	1.5	2	1.94	12°	6	50	6.36	6.60	6.86	7.15	7.83	
08-00520-01002		8	1.5	2	1.94	12°	4	45	8.44	8.78	9.14	9.54	10.48	
08-00521-01002		8	1.5	2	1.94	12°	6	50	8.44	8.78	9.14	9.54	10.48	
08-00520-01003		10	1.5	2	1.94	12°	4	45	10.53	10.95	11.42	11.94	13.14	
08-00521-01003		10	1.5	2	1.94	12°	6	50	10.53	10.95	11.42	11.94	13.14	
08-00520-01004		12	1.5	2	1.94	12°	4	45	12.61	13.13	13.70	14.33	15.79	
08-00521-01004		12	1.5	2	1.94	12°	6	50	12.61	13.13	13.70	14.33	15.79	
● 08-00520-41001		13	1.5	2	1.94	12°	4	45	13.66	14.23	14.86	15.55	17.16	
08-00520-01005		14	1.5	2	1.94	12°	4	50	14.70	15.31	15.98	16.72	18.45	
08-00520-01006		16	1.5	2	1.94	12°	4	50	16.78	17.49	18.27	19.12	Free	
08-00521-01005		16	1.5	2	1.94	12°	6	60	16.78	17.49	18.27	19.12	21.10	
08-00520-01007		18	1.5	2	1.94	12°	4	55	18.87	19.67	20.55	21.51	Free	
08-00520-01008		20	1.5	2	1.94	12°	4	55	20.96	21.85	22.83	23.90	Free	
08-00521-01008		20	1.5	2	1.94	12°	6	60	20.96	21.85	22.83	23.90	26.41	
08-00520-01009		22	1.5	2	1.94	12°	4	60	23.04	24.03	25.11	26.30	Free	
08-00520-01010		25	1.5	2	1.94	12°	4	65	26.17	27.30	28.53	29.89	Free	
08-00521-01010		25	1.5	2	1.94	12°	6	80	26.17	27.30	28.53	29.89	33.04	
08-00520-01011		30	1.5	2	1.94	12°	4	70	31.38	32.74	34.23	Free	Free	
08-00521-01012		30	1.5	2	1.94	12°	6	80	31.38	32.74	34.23	35.87	Free	
08-00520-11001		35	1.5	2	1.94	12°	4	70	36.60	38.19	39.93	Free	Free	
08-00521-01014		35	1.5	2	1.94	12°	6	80	36.60	38.19	39.93	41.85	Free	
08-00520-31002		40	1.5	2	1.94	12°	4	90	41.81	43.64	Free	Free	Free	
08-00521-01015		40	1.5	2	1.94	12°	6	90	41.81	43.64	45.64	47.83	Free	
08-00520-21251		R1.25	6	2.3	2.5	2.4	12°	4	45	6.44	6.68	6.93	7.21	7.87
08-00520-11251			10	2.3	2.5	2.4	12°	4	45	10.62	11.04	11.49	12.00	13.18
08-00520-11252			15	2.3	2.5	2.4	12°	4	50	15.83	16.48	17.20	17.98	Free
08-00520-11253			20	2.3	2.5	2.4	12°	4	55	21.04	21.93	22.90	Free	Free
08-00520-11254			25	2.3	2.5	2.4	12°	4	65	26.26	27.38	28.60	Free	Free
08-00520-11255			30	2.3	2.5	2.4	12°	4	70	31.47	32.82	Free	Free	Free
08-00520-21252		35	2.3	2.5	2.4	12°	4	70	36.69	38.27	Free	Free	Free	
08-00520-31502		R1.5	6	2.5	3	2.85	12°	4	60	6.56	6.78	7.03	7.31	7.95
08-00520-31503			6	2.5	3	2.85	12°	6	60	6.56	6.78	7.03	7.31	7.95
08-00520-01500			8	2.5	3	2.85	12°	6	60	8.64	8.96	9.31	9.70	10.60
08-00520-01501			10	2.5	3	2.85	12°	6	60	10.73	11.14	11.59	12.09	13.26
08-00520-31504			12	2.5	3	2.85	12°	6	60	12.81	13.32	13.88	14.49	15.91
08-00520-31505	14		2.5	3	2.85	12°	6	60	14.90	15.50	16.16	16.88	18.57	
08-00520-01503	15		2.5	3	2.85	12°	6	60	15.94	16.59	17.30	18.08	19.89	
08-00520-31506	16		2.5	3	2.85	12°	6	60	16.98	17.68	18.44	19.27	21.22	
08-00520-01505	20		2.5	3	2.85	12°	6	65	21.16	22.04	23.00	24.06	26.53	
08-00520-01506	25		2.5	3	2.85	12°	6	65	26.37	27.48	28.70	30.04	Free	
08-00520-01507	30		2.5	3	2.85	12°	6	70	31.58	32.93	34.40	36.03	Free	
08-00520-01508	35		2.5	3	2.85	12°	6	80	36.80	38.38	40.11	42.01	Free	
08-00520-11501	40	2.5	3	2.85	12°	6	90	42.01	43.83	45.81	Free	Free		



Unità di misura: mm Unit size: mm

● **NUOVO** NEW

Codice Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
08-00520-11751	R1.75	10	2.8	3.5	3.35	12°	6	60	10.72	11.12	11.56	12.05	13.18
08-00520-11752		15	2.8	3.5	3.35	12°	6	60	15.93	16.57	17.26	18.03	19.81
08-00520-11753		20	2.8	3.5	3.35	12°	6	65	21.14	22.01	22.96	24.01	Free
08-00520-11754		25	2.8	3.5	3.35	12°	6	65	26.36	27.46	28.67	29.99	Free
08-00520-11755		30	2.8	3.5	3.35	12°	6	70	31.57	32.91	34.37	35.98	Free
08-00520-11756		35	2.8	3.5	3.35	12°	6	80	36.79	38.36	40.07	Free	Free
08-00520-11757		40	2.8	3.5	3.35	12°	6	90	42.00	43.80	45.77	Free	Free
08-00520-11758		45	2.8	3.5	3.35	12°	6	90	47.22	49.25	Free	Free	Free
08-00520-02000	R2	10	3	4	3.8	12°	6	65	10.83	11.22	11.66	12.14	13.25
08-00520-32001		12	3	4	3.8	12°	6	65	12.91	13.40	13.94	14.53	15.91
08-00520-32002		14	3	4	3.8	12°	6	65	15.00	15.58	16.22	16.92	18.56
08-00520-02001		15	3	4	3.8	12°	6	65	16.04	16.67	17.36	18.12	19.89
08-00520-32003		16	3	4	3.8	12°	6	65	17.09	17.76	18.50	19.32	21.22
08-00520-02003		20	3	4	3.8	12°	6	65	21.26	22.12	23.06	24.10	Free
08-00520-02004		25	3	4	3.8	12°	6	70	26.47	27.57	28.77	30.09	Free
08-00520-02005		30	3	4	3.8	12°	6	70	31.68	33.01	34.47	Free	Free
08-00520-02006		35	3	4	3.8	12°	6	80	36.90	38.46	40.17	Free	Free
08-00520-02007		40	3	4	3.8	12°	6	85	42.11	43.91	Free	Free	Free
08-00520-02008		45	3	4	3.8	12°	6	90	47.33	49.36	Free	Free	Free
08-00520-02009		50	3	4	3.8	12°	6	100	52.54	54.80	Free	Free	Free
08-00520-32501		R2.5	10	3.5	5	4.8	12°	6	70	10.81	11.18	11.59	12.04
08-00520-12501	15		3.5	5	4.8	12°	6	70	16.02	16.63	17.29	Free	Free
08-00520-02501	20		3.5	5	4.8	12°	6	70	21.24	22.08	Free	Free	Free
08-00520-02502	25		3.5	5	4.8	12°	6	70	26.45	27.52	Free	Free	Free
08-00520-02503	30		3.5	5	4.8	12°	6	80	31.66	Free	Free	Free	Free
08-00520-02504	35		3.5	5	4.8	12°	6	80	36.88	Free	Free	Free	Free
08-00520-12502	40		3.5	5	4.8	12°	6	90	42.09	Free	Free	Free	Free
08-00520-12503	45		3.5	5	4.8	12°	6	100	47.31	Free	Free	Free	Free
08-00520-12504	50		3.5	5	4.8	12°	6	100	52.52	Free	Free	Free	Free
08-00520-33001	R3		10	6	6	5.8	-	6	70	Free	Free	Free	Free
● 08-00520-43001		15	6	6	5.8	-	6	70	Free	Free	Free	Free	Free
08-00520-13001		20	6	6	5.8	-	6	70	Free	Free	Free	Free	Free
08-00520-13002		25	6	6	5.8	-	6	70	Free	Free	Free	Free	Free
08-00520-03001		30	6	6	5.8	-	6	80	Free	Free	Free	Free	Free
08-00520-13003		35	6	6	5.8	-	6	80	Free	Free	Free	Free	Free
08-00520-13004		40	6	6	5.8	-	6	90	Free	Free	Free	Free	Free
08-00520-13005		45	6	6	5.8	-	6	100	Free	Free	Free	Free	Free
08-00520-03003	50	6	6	5.8	-	6	120	Free	Free	Free	Free	Free	

**Attenzione**

Quando ordinate, indicate MRB230 (R)×(ℓ<sub>1</sub>).  
When you order, indicate MRB230 (R)×(ℓ<sub>1</sub>)×(d).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 306.
- Milling condition is recommended on page 306.

- Per lunghezze totali da 80 in su, la tolleranza del dia. del gambo è h6.
- Overall Length 80 and above, tolerance of Shank Dia. is h6.

## Parametri di taglio raccomandati

# MRB230

Recommended Milling Conditions

Materiale Work Material			Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Prehardened Steels C50•1.2311•1.2738 (~44HRC)				Acciaio temprato Hardened Steels 1.2343•STAVAX•1.2344 (46~55HRC)				Acciaio temprato Hardened Steels 1.2379 (56~62HRC)				Rame Copper			
R-Raggio Radius	Lungh. effettiva Effective Length	Rap- porto L/D	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed		Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed		Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed		
			ap mm	ae mm		mm/min	min <sup>-1</sup>	ap mm	ae mm		mm/min	min <sup>-1</sup>	ap mm	ae mm		mm/min	min <sup>-1</sup>	ap mm
0.05	0.3	3	0.005	0.005	80	20,000~50,000	0.003	0.003	60	20,000~50,000	0.003	0.003	50	20,000~50,000	0.005	0.005	80	20,000~50,000
	0.5	5	0.003	0.003	70	20,000~50,000	0.003	0.003	40	20,000~50,000	0.003	0.003	40	20,000~50,000	0.005	0.005	70	20,000~50,000
0.075	0.3	2	0.005	0.015	150	20,000~50,000	0.003	0.005	120	20,000~50,000	0.002	0.005	90	20,000~50,000	0.008	0.01	150	20,000~50,000
	0.5	3.33	0.004	0.007	150	20,000~50,000	0.003	0.005	120	20,000~50,000	0.002	0.005	90	20,000~50,000	0.007	0.008	150	20,000~50,000
0.1	1	6.67	0.003	0.005	100	20,000~50,000	0.002	0.003	70	20,000~50,000	0.001	0.003	60	20,000~50,000	0.005	0.007	100	20,000~50,000
	0.5	2.5	0.01	0.02	250	20,000~50,000	0.01	0.01	210	20,000~50,000	0.007	0.007	170	20,000~50,000	0.01	0.02	250	20,000~50,000
	0.75	3.75	0.007	0.01	250	20,000~50,000	0.005	0.01	210	20,000~50,000	0.004	0.007	170	20,000~50,000	0.01	0.015	250	20,000~50,000
	1	5	0.005	0.01	250	20,000~50,000	0.003	0.005	210	20,000~50,000	0.002	0.004	170	20,000~50,000	0.008	0.015	250	20,000~50,000
	1.25	6.25	0.003	0.01	150	20,000~50,000	0.003	0.005	120	20,000~50,000	0.002	0.004	100	20,000~50,000	0.005	0.015	150	20,000~50,000
	1.5	7.5	0.003	0.01	150	20,000~50,000	0.003	0.005	120	20,000~50,000	0.002	0.004	100	20,000~50,000	0.005	0.015	150	20,000~50,000
	1.75	8.75	0.003	0.007	150	20,000~50,000	0.002	0.005	120	20,000~50,000	0.002	0.003	100	20,000~50,000	0.005	0.01	150	20,000~50,000
	2	10	0.003	0.005	100	20,000~50,000	0.002	0.003	80	20,000~50,000	0.002	0.003	70	20,000~50,000	0.005	0.007	100	20,000~50,000
	2.5	12.5	0.003	0.005	100	20,000~50,000	0.002	0.003	80	20,000~50,000	0.002	0.003	70	20,000~50,000	0.005	0.007	100	20,000~50,000
	3	15	0.002	0.003	80	20,000~50,000	0.002	0.002	60	20,000~50,000	0.002	0.002	50	20,000~50,000	0.003	0.004	80	20,000~50,000
0.15	0.5	1.7	0.01	0.02	250	20,000~50,000	0.01	0.015	210	20,000~50,000	0.007	0.01	170	20,000~50,000	0.012	0.025	250	20,000~50,000
	0.6	2	0.01	0.02	250	20,000~50,000	0.01	0.015	210	20,000~50,000	0.007	0.01	170	20,000~50,000	0.012	0.025	250	20,000~50,000
	0.75	2.5	0.008	0.015	250	20,000~50,000	0.007	0.01	210	20,000~50,000	0.005	0.007	170	20,000~50,000	0.01	0.02	250	20,000~50,000
	1	3.3	0.007	0.01	250	20,000~50,000	0.005	0.01	210	20,000~50,000	0.004	0.007	170	20,000~50,000	0.01	0.02	250	20,000~50,000
	1.25	4.2	0.005	0.01	250	20,000~50,000	0.005	0.005	210	20,000~50,000	0.004	0.004	170	20,000~50,000	0.008	0.015	250	20,000~50,000
	1.5	5	0.005	0.01	200	20,000~50,000	0.005	0.005	170	20,000~50,000	0.004	0.004	140	20,000~50,000	0.008	0.015	200	20,000~50,000
	1.75	5.8	0.005	0.01	200	20,000~50,000	0.005	0.005	170	20,000~50,000	0.004	0.004	140	20,000~50,000	0.008	0.015	200	20,000~50,000
	2	6.7	0.003	0.01	150	20,000~50,000	0.003	0.005	120	20,000~50,000	0.002	0.003	100	20,000~50,000	0.005	0.012	150	20,000~50,000
	2.25	7.5	0.003	0.01	150	20,000~50,000	0.003	0.005	120	20,000~50,000	0.002	0.003	100	20,000~50,000	0.005	0.012	150	20,000~50,000
	2.5	8.3	0.003	0.007	150	20,000~50,000	0.003	0.003	120	20,000~50,000	0.002	0.002	100	20,000~50,000	0.005	0.01	150	20,000~50,000
0.2	2.75	9.2	0.003	0.007	150	20,000~50,000	0.003	0.003	120	20,000~50,000	0.002	0.002	100	20,000~50,000	0.005	0.01	150	20,000~50,000
	3	10	0.003	0.005	150	20,000~50,000	0.003	0.003	120	20,000~50,000	0.002	0.002	100	20,000~50,000	0.005	0.007	150	20,000~50,000
	3.5	11.7	0.003	0.005	100	20,000~50,000	0.003	0.003	80	20,000~50,000	0.002	0.002	70	20,000~50,000	0.005	0.007	100	20,000~50,000
	4	13.3	0.003	0.005	100	20,000~50,000	0.003	0.003	80	20,000~50,000	0.002	0.002	70	20,000~50,000	0.005	0.007	100	20,000~50,000
	4.5	15	0.003	0.003	80	20,000~50,000	0.003	0.003	80	20,000~50,000	0.002	0.002	50	20,000~50,000	0.005	0.005	80	20,000~50,000
	5	16.7	0.003	0.003	80	20,000~50,000	0.003	0.003	80	20,000~50,000	0.002	0.002	50	20,000~50,000	0.005	0.005	80	20,000~50,000
	0.5	1.25	0.02	0.05	800	20,000~50,000	0.02	0.03	650	20,000~50,000	0.015	0.02	560	20,000~50,000	0.03	0.07	800	20,000~50,000
	0.75	1.9	0.02	0.05	800	20,000~50,000	0.02	0.03	650	20,000~50,000	0.015	0.02	560	20,000~50,000	0.03	0.07	800	20,000~50,000
	1	2.5	0.02	0.05	800	20,000~50,000	0.02	0.03	650	20,000~50,000	0.015	0.02	560	20,000~50,000	0.03	0.07	800	20,000~50,000
	1.5	3.8	0.02	0.03	700	20,000~50,000	0.01	0.02	600	20,000~50,000	0.007	0.015	490	20,000~50,000	0.03	0.05	700	20,000~50,000
0.25	2	5	0.015	0.02	600	20,000~50,000	0.01	0.015	500	20,000~50,000	0.007	0.01	420	20,000~50,000	0.02	0.03	600	20,000~50,000
	2.5	6.3	0.015	0.02	450	20,000~50,000	0.01	0.015	380	20,000~50,000	0.007	0.01	310	20,000~50,000	0.02	0.03	450	20,000~50,000
	3	7.5	0.01	0.02	400	20,000~30,000	0.007	0.007	340	20,000~30,000	0.007	0.007	280	20,000~30,000	0.015	0.03	400	20,000~30,000
	3.5	8.8	0.01	0.015	350	20,000~30,000	0.01	0.01	300	20,000~30,000	0.007	0.007	240	20,000~30,000	0.015	0.02	350	20,000~30,000
	4	10	0.005	0.01	250	20,000~30,000	0.005	0.007	210	20,000~30,000	0.004	0.004	170	20,000~30,000	0.008	0.015	250	20,000~30,000
	4.5	11.3	0.005	0.007	200	20,000~30,000	0.005	0.005	170	20,000~30,000	0.004	0.004	140	20,000~30,000	0.008	0.01	200	20,000~30,000
	5	12.5	0.003	0.005	150	20,000~30,000	0.003	0.005	120	20,000~30,000	0.002	0.003	100	20,000~30,000	0.005	0.007	150	20,000~30,000
	5.5	13.8	0.003	0.005	100	20,000~30,000	0.003	0.005	80	20,000~30,000	0.002	0.003	70	20,000~30,000	0.005	0.007	100	20,000~30,000
	6	15	0.003	0.003	80	20,000~30,000	0.003	0.003	80	20,000~30,000	0.002	0.002	50	20,000~30,000	0.005	0.005	80	20,000~30,000
	1	2	0.03	0.05	800	20,000~50,000	0.02	0.05	680	20,000~50,000	0.015	0.035	560	20,000~50,000	0.045	0.07	800	20,000~50,000
0.25	1.5	3	0.03	0.05	700	20,000~50,000	0.02	0.04	600	20,000~50,000	0.015	0.03	490	20,000~50,000	0.04	0.07	700	20,000~50,000
	2	4	0.02	0.04	600	20,000~50,000	0.02	0.03	510	20,000~50,000	0.015	0.02	420	20,000~50,000	0.03	0.06	600	20,000~50,000
	2.5	5	0.015	0.04	600	20,000~50,000	0.01	0.03	510	20,000~50,000	0.007	0.02	420	20,000~50,000	0.02	0.06	600	20,000~50,000
	3	6	0.015	0.035	500	20,000~50,000	0.01	0.025	420	20,000~50,000	0.007	0.015	350	20,000~50,000	0.02	0.05	500	20,000~50,000
	3.5	7	0.015	0.03	400	20,000~50,000	0.01	0.02	340	20,000~50,000	0.007	0.015	280	20,000~50,000	0.02	0.045	400	20,000~50,000

Materiale Work Material			Acciaio al carbonio • Acciaio pretemprato Carbon Steels • Prehardened Steels C50 • 1.2311 • 1.2738 (~44HRC)				Acciaio temprato Hardened Steels 1.2343 • STAVAX • 1.2344 (46~55HRC)				Acciaio temprato Hardened Steels 1.2379 (56~62HRC)				Rame Copper				
R-Raggio Radius	Lunghezza effettiva Effective Length	Rapporto L/D L/D	Profondità di taglio Depth of Cut		Avanz. Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	Profondità di taglio Depth of Cut		Avanz. Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	Profondità di taglio Depth of Cut		Avanz. Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	Profondità di taglio Depth of Cut		Avanz. Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	
			Øp mm	Øe mm			Øp mm	Øe mm			Øp mm	Øe mm			Øp mm	Øe mm			
0.25	4	8	0.012	0.02	400	20,000~50,000	0.005	0.01	340	20,000~50,000	0.004	0.007	280	20,000~50,000	0.018	0.03	400	20,000~50,000	
	4.5	9	0.008	0.01	320	20,000~50,000	0.005	0.005	270	20,000~50,000	0.004	0.004	220	20,000~50,000	0.012	0.015	320	20,000~50,000	
	5	10	0.005	0.01	250	20,000~30,000	0.005	0.005	210	20,000~30,000	0.003	0.003	170	20,000~30,000	0.008	0.015	250	20,000~30,000	
	5.5	11	0.005	0.007	200	20,000~30,000	0.003	0.003	170	20,000~30,000	0.002	0.002	140	20,000~30,000	0.008	0.01	200	20,000~30,000	
	6	12	0.005	0.005	150	20,000~30,000	0.003	0.003	120	20,000~30,000	0.002	0.002	100	20,000~30,000	0.008	0.008	150	20,000~30,000	
	7	14	0.003	0.005	120	20,000~30,000	0.003	0.003	100	20,000~30,000	0.002	0.002	80	20,000~30,000	0.005	0.008	120	20,000~30,000	
	8	16	0.003	0.003	120	20,000~30,000	0.002	0.002	100	20,000~30,000	0.002	0.002	80	20,000~30,000	0.005	0.005	120	20,000~30,000	
	9	18	0.002	0.002	100	18,000~24,000	0.002	0.002	80	18,000~24,000	0.002	0.002	70	18,000~24,000	0.003	0.003	100	18,000~24,000	
	10	20	0.002	0.002	80	18,000~24,000	0.002	0.002	60	18,000~24,000	0.002	0.002	50	18,000~24,000	0.003	0.003	80	18,000~24,000	
	0.3	1	1.7	0.05	0.1	1,200	20,000~50,000	0.05	0.07	1,000	20,000~50,000	0.035	0.05	840	20,000~50,000	0.07	0.12	1,200	20,000~50,000
1.5		2.5	0.05	0.1	1,200	20,000~50,000	0.05	0.07	1,000	20,000~50,000	0.035	0.05	840	20,000~50,000	0.07	0.12	1,200	20,000~50,000	
2		3.3	0.05	0.1	1,200	20,000~50,000	0.04	0.07	1,000	20,000~50,000	0.028	0.05	840	20,000~50,000	0.07	0.12	1,200	20,000~50,000	
2.5		4.2	0.035	0.1	1,200	20,000~50,000	0.03	0.06	1,000	20,000~50,000	0.02	0.04	840	20,000~50,000	0.05	0.12	1,200	20,000~50,000	
3		5	0.025	0.1	1,000	20,000~50,000	0.03	0.05	850	20,000~50,000	0.02	0.035	700	20,000~50,000	0.04	0.1	1,000	20,000~50,000	
3.5		5.8	0.025	0.08	1,000	20,000~50,000	0.02	0.05	850	20,000~50,000	0.015	0.035	700	20,000~50,000	0.04	0.1	1,000	20,000~50,000	
4		6.7	0.025	0.05	800	20,000~50,000	0.02	0.04	680	20,000~50,000	0.015	0.03	580	20,000~50,000	0.035	0.08	800	20,000~50,000	
4.5		7.5	0.025	0.05	750	20,000~50,000	0.01	0.03	630	20,000~50,000	0.007	0.02	520	20,000~50,000	0.035	0.08	750	20,000~50,000	
5		8.3	0.02	0.04	500	20,000~30,000	0.01	0.02	420	20,000~30,000	0.007	0.015	350	20,000~30,000	0.03	0.06	500	20,000~30,000	
5.5		9.2	0.013	0.02	500	20,000~30,000	0.01	0.01	420	20,000~30,000	0.007	0.007	350	20,000~30,000	0.02	0.03	500	20,000~30,000	
6		10	0.01	0.02	450	20,000~30,000	0.005	0.01	380	20,000~30,000	0.004	0.007	310	20,000~30,000	0.015	0.03	450	20,000~30,000	
6.5		10.8	0.008	0.02	450	20,000~30,000	0.005	0.005	380	20,000~30,000	0.004	0.004	310	20,000~30,000	0.012	0.03	450	20,000~30,000	
7		11.7	0.008	0.02	400	20,000~30,000	0.005	0.005	340	20,000~30,000	0.004	0.004	280	20,000~30,000	0.012	0.03	400	20,000~30,000	
7.5		12.5	0.005	0.02	350	20,000~30,000	0.003	0.005	300	20,000~30,000	0.003	0.004	250	20,000~30,000	0.008	0.03	350	20,000~30,000	
8		13.3	0.005	0.01	300	18,000~24,000	0.003	0.005	250	18,000~24,000	0.002	0.004	210	18,000~24,000	0.008	0.015	300	18,000~24,000	
8.5		14.2	0.005	0.01	250	18,000~24,000	0.003	0.003	210	18,000~24,000	0.002	0.002	170	18,000~24,000	0.008	0.015	250	18,000~24,000	
9	15	0.005	0.01	250	18,000~24,000	0.003	0.003	210	18,000~24,000	0.002	0.002	170	18,000~24,000	0.007	0.015	250	18,000~24,000		
9.5	15.8	0.005	0.005	200	18,000~24,000	0.003	0.003	170	18,000~24,000	0.002	0.002	140	18,000~24,000	0.007	0.008	200	18,000~24,000		
10	16.7	0.003	0.005	150	18,000~24,000	0.002	0.003	120	18,000~24,000	0.002	0.002	100	18,000~24,000	0.005	0.008	150	18,000~24,000		
0.35	2	2.9	0.08	0.12	1,800	20,000~50,000	0.07	0.08	1,300	20,000~50,000	0.04	0.06	1,000	20,000~30,000	0.1	0.15	1,500	20,000~30,000	
	4	5.7	0.05	0.11	1,300	20,000~50,000	0.03	0.06	1,100	20,000~50,000	0.02	0.04	700	20,000~30,000	0.06	0.12	1,200	20,000~30,000	
	6	8.6	0.03	0.05	700	20,000~30,000	0.01	0.02	600	20,000~30,000	0.008	0.015	450	20,000~30,000	0.04	0.07	600	20,000~30,000	
	8	11.4	0.005	0.01	400	18,000~24,000	0.003	0.005	330	18,000~24,000	0.002	0.003	250	14,000~21,000	0.008	0.01	400	18,000~24,000	
	2	2.5	0.1	0.15	2,000	20,000~50,000	0.1	0.12	1,700	20,000~50,000	0.07	0.085	1,400	14,000~35,000	0.15	0.2	2,000	20,000~50,000	
	3	3.8	0.07	0.15	1,800	20,000~50,000	0.07	0.1	1,500	20,000~50,000	0.05	0.07	1,200	14,000~35,000	0.12	0.2	1,800	20,000~50,000	
	4	5	0.05	0.12	1,500	20,000~50,000	0.05	0.08	1,300	20,000~50,000	0.035	0.055	1,000	14,000~35,000	0.1	0.2	1,500	20,000~50,000	
	5	6.3	0.05	0.1	1,200	20,000~50,000	0.04	0.07	1,000	20,000~50,000	0.03	0.05	840	14,000~35,000	0.08	0.15	1,200	20,000~50,000	
0.4	6	7.5	0.05	0.08	900	20,000~30,000	0.03	0.05	750	20,000~30,000	0.02	0.035	630	14,000~21,000	0.07	0.12	900	20,000~30,000	
	7	8.8	0.03	0.05	700	20,000~30,000	0.02	0.03	600	20,000~30,000	0.015	0.02	490	14,000~21,000	0.05	0.08	700	20,000~30,000	
	8	10	0.015	0.03	500	18,000~24,000	0.01	0.01	420	18,000~24,000	0.007	0.007	350	12,600~16,800	0.02	0.05	500	18,000~24,000	
	9	11.3	0.005	0.01	400	18,000~24,000	0.003	0.005	340	18,000~24,000	0.002	0.003	280	12,600~16,800	0.008	0.01	400	18,000~24,000	
	10	12.5	0.005	0.01	350	18,000~24,000	0.003	0.005	300	18,000~24,000	0.002	0.003	240	12,600~16,800	0.008	0.008	350	18,000~24,000	
	12	15	0.005	0.005	250	16,000~20,000	0.003	0.003	210	16,000~20,000	0.002	0.002	170	11,200~14,000	0.008	0.008	250	16,000~20,000	
	0.45	2	2.2	0.15	0.2	2,500	20,000~50,000	0.1	0.2	2,000	20,000~50,000	0.07	0.15	1,800	14,000~35,000	0.2	0.3	2,800	20,000~50,000
		4	4.4	0.1	0.2	2,000	20,000~50,000	0.05	0.12	1,500	20,000~50,000	0.04	0.08	1,100	14,000~35,000	0.15	0.25	2,000	20,000~50,000
6		6.7	0.07	0.15	1,300	20,000~30,000	0.035	0.05	1,000	20,000~30,000	0.025	0.035	650	14,000~21,000	0.1	0.2	1,300	20,000~30,000	
8		8.9	0.035	0.05	800	20,000~30,000	0.025	0.04	700	20,000~30,000	0.015	0.025	550	12,600~16,800	0.055	0.08	800	18,000~24,000	

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite** Coating  
**Piane** Square  
**Scaricate** Long Neck  
**Piane** Square

**Rivestite** Coating  
**Sferiche** Ball  
**Scaricate** Long Neck  
**Sferiche** Ball

**Rivestite** Coating  
**Coniche** Taper  
**Scaricate** Taper Ball  
**Sferiche** Taper Ball

**Rivestite** Coating  
**Toriche** Corner R  
**Scaricate** Long Neck  
**Toriche** Corner R

**Rivestite** Coating  
**Frese** Formed  
**Sagomate** Cutter

**Punte** Drill  
Drill

**Altro** Others  
Others

**Dati tecnici** Technical Data  
Technical Data

**Guida tecnica** Technical Guidance  
Technical Guidance

Materiale Work Material			Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Prehardened Steels C50•1.2311•1.2738 (~44HRC)				Acciaio temprato Hardened Steels 1.2343•STAVAX•1.2344 (46~55HRC)				Acciaio temprato Hardened Steels 1.2379 (56~62HRC)				Rame Copper				
R-Raggio Radius	Lunghezza effettiva Effective Length	Rapporto UD L/D	Profondità di taglio Depth of Cut		Avanz.	Giri	Profondità di taglio Depth of Cut		Avanz.	Giri	Profondità di taglio Depth of Cut		Avanz.	Giri	Profondità di taglio Depth of Cut		Avanz.	Giri	
			ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	
0.5	2	2	0.25	0.35	3,200	20,000~50,000	0.12	0.3	2,500	20,000~50,000	0.085	0.2	2,300	14,000~35,000	0.25	0.4	3,500	20,000~50,000	
	2.5	2.5	0.25	0.3	3,000	20,000~50,000	0.12	0.3	2,500	20,000~50,000	0.08	0.2	2,300	14,000~35,000	0.25	0.4	3,200	20,000~50,000	
	3	3	0.2	0.3	3,000	20,000~50,000	0.12	0.3	2,500	20,000~50,000	0.08	0.2	2,100	14,000~35,000	0.25	0.4	3,000	20,000~50,000	
	4	4	0.15	0.25	2,500	20,000~50,000	0.1	0.2	2,100	20,000~50,000	0.07	0.14	1,700	14,000~35,000	0.2	0.4	2,500	20,000~50,000	
	5	5	0.1	0.25	2,000	20,000~50,000	0.08	0.17	1,700	20,000~50,000	0.065	0.12	1,400	14,000~35,000	0.15	0.35	2,000	20,000~50,000	
	6	6	0.1	0.2	1,500	20,000~50,000	0.07	0.12	1,200	20,000~50,000	0.05	0.085	1,000	14,000~35,000	0.15	0.3	1,500	20,000~50,000	
	7	7	0.08	0.2	1,300	20,000~30,000	0.06	0.1	1,100	20,000~30,000	0.04	0.07	910	14,000~21,000	0.12	0.3	1,300	20,000~30,000	
	8	8	0.05	0.1	1,200	20,000~30,000	0.05	0.08	1,000	20,000~30,000	0.035	0.065	840	14,000~21,000	0.08	0.15	1,200	20,000~30,000	
	9	9	0.04	0.06	1,000	20,000~30,000	0.05	0.05	850	20,000~30,000	0.035	0.035	700	14,000~21,000	0.06	0.1	1,000	20,000~30,000	
	10	10	0.03	0.05	800	20,000~30,000	0.03	0.05	680	20,000~30,000	0.02	0.035	560	14,000~21,000	0.05	0.08	800	20,000~30,000	
	12	12	0.015	0.025	600	16,000~20,000	0.01	0.03	510	16,000~20,000	0.007	0.02	420	11,200~14,000	0.02	0.04	600	16,000~20,000	
	13	13	0.012	0.025	600	16,000~20,000	0.007	0.02	450	16,000~20,000	0.005	0.01	400	11,200~14,000	0.015	0.03	600	16,000~20,000	
	14	14	0.01	0.02	500	16,000~20,000	0.005	0.01	420	16,000~20,000	0.004	0.007	350	11,200~14,000	0.015	0.03	500	16,000~20,000	
	16	16	0.005	0.01	250	12,000~16,000	0.005	0.01	210	12,000~16,000	0.004	0.007	170	8,400~11,200	0.01	0.015	250	12,000~16,000	
	18	18	0.005	0.005	150	12,000~16,000	0.003	0.003	120	12,000~16,000	0.002	0.002	100	8,400~11,200	0.008	0.01	150	12,000~16,000	
	20	20	0.005	0.005	100	12,000~16,000	0.003	0.003	80	12,000~16,000	0.002	0.002	70	8,400~11,200	0.008	0.008	100	12,000~16,000	
	22	22	0.003	0.005	80	12,000~16,000	0.002	0.003	60	12,000~16,000	0.002	0.002	50	8,400~11,200	0.005	0.008	80	12,000~16,000	
	0.6	2.4	2	0.25	0.35	3,400	20,000~30,000	0.12	0.3	2,500	20,000~30,000	0.09	0.21	2,500	14,000~21,000	0.3	0.45	3,400	20,000~30,000
		4	3.3	0.2	0.3	3,000	20,000~30,000	0.12	0.3	2,500	20,000~30,000	0.085	0.21	2,100	14,000~21,000	0.28	0.45	3,000	20,000~30,000
		6	5	0.1	0.25	2,000	20,000~30,000	0.08	0.17	1,700	20,000~30,000	0.065	0.12	1,400	14,000~21,000	0.15	0.4	2,000	20,000~30,000
		8	6.7	0.08	0.2	1,300	20,000~30,000	0.06	0.15	1,100	20,000~30,000	0.04	0.1	910	14,000~21,000	0.12	0.3	1,300	20,000~30,000
		10	8.3	0.05	0.1	1,200	14,000~20,000	0.03	0.08	1,000	14,000~20,000	0.02	0.055	840	9,800~14,000	0.08	0.15	1,200	14,000~20,000
12		10	0.03	0.05	800	14,000~20,000	0.02	0.04	680	14,000~20,000	0.015	0.03	560	9,800~14,000	0.05	0.08	800	14,000~20,000	
14		11.7	0.015	0.025	600	14,000~20,000	0.01	0.02	510	14,000~20,000	0.007	0.015	420	9,800~14,000	0.02	0.04	600	14,000~20,000	
16		13.3	0.01	0.02	400	14,000~20,000	0.01	0.01	340	14,000~20,000	0.007	0.007	280	9,800~14,000	0.015	0.03	400	14,000~20,000	
18		15	0.005	0.01	250	12,000~18,000	0.01	0.02	210	12,000~18,000	0.007	0.015	170	8,400~12,600	0.012	0.015	250	12,000~18,000	
20		16.7	0.005	0.007	200	12,000~18,000	0.005	0.005	170	12,000~18,000	0.003	0.003	140	8,400~12,600	0.01	0.01	200	12,000~18,000	
0.7	24	20	0.005	0.005	100	12,000~18,000	0.003	0.003	80	12,000~18,000	0.002	0.002	70	8,400~12,600	0.008	0.01	100	12,000~18,000	
	8	5.7	0.1	0.3	2,500	20,000~30,000	0.1	0.2	2,100	20,000~30,000	0.07	0.14	1,700	14,000~21,000	0.15	0.45	2,500	20,000~30,000	
	12	8.6	0.07	0.12	1,200	14,000~20,000	0.05	0.1	1,000	14,000~20,000	0.035	0.07	840	9,800~14,000	0.1	0.18	1,200	14,000~20,000	
	16	11.4	0.03	0.05	600	14,000~20,000	0.015	0.03	510	14,000~20,000	0.01	0.02	420	9,800~14,000	0.05	0.08	600	14,000~20,000	
	3	2	0.2	0.35	4,000	20,000~30,000	0.015	0.3	3,400	20,000~30,000	0.1	0.18	2,800	14,000~21,000	0.3	0.5	4,000	20,000~30,000	
	4	2.7	0.2	0.3	4,000	20,000~30,000	0.15	0.25	3,400	20,000~30,000	0.09	0.15	2,800	14,000~21,000	0.3	0.45	4,000	20,000~30,000	
	6	4	0.15	0.3	3,000	20,000~30,000	0.12	0.2	2,500	20,000~30,000	0.07	0.12	2,100	14,000~21,000	0.2	0.45	3,000	20,000~30,000	
0.75	8	5.3	0.1	0.25	2,400	20,000~30,000	0.08	0.18	2,000	20,000~30,000	0.05	0.11	1,700	14,000~21,000	0.15	0.4	2,400	20,000~30,000	
	10	6.7	0.08	0.2	1,800	20,000~30,000	0.06	0.12	1,500	20,000~30,000	0.035	0.07	1,200	14,000~21,000	0.12	0.3	1,800	20,000~30,000	
	12	8	0.07	0.13	1,200	18,000~24,000	0.05	0.09	1,000	18,000~24,000	0.03	0.065	840	12,600~16,800	0.1	0.2	1,200	18,000~24,000	
	14	9.3	0.06	0.1	1,200	18,000~24,000	0.04	0.07	1,000	18,000~24,000	0.025	0.04	840	12,600~16,800	0.1	0.15	1,200	18,000~24,000	
	16	10.7	0.05	0.08	800	12,000~18,000	0.035	0.06	680	12,000~18,000	0.02	0.035	560	8,400~12,600	0.07	0.12	800	12,000~18,000	
	18	12	0.03	0.05	500	12,000~18,000	0.02	0.04	420	12,000~18,000	0.012	0.025	350	8,400~12,600	0.05	0.08	500	12,000~18,000	
	20	13.3	0.02	0.04	400	12,000~18,000	0.015	0.03	340	12,000~18,000	0.01	0.02	280	8,400~12,600	0.03	0.06	400	12,000~18,000	
	22	14.7	0.01	0.02	250	10,000~14,000	0.005	0.005	210	10,000~14,000	0.003	0.003	170	7,000~9,800	0.02	0.03	250	10,000~14,000	
	30	20	0.005	0.005	100	10,000~14,000	0.003	0.003	80	10,000~14,000	0.002	0.003	70	7,000~9,800	0.01	0.008	100	10,000~14,000	
	0.8	4	2.5	0.2	0.3	4,000	18,000~24,000	0.17	0.25	3,400	18,000~24,000	0.1	0.15	2,800	12,600~16,800	0.3	0.45	4,000	18,000~24,000
		8	5	0.1	0.3	3,000	18,000~24,000	0.09	0.2	2,500	18,000~24,000	0.065	0.12	2,100	12,600~16,800	0.15	0.45	3,000	18,000~24,000
12		7.5	0.07	0.15	1,800	18,000~24,000	0.06	0.12	1,500	18,000~24,000	0.035	0.07	1,300	12,600~16,800	0.1	0.25	1,800	18,000~24,000	
16		10	0.05	0.1	650	12,000~18,000	0.035	0.07	550	12,000~18,000	0.02	0.04	450	8,400~12,600	0.08	0.15	650	12,000~18,000	
20		12.5	0.03	0.05	450	12,000~18,000	0.02	0.04	380	12,000~18,000	0.01	0.025	310	8,400~12,600	0.05	0.08	450	12,000~18,000	

Materiale Work Material			Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Prehardened Steels C50•1.2311•1.2738 (~44HRC)				Acciaio temprato Hardened Steels 1.2343•STAVAX•1.2344 (46~55HRC)				Acciaio temprato Hardened Steels 1.2379 (56~62HRC)				Rame Copper			
R-Raggio Radius	Lungh. effettiva Effective Length	Rapporto L/D L/D	Profondità di taglio Depth of Cut		Avanz. Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	Profondità di taglio Depth of Cut		Avanz. Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	Profondità di taglio Depth of Cut		Avanz. Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	Profondità di taglio Depth of Cut		Avanz. Feed mm/min	Giri Spindle Speed min <sup>-1</sup>
			ãp mm	ãe mm			ãp mm	ãe mm			ãp mm	ãe mm						
			0.9	8	4.4	0.15	0.3	2,500	16,000~20,000	0.12	0.2	2,100	16,000~20,000	0.07	0.12	1,750	11,200~14,000	0.2
12	6.7	0.1		0.2	1,800	12,000~16,000	0.07	0.15	1,500	12,000~16,000	0.04	0.09	1,300	8,400~11,200	0.15	0.3	1,800	12,000~16,000
16	8.9	0.08		0.13	1,600	10,000~14,000	0.06	0.1	1,400	10,000~14,000	0.035	0.06	1,100	7,000~9,800	0.12	0.2	1,600	10,000~14,000
20	11.1	0.05		0.1	1,000	8,000~12,000	0.04	0.08	850	8,000~12,000	0.025	0.05	700	5,600~8,400	0.08	0.15	1,000	8,000~12,000
1	3	1.5	0.3	0.5	4,000	20,000~30,000	0.2	0.5	3,400	20,000~30,000	0.12	0.3	2,800	14,000~21,000	0.45	0.7	4,000	20,000~30,000
	4	2	0.3	0.5	4,000	20,000~30,000	0.2	0.45	3,400	20,000~30,000	0.12	0.27	2,800	14,000~21,000	0.45	0.7	4,000	20,000~30,000
	6	3	0.25	0.5	3,000	20,000~30,000	0.2	0.4	2,500	20,000~30,000	0.12	0.24	2,100	14,000~21,000	0.38	0.7	3,000	20,000~30,000
	8	4	0.2	0.3	2,500	16,000~20,000	0.15	0.3	2,100	16,000~20,000	0.09	0.18	1,700	11,200~14,000	0.3	0.45	2,500	16,000~20,000
	10	5	0.15	0.3	2,500	16,000~20,000	0.1	0.2	2,100	16,000~20,000	0.06	0.12	1,700	11,200~14,000	0.23	0.45	2,500	16,000~20,000
	12	6	0.13	0.2	1,800	12,000~16,000	0.1	0.15	1,500	12,000~16,000	0.06	0.09	1,300	8,400~11,200	0.2	0.3	1,800	12,000~16,000
	13	6.5	0.12	0.2	1,800	12,000~16,000	0.08	0.13	1,500	12,000~16,000	0.05	0.08	1,300	8,400~11,200	0.2	0.3	1,800	12,000~16,000
	14	7	0.1	0.2	1,800	12,000~16,000	0.07	0.13	1,500	12,000~16,000	0.04	0.08	1,300	8,400~11,200	0.15	0.3	1,800	12,000~16,000
	16	8	0.1	0.15	1,600	10,000~14,000	0.06	0.11	1,400	10,000~14,000	0.035	0.065	1,100	7,000~9,800	0.15	0.25	1,600	10,000~14,000
	18	9	0.07	0.12	1,600	10,000~14,000	0.05	0.1	1,400	10,000~14,000	0.03	0.06	1,100	7,000~9,800	0.1	0.2	1,600	10,000~14,000
	20	10	0.06	0.1	1,000	8,000~12,000	0.05	0.07	850	8,000~12,000	0.03	0.04	700	5,600~8,400	0.1	0.15	1,000	8,000~12,000
	22	11	0.05	0.1	1,000	8,000~12,000	0.04	0.06	850	8,000~12,000	0.025	0.035	700	5,600~8,400	0.08	0.15	1,000	8,000~12,000
	25	12.5	0.03	0.05	800	8,000~12,000	0.03	0.04	680	8,000~12,000	0.02	0.025	560	5,600~8,400	0.05	0.08	800	8,000~12,000
	30	15	0.02	0.04	420	6,000~10,000	0.02	0.04	360	6,000~10,000	0.01	0.025	300	4,200~7,000	0.03	0.06	420	6,000~10,000
	35	17.5	0.02	0.03	140	6,000~10,000	0.015	0.02	120	6,000~10,000	0.01	0.01	100	4,200~7,000	0.03	0.04	140	6,000~10,000
	40	20	0.007	0.01	100	6,000~10,000	0.004	0.007	80	6,000~10,000	0.002	0.004	70	4,200~7,000	0.01	0.015	100	6,000~10,000
1.25	6	2.4	0.35	0.5	4,000	16,000~20,000	0.3	0.4	3,400	16,000~20,000	0.18	0.24	2,800	11,200~14,000	0.5	0.8	4,000	16,000~20,000
	10	4	0.2	0.5	3,000	16,000~20,000	0.25	0.35	2,500	16,000~20,000	0.15	0.21	2,100	11,200~14,000	0.3	0.8	3,000	16,000~20,000
	15	6	0.15	0.3	2,500	16,000~20,000	0.1	0.2	2,100	16,000~20,000	0.06	0.12	1,700	11,200~14,000	0.25	0.45	2,500	16,000~20,000
	20	8	0.1	0.2	1,800	12,000~16,000	0.08	0.15	1,500	12,000~16,000	0.05	0.09	1,300	8,400~11,200	0.15	0.3	1,800	12,000~16,000
	25	10	0.075	0.14	1,100	10,000~14,000	0.05	0.1	930	10,000~14,000	0.03	0.06	770	7,000~9,800	0.1	0.2	1,100	10,000~14,000
	30	12	0.04	0.08	800	8,000~12,000	0.02	0.06	680	8,000~12,000	0.012	0.035	560	5,600~8,400	0.05	0.15	800	8,000~12,000
	35	14	0.03	0.07	450	6,000~10,000	0.01	0.03	380	6,000~10,000	0.006	0.018	310	4,200~7,000	0.05	0.1	450	6,000~10,000
1.5	6	2	0.35	0.6	4,000	16,000~20,000	0.25	0.5	3,400	16,000~20,000	0.15	0.3	2,800	11,200~14,000	0.5	1	4,000	16,000~20,000
	8	2.7	0.3	0.5	4,000	16,000~20,000	0.2	0.5	3,400	16,000~20,000	0.12	0.3	2,800	11,200~14,000	0.45	0.8	4,000	16,000~20,000
	10	3.3	0.3	0.5	4,000	16,000~20,000	0.2	0.45	3,400	16,000~20,000	0.12	0.27	2,800	11,200~14,000	0.45	0.8	4,000	16,000~20,000
	12	4	0.2	0.4	3,000	16,000~20,000	0.2	0.4	2,500	16,000~20,000	0.12	0.24	2,100	11,200~14,000	0.3	0.6	3,000	16,000~20,000
	14	4.7	0.2	0.4	3,000	16,000~20,000	0.15	0.35	2,500	16,000~20,000	0.09	0.21	2,100	11,200~14,000	0.3	0.6	3,000	16,000~20,000
	15	5	0.15	0.4	3,000	16,000~20,000	0.13	0.35	2,500	16,000~20,000	0.08	0.21	2,100	11,200~14,000	0.23	0.6	3,000	16,000~20,000
	16	5.3	0.15	0.35	3,000	16,000~20,000	0.13	0.35	2,500	16,000~20,000	0.07	0.21	2,100	11,200~14,000	0.23	0.5	3,000	16,000~20,000
	20	6.7	0.15	0.3	1,800	12,000~16,000	0.1	0.2	1,500	12,000~16,000	0.06	0.12	1,300	8,400~11,200	0.23	0.45	1,800	12,000~16,000
	25	8.3	0.13	0.27	1,200	12,000~16,000	0.1	0.16	1,000	12,000~16,000	0.06	0.09	840	8,400~11,200	0.2	0.4	1,200	12,000~16,000
	30	10	0.1	0.2	800	8,000~12,000	0.07	0.12	680	8,000~12,000	0.04	0.07	560	5,600~8,400	0.15	0.3	800	8,000~12,000
	35	11.7	0.07	0.15	600	8,000~12,000	0.05	0.1	510	8,000~12,000	0.03	0.06	420	5,600~8,400	0.1	0.2	600	8,000~12,000
40	13.3	0.05	0.1	460	6,000~10,000	0.05	0.07	390	6,000~10,000	0.03	0.04	320	4,200~7,000	0.08	0.15	460	6,000~10,000	
1.75	10	2.9	0.35	0.6	4,000	16,000~20,000	0.25	0.5	3,400	16,000~20,000	0.15	0.3	2,800	11,200~14,000	0.5	1	4,000	16,000~20,000
	15	4.3	0.3	0.4	4,000	16,000~20,000	0.2	0.45	3,400	16,000~20,000	0.12	0.27	2,800	11,200~14,000	0.45	0.6	4,000	16,000~20,000
	20	5.7	0.2	0.3	2,400	14,000~18,000	0.13	0.35	2,000	14,000~18,000	0.08	0.21	1,680	9,800~12,600	0.3	0.45	2,400	14,000~18,000
	25	7.1	0.17	0.3	2,000	14,000~18,000	0.1	0.3	1,800	14,000~18,000	0.08	0.15	1,400	8,400~9,800	0.25	0.42	2,000	14,000~18,000
	30	8.6	0.15	0.27	1,600	8,000~12,000	0.1	0.2	1,400	8,000~12,000	0.06	0.12	1,120	5,600~8,400	0.23	0.4	1,600	8,000~12,000
	35	10	0.1	0.2	1,200	8,000~12,000	0.07	0.15	1,000	8,000~12,000	0.05	0.08	800	5,600~8,400	0.15	0.3	1,200	8,000~12,000
40	11.4	0.07	0.13	800	6,000~10,000	0.05	0.1	680	6,000~10,000	0.03	0.06	560	4,200~7,000	0.1	0.2	800	6,000~10,000	
45	12.9	0.05	0.1	800	6,000~10,000	0.05	0.05	680	6,000~10,000	0.03	0.03	560	4,200~7,000	0.08	0.15	800	6,000~10,000	

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite Coating**  
Piane Square  
**Non Rivestite Non-Coating**  
Scaricate Piane Long Neck Square

**Rivestite Coating**  
Sferiche Ball  
**Non Rivestite Non-Coating**  
Scaricate Sferiche Long Neck Ball

**Rivestite Coating**  
Coniche Taper  
**Non Rivestite Non-Coating**  
Coniche Sferiche Taper Ball

**Rivestite Coating**  
Toriche Corner R  
**Non Rivestite Non-Coating**  
Scaricate Toriche Long Neck Corner R

**Rivestite Coating**  
Frese Sagomate Formed Cutter  
**Non Rivestite Non-Coating**

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Materiale Work Material			Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Prehardened Steels C50•1.2311•1.2738 (~44HRC)				Acciaio temprato Hardened Steels 1.2343•STAVAX•1.2344 (46~55HRC)				Acciaio temprato Hardened Steels 1.2379 (56~62HRC)				Rame Copper			
R-Raggio Radius	Lunghezza effettiva Effective Length	Rapporto L/D L/D	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanz. Feed	Giri Spindle Speed
			a <sub>p</sub> mm	a <sub>e</sub> mm			a <sub>p</sub> mm	a <sub>e</sub> mm			a <sub>p</sub> mm	a <sub>e</sub> mm			a <sub>p</sub> mm	a <sub>e</sub> mm		
2	10	2.5	0.35	0.8	4,000	16,000~20,000	0.25	0.7	3,400	16,000~20,000	0.15	0.42	2,800	11,200~14,000	0.55	1.2	4,000	16,000~20,000
	12	3	0.35	0.7	4,000	16,000~20,000	0.25	0.7	3,400	16,000~20,000	0.15	0.42	2,800	11,200~14,000	0.53	1	4,000	16,000~20,000
	14	3.5	0.3	0.6	4,000	16,000~20,000	0.2	0.5	3,400	16,000~20,000	0.12	0.3	2,800	11,200~14,000	0.45	1	4,000	16,000~20,000
	15	3.8	0.25	0.55	3,500	16,000~20,000	0.2	0.4	3,000	16,000~20,000	0.12	0.24	2,500	11,200~14,000	0.38	0.8	3,500	16,000~20,000
	16	4	0.2	0.5	3,500	16,000~20,000	0.2	0.3	3,000	16,000~20,000	0.12	0.18	2,500	11,200~14,000	0.3	0.8	3,500	16,000~20,000
	20	5	0.2	0.35	3,300	16,000~20,000	0.15	0.3	2,800	16,000~20,000	0.09	0.18	2,300	11,200~14,000	0.3	0.5	3,300	16,000~20,000
	25	6.3	0.15	0.3	2,600	12,000~16,000	0.12	0.25	2,200	12,000~16,000	0.07	0.15	1,800	8,400~11,200	0.23	0.45	2,600	12,000~16,000
2	30	7.5	0.12	0.25	2,600	12,000~16,000	0.1	0.2	2,200	12,000~16,000	0.06	0.12	1,800	8,400~11,200	0.2	0.4	2,600	12,000~16,000
	35	8.8	0.12	0.2	1,800	10,000~14,000	0.07	0.15	1,500	10,000~14,000	0.04	0.09	1,300	7,000~9,800	0.18	0.3	1,800	10,000~14,000
	40	10	0.1	0.15	1,200	10,000~14,000	0.07	0.12	1,000	10,000~14,000	0.04	0.07	840	7,000~9,800	0.15	0.2	1,200	10,000~14,000
	45	11.3	0.07	0.12	800	10,000~14,000	0.05	0.1	700	10,000~14,000	0.03	0.05	600	4,200~7,000	0.1	0.17	800	10,000~14,000
	50	12.5	0.07	0.1	600	6,000~10,000	0.05	0.07	500	6,000~10,000	0.03	0.04	420	4,200~7,000	0.1	0.15	600	6,000~10,000
2.5	10	2	0.4	1.2	4,000	16,000~20,000	0.3	1	3,400	16,000~20,000	0.18	0.6	2,800	11,200~14,000	0.6	1.8	4,000	16,000~20,000
	15	3	0.35	1	4,000	16,000~20,000	0.3	0.9	3,400	16,000~20,000	0.18	0.54	2,800	11,200~14,000	0.55	1.5	4,000	16,000~20,000
	20	4	0.3	0.7	4,000	16,000~20,000	0.25	0.7	3,400	16,000~20,000	0.15	0.42	2,800	11,200~14,000	0.45	1	4,000	16,000~20,000
	25	5	0.25	0.6	3,000	14,000~16,000	0.2	0.5	2,500	14,000~16,000	0.12	0.3	2,100	9,800~11,200	0.38	0.9	3,000	14,000~16,000
	30	6	0.2	0.5	2,400	14,000~16,000	0.15	0.4	2,000	14,000~16,000	0.09	0.24	1,700	9,800~11,200	0.3	0.8	2,400	14,000~16,000
	35	7	0.15	0.4	1,600	10,000~14,000	0.15	0.3	1,400	10,000~14,000	0.09	0.18	1,100	7,000~9,800	0.23	0.6	1,600	10,000~14,000
	40	8	0.15	0.3	1,200	8,000~12,000	0.12	0.2	1,000	8,000~12,000	0.07	0.12	840	5,600~8,400	0.23	0.45	1,200	8,000~12,000
3	45	9	0.12	0.2	1,000	8,000~12,000	0.1	0.15	850	8,000~12,000	0.06	0.09	700	5,600~8,400	0.18	0.3	1,000	8,000~12,000
	50	10	0.1	0.15	680	6,000~10,000	0.07	0.1	570	6,000~10,000	0.04	0.06	470	4,200~7,000	0.15	0.25	680	6,000~10,000
	10	1.7	0.5	1.5	4,000	14,000~18,000	0.35	1.2	3,400	14,000~18,000	0.21	0.72	2,800	9,800~12,600	0.75	2.3	4,000	14,000~18,000
	15	2.5	0.5	1.3	4,000	14,000~18,000	0.35	1.2	3,400	14,000~18,000	0.21	0.68	2,800	9,800~12,600	0.75	2	4,000	14,000~18,000
	20	3.3	0.5	1.2	4,000	14,000~18,000	0.35	1.1	3,400	14,000~18,000	0.21	0.66	2,800	9,800~12,600	0.75	1.8	4,000	14,000~18,000
3	25	4.2	0.4	1	4,000	14,000~18,000	0.3	0.8	3,400	14,000~18,000	0.18	0.48	2,800	9,800~12,600	0.6	1.5	4,000	14,000~18,000
	30	5	0.35	0.7	3,000	8,000~12,000	0.25	0.6	2,500	8,000~12,000	0.15	0.36	2,100	5,600~8,400	0.53	1	3,000	8,000~12,000
	35	5.8	0.35	0.5	2,500	8,000~12,000	0.2	0.5	2,100	8,000~12,000	0.12	0.3	1,700	5,600~8,400	0.53	0.8	2,500	8,000~12,000
	40	6.7	0.25	0.4	2,300	8,000~12,000	0.2	0.4	1,900	8,000~12,000	0.12	0.24	1,600	5,600~8,400	0.38	0.6	2,300	8,000~12,000
	45	7.5	0.25	0.4	1,500	6,000~8,000	0.2	0.35	1,200	6,000~8,000	0.12	0.21	1,000	4,200~5,600	0.38	0.6	1,500	6,000~8,000
50	8.3	0.2	0.4	1,500	6,000~8,000	0.2	0.3	1,200	6,000~8,000	0.12	0.18	1,000	4,200~5,600	0.3	0.6	1,500	6,000~8,000	

**Note**  
Notes

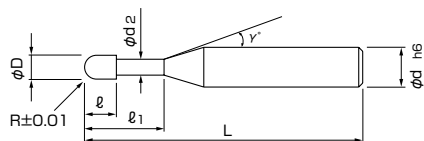
- \*I Parametri di taglio raccomandati sono solo di riferimento e sono da regolare in funzione del pezzo da lavorare e le condizioni della macchina.
- \*Profondità di taglio: **a<sub>p</sub>** = Profondità di taglio assiale, **a<sub>e</sub>** = Profondità di taglio radiale.
- \*Ridurre con la stessa proporzione giri ed avanzamento, per eliminare vibrazioni o in caso di limitato numero di giri della macchina.
- \*Qualora il rapporto L/D superasse 15, trovare la condizione adeguata considerando il profilo della lavorazione.
- \*Si raccomanda l'uso di lubrificazione minima per lavorare acciai temprati.
- \*Recommend to use the milling condition as just reference. Adjust milling conditions according to machining shape and machine status.
- \*Depth of Cut : **a<sub>p</sub>**=Axial Depth of Cut / **a<sub>e</sub>**=Radial Depth of Cut.
- \*Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.
- \*In case L/D exceeds 15, find an adequate condition considering machining profile.
- \*Oil mist coolant is recommended for the machining of hardened steels.



# MRBLN230-6

MUGEN-COATING 2-Flute Long Neck Ball End Mill (Shank Dia. 6)

## Frese 2 Tagli sferiche scaricate rivestite MUGEN (Dia. gambo 6)



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Code No.	(R) Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00522-01501	R0.15	3	0.3	0.3	0.28	15°	6	60
08-00522-02001	R0.2	4	0.4	0.4	0.37	15°	6	60
08-00522-02501	R0.25	5	0.8	0.5	0.46	15°	6	60
08-00522-03001	R0.3	3	1	0.6	0.56	15°	6	60
08-00522-03005		5	1	0.6	0.56	15°	6	60
08-00522-03006		6	1	0.6	0.56	15°	6	60
08-00522-04008	R0.4	8	1.4	0.8	0.76	15°	6	60
08-00522-05010	R0.5	10	1.5	1	0.95	15°	6	60
08-00522-07515	R0.75	15	1.75	1.5	1.45	15°	6	60
08-00522-10020	R1	20	2	2	1.94	15°	6	60

### Attenzione

Quando ordinate, indicate MRBLN230-6 (R)×(ℓ<sub>1</sub>).  
When you order, indicate MRBLN230-6 (R)×(ℓ<sub>1</sub>).

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane  
Square

Scaricate Piane  
Long Neck Square

Sferiche  
Ball

Scaricate Sferiche  
Long Neck Ball

Coniche  
Taper

Coniche Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate Toriche  
Long Neck Corner R

Frese Sagomate  
Formed Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

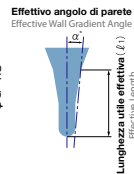
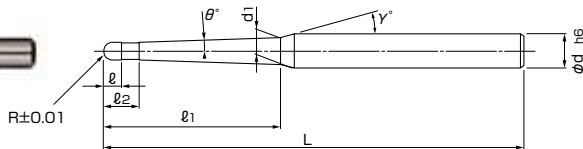
Guida tecnica  
Technical Guidance

# MRBTNH345

**Novità**

MUGEN-COATING PREMIUM 3-Flute Long Taper Neck Ball End Mill

## Frese 3 Tagli sferiche con sforno conico serie lunga rivestite MUGEN PREMIUM



- Rispetto alle versioni scaricate, lo sforno conico aumenta notevolmente la rigidità.
- Il rivestimento MUGEN PREMIUM ha un'elevata resistenza al calore che consente elevate durate nella lavorazione di acciai temprati.
- Elevate prestazioni grazie al design esclusivo NS delle 3 eliche.
- Higher rigidity brought by taper neck than existing long neck.
- MUGEN-COATING PREMIUM because of high heat resistance, realized long tool life for hardened steels.
- High effective machining achieved by NS original 3-flute design.

**Dati tecnici** P491



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(γ) Angolo Neck Taper Angle	(ℓ1) Lungh. effettiva Effective Length	(d1) Dia. scarico Neck Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ2) Lungh. sotto scarico conico Under Neck Taper Length	(γ) Angolo Neck Taper Angle 2	(γ) Angolo effettivo Effective Wall Gradient Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
08-00590-05020	R0.5	30°	12	1.11	0.75	1.25	12°	0° 15'	6	60	
08-00590-05021			16	1.18	0.75	1.25	12°	0° 19'	6	60	
08-00590-05022			20	1.25	0.75	1.25	12°	0° 21'	6	70	
08-00590-05023			25	1.34	0.75	1.25	12°	0° 23'	6	70	
08-00590-05024			30	1.42	0.75	1.25	12°	0° 24'	6	70	
08-00590-05030		1°	12	1.30	0.75	1.25	12°	0° 42'	6	60	
08-00590-05031			16	1.44	0.75	1.25	12°	0° 46'	6	60	
08-00590-05032			20	1.58	0.75	1.25	12°	0° 49'	6	70	
08-00590-05033			25	1.75	0.75	1.25	12°	0° 51'	6	70	
08-00590-05034			30	1.93	0.75	1.25	12°	0° 53'	6	70	
08-00590-05040		1° 30'	12	1.48	0.75	1.25	12°	1° 09'	6	60	
08-00590-05041			16	1.69	0.75	1.25	12°	1° 14'	6	60	
08-00590-05042			20	1.90	0.75	1.25	12°	1° 17'	6	70	
08-00590-05043			25	2.17	0.75	1.25	12°	1° 20'	6	70	
08-00590-05044			30	2.43	0.75	1.25	12°	1° 21'	6	70	
08-00590-05050		2°	20	2.23	0.75	1.25	12°	1° 45'	6	70	
08-00590-05051			30	2.93	0.75	1.25	12°	1° 50'	6	70	
08-00590-07520			30°	12	1.58	1.1	1.85	12°	0° 12'	6	60
08-00590-07521				16	1.65	1.1	1.85	12°	0° 16'	6	60
08-00590-07523				20	1.72	1.1	1.85	12°	0° 19'	6	70
08-00590-07524		25		1.81	1.1	1.85	12°	0° 21'	6	70	
08-00590-07525		30		1.90	1.1	1.85	12°	0° 22'	6	70	
08-00590-07530		R0.75	1°	12	1.76	1.1	1.85	12°	0° 37'	6	60
08-00590-07531				16	1.90	1.1	1.85	12°	0° 43'	6	60
08-00590-07532	20			2.04	1.1	1.85	12°	0° 46'	6	70	
08-00590-07533	25			2.22	1.1	1.85	12°	0° 49'	6	70	
08-00590-07534	30			2.39	1.1	1.85	12°	0° 51'	6	70	
08-00590-07540	1° 30'		20	2.36	1.1	1.85	12°	1° 13'	6	70	
08-00590-07541			30	2.88	1.1	1.85	12°	1° 19'	6	70	
08-00590-07552			2°	30	3.37	1.1	1.85	12°	1° 47'	6	70

### Attenzione

Quando ordinate, indicate MRBTNH345(R)×(θ)×(ℓ1).  
When you order, indicate MRBTNH345 (R)×(θ)×(ℓ1).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 314.
- Milling condition is recommended on page 314.

● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(γ) Angolo Neck Taper Angle	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>1</sub> ) Dia. scarico Neck Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>2</sub> ) Lungh. sotto scarico conico Under Neck Taper Length	(γ) Angolo2 Neck Taper Angle 2	(γ) Angolo effettivo Effective Wall Gradient Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
08-00590-10020	R1	30°	12	2.06	1.5	2.5	12°	0° 08'	6	60	
08-00590-10021			16	2.13	1.5	2.5	12°	0° 13'	6	60	
08-00590-10022			20	2.20	1.5	2.5	12°	0° 16'	6	70	
08-00590-10023			25	2.28	1.5	2.5	12°	0° 19'	6	70	
08-00590-10024			30	2.37	1.5	2.5	12°	0° 21'	6	70	
08-00590-10025			40	2.54	1.5	2.5	12°	0° 23'	6	80	
08-00590-10030		1°	12	2.22	1.5	2.5	12°	0° 31'	6	60	
08-00590-10031			16	2.36	1.5	2.5	12°	0° 38'	6	60	
08-00590-10032			20	2.50	1.5	2.5	12°	0° 43'	6	70	
08-00590-10033			25	2.68	1.5	2.5	12°	0° 46'	6	70	
08-00590-10034			30	2.85	1.5	2.5	12°	0° 48'	6	70	
08-00590-10035			40	3.20	1.5	2.5	12°	0° 51'	6	80	
08-00590-10040		1° 30'	20	2.81	1.5	2.5	12°	1° 09'	6	70	
08-00590-10041			25	3.07	1.5	2.5	12°	1° 13'	6	70	
08-00590-10042			30	3.33	1.5	2.5	12°	1° 16'	6	70	
08-00590-10043			40	3.85	1.5	2.5	12°	1° 19'	6	80	
08-00590-10050		2°	20	3.11	1.5	2.5	12°	1° 35'	6	70	
08-00590-10051			25	3.46	1.5	2.5	12°	1° 40'	6	70	
08-00590-10052			30	3.81	1.5	2.5	12°	1° 43'	6	70	
08-00590-10053			40	4.51	1.5	2.5	12°	1° 47'	6	80	
08-00590-15020		R1.5	30°	15	3.16	4.5	6	12°	0° 18'	6	70
08-00590-15021				20	3.24	4.5	6	12°	0° 21'	6	70
08-00590-15022				25	3.33	4.5	6	12°	0° 22'	6	70
08-00590-15023				30	3.42	4.5	6	12°	0° 24'	6	70
08-00590-15024				40	3.59	4.5	6	12°	0° 25'	6	80
08-00590-15030				1°	15	3.31	4.5	6	12°	0° 36'	6
08-00590-15031			20		3.49	4.5	6	12°	0° 42'	6	70
08-00590-15032			25		3.66	4.5	6	12°	0° 45'	6	70
08-00590-15033	30		3.84		4.5	6	12°	0° 48'	6	70	
08-00590-15034	40		4.19	4.5	6	12°	0° 51'	6	80		
08-00590-15040	1° 30'		30	4.26	4.5	6	12°	1° 12'	6	70	
08-00590-15041			40	4.78	4.5	6	12°	1° 16'	6	80	
08-00590-15042			50	5.30	4.5	6	12°	1° 19'	6	100	
08-00590-15050	2°		30	4.68	4.5	6	12°	1° 36'	6	70	
08-00590-15051			40	5.37	4.5	6	12°	1° 42'	6	80	
08-00590-20031	R2		1°	30	4.77	6	8	12°	0° 44'	6	80
08-00590-20032		40		5.12	6	8	12°	0° 48'	6	80	
08-00590-20033		50		5.47	6	8	12°	0° 50'	6	100	
08-00590-20034		65.2		-	6	8	-	0° 53'	6	110	

**Attenzione** Quando ordinate, indicate MRBTNH345(R)×(θ)×(ℓ<sub>1</sub>).  
When you order, indicate MRBTNH345 (R)×(θ)×(ℓ<sub>1</sub>).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 314.
- Milling condition is recommended on page 314.

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

Materiale Work Material		Acciaio temprato Hardened Steels 1.2343•STAVAX (~52HRC)					Acciaio temprato Hardened Steels 1.2379 (~62HRC)				
R-Raggio Radius	Angolo Neck Taper Angle	Lungh. effettiva Effective Length	Profondità di taglio Depth of Cut		Avanzamento Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	Profondità di taglio Depth of Cut		Avanzamento Feed mm/min	Giri Spindle Speed min <sup>-1</sup>	
			ap mm	ae mm			ap mm	ae mm			
0.5	30'	12	0.02	0.1	1,000	16,000	0.01	0.07	800	14,000	
		16	0.01	0.1	600	12,000	0.005	0.07	500	10,000	
		20	0.01	0.07	400	10,000	0.005	0.05	300	8,000	
		25	0.005	0.05	300	8,000	0.003	0.03	250	6,000	
		30	0.005	0.02	200	6,000	0.003	0.01	150	4,000	
	1°	12	0.03	0.15	1,200	16,000	0.02	0.1	1,000	14,000	
		16	0.02	0.15	700	12,000	0.01	0.1	600	10,000	
		20	0.02	0.1	500	10,000	0.01	0.08	400	8,000	
		25	0.01	0.08	400	8,000	0.008	0.06	300	6,000	
		30	0.01	0.06	300	6,000	0.005	0.04	200	4,000	
	1° 30'	12	0.03	0.15	1,200	16,000	0.02	0.1	1,000	14,000	
		16	0.02	0.15	700	12,000	0.01	0.1	600	10,000	
20		0.02	0.1	500	10,000	0.01	0.08	400	8,000		
25		0.01	0.08	400	8,000	0.008	0.06	300	6,000		
30		0.01	0.06	300	6,000	0.005	0.04	200	4,000		
2°	20	0.03	0.2	700	12,000	0.02	0.15	600	10,000		
	30	0.02	0.1	500	8,000	0.01	0.08	400	6,000		
	12	0.06	0.2	1,500	18,000	0.04	0.15	1,200	16,000		
	16	0.04	0.2	1,200	16,000	0.02	0.15	950	14,000		
	20	0.02	0.1	700	12,000	0.015	0.07	600	10,000		
0.75	30'	25	0.01	0.1	500	9,000	0.01	0.07	350	7,000	
		30	0.01	0.05	300	7,000	0.01	0.04	200	5,000	
		12	0.06	0.2	1,500	18,000	0.05	0.15	1,300	16,000	
		16	0.04	0.2	1,200	16,000	0.04	0.15	1,000	14,000	
		20	0.04	0.15	700	12,000	0.04	0.1	700	10,000	
	1°	25	0.03	0.15	600	9,000	0.01	0.1	400	7,000	
		30	0.02	0.1	400	7,000	0.015	0.08	270	5,000	
		20	0.05	0.2	800	12,000	0.04	0.15	800	10,000	
		30	0.03	0.1	400	7,000	0.02	0.1	350	5,000	
		2°	30	0.04	0.2	500	7,000	0.03	0.15	400	6,000
	1	30'	12	0.1	0.3	1,500	16,000	0.08	0.2	1,400	14,000
			16	0.1	0.3	1,200	12,000	0.08	0.2	1,000	10,000
20			0.07	0.25	800	10,000	0.05	0.2	600	8,000	
25			0.07	0.2	600	8,500	0.05	0.15	500	6,500	
30			0.04	0.1	400	7,000	0.02	0.07	300	5,000	
1°		40	0.02	0.07	300	5,000	0.01	0.05	200	4,000	
		12	0.1	0.3	1,500	16,000	0.08	0.25	1,400	14,000	
		16	0.1	0.3	1,200	12,000	0.08	0.25	1,000	10,000	
		20	0.08	0.25	1,000	10,000	0.06	0.2	800	8,000	
		25	0.08	0.2	800	8,500	0.06	0.15	600	6,500	
1° 30'		30	0.07	0.15	600	7,000	0.04	0.1	400	5,000	
		40	0.04	0.08	400	5,000	0.02	0.06	300	4,000	
	20	0.08	0.3	1,000	10,000	0.06	0.25	800	8,000		
	25	0.08	0.2	800	8,500	0.06	0.15	600	6,500		
	30	0.07	0.15	600	7,000	0.04	0.1	400	5,000		
1° 30'	40	0.04	0.08	400	5,000	0.02	0.06	300	4,000		
	20	0.08	0.3	1,000	10,000	0.06	0.25	800	8,000		
	25	0.08	0.2	800	8,500	0.06	0.15	600	6,500		
1° 30'	30	0.07	0.15	600	7,000	0.04	0.1	400	5,000		
	40	0.04	0.08	400	5,000	0.02	0.06	300	4,000		

# MRBTNH345

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Piane**  
Long Neck Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Sferiche**  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche**  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche Sferiche**  
Taper Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Toriche**  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Frese Sagomate**  
Formed Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Materiale Work Material			Acciaio temprato Hardened Steels 1.2343•STAVAX (~52HRC)				Acciaio temprato Hardened Steels 1.2379 (~62HRC)				
R-Raggio Radius.	Angolo Neck Taper Angle	Lung. effettiva Effective Length	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	Profondità di taglio Depth of Cut		Avanzamento Feed	Giri Spindle Speed	
			ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	
1	2°	20	0.1	0.35	1,200	10,000	0.08	0.25	1,000	8,000	
		25	0.1	0.3	1,000	8,000	0.08	0.2	800	6,500	
		30	0.08	0.25	800	6,000	0.06	0.15	600	5,000	
		40	0.05	0.1	500	4,000	0.03	0.08	400	4,000	
1.5	30'	15	0.2	0.4	2,000	18,000	0.1	0.3	1,600	15,000	
		20	0.1	0.3	1,500	14,000	0.07	0.2	1,200	12,000	
		25	0.1	0.3	1,200	12,000	0.07	0.2	1,000	10,000	
		30	0.07	0.2	1,000	8,500	0.05	0.1	700	7,000	
	1°	40	0.05	0.2	600	6,000	0.02	0.1	400	4,200	
		15	0.2	0.4	2,000	18,000	0.1	0.3	1,600	15,000	
		20	0.1	0.3	1,500	16,000	0.08	0.2	1,200	12,000	
		25	0.1	0.3	1,200	14,000	0.08	0.2	1,000	10,000	
	1° 30'	30	0.08	0.2	1,000	10,000	0.06	0.15	800	7,000	
		40	0.07	0.1	700	7,000	0.04	0.08	500	4,200	
		30	0.08	0.2	1,000	12,000	0.06	0.15	800	7,000	
		40	0.07	0.1	700	8,000	0.04	0.08	500	4,200	
	2°	50	0.05	0.1	400	6,000	0.03	0.08	300	3,500	
		30	0.1	0.3	1,500	12,000	0.08	0.3	1,200	10,000	
	2	1°	40	0.08	0.2	800	8,000	0.06	0.2	600	7,000
			30	0.3	0.5	1,500	8,500	0.2	0.4	1,200	7,000
40			0.2	0.5	1,200	6,000	0.1	0.4	1,000	5,000	
50			0.1	0.3	700	5,000	0.05	0.2	600	4,000	
		65.2	0.07	0.2	400	4,000	0.03	0.1	300	3,000	
Note Notes			<p>※ Ridurre il numero di giri e l'avanzamento nello stesso rapporto, per eliminare vibrazioni o in caso di limitato numero di giri della macchina.</p> <p>※ Nelle lavorazioni profonde la corretta adduzione del refrigerante e la corretta evacuazione truciolo sono molto importanti.</p> <p>※ Vi raccomandiamo di usare lubrificazione minimale.</p> <p>※ Regolare le condizioni di fresatura in accordo alla profondità di taglio e alla rigidità della macchina.</p> <p>※ Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.</p> <p>※ Coolant supply and chip disposal are important for machining deep-rib.</p> <p>※ We recommend using oil mist coolant.</p> <p>※ Adjust milling conditions according to the volume of depth of cut and rigidity of machine.</p>								

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate Piane  
Long Neck Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

Rivestite  
Coating  
Frese Sagomate  
Formed Cutter

Non Rivestite  
Non-Coating  
Punte  
Drill

Altro  
Others

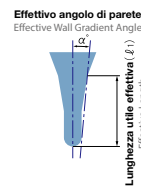
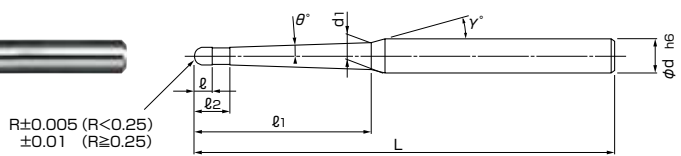
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# MRBTN230

MUGEN-COATING 2-Flute Long Taper Neck Ball End Mill

## Frese 2 Tagli sferiche con sforno conico serie lunga rivestite MUGEN



- È possibile incrementare la rigidità grazie allo sforno conico.
- Profondità di taglio maggiore rispetto alle frese convenzionali.
- It is possible to increase rigidity with the neck taper.
- The volume of depth of cut will be more than conventional end mills.

METALLO DURO **M G** MUGEN Coating **2** **30°** ELICA **~55 HRC**

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(θ) Angolo dello scarico conico Neck Taper Angle	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>1</sub> ) Dia. scarico Neck Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>2</sub> ) Lungh. sotto scarico conico Under Neck Taper Length	(γ) Angolo 2 Neck Taper Angle 2	(α) Angolo effettivo Effective Wall Gradient Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length	
08-00570-01020	R0.1	30°	1	0.21	0.2	0.4	12°	0° 19'	4	50	
08-00570-01021			1.5	0.22	0.2	0.4	12°	0° 23'	4	50	
08-00570-01022			2	0.23	0.2	0.4	12°	0° 25'	4	50	
08-00570-01040		1°	1	0.22	0.2	0.4	12°	0° 38'	4	50	
08-00570-01041			1.5	0.24	0.2	0.4	12°	0° 47'	4	50	
08-00570-01042			2	0.26	0.2	0.4	12°	0° 51'	4	50	
08-00570-01050		1° 30'	1	0.23	0.2	0.4	12°	0° 57'	4	50	
08-00570-01051			1.5	0.26	0.2	0.4	12°	1° 11'	4	50	
08-00570-01052			2	0.28	0.2	0.4	12°	1° 16'	4	50	
08-00570-01060		2°	1	0.24	0.2	0.4	12°	1° 16'	4	50	
08-00570-01061			1.5	0.28	0.2	0.4	12°	1° 35'	4	50	
08-00570-01062			2	0.31	0.2	0.4	12°	1° 41'	4	50	
08-00570-01080		3°	1	0.26	0.2	0.4	12°	1° 54'	4	50	
08-00570-01081			1.5	0.32	0.2	0.4	12°	2° 21'	4	50	
08-00570-01082			2	0.37	0.2	0.4	12°	2° 32'	4	50	
08-00570-01092		R0.15	5°	2	0.48	0.2	0.4	12°	4° 13'	4	50
08-00570-01521			30°	3	0.34	0.3	0.6	12°	0° 25'	4	50
08-00570-01540				2	0.35	0.3	0.6	12°	0° 45'	4	50
08-00570-01541			1°	3	0.38	0.3	0.6	12°	0° 51'	4	50
08-00570-01550				2	0.37	0.3	0.6	12°	1° 08'	4	50
08-00570-01551	1° 30'		3	0.43	0.3	0.6	12°	1° 16'	4	50	
08-00570-01561			2°	3	0.47	0.3	0.6	12°	1° 41'	4	50
08-00570-01581	R0.2	3°	3	0.55	0.3	0.6	12°	2° 32'	4	50	
08-00570-01591		5°	3	0.72	0.3	0.6	12°	4° 13'	4	50	
08-00570-02021		30°	2	0.42	0.4	0.8	12°	0° 20'	4	50	
08-00570-02023	3		0.44	0.4	0.8	12°	0° 24'	4	50		
08-00570-02022	4		0.46	0.4	0.8	12°	0° 25'	4	50		
08-00570-02041	1°	2	0.44	0.4	0.8	12°	0° 40'	4	50		
08-00570-02043		3	0.48	0.4	0.8	12°	0° 47'	4	50		
08-00570-02042		4	0.51	0.4	0.8	12°	0° 51'	4	50		
08-00570-02051	1° 30'	2	0.46	0.4	0.8	12°	1° 00'	4	50		
08-00570-02053		3	0.52	0.4	0.8	12°	1° 11'	4	50		
08-00570-02052		4	0.57	0.4	0.8	12°	1° 16'	4	50		
08-00570-02061	2°	2	0.48	0.4	0.8	12°	1° 20'	4	50		

**Attenzione** Quando ordinate, indicate MRBTN230 (R)×(θ)×(ℓ<sub>1</sub>).  
When you order, indicate MRBTN345 (R)×(θ)×(ℓ<sub>1</sub>).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 321.
- Milling condition is recommended on page 321.

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(θ) Angolo dello scarico conico Neck Taper Angle	(ℓ <sub>1</sub> ) Lunghezza effettiva Effective Length	(d <sub>1</sub> ) Dia. scarico Neck Dia.	(ℓ) Lunghezza tagliente Length of Cut	(ℓ <sub>2</sub> ) Lunghezza sotto scarico conico Under Neck Taper Length	(γ) Angolo 2 Neck Taper Angle 2	(α) Angolo effettivo Effective Wall Gradient Angle	(d) Diametro gambo Shank Dia.	(L) Lunghezza totale Overall Length	
08-00570-02063	R0.2	2°	3	0.55	0.4	0.8	12°	1° 34'	4	50	
08-00570-02062			4	0.62	0.4	0.8	12°	1° 41'	4	50	
08-00570-02081		3°	2	0.53	0.4	0.8	12°	2° 00'	4	50	
08-00570-02082			4	0.74	0.4	0.8	12°	2° 31'	4	50	
08-00570-02092			4	0.96	0.4	0.8	12°	4° 13'	4	50	
08-00570-02521	R0.25	30'	3	0.53	0.5	1	12°	0° 22'	4	50	
08-00570-02522			5	0.57	0.5	1	12°	0° 25'	4	50	
08-00570-02541		1°	3	0.57	0.5	1	12°	0° 44'	4	50	
08-00570-02542			5	0.64	0.5	1	12°	0° 51'	4	50	
08-00570-02551		1° 30'	3	0.6	0.5	1	12°	1° 06'	4	50	
08-00570-02552			5	0.71	0.5	1	12°	1° 16'	4	50	
08-00570-02561			3	0.64	0.5	1	12°	1° 27'	4	50	
08-00570-02562		2°	5	0.78	0.5	1	12°	1° 41'	4	50	
08-00570-02581			3	0.71	0.5	1	12°	2° 11'	4	50	
08-00570-02582		3°	5	0.92	0.5	1	12°	2° 32'	4	50	
08-00570-02592			5	1.2	0.5	1	12°	4° 13'	4	50	
08-00570-03021		R0.3	30'	5	0.67	0.6	1.2	12°	0° 24'	4	50
08-00570-03022				8	0.72	0.6	1.2	12°	0° 27'	4	50
08-00570-03040			1°	4	0.7	0.6	1.2	12°	0° 45'	4	50
08-00570-03041				5	0.73	0.6	1.2	12°	0° 49'	4	50
08-00570-03043	6			0.77	0.6	1.2	12°	0° 51'	4	50	
08-00570-03042	8			0.84	0.6	1.2	12°	0° 53'	4	50	
08-00570-03051	1° 30'		5	0.8	0.6	1.2	12°	1° 13'	4	50	
08-00570-03052			8	0.96	0.6	1.2	12°	1° 19'	4	50	
08-00570-03061	2°		6	0.94	0.6	1.2	12°	1° 41'	4	50	
08-00570-03062			8	1.07	0.6	1.2	12°	1° 46'	4	50	
08-00570-03081	3°		6	1.1	0.6	1.2	12°	2° 32'	4	50	
08-00570-03082			8	1.31	0.6	1.2	12°	2° 39'	4	50	
08-00570-03092	5°		8	1.79	0.6	1.2	12°	4° 25'	4	50	
08-00570-04021	R0.4		30'	8	0.91	0.8	1.6	12°	0° 25'	4	50
08-00570-04022				12	0.98	0.8	1.6	12°	0° 27'	4	60
08-00570-04041			1°	8	1.02	0.8	1.6	12°	0° 50'	4	50
08-00570-04042				12	1.16	0.8	1.6	12°	0° 54'	4	60
08-00570-04051			1° 30'	8	1.14	0.8	1.6	12°	1° 16'	4	50
08-00570-04052		12		1.34	0.8	1.6	12°	1° 21'	4	60	
08-00570-04061		2°	8	1.25	0.8	1.6	12°	1° 42'	4	50	
08-00570-04062			12	1.53	0.8	1.6	12°	1° 48'	4	60	
08-00570-04081		3°	8	1.47	0.8	1.6	12°	2° 31'	4	50	
08-00570-04082			12	1.89	0.8	1.6	12°	2° 41'	4	60	
08-00570-05021		R0.5	30'	10	1.14	1	2	12°	0° 25'	4	60
08-00570-05022				15	1.23	1	2	12°	0° 27'	4	60
08-00570-05023	20			1.31	1	2	12°	0° 28'	4	70	

### Attenzione

Quando ordinate, indicate MRBTN230 (R)×(θ)×(ℓ<sub>1</sub>).  
When you order, indicate MRBTN230 (R)×(θ)×(ℓ<sub>1</sub>).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 321.
- Milling condition is recommended on page 321.

Piane Square  
Scaricate Piano Long Neck Square

Sferiche Ball  
Scaricate Sferiche Long Neck Ball

Coniche Taper  
Coniche Sferiche Taper Ball

Toriche Corner R  
Scaricate Toriche Long Neck Corner R

Frese Sagomate Formed Cutter

Punte Drill

Altro Others

Dati tecnici Technical Data

Guida tecnica Technical Guidance

Codice Code No.	(R) Raggio Radius	(θ) Angolo dello scarico conico Neck Taper Angle	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>1</sub> ) Dia. scarico Neck Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>2</sub> ) Lungh. sotto scarico conico Under Neck Taper Length	(γ) Angolo 2 Neck Taper Angle 2	(α) Angolo effettivo Effective Wall Gradient Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length	
08-00570-05024	R0.5	30'	25	1.41	1	2	12°	0° 29'	4	70	
08-00570-05039			6	1.14	1	2	12°	0° 43'	4	60	
08-00570-05040			8	1.21	1	2	12°	0° 48'	4	60	
08-00570-05041		10	1.28	1	2	12°	0° 50'	4	60		
08-00570-05044		12	1.35	1	2	12°	0° 52'	4	60		
08-00570-05045		15	1.45	1	2	12°	0° 54'	4	60		
08-00570-05046		16	1.49	1	2	12°	0° 54'	4	60		
08-00570-05043		20	1.63	1	2	12°	0° 55'	4	70		
08-00570-05046		22	1.7	1	2	12°	0° 56'	4	70		
08-00570-05047		25	1.8	1	2	12°	0° 56'	4	70		
08-00570-05049		6	1.21	1	2	12°	1° 05'	4	60		
08-00570-05050		8	1.31	1	2	12°	1° 12'	4	60		
08-00570-05051		10	1.42	1	2	12°	1° 16'	4	60		
08-00570-05054		12	1.52	1	2	12°	1° 18'	4	60		
08-00570-05052		15	1.68	1	2	12°	1° 21'	4	60		
08-00570-05055		16	1.73	1	2	12°	1° 21'	4	60		
08-00570-05053		20	1.94	1	2	12°	1° 23'	4	70		
08-00570-05056		22	2.05	1	2	12°	1° 24'	4	70		
08-00570-05057		25	2.2	1	2	12°	1° 24'	4	70		
08-00570-05059		36	2.78	1	2	12°	1° 26'	4	70		
08-00570-05061		10	1.56	1	2	12°	1° 41'	4	60		
08-00570-05062		15	1.91	1	2	12°	1° 48'	4	60		
08-00570-05063		20	2.26	1	2	12°	1° 51'	4	70		
08-00570-05081		10	1.84	1	2	12°	2° 31'	4	60		
08-00570-05082		15	2.36	1	2	12°	2° 41'	4	60		
08-00570-05083		20	2.89	1	2	12°	2° 46'	4	70		
08-00570-05092		15	3.27	1	2	12°	4° 28'	6	60		
08-00570-05093		20	4.15	1	2	12°	4° 37'	6	70		
08-00570-06021		R0.6	30'	12	1.37	1.2	2.4	12°	0° 25'	4	60
08-00570-06022				24	1.58	1.2	2.4	12°	0° 28'	4	70
08-00570-06041	12		1.54	1.2	2.4	12°	0° 51'	4	60		
08-00570-06042	24		1.95	1.2	2.4	12°	0° 55'	4	70		
08-00570-06051	1°		12	1.7	1.2	2.4	12°	1° 16'	4	60	
08-00570-06052			24	2.33	1.2	2.4	12°	1° 23'	4	70	
08-00570-06061	2°		12	1.87	1.2	2.4	12°	1° 41'	4	60	
08-00570-06062			24	2.71	1.2	2.4	12°	1° 51'	4	70	
08-00570-06081	3°		12	2.21	1.2	2.4	12°	2° 32'	4	60	
08-00570-06082			24	3.46	1.2	2.4	12°	2° 46'	6	70	
08-00570-06091	5°		12	2.88	1.2	2.4	12°	4° 13'	4	60	
08-00570-06092			24	4.98	1.2	2.4	12°	4° 37'	6	70	
08-00570-07520	R0.75		30'	10	1.62	1.5	3	12°	0° 23'	4	60
08-00570-07521				15	1.71	1.5	3	12°	0° 25'	4	60



Codice Code No.	(R) Raggio Radius	(θ) Angolo dello scarico conico Neck Taper Angle	(ℓ <sub>1</sub> ) Lunghezza effettiva Effective Length	(d <sub>1</sub> ) Dia. scarico Neck Dia.	(ℓ) Lunghezza tagliente Length of Cut	(ℓ <sub>2</sub> ) Lunghezza sotto scarico conico Under Neck Taper Length	(γ) Angolo 2 Neck Taper Angle 2	(α) Angolo effettivo Effective Wall Gradient Angle	(d) Diametro gambo Shank Dia.	(L) Lunghezza totale Overall Length	
08-00570-07522	R0.75	30°	30	1.97	1.5	3	12°	0° 28'	4	70	
08-00570-07540		1°	10	1.74	1.5	3	12°	0° 45'	4	60	
08-00570-07541			15	1.92	1.5	3	12°	0° 51'	4	60	
08-00570-07543			20	2.09	1.5	3	12°	0° 53'	4	60	
08-00570-07542			30	2.44	1.5	3	12°	0° 55'	4	70	
08-00570-07550		1° 30'	10	1.87	1.5	3	12°	1° 08'	4	60	
08-00570-07551			15	2.13	1.5	3	12°	1° 16'	4	60	
08-00570-07552			30	2.91	1.5	3	12°	1° 23'	4	70	
08-00570-07560		2°	10	1.99	1.5	3	12°	1° 31'	4	60	
08-00570-07561			15	2.34	1.5	3	12°	1° 41'	4	60	
08-00570-07563			20	2.69	1.5	3	12°	1° 46'	4	60	
08-00570-07562			30	3.39	1.5	3	12°	1° 51'	6	70	
08-00570-07581		3°	15	2.76	1.5	3	12°	2° 32'	4	60	
08-00570-07583			20	3.28	1.5	3	12°	2° 39'	4	60	
08-00570-07582			30	4.33	1.5	3	12°	2° 46'	6	70	
08-00570-07591		5°	15	3.6	1.5	3	12°	4° 13'	6	60	
08-00570-07592			28.7	6	1.5	3	12°	4° 36'	6	70	
08-00570-10019		R1	30°	12	2.14	2	4	12°	0° 21'	4	60
08-00570-10020				16	2.21	2	4	12°	0° 24'	4	60
08-00570-10021				20	2.28	2	4	12°	0° 25'	4	60
08-00570-10022	30			2.45	2	4	12°	0° 27'	4	70	
08-00570-10023	40			2.63	2	4	12°	0° 28'	4	80	
08-00570-10039	1°		12	2.28	2	4	12°	0° 43'	4	60	
08-00570-10040			16	2.42	2	4	12°	0° 48'	4	60	
08-00570-10041			20	2.56	2	4	12°	0° 51'	4	60	
08-00570-10044			25	2.73	2	4	12°	0° 53'	4	60	
08-00570-10042	1°		30	2.91	2	4	12°	0° 54'	4	70	
08-00570-10045			35	3.08	2	4	12°	0° 55'	4	80	
08-00570-10043			40	3.26	2	4	12°	0° 55'	6	80	
08-00570-10049			12	2.42	2	4	12°	1° 05'	4	60	
08-00570-10050	1° 30'		16	2.63	2	4	12°	1° 12'	4	60	
08-00570-10051			20	2.84	2	4	12°	1° 16'	4	60	
08-00570-10054			25	3.1	2	4	12°	1° 19'	4	60	
08-00570-10052			30	3.36	2	4	12°	1° 21'	6	70	
08-00570-10055	1° 30'		35	3.62	2	4	12°	1° 22'	6	80	
08-00570-10053			40	3.89	2	4	12°	1° 23'	6	80	
08-00570-10059			2°	12	2.56	2	4	12°	1° 27'	4	60
08-00570-10060		16		2.84	2	4	12°	1° 36'	4	60	
08-00570-10061	20	3.12		2	4	12°	1° 41'	4	60		
08-00570-10062	30	3.82		2	4	12°	1° 48'	6	70		
08-00570-10063	2°	40	4.51	2	4	12°	1° 51'	6	80		
08-00570-10079		3°	12	2.84	2	4	12°	2° 11'	4	60	

### Attenzione

Quando ordinate, indicate MRBTN230 (R)×(θ)×(ℓ<sub>1</sub>).  
When you order, indicate MRBTN230 (R)×(θ)×(ℓ<sub>1</sub>).

