



**CUTTING
SOLUTIONS**



KOBO
CUTTING TOOLS



Linea guida dell'icona - *Icon Guide Line*

Rivestimento - *Coating*

R R-BLU Rivestimento <i>R-BLU Coating</i>	H H-MARRONE Rivestimento <i>H-BROWN Coating</i>
A A-GRIGIO Rivestimento <i>A-GREY Coating</i>	X X-GRIGIO PLUS Rivestimento <i>X-GREY PLUS Coating</i>
S S-VIOLA Rivestimento <i>S-PURPLE Coating</i>	DIA DIAMANTE Rivestimento <i>Diamond Coating</i>
DLC DLC Rivestimento <i>DLC Coating</i>	Non Senza rivestimento <i>Non Coating</i>

N° Taglienti - *N° of Flutes*

1 1 Tagliente <i>1 Flutes</i>	4 4 Taglienti <i>4 Flutes</i>
2 2 Taglienti <i>2 Flutes</i>	5 5 Taglienti <i>5 Flutes</i>
3 3 Taglienti <i>3 Flutes</i>	6 6 Taglienti <i>6 Flutes</i>

Tolleranza - *Tolerance*

R Tolleranza del raggio <i>Radius Tolerance</i>
CR Tolleranza del raggio d'angolo <i>Corner Radius Tolerance</i>
OD Tolleranza del diametro esterno <i>Outside Diameter Tolerance</i>

Angolo dell'elica - *Helix Angle*

20° Angolo dell'elica 20° <i>Helix Angle 20°</i>	40° Angolo dell'elica 40° <i>Helix Angle 40°</i>
30° Angolo dell'elica 30° <i>Helix Angle 30°</i>	43° Angolo dell'elica 43° <i>Helix Angle 43°</i>
35° Angolo dell'elica 35° <i>Helix Angle 35°</i>	45° Angolo dell'elica 45° <i>Helix Angle 45°</i>

Parametri di taglio - *Cutting Condition*

PAGE No. Indica Pagina <i>Indicates Page</i>
--

Codici frese

Rib End Mill Notation

Notation für Rippenschaftfräser

2	K	B	R	H	0	2	0	1	0	0	4	4	5
1	2	3	4	5	6			7			8	0	9

1 N. taglienti - *Flutes*

1: Taglienti - *1: Flutes* | 2: Taglienti - *2: Flutes* | 3: Taglienti - *3: Flutes*
 4: Taglienti - *4: Flutes* | 5: Taglienti - *5: Flutes* | 6: Taglienti - *6: Flutes*

2 KOBOT mark - *KOBOT brand*

3 Tipi di lunghezza effettiva
Effective length types

R: Fresa per nervature - *R: Rib End Mill*

4 Tipo B - *Type B*

B: Ball End Mill - *B: Fresa sferica* | **R**: Raggio - *R: Radius* | **E**: Piana - *E: Flat*

5 Famiglie d'appartenza
Families to which they belong

R: ADDAX - **H**: H-BEETLE - **A**: IBEX - **X**: SAIGA
K: RHINOCEOS - **M**: ELAND - **C**: ORICE

6 Diametro esterno - *Outside diameter*

002: 0.2mm | **020**: 2mm | **120**: 12mm

7 Lunghezza effettiva - *Effective length*

100: 10mm | **R15**: R1.5mm Raggio dell'angolo - *Corner Radius*

8 Diametro gambo - *Shank diameter*

4: 4mm | **A**: 10mm | **G**: 16mm

9 Lunghezza totale - *Overall length*

45: 45mm | **60**: 60mm | **A0**: 100mm | **B0**: 110mm | **F0**: 150mm

Diametro gambo - *Shank diameter* | Più di 10 notazioni - *More than 10 Notation*

Lunghezza totale - *Overall length* | Più di 100 notazioni - *More than 100 Notation*

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Caratteristiche tecniche dei rivestimenti

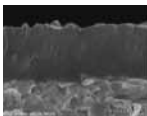
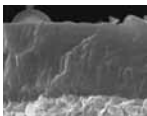
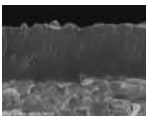
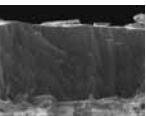
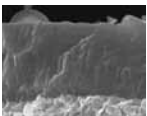
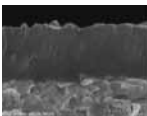
Technical characteristics of the coatings

Technische Eigenschaften der Beschichtungen

Caratteristiche del rivestimento: Bassa resistenza all'attrito, bassa viscosità e basso trasferimento di calore.

Coating features: Low friction resistance, low stickiness and low heat transfer.

Beschichtungsfunktionen: Geringer Reibungswiderstand, geringe Klebrigkeit und geringe Wärmeübertragung.

Tipo di rivestimento Coating Type Beschichtungstyp	MARRONE BROWN BRAUN	GRIGIO GREY GRAU	GRIGIO PLUS GREY PLUS GRAU PLUS	BLU BLUE BLAU	VIOLA PURPLE VIOLET	DIAMANTE DIAMOND DIAMANT
Coefficiente d'attrito Friction Coefficient Reibungskoeffizient	0.4	0.25	0.4	0.5	0.3	0.45
Applicazione Application Anwendung	P	●	●	●	●	●
	M	○	●	○	●	○
	K	●	●	●	●	●
	N					○
	S		○	○	●	●
	H	○	○	●	●	●
Durezza (HV 0,05) Hardness (HV 0.05) Härte (HV 0,05)	HV2800 ~ 3100	HV2800 ~ 3100	HV3200 ~ 3500	HV3500 ~ 3800	HV3500 ~ 3800	GPA 50 ~ 80
Temperatura di lavoro Working Temperature Arbeitstemperatur	800 ~ 900 °C	800 ~ 900 °C	850 ~ 950 °C	1100 ~ 1200 °C	950 ~ 1050 °C	850 ~ 950 °C
Struttura del rivestimento Coating Structure Beschichtungsstruktur	Multi-layer	Multi-layer	Multi-layer	Multi-layer	Multi-layer	Mono-layer
Elementi di rivestimento Coating Elements Beschichtungselemente	Al, Ti, N	Al, Ti, N	Al, Ti, Cr, N	Al, Ti, Si, Cr, N	Al, Ti, Si, Cr, N	Diamond
Immagine SEM SEM Image SEM-Bild						
Colore del rivestimento Coating Color Beschichtungsfarbe	Cooper	Grey	Dark Gray	Blue	Purple	Black



AVVERTENZE

Leggere attentamente prima dell'utilizzo dei nostri prodotti

- Gli utensili, se rotti, possono vibrare. L'uso di occhiali protettivi è assolutamente consigliato in prossimità dell'area di lavoro.
- Il corretto utilizzo dei nostri utensili è essenziale al fine di assicurarne la miglior durata ed evitare operazioni pericolose.
- Gli utensili da taglio hanno un tagliente molto affilato che può procurare ferite alle mani se non protette adeguatamente.
- L'uso di guanti è vietato. Il tessuto può legarsi al tagliente ed essere trascinato dall'utensile in rotazione.
- Gli utensili che cadono possono danneggiare i piedi dell'operatore.
- Le scarpe antinfortunistiche devono essere indossate in qualsiasi momento
- Nel fissare l'utensile alla macchina fare sempre attenzione a non danneggiarlo.
- Controllare il perfetto posizionamento e fissaggio del pezzo da lavorare prima di azionare la macchina.
- Non riutilizzare utensili fortemente usurati o danneggiati.
- La riaffilatura può generare polveri e vapori pericolosi. Attrezzarsi con un sistema di ventilazione adeguato.



VORSICHT

Bitte sorgfältig durchlesen, bevor Sie unsere Produkte gebrauchen

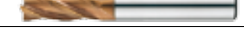
- Beschädigte Werkzeuge können vibrieren, es wird daher dringend empfohlen Schutzbrillen in der Nähe der Arbeitsstelle zu tragen.
- Ordnungsgemäße Handhabung und Arbeitsvoraussetzung sind Grundbedingungen für lange Lebensdauer und Sicherheit.
- Die Schneidkanten der Werkzeuge sind sehr scharf und können ungeschützte Hände verletzen. Vorsicht bei der Handhabung.
- Handschuhe können sich mit drehenden Werkzeugen verfangen, sie sind daher verboten.
- Unfallschutzschuhe ständig anziehen: beim Hinunterfallen können die Werkzeuge die Füße verletzen.
- Beim Einsetzen der Werkzeuge auf die Maschinen ist darauf zu achten, Stöße zu vermeiden.
- Prüfen Sie vor Inbetriebnahme der Maschine die genaue Befestigung der Werkstücke.
- Werkzeuge mit beschädigten Schneiden nicht mehr verwenden.
- Beim Schleifen können gefährliche Partikel oder Gase entstehen. Angemessene Entlüftung muß gewährleistet sein.



WARNING

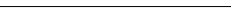
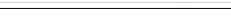
Read carefully before using our products

- Tools may chatter if broken. The wearing of eye protection is strongly advised in the vicinity of the working area.
- The correct using condition and handling of our tools is essential to ensure maximum life and hazard-free operation.
- Cutting tools have sharp edges and care must be taken when handling to avoid cuts/lacerations to unprotected hands.
- The wearing of gloves is forbidden as the gloves may entangle with turning tools.
- Tools may hurt the user's feet when falling off. Safety shoes should be put on at all time.
- While fitting the tools to machine spindles and/or sleeves, care should be taken to avoid subjecting them to shock or impact.
- Check that the workpieces are properly seated and securely held in the chuck before switching on machine power.
- Do not use a tool which cutting edges are worn-out or chipped severely.
- Grinding operations may produce potentially hazardous dust particles or vapour. Adequate ventilation equipment should be provided.

Serie	Materiale da lavorare	Tipo fresa	N° taglienti	Aspetto	Modello NO.	Lunghezza effettiva	Pagina
Series	Workpiece	Type	Flutes	Apearance	Model NO.	Effective Length	Page
ADDAX	HRC 52 ~ 70	Sferica Ball	2		2KBRR	Y	
			2		2KBSR	N	
			2		2KBPR	N	
			3		3KBSR	N	
		Torica Corner Radius	4		4KRRR	Y	
			4		4KRRCR	N	
			9		6KRRCR	N	
		Piana Flat	2		2KERR	Y	
			4		4KLERR	Y	
			4		4KEPR	N	
			4		4KELR	N	
		Conica Taper	2		2KBTR	N	
			3		3KBTR	N	
			2		2KRTR	N	
			4		4KRTR	N	
BEETLE	HRC 45 ~ 55	Sferica Ball	2		2KBRH	Y	
			2		2KBSH	N	
			2		2KBPH	N	
			3		3KBPH	N	
			4		4KBPH	N	
		Torica Corner Radius	2		2KRRH	Y	
			2		2KRCH	N	
			4		4KRRH	Y	
			4		4KRCH	N	
			4		4KTIH	Y	
		Piana Flat	2		2KERH	Y	
			2		2KEPH	N	
			2		2KELH	N	
			4		4KERH	Y	
			4		4KEPH	N	
			4		4KELH	N	
			4		4KEHH	N	
			6		6KEPH	N	
		Raggio angolo interno Inner Corner Radius	2		2KCRI	N	
			4		4KCRI	N	

Acciaio al carbonio	Lega di acciaio	Acciaio bonificato	HRC50	HRC70	Acciaio Inox	Lega acciaio resistente calore	Alluminio	Rame	Grafite	Plastica	Pagina
Carbon Steel	Alloy Steel	Prehardened Steel	HRC50	HRC70	Stainless Steel	Heat resisting alloy Steel	Aluminium	Copper	Graphite	Plastic	Page
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
	○	○	○	△		○					
○	○	△	△	○				○	○		
○	○	△	△	○				○	○		
○	○	△	△	○				○	○		
○	○	△	△	○				○	○		
○	○	△	△	○				○	○		
○	△	△	△	○				○	○		
○	△	△	△	○				○	○		
○	△	△	△	○				○	○		
○	△	△	△	○				○	○		
○	△	△	△	○				○	○		
○	△	△	△	○				○	○		
○	△	△	△	○				○	○		
○	△	△	△	○				○	○		
○	△	△	△	○				○	○		
○	△	△	△	○				○	○		
○	△	△	△	○				○	○		
△	△	△	△				△	○		△	
△	△	△	△				△	○		△	

○ Adatto - Suitable △ Più adatto - Most suitable

Serie	Pezzo	Tipo	Fresa	Aspetto	Modello NO.	Lunghezza effettiva	Pagina
Series	Workpiece	Type	Flutes	Apearance	Model NO.	Effective Length	Page
IBEX	HRC ~ 45	Sferica Ball	2		2KBRA	Y	
			2		2KBSA	Y	
			2		2KBPA	N	
		Torica Corner Radius	2		2KRRA	Y	
			2		2KRCA	N	
			2		2KRLA	Y	
			4		4KRRA	Y	
			4		4KRCA	N	
			4		4KRLA	Y	
		Piana Flat	2		2KREA	Y	
			2		2KEPA	N	
			2		2KLEA	N	
			4		4KEPA	N	
			4		4KLEA	N	
			4		4KLPA	Y	
SAIGA	HRC ~ 50		3		3KEOX	N	
			4		4EOX	N	
		Piana Flat	2		2KEPX	N	
			4		4EPX	N	
			4		4KVERX	Y	
			4		4KVEPX	N	
CARIBOU	SUS Titanium Inconel SUS Titanio Inconel	Sferica Ball	4		4KBUS	N	
		Torica Corner Radius	4		4KRUS	N	
			4		4KARUS	N	
		Piana Flat	4		4KEUS	N	
			4		4KAEUS	N	

Acciaio al carbonio	Lega di acciaio	Acciaio temprato	HRC50	HRC70	Acciaio Inox	Lega acciaio calore	Alluminio	Rame	Grafite	Plastica	Pagina
Carbon Steel	Alloy Steel	Prehardened Steel	HRC50	HRC70	Stainless Steel	Heat resisting alloy Steel	Aluminium	Copper	Graphite	Plastic	Page
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	△	△		○			△			
△	△	○	○								
△	△	○	○								
△	△	○	○		○						
△	△	○	○		○						
△	△	○	○		○						
△	△	○	○		○						
△	△	△			△	○					
△	△	△			△	○					
△	△	△			△	○					
△	△	△			△	○					
△	△	△			△	○					

○ Adatto - Suitable △ Più adatto - Most suitable

Serie	Pezzo	Tipo	Fresa	Aspetto	Modello NO.	Lunghezza effettiva	Pagina
Series	Workpiece	Type	Flutes	Apearance	Model NO.	Effective Length	Page
MARKHOR	Grafite Rame Graphite Copper	Sferica Ball	2		2KBRD	Y	
			2		2KBPD	N	
		Torica Corner Radius	2		2KRRD	Y	
			4		4KRRD	Y	
		Piana Flat	2		2KERD	Y	
			2		2KEPD	N	
			4		4KEPD	N	
RHINOCEROS	Rame Grafite Plastica Graphite Copper Plastic	Sferica Ball	2		2KBRK	Y	
			2		2KBSK	Y	
			2		2KBLK	Y	
		Torica Corner Radius	2		2KRRK	Y	
		Piana Flat	2		2KERK	Y	
			2		2KEPK	N	
BHARAL	Alluminio Plastica Lega non ferrosa Aluminium Plastic Non-Ferrous Alloy	Piana Flat	1		1KELA	N	
			2		2KELA	N	
			3		3KELA	N	
ELAND	PC, PE ABS Plastic Acrylic Acetal Plastic Engineering		2		2KBRM	Y	
			2		2KBMM	N	
		Piana Flat	2		2KERM	Y	
			2		2KEMM	N	
YAK	Non metal Low Carbon Steel	Sferica Ball	2		2KBGM	N	
		Piana Flat	2		2KEGM	N	
			4		4KEGM	N	
ORICE	Low Carbon Steel Heat Treated Steel	Centraggio Centering	2		2KNEC	N	

Acciaio al carbonio	Lega di acciaio	Acciaio temprato	HRC50	HRC70	Acciaio Inox	Lega acciaio calore	Alluminio	Rame	Grafite	Plastica	Pagina
Carbon Steel	Alloy Steel	Prehardened Steel	HRC50	HRC70	Stainless Steel	Heat resisting alloy Steel	Aluminium	Copper	Graphite	Plastic	Page
								○	△		
								△	△		
								△	△		
								△	△		
								△	△		
								△	△		
								△	△		
								△	△		
							○	△	△	△	
							○	△	△	△	
							○	△	△	△	
							○	△	△	△	
							○	△	△	△	
							○	△	△	△	
							△			○	
							△	○		○	
							△	○		○	
							○	○		△	
							○	○		△	
							○	○		△	
							○	○		△	
△	○							○			
△	○							○			
△	○							○			
△	○						△	○		△	

○ Adatto - Suitable △ Più adatto - Most suitable



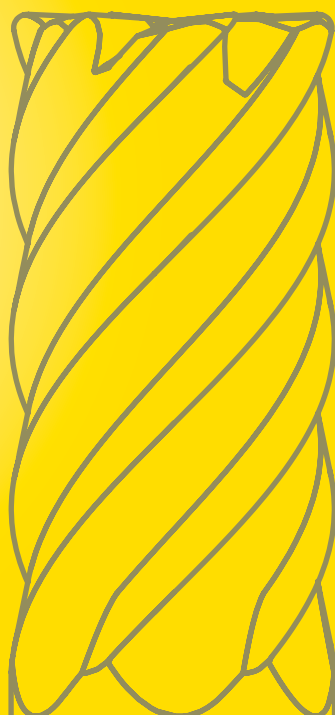
ADDAX SERIES

- Acciai temprati, acciai legati
- Massima resistenza all'usura e vibrazioni ridotte al minimo
- Design geometrico per proteggere la rottura del tagliente e migliorare le prestazioni di taglio.

- *Hardened steels, alloy steel*
- *Maximized the wear resistance & minimized chattering*
- *Geometry design to protect the breakage of cutting edge and improve the cutting performance.*

- *Gehärtete Stähle, legierte Stähle*
- *Maximale Verschleißfestigkeit und minimierte Vibrationen*
- *Geometrisches Design zum Schutz vor Schneidkantenbruch und zur Verbesserung der Schnittleistung.*





KOBOL



SFERICA

BALL

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)	Raggio R Size R	Tolleranza Tolerance
0,1-5	0 -0,010	R0,05 - R2,5	±0,005
6 - 12	0 -0,015	R3 - R6	±0,010

TORICA

CORNER RADIUS

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)	Raggio R Size R	Tolleranza Tolerance
1 - 5	0 - 0,010	R0,02 - R0,5	±0,005
6 - 12	0 - 0,015	R11 - R1,5	±0,010
		R2 - R3	±0,015

PIANA

FLAT

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)
0,1 - 0,9	0 - 0,010
1 - 5	0 - 0,010
6 - 12	0 - 0,015

2KBRR

Fresa sferica a 2 taglienti
2 Flute Rib Ball End Mills



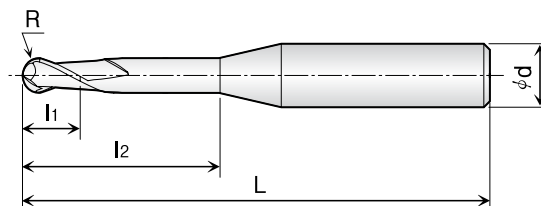
- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μm
- *2 μm ultra-micro grain*

R

2

R

30°

PAGE
No. 203

Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,1-5	0 -0,010	R0,05-R2,5	$\pm 0,005$
6-12	0 -0,015	R3-R6	$\pm 0,010$

CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KBRR-001-002-445	R0.05	0.1	0.2	4	45
2KBRR-001-003-445	R0.05	0.1	0.3	4	45
2KBRR-001-005-445	R0.05	0.1	0.5	4	45
2KBRR-002-006-445	R0.1	0.2	0.6	4	45
2KBRR-002-010-445	R0.1	0.2	1	4	45
2KBRR-002-015-445	R0.1	0.2	1.5	4	45
2KBRR-002-020-445	R0.1	0.2	2	4	45
2KBRR-003-010-445	R0.15	0.3	1	4	45
2KBRR-003-015-445	R0.15	0.3	1.5	4	45
2KBRR-003-020-445	R0.15	0.3	2	4	45
2KBRR-003-025-445	R0.15	0.3	2.5	4	45
2KBRR-003-030-445	R0.15	0.3	3	4	45
2KBRR-004-010-445	R0.2	0.4	1	4	45
2KBRR-004-015-445	R0.2	0.4	1.5	4	45
2KBRR-004-020-445	R0.2	0.4	2	4	45
2KBRR-004-025-445	R0.2	0.4	2.5	4	45
2KBRR-004-030-445	R0.2	0.4	3	4	45
2KBRR-004-040-445	R0.2	0.4	4	4	45
2KBRR-004-050-445	R0.2	0.4	5	4	45
2KBRR-005-010-445	R0.25	0.5	1	4	45
2KBRR-005-015-445	R0.25	0.5	1.5	4	45
2KBRR-005-020-445	R0.25	0.5	2	4	45
2KBRR-005-025-445	R0.25	0.5	2.5	4	45
2KBRR-005-030-445	R0.25	0.5	3	4	45
2KBRR-005-040-445	R0.25	0.5	4	4	45
2KBRR-005-050-445	R0.25	0.5	5	4	45

2KBRR

Fresa sferica a 2 taglienti
 2 Flute Rib Ball End Mills



CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
2KBRR-005-060-445	R0.25	0,5	6	4	45
2KBRR-005-080-445	R0.25	0,5	8	4	45
2KBRR-006-020-445	R0.3	0,6	2	4	45
2KBRR-006-030-445	R0.3	0,6	3	4	45
2KBRR-006-040-445	R0.3	0,6	4	4	45
2KBRR-006-050-445	R0.3	0,6	5	4	45
2KBRR-006-060-445	R0.3	0,6	6	4	45
2KBRR-006-080-445	R0.3	0,6	8	4	45
2KBRR-006-100-445	R0.3	0,6	10	4	45
2KBRR-008-020-445	R0.4	0,8	2	4	45
2KBRR-008-030-445	R0.4	0,8	3	4	45
2KBRR-008-040-445	R0.4	0,8	4	4	45
2KBRR-008-050-445	R0.4	0,8	5	4	45
2KBRR-008-060-445	R0.4	0,8	6	4	45
2KBRR-008-080-445	R0.4	0,8	8	4	45
2KBRR-008-100-445	R0.4	0,8	10	4	45
2KBRR-008-120-445	R0.4	0,8	12	4	45
2KBRR-010-030-445	R0.5	1	3	4	45
2KBRR-010-040-445	R0.5	1	4	4	45
2KBRR-010-050-445	R0.5	1	5	4	45
2KBRR-010-060-445	R0.5	1	6	4	45
2KBRR-010-070-445	R0.5	1	7	4	45
2KBRR-010-080-445	R0.5	1	8	4	45
2KBRR-010-090-445	R0.5	1	9	4	45
2KBRR-010-100-445	R0.5	1	10	4	45
2KBRR-010-120-445	R0.5	1	12	4	45
2KBRR-010-140-450	R0.5	1	14	4	50
2KBRR-010-160-450	R0.5	1	16	4	50
2KBRR-010-180-450	R0.5	1	18	4	50
2KBRR-010-200-450	R0.5	1	20	4	50
2KBRR-012-040-445	R0.6	1,2	4	4	45
2KBRR-012-060-445	R0.6	1,2	6	4	45
2KBRR-012-080-445	R0.6	1,2	8	4	45
2KBRR-012-100-445	R0.6	1,2	10	4	45
2KBRR-012-120-445	R0.6	1,2	12	4	45

2KBRR

Fresa sferica a 2 taglienti
 2 Flute Rib Ball End Mills



CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KBRR-015-040-445	R0.75	1,5	4	4	45
2KBRR-015-060-445	R0.75	1,5	6	4	45
2KBRR-015-080-445	R0.75	1,5	8	4	45
2KBRR-015-100-445	R0.75	1,5	10	4	45
2KBRR-015-120-445	R0.75	1,5	12	4	45
2KBRR-015-140-450	R0.75	1,5	14	4	50
2KBRR-015-160-450	R0.75	1,5	16	4	50
2KBRR-015-180-450	R0.75	1,5	18	4	50
2KBRR-015-200-450	R0.75	1,5	20	4	50
2KBRR-020-060-445	R1.0	2	6	4	45
2KBRR-020-080-445	R1.0	2	8	4	45
2KBRR-020-100-445	R1.0	2	10	4	45
2KBRR-020-120-445	R1.0	2	12	4	45
2KBRR-020-140-450	R1.0	2	14	4	50
2KBRR-020-160-450	R1.0	2	16	4	50
2KBRR-020-180-450	R1.0	2	18	4	50
2KBRR-020-200-450	R1.0	2	20	4	50
2KBRR-020-250-460	R1.0	2	25	4	60
2KBRR-020-300-470	R1.0	2	30	4	70
2KBRR-025-080-445	R1.25	2.5	8	4	45
2KBRR-025-100-445	R1.25	2.5	10	4	45
2KBRR-025-120-445	R1.25	2.5	12	4	45
2KBRR-025-160-450	R1.25	2.5	16	4	50
2KBRR-025-200-450	R1.25	2.5	20	4	50
2KBRR-030-080-650	R1.5	3	8	6	50
2KBRR-030-100-650	R1.5	3	10	6	50
2KBRR-030-120-650	R1.5	3	12	6	50
2KBRR-030-140-660	R1.5	3	14	6	60
2KBRR-030-160-660	R1.5	3	16	6	60
2KBRR-030-180-660	R1.5	3	18	6	60
2KBRR-030-200-660	R1.5	3	20	6	60
2KBRR-030-250-665	R1.5	3	25	6	65
2KBRR-030-300-670	R1.5	3	30	6	70
2KBRR-030-350-680	R1.5	3	35	6	80
2KBRR-040-100-650	R2.0	4	10	6	50
2KBRR-040-120-650	R2.0	4	12	6	50

2KBRR

Fresa sferica a 2 taglienti
 2 Flute Rib Ball End Mills



CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KBRR-040-160-660	R2.0	4	16	6	60
2KBRR-040-200-660	R2.0	4	20	6	60
2KBRR-040-250-665	R2.0	4	25	6	65
2KBRR-040-300-670	R2.0	4	30	6	70
2KBRR-040-350-680	R2.0	4	35	6	80
2KBRR-040-400-680	R2.0	4	40	6	80
2KBRR-050-120-650	R2.5	5	12	6	50
2KBRR-050-300-670	R2.5	5	30	6	70
2KBRR-060-150-660	R3.0	7	15	6	60
2KBRR-060-200-660	R3.0	6	20	6	60
2KBRR-060-300-670	R3.0	6	30	6	70
2KBRR-080-150-865	R4.0	8	15	8	65
2KBRR-080-200-860	R4.0	8	20	8	60
2KBRR-080-300-880	R4.0	8	30	8	80
2KBRR-100-200-A60	R5.0	10	20	10	60
2KBRR-100-250-A70	R5.0	10	25	10	70
2KBRR-100-350-AA0	R5.0	10	35	10	100
2KBRR-120-300-C80	R6.0	12	30	12	80
2KBRR-120-400-CB0	R6.0	12	40	12	110



2KBSR

Fresa sferica corta a 2 taglienti
2 Flute Short Ball End Mills



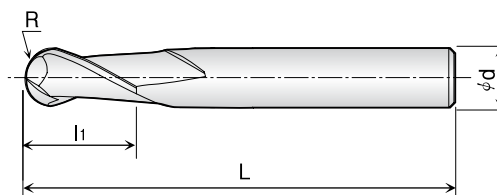
- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μm
- 2 μm ultra-micro grain

R

2

R

30°

PAGE
No. 232

Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,1-5	0 -0,010	R0,05-R2,5	$\pm 0,005$
6-12	0 -0,015	R3-R6	$\pm 0,010$

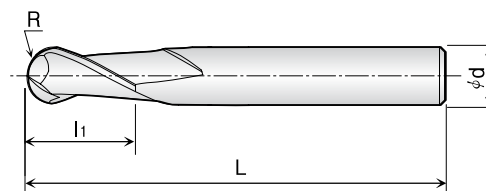
CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
2KBSR-001-001-440	R0.05	0,1	4	40
2KBSR-002-002-440	R0.1	0,2	4	40
2KBSR-003-003-440	R0.15	0,3	4	40
2KBSR-004-004-440	R0.2	0,4	4	40
2KBSR-005-005-440	R0.25	0,5	4	40
2KBSR-006-006-440	R0.3	0,6	4	40
2KBSR-007-007-440	R0.35	0,7	4	40
2KBSR-008-008-440	R0.4	0,8	4	40
2KBSR-009-009-440	R0.45	0,9	4	40
2KBSR-010-015-640	R0.5	1,5	6	40
2KBSR-015-023-640	R0.75	2,3	6	40
2KBSR-020-030-645	R1.0	3	6	45
2KBSR-030-045-645	R1.5	4,5	6	45
2KBSR-040-060-645	R2.0	6	6	45
2KBSR-050-075-650	R2.5	7,5	6	50
2KBSR-060-080-660	R3.0	8	6	60
2KBSR-080-110-860	R4.0	11	8	60
2KBSR-100-130-A60	R5.0	13	10	60
2KBSR-120-150-C60	R6.0	15	12	60

2KBPR

Fresa sferica corta a 2 taglienti
2 Flute Ball End Mills



- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μm
- 2 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,1-5	0 -0,010	R0,05-R2,5	$\pm 0,005$
6-12	0 -0,015	R3-R6	$\pm 0,010$

CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
2KBPR-001-002-445	R0.05	0,2	4	45
2KBPR-002-004-445	R0.1	0,4	4	45
2KBPR-003-006-445	R0.15	0,6	4	45
2KBPR-004-008-445	R0.2	0,8	4	45
2KBPR-005-010-445	R0.25	1	4	45
2KBPR-006-012-445	R0.3	1,2	4	45
2KBPR-007-015-445	R0.35	1.5	4	45
2KBPR-008-015-445	R0.4	1.5	4	45
2KBPR-010-020-450	R0.5	2	4	50
2KBPR-010-020-650	R0.5	2	6	50
2KBPR-012-025-450	R0.6	2.5	4	50
2KBPR-015-040-450	R0.75	4	4	50
2KBPR-015-040-650	R0.75	4	6	50
2KBPR-020-050-450	R1.0	5	4	50
2KBPR-020-050-660	R1.0	5	6	60
2KBPR-025-060-660	R1.25	6	6	60
2KBPR-030-080-360	R1.5	8	3	60
2KBPR-030-080-460	R1.5	8	4	60
2KBPR-030-080-680	R1.5	8	6	80
2KBPR-035-080-660	R1.75	8	6	60
2KBPR-040-080-480	R2.0	8	4	80
2KBPR-040-080-460	R2.0	8	4	60
2KBPR-040-080-670	R2.0	8	6	70
2KBPR-045-100-670	R2.25	10	6	70

2KBPR

Fresa sferica a 2 taglienti
2 Flute Ball End Mills



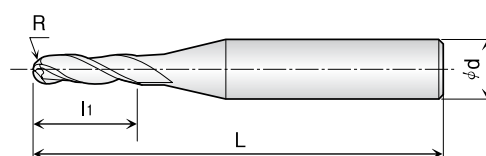
CODICE	Raggio di testa (R)	Lunghezza Elica (l_1)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Radius of ball Nose (R)</i>	<i>Lenght of cut (l_1)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
2KBPR-050-100-680	R2.5	10	6	80
2KBPR-055-120-680	R2.75	12	6	80
2KBPR-060-120-675	R3.0	12	6	75
2KBPR-060-120-690	R3.0	12	6	90
2KBPR-070-140-8A0	R3.5	14	8	100
2KBPR-080-140-875	R4.0	14	8	75
2KBPR-080-140-8A0	R4.0	14	8	100
2KBPR-090-180-AA0	R4.5	18	10	100
2KBPR-100-180-A75	R5.0	18	10	75
2KBPR-100-180-AA0	R5.0	18	10	100
2KBPR-120-220-C80	R6.0	22	12	80
2KBPR-120-220-CB0	R6.0	22	12	110

3KBSR

Fresa sferica a 3 taglienti
Spherical cutter with 3 cutting edges



- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μm
- 2 μm ultra-micro grain



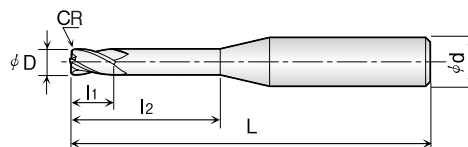
Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,1-5	0 -0,010	R0,05-R2,5	$\pm 0,005$
6-12	0 -0,015	R3-R6	$\pm 0,010$

CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
3KBSR-010-015-640	R0.5	1,5	6	40
3KBSR-020-030-645	R1.0	3	6	45
3KBSR-030-045-645	R1.5	4,5	6	45
3KBSR-040-060-645	R2.0	6	6	45
3KBSR-050-075-650	R2.5	7,5	6	50
3KBSR-060-080-660	R3.0	8	6	60
3KBSR-080-110-860	R4.0	11	8	60
3KBSR-100-130-A60	R5.0	13	10	60
3KBSR-120-150-C60	R6.0	15	12	60
2KBPR-100-180-AA0	R5.0	18	10	100
2KBPR-120-220-C80	R6.0	22	12	80
2KBPR-120-220-CB0	R6.0	22	12	110

4KRRR

Fresa torica a 4 taglienti
4 Flutes Rib Corner Radius End Mills

- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μm
- 2 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
1 - 5	0 - 0,010	R0,02-R0,5	$\pm 0,005$
6 - 12	0 - 0,015	R1 - R1,5	$\pm 0,010$
		R2 - R3	$\pm 0,015$

CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (L ₁)	Effective Length (L ₂)	Shank Diameter (d)	Overall length (L)
4KRRR-008-R005-020-445	0,8	R0.05	1,2	2	4	45
4KRRR-008-R005-040-445	0,8	R0.05	1,2	4	4	45
4KRRR-008-R005-060-445	0,8	R0.05	1,2	6	4	45
4KRRR-008-R01-020-445	0,8	R0.1	1,2	2	4	45
4KRRR-008-R01-040-445	0,8	R0.1	1,2	4	4	45
4KRRR-010-R005-040-445	1	R0.05	1,5	4	4	45
4KRRR-010-R005-060-445	1	R0.05	1,5	6	4	45
4KRRR-010-R005-080-445	1	R0.05	1,5	8	4	45
4KRRR-010-R005-100-445	1	R0.05	1,5	10	4	45
4KRRR-010-R01-040-445	1	R0.1	1,5	4	4	45
4KRRR-010-R01-060-445	1	R0.1	1,5	6	4	45
4KRRR-010-R01-080-445	1	R0.1	1,5	8	4	45
4KRRR-010-R02-040-445	1	R0.2	1,5	4	4	45
4KRRR-010-R02-060-445	1	R0.2	1,5	6	4	45
4KRRR-010-R02-080-445	1	R0.2	1,5	8	4	45
4KRRR-010-R02-100-445	1	R0.2	1,5	10	4	45
4KRRR-010-R02-120-445	1	R0.2	1,5	12	4	45
4KRRR-010-R03-040-445	1	R0.3	1,5	4	4	45
4KRRR-010-R03-060-445	1	R0.3	1,5	6	4	45
4KRRR-010-R03-080-445	1	R0.3	1,5	8	4	45
4KRRR-015-R01-040-445	1,5	R0.1	2,3	4	4	45
4KRRR-015-R01-060-445	1,5	R0.1	2,3	6	4	45
4KRRR-015-R01-080-445	1,5	R0.1	2,3	8	4	45
4KRRR-015-R01-100-445	1,5	R0.1	2,3	10	4	45
4KRRR-015-R02-040-445	1,5	R0.2	2,3	4	4	45