\*(γ) è un valore di riferimento.  
\*(γ) is reference value.

- Per i parametri di taglio vedi pagina 321.
- Milling condition is recommended on page 321.

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**CBN**  
Nitruro Cubico  
di Boro

# MRBTN230

**Diamante**  
Diamond

Rivestite  
Coating  
**Piane**  
Square

Non Rivestite  
Non-Coating  
**Scaricate  
Piane**  
Long Neck  
Square

Rivestite  
Coating  
**Sferiche**  
Ball

Non Rivestite  
Non-Coating  
**Scaricate  
Sferiche**  
Long Neck  
Ball

Rivestite  
Coating  
**Coniche**  
Taper

Non Rivestite  
Non-Coating  
**Coniche  
Sferiche**  
Taper Ball

Rivestite  
Coating  
**Toriche**  
Corner R

Non Rivestite  
Non-Coating  
**Scaricate  
Toriche**  
Long Neck  
Corner R

Rivestite  
Coating  
**Frese  
Sagomate**  
Formed  
Cutter

Non Rivestite  
Non-Coating  
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Codice Code No.	(R) Raggio Radius	(θ) Angolo dello scarico conico Neck Taper Angle	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>1</sub> ) Dia. scarico Neck Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>2</sub> ) Lungh. sotto scarico conico Under Neck Taper Length	(γ) Angolo 2 Neck Taper Angle 2	(α) Angolo effettivo Effective Wall Gradient Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length	
08-00570-10080	R1	3°	16	3.26	2	4	12°	2° 24'	4	60	
08-00570-10081			20	3.68	2	4	12°	2° 31'	6	70	
08-00570-10082			30	4.73	2	4	12°	2° 41'	6	70	
08-00570-10083			40	5.77	2	4	12°	2° 46'	6	80	
08-00570-10091		5°	20	4.8	2	4	12°	4° 13'	6	70	
08-00570-10092			26.8	6	2	4	-	4° 25'	6	70	
08-00570-10093			38.2	8	2	4	-	4° 36'	8	80	
08-00570-15018		R1.5	30'	15	3.16	3	6	12°	0° 20'	6	70
08-00570-15019	20			3.24	3	6	12°	0° 22'	6	70	
08-00570-15020	30			3.43	3	6	12°	0° 26'	6	70	
08-00570-15022	40			3.6	3	6	12°	0° 27'	6	80	
08-00570-15021	50			3.77	3	6	12°	0° 27'	6	90	
08-00570-15038	1°		15	3.31	3	6	12°	0° 39'	6	70	
08-00570-15039			20	3.49	3	6	12°	0° 45'	6	70	
08-00570-15040			30	3.84	3	6	12°	0° 51'	6	70	
08-00570-15042			40	4.19	3	6	12°	0° 53'	6	80	
08-00570-15041	1° 30'		50	4.54	3	6	12°	0° 54'	6	90	
08-00570-15048			15	3.47	3	6	12°	1° 00'	6	70	
08-00570-15049			20	3.73	3	6	12°	1° 07'	6	70	
08-00570-15050			30	4.26	3	6	12°	1° 16'	6	70	
08-00570-15052			40	4.78	3	6	12°	1° 19'	6	80	
08-00570-15051			50	5.3	3	6	12°	1° 22'	6	90	
08-00570-15058			2°	15	3.63	3	6	12°	1° 20'	6	70
08-00570-15059				20	3.98	3	6	12°	1° 31'	6	70
08-00570-15060	30			4.68	3	6	12°	1° 41'	6	70	
08-00570-15061	3°		48.9	6	3	6	-	1° 49'	6	90	
08-00570-15079			20	4.47	3	6	12°	2° 16'	6	70	
08-00570-15080		30	5.52	3	6	12°	2° 32'	6	70		
08-00570-15081		50	7.61	3	6	12°	2° 43'	8	90		
08-00570-15091	R2	5°	23.1	6	3	6	-	3° 58'	6	70	
08-00570-20019			30'	20	4.21	4	8	12°	0° 19'	6	70
08-00570-20020				40	4.56	4	8	12°	0° 25'	6	90
08-00570-20021				60	4.91	4	8	12°	0° 27'	6	110
08-00570-20039		1°		20	4.42	4	8	12°	0° 40'	6	70
08-00570-20040			40	5.12	4	8	12°	0° 50'	6	90	
08-00570-20041			60	5.82	4	8	12°	0° 54'	6	110	

Materiale Work Material			Acciaio al carbonio•Acciaio legato•Acciaio pretemprato Carbon Steels•Alloy Steels•Prehardened Steels C50•42CrMo4•39NiCrMo3•AISI304•1.2311•1.2738			
R-Raggio Radius	Angolo Neck Taper Angle	Lungh. effettiva Effective Length	Profondità di taglio Depth of Cut		Giri Spindle Speed min <sup>-1</sup>	Avanzamento Feed mm/min
			a <sub>p</sub> mm	a <sub>e</sub> mm		
0.1	30'	1	0.01	0.01	20,000	~300
		2	0.005	0.005		
	1°	1	0.01	0.01		
		1.5	0.005	0.005		
	1° 30'	1	0.01	0.01		
		1.5	0.005	0.01		
	2°	2	0.005	0.01		
		1	0.01	0.01		
	3°	1.5	0.01	0.01		
		2	0.01	0.02		
	5°	2	0.01	0.02		
		2	0.01	0.02		
0.15	30'	3	0.005	0.01	20,000	~300
	1°	2	0.005	0.01		
		3	0.005	0.01		
	1° 30'	2	0.005	0.01		
		3	0.005	0.01		
	2°	3	0.01	0.02		
3°	3	0.01	0.02			
0.2	30°	2	0.01	0.02	20,000	~500
		3	0.01	0.02		
		4	0.01	0.02		
	1°	2	0.01	0.02		
		3	0.01	0.02		
		4	0.01	0.02		
	1° 30'	2	0.01	0.03		
		3	0.01	0.03		
		4	0.01	0.03		
	2°	2	0.02	0.03		
		3	0.02	0.03		
		4	0.02	0.03		
3°	2	0.02	0.05			
	4	0.02	0.05			
	4	0.02	0.05			
0.25	30'	3	0.01	0.02	20,000	~500
		5	0.01	0.02		
	1°	3	0.01	0.02		
		5	0.01	0.02		
	1° 30'	3	0.01	0.03		
		5	0.01	0.03		
	2°	3	0.02	0.03		
		5	0.02	0.03		
	3°	3	0.02	0.05		
5		0.02	0.05			
0.3	30'	5	0.01	0.02	20,000	~800
		8	0.01	0.02		
	1°	4	0.01	0.02		
		5	0.01	0.02		
		6	0.01	0.02		
		8	0.01	0.02		
	1° 30'	5	0.01	0.03		
		8	0.01	0.03		
	2°	6	0.02	0.03		
		8	0.02	0.03		
	3°	6	0.02	0.05		
		8	0.02	0.05		
	5°	8	0.03	0.05		

**CBN**  
Nitruro Cubico di Boro

**Diamante**

Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate Piane  
Long Neck Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate Sferiche  
Long Neck Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate Toriche  
Long Neck Corner R

Rivestite  
Coating

Frese Sagomate  
Formed Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

Altro

Others

**Dati tecnici**

Technical Data

**Guida tecnica**

Technical Guidance

Materiale Work Material			Acciaio al carbonio•Acciaio legato•Acciaio pretemprato Carbon Steels•Alloy Steels•Prehardened Steels C50•42CrMo4•39NiCrMo3•AISI304•1.2311•1.2738						
R-Raggio Radius	Angolo Neck Taper Angle	Lunghezza effettiva Effective Length	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanzamento Feed			
			a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min			
0.4	30'	8	0.01	0.02	20,000	~1,000			
		12	0.01	0.02					
	1°	8	0.01	0.02					
		12	0.01	0.02					
	1° 30'	8	0.02	0.03					
		12	0.02	0.03					
	2°	8	0.03	0.05					
		12	0.03	0.05					
	3°	8	0.03	0.05					
		12	0.03	0.05					
	0.5	30'	10	0.01			0.03	16,000~20,000	~1,200
			15	0.01			0.02		
20			0.01	0.01					
25			0.005	0.005					
1°		6	0.05	0.07					
		10	0.02	0.05					
		12	0.02	0.05					
		15	0.02	0.03					
		16	0.01	0.03					
		20	0.01	0.02					
		25	0.005	0.01					
1° 30'		6	0.07	0.15					
		8	0.05	0.1					
		10	0.03	0.05					
		12	0.02	0.05					
		15	0.02	0.03					
		16	0.02	0.03					
		20	0.01	0.05					
		22	0.01	0.01					
		25	0.005	0.01					
		36	0.003	0.005					
		10	0.05	0.1					
		2°	15	0.02	0.05				
20			0.01	0.03					
10			0.07	0.15					
3°		15	0.03	0.05					
		20	0.02	0.05					
5°		15	0.07	0.2					
		20	0.03	0.05					
0.6		30'	12	0.03	0.05	16,000~20,000	~1,200		
			24	0.01	0.01				
		1°	12	0.03	0.05				
			24	0.01	0.02				
		1° 30'	12	0.03	0.05				
			24	0.02	0.02				
		2°	12	0.04	0.05				
	24		0.02	0.03					
	3°	12	0.04	0.07					
		24	0.03	0.03					
	5°	12	0.05	0.1					
		24	0.03	0.05					

Materiale Work Material			Acciaio al carbonio•Acciaio legato•Acciaio pretemprato Carbon Steels•Alloy Steels•Prehardened Steels C50•42CrMo4•39NiCrMo3•AISI304•1.2311•1.2738			
R-Raggio Radius	Angolo Neck Taper Angle	Lunghezza effettiva Effective Length	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanzamento Feed
			a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min
0.75	30'	10	0.1	0.2	16,000~20,000	~1,200
		15	0.05	0.1		
		30	0.01	0.01		
	1°	10	0.1	0.2		
		15	0.05	0.1		
		20	0.02	0.05		
	30	10	0.01	0.01		
		15	0.01	0.02		
		30	0.01	0.02		
	1° 30'	10	0.1	0.3		
		15	0.05	0.12		
		20	0.03	0.05		
	2°	30	0.02	0.03		
		15	0.1	0.15		
		20	0.05	0.07		
	3°	30	0.03	0.05		
		15	0.1	0.2		
		28.7	0.05	0.07		
1	30'	12	0.1	0.2	16,000~20,000	~1,600
		16	0.07	0.15		
		20	0.05	0.1		
		30	0.02	0.05		
		40	0.01	0.015		
	1°	16	0.1	0.12		
		20	0.05	0.1		
		25	0.03	0.05		
		30	0.02	0.05		
		35	0.02	0.05		
	1° 30'	40	0.01	0.02		
		12	0.15	0.3		
		16	0.1	0.15		
		20	0.05	0.12		
		25	0.03	0.07		
	2°	30	0.03	0.05		
		35	0.02	0.05		
		40	0.01	0.02		
		12	0.2	0.3		
		16	0.1	0.2		
	3°	20	0.07	0.15		
		30	0.03	0.1		
		40	0.02	0.03		
		12	0.2	0.5		
		16	0.1	0.3		
	5°	20	0.07	0.2		
		30	0.05	0.1		
40		0.02	0.05			
20		0.1	0.1			
5°	26.8	0.08	0.2			
	38.2	0.05	0.12			

**CBN**  
Nitruro Cubico di Boro

**Diamante**

Diamond

Rivestite  
Coating

**Piane**  
Square

Non Rivestite  
Non-Coating

**Scaricate Piane**  
Long Neck Square

Rivestite  
Coating

**Sferiche**  
Ball

Non Rivestite  
Non-Coating

**Scaricate Sferiche**  
Long Neck Ball

Rivestite  
Coating

**Coniche**  
Taper

Non Rivestite  
Non-Coating

**Coniche Sferiche**  
Taper Ball

Rivestite  
Coating

**Toriche**  
Corner R

Non Rivestite  
Non-Coating

**Scaricate Toriche**  
Long Neck Corner R

Rivestite  
Coating

**Frese Sagomate**  
Formed Cutter

Non Rivestite  
Non-Coating

**Frese Sagomate**  
Formed Cutter

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

Technical Data

**Guida tecnica**

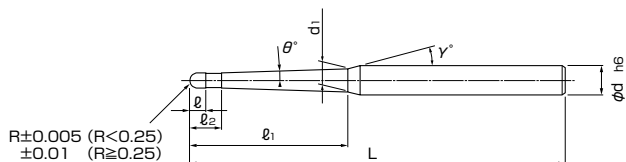
Technical Guidance

Materiale Work Material		Acciaio al carbonio•Acciaio legato•Acciaio pretemprato Carbon Steels•Alloy Steels•Prehardened Steels C50•42CrMo4•39NiCrMo3•AISI304•1.2311•1.2738					
R-Raggio Radius	Angolo Neck Taper Angle	Lunghezza effettiva Effective Length	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanzamento Feed	
			a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	
1.5	30'	15	0.15	0.3	16,000	~1,600	
		20	0.08	0.1			
		30	0.03	0.05			
		40	0.02	0.03			
		50	0.01	0.01			
	1°	15	0.15	0.3			
		20	0.1	0.15			
		30	0.05	0.07			
		40	0.02	0.05			
		50	0.01	0.02			
	1° 30'	15	0.2	0.3			
		20	0.15	0.2			
		30	0.07	0.1			
		40	0.03	0.05			
		50	0.02	0.03			
	2°	15	0.2	0.3			
20		0.15	0.2				
30		0.1	0.1				
48.9		0.03	0.05				
50		0.02	0.03				
3°	20	0.2	0.3				
	30	0.1	0.15				
	50	0.05	0.1				
	2	30'	20	0.2	0.3	14,000	~1,400
			40	0.05	0.1		
60			0.01	0.02			
1°		20	0.2	0.5			
		40	0.07	0.2			
		60	0.01	0.03			
Note	<p>Notes</p> <ul style="list-style-type: none"> <li>※Quando si decidono i parametri di taglio, nel caso in cui la lunghezza effettiva sia lunga e/o l'angolo sia piccolo, si consiglia di scegliere sia la profondità assiale che la profondità radiale al livello inferiore entro la gamma specifica.</li> <li>※Regolate nella stessa proporzione giri ed avanzamento.</li> <li>※Usare lubrorefrigerante con ritardanti di fumo.</li> <li>※Vi raccomandiamo di usare la lubrificazione mininale per la lavorazione di acciai temprati.</li> <li>※When deciding milling condition in case the effective length is long and/or the neck taper angle is small, it is recommended both axial depth of cut and radial depth of cut values are chosen at lower level within the specified range.</li> <li>※Adjust both spindle speed and feed at the same rate.</li> <li>※Use cutting fluid with smoke retardant.</li> <li>※We recommend using oil mist coolant for hardened steels.</li> </ul>						

# MRBTN230L

MUGEN-COATING 2-Flute Extra Long Taper Neck Ball End Mill

## Frese 2 Tagli sferiche extra lunghe con sforno conico rivestite MUGEN



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(θ) Angolo Neck Taper Angle	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>1</sub> ) Dia. scarico Neck Dia.	(ℓ) Lungh. tagliante Length of Cut	(ℓ <sub>2</sub> ) Lungh. sotto scarico conico Under Neck Taper Length	(γ) Angolo <sub>2</sub> Neck Taper Angle 2	(d) Dia. gambo Shank Dia.	(L) totale Overall Length
08-00580-01021	R0.1	30'	2.5	0.24	0.2	0.4	12°	4	50
08-00580-01022			3	0.25	0.2	0.4	12°	4	50
08-00580-01041		1°	2.5	0.27	0.2	0.4	12°	4	50
08-00580-01042			3	0.29	0.2	0.4	12°	4	50
08-00580-01051		1° 30'	2.5	0.31	0.2	0.4	12°	4	50
08-00580-01052			3	0.34	0.2	0.4	12°	4	50
08-00580-01061		2°	2.5	0.35	0.2	0.4	12°	4	50
08-00580-01062			3	0.38	0.2	0.4	12°	4	50
08-00580-01081		3°	2.5	0.42	0.2	0.4	12°	4	50
08-00580-01082			3	0.47	0.2	0.4	12°	4	50
08-00580-01092	5°	3	0.65	0.2	0.4	12°	4	50	
08-00580-01521	R0.15	30'	4	0.36	0.3	0.5	12°	4	50
08-00580-01541		1°	4	0.42	0.3	0.5	12°	4	50
08-00580-01551		1° 30'	4	0.48	0.3	0.5	12°	4	50
08-00580-01561			2°	4	0.54	0.3	0.5	12°	4
08-00580-01581		3°	4	0.67	0.3	0.5	12°	4	50
08-00580-01591			5°	4	0.91	0.3	0.5	12°	4
08-00580-02021	R0.2	30'	5	0.47	0.4	0.8	12°	4	50
08-00580-02022			6	0.49	0.4	0.8	12°	4	50
08-00580-02041		1°	5	0.55	0.4	0.8	12°	4	50
08-00580-02042			6	0.58	0.4	0.8	12°	4	50
08-00580-02051		1° 30'	5	0.62	0.4	0.8	12°	4	50
08-00580-02052			6	0.67	0.4	0.8	12°	4	50
08-00580-02061		2°	5	0.69	0.4	0.8	12°	4	50
08-00580-02062			6	0.76	0.4	0.8	12°	4	50
08-00580-02081		3°	5	0.84	0.4	0.8	12°	4	50
08-00580-02082			6	0.95	0.4	0.8	12°	4	50
08-00580-02092	5°	6	1.31	0.4	0.8	12°	4	50	
08-00580-02521	R0.25	30'	6	0.59	0.5	1	12°	4	50
08-00580-02522			7	0.6	0.5	1	12°	4	50
08-00580-02541		1°	6	0.67	0.5	1	12°	4	50
08-00580-02542			7	0.71	0.5	1	12°	4	50
08-00580-02551		1° 30'	6	0.76	0.5	1	12°	4	50
08-00580-02552			7	0.81	0.5	1	12°	4	50

### Attenzione

Quando ordinate, indicate MRBTN230L (R)×(θ)×(ℓ<sub>1</sub>).  
When you order, indicate MRBTN230L (R)×(θ)×(ℓ<sub>1</sub>).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

Rivestite Coating  
Piane Square

Non Rivestite Non-Coating  
Scaricate Piane Long Neck Square

Rivestite Coating  
Sferiche Ball

Non Rivestite Non-Coating  
Scaricate Sferiche Long Neck Ball

Rivestite Coating  
Coniche Taper

Non Rivestite Non-Coating  
Coniche Sferiche Taper Ball

Rivestite Coating  
Toriche Corner R

Non Rivestite Non-Coating  
Scaricate Toriche Long Neck Corner R

Rivestite Coating  
Frese Sagomate Formed Cutter

Non Rivestite Non-Coating  
Punte Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	( $\theta$ ) Angolo Neck Taper Angle	( $\ell_1$ ) Lungh. effettiva Effective Length	(d1) Dia. scarico Neck Dia.	( $\ell$ ) Lungh. tagliente Length of Cut	( $\ell_2$ ) Lungh. sotto scarico conico Under Neck Taper Length	( $\gamma$ ) Angolo2 Neck Taper Angle 2	(d) Dia. gambo Shank Dia.	(L) totale Overall Length
08-00580-02561	R0.25	2°	6	0.85	0.5	1	12°	4	50
08-00580-02562			7	0.92	0.5	1	12°	4	50
08-00580-02581		3°	6	1.02	0.5	1	12°	4	50
08-00580-02582			7	1.13	0.5	1	12°	4	50
08-00580-02592		5°	7	1.55	0.5	1	12°	4	50
08-00580-03021		R0.3	30'	10	0.75	0.6	1.2	12°	4
08-00580-03022	12			0.79	0.6	1.2	12°	4	60
08-00580-03023	20			0.93	0.6	1.2	12°	4	60
08-00580-03041	1°		10	0.91	0.6	1.2	12°	4	60
08-00580-03042			12	0.98	0.6	1.2	12°	4	60
08-00580-03043			20	1.26	0.6	1.2	12°	4	60
08-00580-03051	1° 30'		10	1.06	0.6	1.2	12°	4	60
08-00580-03052			12	1.17	0.6	1.2	12°	4	60
08-00580-03053			20	1.58	0.6	1.2	12°	4	60
08-00580-03061	2°		10	1.21	0.6	1.2	12°	4	60
08-00580-03062			12	1.35	0.6	1.2	12°	4	60
08-00580-03063			20	1.91	0.6	1.2	12°	4	60
08-00580-03081	3°	10	1.52	0.6	1.2	12°	4	60	
08-00580-03082		12	1.73	0.6	1.2	12°	4	60	
08-00580-03083		20	2.57	0.6	1.2	12°	4	60	
08-00580-03091	5°	10	2.14	0.6	1.2	12°	4	60	
08-00580-03092		12	2.49	0.6	1.2	12°	4	60	
08-00580-03093		20	3.89	0.6	1.2	12°	4	60	
08-00580-04021	R0.4	30'	16	1.05	0.8	1.6	12°	4	60
08-00580-04022			20	1.12	0.8	1.6	12°	4	60
08-00580-04041		1°	16	1.3	0.8	1.6	12°	4	60
08-00580-04042			20	1.44	0.8	1.6	12°	4	60
08-00580-04051		1° 30'	16	1.55	0.8	1.6	12°	4	60
08-00580-04052			20	1.76	0.8	1.6	12°	4	60
08-00580-04061		2°	16	1.81	0.8	1.6	12°	4	60
08-00580-04062			20	2.09	0.8	1.6	12°	4	60
08-00580-04081		3°	16	2.31	0.8	1.6	12°	4	60
08-00580-04082			20	2.73	0.8	1.6	12°	4	60
08-00580-04092		5°	19.8	4	0.8	1.6	-	4	60
08-00580-05021		R0.5	30'	30	1.49	1	2	12°	4
08-00580-05022	50			1.84	1	2	12°	4	90
08-00580-05023	80			2.36	1	2	12°	4	130
08-00580-05041	1°		30	1.98	1	2	12°	4	70
08-00580-05042			50	2.68	1	2	12°	4	90
08-00580-05043			80	3.72	1	2	12°	4	130



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(θ) Angolo Neck Taper Angle	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>1</sub> ) Dia. scarico Neck Dia.	(ℓ) Lungh. tagliante Length of Cut	(ℓ <sub>2</sub> ) Lungh. sotto scarico conico Under Neck Taper Length	(γ) Angolo2 Neck Taper Angle 2	(d) Dia. gambo Shank Dia.	(L) totale Overall Length	
08-00580-05051	R0.5	1° 30'	30	2.47	1	2	12°	4	70	
08-00580-05052			50	3.51	1	2	12°	4	90	
08-00580-05053			80	5.09	1	2	12°	6	130	
08-00580-05061		2°	30	2.96	1	2	12°	4	70	
08-00580-05062			50	4.35	1	2	12°	6	90	
08-00580-05063			73.5	6	1	2	-	6	130	
08-00580-05081		3°	30.6	4	1	2	-	4	70	
08-00580-05082			49.7	6	1	2	-	6	90	
08-00580-05083			80	9.18	1	2	12°	10	130	
08-00580-05091		5°	30.5	6	1	2	-	6	70	
08-00580-05092	53.4		10	1	2	-	10	90		
08-00580-06021	R0.6	30'	36	1.79	1.2	2.4	12°	4	80	
08-00580-06022			48	2	1.2	2.4	12°	4	90	
08-00580-06041		1°	36	2.37	1.2	2.4	12°	4	80	
08-00580-06042			48	2.79	1.2	2.4	12°	4	90	
08-00580-06051		1° 30'	36	2.96	1.2	2.4	12°	4	80	
08-00580-06052			48	3.59	1.2	2.4	12°	4	90	
08-00580-06061		2°	36	3.55	1.2	2.4	12°	4	80	
08-00580-06062			48	4.38	1.2	2.4	12°	6	90	
08-00580-06081		3°	36	4.72	1.2	2.4	12°	6	80	
08-00580-06082			48	6	1.2	2.4	-	6	90	
08-00580-06092		5°	41.2	8	1.2	2.4	-	8	90	
08-00580-07521		R0.75	30'	45	2.23	1.5	3	12°	4	90
08-00580-07522				60	2.49	1.5	3	12°	4	110
08-00580-07541			1°	45	2.97	1.5	3	12°	4	90
08-00580-07542	60			3.49	1.5	3	12°	4	110	
08-00580-07551	1° 30'		45	3.7	1.5	3	12°	4	90	
08-00580-07552			60	4.49	1.5	3	12°	6	110	
08-00580-07561	2°		45	4.43	1.5	3	12°	6	90	
08-00580-07562			60	5.48	1.5	3	12°	6	110	
08-00580-07581	3°		45.9	6	1.5	3	-	6	90	
08-00580-07582			60	7.47	1.5	3	12°	8	110	
08-00580-07591	5°		45	8.85	1.5	3	12°	10	90	
08-00580-07592			60	11.47	1.5	3	12°	12	110	
08-00580-10021	R1		30'	50	2.8	2	4	12°	4	100
08-00580-10022				80	3.33	2	4	12°	4	130
08-00580-10041		1°	50	3.61	2	4	12°	4	100	
08-00580-10042			80	4.65	2	4	12°	6	130	
08-00580-10051		1° 30'	50	4.41	2	4	12°	6	100	
08-00580-10052			80.3	6	2	4	-	6	130	

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

Rivestite Coating  
Piane Square

Non Rivestite Non-Coating  
Scaricate Piane Long Neck Square

Rivestite Coating  
Sferiche Ball

Non Rivestite Non-Coating  
Scaricate Sferiche Long Neck Ball

Rivestite Coating  
Coniche Taper

Non Rivestite Non-Coating  
Coniche Sferiche Taper Ball

Rivestite Coating  
Toriche Corner R

Non Rivestite Non-Coating  
Scaricate Toriche Long Neck Corner R

Rivestite Coating  
Frese Sagomate Formed Cutter

Non Rivestite Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

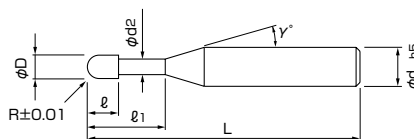
**Guida tecnica**  
Technical Guidance

Codice Code No.	(R) Raggio Radius	(θ) Angolo Neck Taper Angle	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d <sub>1</sub> ) Dia. scarico Neck Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>2</sub> ) Lungh. sotto scarico conico Under Neck Taper Length	(γ) Angolo <sub>2</sub> Neck Taper Angle 2	(d) Dia. gambo Shank Dia.	(L) totale Overall Length
08-00580-10061	R1	2°	50	5.21	2	4	12°	6	100
08-00580-10062			80	7.31	2	4	12°	8	130
08-00580-10081		3°	50	6.82	2	4	12°	8	100
08-00580-10082			80.3	10	2	4	–	10	130
08-00580-10091	R1.5	5°	49.7	10	2	4	–	10	100
08-00580-15021		30'	80	4.29	3	6	12°	6	130
08-00580-15041		1°	80	5.58	3	6	12°	6	130
08-00580-15051		1° 30'	80	6.88	3	6	12°	8	130
08-00580-15061	R2	2°	77.5	8	3	6	–	8	130
08-00580-15081		3°	72.7	10	3	6	–	10	130
08-00580-20021		30'	80	5.26	4	8	12°	6	130
08-00580-20041		1°	80	6.51	4	8	12°	8	130
08-00580-20051	R2.5	1° 30'	60	6.72	4	8	12°	8	110
08-00580-20052			84.3	8	4	8	–	8	130
08-00580-20061		2°	60	7.63	4	8	12°	8	110
08-00580-20062			80	9.03	4	8	12°	10	130
08-00580-20081	R3	3°	60	9.45	4	8	12°	10	110
08-00580-20082			84.3	12	4	8	–	12	130
08-00580-25021		30'	50	5.7	5	10	12°	6	100
08-00580-25022			80	6.22	5	10	12°	8	130
08-00580-25041	R2.5	1°	50	6.4	5	10	12°	8	100
08-00580-25042			80	7.44	5	10	12°	8	130
08-00580-25051		1° 30'	50	7.09	5	10	12°	8	100
08-00580-25052			80	8.67	5	10	12°	10	130
08-00580-25061	R3	2°	52.9	8	5	10	–	8	100
08-00580-25062			81.5	10	5	10	–	10	130
08-00580-25081		3°	57.7	10	5	10	–	10	110
08-00580-30041		R4	1°	69.2	8	6	12	–	8
08-00580-30051	1° 30'		88.3	10	6	12	–	10	140
08-00580-30061	2°		69.3	10	6	12	–	10	130
08-00580-30081	3°		69.2	12	6	12	–	12	130
08-00580-40041	R5	1°	73.2	10	8	16	–	10	130
08-00580-40051			1° 30'	80	11.35	8	16	12°	12
08-00580-40061		2°	73.2	12	8	16	–	12	130
08-00580-50041		R5	1°	77.2	12	10	20	–	12
08-00580-50051	1° 30'		58.2	12	10	20	–	12	110

# DCRB230

Diamond Coating Long Neck Ball End Mill

## Frese sferiche scaricate rivestite diamante



**Dati tecnici** P497



- Lo speciale rivestimento in diamante garantisce una lunga durata nelle lavorazioni di grafite, leghe di alluminio ad alto contenuto di silicio e di materiali fragili.
- La lunghezza della parte scaricata della fresa la rende adatta alla lavorazione di nervature strette e profonde.
- Original Diamond Coating realized a long tool life for the machining of Graphite, silicon-aluminum alloy and brittle materials.
- Long neck design is suited for the machining of narrow and deep area.

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell_2$ ) Lungh. taglienti Length of Cut	(D) Dia. Dia.	(d2) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
05-00520-00201	R0.2	1	0.3	0.4	0.37	12°	4	45
05-00520-00202		2	0.3	0.4	0.37	12°	4	45
05-00520-00204		4	0.3	0.4	0.37	12°	4	45
05-00520-00206		6	0.3	0.4	0.37	12°	4	45
05-00520-00303	R0.3	3	0.45	0.6	0.56	12°	4	45
05-00520-00306		6	0.45	0.6	0.56	12°	4	45
05-00520-00309		9	0.45	0.6	0.56	12°	4	45
05-00520-00312		12	0.45	0.6	0.56	12°	4	45
05-00520-00504	R0.5	4	0.75	1	0.95	12°	4	45
05-00520-00506		6	0.75	1	0.95	12°	4	45
05-00520-00510		10	0.75	1	0.95	12°	4	50
05-00520-00516		16	0.75	1	0.95	12°	4	50
05-00520-00520		20	0.75	1	0.95	12°	4	55
05-00520-01006	R1	6	1.5	2	1.94	12°	4	45
05-00520-01010		10	1.5	2	1.94	12°	4	45
05-00520-01016		16	1.5	2	1.94	12°	4	50
05-00520-01020		20	1.5	2	1.94	12°	4	70
05-00520-01030		30	1.5	2	1.94	12°	4	70
05-00520-01520	R1.5	20	2.5	3	2.85	12°	6	65
05-00520-01540		40	2.5	3	2.85	12°	6	90
05-00520-02015	R2	15	3	4	3.8	12°	6	65
05-00520-02030		30	3	4	3.8	12°	6	70
05-00520-02040		40	3	4	3.8	12°	6	90
05-00520-03030	R3	30	6	6	5.8	—	6	80
05-00520-03060		60	6	6	5.8	—	6	120

### Attenzione

Quando ordinate, indicate DCRB230 (R)×( $\ell_1$ ).  
When you order, indicate DCRB230 (R)×( $\ell_1$ ).

※( $\gamma$ ) è un valore di riferimento.

※( $\gamma$ ) is reference value.

● Per i parametri di taglio vedi pagina 330.

● Milling condition is recommended on page 330.

CBN

Nitruro Cubico di Boro

Diamante

Diamond

Piane  
Square

Scaricate  
Piane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese  
Sagomate

Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Parametri di taglio raccomandati

# DCRB230

### Recommended Milling Conditions

Materiale Work Material		Grafito Graphite				Leghe di alluminio ADC12			
R-Raggio Radius	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	
		min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm
0.2	1	40,000	1,500	0.08	0.1	20,000	800	0.05	0.08
	2	40,000	1,200	0.05	0.1	20,000	600	0.02	0.05
	4	30,000	1,000	0.05	0.1	20,000	200	0.01	0.02
	6	30,000	800	0.03	0.1	20,000	120	0.01	0.01
0.3	3	30,000	1,500	0.1	0.2	20,000	1,000	0.05	0.1
	6	30,000	1,200	0.08	0.2	20,000	600	0.03	0.05
	9	25,000	1,000	0.07	0.15	18,000	400	0.01	0.02
0.5	12	20,000	800	0.05	0.1	15,000	200	0.01	0.01
	4	30,000	2,500	0.2	0.3	20,000	2,000	0.2	0.3
	6	25,000	2,000	0.15	0.3	20,000	1,500	0.1	0.3
	10	20,000	1,800	0.1	0.3	15,000	800	0.05	0.1
1	16	18,000	1,200	0.08	0.2	12,000	500	0.03	0.08
	20	15,000	1,000	0.07	0.2	8,000	300	0.02	0.05
	6	20,000	3,000	0.5	0.6	20,000	2,000	0.3	0.6
	10	20,000	2,500	0.3	0.6	20,000	1,500	0.3	0.6
1.5	16	18,000	2,000	0.2	0.6	15,000	1,200	0.2	0.5
	20	15,000	1,500	0.2	0.5	10,000	1,000	0.1	0.2
	30	12,000	1,000	0.2	0.5	8,000	500	0.05	0.1
	20	20,000	2,500	0.5	1	15,000	1,500	0.5	1
2	40	12,000	1,400	0.3	0.7	7,000	600	0.1	0.3
	15	20,000	3,000	0.5	1.5	16,000	2,000	0.5	1.5
	30	15,000	2,500	0.5	1.5	12,000	1,500	0.5	1.2
3	40	12,000	2,000	0.3	1	8,000	1,000	0.2	0.7
	30	16,000	3,000	0.6	2	12,000	2,000	0.6	2
	60	8,000	2,000	0.4	2	7,000	1,000	0.3	1
Note Notes	<p>※ La grafito dovrebbe essere lavorata con una macchina espressamente progettata per la lavorazione di grafito. Durante la lavorazione della grafito, si raccomanda di utilizzare un aspiratore per proteggersi dalla polvere generata.</p> <p>※ Per lavorare la grafito si raccomanda di utilizzare un refrigerante ad aria.</p> <p>※ Ridurre l'avanzamento per eseguire lavorazioni molto precise e per evitare la rottura del pezzo.</p> <p>※ Regolare con la stessa proporzione giri ed avanzamento per eliminare vibrazioni.</p> <p>※ Graphite should be machined by the machining center designed for graphite machining.</p> <p>When handling with graphite material, dust collector and respirator are recommended to protect against graphite dust.</p> <p>※ Air blow cooling is recommended for the machining of graphite.</p> <p>※ Reduce the feed for high accurate machining and to avoid breakage of work piece.</p> <p>※ Adjust both spindle speed and feed at the same rate when chattering.</p>								

CBN  
Nitruro Cubico di Boro

Diamante

Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

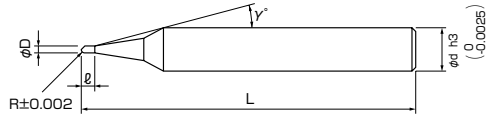
Guida tecnica

Technical Guidance

# NSMB100

Ball End Mill for precision machining "Micro Ball"

## Microfresse sferiche "Micro Ball"

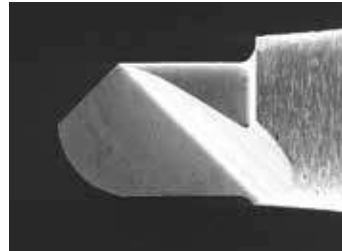


- La prima fresa al mondo con misura R 0.005.
- Le più piccole fresse al mondo "Micro-Ball" ampliano il campo di lavorazioni di elevata precisione.
- La speciale affilatura NS garantisce elevate finiture superficiali
- The world's first standardization of Ball size R0.005. Micro Ball develops new machining field in high-precision technology.
- The world's smallest ball end mill "Micro Ball" extends precision machining field.
- NS original R design exercises fine finishing surface.



Codice Code No.	R - Raggio Radius	(l) Lungh. tagliante Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00003-00005	R0.005	0.01	0.01	15°	4	45
01-00003-00010	R0.01	0.02	0.02	15°	4	45
01-00003-00015	R0.015	0.03	0.03	15°	4	45
01-00003-00020	R0.02	0.04	0.04	15°	4	45
01-00003-00025	R0.025	0.05	0.05	15°	4	45
01-00003-00030	R0.03	0.06	0.06	15°	4	45
01-00003-00040	R0.04	0.08	0.08	15°	4	45
01-00003-00050	R0.05	0.1	0.1	15°	4	45

NSMB100 R0.05

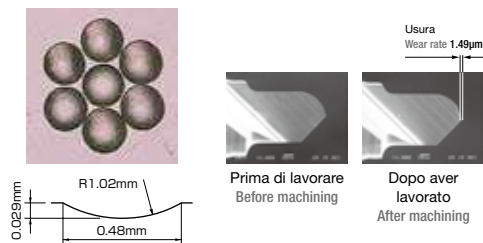


**Attenzione** Quando ordinate, indicate NSMB100 (R). ※(γ) è un valore di riferimento.  
When you order, indicate NSMB100 (R). ※(γ) is reference value.

- Per i parametri di taglio, vedi pagina 332.
- Milling condition is recommended on page 332.

### Dati Tecnici 1 Technical Data 1

#### R0.03 Lenti lenticolari Lens Array Model

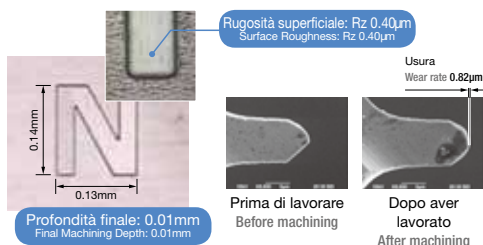


Materiale Work Material	Rame al Berilio Tough Pitch Copper
Giri Spindle Speed	60,000 min <sup>-1</sup>
Avanzamento Feed	Sgrossatura: 50 mm/min Roughing Finitura: 30mm/min Finishing
Prof. di taglio Depth of Cut	Sgrossatura: 1μm×2μm Roughing (ap×ae) Finitura: 1μm×1μm Finishing (ap×ae)
Tempo Time	4hr 40min 4hr 40min
Lungh. fresatura Cutting Length	10.4m
Lubrificante Coolant	Lubrificazione minima Oil Mist

- L'intero pezzo con un solo utensile  
Full process done by one tool.
- ※ap= profondità assiale  
ae= profondità radiale  
ap: Axial Depth of Cut,  
ae: Radial Depth of Cut.

### Dati Tecnici 2 Technical Data 2

#### R0.005 Incisione lettera N N Engraving



Materiale Work Material	1.2311 40HRC
Giri Spindle Speed	60,000min <sup>-1</sup>
Avanzamento Feed	5mm/min
Prof. di taglio Depth of Cut	0.3μm×0.5μm (ap×ae)
Tempo Time	2hr 30min 2hr 30min
Lungh. fresatura Cutting Length	0.8m
Lubrificante Coolant	Lubrificazione minima Oil Mist

- L'intero pezzo con un solo utensile  
Full process done by one tool.
- ※ap= profondità assiale  
ae= profondità radiale  
ap: Axial Depth of Cut,  
ae: Radial Depth of Cut.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Fresse  
Sagomate

Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Parametri di taglio raccomandati

# NSMB100

### Recommended Milling Conditions

Materiale Work Material	Rame•Alluminio Tough pitch copper•Aluminum				
	Profondità di taglio Depth of Cut		Avanzamento Feed	Avanzamento iniziale Approaching Feed	Giri Spindle Speed
(R) Raggio Radius Size	$a_p$ mm	$a_e$ mm	mm/min	mm/min	min <sup>-1</sup>
0.005	0.0003	0.0005	5	2	60,000
0.01	0.0005	0.001	10	3	60,000
0.02	0.001	0.002	20	5	60,000
0.03	0.002	0.003	80	10	60,000
0.04	0.002	0.004	200	30	60,000
0.05	0.003	0.005	300	30	60,000
Note Notes	<p>※Profondità di taglio: <math>a_p</math> = profondità assiale, <math>a_e</math> = profondità radiale.                      ※Maneggiare con cura durante il montaggio e il presettaggio.                      ※Usare un refrigerante appropriato per il tipo di materiale e di lavorazione da eseguire.                      ※Minimizzare l'eccentricità del serraggio                      (si raccomanda di controllare l'eccentricità dinamica).                      ※Utilizzare l'approccio a rampa con un angolo di 3° inferiore.                      ※Incrementare la profondità di taglio può provocare la rottura dell'utensile, fare particolarmente attenzione alla profondità assiale.</p> <p>※Depth of Cut; <math>a_p</math>=Axial Depth of Cut / <math>a_e</math>=Radial Depth of Cut.                      ※Handle with care when exchanging and presetting tool.                      ※Use proper type of coolant for work material and machining process.                      ※Minimize chucking runout                      (Recommend to measure actual runout at activated spindle speed).                      ※Tool approaching angle must be 3 degrees or below.                      ※Increase of Depth of Cut may cause a tool breakage, especially careful for Axial Depth of Cut.</p>				

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

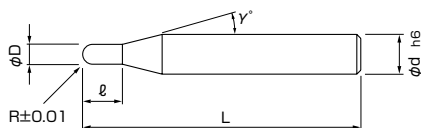
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# NCB-2

2-Flute Miniature Ball End Mill

## Frese 2 Tagli sferiche per miniature



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	R - Raggio Radius	(ℓ) Lungh. tagliante Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00512-00200	R0.2	0.8	0.4	9°	3	35
01-00512-00250	R0.25	1	0.5	9°	3	35
01-00512-00300	R0.3	1.2	0.6	9°	3	35
01-00512-00350	R0.35	1.4	0.7	9°	3	35
01-00512-00400	R0.4	1.6	0.8	9°	3	35
01-00512-00450	R0.45	1.8	0.9	9°	3	35
01-00512-00500	R0.5	2	1	9°	3	35
01-00512-00600	R0.6	2.4	1.2	9°	3	35
01-00512-00700	R0.7	2.8	1.4	9°	3	35
01-00512-00750	R0.75	3	1.5	9°	3	35
01-00512-00800	R0.8	3.2	1.6	9°	3	35
01-00512-00900	R0.9	3.6	1.8	9°	3	35

**Attenzione** Quando ordinate, indicate NCB-2 (R).  
When you order, indicate NCB-2 (R).

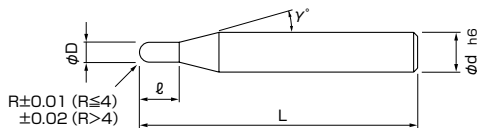
※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio, vedi pagina 334.
- Milling condition is recommended on page 334.

# NSB-2

2-Flute Ball End Mill

## Frese 2 Tagli sferiche



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	R - Raggio Radius	(ℓ) Lungh. tagliante Length of Cut	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00522-00100	R1	3	2	9°	4	60
01-00522-00125	R1.25	3.5	2.5	9°	4	60
01-00522-00150	R1.5	4	3	9°	6	60
01-00522-00175	R1.75	5	3.5	9°	6	60
01-00522-00200	R2	6	4	9°	6	60
01-00522-00250	R2.5	8	5	9°	6	60
01-00522-00300	R3	10	6	-	6	80
01-00522-00350	R3.5	13	7	9°	8	90
01-00522-00400	R4	13	8	-	8	90
01-00522-00450	R4.5	15	9	9°	10	100
01-00522-00500	R5	15	10	-	10	100
01-00522-00550	R5.5	15	11	9°	12	110
01-00522-00600	R6	15	12	-	12	110
01-00522-00700	R7	20	14	9°	16	160
01-00522-00800	R8	20	16	-	16	160
01-00522-00900	R9	25	18	9°	20	170
01-00522-01000	R10	25	20	-	20	170

**Attenzione** Quando ordinate, indicate NSB-2 (R).  
When you order, indicate NSB-2 (R).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio, vedi pagina 334.
- Milling condition is recommended on page 334.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Parametri di taglio raccomandati

# NCB-2

### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio•Acciaio legato•Acciaio pretemprato Carbon Steels•Alloy Steels•Prehardened Steels C50•42CrMo4•39NiCrMo3•AIS1304•1.2311•1.2738	
Velocità di taglio Cutting Speed	50m/min	
Raggio Radius	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min
0.2	40,000	700
0.25	32,000	750
0.3	27,000	750
0.4	20,000	870
0.5	13,300	870
0.6	11,400	870
0.7	10,600	870
0.75	10,000	870
0.8	9,000	870
0.9	8,800	850
Profondità di taglio Depth of Cut		
(R) Raggio Radius.	※Usare lubrorefrigerante. ※Regolare con stessa proporzione giri ed avanzamento. ※Use cutting fluid. ※Adjust both spindle speed and feed at the same rate.	
Note Notes		

Diamante  
Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Parametri di taglio raccomandati

# NSB-2

### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50	Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AIS1304	Acciaio pretemprato Prehardened Steels 1.2311•1.2738(~45HRC)
Velocità di taglio Cutting Speed	80m/min		60m/min
(R) Raggio Radius	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed
	min <sup>-1</sup>	mm/min	mm/min
1	12,700	700	9,600
1.5	8,500	700	6,400
2	6,400	700	4,800
2.5	5,100	700	3,800
3	4,200	700	3,200
4	3,200	700	2,400
5	2,500	700	1,900
6	2,100	700	1,600
8	1,600	700	1,200
10	1,300	700	1,000
Profondità di taglio Depth of Cut			
R: Raggio Radius.	※Usare lubrorefrigerante. ※La tabella sopra indicata mostra i parametri di taglio per la lavorazione di una superficie piana; per superfici inclinate, regolare l'avanzamento. ※I giri e l'avanzamento devono essere regolati in funzione della sporgenza della fresa e della profondità di taglio. ※Use cutting fluid. ※This table shows milling conditions of straight tool path. Adjust feed for inclined surface. ※Spindle speed and feed are changed according to overhang length and depth of cut.		
Note Notes			



# NSBL-2

2-Flute Long Ball End Mill

## Frese 2 Tagli sferiche serie lunga



- Articolo semistandar, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size : mm

Codice Code No.	R - Raggio Radius	(l) Lungh. tagliante Length of Cut	(D) Dia. Dia.	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00530-00300	R3	15	6	6	120
01-00530-00400	R4	20	8	8	130
01-00530-00500	R5	25	10	10	150
01-00530-00600	R6	30	12	12	180
01-00530-00800	R8	40	16	16	200
01-00530-01000	R10	50	20	20	220

### Attenzione

Quando ordinate, indicate NSBL-2 (R).  
When you order, indicate NSBL-2 (R).

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck  
Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck  
Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck  
Corner R

**Frese Sagomate**  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

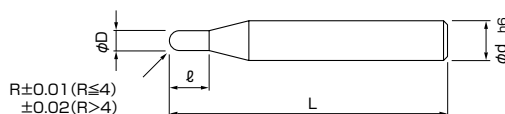
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NLBL-2

2-Flute Extra Long Ball End Mill

## Frese 2 Tagli sferiche serie extra lunga



- Articolo semistandard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	R - Raggio Radius	(ℓ) Lungh. taglienti Length of Cut	(D) Dia. Dia.	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00528-00051	R0.5	5	1	4	50
01-00528-00071	R0.75	8	1.5	4	50
01-00528-00101	R1	10	2	4	100
01-00528-00121	R1.25	13	2.5	4	100
01-00528-00151	R1.5	10	3	6	60
01-00528-00152		15	3	6	100
01-00528-00171	R1.75	10	3.5	6	60
01-00528-00172		18	3.5	6	100
01-00528-00201	R2	10	4	6	60
01-00528-00202		15	4	6	80
01-00528-00203		20	4	6	100
01-00528-00221	R2.25	22	4.5	6	100
01-00528-00251	R2.5	15	5	6	60
01-00528-00252		20	5	6	80
01-00528-00253		25	5	6	100
01-00528-00271	R2.75	28	5.5	6	100
01-00528-00301	R3	20	6	6	100
01-00528-00302		30	6	6	150
01-00528-00351	R3.5	20	7	8	90
01-00528-00352		35	7	8	150
01-00528-00401	R4	20	8	8	90
01-00528-00402		40	8	8	150
01-00528-00451	R4.5	25	9	10	100
01-00528-00452		45	9	10	150

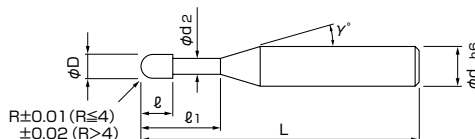
Codice Code No.	R - Raggio Radius	(ℓ) Lungh. taglienti Length of Cut	(D) Dia. Dia.	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00528-00501	R5	30	10	10	100
01-00528-00502		40	10	10	150
01-00528-00503		50	10	10	200
01-00528-00551	R5.5	30	11	12	110
01-00528-00552		50	11	12	150
01-00528-00601	R6	30	12	12	110
01-00528-00602		55	12	12	150
01-00528-00651	R6.5	30	13	12	120
01-00528-00652		55	13	12	150
01-00528-00701	R7	30	14	12	140
01-00528-00702		55	14	12	200
01-00528-00751	R7.5	35	15	16	160
01-00528-00752		60	15	16	200
01-00528-00801	R8	35	16	16	160
01-00528-00802		50	16	16	200
01-00528-00803		60	16	16	230
01-00528-00851	R8.5	35	17	16	160
01-00528-00852		60	17	16	200
01-00528-00901	R9	40	18	20	170
01-00528-00902		70	18	20	250
01-00528-00951	R9.5	40	19	20	170
01-00528-00952		70	19	20	250
01-00528-01001	R10	40	20	20	170
01-00528-01002		55	20	20	200
01-00528-01003		70	20	20	250

**Attenzione** Quando ordinate, indicate NLBL-2 (R)×(ℓ).  
When you order, indicate NLBL-2 (R)×(ℓ).

# NHB-2

2-Flute Long Neck Ball End Mill

## Frese 2 Tagli sferiche scaricate



- Articolo semistandard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	R- Raggio Radius	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell$ ) Lungh. tagliante Length of Cut	(D) Dia. Dia.	( $d_2$ ) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00432-00401	R0.4	6	0.6	0.8	0.76	12°	4	45
01-00432-00402		8	0.6	0.8	0.76	12°	4	45
01-00432-00502	R0.5	8	0.75	1	0.95	12°	4	45
01-00432-00503		12	0.75	1	0.95	12°	4	45
01-00432-00602	R0.6	8	0.9	1.2	1.15	12°	4	45
01-00432-00603		12	0.9	1.2	1.15	12°	4	45
01-00432-00702	R0.7	8	1	1.4	1.35	12°	4	45
01-00432-00703		12	1	1.4	1.35	12°	4	45
01-00432-00704		16	1	1.4	1.35	12°	4	50
01-00432-00752	R0.75	8	1.1	1.5	1.45	12°	4	45
01-00432-00753		12	1.1	1.5	1.45	12°	4	45
01-00432-00754		16	1.1	1.5	1.45	12°	4	50
01-00432-00755		20	1.1	1.5	1.45	12°	4	55
01-00432-00802	R0.8	8	1.2	1.6	1.55	12°	4	45
01-00432-00803		12	1.2	1.6	1.55	12°	4	45
01-00432-00804		16	1.2	1.6	1.55	12°	4	50
01-00432-00805		20	1.2	1.6	1.55	12°	4	55
01-00432-00902	R0.9	8	1.3	1.8	1.74	12°	4	45
01-00432-00903		12	1.3	1.8	1.74	12°	4	45
01-00432-00904		16	1.3	1.8	1.74	12°	4	50
01-00432-00905		20	1.3	1.8	1.74	12°	4	55
01-00432-01002	R1	8	1.5	2	1.94	12°	4	45
01-00432-01003		12	1.5	2	1.94	12°	4	45
01-00432-01004		16	1.5	2	1.94	12°	4	50
01-00432-01005		20	1.5	2	1.94	12°	4	55
01-00432-01510	R1.5	10	2.5	3	2.85	12°	6	60
01-00432-01515		15	2.5	3	2.85	12°	6	60
01-00432-01520		20	2.5	3	2.85	12°	6	65
01-00432-01525		25	2.5	3	2.85	12°	6	65
01-00432-02015	R2	15	3	4	3.8	12°	6	65
01-00432-02020		20	3	4	3.8	12°	6	65
01-00432-02025		25	3	4	3.8	12°	6	70
01-00432-02030		30	3	4	3.8	12°	6	70

**Attenzione** Quando ordinate, indicate NHB-2 (R)×( $\ell_1$ ).  
When you order, indicate NHB-2 (R)×( $\ell_1$ ).

※ ( $\gamma$ ) è un valore di riferimento.  
※ ( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 339.
- Milling condition is recommended on page 339.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Piane**  
Long Neck  
Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Sferiche**  
Long Neck  
Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche**  
**Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate**  
**Toriche**  
Long Neck  
Corner R

**Rivestite**  
Coating  
**Frese**  
**Sagomate**  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Codice Code No.	R- Raggio Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00432-02520	R2.5	20	3.5	5	4.8	12°	6	70
01-00432-02525		25	3.5	5	4.8	12°	6	70
01-00432-02530		30	3.5	5	4.8	12°	6	80
01-00432-02535		35	3.5	5	4.8	12°	6	80
01-00432-03030	R3	30	6	6	5.8	12°	6	80
01-00432-03050		50	6	6	5.8	12°	6	120
01-00432-04040	R4	40	8	8	7.8	12°	8	90
01-00432-04060		60	8	8	7.8	12°	8	130
01-00432-05050	R5	50	10	10	9.8	12°	10	100
01-00432-05070		70	10	10	9.8	12°	10	150

## Parametri di taglio raccomandati

### Recommended Milling Conditions

# NHB-2

Materiale Work Material		Acciaio al carbonio•Acciaio legato•Acciaio pretemprato Carbon Steels•Alloy Steels•Prehardened Steels C50•42CrMo4•39NiCrMo3• AISI304•1.2311•1.2738		Alluminio Aluminum		Rame Copper		Plastica Plastics	
Velocità di taglio Cutting Speed		30~50 m/min		100~200 m/min		50~150 m/min		40~60 m/min	
R-Raggio Radius	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	mm	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.4	0.01~0.02	12,000~20,000	100~250	40,000~	500~ 800	20,000~	300~ 750	16,000~24,000	190~240
0.5	0.01~0.03	9,600~16,000	150~400	32,000~	750~1,600	16,000~48,000	450~1,200	12,700~19,100	190~240
0.6	0.016~0.06	8,000~13,300	150~400	26,500~	750~1,600	13,300~40,000	450~1,200	10,600~16,000	250~320
0.7	0.012~0.1	6,800~11,400	150~400	22,700~45,500	750~1,600	11,400~34,100	450~1,200	9,100~13,600	250~320
0.75	0.008~0.12	6,400~10,600	150~400	20,000~40,000	750~1,600	10,600~32,000	450~1,200	8,500~12,700	250~320
0.8	0.012~0.15	6,000~10,000	150~400	19,900~39,800	750~1,600	10,000~30,000	450~1,200	8,000~12,000	250~320
0.9	0.02~0.18	5,300~ 8,800	150~400	17,700~35,400	750~1,600	8,800~26,500	450~1,200	7,100~10,600	250~320
1	0.03~0.2	4,800~ 8,000	150~400	16,000~32,000	750~1,600	8,000~24,000	450~1,200	6,400~ 9,600	250~320
1.5	0.08~0.3	3,200~ 5,300	150~400	10,600~21,200	750~1,600	5,300~16,000	450~1,200	4,200~ 6,400	250~320
2	0.12~0.3	2,400~ 4,000	150~400	8,000~16,000	750~1,600	4,000~12,000	450~1,200	3,200~ 4,800	190~240
2.5	0.2~0.3	1,900~ 3,200	150~400	6,400~12,700	750~1,600	3,200~ 9,600	450~1,200	2,500~ 3,800	160~200
3	0.2~0.3	1,600~ 2,700	150~400	5,300~10,600	750~1,600	2,700~ 8,000	450~1,200	2,100~ 3,200	160~200
4	0.2~0.3	1,200~ 2,000	150~400	4,000~ 8,000	750~1,600	2,000~ 6,000	450~1,200	1,600~ 2,400	160~200
5	0.2~0.3	1,000~ 1,600	150~400	3,200~ 6,400	750~1,600	1,600~ 4,800	450~1,200	1,300~ 1,900	160~200
Note Notes		※Regolare con la stessa proporzione giri ed avanzamento. ※Usare lubrificante con ritardanti di fumo. ※Adjust spindle speed, feed and depth of cut according to effective length. ※Use cutting fluid with smoke retardant.							

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

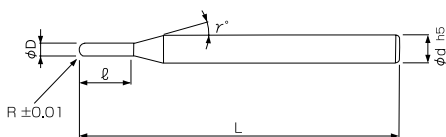
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

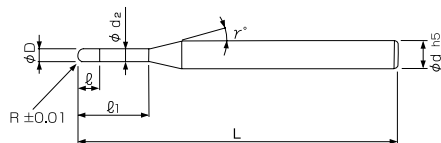
## Frese sferiche per alluminio



Type I: normale



Type II: scaricata



**Dati tecnici** P500



- L'esclusivo design NS delle eliche riduce le vibrazioni nelle lavorazioni degli angoli e in parete.
- NS unique flute design reduces chattering at corner and side milling.

Unità di misura: mm Unit size: mm

Codice Code No.	R- Raggio Radius	(ℓ) Lungh. tagliente Length of Cut	(ℓ1) Lungh. effettiva Effective Length	Tipo Type	(D) Dia. Dia.	(d2) Dia. scarico Under Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00638-03001	R0.3	0.45	3	II	0.6	0.56	12°	4	60
01-00638-04001	R0.4	0.6	4	II	0.8	0.76	12°	4	60
01-00638-05001	R0.5	2	-	I	1	-	12°	4	60
01-00638-05011		0.75	5	II	1	0.95	12°	4	60
01-00638-05013		0.75	10	II	1	0.95	12°	4	60
01-00638-07501	R0.75	3	-	I	1.5	-	12°	4	60
01-00638-07511		1.1	7.5	II	1.5	1.45	12°	4	60
01-00638-07513		1.1	15	II	1.5	1.45	12°	4	60
01-00638-10001	R1	4	-	I	2	-	12°	4	60
01-00638-10011		1.5	10	II	2	1.94	12°	4	60
01-00638-10013		1.5	20	II	2	1.94	12°	4	60
01-00638-15001	R1.5	6	-	I	3	-	12°	6	60
01-00638-15011		2.5	15	II	3	2.85	12°	6	60
01-00638-15013		2.5	30	II	3	2.85	12°	6	70
01-00638-20001	R2	8	-	I	4	-	12°	6	70
01-00638-20011		3	20	II	4	3.8	12°	6	80
01-00638-20013		3	40	II	4	3.8	12°	6	90
01-00638-25001	R2.5	10	-	I	5	-	12°	6	80
01-00638-25011		3.5	25	II	5	4.8	12°	6	80
01-00638-25013		3.5	50	II	5	4.8	12°	6	100
01-00638-30001	R3	12	-	I	6	-	-	6	90
01-00638-30011		6	30	II	6	5.8	-	6	90
01-00638-30013		6	60	II	6	5.8	-	6	120
01-00638-40001	R4	16	-	I	8	-	-	8	90
01-00638-50001	R5	20	-	I	10	-	-	10	100
01-00638-60001	R6	24	-	I	12	-	-	12	110

**Attenzione** Quando ordinate, indicate ALB225 (R)×(ℓ)[×(ℓ1)].  
When you order, indicate ALB225 (R)×(ℓ) [×(ℓ1)].

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 342.
- Milling condition is recommended on page 342.

# ALB225-DLC

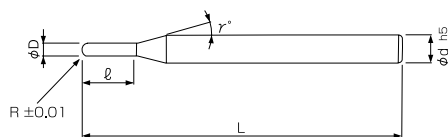
Novità

DLC-Coating Ball End Mill for Aluminum

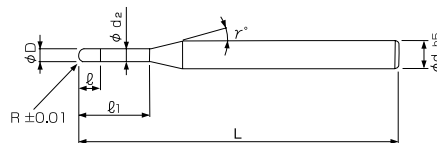
## Frese sferiche per alluminio rivestite DLC



Type I: normale



Type II: scaricata



- Il nostro originale rivestimento DLC è adatto per lavorazioni di lunga durata.
- Our original DLC coating are adopted, it is suitable for cutting for long time.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	R- Raggio Radius	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	Tipo Type	(D) Dia. Dia.	(d <sub>2</sub> ) Dia. scarico Under Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00668-03001	R0.3	0.45	3	II	0.6	0.56	12°	4	60
01-00668-04001	R0.4	0.6	4	II	0.8	0.76	12°	4	60
01-00668-05001	R0.5	2	-	I	1	-	12°	4	60
01-00668-05011		0.75	5	II	1	0.95	12°	4	60
01-00668-05013		0.75	10	II	1	0.95	12°	4	60
01-00668-07501	R0.75	3	-	I	1.5	-	12°	4	60
01-00668-07511		1.1	7.5	II	1.5	1.45	12°	4	60
01-00668-07513		1.1	15	II	1.5	1.45	12°	4	60
01-00668-10001	R1	4	-	I	2	-	12°	4	60
01-00668-10011		1.5	10	II	2	1.94	12°	4	60
01-00668-10013		1.5	20	II	2	1.94	12°	4	60
01-00668-15001	R1.5	6	-	I	3	-	12°	6	60
01-00668-15011		2.5	15	II	3	2.85	12°	6	60
01-00668-15013		2.5	30	II	3	2.85	12°	6	70
01-00668-20001	R2	8	-	I	4	-	12°	6	70
01-00668-20011		3	20	II	4	3.8	12°	6	80
01-00668-20013		3	40	II	4	3.8	12°	6	90
01-00668-25001	R2.5	10	-	I	5	-	12°	6	80
01-00668-25011		3.5	25	II	5	4.8	12°	6	80
01-00668-25013		3.5	50	II	5	4.8	12°	6	100
01-00668-30001	R3	12	-	I	6	-	-	6	90
01-00668-30011		6	30	II	6	5.8	-	6	90
01-00668-30013		6	60	II	6	5.8	-	6	120
01-00668-40001	R4	16	-	I	8	-	-	8	90
01-00668-50001	R5	20	-	I	10	-	-	10	100
01-00668-60001	R6	24	-	I	12	-	-	12	110

### Attenzione

Quando ordinate, indicate ALB225-DLC (R)×(ℓ)×(ℓ<sub>1</sub>).  
When you order, indicate ALB225-DLC (R)×(ℓ) ×(ℓ<sub>1</sub>).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 342.
- Milling condition is recommended on page 342.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# Parametri di taglio raccomandati

# ALB225 • ALB225-DLC

## Recommended Milling Conditions

Materiale Work Material			Alluminio A2017•A5052•A7075							
			Condizioni Generali di fresatura General Milling Conditions				Condizioni di fresatura HSC High Speed Milling Conditions			
Sporgenza utensile Tool Overhung			L/D ≥ 10				L/D < 10			
R - Raggio Radius	Lunghezza tagliente Length of Cut	Lunghezza effettiva Effective Length	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of cut		Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of cut	
			min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm
0.3	0.45	3	20,000	1,000	0.1	0.2	40,000	2,000	0.1	0.2
			20,000	1,000	0.1	0.2	40,000	2,000	0.1	0.2
0.4	0.6	4	20,000	1,000	0.1	0.2	40,000	2,000	0.1	0.2
			20,000	2,000	0.3	0.3	40,000	4,000	0.3	0.3
0.5	0.75	5	20,000	1,500	0.3	0.3	30,000	3,000	0.3	0.3
			10,000	1,000	0.2	0.2	20,000	2,000	0.2	0.2
0.75	3	-	20,000	2,000	0.3	0.5	40,000	4,000	0.3	0.5
			16,000	1,600	0.3	0.5	30,000	3,000	0.3	0.5
1	1.1	7.5	10,000	1,000	0.2	0.3	20,000	2,000	0.2	0.3
			10,000	1,000	0.2	0.3	20,000	2,000	0.2	0.3
1	4	-	20,000	2,000	0.5	0.5	30,000	4,000	0.5	0.5
			15,000	1,500	0.3	0.5	20,000	3,000	0.3	0.5
1.5	1.5	20	12,000	1,200	0.2	0.5	15,000	2,000	0.2	0.5
			18,000	2,000	0.6	1	25,000	4,000	0.6	1
1.5	2.5	15	15,000	1,600	0.6	1	20,000	3,000	0.6	1
			12,000	1,200	0.3	1	15,000	2,000	0.3	1
2	8	-	14,000	2,000	0.5	1.5	20,000	4,000	0.5	1.5
			12,000	1,500	0.5	1.5	16,000	3,000	0.5	1.5
2	3	20	8,000	1,000	0.3	1.5	12,000	2,000	0.3	1.5
			8,000	3,000	0.8	1.8	20,000	5,000	0.8	1.8
2.5	3.5	25	8,000	2,000	0.8	1.8	15,000	3,000	0.8	1.8
			5,000	1,500	0.5	1.8	10,000	2,000	0.5	1.8
3	12	-	12,000	3,000	1	2	20,000	5,000	1	2
			8,000	2,000	1	2	15,000	4,000	1	2
3	6	30	8,000	2,000	1	2	15,000	4,000	1	2
			5,000	1,200	0.6	2	10,000	2,000	0.6	2
4	16	-	10,000	2,000	1	2	15,000	3,000	1	2
5	20	-	8,000	2,000	2	3	12,000	3,000	2	3
6	24	-	6,000	2,000	3	4	10,000	3,000	3	4

Note  
Notes

- ※ Profondità di taglio: **ap** = profondità di taglio assiale, **ae** = profondità di taglio radiale.
- ※ Regolate con la stessa proporzione giri ed avanzamento  
(Quando utilizzate velocità pari o superiori a 20.000 giri, regolate nella stessa proporzione).
- ※ Usare un mandrino rigido e preciso.
- ※ Regolare le condizioni di taglio quando si producono vibrazioni o suoni anomali; questo dipende dalla rigidità della macchina o dal mandrino.
- ※ Si consiglia l'utilizzo di lubrificante refrigerante.
- ※ Depth of Cut: **ap**=Axial Depth of Cut / **ae**=Radial Depth of Cut.
- ※ Adjust both spindle speed and feed at the same rate.  
(When using spindle speed 20,000 or more, the same adjustment is required.)
- ※ Use a rigid and precise machine and chuck holder.
- ※ Adjust milling conditions when vibration and abnormal sounds occur according to the rigidity of the machine and the chuck holder, or work clamping condition.
- ※ Water soluble cutting fluid is recommended.

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate Piane  
Long Neck Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

Rivestite  
Coating  
Frese  
Sagomate

Non Rivestite  
Non-Coating  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance



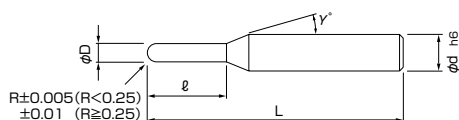
# RSB230

Ball End Mill for Resin

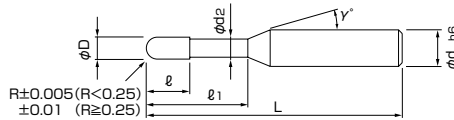
## Frese 2 Tagli sferiche per resine



Type I: normale



Type II: scaricata



- Scegliete la fresa giusta per la vostra lavorazione, 3D, 5D o 10D, con o senza scarico.
- Utilizzabile su materiali non ferrosi come alluminio e rame.
- Select the right one for your job, 3D or 5D or 10D Length of cut, with Extra Long-neck or without neck.
- Applicable to nonferrous material such as Aluminum and copper.



Unità di misura: mm Unit size: mm

Codice Code No.	R- Raggio Radius	( $\ell$ ) Lungh. tagliante Length of Cut	( $\ell_1$ ) Lungh. effettiva Effective Length	Tipo Type	(D) Dia. Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d2) Dia. scarico Neck Dia.	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00654-01000	R0.1	0.6	-	I	0.2	9°	-	4	50
01-00654-01001		1	-	I	0.2	9°	-	4	50
01-00654-01002		0.6	2	II	0.2	12°	0.18	4	50
01-00654-01500	R0.15	0.9	-	I	0.3	9°	-	4	50
01-00654-01501		1.5	-	I	0.3	9°	-	4	50
01-00654-01503		0.9	3	II	0.3	12°	0.28	4	50
01-00654-02000	R0.2	1.2	-	I	0.4	9°	-	4	50
01-00654-02001		2	-	I	0.4	9°	-	4	50
01-00654-02004		1.2	4	II	0.4	12°	0.37	4	50
01-00654-02005		1.2	5	II	0.4	12°	0.37	4	50
01-00654-02500	R0.25	1.5	-	I	0.5	9°	-	4	50
01-00654-02501		2.5	-	I	0.5	9°	-	4	50
01-00654-02502		5	-	I	0.5	9°	-	4	50
01-00654-02510		1.5	10	II	0.5	12°	0.46	4	50
01-00654-02515		1.5	15	II	0.5	12°	0.46	4	50
01-00654-02520	1.5	20	II	0.5	12°	0.46	4	60	
01-00654-03000	R0.3	1.8	-	I	0.6	9°	-	4	50
01-00654-03001		3	-	I	0.6	9°	-	4	50
01-00654-03006		1.8	6	II	0.6	12°	0.56	4	50
01-00654-03010		1.8	10	II	0.6	12°	0.56	4	50
01-00654-04000	R0.4	2.4	-	I	0.8	9°	-	4	50
01-00654-04001		4	-	I	0.8	9°	-	4	50
01-00654-04008		2.4	8	II	0.8	12°	0.76	4	50
01-00654-04012		2.4	12	II	0.8	12°	0.76	4	50
01-00654-05000	R0.5	3	-	I	1	9°	-	4	50
01-00654-05001		5	-	I	1	9°	-	4	50
01-00654-05002		10	-	I	1	9°	-	4	50
01-00654-05010		3	10	II	1	12°	0.95	4	50

### Attenzione

Quando ordinate, indicate RSB230 (R)×( $\ell$ ) [x( $\ell_1$ )]. Scegliere il dia. gambo (d) per il tipo I di R1.5 x 9  $\ell$  e R2 x 12  $\ell$ .  
When you order, indicate RSB230 (R)×( $\ell$ ) [x( $\ell_1$ )]. Choose Shank Dia. (d) for type I of R1.5×9 $\ell$  and R2×12 $\ell$ .

\*( $\gamma$ ) è un valore di riferimento.

\*( $\gamma$ ) is reference value.

CBN

Nitrato Cubico di Boro

Diamante

Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# RSB230

Ball End Mill for Resin

## Frese 2 Tagli sferiche per resine

Unità di misura: mm Unit size: mm

Codice Code No.	R- Raggio Radius	(ℓ) Lungh. tagliente Length of Cut	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	Tipo Type	(D) Dia. Dia.	(γ) Angolo Neck Taper Angle	(d <sub>2</sub> ) Dia scarico Neck Dia.	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00654-05015	R0.5	3	15	II	1	12°	0.95	4	60
01-00654-05020		3	20	II	1	12°	0.95	4	60
01-00654-05030		3	30	II	1	12°	0.95	4	70
01-00654-07500	R0.75	4.5	–	I	1.5	9°	–	4	50
01-00654-07501		7.5	–	I	1.5	9°	–	4	50
01-00654-07502		15	–	I	1.5	9°	–	4	60
01-00654-07515		4.5	15	II	1.5	12°	1.45	4	60
01-00654-07530		4.5	30	II	1.5	12°	1.45	4	70
01-00654-07545		4.5	45	II	1.5	12°	1.45	4	90
01-00654-10000	R1	6	–	I	2	9°	–	4	50
01-00654-10001		10	–	I	2	9°	–	4	50
01-00654-10002		20	–	I	2	9°	–	4	60
01-00654-10020		6	20	II	2	12°	1.94	4	60
01-00654-10030		6	30	II	2	12°	1.94	4	80
01-00654-10050		6	50	II	2	12°	1.94	4	110
01-00654-10070		6	70	II	2	12°	1.94	4	110
01-00654-15000	R1.5	9	–	I	3	–	–	3	100
01-00654-15001		9	–	I	3	9°	–	6	50
01-00654-15002		15	–	I	3	9°	–	6	60
01-00654-15030		9	30	II	3	12°	2.85	6	70
01-00654-15045		9	45	II	3	12°	2.85	6	90
01-00654-15060		9	60	II	3	12°	2.85	6	110
01-00654-20000	R2	12	–	I	4	–	–	4	120
01-00654-20001		12	–	I	4	9°	–	6	50
01-00654-20002		20	–	I	4	9°	–	6	60
01-00654-20030		12	30	II	4	12°	3.8	6	70
01-00654-20040		12	40	II	4	12°	3.8	6	90
01-00654-20070		12	70	II	4	12°	3.8	6	120
01-00654-25000	R2.5	15	–	I	5	9°	–	6	70
01-00654-25001		25	–	I	5	9°	–	6	80
01-00654-30000	R3	18	–	I	6	–	–	6	80
01-00654-30001		30	–	I	6	–	–	6	90
01-00654-30040		18	40	II	6	–	5.8	6	100
01-00654-30060		18	60	II	6	–	5.8	6	120
01-00654-30080		18	80	II	6	–	5.8	6	130

### Attenzione

Quando ordinate, indicate RSB230 (R)×(ℓ) [×(ℓ<sub>1</sub>)]. Scegliere il dia. gambo (d) per il tipo I di R1.5 x 9 ℓ e R2 x 12 ℓ.  
When you order, indicate RSB230 (R)×(ℓ) [×(ℓ<sub>1</sub>)]. Choose Shank Dia. (d) for type I of R1.5×9ℓ and R2×12ℓ.

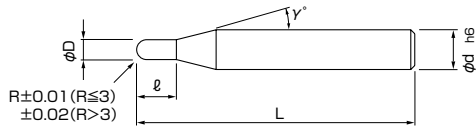
※(γ) è un valore di riferimento.

※(γ) is reference value.

# DB

## 2-Flute Ball End Mill for Nonferrous

### Frese 2 Tagli sferiche per materiali non ferrosi



- Articolo semi standard, prezzo e consegna su richiesta
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	R- Raggio Radius	(l) Lungh. tagliante Length of Cut	(D) Dia. Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
07-00523-00050	R0.5	2	1	9°	4	45
07-00523-00075	R0.75	3	1.5	9°	4	45
07-00523-00100	R1	4	2	12°	6	60
07-00523-00125	R1.25	5	2.5	9°	6	60
07-00523-00150	R1.5	6	3	9°	6	60
07-00523-00175	R1.75	7	3.5	9°	6	60
07-00523-00200	R2	8	4	9°	6	60
07-00523-00250	R2.5	10	5	9°	6	60
07-00523-00300	R3	12	6	-	6	80
07-00523-00400	R4	16	8	-	8	90
07-00523-00500	R5	20	10	-	10	100
07-00523-00600	R6	24	12	-	12	110
07-00523-00800	R8	32	16	-	16	150
07-00523-01000	R10	40	20	-	20	170

**Attenzione** Quando ordinate, indicate DB (R).  
When you order, indicate DB (R).

- \* ( $\gamma$ ) è un valore di riferimento.
- \* ( $\gamma$ ) is reference value.
- Per i parametri di taglio vedi pagina 347.
- Milling condition is recommended on page 347.

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck  
Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck  
Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck  
Corner R

**Frese Sagomate**  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating  
Punte  
Drill

**Altro**  
Others

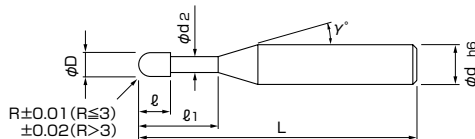
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# DHB

2-Flute Long Neck Ball End Mill for Nonferrous

## Frese 2 Tagli sferiche scaricate per materiali non ferrosi



- Articolo semi standard, prezzo e consegna su richiesta
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Code Code No.	R- Raggio Radius	( $\ell_1$ ) Lung. effettiva Effective Length	( $\ell$ ) Lung. tagliente Length of Cut	(D) Dia. Dia.	(d2) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
07-00432-00504	R0.5	4	1.5	1	0.95	12°	4	50
07-00432-00506		6	1.5	1	0.95	12°	4	50
07-00432-00510		10	1.5	1	0.95	12°	4	50
07-00432-00706	R0.75	6	2.25	1.5	1.45	12°	4	50
07-00432-00710		10	2.25	1.5	1.45	12°	4	50
07-00432-00716		16	2.25	1.5	1.45	12°	4	50
07-00432-01008	R1	8	3	2	1.94	12°	4	50
07-00432-01014		14	3	2	1.94	12°	4	50
07-00432-01020		20	3	2	1.94	12°	4	50
07-00432-01515	R1.5	15	4.5	3	2.85	12°	6	60
07-00432-01525		25	4.5	3	2.85	12°	6	60
07-00432-01535		35	4.5	3	2.85	12°	6	80
07-00432-02020	R2	20	6	4	3.8	12°	6	60
07-00432-02030		30	6	4	3.8	12°	6	70
07-00432-02040		40	6	4	3.8	12°	6	90
07-00432-02520	R2.5	20	7.5	5	4.8	12°	6	60
07-00432-02530		30	7.5	5	4.8	12°	6	70
07-00432-02540		40	7.5	5	4.8	12°	6	90
07-00432-03020	R3	20	9	6	5.8	-	6	60
07-00432-03030		30	9	6	5.8	12°	8	90
07-00432-03050		50	9	6	5.8	12°	8	110
07-00432-04020	R4	20	12	8	7.8	-	8	70
07-00432-04040		40	12	8	7.8	12°	10	100
07-00432-04060		60	12	8	7.8	12°	10	120
07-00432-05030	R5	30	15	10	9.8	-	10	90
07-00432-05050		50	15	10	9.8	12°	12	120
07-00432-05070		70	15	10	9.8	12°	12	140
07-00432-06040	R6	40	18	12	11.8	-	12	110
07-00432-06060		60	18	12	11.8	12°	16	130
07-00432-06080		80	18	12	11.8	12°	16	160

**Attenzione** Quando ordinate, indicate DHB (R)×( $\ell_1$ ).  
When you order, indicate DHB (R)×( $\ell_1$ ).

※( $\gamma$ ) è un valore di riferimento.  
※( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 348.
- Milling condition is recommended on page 348.

Materiale Work Material	Rame Copper			Alluminio Aluminum		
Velocità di taglio Cutting Speed	70~100m/min			100~200m/min		
R- Raggio Radius	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Sgrossatura Roughing	Finitura Finishing		Sgrossatura Roughing	Finitura Finishing
0.5	32,000	200	550	47,000	320	860
0.75	21,000	200	550	47,000	320	860
1	16,000	200	550	23,800	600	860
1.25	13,000	250	700	19,000	750	1,650
1.5	11,000	250	700	16,000	750	1,650
1.75	9,200	250	700	13,600	750	1,650
2	8,000	250	700	12,000	750	1,650
2.5	6,400	250	700	9,600	750	1,650
3	5,300	250	700	8,000	750	1,650
4	4,000	250	700	6,000	750	1,650
5	3,200	250	700	4,800	750	1,650
6	2,700	250	700	4,200	750	1,650
8	2,000	250	700	3,000	750	1,650
10	1,600	250	700	2,300	750	1,650
Profondità di taglio Depth of Cut						
(R) Raggio Radius.						
Note Notes	<ul style="list-style-type: none"> <li>※ Usare lubrorefrigerante.</li> <li>※ Regolate con la stessa proporzione giri ed avanzamento.</li> <li>※ Non utilizzare per fresare acciaio.</li> <li>※ Use cutting fluid.</li> <li>※ Adjust both spindle speed and feed at the same rate.</li> <li>※ Don't use for cutting steels.</li> </ul>					

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
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Technical Guidance

## Parametri di taglio raccomandati

# DHB

### Recommended Milling Conditions

Materiale Work Material		Rame Copper		Alluminio Aluminum		Plastica Plastics	
Velocità di taglio Cutting Speed		50~150m/min		100~200m/min		40~60m/min	
R - Raggio Radius	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	mm	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.5	0.015~0.18	15,900~47,800	450~1,200	31,800~	750~1,600	12,700~19,100	250~320
0.75	0.02~0.25	10,600~31,800	450~1,200	21,200~42,500	750~1,600	8,500~12,700	250~320
1	0.03~0.3	8,000~23,900	450~1,200	15,900~31,800	750~1,600	6,400~ 9,600	250~320
1.5	0.03~0.3	5,300~15,900	450~1,200	10,600~21,200	750~1,600	4,200~ 6,400	250~320
2	0.07~0.4	4,000~11,900	450~1,200	8,000~15,900	750~1,600	3,200~ 4,800	190~240
2.5	1~2.5	3,200~ 9,600	200~ 250	6,400~12,700	600~ 750	2,500~ 3,800	160~200
3	2~3	2,700~ 8,000	200~ 250	5,300~10,600	600~ 750	2,100~ 3,200	160~200
4	2~4	2,000~ 6,000	200~ 250	4,000~ 8,000	600~ 750	1,600~ 2,400	160~200
5	3~5	1,600~ 4,800	200~ 250	3,200~ 6,400	600~ 750	1,300~ 1,900	160~200
6	3.5~6	1,300~ 4,000	200~ 250	2,700~ 5,300	600~ 750	1,100~ 1,600	160~200
Note Notes		※Regolate giri, avanzamento e profondità di taglio in funzione della lunghezza effettiva. ※Usare lubrificante con ritardanti di fumo. ※Non utilizzare per fresare acciaio. ※Adjust spindle speed, feed and depth of cut according to effective length. ※Use cutting fluid with smoke retardant. ※Don't use for cutting steels.					

CBN  
Nitruro Cubico  
di Boro

Diamante

Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

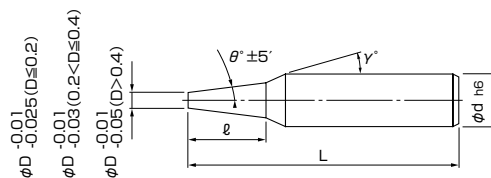
Guida tecnica

Technical Guidance

# MTE230

MUGEN-COATING 2-Flute Taper End Mill

## Frese 2 Tagli piane coniche rivestite MUGEN



- Il rivestimento MUGEN garantisce lunghe durate nelle lavorazioni coniche.
- Disponibile dal dia. 0.2 mm. al dia. 10 mm. con conicità da 30' a 20° (inferiori al dia. 6).
- MUGEN-COATING realizes long tool life at tapered cutting.
- Available from Dia. 0.2 mm to Dia. 10 mm and taper angle are from 30' to 20° (less than dia. 6).



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scarico conico Taper Angle	( $\ell$ ) Lungh. tagliante Length of Cut	(d) Dia. massimo Dia. at Large End	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
08-00300-00202	0.2	30'	0.8	0.21	9°	4	45	
08-00300-00204		1°	0.8	0.23	9°	4	45	
08-00300-00205		1° 30'	0.8	0.24	9°	4	45	
08-00300-00206		2°	0.8	0.26	9°	4	45	
08-00300-00208		3°	0.8	0.28	9°	4	45	
08-00300-00212		5°	0.8	0.34	9°	4	45	
08-00300-00219		10°	0.8	0.48	-	4	45	
08-00300-00302		0.3	30'	1.2	0.32	9°	4	45
08-00300-00304			1°	1.2	0.34	9°	4	45
08-00300-00305			1° 30'	1.2	0.36	9°	4	45
08-00300-00306	2°		1.2	0.38	9°	4	45	
08-00300-00308	3°		1.2	0.43	9°	4	45	
08-00300-00312	5°		1.2	0.51	9°	4	45	
08-00300-00319	10°	1.2	0.72	-	4	45		
08-00300-00402	0.4	30'	1.6	0.43	9°	4	45	
08-00300-00404		1°	1.6	0.46	9°	4	45	
08-00300-00405		1° 30'	1.6	0.48	9°	4	45	
08-00300-00406		2°	1.6	0.51	9°	4	45	
08-00300-00408		3°	1.6	0.57	9°	4	45	
08-00300-00412		5°	1.6	0.68	9°	4	45	
08-00300-00419	10°	1.6	0.96	-	4	45		
08-00300-00502	0.5	30'	2	0.53	9°	4	45	
08-00300-00504		1°	2	0.57	9°	4	45	
08-00300-00505		1° 30'	2	0.60	9°	4	45	
08-00300-00506		2°	2	0.64	9°	4	45	
08-00300-00508		3°	2	0.71	9°	4	45	
08-00300-00510		4°	2	0.78	9°	4	45	
08-00300-00512		5°	2	0.85	9°	4	45	
08-00300-00514		6°	2	0.92	9°	4	45	
08-00300-00516		7°	2	0.99	9°	4	45	
08-00300-00519		10°	2	1.21	-	4	45	
08-00300-00524	15°	2	1.57	15°	4	45		
08-00300-00525	20°	2	1.96	15°	4	45		
08-00300-00602	0.6	30'	2	0.63	9°	4	45	
08-00300-00604		1°	2	0.67	9°	4	45	

08-00300-00605	0.6	1° 30'	2	0.70	9°	4	45
08-00300-00606		2°	2	0.74	9°	4	45
08-00300-00608		3°	2	0.81	9°	4	45
08-00300-00610		4°	2	0.88	9°	4	45
08-00300-00612		5°	2	0.95	9°	4	45
08-00300-00614		6°	2	1.02	9°	4	45
08-00300-00616		7°	2	1.09	9°	4	45
08-00300-00619		10°	2	1.31	-	4	45
08-00300-00624		15°	2	1.67	15°	4	45
08-00300-00625		20°	2	2.06	15°	4	45
08-00300-00702	0.7	30'	2	0.73	9°	4	45
08-00300-00704		1°	2	0.77	9°	4	45
08-00300-00705		1° 30'	2	0.80	9°	4	45
08-00300-00706		2°	2	0.84	9°	4	45
08-00300-00708		3°	2	0.91	9°	4	45
08-00300-00710		4°	2	0.98	9°	4	45
08-00300-00712		5°	2	1.05	9°	4	45
08-00300-00714		6°	2	1.12	9°	4	45
08-00300-00716		7°	2	1.19	9°	4	45
08-00300-00719		10°	2	1.41	-	4	45
08-00300-00724	15°	2	1.77	15°	4	45	
08-00300-00725	20°	2	2.16	15°	4	45	
08-00300-00802	0.8	30'	3	0.85	9°	4	45
08-00300-00804		1°	3	0.90	9°	4	45
08-00300-00805		1° 30'	3	0.96	9°	4	45
08-00300-00806		2°	3	1.01	9°	4	45
08-00300-00808		3°	3	1.11	9°	4	45
08-00300-00810		4°	3	1.21	9°	4	45
08-00300-00812		5°	3	1.32	9°	4	45
08-00300-00814		6°	3	1.43	9°	4	45
08-00300-00816		7°	3	1.54	9°	4	45
08-00300-00819		10°	3	1.86	-	4	45
08-00300-00824	15°	3	2.41	15°	4	45	
08-00300-00825	20°	3	2.98	-	4	45	

**Attenzione** Quando ordinate, indiate MTE230 (D)×(θ).

When you order, indicate MTE230 (D)×(θ).

- Per i parametri di taglio vedi pagina 352.
- Milling condition is recommended on page 352.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

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Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

**Non Rivestite**  
Non-Coating  
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico tagliente Taper Angle	(ℓ) Lungh. tagliente Length of Cut.	(d) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
08-00300-00902	0.9	30°	3	0.95	9°	4	45	
08-00300-00904		1°	3	1.00	9°	4	45	
08-00300-00905		1° 30'	3	1.06	9°	4	45	
08-00300-00906		2°	3	1.11	9°	4	45	
08-00300-00908		3°	3	1.21	9°	4	45	
08-00300-00910		4°	3	1.32	9°	4	45	
08-00300-00912		5°	3	1.42	9°	4	45	
08-00300-00914		6°	3	1.53	9°	4	45	
08-00300-00916		7°	3	1.64	9°	4	45	
08-00300-00919		10°	3	1.96	-	4	45	
08-00300-00924		15°	3	2.51	15°	4	45	
08-00300-00925		20°	3	3.08	-	4	45	
08-00300-01002		1	30°	4	1.07	9°	4	45
08-00300-01004			1°	4	1.14	9°	4	45
08-00300-01005			1° 30'	4	1.21	9°	4	45
08-00300-01006			2°	4	1.28	9°	4	45
08-00300-01008	3°		4	1.42	9°	4	45	
08-00300-01010	4°		4	1.56	9°	4	45	
08-00300-01012	5°		4	1.70	9°	4	45	
08-00300-01014	6°		4	1.84	9°	4	45	
08-00300-01016	7°		4	1.98	9°	4	45	
08-00300-01019	10°		4	2.41	-	4	45	
08-00300-01024	15°		4	3.14	15°	6	50	
08-00300-01025	20°		4	3.91	15°	6	50	
08-00300-01502	1.5		30°	5	1.59	9°	4	45
08-00300-01504			1°	5	1.67	9°	4	45
08-00300-01505			1° 30'	5	1.76	9°	4	45
08-00300-01506			2°	5	1.85	9°	4	45
08-00300-01508		3°	5	2.02	9°	4	45	
08-00300-01510		4°	5	2.20	9°	4	45	
08-00300-01512		5°	5	2.37	9°	4	45	
08-00300-01514		6°	5	2.55	9°	4	45	
08-00300-01516		7°	5	2.73	9°	4	45	
08-00300-01519		10°	5	3.26	-	4	45	
08-00300-01524		15°	5	4.18	15°	6	50	
08-00300-01525		20°	5	5.14	-	6	50	

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico tagliente Taper Angle	(ℓ) Lungh. tagliente Length of Cut.	(d) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
08-00300-02002	2	30°	6	2.10	9°	4	45	
08-00300-02004		1°	6	2.21	9°	4	45	
08-00300-02005		1° 30'	6	2.31	9°	4	45	
08-00300-02006		2°	6	2.41	9°	4	45	
08-00300-02008		3°	6	2.62	9°	4	45	
08-00300-02010		4°	6	2.84	9°	4	45	
08-00300-02012		5°	6	3.05	9°	4	45	
08-00300-02014		6°	6	3.26	9°	4	45	
08-00300-02016		7°	6	3.47	-	4	45	
08-00300-02019		10°	6	4.11	-	6	50	
08-00300-02024		15°	6	5.22	-	6	50	
08-00300-02025		20°	6	6.37	-	6	50	
08-00300-02502		2.5	30°	8	2.64	9°	4	45
08-00300-02504			1°	8	2.78	9°	4	45
08-00300-02505			1° 30'	8	2.91	9°	4	45
08-00300-02506			2°	8	3.05	9°	4	45
08-00300-02508	3°		8	3.33	9°	4	45	
08-00300-02510	4°		8	3.62	-	4	45	
08-00300-02512	5°		8	3.90	-	4	45	
08-00300-02514	6°		8	4.18	-	4	50	
08-00300-02516	7°		8	4.46	-	4	50	
08-00300-02519	10°		8	5.32	-	6	50	
08-00300-02524	15°		8	6.79	-	6	50	
08-00300-02525	20°		8	8.32	-	8	60	
08-00300-03002	3		30°	10	3.17	9°	6	50
08-00300-03004			1°	10	3.35	9°	6	50
08-00300-03005			1° 30'	10	3.52	9°	6	50
08-00300-03006			2°	10	3.69	9°	6	50
08-00300-03008		3°	10	4.05	9°	6	50	
08-00300-03010		4°	10	4.40	9°	6	50	
08-00300-03012		5°	10	4.75	9°	6	50	
08-00300-03014		6°	10	5.10	-	6	50	
08-00300-03016		7°	10	5.46	-	6	50	
08-00300-03019		10°	10	6.53	-	6	50	
08-00300-03024		15°	10	8.36	-	8	60	
08-00300-03025		20°	10	10.30	-	10	70	

**Attenzione** Quando ordinate, indicate MTE230 (D)×(θ).  
When you order, indicate MTE230 (D)×(θ).

- Per i parametri di taglio vedi pagina 352.
- Milling condition is recommended on page 352.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico conico Taper Angle	(ℓ) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00300-04002	4	30°	15	4.26	9°	6	50
08-00300-04004		1°	15	4.52	9°	6	50
08-00300-04005		1° 30'	15	4.79	9°	6	50
08-00300-04006		2°	15	5.04	9°	6	50
08-00300-04008		3°	15	5.57	9°	6	50
08-00300-04010		4°	15	6.10	-	6	55
08-00300-04012		5°	15	6.62	-	6	55
08-00300-04014		6°	15	7.15	-	6	55
08-00300-04016		7°	15	7.68	-	6	55
08-00300-04019		10°	15	9.29	-	8	60
08-00300-04024		15°	15	12.04	-	12	80
08-00300-04025		20°	15	14.92	-	12	80
08-00300-05002	5	30°	20	5.34	9°	6	55
08-00300-05004		1°	20	5.70	9°	6	55
08-00300-05005		1° 30'	20	6.04	-	6	55
08-00300-05006		2°	20	6.39	-	6	55
08-00300-05008		3°	20	7.10	-	6	55
08-00300-05010		4°	20	7.80	-	6	60
08-00300-05012		5°	20	8.50	-	8	60
08-00300-05014		6°	20	9.20	-	8	60
08-00300-05016		7°	20	9.91	-	10	70
08-00300-05019		10°	20	12.05	-	12	80
08-00300-05024		15°	20	15.72	-	16	90
08-00300-05025		20°	20	19.56	-	20	100
08-00300-06002	6	30°	20	6.35	-	6	55
08-00300-06004		1°	20	6.70	-	6	55
08-00300-06005		1° 30'	20	7.05	-	6	55
08-00300-06006		2°	20	7.40	-	6	55
08-00300-06008		3°	20	8.10	-	8	60
08-00300-06010		4°	20	8.80	-	8	65
08-00300-06012		5°	20	9.50	-	8	65
08-00300-06014		6°	20	10.20	-	10	70
08-00300-06016		7°	20	10.91	-	10	70
08-00300-06019		10°	20	13.05	-	12	80
08-00300-06024		15°	20	16.72	-	16	90
08-00300-06025		20°	20	20.56	-	20	100

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico conico Taper Angle	(ℓ) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00300-08002	8	30°	25	8.44	-	8	65
08-00300-08004		1°	25	8.87	-	8	65
08-00300-08005		1° 30'	25	9.31	-	8	65
08-00300-08006		2°	25	9.74	-	8	65
08-00300-08008		3°	25	10.62	-	10	70
08-00300-08012		5°	25	12.37	-	12	90
08-00300-10002	10	30°	35	10.61	-	10	85
08-00300-10004		1°	35	11.22	-	10	85
08-00300-10005		1° 30'	35	11.83	-	10	85
08-00300-10006		2°	35	12.44	-	12	90
08-00300-10008		3°	35	13.67	-	12	90
08-00300-10012		5°	35	16.12	-	16	90

## Attenzione

Quando ordinate, indicate MTE230 (D)×(θ).  
When you order, indicate MTE230 (D)×(θ).