4KRRR

Fresa torica a 4 taglienti
4 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (L ₁)	Effective Length (L ₂)	Shank Diameter (d)	Overall length (L)
4KRRR-015-R02-060-445	1,5	R0.2	2,3	6	4	45
4KRRR-015-R02-080-445	1,5	R0.2	2,3	8	4	45
4KRRR-015-R02-100-445	1,5	R0.2	2,3	10	4	45
4KRRR-015-R02-120-445	1,5	R0.2	2,3	12	4	45
4KRRR-015-R02-160-450	1,5	R0.2	2,3	16	4	50
4KRRR-020-R01-040-445	2	R0.1	3	4	4	45
4KRRR-020-R01-060-445	2	R0.1	3	6	4	45
4KRRR-020-R01-080-445	2	R0.1	3	8	4	45
4KRRR-020-R01-100-445	2	R0.1	3	10	4	45
4KRRR-020-R01-120-445	2	R0.1	3	12	4	45
4KRRR-020-R02-040-445	2	R0.2	3	4	4	45
4KRRR-020-R02-060-445	2	R0.2	3	6	4	45
4KRRR-020-R02-080-445	2	R0.2	3	8	4	45
4KRRR-020-R02-100-445	2	R0.2	3	10	4	45
4KRRR-020-R02-120-445	2	R0.2	3	12	4	45
4KRRR-020-R02-160-450	2	R0.2	3	16	4	50
4KRRR-020-R03-060-445	2	R0.3	3	6	4	45
4KRRR-020-R03-080-445	2	R0.3	3	8	4	45
4KRRR-020-R03-100-445	2	R0.3	3	10	4	45
4KRRR-020-R03-120-445	2	R0.3	3	12	4	45
4KRRR-020-R05-040-445	2	R0.5	3	4	4	45
4KRRR-020-R05-060-445	2	R0.5	3	6	4	45
4KRRR-020-R05-080-445	2	R0.5	3	8	4	45
4KRRR-020-R05-100-445	2	R0.5	3	10	4	45
4KRRR-020-R05-120-445	2	R0.5	3	12	4	45
4KRRR-030-R01-100-450	3	R0.1	4,5	10	4	50
4KRRR-030-R01-120-650	3	R0.1	4,5	12	6	50
4KRRR-030-R02-100-350	3	R0.2	4,5	10	3	50
4KRRR-030-R02-100-450	3	R0.2	4,5	10	4	50
4KRRR-030-R02-080-650	3	R0.2	4,5	8	6	50
4KRRR-030-R02-100-650	3	R0.2	4,5	10	6	50
4KRRR-030-R02-120-650	3	R0.2	4,5	12	6	50
4KRRR-030-R02-160-660	3	R0.2	4,5	16	6	60
4KRRR-030-R02-200-660	3	R0.2	4,5	20	6	60
4KRRR-030-R03-100-350	3	R0.3	4,5	10	3	50
4KRRR-030-R03-100-450	3	R0.3	4,5	10	4	50

4KRRR

Fresa torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (L ₁)	Effective Length (L ₂)	Shank Diameter (d)	Overall length (L)
4KRRR-030-R03-080-650	3	R0.3	4,5	8	6	50
4KRRR-030-R03-100-650	3	R0.3	4,5	10	6	50
4KRRR-030-R03-120-650	3	R0.3	4,5	12	6	50
4KRRR-030-R03-160-660	3	R0.3	4,5	16	6	60
4KRRR-030-R03-200-660	3	R0.3	4,5	20	6	60
4KRRR-030-R05-100-350	3	R0.5	4,5	10	3	50
4KRRR-030-R05-100-450	3	R0.5	4,5	10	4	50
4KRRR-030-R05-080-650	3	R0.5	4,5	8	6	50
4KRRR-030-R05-100-650	3	R0.5	4,5	10	6	50
4KRRR-030-R05-120-650	3	R0.5	4,5	12	6	50
4KRRR-030-R05-160-660	3	R0.5	4,5	16	6	60
4KRRR-030-R05-200-660	3	R0.5	4,5	20	6	60
4KRRR-030-R10-100-350	3	R1.0	4,5	10	3	50
4KRRR-030-R10-100-450	3	R1.0	4,5	10	4	50
4KRRR-030-R10-080-650	3	R1.0	4,5	8	6	50
4KRRR-030-R10-100-650	3	R1.0	4,5	10	6	50
4KRRR-030-R10-120-650	3	R1.0	4,5	12	6	50
4KRRR-030-R10-160-660	3	R1.0	4,5	16	6	60
4KRRR-030-R10-200-660	3	R1.0	4,5	20	6	60
4KRRR-040-R01-120-450	4	R0.1	6	12	4	50
4KRRR-040-R02-120-450	4	R0.2	6	12	4	50
4KRRR-040-R02-100-650	4	R0.2	6	10	6	50
4KRRR-040-R02-120-650	4	R0.2	6	12	6	50
4KRRR-040-R02-160-660	4	R0.2	6	16	6	60
4KRRR-040-R02-200-660	4	R0.2	6	20	6	60
4KRRR-040-R02-250-665	4	R0.2	6	25	6	65
4KRRR-040-R02-300-670	4	R0.2	6	30	6	70
4KRRR-040-R03-120-450	4	R0.3	6	12	4	50
4KRRR-040-R03-100-650	4	R0.3	6	10	6	50
4KRRR-040-R03-120-650	4	R0.3	6	12	6	50
4KRRR-040-R03-160-660	4	R0.3	6	16	6	60
4KRRR-040-R03-200-660	4	R0.3	6	20	6	60
4KRRR-040-R05-120-450	4	R0.5	6	12	4	50
4KRRR-040-R05-160-450	4	R0.5	6	16	4	50
4KRRR-040-R05-160-4A0	4	R0.5	6	16	4	100
4KRRR-040-R05-100-650	4	R0.5	6	10	6	50

4KRRR

Fresa torica a 4 taglienti
4 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (L ₁)	Effective Length (L ₂)	Shank Diameter (d)	Overall length (L)
4KRRR-040-R05-120-650	4	R0.5	6	12	6	50
4KRRR-040-R05-160-660	4	R0.5	6	16	6	60
4KRRR-040-R05-200-660	4	R0.5	6	20	6	60
4KRRR-040-R05-250-665	4	R0.5	6	25	6	65
4KRRR-040-R05-300-670	4	R0.5	6	30	6	70
4KRRR-040-R10-120-450	4	R1.0	6	12	4	50
4KRRR-050-R05-180-660	5	R0.5	7,5	18	6	60
4KRRR-060-R01-200-660	6	R0.1	9	20	6	60
4KRRR-060-R02-200-660	6	R0.2	9	20	6	60
4KRRR-060-R02-200-675	6	R0.2	9	20	6	75
4KRRR-060-R02-200-6A0	6	R0.2	9	20	6	100
4KRRR-060-R03-200-660	6	R0.3	9	20	6	60
4KRRR-060-R03-200-675	6	R0.3	9	20	6	75
4KRRR-060-R03-200-6A0	6	R0.3	9	20	6	100
4KRRR-060-R05-200-660	6	R0.5	9	20	6	60
4KRRR-060-R05-200-675	6	R0.5	9	20	6	75
4KRRR-060-R05-200-6A0	6	R0.5	9	20	6	100
4KRRR-060-R10-200-660	6	R1.0	9	20	6	60
4KRRR-060-R10-200-675	6	R1.0	9	20	6	75
4KRRR-060-R10-200-6A0	6	R1.0	9	20	6	100
4KRRR-080-R01-240-865	8	R0.1	12	24	8	65
4KRRR-080-R02-240-865	8	R0.2	12	24	8	65
4KRRR-080-R02-240-875	8	R0.2	12	24	8	75
4KRRR-080-R02-240-8A0	8	R0.2	12	24	8	100
4KRRR-080-R03-240-865	8	R0.3	12	24	8	65
4KRRR-080-R03-240-875	8	R0.3	12	24	8	75
4KRRR-080-R03-240-8A0	8	R0.3	12	24	8	100
4KRRR-080-R05-240-865	8	R0.5	12	24	8	65
4KRRR-080-R05-240-875	8	R0.5	12	24	8	75
4KRRR-080-R05-240-8A0	8	R0.5	12	24	8	100
4KRRR-080-R10-240-865	8	R1.0	12	24	8	65
4KRRR-080-R10-240-875	8	R1.0	12	24	8	75
4KRRR-080-R10-240-8A0	8	R1.0	12	24	8	100
4KRRR-100-R02-300-A75	10	R0.2	15	30	10	75
4KRRR-100-R02-300-AA0	10	R0.2	15	30	10	100
4KRRR-100-R05-300-A75	10	R0.5	15	30	10	75

4KRRR

Fresa torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



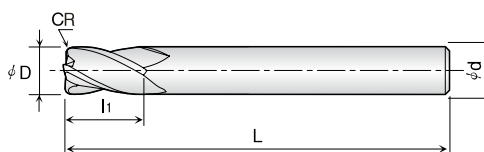
CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Outside Diameter (D)</i>	<i>Corner Radius (CR)</i>	<i>Effective Length (l₁)</i>	<i>Effective Length (l₂)</i>	<i>Shank Diameter (d)</i>	<i>Overall length (L)</i>
4KRRR-100-R05-300-AA0	10	R0.5	15	30	10	100
4KRRR-100-R10-300-A75	10	R1.0	15	30	10	75
4KRRR-100-R10-300-AA0	10	R1.0	15	30	10	100
4KRRR-100-R10-300-AF0	10	R1.0	15	30	10	150
4KRRR-120-R05-300-C80	12	R0.5	18	30	12	80
4KRRR-120-R05-300-CB0	12	R0.5	18	30	12	110
4KRRR-120-R05-300-CF0	12	R0.5	18	30	12	150
4KRRR-120-R10-300-C80	12	R1.0	18	30	12	80
4KRRR-120-R10-300-CB0	12	R1.0	18	30	12	110
4KRRR-120-R10-300-CF0	12	R1.0	18	30	12	150

4KRCR

Fresa torica a 4 taglienti
4 Flutes Corner Radius End Mills



- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μm
- 2 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,1-5	0 - 0,010	R0,02-R0,5	$\pm 0,005$
6-12	0 - 0,015	R1 - R1,5	$\pm 0,010$
		R2 - R3	$\pm 0,015$

CODICE	Diametro di testa (D)	Raggio torico (CR)	Lunghezza elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Corner Radius (CR)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
4KRCR-010-R01-025-445	1	R0.1	2.5	4	45
4KRCR-010-R02-025-445	1	R0.2	2.5	4	45
4KRCR-010-R03-025-445	1	R0.3	2.5	4	45
4KRCR-015-R01-040-445	1,5	R0.1	4	4	45
4KRCR-015-R02-040-445	1,5	R0.2	4	4	45
4KRCR-015-R03-040-445	1,5	R0.3	4	4	45
4KRCR-015-R05-040-445	1,5	R0.5	4	4	45
4KRCR-020-R01-060-445	2	R0.1	6	4	45
4KRCR-020-R02-060-445	2	R0.2	6	4	45
4KRCR-020-R03-060-445	2	R0.3	6	4	45
4KRCR-020-R05-060-445	2	R0.5	6	4	45
4KRCR-025-R01-060-450	2,5	R0.1	6	4	50
4KRCR-025-R02-060-450	2,5	R0.2	6	4	50
4KRCR-025-R03-060-450	2,5	R0.3	6	4	50
4KRCR-025-R05-060-450	2,5	R0.5	6	4	50
4KRCR-030-R01-080-660	3	R0.1	8	6	60
4KRCR-030-R02-080-660	3	R0.2	8	6	60
4KRCR-030-R03-080-660	3	R0.3	8	6	60
4KRCR-030-R05-080-660	3	R0.5	8	6	60
4KRCR-040-R01-100-670	4	R0.1	10	6	70
4KRCR-040-R02-100-670	4	R0.2	10	6	70
4KRCR-040-R03-100-670	4	R0.3	10	6	70
4KRCR-040-R05-100-670	4	R0.5	10	6	70
4KRCR-040-R10-100-670	4	R1.0	10	6	70
4KRCR-050-R01-130-675	5	R0.1	13	6	75

4KRCR

Fresa torica a 4 taglienti
 4 Flutes Corner Radius End Mills

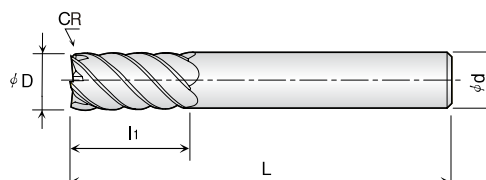


CODICE	Diametro di testa (D)	Raggio torico (CR)	Lunghezza elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
4KRCR-050-R02-130-675	5	R0.2	13	6	75
4KRCR-050-R03-130-675	5	R0.3	13	6	75
4KRCR-050-R05-130-675	5	R0.5	13	6	75
4KRCR-050-R10-130-675	5	R1.0	13	6	75
4KRCR-060-R01-130-690	6	R0.1	13	6	90
4KRCR-060-R02-130-690	6	R0.2	13	6	90
4KRCR-060-R03-130-690	6	R0.3	13	6	90
4KRCR-060-R05-130-690	6	R0.5	13	6	90
4KRCR-060-R10-130-690	6	R1.0	13	6	90
4KRCR-080-R01-190-8A0	8	R0.1	19	8	100
4KRCR-080-R02-190-8A0	8	R0.2	19	8	100
4KRCR-080-R03-190-8A0	8	R0.3	19	8	100
4KRCR-080-R05-190-8A0	8	R0.5	19	8	100
4KRCR-080-R10-190-8A0	8	R1.0	19	8	100
4KRCR-080-R20-190-8A0	8	R2.0	19	8	100
4KRCR-100-R02-220-AA0	10	R0.2	22	10	100
4KRCR-100-R03-220-AA0	10	R0.3	22	10	100
4KRCR-100-R05-220-AA0	10	R0.5	22	10	100
4KRCR-100-R10-220-AA0	10	R1.0	22	10	100
4KRCR-100-R20-220-AA0	10	R2.0	22	10	100
4KRCR-120-R02-260-CB0	12	R0.2	26	12	110
4KRCR-120-R03-260-CB0	12	R0.3	26	12	110
4KRCR-120-R05-260-CB0	12	R0.5	26	12	110
4KRCR-120-R10-260-CB0	12	R1.0	26	12	110
4KRCR-120-R20-260-CB0	12	R2.0	26	12	110

6KRCR

Fresa torica a 6 taglienti 45°
 6 Flutes 45° Corner Radius End Mills

- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μm
- 2 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,1-5	0 -0,010	R0,02-R0,5	$\pm 0,005$
6-12	0 -0,015	R1 - R1,5	$\pm 0,010$
		R2 - R3	$\pm 0,015$

CODICE	Diametro di testa (D)	Raggio torico (CR)	Lunghezza elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Corner radius (CR)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
6KRCR-030-R05-080-650	3	R0.5	8	6	50
6KRCR-040-R05-100-650	4	R0.5	10	6	50
6KRCR-060-R05-130-650	6	R0.5	13	6	50
6KRCR-080-R05-190-865	8	R0.5	19	8	65
6KRCR-100-R05-220-A70	10	R0.5	22	10	70
6KRCR-120-R05-260-C80	12	R0.5	26	12	80

2KERR

Fresa piana a 2 taglienti
2 Flute Rib Flat End Mills



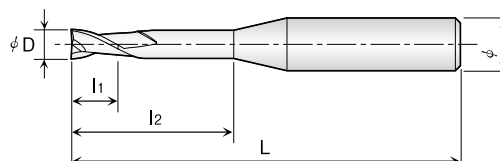
- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μm
- 2 μm ultra-micro grain

R

2

OD

30°

PAGE
No. 235

Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,1-5	0-0,010
6-12	0-0,015

CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KERR-001-003-445	0,1	0,15	0,3	4	45
2KERR-001-005-445	0,1	0,15	0,5	4	45
2KERR-002-005-445	0,2	0,3	0,5	4	45
2KERR-002-010-445	0,2	0,3	1	4	45
2KERR-002-020-445	0,2	0,3	2	4	45
2KERR-003-005-445	0,3	0,45	0,5	4	45
2KERR-003-010-445	0,3	0,45	1	4	45
2KERR-003-015-445	0,3	0,45	1,5	4	45
2KERR-003-020-445	0,3	0,45	2	4	45
2KERR-003-025-445	0,3	0,45	2,5	4	45
2KERR-003-030-445	0,3	0,45	3	4	45
2KERR-004-010-445	0,4	0,6	1	4	45
2KERR-004-015-445	0,4	0,6	1,5	4	45
2KERR-004-020-445	0,4	0,6	2	4	45
2KERR-004-025-445	0,4	0,6	2,5	4	45
2KERR-004-030-445	0,4	0,6	3	4	45
2KERR-004-035-445	0,4	0,6	3,5	4	45
2KERR-004-040-445	0,4	0,6	4	4	45
2KERR-005-010-445	0,5	0,7	1	4	45
2KERR-005-020-445	0,5	0,7	2	4	45
2KERR-005-030-445	0,5	0,7	3	4	45
2KERR-005-040-445	0,5	0,7	4	4	45
2KERR-005-050-445	0,5	0,7	5	4	45
2KERR-005-060-445	0,5	0,7	6	4	45
2KERR-005-080-445	0,5	0,7	8	4	45

2KERR

Fresa piana a 2 taglienti
 2 Flute Rib Flat End Mills



CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KERR-006-020-445	0,6	0,9	2	4	45
2KERR-006-030-445	0,6	0,9	3	4	45
2KERR-006-040-445	0,6	0,9	4	4	45
2KERR-006-050-445	0,6	0,9	5	4	45
2KERR-006-060-445	0,6	0,9	6	4	45
2KERR-006-080-445	0,6	0,9	8	4	45
2KERR-006-100-445	0,6	0,9	10	4	45
2KERR-007-020-445	0,7	1	2	4	45
2KERR-007-040-445	0,7	1	4	4	45
2KERR-007-060-445	0,7	1	6	4	45
2KERR-007-080-445	0,7	1	8	4	45
2KERR-007-100-445	0,7	1	10	4	45
2KERR-007-120-445	0,7	1	12	4	45
2KERR-008-020-445	0,8	1,2	2	4	45
2KERR-008-030-445	0,8	1,2	3	4	45
2KERR-008-040-445	0,8	1,2	4	4	45
2KERR-008-050-445	0,8	1,2	5	4	45
2KERR-008-060-445	0,8	1,2	6	4	45
2KERR-008-080-445	0,8	1,2	8	4	45
2KERR-008-100-445	0,8	1,2	10	4	45
2KERR-008-120-445	0,8	1,2	12	4	45
2KERR-009-060-445	0,9	1,3	6	4	45
2KERR-009-080-445	0,9	1,3	8	4	45
2KERR-009-100-445	0,9	1,3	10	4	45

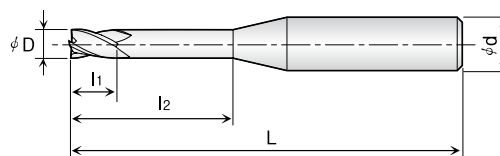


4KERR

Fresa piana 4 taglienti
4 Flute Rib Flat End Mills



- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μm
- *2 μm ultra-micro grain*



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,1-5	0-0,010
6-12	0-0,015

CODICE	Diametro di testa (D)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Length of cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
4KERR-010-030-445	1	1,5	3	4	45
4KERR-010-040-445	1	1,5	4	4	45
4KERR-010-060-445	1	1,5	6	4	45
4KERR-010-080-445	1	1,5	8	4	45
4KERR-010-100-445	1	1,5	10	4	45
4KERR-015-040-445	1,5	2,3	4	4	45
4KERR-015-060-445	1,5	2,3	6	4	45
4KERR-015-080-445	1,5	2,3	8	4	45
4KERR-015-100-445	1,5	2,3	10	4	45
4KERR-015-120-445	1,5	2,3	12	4	45
4KERR-015-160-450	1,5	2,3	16	4	50
4KERR-020-060-445	2	3	6	4	45
4KERR-020-080-445	2	3	8	4	45
4KERR-020-100-445	2	3	10	4	45
4KERR-020-120-445	2	3	12	4	45
4KERR-020-160-450	2	3	16	4	50
4KERR-020-200-450	2	3	20	4	50
4KERR-030-080-650	3	4,5	8	6	50
4KERR-030-100-650	3	4,5	10	6	50
4KERR-030-120-650	3	4,5	12	6	50
4KERR-030-160-660	3	4,5	16	6	60
4KERR-030-200-660	3	4,5	20	6	60
4KERR-040-100-650	4	6	10	6	50
4KERR-040-120-650	4	6	12	6	50
4KERR-040-160-660	4	6	16	6	60

4KERR

Fresa piana 4 taglienti
4 Flute Rib Flat End Mills



CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Diameter (D)</i>	<i>Lenght of cut (l₁)</i>	<i>Effective Lenght (l₂)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
4KERR-040-200-660	4	6	20	6	60
4KERR-040-250-665	4	6	25	6	65
4KERR-050-160-660	5	8	16	6	60
4KERR-050-300-670	5	8	30	6	70
4KERR-060-150-660	6	9	15	6	60
4KERR-060-200-660	6	9	20	6	60
4KERR-060-300-670	6	9	30	6	70
4KERR-080-200-865	8	12	20	8	65
4KERR-080-300-880	8	12	30	8	80
4KERR-080-400-8A0	8	12	40	8	100
4KERR-100-250-A70	10	15	25	10	70
4KERR-100-350-AA0	10	15	35	10	100
4KERR-100-450-AA0	10	15	45	10	100
4KERR-120-300-C80	12	18	30	12	80
4KERR-120-400-CB0	12	18	40	12	110
4KERR-120-500-CB0	12	18	50	12	110

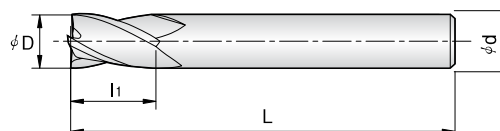


4KEPR

Fresa piana a 4 taglienti
4 Flute Rib Flat End Mills



- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μm
- 2 μm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,1 - 5	0-0,010
6-12	0-0,015

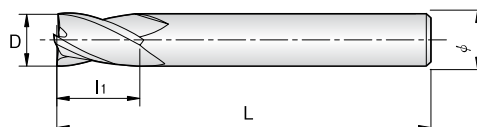
CODICE	Diametro di testa (D)	Lunghezza Elica (l1)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
4KEPR-010-025-445	1	2,5	4	45
4KEPR-012-040-445	1,2	4	4	45
4KEPR-015-040-445	1,5	4	4	45
4KEPR-020-060-445	2	6	4	45
4KEPR-025-080-445	2,5	8	4	45
4KEPR-030-100-450	3	10	4	50
4KEPR-035-100-650	3,5	10	6	50
4KEPR-040-120-450	4	12	4	50
4KEPR-050-150-650	5	15	6	50
4KEPR-060-150-650	6	15	6	50
4KEPR-060-150-675	6	15	6	75
4KEPR-070-200-865	7	20	8	65
4KEPR-080-200-865	8	20	8	65
4KEPR-080-200-875	8	20	8	75
4KEPR-100-250-A70	10	25	10	70
4KEPR-100-250-A75	10	25	10	75
4KEPR-120-300-C80	12	30	12	80

4KELR

Fresa piana a 4 taglienti
4 Flute Rib Flat End Mills



- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μm
- *2 μm ultra-micro grain*



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,1 - 5	0-0,010
6 - 12	0-0,015

CODICE	Diametro di testa (D)	Lunghezza Elica (l1)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Length of cut (l1)	Shank diameter (d)	Overall length (L)
4KELR-080-300-8A0	8	30	8	100
4KELR-100-350-AA0	10	35	10	100
4KELR-120-400-CA0	12	40	12	100

2KBTR

Fresa sferica a 2 taglienti rastremata conica
2 Flute Taper Neck Ball End Mills

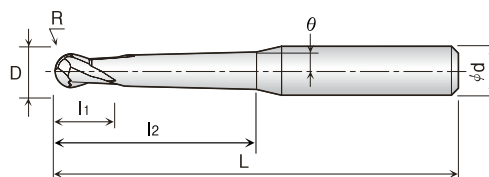
- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μ m
- *2 μ m ultra-micro grain*

R

2

R

30°

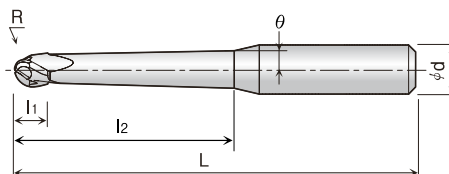
PAGE
No. 230

		Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza		
		Size (D)	Tolerance (D)	Size R	Tolerance		
		0,1-5	0 -0,010	R0,05-R2,5	±0,005		
		6-12	0 -0,015	R3-R6	±0,010		
CODICE	Raggio di testa (R)	Gradi Parziali (Ø)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)	
Model Nr.	Radius of ball Nose (R)	Angle (Ø)	Length of cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)	
2KBTR-010-010-460	R0.5	Gradi a richiesta del cliente <i>Angle Custom Order</i>	1	Lunghezza effettiva a richiesta del cliente <i>Effective Length Custom Order</i>	4	60	
2KBTR-010-010-480	R0.5		1		4	80	
2KBTR-010-010-690	R0.5		1		6	90	
2KBTR-015-015-460	R0.75		1,5		4	60	
2KBTR-015-015-480	R0.75		1,5		4	80	
2KBTR-015-015-690	R0.75		1,5		6	90	
2KBTR-020-020-470	R1.0		2		4	70	
2KBTR-020-020-490	R1.0		2		4	90	
2KBTR-020-020-690	R1.0		2		6	90	
2KBTR-030-030-680	R1.5		3		6	80	
2KBTR-030-030-6A0	R1.5		3		6	100	
2KBTR-030-030-8B0	R1.5		3		8	110	
2KBTR-040-040-680	R2.0		4		6	80	
2KBTR-040-040-6B0	R2.0		4		6	110	
2KBTR-040-040-8B0	R2.0		4		8	110	
2KBTR-050-050-890	R2.5		5		8	90	
2KBTR-050-050-8B0	R2.5		5		8	110	
2KBTR-060-060-8B0	R3.0		6		8	110	
2KBTR-060-060-AF0	R3.0		6		10	150	
2KBTR-080-080-AB0	R4.0		8		10	110	
2KBTR-080-080-CG0	R4.0		8		12	160	
2KBTR-100-100-CB0	R5.0		10		12	110	
2KBTR-100-100-CG0	R5.0		10		12	160	
2KBTR-120-120-GG0	R6.0		12		16	160	

3KBTR

Fresa sferica a 3 taglienti rastremata conica
3 Flute Taper Neck Ball End Mills

- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 μm
- 2 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,1-5	0 -0,010	R0,05-R2,5	$\pm 0,005$
6-12	0 -0,015	R3-R6	$\pm 0,010$

CODICE	Raggio di testa (R)	Gradi Parziali ($\emptyset$)	Lunghezza Elica (l_1)	Lunghezza effettiva (l_2)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Angle ($\emptyset$)	Length of cut (l_1)	Effective Length (l_2)	Shank diameter (d)	Overall length (L)
3KBTR-010-010-460	R0.5	Gradi a richiesta del cliente	1	Lunghezza effettiva a richiesta del cliente	4	60
3KBTR-010-010-480	R0.5		1		4	80
3KBTR-010-010-690	R0.5		1		6	90
3KBTR-015-015-460	R0.75		1,5		4	60
3KBTR-015-015-480	R0.75		1,5		4	80
3KBTR-015-015-690	R0.75		1,5		6	90
3KBTR-020-020-470	R1.0		2		4	70
3KBTR-020-020-490	R1.0		2		4	90
3KBTR-020-020-690	R1.0		2		6	90
3KBTR-030-030-680	R1.5		3		6	80
3KBTR-030-030-6A0	R1.5	Angle Custom Order	3	Effective Length Custom Order	6	100
3KBTR-030-030-8B0	R1.5		3		8	110
3KBTR-040-040-680	R2.0		4		6	80
3KBTR-040-040-6B0	R2.0		4		6	110
3KBTR-040-040-8B0	R2.0		4		8	110
3KBTR-050-050-890	R2.5		5		8	90
3KBTR-050-050-8B0	R2.5		5		8	110
3KBTR-060-060-8B0	R3.0		6		8	110
3KBTR-060-060-AF0	R3.0		6		10	150
3KBTR-080-080-AB0	R4.0		8		10	110
3KBTR-080-080-CG0	R4.0		8		12	160
3KBTR-100-100-CB0	R5.0		10		12	110
3KBTR-100-100-CG0	R5.0		10		12	160
3KBTR-120-120-GG0	R6.0		12		16	160

2KRTR

Fresa torica a 2 taglienti rastremata conica
2 Flute Taper Neck Corner Radius End Mills

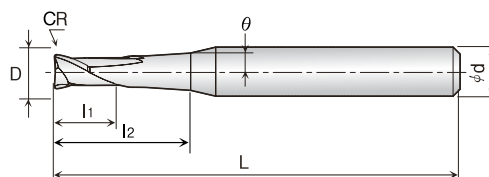
- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 µm
- *2 µm ultra-micro grain*

R

2

CR

30°

PAGE
No. 238

Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,1-5	0 -0,010	R0,05-R2,5	±0,005
6 - 12	0 -0,015	R3-R6	±0,010

CODICE	Diametro di testa (D)	Gradi Parziali (Ø)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Angle (Ø)	Corner Radius (CR)	Lenght of cut (L ₁)	Effective Lenght (L ₂)	Shank diameter (d)	Overall lenght (L)
2KRTR-010-R01-010-460	1	Lunghezza effettiva a richiesta del cliente <i>Effective Lenght Custom Order</i>	R0.1	1	Lunghezza effettiva a richiesta del cliente <i>Effective Lenght Custom Order</i>	4	60
2KRTR-010-R01-010-480	1		R0.1	1		4	80
2KRTR-010-R01-010-680	1		R0.1	1		6	80
2KRTR-010-R02-010-460	1		R0.2	1		4	60
2KRTR-010-R02-010-480	1		R0.2	1		4	80
2KRTR-010-R02-010-680	1		R0.2	1		6	80
2KRTR-010-R03-010-460	1		R0.3	1		4	60
2KRTR-010-R03-010-480	1		R0.3	1		4	80
2KRTR-010-R03-010-680	1		R0.3	1		6	80
2KRTR-015-R02-015-460	1,5		R0.2	1,5		4	60
2KRTR-015-R02-015-480	1,5		R0.2	1,5		4	80
2KRTR-015-R02-015-680	1,5		R0.2	1,5		6	80
2KRTR-015-R03-015-460	1,5		R0.3	1,5		4	60
2KRTR-015-R03-015-480	1,5		R0.3	1,5		4	80
2KRTR-015-R03-015-680	1,5		R0.3	1,5		6	80
2KRTR-015-R05-015-460	1,5		R0.5	1,5		4	60
2KRTR-015-R05-015-480	1,5		R0.5	1,5		4	80
2KRTR-015-R05-015-680	1,5		R0.5	1,5		6	80
2KRTR-020-R02-020-470	2		R0.2	2		4	70
2KRTR-020-R02-020-480	2		R0.2	2		4	80
2KRTR-020-R02-020-680	2		R0.2	2		6	80
2KRTR-020-R03-015-460	2		R0.3	1,5		4	60
2KRTR-020-R03-015-480	2		R0.3	1,5		4	80
2KRTR-020-R03-015-680	2		R0.3	1,5		6	80

2KRTR

Fresa torica a 2 taglienti
rastremata conica
*2 Flute Taper Neck Corner
Radius End Mills*



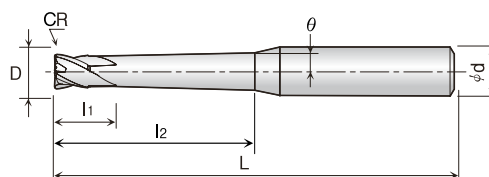
CODICE	Diametro di testa (D)	Gradi Parziali (Ø)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Outside Diameter (D)</i>	<i>Angle (Ø)</i>	<i>Corner Radius (CR)</i>	<i>Lenght of cut (l₁)</i>	<i>Effective Lenght (l₂)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
2KRTR-020-R05-020-470	2	Lunghezza effettiva a richiesta del cliente <i>Effective Lenght Custom Order</i>	R0.5	2	Lunghezza effettiva a richiesta del cliente <i>Effective Lenght Custom Order</i>	4	70
2KRTR-020-R05-020-480	2		R0.5	2		4	80
2KRTR-020-R05-020-680	2		R0.5	2		6	80
2KRTR-030-R02-030-680	3		R0.2	3		6	80
2KRTR-030-R02-030-6A0	3		R0.2	3		6	100
2KRTR-030-R03-030-680	3		R0.3	3		6	80
2KRTR-030-R03-030-6A0	3		R0.3	3		6	100
2KRTR-030-R05-030-680	3		R0.5	3		6	80
2KRTR-030-R05-030-6A0	3		R0.5	3		6	100
2KRTR-040-R02-040-680	4		R0.2	4		6	80
2KRTR-040-R02-040-6A0	4		R0.2	4		6	100
2KRTR-040-R03-040-680	4		R0.3	4		6	80
2KRTR-040-R03-040-6A0	4		R0.3	4		6	100
2KRTR-040-R05-040-680	4		R0.5	4		6	80
2KRTR-040-R05-040-6A0	4		R0.5	4		6	100
2KRTR-040-R10-040-680	4		R1	4		6	80
2KRTR-040-R10-040-6A0	4		R1	4		6	100



4KRTR

Fresa torica a 4 taglienti rastremata conica
4 Flute Taper Neck Corner Radius End Mills

- Acciai temprati HRC 52-72
- *Hardened steels HRC 52-72*
- Ultramicrograna 2 µm
- *2 µm ultra-micro grain*



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,1-5	0 -0,010	R0,05-R2,5	±0,005
6 - 12	0 -0,015	R3-R6	±0,010

CODICE	Diametro di testa (D)	Gradi Parziali (Ø)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Angle (Ø)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
4KRTR-010-R01-010-460	1	Lunghezza effettiva a richiesta del cliente <i>Effective Length Custom Order</i>	R0.1	1	Lunghezza effettiva a richiesta del cliente <i>Effective Length Custom Order</i>	4	60
4KRTR-010-R01-010-480	1		R0.1	1		4	80
4KRTR-010-R01-010-680	1		R0.1	1		6	80
4KRTR-010-R02-010-460	1		R0.2	1		4	60
4KRTR-010-R02-010-480	1		R0.2	1		4	80
4KRTR-010-R02-010-680	1		R0.2	1		6	80
4KRTR-015-R02-015-460	1,5		R0.2	1,5		4	60
4KRTR-015-R02-015-480	1,5		R0.2	1,5		4	80
4KRTR-015-R02-015-680	1,5		R0.2	1,5		6	80
4KRTR-015-R03-015-460	1,5		R0.3	1,5		4	60
4KRTR-015-R03-015-480	1,5		R0.3	1,5		4	80
4KRTR-015-R03-015-680	1,5		R0.3	1,5		6	80
4KRTR-015-R05-015-460	1,5		R0.5	1,5		4	60
4KRTR-015-R05-015-480	1,5		R0.5	1,5		4	80
4KRTR-015-R05-015-680	1,5		R0.5	1,5		6	80
4KRTR-020-R02-020-470	2		R0.2	2		4	70
4KRTR-020-R02-020-480	2		R0.2	2		4	80
4KRTR-020-R02-020-680	2		R0.2	2		6	80
4KRTR-020-R05-020-470	2		R0.5	2		4	70
4KRTR-020-R05-020-480	2		R0.5	2		4	80
4KRTR-020-R05-020-680	2		R0.5	2		6	80
4KRTR-025-R03-025-470	2,5		R0.3	2,5		4	70
4KRTR-025-R03-025-480	2,5		R0.3	2,5		4	80
4KRTR-025-R03-025-680	2,5		R0.3	2,5		6	80

4KRTR

Fresa torica 4 taglienti
 rastremata conica
*4 Flute Taper Neck Corner
 Radius End Mills*



CODICE	Diametro di testa (D)	Gradi Parziali (Ø)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Outside Diameter (D)</i>	<i>Angle (Ø)</i>	<i>Corner Radius (CR)</i>	<i>Lenght of cut (l₁)</i>	<i>Effective Lenght (l₂)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
4KRTR-025-R05-025-470	2,5	Lunghezza effettiva a richiesta del cliente <i>Effective Lenght Custom Order</i>	R0.5	2,5	Lunghezza effettiva a richiesta del cliente <i>Effective Lenght Custom Order</i>	4	70
4KRTR-025-R05-025-480	2,5		R0.5	2,5		4	80
4KRTR-025-R05-025-680	2,5		R0.5	2,5		6	80
4KRTR-030-R03-030-680	3		R0.3	3		6	80
4KRTR-030-R03-030-6A0	3		R0.3	3		6	100
4KRTR-030-R05-030-680	3		R0.5	3		6	80
4KRTR-030-R05-030-6A0	3		R0.5	3		6	100
4KRTR-040-R03-040-680	4		R0.3	4		6	80
4KRTR-040-R03-040-6A0	4		R0.3	4		6	100
4KRTR-040-R05-040-680	4		R0.5	4		6	80
4KRTR-040-R05-040-6A0	4		R0.5	4		6	100

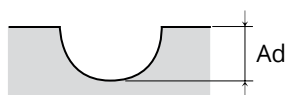


2KBRR & 2KBTR

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 55			HRC 55 ~ 60			HRC 60 ~ 65		
Raggio di Testa	Profondità di taglio Ad (mm)	Numero Giri (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero Giri (min)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero Giri (min)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)
R0.05	0.001~0.005	38,000~60,000	50~120	0.001~0.002	38,000~60,000	40~60	0.001~0.002	38,000~48,000	30~50
R0.1	0.001~0.008	38,000~60,000	200~350	0.001~0.003	38,000~60,000	200~280	0.001~0.003	30,000~38,500	150~240
R0.15	0.004~0.020	38,000~60,000	200~450	0.003~0.005	38,000~60,000	200~400	0.003~0.005	30,000~34,000	150~350
R0.2	0.005~0.020	30,000~50,000	250~500	0.003~0.007	30,000~45,000	200~500	0.003~0.007	25,000~27,000	160~400
R0.25	0.006~0.030	25,000~44,000	300~650	0.003~0.010	25,000~42,000	250~500	0.003~0.010	16,000~27,500	220~400
R0.3	0.006~0.050	22,000~40,000	300~1,300	0.003~0.015	22,000~40,000	250~800	0.003~0.015	16,000~26,700	210~380
R0.4	0.006~0.100	20,000~35,000	260~1,500	0.006~0.017	20,000~40,000	240~1,500	0.006~0.017	16,000~26,700	190~480
R0.5	0.010~0.200	20,000~35,000	500~1,800	0.007~0.020	20,000~38,000	300~2,400	0.007~0.020	16,000~26,70	230~420
R0.6	0.050~0.100	20,000~35,000	600~2,500	0.011~0.015	20,000~30,000	400~2,300	0.011~0.015	23,500~24,800	260~450
R0.75	0.050~0.200	18,000~30,000	600~2,800	0.010~0.025	18,000~30,000	550~2,500	0.010~0.025	18,000~19,800	200~400
R1.0	0.050~0.200	12,000~28,000	800~3,000	0.015~0.030	12,000~20,000	850~2,300	0.015~0.030	10,000~13,000	280~400
R1.5	0.050~0.200	10,000~22,000	1,100~3,000	0.020~0.045	10,000~20,000	900~2,900	0.020~0.045	8,000~10,500	380~550
R2.0	0.100~0.300	10,000~18,000	1,300~3,300	0.030~0.050	10,000~20,000	1,800~3,000	0.030~0.050	7,000~9,000	380~590
R2.5	0.100~0.300	9,000~15,000	1,500~3,700	0.025~0.045	8,000~18,000	1,300~3,800	0.025~0.045	6,500~8,500	450~1,000
R3.0	0.100~0.300	8,000~13,000	1,800~4,000	0.020~0.040	8,000~18,000	1,500~3,800	0.020~0.040	6,500~8,000	450~1,000
R4.0	0.150~0.350	8,000~10,000	2,000~4,000	0.015~0.030	6,000~10,000	1,800~3,700	0.015~0.030	4,500~6,300	800~1,500
R5.0	0.200~0.400	6,000~9,500	2,000~4,000	0.012~0.025	4,000~9,000	1,800~3,700	0.012~0.025	3,000~6,300	800~1,500
R6.0	0.300~0.500	5,000~8,000	2,000~4,000	0.010~0.020	3,000~8,000	1,800~3,700	0.010~0.020	2,500~5,800	800~1,500

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

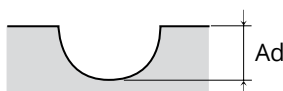
1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KBPR

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 55			HRC 55 ~ 60			HRC 60 ~ 65		
Raggio di Testa	Profondità di taglio Ad (mm)	Numero giri (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)
R0.05	0.003	60,000	150	0.002	60,000	100	0.001	52,500	30
R0.1	0.004	60,000	180	0.003	60,000	120	0.002	45,000	60
R0.15	0.005	45,000	310	0.004	43,500	180	0.003	32,500	90
R0.2	0.006	37,500	420	0.005	35,000	240	0.004	26,250	120
R0.25	0.007	33,000	530	0.006	30,000	300	0.005	22,500	150
R0.3	0.008	27,000	1,200	0.007	26,500	800	0.006	20,000	400
R0.4	0.100	24,000	1,600	0.009	23,500	1,000	0.008	17,500	500
R0.5	0.100	21,000	2,000	0.100	21,000	1,750	0.100	16,000	875
R0.75	0.150	17,000	2,000	0.100	18,000	1,750	0.100	14,500	875
R1.0	0.200	14,000	2,000	0.200	15,000	1,750	0.150	11,250	875
R1.25	0.200	12,250	1,100	0.200	12,250	1,800	0.150	9,200	900
R1.5	0.200	10,500	2,150	0.200	10,700	1,850	0.150	8,050	925
R2.0	0.250	9,000	2,200	0.200	9,200	1,900	0.150	6,900	950
R2.5	0.250	7,800	2,300	0.200	7,900	2,000	0.150	5,900	1,000
R3.0	0.300	6,500	2,500	0.250	6,800	2,100	0.150	5,100	1,050
R4.0	0.400	5,200	2,500	0.300	5,700	2,200	0.200	5,300	1,100
R5.0	0.500	4,300	2,200	0.400	4,500	1,900	0.300	3,400	950
R6.0	0.600	3,600	2,000	0.500	3,750	1,750	0.400	2,800	875
R6.5	0.600	3,600	1,750	0.500	3,150	1,500	0.400	2,350	750
R7.0	0.700	3,000	1,750	0.600	2,850	1,350	0.450	2,150	700
R8.0	0.700	2,500	1,500	0.600	2,300	1,200	0.450	1,800	650
R10.0	0.800	2,500	1,300	0.700	2,300	1,200	0.500	1,800	650

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

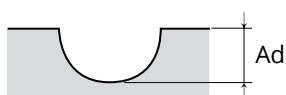
1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KBSR

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 55			HRC 55 ~ 60			HRC 60 ~ 65		
Raggio di Testa	Profondità di taglio Ad (mm)	Numero giri (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)
R0.05	0.002	60,000	150	0.002	60,000	150	0.001	52,500	30
R0.1	0.003	60,000	180	0.002	60,000	180	0.002	45,000	60
R0.15	0.006	60,000	350	0.004	45,00	310	0.003	32,500	90
R0.2	0.010	50,000	500	0.007	37,500	420	0.005	26,250	120
R0.25	0.015	44,000	650	0.010	33,000	550	0.007	22,500	150
R0.3	0.030	40,000	1,100	0.020	30,000	1,200	0.010	20,000	400
R0.4	0.060	35,000	1,600	0.040	27,000	1,600	0.020	17,500	500
R0.5	0.020	30,000	1,750	0.100	24,000	2,000	0.050	16,000	870
R0.6	0.025	30,000	2,000	0.120	21,000	2,000	0.050	14,500	870
R0.75	0.025	30,000	2,450	0.150	17,000	2,000	0.060	11,250	900
R1.0	0.300	28,000	2,900	0.150	14,000	2,100	0.080	9,200	930
R1.5	0.400	24,500	2,950	0.200	12,250	2,150	0.100	8,050	950
R2.0	0.500	21,000	3,000	0.250	10,500	2,200	0.120	6,900	1,000
R2.5	0.500	18,000	3,200	0.250	9,000	2,300	0.150	5,900	1,050
R3.0	0.600	15,600	3,500	0.300	7,800	2,500	0.150	5,000	1,100
R4.0	0.700	13,000	3,000	0.400	6,500	2,500	0.200	4,300	950
R5.0	0.800	9,500	2,500	0.500	5,200	2,200	0.250	3,400	875
R6.0	0.900	7,500	2,000	0.600	4,300	2,000	0.300	2,800	750

Profondità di taglio
 Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

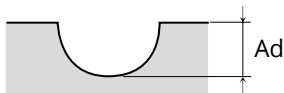
1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

3KBSR & 3KBTR

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 55			HRC 55 ~ 60			HRC 60 ~ 65		
Raggio di Testa	Profondità di taglio Ad (mm)	Numero giri (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)
R0.5	0.015	24,000	1,500	0.015	16,000	1,200	0.010	9,000	850
R1.0	0.250	14,000	2,100	0.250	9,200	1,800	0.060	8,500	900
R1.5	0.300	12,250	2,150	0.300	8,500	1,800	0.080	8,000	930
R2.0	0.400	10,500	2,200	0.400	6,900	2,000	0.090	6,500	950
R2.5	0.400	9,000	2,300	0.400	5,900	2,100	0.120	5,500	1,000
R3.0	0.450	7,800	2,500	0.450	5,000	2,300	0.120	5,000	1,050
R4.0	0.550	6,500	2,500	0.550	4,300	2,300	0.160	4,000	900
R5.0	0.650	5,200	2,200	0.650	3,400	2,300	0.200	3,000	850
R6.0	0.700	4,300	2,000	0.700	2,800	1,850	0.240	2,500	700

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

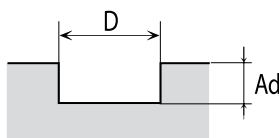
1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KRRR & 4KRRCR & 4KRTR

Fresatura in alta velocità
 High Speed Milling Condition

HRC	HRC < 55			HRC 55 ~ 60			HRC 60 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Numero giri (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)
1.0	0.003~0.030	25,000~30,500	630~670	0.002~0.040	12,000~25,000	300~430	0.002~0.040	10,000~20,000	200~270
1.2	0.007~0.050	25,000~28,500	650~730	0.003~0.040	10,000~25,000	300~460	0.003~0.040	9,000~20,000	200~290
1.5	0.010~0.030	23,000~24,500	680~780	0.005~0.040	9,000~23,000	400~490	0.005~0.040	8,000~20,000	200~300
2.0	0.015~0.050	20,000~22,500	720~800	0.010~0.050	7,000~20,000	400~520	0.010~0.050	6,000~18,000	200~320
3.0	0.020~0.060	16,000~16,500	720~800	0.015~0.070	5,000~16,000	400~520	0.015~0.070	5,000~15,000	200~320
4.0	0.025~0.080	14,000~13,800	750~830	0.025~0.070	4,500~14,000	400~540	0.025~0.070	4,000~10,000	200~335
5.0	0.040~0.100	12,000~13,300	820~950	0.030~0.080	3,500~12,000	400~580	0.030~0.080	3,000~8,000	250~370
6.0	0.040~0.120	12,000~11,900	800~900	0.030~0.080	3,500~12,000	400~560	0.030~0.080	3,000~8,000	250~350
8.0	0.050~0.120	10,000~10,200	780~850	0.040~0.100	4,500~10,000	350~520	0.040~0.100	2,500~7,000	300~330
10.0	0.060~0.120	8,000~9,100	710~790	0.040~0.100	4,000~8,000	300~480	0.040~0.100	2,000~5,000	300~310
12.0	0.070~0.180	7,000~8,500	710~790	0.050~0.120	3,500~7,000	300~480	0.050~0.120	2,000~4,000	300~300

Profondità di taglio
 Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

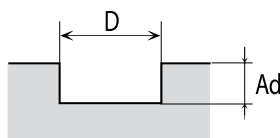
1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KERR

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 55			HRC 55 ~ 60			HRC 60 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Numero giri (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)
0.1	0.006	38,000~48,000	320~345	0.006	30,000~40,000	220~245	0.006	28,350~37,800	180~205
0.2	0.020	30,000~38,500	385~405	0.020	25,000~38,000	285~305	0.020	23,620~35,910	245~265
0.3	0.021	30,000~34,000	325~355	0.021	22,000~35,000	225~255	0.021	20,790~33,000	165~215
0.4	0.040	25,000~27,000	400~440	0.040	18,000~32,000	300~340	0.040	17,000~30,200	260~300
0.5	0.050	16,000~27,500	400~440	0.050	15,000~30,000	300~340	0.050	14,170~28,350	260~300
0.6	0.042	16,000~26,700	600~630	0.045	12,000~25,000	500~530	0.045	11,340~23,620	460~490
0.7	0.070	16,000~26,700	600~630	0.070	12,000~25,000	500~530	0.070	11,340~23,620	460~490
0.8	0.056	16,000~26,700	600~630	0.060	12,000~25,000	500~530	0.060	11,340~23,620	460~490
1.0	0.036	23,500~24,800	545~575	0.040	12,000~20,000	445~475	0.040	11,340~18,900	405~435
1.5	0.100	18,000~19,800	645~670	0.100	8,000~15,000	545~570	0.100	7,560~14,170	505~530
2.0	0.200	10,000~14,800	645~670	0.150	7,000~12,000	545~570	0.150	6,610~11,340	505~530
2.5	0.180	10,000~13,000	675~710	0.200	6,000~12,000	575~610	0.200	5,670~11,340	545~570
3.0	0.210	8,000~10,500	605~635	0.210	5,000~10,000	505~535	0.210	4,720~9,450	465~495
4.0	0.400	7,000~9,000	995~1150	0.370	4,000~9,000	695~750	0.370	3,780~8,500	655~710
5.0	0.090	6,500~8,500	985~1000	0.400	3,500~7,500	685~700	0.400	3,310~7,088	645~660
6.0	0.080	6,500~8,000	915~950	0.170	3,500~7,500	715~750	0.170	6,140~7,080	675~710
8.0	0.100	4,500~6,300	675~710	0.150	2,500~5,000	575~610	0.150	2,360~4,720	535~560
10.0	0.100	3,000~6,300	645~670	0.130	2,000~4,500	545~570	0.130	1,890~4,250	515~530
12.0	0.150	2,500~5,800	545~580	0.100	1,500~3,200	445~480	0.100	1,420~3,020	400~440

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

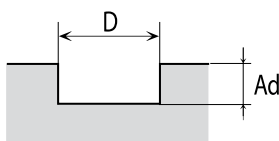


4KERR

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 55			HRC 55 ~ 60			HRC 60 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Numero giri (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min)	Feed (mm/min)
1.0	0.003~0.030	25,000~38,000	200~1,200	0.002~0.040	12,000~25,000	150~250	0.002~0.010	10,000~20,000	130~155
1.2	0.007~0.050	25,000~33,000	200~1,200	0.003~0.040	10,000~25,000	150~275	0.003~0.010	9,000~20,000	130~170
1.5	0.010~0.030	16,000~28,500	200~1,200	0.005~0.040	9,000~23,000	170~290	0.005~0.015	8,000~20,000	140~185
2.0	0.015~0.050	14,000~26,000	200~1,200	0.010~0.050	7,000~20,000	200~300	0.010~0.020	6,000~18,000	140~200
3.0	0.020~0.060	12,000~17,300	200~1,200	0.015~0.070	5,000~16,000	200~300	0.015~0.025	5,000~15,000	150~230
4.0	0.025~0.080	12,000~13,200	200~1,200	0.025~0.070	4,500~14,000	225~335	0.025~0.030	4,000~10,000	150~250
5.0	0.040~0.100	8,000~12,500	250~800	0.030~0.080	3,500~12,000	225~350	0.030~0.030	3,000~8,000	130~240
6.0	0.040~0.120	7,000~10,350	250~800	0.030~0.080	3,500~12,000	225~330	0.040~0.045	3,000~8,000	130~220
8.0	0.050~0.120	3,500~7,800	300~700	0.040~0.100	4,500~10,000	200~310	0.040~0.060	2,500~7,000	120~200
10.0	0.060~0.120	3,000~6,150	300~700	0.040~0.100	4,000~8,000	200~300	0.040~0.080	2,000~5,000	100~180
12.0	0.070~0.180	3,000~5,250	300~650	0.050~0.120	3,500~7,000	150~250	0.050~0.100	2,000~4,000	100~180

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

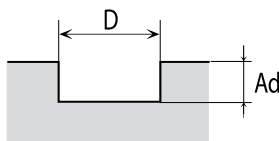
1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KEPR & 4KELR

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 55			HRC 55 ~ 60			HRC 60 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Numero giri (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
1.0	0.003~0.030	30,000~38,000	300~1,800	0.002~0.040	12,000~25,000	200~1,200	0.002~0.010	10,000~20,000	250~700
1.2	0.007~0.050	25,000~32,000	300~1,600	0.003~0.040	10,000~25,000	200~1,200	0.003~0.010	9,000~20,000	280~750
1.5	0.010~0.030	20,000~29,000	400~1,600	0.005~0.040	9,000~23,000	200~1,200	0.005~0.015	8,000~20,000	300~780
2.0	0.015~0.050	19,000~26,000	400~1,600	0.010~0.050	7,000~20,000	200~1,200	0.010~0.020	6,000~18,000	300~800
3.0	0.020~0.060	13,000~18,000	400~1,600	0.015~0.070	5,000~16,000	200~1,200	0.015~0.025	5,000~15,000	330~850
4.0	0.025~0.080	10,000~15,000	400~2,000	0.025~0.070	4,500~14,000	200~1,200	0.025~0.030	4,000~10,000	350~880
5.0	0.040~0.100	5,500~13,000	400~1,000	0.030~0.080	3,500~12,000	250~800	0.030~0.050	3,000~8,000	400~950
6.0	0.040~0.120	5,500~10,500	400~1,000	0.030~0.080	3,500~12,000	250~800	0.030~0.050	3,000~8,000	400~900
8.0	0.050~0.120	3,500~8,000	350~900	0.040~0.100	4,500~10,000	300~700	0.040~0.070	2,500~7,000	330~850
10.0	0.060~0.120	3,000~5,500	300~800	0.040~0.100	4,000~8,000	300~700	0.040~0.100	2,000~5,000	280~750
12.0	0.070~0.180	3,000~4,500	300~800	0.050~0.120	3,500~7,000	300~650	0.050~0.120	2,000~4,000	280~750

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

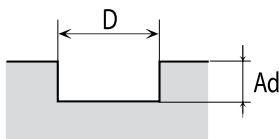
1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KRTR

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 55			HRC 55 ~ 60			HRC 60 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Numero giri (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Numero giri (min)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
0.1	0.002~0.005	38,000~50,000	40~60	0.002~0.005	32,000~42,000	40~60	0.001~0.004	32,000~42,000	40~60
0.2	0.002~0.005	30,000~50,000	60~100	0.002~0.005	32,000~42,000	60~80	0.001~0.005	32,000~42,000	40~65
0.3	0.005~0.007	30,000~48,000	60~120	0.003~0.006	30,000~36,000	60~100	0.003~0.012	30,000~32,000	40~70
0.4	0.005~0.010	30,000~38,000	80~150	0.003~0.008	28,000~35,000	80~120	0.003~0.011	28,000~30,000	50~85
0.5	0.005~0.020	32,000~40,000	80~150	0.005~0.010	20,000~25,000	80~150	0.003~0.011	20,000~23,000	60~90
0.6	0.006~0.030	32,000~40,000	100~200	0.006~0.020	12,000~25,000	100~180	0.003~0.015	12,000~20,000	60~90
0.8	0.008~0.030	23,000~30,000	250~300	0.008~0.025	12,000~25,000	200~250	0.006~0.021	12,000~18,000	70~100
1	0.010~0.050	14,000~25,000	250~35	0.005~0.050	10,000~20,000	250~300	0.007~0.025	12,000~15,000	70~100
1.5	0.015~0.090	14,000~25,000	300~350	0.005~0.06	8,000~18,000	300~320	0.011~0.020	8,000~13,000	80~100
2	0.020~0.120	9,000~18,000	300~365	0.010~0.050	8,000~16,000	250~280	0.010~0.030	8,000~12,000	80~110
3	0.030~0.150	5,000~17,500	350~380	0.010~0.080	6,000~10,000	265~300	0.015~0.035	6,000~10,000	85~110
4	0.030~0.200	5,000~10,000	350~385	0.025~0.200	4,000~10,000	300~320	0.020~0.050	4,000~8,000	90~110
5	0.100~0.200	5,000~8,500	380~420	0.100~0.200	4,000~10,000	320~330	0.050~0.090	4,000~7,500	90~105
6	0.100~0.200	4,000~8,000	400~420	0.100~0.200	4,000~8,000	330~350	0.030~0.160	4,000~7,200	80~95
8	0.100~0.200	3,500~6,900	400~425	0.100~0.200	3,500~6,500	330~360	0.030~0.160	3,500~6,300	40~70
10	0.100~0.200	3,000~4,100	380~415	0.100~0.200	3,000~5,000	320~335	0.080~0.200	3,000~4,500	50~85
12	0.100~0.200	1,800~3,500	380~410	0.100~0.200	2,300~3,000	325~335	0.080~0.250	2,300~3,000	60~90

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

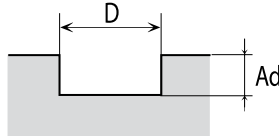
1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

6KRCR

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 55		HRC 55 ~ 60		HRC 60 ~ 65	
Diametro esterno	Numero giri (min ⁻¹)	Avanzamento (mm/min)	Numero giri (min)	Avanzamento (mm/min)	Numero giri (min)	Avanzamento (mm/min)
<i>Outside Diameter</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>
3.0	18,000	1,600	15,000	1,100	13,000	800
4.0	16,000	1,900	12,000	1,200	11,000	850
6.0	12,000	2,200	8,500	1,300	6,500	850
8.0	10,000	2,500	6,000	1,500	3,500	1,000
10.0	6,000	2,500	3,500	1,500	3,200	1,000
12.0	4,800	1,800	2,700	1,000	2,000	700

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



BEETLE SERIES

- Massima resistenza all'usura e vibrazioni ridotte al minimo
- Realizzato per lavorazioni di alta precisione con valori tolleranza bassi
- Progettato per il taglio ad alta velocità

- *Maximized the wear resistance & minimized chattering*
- *Optimized to high precision in machining by applying lower tolerance*
- *Designed for high speed cutting*

- *Maximale Verschleißfestigkeit und minimierte Vibrationen*
- *Gemacht für hochpräzise Bearbeitung mit geringen Toleranzwerten*
- *Konzipiert für High-Speed-Cutting*





SFERICA BALL

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)	Raggio (R) Size R	Tolleranza (R) Tolerance (R)
0,1 ~ 0,25	0 ~ -0,005	R0,05 ~ R2,9	±0,005
0,3 ~ 5,8	0 ~ -0,010	R3 ~ R6	±0,010
6 ~ 12	0 ~ -0,015	R6.5 ~ R10	±0,015
13 ~ 20	0 ~ -0,020		

RAGGIO TORICO CORNER RADIUS

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)	Raggio (R) Size R	Tolleranza (R) Tolerance (R)
0,2 ~ 0,25	0 ~ -0,005	R0,02 ~ R0,5	±0,005
0,3 ~ 5	0 ~ -0,010	R1 ~ R1,5	±0,010
6 ~ 12	0 ~ -0,015	R2 ~ R3	±0,015
16 ~ 20	0 ~ -0,020		

ALTA VELOCITÀ E AVANZAMENTO HIGH SPEED & FEEDRATE

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)	Raggio (R) Size R	Tolleranza (R) Tolerance (R)
0,8 ~ 5	0 ~ -0,010	R0,02 ~ R0,5	±0,005
6 ~ 12	0 ~ -0,015	R1 ~ .5	±0,010
		R2	±0,015

RAGGIO CONCAVO INTERNO INNER CORNER RADIUS

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)	Raggio (R) Size R	Tolleranza (R) Tolerance (R)
0,5 ~ 0,9	0 ~ -0,010	R0.1 ~ R2.5	±0,010
1,4 ~ 5,9	0 ~ -0,020	R3 ~ R8	±0,020

PIANA FLAT

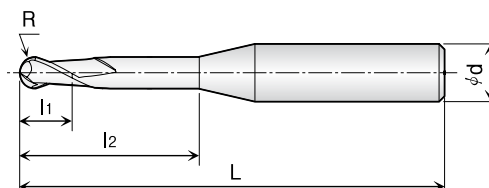
Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)
0,05 ~ 0,25	0 ~ -0,005
0.3 ~ 5.9	0 ~ -0,010
6 ~ 12	0 ~ -0,015
13 ~ 25	0 ~ -0,020

2KBRH

Fresa Sferica a 2 taglienti
 2 Flutes Rib Ball End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio (R)	Tolleranza (R)
Size (D)	Tolerance (D)	Size (R)	Tolerance (R)
0,1-0,25	0 -0,005	R0,05-R2,9	$\pm 0,005$
0,3-5,8	0 -0,010	R3-R6	$\pm 0,010$
6-12	0 -0,015	R6,5-R10	$\pm 0,015$
13-20	0 -0,020		

CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KBRH-001-003-445	R0.05	0,1	0,3	4	45
2KBRH-001-005-445	R0.05	0,1	0,5	4	45
2KBRH-0015-005-445	R0.075	0,15	0,5	4	45
2KBRH-0016-005-445	R0.08	0,16	0,5	4	45
2KBRH-002-005-445	R0.1	0,2	0,5	4	45
2KBRH-002-005-650	R0.1	0,2	0,5	6	50
2KBRH-002-010-445	R0.1	0,2	1	4	45
2KBRH-002-015-445	R0.1	0,2	1,5	4	45
2KBRH-002-020-445	R0.1	0,2	2	4	45
2KBRH-002-025-445	R0.1	0,2	2,5	4	45
2KBRH-002-030-445	R0.1	0,2	3	4	45
2KBRH-0025-008-445	R0.125	0,25	0,8	4	45
2KBRH-003-005-445	R0.15	0,3	0,5	4	45
2KBRH-003-010-445	R0.15	0,3	1	4	45
2KBRH-003-015-445	R0.15	0,3	1,5	4	45
2KBRH-003-020-445	R0.15	0,3	2	4	45
2KBRH-003-025-445	R0.15	0,3	2,5	4	45
2KBRH-003-030-445	R0.15	0,3	3	4	45
2KBRH-003-035-445	R0.15	0,3	3,5	4	45
2KBRH-003-040-445	R0.15	0,3	4	4	45
2KBRH-003-050-445	R0.15	0,3	5	4	45
2KBRH-004-010-445	R0.2	0,4	1	4	45
2KBRH-004-010-650	R0.2	0,4	1	6	50

2KBRH

Fresa Sferica a 2 taglienti
 2 Flutes Rib Ball End Mills



BEETLE



CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KBRH-004-015-445	R0.2	0,4	1,5	4	45
2KBRH-004-020-445	R0.2	0,4	2	4	45
2KBRH-004-025-445	R0.2	0,4	2,5	4	45
2KBRH-004-030-445	R0.2	0,4	3	4	45
2KBRH-004-035-445	R0.2	0,4	3,5	4	45
2KBRH-004-040-445	R0.2	0,4	4	4	45
2KBRH-004-045-445	R0.2	0,4	4,5	4	45
2KBRH-004-050-445	R0.2	0,4	5	4	45
2KBRH-004-060-445	R0.2	0,4	6	4	45
2KBRH-004-080-445	R0.2	0,4	8	4	45
2KBRH-004-100-445	R0.2	0,4	10	4	45
2KBRH-005-010-445	R0.25	0,5	1	4	45
2KBRH-005-015-445	R0.25	0,5	1,5	4	45
2KBRH-005-015-650	R0.25	0,5	1,5	6	50
2KBRH-005-020-445	R0.25	0,5	2	4	45
2KBRH-005-025-445	R0.25	0,5	2,5	4	45
2KBRH-005-030-445	R0.25	0,5	3	4	45
2KBRH-005-035-445	R0.25	0,5	3,5	4	45
2KBRH-005-040-445	R0.25	0,5	4	4	45
2KBRH-005-045-445	R0.25	0,5	4,5	4	45
2KBRH-005-050-445	R0.25	0,5	5	4	45
2KBRH-005-060-445	R0.25	0,5	6	4	45
2KBRH-005-080-445	R0.25	0,5	8	4	45
2KBRH-005-100-445	R0.25	0,5	10	4	45
2KBRH-005-120-445	R0.25	0,5	12	4	45
2KBRH-005-140-445	R0.25	0,5	14	4	45
2KBRH-006-010-445	R0.3	0,6	1	4	45
2KBRH-006-015-650	R0.3	0,6	1,5	6	50
2KBRH-006-020-445	R0.3	0,6	2	4	45
2KBRH-006-030-445	R0.3	0,6	3	4	45
2KBRH-006-040-445	R0.3	0,6	4	4	45
2KBRH-006-050-445	R0.3	0,6	5	4	45
2KBRH-006-060-445	R0.3	0,6	6	4	45
2KBRH-006-080-445	R0.3	0,6	8	4	45
2KBRH-006-100-445	R0.3	0,6	10	4	45
2KBRH-006-120-445	R0.3	0,6	12	4	45

2KBRH

 Fresa Sferica a 2 taglienti
 2 Flutes Rib Ball End Mills


CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KBRH-006-140-445	R0.3	0,6	14	4	45
2KBRH-006-160-445	R0.3	0,6	16	4	45
2KBRH-007-020-445	R0.35	0,7	2	4	45
2KBRH-007-040-445	R0.35	0,7	4	4	45
2KBRH-007-060-445	R0.35	0,7	6	4	45
2KBRH-007-080-445	R0.35	0,7	8	4	45
2KBRH-007-100-445	R0.35	0,7	10	4	45
2KBRH-007-120-445	R0.35	0,7	12	4	45
2KBRH-008-020-445	R0.4	0,8	2	4	45
2KBRH-008-020-650	R0.4	0,8	2	6	50
2KBRH-008-030-445	R0.4	0,8	3	4	45
2KBRH-008-040-445	R0.4	0,8	4	4	45
2KBRH-008-050-445	R0.4	0,8	5	4	45
2KBRH-008-060-445	R0.4	0,8	6	4	45
2KBRH-008-080-445	R0.4	0,8	8	4	45
2KBRH-008-100-445	R0.4	0,8	10	4	45
2KBRH-008-120-445	R0.4	0,8	12	4	45
2KBRH-008-140-445	R0.4	0,8	14	4	45
2KBRH-008-160-445	R0.4	0,8	16	4	45
2KBRH-009-040-445	R0.45	0,9	4	4	45
2KBRH-010-020-445	R0.5	1	2	4	45
2KBRH-010-025-650	R0.5	1	2,5	6	50
2KBRH-010-030-445	R0.5	1	3	4	45
2KBRH-010-040-445	R0.5	1	4	4	45
2KBRH-010-050-445	R0.5	1	5	4	45
2KBRH-010-060-445	R0.5	1	6	4	45
2KBRH-010-080-445	R0.5	1	8	4	45
2KBRH-010-100-445	R0.5	1	10	4	45
2KBRH-010-120-445	R0.5	1	12	4	45
2KBRH-010-140-450	R0.5	1	14	4	50
2KBRH-010-160-450	R0.5	1	16	4	50
2KBRH-010-180-450	R0.5	1	18	4	50
2KBRH-010-200-450	R0.5	1	20	4	50
2KBRH-010-220-460	R0.5	1	22	4	60
2KBRH-010-250-460	R0.5	1	25	4	60
2KBRH-010-300-470	R0.5	1	30	4	70

2KBRH

Fresa Sferica a 2 taglienti
 2 Flutes Rib Ball End Mills



BEETLE



CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KBRH-012-030-650	R0.6	1,2	3	6	50
2KBRH-012-040-445	R0.6	1,2	4	4	45
2KBRH-012-060-445	R0.6	1,2	6	4	45
2KBRH-012-080-445	R0.6	1,2	8	4	45
2KBRH-012-100-445	R0.6	1,2	10	4	45
2KBRH-012-120-445	R0.6	1,2	12	4	45
2KBRH-012-140-450	R0.6	1,2	14	4	50
2KBRH-012-160-450	R0.6	1,2	16	4	50
2KBRH-012-200-450	R0.6	1,2	20	4	50
2KBRH-012-240-460	R0.6	1,2	24	4	60
2KBRH-014-160-450	R0.7	1,4	16	4	50
2KBRH-015-030-445	R0.75	1,5	3	4	45
2KBRH-015-040-445	R0.75	1,5	4	4	45
2KBRH-015-040-650	R0.75	1,5	4	6	50
2KBRH-015-060-445	R0.75	1,5	6	4	45
2KBRH-015-080-445	R0.75	1,5	8	4	45
2KBRH-015-100-445	R0.75	1,5	10	4	45
2KBRH-015-120-445	R0.75	1,5	12	4	45
2KBRH-015-140-450	R0.75	1,5	14	4	50
2KBRH-015-160-450	R0.75	1,5	16	4	50
2KBRH-015-180-450	R0.75	1,5	18	4	50
2KBRH-015-200-450	R0.75	1,5	20	4	50
2KBRH-015-220-460	R0.75	1,5	22	4	60
2KBRH-015-250-460	R0.75	1,5	25	4	60
2KBRH-015-300-470	R0.75	1,5	30	4	70
2KBRH-015-350-470	R0.75	1,5	35	4	70
2KBRH-015-400-480	R0.75	1,5	40	4	80
2KBRH-020-040-445	R1.0	2	4	4	45
2KBRH-020-060-445	R1.0	2	6	4	45
2KBRH-020-060-650	R1.0	2	6	6	50
2KBRH-020-080-445	R1.0	2	8	4	45
2KBRH-020-100-445	R1.0	2	10	4	45
2KBRH-020-120-445	R1.0	2	12	4	45
2KBRH-020-140-450	R1.0	2	14	4	50
2KBRH-020-160-450	R1.0	2	16	4	50
2KBRH-020-180-450	R1.0	2	18	4	50

2KBRH

 Fresa Sferica a 2 taglienti
 2 Flutes Rib Ball End Mills


CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KBRH-020-200-450	R1.0	2	20	4	50
2KBRH-020-220-460	R1.0	2	22	4	60
2KBRH-020-250-460	R1.0	2	25	4	60
2KBRH-020-300-470	R1.0	2	30	4	70
2KBRH-020-350-470	R1.0	2	35	4	70
2KBRH-025-060-650	R1.25	2,5	6	6	50
2KBRH-025-080-445	R1.25	2,5	8	4	45
2KBRH-025-100-445	R1.25	2,5	10	4	45
2KBRH-025-120-445	R1.25	2,5	12	4	45
2KBRH-025-160-450	R1.25	2,5	16	4	50
2KBRH-025-200-450	R1.25	2,5	20	4	50
2KBRH-025-250-460	R1.25	2,5	25	4	60
2KBRH-025-300-470	R1.25	2,5	30	4	70
2KBRH-025-350-470	R1.25	2,5	35	4	70
2KBRH-030-060-360	R1.5	3	6	3	60
2KBRH-030-060-650	R1.5	3	6	6	50
2KBRH-030-080-650	R1.5	3	8	6	50
2KBRH-030-100-650	R1.5	3	10	6	50
2KBRH-030-120-650	R1.5	3	12	6	50
2KBRH-030-140-660	R1.5	3	14	6	60
2KBRH-030-160-660	R1.5	3	16	6	60
2KBRH-030-180-660	R1.5	3	18	6	60
2KBRH-030-200-660	R1.5	3	20	6	60
2KBRH-030-250-665	R1.5	3	25	6	65
2KBRH-030-300-670	R1.5	3	30	6	70
2KBRH-030-350-680	R1.5	3	35	6	80
2KBRH-030-400-680	R1.5	3	40	6	80
2KBRH-030-500-6A0	R1.5	3	50	6	100
2KBRH-040-080-470	R2.0	4	8	4	70
2KBRH-040-080-650	R2.0	4	8	6	50
2KBRH-040-100-650	R2.0	4	10	6	50
2KBRH-040-120-650	R2.0	4	12	6	50
2KBRH-040-140-660	R2.0	4	14	6	60
2KBRH-040-160-660	R2.0	4	16	6	60
2KBRH-040-200-660	R2.0	4	20	6	60
2KBRH-040-250-665	R2.0	4	25	6	65

2KBRH

Fresa Sferica a 2 taglienti
 2 Flutes Rib Ball End Mills



BEETLE



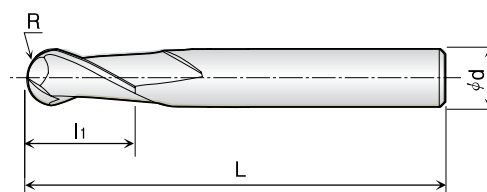
CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KBRH-040-300-670	R2.0	4	30	6	70
2KBRH-040-350-680	R2.0	4	35	6	80
2KBRH-040-400-680	R2.0	4	40	6	80
2KBRH-040-450-690	R2.0	4	45	6	90
2KBRH-040-500-6A0	R2.0	4	50	6	100
2KBRH-040-550-6B0	R2.0	4	55	6	110
2KBRH-040-600-6B0	R2.0	4	60	6	110
2KBRH-040-650-6B0	R2.0	4	65	6	110
2KBRH-040-700-6B0	R2.0	4	70	6	110
2KBRH-050-120-650	R2.5	5	12	6	50
2KBRH-050-160-660	R2.5	5	16	6	60
2KBRH-050-200-660	R2.5	5	20	6	60
2KBRH-050-250-665	R2.5	5	25	6	65
2KBRH-050-300-670	R2.5	5	30	6	70
2KBRH-050-400-680	R2.5	5	40	6	80
2KBRH-050-450-690	R2.5	5	45	6	90
2KBRH-050-500-6A0	R2.5	5	50	6	100
2KBRH-050-600-6B0	R2.5	5	60	6	110
2KBRH-050-650-6B0	R2.5	5	65	6	110
2KBRH-050-700-6B0	R2.5	5	70	6	110
2KBRH-060-150-660	R3.0	7	15	6	60
2KBRH-060-300-670	R3.0	6	30	6	70
2KBRH-060-300-690	R3.0	6	30	6	90
2KBRH-080-200-860	R4.0	10	20	8	60
2KBRH-080-300-880	R4.0	8	30	8	80
2KBRH-100-250-A70	R5.0	12	25	10	70
2KBRH-100-350-AA0	R5.0	10	35	10	100
2KBRH-120-300-C80	R6.0	14	30	12	80
2KBRH-120-400-CB0	R6.0	12	40	12	110

2KBSH

Fresa Sferica Corta a 2 taglienti
 2 Flutes Short Ball End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,1-0,25	0 -0,005	R0,05-R2,9	±0,005
0,3-5,8	0 -0,010	R3-R6	±0,010
6-12	0 -0,015	R6,5-R10	±0,015
13-20	0 -0,020		

CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
2KBSH-001-001-440	R0.05	0,1	4	40
2KBSH-002-002-440	R0.1	0,2	4	40
2KBSH-002-003-440	R0.1	0,3	4	40
2KBSH-003-003-440	R0.15	0,3	4	40
2KBSH-004-004-440	R0.2	0,4	4	40
2KBSH-004-006-440	R0.2	0,6	4	40
2KBSH-005-005-440	R0.25	0,5	4	40
2KBSH-006-006-440	R0.3	0,6	4	40
2KBSH-007-007-440	R0.35	0,7	4	40
2KBSH-008-008-440	R0.4	0,8	4	40
2KBSH-009-009-440	R0.45	0,9	4	40
2KBSH-010-010-440	R0.5	1	4	40
2KBSH-010-010-640	R0.5	1	6	40
2KBSH-010-015-440	R0.5	1,5	4	40
2KBSH-010-015-640	R0.5	1,5	6	40
2KBSH-015-015-440	R0.75	1,5	4	40
2KBSH-015-015-640	R0.75	1,5	6	40
2KBSH-015-023-440	R0.75	2,3	4	40
2KBSH-015-023-640	R0.75	2,3	6	40
2KBSH-020-020-445	R1.0	2	4	45
2KBSH-020-020-645	R1.0	2	6	45
2KBSH-020-030-445	R1.0	3	4	45
2KBSH-020-030-645	R1.0	3	6	45
2KBSH-030-030-445	R1.5	3	4	45

2KBSH

Fresa Sferica Corta a 2 taglienti
2 Flutes Short Ball End Mills



CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Lenght of cut (L ₁)	Shank diameter (d)	Overall lenght (L)
2KBSH-030-030-645	R1.5	3	6	45
2KBSH-030-045-445	R1.5	4,5	4	45
2KBSH-030-045-645	R1.5	4,5	6	45
2KBSH-040-040-445	R2.0	4	4	45
2KBSH-040-040-645	R2.0	4	6	45
2KBSH-040-060-445	R2.0	6	4	45
2KBSH-040-060-645	R2.0	6	6	45
2KBSH-050-050-650	R2.5	5	6	50
2KBSH-050-075-650	R2.5	7,5	6	50
2KBSH-060-060-650	R3.0	6	6	50
2KBSH-060-080-660	R3.0	8	6	60
2KBSH-080-080-850	R4.0	8	8	50
2KBSH-080-110-860	R4.0	11	8	60
2KBSH-100-100-A60	R5.0	10	10	60
2KBSH-100-130-A60	R5.0	13	10	60
2KBSH-120-120-C60	R6.0	12	12	60
2KBSH-120-150-C60	R6.0	15	12	60

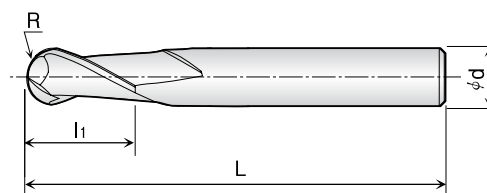


2KBPH

Fresa Sferica a 2 taglienti
 2 Flutes Ball End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,1-0,25	0 -0,005	R0,05-R2,9	$\pm 0,005$
0,3-5,8	0 -0,010	R3-R6	$\pm 0,010$
6-12	0 -0,015	R6,5-R10	$\pm 0,015$
13-20	0 -0,020		

CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
2KBPH-001-002-445	R0.05	0,2	4	45
2KBPH-0015-003-445	R0.075	0,3	4	45
2KBPH-002-004-445	R0.1	0,4	4	45
2KBPH-003-006-445	R0.15	0,6	4	45
2KBPH-004-008-445	R0.2	0,8	4	45
2KBPH-004-008-645	R0.2	0,8	6	45
2KBPH-005-010-445	R0.25	1	4	45
2KBPH-005-010-645	R0.25	1	6	45
2KBPH-006-012-445	R0.3	1,2	4	45
2KBPH-006-012-645	R0.3	1,2	6	45
2KBPH-007-015-445	R0.35	1,5	4	45
2KBPH-008-015-445	R0.4	1,5	4	45
2KBPH-008-015-645	R0.4	1,5	6	45
2KBPH-010-020-350	R0.5	2	3	50
2KBPH-010-020-450	R0.5	2	4	50
2KBPH-010-020-650	R0.5	2	6	50
2KBPH-011-024-450	R0.55	2,4	4	50
2KBPH-012-025-350	R0.6	2,5	3	50
2KBPH-012-025-450	R0.6	2,5	4	50
2KBPH-012-025-650	R0.6	2,5	6	50
2KBPH-013-032-450	R0.65	3,2	4	50
2KBPH-014-035-450	R0.7	3,5	4	50
2KBPH-015-040-350	R0.75	4	3	50
2KBPH-015-040-450	R0.75	4	4	50

2KBPH

Fresa Sferica a 2 taglienti
 2 Flutes Ball End Mills



BEETLE



CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
2KBPH-015-040-650	R0.75	4	6	50
2KBPH-015-040-670	R0.75	4	6	70
2KBPH-015-040-6A0	R0.75	4	6	100
2KBPH-016-040-450	R0.8	4	4	50
2KBPH-017-042-450	R0.85	4,2	4	50
2KBPH-018-045-450	R0.9	4,5	4	50
2KBPH-019-047-450	R0.95	4,7	4	50
2KBPH-020-050-350	R1.0	5	3	50
2KBPH-020-050-450	R1.0	5	4	50
2KBPH-020-050-660	R1.0	5	6	60
2KBPH-020-050-680	R1.0	5	6	80
2KBPH-020-050-6A0	R1.0	5	6	100
2KBPH-022-055-450	R1.1	5,5	4	50
2KBPH-024-060-450	R1.2	6	4	50
2KBPH-025-060-350	R1.25	6	3	50
2KBPH-025-060-450	R1.25	6	4	50
2KBPH-025-060-660	R1.25	6	6	60
2KBPH-025-060-680	R1.25	6	6	80
2KBPH-025-060-6A0	R1.25	6	6	100
2KBPH-026-060-450	R1.3	6	4	50
2KBPH-028-070-450	R1.4	7	4	50
2KBPH-030-080-360	R1.5	8	3	60
2KBPH-030-080-460	R1.5	8	4	60
2KBPH-030-080-660	R1.5	8	6	60
2KBPH-030-080-680	R1.5	8	6	80
2KBPH-030-080-6A0	R1.5	8	6	100
2KBPH-032-080-460	R1.6	8	4	60
2KBPH-034-080-460	R1.7	8	4	60
2KBPH-035-080-660	R1.75	8	6	60
2KBPH-036-080-460	R1.8	8	4	60
2KBPH-038-080-460	R1.9	8	4	60
2KBPH-040-080-460	R2.0	8	4	60
2KBPH-040-080-480	R2.0	8	4	80
2KBPH-040-080-670	R2.0	8	6	70
2KBPH-040-080-690	R2.0	8	6	90
2KBPH-040-080-6C0	R2.0	8	6	120

2KBPH

 Fresa Sferica a 2 taglienti
 2 Flutes Ball End Mills

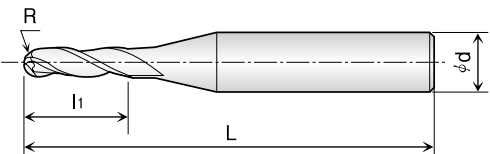

CODICE	Raggio di testa (R)	Lunghezza Elica (L _e)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (L _e)	Shank diameter (d)	Overall length (L)
2KBPH-042-100-670	R2.1	10	6	70
2KBPH-044-100-670	R2.2	10	6	70
2KBPH-045-100-670	R2.25	10	6	70
2KBPH-046-100-670	R2.3	10	6	70
2KBPH-047-100-670	R2.35	10	6	70
2KBPH-048-100-670	R2.4	10	6	70
2KBPH-050-100-680	R2.5	10	6	80
2KBPH-052-120-680	R2.6	12	6	80
2KBPH-054-120-680	R2.7	12	6	80
2KBPH-055-120-680	R2.75	12	6	80
2KBPH-056-120-680	R2.8	12	6	80
2KBPH-058-120-680	R2.9	12	6	80
2KBPH-060-120-675	R3.0	12	6	75
2KBPH-060-120-680	R3.0	12	6	80
2KBPH-060-120-690	R3.0	12	6	90
2KBPH-060-120-6C0	R3.0	12	6	120
2KBPH-060-120-6F0	R3.0	12	6	150
2KBPH-070-140-8A0	R3.5	14	8	100
2KBPH-080-140-875	R4.0	14	8	75
2KBPH-080-140-8A0	R4.0	14	8	100
2KBPH-080-140-8D0	R4.0	14	8	130
2KBPH-080-140-8F0	R4.0	14	8	150
2KBPH-090-180-AA0	R4.5	18	10	100
2KBPH-100-180-A75	R5.0	18	10	75
2KBPH-100-180-AA0	R5.0	18	10	100
2KBPH-100-180-AD0	R5.0	18	10	130
2KBPH-100-180-AF0	R5.0	18	10	150
2KBPH-100-180-AI0	R5.0	18	10	180
2KBPH-110-220-CB0	R5.5	22	12	110
2KBPH-120-220-CB0	R6.0	22	12	110
2KBPH-120-220-CD0	R6.0	22	12	130
2KBPH-120-220-CF0	R6.0	22	12	150
2KBPH-120-220-CK0	R6.0	22	12	200
2KBPH-130-240-EB0	R6.5	24	14	110
2KBPH-140-240-EB0	R7.0	24	14	110
2KBPH-160-300-GB0	R8.0	30	16	110
2KBPH-160-300-GF0	R8.0	30	16	150
2KBPH-200-380-KB0	R10.0	38	20	110
2KBPH-200-380-KF0	R10.0	38	20	150

3KBPH

Fresa Sferica a 3 taglienti
3 Flutes Ball End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*



BEETLE



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
<i>Size (D)</i>	<i>Tolerance (D)</i>	<i>Size R</i>	<i>Tolerance</i>
0,1-0,25	0 -0,005	R0,05-R2,9	±0,005
0,3-5,8	0 -0,010	R3-R6	±0,010
6-12	0 -0,015	R6,5-R10	±0,015
13-20	0 -0,020		

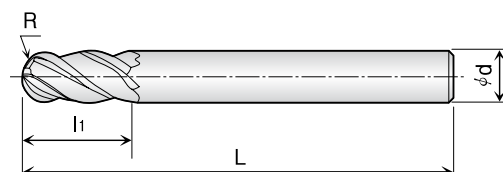
CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Radius of ball Nose (R)</i>	<i>Lenght of cut (L₁)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
3KBPH-010-020-650	R0.5	2	6	50
3KBPH-020-050-660	R1.0	5	6	60
3KBPH-030-080-660	R1.5	8	6	60
3KBPH-040-080-460	R2.0	8	4	60
3KBPH-040-080-670	R2.0	8	6	70
3KBPH-050-100-680	R2.5	10	6	80
3KBPH-060-120-690	R3.0	12	6	90
3KBPH-080-140-8A0	R4.0	14	8	100
3KBPH-100-180-AA0	R5.0	18	10	100
3KBPH-120-220-CB0	R6.0	22	12	110

4KBPH

Fresa Sferica a 4 taglienti
 4 Flutes Ball End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,1-0,25	0 -0,005	R0,05-R2,9	$\pm 0,005$
0,3-5,8	0 -0,010	R3-R6	$\pm 0,010$
6-12	0 -0,015	R6,5-R10	$\pm 0,015$
13-20	0 -0,020		

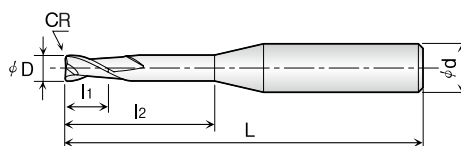
CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
4KBPH-010-020-650	R0.5	2	6	50
4KBPH-015-040-650	R0.75	4	6	50
4KBPH-020-050-660	R1.0	5	6	60
4KBPH-030-080-660	R1.5	8	6	60
4KBPH-040-080-460	R2.0	8	4	60
4KBPH-040-080-670	R2.0	8	6	70
4KBPH-050-100-680	R2.5	10	6	80
4KBPH-060-120-690	R3.0	12	6	90
4KBPH-080-140-8A0	R4.0	14	8	100
4KBPH-100-180-AA0	R5.0	18	10	100
4KBPH-120-220-CB0	R6.0	22	12	110
4KBPH-160-300-GD0	R8.0	30	16	130
4KBPH-200-380-KF0	R10.0	38	20	150

2KRRH

Fresa Torica a 2 taglienti
2 Flutes Rib Corner Radius End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain



H

2

CR

30°

PAGE
No. 245

BEETLE



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,2-0,25	0 -0,005	R0,02-R0,5	±0,005
0,3-5	0 -0,010	R1-R1,5	±0,010
6-12	0 -0,015	R2-R3	±0,015
16-20	0 -0,020		

CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
2KRRH-002-R002-005-445	0,2	R0.02	0,3	0,5	4	45
2KRRH-002-R002-010-445	0,2	R0.02	0,3	1	4	45
2KRRH-002-R002-015-445	0,2	R0.02	0,3	1,5	4	45
2KRRH-002-R005-010-445	0,2	R0.05	0,3	1	4	45
2KRRH-002-R005-015-445	0,2	R0.05	0,3	1,5	4	45
2KRRH-003-R005-010-445	0,3	R0.05	0,45	1	4	45
2KRRH-003-R005-020-445	0,3	R0.05	0,45	2	4	45
2KRRH-003-R005-030-445	0,3	R0.05	0,45	3	4	45
2KRRH-004-R005-010-445	0,4	R0.05	0,6	1	4	45
2KRRH-004-R005-020-445	0,4	R0.05	0,6	2	4	45
2KRRH-004-R005-030-445	0,4	R0.05	0,6	3	4	45
2KRRH-004-R005-040-445	0,4	R0.05	0,6	4	4	45
2KRRH-004-R01-010-445	0,4	R0.1	0,6	1	4	45
2KRRH-004-R01-015-445	0,4	R0.1	0,6	1,5	4	45
2KRRH-004-R01-020-445	0,4	R0.1	0,6	2	4	45
2KRRH-004-R01-030-445	0,4	R0.1	0,6	3	4	45
2KRRH-004-R01-040-445	0,4	R0.1	0,6	4	4	45
2KRRH-005-R002-010-445	0,5	R0.02	0,7	1	4	45
2KRRH-005-R002-015-445	0,5	R0.02	0,7	1,5	4	45
2KRRH-005-R002-020-445	0,5	R0.02	0,7	2	4	45
2KRRH-005-R002-025-445	0,5	R0.02	0,7	2,5	4	45
2KRRH-005-R002-030-445	0,5	R0.02	0,7	3	4	45
2KRRH-005-R002-040-445	0,5	R0.02	0,7	4	4	45
2KRRH-005-R002-050-445	0,5	R0.02	0,7	5	4	45
2KRRH-005-R002-060-445	0,5	R0.02	0,7	6	4	45

2KRRH

 Fresa Torica a 2 taglienti
 2 Flutes Rib Corner Radius End Mills


CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KRRH-005-R002-080-445	0,5	R0.02	0,7	8	4	45
2KRRH-005-R002-100-445	0,5	R0.02	0,7	10	4	45
2KRRH-005-R005-010-445	0,5	R0.05	0,7	1	4	45
2KRRH-005-R005-015-445	0,5	R0.05	0,7	1,5	4	45
2KRRH-005-R005-020-445	0,5	R0.05	0,7	2	4	45
2KRRH-005-R005-025-445	0,5	R0.05	0,7	2,5	4	45
2KRRH-005-R005-030-445	0,5	R0.05	0,7	3	4	45
2KRRH-005-R005-040-445	0,5	R0.05	0,7	4	4	45
2KRRH-005-R005-050-445	0,5	R0.05	0,7	5	4	45
2KRRH-005-R005-060-445	0,5	R0.05	0,7	6	4	45
2KRRH-005-R005-080-445	0,5	R0.05	0,7	8	4	45
2KRRH-005-R005-100-445	0,5	R0.05	0,7	10	4	45
2KRRH-005-R01-010-445	0,5	R0.1	0,7	1	4	45
2KRRH-005-R01-015-445	0,5	R0.1	0,7	1,5	4	45
2KRRH-005-R01-020-445	0,5	R0.1	0,7	2	4	45
2KRRH-005-R01-025-445	0,5	R0.1	0,7	2,5	4	45
2KRRH-005-R01-030-445	0,5	R0.1	0,7	3	4	45
2KRRH-005-R01-040-445	0,5	R0.1	0,7	4	4	45
2KRRH-005-R01-050-445	0,5	R0.1	0,7	5	4	45
2KRRH-005-R01-060-445	0,5	R0.1	0,7	6	4	45
2KRRH-005-R01-080-445	0,5	R0.1	0,7	8	4	45
2KRRH-005-R01-100-445	0,5	R0.1	0,7	10	4	45
2KRRH-006-R002-020-445	0,6	R0.02	0,9	2	4	45
2KRRH-006-R002-030-445	0,6	R0.02	0,9	3	4	45
2KRRH-006-R002-040-445	0,6	R0.02	0,9	4	4	45
2KRRH-006-R002-060-445	0,6	R0.02	0,9	6	4	45
2KRRH-006-R002-080-445	0,6	R0.02	0,9	8	4	45
2KRRH-006-R002-100-445	0,6	R0.02	0,9	10	4	45
2KRRH-006-R005-020-445	0,6	R0.05	0,9	2	4	45
2KRRH-006-R005-030-445	0,6	R0.05	0,9	3	4	45
2KRRH-006-R005-040-445	0,6	R0.05	0,9	4	4	45
2KRRH-006-R005-060-445	0,6	R0.05	0,9	6	4	45
2KRRH-006-R005-080-445	0,6	R0.05	0,9	8	4	45
2KRRH-006-R005-100-445	0,6	R0.05	0,9	10	4	45
2KRRH-006-R01-020-445	0,6	R0.1	0,9	2	4	45

2KRRH

Fresa Torica a 2 taglienti
 2 Flutes Rib Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KRRH-006-R01-030-445	0,6	R0.1	0,9	3	4	45
2KRRH-006-R01-040-445	0,6	R0.1	0,9	4	4	45
2KRRH-006-R01-060-445	0,6	R0.1	0,9	6	4	45
2KRRH-006-R01-080-445	0,6	R0.1	0,9	8	4	45
2KRRH-006-R01-100-445	0,6	R0.1	0,9	10	4	45
2KRRH-007-R01-020-445	0,7	R0.1	1	2	4	45
2KRRH-007-R01-040-445	0,7	R0.1	1	4	4	45
2KRRH-007-R01-060-445	0,7	R0.1	1	6	4	45
2KRRH-008-R002-020-445	0,8	R0.02	1,2	2	4	45
2KRRH-008-R002-040-445	0,8	R0.02	1,2	4	4	45
2KRRH-008-R002-060-445	0,8	R0.02	1,2	6	4	45
2KRRH-008-R002-080-445	0,8	R0.02	1,2	8	4	45
2KRRH-008-R002-100-445	0,8	R0.02	1,2	10	4	45
2KRRH-008-R005-020-445	0,8	R0.05	1,2	2	4	45
2KRRH-008-R005-040-445	0,8	R0.05	1,2	4	4	45
2KRRH-008-R005-060-445	0,8	R0.05	1,2	6	4	45
2KRRH-008-R005-080-445	0,8	R0.05	1,2	8	4	45
2KRRH-008-R005-100-445	0,8	R0.05	1,2	10	4	45
2KRRH-008-R01-020-445	0,8	R0.1	1,2	2	4	45
2KRRH-008-R01-040-445	0,8	R0.1	1,2	4	4	45
2KRRH-008-R01-060-445	0,8	R0.1	1,2	6	4	45
2KRRH-008-R01-080-445	0,8	R0.1	1,2	8	4	45
2KRRH-008-R01-100-445	0,8	R0.1	1,2	10	4	45
2KRRH-008-R02-020-445	0,8	R0.2	1,2	2	4	45
2KRRH-008-R02-040-445	0,8	R0.2	1,2	4	4	45
2KRRH-008-R02-060-445	0,8	R0.2	1,2	6	4	45
2KRRH-008-R02-080-445	0,8	R0.2	1,2	8	4	45
2KRRH-008-R02-100-445	0,8	R0.2	1,2	10	4	45
2KRRH-010-R005-040-445	1	R0.05	1,5	4	4	45
2KRRH-010-R005-060-445	1	R0.05	1,5	6	4	45
2KRRH-010-R005-080-445	1	R0.05	1,5	8	4	45
2KRRH-010-R005-100-445	1	R0.05	1,5	10	4	45
2KRRH-010-R005-120-445	1	R0.05	1,5	12	4	45
2KRRH-010-R005-160-450	1	R0.05	1,5	16	4	50
2KRRH-010-R005-200-450	1	R0.05	1,5	20	4	50

2KRRH

Fresa Torica a 2 taglienti
 2 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KRRH-010-R005-220-460	1	R0.05	1,5	22	4	60
2KRRH-010-R005-250-460	1	R0.05	1,5	25	4	60
2KRRH-010-R01-040-445	1	R0.1	1,5	4	4	45
2KRRH-010-R01-060-445	1	R0.1	1,5	6	4	45
2KRRH-010-R01-080-445	1	R0.1	1,5	8	4	45
2KRRH-010-R01-100-445	1	R0.1	1,5	10	4	45
2KRRH-010-R01-120-445	1	R0.1	1,5	12	4	45
2KRRH-010-R01-160-450	1	R0.1	1,5	16	4	50
2KRRH-010-R01-200-450	1	R0.1	1,5	20	4	50
2KRRH-010-R01-220-460	1	R0.1	1,5	22	4	60
2KRRH-010-R01-250-460	1	R0.1	1,5	25	4	60
2KRRH-010-R02-040-445	1	R0.2	1,5	4	4	45
2KRRH-010-R02-060-445	1	R0.2	1,5	6	4	45
2KRRH-010-R02-080-445	1	R0.2	1,5	8	4	45
2KRRH-010-R02-100-445	1	R0.2	1,5	10	4	45
2KRRH-010-R02-120-445	1	R0.2	1,5	12	4	45
2KRRH-010-R02-160-450	1	R0.2	1,5	16	4	50
2KRRH-010-R02-200-450	1	R0.2	1,5	20	4	50
2KRRH-010-R02-220-460	1	R0.2	1,5	22	4	60
2KRRH-010-R02-250-460	1	R0.2	1,5	25	4	60
2KRRH-010-R025-040-665	1	R0.25	1,5	4	6	65
2KRRH-010-R025-080-665	1	R0.25	1,5	8	6	65
2KRRH-010-R03-040-445	1	R0.3	1,5	4	4	45
2KRRH-010-R03-060-445	1	R0.3	1,5	6	4	45
2KRRH-010-R03-080-445	1	R0.3	1,5	8	4	45
2KRRH-010-R03-100-445	1	R0.3	1,5	10	4	45
2KRRH-010-R03-120-445	1	R0.3	1,5	12	4	45
2KRRH-010-R03-160-450	1	R0.3	1,5	16	4	50
2KRRH-010-R03-200-450	1	R0.3	1,5	20	4	50
2KRRH-010-R03-220-460	1	R0.3	1,5	22	4	60
2KRRH-010-R03-250-460	1	R0.3	1,5	25	4	60
2KRRH-012-R01-040-445	1,2	R0.1	1,8	4	4	45
2KRRH-012-R01-060-445	1,2	R0.1	1,8	6	4	45
2KRRH-012-R01-080-445	1,2	R0.1	1,8	8	4	45
2KRRH-012-R01-100-445	1,2	R0.1	1,8	10	4	45

2KRRH

Fresa Torica a 2 taglienti
 2 Flutes Rib Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KRRH-012-R01-120-445	1,2	R0.1	1,8	12	4	45
2KRRH-012-R01-160-450	1,2	R0.1	1,8	16	4	50
2KRRH-012-R01-200-450	1,2	R0.1	1,8	20	4	50
2KRRH-012-R02-040-445	1,2	R0.2	1,8	4	4	45
2KRRH-012-R02-060-445	1,2	R0.2	1,8	6	4	45
2KRRH-012-R02-080-445	1,2	R0.2	1,8	8	4	45
2KRRH-012-R02-100-445	1,2	R0.2	1,8	10	4	45
2KRRH-012-R02-120-445	1,2	R0.2	1,8	12	4	45
2KRRH-012-R02-160-450	1,2	R0.2	1,8	16	4	50
2KRRH-012-R02-200-450	1,2	R0.2	1,8	20	4	50
2KRRH-012-R03-040-445	1,2	R0.3	1,8	4	4	45
2KRRH-012-R03-060-445	1,2	R0.3	1,8	6	4	45
2KRRH-012-R03-080-445	1,2	R0.3	1,8	8	4	45
2KRRH-012-R03-100-445	1,2	R0.3	1,8	10	4	45
2KRRH-012-R03-120-445	1,2	R0.3	1,8	12	4	45
2KRRH-012-R03-160-450	1,2	R0.3	1,8	16	4	50
2KRRH-012-R03-200-450	1,2	R0.3	1,8	20	4	50
2KRRH-015-R01-040-445	1,5	R0.1	2,3	4	4	45
2KRRH-015-R01-060-445	1,5	R0.1	2,3	6	4	45
2KRRH-015-R01-080-445	1,5	R0.1	2,3	8	4	45
2KRRH-015-R01-100-445	1,5	R0.1	2,3	10	4	45
2KRRH-015-R01-120-445	1,5	R0.1	2,3	12	4	45
2KRRH-015-R01-160-450	1,5	R0.1	2,3	16	4	50
2KRRH-015-R01-200-450	1,5	R0.1	2,3	20	4	50
2KRRH-015-R01-220-460	1,5	R0.1	2,3	22	4	60
2KRRH-015-R01-250-460	1,5	R0.1	2,3	25	4	60
2KRRH-015-R02-040-445	1,5	R0.2	2,3	4	4	45
2KRRH-015-R02-060-445	1,5	R0.2	2,3	6	4	45
2KRRH-015-R02-080-445	1,5	R0.2	2,3	8	4	45
2KRRH-015-R02-100-445	1,5	R0.2	2,3	10	4	45
2KRRH-015-R02-120-445	1,5	R0.2	2,3	12	4	45
2KRRH-015-R02-160-450	1,5	R0.2	2,3	16	4	50
2KRRH-015-R02-200-450	1,5	R0.2	2,3	20	4	50
2KRRH-015-R02-220-460	1,5	R0.2	2,3	22	4	60
2KRRH-015-R02-250-460	1,5	R0.2	2,3	25	4	60

2KRRH

Fresa Torica a 2 taglienti
 2 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KRRH-015-R03-040-445	1,5	R0.3	2,3	4	4	45
2KRRH-015-R03-060-445	1,5	R0.3	2,3	6	4	45
2KRRH-015-R03-060-670	1,5	R0.3	2,3	6	6	70
2KRRH-015-R03-080-445	1,5	R0.3	2,3	8	4	45
2KRRH-015-R03-080-670	1,5	R0.3	2,3	8	6	70
2KRRH-015-R03-100-445	1,5	R0.3	2,3	10	4	45
2KRRH-015-R03-100-670	1,5	R0.3	2,3	10	6	70
2KRRH-015-R03-120-445	1,5	R0.3	2,3	12	4	45
2KRRH-015-R03-160-450	1,5	R0.3	2,3	16	4	50
2KRRH-015-R03-200-450	1,5	R0.3	2,3	20	4	50
2KRRH-015-R03-220-460	1,5	R0.3	2,3	22	4	60
2KRRH-015-R03-250-460	1,5	R0.3	2,3	25	4	60
2KRRH-015-R05-040-445	1,5	R0.5	2,3	4	4	45
2KRRH-015-R05-060-445	1,5	R0.5	2,3	6	4	45
2KRRH-015-R05-080-445	1,5	R0.5	2,3	8	4	45
2KRRH-015-R05-100-445	1,5	R0.5	2,3	10	4	45
2KRRH-015-R05-120-445	1,5	R0.5	2,3	12	4	45
2KRRH-015-R05-160-450	1,5	R0.5	2,3	16	4	50
2KRRH-015-R05-200-450	1,5	R0.5	2,3	20	4	50
2KRRH-015-R05-220-460	1,5	R0.5	2,3	22	4	60
2KRRH-015-R05-250-460	1,5	R0.5	2,3	25	4	60
2KRRH-020-R01-040-445	2	R0.1	3	4	4	45
2KRRH-020-R01-060-445	2	R0.1	3	6	4	45
2KRRH-020-R01-080-445	2	R0.1	3	8	4	45
2KRRH-020-R01-100-445	2	R0.1	3	10	4	45
2KRRH-020-R01-120-445	2	R0.1	3	12	4	45
2KRRH-020-R01-160-450	2	R0.1	3	16	4	50
2KRRH-020-R01-200-450	2	R0.1	3	20	4	50
2KRRH-020-R01-250-460	2	R0.1	3	25	4	60
2KRRH-020-R01-300-470	2	R0.1	3	30	4	70
2KRRH-020-R02-040-445	2	R0.2	3	4	4	45
2KRRH-020-R02-060-445	2	R0.2	3	6	4	45
2KRRH-020-R02-080-445	2	R0.2	3	8	4	45
2KRRH-020-R02-100-445	2	R0.2	3	10	4	45
2KRRH-020-R02-120-445	2	R0.2	3	12	4	45

2KRRH

Fresa Torica a 2 taglienti
 2 Flutes Rib Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KRRH-020-R02-160-450	2	R0.2	3	16	4	50
2KRRH-020-R02-200-450	2	R0.2	3	20	4	50
2KRRH-020-R02-250-460	2	R0.2	3	25	4	60
2KRRH-020-R02-300-470	2	R0.2	3	30	4	70
2KRRH-020-R03-040-445	2	R0.3	3	4	4	45
2KRRH-020-R03-060-445	2	R0.3	3	6	4	45
2KRRH-020-R03-080-445	2	R0.3	3	8	4	45
2KRRH-020-R03-100-445	2	R0.3	3	10	4	45
2KRRH-020-R03-120-445	2	R0.3	3	12	4	45
2KRRH-020-R03-160-450	2	R0.3	3	16	4	50
2KRRH-020-R03-200-450	2	R0.3	3	20	4	50
2KRRH-020-R03-250-460	2	R0.3	3	25	4	60
2KRRH-020-R03-300-470	2	R0.3	3	30	4	70
2KRRH-020-R05-040-445	2	R0.5	3	4	4	45
2KRRH-020-R05-060-445	2	R0.5	3	6	4	45
2KRRH-020-R05-060-670	2	R0.5	3	6	6	70
2KRRH-020-R05-080-445	2	R0.5	3	8	4	45
2KRRH-020-R05-100-445	2	R0.5	3	10	4	45
2KRRH-020-R05-100-670	2	R0.5	3	10	6	70
2KRRH-020-R05-120-445	2	R0.5	3	12	4	45
2KRRH-020-R05-120-670	2	R0.5	3	12	6	70
2KRRH-020-R05-160-450	2	R0.5	3	16	4	50
2KRRH-020-R05-160-670	2	R0.5	3	16	6	70
2KRRH-020-R05-180-450	2	R0.5	3	18	4	50
2KRRH-020-R05-200-450	2	R0.5	3	20	4	50
2KRRH-020-R05-250-460	2	R0.5	3	25	4	60
2KRRH-020-R05-300-470	2	R0.5	3	30	4	70
2KRRH-025-R01-100-445	2,5	R0.1	3,8	10	4	45
2KRRH-025-R01-160-450	2,5	R0.1	3,8	16	4	50
2KRRH-025-R01-200-450	2,5	R0.1	3,8	20	4	50
2KRRH-025-R01-250-460	2,5	R0.1	3,8	25	4	60
2KRRH-025-R01-300-470	2,5	R0.1	3,8	30	4	70
2KRRH-025-R02-100-445	2,5	R0.2	3,8	10	4	45
2KRRH-025-R02-160-450	2,5	R0.2	3,8	16	4	50
2KRRH-025-R02-200-450	2,5	R0.2	3,8	20	4	50

2KRRH

Fresa Torica a 2 taglienti
 2 Flutes Rib Corner Radius End Mills



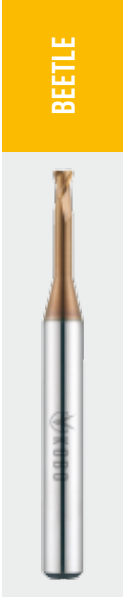
CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KRRH-025-R02-250-460	2,5	R0.2	3,8	25	4	60
2KRRH-025-R02-300-470	2,5	R0.2	3,8	30	4	70
2KRRH-025-R03-100-445	2,5	R0.3	3,8	10	4	45
2KRRH-025-R03-160-450	2,5	R0.3	3,8	16	4	50
2KRRH-025-R03-200-450	2,5	R0.3	3,8	20	4	50
2KRRH-025-R03-250-460	2,5	R0.3	3,8	25	4	60
2KRRH-025-R03-300-470	2,5	R0.3	3,8	30	4	70
2KRRH-025-R05-100-445	2,5	R0.5	3,8	10	4	45
2KRRH-025-R05-140-450	2,5	R0.5	3,8	14	4	50
2KRRH-025-R05-160-450	2,5	R0.5	3,8	16	4	50
2KRRH-025-R05-180-450	2,5	R0.5	3,8	18	4	50
2KRRH-025-R05-200-450	2,5	R0.5	3,8	20	4	50
2KRRH-025-R05-250-460	2,5	R0.5	3,8	25	4	60
2KRRH-025-R05-300-470	2,5	R0.5	3,8	30	4	70
2KRRH-025-R10-100-445	2,5	R1.0	3,8	10	4	45
2KRRH-030-R01-080-650	3	R0.1	4,5	8	6	50
2KRRH-030-R01-100-650	3	R0.1	4,5	10	6	50
2KRRH-030-R01-120-650	3	R0.1	4,5	12	6	50
2KRRH-030-R01-160-660	3	R0.1	4,5	16	6	60
2KRRH-030-R01-200-660	3	R0.1	4,5	20	6	60
2KRRH-030-R01-250-665	3	R0.1	4,5	25	6	65
2KRRH-030-R01-300-670	3	R0.1	4,5	30	6	70
2KRRH-030-R01-350-680	3	R0.1	4,5	35	6	80
2KRRH-030-R01-400-680	3	R0.1	4,5	40	6	80
2KRRH-030-R02-080-650	3	R0.2	4,5	8	6	50
2KRRH-030-R02-100-650	3	R0.2	4,5	10	6	50
2KRRH-030-R02-120-650	3	R0.2	4,5	12	6	50
2KRRH-030-R02-160-660	3	R0.2	4,5	16	6	60
2KRRH-030-R02-200-660	3	R0.2	4,5	20	6	60
2KRRH-030-R02-250-665	3	R0.2	4,5	25	6	65
2KRRH-030-R02-300-670	3	R0.2	4,5	30	6	70
2KRRH-030-R02-350-680	3	R0.2	4,5	35	6	80
2KRRH-030-R02-400-680	3	R0.2	4,5	40	6	80
2KRRH-030-R03-080-650	3	R0.3	4,5	8	6	50
2KRRH-030-R03-100-650	3	R0.3	4,5	10	6	50

2KRRH

Fresa Torica a 2 taglienti
2 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KRRH-030-R03-120-650	3	R0.3	4,5	12	6	50
2KRRH-030-R03-160-660	3	R0.3	4,5	16	6	60
2KRRH-030-R03-200-660	3	R0.3	4,5	20	6	60
2KRRH-030-R03-250-665	3	R0.3	4,5	25	6	65
2KRRH-030-R03-300-670	3	R0.3	4,5	30	6	70
2KRRH-030-R03-350-680	3	R0.3	4,5	35	6	80
2KRRH-030-R03-400-680	3	R0.3	4,5	40	6	80
2KRRH-030-R05-080-650	3	R0.5	4,5	8	6	50
2KRRH-030-R05-080-675	3	R0.5	4,5	8	6	75
2KRRH-030-R05-100-650	3	R0.5	4,5	10	6	50
2KRRH-030-R05-120-650	3	R0.5	4,5	12	6	50
2KRRH-030-R05-120-675	3	R0.5	4,5	12	6	75
2KRRH-030-R05-160-660	3	R0.5	4,5	16	6	60
2KRRH-030-R05-200-660	3	R0.5	4,5	20	6	60
2KRRH-030-R05-200-675	3	R0.5	4,5	20	6	75
2KRRH-030-R05-250-665	3	R0.5	4,5	25	6	65
2KRRH-030-R05-300-670	3	R0.5	4,5	30	6	70
2KRRH-030-R05-350-680	3	R0.5	4,5	35	6	80
2KRRH-030-R05-400-680	3	R0.5	4,5	40	6	80
2KRRH-030-R10-080-650	3	R1.0	4,5	8	6	50
2KRRH-030-R10-100-650	3	R1.0	4,5	10	6	50
2KRRH-030-R10-120-650	3	R1.0	4,5	12	6	50
2KRRH-030-R10-160-660	3	R1.0	4,5	16	6	60
2KRRH-030-R10-200-660	3	R1.0	4,5	20	6	60
2KRRH-030-R10-250-665	3	R1.0	4,5	25	6	65
2KRRH-030-R10-300-670	3	R1.0	4,5	30	6	70
2KRRH-030-R10-350-680	3	R1.0	4,5	35	6	80
2KRRH-030-R10-400-680	3	R1.0	4,5	40	6	80
2KRRH-040-R01-080-650	4	R0.1	6	8	6	50
2KRRH-040-R01-100-650	4	R0.1	6	10	6	50
2KRRH-040-R01-120-650	4	R0.1	6	12	6	50
2KRRH-040-R01-160-660	4	R0.1	6	16	6	60
2KRRH-040-R01-200-660	4	R0.1	6	20	6	60
2KRRH-040-R01-250-665	4	R0.1	6	25	6	65
2KRRH-040-R01-300-670	4	R0.1	6	30	6	70