- Per i parametri di taglio vedi pagina 352.
- Milling condition is recommended on page 352.

## Parametri di taglio raccomandati

# MTE230

### Recommended Milling Conditions

(Cava Ø0.5~1 Slotting)

Materiale Work Material		Acciaio al carbonio•Acciaio legato• Acciaio pretemprato Carbon Steels•Alloy Steels Prehardened Steels (~40HRC)		Alluminio Aluminum		Rame Copper	
Velocità di taglio Cutting Speed		40~70m/min		150~300m/min		80~150m/min	
Dia. Dia.	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	mm	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.5	0.005~0.01	38,000	300	50,000	400	25,000	200
0.6	0.01~0.02	32,000	300	50,000	400	25,000	200
0.7	0.01~0.03	27,000	300	50,000	500	25,000	250
0.8	0.02~0.04	24,000	400	50,000	650	25,000	330
0.9	0.03~0.06	21,000	400	50,000	800	25,000	400
1	0.03~0.08	19,000	400	50,000	1,000	25,000	500
Note Notes		<p>※Usare lubrificante refrigerante.                      ※Regolare giri ed avanzamenti in funzione della conicità della fresa.                      ※Durante la lavorazione di angoli, ridurre l'avanzamento approssimativamente dal 30 al 50%.                      ※Regolare con la stessa proporzione giri ed avanzamento e ridurre anche la profondità di taglio, se il numero di giri è insufficiente.                      ※Si consiglia di eseguire fresatura bidirezionale.                      ※Use cutting fluid.                      ※Adjust spindle speed and feed according to inclined angle.                      ※When corner processing, reduce the feed by approximately 50%~30%.                      ※Adjust spindle speed and feed at the same rate also reduce depth of cut, if the machine spindle speed insufficient.                      ※Recommend reciprocating cutting.</p>					

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

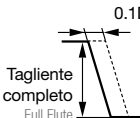
Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato•Acciaio da utensili• Acciaio pretemprato Alloy Steels•Tool Steels Prehardened Steels 42CrMo4•39NiCrMo3•1.2311•1.2738		Acciaio pretemprato Prehardened Steels 1.2343 (~45HRC)	
Velocità di taglio Cutting Speed	50~70m/min		40~60m/min		30~50m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1.5	12,700	330	10,600	250	8,500	200
2	9,600	400	8,000	300	6,400	270
2.5	7,600	450	6,400	330	5,100	300
3	6,400	450	5,300	330	4,300	300
4	4,800	450	4,000	330	3,200	300
5	3,800	450	3,200	330	2,600	300
6	3,200	450	2,700	330	2,200	300
8	2,400	480	2,000	360	1,600	330
10	1,900	480	1,600	360	1,300	330
Profondità di taglio Depth of Cut	Spallamento conico Taper Side Milling 					
(D) Dia. Dia.						
Note Notes	※Usare lubrorefrigerante. ※Regolare giri ed avanzamenti in funzione della conicità della fresa. ※Durante la lavorazione di angoli, ridurre l'avanzamento dal 50% al 30%. ※Regolare con la stessa proporzione giri ed avanzamento e ridurre anche la profondità di taglio, se il numero di giri è insufficiente. ※Use cutting fluid. ※Adjust spindle speed and feed according to inclined angle. ※When corner processing, reduce the feed by approximately 50%~30%. ※Adjust spindle speed and feed at the same rate also reduce depth of cut, if the machine spindle speed insufficient.					

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

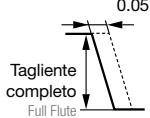
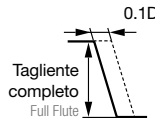
**Guida tecnica**  
Technical Guidance

## Parametri di taglio raccomandati

# MTE230

### Recommended Milling Conditions

(Spallamento Ø1.5~10 Side Milling)

Materiale Work Material	Acciaio temprato Hardened Steels (~55HRC)		Alluminio Aluminum		Rame Copper	
Velocità di taglio Cutting Speed	20m/min		150~300m/min		80~150m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1.5	4,300	110	50,000	1,300	25,000	650
2	3,200	130	48,000	2,000	24,000	1,000
2.5	2,700	150	38,200	2,200	19,100	1,100
3	2,200	150	32,000	2,200	16,000	1,100
4	1,600	150	24,000	2,200	12,000	1,100
5	1,300	150	19,100	2,200	9,600	1,100
6	1,100	150	16,000	2,200	8,000	1,100
8	800	160	12,000	2,200	6,000	1,100
10	650	160	9,600	2,200	4,800	1,100
Profondità di taglio Depth of Cut	Spallamento conico Taper Side Milling 0.05D 		Spallamento conico Taper Side Milling 0.1D 			
(D) Dia. Dia.						
Note Notes	<ul style="list-style-type: none"> <li>※ Usare lubrificante.</li> <li>※ Regolare giri ed avanzamenti in funzione della conicità della fresa.</li> <li>※ Durante la lavorazione di angoli, ridurre l'avanzamento dal 30% al 50%.</li> <li>※ Regolare con la stessa proporzione giri ed avanzamento e ridurre anche la profondità di taglio, se il numero di giri è insufficiente.</li> <li>※ Use cutting fluid.</li> <li>※ Adjust spindle speed and feed according to inclined angle.</li> <li>※ When corner processing, reduce the feed by approximately 50%~30%.</li> <li>※ Adjust spindle speed and feed at the same rate also reduce depth of cut, if the machine spindle speed insufficient.</li> </ul>					

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

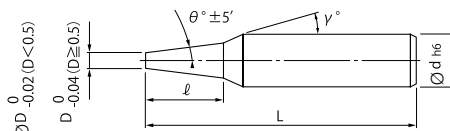
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# MRT425

MUGEN-COATING 4-Flute Taper End Mill for Deep Rib

## Frese 4 Tagli piani coniche per nervature profonde rivestite MUGEN



**2 Taglienti effettivi**  
2 Cutting edges on end



- Grazie all'esclusivo design NS, è possibile eseguire lavorazioni efficienti e ad alta precisione.
- It is possible for high precision and efficiency cutting by NS original design.

Code No.	(D) Dia.	(θ) Angolo scarico conico Taper Angle	(ℓ) Lung. tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
08-00310-02022	0.2	30'	2	0.23	15°	3	40
08-00310-02023		1°		0.27	15°	3	40
08-00310-02024		1° 30'		0.30	15°	3	40
08-00310-02025		2°		0.34	15°	3	40
08-00310-03032	0.3	30'	3	0.35	15°	3	40
08-00310-03033		1°		0.40	15°	3	40
08-00310-03034		1° 30'		0.46	15°	3	40
08-00310-03035	2°	0.51	15°	3	40		
08-00310-04042	0.4	30'	4	0.47	15°	3	40
08-00310-04043		1°		0.54	15°	3	40
08-00310-04044		1° 30'		0.61	15°	3	40
08-00310-04045	2°	0.68	15°	3	40		
08-00310-05042	0.5	30'	4	0.57	15°	3	40
08-00310-05043		1°		0.64	15°	3	40
08-00310-05044		1° 30'		0.71	15°	3	40
08-00310-05045		2°		0.78	15°	3	40
08-00310-05062	0.6	30'	6	0.60	15°	3	40
08-00310-05063		1°		0.71	15°	3	40
08-00310-05064		1° 30'		0.81	15°	3	40
08-00310-05065		2°		0.92	15°	3	40
08-00310-06042	0.6	30'	4	0.67	15°	3	40
08-00310-06043		1°		0.74	15°	3	40
08-00310-06044		1° 30'		0.81	15°	3	40
08-00310-06045		2°		0.88	15°	3	40
08-00310-06062	0.6	30'	6	0.70	15°	3	40
08-00310-06063		1°		0.81	15°	3	40
08-00310-06064		1° 30'		0.91	15°	3	40
08-00310-06065		2°		1.02	15°	3	40
08-00310-07062	0.7	30'	6	0.80	15°	3	40
08-00310-07063		1°		0.91	15°	3	40
08-00310-07064		1° 30'		1.01	15°	3	40
08-00310-07065		2°		1.12	15°	3	40
08-00310-07082	0.7	30'	8	0.84	15°	3	45
08-00310-07083		1°		0.98	15°	3	45
08-00310-07084		1° 30'		1.12	15°	3	45
08-00310-07085		2°		1.26	15°	3	45

Unità di misura: mm Unit size: mm

Code No.	(D) Dia.	(θ) Angolo scarico conico Taper Angle	(ℓ) Lung. tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
08-00310-08041	0.8	15'	4	0.83	15°	4	45
08-00310-08042		30'		0.87	15°	4	45
08-00310-08043		1°		0.94	15°	4	45
08-00310-08044		1° 30'		1.01	15°	4	45
08-00310-08045		2°	1.08	15°	4	45	
08-00310-08061		15'	6	0.85	15°	4	45
08-00310-08062		30'		0.90	15°	4	45
08-00310-08063		1°		1.01	15°	4	45
08-00310-08064		1° 30'		1.11	15°	4	45
08-00310-08065		2°		1.22	15°	4	45
08-00310-08081		15'		8	0.87	15°	4
08-00310-08082		30'	0.94		15°	4	45
08-00310-08083	1°	1.08	15°		4	45	
08-00310-08084	1° 30'	1.22	15°		4	45	
08-00310-08085	2°	1.36	15°	4	45		
08-00310-08101	15'	10	0.89	15°	4	45	
08-00310-08102	30'		0.97	15°	4	45	
08-00310-08103	1°		1.15	15°	4	45	
08-00310-08104	1° 30'		1.32	15°	4	45	
08-00310-08105	2°	1.50	15°	4	45		
08-00310-08122	30'	12	1.01	15°	4	50	
08-00310-08123	1°		1.22	15°	4	50	
08-00310-08124	1° 30'		1.43	15°	4	50	
08-00310-08125	2°		1.64	15°	4	50	
08-00310-10061	1	15'	6	1.05	15°	4	45
08-00310-10062		30'		1.10	15°	4	45
08-00310-10063		1°		1.21	15°	4	45
08-00310-10064		1° 30'		1.31	15°	4	45
08-00310-10065		2°	1.42	15°	4	45	
08-00310-10081		15'	8	1.07	15°	4	45
08-00310-10082		30'		1.14	15°	4	45
08-00310-10083		1°		1.28	15°	4	45
08-00310-10084		1° 30'		1.42	15°	4	45
08-00310-10085		2°	1.56	15°	4	45	
08-00310-10101		15'	10	1.09	15°	4	45
08-00310-10102		30'		1.17	15°	4	45

### Attenzione

Quando ordinate, indicate MRT425 (D)×(θ)×(ℓ).  
When you order, indicate MRT425 (D)×(θ)×(ℓ).

- Per i parametri di taglio vedi pagina 358.
- Milling condition is recommended on page 358.

※(γ) è un valore di riferimento.  
※(γ) is reference value.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Rivestite Coating  
Non Rivestite Non-Coating

Scaricate Piano Long Neck Square  
Rivestite Coating  
Non Rivestite Non-Coating

Sferiche Ball  
Rivestite Coating  
Non Rivestite Non-Coating

Scaricate Sferiche Long Neck Ball  
Rivestite Coating  
Non Rivestite Non-Coating

Coniche Taper  
Rivestite Coating  
Non Rivestite Non-Coating

Coniche Sferiche Taper Ball  
Rivestite Coating  
Non Rivestite Non-Coating

Toriche Corner R  
Rivestite Coating  
Non Rivestite Non-Coating

Scaricate Toriche Long Neck Corner R  
Rivestite Coating  
Non Rivestite Non-Coating

Frese Sagomate Formed Cutter  
Rivestite Coating  
Non Rivestite Non-Coating

Punte Drill

Altro Others

Dati tecnici Technical Data

Guida tecnica Technical Guidance

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia.	(θ) Angolo scarico conico Taper Angle	(ℓ) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00310-10103	1	1°	10	1.35	15°	4	45
08-00310-10104		1° 30'		1.52	15°	4	45
08-00310-10105		2°		1.70	15°	4	45
08-00310-10121		15'	12	1.10	15°	4	50
08-00310-10122		30'		1.21	15°	4	50
08-00310-10123		1°	16	1.42	15°	4	50
08-00310-10124		1° 30'		1.63	15°	4	50
08-00310-10125		2°		1.84	15°	4	50
08-00310-10163		1°	6	1.56	15°	4	55
08-00310-10164		1° 30'		1.84	15°	4	55
08-00310-10165		2°		2.12	15°	4	55
08-00310-12061		15'		1.25	15°	4	45
08-00310-12062		30'	10	1.30	15°	4	45
08-00310-12063		1°		1.41	15°	4	45
08-00310-12064		1° 30'		1.51	15°	4	45
08-00310-12065		2°	12	1.62	15°	4	45
08-00310-12101	15'	1.29		15°	4	45	
08-00310-12102	30'	1.37		15°	4	45	
08-00310-12103	1°	1.55		15°	4	45	
08-00310-12104	1° 30'	16	1.72	15°	4	45	
08-00310-12105	2°		1.90	15°	4	45	
08-00310-12121	15'		1.30	15°	4	50	
08-00310-12122	30'	20	1.41	15°	4	50	
08-00310-12123	1°		1.62	15°	4	50	
08-00310-12124	1° 30'		1.83	15°	4	50	
08-00310-12125	2°		2.04	15°	4	50	
08-00310-12161	15'	12	1.34	15°	4	55	
08-00310-12162	30'		1.48	15°	4	55	
08-00310-12163	1°		1.76	15°	4	55	
08-00310-12164	1° 30'	16	2.04	15°	4	55	
08-00310-12165	2°		2.32	15°	4	55	
08-00310-12203	1°		20	1.90	15°	4	55
08-00310-12204	1° 30'	2.25		15°	4	55	
08-00310-12205	2°	2.60		15°	4	55	
08-00310-13122	30'	12	1.51	15°	4	50	
08-00310-13123	1°		1.72	15°	4	50	
08-00310-13124	1° 30'		1.93	15°	4	50	
08-00310-13125	2°		2.14	15°	4	50	
08-00310-14122	30'	12	1.61	15°	4	50	
08-00310-14123	1°		1.82	15°	4	50	
08-00310-14124	1° 30'		2.03	15°	4	50	
08-00310-14125	2°		2.24	15°	4	50	

Codice Code No.	(D) Dia.	(θ) Angolo scarico conico Taper Angle	(ℓ) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00310-15061	1.5	15'	6	1.55	15°	4	45
08-00310-15062		30'		1.60	15°	4	45
08-00310-15063		1°		1.71	15°	4	45
08-00310-15064		1° 30'		1.81	15°	4	45
08-00310-15065		2°		1.92	15°	4	45
08-00310-15081		15'		1.57	15°	4	45
08-00310-15082		30'	8	1.64	15°	4	45
08-00310-15083		1°		1.78	15°	4	45
08-00310-15084		1° 30'		1.92	15°	4	45
08-00310-15085		2°	2.06	15°	4	45	
08-00310-15101		15'	10	1.59	15°	4	45
08-00310-15102		30'		1.67	15°	4	45
08-00310-15103		1°		1.85	15°	4	45
08-00310-15104		1° 30'		2.02	15°	4	45
08-00310-15105		2°	12	2.20	15°	4	45
08-00310-15121		15'		1.60	15°	4	50
08-00310-15122	30'	1.71		15°	4	50	
08-00310-15123	1°	1.92		15°	4	50	
08-00310-15124	1° 30'	16	2.13	15°	4	50	
08-00310-15125	2°		2.34	15°	4	50	
08-00310-15161	15'		1.64	15°	4	55	
08-00310-15162	30'	20	1.78	15°	4	55	
08-00310-15163	1°		2.06	15°	4	55	
08-00310-15164	1° 30'		2.34	15°	4	55	
08-00310-15165	2°		2.62	15°	4	55	
08-00310-15201	15'	25	1.67	15°	4	55	
08-00310-15202	30'		1.85	15°	4	55	
08-00310-15203	1°		2.20	15°	4	55	
08-00310-15204	1° 30'	8	2.55	15°	4	55	
08-00310-15205	2°		2.90	15°	4	55	
08-00310-15253	1°		2.37	15°	4	60	
08-00310-15254	1° 30'	12	2.81	15°	4	60	
08-00310-15255	2°		3.25	15°	4	60	
08-00310-16082	30'	16	1.74	15°	4	45	
08-00310-16083	1°		1.88	15°	4	45	
08-00310-16084	1° 30'		2.02	15°	4	45	
08-00310-16085	2°		2.16	15°	4	45	
08-00310-16122	30'	12	1.81	15°	4	50	
08-00310-16123	1°		2.02	15°	4	50	
08-00310-16124	1° 30'		2.23	15°	4	50	
08-00310-16125	2°		2.44	15°	4	50	
08-00310-16162	30'	16	1.88	15°	4	55	

### Attenzione

Quando ordinate, indicate MRT425 (D)×(θ)×(ℓ).  
When you order, indicate MRT425 (D)×(θ)×(ℓ).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 358.
- Milling condition is recommended on page. 358

Codice Code No.	(D) Dia.	(θ) Angolo scarico conico Taper Angle	(l) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00310-16163	1.6	1°	16	2.16	15°	4	55
08-00310-16164		1° 30'		2.44	15°	4	55
08-00310-16165		2°		2.72	15°	4	55
08-00310-16202		30'	20	1.95	15°	4	55
08-00310-16203		1°		2.30	15°	4	55
08-00310-16204		1° 30'		2.65	15°	4	55
08-00310-16205		2°		3.00	15°	4	55
08-00310-18081	15'	8	8	1.87	15°	4	45
08-00310-18082	30'			1.94	15°	4	45
08-00310-18083	1°			2.08	15°	4	45
08-00310-18084	1° 30'			2.22	15°	4	45
08-00310-18085	2°			2.36	15°	4	45
08-00310-18161	15'			1.94	15°	4	55
08-00310-18162	30'			2.08	15°	4	55
08-00310-18163	1.8	1°	16	2.36	15°	4	55
08-00310-18164		1° 30'		2.64	15°	4	55
08-00310-18165		2°		2.92	15°	4	55
08-00310-18241	15'	24	24	2.01	15°	4	60
08-00310-18242	30'			2.22	15°	4	60
08-00310-18243	1°			2.64	15°	4	60
08-00310-18244	1° 30'			3.06	15°	4	60
08-00310-18245	2°			3.48	15°	4	60
08-00310-20081	15'	8	8	2.07	15°	4	45
08-00310-20082	30'			2.14	15°	4	45
08-00310-20083	1°			2.28	15°	4	45
08-00310-20084	1° 30'			2.42	15°	4	45
08-00310-20085	2°			2.56	15°	4	45
08-00310-20101	15'			2.09	15°	4	45
08-00310-20102	30'			2.17	15°	4	45
08-00310-20103	1°	10	10	2.35	15°	4	45
08-00310-20104	1° 30'			2.52	15°	4	45
08-00310-20105	2°			2.70	15°	4	45
08-00310-20121	15'	2	12	2.10	15°	4	50
08-00310-20122	30'			2.21	15°	4	50
08-00310-20123	1°			2.42	15°	4	50
08-00310-20124	1° 30'			2.63	15°	4	50
08-00310-20125	2°			2.84	15°	4	50
08-00310-20127	3°			3.26	15°	4	50
08-00310-20161	15'			16	16	2.14	15°
08-00310-20162	30'	2.28	15°			4	55
08-00310-20163	1°	2.56	15°			4	55
08-00310-20164	1° 30'	2.84	15°			4	55
08-00310-20165	2°	3.12	15°			4	55
08-00310-20167	3°	3.68	15°			4	55

Codice Code No.	(D) Dia.	(θ) Angolo scarico conico Taper Angle	(l) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
08-00310-20201	2	15'	20	2.17	15°	4	55	
08-00310-20202		30'		2.35	15°	4	55	
08-00310-20203		1°		2.70	15°	4	55	
08-00310-20204		1° 30'		3.05	15°	4	55	
08-00310-20205		2°	3.40	15°	4	55		
08-00310-20207		3°	4.10	15°	6	55		
08-00310-20251		15'	25	25	2.22	15°	4	60
08-00310-20252		30'			2.44	15°	4	60
08-00310-20253		1°			2.87	15°	4	60
08-00310-20254		1° 30'			3.31	15°	4	60
08-00310-20255		2°	3.75	15°	4	60		
08-00310-20257		3°	4.62	15°	6	60		
08-00310-20302		30'	30	30	2.52	15°	4	65
08-00310-20303		1°			3.05	15°	4	65
08-00310-20304	1° 30'	3.57			15°	4	65	
08-00310-20305	2°	4.10			15°	6	65	
08-00310-20307	3°	5.14	15°	6	65			
08-00310-25102	30'	10	10	2.67	15°	4	45	
08-00310-25103	1°			2.85	15°	4	45	
08-00310-25104	1° 30'			3.02	15°	4	45	
08-00310-25105	2°			3.20	15°	4	45	
08-00310-25162	30'	16	16	2.78	15°	4	50	
08-00310-25163	1°			3.06	15°	4	50	
08-00310-25164	1° 30'			3.34	15°	4	50	
08-00310-25165	2°	3.62	15°	4	50			
08-00310-25202	30'	20	20	2.85	15°	4	55	
08-00310-25203	1°			3.20	15°	4	55	
08-00310-25204	1° 30'			3.55	15°	4	55	
08-00310-25205	2°	3.90	15°	4	55			
08-00310-25252	30'	25	25	2.94	15°	4	60	
08-00310-25253	1°			3.37	15°	4	60	
08-00310-25254	1° 30'			3.81	15°	4	60	
08-00310-25255	2°	4.25	15°	6	60			
08-00310-25302	30'	30	30	3.02	15°	4	65	
08-00310-25303	1°			3.55	15°	4	65	
08-00310-25304	1° 30'			4.07	15°	6	65	
08-00310-25305	2°	4.60	15°	6	65			
08-00310-30252	30'	3	25	3.44	15°	6	65	
08-00310-30253	1°			3.87	15°	6	65	
08-00310-30254	1° 30'			4.31	15°	6	65	
08-00310-30255	2°			4.75	15°	6	65	
08-00310-30402	30'	40	40	3.70	15°	6	80	
08-00310-30403	1°			4.40	15°	6	80	
08-00310-30404	1° 30'			5.09	15°	6	80	
08-00310-30405	2°	5.79	15°	6	80			

## Parametri di taglio raccomandati

# MRT425

### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato•Acciaio pretemprato Alloy Steels•Prehardened Steels 42CrMo4•39NiCrMo3•1.2311•1.2738 (~40HRC)			Acciaio temprato Hardened Steels 1.2343•STAVAX (45~52HRC)		
Velocità di taglio Cutting Speed	10~80m/min (Ø0.2~Ø0.5) 25~100m/min (Ø0.6~Ø0.8) 40~70m/min (Ø1~Ø3)			10~80m/min (Ø0.2~Ø0.5) 25~100m/min (Ø0.6~Ø0.8) 35~65m/min (Ø1~Ø3)			10~65m/min (Ø0.2~Ø0.4) 25~50m/min (Ø0.5~Ø0.8) 25~40m/min (Ø1~Ø3)		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed	Profondità di taglio Depth of Cut
	min <sup>-1</sup>	mm/min	mm	min <sup>-1</sup>	mm/min	mm	min <sup>-1</sup>	mm/min	mm
0.2	20,000~50,000	300~800	0.001~0.002	20,000~50,000	250~700	0.001~0.002	20,000~50,000	200~400	0.001~0.002
0.3	20,000~50,000	300~800	0.002~0.003	20,000~50,000	250~700	0.002~0.003	20,000~50,000	200~400	0.002~0.003
0.4	20,000~50,000	300~800	0.002~0.004	20,000~50,000	250~700	0.002~0.004	20,000~50,000	200~400	0.002~0.004
0.5	20,000~50,000	300~800	0.01~0.025	20,000~50,000	250~700	0.01~0.025	15,000~30,000	200~400	0.005~0.01
0.6	15,000~40,000	350~900	0.012~0.03	15,000~40,000	300~700	0.012~0.03	15,000~30,000	200~400	0.006~0.012
0.7	15,000~40,000	350~900	0.014~0.035	15,000~40,000	300~700	0.014~0.035	10,000~20,000	200~400	0.007~0.014
0.8	15,000~40,000	350~900	0.016~0.04	15,000~40,000	300~700	0.016~0.04	10,000~20,000	200~400	0.008~0.016
1	14,000~20,000	500~1,000	0.02~0.05	12,000~20,000	400~700	0.02~0.05	8,000~11,000	200~400	0.01~0.02
1.2	12,000~17,000	500~1,000	0.024~0.06	10,000~16,000	400~700	0.024~0.06	7,000~9,500	200~400	0.012~0.024
1.3	10,000~16,000	500~1,000	0.026~0.065	9,000~15,000	400~700	0.026~0.065	6,500~8,500	200~400	0.013~0.026
1.4	9,000~15,000	500~1,000	0.028~0.07	8,000~14,000	400~700	0.028~0.07	6,000~8,000	200~400	0.014~0.028
1.5	8,000~14,000	500~1,000	0.03~0.075	7,000~13,000	400~700	0.03~0.075	5,500~7,500	200~400	0.015~0.03
1.6	7,000~13,000	500~1,000	0.032~0.08	6,000~12,000	400~700	0.032~0.08	5,000~7,000	200~400	0.016~0.032
1.8	6,500~12,000	500~1,000	0.036~0.09	5,000~11,000	400~700	0.036~0.09	4,500~6,000	200~400	0.018~0.036
2	6,500~11,000	500~1,000	0.04~0.1	5,000~10,000	400~700	0.04~0.1	4,000~5,500	200~400	0.02~0.04
2.5	6,000~9,000	500~1,000	0.05~0.125	4,000~8,000	400~700	0.05~0.125	3,500~4,500	200~400	0.025~0.05
3	5,000~7,000	500~1,000	0.06~0.15	4,000~6,500	400~700	0.06~0.15	3,000~4,000	200~400	0.03~0.06
Note Notes	※Se la lunghezza di taglio è elevata, ridurre le condizioni sopra indicate. ※Durante le lavorazioni di angoli, ridurre l'avanzamento del 50%. ※Usare lubrificante con ritardanti di fumo. ※Si consiglia di eseguire fresatura bidirezionale. ※When length of cut is long, reduce the conditions listed above. ※When cutting at the corner, reduce the feed by 50% from the above values. ※Use cutting fluid with smoke retardant. ※Recommend reciprocating cutting.								

CBN  
Nitruro Cubico di Boro

Diamante

Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Rivestite  
Coating

Punte  
Drill

Non Rivestite  
Non-Coating

Altro  
Others

Dati tecnici

Technical Data

Guida tecnica

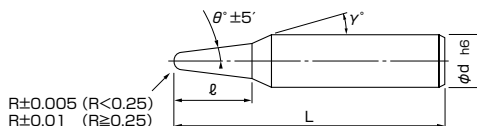
Technical Guidance



# MTB230

MUGEN-COATING 2-Flute Taper Ball End Mill

## Frese 2 Tagli sferiche coniche sferiche rivestite MUGEN



- E' possibile fresare con entrambe le parti conica e sferica in presa.
- Le misure disponibili sono dal R0.1 e angoli singoli fino a 15°.
- It is possible to cut both taper and ball simultaneously.
- The available sizes are from radius 0.1 and single angles up to 15°.



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(θ) Angolo scario conico Taper Angle	(l) Lungh. tagliante Length of Cut	(d) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00540-01004	R0.1	1°	1	0.23	9°	4	50
08-00540-01006		2°	1	0.26	9°	4	50
08-00540-01008		3°	1	0.29	9°	4	50
08-00540-01012		5°	1	0.36	9°	4	50
08-00540-01016		7°	1	0.42	9°	4	50
08-00540-01019		10°	1	0.52	10°	4	50
08-00540-01504	R0.15	1°	1.5	0.35	9°	4	50
08-00540-01506		2°	1.5	0.39	9°	4	50
08-00540-01508		3°	1.5	0.44	9°	4	50
08-00540-01512		5°	1.5	0.54	9°	4	50
08-00540-01516		7°	1.5	0.63	9°	4	50
08-00540-01519		10°	1.5	0.78	10°	4	50
08-00540-01524	15°	1.5	1.03	15°	4	50	
08-00540-02004	R0.2	1°	2	0.46	9°	4	50
08-00540-02006		2°	2	0.53	9°	4	50
08-00540-02008		3°	2	0.59	9°	4	50
08-00540-02012		5°	2	0.72	9°	4	50
08-00540-02016		7°	2	0.84	9°	4	50
08-00540-02019		10°	2	1.04	10°	4	50
08-00540-02024	15°	2	1.38	15°	4	50	
08-00540-02504	R0.25	1°	2.5	0.58	9°	4	50
08-00540-02506		2°	2.5	0.66	9°	4	50
08-00540-02508		3°	2.5	0.74	9°	4	50
08-00540-02512		5°	2.5	0.90	9°	4	50
08-00540-02516		7°	2.5	1.06	9°	4	50
08-00540-02519		10°	2.5	1.30	10°	4	50
08-00540-02524	15°	2.5	1.72	15°	4	50	
08-00540-03004	R0.3	1°	3	0.69	9°	4	50
08-00540-03006		2°	3	0.79	9°	4	50
08-00540-03008		3°	3	0.88	9°	4	50
08-00540-03012		5°	3	1.07	9°	4	50
08-00540-03016		7°	3	1.27	9°	4	50
08-00540-03019		10°	3	1.56	10°	4	50
08-00540-03024	15°	3	2.07	15°	4	50	

Codice Code No.	(R) Raggio Radius	(θ) Angolo scario conico Taper Angle	(l) Lungh. tagliante Length of Cut	(d) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00540-03504	R0.35	1°	3.5	0.81	9°	4	50
08-00540-03506		2°	3.5	0.92	9°	4	50
08-00540-03508		3°	3.5	1.03	9°	4	50
08-00540-03512		5°	3.5	1.25	9°	4	50
08-00540-03516		7°	3.5	1.48	9°	4	50
08-00540-03519		10°	3.5	1.82	10°	4	50
08-00540-03524	15°	3.5	2.41	15°	4	50	
08-00540-04004	R0.4	1°	4	0.93	9°	4	50
08-00540-04006		2°	4	1.05	9°	4	50
08-00540-04008		3°	4	1.18	9°	4	50
08-00540-04012		5°	4	1.43	9°	4	50
08-00540-04016		7°	4	1.69	9°	4	50
08-00540-04019		10°	4	2.08	10°	4	50
08-00540-04024	15°	4	2.76	15°	4	50	
08-00540-04504	R0.45	1°	4	1.02	9°	4	50
08-00540-04506		2°	4	1.15	9°	4	50
08-00540-04508		3°	4	1.27	9°	4	50
08-00540-04512		5°	4	1.52	9°	4	50
08-00540-04516		7°	4	1.74	9°	4	50
08-00540-04519		10°	4	2.17	10°	4	50
08-00540-04524	15°	4	2.83	15°	4	50	
08-00540-05004	R0.5	1°	4	1.12	9°	4	55
08-00540-05006		2°	4	1.25	9°	4	55
08-00540-05008		3°	4	1.37	9°	4	55
08-00540-05012		5°	4	1.62	9°	4	55
08-00540-05016		7°	4	1.87	9°	4	55
08-00540-05019		10°	4	2.25	10°	4	55
08-00540-05024	15°	4	2.91	15°	4	55	
08-00540-06004	R0.6	1°	5	1.35	9°	4	55
08-00540-06006		2°	5	1.50	9°	4	55
08-00540-06008		3°	5	1.66	9°	4	55
08-00540-06012		5°	5	1.97	9°	4	55
08-00540-06016		7°	5	2.29	9°	4	55
08-00540-06019		10°	5	2.77	10°	4	55
08-00540-06024	15°	5	3.60	15°	4	55	

### Attenzione

Quando ordinate, indicate MTB230 (R)×(θ).  
When you order, indicate MTB230 (R)×(θ).

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese  
Sagomate

Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Codice Code No.	(R) Raggio Radius	(θ) Angolo scarico conico Taper Angle	(l) Lunghezza tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lunghezza totale Overall Length
08-00540-07504	R0.75	1°	6	1.68	9°	4	55
08-00540-07506		2°	6	1.87	9°	4	55
08-00540-07508		3°	6	2.05	9°	4	55
08-00540-07512		5°	6	2.42	9°	4	55
08-00540-07516		7°	6	2.80	9°	4	55
08-00540-07519		10°	6	3.37	10°	4	55
08-00540-07524		15°	6	4.37	-	4	55
08-00540-08004		R0.8	1°	6	1.78	9°	4
08-00540-08006	2°		6	1.96	9°	4	55
08-00540-08008	3°		6	2.15	9°	4	55
08-00540-08012	5°		6	2.52	9°	4	55
08-00540-08016	7°		6	2.89	9°	4	55
08-00540-08019	10°		6	3.46	10°	4	55
08-00540-08024	15°	6	4.44	-	4	55	
08-00540-10004	R1	1°	8	2.24	9°	4	60
08-00540-10006		2°	8	2.49	9°	4	60
08-00540-10008		3°	8	2.74	9°	4	60
08-00540-10012		5°	8	3.23	9°	4	60
08-00540-10016		7°	8	3.73	7°	4	60
08-00540-10019		10°	8	4.50	10°	6	60
08-00540-10024		15°	8	5.82	15°	6	60
08-00540-12504	R1.25	1°	10	2.81	9°	4	60
08-00540-12506		2°	10	3.11	9°	4	60
08-00540-12508		3°	10	3.42	9°	4	60
08-00540-12512		5°	10	4.04	9°	6	60
08-00540-12516		7°	10	4.67	9°	6	60
08-00540-12519		10°	10	5.62	-	6	60
08-00540-12524	15°	10	7.28	-	6	60	
08-00540-15004	R1.5	1°	12	3.37	9°	4	60
08-00540-15006		2°	12	3.74	-	4	60
08-00540-15008		3°	12	4.10	9°	6	60
08-00540-15012		5°	12	4.85	9°	6	60
08-00540-15016		7°	12	5.60	-	6	60
08-00540-15019		10°	12	6.75	-	6	60
08-00540-15024		15°	12	8.73	-	8	60

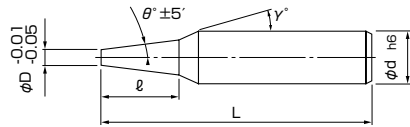
Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(θ) Angolo scarico conico Taper Angle	(l) Lunghezza tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lunghezza totale Overall Length
08-00540-20004	R2	1°	16	4.49	9°	6	65
08-00540-20006		2°	16	4.98	9°	6	65
08-00540-20008		3°	16	5.47	9°	6	65
08-00540-20012		5°	16	6.46	-	6	65
08-00540-20016		7°	16	7.47	-	8	65
08-00540-20019		10°	16	9.00	-	8	65
08-00540-20024		15°	16	11.64	-	10	70

**Attenzione**

Quando ordinate, indicate MTB230(R)×(θ).  
When you order, indicate MTB230 (R)×(θ).

### Frese 2 Tagli piane coniche



● Articolo semi-standard, prezzo e consegna su richiesta  
 ● Semi-standard item, please inquire for price and delivery.

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico conico Taper Angle	(l) Lung. tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
01-00316-00051	0.5	30°	2	0.53	9°	3	35
01-00316-00052		1°	2	0.57	9°	3	35
01-00316-00053		1° 30'	2	0.60	9°	3	35
01-00316-00054		2°	2	0.64	9°	3	35
01-00316-00056		3°	2	0.71	9°	3	35
01-00316-00061	0.6	30°	2	0.63	9°	3	35
01-00316-00062		1°	2	0.67	9°	3	35
01-00316-00063		1° 30'	2	0.70	9°	3	35
01-00316-00064		2°	2	0.74	9°	3	35
01-00316-00066	3°	2	0.81	9°	3	35	
01-00316-00071	0.7	30°	2	0.73	9°	3	35
01-00316-00072		1°	2	0.77	9°	3	35
01-00316-00073		1° 30'	2	0.80	9°	3	35
01-00316-00074		2°	2	0.84	9°	3	35
01-00316-00076		3°	2	0.91	9°	3	35
01-00316-00081	0.8	30°	3	0.85	9°	3	35
01-00316-00082		1°	3	0.90	9°	3	35
01-00316-00083		1° 30'	3	0.96	9°	3	35
01-00316-00084		2°	3	1.01	9°	3	35
01-00316-00086		3°	3	1.11	9°	3	35
01-00316-00091	0.9	30°	3	0.95	9°	3	35
01-00316-00092		1°	3	1.00	9°	3	35
01-00316-00093		1° 30'	3	1.06	9°	3	35
01-00316-00094		2°	3	1.11	9°	3	35
01-00316-00096		3°	3	1.21	9°	3	35
01-00316-00101	1	30°	4	1.07	9°	4	45
01-00316-00102		1°	4	1.14	9°	4	45
01-00316-00103		1° 30'	4	1.21	9°	4	45
01-00316-00104		2°	4	1.28	9°	4	45
01-00316-00106		3°	4	1.42	9°	4	45
01-00316-00107	5°	4	1.70	9°	4	45	

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico conico Taper Angle	(l) Lung. tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
01-00316-00151	1.5	30°	5	1.59	9°	4	45
01-00316-00152		1°	5	1.67	9°	4	45
01-00316-00153		1° 30'	5	1.76	9°	4	45
01-00316-00154		2°	5	1.85	9°	4	45
01-00316-00156		3°	5	2.02	9°	4	45
01-00316-00157		5°	5	2.37	9°	4	45
01-00316-00201		2	30°	6	2.10	9°	4
01-00316-00202	1°		6	2.21	9°	4	45
01-00316-00203	1° 30'		6	2.31	9°	4	45
01-00316-00204	2°		6	2.41	9°	4	45
01-00316-00206	3°		6	2.62	9°	4	45
01-00316-00207	5°	6	3.05	-	4	45	
01-00316-00251	2.5	30°	8	2.64	9°	4	45
01-00316-00252		1°	8	2.78	9°	4	45
01-00316-00253		1° 30'	8	2.92	9°	4	45
01-00316-00254		2°	8	3.05	9°	4	45
01-00316-00256		3°	8	3.33	-	4	45
01-00316-00257	5°	8	3.90	-	4	45	

**Attenzione** Quando ordinate, indicate NTE-2X (D)×(θ).  
 When you order, indicate NTE-2X (D)×(θ).

- Per i parametri di taglio vedi pagina 363.
- Milling condition is recommended on page 363.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese  
Sagomate

Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating

**Piane**  
Square

**Non Rivestite**  
Non-Coating

**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating

**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating

**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating

**Coniche**  
Taper

**Non Rivestite**  
Non-Coating

**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating

**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating

**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating

**Frese Sagomate**  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Frese Sagomate**  
Formed Cutter

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

Technical Data

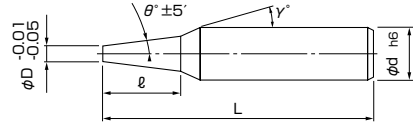
**Guida tecnica**

Technical Guidance

# NTE-4X

4-Flute Taper End Mill

## Frese 4 Tagli piane coniche



- Articolo semi-standard, prezzo e consegna su richiesta
- Semi-standard item, please inquire for price and delivery.

Codice Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scarico conico Taper Angle	( $\ell$ ) Lungh. tagliante Length of Cut	(d) Dia. massimo Dia. at Large End	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00317-00301	3	30°	10	3.17	9°	6	50
01-00317-00302		1°	10	3.35	9°	6	50
01-00317-00303		1° 30'	10	3.52	9°	6	50
01-00317-00304		2°	10	3.69	9°	6	50
01-00317-00306		3°	10	4.05	9°	6	50
01-00317-00307		5°	10	4.75	9°	6	50
01-00317-00401		4	30°	15	4.26	9°	6
01-00317-00402	1°		15	4.52	9°	6	50
01-00317-00403	1° 30'		15	4.79	9°	6	50
01-00317-00404	2°		15	5.04	9°	6	50
01-00317-00406	3°		15	5.57	9°	6	50
01-00317-00407	5°		15	6.62	-	6	55
01-00317-00501	5		30°	20	5.34	9°	6
01-00317-00502		1°	20	5.70	9°	6	55
01-00317-00503		1° 30'	20	6.05	-	6	55
01-00317-00504		2°	20	6.39	-	6	55
01-00317-00506		3°	20	7.10	-	6	55
01-00317-00507		5°	20	8.50	-	8	60
01-00317-00601		6	30°	20	6.35	-	6
01-00317-00602	1°		20	6.70	-	6	55
01-00317-00603	1° 30'		20	7.05	-	6	55
01-00317-00604	2°		20	7.40	-	6	55
01-00317-00606	3°		20	8.10	-	8	60
01-00317-00607	5°		20	9.50	-	8	65
01-00317-00801	8		30°	25	8.44	-	8
01-00317-00802		1°	25	8.87	-	8	65
01-00317-00803		1° 30'	25	9.31	-	8	65
01-00317-00804		2°	25	9.75	-	8	65
01-00317-00806		3°	25	10.62	-	10	70
01-00317-00807		5°	25	12.37	-	12	90

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scarico conico Taper Angle	( $\ell$ ) Lungh. tagliante Length of Cut	(d) Dia. massimo Dia. at Large End	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00317-01001	10	30°	35	10.61	-	10	85
01-00317-01002		1°	35	11.22	-	10	85
01-00317-01003		1° 30'	35	11.83	-	10	85
01-00317-01004		2°	35	12.44	-	12	90
01-00317-01006		3°	35	13.67	-	12	90
01-00317-01007		5°	35	16.12	-	16	90

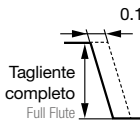
**Attenzione** Quando ordinate, indiate NTE-4X (D)×( $\theta$ ).  
When you order, indicate NTE-4X (D)×( $\theta$ ).

- Per i parametri di taglio vedi pagina 363.
- Milling condition is recommended on page 363.

## Parametri di taglio raccomandati

# NTE-2X

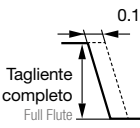
### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738	
Velocità di taglio Cutting Speed	35~45m/min		30~40m/min		25~30m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
1	11,000	160	9,500	130	8,000	100
1.5	7,400	160	6,400	130	5,300	100
2	5,600	160	4,800	130	4,000	100
2.5	4,500	160	3,800	130	3,200	100
Profondità di taglio Depth of Cut	Spallamento Taper Side Milling 					
(D) Dia. Dia.						
Note Notes	※Usare lubrorefrigerante. ※Regolare con la stessa proporzione giri ed avanzamento. ※Raccomandiamo fresatura in concordanza nelle lavorazioni di contornatura. ※Use cutting fluid. ※Adjust both spindle speed and feed at the same rate. ※We recommend a down-cut at side milling.					

## Parametri di taglio raccomandati

# NTE-4X

### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738	
Velocità di taglio Cutting Speed	35~45m/min		30~40m/min		25~30m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
3	3,700	220	3,200	180	2,650	130
4	2,800	220	2,400	180	2,000	130
5	2,200	220	1,900	180	1,600	130
6	1,900	220	1,600	180	1,300	130
Profondità di taglio Depth of Cut	Spallamento conico Taper Side Milling 					
(D) Dia. Dia.						
Note Notes	※Usare lubrorefrigerante. ※Regolare con la stessa proporzione giri ed avanzamento. ※Raccomandiamo fresatura in concordanza nelle lavorazioni di contornatura. ※Use cutting fluid. ※Adjust both spindle speed and feed at the same rate. ※We recommend a down-cut at side milling.					

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate Piane  
Long Neck Square

Sferiche  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate Sferiche  
Long Neck Ball

Coniche  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Coniche Sferiche  
Taper Ball

Toriche  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate Toriche  
Long Neck Corner R

Frese Sagomate  
Formed Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

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Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating  
Punte  
Drill

**Altro**  
Others

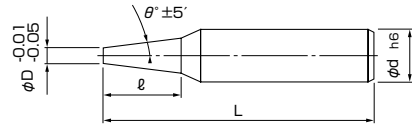
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NTEM-2X

2-Flute Medium Taper End Mill

## Frese 2 Tagli piane coniche medie



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico conico Taper Angle	(l) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00336-00502	0.5	30°	4	0.57	3	35
01-00336-00504		1°	4	0.64	3	35
01-00336-00505		1° 30'	4	0.71	3	35
01-00336-00506		2°	4	0.78	3	35
01-00336-00508		3°	4	0.92	3	35
01-00336-00510		4°	4	1.06	3	35
01-00336-00512		5°	4	1.20	3	35
01-00336-00802		0.8	30°	5	0.89	3
01-00336-00804	1°		5	0.97	3	35
01-00336-00805	1° 30'		5	1.06	3	35
01-00336-00806	2°		5	1.15	3	35
01-00336-00808	3°		5	1.32	3	35
01-00336-00810	4°		5	1.50	3	35
01-00336-00812	5°		5	1.67	3	35
01-00336-01002	1		30°	6	1.10	4
01-00336-01004		1°	6	1.21	4	45
01-00336-01005		1° 30'	6	1.31	4	45
01-00336-01006		2°	6	1.42	4	45
01-00336-01008		3°	6	1.63	4	45
01-00336-01010		4°	6	1.84	4	45
01-00336-01012		5°	6	2.05	4	45
01-00336-01016		7°	6	2.47	4	45
01-00336-01019	10°	6	3.12	4	45	
01-00336-01024	15°	6	4.22	6	45	
01-00336-01502	1.5	30°	8	1.64	4	45
01-00336-01504		1°	8	1.78	4	45
01-00336-01505		1° 30'	8	1.92	4	45
01-00336-01506		2°	8	2.06	4	45
01-00336-01508		3°	8	2.34	4	45
01-00336-01510		4°	8	2.62	4	45
01-00336-01512		5°	8	2.90	4	45
01-00336-01516		7°	8	3.46	4	45
01-00336-01519	10°	8	4.32	6	45	
01-00336-01524	15°	8	5.79	6	45	
01-00336-02002	2	30°	10	2.17	4	50
01-00336-02004		1°	10	2.35	4	50

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico conico Taper Angle	(l) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00336-02005	2	1° 30'	10	2.52	4	50	
01-00336-02006		2°	10	2.70	4	50	
01-00336-02008		3°	10	3.05	4	50	
01-00336-02010		4°	10	3.40	4	50	
01-00336-02012		5°	10	3.75	4	50	
01-00336-02016		7°	10	4.46	6	50	
01-00336-02019		10°	10	5.53	6	50	
01-00336-02024		15°	10	7.36	6	55	
01-00336-02502		2.5	30°	12	2.71	4	50
01-00336-02504			1°	12	2.92	4	50
01-00336-02505	1° 30'		12	3.13	4	50	
01-00336-02506	2°		12	3.34	4	50	
01-00336-02508	3°		12	3.76	4	50	
01-00336-02510	4°		12	4.18	6	50	
01-00336-02512	5°		12	4.60	6	50	
01-00336-02516	7°		12	5.45	6	50	
01-00336-02519	10°		12	6.73	8	60	
01-00336-02524	15°		12	8.93	8	60	
01-00336-03002	3	30°	15	3.26	6	55	
01-00336-03004		1°	15	3.52	6	55	
01-00336-03005		1° 30'	15	3.79	6	55	
01-00336-03006		2°	15	4.05	6	55	
01-00336-03008		3°	15	4.57	6	55	
01-00336-03010		4°	15	5.10	6	55	
01-00336-03012		5°	15	5.62	6	55	
01-00336-03016		7°	15	6.68	6	55	
01-00336-03019		10°	15	8.29	8	60	
01-00336-03024		15°	15	11.04	10	65	
01-00336-04002	4	30°	20	4.35	6	55	
01-00336-04004		1°	20	4.70	6	55	
01-00336-04005		1° 30'	20	5.05	6	55	
01-00336-04006		2°	20	5.40	6	55	
01-00336-04008		3°	20	6.10	6	55	
01-00336-04010		4°	20	6.80	8	60	
01-00336-04012		5°	20	7.50	8	60	
01-00336-04016		7°	20	8.91	10	65	

**Attenzione** Quando ordinate, indicate NTEM-2X (D)×(θ).  
When you order, indicate NTEM-2X (D)×(θ).

Codice Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scarico conico Taper Angle	(l) Lugh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lugh. totale Overall Length
01-00336-04019	4	10°	20	11.05	10	70
01-00336-04024		15°	20	14.72	12	80
01-00336-05002	5	30'	25	5.44	6	65
01-00336-05004		1°	25	5.87	6	65
01-00336-05005		1° 30'	25	6.31	6	65
01-00336-05006		2°	25	6.75	6	65
01-00336-05008		3°	25	7.62	6	65
01-00336-05010		4°	25	8.50	8	70
01-00336-05012		5°	25	9.37	8	70
01-00336-05016		7°	25	11.14	10	70
01-00336-05019		10°	25	13.82	12	80
01-00336-05024		15°	25	18.40	16	90
01-00336-06002	6	30'	30	6.52	8	70
01-00336-06004		1°	30	7.05	8	70
01-00336-06005		1° 30'	30	7.57	8	70
01-00336-06006		2°	30	8.10	8	70
01-00336-06008		3°	30	9.14	10	80
01-00336-06010		4°	30	10.20	10	80
01-00336-06012		5°	30	11.25	10	80
01-00336-06016		7°	30	13.37	12	80
01-00336-06019		10°	30	16.58	16	90
01-00336-06024		15°	30	22.08	20	90

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

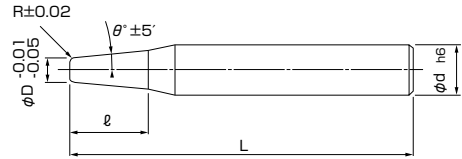
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NERR-2X

2-Flute Taper Radius End Mill for Runner

## Frese 2 Tagli toriche coniche per canalini



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico conico Taper Angle	(R) Angolo raggio Corner Radius	(ℓ) Lungh. tagliente Length of Cut.	(d1) Dia. massimo Dia. at Large End	(d) Dia. gamba Shank Dia.	(L) Lungh. totale Overall Length	
01-00732-20103	2	7°	R0.3	5	3.23	4	45	
01-00732-20105			R0.5	5	3.23	4	45	
01-00732-25103	2.5		R0.3	6	3.97	4	45	
01-00732-25105			R0.5	6	3.97	4	45	
01-00732-30103	3		R0.3	7	4.72	6	55	
01-00732-30105			R0.5	7	4.72	6	55	
01-00732-30110	3.5		R1	7	4.72	6	55	
01-00732-35103			R0.3	7	5.22	6	55	
01-00732-35105			R0.5	7	5.22	6	55	
01-00732-35110	3.5		R1	7	5.22	6	55	
01-00732-40103			4	R0.3	8	5.96	6	55
01-00732-40105				R0.5	8	5.96	6	55
01-00732-40110	4	R1	8	5.96	6	55		
01-00732-45103		4.5	R0.3	9	6.71	8	60	
01-00732-45105			R0.5	9	6.71	8	60	
01-00732-45110	4.5	R1	9	6.71	8	60		
01-00732-50103		5	R0.3	10	7.46	8	60	
01-00732-50105			R0.5	10	7.46	8	60	
01-00732-50110	R1		10	7.46	8	60		
01-00732-50115	5	R1.5	10	7.46	8	60		
01-00732-60103		6	R0.3	12	8.95	10	70	
01-00732-60105			R0.5	12	8.95	10	70	
01-00732-60110	6	R1	12	8.95	10	70		
01-00732-60115		R1.5	12	8.95	10	70		
01-00732-60120		R2	12	8.95	10	70		
01-00732-20203	2	10°	R0.3	5	3.76	4	45	
01-00732-20205			R0.5	5	3.76	4	45	
01-00732-25203	2.5		R0.3	6	4.62	6	55	
01-00732-25205			R0.5	6	4.62	6	55	
01-00732-30203	3		R0.3	7	5.47	6	55	
01-00732-30205			R0.5	7	5.47	6	55	
01-00732-30205	3		R1	7	5.47	6	55	
01-00732-30210			3.5	R0.3	7	5.97	6	55
01-00732-35203				R0.5	7	5.97	6	55
01-00732-35205	3.5		R1	7	5.97	6	55	
01-00732-35210			R1	7	5.97	6	55	

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico conico Taper Angle	(R) Angolo raggio Corner Radius	(ℓ) Lungh. tagliente Length of Cut.	(d1) Dia. massimo Dia. at Large End	(d) Dia. gamba Shank Dia.	(L) Lungh. totale Overall Length	
01-00732-40203	4	10°	R0.3	8	6.82	8	60	
01-00732-40205			R0.5	8	6.82	8	60	
01-00732-40210	4.5		R1	8	6.82	8	60	
01-00732-45203			R0.3	9	7.67	8	60	
01-00732-45205	4.5		R0.5	9	7.67	8	60	
01-00732-45210			R1	9	7.67	8	60	
01-00732-50203	5		R0.3	10	8.53	10	70	
01-00732-50205			R0.5	10	8.53	10	70	
01-00732-50210			R1	10	8.53	10	70	
01-00732-50215	5		R1.5	10	8.53	10	70	
01-00732-60203			6	R0.3	12	10.23	10	70
01-00732-60205				R0.5	12	10.23	10	70
01-00732-60210	6	R1	12	10.23	10	70		
01-00732-60215		R1.5	12	10.23	10	70		
01-00732-60220		R2	12	10.23	10	70		
01-00732-20303	2	12°	R0.3	5	4.13	4	45	
01-00732-20305			R0.5	5	4.13	4	45	
01-00732-25303	2.5		R0.3	6	5.05	6	55	
01-00732-25305			R0.5	6	5.05	6	55	
01-00732-30303	3		R0.3	7	5.98	6	55	
01-00732-30305			R0.5	7	5.98	6	55	
01-00732-30310	3		R1	7	5.98	6	55	
01-00732-35303			3.5	R0.3	7	6.48	8	60
01-00732-35305				R0.5	7	6.48	8	60
01-00732-35310	3.5		R1	7	6.48	8	60	
01-00732-40303			4	R0.3	8	7.40	8	60
01-00732-40305				R0.5	8	7.40	8	60
01-00732-40310	4	R1	8	7.40	8	60		
01-00732-45303		4.5	R0.3	9	8.33	8	60	
01-00732-45305			R0.5	9	8.33	8	60	
01-00732-45310	4.5	R1	9	8.33	8	60		
01-00732-50303		5	R0.3	10	9.25	10	70	
01-00732-50305			R0.5	10	9.25	10	70	
01-00732-50310	5	R1	10	9.25	10	70		
01-00732-50315		R1.5	10	9.25	10	70		

### Attenzione

Quando ordinate, indicate NERR-2X (D)×(θ)×(R).  
When you order, indicate NERR-2X (D)×(θ)×(R).



Code Code No.	(D)Dia. Dia.	(θ) Angolo scario conico Taper Angle	(R) Angolo raggio Corner Radius	(ℓ) Lugh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lugh. totale Overall Length
01-00732-60303	6	12°	R0.3	12	11.10	10	70
01-00732-60305			R0.5	12	11.10	10	70
01-00732-60310			R1	12	11.10	10	70
01-00732-60315			R1.5	12	11.10	10	70
01-00732-60320			R2	12	11.10	10	70
01-00732-20403	2		R0.3	5	4.68	6	55
01-00732-20405			R0.5	5	4.68	6	55
01-00732-25403	2.5		R0.3	6	5.72	6	55
01-00732-25405			R0.5	6	5.72	6	55
01-00732-30403	3		R0.3	7	6.75	6	55
01-00732-30405			R0.5	7	6.75	6	55
01-00732-30410			R1	7	6.75	6	55
01-00732-35403	3.5		R0.3	7	7.25	8	60
01-00732-35405			R0.5	7	7.25	8	60
01-00732-35410			R1	7	7.25	8	60
01-00732-40403	4	15°	R0.3	8	8.29	8	60
01-00732-40405			R0.5	8	8.29	8	60
01-00732-40410			R1	8	8.29	8	60
01-00732-45403	4.5		R0.3	9	9.32	10	70
01-00732-45405			R0.5	9	9.32	10	70
01-00732-45410			R1	9	9.32	10	70
01-00732-50403	5		R0.3	10	10.36	10	70
01-00732-50405			R0.5	10	10.36	10	70
01-00732-50410			R1	10	10.36	10	70
01-00732-50415			R1.5	10	10.36	10	70
01-00732-60403			6		R0.3	12	12.43
01-00732-60405	R0.5	12			12.43	12	75
01-00732-60410	R1	12			12.43	12	75
01-00732-60415	R1.5	12			12.43	12	75
01-00732-60420	R2	12			12.43	12	75

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating  
Punte  
Drill

**Altro**  
Others

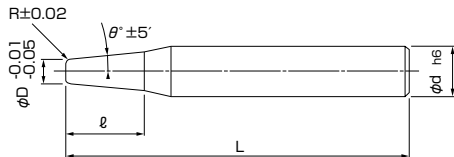
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# ENTER-2X

2-Flute Taper Radius End Mill

## Frese 2 Tagli toriche coniche



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(R) Angolo raggio Corner Radius	(ℓ) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00362-10102	1	30°	R0.2	4	1.07	4	45
01-00362-10103			R0.3	4	1.07	4	45
01-00362-10202		1°	R0.2	4	1.14	4	45
01-00362-10203			R0.3	4	1.14	4	45
01-00362-10302		1° 30'	R0.2	4	1.21	4	45
01-00362-10303			R0.3	4	1.21	4	45
01-00362-10402		2°	R0.2	4	1.28	4	45
01-00362-10403			R0.3	4	1.28	4	45
01-00362-10502		3°	R0.2	4	1.42	4	45
01-00362-10503			R0.3	4	1.42	4	45
01-00362-10602		4°	R0.2	4	1.56	4	45
01-00362-10603			R0.3	4	1.56	4	45
01-00362-10702		5°	R0.2	4	1.70	4	45
01-00362-10703			R0.3	4	1.70	4	45
01-00362-10802		7°	R0.2	4	1.98	4	45
01-00362-10803			R0.3	4	1.98	4	45
01-00362-10902		10°	R0.2	4	2.41	4	45
01-00362-10903			R0.3	4	2.41	4	45
01-00362-15102	1.5	30°	R0.2	5	1.59	4	45
01-00362-15103			R0.3	5	1.59	4	45
01-00362-15105			R0.5	5	1.59	4	45
01-00362-15202		1°	R0.2	5	1.67	4	45
01-00362-15203			R0.3	5	1.67	4	45
01-00362-15205			R0.5	5	1.67	4	45
01-00362-15302		1° 30'	R0.2	5	1.76	4	45
01-00362-15303			R0.3	5	1.76	4	45
01-00362-15305			R0.5	5	1.76	4	45
01-00362-15402		2°	R0.2	5	1.85	4	45
01-00362-15403			R0.3	5	1.85	4	45
01-00362-15405			R0.5	5	1.85	4	45
01-00362-15502		3°	R0.2	5	2.02	4	45
01-00362-15503			R0.3	5	2.02	4	45
01-00362-15505			R0.5	5	2.02	4	45
01-00362-15602		4°	R0.2	5	2.20	4	45
01-00362-15603			R0.3	5	2.20	4	45
01-00362-15605			R0.5	5	2.20	4	45

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(R) Angolo raggio Corner Radius	(ℓ) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length		
01-00362-15702	1.5	5°	R0.2	5	2.37	4	45		
01-00362-15703			R0.3	5	2.37	4	45		
01-00362-15705			R0.5	5	2.37	4	45		
01-00362-15802		7°	R0.2	5	2.73	4	45		
01-00362-15803			R0.3	5	2.73	4	45		
01-00362-15805			R0.5	5	2.73	4	45		
01-00362-15902		10°	R0.2	5	3.26	4	45		
01-00362-15903			R0.3	5	3.26	4	45		
01-00362-15905			R0.5	5	3.26	4	45		
01-00362-20102		30°		R0.2	6	2.10	4	45	
01-00362-20103				R0.3	6	2.10	4	45	
01-00362-20105				R0.5	6	2.10	4	45	
01-00362-20202				1°	R0.2	6	2.21	4	45
01-00362-20203					R0.3	6	2.21	4	45
01-00362-20205				1° 30'	R0.5	6	2.21	4	45
01-00362-20302		R0.2	6		2.31	4	45		
01-00362-20303		2°	R0.3	6	2.31	4	45		
01-00362-20305			R0.5	6	2.31	4	45		
01-00362-20402	2	3°	R0.2	6	2.42	4	45		
01-00362-20403			R0.3	6	2.42	4	45		
01-00362-20405			R0.5	6	2.42	4	45		
01-00362-20502		4°	R0.2	6	2.63	4	45		
01-00362-20503			R0.3	6	2.63	4	45		
01-00362-20505			R0.5	6	2.63	4	45		
01-00362-20602	5°	R0.2	6	2.84	4	45			
01-00362-20603		R0.3	6	2.84	4	45			
01-00362-20605		R0.5	6	2.84	4	45			
01-00362-20702	7°	R0.2	6	3.05	4	45			
01-00362-20703		R0.3	6	3.05	4	45			
01-00362-20705		R0.5	6	3.05	4	45			
01-00362-20802	10°	R0.2	6	3.47	4	45			
01-00362-20803		R0.3	6	3.47	4	45			
01-00362-20805		R0.5	6	3.47	4	45			
01-00362-20902		R0.2	6	4.12	6	45			
01-00362-20903		R0.3	6	4.12	6	45			
01-00362-20905		R0.5	6	4.12	6	45			

### Attenzione

Quando ordinate, indicate ENTER-2X(D)×(θ)×(R).  
When you order, indicate ENTER-2X (D)×(θ)×(R).

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(R) Angolo raggio Corner Radius	(l) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00362-25102	2.5	30°	R0.2	8	2.64	4	45	
01-00362-25103			R0.3	8	2.64	4	45	
01-00362-25105			R0.5	8	2.64	4	45	
01-00362-25202		1°	R0.2	8	2.78	4	45	
01-00362-25203			R0.3	8	2.78	4	45	
01-00362-25205			R0.5	8	2.78	4	45	
01-00362-25302		1° 30'	R0.2	8	2.92	4	45	
01-00362-25303			R0.3	8	2.92	4	45	
01-00362-25305			R0.5	8	2.92	4	45	
01-00362-25402		2°	R0.2	8	3.06	4	45	
01-00362-25403			R0.3	8	3.06	4	45	
01-00362-25405			R0.5	8	3.06	4	45	
01-00362-25502		3°	R0.2	8	3.34	4	45	
01-00362-25503			R0.3	8	3.34	4	45	
01-00362-25505			R0.5	8	3.34	4	45	
01-00362-25602		4°	R0.2	8	3.62	4	45	
01-00362-25603			R0.3	8	3.62	4	45	
01-00362-25605			R0.5	8	3.62	4	45	
01-00362-25702		5°	R0.2	8	3.90	4	45	
01-00362-25703			R0.3	8	3.90	4	45	
01-00362-25705			R0.5	8	3.90	4	45	
01-00362-25802		7°	R0.2	8	4.46	6	50	
01-00362-25803			R0.3	8	4.46	6	50	
01-00362-25805			R0.5	8	4.46	6	50	
01-00362-25902		10°	R0.2	8	5.32	6	50	
01-00362-25903			R0.3	8	5.32	6	50	
01-00362-25905			R0.5	8	5.32	6	50	
01-00362-30102		3	30°	R0.2	10	3.17	6	50
01-00362-30103				R0.3	10	3.17	6	50
01-00362-30105				R0.5	10	3.17	6	50
01-00362-30110	1°		R1	10	3.17	6	50	
01-00362-30202			R0.2	10	3.35	6	50	
01-00362-30203			R0.3	10	3.35	6	50	
01-00362-30205	R0.5		10	3.35	6	50		
01-00362-30210	R1		10	3.35	6	50		

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(R) Angolo raggio Corner Radius	(l) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00362-30302	3	1° 30'	R0.2	10	3.52	6	50	
01-00362-30303			R0.3	10	3.52	6	50	
01-00362-30305			R0.5	10	3.52	6	50	
01-00362-30310		2°	R1	10	3.52	6	50	
01-00362-30402			R0.2	10	3.70	6	50	
01-00362-30403			R0.3	10	3.70	6	50	
01-00362-30405		3°	R0.5	10	3.70	6	50	
01-00362-30410			R1	10	3.70	6	50	
01-00362-30502			R0.2	10	4.05	6	50	
01-00362-30503		4°	R0.3	10	4.05	6	50	
01-00362-30505			R0.5	10	4.05	6	50	
01-00362-30510			R1	10	4.05	6	50	
01-00362-30602		5°	R0.2	10	4.40	6	50	
01-00362-30603			R0.3	10	4.40	6	50	
01-00362-30605			R0.5	10	4.40	6	50	
01-00362-30610		7°	R1	10	4.40	6	50	
01-00362-30702			R0.2	10	4.75	6	50	
01-00362-30703			10°	R0.3	10	4.75	6	50
01-00362-30705		R0.5		10	4.75	6	50	
01-00362-30710		R1		10	4.75	6	50	
01-00362-30802		30°	R0.2	10	5.46	6	50	
01-00362-30803			R0.3	10	5.46	6	50	
01-00362-30805			R0.5	10	5.46	6	50	
01-00362-30810		4°	R1	10	5.46	6	50	
01-00362-30902			R0.2	10	6.53	6	50	
01-00362-30903			1°	R0.3	10	6.53	6	50
01-00362-30905		R0.5		10	6.53	6	50	
01-00362-30910		R1		10	6.53	6	50	
01-00362-40102		4	30°	R0.2	15	4.26	6	50
01-00362-40103				R0.3	15	4.26	6	50
01-00362-40105	R0.5			15	4.26	6	50	
01-00362-40110	1°		R1	15	4.26	6	50	
01-00362-40202			R0.2	15	4.52	6	50	
01-00362-40203			R0.3	15	4.52	6	50	
01-00362-40205	1°	R0.5	15	4.52	6	50		
01-00362-40210		R1	15	4.52	6	50		

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite Coating**  
Piane Square

**Non Rivestite Non-Coating**  
Scaricate Piane Long Neck Square

**Rivestite Coating**  
Sferiche Ball

**Non Rivestite Non-Coating**  
Scaricate Sferiche Long Neck Ball

**Rivestite Coating**  
Coniche Taper

**Non Rivestite Non-Coating**  
Coniche Sferiche Taper Ball

**Rivestite Coating**  
Toriche Corner R

**Non Rivestite Non-Coating**  
Scaricate Toriche Long Neck Corner R

**Rivestite Coating**  
Frese Sagomate Formed Cutter

**Non Rivestite Non-Coating**  
Punte Drill

**Altro Others**

**Dati tecnici Technical Data**

**Guida tecnica Technical Guidance**

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(R) Angolo raggio Corner Radius	(ℓ) Lungh. tagliente Length of Cut	(di) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00362-40302	4	1° 30'	R0.2	15	4.79	6	50	
01-00362-40303			R0.3	15	4.79	6	50	
01-00362-40305			R0.5	15	4.79	6	50	
01-00362-40310			R1	15	4.79	6	50	
01-00362-40402			2°	R0.2	15	5.05	6	50
01-00362-40403				R0.3	15	5.05	6	50
01-00362-40405		R0.5		15	5.05	6	50	
01-00362-40410		3°	R1	15	5.05	6	50	
01-00362-40502			R0.2	15	5.57	6	50	
01-00362-40503			R0.3	15	5.57	6	50	
01-00362-40505		4°	R0.5	15	5.57	6	50	
01-00362-40510			R1	15	5.57	6	50	
01-00362-40602			R0.2	15	6.10	6	55	
01-00362-40603		4°	R0.3	15	6.10	6	55	
01-00362-40605			R0.5	15	6.10	6	55	
01-00362-40610			R1	15	6.10	6	55	
01-00362-40702		5°	R0.2	15	6.62	6	55	
01-00362-40703			R0.3	15	6.62	6	55	
01-00362-40705			R0.5	15	6.62	6	55	
01-00362-40710		7°	R1	15	6.62	6	55	
01-00362-40802			R0.2	15	7.68	6	55	
01-00362-40803			R0.3	15	7.68	6	55	
01-00362-40805		7°	R0.5	15	7.68	6	55	
01-00362-40810			R1	15	7.68	6	55	
01-00362-40902			10°	R0.2	15	9.29	8	60
01-00362-40903		R0.3		15	9.29	8	60	
01-00362-40905		R0.5		15	9.29	8	60	
01-00362-40910		R1		15	9.29	8	60	
01-00362-50102		5	30'	R0.2	20	5.35	6	55
01-00362-50103				R0.3	20	5.35	6	55
01-00362-50105	R0.5			20	5.35	6	55	
01-00362-50110	R1			20	5.35	6	55	
01-00362-50115	R1.5			20	5.35	6	55	
01-00362-50202	1°		R0.2	20	5.70	6	55	
01-00362-50203			R0.3	20	5.70	6	55	
01-00362-50205			R0.5	20	5.70	6	55	
01-00362-50205			R0.5	20	5.70	6	55	
01-00362-50205			R0.5	20	5.70	6	55	

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(R) Angolo raggio Corner Radius	(ℓ) Lungh. tagliente Length of Cut	(di) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00362-50210	5	1°	R1	20	5.70	6	55
01-00362-50215			R1.5	20	5.70	6	55
01-00362-50302		1° 30'	R0.2	20	6.05	6	55
01-00362-50303			R0.3	20	6.05	6	55
01-00362-50305			R0.5	20	6.05	6	55
01-00362-50310		2°	R1	20	6.05	6	55
01-00362-50315			R1.5	20	6.05	6	55
01-00362-50402			R0.2	20	6.40	6	55
01-00362-50403		2°	R0.3	20	6.40	6	55
01-00362-50405			R0.5	20	6.40	6	55
01-00362-50410			R1	20	6.40	6	55
01-00362-50415		3°	R1.5	20	6.40	6	55
01-00362-50502			R0.2	20	7.10	6	55
01-00362-50503			R0.3	20	7.10	6	55
01-00362-50505		3°	R0.5	20	7.10	6	55
01-00362-50510			R1	20	7.10	6	55
01-00362-50515			R1.5	20	7.10	6	55
01-00362-50602		4°	R0.2	20	7.80	6	60
01-00362-50603			R0.3	20	7.80	6	60
01-00362-50605			R0.5	20	7.80	6	60
01-00362-50610		5°	R1	20	7.80	6	60
01-00362-50615			R1.5	20	7.80	6	60
01-00362-50702			5°	R0.2	20	8.50	8
01-00362-50703		R0.3		20	8.50	8	60
01-00362-50705		R0.5		20	8.50	8	60
01-00362-50710		R1		20	8.50	8	60
01-00362-50715		7°	R1.5	20	8.50	8	60
01-00362-50802			R0.2	20	9.91	8	60
01-00362-50803			R0.3	20	9.91	8	60
01-00362-50805		7°	R0.5	20	9.91	8	60
01-00362-50810	R1		20	9.91	8	60	
01-00362-50815	R1.5		20	9.91	8	60	
01-00362-50902	10°	R0.2	20	12.05	12	70	
01-00362-50903		R0.3	20	12.05	12	70	
01-00362-50905		R0.5	20	12.05	12	70	
01-00362-50910		R1	20	12.05	12	70	
01-00362-50915		R1.5	20	12.05	12	70	

**Attenzione**

Quando ordinate, indicate NTER-2X (D)×(θ)×(R).  
When you order, indicate NTER-2X (D)×(θ)×(R).

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(R) Angolo raggio Corner Radius	(l) Lunghezza tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lunghezza totale Overall Length
01-00362-60102	6	30°	R0.2	20	6.35	6	55
01-00362-60103			R0.3	20	6.35	6	55
01-00362-60105			R0.5	20	6.35	6	55
01-00362-60110			R1	20	6.35	6	55
01-00362-60115			R1.5	20	6.35	6	55
01-00362-60120			R2	20	6.35	6	55
01-00362-60202		1°	R0.2	20	6.70	6	55
01-00362-60203			R0.3	20	6.70	6	55
01-00362-60205			R0.5	20	6.70	6	55
01-00362-60210			R1	20	6.70	6	55
01-00362-60215			R1.5	20	6.70	6	55
01-00362-60220			R2	20	6.70	6	55
01-00362-60302		1° 30'	R0.2	20	7.05	6	55
01-00362-60303			R0.3	20	7.05	6	55
01-00362-60305			R0.5	20	7.05	6	55
01-00362-60310			R1	20	7.05	6	55
01-00362-60315			R1.5	20	7.05	6	55
01-00362-60320			R2	20	7.05	6	55
01-00362-60402		2°	R0.2	20	7.40	6	55
01-00362-60403			R0.3	20	7.40	6	55
01-00362-60405			R0.5	20	7.40	6	55
01-00362-60410			R1	20	7.40	6	55
01-00362-60415			R1.5	20	7.40	6	55
01-00362-60420			R2	20	7.40	6	55
01-00362-60502		3°	R0.2	20	8.10	8	60
01-00362-60503			R0.3	20	8.10	8	60
01-00362-60505			R0.5	20	8.10	8	60
01-00362-60510			R1	20	8.10	8	60
01-00362-60515			R1.5	20	8.10	8	60
01-00362-60520			R2	20	8.10	8	60
01-00362-60602		4°	R0.2	20	8.80	8	65
01-00362-60603			R0.3	20	8.80	8	65
01-00362-60605			R0.5	20	8.80	8	65
01-00362-60610			R1	20	8.80	8	65
01-00362-60615			R1.5	20	8.80	8	65
01-00362-60620			R2	20	8.80	8	65

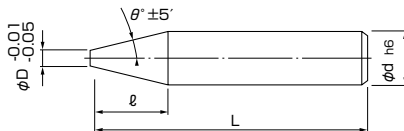
Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(R) Angolo raggio Corner Radius	(l) Lunghezza tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lunghezza totale Overall Length
01-00362-60702	6	5°	R0.2	20	9.50	8	65
01-00362-60703			R0.3	20	9.50	8	65
01-00362-60705			R0.5	20	9.50	8	65
01-00362-60710			R1	20	9.50	8	65
01-00362-60715			R1.5	20	9.50	8	65
01-00362-60720			R2	20	9.50	8	65
01-00362-60802		7°	R0.2	20	10.91	10	70
01-00362-60803			R0.3	20	10.91	10	70
01-00362-60805			R0.5	20	10.91	10	70
01-00362-60810			R1	20	10.91	10	70
01-00362-60815			R1.5	20	10.91	10	70
01-00362-60820			R2	20	10.91	10	70
01-00362-60902		10°	R0.2	20	13.05	12	80
01-00362-60903			R0.3	20	13.05	12	80
01-00362-60905			R0.5	20	13.05	12	80
01-00362-60910			R1	20	13.05	12	80
01-00362-60915			R1.5	20	13.05	12	80
01-00362-60920			R2	20	13.05	12	80

CBN  
Nitruro Cubico  
di Boro

# NER-2

2-Flute Taper End Mill for Runner

## Frese 2 Tagli piane coniche per canalini



Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Codice Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scarico con. Taper Angle	( $\ell$ ) Lungh. tagliente Length of Cut.	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00712-02001	2	7°	5	3.22	4	45	
01-00712-02501	2.5		6	3.97	4	45	
01-00712-03001	3		7	4.71	6	55	
01-00712-03501	3.5		7	5.21	6	55	
01-00712-04001	4		8	5.96	6	55	
01-00712-04501	4.5		9	6.71	8	60	
01-00712-05001	5	10°	10	7.45	8	60	
01-00712-06001	6		12	8.94	10	70	
01-00712-02002	2		10°	5	3.76	4	45
01-00712-02502	2.5			6	4.61	6	55
01-00712-03002	3			7	5.46	6	55
01-00712-03502	3.5			7	5.96	6	55
01-00712-04002	4	8		6.82	8	60	
01-00712-04502	4.5	9		7.67	8	60	
01-00712-05002	5	12°	10	8.52	10	70	
01-00712-06002	6		12	10.23	10	70	
01-00712-02003	2		12°	5	4.12	4	45
01-00712-02503	2.5			6	5.05	6	55
01-00712-03003	3			7	5.97	6	55
01-00712-03503	3.5			7	6.47	8	60
01-00712-04003	4	8		7.40	8	60	
01-00712-04503	4.5	9		8.32	8	60	
01-00712-05003	5	12°	10	9.25	10	70	
01-00712-06003	6		12	11.10	10	70	

**Attenzione** Quando ordinate, indicate NER-2 (D)×( $\theta$ ).  
When you order, indicate NER-2 (D)×( $\theta$ ).

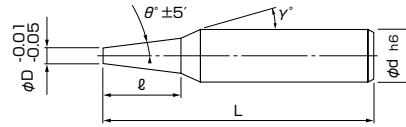
- Per i parametri di taglio vedi pagina 380.
- Milling condition is recommended on page 380.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scarico con. Taper Angle	( $\ell$ ) Lungh. tagliente Length of Cut.	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00712-02004	2	15°	5	4.68	6	55
01-00712-02504	2.5		6	5.71	6	55
01-00712-03004	3		7	6.75	6	55
01-00712-03504	3.5		7	7.25	8	60
01-00712-04004	4		8	8.28	8	60
01-00712-04504	4.5		9	9.32	10	70
01-00712-05004	5	15°	10	10.35	10	70
01-00712-06004	6		12	12.43	12	75

### Frese 2 Tagli piane coniche



● Articolo semi-standard, prezzo e consegna su richiesta.  
● Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Code Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scario con. Taper Angle	( $\ell$ ) Lungh. tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	( $\gamma$ ) Angolo gambo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00312-00051	0.5	30'	2	0.53	9°	3	35
01-00312-00052		1°	2	0.57	9°	3	35
01-00312-00053		1° 30'	2	0.60	9°	3	35
01-00312-00054		2°	2	0.64	9°	3	35
01-00312-00055		2° 30'	2	0.67	9°	3	35
01-00312-00056		3°	2	0.71	9°	3	35
01-00313-00052		5°	2	0.85	9°	3	35
01-00313-00054		10°	2	1.21	10°	3	35
01-00313-00055		15°	2	1.57	15°	3	35
01-00312-00061		0.6	30'	2	0.63	9°	3
01-00312-00062	1°		2	0.67	9°	3	35
01-00312-00063	1° 30'		2	0.70	9°	3	35
01-00312-00064	2°		2	0.74	9°	3	35
01-00312-00065	2° 30'		2	0.78	9°	3	35
01-00312-00066	3°		2	0.81	9°	3	35
01-00312-00071	0.7	30'	2	0.73	9°	3	35
01-00312-00072		1°	2	0.77	9°	3	35
01-00312-00073		1° 30'	2	0.80	9°	3	35
01-00312-00074		2°	2	0.84	9°	3	35
01-00312-00075		2° 30'	2	0.88	9°	3	35
01-00312-00076	3°	2	0.91	9°	3	35	
01-00312-00081	0.8	30'	3	0.85	9°	3	35
01-00312-00082		1°	3	0.90	9°	3	35
01-00312-00083		1° 30'	3	0.96	9°	3	35
01-00312-00084		2°	3	1.01	9°	3	35
01-00312-00085		2° 30'	3	1.06	9°	3	35
01-00312-00086	3°	3	1.11	9°	3	35	
01-00312-00091	0.9	30'	3	0.95	9°	3	35
01-00312-00092		1°	3	1.00	9°	3	35
01-00312-00093		1° 30'	3	1.06	9°	3	35
01-00312-00094		2°	3	1.11	9°	3	35
01-00312-00095		2° 30'	3	1.16	9°	3	35
01-00312-00096	3°	3	1.21	9°	3	35	

Code Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scario con. Taper Angle	( $\ell$ ) Lungh. tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	( $\gamma$ ) Angolo gambo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00312-00101	1	30'	4	1.07	9°	4	45	
01-00312-00102		1°	4	1.14	9°	4	45	
01-00312-00103		1° 30'	4	1.21	9°	4	45	
01-00312-00104		2°	4	1.28	9°	4	45	
01-00312-00105		2° 30'	4	1.35	9°	4	45	
01-00312-00106		3°	4	1.42	9°	4	45	
01-00313-00101		4°	4	1.56	9°	4	45	
01-00312-00107		5°	4	1.70	9°	4	45	
01-00313-00103		7°	4	1.98	7°	4	45	
01-00312-00108		10°	4	2.41	10°	4	45	
01-00313-00105		15°	4	3.14	15°	6	45	
01-00313-00106		20°	4.12	4.00	20°	6	45	
01-00312-00151		1.5	30'	5	1.59	9°	4	45
01-00312-00152			1°	5	1.67	9°	4	45
01-00312-00153			1° 30'	5	1.76	9°	4	45
01-00312-00154			2°	5	1.85	9°	4	45
01-00312-00155			2° 30'	5	1.94	9°	4	45
01-00312-00156	3°		5	2.02	9°	4	45	
01-00313-00151	4°		5	2.20	9°	4	45	
01-00312-00157	5°		5	2.37	9°	4	45	
01-00313-00153	7°		5	2.73	7°	4	45	
01-00312-00158	10°		5	3.26	10°	4	45	
01-00313-00155	15°		5	4.18	15°	6	45	
01-00313-00156	20°		6.18	6.00	20°	6	50	
01-00312-00201	2		30'	6	2.10	9°	4	45
01-00312-00202			1°	6	2.21	9°	4	45
01-00312-00203			1° 30'	6	2.31	9°	4	45
01-00312-00204			2°	6	2.42	9°	4	45
01-00312-00205			2° 30'	6	2.52	9°	4	45
01-00312-00206		3°	6	2.63	9°	4	45	
01-00313-00201		4°	6	2.84	9°	4	45	
01-00312-00207		5°	6	3.05	5°	4	45	
01-00313-00203		7°	6	3.47	7°	4	45	
01-00312-00208		10°	6	4.12	10°	6	45	
01-00313-00205		15°	6	5.22	15°	6	45	
01-00313-00206		20°	6.5	6.73	-	6	50	

#### Attenzione

Quando ordinate, indicate NTE-2 (D)×( $\theta$ ).  
When you order, indicate NTE-2 (D)×( $\theta$ ).

- Per i parametri di taglio vedi pagina 381.
- Milling condition is recommended on page 381.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scariate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scariate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scariate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

● **Articolo semi-standard, prezzo e consegna su richiesta.**

● Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(l) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00312-00251	2.5	30°	8	2.64	9°	4	45
01-00312-00252		1°	8	2.78	9°	4	45
01-00312-00253		1° 30'	8	2.92	9°	4	45
01-00312-00254		2°	8	3.06	9°	4	45
01-00312-00255		2° 30'	8	3.20	9°	4	45
01-00312-00256		3°	8	3.34	3°	4	45
01-00313-00251		4°	8	3.62	4°	4	45
01-00312-00257		5°	8	3.90	5°	4	45
01-00313-00253	7°	8	4.46	7°	6	50	
01-00313-00254	10°	8	5.32	10°	6	50	
01-00312-00301	3	30°	10	3.17	9°	6	50
01-00312-00302		1°	10	3.35	9°	6	50
01-00312-00303		1° 30'	10	3.52	9°	6	50
01-00312-00304		2°	10	3.69	9°	6	50
01-00312-00305		2° 30'	10	3.87	9°	6	50
01-00312-00306		3°	10	4.05	9°	6	50
01-00313-00301		4°	10	4.40	9°	6	50
01-00313-00302		5°	10	4.75	5°	6	50
01-00313-00303	7°	10	5.46	7°	6	50	
01-00313-00304	10°	10	6.53	-	6	50	
01-00313-00305	15°	10	8.36	-	8	50	
01-00313-00306	20°	10	10.28	-	10	70	
01-00312-00401	4	30°	15	4.26	9°	6	50
01-00312-00402		1°	15	4.52	9°	6	50
01-00312-00403		1° 30'	15	4.79	9°	6	50
01-00312-00404		2°	15	5.04	9°	6	50
01-00312-00405		2° 30'	15	5.31	2°30'	6	50
01-00312-00406		3°	15	5.57	3°	6	50
01-00313-00401		4°	15	6.10	-	6	55
01-00313-00402		5°	15	6.62	-	6	55
01-00313-00403	7°	15	7.68	-	6	55	
01-00313-00404	10°	15	9.29	-	8	60	
01-00312-00501	5	30°	20	5.34	9°	6	55
01-00312-00502		1°	20	5.70	9°	6	55
01-00312-00503		1° 30'	20	6.04	-	6	55
01-00312-00504		2°	20	6.39	-	6	55

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(l) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00312-00505	5	2° 30'	20	6.74	-	6	55	
01-00312-00506		3°	20	7.10	-	6	55	
01-00313-00501		4°	20	7.80	-	6	60	
01-00313-00502		5°	20	8.50	-	8	60	
01-00313-00503		7°	20	9.91	-	8	60	
01-00313-00504		10°	20	12.05	-	12	70	
01-00312-00601		6	30°	20	6.35	-	6	55
01-00312-00602			1°	20	6.70	-	6	55
01-00312-00603	1° 30'		20	7.05	-	6	55	
01-00312-00604	2°		20	7.40	-	6	55	
01-00312-00605	2° 30'		20	7.75	-	6	55	
01-00312-00606	3°		20	8.10	-	8	60	
01-00313-00601	4°		20	8.80	-	8	65	
01-00313-00602	5°		20	9.50	-	8	65	
01-00313-00603	7°	20	10.91	-	10	70		
01-00313-00604	10°	20	13.05	-	12	80		
01-00312-00801	8	30°	25	8.44	-	8	65	
01-00312-00802		1°	25	8.87	-	8	65	
01-00312-00803		1° 30'	25	9.31	-	8	65	
01-00312-00804		2°	25	9.74	-	8	65	
01-00312-00805		2° 30'	25	10.18	-	10	70	
01-00312-00806		3°	25	10.62	-	10	70	
01-00313-00801		4°	25	11.50	-	10	80	
01-00313-00802		5°	25	12.37	-	12	90	
01-00313-00803	7°	25	14.14	-	12	90		
01-00313-00804	10°	25	16.81	-	16	90		
01-00312-01001	10	30°	35	10.61	-	10	85	
01-00312-01002		1°	35	11.22	-	10	85	
01-00312-01003		1° 30'	35	11.83	-	10	85	
01-00312-01004		2°	35	12.44	-	12	90	
01-00312-01005		2° 30'	35	13.06	-	12	90	
01-00312-01006		3°	35	13.67	-	12	90	
01-00313-01001		4°	35	14.89	-	12	90	
01-00313-01002		5°	35	16.12	-	16	90	
01-00313-01003	7°	35	18.59	-	16	90		
01-00313-01004	10°	35	22.34	-	20	110		

**Attenzione** Quando ordinate, indicate NTE-2(D)×(θ).  
When you order, indicate NTE-2 (D)×(θ).

● Per i parametri di taglio vedi pagina 381.

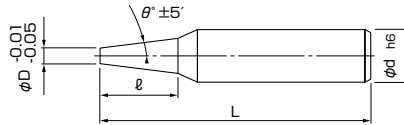
● Milling condition is recommended on page 381.



# NTEM-2

2-Flute Medium Taper End Mill

## Frese 2 Tagli piane coniche medie



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(ℓ) Lung. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
01-00332-01010	1	4°	5	1.70	4	50
01-00332-01016		7°	5	2.23	4	50
01-00332-01024		15°	5	3.68	4	50
01-00332-01510	1.5	4°	7.5	2.55	4	50
01-00332-01516		7°	7.5	3.34	4	50
01-00332-01524		15°	7.5	5.52	6	50
01-00332-02010	2	4°	10	3.40	4	50
01-00332-02016		7°	10	4.46	6	50
01-00332-02024		15°	10	7.36	8	55
01-00332-02510	2.5	4°	12.5	4.25	6	50
01-00332-02516		7°	12.5	5.57	6	50
01-00332-02519		10°	12.5	6.91	6	55
01-00332-02524		15°	12.5	9.20	10	60
01-00332-02525		20°	12.5	11.60	12	65
01-00332-03002	3	30°	15	3.26	4	55
01-00332-03004		1°	15	3.52	4	55
01-00332-03005		1° 30'	15	3.79	4	55
01-00332-03006		2°	15	4.05	6	55
01-00332-03008		3°	15	4.57	6	55
01-00332-03010		4°	15	5.10	6	60
01-00332-03012		5°	15	5.62	6	60
01-00332-03016		7°	15	6.68	6	60
01-00332-03019		10°	15	8.29	8	65
01-00332-03024		15°	15	11.04	10	70
01-00332-03025		20°	15	13.92	12	75

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(ℓ) Lung. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
01-00332-04002	4	30°	20	4.35	6	60
01-00332-04004		1°	20	4.70	6	60
01-00332-04005		1° 30'	20	5.05	6	60
01-00332-04006		2°	20	5.40	6	60
01-00332-04008		3°	20	6.10	6	60
01-00332-04010		4°	20	6.80	6	60
01-00332-04012		5°	20	7.50	8	65
01-00332-04016		7°	20	8.91	8	70
01-00332-04019		10°	20	11.05	10	70
01-00332-04024		15°	20	14.72	12	75
01-00332-04025		20°	20	18.56	16	90



### Attenzione

Quando ordinate, indicate NTEM-2 (D)×(θ).  
When you order, indicate NTEM-2 (D)×(θ).

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane  
Square

Scaricate Piane  
Long Neck Square

Sferiche  
Ball

Scaricate Sferiche  
Long Neck Ball

Coniche  
Taper

Coniche Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate Toriche  
Long Neck Corner R

Frese Sagomate  
Formed Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating  
Frese  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

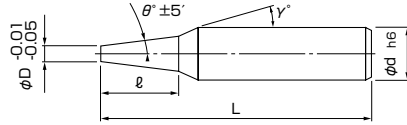
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NTEL-2

2-Flute Long Taper End Mill

## Frese 2 Tagli piane coniche lunghe



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

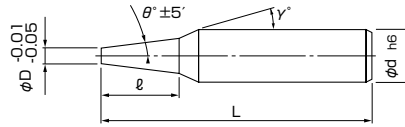
Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(l) Lungh. tagliante Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00322-00101	1	30°	10	1.17	9°	4	45	
01-00322-00102		1°	10	1.35	9°	4	45	
01-00322-00103		1° 30'	10	1.52	9°	4	45	
01-00322-00104		2°	10	1.70	9°	4	45	
01-00322-00105		2° 30'	10	1.87	9°	4	45	
01-00322-00106		3°	10	2.05	9°	4	45	
01-00323-00102		5°	10	2.75	9°	4	45	
01-00323-00104		10°	10	4.53	10°	6	50	
01-00323-00105		15°	9.3	6.00	15°	6	60	
01-00323-00106		20°	8	6.82	-	6	60	
01-00322-00151		1.5	30°	10	1.67	9°	4	45
01-00322-00152			1°	10	1.85	9°	4	45
01-00322-00153			1° 30'	10	2.02	9°	4	45
01-00322-00154			2°	10	2.20	9°	4	45
01-00322-00155			2° 30'	10	2.37	9°	4	45
01-00322-00156			3°	10	2.55	9°	4	45
01-00323-00152	5°		10	3.25	9°	4	45	
01-00323-00154	10°		10	5.03	10°	6	50	
01-00323-00155	15°		10	6.86	-	6	60	
01-00323-00156	20°		10	8.78	-	8	65	
01-00322-00201	2	30°	13	2.22	9°	4	50	
01-00322-00202		1°	13	2.45	9°	4	50	
01-00322-00203		1° 30'	13	2.68	9°	4	50	
01-00322-00204		2°	13	2.90	9°	4	50	
01-00322-00205		2° 30'	13	3.13	9°	4	50	
01-00322-00206		3°	13	3.36	3°	4	50	
01-00322-00207		5°	13	4.27	9°	6	50	
01-00323-00204		10°	13	6.58	-	6	60	
01-00323-00205		15°	13	8.97	-	8	65	
01-00323-00206		20°	13	11.46	-	10	80	

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(l) Lungh. tagliante Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00322-00251	2.5	30°	15	2.76	9°	4	55
01-00322-00252		1°	15	3.03	9°	4	55
01-00322-00253		1° 30'	15	3.29	9°	4	55
01-00322-00254		2°	15	3.55	2°	4	55
01-00322-00255		2° 30'	15	3.81	2°30'	4	55
01-00322-00256		3°	15	4.07	-	4	55
01-00322-00257		5°	15	5.13	5°	6	55
01-00323-00304	3	10°	20	10.05	-	10	70
01-00323-00305		15°	20	13.72	-	12	80
01-00323-00306		20°	20	17.56	-	16	100

**Attenzione** Quando ordinate, indicate NTEL-2 (D)×(θ).  
When you order, indicate NTEL-2 (D)×(θ).

- Per i parametri di taglio vedi pagina 382.
- Milling condition is recommended on page 382.