2KRRH

Fresa Torica a 2 taglienti
 2 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KRRH-040-R01-350-680	4	R0.1	6	35	6	80
2KRRH-040-R01-400-680	4	R0.1	6	40	6	80
2KRRH-040-R01-450-690	4	R0.1	6	45	6	90
2KRRH-040-R01-500-6A0	4	R0.1	6	50	6	100
2KRRH-040-R02-080-650	4	R0.2	6	8	6	50
2KRRH-040-R02-100-650	4	R0.2	6	10	6	50
2KRRH-040-R02-120-650	4	R0.2	6	12	6	50
2KRRH-040-R02-160-660	4	R0.2	6	16	6	60
2KRRH-040-R02-200-660	4	R0.2	6	20	6	60
2KRRH-040-R02-250-665	4	R0.2	6	25	6	65
2KRRH-040-R02-300-670	4	R0.2	6	30	6	70
2KRRH-040-R02-350-680	4	R0.2	6	35	6	80
2KRRH-040-R02-400-680	4	R0.2	6	40	6	80
2KRRH-040-R02-450-690	4	R0.2	6	45	6	90
2KRRH-040-R02-500-6A0	4	R0.2	6	50	6	100
2KRRH-040-R03-080-650	4	R0.3	6	8	6	50
2KRRH-040-R03-100-650	4	R0.3	6	10	6	50
2KRRH-040-R03-120-650	4	R0.3	6	12	6	50
2KRRH-040-R03-160-660	4	R0.3	6	16	6	60
2KRRH-040-R03-200-660	4	R0.3	6	20	6	60
2KRRH-040-R03-250-665	4	R0.3	6	25	6	65
2KRRH-040-R03-300-670	4	R0.3	6	30	6	70
2KRRH-040-R03-350-680	4	R0.3	6	35	6	80
2KRRH-040-R03-400-680	4	R0.3	6	40	6	80
2KRRH-040-R03-450-690	4	R0.3	6	45	6	90
2KRRH-040-R03-500-6A0	4	R0.3	6	50	6	100
2KRRH-040-R05-080-650	4	R0.5	6	8	6	50
2KRRH-040-R05-100-650	4	R0.5	6	10	6	50
2KRRH-040-R05-120-650	4	R0.5	6	12	6	50
2KRRH-040-R05-120-675	4	R0.5	6	12	6	75
2KRRH-040-R05-160-660	4	R0.5	6	16	6	60
2KRRH-040-R05-200-660	4	R0.5	6	20	6	60
2KRRH-040-R05-200-675	4	R0.5	6	20	6	75
2KRRH-040-R05-250-665	4	R0.5	6	25	6	65
2KRRH-040-R05-250-675	4	R0.5	6	25	6	75

2KRRH

Fresa Torica a 2 taglienti
2 Flutes Rib Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KRRH-040-R05-300-670	4	R0.5	6	30	6	70
2KRRH-040-R05-350-680	4	R0.5	6	35	6	80
2KRRH-040-R05-400-680	4	R0.5	6	40	6	80
2KRRH-040-R05-450-690	4	R0.5	6	45	6	90
2KRRH-040-R05-500-6A0	4	R0.5	6	50	6	100
2KRRH-040-R10-080-650	4	R1.0	6	8	6	50
2KRRH-040-R10-100-650	4	R1.0	6	10	6	50
2KRRH-040-R10-120-650	4	R1.0	6	12	6	50
2KRRH-040-R10-120-675	4	R1.0	6	12	6	75
2KRRH-040-R10-160-660	4	R1.0	6	16	6	60
2KRRH-040-R10-200-660	4	R1.0	6	20	6	60
2KRRH-040-R10-250-665	4	R1.0	6	25	6	65
2KRRH-040-R10-300-670	4	R1.0	6	30	6	70
2KRRH-040-R10-350-680	4	R1.0	6	35	6	80
2KRRH-040-R10-400-680	4	R1.0	6	40	6	80
2KRRH-040-R10-450-690	4	R1.0	6	45	6	90
2KRRH-040-R10-500-6A0	4	R1.0	6	50	6	100
2KRRH-050-R02-150-660	5	R0.2	7,5	15	6	60
2KRRH-050-R02-250-665	5	R0.2	7,5	25	6	65
2KRRH-050-R02-300-670	5	R0.2	7,5	30	6	70
2KRRH-050-R02-400-680	5	R0.2	7,5	40	6	80
2KRRH-050-R02-500-6A0	5	R0.2	7,5	50	6	100
2KRRH-050-R05-180-660	5	R0.5	7,5	18	6	60
2KRRH-050-R05-250-665	5	R0.5	7,5	25	6	65
2KRRH-050-R05-300-670	5	R0.5	7,5	30	6	70
2KRRH-050-R05-400-680	5	R0.5	7,5	40	6	80
2KRRH-050-R05-500-6A0	5	R0.5	7,5	50	6	100
2KRRH-050-R10-180-660	5	R1.0	7,5	18	6	60
2KRRH-050-R10-250-665	5	R1.0	7,5	25	6	65
2KRRH-050-R10-300-670	5	R1.0	7,5	30	6	70
2KRRH-050-R10-400-680	5	R1.0	7,5	40	6	80
2KRRH-050-R10-500-6A0	5	R1.0	7,5	50	6	100
2KRRH-060-R01-200-660	6	R0.1	9	20	6	60
2KRRH-060-R01-400-690	6	R0.1	9	40	6	90
2KRRH-060-R02-200-660	6	R0.2	9	20	6	60

2KRRH

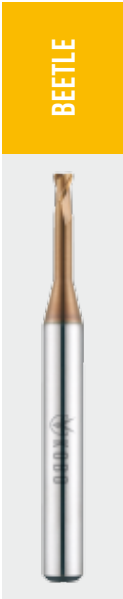
Fresa Torica a 2 taglienti
 2 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KRRH-060-R02-400-690	6	R0.2	9	40	6	90
2KRRH-060-R03-200-660	6	R0.3	9	20	6	60
2KRRH-060-R03-400-690	6	R0.3	9	40	6	90
2KRRH-060-R05-200-660	6	R0.5	9	20	6	60
2KRRH-060-R05-400-690	6	R0.5	9	40	6	90
2KRRH-060-R10-200-660	6	R1.0	9	20	6	60
2KRRH-060-R10-400-690	6	R1.0	9	40	6	90
2KRRH-060-R15-200-660	6	R1.5	9	20	6	60
2KRRH-060-R15-400-690	6	R1.5	9	40	6	90
2KRRH-080-R02-240-865	8	R0.2	12	24	8	65
2KRRH-080-R02-400-8A0	8	R0.2	12	40	8	100
2KRRH-080-R03-240-865	8	R0.3	12	24	8	65
2KRRH-080-R03-400-8A0	8	R0.3	12	40	8	100
2KRRH-080-R05-240-865	8	R0.5	12	24	8	65
2KRRH-080-R05-240-880	8	R0.5	12	24	8	80
2KRRH-080-R05-400-8A0	8	R0.5	12	40	8	100
2KRRH-080-R10-240-865	8	R1.0	12	24	8	65
2KRRH-080-R10-240-880	8	R1.0	12	24	8	80
2KRRH-080-R10-400-8A0	8	R1.0	12	40	8	100
2KRRH-080-R15-240-865	8	R1.5	12	24	8	65
2KRRH-080-R15-400-8A0	8	R1.5	12	40	8	100
2KRRH-080-R20-240-865	8	R2.0	12	24	8	65
2KRRH-100-R02-300-A70	10	R0.2	15	30	10	70
2KRRH-100-R02-400-AA0	10	R0.2	15	40	10	100
2KRRH-100-R03-300-A70	10	R0.3	15	30	10	70
2KRRH-100-R03-400-AA0	10	R0.3	15	40	10	100
2KRRH-100-R05-300-A70	10	R0.5	15	30	10	70
2KRRH-100-R05-400-AA0	10	R0.5	15	40	10	100
2KRRH-100-R10-300-A70	10	R1.0	15	30	10	70
2KRRH-100-R10-400-AA0	10	R1.0	15	40	10	100
2KRRH-100-R15-300-A70	10	R1.5	15	30	10	70
2KRRH-100-R15-400-AA0	10	R1.5	15	40	10	100
2KRRH-100-R20-300-A70	10	R2.0	15	30	10	70
2KRRH-100-R20-400-AA0	10	R2.0	15	40	10	100
2KRRH-120-R02-300-C80	12	R0.2	18	30	12	80

2KRRH

Fresa Torica a 2 taglienti
2 Flutes Rib Corner Radius End Mills



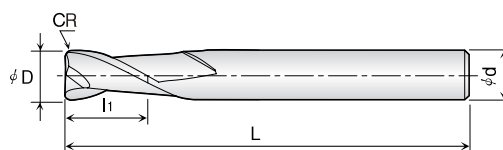
CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KRRH-120-R02-500-CB0	12	R0.2	18	50	12	110
2KRRH-120-R03-300-C80	12	R0.3	18	30	12	80
2KRRH-120-R03-500-CB0	12	R0.3	18	50	12	110
2KRRH-120-R05-300-C80	12	R0.5	18	30	12	80
2KRRH-120-R05-500-CB0	12	R0.5	18	50	12	110
2KRRH-120-R10-300-C80	12	R1.0	18	30	12	80
2KRRH-120-R10-500-CB0	12	R1.0	18	50	12	110
2KRRH-120-R15-300-C80	12	R1.5	18	30	12	80
2KRRH-120-R15-500-CB0	12	R1.5	18	50	12	110
2KRRH-120-R20-300-C80	12	R2.0	18	30	12	80
2KRRH-120-R20-500-CB0	12	R2.0	18	50	12	110
2KRRH-120-R30-300-C80	12	R3.0	18	30	12	80
2KRRH-120-R30-500-CB0	12	R3.0	18	50	12	110
2KRRH-160-R05-400-GB0	16	R0.5	24	40	16	110
2KRRH-160-R05-400-GF0	16	R0.5	24	40	16	150
2KRRH-160-R10-400-GB0	16	R1.0	24	40	16	110
2KRRH-160-R10-400-GF0	16	R1.0	24	40	16	150

2KRCH

Fresa Torica a 2 taglianti
 2 Flutes Corner Radius End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,2-0,25	0 -0,005	R0,02-R0,5	±0,005
0,3-5	0 -0,010	R1-R1,5	±0,010
6-12	0 -0,015	R2-R3	±0,015
16-20	0 -0,020		

CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L1)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (L1)	Shank diameter (d)	Overall length (L)
2KRCH-002-R002-004-445	0,2	R0.02	0,4	4	45
2KRCH-002-R005-004-445	0,2	R0.05	0,4	4	45
2KRCH-003-R002-006-445	0,3	R0.02	0,6	4	45
2KRCH-003-R005-006-445	0,3	R0.05	0,6	4	45
2KRCH-003-R01-006-445	0,3	R0.1	0,6	4	45
2KRCH-004-R002-008-445	0,4	R0.02	0,8	4	45
2KRCH-004-R005-008-445	0,4	R0.05	0,8	4	45
2KRCH-004-R01-008-445	0,4	R0.1	0,8	4	45
2KRCH-005-R002-010-445	0,5	R0.02	1	4	45
2KRCH-005-R005-010-445	0,5	R0.05	1	4	45
2KRCH-005-R01-010-445	0,5	R0.1	1	4	45
2KRCH-006-R002-012-445	0,6	R0.02	1,2	4	45
2KRCH-006-R005-012-445	0,6	R0.05	1,2	4	45
2KRCH-006-R01-012-445	0,6	R0.1	1,2	4	45
2KRCH-006-R02-012-445	0,6	R0.2	1,2	4	45
2KRCH-007-R005-014-445	0,7	R0.05	1,4	4	45
2KRCH-007-R01-014-445	0,7	R0.1	1,4	4	45
2KRCH-007-R02-014-445	0,7	R0.2	1,4	4	45
2KRCH-008-R002-016-445	0,8	R0.02	1,6	4	45
2KRCH-008-R005-016-445	0,8	R0.05	1,6	4	45
2KRCH-008-R01-016-445	0,8	R0.1	1,6	4	45
2KRCH-008-R02-016-445	0,8	R0.2	1,6	4	45
2KRCH-009-R005-018-445	0,9	R0.05	1,8	4	45
2KRCH-009-R01-018-445	0,9	R0.1	1,8	4	45
2KRCH-010-R002-025-445	1	R0.02	2,5	4	45

2KRCH

Fresa Torica a 2 taglienti
 2 Flutes Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
2KRCH-010-R005-025-445	1	R0.05	2,5	4	45
2KRCH-010-R01-025-445	1	R0.1	2,5	4	45
2KRCH-010-R02-025-445	1	R0.2	2,5	4	45
2KRCH-010-R03-025-445	1	R0.3	2,5	4	45
2KRCH-012-R002-032-445	1,2	R0.02	3,2	4	45
2KRCH-012-R005-032-445	1,2	R0.05	3,2	4	45
2KRCH-012-R01-032-445	1,2	R0.1	3,2	4	45
2KRCH-012-R02-032-445	1,2	R0.2	3,2	4	45
2KRCH-012-R03-032-445	1,2	R0.3	3,2	4	45
2KRCH-015-R002-040-445	1,5	R0.02	4	4	45
2KRCH-015-R005-040-445	1,5	R0.05	4	4	45
2KRCH-015-R01-040-445	1,5	R0.1	4	4	45
2KRCH-015-R02-040-445	1,5	R0.2	4	4	45
2KRCH-015-R03-040-445	1,5	R0.3	4	4	45
2KRCH-015-R05-040-445	1,5	R0.5	4	4	45
2KRCH-020-R002-060-445	2	R0.02	6	4	45
2KRCH-020-R005-060-445	2	R0.05	6	4	45
2KRCH-020-R01-060-445	2	R0.1	6	4	45
2KRCH-020-R02-060-445	2	R0.2	6	4	45
2KRCH-020-R03-060-445	2	R0.3	6	4	45
2KRCH-020-R05-060-445	2	R0.5	6	4	45
2KRCH-025-R005-060-450	2,5	R0.05	6	4	50
2KRCH-025-R01-060-450	2,5	R0.1	6	4	50
2KRCH-025-R02-060-450	2,5	R0.2	6	4	50
2KRCH-025-R03-060-450	2,5	R0.3	6	4	50
2KRCH-025-R05-060-450	2,5	R0.5	6	4	50
2KRCH-030-R005-080-660	3	R0.05	8	6	60
2KRCH-030-R01-080-660	3	R0.1	8	6	60
2KRCH-030-R02-080-660	3	R0.2	8	6	60
2KRCH-030-R03-080-660	3	R0.3	8	6	60
2KRCH-030-R05-080-660	3	R0.5	8	6	60
2KRCH-030-R10-080-660	3	R1.0	8	6	60
2KRCH-035-R01-090-670	3,5	R0.1	9	6	70
2KRCH-035-R02-090-670	3,5	R0.2	9	6	70
2KRCH-035-R03-090-670	3,5	R0.3	9	6	70
2KRCH-035-R05-090-670	3,5	R0.5	9	6	70
2KRCH-035-R10-090-670	3,5	R1.0	9	6	70



2KRCH

Fresa Torica a 2 taglienti
2 Flutes Corner Radius End Mills



PAGE
No. 245

CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L _e)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (L _e)	Shank diameter (d)	Overall length (L)
2KRCH-040-R005-100-460	4	R0.05	10	4	60
2KRCH-040-R005-100-670	4	R0.05	10	6	70
2KRCH-040-R01-100-460	4	R0.1	10	4	60
2KRCH-040-R01-100-670	4	R0.1	10	6	70
2KRCH-040-R02-100-460	4	R0.2	10	4	60
2KRCH-040-R02-100-670	4	R0.2	10	6	70
2KRCH-040-R03-100-460	4	R0.3	10	4	60
2KRCH-040-R03-100-670	4	R0.3	10	6	70
2KRCH-040-R05-100-460	4	R0.5	10	4	60
2KRCH-040-R05-100-670	4	R0.5	10	6	70
2KRCH-040-R10-100-460	4	R1.0	10	4	60
2KRCH-040-R10-100-670	4	R1.0	10	6	70
2KRCH-045-R01-110-675	4,5	R0.1	11	6	75
2KRCH-045-R02-110-675	4,5	R0.2	11	6	75
2KRCH-045-R03-110-675	4,5	R0.3	11	6	75
2KRCH-045-R05-110-675	4,5	R0.5	11	6	75
2KRCH-050-R01-130-675	5	R0.1	13	6	75
2KRCH-050-R02-130-675	5	R0.2	13	6	75
2KRCH-050-R03-130-675	5	R0.3	13	6	75
2KRCH-050-R05-130-675	5	R0.5	13	6	75
2KRCH-050-R10-130-675	5	R1.0	13	6	75
2KRCH-060-R005-110-660	6	R0.05	11	6	60
2KRCH-060-R005-130-690	6	R0.05	13	6	90
2KRCH-060-R01-110-660	6	R0.1	11	6	60
2KRCH-060-R01-130-690	6	R0.1	13	6	90
2KRCH-060-R02-110-660	6	R0.2	11	6	60
2KRCH-060-R02-130-690	6	R0.2	13	6	90
2KRCH-060-R03-110-660	6	R0.3	11	6	60
2KRCH-060-R03-130-690	6	R0.3	13	6	90
2KRCH-060-R05-110-660	6	R0.5	11	6	60
2KRCH-060-R05-130-690	6	R0.5	13	6	90
2KRCH-060-R10-110-660	6	R1.0	11	6	60
2KRCH-060-R10-130-690	6	R1.0	13	6	90
2KRCH-060-R15-110-660	6	R1.5	11	6	60
2KRCH-060-R15-130-690	6	R1.5	13	6	90
2KRCH-060-R20-110-660	6	R2.0	11	6	60
2KRCH-060-R20-130-690	6	R2.0	13	6	90

2KRCH

Fresa Torica a 2 taglienti
 2 Flutes Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
2KRCH-060-R25-130-690	6	R2.5	13	6	90
2KRCH-080-R01-160-870	8	R0.1	16	8	70
2KRCH-080-R01-190-8A0	8	R0.1	19	8	100
2KRCH-080-R02-160-870	8	R0.2	16	8	70
2KRCH-080-R02-190-8A0	8	R0.2	19	8	100
2KRCH-080-R03-160-870	8	R0.3	16	8	70
2KRCH-080-R03-190-8A0	8	R0.3	19	8	100
2KRCH-080-R05-160-870	8	R0.5	16	8	70
2KRCH-080-R05-190-8A0	8	R0.5	19	8	100
2KRCH-080-R10-160-870	8	R1.0	16	8	70
2KRCH-080-R10-190-8A0	8	R1.0	19	8	100
2KRCH-080-R15-160-870	8	R1.5	16	8	70
2KRCH-080-R15-190-8A0	8	R1.5	19	8	100
2KRCH-080-R20-160-870	8	R2.0	16	8	70
2KRCH-080-R20-190-8A0	8	R2.0	19	8	100
2KRCH-080-R25-190-8A0	8	R2.5	19	8	100
2KRCH-080-R30-190-8A0	8	R3.0	19	8	100
2KRCH-080-R35-190-8A0	8	R3.5	19	8	100
2KRCH-100-R01-190-A75	10	R0.1	19	10	75
2KRCH-100-R01-220-AA0	10	R0.1	22	10	100
2KRCH-100-R02-190-A75	10	R0.2	19	10	75
2KRCH-100-R02-220-AA0	10	R0.2	22	10	100
2KRCH-100-R03-190-A75	10	R0.3	19	10	75
2KRCH-100-R03-220-AA0	10	R0.3	22	10	100
2KRCH-100-R05-190-A75	10	R0.5	19	10	75
2KRCH-100-R05-220-AA0	10	R0.5	22	10	100
2KRCH-100-R10-190-A75	10	R1.0	19	10	75
2KRCH-100-R10-220-AA0	10	R1.0	22	10	100
2KRCH-100-R15-190-A75	10	R1.5	19	10	75
2KRCH-100-R15-220-AA0	10	R1.5	22	10	100
2KRCH-100-R20-190-A75	10	R2.0	19	10	75
2KRCH-100-R20-220-AA0	10	R2.0	22	10	100
2KRCH-100-R25-220-AA0	10	R2.5	22	10	100
2KRCH-100-R30-220-AA0	10	R3.0	22	10	100
2KRCH-100-R40-220-AA0	10	R4.0	22	10	100
2KRCH-120-R01-220-C80	12	R0.1	22	12	80
2KRCH-120-R01-260-CB0	12	R0.1	26	12	110

2KRCH

Fresa Torica a 2 taglienti
2 Flutes Corner Radius End Mills



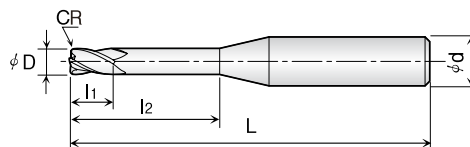
CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Lenght of cut (l ₁)	Shank diameter (d)	Overall lenght (L)
2KRCH-120-R01-220-C80	12	R0.1	22	12	80
2KRCH-120-R01-260-CB0	12	R0.1	26	12	110
2KRCH-120-R02-220-C80	12	R0.2	22	12	80
2KRCH-120-R02-260-CB0	12	R0.2	26	12	110
2KRCH-120-R03-220-C80	12	R0.3	22	12	80
2KRCH-120-R03-260-CB0	12	R0.3	26	12	110
2KRCH-120-R05-220-C80	12	R0.5	22	12	80
2KRCH-120-R05-260-CB0	12	R0.5	26	12	110
2KRCH-120-R05-260-CD0	12	R0.5	26	12	130
2KRCH-120-R10-220-C80	12	R1.0	22	12	80
2KRCH-120-R10-260-CB0	12	R1.0	26	12	110
2KRCH-120-R10-260-CD0	12	R1.0	26	12	130
2KRCH-120-R15-220-C80	12	R1.5	22	12	80
2KRCH-120-R15-260-CB0	12	R1.5	26	12	110
2KRCH-120-R15-260-CD0	12	R1.5	26	12	130
2KRCH-120-R20-220-C80	12	R2.0	22	12	80
2KRCH-120-R20-260-CB0	12	R2.0	26	12	110
2KRCH-120-R20-260-CD0	12	R2.0	26	12	130
2KRCH-120-R25-260-CB0	12	R2.5	26	12	110
2KRCH-120-R30-260-CB0	12	R3.0	26	12	110
2KRCH-120-R40-260-CB0	12	R4.0	26	12	110
2KRCH-120-R50-260-CB0	12	R5.0	26	12	110
2KRCH-160-R05-320-GB0	16	R0.5	32	16	110
2KRCH-160-R05-320-GF0	16	R0.5	32	16	150
2KRCH-160-R10-320-GB0	16	R1.0	32	16	110
2KRCH-160-R10-320-GF0	16	R1.0	32	16	150
2KRCH-160-R15-320-GB0	16	R1.5	32	16	110
2KRCH-160-R20-320-GB0	16	R2.0	32	16	110
2KRCH-160-R30-320-GB0	16	R3.0	32	16	110
2KRCH-200-R05-380-KB0	20	R0.5	38	20	110
2KRCH-200-R05-380-KF0	20	R0.5	38	20	150
2KRCH-200-R10-380-KB0	20	R1.0	38	20	110
2KRCH-200-R10-380-KF0	20	R1.0	38	20	150
2KRCH-200-R15-380-KB0	20	R1.5	38	20	110
2KRCH-200-R20-380-KB0	20	R2.0	38	20	110
2KRCH-200-R30-380-KB0	20	R3.0	38	20	110

4KRRH

Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*



BEETLE



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,2-0,25	0 -0,005	R0,02-R0,5	±0,005
0,3-5	0 -0,010	R1-R1,5	±0,010
6-12	0 -0,015	R2-R3	±0,015
16-20	0 -0,020		

CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (L ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-008-R002-020-445	0,8	R0.02	1,2	2	4	45
4KRRH-008-R002-040-445	0,8	R0.02	1,2	4	4	45
4KRRH-008-R002-060-445	0,8	R0.02	1,2	6	4	45
4KRRH-008-R002-080-445	0,8	R0.02	1,2	8	4	45
4KRRH-008-R002-100-445	0,8	R0.02	1,2	10	4	45
4KRRH-008-R005-020-445	0,8	R0.05	1,2	2	4	45
4KRRH-008-R005-040-445	0,8	R0.05	1,2	4	4	45
4KRRH-008-R005-060-445	0,8	R0.05	1,2	6	4	45
4KRRH-008-R005-080-445	0,8	R0.05	1,2	8	4	45
4KRRH-008-R005-100-445	0,8	R0.05	1,2	10	4	45
4KRRH-008-R01-020-445	0,8	R0.1	1,2	2	4	45
4KRRH-008-R01-040-445	0,8	R0.1	1,2	4	4	45
4KRRH-008-R01-060-445	0,8	R0.1	1,2	6	4	45
4KRRH-008-R01-080-445	0,8	R0.1	1,2	8	4	45
4KRRH-008-R01-100-445	0,8	R0.1	1,2	10	4	45
4KRRH-010-R002-040-445	1	R0.02	1,5	4	4	45
4KRRH-010-R002-060-445	1	R0.02	1,5	6	4	45
4KRRH-010-R002-080-445	1	R0.02	1,5	8	4	45
4KRRH-010-R002-100-445	1	R0.02	1,5	10	4	45
4KRRH-010-R002-120-445	1	R0.02	1,5	12	4	45
4KRRH-010-R002-160-450	1	R0.02	1,5	16	4	50
4KRRH-010-R002-200-450	1	R0.02	1,5	20	4	50
4KRRH-010-R005-040-445	1	R0.05	1,5	4	4	45
4KRRH-010-R005-060-445	1	R0.05	1,5	6	4	45
4KRRH-010-R005-080-445	1	R0.05	1,5	8	4	45

4KRRH

 Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills


CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (l ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-010-R005-100-445	1	R0.05	1,5	10	4	45
4KRRH-010-R005-120-445	1	R0.05	1,5	12	4	45
4KRRH-010-R005-160-450	1	R0.05	1,5	16	4	50
4KRRH-010-R005-200-450	1	R0.05	1,5	20	4	50
4KRRH-010-R01-040-445	1	R0.1	1,5	4	4	45
4KRRH-010-R01-060-445	1	R0.1	1,5	6	4	45
4KRRH-010-R01-080-445	1	R0.1	1,5	8	4	45
4KRRH-010-R01-100-445	1	R0.1	1,5	10	4	45
4KRRH-010-R01-120-445	1	R0.1	1,5	12	4	45
4KRRH-010-R01-160-450	1	R0.1	1,5	16	4	50
4KRRH-010-R01-200-450	1	R0.1	1,5	20	4	50
4KRRH-010-R02-040-445	1	R0.2	1,5	4	4	45
4KRRH-010-R02-060-445	1	R0.2	1,5	6	4	45
4KRRH-010-R02-080-445	1	R0.2	1,5	8	4	45
4KRRH-010-R02-100-445	1	R0.2	1,5	10	4	45
4KRRH-010-R02-120-445	1	R0.2	1,5	12	4	45
4KRRH-010-R02-160-450	1	R0.2	1,5	16	4	50
4KRRH-010-R02-200-450	1	R0.2	1,5	20	4	50
4KRRH-010-R03-040-445	1	R0.3	1,5	4	4	45
4KRRH-010-R03-060-445	1	R0.3	1,5	6	4	45
4KRRH-010-R03-080-445	1	R0.3	1,5	8	4	45
4KRRH-010-R03-100-445	1	R0.3	1,5	10	4	45
4KRRH-010-R03-120-445	1	R0.3	1,5	12	4	45
4KRRH-010-R03-160-450	1	R0.3	1,5	16	4	50
4KRRH-010-R03-200-450	1	R0.3	1,5	20	4	50
4KRRH-012-R002-040-445	1,2	R0.02	1,8	4	4	45
4KRRH-012-R002-060-445	1,2	R0.02	1,8	6	4	45
4KRRH-012-R002-080-445	1,2	R0.02	1,8	8	4	45
4KRRH-012-R002-100-445	1,2	R0.02	1,8	10	4	45
4KRRH-012-R002-120-445	1,2	R0.02	1,8	12	4	45
4KRRH-012-R002-160-450	1,2	R0.02	1,8	16	4	50
4KRRH-012-R002-200-450	1,2	R0.02	1,8	20	4	50
4KRRH-012-R005-040-445	1,2	R0.05	1,8	4	4	45
4KRRH-012-R005-060-445	1,2	R0.05	1,8	6	4	45
4KRRH-012-R005-080-445	1,2	R0.05	1,8	8	4	45

4KRRH

Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (L ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-012-R005-100-445	1,2	R0.05	1,8	10	4	45
4KRRH-012-R005-120-445	1,2	R0.05	1,8	12	4	45
4KRRH-012-R005-160-450	1,2	R0.05	1,8	16	4	50
4KRRH-012-R005-200-450	1,2	R0.05	1,8	20	4	50
4KRRH-012-R01-040-445	1,2	R0.1	1,8	4	4	45
4KRRH-012-R01-060-445	1,2	R0.1	1,8	6	4	45
4KRRH-012-R01-080-445	1,2	R0.1	1,8	8	4	45
4KRRH-012-R01-100-445	1,2	R0.1	1,8	10	4	45
4KRRH-012-R01-120-445	1,2	R0.1	1,8	12	4	45
4KRRH-012-R01-160-450	1,2	R0.1	1,8	16	4	50
4KRRH-012-R01-200-450	1,2	R0.1	1,8	20	4	50
4KRRH-012-R02-040-445	1,2	R0.2	1,8	4	4	45
4KRRH-012-R02-060-445	1,2	R0.2	1,8	6	4	45
4KRRH-012-R02-080-445	1,2	R0.2	1,8	8	4	45
4KRRH-012-R02-100-445	1,2	R0.2	1,8	10	4	45
4KRRH-012-R02-120-445	1,2	R0.2	1,8	12	4	45
4KRRH-012-R02-160-450	1,2	R0.2	1,8	16	4	50
4KRRH-012-R02-200-450	1,2	R0.2	1,8	20	4	50
4KRRH-012-R03-040-445	1,2	R0.3	1,8	4	4	45
4KRRH-012-R03-060-445	1,2	R0.3	1,8	6	4	45
4KRRH-012-R03-080-445	1,2	R0.3	1,8	8	4	45
4KRRH-012-R03-100-445	1,2	R0.3	1,8	10	4	45
4KRRH-012-R03-120-445	1,2	R0.3	1,8	12	4	45
4KRRH-012-R03-160-450	1,2	R0.3	1,8	16	4	50
4KRRH-012-R03-200-450	1,2	R0.3	1,8	20	4	50
4KRRH-015-R002-040-445	1,5	R0.02	2,3	4	4	45
4KRRH-015-R002-060-445	1,5	R0.02	2,3	6	4	45
4KRRH-015-R002-080-445	1,5	R0.02	2,3	8	4	45
4KRRH-015-R002-100-445	1,5	R0.02	2,3	10	4	45
4KRRH-015-R002-120-445	1,5	R0.02	2,3	12	4	45
4KRRH-015-R002-160-450	1,5	R0.02	2,3	16	4	50
4KRRH-015-R002-200-450	1,5	R0.02	2,3	20	4	50
4KRRH-015-R002-220-460	1,5	R0.02	2,3	22	4	60
4KRRH-015-R002-250-460	1,5	R0.02	2,3	25	4	60
4KRRH-015-R005-040-445	1,5	R0.05	2,3	4	4	45

4KRRH

Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (l ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-015-R005-060-445	1,5	R0.05	2,3	6	4	45
4KRRH-015-R005-080-445	1,5	R0.05	2,3	8	4	45
4KRRH-015-R005-100-445	1,5	R0.05	2,3	10	4	45
4KRRH-015-R005-120-445	1,5	R0.05	2,3	12	4	45
4KRRH-015-R005-160-450	1,5	R0.05	2,3	16	4	50
4KRRH-015-R005-200-450	1,5	R0.05	2,3	20	4	50
4KRRH-015-R005-220-460	1,5	R0.05	2,3	22	4	60
4KRRH-015-R005-250-460	1,5	R0.05	2,3	25	4	60
4KRRH-015-R01-040-445	1,5	R0.1	2,3	4	4	45
4KRRH-015-R01-060-445	1,5	R0.1	2,3	6	4	45
4KRRH-015-R01-080-445	1,5	R0.1	2,3	8	4	45
4KRRH-015-R01-100-445	1,5	R0.1	2,3	10	4	45
4KRRH-015-R01-120-445	1,5	R0.1	2,3	12	4	45
4KRRH-015-R01-160-450	1,5	R0.1	2,3	16	4	50
4KRRH-015-R01-200-450	1,5	R0.1	2,3	20	4	50
4KRRH-015-R01-220-460	1,5	R0.1	2,3	22	4	60
4KRRH-015-R01-250-460	1,5	R0.1	2,3	25	4	60
4KRRH-015-R02-040-445	1,5	R0.2	2,3	4	4	45
4KRRH-015-R02-060-445	1,5	R0.2	2,3	6	4	45
4KRRH-015-R02-080-445	1,5	R0.2	2,3	8	4	45
4KRRH-015-R02-100-445	1,5	R0.2	2,3	10	4	45
4KRRH-015-R02-120-445	1,5	R0.2	2,3	12	4	45
4KRRH-015-R02-160-450	1,5	R0.2	2,3	16	4	50
4KRRH-015-R02-200-450	1,5	R0.2	2,3	20	4	50
4KRRH-015-R02-220-460	1,5	R0.2	2,3	22	4	60
4KRRH-015-R02-250-460	1,5	R0.2	2,3	25	4	60
4KRRH-015-R03-040-445	1,5	R0.3	2,3	4	4	45
4KRRH-015-R03-060-445	1,5	R0.3	2,3	6	4	45
4KRRH-015-R03-080-445	1,5	R0.3	2,3	8	4	45
4KRRH-015-R03-100-445	1,5	R0.3	2,3	10	4	45
4KRRH-015-R03-120-445	1,5	R0.3	2,3	12	4	45
4KRRH-015-R03-160-450	1,5	R0.3	2,3	16	4	50
4KRRH-015-R03-200-450	1,5	R0.3	2,3	20	4	50
4KRRH-015-R03-220-460	1,5	R0.3	2,3	22	4	60
4KRRH-015-R03-250-460	1,5	R0.3	2,3	25	4	60

4KRRH

Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (L ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-015-R05-040-445	1,5	R0.5	2,3	4	4	45
4KRRH-015-R05-060-445	1,5	R0.5	2,3	6	4	45
4KRRH-015-R05-080-445	1,5	R0.5	2,3	8	4	45
4KRRH-015-R05-100-445	1,5	R0.5	2,3	10	4	45
4KRRH-015-R05-120-445	1,5	R0.5	2,3	12	4	45
4KRRH-015-R05-160-450	1,5	R0.5	2,3	16	4	50
4KRRH-015-R05-200-450	1,5	R0.5	2,3	20	4	50
4KRRH-015-R05-220-460	1,5	R0.5	2,3	22	4	60
4KRRH-015-R05-250-460	1,5	R0.5	2,3	25	4	60
4KRRH-020-R002-040-445	2	R0.02	3	4	4	45
4KRRH-020-R002-060-445	2	R0.02	3	6	4	45
4KRRH-020-R002-080-445	2	R0.02	3	8	4	45
4KRRH-020-R002-100-445	2	R0.02	3	10	4	45
4KRRH-020-R002-120-445	2	R0.02	3	12	4	45
4KRRH-020-R002-140-450	2	R0.02	3	14	4	50
4KRRH-020-R002-160-450	2	R0.02	3	16	4	50
4KRRH-020-R002-180-450	2	R0.02	3	18	4	50
4KRRH-020-R002-200-450	2	R0.02	3	20	4	50
4KRRH-020-R002-220-460	2	R0.02	3	22	4	60
4KRRH-020-R002-250-460	2	R0.02	3	25	4	60
4KRRH-020-R002-300-470	2	R0.02	3	30	4	70
4KRRH-020-R002-350-470	2	R0.02	3	35	4	70
4KRRH-020-R005-040-445	2	R0.05	3	4	4	45
4KRRH-020-R005-060-445	2	R0.05	3	6	4	45
4KRRH-020-R005-080-445	2	R0.05	3	8	4	45
4KRRH-020-R005-100-445	2	R0.05	3	10	4	45
4KRRH-020-R005-120-445	2	R0.05	3	12	4	45
4KRRH-020-R005-140-450	2	R0.05	3	14	4	50
4KRRH-020-R005-160-450	2	R0.05	3	16	4	50
4KRRH-020-R005-180-450	2	R0.05	3	18	4	50
4KRRH-020-R005-200-450	2	R0.05	3	20	4	50
4KRRH-020-R005-220-460	2	R0.05	3	22	4	60
4KRRH-020-R005-250-460	2	R0.05	3	25	4	60
4KRRH-020-R005-300-470	2	R0.05	3	30	4	70
4KRRH-020-R005-350-470	2	R0.05	3	35	4	70

4KRRH

Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (l ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-020-R01-040-445	2	R0.1	3	4	4	45
4KRRH-020-R01-060-445	2	R0.1	3	6	4	45
4KRRH-020-R01-080-445	2	R0.1	3	8	4	45
4KRRH-020-R01-100-445	2	R0.1	3	10	4	45
4KRRH-020-R01-120-445	2	R0.1	3	12	4	45
4KRRH-020-R01-140-450	2	R0.1	3	14	4	50
4KRRH-020-R01-160-450	2	R0.1	3	16	4	50
4KRRH-020-R01-180-450	2	R0.1	3	18	4	50
4KRRH-020-R01-200-450	2	R0.1	3	20	4	50
4KRRH-020-R01-220-460	2	R0.1	3	22	4	60
4KRRH-020-R01-250-460	2	R0.1	3	25	4	60
4KRRH-020-R01-300-470	2	R0.1	3	30	4	70
4KRRH-020-R01-350-470	2	R0.1	3	35	4	70
4KRRH-020-R02-040-445	2	R0.2	3	4	4	45
4KRRH-020-R02-060-445	2	R0.2	3	6	4	45
4KRRH-020-R02-080-445	2	R0.2	3	8	4	45
4KRRH-020-R02-100-445	2	R0.2	3	10	4	45
4KRRH-020-R02-120-445	2	R0.2	3	12	4	45
4KRRH-020-R02-140-450	2	R0.2	3	14	4	50
4KRRH-020-R02-160-450	2	R0.2	3	16	4	50
4KRRH-020-R02-180-450	2	R0.2	3	18	4	50
4KRRH-020-R02-200-450	2	R0.2	3	20	4	50
4KRRH-020-R02-220-460	2	R0.2	3	22	4	60
4KRRH-020-R02-250-460	2	R0.2	3	25	4	60
4KRRH-020-R02-300-470	2	R0.2	3	30	4	70
4KRRH-020-R02-350-470	2	R0.2	3	35	4	70
4KRRH-020-R03-040-445	2	R0.3	3	4	4	45
4KRRH-020-R03-060-445	2	R0.3	3	6	4	45
4KRRH-020-R03-080-445	2	R0.3	3	8	4	45
4KRRH-020-R03-100-445	2	R0.3	3	10	4	45
4KRRH-020-R03-120-445	2	R0.3	3	12	4	45
4KRRH-020-R03-140-450	2	R0.3	3	14	4	50
4KRRH-020-R03-160-450	2	R0.3	3	16	4	50
4KRRH-020-R03-180-450	2	R0.3	3	18	4	50
4KRRH-020-R03-200-450	2	R0.3	3	20	4	50

4KRRH

Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (L ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-020-R03-220-460	2	R0.3	3	22	4	60
4KRRH-020-R03-250-460	2	R0.3	3	25	4	60
4KRRH-020-R03-300-470	2	R0.3	3	30	4	70
4KRRH-020-R03-350-470	2	R0.3	3	35	4	70
4KRRH-020-R05-040-445	2	R0.5	3	4	4	45
4KRRH-020-R05-060-445	2	R0.5	3	6	4	45
4KRRH-020-R05-080-445	2	R0.5	3	8	4	45
4KRRH-020-R05-100-445	2	R0.5	3	10	4	45
4KRRH-020-R05-120-445	2	R0.5	3	12	4	45
4KRRH-020-R05-140-450	2	R0.5	3	14	4	50
4KRRH-020-R05-160-450	2	R0.5	3	16	4	50
4KRRH-020-R05-180-450	2	R0.5	3	18	4	50
4KRRH-020-R05-200-450	2	R0.5	3	20	4	50
4KRRH-020-R05-220-460	2	R0.5	3	22	4	60
4KRRH-020-R05-250-460	2	R0.5	3	25	4	60
4KRRH-020-R05-300-470	2	R0.5	3	30	4	70
4KRRH-020-R05-350-470	2	R0.5	3	35	4	70
4KRRH-025-R01-060-445	2,5	R0.1	3,8	6	4	45
4KRRH-025-R01-080-445	2,5	R0.1	3,8	8	4	45
4KRRH-025-R01-100-445	2,5	R0.1	3,8	10	4	45
4KRRH-025-R01-120-445	2,5	R0.1	3,8	12	4	45
4KRRH-025-R01-160-450	2,5	R0.1	3,8	16	4	50
4KRRH-025-R01-200-450	2,5	R0.1	3,8	20	4	50
4KRRH-025-R01-250-460	2,5	R0.1	3,8	25	4	60
4KRRH-025-R01-300-470	2,5	R0.1	3,8	30	4	70
4KRRH-025-R02-060-445	2,5	R0.2	3,8	6	4	45
4KRRH-025-R02-080-445	2,5	R0.2	3,8	8	4	45
4KRRH-025-R02-100-445	2,5	R0.2	3,8	10	4	45
4KRRH-025-R02-120-445	2,5	R0.2	3,8	12	4	45
4KRRH-025-R02-160-450	2,5	R0.2	3,8	16	4	50
4KRRH-025-R02-200-450	2,5	R0.2	3,8	20	4	50
4KRRH-025-R02-250-460	2,5	R0.2	3,8	25	4	60
4KRRH-025-R02-300-470	2,5	R0.2	3,8	30	4	70
4KRRH-025-R03-060-445	2,5	R0.3	3,8	6	4	45
4KRRH-025-R03-080-445	2,5	R0.3	3,8	8	4	45

4KRRH

Fresa Torica a 4 taglienti
4 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (l ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-025-R03-100-445	2,5	R0.3	3,8	10	4	45
4KRRH-025-R03-120-445	2,5	R0.3	3,8	12	4	45
4KRRH-025-R03-160-450	2,5	R0.3	3,8	16	4	50
4KRRH-025-R03-200-450	2,5	R0.3	3,8	20	4	50
4KRRH-025-R03-250-460	2,5	R0.3	3,8	25	4	60
4KRRH-025-R03-300-470	2,5	R0.3	3,8	30	4	70
4KRRH-025-R05-060-445	2,5	R0.5	3,8	6	4	45
4KRRH-025-R05-080-445	2,5	R0.5	3,8	8	4	45
4KRRH-025-R05-100-445	2,5	R0.5	3,8	10	4	45
4KRRH-025-R05-120-445	2,5	R0.5	3,8	12	4	45
4KRRH-025-R05-160-450	2,5	R0.5	3,8	16	4	50
4KRRH-025-R05-200-450	2,5	R0.5	3,8	20	4	50
4KRRH-025-R05-250-460	2,5	R0.5	3,8	25	4	60
4KRRH-025-R05-300-470	2,5	R0.5	3,8	30	4	70
4KRRH-030-R01-080-650	3	R0.1	4,5	8	6	50
4KRRH-030-R01-100-450	3	R0.1	4,5	10	4	50
4KRRH-030-R01-100-650	3	R0.1	4,5	10	6	50
4KRRH-030-R01-120-650	3	R0.1	4,5	12	6	50
4KRRH-030-R01-160-660	3	R0.1	4,5	16	6	60
4KRRH-030-R01-200-660	3	R0.1	4,5	20	6	60
4KRRH-030-R01-250-665	3	R0.1	4,5	25	6	65
4KRRH-030-R01-300-670	3	R0.1	4,5	30	6	70
4KRRH-030-R01-350-680	3	R0.1	4,5	35	6	80
4KRRH-030-R01-400-680	3	R0.1	4,5	40	6	80
4KRRH-030-R01-500-6A0	3	R0.1	4,5	50	6	100
4KRRH-030-R02-100-350	3	R0.2	4,5	10	3	50
4KRRH-030-R02-100-450	3	R0.2	4,5	10	4	50
4KRRH-030-R02-080-650	3	R0.2	4,5	8	6	50
4KRRH-030-R02-100-650	3	R0.2	4,5	10	6	50
4KRRH-030-R02-120-650	3	R0.2	4,5	12	6	50
4KRRH-030-R02-160-660	3	R0.2	4,5	16	6	60
4KRRH-030-R02-200-660	3	R0.2	4,5	20	6	60
4KRRH-030-R02-250-665	3	R0.2	4,5	25	6	65
4KRRH-030-R02-300-670	3	R0.2	4,5	30	6	70
4KRRH-030-R02-350-680	3	R0.2	4,5	35	6	80

4KRRH

Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (L ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-030-R02-400-680	3	R0.2	4,5	40	6	80
4KRRH-030-R02-500-6A0	3	R0.2	4,5	50	6	100
4KRRH-030-R03-080-650	3	R0.3	4,5	8	6	50
4KRRH-030-R03-100-350	3	R0.3	4,5	10	3	50
4KRRH-030-R03-100-450	3	R0.3	4,5	10	4	50
4KRRH-030-R03-100-650	3	R0.3	4,5	10	6	50
4KRRH-030-R03-120-650	3	R0.3	4,5	12	6	50
4KRRH-030-R03-160-660	3	R0.3	4,5	16	6	60
4KRRH-030-R03-200-660	3	R0.3	4,5	20	6	60
4KRRH-030-R03-250-665	3	R0.3	4,5	25	6	65
4KRRH-030-R03-300-670	3	R0.3	4,5	30	6	70
4KRRH-030-R03-350-680	3	R0.3	4,5	35	6	80
4KRRH-030-R03-400-680	3	R0.3	4,5	40	6	80
4KRRH-030-R03-500-6A0	3	R0.3	4,5	50	6	100
4KRRH-030-R05-080-650	3	R0.5	4,5	8	6	50
4KRRH-030-R05-100-350	3	R0.5	4,5	10	3	50
4KRRH-030-R05-100-450	3	R0.5	4,5	10	4	50
4KRRH-030-R05-100-650	3	R0.5	4,5	10	6	50
4KRRH-030-R05-120-650	3	R0.5	4,5	12	6	50
4KRRH-030-R05-160-660	3	R0.5	4,5	16	6	60
4KRRH-030-R05-200-660	3	R0.5	4,5	20	6	60
4KRRH-030-R05-250-665	3	R0.5	4,5	25	6	65
4KRRH-030-R05-300-670	3	R0.5	4,5	30	6	70
4KRRH-030-R05-350-675	3	R0.5	4,5	35	6	75
4KRRH-030-R05-400-680	3	R0.5	4,5	40	6	80
4KRRH-030-R05-500-6A0	3	R0.5	4,5	50	6	100
4KRRH-030-R10-080-650	3	R1.0	4,5	8	6	50
4KRRH-030-R10-100-350	3	R1.0	4,5	10	3	50
4KRRH-030-R10-100-450	3	R1.0	4,5	10	4	50
4KRRH-030-R10-100-650	3	R1.0	4,5	10	6	50
4KRRH-030-R10-120-650	3	R1.0	4,5	12	6	50
4KRRH-030-R10-160-660	3	R1.0	4,5	16	6	60
4KRRH-030-R10-200-660	3	R1.0	4,5	20	6	60
4KRRH-030-R10-250-665	3	R1.0	4,5	25	6	65
4KRRH-030-R10-300-670	3	R1.0	4,5	30	6	70

4KRRH

Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (l ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-030-R10-350-680	3	R1.0	4,5	35	6	80
4KRRH-030-R10-400-680	3	R1.0	4,5	40	6	80
4KRRH-030-R10-500-6A0	3	R1.0	4,5	50	6	100
4KRRH-040-R01-080-650	4	R0.1	6	8	6	50
4KRRH-040-R01-100-650	4	R0.1	6	10	6	50
4KRRH-040-R01-120-450	4	R0.1	6	12	4	50
4KRRH-040-R01-120-650	4	R0.1	6	12	6	50
4KRRH-040-R01-160-660	4	R0.1	6	16	6	60
4KRRH-040-R01-200-660	4	R0.1	6	20	6	60
4KRRH-040-R01-250-665	4	R0.1	6	25	6	65
4KRRH-040-R01-300-670	4	R0.1	6	30	6	70
4KRRH-040-R01-350-680	4	R0.1	6	35	6	80
4KRRH-040-R01-400-680	4	R0.1	6	40	6	80
4KRRH-040-R01-450-690	4	R0.1	6	45	6	90
4KRRH-040-R01-500-6A0	4	R0.1	6	50	6	100
4KRRH-040-R02-080-650	4	R0.2	6	8	6	50
4KRRH-040-R02-100-650	4	R0.2	6	10	6	50
4KRRH-040-R02-120-450	4	R0.2	6	12	4	50
4KRRH-040-R02-120-650	4	R0.2	6	12	6	50
4KRRH-040-R02-160-660	4	R0.2	6	16	6	60
4KRRH-040-R02-200-660	4	R0.2	6	20	6	60
4KRRH-040-R02-250-665	4	R0.2	6	25	6	65
4KRRH-040-R02-300-670	4	R0.2	6	30	6	70
4KRRH-040-R02-350-680	4	R0.2	6	35	6	80
4KRRH-040-R02-400-680	4	R0.2	6	40	6	80
4KRRH-040-R02-450-690	4	R0.2	6	45	6	90
4KRRH-040-R02-500-6A0	4	R0.2	6	50	6	100
4KRRH-040-R03-080-650	4	R0.3	6	8	6	50
4KRRH-040-R03-100-650	4	R0.3	6	10	6	50
4KRRH-040-R03-120-450	4	R0.3	6	12	4	50
4KRRH-040-R03-120-650	4	R0.3	6	12	6	50
4KRRH-040-R03-160-660	4	R0.3	6	16	6	60
4KRRH-040-R03-200-660	4	R0.3	6	20	6	60
4KRRH-040-R03-250-665	4	R0.3	6	25	6	65
4KRRH-040-R03-300-670	4	R0.3	6	30	6	70

4KRRH

Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (l ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-040-R03-350-680	4	R0.3	6	35	6	80
4KRRH-040-R03-400-680	4	R0.3	6	40	6	80
4KRRH-040-R03-450-690	4	R0.3	6	45	6	90
4KRRH-040-R03-500-6A0	4	R0.3	6	50	6	100
4KRRH-040-R05-080-650	4	R0.5	6	8	6	50
4KRRH-040-R05-100-650	4	R0.5	6	10	6	50
4KRRH-040-R05-120-450	4	R0.5	6	12	4	50
4KRRH-040-R05-120-650	4	R0.5	6	12	6	50
4KRRH-040-R05-160-450	4	R0.5	6	16	4	50
4KRRH-040-R05-160-4A0	4	R0.5	6	16	4	100
4KRRH-040-R05-160-660	4	R0.5	6	16	6	60
4KRRH-040-R05-200-660	4	R0.5	6	20	6	60
4KRRH-040-R05-250-665	4	R0.5	6	25	6	65
4KRRH-040-R05-300-670	4	R0.5	6	30	6	70
4KRRH-040-R05-350-680	4	R0.5	6	35	6	80
4KRRH-040-R05-400-680	4	R0.5	6	40	6	80
4KRRH-040-R05-450-690	4	R0.5	6	45	6	90
4KRRH-040-R05-500-6A0	4	R0.5	6	50	6	100
4KRRH-040-R10-080-650	4	R1.0	6	8	6	50
4KRRH-040-R10-100-650	4	R1.0	6	10	6	50
4KRRH-040-R10-120-450	4	R1.0	6	12	4	50
4KRRH-040-R10-120-650	4	R1.0	6	12	6	50
4KRRH-040-R10-160-450	4	R1.0	6	16	4	50
4KRRH-040-R10-160-660	4	R1.0	6	16	6	60
4KRRH-040-R10-200-660	4	R1.0	6	20	6	60
4KRRH-040-R10-250-665	4	R1.0	6	25	6	65
4KRRH-040-R10-300-670	4	R1.0	6	30	6	70
4KRRH-040-R10-350-680	4	R1.0	6	35	6	80
4KRRH-040-R10-400-680	4	R1.0	6	40	6	80
4KRRH-040-R10-450-690	4	R1.0	6	45	6	90
4KRRH-040-R10-500-6A0	4	R1.0	6	50	6	100
4KRRH-050-R01-180-660	5	R0.1	7,5	18	6	60
4KRRH-050-R01-300-670	5	R0.1	7,5	30	6	70
4KRRH-050-R01-400-680	5	R0.1	7,5	40	6	80
4KRRH-050-R01-500-6A0	5	R0.1	7,5	50	6	100

4KRRH

 Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills


CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (l ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-050-R02-180-660	5	R0.2	7,5	18	6	60
4KRRH-050-R02-300-670	5	R0.2	7,5	30	6	70
4KRRH-050-R02-400-680	5	R0.2	7,5	40	6	80
4KRRH-050-R02-500-6A0	5	R0.2	7,5	50	6	100
4KRRH-050-R03-180-660	5	R0.3	7,5	18	6	60
4KRRH-050-R03-300-670	5	R0.3	7,5	30	6	70
4KRRH-050-R03-400-680	5	R0.3	7,5	40	6	80
4KRRH-050-R03-500-6A0	5	R0.3	7,5	50	6	100
4KRRH-050-R05-180-660	5	R0.5	7,5	18	6	60
4KRRH-050-R05-300-670	5	R0.5	7,5	30	6	70
4KRRH-050-R05-400-680	5	R0.5	7,5	40	6	80
4KRRH-050-R05-500-6A0	5	R0.5	7,5	50	6	100
4KRRH-050-R10-180-660	5	R1.0	7,5	18	6	60
4KRRH-050-R10-300-670	5	R1.0	7,5	30	6	70
4KRRH-050-R10-400-680	5	R1.0	7,5	40	6	80
4KRRH-050-R10-500-6A0	5	R1.0	7,5	50	6	100
4KRRH-060-R01-200-660	6	R0.1	9	20	6	60
4KRRH-060-R01-400-690	6	R0.1	9	40	6	90
4KRRH-060-R01-500-6A0	6	R0.1	9	50	6	100
4KRRH-060-R02-200-660	6	R0.2	9	20	6	60
4KRRH-060-R02-200-675	6	R0.2	9	20	6	75
4KRRH-060-R02-200-6A0	6	R0.2	9	20	6	100
4KRRH-060-R02-300-680	6	R0.2	9	30	6	80
4KRRH-060-R02-400-690	6	R0.2	9	40	6	90
4KRRH-060-R02-500-6A0	6	R0.2	9	50	6	100
4KRRH-060-R03-200-660	6	R0.3	9	20	6	60
4KRRH-060-R03-200-675	6	R0.3	9	20	6	75
4KRRH-060-R03-200-6A0	6	R0.3	9	20	6	100
4KRRH-060-R03-300-680	6	R0.3	9	30	6	80
4KRRH-060-R03-400-690	6	R0.3	9	40	6	90
4KRRH-060-R03-500-6A0	6	R0.3	9	50	6	100
4KRRH-060-R05-200-660	6	R0.5	9	20	6	60
4KRRH-060-R05-200-675	6	R0.5	9	20	6	75
4KRRH-060-R05-200-6A0	6	R0.5	9	20	6	100
4KRRH-060-R05-300-680	6	R0.5	9	30	6	80

4KRRH

Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (l ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-060-R05-400-690	6	R0.5	9	40	6	90
4KRRH-060-R05-500-6A0	6	R0.5	9	50	6	100
4KRRH-060-R10-200-660	6	R1.0	9	20	6	60
4KRRH-060-R10-200-675	6	R1.0	9	20	6	75
4KRRH-060-R10-200-6A0	6	R1.0	9	20	6	100
4KRRH-060-R10-300-680	6	R1.0	9	30	6	80
4KRRH-060-R10-400-690	6	R1.0	9	40	6	90
4KRRH-060-R10-500-6A0	6	R1.0	9	50	6	100
4KRRH-060-R15-200-660	6	R1.5	9	20	6	60
4KRRH-060-R15-200-675	6	R1.5	9	20	6	75
4KRRH-060-R15-200-6A0	6	R1.5	9	20	6	100
4KRRH-060-R15-300-680	6	R1.5	9	30	6	80
4KRRH-060-R15-400-690	6	R1.5	9	40	6	90
4KRRH-060-R15-500-6A0	6	R1.5	9	50	6	100
4KRRH-060-R20-200-660	6	R2.0	9	20	6	60
4KRRH-060-R20-200-675	6	R2.0	9	20	6	75
4KRRH-060-R20-200-6A0	6	R2.0	9	20	6	100
4KRRH-060-R20-400-690	6	R2.0	9	40	6	90
4KRRH-080-R01-240-865	8	R0.1	12	24	8	65
4KRRH-080-R02-240-865	8	R0.2	12	24	8	65
4KRRH-080-R02-240-875	8	R0.2	12	24	8	75
4KRRH-080-R02-240-8A0	8	R0.2	12	24	8	100
4KRRH-080-R03-240-865	8	R0.3	12	24	8	65
4KRRH-080-R03-240-875	8	R0.3	12	24	8	75
4KRRH-080-R03-240-8A0	8	R0.3	12	24	8	100
4KRRH-080-R05-240-865	8	R0.5	12	24	8	65
4KRRH-080-R05-240-875	8	R0.5	12	24	8	75
4KRRH-080-R05-240-8A0	8	R0.5	12	24	8	100
4KRRH-080-R05-300-890	8	R0.5	12	30	8	90
4KRRH-080-R05-400-8A0	8	R0.5	12	40	8	100
4KRRH-080-R10-240-865	8	R1.0	12	24	8	65
4KRRH-080-R10-240-875	8	R1.0	12	24	8	75
4KRRH-080-R10-240-8A0	8	R1.0	12	24	8	100
4KRRH-080-R10-240-8C5	8	R1.0	12	24	8	125
4KRRH-080-R10-300-890	8	R1.0	12	30	8	90

4KRRH

Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (L ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-080-R10-400-8A0	8	R1.0	12	40	8	100
4KRRH-080-R15-240-865	8	R1.5	12	24	8	65
4KRRH-080-R15-240-875	8	R1.5	12	24	8	75
4KRRH-080-R15-240-8A0	8	R1.5	12	24	8	100
4KRRH-080-R15-400-8A0	8	R1.5	12	40	8	100
4KRRH-080-R20-240-865	8	R2.0	12	24	8	65
4KRRH-080-R20-240-875	8	R2.0	12	24	8	75
4KRRH-080-R20-300-890	8	R2.0	12	30	8	90
4KRRH-100-R02-300-A70	10	R0.2	15	30	10	70
4KRRH-100-R02-300-A75	10	R0.2	15	30	10	75
4KRRH-100-R02-300-AA0	10	R0.2	15	30	10	100
4KRRH-100-R03-300-A70	10	R0.3	15	30	10	70
4KRRH-100-R03-300-A75	10	R0.3	15	30	10	75
4KRRH-100-R03-300-AA0	10	R0.3	15	30	10	100
4KRRH-100-R05-300-A70	10	R0.5	15	30	10	70
4KRRH-100-R05-300-A75	10	R0.5	15	30	10	75
4KRRH-100-R05-300-AA0	10	R0.5	15	30	10	100
4KRRH-100-R05-400-AA0	10	R0.5	15	40	10	100
4KRRH-100-R10-300-A70	10	R1.0	15	30	10	70
4KRRH-100-R10-300-A75	10	R1.0	15	30	10	75
4KRRH-100-R10-300-AA0	10	R1.0	15	30	10	100
4KRRH-100-R10-300-AF0	10	R1.0	15	30	10	150
4KRRH-100-R10-400-AA0	10	R1.0	15	40	10	100
4KRRH-100-R15-300-A70	10	R1.5	15	30	10	70
4KRRH-100-R15-300-A75	10	R1.5	15	30	10	75
4KRRH-100-R15-300-AA0	10	R1.5	15	30	10	100
4KRRH-100-R15-400-AA0	10	R1.5	15	40	10	100
4KRRH-100-R20-300-A70	10	R2.0	15	30	10	70
4KRRH-100-R20-300-A75	10	R2.0	15	30	10	75
4KRRH-100-R20-300-AA0	10	R2.0	15	30	10	100
4KRRH-100-R20-400-AA0	10	R2.0	15	40	10	100
4KRRH-100-R25-300-A70	10	R2.5	15	30	10	70
4KRRH-120-R03-300-C80	12	R0.3	18	30	12	80
4KRRH-120-R03-300-CB0	12	R0.3	18	30	12	110
4KRRH-120-R05-300-C80	12	R0.5	18	30	12	80

4KRRH

Fresa Torica a 4 taglienti
 4 Flutes Rib Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Effective Length (l ₂)	Shank diameter (d)	Shank Diameter (d)	Overall length (L)
4KRRH-120-R05-300-CB0	12	R0.5	18	30	12	110
4KRRH-120-R05-300-CF0	12	R0.5	18	30	12	150
4KRRH-120-R05-400-CB0	12	R0.5	18	40	12	110
4KRRH-120-R10-300-C80	12	R1.0	18	30	12	80
4KRRH-120-R10-300-CB0	12	R1.0	18	30	12	110
4KRRH-120-R10-300-CF0	12	R1.0	18	30	12	150
4KRRH-120-R10-400-CB0	12	R1.0	18	40	12	110
4KRRH-120-R15-300-C80	12	R1.5	18	30	12	80
4KRRH-120-R15-300-CB0	12	R1.5	18	30	12	110
4KRRH-120-R15-400-CB0	12	R1.5	18	40	12	110
4KRRH-120-R20-300-C80	12	R2.0	18	30	12	80
4KRRH-120-R20-300-CB0	12	R2.0	18	30	12	110
4KRRH-120-R20-300-CF0	12	R2.0	18	30	12	150
4KRRH-120-R20-300-CK0	12	R2.0	18	30	12	200
4KRRH-120-R20-400-CB0	12	R2.0	18	40	12	110
4KRRH-120-R30-300-C80	12	R3.0	18	30	12	80
4KRRH-120-R30-300-CB0	12	R3.0	18	30	12	110

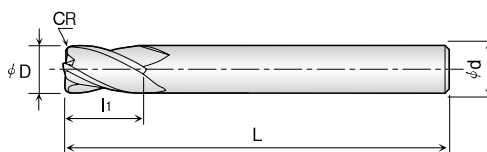


4KRCH

Fresa Torica a 4 taglienti
 4 Flutes Corner Radius End Mills



- Acciai bonificati HRC 40-55
- Hardened steels HRC 40-55
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,2-0,25	0 -0,005	R0,02-R0,5	$\pm 0,005$
0,3-5	0 -0,010	R1-R1,5	$\pm 0,010$
6-12	0 -0,015	R2-R3	$\pm 0,015$
16-20	0 -0,020		

CODICE	Diametro di testa (D)	Raggio torico (CR)	Lunghezza elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Corner Radius (CR)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
4KRCH-010-R002-025-445	1	R0.02	2,5	4	45
4KRCH-010-R005-025-445	1	R0.05	2,5	4	45
4KRCH-010-R01-025-445	1	R0.1	2,5	4	45
4KRCH-010-R02-025-445	1	R0.2	2,5	4	45
4KRCH-010-R03-025-445	1	R0.3	2,5	4	45
4KRCH-012-R002-032-445	1,2	R0.02	3,2	4	45
4KRCH-012-R005-032-445	1,2	R0.05	3,2	4	45
4KRCH-012-R01-032-445	1,2	R0.1	3,2	4	45
4KRCH-012-R02-032-445	1,2	R0.2	3,2	4	45
4KRCH-012-R03-032-445	1,2	R0.3	3,2	4	45
4KRCH-015-R002-040-445	1,5	R0.02	4	4	45
4KRCH-015-R005-040-445	1,5	R0.05	4	4	45
4KRCH-015-R01-040-445	1,5	R0.1	4	4	45
4KRCH-015-R02-040-445	1,5	R0.2	4	4	45
4KRCH-015-R03-040-445	1,5	R0.3	4	4	45
4KRCH-015-R05-040-445	1,5	R0.5	4	4	45
4KRCH-020-R002-060-445	2	R0.02	6	4	45
4KRCH-020-R005-060-445	2	R0.05	6	4	45
4KRCH-020-R01-060-445	2	R0.1	6	4	45
4KRCH-020-R02-060-445	2	R0.2	6	4	45
4KRCH-020-R03-060-445	2	R0.3	6	4	45
4KRCH-020-R05-060-445	2	R0.5	6	4	45
4KRCH-025-R005-060-450	2,5	R0.05	6	4	50
4KRCH-025-R01-060-450	2,5	R0.1	6	4	50
4KRCH-025-R02-060-450	2,5	R0.2	6	4	50

4KRCH

Fresa Torica a 4 taglienti
 4 Flutes Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio torico (CR)	Lunghezza elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
4KRCH-025-R03-060-450	2,5	R0.3	6	4	50
4KRCH-025-R05-060-450	2,5	R0.5	6	4	50
4KRCH-030-R005-080-660	3	R0.05	8	6	60
4KRCH-030-R01-080-660	3	R0.1	8	6	60
4KRCH-030-R02-080-660	3	R0.2	8	6	60
4KRCH-030-R03-080-660	3	R0.3	8	6	60
4KRCH-030-R05-080-660	3	R0.5	8	6	60
4KRCH-030-R10-080-660	3	R1	8	6	60
4KRCH-035-R01-090-670	3,5	R0.1	9	6	70
4KRCH-035-R02-090-670	3,5	R0.2	9	6	70
4KRCH-035-R03-090-670	3,5	R0.3	9	6	70
4KRCH-035-R05-090-670	3,5	R0.5	9	6	70
4KRCH-035-R10-090-670	3,5	R1	9	6	70
4KRCH-040-R005-100-460	4	R0.05	10	4	60
4KRCH-040-R005-100-670	4	R0.05	10	6	70
4KRCH-040-R01-100-460	4	R0.1	10	4	60
4KRCH-040-R01-100-670	4	R0.1	10	6	70
4KRCH-040-R02-100-460	4	R0.2	10	4	60
4KRCH-040-R02-100-670	4	R0.2	10	6	70
4KRCH-040-R03-100-460	4	R0.3	10	4	60
4KRCH-040-R03-100-670	4	R0.3	10	6	70
4KRCH-040-R05-100-460	4	R0.5	10	4	60
4KRCH-040-R05-100-670	4	R0.5	10	6	70
4KRCH-040-R10-100-460	4	R1	10	4	60
4KRCH-040-R10-100-670	4	R1	10	6	70
4KRCH-045-R01-110-675	4,5	R0.1	11	6	75
4KRCH-045-R02-110-675	4,5	R0.2	11	6	75
4KRCH-045-R03-110-675	4,5	R0.3	11	6	75
4KRCH-045-R05-110-675	4,5	R0.5	11	6	75
4KRCH-050-R01-130-675	5	R0.1	13	6	75
4KRCH-050-R02-130-675	5	R0.2	13	6	75
4KRCH-050-R03-130-675	5	R0.3	13	6	75
4KRCH-050-R05-130-675	5	R0.5	13	6	75
4KRCH-050-R10-130-675	5	R1	13	6	75
4KRCH-060-R005-110-660	6	R0.05	11	6	60
4KRCH-060-R005-130-690	6	R0.05	13	6	90

4KRCH

Fresa Torica a 4 taglienti
4 Flutes Corner Radius End Mills



CODICE	Diametro di testa (D)	Raggio torico (CR)	Lunghezza elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
4KRCH-060-R01-110-660	6	R0.1	11	6	60
4KRCH-060-R01-130-690	6	R0.1	13	6	90
4KRCH-060-R02-110-660	6	R0.2	11	6	60
4KRCH-060-R02-130-690	6	R0.2	13	6	90
4KRCH-060-R03-110-660	6	R0.3	11	6	60
4KRCH-060-R03-130-690	6	R0.3	13	6	90
4KRCH-060-R05-110-660	6	R0.5	11	6	60
4KRCH-060-R05-130-690	6	R0.5	13	6	90
4KRCH-060-R10-110-660	6	R1	11	6	60
4KRCH-060-R10-130-690	6	R1	13	6	90
4KRCH-060-R15-110-660	6	R1.5	11	6	60
4KRCH-060-R15-130-690	6	R1.5	13	6	90
4KRCH-060-R20-110-660	6	R2	11	6	60
4KRCH-060-R20-130-690	6	R2	13	6	90
4KRCH-060-R25-130-690	6	R2.5	13	6	90
4KRCH-080-R01-160-870	8	R0.1	16	8	70
4KRCH-080-R01-190-8A0	8	R0.1	19	8	100
4KRCH-080-R02-160-870	8	R0.2	16	8	70
4KRCH-080-R02-190-8A0	8	R0.2	19	8	100
4KRCH-080-R03-160-870	8	R0.3	16	8	70
4KRCH-080-R03-190-8A0	8	R0.3	19	8	100
4KRCH-080-R05-160-870	8	R0.5	16	8	70
4KRCH-080-R05-190-8A0	8	R0.5	19	8	100
4KRCH-080-R10-160-870	8	R1	16	8	70
4KRCH-080-R10-190-8A0	8	R1	19	8	100
4KRCH-080-R15-160-870	8	R1.5	16	8	70
4KRCH-080-R15-190-8A0	8	R1.5	19	8	100
4KRCH-080-R20-160-870	8	R2	16	8	70
4KRCH-080-R20-190-8A0	8	R2	19	8	100
4KRCH-080-R25-190-8A0	8	R2.5	19	8	100
4KRCH-080-R30-190-8A0	8	R3	19	8	100
4KRCH-080-R35-190-8A0	8	R3.5	19	8	100
4KRCH-100-R01-190-A75	10	R0.1	19	10	75
4KRCH-100-R01-220-AA0	10	R0.1	22	10	100
4KRCH-100-R02-190-A75	10	R0.2	19	10	75
4KRCH-100-R02-220-AA0	10	R0.2	22	10	100

4KRCH

Fresa Torica a 4 taglienti
 4 Flutes Corner Radius End Mills



BEETLE



CODICE	Diametro di testa (D)	Raggio torico (CR)	Lunghezza elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
4KRCH-100-R03-190-A75	10	R0.3	19	10	75
4KRCH-100-R03-220-AA0	10	R0.3	22	10	100
4KRCH-100-R05-190-A75	10	R0.5	19	10	75
4KRCH-100-R05-220-AA0	10	R0.5	22	10	100
4KRCH-100-R10-190-A75	10	R1	19	10	75
4KRCH-100-R10-220-AA0	10	R1	22	10	100
4KRCH-100-R15-190-A75	10	R1.5	19	10	75
4KRCH-100-R15-220-AA0	10	R1.5	22	10	100
4KRCH-100-R20-190-A75	10	R2	19	10	75
4KRCH-100-R20-220-AA0	10	R2	22	10	100
4KRCH-100-R25-220-AA0	10	R2.5	22	10	100
4KRCH-100-R30-220-AA0	10	R3	22	10	100
4KRCH-100-R40-220-AA0	10	R4	22	10	100
4KRCH-120-R01-220-C80	12	R0.1	22	12	80
4KRCH-120-R01-260-CB0	12	R0.1	26	12	110
4KRCH-120-R02-220-C80	12	R0.2	22	12	80
4KRCH-120-R02-260-CB0	12	R0.2	26	12	110
4KRCH-120-R03-220-C80	12	R0.3	22	12	80
4KRCH-120-R03-260-CB0	12	R0.3	26	12	110
4KRCH-120-R05-220-C80	12	R0.5	22	12	80
4KRCH-120-R05-260-CB0	12	R0.5	26	12	110
4KRCH-120-R05-260-CD0	12	R0.5	26	12	130
4KRCH-120-R10-220-C80	12	R1	22	12	80
4KRCH-120-R10-260-CB0	12	R1	26	12	110
4KRCH-120-R10-260-CD0	12	R1	26	12	130
4KRCH-120-R15-220-C80	12	R1.5	22	12	80
4KRCH-120-R15-260-CB0	12	R1.5	26	12	110
4KRCH-120-R15-260-CD0	12	R1.5	26	12	130
4KRCH-120-R20-220-C80	12	R2	22	12	80
4KRCH-120-R20-260-CB0	12	R2	26	12	110
4KRCH-120-R20-260-CD0	12	R2	26	12	130
4KRCH-120-R25-260-CB0	12	R2.5	26	12	110
4KRCH-120-R30-260-CB0	12	R3	26	12	110
4KRCH-120-R40-260-CB0	12	R4	26	12	110
4KRCH-120-R50-260-CB0	12	R5	26	12	110
4KRCH-160-R05-320-GB0	16	R0.5	32	16	110

4KRCH

Fresa Torica a 4 taglienti
 4 Flutes Corner Radius End Mills

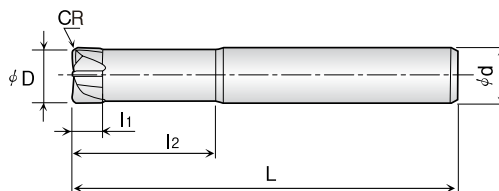


CODICE	Diametro di testa (D)	Raggio torico (CR)	Lunghezza elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
4KRCH-160-R05-320-GF0	16	R0.5	32	16	150
4KRCH-160-R10-320-GB0	16	R1	32	16	110
4KRCH-160-R10-320-GF0	16	R1	32	16	150
4KRCH-160-R15-320-GB0	16	R1.5	32	16	110
4KRCH-160-R20-320-GB0	16	R2	32	16	110
4KRCH-160-R30-320-GB0	16	R3	32	16	110
4KRCH-200-R05-380-KB0	20	R0.5	38	20	110
4KRCH-200-R05-380-KF0	20	R0.5	38	20	150
4KRCH-200-R10-380-KB0	20	R1	38	20	110
4KRCH-200-R10-380-KF0	20	R1	38	20	150
4KRCH-200-R15-380-KB0	20	R1.5	38	20	110
4KRCH-200-R20-380-KB0	20	R2	38	20	110
4KRCH-200-R30-380-KB0	20	R3	38	20	110