### Frese 4 Tagli piane coniche



● Articolo semi-standard, prezzo e consegna su richiesta.  
● Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(theta) Angolo scarico con. Taper Angle	(l) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	Angolo (gamma) Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00314-00301	3	30'	10	3.17	9°	6	50
01-00314-00302		1°	10	3.35	9°	6	50
01-00314-00303		1° 30'	10	3.52	9°	6	50
01-00314-00304		2°	10	3.69	9°	6	50
01-00314-00305		2° 30'	10	3.87	9°	6	50
01-00314-00306		3°	10	4.05	9°	6	50
01-00315-00301		4°	10	4.40	9°	6	50
01-00314-00307		5°	10	4.75	5°	6	50
01-00315-00303		7°	10	5.46	7°	6	50
01-00315-00304		10°	10	6.53	-	6	50
01-00315-00305	15°	10	8.36	-	8	50	
01-00314-00401	4	30'	15	4.26	9°	6	50
01-00314-00402		1°	15	4.52	9°	6	50
01-00314-00403		1° 30'	15	4.79	9°	6	50
01-00314-00404		2°	15	5.04	9°	6	50
01-00314-00405		2° 30'	15	5.31	2° 30'	6	50
01-00314-00406		3°	15	5.57	3°	6	50
01-00315-00401		4°	15	6.10	-	6	55
01-00314-00407		5°	15	6.62	-	6	55
01-00315-00403		7°	15	7.68	-	6	55
01-00315-00404		10°	15	9.29	-	8	60
01-00314-00501	5	30'	20	5.34	9°	6	55
01-00314-00502		1°	20	5.70	9°	6	55
01-00314-00503		1° 30'	20	6.04	-	6	55
01-00314-00504		2°	20	6.39	-	6	55
01-00314-00505		2° 30'	20	6.74	-	6	55
01-00314-00506		3°	20	7.10	-	6	55
01-00315-00501		4°	20	7.80	-	6	60
01-00314-00507		5°	20	8.50	-	8	60
01-00315-00503		7°	20	9.91	-	8	60
01-00315-00504		10°	20	12.05	-	12	70

Codice Code No.	(D) Dia. Dia.	(theta) Angolo scarico con. Taper Angle	(l) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	Angolo (gamma) Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00314-00601	6	30'	20	6.35	-	6	55
01-00314-00602		1°	20	6.70	-	6	55
01-00314-00603		1° 30'	20	7.05	-	6	55
01-00314-00604		2°	20	7.40	-	6	55
01-00314-00605		2° 30'	20	7.75	-	6	55
01-00314-00606		3°	20	8.10	-	8	60
01-00315-00601		4°	20	8.80	-	8	65
01-00314-00607		5°	20	9.50	-	8	65
01-00315-00603		7°	20	10.91	-	10	70
01-00315-00604		10°	20	13.05	-	12	80
01-00314-00801	8	30'	25	8.44	-	8	65
01-00314-00802		1°	25	8.87	-	8	65
01-00314-00803		1° 30'	25	9.31	-	8	65
01-00314-00804		2°	25	9.74	-	8	65
01-00314-00805		2° 30'	25	10.18	-	10	70
01-00314-00806		3°	25	10.62	-	10	70
01-00315-00801		4°	25	11.50	-	10	80
01-00314-00807		5°	25	12.37	-	12	90
01-00315-00803		7°	25	14.14	-	12	90
01-00315-00804		10°	25	16.81	-	16	90
01-00314-01001	10	30'	35	10.61	-	10	85
01-00314-01002		1°	35	11.22	-	10	85
01-00314-01003		1° 30'	35	11.83	-	10	85
01-00314-01004		2°	35	12.44	-	12	90
01-00314-01005		2° 30'	35	13.06	-	12	90
01-00314-01006		3°	35	13.67	-	12	90
01-00315-01001		4°	35	14.89	-	12	90
01-00314-01007		5°	35	16.12	-	16	90
01-00315-01003		7°	35	18.59	-	16	90
01-00315-01004		10°	35	22.34	-	20	110

#### Attenzione

Quando ordinate, indicate NTE-4 (D)x(theta).  
When you order, indicate NTE-4 (D)x(theta).

- Per i parametri di taglio vedi pagina 383.
- Milling condition is recommended on page 383.

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane  
Square

Scaricate Piane  
Long Neck Square

Sferiche  
Ball

Scaricate Sferiche  
Long Neck Ball

Coniche  
Taper

Coniche Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate Toriche  
Long Neck Corner R

Frese Sagomate  
Formed Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite Coating**  
Piane Square

**Non Rivestite Non-Coating**  
Scaricate Piane Long Neck Square

**Rivestite Coating**  
Sferiche Ball

**Non Rivestite Non-Coating**  
Scaricate Sferiche Long Neck Ball

**Rivestite Coating**  
Coniche Taper

**Non Rivestite Non-Coating**  
Coniche Sferiche Taper Ball

**Rivestite Coating**  
Toriche Corner R

**Non Rivestite Non-Coating**  
Scaricate Toriche Long Neck Corner R

**Rivestite Coating**  
Frese Sagomate Formed Cutter

**Non Rivestite Non-Coating**

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scarico con. Taper Angle	( $l$ ) Lungh. tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00314-01201	12	30°	55	12.96	–	12	110
01-00314-01202		1°	55	13.92	–	12	110
01-00314-01203		1° 30'	55	14.88	–	12	110
01-00314-01204		2°	55	15.84	2°	16	110
01-00314-01205		2° 30'	55	16.80	–	16	110
01-00314-01206		3°	55	17.76	–	16	110
01-00315-01201		4°	55	19.69	4°	20	110
01-00315-01202		5°	55	21.62	–	20	120
01-00315-01203		7°	55	25.51	–	25	120
01-00315-01204		10°	55	31.39	–	25	120
01-00314-01601	16	30°	65	17.13	–	16	130
01-00314-01602		1°	65	18.27	–	16	130
01-00314-01603		1° 30'	65	19.40	–	16	130
01-00314-01604		2°	65	20.53	–	20	130
01-00314-01605		2° 30'	65	21.68	–	20	130
01-00314-01606		3°	65	22.81	–	20	130
01-00315-01601		4°	65	25.09	–	25	140
01-00315-01602		5°	65	27.37	–	25	140
01-00315-01603		7°	65	31.96	7°	32	140
01-00315-01604		10°	65	38.92	–	32	140

### Attenzione

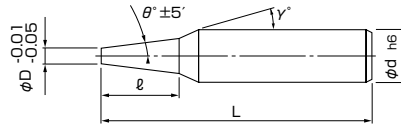
Quando ordinate, indicate NTE-4 (D)×( $\theta$ ).  
When you order, indicate NTE-4 (D)×( $\theta$ ).

- Per i parametri di taglio vedi pagina 383.
- Milling condition is recommended on page 383.

# NTEL-4

4-Flute Long Taper End Mill

## Frese 4 Tagli piane coniche lunghe



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Code Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scarico con. Taper Angle	( $\ell$ ) Lungh. tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	( $\gamma$ ) Angolo gambo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00324-00301	3	30'	20	3.35	9°	6	60
01-00324-00302		1°	20	3.70	9°	6	60
01-00324-00303		1° 30'	20	4.05	9°	6	60
01-00324-00304		2°	20	4.40	9°	6	60
01-00324-00305		2° 30'	20	4.75	9°	6	60
01-00324-00306		3°	20	5.10	3°	6	60
01-00325-00301		4°	20	5.80	4°	6	60
01-00324-00307		5°	20	6.50	-	6	60
01-00324-00401	4	30'	25	4.44	9°	6	60
01-00324-00402		1°	25	4.88	9°	6	60
01-00324-00403		1° 30'	25	5.31	9°	6	60
01-00324-00404		2°	25	5.75	2°	6	60
01-00324-00405		2° 30'	25	6.19	-	6	60
01-00324-00406		3°	25	6.62	9°	8	60
01-00325-00401		4°	25	7.50	4°	8	65
01-00324-00407	5°	25	8.38	-	8	65	
01-00324-00501	5	30'	30	5.52	9°	6	65
01-00324-00502		1°	30	6.05	-	6	65
01-00324-00503		1° 30'	30	6.57	9°	8	65
01-00324-00504		2°	30	7.09	9°	8	70
01-00324-00505		2° 30'	30	7.62	2° 30'	8	70
01-00324-00506		3°	30	8.14	-	8	75
01-00325-00501		4°	30	9.20	4°	10	80
01-00324-00507	5°	30	10.25	-	10	80	

Unità di misura: mm Unit size: mm

Code Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scarico con. Taper Angle	( $\ell$ ) Lungh. tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	( $\gamma$ ) Angolo gambo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00324-00601	6	30'	35	6.61	7° 30'	8	70
01-00324-00602		1°	35	7.22	7° 30'	8	70
01-00324-00603		1° 30'	35	7.83	1° 30'	8	70
01-00324-00604		2°	35	8.44	-	8	80
01-00324-00605		2° 30'	35	9.05	7° 30'	10	85
01-00324-00606		3°	35	9.67	-	10	85
01-00325-00601		4°	35	10.89	-	10	90
01-00324-00607		5°	35	12.12	-	12	90



CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

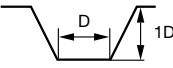

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

### Attenzione

Quando ordinate, indicate NTEL-4 (D)x( $\theta$ ).  
When you order, indicate NTEL-4 (D)x( $\theta$ ).

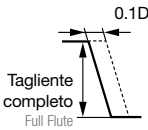
- Per i parametri di taglio vedi pagina 383.
- Milling condition is recommended on page 383.

Materiale Work Material		Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AISI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738		
Velocità di taglio Cutting Speed		33~37m/min			30~32m/min			16~20m/min		
Dia. Dia.	Angolo Taper Angle	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
			mm/min			mm/min			mm/min	
		min <sup>-1</sup>	Spallamento Side Milling	Cava Slotting	min <sup>-1</sup>	Spallamento Side Milling	Cava Slotting	min <sup>-1</sup>	Spallamento Side Milling	Cava Slotting
2	7~10°	4,300	120	60	3,700	100	50	3,100	70	35
	12~15°	3,800	130	65	3,200	110	55	2,700	80	40
2.5	7~10°	3,400	120	60	3,000	100	50	2,450	70	35
	12~15°	3,000	130	65	2,600	110	55	2,150	80	40
3	7~10°	2,900	120	60	2,450	100	50	2,050	70	35
	12~15°	2,500	130	65	2,150	110	55	1,800	80	40
3.5	7~10°	2,450	120	60	2,100	100	50	1,750	70	35
	12~15°	2,100	130	65	1,800	110	55	1,500	80	40
4	7~10°	2,100	120	60	1,800	100	50	1,500	70	35
	12~15°	1,900	130	65	1,600	110	55	1,350	80	40
4.5	7~10°	1,900	120	60	1,600	100	50	1,400	70	35
	12~15°	1,650	130	65	1,400	110	55	1,200	80	40
5	7~10°	1,700	120	60	1,500	100	50	1,250	70	35
	12~15°	1,500	130	65	1,300	110	55	1,100	80	40
6	7~10°	1,400	120	60	1,200	100	50	1,000	70	35
	12~15°	1,250	130	65	1,100	110	55	900	80	40
Profondità di taglio Depth of Cut		Cava conica Taper Slotting				Spallamento conico Taper Side Milling				
(D) Dia. Dia.										
Note Notes		<p>※ Usare un mandrino rigido e preciso.                  ※ Usare lubrificante.                  ※ Regolare nella stessa proporzione giri ed avanzamento.                  ※ Use a high rigid and precise machine and chuck holder.                  ※ Use cutting fluid.                  ※ Adjust both spindle speed and feed at the same rate.</p>								

## Parametri di taglio raccomandati

# NTE-2

### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738	
Velocità di taglio Cutting Speed	35m/min		30m/min		25m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.5	22,000	70	19,000	45	16,000	30
0.6	19,000	70	16,000	45	13,000	30
0.7	16,000	70	13,600	45	11,400	30
0.8	14,000	110	12,000	70	10,000	50
0.9	12,400	110	10,600	70	8,800	50
1	11,000	160	9,500	130	8,000	100
1.5	7,400	160	6,400	130	5,300	100
2	5,600	160	4,800	130	4,000	100
2.5	4,500	160	3,800	130	3,200	100
Profondità di taglio Depth of Cut	<p>Spallamento conico Taper Side Milling</p>  <p>0.1D</p> <p>Tagliente completo Full Flute</p>					
(D) Dia. Dia.						
Note Notes	<ul style="list-style-type: none"> <li>※ Usare lubrorefrigerante.</li> <li>※ Regolare con la stessa proporzione giri ed avanzamento.</li> <li>※ Raccomandiamo fresatura in concordanza nelle operazioni di contornatura.</li> <li>※ Use cutting fluid.</li> <li>※ Adjust both spindle speed and feed at the same rate.</li> <li>※ We recommend a down-cut at side milling.</li> </ul>					

CBN

Nitruro Cubico di Boro

Diamante

Diamond

Piane

Square

Scaricate

Piane

Long Neck Square

Sferiche

Ball

Scaricate

Sferiche

Long Neck Ball

Coniche

Taper

Coniche

Sferiche

Taper Ball

Toriche

Corner R

Scaricate

Toriche

Long Neck Corner R

Frese

Sagomate

Formed Cutter

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

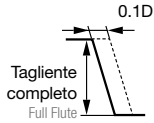
Guida tecnica

Technical Guidance

# Parametri di taglio raccomandati

# NTEL-2

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738	
Velocità di taglio Cutting Speed	17m/min		15m/min		12m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
0.5	11,000	35	9,500	20	8,000	15
0.6	9,500	35	8,000	20	6,500	15
0.7	8,000	35	6,800	20	5,700	15
0.8	7,000	55	6,000	35	5,000	25
0.9	6,200	55	5,300	35	4,400	25
1	5,500	80	4,750	65	4,000	50
1.5	3,700	80	3,200	65	2,650	50
2	2,800	80	2,400	65	2,000	50
2.5	2,250	80	1,900	65	1,600	50
Profondità di taglio Depth of Cut	Spallamento conico Taper Side Milling 					
(D) Dia. Dia.						
Note Notes	※Usare lubrificante. ※Regolare nella stessa proporzione giri ed avanzamento. ※Consigliamo fresatura in concordanza nelle operazioni di contornatura. ※Use cutting fluid. ※Adjust both spindle speed and feed at the same rate. ※We recommend a down-cut at side milling.					

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate Piane  
Long Neck Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

Rivestite  
Coating  
Frese Sagomate  
Formed Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data


Guida tecnica  
Technical Guidance



## Parametri di taglio raccomandati

# NTE-4

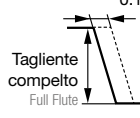
### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738	
Velocità di taglio Cutting Speed	35m/min		30m/min		25m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
3	3,700	220	3,200	180	2,650	130
4	2,800	220	2,400	180	2,000	130
5	2,200	220	1,900	180	1,600	130
6	1,900	220	1,600	180	1,300	130
8	1,400	220	1,200	180	1,000	130
10	1,100	220	950	180	800	130
Profondità di taglio Depth of Cut	Spallamento conico Taper Side Milling 0.1D 					
(D) Dia. Dia.						
Note Notes	※Usare lubrorefrigerante. ※Regolare nella stessa proporzione giri ed avanzamento. ※Raccomandiamo fresatura in concordanza nelle operazioni di contornatura. ※Use cutting fluid. ※Adjust both spindle speed and feed at the same rate. ※We recommend a down-cut at side milling.					

## Parametri di taglio raccomandati

# NTEL-4

### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738	
Velocità di taglio Cutting Speed	17m/min		15m/min		12m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
3	1,850	110	1,600	90	1,300	65
4	1,400	110	1,200	90	1,000	65
5	1,100	110	950	90	800	65
6	950	110	800	90	650	65
Profondità di taglio Depth of Cut	Spallamento conico Taper Side Milling 0.1D 					
(D) Dia. Dia.						
Note Notes	※Usare lubrorefrigerante. ※Regolare nella stessa proporzione giri ed avanzamento. ※Raccomandiamo fresatura in concordanza nelle operazioni di contornatura. ※Use cutting fluid. ※Adjust both spindle speed and feed at the same rate. ※We recommend a down-cut at side milling.					

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

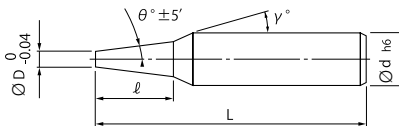
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NRF-4

4-Flute Taper End Mill for Deep Rib

## Frese 4 Tagli plane coniche per nervature profonde



**2 Taglienti effettivi (D=0.5)**  
2 Cutting edges on end. (D=0.5)



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(ℓ) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo gambo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00425-00502	0.5	30°	2	0.53	9°	4	55	
01-00425-00504		1°		0.57	9°	4	55	
01-00425-00505		1° 30'		0.60	9°	4	55	
01-00425-00506		2°	4	0.64	9°	4	55	
01-00425-00512		30°		0.57	9°	4	55	
01-00425-00514		1°		0.64	9°	4	55	
01-00425-00515		1° 30'	0.71	9°	4	55		
01-00425-00516		2°	0.78	9°	4	55		
01-00425-00518		3°	0.92	9°	4	55		
01-00425-00522		30°	6	0.60	9°	4	55	
01-00425-00524		1°		0.71	9°	4	55	
01-00425-00525		1° 30'		0.81	9°	4	55	
01-00425-00526	2°	8	0.92	9°	4	55		
01-00425-00528	3°		1.13	9°	4	55		
01-00425-00538	3°		1.34	9°	4	60		
01-00425-00812	0.8	30°	4	0.87	9°	4	55	
01-00425-00814		1°		0.94	9°	4	55	
01-00425-00815		1° 30'		1.01	9°	4	55	
01-00425-00822		30°	6	0.90	9°	4	55	
01-00425-00824		1°		1.01	9°	4	55	
01-00425-00825		1° 30'		1.11	9°	4	55	
01-00425-00826		2°	8	1.22	9°	4	55	
01-00425-00828		3°		1.43	9°	4	55	
01-00425-00836		2°		1.36	9°	4	60	
01-00425-00838		3°	1.64	9°	4	60		
01-00425-00842		1	30°	10	0.97	9°	4	60
01-00425-00844			1°		1.15	9°	4	60
01-00425-00845	1° 30'		1.32		9°	4	60	
01-00425-00856	2°		12	1.64	9°	4	60	
01-00425-00858	3°			2.06	9°	4	60	
01-00425-01012	30°			4	1.07	9°	4	60
01-00425-01014	1°		1.14		9°	4	60	
01-00425-01022	30°		6		1.10	9°	4	60
01-00425-01024	1°			1.21	9°	4	60	
01-00425-01035	1° 30'			8	1.42	9°	4	60
01-00425-01036	2°		1.56		9°	4	60	

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(ℓ) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo gambo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	
01-00425-01038	1	3°	8	1.84	9°	4	60	
01-00425-01052		30°		1.21	9°	4	60	
01-00425-01054		1°		1.42	9°	4	60	
01-00425-01055		1° 30'	12	1.63	9°	4	60	
01-00425-01056		2°		1.84	9°	4	60	
01-00425-01058		3°		2.26	9°	4	60	
01-00425-01075		1° 30'	21	2.10	9°	4	70	
01-00425-01076		2°		2.47	9°	4	70	
01-00425-01078		3°		3.20	—	4	70	
01-00425-01212		1.2	30°	4	1.27	9°	4	60
01-00425-01214			1°		1.34	9°	4	60
01-00425-01222			30°		6	1.30	9°	4
01-00425-01224	1°		1.41	9°		4	60	
01-00425-01235	1° 30'		8	1.62		9°	4	60
01-00425-01236	2°			1.76	9°	4	60	
01-00425-01238	3°			2.04	9°	4	60	
01-00425-01252	1.4		30°	12	1.41	9°	4	60
01-00425-01254			1°		1.62	9°	4	60
01-00425-01255			1° 30'		1.83	9°	4	60
01-00425-01256			2°	21	2.04	9°	4	60
01-00425-01258			3°		2.46	9°	4	60
01-00425-01275		1° 30'	8		2.30	9°	4	70
01-00425-01276		2°		2.67	9°	4	70	
01-00425-01278		3°		3.40	—	4	70	
01-00425-01412		1.4	30°	8	1.54	9°	4	60
01-00425-01414			1°		1.68	9°	4	60
01-00425-01425			1° 30'		10	1.92	9°	4
01-00425-01432			30°	12		1.61	9°	4
01-00425-01434	1°		1.82			9°	4	60
01-00425-01436	2°		2.24		9°	4	60	
01-00425-01438	3°		16	2.66	9°	4	60	
01-00425-01442	30°			1.68	9°	4	65	
01-00425-01445	1° 30'			2.24	9°	4	65	
01-00425-01454	1°		21	2.13	9°	4	70	
01-00425-01456	2°			2.87	9°	4	70	
01-00425-01458	3°			3.60	—	4	70	

**Attenzione** Quando ordinate, indicate NRF-4 (D)×(θ)×(ℓ).  
When you order, indicate NRF-4 (D)×(θ)×(ℓ).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 386.
- Milling condition is recommended on page 386.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(ℓ) Lungh. tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00425-01465	1.4	1° 30'	26	2.76	9°	4	75
01-00425-01476		2°	31	3.57	-	4	80
01-00425-01478		3°		4.65	9°	6	80
01-00425-01512	1.5	30'	8	1.64	-	4	60
01-00425-01514		1°		1.78	9°	4	60
01-00425-01525		1° 30'	10	2.02	9°	4	60
01-00425-01532		30'		1.71	9°	4	60
01-00425-01534		1°		1.92	9°	4	60
01-00425-01536		2°	12	2.34	9°	4	60
01-00425-01538		3°		2.76	9°	4	60
01-00425-01542		30'		1.78	9°	4	65
01-00425-01545		1° 30'	16	2.34	9°	4	65
01-00425-01554		1°		2.23	9°	4	70
01-00425-01556		2°	21	2.97	9°	4	70
01-00425-01558		3°		3.70	-	4	70
01-00425-01565	1.8	1° 30'	26	2.86	9°	4	75
01-00425-01576		2°		3.67	-	4	80
01-00425-01578		3°	31	4.75	9°	6	80
01-00425-01812		30'		1.94	9°	4	60
01-00425-01824		1°	10	2.15	9°	4	60
01-00425-01825		1° 30'		2.32	9°	4	60
01-00425-01832		30'	12	2.01	9°	4	60
01-00425-01836		2°		2.64	9°	4	60
01-00425-01838		3°		3.06	-	4	60
01-00425-01844		1°	16	2.36	9°	4	65
01-00425-01845		1° 30'		2.64	9°	4	65
01-00425-01852		30'	21	2.17	9°	4	70
01-00425-01856	2°	3.27		-	4	70	
01-00425-01858	3°	4.00		9°	6	70	
01-00425-01864	1°	26	2.71	9°	4	75	
01-00425-01875	1° 30'		3.42	-	4	80	
01-00425-01886	2°	36	4.31	9°	6	85	
01-00425-01888	3°		5.57	-	6	85	

Codice Code No.	(D) Dia. Dia.	(θ) Angolo scarico con. Taper Angle	(ℓ) Lungh. tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00425-02012	2	30'	8	2.14	9°	4	60
01-00425-02024		1°		10	2.35	9°	4
01-00425-02025		1° 30'	2.52		9°	4	60
01-00425-02032		30'	2.21		9°	4	65
01-00425-02036		2°	12	2.84	9°	4	65
01-00425-02038		3°		3.26	-	4	65
01-00425-02044		1°	16	2.56	9°	4	65
01-00425-02045		1° 30'		2.84	9°	4	65
01-00425-02052		30'		2.37	9°	4	70
01-00425-02056		2°	21	3.47	-	4	70
01-00425-02058		3°		4.20	9°	6	70
01-00425-02064		1°	26	2.91	9°	4	75
01-00425-02075	1° 30'	3.62		-	4	80	
01-00425-02086	2°	36	4.51	9°	6	85	
01-00425-02088	3°		5.77	-	6	85	

Materiale Work Material			Acciaio al carbonio • Acciaio pretemprato Carbon Steels • Alloy Steels • Prehardened Steels		
Velocità di taglio Cutting Speed			40~70m/min		
Dia Dia.	Angolo Taper Angle	Lunghezza tagliente Length of Cut	Profondità di taglio Depth of Cut	Giri Spindle Speed	Avanzamento Feed
			mm	min <sup>-1</sup>	mm/min
0.5	30°~1°	2~ 6	0.005~0.02	25,000~44,000	300~ 800
	1° 30'~3°	2~ 8	0.015~0.05	25,000~44,000	300~ 800
1	30°~1°	4~12	0.015~0.06	13,000~22,000	400~1,000
	1° 30'~3°	8~21	0.015~0.1	13,000~22,000	400~1,000
1.2	30°~1°	4~12	0.015~0.06	10,600~18,000	400~1,000
	1° 30'~3°	8~21	0.02 ~0.1	10,600~18,000	400~1,000
1.5	30°~1°	8~21	0.015~0.07	8,500~15,000	400~1,000
	1° 30'~3°	10~31	0.03 ~0.15	8,500~15,000	400~1,000
2	30°~1°	8~26	0.02 ~0.1	6,400~11,000	400~1,000
	1° 30'~3°	10~36	0.05 ~0.2	6,400~11,000	400~1,000
Note Notes			※Si consiglia l'utilizzo di lubrificante. ※Prestare una particolare cura al runout della fresa. ※Utilizzare un mandrino rigido. ※Si consiglia di eseguire fresatura bidirezionale. ※Water-insoluble cutting fluid is recommended. ※Take a special care of the runout of the endmills. ※Use a rigid machine and holder. ※Recommend reciprocating cutting.		

**Diamante**  
Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

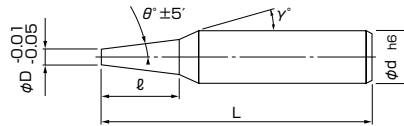
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

### Frese 2 Tagli piane coniche per materiali non ferrosi



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scarico con. Taper Angle	( $\ell$ ) Lungh. tagliante Length of Cut	(d) Dia. massimo Dia. at Large End	( $\gamma$ ) Angolo gambo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
07-00313-00101	1	30°	4	1.07	9°	4	45
07-00313-00102		1°	4	1.14	9°	4	45
07-00313-00103		1° 30'	4	1.21	9°	4	45
07-00313-00104		2°	4	1.28	9°	4	45
07-00313-00105		3°	4	1.42	9°	4	45
07-00313-00106		4°	4	1.56	9°	4	45
07-00313-00107		5°	4	1.70	9°	4	45
07-00313-00151	1.5	30°	5	1.59	9°	4	45
07-00313-00152		1°	5	1.67	9°	4	45
07-00313-00153		1° 30'	5	1.76	9°	4	45
07-00313-00154		2°	5	1.85	9°	4	45
07-00313-00155		3°	5	2.02	9°	4	45
07-00313-00156		4°	5	2.20	9°	4	45
07-00313-00157	5°	5	2.37	-	4	45	
07-00313-00201	2	30°	6	2.10	9°	4	45
07-00313-00202		1°	6	2.21	9°	4	45
07-00313-00203		1° 30'	6	2.31	9°	4	45
07-00313-00204		2°	6	2.42	9°	4	45
07-00313-00205		3°	6	2.63	9°	4	45
07-00313-00206		4°	6	2.84	-	4	45
07-00313-00207		5°	6	3.05	-	4	45
07-00313-00251	2.5	30°	8	2.64	9°	4	45
07-00313-00252		1°	8	2.78	9°	4	45
07-00313-00253		1° 30'	8	2.92	9°	4	45
07-00313-00254		2°	8	3.06	9°	4	45
07-00313-00255		3°	8	3.34	-	4	45
07-00313-00256		4°	8	3.62	-	4	45
07-00313-00257	5°	8	3.90	-	4	45	
07-00313-00301	3	30°	10	3.17	9°	6	50
07-00313-00302		1°	10	3.35	9°	6	50
07-00313-00303		1° 30'	10	3.52	9°	6	50
07-00313-00304		2°	10	3.70	9°	6	50
07-00313-00305		3°	10	4.05	9°	6	50
07-00313-00306		4°	10	4.40	9°	6	50
07-00313-00307	5°	10	4.75	-	6	50	

Codice Code No.	(D) Dia. Dia.	( $\theta$ ) Angolo scarico con. Taper Angle	( $\ell$ ) Lungh. tagliante Length of Cut	(d) Dia. massimo Dia. at Large End	( $\gamma$ ) Angolo gambo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
07-00313-00401	4	30°	15	4.26	9°	6	50
07-00313-00402		1°	15	4.52	9°	6	50
07-00313-00403		1° 30'	15	4.79	9°	6	50
07-00313-00404		2°	15	5.05	9°	6	50
07-00313-00405		3°	15	5.57	-	6	50
07-00313-00406		4°	15	6.10	-	6	55
07-00313-00407		5°	15	6.62	-	6	55
07-00313-00501	5	30°	20	5.35	9°	6	55
07-00313-00502		1°	20	5.70	-	6	55
07-00313-00503		1° 30'	20	6.05	-	6	55
07-00313-00504		2°	20	6.39	-	6	55
07-00313-00505		3°	20	7.10	-	6	55
07-00313-00506		4°	20	7.80	-	8	60
07-00313-00507		5°	20	8.50	-	8	60
07-00313-00601	6	30°	20	6.35	-	6	60
07-00313-00602		1°	20	6.70	-	6	60
07-00313-00603		1° 30'	20	7.05	-	6	60
07-00313-00604		2°	20	7.40	-	6	60
07-00313-00605		3°	20	8.10	-	8	60
07-00313-00606		4°	20	8.80	-	8	65
07-00313-00607		5°	20	9.50	-	8	65
07-00313-00801	8	30°	25	8.44	-	8	70
07-00313-00802		1°	25	8.87	-	8	70
07-00313-00803		1° 30'	25	9.31	-	8	70
07-00313-00804		2°	25	9.74	-	8	70
07-00313-00805		3°	25	10.62	-	10	70
07-00313-00806		4°	25	11.50	-	10	80
07-00313-00807		5°	25	12.37	-	12	80
07-00313-01001	10	30°	35	10.61	-	10	85
07-00313-01002		1°	35	11.22	-	10	85
07-00313-01003		1° 30'	35	11.83	-	10	85
07-00313-01004		2°	35	12.44	-	12	90
07-00313-01005		3°	35	13.67	-	12	90
07-00313-01006		4°	35	14.89	-	12	90
07-00313-01007	5°	35	16.12	-	16	90	

#### Attenzione

Quando ordinate, indicate DTE (D)×( $\theta$ ).  
When you order, indicate DTE (D)×( $\theta$ ).

- Per i parametri di taglio vedi pagina 388.
- Milling condition is recommended on page 388.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese  
Sagomate

Formed  
Cutter

Punte  
Drill

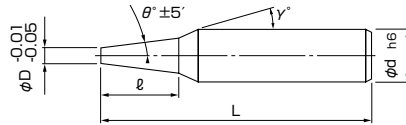
Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

Materiale Work Material	Rame Copper	Alluminio Aluminum		
Velocità di taglio Cutting Speed	20~30m/min		60~90m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
<b>1</b>	9,600	110	28,800	330
<b>1.5</b>	6,400	110	19,200	330
<b>2</b>	4,800	120	14,400	360
<b>2.5</b>	3,800	120	11,400	360
<b>3</b>	3,200	120	9,600	360
<b>4</b>	2,400	120	7,200	360
<b>5</b>	1,900	130	5,700	390
<b>6</b>	1,600	130	4,800	390
<b>8</b>	1,200	130	3,600	390
<b>10</b>	1,000	130	3,000	390
Profondità di taglio Depth of Cut	Spallamento conico Taper Side Milling			
(D) Dia. Dia.	<p>The diagram illustrates taper side milling. It shows a cylindrical tool with a 'Full Flute' and a 'Taper Side Milling' operation. The taper angle is labeled as 0.2D. The 'Tagliante completo' (Full Flute) is shown as a solid line, and the 'Spallamento conico' (Taper Side Milling) is shown as a dashed line.</p>			
Note Notes	<ul style="list-style-type: none"> <li>※Usare lubrificante.</li> <li>※Regolare con la stessa proporzione giri ed avanzamento.</li> <li>※Non utilizzare per il taglio dell'acciaio.</li> <li>※Use cutting fluid.</li> <li>※Adjust both spindle speed and feed at the same rate.</li> <li>※Don't use for cutting steels.</li> </ul>			

### Frese 2 Tagli piane coniche lunghe per materiali non ferrosi



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(theta) Angolo scarico con. Taper Angle	(l) Lunghezza tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	(gamma) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lunghezza totale Overall Length
07-00322-00101	1	30°	8	1.14	9°	4	50
07-00322-00102		1°	8	1.28	9°	4	50
07-00322-00103		1° 30'	8	1.42	9°	4	50
07-00322-00104		2°	8	1.56	9°	4	50
07-00322-00105		3°	8	1.84	9°	4	50
07-00322-00106		4°	8	2.12	9°	4	50
07-00322-00107		5°	8	2.40	-	4	50
07-00322-00151	1.5	30°	12	1.71	9°	4	50
07-00322-00152		1°	12	1.92	9°	4	50
07-00322-00153		1° 30'	12	2.13	9°	4	50
07-00322-00154		2°	12	2.34	9°	4	50
07-00322-00155		3°	12	2.76	9°	4	50
07-00322-00156		4°	12	3.18	-	4	50
07-00322-00157	5°	12	3.60	-	4	50	
07-00322-00201	2	30°	16	2.28	9°	4	50
07-00322-00202		1°	16	2.56	9°	4	50
07-00322-00203		1° 30'	16	2.84	9°	4	50
07-00322-00204		2°	16	3.12	9°	4	50
07-00322-00205		3°	16	3.68	-	4	50
07-00322-00206		4°	16	4.24	-	4	50
07-00322-00207		5°	16	4.80	-	4	60
07-00322-00251	2.5	30°	20	2.85	9°	4	60
07-00322-00252		1°	20	3.20	9°	4	60
07-00322-00253		1° 30'	20	3.55	9°	4	60
07-00322-00254		2°	20	3.90	-	4	60
07-00322-00255		3°	20	4.60	-	4	60
07-00322-00256	4°	20	5.30	-	4	60	
07-00322-00257	5°	20	6.00	-	6	60	
07-00322-00301	3	30°	24	3.42	9°	4	60
07-00322-00302		1°	24	3.84	-	4	60
07-00322-00303		1° 30'	24	4.26	-	4	60
07-00322-00304		2°	24	4.68	-	4	60
07-00322-00305		3°	24	5.52	-	4	60
07-00322-00306		4°	24	6.36	-	6	60
07-00322-00307	5°	24	7.20	-	6	60	

Codice Code No.	(D) Dia. Dia.	(theta) Angolo scarico con. Taper Angle	(l) Lunghezza tagliente Length of Cut	(d) Dia. massimo Dia. at Large End	(gamma) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lunghezza totale Overall Length
07-00322-00401	4	30°	32	4.56	-	4	80
07-00322-00402		1°	32	5.12	-	4	80
07-00322-00403		1° 30'	32	5.68	-	4	80
07-00322-00404		2°	32	6.23	-	6	80
07-00322-00405		3°	32	7.35	-	6	80
07-00322-00406		4°	32	8.48	-	8	80
07-00322-00407		5°	32	9.60	-	10	90
07-00322-00501	5	30°	40	5.70	-	4	80
07-00322-00502		1°	40	6.40	-	6	80
07-00322-00503		1° 30'	40	7.09	-	6	80
07-00322-00504		2°	40	7.79	-	6	80
07-00322-00505		3°	40	9.19	-	8	90
07-00322-00506		4°	40	10.59	-	10	90
07-00322-00507		5°	40	12.00	-	12	90
07-00322-00601	6	30°	48	6.84	-	6	100
07-00322-00602		1°	48	7.68	-	6	100
07-00322-00603		1° 30'	48	8.51	-	8	100
07-00322-00604		2°	48	9.35	-	8	100
07-00322-00605		3°	48	11.03	-	10	100
07-00322-00606		4°	48	12.71	-	12	100
07-00322-00607		5°	48	14.40	-	12	100
07-00322-00801	8	30°	64	9.12	-	8	120
07-00322-00802		1°	64	10.23	-	10	120
07-00322-00803		1° 30'	64	11.35	-	10	120
07-00322-00804		2°	64	12.47	-	12	120
07-00322-00805		3°	64	14.71	-	12	120
07-00322-00806		4°	64	16.95	-	16	125
07-00322-00807		5°	64	19.20	-	20	130

#### Attenzione

Quando ordinate, indicate DTEL (D)×(theta).  
When you order, indicate DTEL (D)×(theta).

- Per i parametri di taglio vedi pagina 390.
- Milling condition is recommended on page 390.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane  
Square

Scaricate Piane  
Long Neck Square

Sferiche  
Ball

Scaricate Sferiche  
Long Neck Ball

Coniche  
Taper

Coniche Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate Toriche  
Long Neck Corner R

Frese Sagomate  
Formed Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Parametri di taglio raccomandati

# DTEL

### Recommended Milling Conditions

Materiale Work Material	Rame Copper	Alluminio Aluminum		
Velocità di taglio Cutting Speed	20~30m/min		40~60m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
<b>1</b>	6,400	110	12,800	220
<b>1.5</b>	4,300	110	8,600	220
<b>2</b>	3,200	120	6,400	240
<b>2.5</b>	2,600	120	5,200	240
<b>3</b>	2,100	120	4,200	240
<b>4</b>	1,600	120	3,200	240
<b>5</b>	1,300	130	2,600	260
<b>6</b>	1,000	130	2,000	260
<b>8</b>	800	130	1,600	260
Profondità di taglio Depth of Cut	Spallamento conico Taper Side Milling			
(D) Dia. Dia.	<p>The diagram illustrates taper side milling. It shows a cross-section of a milling cutter with a full flute (Tagliente completo / Full Flute) and a tapered side (Spallamento conico / Taper Side Milling). The taper angle is indicated as 0.1D, where D is the diameter of the workpiece.</p>			
Note Notes	<ul style="list-style-type: none"> <li>※ Usare lubrorefrigerante.</li> <li>※ Regolare con la stessa proporzione giri ed avanzamento.</li> <li>※ Non utilizzare per il taglio di acciaio.</li> <li>※ Use cutting fluid.</li> <li>※ Adjust both spindle speed and feed at the same rate.</li> <li>※ Don't use for cutting steels.</li> </ul>			

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

Rivestite Coating  
Piane Square  
Non Rivestite Non-Coating  
Scaricate Piane Long Neck Square

Rivestite Coating  
Sferiche Ball  
Non Rivestite Non-Coating  
Scaricate Sferiche Long Neck Ball

Rivestite Coating  
Coniche Taper  
Non Rivestite Non-Coating  
Coniche Sferiche Taper Ball

Rivestite Coating  
Toriche Corner R  
Non Rivestite Non-Coating  
Scaricate Toriche Long Neck Corner R

Rivestite Coating  
Frese Sagomate Formed Cutter  
Non Rivestite Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

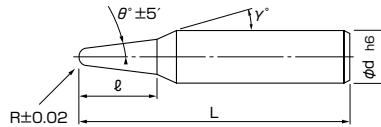
**Guida tecnica**  
Technical Guidance



# NTB-2

2-Flute Taper Ball End Mill

## Frese 2 Tagli sferiche coniche



● Articolo semi-standard, prezzo e consegna su richiesta  
● Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(θ) Angolo scarico con. Taper Angle	(l) Lungh. tagliante Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo gambo Shank Dia.	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00352-00501	R0.5	30°	10	1.17	9°	4	50
01-00352-00502		1°	10	1.33	9°	4	50
01-00352-00503		1° 30'	10	1.50	9°	4	50
01-00352-00504		2°	10	1.66	9°	4	50
01-00352-00505		3°	10	2.00	9°	4	50
01-00352-00506		4°	10	2.33	9°	4	50
01-00352-00507		5°	10	2.67	9°	4	50
01-00352-00508		7°	10	3.34	7°	4	50
01-00352-00509		10°	10	4.37	-	4	50
01-00352-00751	R0.75	30°	10	1.66	9°	4	50
01-00352-00752		1°	10	1.82	9°	4	50
01-00352-00753		1° 30'	10	1.99	9°	4	50
01-00352-00754		2°	10	2.15	9°	4	50
01-00352-00755		3°	10	2.47	9°	4	50
01-00352-00756		4°	10	2.80	9°	4	50
01-00352-00757		5°	10	3.12	9°	4	50
01-00352-00758		7°	10	3.78	7°	4	50
01-00352-00759		10°	10	4.79	-	4	50
01-00352-01001	R1	30°	13	2.21	9°	4	55
01-00352-01002		1°	13	2.42	9°	4	55
01-00352-01003		1° 30'	13	2.63	9°	4	55
01-00352-01004		2°	13	2.84	9°	4	55
01-00352-01005		3°	13	3.26	9°	4	55
01-00352-01006		4°	13	3.68	4°	4	55
01-00352-01007		5°	13	4.11	-	4	55
01-00352-01008		7°	13	4.96	-	4	55
01-00352-01009		10°	13	6.26	-	6	55
01-00352-01251	R1.25	30°	15	2.74	9°	4	55
01-00352-01252		1°	15	2.98	9°	4	55
01-00352-01253		1° 30'	15	3.22	9°	4	55
01-00352-01254		2°	15	3.46	9°	4	55
01-00352-01255		3°	15	3.94	-	4	55
01-00352-01256		4°	15	4.43	-	4	55
01-00352-01257		5°	15	4.92	-	4	55
01-00352-01258		7°	15	5.90	-	6	55
01-00352-01259		10°	15	7.39	-	6	55

Codice Code No.	(R) Raggio Radius	(θ) Angolo scarico con. Taper Angle	(l) Lungh. tagliante Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo gambo Shank Dia.	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00352-01501	R1.5	30°	20	3.32	9°	4	60
01-00352-01502		1°	20	3.65	9°	4	60
01-00352-01503		1° 30'	20	3.97	-	4	60
01-00352-01504		2°	20	4.29	-	4	60
01-00352-01505		3°	20	4.94	-	4	60
01-00352-01506		4°	20	5.60	4°	6	60
01-00352-01507		5°	20	6.25	-	6	65
01-00352-01508		7°	20	7.57	7°	8	65
01-00352-01509		10°	20	9.57	-	10	70
01-00352-02001	R2	30°	25	4.40	-	4	60
01-00352-02002		1°	25	4.80	-	4	60
01-00352-02003		1° 30'	25	5.21	9°	6	60
01-00352-02004		2°	25	5.61	2°	6	60
01-00352-02005		3°	25	6.42	-	6	60
01-00352-02006		4°	25	7.23	4°	8	65
01-00352-02007		5°	25	8.04	-	8	65
01-00352-02008		7°	25	9.68	7°	10	70
01-00352-02009		10°	25	12.17	-	12	70
01-00352-02501	R2.5	30°	30	5.48	9°	6	65
01-00352-02502		1°	30	5.96	1°	6	65
01-00352-02503		1° 30'	30	6.44	-	6	65
01-00352-02504		2°	30	6.92	-	6	65
01-00352-02505		3°	30	7.89	3°	8	70
01-00352-02506		4°	30	8.86	-	8	75
01-00352-02507		5°	30	9.83	5°	10	80
01-00352-02508		7°	30	11.79	7°	12	85
01-00352-02509		10°	30	14.78	10°	16	90
01-00352-03001	R3	30°	35	6.56	-	6	70
01-00352-03002		1°	35	7.12	-	6	70
01-00352-03003		1° 30'	35	7.68	-	6	70
01-00352-03004		2°	35	8.24	-	8	80
01-00352-03005		3°	35	9.36	-	8	85
01-00352-03006		4°	35	10.49	-	10	90
01-00352-03007		5°	35	11.62	5°	12	90
01-00352-03008		7°	35	13.90	-	12	95
01-00352-03009		10°	35	17.38	-	16	100

**Attenzione** Quando ordinate, indicate NTB-2 (R)×(θ)  
When you order, indicate NTB-2 (R)×(θ).

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating  
Punte  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NTB-2

2-Flute Taper Ball End Mill

## Frese 2 Tagli sferiche coniche

- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(θ) Angolo scarico con. Taper Angle	(ℓ) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(γ) Angolo Neck taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00352-04001	R4	30°	40	8.63	—	8	90
01-00352-04002		1°	40	9.26	—	8	90
01-00352-04003		1° 30'	40	9.89	1° 30'	10	90
01-00352-04004		2°	40	10.52	—	10	90
01-00352-04005		3°	40	11.78	3°	12	100
01-00352-04006		4°	40	13.05	—	12	100
01-00352-04007		5°	40	14.33	—	12	100
01-00352-04008		7°	40	16.90	—	16	110
01-00352-04009		10°	40	20.82	—	20	110
01-00352-05001		R5	30°	45	10.70	—	10
01-00352-05002	1°		45	11.40	—	10	105
01-00352-05003	1° 30'		45	12.10	—	12	105
01-00352-05004	2°		45	12.80	—	12	110
01-00352-05005	3°		45	14.20	—	12	110
01-00352-05006	4°		45	15.62	4°	16	120
01-00352-05007	5°		45	17.04	—	16	120
01-00352-05008	7°		45	19.90	7°	20	130
01-00352-05009	10°		45	24.26	10°	25	140

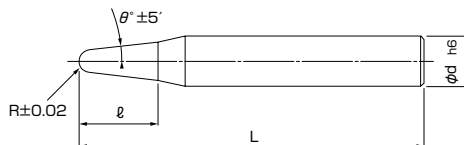
### Attenzione

Quando ordinate, indicate NTB-2 (R)×(θ).  
When you order, indicate NTB-2 (R)×(θ).

# NERB-2

2-Flute Taper Ball End Mill for Runner

## Frese 2 Tagli sferiche coniche per canalini



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(θ) Angolo scarico con. Taper Angle	(ℓ) Lungh. tagliente Length of Cut	(d1) Dia. massimo Dia. at Large End	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00722-01002	R1	10°	4	3.09	4	50
01-00722-01004		15°	4	3.68	4	50
01-00722-01005		20°	4	4.31	6	55
01-00722-01252	R1.25	10°	5	3.86	4	50
01-00722-01254		15°	5	4.60	6	55
01-00722-01255		20°	5	5.39	6	55
01-00722-01502	R1.5	10°	6	4.63	6	55
01-00722-01504		15°	6	5.52	6	55
01-00722-01505		20°	6	6.47	8	60
01-00722-01752	R1.75	10°	7	5.41	6	55
01-00722-01754		15°	7	6.44	8	60
01-00722-01755		20°	7	7.55	8	60
01-00722-02002	R2	10°	8	6.18	6	55
01-00722-02004		15°	8	7.36	8	60
01-00722-02005		20°	8	8.62	10	70
01-00722-02502	R2.5	10°	10	7.72	8	60
01-00722-02504		15°	10	9.20	10	70
01-00722-02505		20°	10	10.78	12	80
01-00722-03002	R3	10°	12	9.27	10	70
01-00722-03004		15°	12	11.03	12	80
01-00722-03005		20°	12	12.94	12	90

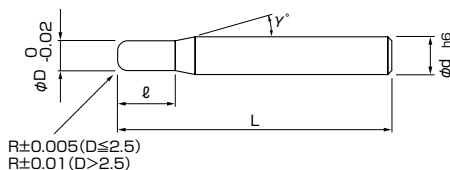
### Attenzione

Quando ordinate, indicate NERB-2 (R)×(θ).  
When you order, indicate NERB-2 (R)×(θ).

# MSRS230

MUGEN-COATING 2-Flute Radius End Mill

## Frese 2 Tagli toriche rivestite MUGEN



● È possibile fresare con entrambe le parti del raggio e dello spallamento in presa.

● It is possible to cut both straight and corner radius simultaneously.

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00700-01001	1	R0.1	2	9°	4	60
08-00700-01002		R0.2				
08-00700-01003		R0.3				
08-00700-01501	1.5	R0.1	3	9°	4	60
08-00700-01502		R0.2				
08-00700-01503		R0.3				
08-00700-01505		R0.5				
08-00700-02001	2	R0.1	4	9°	4	60
08-00700-02002		R0.2				
08-00700-02003		R0.3				
08-00700-02005		R0.5				
08-00700-02501	2.5	R0.1	5	9°	4	60
08-00700-02502		R0.2				
08-00700-02503		R0.3				
08-00700-02505		R0.5				
08-00700-03001	3	R0.1	6	9°	6	60
08-00700-03002		R0.2				
08-00700-03003		R0.3				
08-00700-03005		R0.5				
08-00700-03010		R1				
08-00700-04001	4	R0.1	8	9°	6	65
08-00700-04002		R0.2				
08-00700-04003		R0.3				
08-00700-04005		R0.5				
08-00700-04010		R1				



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00700-05001	5	R0.1	10	9°	6	70
08-00700-05002		R0.2				
08-00700-05003		R0.3				
08-00700-05005		R0.5				
08-00700-05010		R1				
08-00700-05015		R1.5				

**Attenzione** Quando ordinate, indicate MSRS230 Dia.(D)×(R).  
When you order, indicate MSRS230 (D)×(R).

- Per i parametri di taglio vedi pagina 395.
- Milling condition is recommended on page 395.

※(γ) è un valore di riferimento.

※(γ) is reference value.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese  
Sagomate

Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating  
Punte  
Drill

**Altro**  
Others

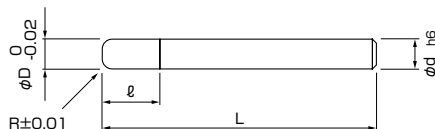
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MSRS430

MUGEN-COATING 4-Flute Radius End Mill

## Frese 4 Tagli toriche rivestite MUGEN



● È possibile fresare con entrambe le parti del raggio e dello spallamento in presa.

● It is possible to cut both straight and corner radius simultaneously.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(l) Lungh. tagliente Length of Cut	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00710-06001	6	R0.1	12	6	80
08-00710-06002		R0.2			
08-00710-06003		R0.3			
08-00710-06005		R0.5			
08-00710-06010		R1			
08-00710-06015		R1.5			
08-00710-06020	R2	8	16	8	90
08-00710-08001	R0.1				
08-00710-08002	R0.2				
08-00710-08005	R0.5				
08-00710-08010	R1				
08-00710-08015	R1.5				
08-00710-08020	R2	10	20	10	100
08-00710-08025	R2.5				
08-00710-08030	R3				
08-00710-10001	R0.1				
08-00710-10002	R0.2				
08-00710-10003	R0.3				
08-00710-10005	R0.5				
08-00710-10010	R1				
08-00710-10015	R1.5				
08-00710-10020	R2				
08-00710-10025	R2.5				
08-00710-10030	R3				

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(l) Lungh. tagliente Length of Cut	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00710-12001	12	R0.1	24	12	110
08-00710-12002		R0.2			
08-00710-12003		R0.3			
08-00710-12005		R0.5			
08-00710-12010		R1			
08-00710-12015		R1.5			
08-00710-12020		R2			
08-00710-12025		R2.5			
08-00710-12030		R3			

### Attenzione

Quando ordinate, indicate MSRS430 (D)×(R).  
When you order, indicate MSRS430 (D)×(R).

- Per i parametri di taglio vedi pagina 395.
- Milling condition is recommended on page 395.

## Parametri di taglio raccomandati

# MSRS230

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AISI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738			Acciaio temprato Hardened Steels 1.2343 (~52HRC)		
Velocità di taglio Cutting Speed	60~80m/min			50~70m/min			30~50m/min			20~30m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
		mm/min			mm/min			mm/min			mm/min	
	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting	min <sup>-1</sup>	Contornatura Side Milling	Cava Slotting
1	25,500	200	100	19,200	130	50	12,800	80	40	6,400	60	30
1.5	17,100	340	120	12,800	180	60	8,500	90	45	4,200	70	35
2	12,800	400	150	9,600	210	70	6,400	110	55	3,200	80	40
2.5	10,200	400	150	7,700	210	70	5,100	110	55	2,500	80	40
3	8,500	450	160	6,400	250	80	4,300	120	60	2,100	100	50
4	6,400	450	160	4,800	250	80	3,200	120	60	1,600	100	50
5	5,100	600	200	3,800	300	90	2,600	150	75	1,300	120	60
Profondità di taglio Depth of Cut												
(D) Dia. Dia.												
Note Notes	※ Durante la lavorazione di angoli, ridurre l'avanzamento approssimativamente del 30~50%. ※ Regolare giri ed avanzamento nella stessa proporzione ed anche la profondità di taglio, in caso di limitato numero di giri della macchina. ※ When corner processing, reduce the feed by approximately 50%~30%. ※ Adjust spindle speed and feed at the same rate also reduce depth of cut, if the machine spindle speed insufficient.											

## Parametri di taglio raccomandati

# MSRS430

### Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50		Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738		Acciaio temprato Hardened Steels 1.2343 (~52HRC)	
Velocità di taglio Cutting Speed	60~80m/min		50~70m/min		30~50m/min		20~30m/min	
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
6	4,300	780	3,200	580	2,200	380	1,100	160
8	3,200	780	2,400	580	1,600	380	800	160
10	2,600	780	1,900	580	1,300	380	650	160
12	2,100	780	1,600	580	1,100	380	530	160
Profondità di taglio Depth of Cut								
(D) Dia. Dia.								
Note Notes	※ Durante la lavorazione di angoli, ridurre l'avanzamento approssimativamente del 30~50%. ※ Regolare giri ed avanzamento nella stessa proporzione ed anche la profondità di taglio, in caso di limitato numero di giri della macchina. ※ When corner processing, reduce the feed by approximately 50%~30%. ※ Adjust spindle speed and feed at the same rate also reduce depth of cut, if the machine spindle speed insufficient.							

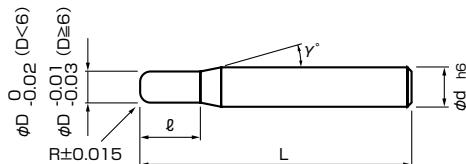
CBN  
Nitruro Cubico  
di Boro

# MSXH440R

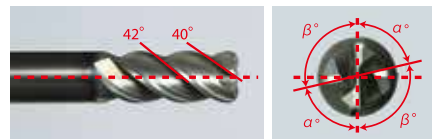
Novità

Power Radius End Mill

## Frese 4 Tagli toriche "POWER"



- Design migliorato, grazie all'elica variabile e il passo differenziato, che permettono di realizzare fresature stabili senza vibrazioni.
- L'originale design del tagliente torico incrementa le prestazioni di taglio.
- Struttura ad alta rigidità per eliminare scheggiature sul tagliente torico, anche nelle lavorazioni gravose.
- Utilizzato il rivestimento Mugen Premium, per una migliore resistenza al taglio e per proteggere i taglienti dal calore generato durante le lavorazioni.
- Improved designs of unequal helix angle and flute spacing.
- Suppression from chattering to realize stable milling progression.
- Original spiral design at corner radius flutes improves cutting edge performance!
- Designed for high rigidity to suppress corner radius flute breakage even on rough milling stresses.
- Adopted MUGEN-COATING PREMIUM for improvement heat resistance and cutting edge strength to protect from milling heat influence.



Elica variabile  
Unequal Helix Angle

Passo differenziato  
Unequal Flute Spacing

Dati tecnici P



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(l) Lungh. tagliente Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
● 08-00150-03003	3	R0.3	8	12°	6	60
● 08-00150-03005		R0.5	8	12°	6	60
● 08-00150-04003	4	R0.3	11	12°	6	60
● 08-00150-04005		R0.5	11	12°	6	60
● 08-00150-04010		R1	11	12°	6	60
● 08-00150-05003	5	R0.3	13	12°	6	60
● 08-00150-05005		R0.5	13	12°	6	60
● 08-00150-05010		R1	13	12°	6	60
● 08-00150-06005	6	R0.5	13	–	6	60
● 08-00150-06010		R1	13	–	6	60
● 08-00150-08005	8	R0.5	19	–	8	65
● 08-00150-08010		R1	19	–	8	65
● 08-00150-10005	10	R0.5	22	–	10	75
● 08-00150-10010		R1	22	–	10	75
● 08-00150-10020		R2	22	–	10	75
● 08-00150-10030		R3	22	–	10	75
● 08-00150-12005	12	R0.5	26	–	12	80
● 08-00150-12010		R1	26	–	12	80
● 08-00150-12020		R2	26	–	12	80

### Attenzione

Quando ordinate, indicate MSXH440R (D)×(R).

When you order, indicate MSXH440R(D)×(R).

- Per i parametri di taglio vedi pagina 397.
- Milling condition is recommended on page 397.

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# Parametri di taglio raccomandati

# MSXH440R

## Recommended Milling Conditions

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

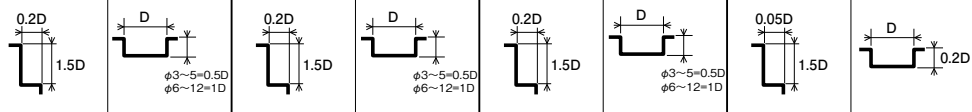
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Materiale Work Material		Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3				Acciaio inox Stainless Steels AISI304				Lega di titanio Titanium Alloy Ti-6Al-4V				Leghe resistenti al calore Heat Resistance Alloy Inconel®718			
Dia. Dia.	Raggio Corner Radius	Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting	
		Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
		min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
3	0.3	17,600	1,430	8,600	700	6,000	750	6,000	600	5,600	750	5,600	600	3,600	250	2,500	140
	0.5	17,600	1,430	8,600	700	6,000	750	6,000	550	5,600	750	5,600	550	3,600	250	2,500	140
	1	13,200	1,540	6,500	780	5,200	800	5,200	650	4,800	800	4,800	650	3,100	250	2,200	150
4	0.3	13,200	1,540	6,500	780	5,200	800	5,200	600	4,800	800	4,800	600	3,100	250	2,200	150
	0.5	13,200	1,540	6,500	780	5,200	800	5,200	600	4,800	800	4,800	600	3,100	250	2,200	150
	1	10,500	1,650	5,500	760	4,600	900	4,600	700	4,200	900	4,200	700	2,600	300	1,900	160
5	0.3	10,500	1,650	5,500	760	4,600	900	4,600	650	4,200	900	4,200	650	2,600	300	1,900	160
	0.5	10,500	1,650	5,500	760	4,600	900	4,600	650	4,200	900	4,200	650	2,600	300	1,900	160
	1	8,800	2,420	4,300	630	4,200	1,000	4,000	400	3,800	1,000	3,600	400	2,100	300	1,300	170
6	0.3	8,800	2,420	4,300	630	4,200	1,000	4,000	350	3,800	1,000	3,600	350	2,100	300	1,300	170
	0.5	6,800	1,980	3,300	560	3,600	850	3,200	350	3,200	850	2,800	350	1,700	300	1,100	170
	1	6,600	1,980	3,300	560	3,600	850	3,200	300	3,200	850	2,800	300	1,700	300	1,100	170
8	0.5	5,300	1,430	2,600	550	3,000	600	2,500	300	2,600	600	2,100	300	1,300	250	900	160
	1	5,300	1,430	2,600	550	3,000	600	2,500	300	2,600	600	2,100	300	1,300	250	900	160
	2	5,300	1,430	2,600	550	3,000	600	2,500	250	2,600	600	2,100	250	1,300	250	900	160
10	0.5	5,300	1,430	2,600	550	3,000	600	2,500	200	2,600	600	2,100	200	1,300	250	900	160
	1	5,300	1,430	2,600	550	3,000	600	2,500	200	2,600	600	2,100	200	1,300	250	900	160
	2	4,400	1,100	2,200	480	2,500	500	2,000	200	2,100	500	1,600	200	900	200	700	150
12	0.5	4,400	1,100	2,200	480	2,500	500	2,000	200	2,100	500	1,600	200	900	200	700	150
	1	4,400	1,100	2,200	480	2,500	500	2,000	200	2,100	500	1,600	200	900	200	700	150
	2	4,400	1,100	2,200	480	2,500	500	2,000	150	2,100	500	1,600	150	900	200	700	150



**Note**

- Regolate le condizioni di fresatura in funzione della rigidità della macchina e allo staffaggio del pezzo.
- I parametri di taglio consigliati sono basati su lavorazioni di fresatura con l'utilizzo di lubrificante.
- Regolare le condizioni di fresatura con cautela per la corretta evacuazione del truciolo e per evitare la generazione di fumo quando fresate con lubrificante.
- Usare un mandrino rigido.
- La sporgenza della fresa fuori dal mandrino deve essere la minore possibile (i parametri di taglio consigliati sono valori di riferimento fino ad una lunghezza di L/D: 5D (Ø3~5), 4D (Ø6~8), 3D (Ø10~12).
- Adjust milling condition conforming with machine rigidity and clamping condition.
- The recommended milling conditions are based on milling with water-soluble cutting fluid.
- Adjust milling condition with caution for chip evacuation and smoke generation when milling with water-insoluble cutting fluid.
- Use a rigid machine and holder.
- Overhang of end mill should be as short as possible from spindle nose.
- (The recommended milling conditions are reference values under the overhang L/D: 5D (Ø3~5), 4D (Ø6~8), 3D (Ø10~12).

## Dati Tecnici Technical Data

Materiale: Alloy718  
Material (Inconel®718 Equivalente)  
Equivalent



Dimensione del pezzo: Ø80x35  
Work Size

Processo Process	Sgrossatura (esterna) Roughing (Outer profile)	Sgrossatura (interna) Roughing (Inner profile)	Sgrossatura (interpala) Roughing (Blades)	Finitura Finishing
Utensile Tool	Ø6xR0.5			
Numero giri [min <sup>-1</sup> ] Spindle speed	2,100		Scanalatura: 1,800 Groove Fianco: 2,100	2,100
Avanzamento [mm/min] Feed	500	Interp. elic.: 300 Helix Side Fianco: 500	Scanalatura: 300 Groove Side Fianco: 500	250
Profondità di taglio [mm] Depth of cut	8.95x0.2 (ap x ae)	Interp. elic.: (ap0.16) Helix Side Fianco: 8.95x0.2 Side (ap x ae)	Scanalatura: ap0.6 Groove Side Fianco: 5.95x0.2 Side (ap x ae)	Fianco: 3~6x0.05 Side (ap x ae) Piano: 0.05x1.5 Bottom (ap x ae)
Refrigerante Coolant	Olio emulsionabile Water-soluble Oil			
Tempo di lavorazione Time	15 min 15 min	20 min 20 min	50 min 50 min	20 min 20 min

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

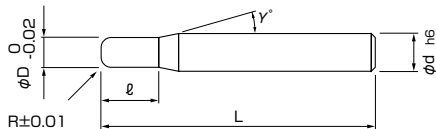
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# MHDH445R

4-Flute Radius End Mill for Hardened Steel

## Frese 4 Tagli toriche per acciai temprati



- Grande stabilità e lunga durata (48~65HRC) nella lavorazione di acciai temprati.
- La toricità della fresa e l'alto angolo d'elica prevengono le scheggiature dei taglianti.
- Realized stably long tool life against high hardened steels (48~65HRC).
- Corner radius to prevent flute chipping, and high helix angle for cutting sharpness.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lung. tagliante Length of Cut	(R) Raggio Corner Radius	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
* 08-00437-03002	3	6	R0.2	12°	6	60
* 08-00437-03003			R0.3			
* 08-00437-03005			R0.5			
* 08-00437-04002	4	8	R0.2	12°	6	60
* 08-00437-04003			R0.3			
* 08-00437-04005			R0.5			

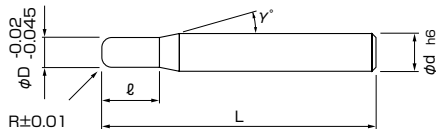
**Attenzione** Quando ordinate, indicate MHDH445R (D)×(ℓ)×(R).  
When you order, indicate MHDH445R (D)×(ℓ)×(R).

- Per i parametri di taglio vedi pagina 399.
- Milling condition is recommended on page 399.

# MHDH645R

6-Flute Radius End Mill for Hardened Steel

## Frese 6 Tagli toriche per acciai temprati



- Grande stabilità e lunga durata (48~65HRC) nella lavorazione di acciai temprati.
- La toricità della fresa e l'alto angolo d'elica prevengono le scheggiature dei taglianti.
- Realized stably long tool life against high hardened steels (48~65HRC).
- Corner radius to prevent flute chipping, and high helix angle for cutting sharpness.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(ℓ) Lung. tagliante Length of Cut	(R) Raggio Corner Radius	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lung. totale Overall Length
* 08-00438-05002	5	10	R0.2	12°	6	60
* 08-00438-05003			R0.3			
* 08-00438-05005			R0.5			
* 08-00438-05010	6	12	R1	-	6	60
* 08-00438-06002			R0.2			
* 08-00438-06003			R0.3			
* 08-00438-06005	8	16	R0.5	-	8	65
* 08-00438-06010			R1			
* 08-00438-08003			R0.3			
* 08-00438-08005	10	20	R0.5	-	10	75
* 08-00438-08010			R1			
* 08-00438-08015			R1.5			
* 08-00438-10003	12	24	R0.3	-	12	80
* 08-00438-10005			R0.5			
* 08-00438-10010			R1			
* 08-00438-10015	12	24	R1.5	-	12	80
* 08-00438-10020			R2			
* 08-00438-12005			R0.5			
* 08-00438-12010	12	24	R1	-	12	80
* 08-00438-12015			R1.5			
* 08-00438-12020			R2			

**Attenzione** Quando ordinate, indicate MHDH645R (D)×(ℓ)×(R).  
When you order, indicate MHDH645R (D)×(ℓ)×(R).

- Per i parametri di taglio vedi pagina 399.
- Milling condition is recommended on page 399.



# Parametri di taglio raccomandati

# MHDH445R • MHDH645R

## Recommended Milling Conditions

Materiale Work Material		Acciaio temprato Hardened Steels 1.2343•STAVAX (~55HRC)				Acciaio temprato Hardened Steels 1.2379 (~62HRC)				Acciaio HSS High Speed Tool Steels ASP•M2•1.3343 (~65HRC)			
Dia. Dia.	Lungh. tagliente Length of Cut	Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting		Contornatura Side Milling		Cava Slotting	
		Giri Spindle Speed	Avanz. Feed	Giri Spindle Speed	Avanz. Feed	Giri Spindle Speed	Avanz. Feed	Giri Spindle Speed	Avanz. Feed	Giri Spindle Speed	Avanz. Feed	Giri Spindle Speed	Avanz. Feed
		min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
3	6	10,000	1,000	8,000	580	8,000	700	7,500	500	7,000	560	6,000	280
4	8	8,500	1,200	7,500	620	7,000	800	6,000	540	6,000	600	5,000	300
5	10	7,600	1,600	6,800	900	6,200	1,200	5,600	600	5,300	800	4,800	350
6	12	6,400	1,800	5,800	950	5,300	1,200	4,800	600	4,600	800	4,200	350
8	16	4,800	2,000	4,300	1,000	4,000	1,400	3,600	700	3,400	1,000	3,000	400
10	20	3,800	2,000	3,400	1,000	3,200	1,600	2,800	800	2,600	1,000	2,300	500
12	24	3,200	2,000	2,800	1,000	2,600	1,600	2,300	800	2,200	1,000	2,000	500
Profondità di taglio Depth of Cut  (D) Dia. Dia.													
Note Notes		<p>※ Usare un mandrino rigido e preciso.                      ※ Regolare le condizioni di fresatura in accordo alla profondità di taglio ed alla rigidità della macchina.                      ※ Regolare nella stessa proporzione giri ed avanzamento.                      ※ Utilizzare lubrificazione minimale o aria.                      ※ Use a rigid and precise machine and chuck holder.                      ※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.                      ※ Adjust both spindle speed and feed at the same rate.                      ※ Use oilmist coolant or air blow.</p>											

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

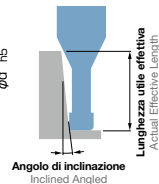
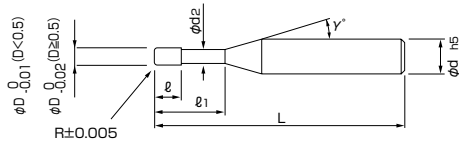
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MHRH230R

2-Flute Long Neck Radius End Mill for Hardened Steels

## Frese 2 Tagli toriche scaricate per materiali temprati



● Il rivestimento MUGEN PREMIUM ed il nuovo design dell'affilatura prevengono le usure e le scheggiature.

● In totale 48 misure.

● Mugen Coating Premium for hardened steels and unique new design excel in chipping prevention and resolve chattering to realize excellent finished surface.

● Total 48 sizes.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinaz. del pezzo Actual effective length depending on inclined angle of workpiece				
									30°	1°	1° 30'	2°	3°
08-00227-02051	0.2	R0.05	0.5	0.15	0.18	12°	4	45	0.56	0.59	0.61	0.64	0.71
08-00227-02053			1					45	1.08	1.13	1.18	1.24	1.37
08-00227-02055			1.5					45	1.61	1.68	1.75	1.84	2.03
08-00227-02057			2					45	2.13	2.22	2.32	2.43	2.70
08-00227-03051	0.3	R0.05	1	0.25	0.28	12°	4	45	1.08	1.13	1.18	1.24	1.37
08-00227-03052			1.5					45	1.61	1.68	1.75	1.84	2.03
08-00227-03053			2					45	2.13	2.22	2.32	2.43	2.70
08-00227-03054			2.5					45	2.65	2.77	2.89	3.03	3.36
08-00227-03055			3				45	3.17	3.31	3.46	3.63	4.02	
08-00227-04051	0.4	R0.05	1	0.3	0.37	12°	4	45	1.12	1.17	1.22	1.28	1.42
08-00227-04053			2					45	2.16	2.26	2.36	2.48	2.74
08-00227-04055			3					45	3.21	3.35	3.50	3.67	4.07
08-00227-04057			4					45	4.25	4.44	4.64	4.87	5.40
08-00227-04101	R0.1		1				4	45	1.12	1.17	1.22	1.27	1.40
08-00227-04103			2					45	2.16	2.25	2.36	2.47	2.73
08-00227-04105			3					45	3.21	3.34	3.50	3.66	4.05
08-00227-04107			4					45	4.25	4.43	4.64	4.86	5.38
08-00227-05051	0.5	R0.05	1	0.4	0.46	12°	4	45	1.13	1.18	1.24	1.29	1.43
08-00227-05052			2					45	2.18	2.27	2.38	2.49	2.76
08-00227-05053			3					45	3.22	3.36	3.52	3.69	4.09
08-00227-05054			4					45	4.26	4.45	4.66	4.88	5.41
08-00227-05055			5				45	5.31	5.54	5.80	6.08	6.74	
08-00227-05101	R0.1		1				4	45	1.13	1.18	1.23	1.28	1.42
08-00227-05102			2					45	2.17	2.27	2.37	2.48	2.74
08-00227-05103			3					45	3.22	3.36	3.51	3.68	4.07
08-00227-05104			4					45	4.26	4.45	4.65	4.87	5.40
08-00227-05105			5				45	5.30	5.54	5.79	6.07	6.72	
08-00227-06051	0.6	R0.05	2	0.5	0.56	12°	4	45	2.18	2.27	2.38	2.49	2.76
08-00227-06053			4					45	4.26	4.45	4.66	4.88	5.41
08-00227-06055			6					45	6.35	6.63	6.94	7.28	8.07
08-00227-06101			2					45	2.17	2.27	2.37	2.48	2.74
08-00227-06103	R0.1		4				45	4.26	4.45	4.65	4.87	5.40	
08-00227-06105			6	45	6.35	6.63	6.93	7.27	8.05				

**Attenzione** Quando ordinate, indicate MHRH230R (D)×(R)×(ℓ1).  
When you order, indicate MHRH230R (D)×(R)×(ℓ1).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

● Per i parametri di taglio vedi pagina 408.  
● Milling condition is recommended on page 408.

# MHRH230R

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Piane**  
Long Neck Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Sferiche**  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Sferiche**  
Long Neck Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche**  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche Sferiche**  
Taper Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Toriche**  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Toriche**  
Long Neck Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

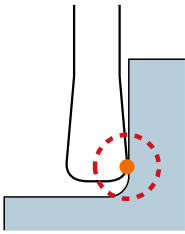
**Frese Sagomate**  
Formed Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Punte**  
Drill  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie. Point milling with reducing the machining load to realize fine surface.

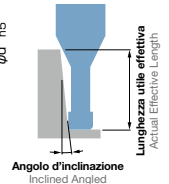
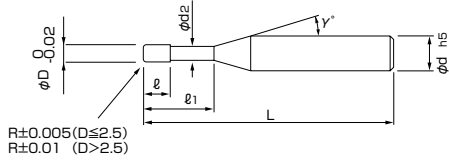
Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinaz. del pezzo Actual effective length depending on inclined angle of workpiece				
									30'	1°	1° 30'	2°	3°
08-00227-07051	0.7	R0.05	4	0.55	0.66	12°	4	45	4.26	4.45	4.66	4.88	5.41
08-00227-07053			6					45	6.35	6.63	6.94	7.28	8.07
08-00227-07101		R0.1	4					45	4.26	4.45	4.65	4.87	5.40
08-00227-07103			6					45	6.35	6.63	6.93	7.27	8.05
08-00227-08051	0.8	R0.05	4	0.65	0.76	12°	4	45	4.27	4.46	4.67	4.90	5.43
08-00227-08053			6					45	6.36	6.64	6.95	7.29	8.08
08-00227-08055			8					50	8.45	8.82	9.23	9.68	10.74
08-00227-08101		R0.1	4					45	4.27	4.46	4.66	4.89	5.41
08-00227-08103			6					45	6.36	6.64	6.94	7.28	8.07
08-00227-08105			8					50	8.44	8.82	9.23	9.68	10.72
08-00227-08201		R0.2	4					45	4.27	4.45	4.65	4.87	5.38
08-00227-08203			6					45	6.35	6.63	6.93	7.26	8.04
08-00227-08205			8					50	8.44	8.81	9.21	9.66	10.69
08-00227-09101			R0.1					4	45	4.28	4.47	4.68	4.90
08-00227-09105	8	50		8.46	8.83	9.24	9.69	10.74					

# MHRH430R

4-Flute Long Neck Radius End Mill for Hardened Steels

## Frese 4 Tagli toriche scaricate per materiali temprati



- Il rivestimento MUGEN PREMIUM ed il nuovo design dell'affilatura prevengono le usure e le scheggiature
- Frese a 4 Tagli per un'altissima efficienza.
- In totale 210 misure.
- Mugen Coating Premium for hardened steels and unique new design excel in chipping prevention and resolve chattering to realize excellent finished surface.
- 4 flutes end mill for higher efficiency.
- Total 210 sizes.

Dati tecnici P492



● NUOVO NEW

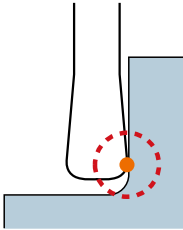
Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinaz. del pezzo Actual effective length depending on inclined angle of workpiece										
									30°	1°	1° 30'	2°	3°						
● 08-00237-10058	1	R0.05	2	0.8	0.95	12°	4	50	2.20	2.30	2.40	2.52	2.79						
08-00237-10050			3					50	3.24	3.39	3.54	3.72	4.12						
08-00237-10051			4					50	4.29	4.48	4.68	4.91	5.44						
08-00237-10052			5					50	5.33	5.57	5.82	6.11	6.77						
08-00237-10053			6					50	6.37	6.66	6.97	7.31	8.10						
08-00237-10055			8					50	8.46	8.83	9.25	9.70	10.75						
08-00237-10057			10					50	10.54	11.01	11.53	12.09	13.41						
● 08-00237-10108			R0.1					2	50	2.20	2.29	2.40	2.51	2.77					
08-00237-10100								3	50	3.24	3.38	3.54	3.71	4.10					
08-00237-10101								4	50	4.28	4.47	4.68	4.90	5.43					
08-00237-10102		5						50	5.33	5.56	5.82	6.10	6.75						
08-00237-10103		6						50	6.37	6.65	6.96	7.30	8.08						
08-00237-10105		8						50	8.46	8.83	9.24	9.69	10.74						
08-00237-10107		10						50	10.54	11.01	11.52	12.08	13.39						
● 08-00237-10208		R0.2						2	50	2.19	2.28	2.38	2.49	2.74					
08-00237-10200								3	50	3.24	3.37	3.52	3.69	4.07					
08-00237-10201								4	50	4.28	4.46	4.66	4.88	5.39					
08-00237-10202			5					50	5.32	5.55	5.80	6.08	6.72						
08-00237-10203			6					50	6.37	6.64	6.94	7.28	8.05						
08-00237-10205			8					50	8.45	8.82	9.23	9.67	10.70						
08-00237-10207			10					50	10.54	11.00	11.51	12.06	13.36						
● 08-00237-10308			R0.3					2	50	2.19	2.28	2.37	2.47	2.71					
08-00237-10300								3	50	3.23	3.36	3.51	3.67	4.03					
08-00237-10301								4	50	4.28	4.45	4.65	4.86	5.36					
08-00237-10302		5						50	5.32	5.54	5.79	6.06	6.69						
08-00237-10303		6						50	6.36	6.63	6.93	7.26	8.02						
08-00237-10305		8						50	8.45	8.81	9.21	9.65	10.67						
08-00237-10307		10						50	10.53	10.99	11.49	12.04	13.33						
08-00237-12101		1.2						R0.1	5	1	1.14	12°	4	50	5.35	5.59	5.84	6.13	6.79
08-00237-12103									10					50	10.57	11.03	11.55	12.11	13.42
08-00237-12201	R0.2			5	50	5.35	5.58	5.83	6.11					6.75					
08-00237-12203			10	50	10.56	11.03	11.53	12.09	13.39										
08-00237-12301			R0.3	5	50	5.34	5.57	5.82	6.09					6.72					
08-00237-12303				10	50	10.56	11.02	11.52	12.07					13.36					

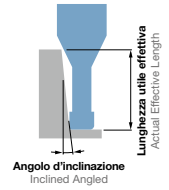
**Attenzione** Quando ordinate, indicate MHRH430R (D)×(R)×(ℓ<sub>1</sub>).  
When you order, indicate MHRH430R (D)×(R)×(ℓ<sub>1</sub>).

\* (γ) è un valore di riferimento.  
\*(γ) is reference value.

- Per i parametri di taglio vedi pagina 409.
- Milling condition is recommended on page 409.



Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie. Point milling with reducing the machining load to realize fine surface.



●NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclin. del pezzo Actual effective length depending on inclined angle of workpiece					
									30°	1°	1° 30'	2°	3°	
● 08-00237-15050	1.5	R0.05	3	1.2	1.43	12°	4	50	3.29	3.44	3.60	3.77	4.18	
● 08-00237-15051			50					4.34	4.53	4.74	4.97	5.51		
● 08-00237-15053			50					6.42	6.71	7.02	7.36	8.16		
● 08-00237-15055			50					8.51	8.89	9.30	9.75	10.82		
● 08-00237-15057			50					12.68	13.24	13.86	14.54	16.12		
● 08-00237-15059			50					15.81	16.51	17.28	18.13	20.11		
● 08-00237-15100			R0.1					3	50	3.29	3.43	3.59	3.76	4.16
08-00237-15101								4	50	4.34	4.52	4.73	4.96	5.49
08-00237-15103								6	50	6.42	6.70	7.01	7.35	8.14
08-00237-15105								8	50	8.50	8.88	9.29	9.75	10.80
08-00237-15107								12	50	12.68	13.24	13.85	14.53	16.11
08-00237-15109								15	60	15.80	16.51	17.28	18.12	20.09
● 08-00237-15200			R0.2					3	50	3.29	3.42	3.58	3.74	4.13
08-00237-15201								4	50	4.33	4.51	4.72	4.94	5.46
08-00237-15203								6	50	6.42	6.69	7.00	7.33	8.11
08-00237-15205		8						50	8.50	8.87	9.28	9.73	10.77	
08-00237-15207		12						50	12.67	13.23	13.84	14.51	16.08	
08-00237-15209		15						60	15.80	16.50	17.26	18.10	20.06	
● 08-00237-15300		R0.3	3					50	3.28	3.42	3.56	3.72	4.10	
08-00237-15301			4					50	4.33	4.51	4.70	4.92	5.42	
08-00237-15303			6					50	6.41	6.68	6.98	7.31	8.08	
08-00237-15305			8					50	8.50	8.86	9.26	9.71	10.73	
08-00237-15307			12					50	12.67	13.22	13.83	14.49	16.04	
08-00237-15309			15					60	15.80	16.49	17.25	18.08	20.02	
● 08-00237-15500		R0.5	3					50	3.27	3.40	3.53	3.68	4.03	
08-00237-15501			4					50	4.32	4.49	4.67	4.88	5.36	
08-00237-15503			6					50	6.40	6.67	6.96	7.27	8.01	
08-00237-15505			8					50	8.49	8.85	9.24	9.67	10.67	
08-00237-15507			12					50	12.66	13.20	13.80	14.45	15.98	
08-00237-15509			15					60	15.79	16.47	17.22	18.04	19.96	
● 08-00237-20050	2	R0.05	4	50	4.38	4.58	4.79	5.02	5.57					
● 08-00237-20051			6	50	6.47	6.76	7.07	7.42	8.22					
● 08-00237-20053			8	50	8.56	8.94	9.35	9.81	10.88					
● 08-00237-20055			12	50	12.73	13.29	13.92	14.60	16.19					
● 08-00237-20057			16	60	16.90	17.65	18.48	19.38	21.50					
● 08-00237-20059			20	60	21.07	22.01	23.04	24.17	Free					

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

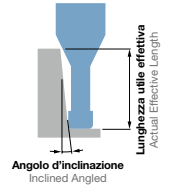
**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

**Non Rivestite**  
Non-Coating  
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



●NUOVO NEW

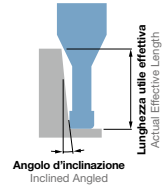
Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinaz. del pezzo Actual effective length depending on inclined angle of workpiece				
									30°	1°	1° 30'	2°	3°
● 08-00237-20100	2	R0.1	4	1.6	1.91	12°	4	50	4.38	4.57	4.78	5.02	5.55
08-00237-20101			50					6.47	6.75	7.07	7.41	8.21	
08-00237-20103			50					8.55	8.93	9.35	9.80	10.86	
08-00237-20105			50					12.73	13.29	13.91	14.59	16.17	
08-00237-20107			60					16.90	17.65	18.47	19.37	21.48	
08-00237-20109			60					21.07	22.01	23.03	24.16	Free	
● 08-00237-20200		R0.2	4					50	4.38	4.57	4.77	5.00	5.52
08-00237-20201			50					6.46	6.74	7.05	7.39	8.17	
08-00237-20203			50					8.55	8.92	9.33	9.78	10.83	
08-00237-20205			50					12.72	13.28	13.89	14.57	16.14	
08-00237-20207			60					16.89	17.64	18.46	19.35	21.45	
08-00237-20209			60					21.06	22.00	23.02	24.14	Free	
● 08-00237-20300		R0.3	4					50	4.37	4.56	4.76	4.98	5.49
08-00237-20301			50					6.46	6.74	7.04	7.37	8.14	
08-00237-20303			50					8.55	8.91	9.32	9.76	10.80	
08-00237-20305			50					12.72	13.27	13.88	14.55	16.10	
08-00237-20307			60					16.89	17.63	18.44	19.33	21.41	
08-00237-20309			60					21.06	21.99	23.00	24.12	Free	
● 08-00237-20500		R0.5	4					50	4.37	4.54	4.73	4.94	5.42
08-00237-20501			50					6.45	6.72	7.01	7.33	8.08	
08-00237-20503	50		8.54	8.90	9.29	9.72	10.73						
08-00237-20505	50		12.71	13.25	13.85	14.51	16.04						
08-00237-20507	60		16.88	17.61	18.41	19.30	21.35						
08-00237-20509	60		21.05	21.97	22.98	24.08	Free						
08-00237-25101	2.5	R0.1	10	2	2.39	12°	4	50	10.69	11.16	11.68	12.25	13.58
08-00237-25103			60					21.12	22.06	23.09	24.22	Free	
08-00237-25105			70					31.54	32.95	34.49	Free	Free	
08-00237-25201		R0.2	10					50	10.68	11.15	11.67	12.23	13.55
08-00237-25203			60					21.11	22.05	23.07	24.20	Free	
08-00237-25205			70					31.54	32.94	34.48	Free	Free	
08-00237-25301		R0.3	10					50	10.68	11.14	11.65	12.21	13.51
08-00237-25303			60					21.11	22.04	23.06	24.18	Free	
08-00237-25305			70					31.54	32.93	34.46	Free	Free	
08-00237-25501		R0.5	10					50	10.67	11.13	11.61	12.17	13.45
08-00237-25503			60					21.10	22.02	23.03	24.14	Free	
08-00237-25505			70					31.53	32.92	34.43	Free	Free	

**Attenzione** Quando ordinate, indicate MHRH430R Dia.(D)×(R)×(ℓ<sub>1</sub>).  
When you order, indicate MHRH430R (D)×(R)×(ℓ<sub>1</sub>).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 409.
- Milling condition is recommended on page 409.



•NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ₁) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d₂) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinaz. del pezzo Actual effective length depending on inclined angle of workpiece					
									30°	1°	1° 30'	2°	3°	
● 08-00237-30058	3	R0.05	4	2.5	2.85	12°	6	50	4.53	4.73	4.95	5.19	5.76	
● 08-00237-30050			6					50	6.62	6.91	7.23	7.59	8.41	
● 08-00237-30051			8					50	8.70	9.09	9.51	9.98	11.06	
● 08-00237-30053			12					50	12.87	13.45	14.08	14.77	16.37	
● 08-00237-30055			16					60	17.05	17.81	18.64	19.55	21.68	
● 08-00237-30057			20					60	21.22	22.16	23.20	24.34	26.99	
● 08-00237-30112		R0.1	4					50	4.53	4.73	4.95	5.18	5.74	
● 08-00237-30100			6					50	6.62	6.91	7.23	7.58	8.39	
08-00237-30101			8					50	8.70	9.09	9.51	9.97	11.05	
08-00237-30103			12					50	12.87	13.44	14.07	14.76	16.36	
08-00237-30105			16					60	17.04	17.80	18.63	19.54	21.67	
08-00237-30107			20					60	21.21	22.16	23.19	24.33	26.98	
08-00237-30109			25					70	26.43	27.61	28.90	30.31	Free	
08-00237-30111			30					70	31.64	33.05	34.60	36.30	Free	
● 08-00237-30212			R0.2					4	50	4.53	4.72	4.93	5.16	5.71
● 08-00237-30200								6	50	6.61	6.90	7.21	7.56	8.36
08-00237-30201								8	50	8.70	9.08	9.49	9.95	11.02
08-00237-30203								12	50	12.87	13.44	14.06	14.74	16.32
08-00237-30205								16	60	17.04	17.79	18.62	19.52	21.63
08-00237-30207								20	60	21.21	22.15	23.18	24.31	26.94
08-00237-30209		25						70	26.42	27.60	28.88	30.29	Free	
08-00237-30211		30						70	31.64	33.05	34.58	36.28	Free	
● 08-00237-30312		R0.3						4	50	4.52	4.71	4.92	5.14	5.67
● 08-00237-30300								6	50	6.61	6.89	7.20	7.54	8.33
08-00237-30301								8	50	8.69	9.07	9.48	9.93	10.98
08-00237-30303								12	50	12.86	13.43	14.04	14.72	16.29
08-00237-30305								16	60	17.04	17.78	18.60	19.50	21.60
08-00237-30307								20	60	21.21	22.14	23.17	24.29	26.91
08-00237-30309			25					70	26.42	27.59	28.87	30.27	Free	
08-00237-30311			30					70	31.63	33.04	34.57	36.26	Free	
● 08-00237-30512	R0.5		4	50	4.51	4.69	4.89	5.11	5.61					
● 08-00237-30500			6	50	6.60	6.87	7.17	7.50	8.26					
08-00237-30501			8	50	8.69	9.05	9.45	9.89	10.92					
08-00237-30503			12	50	12.86	13.41	14.01	14.68	16.23					
08-00237-30505			16	60	17.03	17.77	18.58	19.46	21.54					
08-00237-30507			20	60	21.20	22.12	23.14	24.25	26.84					
08-00237-30509		25	70	26.41	27.57	28.84	30.23	Free						
08-00237-30511		30	70	31.63	33.02	34.54	36.22	Free						
08-00237-31001		R1	8	50	8.66	9.01	9.38	9.79	10.75					
08-00237-31003			12	50	12.83	13.36	13.94	14.58	16.06					
08-00237-31005			16	60	17.01	17.72	18.50	19.37	21.37					
08-00237-31007			20	60	21.18	22.08	23.07	24.15	26.68					
08-00237-31009			25	70	26.39	27.53	28.77	30.14	33.32					
08-00237-31011			30	70	31.60	32.97	34.47	36.12	Free					

# MHRH430R

**CBN**

Nitruro Cubico di Boro

**Diamante**

Diamond

Rivestite Coating

Piane Square

Non Rivestite Non-Coating

Scaricate Piane Long Neck Square

Rivestite Coating

Sferiche Ball

Non Rivestite Non-Coating

Scaricate Sferiche Long Neck Ball

Rivestite Coating

Coniche Taper

Non Rivestite Non-Coating

Coniche Sferiche Taper Ball

Rivestite Coating

Toriche Corner R

Non Rivestite Non-Coating

Scaricate Toriche Long Neck Corner R

Rivestite Coating

Frese Sagomate Formed Cutter

Non Rivestite Non-Coating

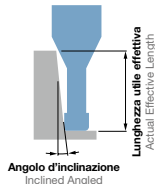
Punte Drill

Rivestite Coating

Altro Others

Dati tecnici Technical Data

Guida tecnica Technical Guidance



●NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinaz. del pezzo Actual effective length depending on inclined angle of workpiece									
									30°	1°	1° 30'	2°	3°					
● 08-00237-40106	4	R0.1	8	3.2	3.8	12°	6	60	8.82	9.21	9.64	10.11	11.20					
08-00237-40100			60					13.00	13.57	14.20	14.90	16.51						
08-00237-40101			60					17.17	17.93	18.77	19.68	21.82						
08-00237-40103			70					25.51	26.65	27.89	29.26	Free						
08-00237-40105			70					33.85	35.36	37.01	Free	Free						
● 08-00237-40206			60					8.82	9.21	9.63	10.09	11.17						
08-00237-40200			60					12.99	13.56	14.19	14.88	16.48						
08-00237-40201			60					17.16	17.92	18.75	19.66	21.79						
08-00237-40203		70	25.50					26.64	27.78	29.24	Free							
08-00237-40205		70	33.85					35.35	37.00	Free	Free							
● 08-00237-40306		60	8.82					9.20	9.61	10.07	11.14							
08-00237-40300		60	12.99					13.55	14.18	14.86	16.45							
08-00237-40301		60	17.16					17.91	18.74	19.64	21.76							
08-00237-40303		70	25.50					26.63	27.86	29.22	Free							
08-00237-40305		70	33.84					35.34	36.99	Free	Free							
● 08-00237-40506		60	8.81					9.18	9.59	10.03	11.07							
08-00237-40500		60	12.98					13.54	14.15	14.82	16.38							
08-00237-40501		60	17.15					17.89	18.71	19.61	21.69							
08-00237-40503		70	25.49					26.61	27.83	29.18	Free							
08-00237-40505		70	33.83					35.33	36.96	Free	Free							
● 08-00237-41006		60	8.79					9.13	9.52	9.93	10.91							
08-00237-41000		60	12.96					13.49	14.08	14.72	16.22							
08-00237-41001		60	17.13					17.85	18.64	19.51	21.53							
08-00237-41003		70	25.47					26.57	27.76	29.08	Free							
08-00237-41005		70	33.81					35.28	36.89	Free	Free							
08-00237-50100		5	R0.1					15	4	4.75	12°	6	70	16.25	16.97	17.76	18.63	Free
08-00237-50101								70					21.46	22.42	23.46	Free	Free	
08-00237-50103								90					42.32	Free	Free	Free	Free	
08-00237-50200								70					16.24	16.96	17.75	18.61	Free	
08-00237-50201			70					21.46					22.41	23.45	Free	Free		
08-00237-50203			90					42.31					Free	Free	Free	Free		
08-00237-50300			70					16.24					16.95	17.73	18.59	Free		
08-00237-50301	70		21.45	22.40	23.43	Free	Free											
08-00237-50303	90		42.31	Free	Free	Free	Free											
08-00237-50500	70		16.23	16.93	17.70	18.55	Free											
08-00237-50501	70		21.44	22.38	23.41	Free	Free											
08-00237-50503	90		42.30	Free	Free	Free	Free											
08-00237-51000	70		16.21	16.89	17.63	18.45	Free											
08-00237-51001	70		21.42	22.34	23.34	Free	Free											
08-00237-51003	90		42.28	Free	Free	Free	Free											

**Attenzione**

Quando ordinate, indicate MHRH430R Dia.(D)×(R)×(ℓ<sub>1</sub>).  
When you order, indicate MHRH430R (D)×(R)×(ℓ<sub>1</sub>).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 409.
- Milling condition is recommended on page 409.