4KTIH

Fresa a 4 taglienti Dritti Alto Avanzamento
4 Flutes End Mills for High Speed & Feedrate

- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,2-0,25	0 -0,005	R0,02-R0,5	±0,005
0,3-5	0 -0,010	R1-R1,5	±0,010
6-12	0 -0,015	R2-R3	±0,015
16-20	0 -0,020		

CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
4KTIH-015-R03-040-645	1,5	R0.3	0,8	4	6	45
4KTIH-020-R05-060-650	2	R0.5	1	6	6	50
4KTIH-020-R05-060-670	2	R0.5	1	6	6	70
4KTIH-030-R05-080-650	3	R0.5	1,5	8	6	50
4KTIH-030-R05-080-670	3	R0.5	1,5	8	6	70
4KTIH-030-R10-080-650	3	R1.0	1,5	8	6	50
4KTIH-030-R10-200-660	3	R1.0	1,5	20	6	60
4KTIH-040-R05-120-660	4	R0.5	2	12	6	60
4KTIH-040-R05-120-670	4	R0.5	2	12	6	70
4KTIH-040-R05-160-660	4	R0.5	2	16	6	60
4KTIH-040-R05-160-670	4	R0.5	2	16	6	70
4KTIH-040-R10-120-660	4	R1.0	2	12	6	60
4KTIH-040-R10-120-670	4	R1.0	2	12	6	70
4KTIH-040-R10-160-660	4	R1.0	2	16	6	60
4KTIH-040-R10-160-670	4	R1.0	2	16	6	70
4KTIH-050-R10-150-660	5	R1.0	2,5	15	6	60
4KTIH-060-R05-120-660	6	R0.5	3	12	6	60
4KTIH-060-R05-150-660	6	R0.5	3	15	6	60
4KTIH-060-R05-150-680	6	R0.5	3	15	6	80
4KTIH-060-R05-200-680	6	R0.5	3	20	6	80
4KTIH-060-R05-300-680	6	R0.5	3	30	6	80
4KTIH-060-R10-150-660	6	R1.0	3	15	6	60
4KTIH-060-R10-150-680	6	R1.0	3	15	6	80
4KTIH-060-R10-200-680	6	R1.0	3	20	6	80
4KTIH-060-R10-300-680	6	R1.0	3	30	6	80



4KTIH

Fresa a 4 taglienti Dritti Alto Avanzamento
 4 Flutes End Mills for High Speed & Feedrate



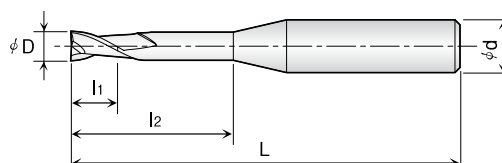
CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
4KTIH-060-R15-150-660	6	R1.5	3	15	6	60
4KTIH-080-R05-200-865	8	R0.5	4	20	8	65
4KTIH-080-R05-200-890	8	R0.5	4	20	8	90
4KTIH-080-R05-200-8A0	8	R0.5	4	20	8	100
4KTIH-080-R05-400-890	8	R0.5	4	40	8	90
4KTIH-080-R10-200-865	8	R1.0	4	20	8	65
4KTIH-080-R10-200-890	8	R1.0	4	20	8	90
4KTIH-080-R10-200-8A0	8	R1.0	4	20	8	100
4KTIH-080-R10-300-890	8	R1.0	4	30	8	90
4KTIH-080-R10-400-890	8	R1.0	4	40	8	90
4KTIH-080-R20-200-865	8	R2.0	4	20	8	65
4KTIH-080-R20-200-8A0	8	R2.0	4	20	8	100
4KTIH-100-R05-250-A70	10	R0.5	5	25	10	70
4KTIH-100-R05-250-AA0	10	R0.5	5	25	10	100
4KTIH-100-R10-250-A70	10	R1.0	5	25	10	70
4KTIH-100-R10-250-AA0	10	R1.0	5	25	10	100
4KTIH-100-R10-250-AB0	10	R1.0	5	25	10	110
4KTIH-100-R10-400-AA0	10	R1.0	5	40	10	100
4KTIH-100-R20-200-A70	10	R2.0	5	20	10	70
4KTIH-100-R20-250-A70	10	R2.0	5	25	10	70
4KTIH-100-R20-250-AB0	10	R2.0	5	25	10	110
4KTIH-120-R10-300-C80	12	R1.0	6	30	12	80
4KTIH-120-R10-300-CB0	12	R1.0	6	30	12	110
4KTIH-120-R10-400-CB0	12	R1.0	6	40	12	110
4KTIH-120-R20-300-C80	12	R2.0	6	30	12	80
4KTIH-120-R20-300-CB0	12	R2.0	6	30	12	110
4KTIH-120-R20-400-CB0	12	R2.0	6	40	12	110

2KERH

Fresa Piana a 2 taglienti
2 Flutes Rib Flat End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 μm
- *4 μm ultra-micro grain*



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,05-0,25	0 -0,005
0,3-5,9	0 -0,010
6-12	0 -0,015
13-25	0 -0,020

CODICE	Diametro di testa (D)	Lunghezza elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KERH-001-003-445	0,1	0,15	0,3	4	45
2KERH-001-005-445	0,1	0,15	0,5	4	45
2KERH-002-005-445	0,2	0,3	0,5	4	45
2KERH-002-010-445	0,2	0,3	1	4	45
2KERH-002-015-445	0,2	0,3	1,5	4	45
2KERH-002-020-445	0,2	0,3	2	4	45
2KERH-002-025-445	0,2	0,3	2,5	4	45
2KERH-002-030-445	0,2	0,3	3	4	45
2KERH-003-005-445	0,3	0,45	0,5	4	45
2KERH-003-010-445	0,3	0,45	1	4	45
2KERH-003-015-445	0,3	0,45	1,5	4	45
2KERH-003-020-445	0,3	0,45	2	4	45
2KERH-003-025-445	0,3	0,45	2,5	4	45
2KERH-003-030-445	0,3	0,45	3	4	45
2KERH-003-035-445	0,3	0,45	3,5	4	45
2KERH-003-040-445	0,3	0,45	4	4	45
2KERH-003-050-445	0,3	0,45	5	4	45
2KERH-004-010-445	0,4	0,6	1	4	45
2KERH-004-015-445	0,4	0,6	1,5	4	45
2KERH-004-020-445	0,4	0,6	2	4	45
2KERH-004-025-445	0,4	0,6	2,5	4	45
2KERH-004-030-445	0,4	0,6	3	4	45
2KERH-004-035-445	0,4	0,6	3,5	4	45
2KERH-004-040-445	0,4	0,6	4	4	45
2KERH-004-050-445	0,4	0,6	5	4	45



2KERH

Fresa Piana a 2 taglienti
2 Flutes Rib Flat End Mills


PAGE
No. 248

CODICE	Diametro di testa (D)	Lunghezza elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KERH-004-060-445	0,4	0,6	6	4	45
2KERH-004-080-445	0,4	0,6	8	4	45
2KERH-004-100-445	0,4	0,6	10	4	45
2KERH-005-010-445	0,5	0,7	1	4	45
2KERH-005-020-445	0,5	0,7	2	4	45
2KERH-005-030-445	0,5	0,7	3	4	45
2KERH-005-040-445	0,5	0,7	4	4	45
2KERH-005-050-445	0,5	0,7	5	4	45
2KERH-005-060-445	0,5	0,7	6	4	45
2KERH-005-080-445	0,5	0,7	8	4	45
2KERH-005-100-445	0,5	0,7	10	4	45
2KERH-005-120-445	0,5	0,7	12	4	45
2KERH-005-140-445	0,5	0,7	14	4	45
2KERH-006-020-445	0,6	0,9	2	4	45
2KERH-006-030-445	0,6	0,9	3	4	45
2KERH-006-040-445	0,6	0,9	4	4	45
2KERH-006-050-445	0,6	0,9	5	4	45
2KERH-006-060-445	0,6	0,9	6	4	45
2KERH-006-080-445	0,6	0,9	8	4	45
2KERH-006-100-445	0,6	0,9	10	4	45
2KERH-006-120-445	0,6	0,9	12	4	45
2KERH-006-140-445	0,6	0,9	14	4	45
2KERH-006-160-445	0,6	0,9	16	4	45
2KERH-007-020-445	0,7	1	2	4	45
2KERH-007-040-445	0,7	1	4	4	45
2KERH-007-060-445	0,7	1	6	4	45
2KERH-007-080-445	0,7	1	8	4	45
2KERH-007-100-445	0,7	1	10	4	45
2KERH-007-120-445	0,7	1	12	4	45
2KERH-008-020-445	0,8	1,2	2	4	45
2KERH-008-030-445	0,8	1,2	3	4	45
2KERH-008-040-445	0,8	1,2	4	4	45
2KERH-008-050-445	0,8	1,2	5	4	45
2KERH-008-060-445	0,8	1,2	6	4	45
2KERH-008-080-445	0,8	1,2	8	4	45

2KERH

Fresa Piana a 2 taglienti
2 Flutes Rib Flat End Mills



BEETLE



CODICE	Diametro di testa (D)	Lunghezza elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KERH-008-100-445	0,8	1,2	10	4	45
2KERH-008-120-445	0,8	1,2	12	4	45
2KERH-008-140-445	0,8	1,2	14	4	45
2KERH-009-060-445	0,9	1,3	6	4	45
2KERH-009-080-445	0,9	1,3	8	4	45
2KERH-009-100-445	0,9	1,3	10	4	45
2KERH-010-020-445	1	1,5	2	4	45
2KERH-010-030-445	1	1,5	3	4	45
2KERH-010-040-445	1	1,5	4	4	45
2KERH-010-050-445	1	1,5	5	4	45
2KERH-010-060-445	1	1,5	6	4	45
2KERH-010-080-445	1	1,5	8	4	45
2KERH-010-100-445	1	1,5	10	4	45
2KERH-010-120-445	1	1,5	12	4	45
2KERH-010-140-450	1	1,5	14	4	50
2KERH-010-160-450	1	1,5	16	4	50
2KERH-010-180-450	1	1,5	18	4	50
2KERH-010-200-450	1	1,5	20	4	50
2KERH-010-250-460	1	1,5	25	4	60
2KERH-012-040-445	1,2	1,8	4	4	45
2KERH-012-060-445	1,2	1,8	6	4	45
2KERH-012-080-445	1,2	1,8	8	4	45
2KERH-012-100-445	1,2	1,8	10	4	45
2KERH-012-120-445	1,2	1,8	12	4	45
2KERH-012-160-450	1,2	1,8	16	4	50
2KERH-012-200-450	1,2	1,8	20	4	50
2KERH-015-040-445	1,5	2,3	4	4	45
2KERH-015-060-445	1,5	2,3	6	4	45
2KERH-015-080-445	1,5	2,3	8	4	45
2KERH-015-100-445	1,5	2,3	10	4	45
2KERH-015-120-445	1,5	2,3	12	4	45
2KERH-015-140-450	1,5	2,3	14	4	50
2KERH-015-160-450	1,5	2,3	16	4	50
2KERH-015-180-450	1,5	2,3	18	4	50
2KERH-015-200-450	1,5	2,3	20	4	50

2KERH

Fresa Piana a 2 taglienti
2 Flutes Rib Flat End Mills


PAGE
No. 248

CODICE	Diametro di testa (D)	Lunghezza elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KERH-015-250-460	1,5	2,3	25	4	60
2KERH-015-300-470	1,5	2,3	30	4	70
2KERH-020-040-445	2	3	4	4	45
2KERH-020-060-445	2	3	6	4	45
2KERH-020-080-445	2	3	8	4	45
2KERH-020-100-445	2	3	10	4	45
2KERH-020-120-445	2	3	12	4	45
2KERH-020-140-450	2	3	14	4	50
2KERH-020-160-450	2	3	16	4	50
2KERH-020-180-450	2	3	18	4	50
2KERH-020-200-450	2	3	20	4	50
2KERH-020-220-460	2	3	22	4	60
2KERH-020-250-460	2	3	25	4	60
2KERH-020-300-470	2	3	30	4	70
2KERH-020-350-470	2	3	35	4	70
2KERH-025-080-445	2,5	3,8	8	4	45
2KERH-025-100-445	2,5	3,8	10	4	45
2KERH-025-120-445	2,5	3,8	12	4	45
2KERH-025-160-450	2,5	3,8	16	4	50
2KERH-025-200-450	2,5	3,8	20	4	50
2KERH-025-250-460	2,5	3,8	25	4	60
2KERH-025-300-470	2,5	3,8	30	4	70
2KERH-025-350-470	2,5	3,8	35	4	70
2KERH-030-080-650	3	4,5	8	6	50
2KERH-030-100-650	3	4,5	10	6	50
2KERH-030-120-650	3	4,5	12	6	50
2KERH-030-140-660	3	4,5	14	6	60
2KERH-030-160-660	3	4,5	16	6	60
2KERH-030-180-660	3	4,5	18	6	60
2KERH-030-200-660	3	4,5	20	6	60
2KERH-030-250-665	3	4,5	25	6	65
2KERH-030-300-670	3	4,5	30	6	70
2KERH-030-350-680	3	4,5	35	6	80
2KERH-030-400-680	3	4,5	40	6	80
2KERH-030-500-6A0	3	4,5	50	6	100

2KERH

Fresa Piana a 2 taglienti
 2 Flutes Rib Flat End Mills



BEETLE



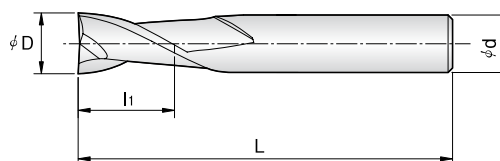
CODICE	Diametro di testa (D)	Lunghezza elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KERH-040-080-650	4	6	8	6	50
2KERH-040-100-650	4	6	10	6	50
2KERH-040-120-650	4	6	12	6	50
2KERH-040-160-660	4	6	16	6	60
2KERH-040-200-660	4	6	20	6	60
2KERH-040-250-665	4	6	25	6	65
2KERH-040-300-670	4	6	30	6	70
2KERH-040-350-680	4	6	35	6	80
2KERH-040-400-680	4	6	40	6	80
2KERH-040-450-690	4	6	45	6	90
2KERH-040-500-6A0	4	6	50	6	100
2KERH-040-550-6B0	4	6	55	6	110
2KERH-040-600-6B0	4	6	60	6	110
2KERH-050-160-660	5	8	16	6	60
2KERH-050-200-660	5	8	20	6	60
2KERH-050-250-665	5	8	25	6	65
2KERH-050-300-670	5	8	30	6	70
2KERH-050-350-680	5	8	35	6	80
2KERH-050-400-680	5	8	40	6	80
2KERH-050-500-6A0	5	8	50	6	100
2KERH-060-200-660	6	9	20	6	60
2KERH-060-300-670	6	9	30	6	70
2KERH-060-400-690	6	9	40	6	90
2KERH-060-500-6A0	6	9	50	6	100
2KERH-080-200-865	8	12	20	8	65
2KERH-080-300-880	8	12	30	8	80
2KERH-080-400-8A0	8	12	40	8	100
2KERH-100-250-A70	10	15	25	10	70
2KERH-100-350-AA0	10	15	35	10	100
2KERH-100-450-AA0	10	15	45	10	100
2KERH-120-300-C80	12	18	30	12	80
2KERH-120-400-CB0	12	18	40	12	110
2KERH-120-500-CB0	12	18	50	12	110

2KEPH

Fresa Piana a 2 taglienti
 2 Flutes Flat End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,05-0,25	0 -0,005
0,3-5,9	0 -0,010
6-12	0 -0,015
13-25	0 -0,020

CODICE	Diametro di testa (D)	Lunghezza Elica (L1)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (L1)	Shank diameter (d)	Overall length (L)
2KEPH-001-002-445	0,1	0,2	4	45
2KEPH-0015-003-445	0,15	0,3	4	45
2KEPH-002-004-445	0,2	0,4	4	45
2KEPH-0025-005-445	0,25	0,5	4	45
2KEPH-003-006-445	0,3	0,6	4	45
2KEPH-0035-007-445	0,35	0,7	4	45
2KEPH-004-008-445	0,4	0,8	4	45
2KEPH-0045-009-445	0,45	0,9	4	45
2KEPH-005-010-345	0,5	1	3	45
2KEPH-005-010-445	0,5	1	4	45
2KEPH-0055-011-445	0,55	1,1	4	45
2KEPH-006-012-345	0,6	1,2	3	45
2KEPH-006-012-445	0,6	1,2	4	45
2KEPH-0065-013-445	0,65	1,3	4	45
2KEPH-007-014-445	0,7	1,4	4	45
2KEPH-0075-015-445	0,75	1,5	4	45
2KEPH-008-016-345	0,8	1,6	3	45
2KEPH-008-016-445	0,8	1,6	4	45
2KEPH-0085-017-445	0,85	1,7	4	45
2KEPH-009-018-445	0,9	1,8	4	45
2KEPH-0095-019-445	0,95	1,9	4	45
2KEPH-010-025-345	1	2,5	3	45
2KEPH-010-025-445	1	2,5	4	45
2KEPH-010-025-645	1	2,5	6	45
2KEPH-0105-025-645	1,05	2,5	6	45

2KEPH

Fresa Piana a 2 taglienti
 2 Flutes Rib Flat End Mills



BEETLE



CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Lenght of cut (l ₁)	Shank diameter (d)	Overall lenght (L)
2KEPH-011-025-645	1,1	2,5	6	45
2KEPH-012-040-345	1,2	4	3	45
2KEPH-012-040-445	1,2	4	4	45
2KEPH-012-040-645	1,2	4	6	45
2KEPH-0125-040-645	1,25	4	6	45
2KEPH-013-040-645	1,3	4	6	45
2KEPH-0135-040-645	1,35	4	6	45
2KEPH-014-040-645	1,4	4	6	45
2KEPH-0145-040-645	1,45	4	6	45
2KEPH-015-040-345	1,5	4	3	45
2KEPH-015-040-445	1,5	4	4	45
2KEPH-015-040-645	1,5	4	6	45
2KEPH-0155-040-645	1,55	4	6	45
2KEPH-016-040-645	1,6	4	6	45
2KEPH-0165-040-645	1,65	4	6	45
2KEPH-017-042-645	1,7	4,2	6	45
2KEPH-0175-042-645	1,75	4,2	6	45
2KEPH-018-045-645	1,8	4,5	6	45
2KEPH-0185-045-645	1,85	4,5	6	45
2KEPH-019-050-645	1,9	5	6	45
2KEPH-020-060-345	2	6	3	45
2KEPH-020-060-445	2	6	4	45
2KEPH-020-060-645	2	6	6	45
2KEPH-021-060-645	2,1	6	6	45
2KEPH-022-060-645	2,2	6	6	45
2KEPH-023-060-645	2,3	6	6	45
2KEPH-024-080-650	2,4	8	6	50
2KEPH-025-080-350	2,5	8	3	50
2KEPH-025-080-450	2,5	8	4	50
2KEPH-025-080-650	2,5	8	6	50
2KEPH-026-080-650	2,6	8	6	50
2KEPH-027-080-650	2,7	8	6	50
2KEPH-028-080-650	2,8	8	6	50
2KEPH-029-080-650	2,9	8	6	50
2KEPH-030-080-450	3	8	4	50

2KEPH

 Fresca Piana a 2 taglienti
 2 Flutes Rib Flat End Mills


CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Lenght of cut (l ₁)	Shank diameter (d)	Overall lenght (L)
2KEPH-030-100-350	3	10	3	50
2KEPH-030-100-650	3	10	6	50
2KEPH-031-100-650	3,1	10	6	50
2KEPH-032-100-650	3,2	10	6	50
2KEPH-033-100-650	3,3	10	6	50
2KEPH-034-100-650	3,4	10	6	50
2KEPH-035-100-650	3,5	10	6	50
2KEPH-036-100-650	3,6	10	6	50
2KEPH-037-100-650	3,7	10	6	50
2KEPH-038-100-650	3,8	10	6	50
2KEPH-039-100-650	3,9	10	6	50
2KEPH-040-120-450	4	12	4	50
2KEPH-040-120-650	4	12	6	50
2KEPH-041-120-650	4,1	12	6	50
2KEPH-042-120-650	4,2	12	6	50
2KEPH-043-120-650	4,3	12	6	50
2KEPH-044-120-650	4,4	12	6	50
2KEPH-045-120-650	4,5	12	6	50
2KEPH-046-130-650	4,6	13	6	50
2KEPH-047-130-650	4,7	13	6	50
2KEPH-048-130-650	4,8	13	6	50
2KEPH-049-130-650	4,9	13	6	50
2KEPH-050-150-650	5	15	6	50
2KEPH-051-150-650	5,1	15	6	50
2KEPH-052-150-650	5,2	15	6	50
2KEPH-053-150-650	5,3	15	6	50
2KEPH-054-150-650	5,4	15	6	50
2KEPH-055-150-650	5,5	15	6	50
2KEPH-056-150-650	5,6	15	6	50
2KEPH-057-150-650	5,7	15	6	50
2KEPH-058-150-650	5,8	15	6	50
2KEPH-059-150-650	5,9	15	6	50
2KEPH-060-150-650	6	15	6	50
2KEPH-061-160-860	6,1	16	8	60
2KEPH-062-160-860	6,2	16	8	60

2KEPH

Fresa Piana a 2 taglienti
2 Flutes Rib Flat End Mills



CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
2KEPH-063-160-860	6,3	16	8	60
2KEPH-064-160-860	6,4	16	8	60
2KEPH-065-160-860	6,5	16	8	60
2KEPH-070-200-865	7	20	8	65
2KEPH-075-200-865	7,5	20	8	65
2KEPH-080-200-865	8	20	8	65
2KEPH-085-200-A65	8,5	20	10	65
2KEPH-090-250-A70	9	25	10	70
2KEPH-095-250-A70	9,5	25	10	70
2KEPH-100-250-A70	10	25	10	70
2KEPH-105-250-C75	10,5	25	12	75
2KEPH-110-250-C75	11	25	12	75
2KEPH-115-250-C75	11,5	25	12	75
2KEPH-120-300-C80	12	30	12	80
2KEPH-130-350-E90	13	35	14	90
2KEPH-140-350-E90	14	35	14	90
2KEPH-150-350-GA0	15	35	16	100
2KEPH-160-400-GA0	16	40	16	100
2KEPH-180-450-IA0	18	45	18	100
2KEPH-200-450-KA0	20	45	20	100

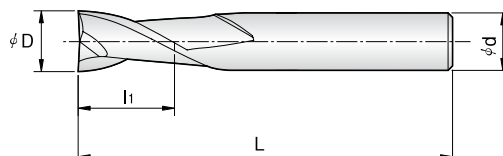


2KELH

Fresa Piana a 2 taglienti Lunga
2 Flutes Long Length Flat End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,05-0,25	0 -0,005
0,3-5,9	0 -0,010
6-12	0 -0,015
13-25	0 -0,020

CODICE	Diametro di testa (R)	Lunghezza Elica (L1)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (R)	Length of cut (L1)	Shank diameter (d)	Overall length (L)
2KELH-010-030-660	1	3	6	60
2KELH-010-050-660	1	5	6	60
2KELH-010-070-660	1	7	6	60
2KELH-010-100-660	1	10	6	60
2KELH-010-120-660	1	12	6	60
2KELH-010-150-660	1	15	6	60
2KELH-015-060-660	1,5	6	6	60
2KELH-015-080-660	1,5	8	6	60
2KELH-015-100-660	1,5	10	6	60
2KELH-015-150-660	1,5	15	6	60
2KELH-015-200-660	1,5	20	6	60
2KELH-020-100-660	2	10	6	60
2KELH-020-120-660	2	12	6	60
2KELH-020-150-660	2	15	6	60
2KELH-020-200-660	2	20	6	60
2KELH-030-120-670	3	12	6	70
2KELH-030-150-670	3	15	6	70
2KELH-030-200-670	3	20	6	70
2KELH-030-250-670	3	25	6	70
2KELH-030-300-670	3	30	6	70
2KELH-040-150-670	4	15	6	70
2KELH-040-200-670	4	20	6	70
2KELH-040-300-675	4	30	6	75
2KELH-040-350-675	4	35	6	75

2KELH

Fresa Piana a 2 taglienti Lunga
 2 Flutes Long Length Flat End Mills



BEETLE



CODICE	Diametro di testa (R)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (R)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
2KELH-040-400-680	4	40	6	80
2KELH-050-200-670	5	20	6	70
2KELH-050-250-670	5	25	6	70
2KELH-050-300-675	5	30	6	75
2KELH-050-400-680	5	40	6	80
2KELH-060-200-670	6	20	6	70
2KELH-060-200-6A0	6	20	6	100
2KELH-060-250-675	6	25	6	75
2KELH-060-300-680	6	30	6	80
2KELH-060-350-680	6	35	6	80
2KELH-060-400-690	6	40	6	90
2KELH-080-250-875	8	25	8	75
2KELH-080-250-8A0	8	25	8	100
2KELH-080-300-880	8	30	8	80
2KELH-080-350-880	8	35	8	80
2KELH-080-400-890	8	40	8	90
2KELH-080-450-8A0	8	45	8	100
2KELH-080-500-8A0	8	50	8	100
2KELH-080-550-8A0	8	55	8	100
2KELH-100-300-A80	10	30	10	80
2KELH-100-350-AA0	10	35	10	100
2KELH-100-400-AA0	10	40	10	100
2KELH-100-450-AA0	10	45	10	100
2KELH-100-500-AA0	10	50	10	100
2KELH-100-550-AB0	10	55	10	110
2KELH-100-600-AB0	10	60	10	110
2KELH-100-650-AC0	10	65	10	120
2KELH-100-700-AC0	10	70	10	120
2KELH-120-300-CA0	12	30	12	100
2KELH-120-350-CA0	12	35	12	100
2KELH-120-400-CA0	12	40	12	100
2KELH-120-450-CA0	12	45	12	100
2KELH-120-500-CA0	12	50	12	100
2KELH-120-550-CB0	12	55	12	110

2KELH

Fresa Piana a 2 taglienti Lunga
 2 Flutes Long Length Flat End Mills



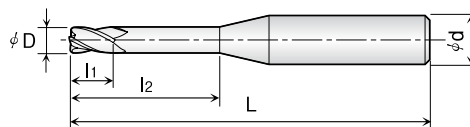
CODICE	Diametro di testa (R)	Lunghezza Elica (l _f)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Outside Diameter (R)</i>	<i>Lenght of cut (l_f)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
2KELH-120-600-CB0	12	60	12	110
2KELH-120-700-CD0	12	70	12	130
2KELH-120-800-CD0	12	80	12	130
2KELH-140-500-EB0	14	50	14	110
2KELH-160-400-GF0	16	40	16	150
2KELH-160-550-GC0	16	55	16	120
2KELH-160-700-GD0	16	70	16	130
2KELH-160-800-GF0	16	80	16	150
2KELH-200-500-KF0	20	50	20	150
2KELH-200-600-KD0	20	60	20	130
2KELH-250-750-PF0	25	75	25	150

4KERH

Fresa Piana a 4 taglienti
4 Flutes Rib Flat End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*



BEETLE



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,05-0,25	0 -0,005
0,3-5,9	0 -0,010
6-12	0 -0,015
13-25	0 -0,0200

CODICE	Diametro di testa (D)	Lunghezza elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Length of cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
4KERH-008-020-445	0,8	1,2	2	4	45
4KERH-008-040-445	0,8	1,2	4	4	45
4KERH-008-060-445	0,8	1,2	6	4	45
4KERH-008-080-445	0,8	1,2	8	4	45
4KERH-008-100-445	0,8	1,2	10	4	45
4KERH-008-120-445	0,8	1,2	12	4	45
4KERH-008-160-445	0,8	1,2	16	4	45
4KERH-009-020-445	0,9	1,4	2	4	45
4KERH-009-060-445	0,9	1,4	6	4	45
4KERH-009-080-445	0,9	1,4	8	4	45
4KERH-009-100-445	0,9	1,4	10	4	45
4KERH-010-020-445	1	1,5	2	4	45
4KERH-010-030-445	1	1,5	3	4	45
4KERH-010-040-445	1	1,5	4	4	45
4KERH-010-060-445	1	1,5	6	4	45
4KERH-010-080-445	1	1,5	8	4	45
4KERH-010-100-445	1	1,5	10	4	45
4KERH-010-120-445	1	1,5	12	4	45
4KERH-010-140-450	1	1,5	14	4	50
4KERH-010-160-450	1	1,5	16	4	50
4KERH-010-200-450	1	1,5	20	4	50
4KERH-010-250-460	1	1,5	25	4	60
4KERH-012-040-445	1,2	1,8	4	4	45
4KERH-012-060-445	1,2	1,8	6	4	45
4KERH-012-080-445	1,2	1,8	8	4	45

4KERH

Fresa Piana a 4 taglienti
4 Flutes Rib Flat End Mills



CODICE	Diametro di testa (D)	Lunghezza elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
4KERH-012-100-445	1,2	1,8	10	4	45
4KERH-012-120-445	1,2	1,8	12	4	45
4KERH-012-160-450	1,2	1,8	16	4	50
4KERH-015-040-445	1,5	2,3	4	4	45
4KERH-015-060-445	1,5	2,3	6	4	45
4KERH-015-080-445	1,5	2,3	8	4	45
4KERH-015-100-445	1,5	2,3	10	4	45
4KERH-015-120-445	1,5	2,3	12	4	45
4KERH-015-160-450	1,5	2,3	16	4	50
4KERH-015-200-450	1,5	2,3	20	4	50
4KERH-015-250-460	1,5	2,3	25	4	60
4KERH-020-040-445	2	3	4	4	45
4KERH-020-060-445	2	3	6	4	45
4KERH-020-080-445	2	3	8	4	45
4KERH-020-100-445	2	3	10	4	45
4KERH-020-120-445	2	3	12	4	45
4KERH-020-140-450	2	3	14	4	50
4KERH-020-160-450	2	3	16	4	50
4KERH-020-180-450	2	3	18	4	50
4KERH-020-200-450	2	3	20	4	50
4KERH-020-250-460	2	3	25	4	60
4KERH-020-300-470	2	3	30	4	70
4KERH-025-100-445	2,5	3,8	10	4	45
4KERH-025-120-445	2,5	3,8	12	4	45
4KERH-025-160-450	2,5	3,8	16	4	50
4KERH-025-200-450	2,5	3,8	20	4	50
4KERH-025-250-460	2,5	3,8	25	4	60
4KERH-025-300-470	2,5	3,8	30	4	70
4KERH-030-060-645	3	4,5	6	6	45
4KERH-030-080-650	3	4,5	8	6	50
4KERH-030-100-650	3	4,5	10	6	50
4KERH-030-120-650	3	4,5	12	6	50
4KERH-030-160-660	3	4,5	16	6	60
4KERH-030-200-660	3	4,5	20	6	60
4KERH-030-250-665	3	4,5	25	6	65

4KERH

Fresa Piana a 4 taglienti
 4 Flutes Rib Flat End Mills



BEETLE



CODICE	Diametro di testa (D)	Lunghezza elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
4KERH-030-300-670	3	4,5	30	6	70
4KERH-030-350-680	3	4,5	35	6	80
4KERH-030-400-680	3	4,5	40	6	80
4KERH-040-080-650	4	6	8	6	50
4KERH-040-100-650	4	6	10	6	50
4KERH-040-120-650	4	6	12	6	50
4KERH-040-160-660	4	6	16	6	60
4KERH-040-200-660	4	6	20	6	60
4KERH-040-250-665	4	6	25	6	65
4KERH-040-300-670	4	6	30	6	70
4KERH-040-400-680	4	6	40	6	80
4KERH-040-450-690	4	6	45	6	90
4KERH-040-500-6A0	4	6	50	6	100
4KERH-050-160-660	5	8	16	6	60
4KERH-050-200-660	5	8	20	6	60
4KERH-050-250-665	5	8	25	6	65
4KERH-050-300-670	5	8	30	6	70
4KERH-050-400-680	5	8	40	6	80
4KERH-050-500-6A0	5	8	50	6	100
4KERH-060-200-660	6	9	20	6	60
4KERH-060-300-670	6	9	30	6	70
4KERH-060-400-690	6	9	40	6	90
4KERH-060-500-6A0	6	9	50	6	100
4KERH-080-200-865	8	12	20	8	65
4KERH-080-300-880	8	12	30	8	80
4KERH-080-400-8A0	8	12	40	8	100
4KERH-100-250-A70	10	15	25	10	70
4KERH-100-350-AA0	10	15	35	10	100
4KERH-100-450-AA0	10	15	45	10	100
4KERH-120-300-C80	12	18	30	12	80
4KERH-120-400-CB0	12	18	40	12	110
4KERH-120-500-CB0	12	18	50	12	110

4KEPH

Fresa Piana a 4 taglienti
4 Flutes Flat End Mills



- Acciai bonificati HRC 40-55
- Hardened steels HRC 40-55
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,05-0,25	0 -0,005
0,3-5,9	0 -0,010
6-12	0 -0,015
13-25	0 -0,020

CODICE	Diametro di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
4KEPH-008-016-445	0,8	1,6	4	45
4KEPH-010-025-445	1	2,5	4	45
4KEPH-010-025-645	1	2,5	6	45
4KEPH-012-040-445	1,2	4	4	45
4KEPH-015-040-445	1,5	4	4	45
4KEPH-015-040-645	1,5	4	6	45
4KEPH-020-060-445	2	6	4	45
4KEPH-020-060-645	2	6	6	45
4KEPH-025-080-445	2,5	8	4	45
4KEPH-025-080-645	2,5	8	6	45
4KEPH-030-100-350	3	10	3	50
4KEPH-030-100-450	3	10	4	50
4KEPH-030-100-650	3	10	6	50
4KEPH-035-100-650	3,5	10	6	50
4KEPH-040-120-450	4	12	4	50
4KEPH-040-120-650	4	12	6	50
4KEPH-045-120-650	4,5	12	6	50
4KEPH-050-150-650	5	15	6	50
4KEPH-055-150-650	5,5	15	6	50
4KEPH-060-150-650	6	15	6	50
4KEPH-060-150-675	6	15	6	75
4KEPH-060-150-6A0	6	15	6	100
4KEPH-070-200-865	7	20	8	65
4KEPH-080-200-865	8	20	8	65
4KEPH-080-200-875	8	20	8	75

4KEPH

Fresa Piana a 4 taglienti
4 Flutes Flat End Mills



CODICE	Diametro di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (R)	Lenght of cut (L ₁)	Shank diameter (d)	Overall lenght (L)
4KEPH-080-200-8A0	8	20	8	100
4KEPH-100-250-A70	10	25	10	70
4KEPH-100-250-A75	10	25	10	75
4KEPH-100-250-AA0	10	25	10	100
4KEPH-120-300-C80	12	30	12	80
4KEPH-120-300-CA0	12	30	12	100
4KEPH-140-350-E90	14	35	14	90
4KEPH-160-400-GA0	16	40	16	100
4KEPH-180-450-IA0	18	45	18	100
4KEPH-200-450-KA0	20	45	20	100

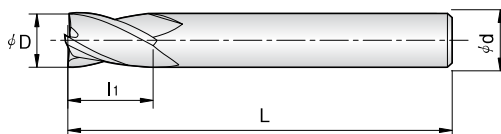


4KELH

Fresa Piana a 4 taglienti Lunga
 4 Flutes Long Length Flat End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,05-0,25	0 -0,005
0,3-5,9	0 -0,010
6-12	0 -0,015
13-25	0 -0,020

CODICE	Diametro di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
4KELH-010-030-660	1	3	6	60
4KELH-010-050-660	1	5	6	60
4KELH-010-070-660	1	7	6	60
4KELH-015-060-660	1,5	6	6	60
4KELH-015-080-660	1,5	8	6	60
4KELH-015-100-660	1,5	10	6	60
4KELH-020-080-660	2	8	6	60
4KELH-020-100-660	2	10	6	60
4KELH-020-120-660	2	12	6	60
4KELH-020-150-660	2	15	6	60
4KELH-030-100-670	3	10	6	70
4KELH-030-150-670	3	15	6	70
4KELH-030-200-670	3	20	6	70
4KELH-030-250-670	3	25	6	70
4KELH-030-300-670	3	30	6	70
4KELH-040-120-670	4	12	6	70
4KELH-040-150-470	4	15	4	70
4KELH-040-150-670	4	15	6	70
4KELH-040-200-470	4	20	4	70
4KELH-040-200-670	4	20	6	70
4KELH-040-250-670	4	25	6	70
4KELH-040-300-675	4	30	6	75
4KELH-040-350-675	4	35	6	75
4KELH-040-400-680	4	40	6	80