# MHRH430R

**CBN**  
Nitrato Cubico  
di Boro

**Diamante**

Diamond

**Piane**  
Square

**Scaricate**  
Piane

Long Neck  
Square



●NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> )Dia. scarico Neck Dia.	(γ)Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. utile effettiva dipende dall'angolo d'inclinaz. del pezzo Actual effective length depending on inclined angle of workpiece				
									30'	1°	1° 30'	2°	3°
● 08-00237-60104	6	R0.1	12	5	5.7	-	6	70	Free	Free	Free	Free	Free
08-00237-60100			90					Free	Free	Free	Free	Free	
08-00237-60101			90					Free	Free	Free	Free	Free	
08-00237-60103			110					Free	Free	Free	Free	Free	
● 08-00237-60204		R0.2	12					70	Free	Free	Free	Free	Free
08-00237-60200			18					90	Free	Free	Free	Free	Free
08-00237-60201			24					90	Free	Free	Free	Free	Free
08-00237-60203			48					110	Free	Free	Free	Free	Free
● 08-00237-60304		R0.3	12					70	Free	Free	Free	Free	Free
08-00237-60300			18					90	Free	Free	Free	Free	Free
08-00237-60301			24					90	Free	Free	Free	Free	Free
08-00237-60303			48					110	Free	Free	Free	Free	Free
● 08-00237-60504		R0.5	12					70	Free	Free	Free	Free	Free
08-00237-60500			18					90	Free	Free	Free	Free	Free
08-00237-60501			24					90	Free	Free	Free	Free	Free
08-00237-60503			48					110	Free	Free	Free	Free	Free
● 08-00237-61004		R1	12					70	Free	Free	Free	Free	Free
08-00237-61000			18					90	Free	Free	Free	Free	Free
08-00237-61001			24					90	Free	Free	Free	Free	Free
08-00237-61003			48					110	Free	Free	Free	Free	Free

**Sferiche**

Ball

**Scaricate**  
Sferiche

Long Neck  
Ball

**Coniche**

Taper

**Coniche**  
Sferiche

Taper Ball

**Toriche**

Corner R

**Scaricate**  
Toriche

Long Neck  
Corner R

**Frese**  
Sagomate

Formed  
Cutter

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

Technical Data

**Guida tecnica**

Technical Guidance

Materiale Work Material			Acciaio temprato Hardened Steels 1.2343•STAVAX (~ 55HRC)				Acciaio temprato Hardened Steels 1.2739 (~ 62HRC)				Acciaio HSS High Speed Tool Steels ASP•M2•1.3343 (~ 65HRC)			
Dia. Dia.	Angolo raggio Corner Radius	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
			min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm
0.2	0.05	0.5	30,000	200	0.003	0.03	30,000	160	0.003	0.02	30,000	120	0.003	0.01
		1	30,000	150	0.003	0.02	30,000	120	0.003	0.01	30,000	80	0.003	0.007
		1.5	30,000	100	0.002	0.01	30,000	80	0.002	0.007	30,000	60	0.002	0.005
0.3	0.05	1	30,000	300	0.003	0.05	30,000	250	0.003	0.04	30,000	200	0.003	0.03
		1.5	30,000	200	0.003	0.04	30,000	160	0.003	0.03	30,000	120	0.003	0.02
		2	30,000	150	0.003	0.03	30,000	120	0.003	0.02	25,000	100	0.003	0.01
		2.5	25,000	100	0.002	0.02	25,000	80	0.002	0.01	20,000	60	0.002	0.007
0.4	0.05 0.1	1	30,000	400	0.005	0.07	30,000	350	0.005	0.05	25,000	300	0.005	0.03
		2	30,000	320	0.005	0.05	25,000	280	0.005	0.03	25,000	220	0.005	0.02
		3	25,000	260	0.004	0.03	20,000	220	0.003	0.02	18,000	180	0.003	0.01
		4	25,000	200	0.003	0.01	20,000	160	0.002	0.01	18,000	120	0.002	0.007
0.5	0.05 0.1	1	25,000	500	0.01	0.15	23,000	450	0.007	0.1	20,000	400	0.005	0.08
		2	25,000	420	0.01	0.1	23,000	380	0.007	0.08	20,000	320	0.005	0.05
		3	25,000	350	0.007	0.07	23,000	320	0.005	0.05	20,000	280	0.003	0.03
		4	25,000	280	0.005	0.05	23,000	240	0.003	0.03	20,000	200	0.002	0.02
0.6	0.05 0.1	2	25,000	500	0.015	0.2	23,000	400	0.01	0.15	20,000	300	0.007	0.1
		4	25,000	350	0.015	0.1	23,000	250	0.007	0.1	16,000	200	0.005	0.05
		6	20,000	200	0.008	0.07	18,000	150	0.005	0.05	12,000	100	0.003	0.02
0.7	0.05 0.1	4	25,000	600	0.02	0.15	23,000	500	0.01	0.1	20,000	400	0.007	0.07
		6	20,000	350	0.01	0.06	18,000	250	0.007	0.05	16,000	200	0.005	0.03
0.8	0.05 0.1 0.2	4	25,000	700	0.025	0.2	23,000	600	0.015	0.15	20,000	500	0.01	0.1
		6	20,000	550	0.02	0.15	18,000	450	0.01	0.1	16,000	350	0.007	0.08
		8	16,000	400	0.007	0.08	14,000	300	0.005	0.05	12,000	200	0.005	0.03
0.9	0.1	4	25,000	800	0.03	0.25	20,000	720	0.02	0.2	16,000	600	0.01	0.15
		8	16,000	400	0.01	0.1	12,000	350	0.008	0.1	8,500	300	0.005	0.07

Note

- ※ I parametri di taglio sopra indicati vanno regolati in base alla forma da fresare e al tipo di macchina.
- ※ a<sub>p</sub> = profondità di taglio assiale, a<sub>e</sub> = profondità di taglio radiale.
- ※ Raccomandiamo l'uso di lubrificazione minima specifica per materiali temprati.
- ※ Raccomandiamo l'approccio a rampa o elicoidale, per entrare nel pezzo in maniera assiale.
- ※ Regolate l'avanzamento più basso del 50% e la profondità di taglio radiale (a<sub>e</sub>) del 30% quando la profondità di fresatura è maggiore di 8XD per una fresatura stabile.
- ※ Per cave consigliamo la fresatura bidirezionale e la riduzione di avanzamento e profondità di taglio assiale(a<sub>p</sub>) del 50%.
- ※ Ridurre con la stessa proporzione giri ed avanzamento, per eliminare vibrazioni o in caso di limitato numero di giri della macchina.
- ※ Adjust milling conditions according to milling shape and machine type.
- ※ a<sub>p</sub> : Axial depth of cutting, a<sub>e</sub> : Radial depth of cutting.
- ※ Recommend to use oil mist coolant for machining hardened steels.
- ※ Recommend to apply helical or ramping for approaching into axial direction.
- ※ Adjust feed rate 50% lower and cutting depth (a<sub>e</sub>) 30% lower for milling deep wall area when L/D exceeds 8 for stable milling.
- ※ For slotting, recommend reciprocating milling by adjusting feed & a<sub>p</sub> in below 50% of recommended milling condition.
- ※ Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.

Materiale Work Material			Acciaio temprato Hardened Steels 1.2343•STAVAX (~ 55HRC)				Acciaio temprato Hardened Steels 1.2379 (~ 62HRC)				Acciaio HSS High Speed Tool Steels ASP•M2•1.3343 (~ 65HRC)			
Dia. Dia.	Angolo raggio Corner Radius	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
			min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm
1	0.05 0.1 0.2 0.3	2	28,000	2,200	0.05	0.3	22,000	2,000	0.04	0.25	18,000	1,350	0.03	0.2
		3	25,000	2,000	0.05	0.3	20,000	1,800	0.04	0.25	16,000	1,200	0.03	0.2
		4	23,000	1,800	0.04	0.3	18,000	1,600	0.03	0.25	14,000	1,000	0.02	0.2
		5	20,000	1,600	0.03	0.25	16,000	1,400	0.02	0.2	12,000	920	0.01	0.15
		6	18,000	1,400	0.02	0.25	14,000	1,200	0.01	0.2	10,000	800	0.007	0.15
		8	16,000	1,200	0.02	0.2	12,000	1,000	0.01	0.15	8,000	680	0.005	0.1
		10	14,000	1,000	0.01	0.1	10,000	800	0.007	0.1	6,000	500	0.005	0.07
1.2	0.1 0.2 0.3	5	23,000	1,600	0.03	0.4	20,000	1,500	0.02	0.3	16,000	1,000	0.01	0.2
		10	12,000	1,000	0.02	0.2	10,000	850	0.01	0.15	8,000	600	0.005	0.08
1.5	0.05 0.1 0.2 0.3 0.5	3	27,000	2,200	0.05	0.5	22,000	1,800	0.04	0.4	18,000	1,350	0.03	0.3
		4	25,000	2,000	0.05	0.5	20,000	1,600	0.04	0.4	16,000	1,200	0.03	0.3
		6	20,000	1,600	0.04	0.4	18,000	1,400	0.03	0.3	14,000	1,000	0.02	0.2
		8	18,000	1,200	0.04	0.4	14,000	1,200	0.03	0.3	10,000	750	0.01	0.1
		12	14,000	1,000	0.03	0.3	12,000	850	0.02	0.2	8,000	620	0.007	0.1
		15	12,000	860	0.02	0.2	9,500	700	0.007	0.1	6,500	500	0.005	0.07
2	0.05 0.1 0.2 0.3 0.5	4	20,000	2,000	0.06	0.6	17,000	1,700	0.05	0.5	14,000	1,400	0.03	0.3
		6	18,000	1,800	0.06	0.6	15,000	1,500	0.05	0.5	12,000	1,200	0.03	0.3
		8	16,000	1,600	0.05	0.6	12,000	1,200	0.04	0.5	9,500	1,000	0.02	0.3
		12	12,000	1,200	0.04	0.5	10,000	1,000	0.03	0.4	8,200	800	0.01	0.2
		16	10,000	1,000	0.03	0.4	9,200	800	0.02	0.2	7,500	680	0.007	0.1
		20	9,200	750	0.02	0.3	8,500	680	0.01	0.1	6,000	520	0.005	0.1
2.5	0.1 0.2 0.3 0.5	10	14,000	1,600	0.07	0.7	10,000	1,400	0.05	0.5	7,500	1,000	0.03	0.5
		20	8,200	1,200	0.05	0.4	7,500	1,000	0.02	0.2	5,000	800	0.01	0.1
		30	6,500	600	0.01	0.2	5,000	400	0.01	0.1	3,500	300	0.005	0.07
3	0.05 0.1 0.2 0.3 0.5 1	4	16,000	2,200	0.1	0.8	12,000	2,000	0.07	0.7	10,500	1,600	0.05	0.6
		6	15,000	2,000	0.1	0.8	11,000	1,800	0.07	0.7	9,500	1,450	0.05	0.6
		8	14,000	1,800	0.1	0.8	10,000	1,600	0.07	0.7	8,000	1,200	0.05	0.6
		12	12,000	1,600	0.08	0.8	9,200	1,400	0.06	0.6	7,200	1,000	0.04	0.5
		16	10,000	1,400	0.07	0.7	8,500	1,200	0.05	0.5	6,500	800	0.03	0.4
		20	9,000	1,400	0.07	0.7	7,800	1,200	0.04	0.4	5,800	800	0.02	0.3
		25	8,200	1,200	0.06	0.5	7,000	1,000	0.03	0.3	5,000	720	0.01	0.2
		30	7,000	1,200	0.03	0.4	6,500	1,000	0.02	0.2	4,500	650	0.007	0.1
4	0.1 0.2 0.3 0.5 1	8	10,500	2,500	0.15	1.2	9,000	1,800	0.08	1	8,000	1,600	0.06	0.8
		12	9,500	2,200	0.15	1.2	8,000	1,600	0.08	1	7,000	1,400	0.06	0.8
		16	8,000	1,800	0.1	1	7,000	1,400	0.06	0.8	6,000	1,200	0.05	0.6
		24	6,200	1,400	0.08	0.8	5,500	1,200	0.05	0.65	4,200	1,000	0.03	0.4
		32	4,500	1,000	0.04	0.7	4,000	800	0.02	0.3	3,200	600	0.01	0.2
5	0.1 0.2 0.3 0.5 1	15	7,000	2,000	0.15	2	5,500	1,500	0.08	1.6	4,500	1,200	0.06	1.2
		20	6,000	1,500	0.1	2	5,000	1,400	0.07	1.5	4,000	1,000	0.05	1
		40	3,000	850	0.05	1	2,500	700	0.02	0.5	2,000	500	0.01	0.3

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite Coating**  
Piane Square  
**Non Rivestite Non-Coating**  
Scaricate Piane Long Neck Square

**Rivestite Coating**  
Sferiche Ball  
**Non Rivestite Non-Coating**  
Scaricate Sferiche Long Neck Ball

**Rivestite Coating**  
Coniche Taper  
**Non Rivestite Non-Coating**  
Coniche Sferiche Taper Ball

**Rivestite Coating**  
Toriche Corner R  
**Non Rivestite Non-Coating**  
Scaricate Toriche Long Neck Corner R

**Rivestite Coating**  
Frese Sagomate Formed Cutter  
**Non Rivestite Non-Coating**

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

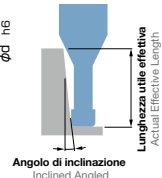
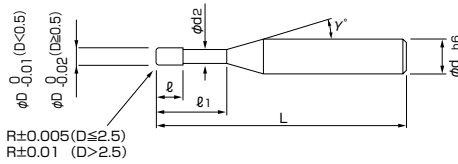
**Guida tecnica**  
Technical Guidance

Materiale Work Material			Acciaio temprato Hardened Steels 1.2343•STAVAX (~ 55HRC)				Acciaio temprato Hardened Steels 1.2739 (~ 62HRC)				Acciaio HSS High Speed Tool Steels ASP•M2•1.3343 (~ 65HRC)			
Dia. Dia.	Angolo raggio Corner Radius	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
			min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm
6	0.1 0.2 0.3 0.5 1	12	7,000	2,200	0.18	2.5	5,000	1,500	0.08	2	4,000	1,150	0.06	1.5
		18	6,500	2,000	0.18	2.5	4,500	1,350	0.08	2	3,500	1,000	0.06	1.5
		24	5,000	1,500	0.15	2.5	4,000	1,200	0.07	2	3,200	800	0.05	1
		48	2,500	700	0.05	1	2,000	600	0.03	0.5	1,600	400	0.02	0.3
Note Notes			<p>※ I parametri di taglio sopra indicati vanno regolati in base alla forma da fresare e al tipo di macchina.            ※ a<sub>p</sub> = profondità di taglio assiale, a<sub>e</sub> = profondità di taglio radiale.            ※ Raccomandiamo l'uso di lubrificazione minimale specifica per materiali temprati.            ※ Raccomandiamo l'approccio a rampa o elicoidale, per entrare nel pezzo in maniera assiale.            ※ Regolate l'avanzamento più basso del 50% e la profondità di taglio radiale (a<sub>e</sub>) del 30% quando la profondità di fresatura è maggiore di 8XD per stabilizzare la fresa.            ※ Per cave consigliamo la fresatura bidirezionale e la riduzione di avanzamento e profondità di taglio assiale (a<sub>p</sub>) del 50%.            ※ Ridurre con la stessa proporzione giri ed avanzamento, per eliminare vibrazioni o in caso di limitato numero di giri della macchina.            ※ Adjust milling conditions according to milling shape and machine type.            ※ a<sub>p</sub> : Axial depth of cutting, a<sub>e</sub> : Radial depth of cutting.            ※ Recommend to use oil mist coolant for machining hardened steels.            ※ Recommend to apply helical or ramping for approaching into axial direction.            ※ Adjust feed rate 50% lower and cutting depth (a<sub>e</sub>) 30% lower for milling deep wall area when L/D exceeds 8 for stable milling.            ※ For slotting, recommend reciprocating milling by adjusting feed &amp; a<sub>p</sub> in below 50% of recommended milling condition.            ※ Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.</p>											

# MHR230R

MUGEN-COATING 2-Flute Long Neck Radius End Mill

## Frese 2 Tagli toriche rivestite MUGEN



- Vibrazioni ridotte grazie al tagliente periferico studiato per minimizzare il contatto con il pezzo.
- Si possono ottenere efficienti fresature utilizzando uno step radiale più ampio rispetto alle frese sferiche.
- Precisione del raggio  $\pm 5\mu\text{m}$  (D2.5 e inferiore).
- Grazie al rivestimento MUGEN si ottengono grandi performance in fresature di acciai pretemprati e rame per elettrodi.
- Minimized chattering by peripheral cutting edge designed for minimal contact to work material.
- Realized high efficiency milling by obtaining larger radial depth of cutting comparing with Ball End Mill.
- Corner R accuracy :  $\pm 5\mu\text{m}$  (2.5D and below)
- Upgraded MUGEN-COATING brings outstanding performance for milling of Prehardened Steels and Copper Electrode as well.
- **NUOVO NEW**



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece:				
									30°	1°	1° 30'	2°	3°
08-00221-02050	0.2	R0.05	0.5	0.15	0.18	12°	4	45	0.57	0.59	0.62	0.65	0.71
08-00220-02001			6				50	0.57	0.59	0.62	0.65	0.71	
08-00221-02051			1				4	45	1.09	1.14	1.19	1.24	1.38
08-00220-02002			1						1.09	1.14	1.19	1.24	1.38
08-00221-02052			1.5				4	45	1.61	1.68	1.76	1.84	2.04
08-00221-02053			2				4	45	2.13	2.23	2.33	2.44	2.71
08-00221-03050	0.3	R0.05	1	0.25	0.28	12°	4	45	1.09	1.14	1.19	1.24	1.38
08-00220-03001			6				50	1.09	1.14	1.19	1.24	1.38	
08-00221-03051			1.5				4	45	1.61	1.68	1.76	1.84	2.04
08-00221-03052			2				4	45	2.13	2.23	2.33	2.44	2.71
08-00220-03002			2				6	50	2.13	2.23	2.33	2.44	2.71
08-00221-03053			2.5				4	45	2.65	2.77	2.90	3.04	3.37
08-00221-03054	3	4	45	3.18	3.32	3.47	3.64	4.04					
08-00221-04050	0.4	R0.05	1	0.3	0.37	12°	4	45	1.11	1.16	1.22	1.27	1.41
08-00221-04051			1.5				4	45	1.64	1.71	1.79	1.87	2.07
08-00221-04052			2				4	45	2.16	2.25	2.36	2.47	2.74
08-00220-04005			2				6	50	2.16	2.25	2.36	2.47	2.74
08-00221-04053			3				4	45	3.20	3.34	3.50	3.67	4.07
08-00220-04006			3				6	50	3.20	3.34	3.50	3.67	4.07
08-00221-04054		4	4	45	4.24	4.43	4.64	4.87	5.40				
08-00220-04007		4	6	50	4.24	4.43	4.64	4.87	5.40				
08-00221-04100		1	4	45	1.11	1.16	1.21	1.26	1.39				
08-00221-04101		1.5	4	45	1.63	1.70	1.78	1.86	2.06				
08-00221-04102		2	4	45	2.16	2.25	2.35	2.46	2.72				
08-00220-04011		2	6	50	2.16	2.25	2.35	2.46	2.72				
08-00221-04103	3	4	45	3.20	3.34	3.49	3.66	4.05					
08-00220-04013	3	6	50	3.20	3.34	3.49	3.66	4.05					
08-00221-04104	4	4	45	4.24	4.43	4.63	4.86	5.39					
08-00220-04012	4	6	50	4.24	4.43	4.63	4.86	5.39					
08-00221-05050	0.5	R0.05	1	0.4	0.46	12°	4	45	1.14	1.19	1.24	1.30	1.44
08-00221-05051			4				45	2.18	2.28	2.38	2.50	2.77	
08-00220-05005			2				6	50	2.18	2.28	2.38	2.50	2.77
08-00221-05052			3				4	45	3.22	3.37	3.52	3.70	4.10

**Attenzione** Quando ordinate, indicate MHR230R Dia.(D)×(R)×(ℓ<sub>1</sub>)×(d).  
 When you order, indicate MHR230R (D)×(R)×(ℓ<sub>1</sub>)×(d).

※ (γ) è un valore di riferimento.  
 ※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 427.
- Milling condition is recommended on page 427.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane

Sferiche  
Ball

Scaricate  
Sferiche

Coniche  
Taper

Coniche  
Sferiche

Toriche  
Corner R

Scaricate  
Toriche

Frese  
Sagomate

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

Rivestite Coating  
Piane Square

Non Rivestite Non-Coating  
Scaricate Piane Long Neck Square

Rivestite Coating  
Sferiche Ball

Non Rivestite Non-Coating  
Scaricate Sferiche Long Neck Ball

Rivestite Coating  
Coniche Taper

Non Rivestite Non-Coating  
Coniche Sferiche Taper Ball

Rivestite Coating  
Toriche Corner R

Non Rivestite Non-Coating  
Scaricate Toriche Long Neck Corner R

Rivestite Coating  
Frese Sagomate Formed Cutter

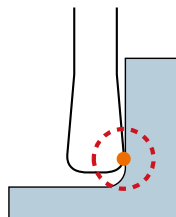
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MHR230R



Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie.  
Point milling with reducing the machining load to realize fine surface.



● NUOVO NEW

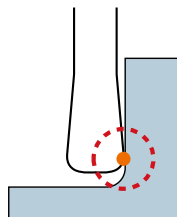
Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.														
									30'	1°	1° 30'	2°	3°										
08-00220-05006	0.5	R0.05	3	0.4	0.46	12°	6	50	3.22	3.37	3.52	3.70	4.10										
● 08-00221-05053			4				45	4.27	4.46	4.67	4.90	5.43											
08-00220-05007			4				50	4.27	4.46	4.67	4.90	5.43											
● 08-00221-05054			5				45	5.31	5.55	5.81	6.09	6.76											
08-00220-05008			5				50	5.31	5.55	5.81	6.09	6.76											
● 08-00221-05055			6				45	6.35	6.64	6.95	7.29	8.10											
● 08-00221-05100		R0.1	1				0.4	0.46	12°	4	45	1.14	1.18	1.24	1.29	1.42							
● 08-00221-05101			2							45	2.18	2.27	2.38	2.49	2.75								
08-00220-05011			2							50	2.18	2.27	2.38	2.49	2.75								
● 08-00221-05102			3							45	3.22	3.36	3.52	3.69	4.09								
08-00220-05013			3							50	3.22	3.36	3.52	3.69	4.09								
● 08-00221-05103			4							45	4.27	4.45	4.66	4.89	5.42								
08-00220-05012		R0.1	4							0.4	0.46	12°	6	50	4.27	4.45	4.66	4.89	5.42				
● 08-00221-05104			4										45	5.31	5.54	5.80	6.08	6.75					
08-00220-05014			5										50	5.31	5.54	5.80	6.08	6.75					
● 08-00221-05105			6										45	6.35	6.63	6.94	7.28	8.08					
● 08-00221-06050			R0.05										2	0.5	0.56	12°	4	45	2.18	2.28	2.38	2.50	2.77
08-00220-06005													2				50	2.18	2.28	2.38	2.50	2.77	
● 08-00221-06051	3	45		3.22	3.37	3.52							3.70				4.10						
● 08-00221-06052	4	45		4.27	4.46	4.67							4.90				5.43						
08-00220-06007	4	50		4.27	4.46	4.67							4.90				5.43						
● 08-00221-06053	6	45		6.35	6.64	6.95							7.29				8.10						
08-00220-06009	R0.1	6	0.5	0.56	12°	6							50				6.35	6.64	6.95	7.29	8.10		
● 08-00221-06054		8				50							8.44				8.82	9.23	9.69	10.76			
● 08-00221-06100		2				45	2.18	2.27	2.38				2.49				2.75						
● 08-00221-06101		3				45	3.22	3.36	3.52				3.69				4.09						
● 08-00221-06102		4				45	4.27	4.45	4.66				4.89				5.42						
08-00220-06011		4				50	4.27	4.45	4.66				4.89				5.42						
● 08-00221-06103	R0.1	6				0.5	0.56	12°	4				45				6.35	6.63	6.94	7.28	8.08		
08-00220-06012		6							50				6.35				6.63	6.94	7.28	8.08			
● 08-00221-06104		4							50	8.44	8.81	9.22	9.68				10.74						
● 08-00221-06200		R0.2							2	45	2.18	2.26	2.36				2.47	2.72					
● 08-00221-06201									3	45	3.22	3.35	3.50				3.67	4.05					

**Attenzione** Quando ordinate, indicate MHR230R Dia.(D)×(R)×(ℓ<sub>1</sub>)×(d).  
When you order, indicate MHR230R (D)×(R)×(ℓ<sub>1</sub>)×(d).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 427.
- Milling condition is recommended on page 427.



Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie.  
Point milling with reducing the machining load to realize fine surface.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.					
									30°	1°	1° 30'	2°	3°	
● 08-00221-06202	0.6	R0.2	4	0.5	0.56	12°	4	45	4.26	4.44	4.64	4.87	5.38	
● 08-00221-06203			6						6.35	6.62	6.93	7.26	8.05	
● 08-00221-06204			8						8.43	8.80	9.21	9.66	10.71	
● 08-00221-07050	0.7	R0.05	4	0.55	0.66	12°	4	45	4.27	4.46	4.67	4.90	5.43	
08-00220-07005			6						4.27	4.46	4.67	4.90	5.43	
● 08-00221-07051			6						6.35	6.64	6.95	7.29	8.10	
08-00220-07006			6						6.35	6.64	6.95	7.29	8.10	
● 08-00221-07100		R0.1	4				4.27	4.45	4.66	4.89	5.42			
08-00220-07011			6				4.27	4.45	4.66	4.89	5.42			
● 08-00221-07101			4				6.35	6.63	6.94	7.28	8.08			
08-00220-07012			6				6.35	6.63	6.94	7.28	8.08			
● 08-00221-08050	0.8	R0.05	4	0.65	0.76	12°	4	45	4.27	4.46	4.67	4.90	5.43	
08-00220-08005			6						4.27	4.46	4.67	4.90	5.43	
● 08-00221-08051			4						6.35	6.64	6.95	7.29	8.10	
08-00220-08006			6						6.35	6.64	6.95	7.29	8.10	
● 08-00221-08052			8						8.44	8.82	9.23	9.69	10.76	
08-00220-08007			8						8.44	8.82	9.23	9.69	10.76	
● 08-00221-08100			R0.1						4	4.27	4.45	4.66	4.89	5.42
08-00220-08011									4	4.27	4.45	4.66	4.89	5.42
● 08-00221-08101		6					6.35	6.63	6.94	7.28	8.08			
08-00220-08012		6					6.35	6.63	6.94	7.28	8.08			
● 08-00221-08102		8					8.44	8.81	9.22	9.68	10.74			
08-00220-08013		8					8.44	8.81	9.22	9.68	10.74			
● 08-00221-08200		R0.2					4	4.26	4.44	4.64	4.87	5.38		
08-00220-08021							6	4.26	4.44	4.64	4.87	5.38		
● 08-00221-08201			4				6.35	6.62	6.93	7.26	8.05			
08-00220-08022			6				6.35	6.62	6.93	7.26	8.05			
● 08-00221-08202	8		8.43	8.80	9.21	9.66	10.71							
08-00220-08023	8		8.43	8.80	9.21	9.66	10.71							
● 08-00221-09100	0.9		R0.1	4	0.7	0.86	12°	4	45	4.27	4.45	4.66	4.89	5.42
08-00220-09011				6						4.27	4.45	4.66	4.89	5.42
● 08-00221-09101		4		8.44						8.81	9.22	9.68	10.74	
08-00220-09012		6		8.44						8.81	9.22	9.68	10.74	
● 08-00221-10050	1	R0.05	2	0.8	0.95	12°	4	50	2.21	2.30	2.41	2.53	2.80	
● 08-00221-10051			3						3.25	3.39	3.55	3.73	4.13	
08-00220-10001			3						3.25	3.39	3.55	3.73	4.13	
● 08-00221-10052			4						4.29	4.48	4.69	4.92	5.46	

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

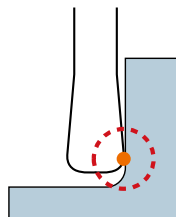
**Non Rivestite**  
Non-Coating

**Punte**  
Drill

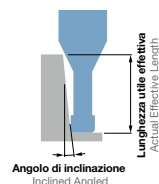
**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie.  
Point milling with reducing the machining load to realize fine surface.

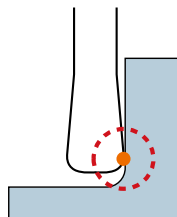


● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30'	1°	1° 30'	2°	3°
08-00220-10002	1	R0.05	4	0.8	0.95	12°	6	50	4.29	4.48	4.69	4.92	5.46
● 08-00221-10053			5				4	50	5.34	5.57	5.83	6.12	6.80
08-00220-10003			5				6	50	5.34	5.57	5.83	6.12	6.80
● 08-00221-10054			6				4	50	6.38	6.66	6.98	7.32	8.13
08-00220-10004			6				6	50	6.38	6.66	6.98	7.32	8.13
● 08-00221-10055			8				4	50	8.46	8.84	9.26	9.72	10.79
08-00220-10006			8				6	50	8.46	8.84	9.26	9.72	10.79
● 08-00221-10056			10				4	50	10.55	11.02	11.54	12.11	13.45
08-00220-10008			10				6	50	10.55	11.02	11.54	12.11	13.45
● 08-00221-10057			12				4	50	12.64	13.20	13.82	14.51	16.11
08-00220-10009			12				6	50	12.64	13.20	13.82	14.51	16.11
● 08-00221-10058			16				4	60	16.81	17.56	18.39	19.30	21.44
● 08-00221-10059		20	4	60	20.98	21.92	22.95	24.09	26.76				
● 08-00221-10100		2	4	50	2.20	2.30	2.40	2.52	2.79				
● 08-00221-10101		3	4	50	3.25	3.39	3.54	3.72	4.12				
08-00220-10010		3	6	50	3.25	3.39	3.54	3.72	4.12				
● 08-00221-10102		4	4	50	4.29	4.48	4.69	4.91	5.45				
08-00220-10011		4	6	50	4.29	4.48	4.69	4.91	5.45				
● 08-00221-10103		5	4	50	5.33	5.57	5.83	6.11	6.78				
08-00220-10014		5	6	50	5.33	5.57	5.83	6.11	6.78				
● 08-00221-10104		6	4	50	6.38	6.66	6.97	7.31	8.11				
08-00220-10015		6	6	50	6.38	6.66	6.97	7.31	8.11				
● 08-00221-10105		8	4	50	8.46	8.84	9.25	9.71	10.77				
08-00220-10012		8	6	50	8.46	8.84	9.25	9.71	10.77				
● 08-00221-10106	10	4	50	10.55	11.02	11.53	12.10	13.43					
08-00220-10016	10	6	50	10.55	11.02	11.53	12.10	13.43					
● 08-00221-10107	12	4	50	12.63	13.20	13.82	14.50	16.10					
08-00220-10013	12	6	50	12.63	13.20	13.82	14.50	16.10					
● 08-00221-10108	16	4	60	16.80	17.56	18.38	19.29	21.42					
● 08-00221-10109	20	4	60	20.98	21.92	22.95	24.08	26.74					
● 08-00221-10200	2	4	50	2.20	2.29	2.39	2.50	2.75					
● 08-00221-10201	3	4	50	3.24	3.38	3.53	3.70	4.08					
08-00220-10024	3	6	50	3.24	3.38	3.53	3.70	4.08					
● 08-00221-10202	4	4	50	4.29	4.47	4.67	4.89	5.42					
08-00220-10021	4	6	50	4.29	4.47	4.67	4.89	5.42					
● 08-00221-10203	5	4	50	5.33	5.56	5.81	6.09	6.75					
08-00220-10025	5	6	50	5.33	5.56	5.81	6.09	6.75					





Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie.  
Point milling with reducing the machining load to realize fine surface.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30°	1°	1° 30'	2°	3°
● 08-00221-10204	1	R0.2	6	0.8	0.95	12°	4	50	6.37	6.65	6.95	7.29	8.08
08-00220-10026			6				50	6.37	6.65	6.95	7.29	8.08	
● 08-00221-10205			8				4	50	8.46	8.83	9.24	9.69	10.74
08-00220-10022			8				6	50	8.46	8.83	9.24	9.69	10.74
● 08-00221-10206			10				4	50	10.54	11.01	11.52	12.08	13.40
08-00220-10027			10				6	50	10.54	11.01	11.52	12.08	13.40
● 08-00221-10207			12				4	50	12.63	13.19	13.80	14.48	16.06
08-00220-10023			12				6	50	12.63	13.19	13.80	14.48	16.06
● 08-00221-10208			16				4	60	16.80	17.55	18.37	19.27	21.39
● 08-00221-10209			20				4	60	20.97	21.91	22.93	24.06	26.71
● 08-00221-10300		R0.3	2				4	50	2.20	2.28	2.38	2.48	2.72
● 08-00221-10301			3				4	50	3.24	3.37	3.52	3.68	4.05
08-00220-10034			3				6	50	3.24	3.37	3.52	3.68	4.05
● 08-00221-10302			4				4	50	4.28	4.46	4.66	4.87	5.38
08-00220-10031			4				6	50	4.28	4.46	4.66	4.87	5.38
● 08-00221-10303			5				4	50	5.32	5.55	5.80	6.07	6.71
08-00220-10035			5				6	50	5.32	5.55	5.80	6.07	6.71
● 08-00221-10304			6				4	50	6.37	6.64	6.94	7.27	8.04
08-00220-10036			6				6	50	6.37	6.64	6.94	7.27	8.04
● 08-00221-10305			8				4	50	8.45	8.82	9.22	9.67	10.71
08-00220-10032	8	6	50	8.45	8.82	9.22	9.67	10.71					
● 08-00221-10306	10	4	50	10.54	11.00	11.51	12.06	13.37					
08-00220-10037	10	6	50	10.54	11.00	11.51	12.06	13.37					
● 08-00221-10307	12	4	50	12.62	13.18	13.79	14.46	16.03					
08-00220-10033	12	6	50	12.62	13.18	13.79	14.46	16.03					
● 08-00221-10308	16	4	60	16.80	17.54	18.35	19.25	21.35					
● 08-00221-10309	20	4	60	20.97	21.90	22.92	24.04	26.68					
08-00220-12011	1.2	R0.1	5	1	1.15	12°	6	50	5.33	5.56	5.82	6.10	6.76
● 08-00221-12100			6				4	50	6.38	6.66	6.97	7.31	8.11
● 08-00221-12101			8				4	50	8.46	8.84	9.25	9.71	10.77
● 08-00221-12102			10				4	50	10.55	11.02	11.53	12.10	13.43
08-00220-12013			10				6	50	10.55	11.02	11.53	12.10	13.43
● 08-00221-12103			12				4	50	12.63	13.20	13.82	14.50	16.10
08-00220-12015			15				6	60	15.76	16.46	17.22	18.07	20.03
● 08-00221-12104			16				4	60	16.80	17.56	18.38	19.29	21.42
● 08-00221-12105			20				4	60	20.98	21.92	22.95	24.08	26.74
08-00220-12021			R0.2				5	6	50	5.32	5.55	5.80	6.08

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite Coating**  
Piane Square

**Non Rivestite Non-Coating**  
Scaricate Piane Long Neck Square

**Rivestite Coating**  
Sferiche Ball

**Non Rivestite Non-Coating**  
Scaricate Sferiche Long Neck Ball

**Rivestite Coating**  
Coniche Taper

**Non Rivestite Non-Coating**  
Coniche Sferiche Taper Ball

**Rivestite Coating**  
Toriche Corner R

**Non Rivestite Non-Coating**  
Scaricate Toriche Long Neck Corner R

**Rivestite Coating**  
Frese Sagomate Formed Cutter

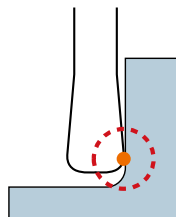
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MHR230R



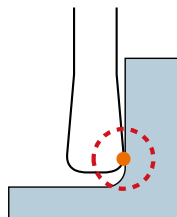
Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie. Point milling with reducing the machining load to realize fine surface.



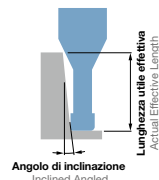
• NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.								
									30°	1°	1° 30'	2°	3°				
08-00221-12200	1.2	R0.2	6	1	1.15	12°	4	50	6.37	6.65	6.95	7.29	8.08				
08-00221-12201			4				50	8.46	8.83	9.24	9.69	10.74					
08-00221-12202			4				50	10.54	11.01	11.52	12.08	13.40					
08-00220-12022			6				50	10.54	11.01	11.52	12.08	13.40					
08-00221-12203			4				50	12.63	13.19	13.80	14.48	16.06					
08-00220-12023			6				60	15.75	16.45	17.21	18.05	20.00					
08-00221-12204			4				60	16.80	17.55	18.37	19.27	21.39					
08-00221-12205			4				60	20.97	21.91	22.93	24.06	26.71					
08-00220-12031			6				50	5.32	5.54	5.79	6.06	6.69					
08-00221-12300			4				50	6.37	6.64	6.94	7.27	8.04					
08-00221-12301		4	50				8.45	8.82	9.22	9.67	10.71						
08-00221-12302		4	50				10.54	11.00	11.51	12.06	13.37						
08-00220-12032		6	50				10.54	11.00	11.51	12.06	13.37						
08-00221-12303		4	50				12.62	13.18	13.79	14.46	16.03						
08-00220-12033		6	60				15.75	16.44	17.20	18.03	19.96						
08-00221-12304		4	60				16.80	17.54	18.35	19.25	21.35						
08-00221-12305		4	60				20.97	21.90	22.92	24.04	26.68						
08-00221-15100		1.5	R0.1				4	1.2	1.45	12°	4	50	4.29	4.48	4.69	4.91	5.45
08-00221-15101							4				50	6.38	6.66	6.97	7.31	8.11	
08-00220-15011							6				50	6.38	6.66	6.97	7.31	8.11	
08-00221-15102	4			50	8.46	8.84	9.25				9.71	10.77					
08-00221-15103	4			50	10.55	11.02	11.53				12.10	13.43					
08-00221-15104	4			50	12.63	13.20	13.82				14.50	16.10					
08-00220-15013	6			50	12.63	13.20	13.82				14.50	16.10					
08-00221-15105	4			60	16.80	17.56	18.38				19.29	21.42					
08-00221-15106	4			60	18.89	19.74	20.66				21.69	24.08					
08-00220-15015	6			60	18.89	19.74	20.66				21.69	24.08					
08-00221-15107	4		60	20.98	21.92	22.95	24.08				26.74						
08-00221-15200	4		50	4.29	4.47	4.67	4.89				5.42						
08-00221-15201	4		50	6.37	6.65	6.95	7.29				8.08						
08-00220-15021	6		50	6.37	6.65	6.95	7.29				8.08						
08-00221-15202	4		50	8.46	8.83	9.24	9.69				10.74						
08-00221-15203	4		50	10.54	11.01	11.52	12.08				13.40						
08-00221-15204	4		50	12.63	13.19	13.80	14.48				16.06						
08-00220-15023	6		50	12.63	13.19	13.80	14.48				16.06						
08-00221-15205	4		60	16.80	17.55	18.37	19.27				21.39						
08-00221-15206	4		60	18.89	19.73	20.65	21.67				24.05						



Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie.  
Point milling with reducing the machining load to realize fine surface.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
08-00220-15025	1.5	R0.2	18	1.2	1.45	12°	6	60	18.89	19.73	20.65	21.67	24.05
● 08-00221-15207			4				60	20.97	21.91	22.93	24.06	26.71	
● 08-00221-15300			4				50	4.28	4.46	4.66	4.87	5.38	
● 08-00221-15301			6				4	50	6.37	6.64	6.94	7.27	8.04
08-00220-15031			6				6	50	6.37	6.64	6.94	7.27	8.04
● 08-00221-15302			8				4	50	8.45	8.82	9.22	9.67	10.71
● 08-00221-15303			10				4	50	10.54	11.00	11.51	12.06	13.37
● 08-00221-15304			12				4	50	12.62	13.18	13.79	14.46	16.03
08-00220-15032			12				6	50	12.62	13.18	13.79	14.46	16.03
● 08-00221-15305			16				4	60	16.80	17.54	18.35	19.25	21.35
● 08-00221-15306		18	4				60	18.88	19.72	20.64	21.65	24.01	
08-00220-15033		18	6				60	18.88	19.72	20.64	21.65	24.01	
● 08-00221-15307		20	4				60	20.97	21.90	22.92	24.04	26.68	
● 08-00221-15500		4	4				50	4.27	4.44	4.63	4.83	5.32	
● 08-00221-15501		6	4				50	6.36	6.62	6.91	7.23	7.98	
08-00220-15051		6	6				50	6.36	6.62	6.91	7.23	7.98	
● 08-00221-15502		8	4				50	8.44	8.80	9.19	9.63	10.64	
● 08-00221-15503		10	4				50	10.53	10.98	11.48	12.02	13.30	
● 08-00221-15504		12	4				50	12.62	13.16	13.76	14.42	15.96	
08-00220-15052		12	6				50	12.62	13.16	13.76	14.42	15.96	
● 08-00221-15505	16	4	60	16.79	17.52	18.32	19.21	21.29					
● 08-00221-15506	18	4	60	18.87	19.70	20.61	21.61	23.95					
08-00220-15053	18	6	60	18.87	19.70	20.61	21.61	23.95					
● 08-00221-15507	20	4	60	20.96	21.88	22.89	24.00	26.61					
● 08-00221-20100	2	R0.1	4	1.6	1.94	12°	4	50	4.31	4.50	4.71	4.94	5.48
● 08-00221-20101			6				4	50	6.40	6.68	7.00	7.34	8.14
● 08-00221-20102			8				4	50	8.49	8.86	9.28	9.73	10.80
08-00220-20011			8				6	50	8.49	8.86	9.28	9.73	10.80
● 08-00221-20103			10				4	50	10.57	11.04	11.56	12.13	13.47
● 08-00221-20104			12				4	50	12.66	13.22	13.84	14.53	16.13
08-00220-20014			12				6	50	12.66	13.22	13.84	14.53	16.13
● 08-00221-20105			16				4	60	16.83	17.58	18.41	19.32	21.45
08-00220-20012			16				6	60	16.83	17.58	18.41	19.32	21.45
● 08-00221-20106			20				4	60	21.00	21.94	22.97	24.11	26.77
08-00220-20015			20				6	60	21.00	21.94	22.97	24.11	26.77
● 08-00221-20107			24				4	70	25.17	26.30	27.54	28.90	32.10
08-00220-20013			24				6	70	25.17	26.30	27.54	28.90	32.10

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scaricate  
Plane  
Long Neck  
Square

Sferiche  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

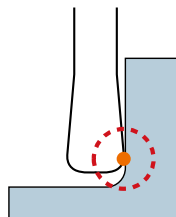
**Non Rivestite**  
Non-Coating  
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MHR230R



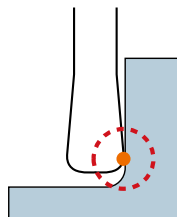
Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie.  
Point milling with reducing the machining load to realize fine surface.



● NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30°	1°	1° 30'	2°	3°
● 08-00221-20108	2	R0.1	26	1.6	1.94	12°	4	70	27.26	28.48	29.82	31.30	34.76
● 08-00221-20109			30						31.43	32.84	34.39	36.09	40.08
● 08-00221-20200			4						4.31	4.50	4.70	4.92	5.45
● 08-00221-20201			6						6.40	6.68	6.98	7.32	8.11
● 08-00221-20202			8						8.48	8.85	9.26	9.71	10.77
08-00220-20021			8						8.48	8.85	9.26	9.71	10.77
● 08-00221-20203		10	10.57						11.03	11.55	12.11	13.43	
● 08-00221-20204		12	12.65						13.21	13.83	14.51	16.09	
08-00220-20023		12	12.65						13.21	13.83	14.51	16.09	
● 08-00221-20205		16	16.83						17.57	18.39	19.30	21.42	
08-00220-20025		16	16.83						17.57	18.39	19.30	21.42	
● 08-00221-20206		20	21.00						21.93	22.96	24.09	26.74	
08-00220-20027		20	21.00						21.93	22.96	24.09	26.74	
● 08-00221-20207		24	25.17						26.29	27.52	28.88	32.06	
08-00220-20029		24	25.17						26.29	27.52	28.88	32.06	
● 08-00221-20208		26	27.25						28.47	29.81	31.28	34.73	
● 08-00221-20209		30	31.43						32.83	34.37	36.07	40.05	
● 08-00221-20300		4	4.31						4.49	4.68	4.90	5.41	
● 08-00221-20301		6	6.39						6.67	6.97	7.30	8.08	
● 08-00221-20302		8	8.48						8.85	9.25	9.70	10.74	
08-00220-20031		8	8.48						8.85	9.25	9.70	10.74	
● 08-00221-20303		10	10.56						11.03	11.53	12.09	13.40	
● 08-00221-20304		12	12.65						13.20	13.81	14.49	16.06	
08-00220-20034		12	12.65						13.20	13.81	14.49	16.06	
● 08-00221-20305		16	16.82						17.56	18.38	19.28	21.38	
08-00220-20032		16	16.82						17.56	18.38	19.28	21.38	
● 08-00221-20306		20	20.99						21.92	22.95	24.07	26.71	
08-00220-20035		20	20.99						21.92	22.95	24.07	26.71	
● 08-00221-20307		24	25.16						26.28	27.51	28.86	32.03	
08-00220-20033		24	25.16						26.28	27.51	28.86	32.03	
● 08-00221-20308	26	27.25	28.46	29.79	31.26	34.69							
● 08-00221-20309	30	31.42	32.82	34.36	36.05	40.02							
● 08-00221-20500	4	4.30	4.47	4.66	4.86	5.35							
● 08-00221-20501	6	6.38	6.65	6.94	7.26	8.01							
● 08-00221-20502	8	8.47	8.83	9.22	9.66	10.67							
08-00220-20051	8	8.47	8.83	9.22	9.66	10.67							
● 08-00221-20503	10	10.55	11.01	11.50	12.05	13.33							



Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie.  
Point milling with reducing the machining load to realize fine surface.



• NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30°	1°	1° 30'	2°	3°
• 08-00221-20504	2	R0.5	12	1.6	1.94	12°	4	50	12.64	13.19	13.79	14.45	15.99
08-00220-20054			12				6	50	12.64	13.19	13.79	14.45	15.99
• 08-00221-20505			16				4	60	16.81	17.55	18.35	19.24	21.32
08-00220-20052			16				6	60	16.81	17.55	18.35	19.24	21.32
• 08-00221-20506			20				4	60	20.98	21.91	22.92	24.03	26.64
08-00220-20055			20				6	60	20.98	21.91	22.92	24.03	26.64
• 08-00221-20507			24				4	70	25.16	26.26	27.48	28.82	31.97
08-00220-20053			24				6	70	25.16	26.26	27.48	28.82	31.97
• 08-00221-20508			26				4	70	27.24	28.44	29.76	31.22	34.63
• 08-00221-20509	30	4	70	31.41	32.80	34.33	36.01	39.95					
• 08-00221-25100	2.5	R0.1	10	2	2.4	12°	4	50	10.67	11.15	11.67	12.24	13.59
08-00220-25011			10				6	50	10.67	11.15	11.67	12.24	13.59
• 08-00221-25101			20				4	60	21.10	22.04	23.08	24.22	26.90
08-00220-25013			20				6	60	21.10	22.04	23.08	24.22	26.90
• 08-00221-25102			30				4	70	31.53	32.94	34.49	36.21	40.21
08-00220-25015			30				6	70	31.53	32.94	34.49	36.21	40.21
• 08-00221-25200		R0.2	10				4	50	10.67	11.14	11.65	12.22	13.56
08-00220-25021			10				6	50	10.67	11.14	11.65	12.22	13.56
• 08-00221-25201			20				4	60	21.10	22.04	23.07	24.20	26.87
08-00220-25023			20				6	60	21.10	22.04	23.07	24.20	26.87
• 08-00221-25202			30				4	70	31.52	32.93	34.48	36.19	40.18
08-00220-25025			30				6	70	31.52	32.93	34.48	36.19	40.18
• 08-00221-25300		R0.3	10				4	50	10.66	11.13	11.64	12.20	13.53
08-00220-25031			10				6	50	10.66	11.13	11.64	12.20	13.53
• 08-00221-25301			20				4	60	21.09	22.03	23.05	24.19	26.83
08-00220-25032			20				6	60	21.09	22.03	23.05	24.19	26.83
• 08-00221-25302			30				4	70	31.52	32.92	34.47	36.17	40.14
08-00220-25033			30				6	70	31.52	32.92	34.47	36.17	40.14
• 08-00221-25500	R0.5	10	4	50	10.65	11.11	11.61	12.16	13.46				
08-00220-25051		10	6	50	10.65	11.11	11.61	12.16	13.46				
• 08-00221-25501		20	4	60	21.08	22.01	23.02	24.15	26.77				
08-00220-25052		20	6	60	21.08	22.01	23.02	24.15	26.77				
• 08-00221-25502		30	4	70	31.51	32.91	34.44	36.13	40.08				
08-00220-25053		30	6	70	31.51	32.91	34.44	36.13	40.08				
08-00220-30011	3	R0.1	12	4.5	2.85	12°	6	50	12.87	13.44	14.07	14.76	16.36
08-00220-30013			18				6	60	19.13	19.98	20.91	21.94	24.32
08-00220-30015			24				6	70	25.39	26.52	27.76	29.12	Free

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Scaricate  
Plane  
Long Neck  
Square

Sferiche  
Ball  
Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

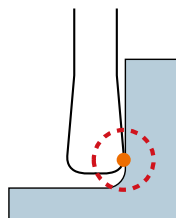
**Non Rivestite**  
Non-Coating  
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MHR230R



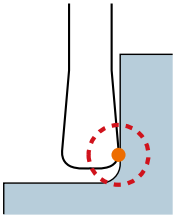
Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie. Point milling with reducing the machining load to realize fine surface.



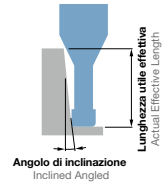
• NUOVO NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d2) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.							
									30°	1°	1° 30'	2°	3°			
08-00220-30017	3	R0.1	30	4.5	2.85	12°	6	70	31.64	33.05	34.60	36.30	Free			
08-00220-30019			36						37.90	39.59	41.44	43.48	Free			
08-00220-30021			R0.2						12	6	50	12.87	13.44	14.06	14.74	16.33
08-00220-30023									18	6	60	19.13	19.97	20.90	21.92	24.29
08-00220-30025		24					6	70	25.38	26.51	27.74	29.10	Free			
08-00220-30027		30					6	70	31.64	33.05	34.58	36.28	Free			
08-00220-30029		R0.3	36				6	80	37.90	39.58	41.43	43.46	Free			
08-00220-30031			12				6	50	12.86	13.43	14.04	14.72	16.29			
08-00220-30034			18				6	60	19.12	19.96	20.88	21.90	24.26			
08-00220-30032			24				6	70	25.38	26.50	27.73	29.08	Free			
08-00220-30035		R0.5	30				6	70	31.63	33.04	34.57	36.26	Free			
08-00220-30033			36				6	80	37.89	39.57	41.41	43.44	Free			
08-00220-30051			12				6	50	12.86	13.41	14.01	14.68	16.23			
08-00220-30054			18				6	60	19.11	19.95	20.86	21.86	24.19			
08-00220-30052		R1	24				6	70	25.37	26.48	27.70	29.04	Free			
08-00220-30055			30				6	70	31.63	33.02	34.54	36.22	Free			
08-00220-30053			36				6	80	37.88	39.56	41.39	43.40	Free			
08-00220-30101			12				6	50	12.83	13.36	13.94	14.58	16.07			
08-00220-30104		R0.1	18				6	60	19.09	19.90	20.79	21.76	24.04			
08-00220-30102			24				6	70	25.35	26.44	27.63	28.94	Free			
08-00220-30105	30		6	70	31.60	32.97	34.47	36.12	Free							
08-00220-30103	36		6	80	37.86	39.51	41.32	43.30	Free							
08-00220-40011	4	R0.1	16	6	3.8	12°	6	60	17.17	17.93	18.77	19.68	Free			
08-00220-40013			24						6	70	25.51	26.65	27.89	29.26	Free	
08-00220-40015			32						6	70	33.85	35.36	37.01	Free	Free	
08-00220-40017			48						6	100	50.54	52.79	Free	Free	Free	
08-00220-40021		R0.2	16				6	60	17.16	17.92	18.75	19.66	Free			
08-00220-40023			24				6	70	25.50	26.64	27.88	29.24	Free			
08-00220-40025			32				6	70	33.85	35.35	37.00	Free	Free			
08-00220-40027			48				6	100	50.53	52.78	Free	Free	Free			
08-00220-40031		R0.3	16				6	60	17.16	17.91	18.74	19.65	Free			
08-00220-40034			24				6	70	25.50	26.63	27.86	29.22	Free			
08-00220-40032			32				6	70	33.84	35.34	36.99	Free	Free			
08-00220-40033			48				6	100	50.53	52.78	Free	Free	Free			
08-00220-40051	R0.5	16	6	60	17.15	17.89	18.71	19.61	Free							
08-00220-40054		24	6	70	25.49	26.61	27.83	29.18	Free							
08-00220-40052		32	6	70	33.83	35.33	36.96	Free	Free							



Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie.  
Point milling with reducing the machining load to realize fine surface.



● **NUOVO** NEW

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.								
									30°	1°	1° 30'	2°	3°				
08-00220-40053	4	R0.5	48	6	3.8	12°	6	100	50.52	52.76	Free	Free	Free				
08-00220-40101		R1	16						17.13	17.85	18.64	19.51	Free				
08-00220-40104			24						25.47	26.57	27.77	29.08	Free				
08-00220-40102			32						33.81	35.28	36.89	Free	Free				
08-00220-40103			48						6	100	50.50	52.71	Free	Free	Free		
08-00220-50011	5	R0.1	20	7.5	4.8	12°	6	70	21.34	22.29	Free	Free	Free				
08-00220-50013			40						42.19	Free	Free	Free	Free				
08-00220-50021			20						21.33	22.28	Free	Free	Free				
08-00220-50023		R0.2	40				6	90	42.19	Free	Free	Free	Free				
08-00220-50031			20				21.33	22.27	Free	Free	Free						
08-00220-50032		R0.3	40				6	90	42.19	Free	Free	Free	Free				
08-00220-50051			20				21.32	22.25	Free	Free	Free						
08-00220-50052			40				6	90	42.18	Free	Free	Free	Free				
08-00220-50101		R1	20				6	70	21.30	22.21	Free	Free	Free				
08-00220-50102			40				6	90	42.16	Free	Free	Free	Free				
08-00220-60011		6	R0.1				24	9	5.8	-	6	90	Free	Free	Free	Free	Free
08-00220-60013							48						6	110	Free	Free	Free
08-00220-60021			R0.2				24				6	90	Free	Free	Free	Free	
08-00220-60023	48			6	110	Free	Free				Free	Free					
08-00220-60031	R0.3		24	6	90	Free	Free				Free	Free					
08-00220-60032			48	6	110	Free	Free				Free	Free					
08-00220-60051			24	6	90	Free	Free				Free	Free					
08-00220-60052	R0.5		48	6	110	Free	Free				Free	Free					
08-00220-60101			R1	24	6	90	Free				Free	Free	Free				
08-00220-60102	48			6	110	Free	Free				Free	Free					

**Attenzione**

Quando ordinate, indicate MHR230R (D)×(R)×(ℓ<sub>1</sub>)×(d).  
When you order, indicate MHR230R (D)×(R)×(ℓ<sub>1</sub>)×(d).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 427.
- Milling condition is recommended on page 427.

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

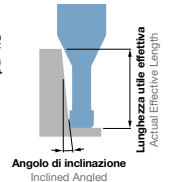
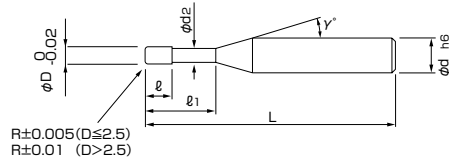
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MHR430R

MUGEN-COATING 4-Flute Long Neck Radius End Mill

## Frese 4 Tagli toriche rivestite MUGEN



- Possibilità di scegliere tra 146 misure, per eseguire una vasta gamma di applicazioni.
- Vibrazioni ridotte grazie alla riduzione del carico dovuta alla forma del tagliente.
- Precisione del raggio  $\pm 5\mu\text{m}$  (D2.5 ed inferiore).
- Grazie al rivestimento MUGEN si ottengono grandi performance in fresature di acciai pretemprati e rame per elettrodi.
- Enhanced selectivity for machining process in all 146 sizes.
- Employing short flute length. Less contact to work material reduces chattering.
- Corner R accuracy :  $\pm 5\mu\text{m}$  (2.5D and below)
- Upgraded MUGEN-COATING brings outstanding performance for milling of Prehardened Steels and Copper Electrode as well.



Unità di misura: mm Unit size: mm

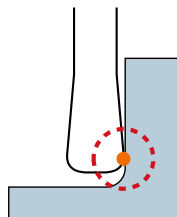
Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	( $\ell_1$ ) Lungh. effettiva Effective Length	( $\ell$ ) Lungh. tagliente Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.					
									30°	1°	1° 30'	2°	3°	
08-00230-10021	1	R0.05	3	0.8	0.95	12°	4	50	3.25	3.39	3.55	3.73	4.13	
08-00230-10022			4					50	4.29	4.48	4.69	4.92	5.46	
08-00230-10023			5					50	5.34	5.57	5.83	6.12	6.80	
08-00230-10024			6					50	6.38	6.66	6.98	7.32	8.13	
08-00230-10025			8					50	8.46	8.84	9.26	9.72	10.79	
08-00230-10026			10					50	10.55	11.02	11.54	12.11	13.45	
08-00230-10027			12					50	12.64	13.20	13.82	14.51	16.11	
08-00230-10031			3					R0.1	50	3.25	3.39	3.54	3.72	4.12
08-00230-10032			4						50	4.29	4.48	4.69	4.91	5.45
08-00230-10033			5						50	5.33	5.57	5.83	6.11	6.78
08-00230-10034			6						50	6.38	6.66	6.97	7.31	8.11
08-00230-10035			8						50	8.46	8.84	9.25	9.71	10.77
08-00230-10036		10	50	10.55	11.02	11.53	12.10		13.43					
08-00230-10037		12	50	12.63	13.20	13.82	14.50		16.10					
08-00230-10041		3	R0.2	50	3.24	3.38	3.53		3.70	4.08				
08-00230-10042		4		50	4.29	4.47	4.67		4.89	5.42				
08-00230-10043		5		50	5.33	5.56	5.81		6.09	6.75				
08-00230-10044		6		50	6.37	6.65	6.95		7.29	8.08				
08-00230-10045		8		50	8.46	8.83	9.24		9.69	10.74				
08-00230-10046		10		50	10.54	11.01	11.52	12.08	13.40					
08-00230-10047		12		50	12.63	13.19	13.80	14.48	16.06					
08-00230-10051		3		R0.3	50	3.24	3.37	3.52	3.68	4.05				
08-00230-10052		4			50	4.28	4.46	4.66	4.87	5.38				
08-00230-10053		5			50	5.32	5.55	5.80	6.07	6.71				
08-00230-10054		6			50	6.37	6.64	6.94	7.27	8.04				
08-00230-10055		8			50	8.45	8.82	9.22	9.67	10.71				
08-00230-10056		10	50		10.54	11.00	11.51	12.06	13.37					
08-00230-10057	12	50	12.62		13.18	13.79	14.46	16.03						
08-00230-12031	1.2	R0.1	5		1	1.15	12°	4	50	5.33	5.57	5.83	6.11	6.78
08-00230-12032			10						50	10.55	11.02	11.53	12.10	13.43
08-00230-12033			15						60	15.76	16.47	17.24	18.09	20.09

**Attenzione** Quando ordinate, indicate MHR430R (D)×(R)×(ℓ<sub>1</sub>).  
When you order, indicate MHR430R (D)×(R)×(ℓ<sub>1</sub>).

\*( $\gamma$ ) è un valore di riferimento.  
\*( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 429.
- Milling condition is recommended on page 429.





Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie.  
Point milling with reducing the machining load to realize fine surface.



Unità di misura: mm Unit size: mm

Codice Code No..	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.									
									30°	1°	1° 30'	2°	3°					
08-00230-12041	1.2	R0.2	5	1	1.15	12°	4	50	5.33	5.56	5.81	6.09	6.75					
08-00230-12042			10					50	10.54	11.01	11.52	12.08	13.40					
08-00230-12043			15					60	15.76	16.46	17.23	18.07	20.06					
08-00230-12051		R0.3	5					50	5.32	5.55	5.80	6.07	6.71					
08-00230-12052			10					50	10.54	11.00	11.51	12.06	13.37					
08-00230-12053			15					60	15.75	16.45	17.21	18.05	20.02					
08-00230-15031	1.5	R0.1	6	1.2	1.45	12°	4	50	6.38	6.66	6.97	7.31	8.11					
08-00230-15032			12					50	12.63	13.20	13.82	14.50	16.10					
08-00230-15033			18					60	18.89	19.74	20.66	21.69	24.08					
08-00230-15041		R0.2	6					50	6.37	6.65	6.95	7.29	8.08					
08-00230-15042			12					50	12.63	13.19	13.80	14.48	16.06					
08-00230-15043			18					60	18.89	19.73	20.65	21.67	24.05					
08-00230-15051		R0.3	6					50	6.37	6.64	6.94	7.27	8.04					
08-00230-15052			12					50	12.62	13.18	13.79	14.46	16.03					
08-00230-15053			18					60	18.88	19.72	20.64	21.65	24.01					
08-00230-15061		R0.5	6					50	6.36	6.62	6.91	7.23	7.98					
08-00230-15062			12					50	12.62	13.16	13.76	14.42	15.96					
08-00230-15063			18					60	18.87	19.70	20.61	21.61	23.95					
08-00230-20031		2	R0.1					8	1.6	1.94	12°	4	50	8.49	8.86	9.28	9.73	10.80
08-00230-20032								12					50	12.66	13.22	13.84	14.53	16.13
08-00230-20033								16					60	16.83	17.58	18.41	19.32	Free
08-00230-20034								20					60	21.00	21.94	22.97	24.11	Free
08-00230-20035								24					70	25.17	26.30	27.54	28.90	Free
08-00230-20041								R0.2					8	50	8.48	8.85	9.26	9.71
08-00230-20042	12		50	12.65	13.21	13.83	14.51						16.09					
08-00230-20043	16		60	16.83	17.57	18.39	19.30						Free					
08-00230-20044	20		60	21.00	21.93	22.96	24.09						Free					
08-00230-20045	24		70	25.17	26.29	27.52	28.88						Free					
08-00230-20051	R0.3		8	50	8.48	8.85	9.25						9.70	10.74				
08-00230-20052			12	50	12.65	13.20	13.81	14.49					16.06					
08-00230-20053			16	60	16.82	17.56	18.38	19.28					Free					
08-00230-20054			20	60	20.99	21.92	22.95	24.07					Free					
08-00230-20055			24	70	25.16	26.28	27.51	28.86					Free					

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

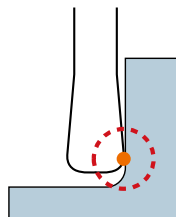
**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating  
Punte  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie. Point milling with reducing the machining load to realize fine surface.



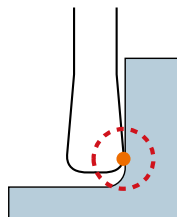
Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ1) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliente Length of Cut	(dz) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30'	1°	1° 30'	2°	3°
08-00230-20061	2	R0.5	8	1.6	1.94	12°	4	50	8.47	8.83	9.22	9.66	10.67
08-00230-20062			12					50	12.64	13.19	13.79	14.45	15.98
08-00230-20063			16					60	16.81	17.55	18.35	19.24	Free
08-00230-20064			20					60	20.98	21.91	22.92	24.03	Free
08-00230-20065			24					70	25.16	26.26	27.48	28.82	Free
08-00230-25031	2.5	R0.1	10	2	2.4	12°	4	50	10.67	11.15	11.67	12.24	13.59
08-00230-25032			20					60	21.10	22.04	23.08	Free	Free
08-00230-25033			30					70	31.53	32.94	Free	Free	Free
08-00230-25041		R0.2	10					50	10.67	11.14	11.65	12.22	13.56
08-00230-25042			20					60	21.10	22.04	23.07	Free	Free
08-00230-25043			30					70	31.52	32.93	Free	Free	Free
08-00230-25051		R0.3	10					50	10.66	11.13	11.64	12.20	13.53
08-00230-25052			20					60	21.09	22.03	23.05	Free	Free
08-00230-25053			30					70	31.52	32.92	Free	Free	Free
08-00230-25061		R0.5	10					50	10.65	11.11	11.61	12.16	13.46
08-00230-25062	20		60	21.08	22.01	23.02	Free	Free					
08-00230-25063	30		70	31.51	32.91	Free	Free	Free					
08-00230-30031	3	R0.1	12	2.5	2.85	12°	6	50	12.88	13.45	14.09	14.78	16.41
08-00230-30032			18					60	19.14	19.99	20.93	21.97	24.40
08-00230-30033			24					70	25.39	26.53	27.78	29.16	Free
08-00230-30034			30					70	31.65	33.07	34.63	36.35	Free
08-00230-30035			36					80	37.91	39.61	41.48	43.54	Free
08-00230-30041		R0.2	12					50	12.87	13.45	14.07	14.76	16.38
08-00230-30042			18					60	19.13	19.98	20.92	21.95	24.36
08-00230-30043			24					70	25.39	26.52	27.77	29.14	Free
08-00230-30044			30					70	31.65	33.06	34.62	36.33	Free
08-00230-30045			36					80	37.90	39.60	41.46	43.52	Free
08-00230-30051		R0.3	12					50	12.87	13.44	14.06	14.74	16.34
08-00230-30052			20					60	21.21	22.15	23.19	24.33	26.99
08-00230-30053			24					70	25.39	26.51	27.75	29.12	Free
08-00230-30054			30					70	31.64	33.05	34.60	36.31	Free
08-00230-30055			36					80	37.90	39.59	41.45	43.50	Free

**Attenzione** Quando ordinate, indicate MHR430R (D)×(R)×(ℓ1).  
When you order, indicate MHR430R (D)×(R)×(ℓ1).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 429.
- Milling condition is recommended on page 429.



Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie.  
Point milling with reducing the machining load to realize fine surface.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30'	1°	1° 30'	2°	3°
08-00230-30061	3	R0.5	12	2.5	2.85	12°	6	50	12.86	13.42	14.03	14.70	16.28
08-00230-30062			20					60	21.21	22.14	23.16	24.29	26.93
08-00230-30063			24					70	25.38	26.50	27.72	29.08	Free
08-00230-30064			30					70	31.63	33.03	34.57	36.27	Free
08-00230-30065			36					80	37.89	39.57	41.42	43.46	Free
08-00230-30071		R1	12					50	12.84	13.37	13.96	14.60	16.11
08-00230-30072			20					60	21.18	22.09	23.09	24.19	26.76
08-00230-30073			24					70	25.36	26.45	27.65	28.98	Free
08-00230-30074			30					70	31.61	32.99	34.50	36.17	Free
08-00230-30075			36					80	37.87	39.53	41.35	43.36	Free
08-00230-40031	4	R0.1	16	3.2	3.8	12°	6	60	17.17	17.94	18.79	19.72	Free
08-00230-40032			24					70	25.52	26.66	27.92	29.30	Free
08-00230-40033			32					70	33.86	35.38	37.05	Free	Free
08-00230-40034			48					100	50.55	52.82	Free	Free	Free
08-00230-40041			R0.2					16	60	17.17	17.93	18.77	19.70
08-00230-40042		24						70	25.51	26.65	27.90	29.28	Free
08-00230-40043		32						70	33.86	35.37	37.03	Free	Free
08-00230-40044		48						100	50.54	52.81	Free	Free	Free
08-00230-40051		R0.3						16	60	17.16	17.92	18.76	19.68
08-00230-40052			24					70	25.51	26.64	27.89	29.26	Free
08-00230-40053			32					70	33.85	35.36	37.02	Free	Free
08-00230-40054			48					100	50.54	52.80	Free	Free	Free
08-00230-40061			R0.5					16	60	17.16	17.91	18.73	19.64
08-00230-40062		24						70	25.50	26.62	27.86	29.22	Free
08-00230-40063		32						70	33.84	35.34	36.99	Free	Free
08-00230-40064		48						100	50.53	52.78	Free	Free	Free
08-00230-40071		R1						16	60	17.13	17.86	18.66	19.54
08-00230-40072			24					70	25.48	26.58	27.79	29.12	Free
08-00230-40073			32					70	33.82	35.30	36.92	Free	Free
08-00230-40074			48					100	50.51	52.73	Free	Free	Free
08-00230-50031	5		R0.1	20	4	4.8	12°	6	70	21.35	22.30	Free	Free
08-00230-50032		40		90					42.20	Free	Free	Free	Free
08-00230-50041		R0.2	20	70					21.34	22.29	Free	Free	Free
08-00230-50042			40	90					42.20	Free	Free	Free	Free
08-00230-50051		R0.3	20	70					21.34	22.28	Free	Free	Free
08-00230-50052			40	90					42.19	Free	Free	Free	Free

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

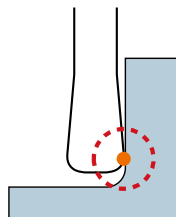
**Punte**

**Drill**

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



Vibrazioni ridotte grazie alla riduzione del carico per una migliore superficie. Point milling with reducing the machining load to realize fine surface.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(ℓ) Lungh. tagliante Length of Cut	(d <sub>2</sub> ) Dia. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length	La lungh. effettiva dipende dall'angolo d'inclinazione del pezzo Actual effective length depending on inclined angle of workpiece.				
									30'	1°	1° 30'	2°	3°
08-00230-50061	5	R0.5	20	4	4.8	12°	6	70	21.33	22.27	Free	Free	Free
08-00230-50062			40					90	42.19	Free	Free	Free	Free
08-00230-50071		R1	20					70	21.31	22.22	Free	Free	Free
08-00230-50072			40					90	42.16	Free	Free	Free	Free
08-00230-60031	6	R0.1	24	5	5.8	-	6	90	Free	Free	Free	Free	Free
08-00230-60032			48					110	Free	Free	Free	Free	Free
08-00230-60041		R0.2	24					90	Free	Free	Free	Free	Free
08-00230-60042			48					110	Free	Free	Free	Free	Free
08-00230-60051		R0.3	24					90	Free	Free	Free	Free	Free
08-00230-60052			48					110	Free	Free	Free	Free	Free
08-00230-60061		R0.5	24					90	Free	Free	Free	Free	Free
08-00230-60062			48					110	Free	Free	Free	Free	Free
08-00230-60071		R1	24					90	Free	Free	Free	Free	Free
08-00230-60072			48					110	Free	Free	Free	Free	Free

**Attenzione** Quando ordinate, indicate MHR430R (D)×(R)×(ℓ<sub>1</sub>).  
When you order, indicate MHR430R (D)×(R)×(ℓ<sub>1</sub>).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 429.
- Milling condition is recommended on page 429.

# Parametri di taglio raccomandati

## Recommended Milling Conditions

# MHR230R

Materiale Work Material			Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Prehardened Steels C50•1.2311•1.2738 (~43HRC)				Acciaio temprato Hardened Steels 1.2343•STAVAX (~55HRC)				Rame•Alluminio Copper•Aluminum			
Dia. Dia.	Angolo Raggio Corner Radius	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
			min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm
0.2	0.05	0.5	30,000	200	0.01	0.05	30,000	150	0.003	0.04	30,000	250	0.012	0.05
		1	30,000	150	0.007	0.05	30,000	100	0.003	0.04	30,000	200	0.008	0.05
		1.5	30,000	100	0.005	0.05	30,000	80	0.002	0.04	30,000	135	0.006	0.05
		2	30,000	50	0.003	0.05	30,000	50	0.002	0.04	30,000	75	0.004	0.05
0.3	0.05	1	30,000	200	0.02	0.1	30,000	180	0.003	0.08	30,000	300	0.024	0.1
		1.5	30,000	180	0.015	0.1	30,000	130	0.003	0.08	30,000	260	0.018	0.1
		2	30,000	150	0.01	0.1	30,000	100	0.003	0.08	30,000	250	0.012	0.1
		2.5	30,000	120	0.007	0.1	25,000	80	0.002	0.08	30,000	240	0.008	0.1
0.4	0.05 0.1	3	30,000	100	0.005	0.1	25,000	50	0.002	0.08	30,000	220	0.006	0.1
		1	30,000	350	0.025	0.12	30,000	300	0.005	0.1	30,000	450	0.03	0.12
		1.5	30,000	300	0.022	0.12	30,000	270	0.005	0.1	30,000	400	0.027	0.12
		2	30,000	250	0.02	0.12	25,000	180	0.005	0.1	30,000	360	0.024	0.12
0.5	0.05 0.1	3	30,000	220	0.015	0.12	25,000	150	0.004	0.1	30,000	300	0.018	0.12
		4	25,000	160	0.01	0.12	20,000	100	0.003	0.1	30,000	240	0.012	0.12
		1	30,000	500	0.03	0.14	25,000	400	0.01	0.12	30,000	650	0.036	0.14
		2	30,000	400	0.025	0.14	25,000	300	0.01	0.12	30,000	600	0.03	0.14
		3	30,000	340	0.02	0.14	25,000	250	0.008	0.12	30,000	480	0.024	0.14
		4	25,000	280	0.015	0.14	20,000	180	0.005	0.12	30,000	430	0.018	0.14
0.6	0.05 0.1 0.2	5	25,000	230	0.01	0.14	20,000	150	0.004	0.12	30,000	360	0.012	0.14
		6	20,000	180	0.008	0.14	16,000	100	0.003	0.12	25,000	270	0.01	0.14
		2	30,000	600	0.035	0.16	25,000	400	0.02	0.13	30,000	800	0.04	0.16
		3	30,000	500	0.03	0.16	25,000	350	0.015	0.13	30,000	750	0.035	0.16
		4	25,000	400	0.025	0.16	20,000	250	0.015	0.13	30,000	650	0.03	0.16
		6	20,000	250	0.015	0.16	16,000	150	0.008	0.13	25,000	400	0.018	0.16
0.7	0.05 0.1	8	18,000	180	0.01	0.16	14,000	100	0.005	0.13	20,000	300	0.012	0.16
		4	25,000	600	0.03	0.2	20,000	400	0.02	0.16	30,000	1,000	0.04	0.2
		6	20,000	450	0.02	0.2	16,000	250	0.01	0.16	25,000	700	0.025	0.2
		4	25,000	1,000	0.045	0.25	20,000	600	0.025	0.2	30,000	1,400	0.055	0.25
0.8	0.05 0.1 0.2	6	20,000	700	0.03	0.25	16,000	400	0.02	0.2	25,000	1,000	0.04	0.25
		8	18,000	400	0.02	0.25	14,000	250	0.01	0.2	22,000	600	0.025	0.25
		4	25,000	1,100	0.05	0.3	20,000	700	0.03	0.24	30,000	1,500	0.06	0.3
0.9	0.1	8	18,000	500	0.03	0.3	14,000	350	0.01	0.24	22,000	800	0.04	0.3
		2	25,000	1,600	0.065	0.35	20,000	900	0.05	0.28	30,000	2,200	0.08	0.35
1	0.05 0.1 0.2 0.3	3	25,000	1,500	0.06	0.35	20,000	850	0.05	0.28	30,000	2,100	0.07	0.35
		4	25,000	1,400	0.055	0.35	20,000	800	0.04	0.28	30,000	2,000	0.065	0.35
		5	22,000	1,200	0.05	0.35	18,000	700	0.03	0.28	27,000	1,700	0.06	0.35
		6	20,000	1,000	0.045	0.35	16,000	600	0.02	0.28	25,000	1,500	0.055	0.35
		8	18,000	700	0.035	0.35	14,000	450	0.02	0.28	22,000	1,000	0.045	0.35
		10	16,000	600	0.025	0.35	13,000	350	0.01	0.28	20,000	800	0.03	0.35
		12	14,000	350	0.02	0.35	12,000	250	0.008	0.28	18,000	600	0.025	0.35
		16	12,000	250	0.01	0.35	10,000	150	0.005	0.28	14,000	350	0.012	0.35
		20	11,000	150	0.005	0.35	9,000	100	0.003	0.28	13,000	250	0.006	0.35
		1.2	0.1 0.2 0.3	5	22,000	1,500	0.055	0.4	18,000	850	0.03	0.32	26,000	2,200
6	20,000			1,300	0.05	0.4	17,000	750	0.03	0.32	25,000	2,000	0.06	0.4
8	18,000			1,100	0.04	0.4	15,000	600	0.025	0.32	22,000	1,600	0.05	0.4
10	16,000			900	0.03	0.4	13,000	500	0.02	0.32	20,000	1,400	0.04	0.4
12	14,000			700	0.025	0.4	11,000	400	0.015	0.32	17,000	1,000	0.03	0.4
15	12,000			360	0.018	0.4	10,000	210	0.01	0.32	14,000	520	0.022	0.4
16	12,000			350	0.015	0.4	10,000	200	0.008	0.32	14,000	500	0.02	0.4
20	10,000			230	0.01	0.4	8,000	150	0.005	0.32	12,000	330	0.012	0.4

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate**  
Piane

Long Neck  
Square

**Sferiche**  
Ball

**Scaricate**  
Sferiche

Long Neck  
Ball

**Coniche**  
Taper

**Coniche**  
Sferiche

Taper  
Ball

**Toriche**  
Corner R

**Scaricate**  
Toriche

Long Neck  
Corner R

**Frese**  
Sagomate

Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Materiale Work Material			Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Prehardened Steels C50•1.2311•1.2738 (~43HRC)				Acciaio temprato Hardened Steels 1.2343•STAVAX (~55HRC)				Rame•Alluminio Copper•Aluminum			
Dia. Dia.	Angolo Raggio Corner Radius	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
			min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm
1.5	0.1 0.2 0.3 0.5	4	22,000	1,600	0.09	0.45	18,000	1,000	0.05	0.36	26,000	2,300	0.1	0.45
		6	20,000	1,400	0.08	0.45	16,000	850	0.045	0.36	24,000	2,000	0.09	0.45
		8	18,000	1,200	0.07	0.45	15,000	700	0.04	0.36	22,000	1,800	0.08	0.45
		10	16,000	1,000	0.06	0.45	13,000	550	0.035	0.36	20,000	1,500	0.07	0.45
		12	14,000	800	0.05	0.45	11,000	450	0.03	0.36	17,000	1,200	0.06	0.45
		16	12,000	600	0.035	0.45	10,000	350	0.018	0.36	15,000	900	0.04	0.45
2	0.1 0.2 0.3 0.5	18	11,000	450	0.03	0.45	9,000	280	0.01	0.36	13,000	650	0.035	0.45
		20	10,000	300	0.02	0.45	8,000	200	0.005	0.36	12,000	450	0.025	0.45
		4	16,000	2,200	0.13	0.5	14,000	1,000	0.06	0.4	20,000	3,000	0.15	0.5
		6	16,000	2,100	0.12	0.5	14,000	900	0.055	0.4	20,000	2,800	0.14	0.5
		8	16,000	2,000	0.11	0.5	13,000	800	0.05	0.4	20,000	2,600	0.13	0.5
		10	16,000	1,800	0.1	0.5	13,000	750	0.045	0.4	20,000	2,300	0.12	0.5
		12	14,000	1,500	0.09	0.5	11,000	600	0.04	0.4	17,000	1,900	0.11	0.5
		16	12,000	1,200	0.07	0.5	10,000	500	0.03	0.4	15,000	1,600	0.085	0.5
2.5	0.1 0.2 0.3 0.5	20	10,000	800	0.05	0.5	8,000	350	0.02	0.4	12,000	1,000	0.06	0.5
		24	9,000	700	0.03	0.5	7,000	280	0.01	0.4	11,000	900	0.04	0.5
		26	9,000	600	0.025	0.5	7,000	250	0.008	0.4	11,000	850	0.03	0.5
		30	8,000	400	0.02	0.5	6,400	200	0.005	0.4	9,000	550	0.025	0.5
3	0.1 0.2 0.3 0.5 1	10	13,000	1,800	0.14	0.8	11,000	900	0.07	0.65	16,000	3,000	0.17	0.8
		20	9,000	1,000	0.08	0.8	7,000	450	0.05	0.65	11,000	1,600	0.1	0.8
		30	7,000	500	0.03	0.8	5,600	250	0.01	0.65	8,500	850	0.035	0.8
4	0.1 0.2 0.3 0.5 1	12	11,000	1,800	0.16	0.9	9,000	900	0.08	0.75	13,000	3,000	0.2	0.9
		18	10,000	1,400	0.12	0.9	8,000	700	0.07	0.75	12,000	2,400	0.14	0.9
		24	8,000	1,000	0.08	0.9	6,400	500	0.05	0.75	10,000	1,800	0.1	0.9
		30	7,000	800	0.06	0.9	5,600	400	0.03	0.75	8,500	1,300	0.07	0.9
		36	6,000	500	0.03	0.9	4,800	300	0.01	0.75	7,200	1,000	0.04	0.9
5	0.1 0.2 0.3 0.5 1	16	8,000	2,000	0.2	1.2	6,400	850	0.1	1	10,000	3,200	0.3	1.2
		24	7,000	1,500	0.12	1.2	5,600	700	0.08	1	8,500	2,400	0.18	1.2
		32	6,000	800	0.08	1.2	4,800	500	0.04	1	8,000	1,800	0.14	1.2
		48	4,000	400	0.04	1.2	3,200	300	0.01	1	4,800	700	0.05	1.2
6	0.1 0.2 0.3 0.5 1	20	6,000	1,800	0.25	1.6	4,800	800	0.1	1.3	7,200	3,000	0.36	1.6
		40	4,000	700	0.07	1.6	3,200	400	0.05	1.3	4,800	1,300	0.16	1.6
6	0.1 0.2 0.3 0.5 1	24	4,500	1,500	0.3	2.1	3,600	700	0.15	1.7	5,400	2,600	0.48	2.1
		48	3,000	600	0.1	2.1	2,400	350	0.05	1.7	3,600	1,000	0.18	2.1

Note  
Notes

- ※ I parametri di taglio sopra indicati vanno regolati in base alla forma da fresare e al tipo di macchina.
- ※ a<sub>p</sub> = profondità di taglio assiale, a<sub>e</sub> = profondità di taglio radiale.
- ※ Raccomandiamo l'uso di lubrificazione minimale specifica per materiali temprati.
- ※ Raccomandiamo l'approccio a rampa o elicoidale per entrare nel pezzo in maniera assiale.
- ※ Regolare l'avanzamento più basso del 50% e la profondità radiale (a<sub>e</sub>) del 30% quando la profondità di fresatura è maggiore di 8xD per stabilizzare la fresa.
- ※ Per cave consigliamo la fresatura bidirezionale e la riduzione avanzamento e profondità assiale (a<sub>p</sub>) del 50%.
- ※ Ridurre con la stessa proporzione giri ed avanzamento, per eliminare vibrazioni o in caso di limitato numero di giri della macchina.
- ※ Adjust milling conditions according to milling shape and machine type.
- ※ a<sub>p</sub> : Axial depth of cutting, a<sub>e</sub> : Radial depth of cutting.
- ※ Recommend to use oil mist coolant for machining hardened steels.
- ※ Recommend to apply helical or ramping for approaching into axial direction.
- ※ Adjust feed rate 50% lower and cutting depth (a<sub>e</sub>) 30% lower for milling deep wall area when L/D exceeds 8 for stable milling.
- ※ For slotting, recommend reciprocating milling by adjusting feed & a<sub>p</sub> in below 50% of recommended milling condition.
- ※ Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.

# Parametri di taglio raccomandati

## Recommended Milling Conditions

# MHR430R

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

Materiale Work Material			Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Prehardened Steels C50•1.2311•1.2738 (~43HRC)				Acciaio temprato Hardened Steels 1.2343•STAVAX (~55HRC)				Acciaio temprato Hardened Steels 1.2379 (~62HRC)				Rame•Alluminio Copper•Aluminum			
Dia. Dia.	Angolo Raggio Corner Radius	Lunghezza effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
			min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm
1	0.05 0.1 0.2 0.3	3	16,000	1,800	0.06	0.35	12,800	1,260	0.045	0.3	10,800	1,000	0.03	0.25	16,000	1,800	0.2	0.23
		4	16,000	1,500	0.05	0.35	12,800	1,050	0.04	0.3	10,800	840	0.03	0.25	16,000	1,500	0.15	0.23
		5	16,000	1,410	0.045	0.35	12,800	990	0.035	0.25	10,800	800	0.02	0.2	16,000	1,410	0.13	0.23
		6	14,500	1,200	0.04	0.25	11,600	840	0.03	0.25	8,900	680	0.015	0.2	14,500	1,200	0.12	0.2
		8	14,500	870	0.03	0.25	11,600	620	0.02	0.2	8,900	500	0.012	0.16	14,500	870	0.09	0.2
		10	11,100	660	0.025	0.25	8,900	470	0.015	0.1	7,100	370	0.01	0.1	11,100	660	0.075	0.15
1.2	0.1 0.2 0.3	5	15,500	1,740	0.06	0.4	12,400	1,220	0.045	0.35	10,000	970	0.025	0.25	15,500	1,740	0.18	0.28
		10	12,000	1,290	0.04	0.35	9,600	900	0.03	0.25	8,000	720	0.01	0.15	12,000	1,290	0.12	0.28
		15	10,600	480	0.02	0.25	8,500	330	0.01	0.1	6,600	270	0.005	0.08	10,600	480	0.07	0.23
1.5	0.1 0.2 0.3 0.5	6	14,000	1,910	0.08	0.53	11,200	1,340	0.05	0.4	8,500	1,070	0.03	0.3	14,000	1,910	0.24	0.35
		12	11,500	1,250	0.06	0.42	9,000	870	0.04	0.3	6,400	700	0.01	0.2	11,500	1,250	0.18	0.3
		18	8,500	560	0.02	0.3	6,800	390	0.01	0.15	5,400	320	0.005	0.1	8,500	560	0.08	0.25
2	0.1 0.2 0.3 0.5	8	11,100	2,150	0.08	0.6	8,800	1,500	0.05	0.5	7,000	1,200	0.03	0.4	11,100	2,150	0.24	0.45
		12	11,100	1,800	0.065	0.6	8,800	1,260	0.045	0.5	5,600	1,000	0.027	0.4	11,100	1,800	0.2	0.43
		16	9,600	1,500	0.05	0.5	7,700	1,050	0.04	0.35	4,800	840	0.01	0.2	9,600	1,500	0.15	0.39
		20	9,600	900	0.03	0.45	7,700	630	0.015	0.25	4,500	500	0.01	0.1	9,600	900	0.12	0.35
2.5	0.1 0.2 0.3 0.5	10	9,200	2,280	0.1	0.85	7,400	1,590	0.07	0.7	6,000	1,280	0.04	0.5	9,200	2,280	0.3	0.5
		20	8,300	1,580	0.08	0.6	6,600	1,110	0.05	0.4	4,000	900	0.01	0.2	8,300	1,580	0.24	0.43
		30	5,400	710	0.025	0.45	4,300	500	0.01	0.2	3,200	400	0.005	0.1	5,400	710	0.1	0.33
		12	8,000	2,400	0.12	0.9	6,400	1,680	0.08	0.8	5,200	1,350	0.05	0.65	8,000	2,400	0.36	0.55
		18	7,800	2,000	0.11	0.8	6,200	1,410	0.07	0.7	3,700	1,100	0.03	0.4	7,800	2,010	0.33	0.5
3	0.1 0.2 0.3 0.5 1	20	7,700	1,850	0.1	0.8	6,200	1,250	0.06	0.6	3,600	1,000	0.03	0.3	7,700	1,850	0.3	0.5
		24	7,500	1,620	0.1	0.7	6,000	1,140	0.06	0.5	3,400	900	0.02	0.2	7,500	1,620	0.3	0.45
		30	6,000	1,050	0.05	0.6	4,800	740	0.03	0.4	3,000	600	0.005	0.1	6,000	1,050	0.15	0.4
		36	4,200	710	0.03	0.5	3,400	500	0.01	0.3	2,500	400	0.005	0.1	4,200	710	0.1	0.35
		16	6,000	2,520	0.15	1.2	4,800	1,770	0.1	1	4,000	1,400	0.06	0.8	6,000	2,520	0.45	0.75
4	0.1 0.2 0.3 0.5 1	24	5,400	2,030	0.12	1	4,300	1,430	0.085	0.8	2,800	1,140	0.05	0.65	5,400	2,030	0.39	0.7
		32	4,800	1,350	0.08	0.9	3,800	950	0.04	0.7	2,300	750	0.01	0.1	4,800	1,350	0.25	0.6
		48	3,200	570	0.04	0.8	2,600	410	0.01	0.35	1,500	330	0.005	0.1	3,200	570	0.12	0.5
		20	5,100	2,300	0.17	1.6	4,100	1,610	0.12	1.2	3,300	1,280	0.07	1	5,100	2,300	0.52	1
5	0.1 0.2 0.3 0.5 1	40	3,200	1,020	0.07	1.2	2,600	720	0.05	0.9	1,500	570	0.02	0.1	3,200	1,020	0.25	0.8
		24	3,700	2,100	0.2	2.1	3,000	1,470	0.12	1.5	2,700	1,170	0.07	1.2	3,700	2,100	0.6	1.2
6	0.1 0.2 0.3 0.5 1	48	2,600	950	0.09	1.5	2,100	660	0.05	1.2	1,200	520	0.03	0.2	2,600	950	0.32	0.9

- Note**  
Notes
- ※I parametri di taglio sopra indicati vanno regolati in base alla forma da fresare e al tipo di macchina.
  - ※**ap** = profondità di taglio assiale, **ae** = profondità di taglio radiale.
  - ※Raccomandiamo l'uso di lubrificazione minima specifica per materiali temprati.
  - ※Raccomandiamo l'approccio a rampa o elicoidale per entrare nel pezzo in maniera assiale.
  - ※Regolare l'avanzamento più basso del 50% e la profondità radiale (**ae**) del 30% quando la profondità di fresatura è maggiore di 8XD, per stabilizzare la fresa.
  - ※Per cave consigliamo la fresatura bidirezionale e la riduzione avanzamento e profondità assiale (**ap**) del 50%.
  - ※Ridurre con la stessa proporzione giri ed avanzamento, per eliminare vibrazioni o in caso di limitato numero di giri della macchina.
  - ※Adjust milling conditions according to milling shape and machine type.
  - ※**ap** : Axial depth of cutting, **ae** : Radial depth of cutting.
  - ※Recommend to use oil mist coolant for machining hardened steels.
  - ※Recommend to apply helical or ramping for approaching into axial direction.
  - ※Adjust feed rate 50% lower and cutting depth(**ae**) 30% lower for milling deep wall area. When L/D exceeds 8 for stable milling.
  - ※For slotting, recommend reciprocating milling by adjusting feed & **ap** in below 50% of recommended milling condition.
  - ※Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.

## Parametri di taglio raccomandati

# MHR430R

### Recommended High Speed Milling Conditions

Materiale Work Material			Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Prehardened Steels C50•1.2311•1.2738 (~43HRC)				Acciaio temprato Hardened Steels 1.2343•STAVAX (~55HRC)				Acciaio temprato Hardened Steels 1.2379 (~62HRC)			
Dia. Dia.	Angolo Raggio Corner Radius	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
			min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm	min <sup>-1</sup>	mm/min	a <sub>p</sub> mm	a <sub>e</sub> mm
2	0.5	8	22,000	6,200	0.06	0.4	16,000	4,500	0.04	0.3	12,800	3,000	0.03	0.2
2.5	0.5	10	18,000	6,400	0.08	0.65	13,000	4,600	0.05	0.5	10,200	3,600	0.03	0.3
3	1	12	15,000	7,100	0.1	0.7	11,000	5,100	0.06	0.6	8,500	3,700	0.04	0.4
4	1	16	11,000	7,100	0.13	1	8,000	5,100	0.08	0.8	6,300	3,800	0.05	0.5
5	1	20	9,000	8,200	0.15	1.4	6,500	5,200	0.1	1	5,100	3,700	0.05	0.7
6	1	24	7,500	7,700	0.18	1.8	5,300	5,300	0.1	1.3	4,200	3,100	0.06	0.8
Note Notes			※ I parametri di taglio sopra indicati vanno regolati in base alla forma da fresare e al tipo di macchina. ※ a <sub>p</sub> = profondità di taglio assiale, a <sub>e</sub> = profondità di taglio radiale. ※ Raccomandiamo l'uso di lubrificazione minimale specifica per materiali temprati. ※ Regolare l'avanzamento più basso del 50% e la profondità radiale (a <sub>e</sub> ) del 30% per fresature profonde. ※ Raccomandiamo l'approccio a rampa o elicoidale per entrare nel pezzo in maniera assiale. ※ Ridurre con la stessa proporzione giri ed avanzamento, per eliminare vibrazioni o in caso di limitato numero di giri della macchina. ※ Adjust milling conditions according to milling shape and machine type. ※ a <sub>p</sub> : Axial depth of cutting, a <sub>e</sub> : Radial depth of cutting. ※ Recommend to use oil mist coolant for machining hardened steels. ※ Adjust feed rate 50% lower and cutting depth (a <sub>e</sub> ) 30% lower for milling deep wall area. ※ Recommend to apply helical or ramping for approaching into axial direction. ※ Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.											

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

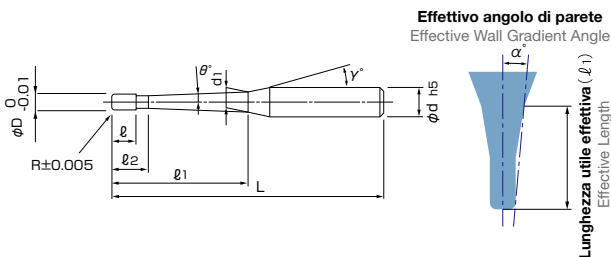
Guida tecnica  
Technical Guidance



# MSTNR230

MUGEN-COATING 2-Flute Long Taper Neck Radius End Mill

## Frese 2 Tagli toriche con sformo conico



- Incrementa la precisione delle superfici in lavorazioni "HSC" con minime vibrazioni in sgrassatura e finitura.
- Elevata precisione del raggio  $\pm 5\mu\text{m}$ .
- Migliori prestazioni in un'ampia gamma di materiali, dall'acciaio temprato, acciaio pretemprato al rame per elettrodi.
- Improve surface overall accuracy brought by high speed cutting with minimal chattering in roughing to finishing process.
- High R-Accuracy  $\pm 5\mu\text{m}$ .
- Better performance in wide range of machining of direct carving on Hardened Steels, Prehardened Steels and Copper Electrode.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(θ) Angolo scarico conico Neck Taper Angle	(ℓ1) Lungh. effettiva Effective Length	(d1) Dia. scarico Neck Dia.	(ℓ) Lungh. tagliente Length of Cut	(ℓ2) Lungh. sotto scarico conico Under Neck Taper Length	(γ) Angolo 2 Neck Taper Angle 2	(α) Angolo effettivo Effective Wall Gradient Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
08-00770-02211	0.2	R0.05	1°	1	0.22	0.15	0.4	12°	0° 38'	4	50
08-00770-02212				2	0.26				0° 49'		50
08-00770-02231			3°	1	0.26				1° 54'		50
08-00770-02232				2	0.37				2° 28'		50
08-00770-02251			5°	1	0.3				3° 10'		50
08-00770-02252				2	0.48				4° 07'		50
08-00770-03211	0.3	R0.05	1°	2	0.35	0.25	0.6	12°	0° 43'	4	50
08-00770-03212				3	0.38				0° 49'		50
08-00770-03231			3°	2	0.45				2° 10'		50
08-00770-03232				3	0.55				2° 27'		50
08-00770-03251			5°	2	0.54				3° 35'		50
08-00770-03252				3	0.72				4° 04'		50
08-00770-04211	0.4	R0.05	1°	3	0.48	0.3	0.8	12°	0° 45'	4	50
08-00770-04212				4	0.51				0° 49'		50
08-00770-04231			3°	3	0.63				2° 14'		50
08-00770-04232				4	0.74				2° 26'		50
08-00770-04251			5°	3	0.78				3° 44'		50
08-00770-04252				4	0.96				4° 03'		50
08-00770-04311		R0.1	1°	3	0.48				0° 46'	50	
08-00770-04312				4	0.51				0° 49'	50	
08-00770-04331			3°	3	0.63				2° 17'	50	
08-00770-04332				4	0.74				2° 28'	50	
08-00770-04351			5°	3	0.78				3° 48'	50	
08-00770-04352				4	0.96				4° 07'	50	
08-00770-05211	0.5	R0.05	1°	3	0.57	0.4	1	12°	0° 41'	4	50
08-00770-05212				5	0.64				0° 49'		50
08-00770-05213				8	0.74				0° 53'		50
08-00770-05214				10	0.81				0° 54'		50
08-00770-05215				12	0.88				0° 55'		50

### Attenzione

Quando ordinate, indicate MSTNR230 (D)×(R)×(θ)×(ℓ1).  
When you order, indicate MSTNR230 (D)×(R)×(θ)×(ℓ1).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 436.
- Milling condition is recommended on page 436.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Scaricate Piano Long Neck Square

Sferiche Ball  
Scaricate Sferiche Long Neck Ball

Coniche Taper  
Coniche Sferiche Taper Ball

Toriche Corner R  
Scaricate Toriche Long Neck Corner R

Frese Sagomate Formed Cutter

Punte Drill

Altro Others

Dati tecnici Technical Data

Guida tecnica Technical Guidance

# MSTNR230

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

**Non Rivestite**  
Non-Coating

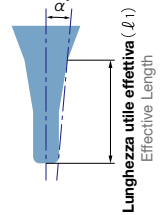
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**Effettivo angolo di parete**  
Effective Wall Gradient Angle



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(θ) Angolo scarico conico Neck Taper Angle	(ℓ <sub>1</sub> ) Lungh. effettiva Effective Length	(d) Dia. scarico Neck Dia.	(ℓ) Lungh. tagliante Length of Cut	(ℓ <sub>2</sub> ) Lungh. sotto scarico conico Under Neck Taper Length	(γ) Angolo 2 Neck Taper Angle 2	(α) Angolo effettivo Effective Wall Gradient Angle	(c) Dia. gamba Shank Dia.	(L) Lungh. totale Overall Length	
08-00770-05231	0.5	R0.05	3°	3	0.71	0.4	1	12°	2° 02'	4	50	
08-00770-05232				5	0.92				2° 25'		50	
08-00770-05233				8	1.23				2° 38'		50	
08-00770-05234				10	1.44				2° 43'		50	
08-00770-05235				12	1.65				2° 46'		50	
08-00770-05251			5°	3	0.85				3° 23'		50	
08-00770-05252				5	1.2				4° 02'		50	
08-00770-05253				8	1.72				4° 25'		50	
08-00770-05254				10	2.07				4° 32'		50	
08-00770-05311				R0.1	1°				3		0.57	0° 41'
08-00770-05312		5	0.64						0° 49'		50	
08-00770-05313		8	0.74						0° 53'		50	
08-00770-05314		10	0.81						0° 55'		50	
08-00770-05315		12	0.88						0° 55'		50	
08-00770-05331		3°	3		0.71				2° 04'		50	
08-00770-05332			5		0.92				2° 27'		50	
08-00770-05333			8		1.23				2° 40'		50	
08-00770-05334			10		1.44				2° 44'		50	
08-00770-05335			12		1.65				2° 46'		50	
08-00770-05351		5°	3	0.85	3° 27'				50			
08-00770-05352	5		1.2	4° 05'	50							
08-00770-05353	8		1.72	4° 26'	50							
08-00770-05354	10		2.07	4° 33'	50							
08-00770-08211	0.8		R0.05	1°	5	0.92	0.65	1.6	12°	0° 41'	4	50
08-00770-08212		8			1.02	0° 48'				50		
08-00770-08231		3°		5	1.16	2° 04'				50		
08-00770-08232				8	1.47	2° 25'				50		
08-00770-08311		R0.1		1°	5	0.92				0° 42'		50
08-00770-08312					8	1.02				0° 49'		50
08-00770-08331			3°	5	1.16	2° 05'				50		
08-00770-08332				8	1.47	2° 26'				50		
08-00770-08411			R0.2	1°	5	0.92				0° 43'		50
08-00770-08412					8	1.02				0° 49'		50
08-00770-08431		3°		5	1.16	2° 07'				50		
08-00770-08432				8	1.47	2° 28'				50		
08-00770-10211	1	R0.05		1°	6	1.14	0.8	2	12°	0° 40'	4	50
08-00770-10212					10	1.28				0° 48'		60
08-00770-10213			15		1.45	0° 52'				60		
08-00770-10214			20		1.63	0° 54'				60		

# MSTNR230

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

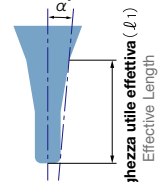
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**Effettivo angolo di parete**  
Effective Wall Gradient Angle



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(θ) Angolo scarico conico Neck Taper Angle	(ℓ1) Lungh. effettiva Effective Length	(d1) Dia. scarico Neck Dia.	(ℓ) Lungh. tagliante Length of Cut	(ℓ2) Lungh. sotto scarico conico Under Neck Taper Length	(γ) Angolo 2 Neck Taper Angle 2	(α) Angolo effettivo Effective Wall Gradient Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length						
08-00770-10215	1	R0.05	1°	25	1.8	0.8	2	12°	0° 55'	4	70						
08-00770-10216				30	1.98				0° 56'		80						
08-00770-10217				35	2.15				0° 56'		80						
08-00770-10231			3°	6	1.42				2° 01'		50						
08-00770-10232				10	1.84				2° 25'		60						
08-00770-10311			R0.1	1°	6				1.14		0° 41'	50					
08-00770-10312		10			1.28				0° 49'		60						
08-00770-10313		15			1.45				0° 52'		60						
08-00770-10314		20			1.63				0° 54'		60						
08-00770-10315		25			1.8				0° 55'		70						
08-00770-10316		30			1.98				0° 56'		80						
08-00770-10317		35		2.15	0° 57'				80								
08-00770-10331		3°		6	1.42				2° 02'		50						
08-00770-10332				10	1.84				2° 26'		60						
08-00770-10411		R0.2		1°	6				1.14		0° 41'	50					
08-00770-10412					10				1.28		0° 49'	60					
08-00770-10413					15				1.45		0° 53'	60					
08-00770-10414			20		1.63				0° 55'		60						
08-00770-10415			25		1.8				0° 56'		70						
08-00770-10416			30		1.98				0° 56'		80						
08-00770-10417			35	2.15	0° 57'				80								
08-00770-10431			3°	6	1.42				2° 04'		50						
08-00770-10432				10	1.84				2° 27'		60						
08-00770-10511			R0.3	1°	6				1.14		0° 42'	50					
08-00770-10512					10				1.28		0° 49'	60					
08-00770-10513					15				1.45		0° 53'	60					
08-00770-10514		20			1.63				0° 55'		60						
08-00770-10515		25			1.8				0° 56'		70						
08-00770-10516		30			1.98				0° 56'		80						
08-00770-10517		35		2.15	0° 57'				80								
08-00770-10531		3°		6	1.42				2° 06'		50						
08-00770-10532				10	1.84				2° 29'		60						
08-00770-15311		1.5		R0.1	1°				10		1.74	1.2	3	12°	0° 43'	4	60
08-00770-15312									15		1.92				0° 49'		60
08-00770-15313									20		2.09				0° 51'		60
08-00770-15314	25		2.27		0° 53'	70											
08-00770-15315	30		2.44		0° 54'	80											
08-00770-15331	3°		10		2.23	2° 07'	60										
08-00770-15332		15	2.76	2° 25'	60												

# MSTNR230

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

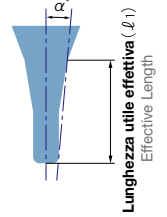
**Non Rivestite**  
Non-Coating  
Punte  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**Effettivo angolo di parete**  
Effective Wall Gradient Angle



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(θ) Angolo scarico conico Neck Taper Angle	(ℓ1) Lugh. effettiva Effective Length	(d1) Dia. scarico Neck Dia.	(ℓ) Lugh. tagliante Length of Cut	(ℓ2) Lugh. sotto scarico conico Under Neck Taper Length	(γ) Angolo 2 Neck Taper Angle 2	(α) Angolo effettivo Effective Wall Grad- ient Angle	(d) Dia. gambo Shank Dia.	(L) Lugh. totale Overall Length					
08-00770-15411	1.5	R0.2	1°	10	1.74	1.2	3	12°	0° 43'	4	60					
08-00770-15412				15	1.92				0° 49'		60					
08-00770-15413				20	2.09				0° 52'		60					
08-00770-15414				25	2.27				0° 53'		70					
08-00770-15415			30	2.44	0° 55'				80							
08-00770-15431			3°	10	2.23				2° 08'		60					
08-00770-15432				15	2.76				2° 26'		60					
08-00770-15511			R0.3	1°	10				1.74		0° 43'	60				
08-00770-15512		15			1.92				0° 49'		60					
08-00770-15513		20			2.09				0° 52'		60					
08-00770-15514		25			2.27				0° 53'		70					
08-00770-15515		30		2.44	0° 55'				80							
08-00770-15531		3°		10	2.23				2° 10'		60					
08-00770-15532				15	2.76				2° 27'		60					
08-00770-20311		2		R0.1	1°				15		2.38	1.6	4	12°	4	0° 44'
08-00770-20312			20						2.56		0° 48'					60
08-00770-20313	25		2.73			0° 50'	70									
08-00770-20314	30		2.91			0° 52'	80									
08-00770-20315	40		3.26		0° 54'	80										
08-00770-20316	50		3.61		0° 55'	100										
08-00770-20331	3°		15		3.15	2° 13'	60									
08-00770-20332			20		3.68	2° 25'	60									
08-00770-20411	R0.2		1°	15	2.38	0° 44'	60									
08-00770-20412				20	2.56	0° 49'	60									
08-00770-20413				25	2.73	0° 51'	70									
08-00770-20414				30	2.91	0° 52'	80									
08-00770-20415			40	3.26	0° 54'	80										
08-00770-20416			50	3.61	0° 55'	100										
08-00770-20431			3°	15	3.15	2° 14'	60									
08-00770-20432				20	3.68	2° 25'	60									
08-00770-20511	R0.3	1°	15	2.38	0° 45'	60										
08-00770-20512			20	2.56	0° 49'	60										
08-00770-20513			25	2.73	0° 51'	70										
08-00770-20514			30	2.91	0° 53'	80										
08-00770-20515		40	3.26	0° 55'	80											
08-00770-20516		50	3.61	0° 56'	100											
08-00770-20531		3°	15	3.15	2° 15'	60										
08-00770-20532			20	3.68	2° 26'	60										

# MSTNR230

**CBN**  
Nitrato Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Piane**  
Long Neck  
Square

**Sferiche**  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Sferiche**  
Long Neck  
Ball

**Coniche**  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Toriche**  
Long Neck  
Corner R

**Frese Sagomate**  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

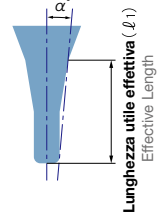
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**Effettivo angolo di parete**  
Effective Wall Gradient Angle



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	( $\theta$ ) Angolo scarico conico Neck Taper Angle	( $l_1$ ) Lugh. effettiva Effective Length	( $d_1$ ) Dia. scarico Neck Dia.	( $l$ ) Lugh. tagliente Length of Cut	( $l_2$ ) Lugh. sotto scarico conico Under Neck Taper Length	( $\gamma$ ) Angolo 2 Neck Taper Angle 2	( $\alpha$ ) Angolo effettivo Effective Wall Gradient Angle	(d) Dia. gambo Shank Dia.	(L) Lugh. totale Overall Length	
08-00770-20611	2	R0.5	1°	15	2.38	1.6	4	12°	0° 46'	4	60	
08-00770-20612				20	2.56				0° 49'		60	
08-00770-20613				25	2.73				0° 52'		70	
08-00770-20614				30	2.91				0° 53'		80	
08-00770-20615			40	3.26	0° 55'				80			
08-00770-20616			50	3.61	0° 56'				100			
08-00770-20631			3°	15	3.15				2° 17'		60	
08-00770-20632				20	3.68				2° 28'		60	
08-00770-30411	3	R0.2	1°	15	3.31	2.5	6	12°	6	60		
08-00770-30412				20	3.49					0° 43'	60	
08-00770-30413				30	3.84					0° 49'	80	
08-00770-30414				40	4.19					0° 51'	80	
08-00770-30415				50	4.54					0° 53'	100	
08-00770-30416				60	4.89					0° 54'	110	
08-00770-30611		R0.5	1°	1°	15					3.31	0° 37'	60
08-00770-30612					20					3.49	0° 43'	60
08-00770-30613					30					3.84	0° 49'	80
08-00770-30614					40					4.19	0° 52'	80
08-00770-30615					50					4.54	0° 53'	100
08-00770-30616					60					4.89	0° 55'	110

## Attenzione

Quando ordinate, indicate MSTNR230 (D)×(R)×( $\theta$ )×( $l_1$ ).  
When you order, indicate MSTNR230 (D)×(R)×( $\theta$ )×( $l_1$ ).

※( $\gamma$ ) è un valore di riferimento.  
※( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 436.
- Milling condition is recommended on page 436.

# Parametri di taglio raccomandati

# MSTNR230

## Recommended Milling Conditions

Materiale Work Material				Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Prehardened Steels C50•1.2311•1.2738 (~43HRC)				Acciaio temprato Hardened Steels 1.2343•STAVAX (~55HRC)				Rame•Alluminio Copper•Aluminum			
Dia. Dia.	Angolo Raggio Corner Radius	Angolo dello scarico conico Neck Taper Angle	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
				min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm
0.2	0.05	1°	1	30,000	200	0.005	0.02	30,000	150	0.005	0.02	30,000	250	0.015	0.06
			2	30,000	200	0.005	0.02	30,000	150	0.005	0.02	30,000	250	0.015	0.06
		3°	1	30,000	300	0.005	0.03	30,000	200	0.005	0.02	30,000	360	0.02	0.06
			2	30,000	300	0.005	0.03	30,000	200	0.005	0.02	30,000	360	0.02	0.06
		5°	1	30,000	350	0.01	0.03	30,000	250	0.01	0.03	30,000	420	0.04	0.06
			2	30,000	350	0.01	0.03	30,000	250	0.01	0.03	30,000	420	0.04	0.06
0.3	0.05	1°	2	30,000	200	0.007	0.03	30,000	150	0.005	0.03	30,000	250	0.02	0.06
			3	30,000	200	0.007	0.03	30,000	150	0.005	0.03	30,000	250	0.02	0.06
		3°	2	30,000	300	0.01	0.05	30,000	200	0.01	0.03	30,000	360	0.03	0.15
			3	30,000	300	0.01	0.05	30,000	200	0.01	0.03	30,000	360	0.03	0.15
		5°	2	30,000	350	0.02	0.06	30,000	250	0.02	0.05	30,000	420	0.06	0.15
			3	30,000	350	0.02	0.06	30,000	250	0.02	0.05	30,000	420	0.06	0.15
0.4	0.05 0.1	1°	3	30,000	300	0.015	0.05	30,000	200	0.01	0.04	30,000	360	0.03	0.15
			4	30,000	300	0.015	0.05	30,000	200	0.01	0.04	30,000	360	0.03	0.15
		3°	3	30,000	350	0.02	0.06	30,000	250	0.02	0.05	30,000	420	0.06	0.15
			4	30,000	350	0.02	0.06	30,000	250	0.02	0.05	30,000	420	0.06	0.15
		5°	3	30,000	450	0.03	0.07	30,000	300	0.03	0.06	30,000	540	0.09	0.15
			4	30,000	450	0.03	0.07	30,000	300	0.03	0.06	30,000	540	0.09	0.15
0.5	0.05 0.1	1°	3	30,000	500	0.02	0.1	30,000	350	0.02	0.1	30,000	600	0.06	0.24
			5	30,000	500	0.015	0.1	30,000	350	0.015	0.1	30,000	600	0.045	0.24
			8	30,000	500	0.01	0.08	30,000	350	0.01	0.05	30,000	600	0.03	0.24
			10	24,000	400	0.007	0.06	24,000	250	0.007	0.04	24,000	480	0.02	0.18
			12	24,000	300	0.005	0.05	24,000	150	0.005	0.03	24,000	360	0.015	0.15
		3°	3	30,000	600	0.03	0.1	30,000	400	0.03	0.1	30,000	700	0.09	0.25
			5	30,000	600	0.02	0.1	30,000	400	0.02	0.1	30,000	700	0.06	0.25
			8	30,000	600	0.02	0.08	30,000	400	0.02	0.05	30,000	700	0.06	0.24
			10	24,000	500	0.015	0.08	24,000	350	0.01	0.05	24,000	600	0.03	0.24
		5°	12	24,000	350	0.015	0.05	24,000	200	0.01	0.03	24,000	420	0.03	0.15
			3	30,000	750	0.05	0.15	30,000	500	0.05	0.1	30,000	900	0.15	0.25
			5	30,000	750	0.03	0.15	30,000	500	0.03	0.1	30,000	900	0.09	0.25
0.8	0.05 0.1 0.2	1°	8	24,000	800	0.04	0.2	19,000	560	0.04	0.1	24,000	950	0.12	0.3
			5	26,000	1,200	0.08	0.3	21,000	840	0.08	0.3	26,000	1,400	0.24	0.35
			8	24,000	1,000	0.06	0.3	19,000	700	0.06	0.3	24,000	1,200	0.18	0.35
3°		5	26,000	1,200	0.08	0.3	21,000	840	0.08	0.3	26,000	1,400	0.24	0.35	
		8	24,000	1,000	0.06	0.3	19,000	700	0.06	0.3	24,000	1,200	0.18	0.35	

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

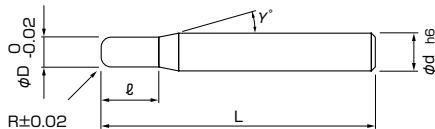
Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

Materiale Work Material				Acciaio al carbonio•Acciaio pretemprato Carbon Steels•Prehardened Steels C50•1.2311•1.2738 (~43HRC)				Acciaio temprato Hardened Steels 1.2343•STAVAX (~55HRC)				Rame•Alluminio Copper•Aluminum			
Dia. Dia.	Angolo Raggio Corner Radius	Angolo dello scarico conico Neck Taper Angle	Lungh. effettiva Effective Length	Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut		Giri Spindle Speed	Avanz. Feed	Profondità di taglio Depth of Cut	
				min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm
1	0.05 0.1 0.2 0.3	1°	6	22,000	1,300	0.08	0.35	17,000	900	0.06	0.35	22,000	1,500	0.24	0.5
			10	18,000	1,000	0.05	0.35	14,000	700	0.05	0.35	18,000	1,200	0.15	0.5
			15	18,000	850	0.03	0.2	14,000	600	0.03	0.13	18,000	1,000	0.09	0.5
			20	14,000	700	0.025	0.1	11,000	500	0.025	0.06	14,000	850	0.075	0.3
			25	14,000	600	0.02	0.05	11,000	400	0.02	0.03	14,000	700	0.06	0.15
			35	10,000	350	0.01	0.02	8,000	250	0.01	0.01	10,000	400	0.03	0.06
	3°	6	22,000	1,500	0.1	0.35	17,600	1,000	0.1	0.35	22,000	1,800	0.3	0.5	
		10	18,000	1,200	0.08	0.35	14,400	800	0.08	0.35	18,000	1,400	0.24	0.5	
		15	14,000	1,000	0.07	0.55	11,200	700	0.07	0.55	14,000	1,200	0.2	0.6	
		20	14,000	800	0.05	0.3	11,200	550	0.05	0.2	14,000	900	0.16	0.5	
1.5	0.1 0.2 0.3	1°	25	14,000	600	0.03	0.1	11,200	400	0.03	0.06	14,000	700	0.1	0.3
			30	12,000	450	0.03	0.05	9,600	300	0.03	0.03	12,000	550	0.09	0.15
			10	16,000	1,500	0.15	0.55	12,800	1,000	0.15	0.55	16,000	1,800	0.45	0.6
			15	14,000	1,200	0.1	0.55	11,200	850	0.1	0.55	14,000	1,400	0.3	0.6
			20	14,000	1,200	0.1	0.7	11,200	850	0.07	0.7	14,000	1,400	0.3	0.7
			25	12,000	1,200	0.07	0.7	9,600	850	0.07	0.7	12,000	1,400	0.2	0.7
	3°	15	12,000	1,000	0.05	0.5	9,600	700	0.04	0.5	12,000	1,200	0.15	0.7	
		30	10,000	750	0.04	0.3	8,000	500	0.03	0.3	10,000	900	0.13	0.7	
		40	8,000	400	0.03	0.2	6,400	300	0.02	0.2	8,000	500	0.1	0.5	
		50	6,000	350	0.015	0.1	4,800	250	0.01	0.1	6,000	400	0.05	0.3	
2	0.1 0.2 0.3 0.5	1°	15	20,000	2,000	0.2	0.7	16,000	1,400	0.2	0.7	20,000	2,400	0.6	0.7
			20	16,000	1,600	0.1	0.7	12,800	1,100	0.1	0.7	16,000	2,000	0.4	0.7
			15	11,000	1,600	0.15	1.05	8,800	1,100	0.1	1.05	11,000	1,900	0.6	1.1
			20	11,000	1,600	0.13	1.05	8,800	1,100	0.1	1.05	11,000	1,900	0.45	1.1
			30	9,000	1,200	0.1	1.05	7,200	850	0.07	1.05	9,000	1,400	0.3	1.1
			40	9,000	1,000	0.07	0.6	7,200	700	0.05	0.6	9,000	1,200	0.21	0.9
	3°	50	8,000	640	0.05	0.35	6,400	450	0.04	0.35	8,000	750	0.15	0.8	
		60	8,000	480	0.03	0.2	6,400	300	0.02	0.2	8,000	550	0.1	0.7	
		<p><b>Note</b> Notes</p> <p>※Regolare i parametri di taglio sopra indicati in base alla forma da fresare e al tipo di macchina.                      ※Ridurre con la stessa proporzione giri ed avanzamento per eliminare vibrazioni o in caso di limitato numero di giri della macchina.                      ※Raccomandiamo l'uso di lubrificazione minima specifica per materiali temprati.                      ※Nelle nervature profonde sono molto importanti la corretta adduzione del refrigerante e la corretta evacuazione truciolo.                      ※Adjust milling conditions according to machining profile and machine status.                      ※Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.                      ※Recommend to use oil mist coolant for machining hardened steels.                      ※Coolant supply and chip disposal are important for machining deep-rib.</p>													

## Frese 2 Tagli toriche



Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. tagliante Overall Length
01-00772-00102	1	R0.2	3	9°	4	45
01-00772-00152	1.5	R0.2	4.5	9°	4	45
01-00772-00155		R0.5				
01-00772-00202	2	R0.2	6	9°	4	45
01-00772-00205		R0.5				
01-00772-00252	2.5	R0.2	8	9°	4	45
01-00772-00255		R0.5				
01-00772-00302	3	R0.2	10	9°	6	45
01-00772-00305		R0.5				
01-00772-00310		R1				
01-00772-00402	4	R0.2	12	9°	6	50
01-00772-00405		R0.5				
01-00772-00410		R1				
01-00772-00502	5	R0.2	15	9°	6	55
01-00772-00505		R0.5				
01-00772-00510		R1				
01-00772-00515		R1.5				
01-00772-00602	6	R0.2	18	-	6	60
01-00772-00605		R0.5				
01-00772-00610		R1				
01-00772-00615	6	R1.5	18	-	6	60
01-00772-00620		R2				
01-00772-00805		R0.5				
01-00772-00810	R1					
01-00772-00815	R1.5					
01-00772-00820	R2					
01-00772-00825	R2.5					
01-00772-00830	R3					



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(R) Raggio Corner Radius	(l) Lungh. tagliante Length of Cut	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. tagliante Overall Length
01-00772-01005	10	R0.5	30	-	10	80
01-00772-01010		R1				
01-00772-01015		R1.5				
01-00772-01020		R2				
01-00772-01025		R2.5				
01-00772-01030	R3					
01-00772-01205	12	R0.5	36	-	12	85
01-00772-01210		R1				
01-00772-01215		R1.5				
01-00772-01220		R2				
01-00772-01225		R2.5				
01-00772-01230	R3					
01-00772-01610	16	R1	50	-	16	110
01-00772-01615		R1.5				
01-00772-01620		R2				
01-00772-01625		R2.5				
01-00772-01630		R3				
01-00772-01640	R4					
01-00772-01650	R5					
01-00772-02010	20	R1	60	-	20	135
01-00772-02015		R1.5				
01-00772-02020		R2				
01-00772-02025		R2.5				
01-00772-02030		R3				
01-00772-02040	R4					
01-00772-02050	R5					

**Attenzione** Quando ordinate, indicate NSR-2 (D)×(R).  
When you order, indicate NSR-2 (D)×(R).

- Per i parametri di taglio vedi pagina 439.
- Milling condition is recommended on page 439.

※(γ) è un valore di riferimento.  
※(γ) is reference value.



# Parametri di taglio raccomandati

# NSR-2

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3•AISI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738		
Velocità di taglio Cutting Speed	40~50m/min			35~45m/min			25~35m/min		
Dia. Dia.	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting		Contornatura Side Milling	Cava Slotting
1	14,300	130	50	12,700	90	40	9,600	80	35
1.5	9,600	130	50	8,500	90	40	6,400	80	35
2	7,200	130	50	6,400	90	40	4,800	80	35
2.5	5,700	130	50	5,100	90	40	3,800	80	35
3	4,800	150	60	4,200	120	50	3,200	90	40
4	3,600	150	60	3,200	120	50	2,400	90	40
5	2,900	170	70	2,500	140	55	1,900	110	45
6	2,400	170	70	2,100	140	55	1,600	110	45
8	1,800	170	70	1,600	140	55	1,200	110	45
10	1,400	170	70	1,300	140	55	1,000	110	45
12	1,200	170	70	1,100	140	55	800	110	45
Profondità di taglio Depth of Cut  (D) Dia. Dia.	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Contornatura Side Milling</p> </div> <div style="text-align: center;"> <p>Cava Slotting</p> </div> <div style="text-align: center;"> <p><math>a_p</math> Ø1 ~2.5=0.5D Ø3 ~12=1D</p> </div> </div>								
Note Notes	<p>※ Durante la lavorazione di angoli, ridurre l'avanzamento dal 30 al 50%.</p> <p>※ Quando utilizzate macchine a bassa velocità, ridurre avanzamento e profondità di taglio.</p> <p>※ When corner processing, reduce the feed by approximately 30%~50%.</p> <p>※ When using low speed machine, reduce feed and depth of cut.</p>								

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square  
  
**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball  
  
**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper  
  
**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R  
  
**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

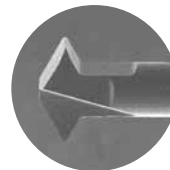
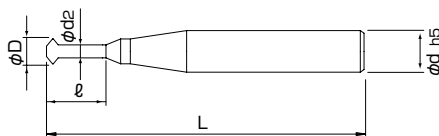
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

## Frese per micro-filetti



- È possibile eseguire il filetto più piccolo al mondo con misura 0.1 mm.
- In caso di rottura dell'utensile durante la lavorazione di filettatura, questo può essere facilmente rimosso, dato che il diametro è più piccolo del foro.
- Il rivestimento Mugen conferisce una maggiore durata all'utensile.
- World smallest threaded size 0.1mm is possible to cut.
- When the tool is broken during thread milling, the wreckages can be easily removed as the tool diameter is smaller than the pilot hole.
- MUGEN-COATING realized long tool life.
- **NUOVO** NEW



Unità di misura: mm Unit size: mm

Codice Code No.	(S) Misura filetto Thread Size	(D) Diametro Dia.	(ℓ) Lunghezza effettiva Effective Length	(d <sub>2</sub> ) Diametro scarico Neck Dia.	(d) Diametro gambo Shank Dia.	(L) Lunghezza totale Overall Length
06-00001-01000	S0.1	0.066	0.15	0.032	4	45
06-00001-02000	S0.2	0.14	0.31	0.07	4	45
06-00001-03000	S0.3	0.2	0.48	0.085	4	45
06-00001-04000	S0.4	0.28	0.61	0.15	4	45
06-00001-05000	S0.5	0.35	0.77	0.17	4	45
06-00001-06000	S0.6	0.43	0.93	0.22	4	45
06-00001-08000	S0.8	0.58	1.24	0.31	4	45
06-00001-10000	S1.0	0.73	1.55	0.41	4	45
06-00001-10001		0.73	3.17	0.41	4	45
06-00001-12000	S1.2	0.93	1.6	0.61	4	45
06-00001-12001		0.93	3.22	0.61	4	45
06-00001-14000	S1.4	1.08	1.9	0.7	4	45
06-00001-14001		1.08	3.86	0.7	4	45

### Attenzione

Quando ordinate, indicate MMTS (S)×(ℓ).  
When you order, indicate MMTS(S)×(ℓ).

- Il filetto standard JIS parte da S0.3, mentre lo standard NS Tool Co., LTD parte da S0.1, S0.2.
- S0.1 and S0.2 are original standard by NS Tool Co., LTD. as a miniature thread standard of JIS is from S0.3.
- Per i parametri di taglio vedi pagina 441.
- Milling condition is recommended on page 441.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Parametri di taglio raccomandati

# MMTS

### Recommended Milling Conditions

Misura filetto Thread Size	Diametro Dia.	Passo Pitch	Diametro preforo consigliato Recommended pilot hole Dia.	Processo elicoidale consigliato Recommended process Helical	Acciaio inox Stainless Steels AISI304		Lega di alluminio Aluminum Alloy 5052		Titanio non legato Unalloyed Titanium Ti		Acciaio al carbonio Carbon Steels C50	
					Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
					mm	mm	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
S0.1	0.066	0.025	0.075	R0.017*2	20,000	5	20,000	5	20,000	5	20,000	5
S0.2	0.14	0.05	0.15	R0.035*2	20,000	5	20,000	5	20,000	5	20,000	5
S0.3	0.2	0.08	0.23	R0.061*2	20,000	5	20,000	5	20,000	5	20,000	5
S0.4	0.28	0.1	0.32	R0.070	18,000	5	18,000	5	18,000	5	18,000	5
S0.5	0.35	0.125	0.4	R0.088	15,000	10	15,000	10	15,000	10	15,000	10
S0.6	0.43	0.15	0.48	R0.110	12,000	10	12,000	10	12,000	10	12,000	10
S0.8	0.58	0.2	0.64	R0.130	10,000	20	10,000	20	10,000	20	10,000	20
S1.0	0.73	0.25	0.8	R0.155	7,000	50	7,000	50	7,000	50	7,000	50
S1.2	0.93	0.25	1	R0.155	6,000	80	6,000	80	6,000	80	6,000	80
S1.4	1.08	0.3	1.15	R0.190	5,000	100	5,000	100	5,000	100	5,000	100

**Note**  
Notes

\*1 La profondità di taglio radiale può essere suddivisa in base alla concentricità del mandrino e al tipo di macchina  
\*2 La profondità di taglio radiale deve essere suddivisa in base alle dimensioni del filetto: S0.1, S0.2, S0.3.

※ Regolate il processo di interpolazione elicoidale sulla base del diametro reale misurato della fresa.  
 ※ Prestare attenzione alla precisione del preforo, che può variare a seconda del run-out della punta.  
 ※ La fresa MMTS esegue un movimento circolare elicoidale.  
 ※ Aggiungere un passaggio a zero nel caso risulti una flessione nella filettatura.  
 ※ La lunghezza della fresa deve essere la minore possibile.  
 ※ Prestare particolare attenzione durante il settaggio e la misurazione della fresa.  
 ※ Scegliere il refrigerante appropriato, in funzione del materiale da lavorare.  
 ※ Prestare attenzione all'evacuazione del truciolo.

\*1 Radial depth of cut may be divided into multiple cutting approaches by condition of spindle runout and machine.  
 \*2 Radial depth of cut must be divided into multiple cutting approaches for the sizes, S0.1, S0.2, and S0.3.

※ Adjust process helical final value based on measured actual Dia. of the tool if possible.  
 ※ Care differences of actual pilot hole Dia. caused by runout of a pilot drill and rotation.  
 ※ Process Helical is a circular radius value of actual tool movement when helical process by MMTS.  
 ※ Add zero-cut process in case completed thread left deflection angle.  
 ※ Tool overhang to be as short as possible.  
 ※ Extra care of handling when tool setting and measuring.  
 ※ Choose appropriate coolant for each working material.  
 ※ Care with cutting chip removal.

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

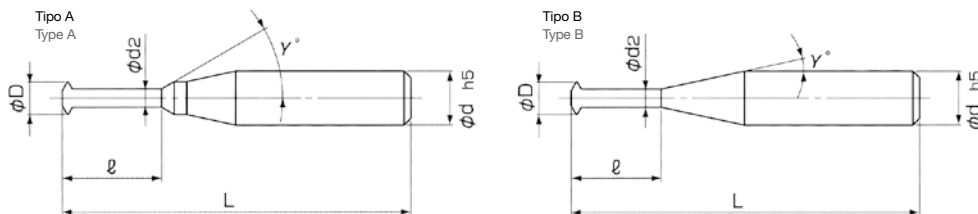
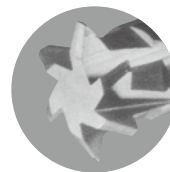
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

## Frese per filetti metrici M



- Nuove frese migliorate sull'affilatura per consentire una maggiore precisione nel taglio.
- Il rivestimento MUGEN PREMIUM migliora la durata della fresa.
- Improvement of cutting accuracy by adoption of tool design focusing on sharpness.
- MUGEN-COATING realized long tool life.

**Dati tecnici** P503



● **NUOVO - NEW**

Unità di misura: mm Unit size: mm

Codice Code No.	(M) Misura filetto Thread Size	(D) Diametro Dia.	(P) Passo Pitch	(ℓ) Lung. effettiva Effective Length	Tipo Type	(d <sub>2</sub> ) Diam. scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Diam. gambo Shank Dia.	(L) Lung. totale Overall Length	Numero taglienti N° of flutes	Fresa per filetti Thread Milling Size
06-00002-00100	<b>M1</b>	0.72	0.25	2.64	A	0.36	30°	4	45	4	M1 M1.1
06-00002-00120	<b>M1.2</b>	0.92	0.25	2.67	A	0.56	30°	4	45	4	M1.2
06-00002-00140	<b>M1.4</b>	1.05	0.3	3.18	A	0.62	30°	4	45	4	M1.4
06-00002-00160	<b>M1.6</b>	1.2	0.35	3.71	A	0.68	30°	4	45	4	M1.6
06-00002-00170	<b>M1.7</b>	1.3	0.35	3.71	A	0.78	30°	4	45	4	M1.7 M1.8
06-00002-00200	<b>M2</b>	1.5	0.4	5.02	B	0.89	12°	4	45	6	M2 M2.3
06-00002-00250	<b>M2.5</b>	1.95	0.45	5.7	B	1.28	12°	4	45	6	M2.5 M2.6
06-00002-00300	<b>M3</b>	2.36	0.5	6.3	B	1.63	12°	4	45	6	M3
● 06-00002-00400	<b>M4</b>	3.08	0.7	8.8	B	2.08	12°	6	60	6	M4
● 06-00002-00500	<b>M5</b>	3.97	0.8	10.1	B	2.86	12°	6	60	6	M5
● 06-00002-00600	<b>M6</b>	4.72	1	12.6	B	3.35	12°	6	60	6	M6

### Attenzione

Quando ordinate, indicate MMTM (M).  
When you order, indicate MMTM (M).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 443.
- Milling condition is recommended on page 443.

# Parametri di taglio raccomandati

# MMTM

## Recommended Milling Conditions

Misura filetto Thread Size	Misura filetto fresato Thread Cutting Size	Diam. Dia.	Passo Pitch	R elica Helical R	Senso di lavorazione consigliato Recommended process	Acciaio al carbonio Carbon Steels C50			Acciaio inox Stainless Steels AISI304			Leghe di Titanio Titanium Alloy Ti-6Al-4V			Leghe di Alluminio Aluminium Alloy A5052		
						Giri Spindle Speed	Avanz. Feed	Avanz. x dente Feed per Tooth	Giri Spindle Speed	Avanz. Feed	Avanz. x dente Feed per Tooth	Giri Spindle Speed	Avanz. Feed	Avanz. x dente Feed per Tooth	Giri Spindle Speed	Avanz. Feed	Avanz. x dente Feed per Tooth
						min <sup>-1</sup>	mm/min	mm/ dente	min <sup>-1</sup>	mm/min	mm/ dente	min <sup>-1</sup>	mm/min	mm/ dente	min <sup>-1</sup>	mm/min	mm/ dente
M1	M1	0.72	0.25	R0.155	discordanza Up-cut	35,000	600	0.004	35,000	600	0.004	18,000	150	0.002	45,000	1,000	0.006
M1.2	M1.2	0.92	0.25	R0.155	discordanza Up-cut	27,000	600	0.005	27,000	600	0.005	14,000	160	0.003	35,000	1,000	0.007
M1.4	M1.4	1.05	0.3	R0.195	discordanza Up-cut	24,000	600	0.006	24,000	600	0.006	12,000	180	0.004	30,000	1,000	0.008
M1.6	M1.6	1.2	0.35	R0.22	discordanza Up-cut	21,000	600	0.007	21,000	600	0.007	10,000	220	0.005	26,000	1,000	0.01
M1.7	M1.7	1.3	0.35	R0.22	discordanza Up-cut	20,000	600	0.007	20,000	600	0.007	10,000	250	0.006	24,000	1,000	0.01
M1.7	M1.8	1.3	0.35	R0.27	discordanza Up-cut	20,000	600	0.007	20,000	600	0.007	10,000	250	0.006	24,000	1,000	0.01
M2	M2	1.5	0.4	R0.28	concordanza Down-cut	12,000	600	0.008	12,000	600	0.008	10,000	500	0.008	20,000	1,200	0.01
M2	M2.3	1.5	0.4	R0.43	concordanza Down-cut	12,000	600	0.008	12,000	600	0.008	10,000	500	0.008	20,000	1,200	0.01
M2.5	M2.5	1.95	0.45	R0.305	concordanza Down-cut	12,000	600	0.008	12,000	600	0.008	10,000	500	0.008	16,000	1,200	0.012
M2.5	M2.6	1.95	0.45	R0.355	concordanza Down-cut	12,000	600	0.008	12,000	600	0.008	10,000	400	0.008	16,000	1,200	0.012
M3	M3	2.36	0.5	R0.36	concordanza Down-cut	8,000	600	0.012	8,000	600	0.012	8,000	500	0.01	10,000	1,200	0.02
M4	M4	3.08	0.7	R0.5	concordanza Down-cut	5,700	400	0.012	5,700	400	0.012	4,600	350	0.013	7,000	800	0.019
M5	M5	3.97	0.8	R0.555	concordanza Down-cut	4,000	400	0.017	4,000	400	0.017	3,200	350	0.018	5,500	800	0.024
M6	M6	4.72	1	R0.68	concordanza Down-cut	3,200	400	0.021	3,200	400	0.021	3,000	350	0.019	4,500	800	0.03

Note  
Notes

- ※ Il software per creare il programma NC è fornito sul sito internet della NS.
- ※ I dati di taglio indicati come linea guida si riferiscono a casi in cui la profondità di taglio è divisa in 2 e con lubrificante.
- ※ Eseguire sempre un pre-foro guida.
- ※ In base alle condizioni di lavoro correggere il numero di giri, l'avanzamento, il numero di passate e la direzione di lavoro.
- ※ Il raggio R indicato è per ottenere tolleranze 5H fino a M1,4 e 6H per filetti maggiori. Regolare comunque il R in base al filetto che si vuole ottenere.
- ※ Se utilizzate il raggio R di interpolazione raccomandato, verificate che il diametro del preforo non crei interferenza con il gambo scaricato della fresa.
- ※ Aggiungere un passaggio a zero nel caso risulti una flessione nella filettatura.
- ※ Scegliere il raffreddamento appropriato al materiale da lavorare
- ※ The above Recommended Milling Conditions is provided as a guide for cutting when the depth of cut is divided into twice with water soluble cutting fluid.
- ※ Recommended making pilot hole in advance by using drill, etc.
- ※ Depending on environment, adjustment of spindle speed based on feed per tooth, feed, number of paths and cutting direction are needed.
- ※ Helical R, 5H for M1.4 and under and 6H for more than M1.6, is a guideline for thread milling and it is R value in the final cutting.
- ※ When use helical R in the Recommended Milling Conditions, set pilot hole dia. for avoiding interference between the area of under neck and pilot hole.
- ※ Add zero-cut process in case completed thread left deflection angle.
- ※ Choose appropriate coolant for each working material.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

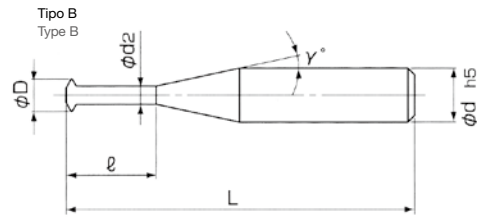
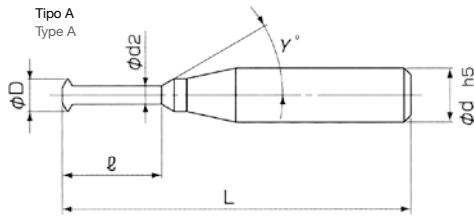
Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

## Frese per filetti in pollici UNC/UNF



- Nuove frese migliorate sull'affilatura per consentire una maggiore precisione nel taglio.
- Il rivestimento MUGEN PREMIUM migliora la durata della fresa.
- Improvement of cutting accuracy by adoption of tool design focusing on sharpness.
- MUGEN-COATING realized long tool life.



Unità di misura: mm Unit size: mm

Codice Code No.	Misura Size	(D) Diametro Dia.	(ℓ) Lung. effettiva Effective Length	Tipo Type	(d2) Diametro scarico Neck Dia.	(Y) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lung. totale Overall Length	Numero taglienti N° of flutes
06-00003-00800	No.0-80UNF	1.16	3.28	A	0.72	30°	4	45	4
06-00003-01640	No.1-64UNF	1.4	3.98	B	0.84	12°	4	45	6
06-00003-01720	No.1-72UNF	1.45	3.97	B	0.93	12°	4	45	6
06-00003-02560	No.2-56UNC	1.63	4.67	B	0.99	12°	4	45	6
06-00003-02640	No.2-64UNF	1.69	4.67	B	1.11	12°	4	45	6
06-00003-03480	No.3-48UNC	1.88	5.37	B	1.15	12°	4	45	6
06-00003-03560	No.3-56UNF	1.96	5.36	B	1.31	12°	4	45	6
06-00003-04400	No.4-40UNC	2.09	6.08	B	1.23	12°	4	45	6
06-00003-04480	No.4-48UNF	2.21	6.06	B	1.46	12°	4	45	6
06-00003-05400	No.5-40UNC	2.38	6.76	B	1.52	12°	4	45	6
06-00003-05440	No.5-44UNF	2.45	6.75	B	1.65	12°	4	45	6
06-00003-06320	No.6-32UNC	2.54	7.48	B	1.50	12°	4	45	6
06-00003-06400	No.6-40UNF	2.72	7.45	B	1.86	12°	4	45	6
06-00003-08320	No.8-32UNC	3.14	8.86	B	2.04	12°	6	60	6
06-00003-08360	No.8-36UNF	3.24	8.84	B	2.24	12°	6	60	6
06-00003-10240	No.10-24UNC	3.52	10.29	B	2.14	12°	6	60	6
06-00003-10320	No.10-32UNF	3.8	10.22	B	2.70	12°	6	60	6
06-00003-12240	No.12-24UNC	4.14	11.65	B	2.72	12°	6	60	6
06-00003-12280	No.12-28UNF	4.29	11.62	B	3.02	12°	6	60	6
06-00003-14200	1/4-20UNC	4.77	13.48	B	3.12	12°	6	60	6
06-00002-14280	1/4-28UNF	5.16	13.39	B	3.89	12°	6	60	6

**Attenzione** Quando ordinate, indicate MMTU.  
When you order, indicate MMTU.

- Per i parametri di taglio vedi pagina 445.
- Milling condition is recommended on page 445.
- ( ) Articoli semi-standard, richiedere prezzo e consegna.
- ( ) Semi-standard item, please inquire for price and delivery.

## Parametri di taglio raccomandati

### Recommended Milling Conditions

# MMTU

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Coating  
Non Rivestite  
Non-Coating

**Sfere**  
Ball  
Coating  
Rivestite  
Non Rivestite  
Non-Coating

**Coniche**  
Taper  
Coating  
Rivestite  
Non Rivestite  
Non-Coating

**Toriche**  
Corner R  
Coating  
Rivestite  
Non Rivestite  
Non-Coating

**Frese**  
Sagomate  
Formed  
Cutter  
Coating  
Rivestite  
Non Rivestite  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

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Technical Guidance

Misura Size	Diam. Dia.	Passo Pitch	R elica Helical R	Acciaio inossidabile Stainless Steels AISI304			Leghe di Titanio Titanium Alloy Ti-6Al-4V			Leghe resistenti alle alte temperature - Inconel Heat Resistance Alloy Inconel			Leghe di Alluminio Aluminium Alloy A7075		
				Giri Spindle Speed	Avanz. Feed	Avanz. x dente Feed per Tooth	Giri Spindle Speed	Avanz. Feed	Avanz. x dente Feed per Tooth	Giri Spindle Speed	Avanz. Feed	Avanz. x dente Feed per Tooth	Giri Spindle Speed	Avanz. Feed	Avanz. x dente Feed per Tooth
				min <sup>-1</sup>	mm/min	mm/dente	min <sup>-1</sup>	mm/min	mm/dente	min <sup>-1</sup>	mm/min	mm/dente	min <sup>-1</sup>	mm/min	mm/dente
No.0-80UNF	1.16	0.318	R0.21	12,000	250	0.005	12,000	200	0.004	6,800	130	0.003	20,000	400	0.005
No.1-64UNF	1.4	0.397	R0.26	10,000	300	0.005	8,000	240	0.005	5,600	150	0.004	15,000	450	0.005
No.1-72UNF	1.45	0.353	R0.23	10,000	300	0.005	8,000	240	0.005	5,600	150	0.004	15,000	450	0.005
No.2-56UNC	1.63	0.454	R0.32	8,000	300	0.006	6,400	240	0.006	4,500	150	0.005	12,000	600	0.008
No.2-64UNF	1.69	0.397	R0.28	8,000	300	0.006	6,400	240	0.006	4,500	150	0.005	12,000	600	0.008
No.3-48UNC	1.88	0.529	R0.36	8,000	300	0.006	6,400	240	0.006	4,500	150	0.006	12,000	600	0.008
No.3-56UNF	1.96	0.454	R0.31	8,000	300	0.006	6,400	240	0.006	4,500	150	0.006	12,000	600	0.008
No.4-40UNC	2.09	0.635	R0.43	6,000	300	0.008	4,800	240	0.008	3,400	150	0.007	9,000	600	0.011
No.4-48UNF	2.21	0.529	R0.36	6,000	300	0.008	4,800	240	0.008	3,400	150	0.007	9,000	600	0.011
No.5-40UNC	2.38	0.635	R0.45	6,000	300	0.008	4,800	240	0.008	3,400	150	0.007	9,000	600	0.011
No.5-44UNF	2.45	0.577	R0.4	6,000	300	0.008	4,800	240	0.008	3,400	150	0.007	9,000	600	0.011
No.6-32UNC	2.54	0.794	R0.55	5,500	300	0.009	4,300	240	0.009	3,000	150	0.008	7,700	600	0.013
No.6-40UNF	2.72	0.635	R0.44	5,500	300	0.009	4,300	240	0.009	3,000	150	0.008	7,700	600	0.013
No.8-32UNC	3.14	0.794	R0.57	5,000	300	0.01	4,000	240	0.01	2,800	150	0.009	7,700	600	0.013
No.8-36UNF	3.24	0.706	R0.51	5,000	300	0.01	4,000	240	0.01	2,800	150	0.009	7,700	600	0.013
No.10-24UNC	3.52	1.058	R0.72	4,200	300	0.012	3,400	240	0.012	2,400	150	0.01	6,300	600	0.016
No.10-32UNF	3.8	0.794	R0.57	4,200	300	0.012	3,400	240	0.012	2,400	150	0.01	6,300	600	0.016
No.12-24UNC	4.14	1.058	R0.74	4,200	300	0.012	3,400	240	0.012	2,400	150	0.01	6,300	600	0.016
No.12-28UNF	4.29	0.907	R0.65	4,200	300	0.012	3,400	240	0.012	2,400	150	0.01	6,300	600	0.016
1/4-20UNC	4.77	1.27	R0.86	2,600	300	0.019	2,200	240	0.018	1,500	150	0.017	3,800	600	0.026
1/4-28UNF	5.16	0.907	R0.65	2,600	300	0.019	2,200	240	0.018	1,500	150	0.017	3,800	600	0.026

Note  
Notes

- ※ I dati di taglio indicati come linea guida si riferiscono a casi in cui la profondità di taglio è divisa in 2 e con lubrificante. Nel caso della misura 1/4 la profondità di taglio è divisa per 3.
- ※ Si consiglia di lavorare in concordanza.
- ※ Eseguire sempre un pre-foro guida.
- ※ In base alle condizioni di lavoro correggere il numero di giri, l'avanzamento, il numero di passate e la direzione di lavoro.
- ※ Se utilizzate il raggio R di interpolazione raccomandato, verificate che il diametro del preforo non crei interferenza con il gambo scaricato della fresa.
- ※ Aggiungere un passaggio a zero nel caso risulti una flessione nella filettatura.
- ※ Scegliere il raffreddamento appropriato al materiale da lavorare
- ※ The above Recommended Milling Conditions are provided as a reference for cutting when the depth of cut is divided into twice with water soluble cutting fluid. Also milling conditions for size 1/4 are for reference when it is divided into three times.
- ※ Down-cut is recommended.
- ※ Recommended making pilot hole in advance by using drill, etc.
- ※ Depending on environment, adjustment of spindle speed based on feed per tooth, feed, number of paths and cutting direction are needed.
- ※ When use helical R in the Recommended Milling Conditions, set pilot hole dia. for avoiding interference between the area of under neck and pilot hole is required.
- ※ Add zero-cut process in case completed thread has deflection.
- ※ Choose appropriate coolant for each working material.

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

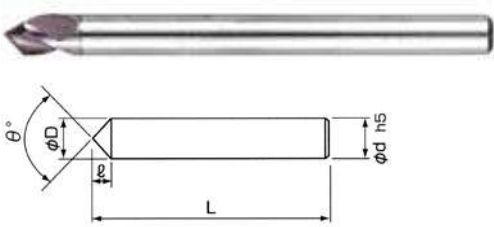
**Guida tecnica**  
Technical Guidance

# NCSV-M

Novità

CHAMPION SOLID 2-Flute Long End Mill

## Frese 3 tagli per smussi rivestite MUGEN



- Facilita le lavorazioni sugli angoli.
- Il rivestimento MUGEN conferisce lunga durata alla fresa e maggiore resistenza all'usura.
- It can be cut at the corner easily.
- Tool life is exceptionally as MUGEN-COATING provides additional wear resistance.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(Theta) smusso Taper Angle	(l) Lungh. tagliente Length of Cut	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00260-00400	4	90°	2	4	60
04-00260-00600	6	90°	3	6	70

**Attenzione** Quando ordinate, indicate NCSV-M (D).  
When you order, indicate NCSV-M (D).

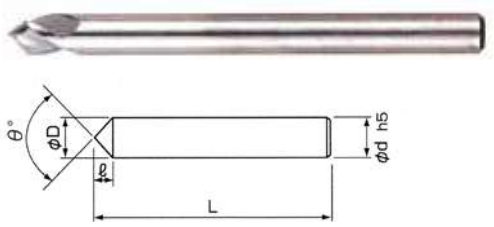
- Per i parametri di taglio vedi pagina 447.
- Milling condition is recommended on page 447.

# NCSV

Novità

CHAMPION SOLID 2-Flute Long Shank End Mill

## Frese 3 tagli per smussi



- Facilita le lavorazioni sugli angoli.
- It can be cut at the corner easily.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Dia. Dia.	(Theta) smusso Taper Angle	(l) Lungh. tagliente Length of Cut	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00250-00400	4	90°	2	4	60
04-00250-00600	6	90°	3	6	70

**Attenzione** Quando ordinate, indicate NCSV-M (D).  
When you order, indicate NCSV-M (D).

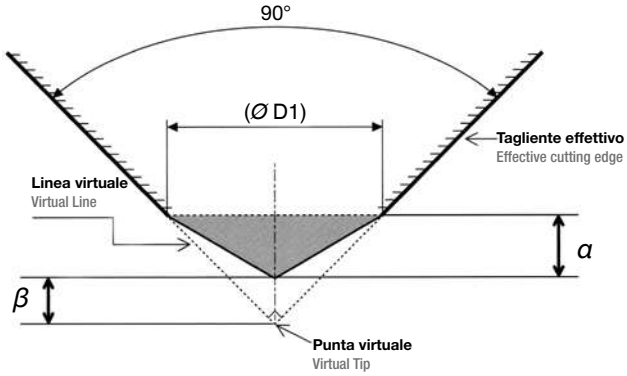
- Per i parametri di taglio vedi pagina 447.
- Milling condition is recommended on page 447.

### Precauzioni

Precaution for use

#### Individuare la sezione della punta

Enlargement of the tip section



Unità di misura: mm Unit size: mm

Diametro Dia.	$\alpha$	$\beta$	( $\phi$ D1)
4	0,15	0,06	0,42
6	0,45	0,15	1,2

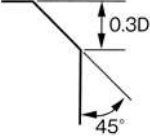
- ※ Regolare i punti di taglio in modo da evitare di impiegare la parte  $\alpha$  poiché la fresa non è tagliente in punta
- ※ La parte  $\alpha$  non è 90° quindi il valore  $\beta$  deve essere compensato nella direzione dell'ap durante la lavorazione basata sulla "punta virtuale". Fare attenzione nel caso di lavorazioni senza alcuna regolazione poiché lo smusso sarà maggiore del valore richiesto.
- ※ Required adjustment of the cut points to avoid using  $\alpha$  part because its tool tip has no cutting edges.
- ※ Because the tool tip  $\alpha$  part of point angle is not 90°, the value of  $\beta$  must be offset in the ap direction during machining on virtual tip basis.
- In case of no adjustments, it requires attention because chamfer will be bigger than targeted value.



## Parametri di taglio raccomandati

# NSCV-M • NSCV

### Recommended Milling Conditions

Materiale lavorato								
Misura Size	Acciaio al carbonio Carbon Steels C50		Acciaio inossidabile Stainless Steels AISI304		Acciaio pretemprato Prehardened Steels 1.2311•1.2738		Leghe di Alluminio Aluminium Alloy A5052	
	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed	Giri Spindle Speed	Avanzamento Feed
	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min	min <sup>-1</sup>	mm/min
<b>4</b>	6.500	580	6.000	540	4.500	400	11.000	2.400
<b>6</b>	4.300	380	4.000	360	3.000	270	7.500	1.800
Profondità di taglio Depth of Cut	 <p>D: Diametro nominale della fresa</p>							
Note Notes	<p>※ I parametri indicati in tabella si riferiscono a lavorazioni 4xD. In caso di lunghezze maggiori è necessario fare degli aggiustamenti</p> <p>※ Regolare nella stessa proporzione giri e avanzamento</p> <p>※ Macchina e mandrino devono essere sufficientemente rigidi</p> <p>※ Scegliere il raffreddamento appropriato al materiale da lavorare</p> <p>※ The above milling conditions are the value of reference for 4D, it needs adjustment of the conditions when it is longer.</p> <p>※ Adjust both spindle speed and feed at the same rate.</p> <p>※ Machine, tool chuck must be sufficiently rigid.</p> <p>※ Choose appropriate coolant for each working material.</p>							

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

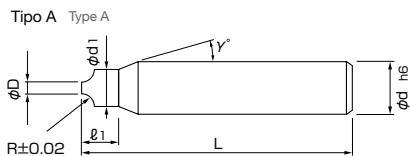
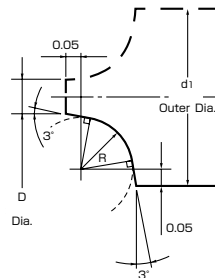
**Guida tecnica**  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

# MIR200

MUGEN-COATING 2-Flute Inner Radius Cutter

## Frese 2 Tagli con raggio concavo rivestite MUGEN



- Adatta per entrambi i processi: NC e MC.
- Eccezionale durata, grazie al rivestimento MUGEN, che fornisce un'alta resistenza all'usura.
- It is suitable for both processing NC and MC and can be cut at the corner radius easily.
- Tool life is exceptionally extended as MUGEN-COATING provides additional wear resistance.



Unità di misura: mm Unit size: mm

Codice. Code No.	(R) Raggio Radius	(D) Diametro Dia.	(d1) Dia. esterno Outer Dia.	(ℓ1) Lugh. dia. esterno Outer Dia. Length	(γ) Angolo Neck Taper Angle	Tipo Type	(d) Dia. gambo Shank Dia.	(L) Lugh. totale Overall Length
08-00900-00100	R0.1	0.5	0.8	3	12°	A	4	45
08-00900-00150	R0.15	0.5	0.9	3	12°	A	4	45
08-00900-00200	R0.2	0.5	1	3	12°	A	4	45
08-00900-00250	R0.25	0.5	1.1	3	12°	A	4	45
08-00900-00300	R0.3	0.5	1.2	3	12°	A	4	45
08-00900-00350	R0.35	0.5	1.3	3	12°	A	4	45
08-00900-00400	R0.4	0.5	1.4	3	12°	A	4	45
08-00900-00450	R0.45	0.5	1.5	3	12°	A	4	45
08-00900-00500	R0.5	0.5	1.6	5	12°	A	4	45
08-00900-00550	R0.55	0.5	1.7	5	12°	A	4	45
08-00900-00600	R0.6	0.5	1.8	5	12°	A	4	45
08-00900-00650	R0.65	0.5	1.9	5	12°	A	4	45
08-00900-00700	R0.7	0.5	2	5	12°	A	4	45
08-00900-00750	R0.75	0.5	2.1	5	12°	A	4	45
08-00900-00800	R0.8	0.8	2.5	5	12°	A	4	45
08-00900-00850	R0.85	0.8	2.6	5	12°	A	4	45
08-00900-00900	R0.9	0.8	2.7	5	12°	A	4	45
08-00900-00950	R0.95	0.8	2.8	5	12°	A	4	45
08-00900-01000	R1	0.8	2.9	8	12°	A	4	45
08-00900-01250	R1.25	0.8	3.4	8	12°	A	4	45
08-00900-01500	R1.5	1.5	4.6	8	-	B	4	45
08-00900-01750	R1.75	1.5	5.1	8	-	B	4	45
08-00900-02000	R2	1.5	5.6	10	-	B	4	45
08-00900-02500	R2.5	1.5	6.6	10	-	B	6	45
08-00900-03000	R3	1.5	7.6	12	45°	A	8	55
08-00900-03500	R3.5	2	9.1	12	45°	A	10	55
08-00900-04000	R4	2	10.1	12	-	B	10	55
08-00900-04500	R4.5	2	11.1	15	45°	A	12	65
08-00900-05000	R5	2	12.1	15	-	B	12	65

**Attenzione** Quando ordinate, indicate MIR200 (R).  
When you order, indicate MIR200 (R).

- Per i parametri di taglio vedi pagina 449.
- Milling condition is recommended on page 449.

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# Parametri di taglio raccomandati

# MIR200

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AiSI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738		
Velocità di taglio Cutting Speed	30~40m/min			20~30m/min			15~25m/min		
R	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Sgrossatura Roughing	Finitura Finishing		Sgrossatura Roughing	Finitura Finishing		Sgrossatura Roughing	Finitura Finishing
0.1	18,500	60	100	13,300	50	70	10,600	40	60
0.2	16,000	60	100	11,400	50	70	9,100	40	60
0.3	14,000	60	100	10,000	50	70	8,000	40	60
0.4	12,500	60	100	8,800	50	70	7,100	40	60
0.5	11,000	60	100	8,000	50	70	6,400	40	60
0.75	9,000	60	100	6,400	50	70	5,100	40	60
0.8	7,000	60	100	5,000	50	70	4,900	40	60
1	6,200	60	100	4,400	50	70	4,200	40	60
1.25	5,400	60	100	3,900	50	70	3,600	40	60
1.5	3,700	60	100	2,700	50	70	3,200	40	60
1.75	3,400	60	100	2,400	50	70	2,800	40	60
2	3,200	60	100	2,300	50	70	2,500	40	60
2.5	2,800	60	100	2,000	50	70	2,100	40	60
3	2,500	60	100	1,800	50	70	1,800	40	60
3.5	2,000	60	100	1,400	50	70	1,600	40	60
4	1,850	60	100	1,300	50	70	1,400	40	60
4.5	1,700	60	100	1,200	50	70	1,300	40	60
5	1,600	60	100	1,100	50	70	1,200	40	60
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Sgrossatura Roughing</p> </div> <div style="text-align: center;"> <p>Finitura Finishing</p> </div> </div> <p style="margin-left: 400px;">a</p> <p style="margin-left: 400px;">R 0.1~0.4 = 0.02 mm</p> <p style="margin-left: 400px;">R 0.5~5 = 0.05 mm</p>								
(R) Raggio Radius:									
Note Notes	<ul style="list-style-type: none"> <li>※ Usare lubrorefrigerante.</li> <li>※ Dividere la profondità di taglio in più passate.</li> <li>※ Use cutting fluid.</li> <li>※ Divide the cutting depth into several paths.</li> </ul>								

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

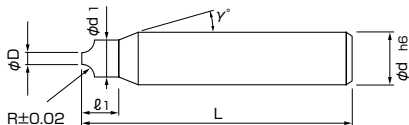
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

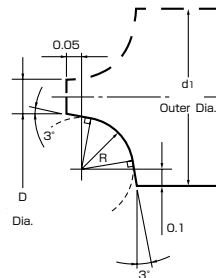
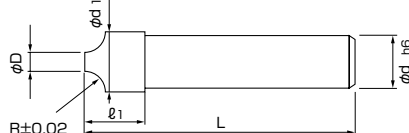
## Frese 2 Tagli con raggio concavo



Tipo A Type A



Tipo B Type B



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(D) Diametro Dia.	(d1) Dia esterno Outer Dia.	( $\ell_1$ ) Lungh. dia. esterno Outer Dia. Length	( $\gamma$ ) Angolo Neck Taper Angle	Tipo Type	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00913-00500	R0.5	1.5	2.7	4	9°	A	4	45
01-00913-00750	R0.75	1.5	3.2	4	9°	A	4	45
01-00913-01000	R1	1.5	3.7	4	9°	A	4	45
01-00913-01250	R1.25	1.5	4.2	4	—	B	4	45
01-00913-01500	R1.5	1.5	4.7	4	9°	A	6	45
01-00913-01750	R1.75	1.5	5.2	4	9°	A	6	45
01-00913-02000	R2	1.5	5.7	4	9°	A	6	45
01-00913-02500	R2.5	1.5	6.7	6	—	B	6	50
01-00913-03000	R3	1.5	7.7	6	9°	A	8	50

### Attenzione

Quando ordinate, indicate NCR-2X (R).  
When you order, indicate NCR-2X (R).

- Per i parametri di taglio vedi pagina 451.
- Milling condition is recommended on page 451.

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

# Parametri di taglio raccomandati

# NCR-2X

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AISI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738		
Velocità di taglio Cutting Speed	25~35m/min			20~30m/min			15~25m/min		
R	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Sgrossatura Roughing	Finitura Finishing		Sgrossatura Roughing	Finitura Finishing		Sgrossatura Roughing	Finitura Finishing
0.5	4,800	55	80	4,000	40	60	3,200	30	45
0.75	4,250	55	80	3,500	40	60	2,800	30	45
1	3,800	55	80	3,200	40	60	2,550	30	45
1.25	3,500	55	80	2,900	40	60	2,300	30	45
1.5	3,200	55	80	2,650	40	60	2,100	30	45
1.75	2,950	55	80	2,450	40	60	1,950	30	45
2	2,700	55	80	2,300	40	60	1,800	30	45
2.5	2,400	55	80	2,000	40	60	1,600	30	45
3	2,100	55	80	1,750	40	60	1,400	30	45
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Sgrossatura Roughing</p> </div> <div style="text-align: center;"> <p>Finitura Finishing</p> </div> </div>								
(R) Raggio Radius.									
Note Notes	※ Usare lubrificante. ※ Dividere la profondità di taglio in più passate. ※ Use cutting fluid. ※ Divide the cutting depth into several paths.								

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

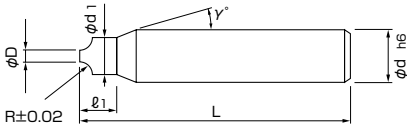
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

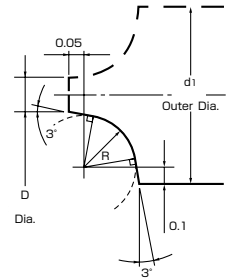
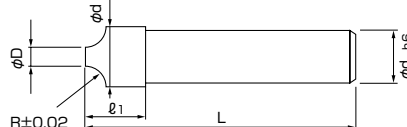
## Frese 2 Tagli con raggio concavo



Tipo A Type A



Tipo B Type B



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.

Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(D) Diametro Dia.	(d1) Dia. esterno Outer Dia.	(ℓ1) Lungh. dia. esterno Outer Dia. Length	(γ) Angolo Neck Taper Angle	Tipo Type	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
01-00912-00500	R0.5	1.5	2.7	4	9°	A	4	45
01-00912-00750	R0.75	1.5	3.2	4	9°	A	4	45
01-00912-01000	R1	1.5	3.7	4	9°	A	4	45
01-00912-01250	R1.25	1.5	4.2	4	—	B	4	45
01-00912-01500	R1.5	1.5	4.7	4	9°	A	6	45
01-00912-01750	R1.75	1.5	5.2	4	9°	A	6	45
01-00912-02000	R2	1.5	5.7	4	9°	A	6	45
01-00912-02250	R2.25	1.5	6.2	6	—	B	6	50
01-00912-02500	R2.5	1.5	6.7	6	—	B	6	50
01-00912-02750	R2.75	1.5	7.2	6	9°	A	8	70
01-00912-03000	R3	1.5	7.7	6	9°	A	8	50
01-00912-03250	R3.25	3	9.7	12	9°	A	10	75
01-00912-03500	R3.5	3	10.2	11.5	—	B	10	75
01-00912-03750	R3.75	3	10.7	15	—	B	10	75
01-00912-04000	R4	3	11.2	14.5	—	B	10	75
01-00912-04250	R4.25	3	11.7	14.5	—	B	10	80
01-00912-04500	R4.5	3.5	12.7	14.5	—	B	12	80
01-00912-04750	R4.75	3.5	13.2	14.5	—	B	12	80
01-00912-05000	R5	3.5	13.7	14.5	—	B	12	80

**Attenzione** Quando ordinate, indicate NCR-2 (R).  
When you order, indicate NCR-2 (R).

- Per i parametri di taglio vedi pagina 453.
- Milling condition is recommended on page 453.

# Parametri di taglio raccomandati

# NCR-2

## Recommended Milling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4 • 39NiCrMo3•AiSI304			Acciaio pretemprato Prehardened Steels 1.2311•1.2738		
Velocità di taglio Cutting Speed	25~35m/min			20~30m/min			15~25m/min		
R	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Sgrossatura Roughing	Finitura Finishing		Sgrossatura Roughing	Finitura Finishing		Sgrossatura Roughing	Finitura Finishing
0.5	4,800	55	80	4,000	40	60	3,200	30	45
0.75	4,250	55	80	3,500	40	60	2,800	30	45
1	3,800	55	80	3,200	40	60	2,550	30	45
1.25	3,500	55	80	2,900	40	60	2,300	30	45
1.5	3,200	55	80	2,650	40	60	2,100	30	45
1.75	2,950	55	80	2,450	40	60	1,950	30	45
2	2,700	55	80	2,300	40	60	1,800	30	45
2.5	2,400	55	80	2,000	40	60	1,600	30	45
3	2,100	55	80	1,750	40	60	1,400	30	45
Profondità di taglio Depth of Cut  (R) Raggio Radius	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Sgrossatura Roughing</p> </div> <div style="text-align: center;"> <p>Finitura Finishing</p> </div> </div>								
Note Notes	※ Usare lubrificante. ※ Dividere la profondità di taglio in più passate. ※ Use cutting fluid. ※ Divide the cutting depth into several paths.								

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane Square**  
Coating  
Non-Rivestite Non-Coating

**Scaricate Piano Long Neck Square**  
Coating  
Non-Rivestite Non-Coating

**Sferiche Ball**  
Coating  
Rivestite Rivestite

**Scaricate Sferiche Long Neck Ball**  
Coating  
Non-Rivestite Non-Coating

**Coniche Taper**  
Coating  
Rivestite Rivestite

**Coniche Sferiche Taper Ball**  
Coating  
Non-Rivestite Non-Coating

**Toriche Corner R**  
Coating  
Rivestite Rivestite

**Scaricate Toriche Long Neck Corner R**  
Coating  
Non-Rivestite Non-Coating

**Frese Sagomate Formed Cutter**  
Coating  
Rivestite Rivestite

**Punte Drill**

**Altro Others**

**Dati tecnici Technical Data**

**Guida tecnica Technical Guidance**

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

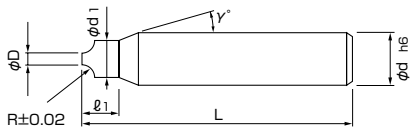
# DIR

2-Flute Inner Radius Cutter for Nonferrous

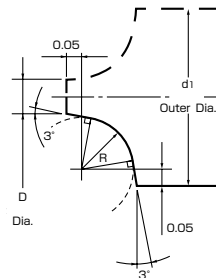
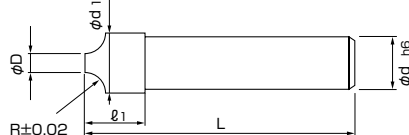
## Frese 2 Tagli con raggio concavo per materiali non ferrosi



Tipo A Type A



Tipo B Type B



- Articolo semi-standard, prezzo e consegna su richiesta.
- Semi-standard item, please inquire for price and delivery.



Unità di misura: mm Unit size: mm

Codice Code No.	(R) Raggio Radius	(D) Diametro Dia.	(d1) Dia. esterno Outer Dia.	(l1) Lungh. dia. esterno Outer Dia. Length	(γ) Angolo Neck Taper Angle	Tipo Type	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
07-00913-00100	R0.1	0.5	0.8	3	12°	A	4	45
07-00913-00150	R0.15	0.5	0.9	3	12°	A	4	45
07-00913-00200	R0.2	0.5	1	3	12°	A	4	45
07-00913-00250	R0.25	0.5	1.1	3	12°	A	4	45
07-00913-00300	R0.3	0.5	1.2	3	12°	A	4	45
07-00913-00350	R0.35	0.5	1.3	3	12°	A	4	45
07-00913-00400	R0.4	0.5	1.4	3	12°	A	4	45
07-00913-00450	R0.45	0.5	1.5	3	12°	A	4	45
07-00913-00500	R0.5	0.5	1.6	5	12°	A	4	45
07-00913-00550	R0.55	0.5	1.7	5	12°	A	4	45
07-00913-00600	R0.6	0.5	1.8	5	12°	A	4	45
07-00913-00650	R0.65	0.5	1.9	5	12°	A	4	45
07-00913-00700	R0.7	0.5	2	5	12°	A	4	45
07-00913-00750	R0.75	0.5	2.1	5	12°	A	4	45
07-00913-00800	R0.8	0.8	2.5	5	12°	A	4	45
07-00913-00850	R0.85	0.8	2.6	5	12°	A	4	45
07-00913-00900	R0.9	0.8	2.7	5	12°	A	4	45
07-00913-00950	R0.95	0.8	2.8	5	12°	A	4	45
07-00913-01000	R1	0.8	2.9	8	12°	A	4	45
07-00913-01250	R1.25	0.8	3.4	8	12°	A	4	45
07-00913-01500	R1.5	1.5	4.6	8	-	B	4	45
07-00913-01750	R1.75	1.5	5.1	8	-	B	4	45
07-00913-02000	R2	1.5	5.6	10	-	B	4	45
07-00913-02500	R2.5	1.5	6.6	10	-	B	6	45
07-00913-03000	R3	1.5	7.6	12	45°	A	8	55
07-00913-03500	R3.5	2	9.1	12	45°	A	10	55
07-00913-04000	R4	2	10.1	12	-	B	10	55
07-00913-04500	R4.5	2	11.1	15	45°	A	12	65
07-00913-05000	R5	2	12.1	15	-	B	12	65

**Attenzione** Quando ordinate, indicate (R).  
When you order, indicate (R).

- Per i parametri di taglio vedi pagina 455.
- Milling condition is recommended on page 455.



# Parametri di taglio raccomandati

# DIR

## Recommended Milling Conditions

Materiale Work Material	Rame Copper			Alluminio Aluminum		
Velocità di taglio Cutting Speed	80m/min			80~150m/min		
R	Giri Spindle Speed	Avanzamento Feed		Giri Spindle Speed	Avanzamento Feed	
	min <sup>-1</sup>	mm/min		min <sup>-1</sup>	mm/min	
		Sgrossatura Roughing	Finitura Finishing		Sgrossatura Roughing	Finitura Finishing
0.1	32,000	300	450	50,000	470	860
0.2	26,000	300	450	50,000	470	860
0.3	21,000	300	450	42,000	600	900
0.4	18,000	200	300	36,000	400	600
0.5	16,000	200	300	32,000	400	600
0.6	14,000	200	300	28,000	400	600
0.7	13,000	200	300	26,000	400	600
0.8	10,000	200	300	20,000	400	600
0.9	9,500	200	300	19,000	400	600
1	8,800	200	300	17,600	400	600
1.25	7,500	200	300	15,000	400	600
1.5	5,600	150	250	11,200	300	500
1.75	5,000	150	250	10,000	300	500
2	4,600	150	250	9,200	300	500
2.5	3,900	150	250	7,800	300	500
3	3,400	150	250	6,800	300	500
3.5	2,800	120	200	5,600	240	400
4	2,500	120	200	5,000	240	400
4.5	2,300	120	200	4,600	240	400
5	2,100	120	200	4,200	240	400
Profondità di taglio Depth of Cut	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Sgrossatura Roughing</p> </div> <div style="text-align: center;"> <p>Finitura Finishing</p> </div> </div> <p style="margin-left: 400px;">a R 0.1~0.4 = 0.02 R 0.5~5 = 0.05</p>					
(R) Raggio Radius						
Note Notes	<ul style="list-style-type: none"> <li>※ Usare lubrificante.</li> <li>※ Regolare nella stessa proporzione giri ed avanzamento.</li> <li>※ Non utilizzare per fresare l'acciaio.</li> <li>※ Use cutting fluid.</li> <li>※ Adjust both spindle speed and feed at the same rate.</li> <li>※ Don't use for cutting steels.</li> </ul>					

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

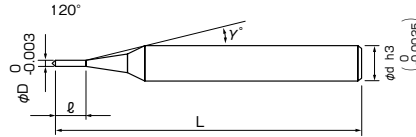
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# NSMD

Micro Drill

## Micro-punte



NSMD00.01



- Misure standard a partire da Ø0.01, grazie alla tecnologia NS.
- Micropunte di super precisione sviluppano nuove capacità di foratura.
- L'affilatura riduce gli sforzi per precise forature (Ø0.02-).
- Tipo standard: 10xD.
- Standardized from dia. 0.01mm by concentrating NS manufacturing technology!
- Micro Drill develops new drilling capability.
- Thinning on the cutting edge to reduce cutting forces for accurate drilling. (Dia. 0.02-)
- L/D=10 standard type.



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(ℓ) Lungh. elica Flute Length	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00001-00100	0.01	0.1	15°	4	40
04-00001-00150	0.015	0.15	15°	4	40
04-00001-00200	0.02	0.2	15°	4	40
04-00001-00250	0.025	0.25	15°	4	40
04-00001-00300	0.03	0.3	15°	4	40
04-00001-00400	0.04	0.4	15°	4	40
04-00001-00500	0.05	0.5	15°	4	40
04-00001-00600	0.06	0.6	15°	4	40
04-00001-00700	0.07	0.7	15°	4	40
04-00001-00800	0.08	0.8	15°	4	40
04-00001-00900	0.09	0.9	15°	4	40
04-00001-01000	0.1	1	15°	4	40

**Attenzione** Quando ordinate, indicate NSMD (D). \* (γ) è un valore di riferimento.  
When you order, indicate NSMD (D). \* (γ) is reference value.

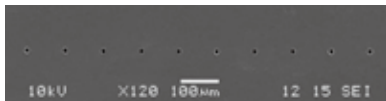
- Per i parametri di taglio vedi pagina 462.
- Drilling condition is recommended on page 462.

### Dati Tecnici 1 Technical Data 1

**Alluminio** Aluminum

■ **Diametro del foro: Ø0.01mm foro cieco profondità 0.1 mm (L/D=10)**

Hole description: Ø0.01mm Blind hole Depth 0.1mm (L/D=10)



Giri Spindle Speed	60,000min <sup>-1</sup>
Avanzamento Feed	2mm/min
Step Step Feed	0.2µm
Lubrificazione Coolant	Minimale Oil Mist



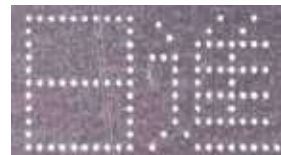
Misura punta: Ø0.01  
Drill Size  
Materiale: A5052  
Work Material  
Numero di fori: 10  
No. of holes: 10 holes  
Tempo di lavoro: 1hr 20min.  
Process time: 1hr 20min

### Dati Tecnici 2 Technical Data 2

**AISI304 (inox)** SUS304

■ **Diametro del foro: Ø0.03 mm foro cieco profondità 0.15 mm (L/D=5)**

Hole description: Ø0.03mm Through hole Depth 0.15mm (L/D=5)



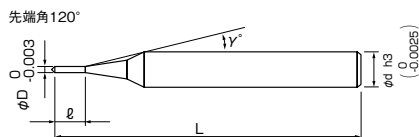
Giri Spindle Speed	60,000min <sup>-1</sup>
Avanzamento Feed	1mm/min
Step Step Feed	1µm
Lubrificazione Coolant	Minimale Oil Mist

Misura punta: Ø0.03  
Drill Size  
Materiale: AISI304  
Work Material  
Numero di fori: 105  
No. of holes: 105 holes  
Tempo di lavoro: 16hr.  
Process time: 16hr

# NSMD-S

Micro Drill Short

## Micro-punte corte



- Tipo corto: 6xD, realizza forature stabili.
- L'affilatura sul tagliente riduce le forze di taglio per forature precise ( $\phi 0.02$ -).
- L/D=6 short type, realized stable drilling.
- Thinning on the cutting edge to reduce cutting forces for accurate drilling. (Dia. 0.02-)



Unità di misura: mm Unit size: mm

Code Code No.	(D) Diametro Dia.	( $\ell$ ) Lungh. elica Flute Length	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00005-00100	0.01	0.06	15°	4	40
04-00005-00150	0.015	0.09	15°	4	40
04-00005-00200	0.02	0.12	15°	4	40
04-00005-00250	0.025	0.15	15°	4	40
04-00005-00300	0.03	0.18	15°	4	40
04-00005-00400	0.04	0.24	15°	4	40
04-00005-00500	0.05	0.3	15°	4	40

### Attenzione

Quando ordinate, indicate NSMD-S (D)  
When you order, indicate NSMD-S (D).

※( $\gamma$ ) è un valore di riferimento  
※( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 462.
- Drilling condition is recommended on page 462.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitrato Cubico  
di Boro

# NSPD

Micro Point Drill

## Micro-punte da centro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

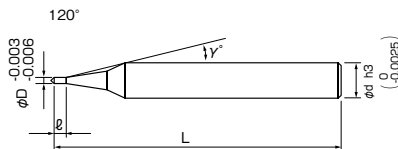
**Punte**

Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



- Micro-punte per fori guida.
- L'affilatura sul tagliente riduce le forze di taglio per forature precise (Ø0.025-).
- Micro Point Drill for guide hole.
- Thinning on the cutting edge to reduce cutting forces for accurate drilling. (Dia. 0.025-).



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(ℓ) Lungh. elica Flute Length	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00010-00100	0.01	0.015	15°	4	40
04-00010-00150	0.015	0.025	15°	4	40
04-00010-00200	0.02	0.04	15°	4	40
04-00010-00250	0.025	0.05	15°	4	40
04-00010-00300	0.03	0.06	15°	4	40
04-00010-00400	0.04	0.08	15°	4	40
04-00010-00500	0.05	0.1	15°	4	40
04-00010-00600	0.06	0.12	15°	4	40
04-00010-00700	0.07	0.14	15°	4	40
04-00010-00800	0.08	0.16	15°	4	40
04-00010-00900	0.09	0.18	15°	4	40
04-00010-01000	0.1	0.2	15°	4	40

**Attenzione** Quando ordinate, indicate NSPD Diametro (D)  
When you order, indicate NSPD (D).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 462.
- Drilling condition is recommended on page 462.

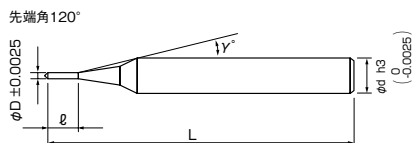
NSPD Ø0.03



# NSMD-M

MUGEN Micro Coating Micro Drill

## Micro punte corte rivestite MUGEN Micro



- Tipo standard: 10xD
- Lo speciale spessore del rivestimento per le punte micro garantisce altissime prestazioni su acciaio incluso acciaio inox.
- L'affilatura sul tagliente riduce le forze di taglio per forature precise (Ø0.02-).
- L/D=10 standard type.
- Special thin film coating for Micro Drill exercise high drilling performance on steels include stainless steels.
- Thinning on the cutting edge to reduce cutting forces for accurate drilling. (Dia. 0.02-).



Unità di misura: mm Unit size: mm

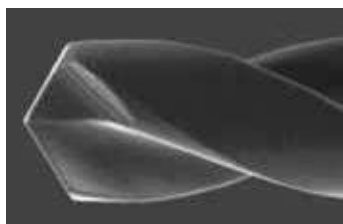
Code Code No.	(D) Diametro Dia.	(ℓ) Lungh. elica Flute Length	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00002-00100	0.01	0.1	15°	4	40
04-00002-00150	0.015	0.15	15°	4	40
04-00002-00200	0.02	0.2	15°	4	40
04-00002-00250	0.025	0.25	15°	4	40
04-00002-00300	0.03	0.3	15°	4	40
04-00002-00350	0.035	0.4	15°	4	40
04-00002-00400	0.04	0.4	15°	4	40
04-00002-00450	0.045	0.5	15°	4	40
04-00002-00500	0.05	0.5	15°	4	40
04-00002-00550	0.055	0.6	15°	4	40
04-00002-00600	0.06	0.6	15°	4	40
04-00002-00650	0.065	0.7	15°	4	40
04-00002-00700	0.07	0.7	15°	4	40
04-00002-00750	0.075	0.8	15°	4	40
04-00002-00800	0.08	0.8	15°	4	40
04-00002-00850	0.085	0.9	15°	4	40
04-00002-00900	0.09	0.9	15°	4	40
04-00002-00950	0.095	1	15°	4	40
04-00002-01000	0.1	1	15°	4	40

### Attenzione

Quando ordinate, indicate NSMD-M (D) ※(γ) è un valore di riferimento  
When you order, indicate NSMD-M (D). ※(γ) is reference value.

- Per i parametri di taglio vedi pagina 462.
- Drilling condition is recommended on page 462.

NSMD-M Ø0.03



CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane  
Square  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

# NSMD-MS

MUGEN Micro Coating Micro Drill Short

## Micro punte corte rivestite MUGEN Micro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

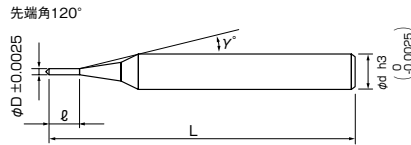
**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



- Tipo corto: 6xD.
- Lo speciale spessore del rivestimento garantisce altissime prestazioni su acciaio incluso acciaio inox.
- L'affilatura del tagliente riduce le forze di taglio per forture precise ( $\phi 0.02$ -).
- L/D=6 short type.
- Special thin film coating for Micro Drill exercise high drilling performance on steels include stainless steels.
- Thinning on the cutting edge to reduce cutting forces for accurate drilling. (Dia. 0.02-).



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	( $\ell$ ) Lungh. elica Flute Length	( $\gamma$ ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00006-00100	0.01	0.06	15°	4	40
04-00006-00150	0.015	0.09	15°	4	40
04-00006-00200	0.02	0.12	15°	4	40
04-00006-00250	0.025	0.15	15°	4	40
04-00006-00300	0.03	0.18	15°	4	40
04-00006-00350	0.035	0.24	15°	4	40
04-00006-00400	0.04	0.24	15°	4	40
04-00006-00450	0.045	0.3	15°	4	40
04-00006-00500	0.05	0.3	15°	4	40

### Attenzione

Quando ordinate, indicate NSMD-MS (D)  
When you order, indicate NSMD-MS (D).

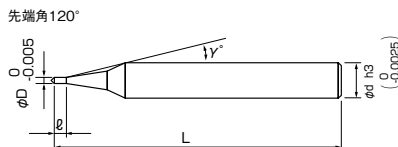
※( $\gamma$ ) è un valore di riferimento.  
※( $\gamma$ ) is reference value.

- Per i parametri di taglio vedi pagina 462.
- Drilling condition is recommended on page 462.

# NSPD-M

MUGEN Micro Coating Micro Point Drill

## Micro punte da centro rivestite MUGEN Micro



- Micro punte da centri e per fori guida.
- Lo speciale spessore del rivestimento garantisce altissime prestazioni su acciaio incluso acciaio inox.
- L'affilatura sul tagliente riduce le forze di taglio per forature precise (Ø0.025-).
- Guide hole for Micro Drill.
- Special thin film coating for Micro Drill exercise high drilling performance on steels include stainless steels.
- Thinning on the cutting edge to reduce cutting forces for accurate drilling. (Dia. 0.025-).



Unità di misura: mm Unit size: mm

Code No.	(D) Diametro Dia.	(ℓ) Lungh. elica Flute Length	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00012-00100	0.01	0.015	15°	4	40
04-00012-00150	0.015	0.025	15°	4	40
04-00012-00200	0.02	0.04	15°	4	40
04-00012-00250	0.025	0.05	15°	4	40
04-00012-00300	0.03	0.06	15°	4	40
04-00012-00400	0.04	0.08	15°	4	40
04-00012-00500	0.05	0.1	15°	4	40
04-00012-00600	0.06	0.12	15°	4	40
04-00012-00700	0.07	0.14	15°	4	40
04-00012-00800	0.08	0.16	15°	4	40
04-00012-00900	0.09	0.18	15°	4	40
04-00012-01000	0.1	0.2	15°	4	40

### Attenzione

Quando ordinate, indicate NSPD-M (D).  
When you order, indicate NSPD-M (D).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 462.
- Drilling condition is recommended on page 462.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane Square  
Rivestite Coating  
Non Rivestite Non-Coating

Scaricate Plane Long Neck Square  
Rivestite Coating  
Non Rivestite Non-Coating

Sferiche Ball  
Rivestite Coating  
Non Rivestite Non-Coating

Scaricate Sferiche Long Neck Ball  
Rivestite Coating  
Non Rivestite Non-Coating

Coniche Taper  
Rivestite Coating  
Non Rivestite Non-Coating

Coniche Sferiche Taper Ball  
Rivestite Coating  
Non Rivestite Non-Coating

Toriche Corner R  
Rivestite Coating  
Non Rivestite Non-Coating

Scaricate Toriche Long Neck Corner R  
Rivestite Coating  
Non Rivestite Non-Coating

Frese Sagomate Formed Cutter  
Rivestite Coating  
Non Rivestite Non-Coating

Punte Drill

Altro Others

Dati tecnici Technical Data

Guida tecnica Technical Guidance

## Parametri di taglio raccomandati

**NSMD • NSMD-S •  
NSMD-M • NSMD-MS**

### Recommended Drilling Conditions

Materiale Work Material	Acciaio inox Stainless Steels AIS1304			Alluminio Aluminum A5052		
	Giri Spindle Speed	Avanzamento Feed	Step Step Feed	Giri Spindle Speed	Avanzamento Feed	Step Step Feed
Diametro Dia.	min <sup>-1</sup>	mm/min	µm	min <sup>-1</sup>	mm/min	µm
<b>0.01</b>	20,000	1	0.1	30,000	2	0.5
<b>0.03</b>	20,000	2	0.5	30,000	3	1.5
<b>0.05</b>	20,000	2	3	30,000	4	5
<b>0.1</b>	20,000	5	5	25,000	10	10
Note Notes	※ Usare un refrigerante appropriato per il materiale da lavorare ed il tipo di lavorazione da eseguire. ※ Minimizzare l'eccentricità del serraggio e controllare l'eccentricità dinamica. ※ Preparare una superficie piana prima di iniziare la foratura. ※ Maneggiare con la massima cura durante il montaggio e lo smontaggio. ※ Use appropriate coolant for work material and machining description. ※ Minimize chucking runout by setting spindle speed at minimum oscillation. (Recommend to measure actual runout at activated rpm) ※ Set up flat surface before start machining. ※ Take extra care when chucking in and out.					

## Parametri di taglio raccomandati

**NSPD • NSPD-M**

### Recommended Drilling Conditions

Materiale Work Material	Acciaio inox Stainless Steels AIS1304			Alluminio Aluminum A5052		
	Giri Spindle Speed	Avanzamento Feed	Step Step Feed	Giri Spindle Speed	Avanzamento Feed	Step Step Feed
Dia. Dia.	min <sup>-1</sup>	mm/min	µm	min <sup>-1</sup>	mm/min	µm
<b>0.01</b>	20,000	1	0.1	20,000	1	0.1
<b>0.03</b>	20,000	2	0.5	20,000	2	0.5
<b>0.05</b>	20,000	2	1	20,000	2	1
<b>0.1</b>	20,000	5	2	25,000	5	2
Note Notes	※ Usare un refrigerante appropriato per il materiale da lavorare ed il tipo di lavorazione da eseguire. ※ Minimizzare l'eccentricità del serraggio e controllare l'eccentricità dinamica. ※ Preparare una superficie piana prima di iniziare la foratura. ※ Maneggiare con la massima cura durante il montaggio e lo smontaggio. ※ Use appropriate coolant for work material and machining description. ※ Minimize chucking runout by setting spindle speed at minimum oscillation (Recommend to measure actual runout at activated rpm). ※ Set up flat surface before start machining. ※ Take extra care when chucking in and out.					



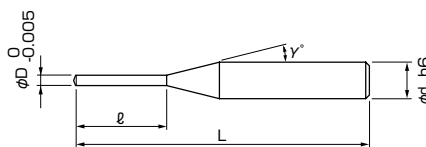
# MDR-R

MUGEN-COATING Miniature Drill

## Punte per miniature rivestite MUGEN



先端角 120°



- Durata lunga e stabile grazie al rivestimento MUGEN.
- Lavorazioni ad altissima precisione. Tolleranza del diametro: 0/-0.005 mm.
- Stable and long-life drill realized by MUGEN-COATING.
- High accuracy suitable for precision machining. Tolerance of diameter : 0/-0.005 mm.

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diam. Dia.	(l) Lungh. elica Flute Length	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00200-00100	0.1	1.2	15°	3	38
04-00200-00110	0.11	1.2	15°	3	38
04-00200-00120	0.12	1.4	15°	3	38
04-00200-00130	0.13	1.4	15°	3	38
04-00200-00140	0.14	1.4	15°	3	38
04-00200-00150	0.15	1.8	15°	3	38
04-00200-00160	0.16	1.8	15°	3	38
04-00200-00170	0.17	1.8	15°	3	38
04-00200-00180	0.18	2.1	15°	3	38
04-00200-00190	0.19	2.1	15°	3	38
04-00200-00200	0.2	2.4	15°	3	38
04-00200-00210	0.21	2.4	15°	3	38
04-00200-00220	0.22	2.6	15°	3	38
04-00200-00230	0.23	2.6	15°	3	38
04-00200-00240	0.24	2.6	15°	3	38
04-00200-00250	0.25	3	15°	3	38
04-00200-00260	0.26	3	15°	3	38
04-00200-00270	0.27	3	15°	3	38
04-00200-00280	0.28	3.3	15°	3	38
04-00200-00290	0.29	3.3	15°	3	38
04-00200-00300	0.3	5	15°	3	38
04-00200-00310	0.31	5	15°	3	38
04-00200-00320	0.32	5	15°	3	38
04-00200-00330	0.33	5	15°	3	38
04-00200-00340	0.34	5	15°	3	38
04-00200-00350	0.35	5	15°	3	38
04-00200-00360	0.36	5	15°	3	38
04-00200-00370	0.37	5	15°	3	38
04-00200-00380	0.38	5	15°	3	38
04-00200-00390	0.39	5	15°	3	38
04-00200-00400	0.4	6	15°	3	38
04-00200-00410	0.41	6	15°	3	38
04-00200-00420	0.42	6	15°	3	38

Codice Code No.	(D) Diam. Dia.	(l) Lungh. elica Flute Length	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00200-00430	0.43	6	15°	3	38
04-00200-00440	0.44	6	15°	3	38
04-00200-00450	0.45	6	15°	3	38
04-00200-00460	0.46	6	15°	3	38
04-00200-00470	0.47	6	15°	3	38
04-00200-00480	0.48	6	15°	3	38
04-00200-00490	0.49	6	15°	3	38
04-00200-00500	0.5	6	15°	3	38
04-00200-00510	0.51	6	15°	3	38
04-00200-00520	0.52	6	15°	3	38
04-00200-00530	0.53	6	15°	3	38
04-00200-00540	0.54	6	15°	3	38
04-00200-00550	0.55	6	15°	3	38
04-00200-00560	0.56	6	15°	3	38
04-00200-00570	0.57	6	15°	3	38
04-00200-00580	0.58	6	15°	3	38
04-00200-00590	0.59	6	15°	3	38
04-00200-00600	0.6	7	15°	3	38
04-00200-00610	0.61	7	15°	3	38
04-00200-00620	0.62	7	15°	3	38
04-00200-00630	0.63	7	15°	3	38
04-00200-00640	0.64	7	15°	3	38
04-00200-00650	0.65	7	15°	3	38
04-00200-00660	0.66	7	15°	3	38
04-00200-00670	0.67	7	15°	3	38
04-00200-00680	0.68	7	15°	3	38
04-00200-00690	0.69	7	15°	3	38
04-00200-00700	0.7	8	15°	3	38
04-00200-00710	0.71	8	15°	3	38
04-00200-00720	0.72	8	15°	3	38
04-00200-00730	0.73	8	15°	3	38
04-00200-00740	0.74	8	15°	3	38
04-00200-00750	0.75	8	15°	3	38

### Attenzione

Quando ordinate, indicate MDR-R (D). ※(γ) è un valore di riferimento.  
When you order, indicate MDR-R (D). ※(γ) is reference value.

- Per i parametri di taglio vedi pagina 465.
- Drilling condition is recommended on page 465.

CBN  
Nitruro Cubico  
di Boro

Diamante  
Diamond

Piane  
Square

Scaricate  
Piane

Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche

Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche

Taper Ball

Toriche  
Corner R

Scaricate  
Toriche

Long Neck  
Corner R

Frese  
Sagomate

Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

**CBN**

Nitruro Cubico di Boro

**Diamante**

Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

Technical Data

**Guida tecnica**

Technical Guidance

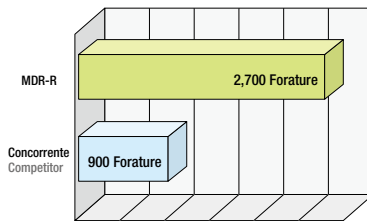
Codice Code No.	(D) Diam. Dia.	(ℓ) Lungh. elica Flute Length	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00200-00760	0.76	8	15°	3	38
04-00200-00770	0.77	8	15°	3	38
04-00200-00780	0.78	8	15°	3	38
04-00200-00790	0.79	8	15°	3	38
04-00200-00800	0.8	8	15°	3	38
04-00200-00810	0.81	8	15°	3	38
04-00200-00820	0.82	8	15°	3	38
04-00200-00830	0.83	8	15°	3	38
04-00200-00840	0.84	8	15°	3	38
04-00200-00850	0.85	8	15°	3	38
04-00200-00860	0.86	8	15°	3	38
04-00200-00870	0.87	8	15°	3	38
04-00200-00880	0.88	8	15°	3	38

Codice Code No.	(D) Diam. Dia.	(ℓ) Lungh. elica Flute Length	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00200-00890	0.89	8	15°	3	38
04-00200-00900	0.9	8	15°	3	38
04-00200-00910	0.91	8	15°	3	38
04-00200-00920	0.92	8	15°	3	38
04-00200-00930	0.93	8	15°	3	38
04-00200-00940	0.94	8	15°	3	38
04-00200-00950	0.95	8	15°	3	38
04-00200-00960	0.96	8	15°	3	38
04-00200-00970	0.97	8	15°	3	38
04-00200-00980	0.98	8	15°	3	38
04-00200-00990	0.99	8	15°	3	38
04-00200-01000	1	10	15°	3	38

## Dati Tecnici 1 Technical Data 1

**C50** Foratura con foro passante Through hole drilling

Utensile Tool	MDR-RØ1
Giri Spindle Speed	10,000 min <sup>-1</sup>
Avanzamento Feed	500 mm/min
Step Step Feed	0.5 mm
Profondità foro Depth of Hole	9 mm (passante) Through
Lubrificazione Coolant	Lubrorefrigerante Water Soluble Fluid

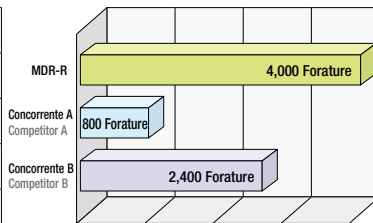


Numero di fori  
Number of holes

## Dati Tecnici2 Technical Data 2

**AISI304** Foratura con foro passante Through hole drilling

Utensile Tool	MDR-RØ0.5
Giri Spindle Speed	7,000 min <sup>-1</sup>
Avanzamento Feed	105 mm/min
Step Step Feed	0.1 mm
Profondità foro Depth of Hole	4 mm (passante) Through
Lubrificazione Coolant	Lubrorefrigerante Water Soluble Fluid



Numero di fori  
Number of holes

# Parametri di taglio raccomandati

# MDR-R

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

## Recommended Drilling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3			Acciaio pretemprato Prehardened Steels 1.2311•1.2738 (~40HRC)			Leghe di alluminio Aluminum Alloy A5052			Acciaio inox Stainless Steels AISI304		
	Giri Spindle Speed	Avanzamento Feed	Step Step Feed	Giri Spindle Speed	Avanzamento Feed	Step Step Feed	Giri Spindle Speed	Avanzamento Feed	Step Step Feed	Giri Spindle Speed	Avanzamento Feed	Step Step Feed	Giri Spindle Speed	Avanzamento Feed	Step Step Feed
Dia. Dia.	min <sup>-1</sup>	mm/min	mm	min <sup>-1</sup>	mm/min	mm	min <sup>-1</sup>	mm/min	mm	min <sup>-1</sup>	mm/min	mm	min <sup>-1</sup>	mm/min	mm
0.1	25,000	50	0.02	20,000	40	0.02	17,000	35	0.02	25,000	50	0.05	15,000	30	0.005
0.15	25,000	50	0.02	20,000	40	0.02	17,000	35	0.02	25,000	50	0.05	15,000	30	0.005
0.2	25,000	75	0.04	20,000	60	0.04	17,000	50	0.04	25,000	100	0.1	15,000	45	0.01
0.25	25,000	75	0.04	20,000	60	0.04	17,000	50	0.04	25,000	100	0.2	15,000	45	0.01
0.3	20,000	120	0.05	15,000	60	0.05	13,000	50	0.05	22,000	400	0.3	11,000	45	0.02
0.35	20,000	120	0.05	15,000	60	0.05	13,000	50	0.05	22,000	400	0.3	11,000	45	0.02
0.4	20,000	160	0.06	15,000	75	0.06	13,000	65	0.06	22,000	700	0.4	8,500	45	0.04
0.45	20,000	160	0.06	15,000	75	0.06	13,000	65	0.06	22,000	700	0.4	8,500	45	0.07
0.5	18,000	180	0.1	13,000	100	0.1	10,000	80	0.1	20,000	1,000	0.5	7,000	55	0.1
0.55	18,000	180	0.1	13,000	100	0.1	10,000	80	0.1	20,000	1,000	0.5	7,000	55	0.1
0.6	18,000	360	0.15	13,000	100	0.15	10,000	80	0.15	20,000	1,000	0.6	7,000	55	0.12
0.65	18,000	360	0.15	13,000	100	0.15	10,000	80	0.15	20,000	1,000	0.6	7,000	55	0.12
0.7	16,000	480	0.2	11,000	110	0.2	8,000	80	0.2	18,000	1,100	0.7	6,000	60	0.14
0.75	16,000	480	0.2	11,000	110	0.2	8,000	80	0.2	18,000	1,100	0.7	6,000	60	0.14
0.8	16,000	640	0.3	11,000	220	0.3	8,000	160	0.3	18,000	1,100	0.8	6,000	120	0.16
0.85	16,000	640	0.3	11,000	220	0.3	8,000	160	0.3	18,000	1,100	0.8	6,000	120	0.16
0.9	15,000	750	0.4	9,000	270	0.4	7,000	210	0.4	16,000	1,200	0.8	5,000	150	0.18
0.95	15,000	750	0.4	9,000	270	0.4	7,000	210	0.4	16,000	1,200	0.8	5,000	150	0.18
1	15,000	750	0.5	9,000	270	0.5	7,000	210	0.5	16,000	1,200	1	5,000	150	0.2
<b>Note</b> Notes	※ Usare un refrigerante appropriato per il materiale da lavorare ed il tipo di lavorazione da eseguire. ※ Minimizzare l'eccentricità del serraggio e controllare l'eccentricità dinamica. ※ Preparare una superficie piana prima di iniziare la foratura. ※ Maneggiare con la massima cura durante il montaggio e lo smontaggio. ※ Use appropriate coolant for work material and machining description. ※ Minimize chucking runout by setting spindle speed at minimum oscillation (Recommend to measure actual runout at activated rpm). ※ Set up flat surface before start machining. ※ Take extra care when chucking in and out.														

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

**Rivestite**  
Coating  
Frese  
Sagomate  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

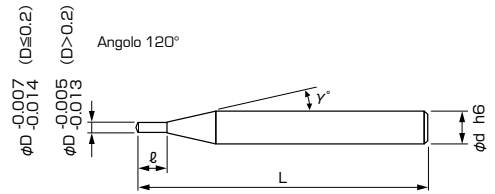
**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

# MDR-PD

Drill for guide hole MUGEN-COATING Point Drill

## Punte da centro e per fori guida rivestite MUGEN



- Progettate per eseguire fori guida per punte Mugen miniature. Utilizzate inoltre per la foratura di di pezzi di basso spessore.
- La speciale geometria di taglio permette un preciso posizionamento della punta.
- Aiming at guide hole for Mugen miniature drill. Also used for drilling on thin materials.
- Positioning of drill center is improved by web thinning which brings stable drilling.



Unità di misura: mm Unit size: mm

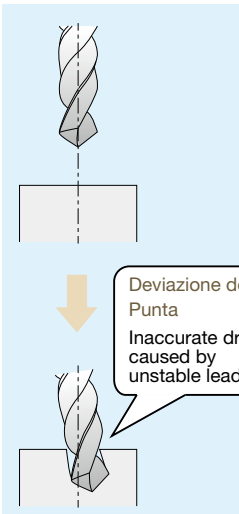
Codice Code No.	(D) Diametro Dia.	(ℓ) Lungh. elica Flute Length	(γ) Angolo Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00210-00100	0.1	0.2	15°	3	38
04-00210-00200	0.2	0.4	15°	3	38
04-00210-00300	0.3	0.6	15°	3	38
04-00210-00400	0.4	0.6	15°	3	38
04-00210-00500	0.5	1	15°	3	38
04-00210-00600	0.6	1	15°	3	38
04-00210-00700	0.7	1.2	15°	3	38
04-00210-00800	0.8	1.2	15°	3	38
04-00210-00900	0.9	1.8	15°	3	38
04-00210-01000	1	2	15°	3	38

**Attenzione** Quando ordinate, indicate MDR-PD (D). \*(γ) è un valore di riferimento.  
When you order, indicate MDR-PD (D). \*(γ) is reference value.

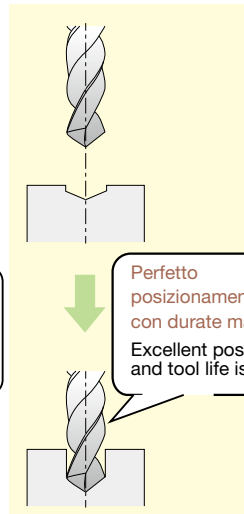
- Per i parametri di taglio vedi pagina 467.
- Drilling condition is recommended on page 467.

## Effetto della Punta da centro Effect of Point drill

Senza Punta da centro  
Without Point drill



Con Punta da centro  
With Point drill



La punta da centro garantisce una maggiore stabilità e durata della punta in uso (indispensabile per forature su superfici non piane)

Positioning of drill center is improved by point drill which brings stable drilling. (Point drill is required for drilling on a curved surface.)

## Parametri di taglio raccomandati

# MDR-PD

### Recommended Drilling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4•39NiCrMo3			Acciaio pretemprato Prehardened Steels 1.2311•1.2738 (~40HRC)			Lega di alluminio Aluminum Alloy A5052			Acciaio inox Stainless Steels AISI304		
	Giri Spindle Speed	Avanzamento Feed	Step Step Feed	Giri Spindle Speed	Avanzamento Feed	Step Step Feed	Giri Spindle Speed	Avanzamento Feed	Step Step Feed	Giri Spindle Speed	Avanzamento Feed	Step Step Feed	Giri Spindle Speed	Avanzamento Feed	Step Step Feed
Dia. Dia.	min <sup>-1</sup>	mm/min	mm	min <sup>-1</sup>	mm/min	mm	min <sup>-1</sup>	mm/min	mm	min <sup>-1</sup>	mm/min	mm	min <sup>-1</sup>	mm/min	mm
0.1	20,000	20	0.01	16,000	16	0.01	14,000	10	0.01	25,000	25	0.01	10,000	10	0.003
0.2	20,000	40	0.02	16,000	32	0.02	14,000	25	0.02	25,000	50	0.02	10,000	20	0.005
0.3	16,000	48	0.02	12,000	35	0.02	10,000	30	0.02	22,000	110	0.02	8,000	20	0.01
0.4	16,000	64	0.03	12,000	40	0.03	10,000	30	0.03	22,000	440	0.03	8,000	25	0.02
0.5	14,000	70	0.05	10,000	40	0.05	8,000	35	0.05	20,000	500	0.05	5,000	25	0.05
0.6	14,000	140	0.07	10,000	40	0.07	8,000	35	0.07	20,000	500	0.07	5,000	25	0.06
0.7	12,000	180	0.1	8,000	40	0.1	6,000	30	0.1	18,000	540	0.1	4,000	20	0.07
0.8	12,000	240	0.15	8,000	80	0.15	6,000	60	0.15	18,000	540	0.15	4,000	40	0.08
0.9	10,000	250	0.2	6,000	90	0.2	5,000	75	0.2	16,000	560	0.2	3,000	45	0.09
1	10,000	250	0.2	6,000	90	0.2	5,000	75	0.2	16,000	560	0.2	3,000	45	0.1

**Note**  
Notes

- ※ Usare un refrigerante appropriato per il materiale da lavorare ed il tipo di lavorazione da eseguire.
- ※ Minimizzare l'eccentricità del serraggio e controllare l'eccentricità dinamica.
- ※ Preparare una superficie piana prima di iniziare la foratura.
- ※ Maneggiare con la massima cura durante il montaggio e lo smontaggio.
- ※ Use appropriate coolant for work material and machining description.
- ※ Minimize chucking runout by setting spindle speed at minimum oscillation.  
(Recommend to measure actual runout at activated rpm).
- ※ Set up flat surface before start machining.
- ※ Take extra care when chucking in and out.

**CBN**  
Nitruro Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Piane**  
Long Neck  
Square

**Sferiche**  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Sferiche**  
Long Neck  
Ball

**Coniche**  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Toriche**  
Long Neck  
Corner R

**Frese Sagomate**  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

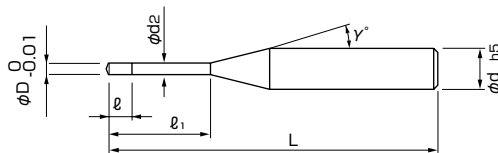
**Guida tecnica**  
Technical Guidance

**CBN**  
Nitruro Cubico di Boro

# MSDH

Precision drill for Hardened Steel

## Punte di precisione per acciaio temprato



Angolo di affilatura 150°

- Forature di precisione su acciaio temprato (65HRC).
- Precisione fori costante e stabile e lunga durata!
- Foratura su acciaio temprato (Ø0.1~)!
- Precise drilling on hardened steel (65HRC)!
- Equable hole accuracy and stably long tool life!
- Drilling on high hardened steel (Ø0.1~)!



Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(ℓ) Lunghezza elica Flute Length	(ℓ1) Lunghezza effettiva Effective Length	(d2) Diametro scarico Neck Dia.	(γ) Angolo Neck Taper Angle	(d) Diametro gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00050-01000	0.1	0.2	1	0.085	15°	4	45
04-00050-01500	0.15	0.3	1.5	0.13	15°	4	45
04-00050-02000	0.2	0.4	2	0.18	15°	4	45
04-00050-02500	0.25	0.5	2.5	0.23	15°	4	45
04-00050-03000	0.3	0.6	3	0.28	15°	4	45
04-00050-03500	0.35	0.7	3.5	0.32	15°	4	45
04-00050-04000	0.4	0.8	4	0.37	15°	4	45
04-00050-04500	0.45	0.9	4.5	0.41	15°	4	45
04-00050-05000	0.5	1	5	0.46	15°	4	45
04-00050-05500	0.55	1.1	5.5	0.51	15°	4	45
04-00050-06000	0.6	1.2	6	0.56	15°	4	45
04-00050-06500	0.65	1.3	6.5	0.61	15°	4	45
04-00050-07000	0.7	1.4	7	0.66	15°	4	45
04-00050-07500	0.75	1.5	7.5	0.71	15°	4	45
04-00050-08000	0.8	1.6	8	0.76	15°	4	45
04-00050-08500	0.85	1.7	8.5	0.81	15°	4	45
04-00050-09000	0.9	1.8	9	0.86	15°	4	45
04-00050-09500	0.95	1.9	9.5	0.9	15°	4	45
04-00050-10000	1	2	10	0.95	15°	4	45

### Attenzione

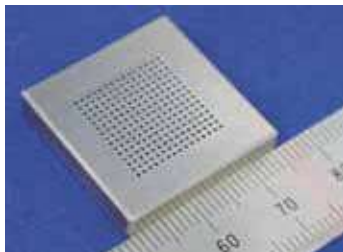
Quando ordinate, indicate MSDH (D).  
When you order, indicate MSDH (D).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

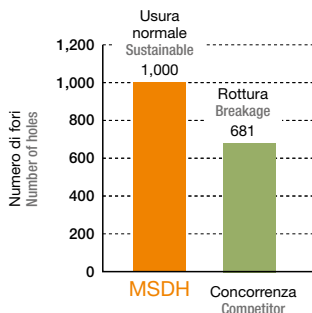
- Per i parametri di taglio vedi pagina 469.
- Drilling condition is recommended on page 469.

### Dati Tecnici Technical Data

**Materiale: K340 (60HRC)**  
Work Material:



Misura pezzo: 25mmx25mmx4.9mm  
Work Size:



Utensile Tool	MSDH Ø0.5
Giri Spindle Speed	15,000 min <sup>-1</sup>
Avanzamento Feed	50 mm/min
Step Step Feed	0.025 mm
Profondità foro Depth of Hole	4.9 mm (passante) Through
Lubrificazione Coolant	Minimale Oil Mist
Numeri di fori Number of holes	1,000 fori 1,000 holes
Tempo di lavoro Cutting Time	1min. 25 sec. / 1 foro 1min 25sec / 1 hole

Materiale Work Material	Acciaio temprato Hardened Steels 1.2343•STAVAX (~55HRC)			Acciaio temprato Hardened Steels 1.2379 (~62HRC)			Acciaio super rapido da utensili High Speed Tool Steels ASP•M2•1.3343 (~65HRC)		
	Giri Spindle Speed	Avanzamento Feed	Step Step Feed	Giri Spindle Speed	Avanzamento Feed	Step Step Feed	Giri Spindle Speed	Avanzamento Feed	Step Step Feed
	min <sup>-1</sup>	mm/min	mm	min <sup>-1</sup>	mm/min	mm	min <sup>-1</sup>	mm/min	mm
<b>0.1</b>	40,000	10	0.005	40,000	5	0.003	40,000	3	0.001
<b>0.15</b>	40,000	10	0.005	40,000	5	0.003	40,000	3	0.001
<b>0.2</b>	30,000	20	0.01	30,000	15	0.005	30,000	5	0.003
<b>0.25</b>	30,000	20	0.01	30,000	15	0.005	30,000	5	0.003
<b>0.3</b>	20,000	30	0.02	20,000	25	0.01	20,000	15	0.005
<b>0.35</b>	20,000	30	0.02	20,000	25	0.01	20,000	15	0.005
<b>0.4</b>	20,000	40	0.04	20,000	40	0.02	20,000	40	0.007
<b>0.45</b>	20,000	40	0.04	20,000	40	0.02	20,000	40	0.007
<b>0.5</b>	15,000	50	0.05	15,000	50	0.03	15,000	50	0.01
<b>0.55</b>	15,000	50	0.05	15,000	50	0.03	15,000	50	0.01
<b>0.6</b>	15,000	70	0.05	15,000	70	0.03	15,000	70	0.01
<b>0.65</b>	15,000	70	0.05	15,000	70	0.03	15,000	70	0.01
<b>0.7</b>	12,000	130	0.06	12,000	120	0.04	12,000	100	0.02
<b>0.75</b>	12,000	130	0.06	12,000	120	0.04	12,000	100	0.02
<b>0.8</b>	12,000	160	0.06	12,000	150	0.04	12,000	140	0.02
<b>0.85</b>	12,000	160	0.06	12,000	150	0.04	12,000	140	0.02
<b>0.9</b>	10,000	200	0.07	10,000	200	0.05	10,000	180	0.03
<b>0.95</b>	10,000	200	0.07	10,000	200	0.05	10,000	180	0.03
<b>1</b>	10,000	200	0.07	10,000	200	0.05	10,000	180	0.03
<b>Note</b> Notes	※ Usare un refrigerante appropriato per il materiale da lavorare ed il tipo di lavorazione da eseguire. ※ Minimizzare l'eccentricità del serraggio e controllare l'eccentricità dinamica. ※ Preparare una superficie piana prima di iniziare la foratura. ※ Maneggiare con la massima cura durante il montaggio e lo smontaggio. ※ Use appropriate coolant for work material and machining description. ※ Minimize chucking runout by setting spindle speed at minimum oscillation. (Recommend to measure actual runout at activated rpm.) ※ Set up flat surface before start machining. ※ Take extra care when chucking in and out.								

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter  
Rivestite  
Coating  
Non-Rivestite  
Non-Coating

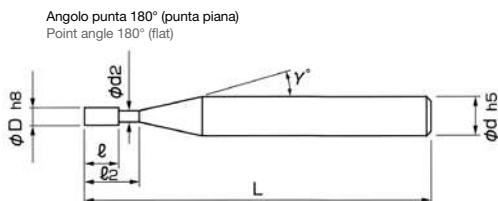
**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

## Punte piatte rivestite MUGEN



- Per forature stabili su diverse applicazioni come superfici inclinate o curve!
- Molto efficienti in operazioni di allargatura di fori.
- Possibile eliminare la bava in uscita.
- Stable drilling is realized in various scene such as inclined surface and curved surface!
- High efficient counter boring.
- Possible to reduce rear burr.

**Materiale:** Micro grana di metallo duro

Material

**Rivestimento:** MUGEN

Coating

**Nr di taglianti:** 2

No. of Flutes

**Angolo elica:** 30°

Helix Angle



★ dal diam. 3 triplo assottigliamento

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(ℓ) Lungh. elica Flute Length	(ℓ <sub>2</sub> ) Lungh. elica Under Neck Taper Length	(d <sub>2</sub> ) Diam. scarico Neck Taper Angle	(γ) Angolo scarico Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
04-00230-00100	1	2	3	0.95	9°	4	55
04-00230-00110	1.1	2.2	3.3	1.05	9°	4	55
04-00230-00120	1.2	2.4	3.6	1.15	9°	4	55
04-00230-00130	1.3	2.6	3.9	1.25	9°	4	55
04-00230-00140	1.4	2.8	4.2	1.35	9°	4	55
04-00230-00150	1.5	3	4.5	1.45	9°	4	55
04-00230-00160	1.6	3.2	4.8	1.55	9°	4	55
04-00230-00170	1.7	3.4	5.1	1.65	9°	4	55
04-00230-00180	1.8	3.6	5.4	1.75	9°	4	55
04-00230-00190	1.9	3.8	5.7	1.84	9°	4	55
04-00230-00200	2	4	6	1.94	9°	4	55
04-00230-00210	2.1	4.2	6.3	2	9°	4	60
04-00230-00220	2.2	4.4	6.6	2,1	9°	4	60
04-00230-00230	2.3	4.6	6.9	2.2	9°	4	60
04-00230-00240	2.4	4.8	7.2	2.3	9°	4	60
04-00230-00250	2.5	5	7.5	2.4	9°	4	60
04-00230-00260	2.6	5.2	7.8	2.45	9°	4	60
04-00230-00270	2.7	5.4	8.1	2.55	9°	4	60
04-00230-00280	2.8	5.6	8.4	2.65	9°	4	60
04-00230-00290	2.9	5.8	8.7	2.75	9°	4	60
★ 04-00230-00300	3	6	9	2.85	9°	6	60
★ 04-00230-00310	3.1	6.2	9.3	2.9	9°	6	60
★ 04-00230-00320	3.2	6.4	9.6	3	9°	6	60
★ 04-00230-00330	3.3	6.6	9.9	3.1	9°	6	60
★ 04-00230-00340	3.4	6.8	10.2	3.2	9°	6	60
★ 04-00230-00350	3.5	7	10.5	3.3	9°	6	60
★ 04-00230-00360	3.6	7.2	10.8	3.4	9°	6	60
★ 04-00230-00370	3.7	7.4	11.1	3.5	9°	6	60
★ 04-00230-00380	3.8	7.6	11.4	3.6	9°	6	60
★ 04-00230-00390	3.9	7.8	11.7	3.7	9°	6	60

### Attenzione

Quando ordinate, indicate MFD (D).  
When you order, indicate MFD (D).

※ (γ) è un valore di riferimento.  
※ (γ) is reference value.

- Per i parametri di taglio vedi pagina 472.
- Drilling condition is recommended on page 472.



★ dal diam. 3 triplo assottigliamento

Unità di misura: mm Unit size: mm

Codice Code No.	(D) Diametro Dia.	(ℓ) Lungh. elica Flute Length	(ℓ <sub>2</sub> ) Lungh. elica Under Neck Taper Length	(d <sub>2</sub> ) Diam. scarico Neck Taper Angle	(γ) Angolo scarico Neck Taper Angle	(d) Dia. gambo Shank Dia.	(L) Lungh. totale Overall Length
★ 04-00230-00400	4	8	12	3.8	9°	6	60
★ 04-00230-00410	4.1	8.2	12.3	3.9	9°	6	60
★ 04-00230-00420	4.2	8.4	12.6	4	9°	6	60
★ 04-00230-00430	4.3	8.6	12.9	4.1	9°	6	60
★ 04-00230-00440	4.4	8.8	13.2	4.2	9°	6	60
★ 04-00230-00450	4.5	9	13.5	4.3	9°	6	60
★ 04-00230-00460	4.6	9.2	13.8	4.4	9°	6	60
★ 04-00230-00470	4.7	9.4	14.1	4.5	9°	6	60
★ 04-00230-00480	4.8	9.6	14.4	4.6	9°	6	60
★ 04-00230-00490	4.9	9.8	14.7	4.7	9°	6	60
★ 04-00230-00500	5	10	15	4.8	9°	6	60
★ 04-00230-00510	5.1	10.2	15.3	4.9	9°	6	60
★ 04-00230-00520	5.2	10.4	15.6	5	9°	6	60
★ 04-00230-00530	5.3	10.6	15.9	5.1	9°	6	60
★ 04-00230-00540	5.4	10.8	16.2	5.2	9°	6	60
★ 04-00230-00550	5.5	11	16.5	5.3	9°	6	60
★ 04-00230-00560	5.6	11.2	16.8	5.4	9°	6	60
★ 04-00230-00570	5.7	11.4	17.1	5.5	9°	6	60
★ 04-00230-00580	5.8	11.6	17.4	5.6	9°	6	60
★ 04-00230-00590	5.9	11.8	17.7	5.7	9°	6	60
★ 04-00230-00600	6	12	18	5.8	9°	6	60

### Attenzione

Quando ordinate, indicate MFD (D).  
When you order, indicate MFD (D).

※(γ) è un valore di riferimento.  
※(γ) is reference value.

- Per i parametri di taglio vedi pagina 472.
- Drilling condition is recommended on page 472.

# Parametri di taglio raccomandati



## Recommended Drilling Conditions

Materiale Work Material	Acciaio al carbonio Carbon Steels C50			Acciaio legato Alloy Steels 42CrMo4			Acciaio inossidabile Stainless Steels AISI304			Lega di alluminio Aluminum Alloy A5052			Lega di alluminio pressofusa Aluminum Alloy Die Casting ADC		
Velocità di taglio Cutting speed	60 ~ 75 m/min			55 ~ 70 m/min			20 ~ 30 m/min			60 ~ 145 m/min			60 ~ 125 m/min		
Dia. Dia.	Giri Spindle Speed	Avanzam. Feed	Avanz./giri Feed per revolution	Giri Spindle Speed	Avanzam. Feed	Avanz./giri Feed per revolution	Giri Spindle Speed	Avanzam. Feed	Avanz./giri Feed per revolution	Giri Spindle Speed	Avanzam. Feed	Avanz./giri Feed per revolution	Giri Spindle Speed	Avanzam. Feed	Avanz./giri Feed per revolution
	min <sup>-1</sup>	mm/min	mm/rev	min <sup>-1</sup>	mm/min	mm/rev	min <sup>-1</sup>	mm/min	mm/rev	min <sup>-1</sup>	mm/min	mm/rev	min <sup>-1</sup>	mm/min	mm/rev
1	19,000	250	0.013	18,000	180	0.01	6,500	35	0.005	20,000	360	0.018	20,000	300	0.015
2	10,500	370	0.035	10,000	200	0.02	3,600	35	0.01	20,000	720	0.036	20,000	600	0.03
3	8,000	430	0.054	6,800	300	0.044	2,500	40	0.016	15,000	1,000	0.067	13,000	760	0.058
4	6,000	430	0.072	5,200	320	0.062	2,400	60	0.025	11,000	1,000	0.091	10,000	760	0.076
5	4,800	430	0.09	4,200	320	0.076	1,900	60	0.032	9,000	1,000	0.111	8,000	760	0.095
6	4,000	430	0.108	3,600	320	0.089	1,600	80	0.05	7,500	1,000	0.133	6,600	760	0.115

- ※ Consigliate per forature fino a 2xD.
- ※ Indirizzare il refrigerante direttamente sul punto di foratura o sulle scanalature della punta.
- ※ Regolare i parametri di foratura in relazione alla rigidità della macchina, del mandrino e allo staffaggio.
- ※ Fare riferimento alle indicazioni sottostanti per forature su superfici curve, inclinate o fori semicircolari.
- ※ Ridurre al minimo il runout del mandrino.
- ※ Se l'evacuazione del truciolo non fosse possibile impostare un avanzamento a step.
- ※ Si consiglia di utilizzare lubrificante.
- ※ Recommended drilling depth is 2D.
- ※ Coolant must supply correctly to the point of drilling or flute.
- ※ Adjust drilling condition conforming to machine rigidity, holder rigidity and clamping condition.
- ※ Refer below table for recommended drilling condition in case of drilling on curved surface, inclined surface or semicircular hole.
- ※ Minimize chacking runout.
- ※ When chip can not be disposed apply steep feed.
- ※ Water soluble cutting fluid is recommended.

### Dati di taglio in relazione all'applicazione:

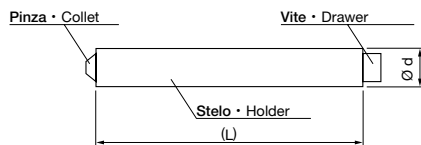
Recommended drilling Conditions depending on Work Shape:

Note  
Notes

Piano inclinato <30° Slope (inclination angle 30° lower)		Piano inclinato >30° Slope (inclination angle 30° over)		Superfici curve Curved surface		Fori semicircolari Semicircular hole			
Diam. Dia.	Avanzam. Feed	Diam. Dia.	N. giri Spindle Speed	Avanzam. Feed	Diam. Dia.	Avanzam. Feed	Diam. Dia.	N. giri Spindle Speed	Avanzam. Feed
Ø 1 ~ 4.5	70%	Ø 1 ~ 4.5	80%	50%	Ø 1 ~ 6	90%	Ø 1 ~ 4.5	80%	40%
Ø 4.6 ~ 6	40%	Ø 4.6 ~ 6	80%	30%			Ø 4.6 ~ 6	80%	30%

### Mandrini in metallo duro ASHINAGA CHUCK

\*Articoli fuori produzione, fornibili fino ad esaurimento stock.



- Lo stelo è costituito di metallo duro.
- È adatto per lavorazioni precise su aree profonde senza vibrazioni.
- Holder is made of heavy and stiff carbide.
- It is very suitable for precise cutting at deep area without chattering.

#### Assortimenti (Ø12)

Unità di misura: mm  
Unit size: mm

Codice Code No.	Modello Model	SET SET (Stelo•Vite Pinza : Ø3, 4, 6)	(L) Lunghe. totale Overall Length
01-00996-02050	S12-NPC6-50S	Set	50
01-00996-02060	S12-NPC6-60S	Set	60
01-00996-02070	S12-NPC6-70S	Set	70
01-00996-02100	S12-NPC6-100S	Set	100
01-00996-02150	S12-NPC6-150S	Set	150
01-00996-02200	S12-NPC6-200S	Set	200

**Attenzione** Set composto: stelo + vite + pinze Ø3, Ø4, Ø6



#### Stelo di ricambio (Ø12)

Unità di misura: mm  
Unit size: mm

Codice Code No.	Modello Model	(L) Lunghezza totale Overall Length
01-00996-00050	S12-NPC6-50	50
01-00996-00060	S12-NPC6-60	60
01-00996-00070	S12-NPC6-70	70
01-00996-00100	S12-NPC6-100	100
01-00996-00150	S12-NPC6-150	150
01-00996-00200	S12-NPC6-200	200

**Attenzione** Ricambio sciolto.



#### Pinza ricambio (Utensile : Ø12)

Unità di misura: mm  
Unit size: mm

Codice Code No.	Modello Model	(Ø) Misura Collet Size
01-00996-00003	NPC6-3	3
01-00996-00004	NPC6-4	4
01-00996-00006	NPC6-6	6

**Attenzione** Ricambio sciolto.



#### Vite ricambio (Holder : Ø12)

Unità di misura: mm  
Unit size: mm

Codice Code No.	Modello Model	(L) lunghezza totale Overall Length
01-00996-00033	NPC6-50	33
01-00996-00043	NPC6-60	43
01-00996-00053	NPC6-70	53
01-00996-00083	NPC6-100	83
01-00996-00133	NPC6-150	133
01-00996-00183	NPC6-200	183

**Attenzione** Ricambio sciolto.

**CBN**  
Nitrato Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Piane**  
Long Neck  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Sferiche**  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche**  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche Sferiche**  
Taper Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Toriche**  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Toriche**  
Long Neck  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Frese Sagomate**  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

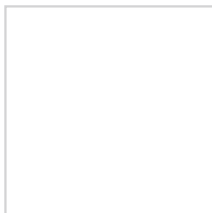
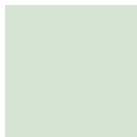
**Punte**  
Drill  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Altro**  
Others

**Dati tecnici**  
Technical Data

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Technical Guidance





## **DATI TECNICI** *TECHNICAL DATA*

**Caratteristiche delle frese NS** ..... p. 476  
Features of NS End Mill

**Dati di taglio** ..... p. 481  
Machining Data

# Caratteristiche delle frese in CBN

## Features of NS End Mill

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

**Non Rivestite**  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
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Technical Guidance

### Frese in CBN CBN End Mill

CBN (Cubic Boron Nitride / Nitruro Cubico di Boro sinterizzato) ha una durezza tre volte superiore al metallo duro ed è secondo in durezza solo dopo il diamante. Ha inoltre una elevata resistenza alle alte temperature ed un'alta conduttività termica. Allo stesso tempo la bassa tenacità del CBN può essere spesso la causa di una facile scheggiatura del tagliente. Per questo motivo il CBN è consigliato per la finitura di materiali duri con bassi carichi di taglio sul tagliente garantendo una eccezionale durata dell'utensile.

CBN(Cubic Boron Nitride) sintered alloy is 3 times harder than Tungsten carbide, second hardest material next to diamond, moreover strong heat-resistant and high thermal conductivity. However less tough characteristic of CBN often causes chipping of tool edge easily. Accordingly, CBN is recommended for finishing of hard materials with less cutting load on the tool edge, which guarantees extra long tool life.

### Frese in PCD PCD End Mill

Il PCD è formato da micro-polveri di diamante artificiale sinterizzato ad elevate pressioni e temperature con un legante come, ad esempio, il Cobalto. Il PCD è duro come il diamante monocristallino, caratterizzato da un'altissima resistenza all'usura. Tuttavia il suo utilizzo è limitato a causa della sua bassa resistenza al calore. È spesso utilizzato per la lavorazione di materiali fragili.

PCD consists micron-size artificial diamond powders sintered with binding materials such as Co and etc. at high pressure and temperature. PCD is as hard as Monocrystalline Diamond featuring strong wear-resistance. However the use is limited as being fragile against heat. It is mostly used for the machining of brittle materials.

### Frese in Diamante Monocristallino Monocrystalline Diamond End Mill

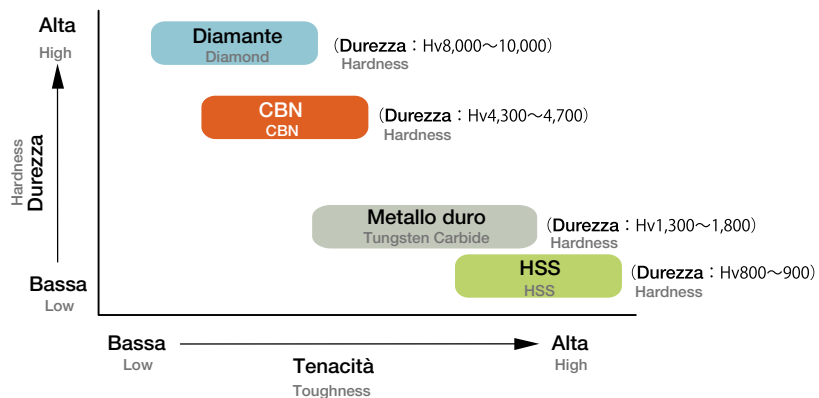
Le frese in diamante monocristallino sono costruite con il più duro materiale esistente sulla terra, costituito da un singolo cristallo, a differenza del PCD che è composto da vari elementi leganti. Il suo tagliente perfettamente affilato permette di ridurre gli sforzi di fresatura, mentre la sua gamma di applicazioni è limitata ai materiali fragili e ai materiali non ferrosi.

Monocrystalline diamond end mill by the hardest material on earth is made by a single crystal on flute unlike PCD consisting various binding materials. Its perfect sharp edge allows milling stress at minimum, while its application range may be limited due to behavior gap of flute wearing against material types. It is mostly used for the machining of brittle materials and nonferrous metals.

### Frese in metallo duro Cemented Carbide End Mill

Le frese in carburo sono costituite da una base di WC (Carburo di Tungsteno) sinterizzato, composto da polveri di cobalto, etc. La sua durezza è superiore al HSS (acciaio super rapido), con il vantaggio di avere una resistenza superiore all'usura. È ampiamente utilizzato per la lavorazione di svariati materiali in sgrossatura e finitura.

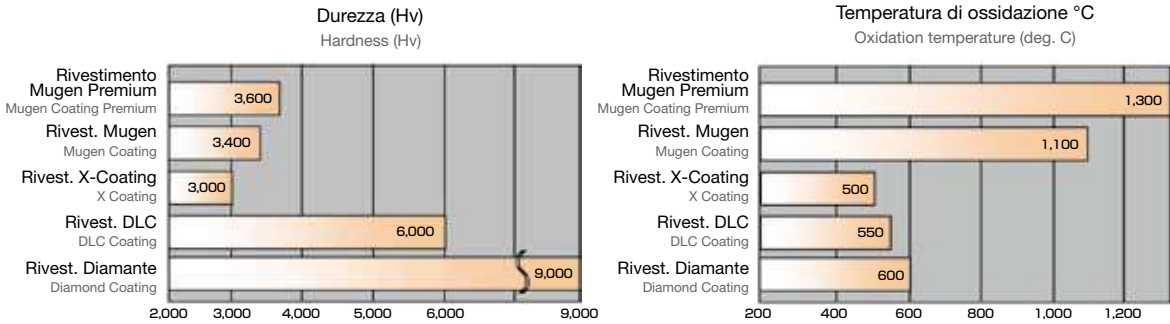
Cemented Carbide End Mill is made by WC (Tungsten carbide) -based sintered metal composed with power materials of Co (Cobalt) and etc. Its hardness higher than HSS (High speed steel) takes advantage on wear-resistance. It is widely used for the machining of various materials from Roughing to Finishing.



## ■ Frese in metallo duro rivestito Coated Cemented Carbide End Mill

Le frese in metallo duro sono rivestite con un singolo o multiplo strato di materiali come carburo, nitrato, ossido o diamante, che aderiscono fisicamente o chimicamente ai taglienti. Per ogni tipo di materiale da lavorare è possibile scegliere il rivestimento più adatto, tra una grande varietà di tipologie.

Coated Cemented Carbide End Mill is the cutting tool that one or more layers of coating materials such as carbide, nitride, oxide or diamond are chemically or physically adhered on flutes. Most suitable type of coating can be selected from among variety of coatings, which should be fit for the work material.



## ■ Rivestimento MUGEN Premium Mugen Coating Premium

Il rivestimento Mugen Premium, migliorato rispetto all'esistente rivestimento Mugen, garantisce una maggiore durata nella lavorazione di acciai temprati da 48 HRC a 65 HRC, grazie alla durezza del rivestimento di 3.600 Hv e alla temperatura di ossidazione di 1.300 °C.

Mugen Coating Premium, improved from existing Mugen coating is suited for direct machining of hardened steels with extended tool life. By the hardness Hv3,600 and the oxidation temperature 1,300deg.C, it is recommended for hard materials from 48 to 65 HRC.

### S590 65HRC (Acciaio HSS Powder HSS)



Spessore usura 0.029mm  
Tool wear

**MRBH230 R1x 6**

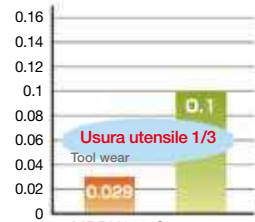
n: 20,000min<sup>-1</sup> Vf: 1,600 mm/min  
Minimale Tempo lavorazione: 18 min.  
Oil mist Cutting time : 18min



Spessore usura 0.1mm  
Tool wear

Fresa di marca concorrente  
Competitor

ap0.15mm x ae0.3 mm  
Lungh. fresatura: 25 m  
Cutting length : 25m



**MRBH230 Concorrenza Rival**  
Comparazione usura utensile  
Comparison of tool wear

### 1.2379 60HRC (K110)



Spessore usura 0.046mm  
Tool wear

**MRBH230 R1x 6**

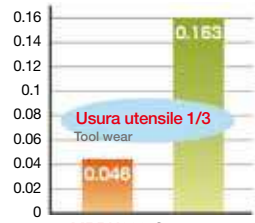
n: 25,000 min<sup>-1</sup> Vf: 2,000 mm/min  
Minimale Tempo lavorazione: 62 min.  
Oil mist Cutting time : 62min



Spessore usura 0.163mm  
Tool wear

Fresa di marca concorrente  
Competitor

ap0.2 mm x ae0.3 mm  
Lungh. fresatura: 100 m  
Cutting length : 100m



**MRBH230 Concorrenza Rival**  
Comparazione usura utensile  
Comparison of tool wear

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite** Coating  
**Piane** Square  
**Non Rivestite** Non-Coating  
**Scaricate Piane** Long Neck Square

**Rivestite** Coating  
**Sferiche** Ball  
**Non Rivestite** Non-Coating  
**Scaricate Sferiche** Long Neck Ball

**Rivestite** Coating  
**Coniche** Taper  
**Non Rivestite** Non-Coating  
**Coniche Sferiche** Taper Ball

**Rivestite** Coating  
**Toriche** Corner R  
**Non Rivestite** Non-Coating  
**Scaricate Toriche** Long Neck Corner R

**Rivestite** Coating  
**Frese Sagomate** Formed Cutter  
**Non Rivestite** Non-Coating

**Punte**  
Drill

**Altro**  
Others

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### Rivestimento MUGEN Mugen Coating

Il rivestimento MUGEN sfrutta le caratteristiche del TiAlN (nitruro di titanio e alluminio) che ha una durezza 3.400 Hv e una temperatura di ossidazione di 1.100 °C. Gran resistenza all'usura e capacità di lubrificante su acciai temprati (60HRC), pretemprati, acciai al carbonio e rame. Compatibile all'utilizzo di olio intero, lubrorefrigerante, minimale e aria.

Mugen Coating with the hardness Hv3,400 and the oxidation temperature 1,100deg.C, based on TiAlN (Titanium Aluminum Nitride) is recommended for various materials such as hardened steel(60HRC),pre-hardened steel, raw steel and copper because of strong wear-resistance and high lubricity. In addition, any kind of cutting fluid is available such as water soluble, oil, air blow and oil mist.

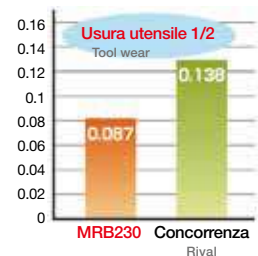
#### 1.2083 52HRC (STAVAX)



MRB230 R1 x 10



Fresa di marca concorrente  
Competitor



Comparazione usura utensile  
Comparison of tool wear

n: 10,000min<sup>-1</sup> Vf: 1,500 mm/min ap0.1 mm x ae0.2 mm  
Lubriferante: acqua  
Tempo di lavorazione: 132 min. Lunghezza fresatura: 150 m  
Water soluble fluid Cutting time : 132min Cutting length : 150m

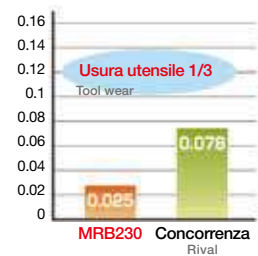
#### Rame Copper



MRB230 R1 x 20

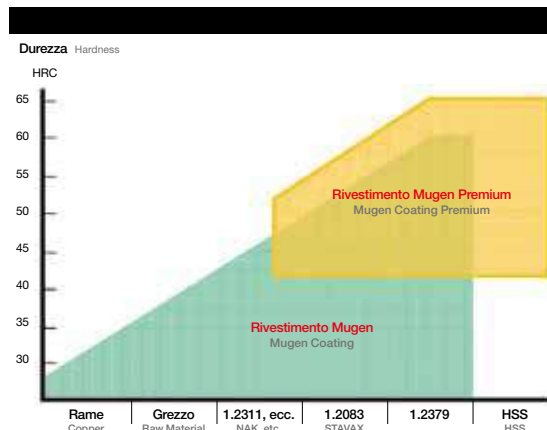


CrN del concorrente  
Competitor



Comparazione usura utensile  
Comparison of tool wear

Sgrossatura n: 12,000min<sup>-1</sup> Vf: 1,200 mm/min ap0.2mm x ae0.3 mm  
Roughing  
Finitura n: 5,000 min<sup>-1</sup> Vf: 700mm/min ap0.05mm x ae0.03 mm  
Finishing  
Lubriferante: acqua  
Tempo di lavorazione: 8 hr. 54 min.  
Water soluble fluid Cutting time : 8hr 54min





## ■ Rivestimento Mugen Micro Mugen Micro Coating

Il rivestimento ultra sottile Mugen Micro è sviluppato esclusivamente per la serie di punte Micro Drill. Inferiore a 1 µm di spessore e senza impurezze sulla superficie, mantiene la precisione e la forma delle Micro Drill, consentendo di ottenere durate superiori su acciai e acciai inox.

The ultra thin Micro Coating is exclusively developed for Micro Drill series. Under 1µm thickness with no impure substances on the surface maintains the precise shape accuracy of Micro Drill as well as high performance by extended drilling life on steels include stainless steels.

## ■ Rivestimento X (TiCN) X Coating (TiCN)

Il rivestimento "X" sfrutta le caratteristiche del TiCN (Titanium Carbon Nitride), che ha durezza 3.000 Hv ed elevato coefficiente di scorrevolezza. Però la resistenza termica fino a 500 °C non consente operazioni ad alta velocità (superiori a 100 m/min). Rivestimento versatile per lavorazioni generiche (inferiori a 100 m/min) con lubrorefrigerante per abbassare la temperatura della lavorazione.

X Coating is based on TiCN(Titanium Carbon Nitride). The hardness is Hv3,000 with strong adhesion but cutting speed higher than 100m/min is not recommended because the oxidation temperature is low at 500deg.C. Accordingly X Coating performs well at medium cutting speed lower than 100m/min with water soluble cutting fluid.

## ■ Rivestimento DLC DLC Coating

Il rivestimento DLC (Diamond Like Carbon) è un durissimo composto amorfo di carbonio con caratteristiche simili al diamante. È raccomandato per le finiture di leghe di alluminio grazie alle sue caratteristiche di elevata durezza pari a Hv600, al basso coefficiente di frizione di 0,1 µm, alla bassissima rugosità superficiale di Ra 0,02 µm e alla resistenza all'adesione. Non è adatto alla lavorazione di acciai, ma solo di leghe non ferrose, a causa della sua affinità al carbonio.

DLC (Diamond Like Carbon) Coating is very hard amorphous coating with similar characteristic as diamond. It is recommended for the finishing of aluminum alloy as being high hardness Hv6,000, friction coefficient 0.1µ, smooth surface roughness Ra0.02µm and with anti-welding feature. However it is not suited for steel materials but good for nonferrous metals because DLC is the carbon base coating.

## ■ Rivestimento in Diamante Diamond Coating

Il rivestimento in diamante è composto da un sottile strato di policristallino, duro come il diamante naturale, con un'alta resistenza all'usura. Non c'è limite di forma che il rivestimento diamantato non possa coprire. È assicurata una qualità costante ed una lunga durata nelle lavorazioni di grafite e materiali fragili, grazie all'alta resistenza all'usura e all'alta aderenza del diamante puro, senza leganti e impurità.

Diamond Coating is a minute polycrystalline film, as hard as natural diamond and with strong wear-resistance. There is no limit of tool shape as Diamond Coating is given on the Cemented Carbide surface. Stable coating quality has been ensured long tool life against graphite and brittle materials by strong wear-resistance and adherence brought by pure diamond without binders and impurities.

# Caratteristiche delle frese NS

## Features of NS End Mill

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

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Technical Guidance

### Rivestimenti consigliati per i vari tipi di materiale Recommended coatings for various materials

Rivestimento Coating	MUGEN Premium MUGEN Premium	Rivestimento MUGEN MUGEN Coating	Rivestimento X X Coating	Rivestimento DLC DLC Coating	Rivestimento Diamante Diamond Coating
56~65HRC	●				
45~55HRC	●	○	○		
Acciaio pretemprato Pre-hardened Steels	●	●	○		
Ferro Soft Irons	○	●	○		
Rame Copper	○	●	○	○	
Alluminio Aluminum	○	○	○	●	
Materiali fragili Brittle materials					●
Grafite Graphite					●

La qualità costante garantisce un utilizzo affidabile

Steady quality assures reliable use.

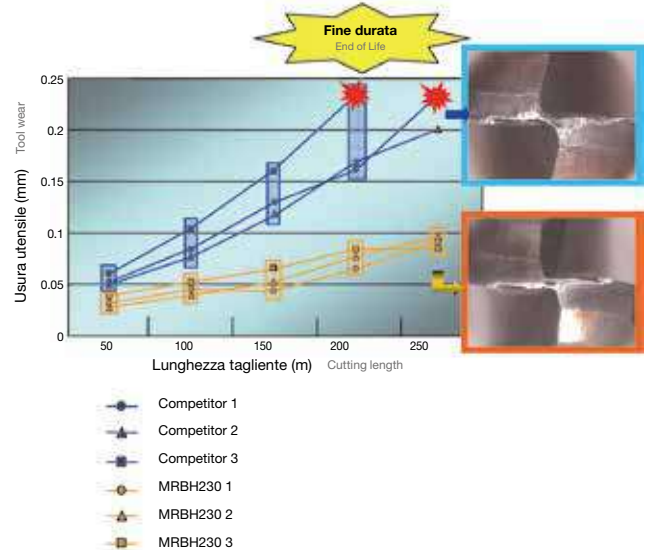
**K110 60HRC**

Comparazione con la concorrenza  
Comparison with competitor

Utensile Tool

MRBH230 R1×10 concorrente R1×10 competitor

Giri Spindle speed	20,000 min <sup>-1</sup>
Avanzamento Feed	2,000 mm/min
Profondità di taglio Depth of cut	ap 0.1×ae 0.3 mm
Lunghezza di taglio Cutting length	55m/1pz. 55m/pc
Tempo di lavorazione Cutting time	40min./1pz. 40min/pc
Lubrificazione Coolant	Minimale Oil mist





### Esempio lavorazione 1 : modello di connettore Cutting Example 1 : Connector model

**Materiale lavorato: S590 64HRC** Material : HAP40 64HRC

**Refrigerante: Lubrificazione minima** Coolant : Oil mist

**Tempo di lavorazione: 13hr 32min** Cutting time : 13hr 32min



Processo Cutting process	Sgrossatura Roughing	Semi-finitura Semi-finishing		Finitura Finishing	
		Lato (contornatura) Side (contour)	Piano (scansione) Plane (scan)	Lato (contornatura) Side (contour)	Piano (scansione) Plane (scan)
Utensile Tool	SSR200 Ø 0.5xR0.05x2.5			SSE600 Ø 0.5x2.5	
Giri [min <sup>-1</sup> ] Spindle speed	30,000				
Avanzamento [mm/min] Feed	500	500	300	400	300
Prof. di taglio a <sub>p</sub> x a <sub>e</sub> [mm] Depth of cut	0.005x0.2	0.005x0.001		0.005x0.002	0.002x0.01
Tempo di lavorazione Cutting time	7hr 20min 7hr 20min	2hr 52min 2hr 52min		3hr 20min 3hr 20min	

Dimensione: 15x15x2 mm (D)

Work size : 15x15x2mm(D)

#### © Misurazioni del pezzo Measurement of work

	Obiettivo [mm] Target	Attuale [mm] Actual
Larghezza cava Slot width	0.600	0.598~0.601
Largh. parete restante Width of remained wall	0.600	0.598~0.602
Profondità Depth	2.000	2.002

#### © Rugosità superficiale Surface roughness

Superficie superiore Top Surface	Superficie inferiore Bottom Surface	Lato Side
Ra 0.05µm	Ra 0.15µm	Ra 0.12µm

- La differenza tra le dimensioni ottenute e quelle richieste è di  $\pm 2\mu\text{m}$  e la rugosità superficiale è di Ra 0.2µm, dopo un tempo di finitura di 3hr e 20 min.

Difference between Target and Actual work dimension within  $\pm 2\mu\text{m}$  and Surface roughness all within Ra0.2µm after 3hr 20min finishing process.

CBN  
Nitruro Cubico di Boro

Diamante

Diamond

Piane

Square

Scaricate

Piane

Long Neck

Square

Sferiche

Ball

Scaricate

Sferiche

Long Neck

Ball

Coniche

Taper

Coniche

Sferiche

Taper

Ball

Toriche

Corner R

Scaricate

Toriche

Long Neck

Corner R

Frese

Sagomate

Formed

Cutter

Punte

Drill

Altro

Others

Dati tecnici

Technical Data

Guida tecnica

Technical Guidance



### Esempio lavorazione 1 : Finitura di tasche

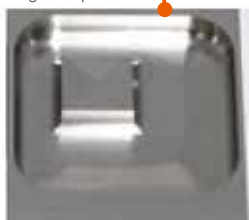
Materiale lavorato: **1.2379 (60HRC)** Material : SKD11 60HRC

Refrigerante: lubrificazione minima Coolant : Oil mist

Tempo di lavorazione: **36hr 40min** Cutting time : 36hr 40min

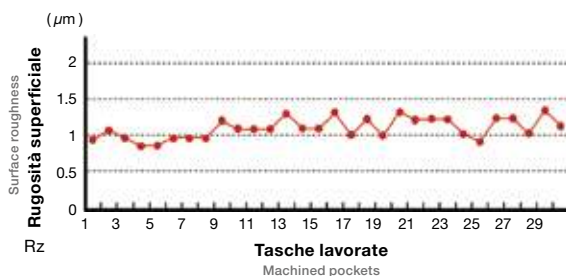


Zoom  
Magnified photo



Dimensione tasca: 14x14x1.8 (mm)  
Pocket size : 14x14x1.8mm(D)

Processo Cutting process	Sgrossatura Roughing	Semifinitura Semi-finishing	Finitura Finishing
Utensile Tool	MACH225 R0.5		SFB200 R0.5
Giri [min <sup>-1</sup> ] Spindle speed	30,000		30,000
Avanzamento [mm/min] Feed	1,000		1,200
Prof. di taglio a <sub>p</sub> x <sub>a</sub> e <sub>f</sub> [mm] Depth of cut	0.1x0.2	0.05x0.05	0.01x0.02
Tempo di lavorazione Cutting time	16min/1pz. 16min/pc	9min/1pz. 9min/pc	30min/1pz. 30min/pc



### Esempio lavorazione 2 : Riflettore

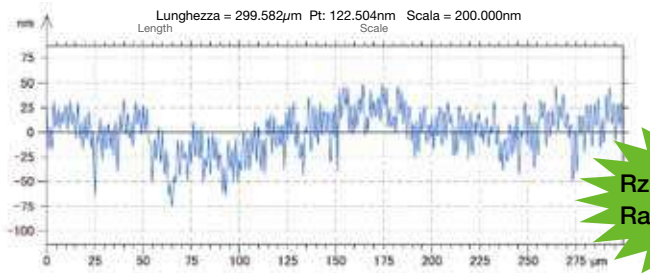
Materiale lavorato: **ELMAX 60HRC** Material : ELMAX 60HRC

Refrigerante: Lubrificazione minima Coolant : Oil mist

Tempo totale di lavorazione: **19hr 10min** Total cutting time : 19hr 10min



Dimensione: 20x20 mm  
Work size : 20x20mm



Processo Cutting process	Sgrossatura Roughing	Semifinitura Semi-finishing	Finitura Finishing
Utensile Tool	MSBH230 R0.2	SSBL200 R0.2x1.2	SFB200 R0.2x1
Giri [min <sup>-1</sup> ] Spindle speed	40,000		
Avanzamento [mm/min] Feed	800	700	400
Prof. di taglio a <sub>p</sub> x <sub>a</sub> e <sub>f</sub> [mm] Depth of cut	0.015x0.05	0.005x0.01	0.004x0.002
Tempo di lavorazione Cutting time	3hr 23min 3hr 23min	2hr 10min 2hr 10min	13hr 37min 13hr 37min

● **Rugosità superficiale: Rz0.079µm dopo 13hr 37min. Le frese sferiche CBN SFB200 garantiscono una stabile qualità superficiale per acciai temprati, anche dopo diverso tempo di lavorazione**

Surface roughness is Rz 0.079 micrometer after 13hours 37minutes finishing process.

SFB200, cBN ball End Mill brings about stable and high quality surface for hardened steels even after long time machining.

# SSB200 SSBL200

Fresa sferica CBN per supervelocità

CBN Super Speed Ball End Mill

Fresa sferica scaricata CBN per supervelocità per nervature

CBN Super Speed Long Neck Ball End Mill

➔ P. 67



## Esempio lavorazione 1 : Ingranaggio conico

Cutting Example 1 : Bevel Gear Model

Materiale lavorato: **ASP23 (HSS sinterizzato) 63HRC** Material : ASP23 (Powder HSS) 63HRC

Refrigerante: **Lubrificazione minima** Coolant : Oil mist

Tempo di lavorazione: **1hr 47min** Cutting time : 1hr 47min



Dimensione: 30x30 mm

Work size : 30x30mm

Processo Cutting process	Pre-Sgrossatura Pre-roughing	Sgrossatura + Semifinitura Roughing+ Semi-finishing	Finitura Finishing
Utensile Tool	MHD645 Ø5	MACH225 R0.5	SSBL200 R0.3x3
Giri [min <sup>-1</sup> ] Spindle speed	2,400	20,000	20,000
Avanzamento [mm/min] Feed	300	2,000	800
Prof. di taglio α <sub>p</sub> ×α <sub>e</sub> [mm] Depth of cut	α <sub>p</sub> 0.1 (italiano) Helical	0.1×0.1	0.02×0.02
Tempo di lavorazione Cutting time	5min 5min	25min 25min	77min 77min

### Con le frese CBN precisione superficiale garantita a lungo su HSS a 63HRC

Smooth surface roughness is obtained on Powder HSS at 63HRC by CBN End Mill.

## Esempio lavorazione 2 : Comando per giochi

Cutting Example 2 : Game Controller Model (Core)

Materiale lavorato: **K340 62HRC** Material : DC53 62HRC

Refrigerante: **Lubrificazione minima** Coolant : Oil mist

Tempo di lavorazione: **4hr 10min** Cutting time : 4hr 10min

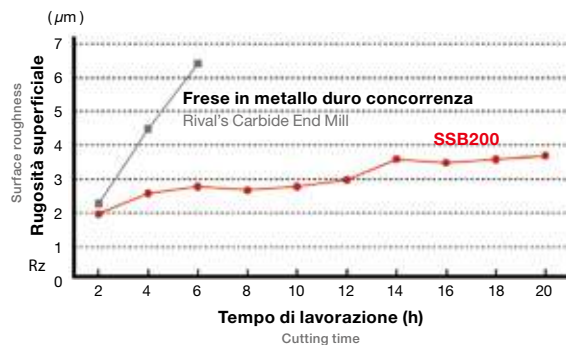


Dimensione: 55x85 mm

Work size : 55x85mm

Processo Cutting process	Sgrossatura + Semifinitura Roughing+ Semi-finishing	Ripresa materiale residuo Stock removing	Finitura Finishing
Utensile Tool	MACH225 R2	MACH225 R1	SSB200 R1
Giri [min <sup>-1</sup> ] Spindle speed	10,000	20,000	40,000
Avanzamento [mm/min] Feed	2,500	2,000	1,600
Prof. di taglio α <sub>p</sub> ×α <sub>e</sub> [mm] Depth of cut	0.3×1	0.2×0.2	0.05×0.05-0.1
Tempo di lavorazione Cutting time	105 min 105min	10 min 10min	120 min 120min

Processo Cutting process	Incisione Engraving
Utensile Tool	MACH225 R0.2
Giri [min <sup>-1</sup> ] Spindle speed	20,000
Avanzamento [mm/min] Feed	500
Prof. di taglio α <sub>p</sub> ×α <sub>e</sub> [mm] Depth of cut	0.02×0.05
Tempo di lavorazione Cutting time	15 min 15min



### La rugosità superficiale raggiunta è 3.5μm, dopo aver finito 10 pezzi in 20 ore (120 min/pezzo).

La vita utensile è 10 volte maggiore rispetto ad una fresa in metallo duro

Surface roughness is 3.5 micron even after 20 hours finish-machining for 10 work pieces, which shows 10 times longer tool life compared with Carbide End Mill.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Piane  
Square  
Scaricate  
Plane  
Long Neck  
Square

Sferiche  
Ball  
Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper  
Coniche  
Sferiche  
Taper Ball

Toriche  
Corner R  
Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

Dati tecnici  
Technical Data

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Technical Guidance



### Esempio lavorazione 1 : microlavorazione combinata Cutting Example 1 : Combined micro-machining.

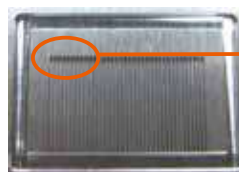
**Materiale lavorato: 1.2379 60HRC** Material : PD613 60HRC

**Refrigerante: Lubrificazione minimale** Coolant : Oil mist

**Tempo di lavorazione 14hr 47min compresa sgrossatura** Cutting time : 14hr 47min including roughing



Dimensione: 30x30 mm  
Work size : 30x30mm



① Cava  
Slot

Largh. cava: 0.21 mm  
Slot width  
Profondità: 0.5 mm  
Depth  
Lunghezza: 5 mm  
Length  
Numero cava: 36  
Number of groove

Zoom  
Magnified photo



② Logo NS  
NS Logo

2.001 mm  
(Obiettivo: 2.000 mm)  
Target

Zoom dello spigolo  
Magnified photo for corner edge



Superiore  
Top

Inferiore  
Bottom



③ Ingranaggi  
Gear  
(Dia. ingranaggi 8mm)  
Gear dia.

Rugosità superficiale fondo  
Bottom surface roughness  
Rz 0.25µm

Raggio fresa dopo la finitura  
Corner radius after finishing



Zoom: 1,000  
Magnification rate

Pezzo da lavorare Cutting part	① Cava Slot		② Logo NS NS Logo		③ Ingranaggio Gear	
	Cava (Z-0.03) Slotting (to Z-0.03)	Cava (Z-0.5) Slotting (to Z-0.5)	Finitura (laterale) Finishing (Side)	Finitura (inferiore) Finishing (Bottom)	Finitura (laterale) Finishing (Side)	Finitura (inferiore) Finishing (Bottom)
Utensile Tool	SSR200 Ø0.2xR0.02x0.5				SSR200 Ø0.2xR0.02x1	
Giri [min <sup>-1</sup> ] Spindle speed	40,000					
Avanzamento [mm/min] Feed	100	300	300		200	
Prof. di taglio a <sub>p</sub> x a <sub>e</sub> [mm] Depth of cut	a <sub>p</sub> 0.001	a <sub>p</sub> 0.003	0.001x0.005	0.005x0.005	0.003x0.005	0.005x0.005
Tempo di lavorazione Cutting time	1hr 8min 1hr 8min	2hr 19min 2hr 19min	1hr 55min 1hr 55min	20min 20min	1hr 45min 1hr 45min	30min 30min

● Le frese CBN SSR200 assicurano un'alta qualità superficiale e precisione anche dopo un lungo tempo di lavorazione di acciai temprati (HRC60) perfino con frese con diametro di 0.2 mm.

SSR200, CBN end Mill ensures high quality surface and accuracy for a long time machining of hardened steels (HRC60) even with 0.2mm cutter diameter.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

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Technical Guidance

**CBN**  
Nitrato Cubico  
di Boro

**Diamante**  
Diamond

**Piane**  
Square  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Piane**  
Long Neck  
Square

**Sferiche**  
Ball  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Sferiche**  
Long Neck  
Ball

**Coniche**  
Taper  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Coniche Sferiche**  
Taper  
Ball

**Toriche**  
Corner R  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Scaricate Toriche**  
Long Neck  
Corner R

**Frese Sagomate**  
Formed  
Cutter  
Rivestite  
Coating  
Non Rivestite  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance

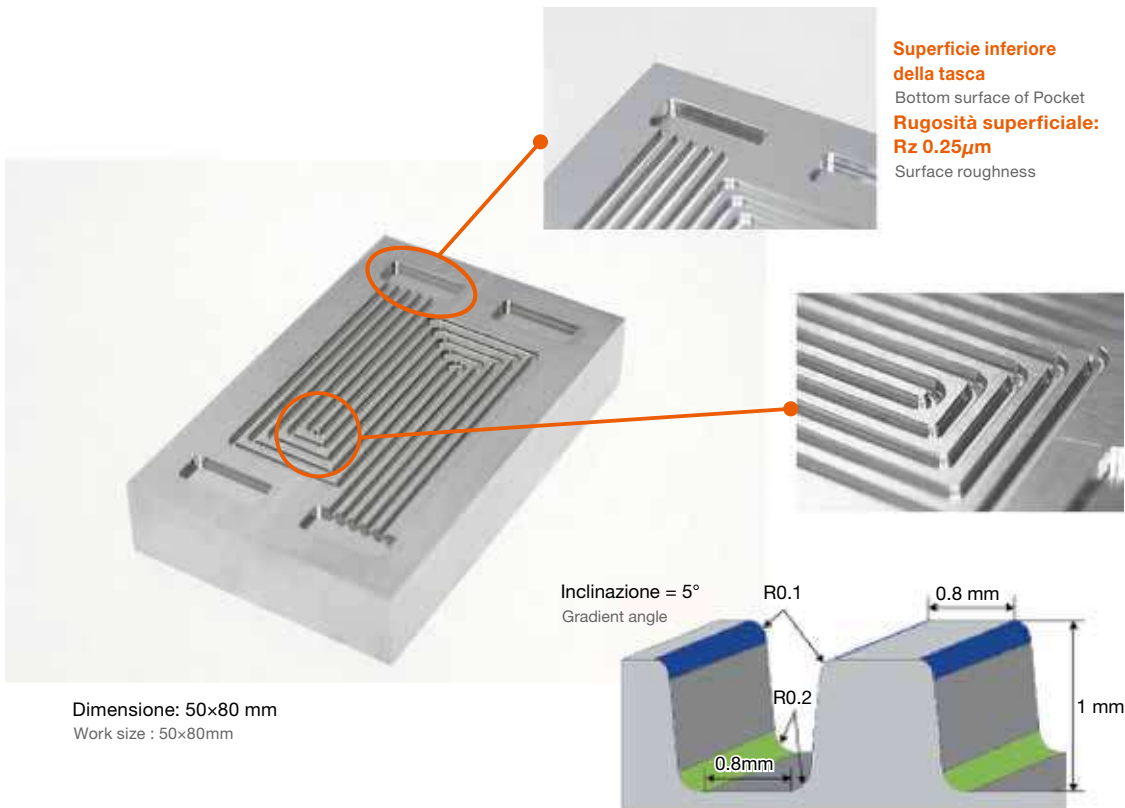
## Esempio lavorazione 2 : Modello FC Cutting Example 2 : Fuel Cell Separator Press Mold

**Materiale lavorato: YXR7 (HSS) 64HRC** Material : YXR7 (Matrix HSS) 64HRC

**Refrigerante: Lubrificazione minimale** Coolant : Oil mist

**Tempo di lavorazione: 11hr 24min compresa sgrossatura** Cutting time : 11hr 24min including roughing

Processo Cutting process	Finitura Finishing	
Pezzo da lavorare Cutting part	Laterale Side	Inferiore Bottom
Utensile Tool	SSR200 Ø1×R0.1×3	
Giri [min <sup>-1</sup> ] Spindle speed	30,000	
Avanzamento [mm/min] Feed	1,200	600
Profondità di taglio a <sub>p</sub> ×a <sub>e</sub> [mm] Depth of cut	0.01×0.01	0.01×0.03
Tempo di lavorazione Cutting time	3hr 3hr	



Dimensione: 50×80 mm  
Work size : 50×80mm

● Con le frese toriche CBN per supervelocità è possibile realizzare lavorazioni stabili e precise.  
CBN Super Speed Radius End Mill will realize stable and accurate machining.

# MSBH230 MRBH230

**Frese 2 Tagli sferiche per acciai temprati rivestite Mugen Premium**

Mugen Coating Premium 2-Flute Ball End Mill for Hardened Steel

**Frese 2 Tagli sferiche scaricate per nervature per acciai temprati rivestite Mugen Premium**

Mugen Coating Premium Long Neck Ball Hard for Hardened Steel

➔ P. 264/286



## Esempio lavorazione 1 : Stampo trancia Cutting Example 1 : cutting & Punch die model

### MRBH230

**Materiale lavorato: S590 (HSS sinterizzato) 65HRC** Material : HAP40 (Powder HSS) 65HRC

**Refrigerante: Lubrificazione minimale** Coolant : Oil mist

**Tempo di lavorazione: 9hr 42min compresa sgrossatura** Cutting time : 9hr 42min including roughing

### © Finitura Finishing

Pezzo da lavorare <small>Cutting part</small>	Parte troncatrice <small>Cutting die part</small>	Parte punzonatura <small>Punch die part</small>
Utensile <small>Tool</small>	MRBH230 R1×4	MRBH230 R1×8
Giri [min <sup>-1</sup> ] <small>Spindle speed</small>	20,000	12,000
Avanzamento [mm/min] <small>Feed</small>	1,200	
Prof. di taglio $a_p \times a_e$ [mm] <small>Depth of cut</small>	Piano <small>Bottom surface</small>	0.01×0.02
	Lato <small>Side</small>	0.02×0.03
Tempo di lavorazione <small>Cutting time</small>	2hr 45min 2hr 45min	5hr 25min 5hr 25min

- CBN  
Nitruro Cubico di Boro
- Diamante  
Diamond
- Rivestite Coating  
Piane Square
- Non Rivestite Non-Coating  
Scaricate Piane Long Neck Square
- Rivestite Coating  
Sferiche Ball
- Non Rivestite Non-Coating  
Scaricate Sferiche Long Neck Ball
- Rivestite Coating  
Coniche Taper
- Non Rivestite Non-Coating  
Coniche Sferiche Taper Ball
- Rivestite Coating  
Toriche Corner R
- Non Rivestite Non-Coating  
Scaricate Toriche Long Neck Corner R
- Rivestite Coating  
Frese Sagomate Formed Cutter
- Non Rivestite Non-Coating
- Punte  
Drill
- Altro  
Others
- Dati tecnici  
Technical Data
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Technical Guidance

**Superficie piana: Rz 0.744µm**

Bottom surface roughness



**Rugosità superficiale**

Surface roughness

**Superficie piana: Rz 0.712µm**

Bottom

**Superficie laterale: Rz 0.669µm**

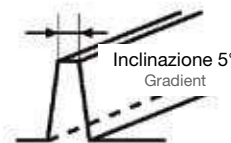
Side



R1×8 tagliente dopo lavorazione  
Cutting edge after machining



**Obiettivo: 0.050mm → Attuale: 0.057mm**  
Target Actual



R1×4 tagliente dopo lavorazione  
Cutting edge after machining



Usura utensile 0.025 mm  
Tool wear

Dimensioni: 30×20×8 mm  
Work size : 30×20×8mm(D)

Usura utensile 0.014 mm  
Tool wear

● **Misure attuali 0.057 mm contro l'obiettivo 0.050 mm su acciaio HSS**

Actual measurement 0.057mm against the target 0.050mm on Powder HSS.



**Esempio lavorazione 2 : mouse (cavità)** Cutting Example 2 : Mouse Cavity Model

**MSBH230•MRBH230**

**Materiale lavorato: STAVAX (SUS420J2) 52HRC** Material : STAVAX (SUS420J2) 52HRC

**Refrigerante: Lubrificazione minimale** Coolant : Oil mist

**Tempo di lavorazione totale: 32hr 10min compresa sgrossatura** Cutting time : 32hr 10min including roughing

**Rugosità superficiale**

Surface roughness

**Rz 1.492µm**



Tagliente dopo la lavorazione R1x6  
Cutting edge after machining



Usura utensile 0.008mm  
Tool wear

Tagliente dopo la lavorazione R0.5x6  
Cutting edge after machining



Usura utensile 0.010mm  
Tool wear

© **Finitura** Main part finishing

Utensile Tool	MRBH230 R1x6
Giri [min <sup>-1</sup> ] Spindle speed	18,000
Avanzamento [mm/min] Feed	720
Altezza cresta Rmax [mm] Depth of cut	0.001
Sovrametallo [mm] Stock removal to finish	0.03
Tempo di lavorazione Cutting time	6hr 4min 6hr 4min

**Rugosità superficiale**

Surface roughness

**Rz 0.909µm**



Tagliente dopo la lavorazione R3  
Cutting edge after machining



Dimensioni:  
135x95 mm  
Work size : 135x95mm

© **Finitura piano**

Parting face part finishing

Utensile Tool	MSBH230 R3
Giri [min <sup>-1</sup> ] Spindle speed	12,000
Avanzamento [mm/min] Feed	1,120
Altezza cresta Rmax [mm] Depth of cut	0.001
Sovrametallo [mm] Stock removal to finish	0.05
Tempo di lavorazione Cutting time	2hr 20min 2hr 20min



Usura utensile 0.008mm  
Tool wear

Tagliente dopo la lavorazione R0.3x4  
Cutting edge after machining



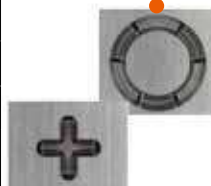
Usura utensile 0.008mm  
Tool wear

© **Finitura** Main part finishing

Utensile Tool	MRBH230 R0.5x6
Giri [min <sup>-1</sup> ] Spindle speed	18,000
Avanzamento [mm/min] Feed	720
Prof. di taglio Rmax [mm] Depth of cut	0.001
Sovrametallo [mm] Stock removal to finish	0.025
Tempo di lavorazione Cutting time	2hr 43min 2hr 43min



**Rugosità superficiale**  
Surface roughness  
**Rz 0.607µm**



Inclinazione Gradient: 1°  
Profondità Depth: 4 mm

© **Finitura cava (L/D=6.6)**

Gutter finishing

Utensile Tool	MRBH230 R0.3x4
Giri [min <sup>-1</sup> ] Spindle speed	18,000
Avanzamento [mm/min] Feed	300
Prof. di taglio αp×αe[mm] Depth of cut	0.01×0.015
Tempo di lavorazione Cutting time	2hr 10min 2hr 10min

- **Qualità e precisione delle superfici mantenuta per lungo tempo nella lavorazione di materiali temprati. Stabilità nelle nervature con frese di piccole dimensioni.**

Cutting surface is accurately maintained for a long time on hard materials.

Slotting by small-size end mill is also consistent.

**Diamante**

Diamond

**Piane**

Square

**Scaricate**

Plane

Long Neck

Square

**Sferiche**

Ball

**Scaricate**

Sferiche

Long Neck

Ball

**Coniche**

Taper

**Coniche**

Sferiche

Taper

Ball

**Toriche**

Corner R

**Scaricate**

Toriche

Long Neck

Corner R

**Frese**

Sagomate

Formed

Cutter

**Punte**

Drill

**Altro**

Others

**Dati tecnici**

Technical Data

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### Esempio lavorazione 3 : stampo pressofusione Cutting Example 3 : HSS YXR7 Direct Cutting

#### MRBH230

**Materiale lavorato: YXR7 (HSS) 65HRC** Material : YXR7 (Matrix HSS) 65HRC

**Refrigerante: Lubrificazione minimale** Coolant : Oil mist

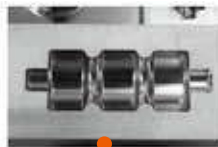
**Tempo di lavorazione totale: 14hr 18min inclusa sgrossatura** Cutting time : 14hr 18min including roughing

#### ② Finitura ② Finishing



Utensile Tool	MRBH230 R0.5x4
Giri [min <sup>-1</sup> ] Spindle speed	25,000
Avanzamento [mm/min] Feed	1,200
Prof. di taglio $\bar{a}_p \times \bar{a}_e$ [mm] Depth of cut	0.01 x 0.02
Tempo di lavorazione Cutting time	33 min 33min

#### ① Finitura ① Finishing



Utensile Tool	MRBH230 R1x8
Giri [min <sup>-1</sup> ] Spindle speed	16,000
Avanzamento [mm/min] Feed	1,200
Prof. di taglio $\bar{a}_p \times \bar{a}_e$ [mm] Depth of cut	0.01 x 0.02
Tempo di lavorazione Cutting time	1hr 19 min 1hr 19min



Dimensioni:  
60x60 x profondità finale 8 (mm)  
Work size :  
60x60x8mm(D)Maximum depth to be cut

#### ③ Finitura ③ Finishing



Utensile Tool	MRBH230 R1x8
Giri [min <sup>-1</sup> ] Spindle speed	16,000
Avanzamento [mm/min] Feed	1,200
Prof. di taglio $\bar{a}_p \times \bar{a}_e$ [mm] Depth of cut	0.02 x 0.3
Tempo di lavorazione Cutting time	2hr 20min 2hr 20min

#### ④ Finitura ④ Finishing



Utensile Tool	MRBH230 R1x8
Giri [min <sup>-1</sup> ] Spindle speed	16,000
Avanzamento [mm/min] Feed	1,200
Prof. di taglio $\bar{a}_p \times \bar{a}_e$ [mm] Depth of cut	0.02 x 0.01
Tempo di lavorazione Cutting time	2hr 6min 2hr 6min

#### ● Lavorazione diretta da blocco.

Il design originale della fresa NS permette lavorazioni lunghe e stabili su materiale temprato HSS 65HRC con elevata precisione sia sulla superficie piana sia sul fianco.

Direct cutting from the square block.

NS original tool design made it possible to stably machine HSS at 65HRC for a long time with a good accuracy on bottom and side surfaces.

## Esempio lavorazione 4 : fresatura diretta di un modello di stampo per forgiatura a caldo

**MRBH230**

Cutting Example 4 : Hot Forging Mold Direct Cutting

**Materiale lavorato: YXR3 (HSS) 60HRC** Material : YXR3 (Matrix HSS) 60HRC

**Refrigerante: Lubrificazione minima** Coolant : Oil mist

**Tempo di lavorazione: 15hr 38min** Cutting time : 15hr 38min

### Pre-grossatura Pre-roughing

<b>Pezzo da lavorare</b> Cutting part	Lavorazione completa Whole profile
<b>Utensile</b> Tool	MRBH230 R3x20
<b>Giri [min<sup>-1</sup>]</b> Spindle speed	8,000
<b>Avanzamento [mm/min]</b> Feed	2,500
<b>Prof. di taglio <math>a_p \times a_e</math> [mm]</b> Depth of cut	0.3x1.2
<b>Tempo di lavorazione</b> Cutting time	2hr 2hr

### Ripresa del materiale residuo sul fianco Stock removing at side surface

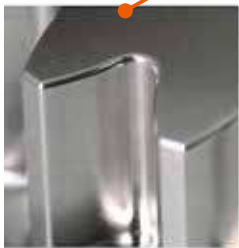
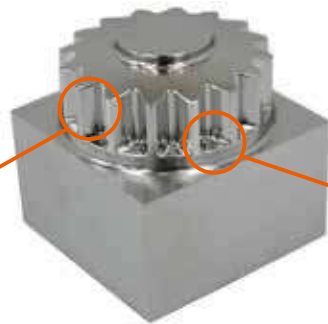
<b>Profondità di lavorazione [mm]</b> Machined depth	13.5	13.5~17.5	17.5~23.97
<b>Utensile</b> Tool	MRBH230 R1.5x8	MRBH230 R1.5x12	MRBH230 R1.5x16
<b>Giri [min<sup>-1</sup>]</b> Spindle speed	14,000	14,000	12,000
<b>Avanzamento [mm/min]</b> Feed	2,000	1,500	1,200
<b>Prof. di taglio <math>a_p \times a_e</math> [mm]</b> Depth of cut	0.2x0.5	0.15x0.3	0.1x0.2
<b>Tempo di lavorazione</b> Cutting time	1hr 8min 1hr 8min	59min 59min	4hr 36min 4hr 36min

### Semifinitura Semi-finishing

<b>Pezzo da lavorare</b> Cutting part	<b>Figura</b> Top curving face	<b>Piani</b> Flat bottom surface
<b>Utensile</b> Tool	MRBH230 R1.5x8	MRBH230 R1.5x16
<b>Giri [min<sup>-1</sup>]</b> Spindle speed	14,000	12,000
<b>Avanzamento [mm/min]</b> Feed	2,000	1,200
<b>Prof. di taglio <math>a_p \times a_e</math> [mm]</b> Depth of cut	Rmax0.001	0.02x0.05
<b>Tempo di lavorazione</b> Cutting time	29min 29min	26min 26min

### Finitura Finishing

<b>Pezzo da lavorare</b> Cutting part	<b>Lato</b> Side	<b>Figura e piani</b> Curving and flat face
<b>Utensile</b> Tool	MRBH230 R1.5x16	
<b>Giri [min<sup>-1</sup>]</b> Spindle speed	8,000	
<b>Avanzamento [mm/min]</b> Feed	600	
<b>Prof. di taglio <math>a_p \times a_e</math> [mm]</b> Depth of cut	0.03x0.01	Rmax0.0005
<b>Tempo di lavorazione</b> Cutting time	6hr 6hr	



Dimensioni: 60x60xProf. finale 24 mm. (D)  
Work size : 60x60x24mm(D) Maximum depth to be cut



- La geometria scaricata del tagliente periferico minimizza le vibrazioni nelle zone più critiche, come nei raggi ridotti o le pareti con piccoli gradi di sforno.

Back-taper of peripheral cutting edge minimizes chattering when cutting the part of narrow corner R at a small gradient angle, where the harmful vibration easily happens.

**MHDH445**  
**MHDH645**

**Frese 4 Tagli plane per acciai temprati rivestite Mugen Premium**  
Mugen Coating Premium 4-Flute Square End Mill for Hardened Steel  
**Frese 6 Tagli plane per acciai temprati rivestite Mugen Premium**  
Mugen Coating Premium 6-Flute Square End Mill for Hardened Steel

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**Esempio lavorazione 1 : lavorazione diretta di acciaio temprato**

Cutting Example 1 : Hard Metal Direct Cutting

**Materiale lavorato: 1.2379 60HRC** Material : PD613 60HRC

**Refrigerante: Lubrificazione minima** Coolant : Oil mist

**Tempo di lavorazione: 1hr 31min** Cutting time : 1hr 32min

Processo Cutting process	Sgrossatura Roughing			Finitura Finishing
	Interpol. elicoidale Helical milling	Cava Slotting	Contornatura Side milling	Contornatura Side milling
Utensile Tool	MHDH645 Ø6x12			
Giri [min <sup>-1</sup> ] Spindle speed	5,000			
Avanzamento [mm/min] Feed	350	600	2,000	600
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	$a_p$ 0.15		12x0.2	8~12x0.01
Tempo di lavorazione Cutting time	3min 3min	20min 20min	15min 15min	5min 5min

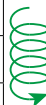
Interpolaz. elicoidale

Helical milling



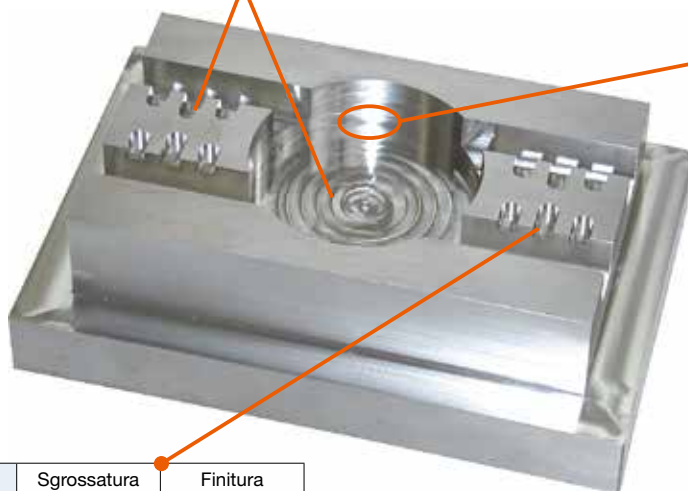
Contornatura

Side milling



**Deviazione della parete inferiore o uguale 3µm**

Slanting of side wall less or equal 3µm.



Dimensioni:

80x120 mm

Work size : 80x120mm

Processo Cutting process	Sgrossatura Roughing	Finitura Finishing
	Cava Slotting	Contornatura Side milling
Utensile Tool	MHDH445 Ø3	
Giri [min <sup>-1</sup> ] Spindle speed	10,000	
Avanzamento [mm/min] Feed	500	350
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	$a_p$ 0.05	1.5x0.01
Tempo di lavorazione Cutting time	36 min 36min	



● **Lavorazione diretta su acciaio temprato da un blocco squadrato in 1 ora e 32 minuti.**

Direct cutting of hardened steel completed from the square block in 1hour and 32 minutes.

- CBN  
Nitruro Cubico di Boro
- Diamante  
Diamond
- Rivestite  
Non-Rivestite  
Coating  
Non-Coating  
Piane  
Square  
Scaricate  
Piane  
Long Neck  
Square
- Sferiche  
Ball
- Scaricate  
Sferiche  
Long Neck  
Ball
- Coniche  
Taper
- Coniche  
Sferiche  
Taper Ball
- Toriche  
Corner R
- Scaricate  
Toriche  
Long Neck  
Corner R
- Frese  
Sagomate  
Formed  
Cutter
- Punte  
Drill
- Altro  
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### Esempio lavorazione 1 : stampo pressofusione di alluminio di lampada LED

Cutting Example 1 : LED Lamp Housing Aluminium Die-casting Mold

**Materiale lavorato: 1.2343 (48HRC)** Material : DH31-S 48HRC

**Refrigerante: Lubrorefrigerante** Coolant : Water soluble fluid

**Tempo di lavorazione: 7hr 13min** Cutting time : 7hr 13min

**Inclinazione 2°**  
Gradient



**Rugosità superficiale laterale Rz 1.52µm**

Side surface roughness

**Dimensioni: 50x50 mm**

Work size : 50x50mm

	Dimensione Dimension (Superiore) Top	Inclinazione Deflection (Laterale) Side
Obiettivo Target	3.458mm	2°
Attuale Actual	3.455mm	2°01'

Processo Cutting process	Pre-grossatura Pre-roughing	Sgrossatura Roughing	Semifinitura Semi-finishing	Finitura Finishing		
				Laterale Side	Piano Plane	Superficie curva Curved Surface
Utensile Tool	MHRH430R Ø6xR1x24	MRBTNH345 R1x2°x20		MRBTNH345 R1x2°x20		
Giri [min <sup>-1</sup> ] Spindle speed	5,000	10,000		5,000		
Avanzamento [mm/min] Feed	5,000	1,200	600	600		300
Prof. di taglio a <sub>p</sub> x a <sub>e</sub> [mm] Depth of cut	0.15x1.5	0.1x0.35	a <sub>p</sub> 0.05	0.05x0.05	0.05x0.03	a <sub>p</sub> 0.03
Sovrametallo [mm] Stock	0.05	0.05		-		
Tempo di lavorazione Cutting time	12min 12min	3hr 1min 3hr 1min		4hr 4hr		

● Il rivestimento Mugen Premium permette efficienti fresature 3D ed una durata prolungata, grazie al suo originale design realizza un'ottima qualità di finitura di pareti profonde

Mugen Coating Premium performing for high efficient 3D milling by it's original design and tool life improvement realized stable and quality finish even at side and deep profiles.

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

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### Esempio lavorazione 1 : Custodia DVD finitura a specchio

Cutting Example 1 : DVD Case (Mirror surface)

**Materiale lavorato: STAVAX 52HRC** Material : STAVAX 52HRC

**Refrigerante: Lubrificazione minimale** Coolant : Oil mist

**Tempo di lavorazione: 11hr 20min compresa grossatura** Cutting time : 11hr 20min including roughing



Dimensioni: 150x150 mm  
Work size : 150x150mm

Processo	Finitura	
Cutting process	Finishing	
Pezzo da lavorare	Laterale	Piano
Cutting part	Side	Bottom
Utensile	MHRH430R	
Tool	Ø2xR0.5x8	
Giri [min <sup>-1</sup> ]	40,000	
Spindle speed		
Avanzamento [mm/min]	3,000	2,000
Feed		
Prof. di taglio $a_p \times a_e$ [mm]	0.02x0.01	0.01x0.03
Depth of cut		
Tempo di lavorazione	1hr 30min	7hr 30min
Cutting time	1hr 30min	7hr 30min



**Rugosità superficiale piano**  
Bottom surface roughness  
**Rz 0.3µm**

● Il materiale utilizzato in questo esempio di lavorazione è STAVAX temprato. La finitura a specchio è stata realizzata con la fresa MHRH430R, utilizzando i parametri di taglio ottimali.

Material of this cutting example is hardened STAVAX. Mirror surface has been realized through direct cutting by MHRH430R under the optimum cutting conditions.

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating

Piane  
Square

Non Rivestite  
Non-Coating

Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating

Sferiche  
Ball

Non Rivestite  
Non-Coating

Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating

Coniche  
Taper

Non Rivestite  
Non-Coating

Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating

Toriche  
Corner R

Non Rivestite  
Non-Coating

Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating

Frese  
Sagomate  
Formed  
Cutter

Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

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Technical Guidance



### Esempio lavorazione 1 : Fresatura ad alta efficienza di Ti-6Al-4V

Cutting Example 1 : High efficient Ti-6Al-4V cutting

Utensile: **MSXH440R Ø6xR0.5** Tool : MSXH440R Ø6xR0.5

Materiale lavorato: **Ti-6Al-4V** Material : Ti-6Al-4V

Refrigerante: **Lubrorefrigerante** Coolant : Water soluble fluid

Tempo di lavorazione: **3min 9sec** Cutting time : 3min 9sec



Dimensioni: 50x40 mm  
Work size : 50x40mm

Lavorazione Cutting part	Tasca Pocket	
Processo Cutting process	Sgrossatura Roughing	Finitura Finishing
Giri [min <sup>-1</sup> ] Spindle speed	3,600	
Avanzamento [mm/min] Feed	400	
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	6x3	12x0.1
Tempo di lavorazione Cutting time	51 sec 51sec	9 sec 9sec
Tempo di lavorazione totale Total Cutting time	60 sec 60sec	

Lavorazione Cutting part	Contornatura Side	
Processo Cutting process	Sgrossatura Roughing	Finitura Finishing
Giri [min <sup>-1</sup> ] Spindle speed	3,600	
Avanzamento [mm/min] Feed	1,000	400
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	9x1.2	9x0.1
Tempo di lavorazione Cutting time	6 sec 65sec	1 sec 14sec
Tempo di lavorazione totale Total Cutting time	79 sec 79sec	

Lavorazione Cutting part	Cava da pieno Slot	
Processo Cutting process	Sgrossatura Roughing	Finitura Finishing
Giri [min <sup>-1</sup> ] Spindle speed	3,600	
Avanzamento [mm/min] Feed	400	
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	$a_p$ 6	12x0.1
Tempo di lavorazione Cutting time	25 sec 25sec	25 sec 25sec
Tempo di lavorazione totale Total Cutting time	50 sec 50sec	

### Esempio lavorazione 2 : Ugello di turbina

Cutting Example 2 : Turbine nozzle model

Utensile: **MSXH440R Ø6xR0.5** Tool : MSXH440R Ø6xR0.5

Materiale lavorato: **Inconel718** Material : Alloy718

Refrigerante: **Lubrorefrigerante** Coolant : Water soluble fluid

Tempo di lavorazione: **1hr 45min** Cutting time : 1hr 45min



Dimensione: 80x35 mm  
Work size : 80x35 mm

Pezzo da lavorare Cutting part	Profilo esterno Outer profile	Profilo interno Inner profile	Lame Blades	Dettaglio Detail
Processo Cutting process	Sgrossatura Roughing			Finitura Finishing
Giri [min <sup>-1</sup> ] Spindle speed	2,100		Cava: 1,800 Slot Lato: 2,100 Side	2,100
Avanzamento [mm/min] Feed	500	Elicoidale: 300 Helical Lato: 500 Side	Cava: 300 Slot Lato: 500 Side	250
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	8.95x0.2	Elicoidale: $a_p$ 0.16 Helical Lato: 8.95x0.2 Side	Cava: $a_p$ 0.6 Slot Lato: 5.95x0.2 Side	Lato: 3-6x0.05 Side Piano: 0.05x1.5 Bottom
Tempo di lavorazione Cutting time	15 min 15min	20 min 20min	50 min 50min	20 min 20min

● Impiegando il rivestimento Mugen Premium ad alta resistenza alle temperature, il tagliente elicoidale torico e l'elica variabile e il passo differenziato, si possono realizzare lavorazioni stabili ed efficienti, riducendo le vibrazioni.

By employing high heat-resistible Mugen Coating Premium, original spiral form at corner radius, and improved design of unequal helix angle as well as flute spacing, high efficient and steady machining has been realized to reduce harmful vibration.

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Piane  
Square

Scaricate Piane  
Long Neck Square

Sferiche  
Ball

Scaricate Sferiche  
Long Neck Ball

Coniche  
Taper

Coniche Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate Toriche  
Long Neck Corner R

Frese Sagomate  
Formed Cutter

Punte  
Drill

Altro  
Others

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Technical Guidance



### Esempio lavorazione 1 : MSZ345 Ø10 fresatura molto efficiente

Cutting Example 1 : MSZ345 Ø10 High efficient cutting

Materiale da lavorare: **C50** Material : S50C

Refrigerante: **Aria** Coolant : Air blow



Dimensione: 100x100 mm

Work size : 100x100mm

Utensile Tool		MSZ345 Ø10
Giri [min <sup>-1</sup> ] Spindle speed		3,000
Avanzamento [mm/min] Feed	Tuffo Plunging	300
	Fresatura tasca Pocket milling	1,500
	Cava Slotting	800
	Spallamento Side milling	1,500
Prof. di taglio a <sub>p</sub> x a <sub>e</sub> [mm] Depth of cut	Tuffo Plunging	a <sub>p</sub> 10
	Cava Slotting	a <sub>p</sub> 10
	Spallamento Side milling	10x3
Tempo di lavorazione Cutting time		6 min 6min

### Forma del truciolo nella lavorazione a tuffo Chips of Plunging



MSZ345



Fresa convenzionale

Ordinary End Mill

- L'originale design del tagliente (brevettato) consente la formazione di truciolo corto e rende possibile la lavorazione a tuffo

Original flute design (Patented) brought a high efficient plunging because chips are separated to small pieces.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Rivestite Coating  
Piane Square

Non Rivestite Non-Coating  
Scaricate Piane Long Neck Square

Rivestite Coating  
Sferiche Ball

Non Rivestite Non-Coating  
Scaricate Sferiche Long Neck Ball

Rivestite Coating  
Coniche Taper

Non Rivestite Non-Coating  
Coniche Sferiche Taper Ball

Rivestite Coating  
Toriche Corner R

Non Rivestite Non-Coating  
Scaricate Toriche Long Neck Corner R

Rivestite Coating  
Frese Sagomate Formed Cutter

Non Rivestite Non-Coating

Punte  
Drill

Altro  
Others

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## Esempio lavorazione 2 : MSZ345 Ø3 Fresature efficienti su diversi materiali

Cutting Example 2 : MSZ345 Ø3 High efficient cutting for various materials

**Materiale lavorato: C50, 1.2311 (40HRC), 1.2343 non temprato (inox)**

Material : S50C, NAK80(40HRC), SKD61(Raw), SUS304

**Refrigerante: Aria-Lubrorefrigerante su SUS304** Coolant : Air blow (Water soluble for SUS304)

### © C50 Condizioni di fresatura S50C Milling condition

Utensile Tool		MSZ345 Ø3
Giri [min <sup>-1</sup> ] Spindle speed		9,600
Avanzamento [mm/min] Feed	Tuffo Plunging	200
	Fresatura tasca Pocket milling	800
	Cava Slotting	550
	Spallamento Side milling	800
Prof. di taglio a <sub>p</sub> ×a <sub>e</sub> [mm] Depth of cut	Fresatura tasca Pocket milling	4.5×0.9
	Cava Slotting	a <sub>p</sub> 3
	Spallamento Side milling	4.5×0.9
Tempo di lavorazione Cutting time		4 min 4min

### © 1.2311 Condizioni di fresatura NAK80 Milling condition

Utensile Tool		MSZ345 Ø3
Giri [min <sup>-1</sup> ] Spindle speed		5,800
Avanzamento [mm/min] Feed	Tuffo Plunging	100
	Fresatura tasca Pocket milling	400
	Cava Slotting	250
	Spallamento Side milling	400
Prof. di taglio a <sub>p</sub> ×a <sub>e</sub> [mm] Depth of cut	Fresatura tasca Pocket milling	4.5×0.9
	Cava Slotting	a <sub>p</sub> 3
	Spallamento Side milling	4.5×0.9
Tempo di lavorazione Cutting time		8 min 8min



Dimensione: 45×45 mm  
Work size : 45×45mm

### © 1.2343 (non temprato) Condizioni di fresatura SKD61 (Raw) Milling condition

Utensile Tool		MSZ345 Ø3
Giri [min <sup>-1</sup> ] Spindle speed		4,200
Avanzamento [mm/min] Feed	Tuffo Plunging	70
	Fresatura tasca Pocket milling	350
	Cava Slotting	200
	Spallamento Side milling	550
Prof. di taglio a <sub>p</sub> ×a <sub>e</sub> [mm] Depth of cut	Fresatura tasca Pocket milling	2.25×0.9
	Cava Slotting	a <sub>p</sub> 1.5
	Spallamento Side milling	4.5×0.9
Tempo di lavorazione Cutting time		9 min 9min

### © AISI304 (inox) Condizioni di fresatura SUS304 Milling condition

Utensile Tool		MSZ345 Ø3
Giri [min <sup>-1</sup> ] Spindle speed		3,600
Avanzamento [mm/min] Feed	Tuffo Plunging	30
	Fresatura tasca Pocket milling	200
	Cava Slotting	100
	Spallamento Side milling	250
Prof. di taglio a <sub>p</sub> ×a <sub>e</sub> [mm] Depth of cut	Fresatura tasca Pocket milling	2.25×0.6
	Cava Slotting	a <sub>p</sub> 1.5
	Spallamento Side milling	4.5×0.6
Tempo di lavorazione Cutting time		20 min 20min

**Il profilo unico e brevettato del tagliente consente lavorazioni efficienti su diversi materiali.**

Original flute design (Patented) made it possible for efficient cutting of various materials.

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

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Tolleranza R±2µm R-Tolerance ±2µm

## Esempio lavorazione 1 : Confronto tra fresa MSB230G2 e fresa sferica di altra marca

Cutting Example 1 : Comparison of MSB230G2 with Rival manufacturer

Materiale lavorato: **STAVAX (SUS420J2) 52HRC** Material : STAVAX (SUS420J2) 52HRC

Refrigerante: **Lubrificazione minima** Coolant : Oil mist

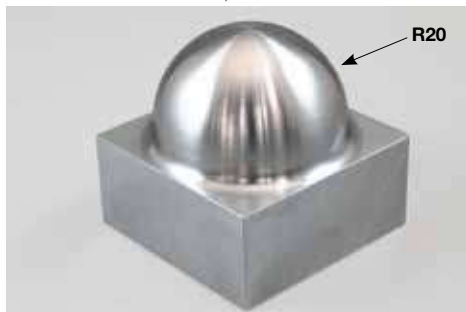
Tempo di lavorazione: **4hr 30min (compresa sgrossatura)** Cutting time : 4hr 30min include roughing

### Confronto tra la fresa ad altissima precisione MSB230G2 con tolleranza sul raggio ±2µm con un'altra marca con tolleranza ±10µm

Cutting accuracy comparison of hemispherical model after machined by NS Profit Ball End Mill; MSB230G2 R-tolerance ±2µm and the rival product R-tolerance ±10µm.

#### Profilo emisfera R20

R20 Hemispherical model



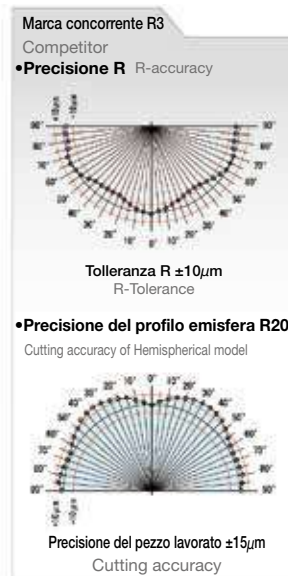
Dimensione: 50x50 mm

Work size : 50x50mm

Processo Cutting process	Finitura Finishing	
Utensile Tool	MSB230G2 R3	Marca concorrente R3 Competitor
Giri [min <sup>-1</sup> ] Spindle speed	9,000	
Avanzamento [mm/min] Feed	1,200	
Prof. di taglio ap×ae[mm] Depth of cut	0.05×0.05	
Tempo di lavorazione Cutting time	1hr 30min 1hr 30min	

### Confronto con fresa di altra marca sulla precisione del raggio prima della lavorazione e sulla precisione della lavorazione

R-accuracy of the End Mill and the cutting accuracy of the work piece: Hemispherical model.



(Strumenti di misura utensile: misurazione del raggio per le frese sferiche)

Tool measuring equipment : Radius measuring for ball end mill.

(Strumenti di misura del lavoro: macchina CNC di misurazione)

Work measuring equipment : CNC coordinate measuring machine.

● La precisione del pezzo è subordinata alla precisione del raggio dell'utensile

Cutting accuracy is subject to R-accuracy of the tool.

**DCRB230**  
**DCHR230**  
**DCSE235**

**Frese sferiche scaricate rivestite diamante**  
Diamond Coating Long Neck Ball End Mill  
**Frese piane scaricate rivestite diamante**  
Diamond Coating Long Neck Square End Mill  
**Frese piane 2 Tagli rivestite diamante**  
Diamond Coating 2-Flute Square End Mill

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## Esempio lavorazione 1 Cutting Example 1

**DCRB230**

**Materiale lavorato: MMC** Material : Metal Matrix Composites

**Tempo di lavorazione: 2hr 53min** Cutting time : 2hr 53min

Processo Cutting process	Sgrossatura Roughing	Finitura Finishing
Utensile Tool	DCRB230 R3x30	
Giri [min <sup>-1</sup> ] Spindle speed	10,000	
Avanzamento [mm/min] Feed	3,000	2,000
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	1x2	0.2x0.2
Tempo di lavorazione Cutting time	1hr 28min 1hr 28min	1hr 25min 1hr 25min

**MMC (Metal Matrix Composites)** Materiale composto di metallo - ceramica. Grande usura - alta rigidità - alta conduttività termica e bassa dilatazione termica - materiale di ultima generazione

Composite materials of metal - ceramics  
Strong wear - resistance owing to light - weight, high rigidity, high thermal conductivity and low heat dilation.  
Noteworthy material for next generation.



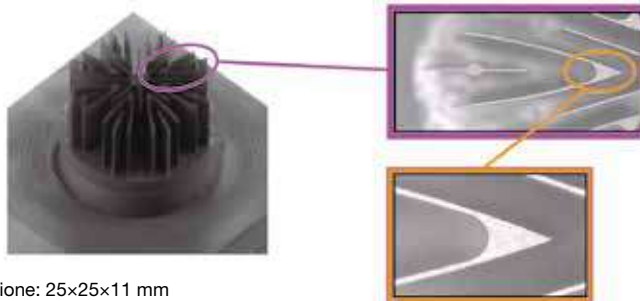
Dimensione: 140x135x30 mm  
Work size : 140x135x30mm

## Esempio lavorazione 2 Cutting Example 2

**DCSE235 • DCHR230**

**Materiale lavorato: Grafite** Material : Graphite

**Tempo di lavorazione 5hr 16min** Cutting time : 5hr 16min



Dimensione: 25x25x11 mm  
Work size : 25x25x11mm

Processo Cutting process	Profilo esterno Outer profile	Pareti sottili Thin plates
Utensile Tool	DCSE235 Ø6	DCHR230 Ø0.5x6
Giri [min <sup>-1</sup> ] Spindle speed	6,000	20,000
Avanzamento [mm/min] Feed	2,000	1,000
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	12x0.5	0.03x0.24
Tempo di lavorazione Cutting time	3min 3min	5hr 13min 5hr 13min

Adatta per la lavorazione di grafite, materiali fragili e leghe di alluminio ad alto contenuto di silicio.  
Suitable for machining of graphite, brittle material and high silicon-aluminum alloy.

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

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**ALZ345**  
**AL5D-2**

**Fresa 3 Tagli Power "Z" per alluminio**

3-Flute Power "Z" End Mill for Aluminum

**Fresa 2 Tagli tipo lungo per alluminio**

2-Flute Long End Mill for Aluminum

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**Esempio lavorazione 1 : Confronto prestazioni con fresa marca concorrente per alluminio**

Cutting Example 1 : Comparison of performance with rival manufacturers

**ALZ345**

Materiale lavorato: **Alluminio (A5052)** Material : Aluminum (A5052)

Refrigerante: **Lubrorefrigerante** Coolant : Water soluble fluid

	Condizioni ① Case 1	Condizioni ② Case 2	Condizioni ③ Case 3	Condizioni ④ Case 4
Utensile Tool	ALZ345 Ø6			
Processo Cutting process	Foro → Cava (Larghezza Cava 30mm) Hole → Slot (Slot width 30mm)			Spallamento Side milling
Giri [min <sup>-1</sup> ] Spindle speed	5,000	10,000	20,000	20,000
Avanzamento (tuffo) [mm/min] Feed (Plunge)	250	500	700	-
Avanzamento [mm/min] Feed	1,500	3,000	6,000	10,000
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	$a_p$ 6			6x3
○ Risultato	Condizioni ① Case 1	Condizioni ② Case 2	Condizioni ③ Case 3	Condizioni ④ Case 4
NS	○	○	○	○
Marca A Company A	△	△	△	△
Marca B Company B	×	□	□	○

○ Nessuna scheggiatura o vibrazione    △ vibrazione    □ scheggiatura    × rottura  
no chipping, no chattering    chattering    Chipping    Breakage

● **ALZ345 dà risultati eccellenti in tutti i casi, la marca A ha una vibrazione costante e la marca B si scheggia e rompe facilmente**

ALZ345 resulted in excellent performance in all cases, while abnormal chattering happened at Company A and chipping at Company B which may cause breakage.

**Esempio lavorazione 2 : Confronto sulle vibrazioni su una lunghezza di taglio 5xD**

Cutting Example 2 : Comparison of chattering at long length of cut (L/D=5)

**AL5D-2**

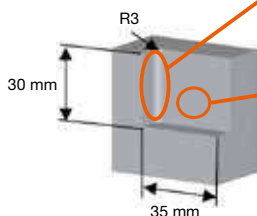
Materiale lavorato: **Alluminio (A5052)** Material : Aluminum (A5052)

Refrigerante: **Lubrorefrigerante** Coolant : Water soluble fluid

**Superficie dopo la Finitura**  
Surface after finishing

Processo Cutting process	Finitura Finishing	
Utensile Tool	AL5D-2 Ø6	Concorrente Ø6
Giri [min <sup>-1</sup> ] Spindle speed	12,000	
Avanzamento [mm/min] Feed	800	
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	30x0.06	

Dimensione:  
35x50 mm  
Work size : 35x50mm



	AL5D-2	Concorrente Rival
Raggio Corner		
Parete Side		

● **La serie AL realizza ottime superfici su alluminio senza vibrazioni.**

AL-series realize fine surface on aluminum cutting without chattering.

**ALZ345**  
**AL3D-2**

**Fresa 3 Tagli Power "Z" per alluminio**

3-Flute Power "Z" End Mill for Aluminum

**Fresa 2 Tagli media per alluminio**

2-Flute Medium End Mill for Aluminum

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**Esempio lavorazione 3 : Fresatura molto efficiente su alluminio**

Cutting Example 3 : High efficient cutting on Aluminum

**Materiale lavorato: Alluminio (A5052)** Material : Aluminum (A5052)

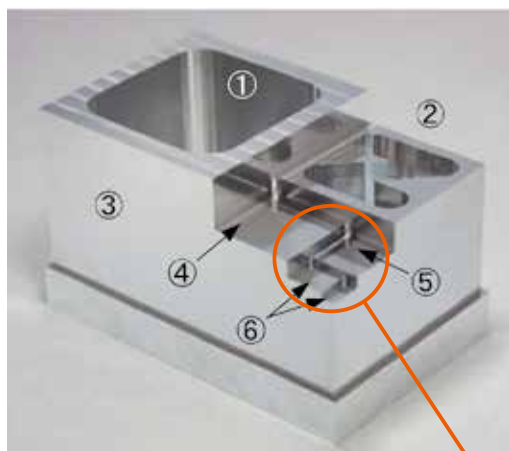
**Refrigerante: Lubrorefrigerante** Coolant : Water soluble fluid

**Tempo di lavorazione: 6min** Cutting time : 6min

		①	②	③	④	⑤	⑥	
<b>Processo</b> Cutting process		Tasca Pocket	Cava Slot	Spallamento Side	Superficie piana Plane surface			
<b>Utensile</b> Tool		ALZ345		AL3D-2	ALZ345			
		Ø10	Ø6	Ø10	Ø3	Ø2	Ø1	
<b>Giri [min<sup>-1</sup>]</b> Spindle speed	<b>Sgrossatura</b> Roughing	11,000	18,600	10,500	20,000	20,000	20,000	
	<b>Finitura</b> Finishing	20,000	20,000	20,000	20,000	20,000	20,000	
<b>Avanzamento [mm/min]</b> Feed	<b>Tuffo</b> Plunging	300	400	-	-	-	-	
	<b>Sgrossatura</b> Roughing	3,000	2,200	1,700	2,200	1,500	1,100	
		<b>Finitura</b> Finishing	2,000	1,100	2,000	1,100	700	500
<b>Prof. di taglio</b> <b>a<sub>p</sub> × a<sub>e</sub> [mm]</b> Depth of cut	<b>Sgrossatura</b> Roughing	10×3	ap 5.95	30×0.5	3×0.9	2×0.6	1×0.3	
	<b>Finitura</b> Finishing	15×0.01	6×0.05	30×0.01	3×0.01	2×0.01	1×0.005	

(Flessione sulla superficie laterale entro 2µm, rugosità superficiale entro Rz1µm)

[Deflection of side wall within 2µm, surface roughness is within Rz 1µm.]

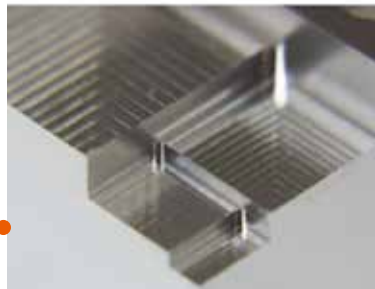


Dimensione: 40×63.5×38 mm

Work size : 40×63.5×38mm(H)



**Nessuna vibrazione durante la lavorazione degli angoli**  
No chattering at corner



**Nessuno scalino sulla parete**  
No difference in level at side face

● **Ottenuta precisione nella flessione entro 2µm e rugosità superficiale entro Rz1µm**

Deflection of side wall is within 2µm, surface roughness is within Rz 1µm.

**CBN**

Nitrato Cubico di Boro

**Diamante**

Diamond

**Piane**

Square

**Scaricate Piane**

Long Neck Square

**Sferiche**

Ball

**Scaricate Sferiche**

Long Neck Ball

**Coniche**

Taper

**Coniche Sferiche**

Taper Ball

**Toriche**

Corner R

**Scaricate Toriche**

Long Neck Corner R

**Frese Sagomate**

Formed Cutter

**Punte**

Drill

**Altro**

Others

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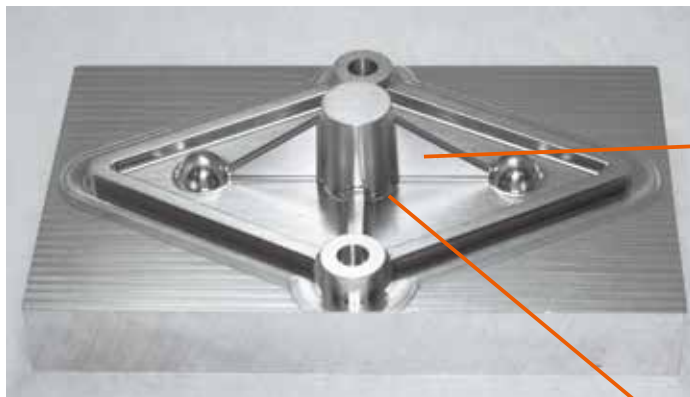
### Esempio lavorazione 1 : Parti in alluminio Cutting Example 1 : Aluminum Parts Model

**Materiale lavorato: Alluminio (A5052)** Material : Aluminum (A5052)

**Refrigerante: Lubrorefrigerante** Coolant : Water soluble fluid

**Tempo di lavorazione: 3hr 20min** Cutting time : 3hr 20min

Processo Cutting process	Sgrossatura Roughing	Semifinitura Semi-finishing	Materiale residuo Stock removing	Materiale residuo Stock removing	Finitura Finishing
Utensile Tool	ALB225 R3x12		ALB225 R1.5x2.5x15	ALB225 R1x1.5x20	
Giri [min <sup>-1</sup> ] Spindle speed	20,000		18,000	12,000	
Avanzamento [mm/min] Feed	7,500	3,000	2,000	1,200	2,000
Prof. di taglio $\alpha_p \times \alpha_e$ [mm] Depth of cut	1x2	0.2x0.2	0.6x0.6	0.1x0.1	0.05x0.05
Sovrametallo [mm] Stock	0.1	0.05	0.05	0.05	-
Tempo di lavorazione Cutting time	14min 14min	24min 24min	8min 8min	24min 24min	2hr 10min 2hr 10min



Dimensione: 60x100 mm  
Work size : 60x100mm



- Il nuovo design del tagliente per lavorazioni senza vibrazioni garantisce un'eccellente rugosità superficiale nella lavorazioni di pareti e degli angoli.

New chatter-free flute design brought an excellent surface roughness especially for the cutting of side wall and at corner.

CBN  
Nitruro Cubico di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square  
Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball  
Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper  
Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R  
Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter  
Non Rivestite  
Non-Coating

Punte  
Drill

Altro  
Others

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### Esempio lavorazione 1 : Vassoio di resina ABS Cutting Example 1 : ABS Resin Tray

**Materiale lavorato: resina ABS** Material : ABS resin

**Refrigerante: Aria** Coolant : Air blow

**Tempo di lavorazione: 1hr 1min** Cutting time : 1hr 1min

Spessore 2 mm!  
Thickness 2mm



Dimensione: 150x100x14 mm  
Work size : 150x100x14mm  
(Dimensione dopo la lavorazione: 146x94x9 mm)  
(Work size after machining : 146x94x9mm)

Zoom  
Magnified



Logo NS  
NS logo  
Profondità di taglio: 0.15 mm  
Cutting depth

Pezzo da lavorare Cutting part	Contornatura esterna Outer contouring		Tasca Pocket		Logo NS NS logo	
	Sgrossatura Roughing	Finitura Finishing	Sgrossatura Roughing	Finitura Finishing	Sgrossatura Roughing	Finitura Finishing
Utensile Tool	RSES230 Ø6x9				RSES230 Ø0.5x0.75	
Giri [min <sup>-1</sup> ] Spindle speed	3,000		3,000		20,000	
Avanzamento [mm/min] Feed	1,250	600	1,250	600	350	Lato: 150 Side Inferiore: 350 Bottom
Prof. di taglio ap x ae [mm] Depth of cut	9x0.1	Lato: 9x0.1 Side Superiore: 0.1x3 Top	2x3	Lato: 7x0.1 Side Inferiore: 0.1x3 Bottom	0.1x0.2	Lato: 0.15x0.05 Side Inferiore: 0.05x0.2 Bottom
Sovrametallo [mm] Stock	0.1	-	0.1	-	0.05	-
Tempo di lavorazione Cutting time	7 min 7min	25 min 25min	13 min 13min	9 min 9min	7 min 7min	

- La fresa con eliche corte RSES230 assicura stabilità anche durante la lavorazione di pezzi sottili, grazie alle ridotte vibrazioni.

Short flute RSE230 assures stable machining also for thin work-pieces by reducing chattering.

CBN  
Nitrato Cubico di Boro

Diamante  
Diamond

Piane  
Square

Scaricate Piane  
Long Neck Square

Sferiche  
Ball

Scaricate Sferiche  
Long Neck Ball

Coniche  
Taper

Coniche Sferiche  
Taper Ball

Toriche  
Corner R

Scaricate Toriche  
Long Neck Corner R

Frese Sagomate  
Formed Cutter

Punte  
Drill

Altro  
Others

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**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

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Technical Data

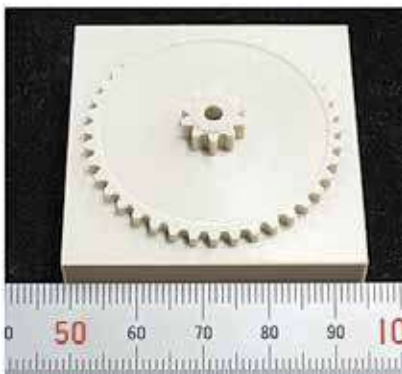
**Guida tecnica**  
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### Esempio lavorazione 2 : Ingranaggio Cutting Example 1 : Gear Profile Model

**Materiale lavorato: Resina PEEK** Material : PEEK resin

**Refrigerante: Lubrorefrigerante** Coolant : Water soluble fluid

**Tempo di lavorazione: 1hr 40min** Cutting time : 1hr 40min



Dimensione: 45x45x20 mm

Work size : 45x45x20mm

(Altezza profilo: 6.5 mm)

Profile height

Processo Cutting process	Sgrossatura Roughing	Semifinitura Semi-finishing	Finitura Finishing
Utensile Tool	RSES230 Ø 6x9	RSES230 Ø 1x1.5x4	RSES230 Ø 1x1.5x4
Giri [min <sup>-1</sup> ] Spindle speed	3,000	20,000	20,000
Avanzamento [mm/min] Feed	1,250	800	400
Prof. di taglio a <sub>p</sub> x a <sub>e</sub> [mm] Depth of cut	6.47x1	0.3x0.5	Lato: 0.3x0.03 Side Superficie piana: 0.03x0.3 Plane surface
Sovrametallo [mm] Stock	0.03	0.03	-
Tempo di lavorazione Cutting time	4min 30sec 4min 30sec	7min 7min	1hr 28min 30sec 1hr 28min 30sec

- La fresa RSES230 con eliche corte e lunga parte scaricata permette di ottenere eccellenti superfici anche nella lavorazione degli angoli

Short flute on the long neck RSES230 type suppress chattering to obtain excellent surface even at corners.



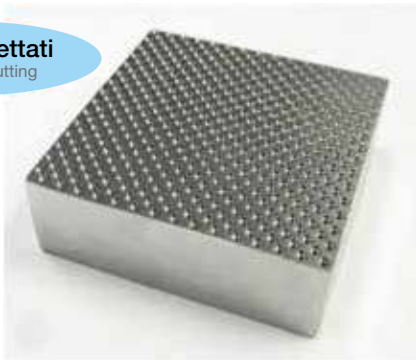


**Esempio lavorazione 1 : Filettatura interna M1 su AISI316L**

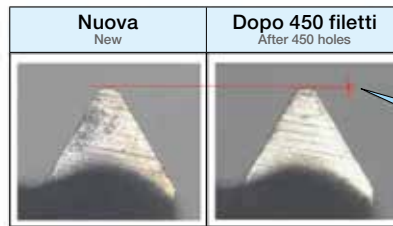
Cutting example 1: M1 Internal thread SUS316L Holes sample

**Materiale: AISI316L: SUS316L** Material : SUS316L  
**Refrigerante: Lubrorefrigerante** Coolant : Oil mist  
**Tempo di lavorazione: 3hr 20min** Cutting time : 3hr 20min

**450 fori filettati**  
450 Holes Cutting



Dimensione pezzo: 35x35 mm  
Work size : 35x35



**Altezza usura**  
Retreat amount  
**0.002 mm**

Processo Cutting process	Foratura centrino Center hole milling	Foratura preforo Pilot hole milling	Fresatura filetto Thread milling
Utensile Tool	MDR-PD Ø 0.7	MDR-R Ø 0.76	MMTM M1
Giri [min <sup>-1</sup> ] Spindle speed	6.000		17.500
Avanzamento [mm/min] Feed	30	90	300
Prof. di taglio a <sub>p</sub> × a <sub>e</sub> [mm] Depth of cut	Altezza step: 0,05 Step amount: 0.05	Altezza step: 0,1 Step amount: 0.1	a <sub>e</sub> 0,088 × 2 (Raggio finale elica R0.155) Final helical R0.155
Profondità di taglio [mm] Cutting depth	1,2	3,4	2,64
Tempo di lavorazione Cutting time	1hr 21min 5sec 1hr 28min 5sec	1hr 24min 35sec 1hr 24min 35sec	34min 20sec 34min 20sec

Fresatura in discordanza  
Thread milling: Up-cut

**CBN**  
Nitrato Cubico di Boro

**Diamante**  
Diamond

**Piane**  
Square

**Scaricate Piane**  
Long Neck Square

**Sferiche**  
Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

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**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
Piane  
Square

**Non Rivestite**  
Non-Coating  
Scaricate Piane  
Long Neck Square

**Rivestite**  
Coating  
Sferiche  
Ball

**Non Rivestite**  
Non-Coating  
Scaricate Sferiche  
Long Neck Ball

**Rivestite**  
Coating  
Coniche  
Taper

**Non Rivestite**  
Non-Coating  
Coniche Sferiche  
Taper Ball

**Rivestite**  
Coating  
Toriche  
Corner R

**Non Rivestite**  
Non-Coating  
Scaricate Toriche  
Long Neck Corner R

**Rivestite**  
Coating  
Frese Sagomate  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

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### Esempio lavorazione 2 Filettatura interna M3 su ALLOY718

Cutting example: M3 Internal thread ALLOY718

**Materiale: ALLOY718 (equivalente dell'Inconel718)**

Material : ALLOY718

**Refrigerante: Lubrorefrigerante**

Coolant : Water soluble fluid

**Tempo di lavorazione: circa 18 sec. per foro**

Cutting time : about 18 sec/hole



Dimensione pezzo: 56 x 36 x 46 mm

Work size : 56 x 36 x 46

Utensile Tool	MMTM M3
Giri [min <sup>-1</sup> ] Spindle speed	3.000
Avanzamento [mm/min] Feed	200
Profondità di taglio a <sub>p</sub> ×a <sub>e</sub> [mm] Depth of cut	0,145 × 2 (ripasso a zero) Zero-cut (elica R0.36) Helical R0.36
Profondità filetto [mm] Cutting depth	6,0

Tempo di lavorazione riferito solo alla fresatura del filetto  
Cutting time is for thread milling only

### Esempio lavorazione 3 Filettatura interna M3 su Acrilico

Cutting example: M3 Internal thread Acrylic

**Materiale: Acrilico**

Material : Acrylic

**Refrigerante: Minimale**

Coolant: Oil mist

**Tempo di lavorazione: circa 8 sec. per foro**

Cutting time : about 8 sec/hole



Dimensione pezzo: 50 x 50 x 50 mm

Work size : 50 x 50 x 50

Utensile Tool	MMTM M3
Giri [min <sup>-1</sup> ] Spindle speed	10.000
Avanzamento [mm/min] Feed	200
Profondità di taglio a <sub>p</sub> ×a <sub>e</sub> [mm] Depth of cut	0,145 × 2 (ripasso a zero) Zero-cut (elica R0.36) Helical R0.36
Profondità filetto [mm] Cutting depth	6,0

Tempo di lavorazione riferito solo alla fresatura del filetto  
Cutting time is for thread milling only



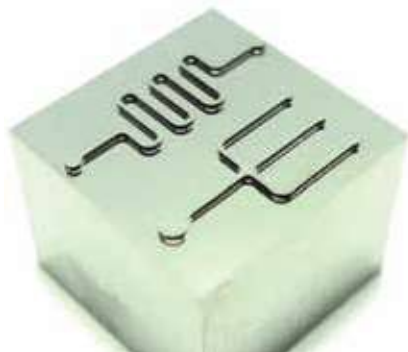
**Esempio lavorazione 1 : Stampo in metallo duro**

Cutting example 1: Cemented Carbide Reactor Mold

**Materiale: Metallo duro 92.5 HRA** Work material : Cemented Carbide 92.5HRA

**Refrigerante: Lubrorefrigerante** Coolant : Water-insoluble fluid

**Tempo di lavorazione: 12hr 50min** Cutting time : 12hr 50min



Processo Cutting process	Finitura in contornatura Contour line finishing	Finitura bidirezionale piano Scanning line finishing
Utensile Tool	PCDSE Ø 0,5	PCDSE Ø 0,5
Giri [min <sup>-1</sup> ] Spindle speed	56.000	56.000
Avanzamento [mm/min] Feed	70	50
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	0,001 x 0,002	0,001 x 0,01
Tempo di lavorazione Cutting time	5hr 5hr	7hr 50min (2 superfici) 7hr 50min (2 Surfaces)

Dimensione pezzo: 10 x 10 mm (Profondità 0,25 mm)

Work size : 10 x 10 mm (Cutting depth 0.25mm)

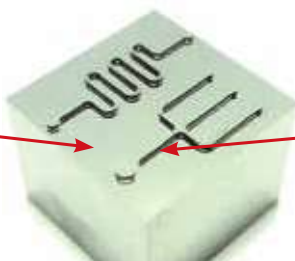
**Rugosità superficie fondo**

Bottom surface roughness

**Ra : 2nm, Rz : 38nm**

Misurazione valutata esclusi disturbi

Measured value except noise



**Larghezza canale**

Passage width

**Target: 0,180 mm**

**Ottenuto: 0,182 mm**  
Actual:

**Esempio lavorazione 2 : Superficie piana**

Cutting example 2: Flat surface

**Materiale: STAVAX 52HRC** Material : STAVAX 52HRC

**Refrigerante: Lubrorefrigerante** Coolant : Water-insoluble fluid



**Rugosità  
superficie**  
Surface roughness  
**Ra : 1.2nm  
Rz : 8.6nm**

Dimensione pezzo: 15 x 10 mm (finitura 1 µm)

Work size : 15 x 10 mm (Finishing 1 µm)

Processo Cutting process	Finitura
Utensile Tool	PCDSE Ø 0,5
Giri [min <sup>-1</sup> ] Spindle speed	30.000
Avanzamento [mm/min] Feed	300
Profondità di taglio $a_p \times a_e$ [mm] Depth of cut	0,0005 x 0,005
Lunghezza di taglio [m] Cutting length	60
Tempo di lavorazione Cutting time	4hr 4hr

2 ore 30min/faccia x 2  
2hr/face (30m) x 2

**CBN**

Nitrato Cubico  
di Boro

**Diamante**

Diamond

**Piane**  
Square

**Scaricate  
Piane**  
Long Neck  
Square

**Sferiche**  
Ball

**Scaricate  
Sferiche**  
Long Neck  
Ball

**Coniche**  
Taper

**Coniche  
Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate  
Toriche**  
Long Neck  
Corner R

**Frese  
Sagomate**  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

**Dati tecnici**  
Technical Data

**Guida tecnica**  
Technical Guidance



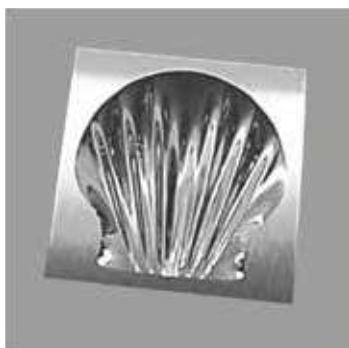
## Esempio lavorazione 1 : Forma conchiglia

Cutting example 1: Shell sample

**Materiale: Metallo duro 92.5 HRA** Work material : Cemented Carbide 92.5HRA

**Refrigerante: Lubrorefrigerante** Coolant : Water-insoluble fluid

**Tempo di lavorazione: 9hr 10min** Cutting time : 9hr 10min



Dimensione pezzo: 15 mm x 15 mm

Work size : 15mm x 15 mm

Processo Cutting process	Sgrossatura Pre-stage milling	Semifinitura Semi-finishing	Finitura Finishing
Utensile Tool	DCMB R0,5	DCMB R0,5	PCDRB R0,5
Giri [min <sup>-1</sup> ] Spindle speed	30.000	30.000	120.000
Avanzamento [mm/min] Feed	300	450	350
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	0,025 x 0,15	0,005 x 0,005	0,003 x 0,0015
Sovrametallo [mm] Stock	0,01	0,005	-
Tempo di lavorazione Cutting time	2hr 20min 2hr 20min	1hr 10min 1hr 10min	5hr 40min 5hr 40min



Punto di misurazione Measuring point	Rz $\mu\text{m}$	Ra $\mu\text{m}$
① Circa 5° Around 5 degree	0,523	0,078
② Circa 15° Around 15 degree	0,592	0,078
③ Circa 25° Around 25 degree	0,412	0,074

Strumento di misura: NH-3SP  
Measuring instrument: Mitaka Kohki NH-3SP



Punto di misura  
Measuring point

## Esempio lavorazione 2 : Fresatura di lucidatura

Cutting example 2: Mirror milling

**Materiale: ELMAX 59HRC** Material : ELMAX 59HRC

**Refrigerante: Lubrorefrigerante** Coolant : Water-insoluble fluid



Processo Cutting process	Finitura Finishing
Utensile Tool	PCDRB R0,5
Giri [min <sup>-1</sup> ] Spindle speed	40.000
Avanzamento [mm/min] Feed	100
Prof. di taglio $a_p \times a_e$ [mm] Depth of cut	0,002 x 0,001
Tempo di lavorazione Cutting time	8hr 10min 8hr 10min

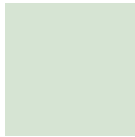


Misurazione Measurement	Rz $\mu\text{m}$	Ra $\mu\text{m}$
Vicino al centro Near the Center	0,37	0,05

NH-3SP (rugosimetro 3D senza contatto)  
Mitaka Kohki NH-3SP (Non-contact 3D Surface  
Roughness Measuring instrument)

Dimensione pezzo: 15 mm x 15 mm (profondità 1,3 mm)

Work size : 15mm x 15 mm (Cutting depth 1.3mm)



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# Calcolo della velocità di taglio, Nr. di Giri e Avanzamento (1)

Calculation for Cutting Speed, Spindle Speed and Feed (1)

CBN Nitrato Cubico di Boro	
Diamante Diamond	
Rivestite Coating	Piane Square
Non Rivestite Non-Coating	Scaricate Piane Long Neck Square
Rivestite Coating	Sferiche Ball
Non Rivestite Non-Coating	Scaricate Sferiche Long Neck Ball
Rivestite Coating	Coniche Taper
Non Rivestite Non-Coating	Coniche Sferiche Taper Ball
Rivestite Coating	Toriche Corner R
Non Rivestite Non-Coating	Scaricate Toriche Long Neck Corner R
Rivestite Coating	Frese Sagomate Formed Cutter
Non Rivestite Non-Coating	
Punte Drill	
Altro Others	
Dati tecnici Technical Data	
Guida tecnica Technical Guidance	

$$\text{Velocità di taglio (Vc)} = \frac{\pi \times D \times n}{1,000}$$

Cutting Speed

$$\text{Numero di Giri (n)} = Vc \div \pi \div D \times 1,000$$

Spindle Speed

$$\text{Avanzamento (Vf)} = n \times fz \times Z$$

Feed

$$\text{Avanzamento x dente (fz)} = \frac{Vf}{n \times Z}$$

Feed per Tooth

## Dati di taglio

<b>Vc</b> = Velocità di taglio (m/min) Cutting Speed	<b>n</b> = Numero di Giri (min <sup>-1</sup> ) Spindle Speed	<b>Z</b> = Numero Taglienti Number of Flutes
<b>π</b> = 3.14 (Costante circolare) The Circular Constant	<b>Vf</b> = Avanzamento (mm/min) Feed	<b>ap</b> = Profondità assiale (mm) Axial Depth of Cut
<b>D</b> = Diametro Diameter	<b>fz</b> = Avanzamento per dente (mm/dente) Feed per Tooth	<b>ae</b> = Profondità Radiale (mm) Radial Depth of Cut

- Se il numero di giri raggiungibile dalla macchina è inferiore a quanto indicato nella tabella dei dati consigliati, fare riferimento al calcolo sotto indicato.

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.

- Il coefficiente [α] è calcolato dal rapporto del numero giri [n] e il numero giri consigliato [n1]  
Rate (α) is calculated by chosen Spindle Speed (n) and Recommended Spindle Speed (n1)

$$n \text{ (min}^{-1}\text{)} \div n1 \text{ (min}^{-1}\text{)} = \alpha$$

Coefficiente  
Rate

- L'avanzamento [Vf] si ottiene moltiplicando l'avanzamento consigliato [Vf1] con il coefficiente [α]  
Obtain Feed (Vf) for actual machining by dividing Recommended Feed (Vf1) from Rate (α)

$$Vf1 \text{ (mm/min)} \times \alpha = Vf \text{ (mm/min)}$$

Avanzamento  
Feed for actual machining

**Esempio Example** MSE430P Lavorazione su C50 con fresa MSE430P  
Machining S50C with MSE430P Φ1

Dati di taglio consigliati  
Recommended milling condition

Num. Giri; 25,500 min<sup>-1</sup>  
Spindle Speed n

Avanzam. Vf 1; 440 mm/min  
Feed Vf1

Num. Giri max  
a disposizione 10.000 min.  
In case Maximum Spindle Speed  
of the machine is 10,000min<sup>-1</sup>...

Avanzamento per n. di giri 10.000min<sup>-1</sup>  
Feed for Spindle Speed 10,000min<sup>-1</sup>

10,000 ÷ 25,500 = 0.392 (Coefficiente)  
(Rate)

440 × 0.392 = 172 mm/min

Avanzam. Vf ; 172 mm/min  
Feed Vf

**Velocità di taglio (Vc)** Cutting Speed (Vc)

La velocità di taglio appropriata deve essere decisa considerando i parametri come: materiale della fresa, diametro, lunghezza del taglio, materiale da lavorare, macchina, rigidità del mandrino, configurazione del lavoro, precisione, liquido da taglio, ecc. Generalmente il materiale della fresa e il materiale da lavorare sono i parametri fondamentali per determinare la velocità di taglio.

Appropriate Cutting Speed should be decided by parameters such as tool material, diameter, length of cut, work material, cutting machine, rigidity of tool holder, machining configuration, accuracy, cutting fluid, and etc.  
Generally tool material and work material are main factors to determine the Cutting Speed.

**Tabella 1. Velocità di taglio**

Table 1. Cutting Speed

Materiali Work Materials	Velocità di taglio [m/min] Cutting Speed (m/min)	
	Metallo duro Carbide	Metallo duro rivestito Coated Carbide
<b>Acciaio al carbonio (C50)</b> Carbon Steels	20 ~ 40	40 ~ 80
<b>Acciai legati (42CrMo4, 39NiCrMo3)</b> Alloy Steels	20 ~ 35	35 ~ 60
<b>Acciai pretemprati (1.2311, 1.2738)</b> Prehardened Steels	15 ~ 30	30 ~ 50
<b>Acciai inox (AISI304)</b> Stainless Steels	5 ~ 20	10 ~ 30
<b>Acciai temprati (1.2343, STAVAX 45~60HRC)</b> Hardened Steels	-	20 ~ 40

**Avanzamento per dente** Feed per Tooth (fz)

L'avanzamento per dente è un fattore determinante per avere delle lavorazioni efficienti, che possono essere influenzate da parametri quali: diametro, tipologia fresa, materiale da lavorare, macchina, rigidità del mandrino, configurazione del lavoro, precisione e profondità di taglio.

La tabella 2 è una linea guida per l'Avanzamento per Dente per frese con eliche corte.

Feed per Tooth is an important element for efficient machining which should be determined by parameters such as tool diameter, type, work material, cutting machine, rigidity of tool holder, machining configuration, accuracy and cutting depth.

Table 2 is a guideline of Feed per Tooth for short flute end mills.

**Tabella 2. Avanzamento per dente**

Table 2. Feed per Tooth

Diametro [mm] Diameter (mm)	Avanzamento [mm/dente] Feed per Tooth (mm/tooth)	
	2 Taglienti 2-Flutes	4 Taglienti 4-Flutes
<b>1</b>	0.001 ~ 0.005	
<b>6</b>	0.02 ~ 0.04	0.01 ~ 0.03
<b>10</b>	0.04 ~ 0.08	0.03 ~ 0.06
<b>20</b>	0.08 ~ 0.12	0.06 ~ 0.1

**N.B. L'avanzamento per dente per frese standard andrebbe impostato all'80% o meno della Tab.2**

Note: Feed per Tooth for standard flute size end mills should be adjusted to 80% or less from table 2.

I parametri di taglio, l'avanzamento per dente, il numero di giri e l'avanzamento sono stati calcolati considerando anche tutte le altre condizioni di lavoro.

Referring above parameters of Cutting Speed and Feed per Tooth, both Spindle Speed and Feed are calculated considering all other related factors as well.

# Calcolo della velocità di taglio, Nr. di Giri e Avanzamento (2)

Calculation for Cutting Speed, Spindle Speed and Feed (2)

## Scelta del numero di taglienti Selection of Number of Flute

	2 Taglienti 2-Flutes	3 Taglienti 3-Flutes	4 Taglienti 4-Flutes	6 Taglienti 6-Flutes
<b>Cava</b> Slotting	○	◎	○	×
<b>Spallamento</b> Side Milling	○	◎	◎	◎

Solitamente le frese 2 e 3 tagli sono scelte per fresature dal pieno per la maggiore area disponibile per l'evacuazione del truciolo.

Le frese a 4 e 6 tagli sono consigliate per spallamenti, dato che non presentano problemi di evacuazione del truciolo.

Generally 2-flutes and 3-flutes are selected for slotting because of the larger chip pocket.

4-flutes and 6-flutes are recommended for side milling as no problem of chip disposal.

## Scelta dell'elica Selection of Helix Angle

		Elica a 25° Helix 25°	Elica a 30° Helix 30°	Elica a 35° Helix 35°	Elica a 40° Helix 40°	Elica a 45° Helix 45°
<b>Capacità di taglio</b> Shearing ability		○	○	◎	◎	◎
<b>Resistenza alle vibrazioni</b> Chatter resistance		○	○	◎	◎	◎
<b>Rugosità superficiale</b> Surface roughness		○	○	◎	◎	◎
<b>Inclinazione</b> Inclination		◎	◎	◎	○	○
<b>Onda</b> Wave		◎	◎	◎	○	○
<b>Applicazione</b> Application	<b>Cava</b> Slotting	◎	◎	○	○	△
	<b>Spallamento</b> Side milling	○	◎	◎	◎	◎
	<b>Acciai temprati</b> Hardened steels	△	△	○	◎	◎

### Note Remarks

#### ● Elica a 25° Helix 25°

**Adatta per la lavorazione di cave dal pieno**

Suitable for slotting.

#### ● Elica a 30° Helix 30°

**Consigliabile sia per cave dal pieno che per spallamento**

Recommendable for both slotting and side milling.

#### ● Elica a 35°, Elica a 40°, Elica a 45° Helix 35°, Helix 40°, Helix 45°

**Selezionabile in base alle tolleranze richieste. L'angolo maggiore aumenta la capacità di taglio e riduce le vibrazioni con la possibilità quindi di aumentare la durata della fresa**

Selectable within the required tolerance.

As larger angle gives higher shearing ability and reduce chattering, it is possible to relatively prolong the length of cut.

#### ● Elica a 45° Helix 45°

**Adatta per la lavorazione di acciai temprati e materiali difficili**

Suitable for machining for hardened steels and tough materials.

CBN  
Nitrato Cubico  
di Boro

Diamante  
Diamond

Rivestite  
Coating  
Piane  
Square

Non Rivestite  
Non-Coating  
Scaricate  
Piane  
Long Neck  
Square

Rivestite  
Coating  
Sferiche  
Ball

Non Rivestite  
Non-Coating  
Scaricate  
Sferiche  
Long Neck  
Ball

Rivestite  
Coating  
Coniche  
Taper

Non Rivestite  
Non-Coating  
Coniche  
Sferiche  
Taper Ball

Rivestite  
Coating  
Toriche  
Corner R

Non Rivestite  
Non-Coating  
Scaricate  
Toriche  
Long Neck  
Corner R

Rivestite  
Coating  
Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

Altro  
Others

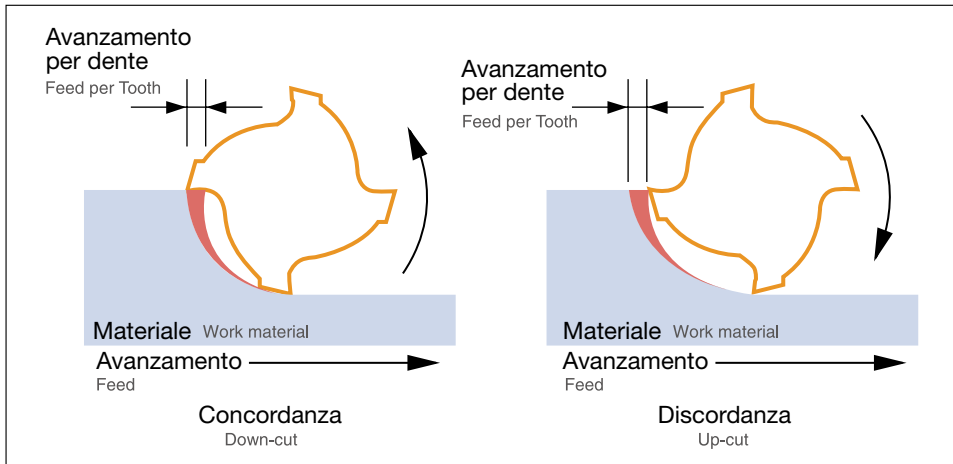
Dati tecnici  
Technical Data

Guida tecnica  
Technical Guidance

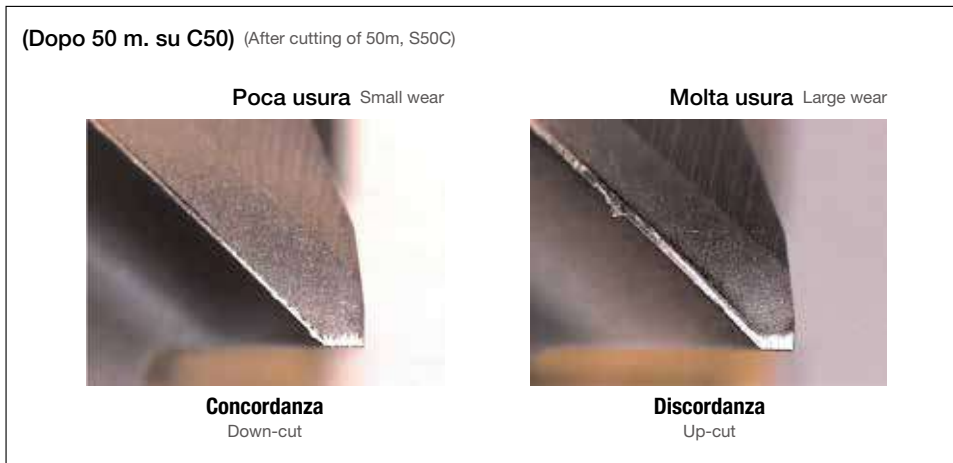


■ **Direzione di taglio (discordanza/concordanza)** Cutting Direction (Up-cut and Down-cut)

**Direzione di taglio (discordanza/concordanza)** Cutting structure of Up-cut and Down-cut



**Differenza di usura in base alla direzione di taglio** Difference of edge wear by cutting directions



In concordanza: lo spessore di taglio diventa progressivamente più fine; in discordanza avviene il contrario (vedi illustrazione). La lavorazione in concordanza è consigliata perché l'usura è minore e la fresa ha una durata maggiore.

Down-cut tooth first cuts thicker then progressively thinner, while Up-cut goes the opposite. As shown by above photos, Down-cut is recommended since the wear of cutting edge is comparatively small and tool life is eventually longer.

# Tabella del n. di Giri

## Spindle Speed Table

Diam. Dia.	Velocità di taglio (Vc) [m/min]															
	Cutting Speed															
D	20	30	40	50	60	70	80	90	100	120	140	150	180	200	250	300
0.2	31,850	47,770	63,690	79,620	95,540	111,460	127,390	143,310	159,240	191,080	222,930	238,850	286,620	318,470	398,090	477,710
0.3	21,230	31,850	42,460	53,080	63,690	74,310	84,930	95,540	106,160	127,390	148,620	159,240	191,080	212,310	265,390	318,470
0.4	15,920	23,890	31,850	39,810	47,770	55,730	63,690	71,660	79,620	95,540	111,460	119,430	143,310	159,240	199,040	238,850
0.5	12,740	19,110	25,480	31,850	38,220	44,590	50,960	57,320	63,690	76,430	89,170	95,540	114,650	127,390	159,240	191,080
0.6	10,620	15,920	21,230	26,540	31,850	37,150	42,460	47,770	53,080	63,690	74,310	79,620	95,540	106,160	132,700	159,240
0.7	9,100	13,650	18,200	22,750	27,300	31,850	36,400	40,950	45,500	54,590	63,690	68,240	81,890	90,990	113,740	136,490
0.8	7,960	11,940	15,920	19,900	23,890	27,870	31,850	35,830	39,810	47,770	55,730	59,710	71,660	79,620	99,520	119,430
0.9	7,080	10,620	14,150	17,690	21,230	24,770	28,310	31,850	35,390	42,640	49,540	53,080	63,690	70,770	88,460	106,160
1	6,370	9,550	12,740	15,920	19,110	22,290	25,480	28,660	31,850	38,220	44,590	47,770	57,320	63,390	79,620	95,540
1.4	4,550	6,820	9,100	11,370	13,650	15,920	18,200	20,470	22,750	27,300	31,850	34,120	40,950	45,500	56,870	68,240
1.6	3,980	5,970	7,960	9,950	11,940	13,390	15,920	17,910	19,900	23,890	27,870	29,860	35,830	39,810	49,760	59,710
1.8	3,540	5,310	7,080	8,850	10,620	12,380	14,150	15,920	17,690	21,230	24,770	26,540	31,850	35,390	44,230	53,080
2	3,180	4,780	6,370	7,960	9,550	11,150	12,740	14,330	15,920	19,110	22,290	23,890	28,660	31,850	39,810	47,770
2.2	2,900	4,340	5,790	7,240	8,690	10,130	11,580	13,030	14,480	17,370	20,270	21,710	26,060	28,950	36,190	43,430
2.4	2,650	3,980	5,310	6,630	7,960	9,290	10,620	11,940	13,270	15,920	18,580	19,900	23,890	26,540	33,170	39,810
2.6	2,450	3,670	4,900	6,120	7,350	8,570	9,800	11,020	12,250	14,700	17,150	18,370	22,050	24,500	30,620	36,750
2.8	2,270	3,410	4,550	5,690	6,820	7,960	9,100	10,240	11,370	13,650	15,920	17,060	20,470	22,750	28,430	34,120
3	2,120	3,180	4,250	5,310	6,370	7,430	8,490	9,550	10,620	12,740	14,860	15,920	19,110	21,230	26,540	31,850
4	1,590	2,390	3,180	3,980	4,780	5,570	6,370	7,170	7,960	9,550	11,150	11,940	14,330	15,920	19,900	23,890
5	1,270	1,910	2,550	3,180	3,820	4,460	5,100	5,730	6,370	7,640	8,920	9,550	11,460	12,740	15,920	19,110
6	1,060	1,590	2,120	2,650	3,180	3,720	4,250	4,780	5,310	6,370	7,430	7,960	9,550	10,620	13,270	15,920
7	910	1,360	1,820	2,270	2,730	3,180	3,640	4,090	4,550	5,460	6,370	6,820	8,190	9,100	11,370	13,650
8	800	1,190	1,590	1,990	2,390	2,790	3,180	3,580	3,980	4,780	5,570	5,970	7,170	7,960	9,950	11,940
9	710	1,060	1,420	1,770	2,120	2,480	2,830	3,180	3,540	4,250	4,950	5,310	6,370	7,080	8,850	10,620
10	640	960	1,270	1,590	1,910	2,230	2,550	2,870	3,180	3,820	4,460	4,780	5,730	6,370	7,960	9,550
11	580	870	1,160	1,450	1,740	2,030	2,320	2,610	2,900	3,470	4,050	4,340	5,210	5,790	7,240	8,690
12	530	800	1,060	1,330	1,590	1,860	2,120	2,390	2,650	3,180	3,720	3,980	4,780	5,310	6,630	7,960
13	490	730	980	1,220	1,470	1,710	1,960	2,200	2,450	2,940	3,430	3,670	4,410	4,900	6,120	7,350
14	450	680	910	1,140	1,360	1,590	1,820	2,050	2,270	2,730	3,180	3,410	4,090	4,550	5,690	6,820
15	420	640	850	1,060	1,270	1,490	1,700	1,910	2,120	2,550	2,970	3,180	3,820	4,250	5,310	6,370
16	400	600	800	1,000	1,190	1,390	1,590	1,790	1,990	2,390	2,790	2,990	3,580	3,980	4,980	5,970
17	370	560	750	940	1,120	1,310	1,500	1,690	1,870	2,250	2,620	2,810	3,370	3,750	4,680	5,620
18	350	530	710	880	1,060	1,240	1,420	1,590	1,770	2,120	2,480	2,650	3,180	3,540	4,420	5,310
19	340	500	670	840	1,010	1,170	1,340	1,510	1,680	2,020	2,350	2,510	3,020	3,350	4,190	5,030
20	320	480	640	800	960	1,110	1,270	1,430	1,590	1,910	2,230	2,390	2,870	3,180	3,980	4,780
21	300	450	610	760	910	1,060	1,210	1,360	1,520	1,820	2,120	2,270	2,730	3,030	3,790	4,550
22	290	430	580	720	870	1,010	1,160	1,300	1,450	1,740	2,030	2,170	2,610	2,900	3,620	4,340
23	280	420	550	690	830	970	1,100	1,250	1,380	1,660	1,940	2,080	2,490	2,770	3,460	4,150
24	270	400	530	660	800	930	1,060	1,190	1,330	1,590	1,860	1,990	2,390	2,650	3,320	3,980
25	250	380	510	640	760	890	1,020	1,150	1,270	1,530	1,780	1,910	2,290	2,550	3,180	3,820
26	240	370	490	610	730	860	980	1,100	1,220	1,470	1,710	1,840	2,200	2,450	3,060	3,670
27	240	350	470	590	710	830	940	1,060	1,180	1,420	1,650	1,770	2,120	2,360	2,950	3,540
28	230	340	450	570	680	800	910	1,020	1,140	1,360	1,590	1,710	2,050	2,270	2,840	3,410
29	220	330	440	550	660	770	880	990	1,100	1,320	1,540	1,650	1,980	2,200	2,750	3,290
30	210	320	420	530	640	740	850	960	1,060	1,270	1,490	1,590	1,910	2,120	2,650	3,180

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
**Piane**  
Square

**Non Rivestite**  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

**Rivestite**  
Coating  
**Sferiche**  
Ball

**Non Rivestite**  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

**Rivestite**  
Coating  
**Coniche**  
Taper

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Taper Ball

**Rivestite**  
Coating  
**Toriche**  
Corner R

**Non Rivestite**  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

**Rivestite**  
Coating  
**Frese Sagomate**  
Formed Cutter

**Non Rivestite**  
Non-Coating

**Punte**  
Drill

**Altro**  
Others

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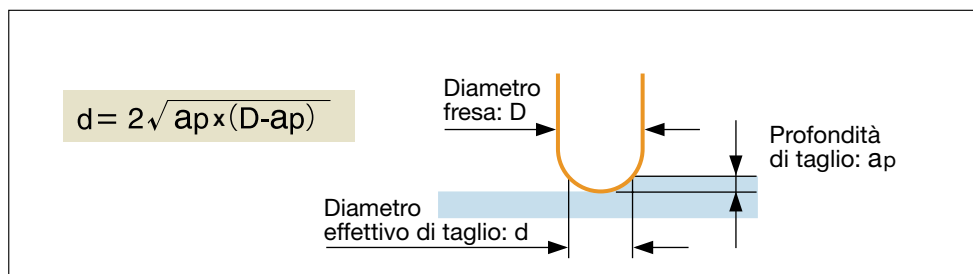
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# Diametri effettivi delle frese sferiche

Ball End Milling Actual Diameter

R R	D D	Profondità di taglio (mm)														
		Depth of Cut (ap)														
Raggio	Dia.	0.01	0.02	0.03	0.04	0.05	0.08	0.1	0.15	0.2	0.3	0.5	0.8	1	2	3
0.1	0.2	0.087	0.12	0.143	0.16	0.173	0.196	0.2								
0.2	0.4	0.125	0.174	0.211	0.24	0.265	0.32	0.35	0.39	0.4						
0.3	0.6	0.154	0.215	0.262	0.299	0.332	0.41	0.45	0.52	0.57	0.6					
0.4	0.8	0.178	0.25	0.304	0.349	0.387	0.48	0.53	0.62	0.69	0.77					
0.5	1	0.199	0.28	0.341	0.392	0.436	0.54	0.6	0.71	0.8	0.92	1				
1	2	0.282	0.398	0.486	0.56	0.624	0.78	0.87	1.05	1.2	1.43	1.73	1.96	2		
1.5	3	0.346	0.488	0.597	0.688	0.768	0.97	1.08	1.31	1.5	1.8	2.24	2.65	2.83		
2	4	0.399	0.564	0.69	0.796	0.889	1.12	1.25	1.52	1.74	2.11	2.65	3.2	3.46	4	
2.5	5	0.447	0.631	0.722	0.891	0.995	1.25	1.4	1.71	1.96	2.37	3	3.67	4	4.9	
3	6	0.489	0.692	0.846	0.977	1.091	1.38	1.54	1.87	2.15	2.62	3.32	4.08	4.47	5.66	6
4	8	0.565	0.799	0.978	1.129	1.261	1.59	1.78	2.17	2.5	3.04	3.87	4.8	5.29	6.93	7.75
5	10	0.632	0.894	1.094	1.262	1.411	1.78	1.99	2.43	2.8	3.41	4.36	5.43	6	8	9.17
6	12	0.693	0.979	1.198	1.383	1.546	1.95	2.18	2.67	3.07	3.75	4.8	5.99	6.63	8.94	10.39
7	14	0.748	1.058	1.295	1.495	1.67	2.11	2.36	2.88	3.32	4.05	5.2	6.5	7.21	9.8	11.49
8	16	0.8	1.131	1.384	1.598	1.786	2.26	2.52	3.08	3.56	4.34	5.57	6.97	7.75	10.58	12.49
9	18	0.848	1.199	1.468	1.695	1.895	2.39	2.68	3.27	3.77	4.61	5.92	7.42	8.25	11.31	13.42
10	20	0.894	1.264	1.548	1.787	1.997	2.52	2.82	3.45	3.98	4.86	6.24	7.84	8.72	12	14.28

## Calcolo diametro effettivo Calculation of Actual Dia.



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Ball

**Scaricate Sferiche**  
Long Neck Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck Corner R

**Frese Sagomate**  
Formed Cutter

**Punte**  
Drill

**Altro**  
Others

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# Misurazione e simboli della rugosità superficiale (secondo la norma JIS B 0601-2001)

Measurement and Symbol of Surface Roughness (Extract from JIS B 0601-2001)

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

Rivestite  
Coating  
**Piane**  
Square

Non Rivestite  
Non-Coating  
**Scaricate Piane**  
Long Neck Square

Rivestite  
Coating  
**Sferiche**  
Ball

Non Rivestite  
Non-Coating  
**Scaricate Sferiche**  
Long Neck Ball

Rivestite  
Coating  
**Coniche**  
Taper

Non Rivestite  
Non-Coating  
**Coniche Sferiche**  
Taper Ball

Rivestite  
Coating  
**Toriche**  
Corner R

Non Rivestite  
Non-Coating  
**Scaricate Toriche**  
Long Neck Corner R

Rivestite  
Coating  
**Frese Sagomate**  
Formed Cutter

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Drill

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Tipo Type	Simbolo Symbol	Descrizione Description	Grafico Reference chart
<b>Altezza massimo del profilo</b> Maximum Height of the Profile	<b>Rz</b>	<p><b>L'altezza massima del profilo è la distanza tra il punto più alto e quello più basso rispetto alle linea mediana. Rz (ISO/JIS) è la somma dei valori massimi di picco e di valle per la lunghezza stimata</b></p> <p>The maximum height of the profile is the distance between the maximum peak height and the maximum valley depth from the mean line in each sampling length. Rz (ISO/JIS) is the mean value of the maximum peak-to-valley heights in the evaluation length.</p>	
<b>Deviazione media aritmetica del profilo</b> Arithmetic Mean Deviation of the Profile	<b>Ra</b>	<p><b>La deviazione media aritmetica del profilo è la media matematica di tutte le distanze dalla linea mediana</b></p> <p>The arithmetic mean deviation of the profile is the arithmetic mean of the absolute values of distances from the mean line to the profile.</p>	$Ra = \frac{1}{L} \int_0^L  f(x)  dx$ <p><b>L</b> = Lunghezza testata Evaluation Length</p>

Valore di massima altezza del profilo (Rz) Value of Maximum Height of the Profile	Valore della deviazione media aritmetica del profilo (Ra) Value of Arithmetic Mean Deviation of the Profile	Simbolo di finitura Finishing Symbol	Indicazione della struttura superficiale nella documentazione tecnica del prodotto (Ra) Indication of surface texture in technical product documentation
0.05S	0.012a		
0.1S	0.025a		
0.2S	0.05a		$\sqrt{\text{Ra } 0.012} \sim \sqrt{\text{Ra } 0.2}$
0.3S	0.1a		
0.8S	0.2a		
1.6S	0.4a		
3.2S	0.8a		$\sqrt{\text{Ra } 0.4} \sim \sqrt{\text{Ra } 1.6}$
6.3S	1.6a		
12.5S	3.2a		$\sqrt{\text{Ra } 3.2} \sim \sqrt{\text{Ra } 6.3}$
25S	6.3a		
50S	12.5a		$\sqrt{\text{Ra } 12.5} \sim \sqrt{\text{Ra } 25}$
100S	25a		

**Nota: i simboli triangolari specificano il tipo di finitura, identificati da Ra e Rz.**

Note: Triangle Finishing Symbol Mark presents approximate surface roughness specified by Ra and Rz.

# Tabella comparativa delle durezza

Comparison Table of Hardness

Durezza in Rockwell Rockwell Hardness C Scale 150kg Brale (HRC)	Durezza Vickers Diamond Pyramid Hardness Number, Vickers (HV)	Durezza Brinell 29.42kN Brinell Hardness Standard 10mm Ball 29.42kN (HB)	Durezza Rockwell Scala A (HRA) Rockwell Hardness A Scale 60kg Brale (HRA)	Durezza Shore (HS) Shore Scleroscope Hardness Number (HS)	Resilienza approssimativa N/mm <sup>2</sup> Approx Tensile Strength N/mm <sup>2</sup>
68	940	-	85.6	97	-
67	900	-	85.5	95	-
66	865	-	84.5	92	-
65	832	-	83.9	91	-
64	800	-	83.4	88	-
63	772	-	82.8	87	-
62	746	-	82.3	85	-
61	720	-	81.8	83	-
60	697	-	81.2	81	-
59	674	-	80.7	80	-
58	653	-	80.1	78	-
57	633	-	79.6	76	-
56	613	-	79.0	75	-
55	595	-	78.5	74	2079
54	577	-	78.0	72	2010
53	560	-	77.4	71	1952
52	544	500	76.8	69	1883
51	528	487	76.3	68	1824
50	513	475	75.9	67	1755
49	498	464	75.2	66	1687
48	484	451	74.7	64	1639
47	471	442	74.1	63	1578
46	458	432	73.6	62	1530
45	446	421	73.1	60	1481
44	434	409	72.5	58	1432
43	423	400	72.0	57	1383
42	412	390	71.5	56	1334
41	402	381	70.9	55	1294
40	392	371	70.4	54	1245
39	382	362	69.9	52	1216
38	372	353	69.4	51	1177
37	363	344	68.9	50	1157
36	354	336	68.4	49	1118
35	345	327	67.9	48	1079
34	336	319	67.4	47	1059
33	327	311	66.8	46	1030
32	318	301	66.3	44	1000
31	310	294	65.8	43	981
30	302	286	65.3	42	952
29	294	279	64.7	41	932
28	285	271	64.3	41	912
27	279	264	63.8	40	883
26	272	258	63.3	38	863
25	266	253	62.8	38	843
24	260	247	62.4	37	824
23	254	243	62.0	36	804
22	248	237	61.5	35	785
21	243	231	61.0	35	775
20	238	226	60.5	34	755
(18)	230	219	-	33	736
(16)	222	212	-	32	706
(14)	213	203	-	31	677
(12)	204	194	-	29	647
(10)	196	187	-	28	618
( 8)	188	179	-	27	598
( 6)	180	171	-	26	579
( 4)	173	165	-	25	549
( 2)	166	158	-	24	530
( 0)	160	152	-	24	520

CBN

Nitrato Cubico di Boro

Diamante

Diamond

Piane

Square

Scaricate

Piane

Long Neck

Square

Sferiche

Ball

Scaricate

Sferiche

Long Neck

Ball

Coniche

Taper

Coniche

Sferiche

Taper Ball

Toriche

Corner R

Scaricate

Toriche

Long Neck

Corner R

Frese

Sagomate

Formed

Cutter

Punte

Drill

Altro

Others

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# Fattori influenzanti le applicazioni

Factors for End Mill Operation

**CBN**  
Nitruro Cubico di Boro

**Diamante**  
Diamond

**Rivestite**  
Coating  
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Square

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Non-Coating  
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Long Neck Square

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Coating  
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Ball

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Long Neck Ball

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Drill

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Fattore Factor	Istruzioni e Consigli Instruction and Advice
<b>Rigidità della macchina</b> Rigidity of Machine	<ol style="list-style-type: none"> <li>① <b>Usare una macchina rigida.</b> Use a rigid machine.</li> <li>② <b>Regolare i parametri di taglio in base alla rigidità della macchina</b> Adjust cutting conditions according to the rigidity of machine.</li> </ol>
<b>Mandrino portapinzette ed eccentricità della fresa</b> Collet Chuck and Run out of End Mill	<ol style="list-style-type: none"> <li>① <b>Utilizzare un mandrino rigido e preciso</b> Use a rigid and precise collet chuck.</li> <li>② <b>Ridurre l'eccentricità della fresa</b> Minimize the run out of end mill.</li> </ol>
<b>Staffaggio</b> Work Clamp	<ol style="list-style-type: none"> <li>① <b>Il pezzo deve essere staffato molto bene</b> Work piece must be firmly clamped.</li> <li>② <b>Se il pezzo non può essere bloccato, ridurre i parametri</b> In case work piece cannot be firmly clamped, relieve cutting condition.</li> </ol>
<b>Liquido di taglio e trucioli</b> Cutting Fluid and Chips	<ol style="list-style-type: none"> <li>① <b>Apportare liquido di taglio sufficiente</b> Give a sufficient cutting fluid.</li> <li>② <b>Per lavorazioni pesanti, si consiglia lubrorefrigerante</b> Recommend water-base cutting fluid for heavy cutting.</li> <li>③ <b>Alcune frese vanno utilizzate solo a secco</b> Some end mills apply dry cutting only.</li> <li>④ <b>Nel caso di lavorazioni a secco usare aria</b> Use air blow for dry cutting.</li> <li>⑤ <b>Rimuovere i trucioli dall'area di lavoro</b> Remove chips from working area.</li> </ol>
<b>Scelta della fresa</b> Selection of End Mill	<ol style="list-style-type: none"> <li>① <b>Scegliere la fresa più adatta in base al materiale e alle dimensioni da lavorare</b> Select most suitable end mills according to work material and dimension.</li> <li>② <b>Vedere indice iniziale</b> Refer to the index table on front page.</li> </ol>
<b>Condizioni di taglio</b> Cutting Conditions	<ol style="list-style-type: none"> <li>① <b>Vedere Tabella dati di taglio consigliati</b> Refer to recommended milling condition table.</li> <li>② <b>I dati di taglio vanno adattati secondo la rigidità della macchina e allo staffaggio del pezzo</b> It is necessary to adjust conditions according to the machine rigidity and clamping condition of work piece.</li> </ol>
<b>Sporgenza fresa dal mandrino</b> Overhang of End Mill from tool holder	<ol style="list-style-type: none"> <li>① <b>La fresa deve sporgere il meno possibile</b> Overhang of end mill must be as short as possible from tool holder.</li> <li>② <b>Se non è possibile ridurre la sporgenza, ridurre i parametri di taglio</b> In case overhang cannot be shorten, relieve cutting condition .</li> </ol>

# Problemi nell'avvio delle applicazioni

Troubleshooting for End Mill Operation

Sintomi del problema Symptoms of troubles	Causa Cause	Soluzione Solution
<b>Vibrazioni</b> Chattering	<ul style="list-style-type: none"> <li>•Eccessivo n. di giri</li> <li>•Eccessivo avanzamento</li> <li>•Lunghezza effettiva o sporgenza utensile eccessiva</li> <li>•Pezzo non staffato correttamente</li> <li>•Usura tagliente fresa</li> <li>•Eccentricità mandrino eccessiva</li> </ul> <p>Excessive spindle speed Excessive feed Excessive long of effective length or overhang of end mill Work piece is not firmly clamped Wear of cutting edge progressed Excessive chucking runout</p>	<ul style="list-style-type: none"> <li>•Ridurre n. di giri</li> <li>•Ridurre avanzamento</li> <li>•Ridurre il più possibile la lunghezza effettiva e la sporgenza utensile</li> <li>•Staffare meglio il pezzo</li> <li>•Utilizzare una nuova fresa o riaffilare</li> <li>•Regolare l'eccentricità del mandrino</li> </ul> <p>Reduce spindle speed Reduce feed Adjust effective length and overhang as short as possible Clamp work piece firmly Use new end mill or regrind Adjust chucking runout</p>
<b>Rottura fresa</b> Breakage of end mill	<ul style="list-style-type: none"> <li>•Profondità di taglio eccessiva</li> <li>•Intasamento trucioli</li> <li>•Avanzamento per dente eccessivo</li> <li>•Usura tagliente fresa</li> </ul> <p>Excessive depth of cut Chips clogged Excessive feed per tooth Wear of cutting edge progressed</p>	<ul style="list-style-type: none"> <li>•Ridurre la profondità di taglio</li> <li>•Indirizzare correttamente il refrigerante per facilitare l'evacuazione del truciolo</li> <li>•Ridurre l'avanzamento per dente</li> <li>•Utilizzare una nuova fresa o riaffilare</li> </ul> <p>Reduce depth of cut Adjust coolant nozzle to right direction to dispose chips Reduce feed per tooth Use new end mill or regrind</p>
<b>Scheggiatura sul tagliente</b> Chipping of cutting edge	<ul style="list-style-type: none"> <li>•Eccessiva profondità di taglio</li> <li>•Eccessivo avanzamento</li> <li>•Pezzo non staffato correttamente</li> <li>•Eccessivo n. di giri</li> <li>•Lunghezza effettiva o sporgenza utensile eccessiva</li> <li>•Usura tagliente fresa</li> <li>•Tagliente di riporto</li> <li>•Troppo raffreddamento</li> </ul> <p>Excessive depth of cut Excessive feed Work piece is not firmly clamped Excessive spindle speed Excessive long of effective length or overhang of end mill Wear of cutting edge progressed Built up edge Excessive cooling</p>	<ul style="list-style-type: none"> <li>•Ridurre profondità di taglio</li> <li>•Ridurre avanzamento</li> <li>•Staffare correttamente il pezzo</li> <li>•Ridurre n. di giri</li> <li>•Ridurre il più possibile la lunghezza effettiva e la sporgenza utensile</li> <li>•Utilizzare una nuova fresa o riaffilare</li> <li>•Utilizzare il raffreddamento corretto</li> <li>•Utilizzare aria o lubrificazione minima</li> </ul> <p>Reduce depth of cut Reduce feed Clamp work piece firmly Reduce spindle speed Adjust effective length and overhang as short as possible Use new end mill or regrind Choose appropriate coating Use air blow or oil mist</p>
<b>Usura anormale</b> Abnormal wear	<ul style="list-style-type: none"> <li>•Eccessivo n. di giri</li> <li>•Avanzamento troppo basso</li> </ul> <p>Excessive spindle speed Too low feed</p>	<ul style="list-style-type: none"> <li>•Ridurre n. di giri</li> <li>•Aumentare avanzamento</li> </ul> <p>Reduce spindle speed Increase feed</p>
<b>Intasamento e deposito</b> Clogging and Depositing	<ul style="list-style-type: none"> <li>•Scarsa evacuazione trucioli</li> <li>•Eccessivo avanzamento</li> <li>•Eccessiva profondità di taglio</li> <li>•N. taglienti non corretto</li> <li>•Usura tagliente fresa</li> </ul> <p>Chips are not well disposed Excessive feed Excessive depth of cut Inappropriate number of flute Wear of cutting edge progressed</p>	<ul style="list-style-type: none"> <li>•Indirizzare correttamente il refrigerante per facilitare l'evacuazione del truciolo</li> <li>•Ridurre avanzamento</li> <li>•Ridurre profondità di taglio</li> <li>•Ridurre N. taglienti</li> <li>•Utilizzare una nuova fresa o riaffilare</li> </ul> <p>Adjust coolant nozzle to right direction to dispose chips Reduce feed Reduce depth of cut Use fewer flutes end mill Use new end mill or regrind</p>
<b>Flessione fresa</b> Deflection of end mill	<ul style="list-style-type: none"> <li>•Eccessivo avanzamento</li> <li>•Eccessiva profondità di taglio</li> <li>•Lunghezza effettiva o sporgenza utensile eccessiva</li> <li>•Elica troppo larga</li> </ul> <p>Excessive feed Excessive depth of cut Excessive long of effective length or overhang of end mill Large helix angle of flutes</p>	<ul style="list-style-type: none"> <li>•Ridurre avanzamento</li> <li>•Ridurre profondità di taglio</li> <li>•Ridurre il più possibile la lunghezza effettiva e la sporgenza utensile</li> <li>•Scegliere un'elica più stretta</li> </ul> <p>Reduce feed Reduce depth of cut Adjust effective length and overhang as short as possible Use smaller helix angle</p>
<b>Bava sulla superficie finita</b> Burr on finished surface	<ul style="list-style-type: none"> <li>•Usura tagliente fresa</li> <li>•Elica troppo stretta</li> <li>•Eccessiva profondità di taglio</li> </ul> <p>Wear of cutting edge progressed Small helix angle of flutes Excessive depth of cut</p>	<ul style="list-style-type: none"> <li>•Utilizzare una nuova fresa o riaffilare</li> <li>•Scegliere un'elica più larga</li> <li>•Ridurre profondità di taglio</li> </ul> <p>Use new end mill or regrind Use larger helix angle Reduce depth of cut</p>
<b>Cattiva rugosità superficiale</b> Poor surface roughness	<ul style="list-style-type: none"> <li>•Usura tagliente fresa</li> <li>•Pizzicatura del truciolo</li> <li>•Eccessivo avanzamento</li> <li>•Lunghezza effettiva o sporgenza utensile</li> <li>•N. giri insufficiente</li> <li>•Altezze diverse del sovrametallo residuo per la finitura</li> <li>•Eccentricità mandrino eccessiva</li> </ul> <p>Wear of cutting edge progressed Chips bite Excessive feed Excessive long of effective length or overhang of end mill Too low spindle speed Stock removals vary for finishing Excessive chucking runout</p>	<ul style="list-style-type: none"> <li>•Utilizzare una nuova fresa o riaffilare</li> <li>•Utilizzare il refrigerante per evacuare il truciolo</li> <li>•Ridurre avanzamento</li> <li>•Ridurre il più possibile la lunghezza effettiva e la sporgenza utensile</li> <li>•Aumentare n. giri</li> <li>•Migliorare la semifinitura</li> <li>•Regolare l'eccentricità del mandrino</li> </ul> <p>Use new end mill or regrind Use coolant to remove chips Reduce feed Adjust effective length and overhang as short as possible Increase spindle speed Improve semi-finishing process Adjust chucking runout</p>
<b>Cattiva precisione della lavorazione</b> Poor machining accuracy	<ul style="list-style-type: none"> <li>•Estensione termica del mandrino</li> <li>•Altezze diverse del sovrametallo residuo per la finitura</li> <li>•Eccessivo avanzamento</li> <li>•Eccentricità mandrino eccessiva</li> </ul> <p>Inconsistent thermal extension of spindle Stock removals vary for finishing Excessive feed Excessive chucking runout</p>	<ul style="list-style-type: none"> <li>•Riscaldare il mandrino facendolo girare a vuoto prima di iniziare il lavoro</li> <li>•Migliorare la semifinitura</li> <li>•Ridurre avanzamento</li> <li>•Regolare l'eccentricità del mandrino</li> </ul> <p>Warm up spindle by idling before starting operation Improve semi-finishing process Reduce feed Adjust chucking runout</p>

CBN

Nitrato Cubico di Boro

Diamante

Diamond

Piane  
Square

Scaricate  
Piane  
Long Neck  
Square

Sferiche  
Ball

Scaricate  
Sferiche  
Long Neck  
Ball

Coniche  
Taper

Coniche  
Sferiche  
Taper  
Ball

Toriche  
Corner R

Scaricate  
Toriche  
Long Neck  
Corner R

Frese  
Sagomate  
Formed  
Cutter

Punte  
Drill

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Others

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# Tabella comparativa dei materiali per stampi

Comparison Table of Die and Mold Materials

## ● Acciai per stampi plastica Plastic Mold Steels

Classificazione Classification	JIS e altri JIS and others	Durezza (HRC) Hardness	Acciai Aichi AICHI STEEL	Acciai Uddeholm UDDEHOLM	Acciai Kobe KOBÉ STEEL	Acciai speciali Sanyo SANYO SPECIAL STEEL	Acciai Daido DAIDO STEEL	Acciai Nippon Koshuha NIPPON KOSHUHA STEEL	Metalli Hitachi HITACHI METALS
Acciai pretemprati Prehardened steels	SC	13	AUK1	UHB11	KTSM21 KTSM2A KTSM22 U2000	PC55	PXZ PDS1	KPM1 KPMAX	
	SCM	28	AUK11		KTSM31 KTSM3A U3000		PDS3		
	SCM AISI P20	33		PLAMAX IMPAX HH	KTSM3M U3500	PCM30	PXA30 PX5 PX7	KPM30	HPM2 HPM7
	SUS			STAVAX	KTSM60	QPD1	S-STAR D-STAR	420M	HPM38
	SUS	35		RAMAX-S		QPD5	G-STAR		HPM77
	SUS			CORRAX		QS630	NAK101	U630	PSL
	SKD61	40	AUD61	ORVAR-S		QD6F	DH2F		FDAC
	AISI P21				KTSM40EF KTSM40E	PCM40 PCM40S	NAK55 NAK80	KAP65 KAP88	HPM1 HPM50 HPM-PRO CENA1
italiano	40		NIMAX RIGOR SLEIPNER CALDIE CALMAX					HPM-MAGIC	
Acciai induriti e temprati Hardened & Tempered steels	SKD11	55-60	AUD11			QCM8	PD613	KD21 KD11S	HPM31
	SUS 440C	57-60		ELMAX		QPD5 SPC5 (Powder Metal)	SUS440C DEX-P1 (Powder Metal)	KSP2	SUS440C ZDP282 (Powder Metal)
	SUS 420	48-53		STAVAX MIRRX ESR			S-STAR D-STAR G-STAR	KSP1	HPM38 HPM77
Acciai invecchiati Age-hardened steels	Acciaio Maranging Maranging Steel	50 italiano				QM300	MAS1C	KMS18-20	YAG

## ● Acciai per pressofusione Hot Die Steels

Classificazione Classification	JIS e altri JIS and others	Durezza (HRC) Hardness	Acciaio Aichi AICHI STEEL	Acciaio Uddeholm UDDEHOLM	Acciaio speciale Sanyo SANYO SPECIAL STEEL	Acciaio Daido DAIDO STEEL	Acciaio Giapponese Koshuha NIPPON KOSHUHA STEEL	Metalli Hitachi HITACHI METALS	Nachi Fujikoshi NACHI FUJIKOSHI
Acciai legati Alloy steels	SKD4	40-50	SKD4			DH4	KD4		
	SKD5	45-50	SKD5			DH5	KD5		
	SKD6	40-52		VIDAR		DH6	KD6		
	SKD61	42-53	SKD61	ORVAR 2M	QD61	DHA DHA1	KDA	DAC	
	SKD61	42-53	AUD61 AUD60A	ORVAR-S DIEVAR	QDA61 QDN	DHA2 DH21 DH31-S	KDA1 KDA1S KDAMAX	DAC3 DAC10 DAC55 DAC-MAGIC	
	SKD61	38-42				DH2F	KAP90F	FDAC	
	SKD7	40-50	AUD7		QD10	DH72	KDH1		
	SKD7	40-50	AUD71 AUD72		QDH	DH32 DH71 DH73		DAC40 YEM-K	HDN1 DURO-N1
	SKD8	40-50	SKD8			DH41	KDF		
	SKD8	40-50				DH42	KDF4	MDC-K DAC45	
	SKT4	35-50	SKT4A	ALVAR14	QT41	GFA	KTV	DM	
	SKT4	36-45	AUD60		QDT	GF78	TD3	YHD28	
	italiano	40-50			QF5				
	Acciai super rapidi High-Speed steels	Tipo Matrix Matrix Type	55-60			QHZ	DRM1 DRM2 DRM3	KMX1	YXR3 YXR33



# Tabella comparativa dei materiali per stampi

Comparison Table of Die and Mold Materials

## ● Acciai per stampi a freddo Cold Die Steels

Classificazione Classification	JIS e altri JIS and others	Durezza (HRC) Hardness	Acciai Aichi AICHI STEEL	Uddeholm UDDEHOLM	Acciaio speciale Sanyo SANYO SPECIAL STEEL	Acciaio Daido DAIDO STEEL	Acciaio giapponese Koshuha NIPPON KOSHUHA STEEL	Metalli Hitachi HITACHI METALS	Nachi Fujikoshi NACHI FUJIKOSHI
<b>Acciai al carbonio</b> Carbon steels	SK105 (SK3)	58-61	SK3		QK3	YK3			
<b>Acciai legato</b> Alloy steels	SKS93	55-62	SK301		QK3M	YK30	K3M	YCS3	
	SKS3		SKS3	ARNE	QKS3	GOA	KS3	SGT	
	SKD1		SKD1	SVERKER3	QC1		KD1	CRD	
	SKD11		SKD11	SVERKER21	QC11	DC11	KD11	SLD	CDS11
	SKD11		AUD15	SLEIPNER	QCM8	DC53	KD11S KD21	SLD8	MDS9
	SKD11		SXACE		QCM7	DCMX	NOGA	ARK1 SLD-MAGIC	
	SKD12	SKD12	RIGOR		DC12	KD12		CDS12	
	Pretemprato Prehardened	38-42 48-52		IMPAX HH		GO40F CX1	KAP65	HPM-MAGIC	
	italiano Flame hardening Steel	55-62	SX105V SX4	FERNO	QF3	GO5	FH5 KRCX	HMD5	
	italiano Low Temperature Air-cooled Steel		AKS3			GO4	KSM	ACD37	
<b>Acciai super rapidi</b> High-Speed steels	SKH51	55-68			QH51		H51	YXM1	SKH9
	SKH55						HM35	YXM4	
	SKH57						MV10	XVC5	DURO-SP
	ASP acciaio sinterizzato Powder Metal High Speed Tool Steels	58-72		ASP23 ASP30 ASP60	SPM23 SPM30 SPM60	DEX20		HAP10 HAP50 HAP72	FAX31 FAX55 FAXG2
	Tipo Matrix Matrix Type	56-66				QHZ	DRM1 DRM2 DRM3	KMX1 KMX2 KMX3	HAP5R YXR3 YXR33 YXR7

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Ball

**Scaricate Sferiche**  
Long Neck  
Ball

**Coniche**  
Taper

**Coniche Sferiche**  
Taper Ball

**Toriche**  
Corner R

**Scaricate Toriche**  
Long Neck  
Corner R

**Frese Sagomate**  
Formed  
Cutter

**Punte**  
Drill

**Altro**  
Others

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# Leggere le seguenti precauzioni d'uso

Read Following Precautions for Safe Use

Attenzione



## Precauzioni per la sicurezza Attention on Safety

- **Nella rimozione delle frese dalle scatole non toccare direttamente i taglienti.**  
When removing tools from cases, be careful of getting-out of tools and don't touch directly the cutting edges.
- **Non toccare mai i taglienti a mani nude.**  
Never touch the cutting edges directly with bare hand.
- **Usare sempre gli occhiali protettivi, l'utensile potrebbe rompersi.**  
Use safety covers and eye protection, as tools may be broken.
- **Utilizzare sempre l'utensile più adatto alla lavorazione da eseguire. L'utensile deve sempre essere bloccato in maniera ottimale dal mandrino per prevenire vibrazioni.**  
Use holders, etc. that match the tools and nature of the processing operations.  
The tool should be firmly attached to the holder to prevent shaking.
- **Il pezzo da lavorare deve essere bloccato rigidamente.**  
The work materials clamp firmly.
- **Prima di iniziare la lavorazione controllare le dimensioni del pezzo e dell'utensile.**  
Make sure of dimensions of tools and work pieces before starting operation.
- **Se è necessario, modificare le condizioni di taglio in base alle dimensioni del pezzo e della macchina.**  
It is necessary to adjust conditions according to the dimensions of work materials and the machine.
- **Selezionare il tipo di fluido da taglio in base al tipo di lavorazione. Usando un fluido da taglio a base non acquosa porta alla generazione di fiamme causate dalle scintille provocate dalla rottura dell'utensile. Assicurarsi di avere sistemi di prevenzione incendi.**  
Select a cutting fluid appropriate to the particular usage. Using a non-water cutting fluid could lead to fires due to sparks generated during processing or heat caused by breakage. Ensure that you take proper fire-prevention measures.
- **Se durante la lavorazione si generano dei rumori strani, fermare la macchina immediatamente.**  
If abnormal sound, etc. occurs during processing, stop the machine immediately.
- **Non modificare gli utensili.**  
Don't modify tools.

## Precauzioni per la riaffilatura Attention on Regrinding

- **Quando si riaffila l'utensile, si genera della polvere dannosa per la salute. Assicurarsi di indossare occhiali protettivi e maschera antipolvere.**  
When the tool is reground, grinding dust is generated which is dangerous to your health. Be sure to wear protective glasses and a dust proof mask.
- **Riaffilare gli utensili nel momento idoneo.**  
Regrind tools at proper period.

\* Le specifiche possono variare senza preavviso.

\* Specifications may change without notice for improvement.

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