4KELH

Fresa Piana a 4 taglienti Lunga
 4 Flutes Long Length Flat End Mills



BEETLE



CODICE	Diametro di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Outside Diameter (R)</i>	<i>Lenght of cut (L₁)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
4KELH-050-200-670	5	20	6	70
4KELH-050-250-670	5	25	6	70
4KELH-050-300-675	5	30	6	75
4KELH-050-400-680	5	40	6	80
4KELH-060-200-670	6	20	6	70
4KELH-060-200-6A0	6	20	6	100
4KELH-060-250-675	6	25	6	75
4KELH-060-250-6A0	6	25	6	100
4KELH-060-300-680	6	30	6	80
4KELH-060-350-680	6	35	6	80
4KELH-060-400-690	6	40	6	90
4KELH-080-250-875	8	25	8	75
4KELH-080-250-8A0	8	25	8	100
4KELH-080-300-880	8	30	8	80
4KELH-080-300-8A0	8	30	8	100
4KELH-080-300-8F0	8	30	8	150
4KELH-080-350-880	8	35	8	80
4KELH-080-400-890	8	40	8	90
4KELH-080-450-8A0	8	45	8	100
4KELH-080-500-8A0	8	50	8	100
4KELH-080-550-8A0	8	55	8	100
4KELH-100-300-A80	10	30	10	80
4KELH-100-350-AA0	10	35	10	100
4KELH-100-350-AF0	10	35	10	150
4KELH-100-400-AA0	10	40	10	100
4KELH-100-450-AA0	10	45	10	100
4KELH-100-500-AA0	10	50	10	100
4KELH-100-550-AB0	10	55	10	110
4KELH-100-600-AB0	10	60	10	110
4KELH-100-650-AC0	10	65	10	120
4KELH-100-700-AC0	10	70	10	120
4KELH-120-300-CA0	12	30	12	100
4KELH-120-350-CA0	12	35	12	100
4KELH-120-400-CA0	12	40	12	100
4KELH-120-400-CF0	12	40	12	150
4KELH-120-450-CA0	12	45	12	100

4KELH

Fresa Piana a 4 taglienti Lunga
4 Flutes Long Length Flat End Mills



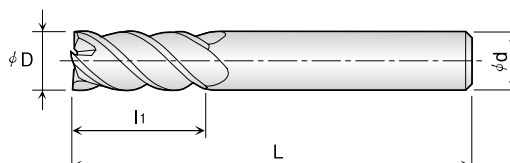
CODICE	Diametro di testa (R)	Lunghezza Elica (l _e)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Outside Diameter (R)</i>	<i>Lenght of cut (l_e)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
4KELH-120-500-CA0	12	50	12	100
4KELH-120-550-CB0	12	55	12	110
4KELH-120-600-CB0	12	60	12	110
4KELH-120-700-CD0	12	70	12	130
4KELH-140-500-EB0	14	50	14	110
4KELH-160-400-GF0	16	40	16	150
4KELH-160-550-GC0	16	55	16	120
4KELH-160-700-GD0	16	70	16	130
4KELH-200-500-KF0	20	50	20	150
4KELH-200-600-KD0	20	60	20	130
4KELH-250-750-PF0	25	75	25	150

4KEHH

Fresa Piana a 4 taglienti ELICA 43°
4 Flutes 43° HELIX Flat End Mills



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,05-0,25	0 -0,005
0,3-5,9	0 -0,010
6-12	0 -0,015
13-25	0 -0,020

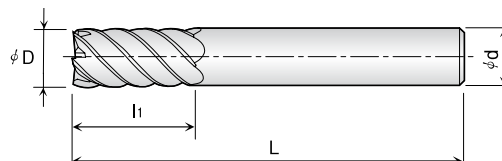
CODICE	Diametro di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
4KEHH-010-020-445	1	2	4	45
4KEHH-010-020-645	1	2	6	45
4KEHH-015-040-445	1,5	4	4	45
4KEHH-015-040-645	1,5	4	6	45
4KEHH-020-050-445	2	5	4	45
4KEHH-020-050-645	2	5	6	45
4KEHH-030-080-350	3	8	3	50
4KEHH-030-080-445	3	8	4	45
4KEHH-030-080-650	3	8	6	50
4KEHH-040-100-460	4	10	4	60
4KEHH-040-100-650	4	10	6	50
4KEHH-040-120-445	4	12	4	45
4KEHH-050-130-650	5	13	6	50
4KEHH-060-150-650	6	15	6	50
4KEHH-060-150-675	6	15	6	75
4KEHH-080-200-865	8	20	8	65
4KEHH-080-200-875	8	20	8	75
4KEHH-100-250-A70	10	25	10	70
4KEHH-100-250-A75	10	25	10	75
4KEHH-120-300-C80	12	30	12	80
4KEHH-160-400-GA0	16	40	16	100
4KEHH-200-450-KA0	20	45	20	100

6KEPH

Fresa Multitagliente 45°
 6 Flutes 45° Helix Flat End Mills



- Acciai bonificati HRC 40-55
- Hardened steels HRC 40-55
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,05-0,25	0 -0,005
0,3-5,9	0 -0,010
6-12	0 -0,015
13-25	0 -0,020

CODICE	Diametro di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
6KEPH-060-150-650	6	15	6	50
6KEPH-080-200-865	8	20	8	65
6KEPH-100-250-A70	10	25	10	70
6KEPH-120-300-C80	12	30	12	80
6KEPH-160-400-GA0	16	40	16	100
6KEPH-200-450-KA0	20	45	20	100

2KCRI

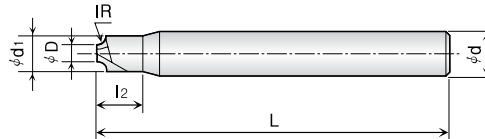
Fresa Raggio Concavo a 2 taglienti
 2 Flutes Inner Corner Radius

- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain

H

2

R

PAGE
No. 256

Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,5-0,9	0 -0,010	R0,1-R2,5	±0,010
1,4-5,9	0 -0,020	R3-R8	±0,020

CODICE	Diametro di testa (D)	Raggio Concavo (IR)	Diametro esterno di taglio (d ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Inner Radius (IR)	Outside Diameter of Cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KCRI-005-IR055-017-445	0,5	IR0.55	1.7	3	4	45
2KCRI-005-IR06-018-445	0,5	IR0.6	1.8	3	4	45
2KCRI-005-IR065-019-445	0,5	IR0.65	1.9	3	4	45
2KCRI-005-IR07-020-445	0,5	IR0.7	2	3	4	45
2KCRI-009-IR05-020-445	0,9	IR0.5	2	3	4	45
2KCRI-009-IR075-025-445	0,9	IR0.75	2.5	4	4	45
2KCRI-009-IR08-026-445	0,9	IR0.8	2.6	4	4	45
2KCRI-009-IR085-027-445	0,9	IR0.85	2.7	4	4	45
2KCRI-009-IR09-028-445	0,9	IR0.9	2.8	4	4	45
2KCRI-009-IR095-029-445	0,9	IR0.95	2.9	4	4	45
2KCRI-009-IR10-030-650	0,9	IR1.0	3	5	6	50
2KCRI-009-IR125-035-650	0,9	IR1.25	3.5	5	6	50
2KCRI-014-IR15-045-650	1,4	IR1.5	4.5	8	6	50
2KCRI-014-IR20-055-650	1,4	IR2.0	5.5	10	6	50
2KCRI-019-IR25-070-860	1,9	IR2.5	7	13	8	60
2KCRI-019-IR30-080-860	1,9	IR3.0	8	-	8	60
2KCRI-019-IR35-090-A70	1,9	IR3.5	9	13	10	70
2KCRI-019-IR40-100-A70	1,9	IR4.0	10	-	10	70
2KCRI-019-IR45-110-C80	1,9	IR4.5	11	13	12	80
2KCRI-019-IR50-120-C80	1,9	IR5.0	12	-	12	80
2KCRI-034-IR125-060-650	3,4	IR1.25	6	-	6	50
2KCRI-039-IR10-060-650	3,9	IR1.0	6	-	6	50
2KCRI-039-IR20-080-860	3,9	IR2.0	8	-	8	60
2KCRI-039-IR60-160-G85	3,9	IR6.0	16	-	16	85

2KCRI

Fresa Raggio Concavo a 2 taglienti
 2 Flutes Inner Corner Radius



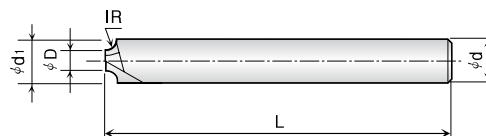
CODICE	Diametro di testa (D)	Raggio Concavo (IR)	Diametro esterno di taglio (d ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Inner Radius (IR)	Outside Diameter of Cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KCRI-039-IR80-200-K85	3,9	IR8.0	20	-	20	85
2KCRI-049-IR05-060-660	4,9	IR0.5	6	-	6	60
2KCRI-049-IR15-080-860	4,9	IR1.5	8	-	8	60
2KCRI-059-IR10-080-860	5,9	IR1.0	8	-	8	60
2KCRI-059-IR40-200-K85	5,9	IR7.0	20	-	20	85

4KCRI

Fresa Raggio Concavo a 4 taglienti
 4 Flutes Inner Corner Radius



- Acciai bonificati HRC 40-55
- *Hardened steels HRC 40-55*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,5-0,9	0 -0,010	R0,1-R2,5	$\pm 0,010$
1,4-5,9	0 -0,020	R3-R8	$\pm 0,020$

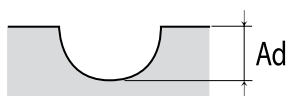
CODICE	Diametro di testa (D)	Raggio Concavo (IR)	Diametro esterno di taglio (d _t)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Diameter (D)	Inner Radius (IR)	Outside Diameter of Cut (d _t)	Shank diameter (d)	Overall length (L)
4KCRI-019-IR10-040-450	1,9	IR1.0	4	4	50
4KCRI-024-IR075-040-450	2,4	IR0.75	4	4	50
4KCRI-029-IR05-040-450	2,9	IR0.5	4	4	50
4KCRI-039-IR10-060-650	3,9	IR1.0	6	6	50
4KCRI-039-IR20-080-860	3,9	IR2.0	8	8	60
4KCRI-039-IR30-100-A70	3,9	IR3.0	10	10	70
4KCRI-039-IR40-120-C80	3,9	IR4.0	12	12	80
4KCRI-039-IR60-160-G80	3,9	IR6.0	16	16	80
4KCRI-049-IR05-060-650	4,9	IR0.5	6	6	50
4KCRI-049-IR075-060-650	4,9	IR0.75	6	6	50
4KCRI-049-IR15-080-860	4,9	IR1.5	8	8	60
4KCRI-049-IR25-100-A70	4,9	IR2.5	10	10	70
4KCRI-059-IR10-080-860	5,9	IR1.0	8	8	60
4KCRI-059-IR20-100-A70	5,9	IR2.0	10	10	70
4KCRI-059-IR30-120-C80	5,9	IR3.0	12	12	80
4KCRI-059-IR50-160-G80	5,9	IR5.0	16	16	80

2KBRH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 45			HRC 45 ~ 55			HRC 55 ~ 65			Rame - Copper Alloy		
Raggio di testa	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
R0.05	0.001-0.005	38,000-50,000	50-80	0.001-0.005	38,000-50,000	40-60	0.001-0.004	38,000-50,000	30-50	0.003-0.010	38,000-50,000	50-100
R0.1	0.001-0.010	38,000-50,000	200-350	0.001-0.009	38,000-50,000	200-280	0.001-0.005	38,000-50,000	150-240	0.010-0.020	38,000-50,000	200-500
R0.15	0.004-0.018	38,000-50,000	200-600	0.003-0.014	38,000-50,000	200-400	0.003-0.012	38,000-50,000	150-350	0.010-0.025	38,000-50,000	300-800
R0.2	0.005-0.020	30,000-45,000	250-800	0.003-0.014	30,000-45,000	200-500	0.003-0.011	30,000-45,000	160-400	0.010-0.030	30,000-42,000	300-1,000
R0.25	0.006-0.020	25,000-42,000	300-700	0.004-0.014	25,000-42,000	250-500	0.003-0.011	25,000-42,000	220-400	0.010-0.030	30,000-42,000	500-1,400
R0.3	0.006-0.030	22,000-40,000	300-1,200	0.006-0.030	22,000-40,000	250-800	0.003-0.01	520,000-27,000	210-380	0.010-0.100	24,000-40,000	350-1,600
R0.4	0.006-0.100	20,000-40,000	260-1,800	0.006-0.080	20,000-40,000	240-1,500	0.006-0.021	20,000-40,000	190-480	0.030-0.100	20,000-40,000	450-2,000
R0.5	0.010-0.200	20,000-38,000	500-2,800	0.010-0.080	20,000-38,000	300-2,400	0.007-0.025	12,000-17,000	230-420	0.050-0.200	20,000-40,000	800-3,000
R0.6	0.050-0.100	20,000-30,000	600-2,500	0.020-0.060	20,000-30,000	400-2,300	0.011-0.020	13,000-14,000	260-450	0.060-0.100	20,000-30,000	1,000-2,500
R0.75	0.050-0.200	18,000-30,000	600-3,100	0.020-0.180	18,000-30,000	550-2,500	0.010-0.030	8,500-11,000	200-400	0.100-0.300	18,000-30,000	1,200-3,000
R1.0	0.050-0.200	12,000-25,000	800-2,400	0.030-0.120	12,000-20,000	850-2,300	0.015-0.035	7,000-8,500	280-400	0.100-0.400	12,000-20,000	1,200-3,000
R1.5	0.050-0.200	10,000-20,000	1,100-3,800	0.030-0.180	10,000-20,000	900-2,900	0.020-0.050	5,200-6,000	380-550	0.200-0.500	16,000-20,000	1,800-4,000
R2.0	0.100-0.300	10,000-20,000	1,300-3,900	0.080-0.180	10,000-20,000	1,800-3,000	0.050-0.090	4,000-4,600	380-590	0.300-0.500	16,000-20,000	2,600-4,000
R2.5	0.100-0.300	9,000-20,000	1,500-3,900	0.050-0.200	8,000-18,000	1,300-3,800	0.030-0.160	6,000-16,000	450-1,000	0.300-0.500	9,000-20,000	2,600-4,000
R3.0	0.100-0.300	8,000-18,000	1,800-3,900	0.050-0.200	8,000-18,000	1,500-3,800	0.030-0.160	6,000-16,000	450-1,000	0.300-0.500	8,000-18,000	2,600-4,000
R4.0	0.150-0.350	8,000-12,000	2,000-4,000	0.100-0.250	6,000-10,000	1,800-3,700	0.080-0.200	4,000-8,000	800-1,500	0.300-0.500	8,000-12,000	2,600-5,000
R5.0	0.200-0.400	6,000-11,000	2,000-4,000	0.100-0.300	4,000-9,000	1,800-3,700	0.080-0.250	3,000-8,000	800-1,500	0.300-0.500	6,000-11,000	2,600-5,000
R6.0	0.300-0.500	5,000-10,000	2,000-4,000	0.200-0.400	3,000-8,000	1,800-3,700	0.150-0.350	2,000-6,000	800-1,500	0.300-0.500	5,000-10,000	2,600-5,000

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

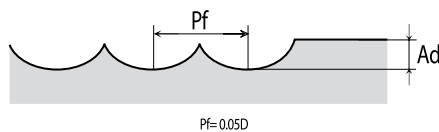
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KBSH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 45			HRC 45 ~ 55			HRC 55 ~ 65		
Raggio di testa	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
R0.05	0.003	50,000	170	0.002	42,000	150	0.001	40,000	100
R0.1	0.004	50,000	200	0.003	42,000	180	0.002	40,000	120
R0.15	0.005	45,000	320	0.004	42,000	300	0.003	40,000	180
R0.2	0.006	45,000	420	0.005	42,000	400	0.004	40,000	240
R0.25	0.007	45,000	530	0.006	42,000	500	0.005	40,000	300
R0.3	0.008	42,000	1,000	0.007	40,000	1,200	0.006	40,000	800
R0.4	0.100	42,000	1,400	0.009	40,000	1,600	0.008	40,000	1,000
R0.5	0.10	40,000	2,600	0.10	30,000	2,000	0.10	25,000	1,300
R0.75	0.15	30,000	3,000	0.10	30,000	2,500	0.10	25,000	1,800
R1.0	0.20	25,000	3,000	0.20	25,000	2,500	0.15	20,000	1,800
R1.25	0.20	25,000	3,000	0.20	20,000	2,500	0.15	16,000	1,800
R1.5	0.20	20,000	3,000	0.20	18,000	2,500	0.15	14,000	2,000
R2.0	0.25	20,000	3,000	0.20	16,000	2,500	0.15	12,000	2,000
R2.5	0.25	18,000	3,000	0.20	14,000	2,500	0.15	9,000	2,000
R3.0	0.30	18,000	3,300	0.25	16,000	2,800	0.15	8,000	2,000
R4.0	0.40	16,000	3,300	0.30	12,000	2,800	0.20	7,000	1,500
R5.0	0.50	13,000	3,400	0.40	10,000	2,600	0.30	5,000	1,300
R6.0	0.60	7,000	2,000	0.50	6,000	1,800	0.40	4,000	1,100

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

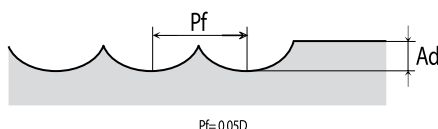
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KBPH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC 30 ~ 45			HRC 45 ~ 55			HRC 55 ~ 65		
Raggio di testa	Profondità di taglio Ad (mm)	Velocità (-)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
R0.05	0.003	50,000	170	0.002	42,000	150	0.001	40,000	100
R0.1	0.004	50,000	200	0.003	42,000	180	0.002	40,000	120
R0.15	0.005	45,000	320	0.004	42,000	300	0.003	40,000	180
R0.2	0.006	45,000	420	0.005	42,000	400	0.004	40,000	240
R0.25	0.007	45,000	530	0.006	42,000	500	0.005	40,000	300
R0.3	0.008	42,000	1,000	0.007	40,000	1,200	0.006	40,000	800
R0.4	0.100	42,000	1,400	0.009	40,000	1,600	0.008	40,000	1,000
R0.5	0.10	40,000	2,600	0.10	30,000	2,000	0.10	25,000	1,300
R0.75	0.15	30,000	3,000	0.10	30,000	2,500	0.10	25,000	1,800
R1.0	0.20	25,000	3,000	0.20	25,000	2,500	0.15	20,000	1,800
R1.25	0.20	25,000	3,000	0.20	20,000	2,500	0.15	16,000	1,800
R1.5	0.20	20,000	3,000	0.20	18,000	2,500	0.15	14,000	2,000
R2.0	0.25	20,000	3,000	0.20	16,000	2,500	0.15	12,000	2,000
R2.5	0.25	18,000	3,000	0.20	14,000	2,500	0.15	9,000	2,000
R3.0	0.30	18,000	3,300	0.25	16,000	2,800	0.15	8,000	2,000
R4.0	0.40	16,000	3,300	0.30	12,000	2,800	0.20	7,000	1,500
R5.0	0.50	13,000	3,400	0.40	10,000	2,600	0.30	5,000	1,300
R6.0	0.60	7,000	2,000	0.50	6,000	1,800	0.40	4,000	1,100

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

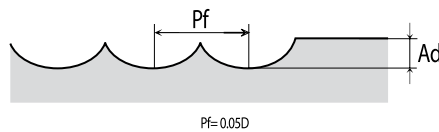
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

3KBPH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC 30 ~ 45			HRC 45 ~ 55			HRC 55 ~ 65		
Raggio di testa	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
R0.5	0.08	27,500	1,650	0.08	22,000	1,400	0.05	11,000	1,000
R0.75	0.12	24,000	1,650	0.12	20,000	1,400	0.08	10,000	1,000
R1.0	0.15	22,000	1,650	0.15	18,000	1,800	0.10	9,500	1,200
R1.25	0.20	20,000	2,200	0.20	14,000	1,800	0.13	7,000	1,200
R1.5	0.23	18,000	2,200	0.23	12,000	1,800	0.15	6,500	1,200
R2.0	0.30	16,500	3,300	0.30	10,000	3,500	0.20	6,000	2,000
R2.5	0.38	11,000	2,800	0.38	9,500	4,000	0.25	6,000	2,000
R3.0	0.45	10,000	2,800	0.45	9,000	4,000	0.30	5,500	2,000
R4.0	0.60	70,000	3,500	0.60	7,000	3,500	0.40	5,000	1,800
R5.0	0.75	5,500	3,300	0.75	5,000	3,200	0.50	4,000	1,800
R6.0	0.90	4,500	3,300	0.90	4,000	3,200	0.60	3,300	1,800

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

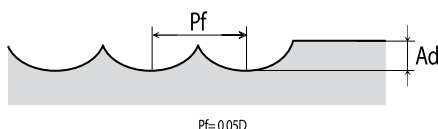
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KBPH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 45			HRC 45 ~ 55			HRC 55 ~ 65		
Raggio di testa	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
R0.5	0.08	25,000	1,500	0.08	20,000	1,200	0.05	10,000	1,000
R0.75	0.12	22,000	1,500	0.12	18,000	1,200	0.08	9,500	1,000
R1.0	0.15	20,000	1,500	0.15	16,000	1,500	0.10	8,500	1,200
R1.25	0.20	18,000	2,000	0.20	13,000	1,500	0.13	6,500	1,200
R1.5	0.23	16,000	2,000	0.23	10,500	1,500	0.15	5,500	1,200
R2.0	0.30	15,000	3,000	0.30	9,000	3,000	0.20	6,200	2,000
R2.5	0.38	10,000	2,500	0.38	8,500	3,500	0.25	5,500	2,000
R3.0	0.45	9,000	2,500	0.45	8,000	3,500	0.30	5,000	2,000
R4.0	0.60	6,500	3,300	0.60	6,200	3,000	0.40	4,500	1,800
R5.0	0.75	5,000	3,000	0.75	4,500	2,700	0.50	3,600	1,800
R6.0	0.90	4,000	3,000	0.90	3,750	2,700	0.60	3,000	1,800

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

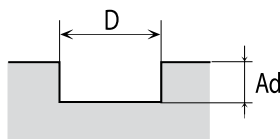
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KRRH & 2KCRH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 45			HRC 45 ~ 55			Lega di rame - Copper Alloy		
Diametro esterno	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
0.2	0.002~0.005	30,000~38,000	80~150	0.002~0.005	32,000~42,000	60~120	0.002~0.005	30,000~38,000	120~220
0.3	0.005~0.007	28,000~35,000	100~200	0.003~0.006	30,000~36,000	80~160	0.005~0.018	28,000~35,000	180~260
0.4	0.005~0.010	25,000~30,000	200~350	0.003~0.008	28,000~35,000	120~300	0.005~0.024	25,000~30,000	200~360
0.5	0.005~0.020	18,000~30,000	200~500	0.005~0.010	20,000~25,000	150~350	0.005~0.030	22,000~30,000	220~600
0.6	0.006~0.030	18,000~30,000	180~600	0.006~0.020	12,000~25,000	100~400	0.006~0.030	18,000~30,000	250~650
0.7	0.007~0.030	18,000~30,000	140~650	0.007~0.020	12,000~25,000	100~450	0.007~0.050	18,000~30,000	250~700
0.8	0.008~0.030	14,000~25,000	250~1,100	0.008~0.025	12,000~25,000	150~900	0.008~0.060	14,000~25,000	400~1,400
1.0	0.010~0.050	14,000~25,000	250~1,100	0.005~0.050	10,000~20,000	150~900	0.010~0.080	14,000~25,000	500~2,000
1.2	0.010~0.050	11,000~25,000	300~1,100	0.008~0.050	10,000~18,000	150~800	0.010~0.080	11,000~25,000	600~2,000
1.5	0.015~0.090	10,000~20,000	300~1,600	0.005~0.060	8,000~18,000	180~1,000	0.015~0.090	10,000~20,000	800~2,000
2.0	0.020~0.120	9,000~18,000	300~2,000	0.010~0.050	8,000~16,000	250~1,000	0.020~0.130	9,000~18,000	1,200~2,500
2.5	0.050~0.130	8,000~18,000	300~2,000	0.035~0.070	8,000~16,000	250~1,000	0.050~0.130	8,000~18,000	1,200~2,800
3.0	0.030~0.150	5,000~18,000	400~1,800	0.010~0.080	6,000~10,000	250~1,000	0.030~0.200	5,000~18,000	1,500~3,000
4.0	0.030~0.200	5,000~14,000	500~1,500	0.025~0.200	4,000~10,000	300~1,000	0.030~0.300	5,000~14,000	1,500~3,200
5.0	0.100~0.200	5,000~14,000	500~1,800	0.100~0.200	4,000~13,000	400~1,500	0.100~0.400	5,000~14,000	1,500~3,200
6.0	0.100~0.200	4,000~9,000	1,000~2,000	0.100~0.200	4,000~13,000	800~1,200	0.200~0.400	8,000~14,000	2,500~3,500
8.0	0.100~0.200	3,500~6,000	1,000~2,000	0.100~0.200	3,500~7,500	800~1,200	0.200~0.400	7,000~12,000	2,500~4,000
10.0	0.100~0.200	3,000~5,000	1,000~2,000	0.100~0.200	3,000~6,000	800~1,200	0.200~0.400	5,000~12,000	2,500~4,500
12.0	0.100~0.200	3,000~5,000	1,000~2,000	0.100~0.200	3,000~5,000	800~1,200	0.200~0.400	3,000~9,000	2,500~4,500
16.0	0.100~0.200	1,800~3,000	1,000~2,000	0.100~0.200	1,800~3,000	800~1,200	0.200~0.400	1,800~3,000	2,500~4,500
20.0	0.100~0.200	1,200~2,500	1,000~2,000	0.100~0.200	1,200~2,500	800~1,200	0.200~0.400	1,200~2,500	2,500~4,500

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

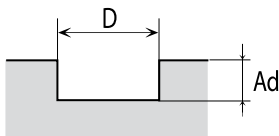
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KRRRH & 4KRCH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 45			HRC 45 ~ 55			HRC 55 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
0.8	0.006~0.030	12,000~25,000	250~1,000	0.004~0.025	12,000~25,000	250~1,000	0.002~0.020	12,000~25,000	250~1,000
1.0	0.007~0.050	10,000~25,000	600~2,000	0.005~0.040	8,000~20,000	500~1,800	0.003~0.030	5,000~16,000	500~1,800
1.2	0.009~0.045	10,000~25,000	500~1,000	0.006~0.040	8,000~20,000	500~1,800	0.004~0.030	8,000~20,000	500~1,800
1.5	0.010~0.050	8,000~20,000	450~2,000	0.007~0.040	7,000~20,000	350~1,600	0.005~0.030	5,000~15,000	350~1,600
2.0	0.015~0.060	7,000~18,000	500~1,800	0.010~0.050	8,000~15,000	450~1,500	0.005~0.030	5,000~12,000	450~1,500
2.5	0.030~0.070	7,000~14,000	600~1,500	0.020~0.050	8,000~15,000	500~1,400	0.008~0.030	4,500~10,000	500~1,400
3.0	0.020~0.100	5,000~18,000	700~2,200	0.015~0.060	6,000~12,000	600~1,800	0.008~0.030	4,500~10,000	600~1,800
4.0	0.025~0.100	4,500~12,000	700~2,000	0.010~0.060	4,000~10,000	600~1,500	0.008~0.050	3,000~8,500	600~1,500
5.0	0.100~0.200	5,000~8,000	1,000~2,000	0.050~0.100	3,500~10,000	1,000~1,600	0.030~0.050	3,500~7,000	800~1,300
6.0	0.050~0.150	4,000~10,000	2,000~3,500	0.030~0.100	3,500~10,000	2,000~3,000	0.010~0.060	3,500~7,000	1,200~2,000
8.0	0.050~0.150	6,500~9,000	2,500~3,600	0.030~0.100	5,000~7,500	2,000~3,000	0.020~0.050	4,500~6,000	1,500~2,500
10.0	0.050~0.150	5,000~7,500	2,300~3,000	0.030~0.100	4,000~6,000	1,800~2,300	0.020~0.050	3,500~5,500	1,200~2,000
12.0	0.050~0.200	3,000~5,000	1,700~2,500	0.030~0.120	3,000~5,000	1,500~2,000	0.020~0.050	2,800~4,000	1,000~1,600
16.0	0.050~0.200	1,500~2,800	1,500~3,000	0.030~0.120	1,500~2,800	1,500~2,000	0.020~0.050	2,800~4,000	1,000~1,600
20.0	0.050~0.200	1,200~2,500	1,500~3,000	0.030~0.120	1,200~2,500	1,500~2,000	0.020~0.050	2,800~4,000	1,000~1,600

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

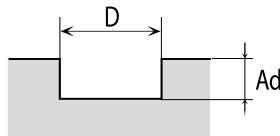
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KTIH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC < 45			HRC 45 ~ 55			HRC 55 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
1.5	0.030~0.050	28,000~38,000	2,500~6,000	0.030~0.050	20,000~30,000	2,000~5,000	0.005~0.015	15,000~25,000	1,000~4,000
2.0	0.050~0.100	25,000~35,000	3,500~8,000	0.050~0.100	20,000~28,000	2,500~7,000	0.005~0.025	15,000~22,000	1,500~6,000
3.0	0.050~0.100	20,000~27,000	5,000~8,000	0.050~0.100	15,000~23,000	4,000~7,000	0.008~0.025	10,000~18,000	3,000~6,000
4.0	0.050~0.100	13,000~18,000	5,000~8,000	0.050~0.100	8,000~15,000	4,000~7,000	0.008~0.050	6,000~12,000	3,000~6,000
5.0	0.050~0.150	8,000~13,000	5,000~8,000	0.050~0.150	6,500~10,000	4,000~7,000	0.030~0.050	4,500~8,000	3,000~6,000
6.0	0.050~0.150	8,000~13,000	5,000~8,000	0.050~0.150	6,500~10,000	4,000~7,000	0.010~0.050	4,500~8,000	3,000~6,000
8.0	0.050~0.150	6,000~9,500	5,000~9,000	0.050~0.150	5,000~7,500	4,000~8,000	0.020~0.050	4,000~6,500	3,000~7,000
10.0	0.050~0.150	6,000~8,000	5,000~10,000	0.050~0.150	4,000~7,000	4,000~9,000	0.020~0.050	3,000~5,500	3,000~7,000
12.0	0.050~0.150	5,000~7,000	5,000~10,000	0.050~0.150	4,000~6,000	4,000~9,000	0.020~0.050	3,000~5,000	3,000~7,000

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

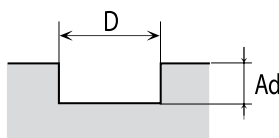
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KERH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC 30 ~ 45			HRC 45 ~ 55			HRC 55 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
0.1	0.001~0.004	38,000~50,000	50~80	0.001~0.004	35,000~45,000	30~65	0.001~0.002	25,000~35,000	20~60
0.2	0.002~0.005	30,000~50,000	60~240	0.002~0.005	25,000~40,000	40~200	0.002~0.003	20,000~32,000	30~160
0.3	0.003~0.007	30,000~48,000	60~350	0.003~0.007	22,000~38,000	45~300	0.002~0.003	18,000~30,000	35~250
0.4	0.003~0.010	25,000~40,000	150~500	0.003~0.010	20,000~35,000	100~400	0.002~0.005	18,000~30,000	80~350
0.5	0.003~0.020	16,000~30,000	150~500	0.003~0.020	16,000~30,000	100~400	0.001~0.007	12,000~23,000	80~360
0.6	0.004~0.020	16,000~30,000	230~620	0.004~0.020	16,000~28,000	130~500	0.002~0.007	12,000~23,000	100~400
0.7	0.010~0.040	16,000~30,000	330~650	0.005~0.040	16,000~25,000	130~550	0.003~0.020	12,000~23,000	100~450
0.8	0.005~0.040	16,000~30,000	250~900	0.005~0.040	13,500~23,000	150~800	0.002~0.040	10,000~20,000	100~650
1.0	0.005~0.050	12,000~27,000	150~1,000	0.003~0.050	10,000~23,000	60~900	0.002~0.040	6,000~18,000	50~800
1.2	0.010~0.050	12,500~25,000	350~1,000	0.007~0.050	10,000~23,000	250~900	0.003~0.040	7,000~18,000	200~800
1.5	0.010~0.070	9,000~23,000	300~1,200	0.010~0.060	8,000~20,000	200~900	0.005~0.040	7,000~18,000	150~800
2.0	0.015~0.080	7,000~20,000	280~1,000	0.015~0.060	7,000~18,000	180~900	0.010~0.050	7,000~15,000	160~750
3.0	0.030~0.100	5,000~16,000	350~900	0.020~0.100	6,000~16,000	250~800	0.015~0.070	6,000~10,000	200~700
4.0	0.035~0.100	4,500~14,000	350~900	0.035~0.100	5,000~12,000	250~800	0.025~0.070	5,000~9,500	200~700
5.0	0.050~0.120	3,500~12,000	400~1,000	0.040~0.100	4,000~10,000	300~900	0.030~0.080	3,000~8,000	250~800
6.0	0.050~0.120	3,500~12,000	400~1,000	0.040~0.120	4,000~10,000	300~900	0.030~0.080	3,000~8,000	250~800
8.0	0.060~0.150	4,500~10,000	450~1,000	0.050~0.120	3,500~9,000	350~900	0.040~0.100	2,500~7,000	300~800
10.0	0.080~0.150	4,000~8,000	500~1,000	0.060~0.120	3,000~7,000	400~900	0.040~0.100	2,000~5,000	300~800
12.0	0.080~0.200	3,500~7,000	500~1,000	0.070~0.180	2,500~6,000	400~900	0.050~0.120	1,500~4,000	300~800

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

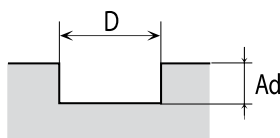
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KEPH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC 30 ~ 45			HRC 45 ~ 55			HRC 55 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
0.1	0.01	38,000~50,000	50~80	0.005	32,000~45,000	50~80	0.003	30,000~40,000	50~80
0.2	0.02	30,000~50,000	60~240	0.010	28,000~42,000	60~240	0.005	25,000~38,000	50~100
0.3	0.03	30,000~48,000	60~350	0.015	25,000~40,000	60~350	0.008	22,000~35,000	60~150
0.4	0.04	25,000~40,000	150~500	0.020	20,000~35,000	150~500	0.010	18,000~32,000	70~150
0.5	0.05	16,000~30,000	150~500	0.025	12,000~25,000	150~500	0.013	15,000~30,000	70~150
0.6	0.06	16,000~30,000	230~620	0.03	12,000~25,000	230~620	0.02	12,000~25,000	80~150
0.7	0.07	16,000~30,000	330~650	0.04	12,000~25,000	330~650	0.02	12,000~25,000	80~150
0.8	0.08	16,000~30,000	250~900	0.04	12,000~25,000	250~900	0.02	12,000~25,000	80~150
1.0	0.10	25,000~32,000	150~500	0.05	16,000~24,000	150~500	0.03	12,000~20,000	90~120
1.5	0.15	18,000~25,000	200~500	0.08	10,000~15,000	200~500	0.04	8,000~15,000	100~150
2.0	0.20	16,000~20,000	200~500	0.10	8,000~13,000	200~500	0.05	7,000~12,000	100~150
2.5	0.25	10,000~15,000	200~500	0.13	7,000~12,000	200~500	0.06	6,000~12,000	120~230
3.0	0.30	8,000~13,000	200~500	0.15	6,000~11,000	200~500	0.08	5,000~10,000	150~250
4.0	0.40	7,000~12,000	200~600	0.20	5,000~10,000	200~600	0.10	4,000~9,000	150~250
5.0	0.50	6,500~10,000	200~500	0.25	4,000~8,500	200~500	0.13	3,500~7,500	150~230
6.0	0.60	6,500~10,000	200~600	0.30	4,000~8,500	200~600	0.15	3,500~7,500	150~230
8.0	1.20	4,500~8,000	200~400	0.40	2,500~6,500	150~400	0.20	2,500~5,000	120~200
10.0	1.50	3,000~6,000	200~400	0.50	2,000~5,500	150~400	0.25	2,000~4,500	120~200
12.0	1.80	2,500~5,000	200~400	0.60	1,500~3,500	150~400	0.30	1,500~3,200	120~200

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

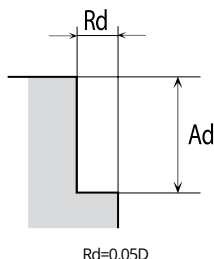
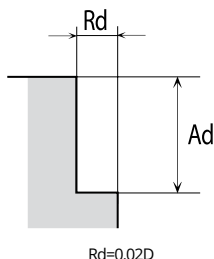
1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KELH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC 30 ~ 45			HRC 45 ~ 55			HRC 55 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
1.0	1.0	10,000~15,000	40~80	1.0	7,000~12,000	40~80	0.5	7,000~12,000	40~80
1.5	1.5	9,000~13,000	40~80	1.5	6,000~10,000	40~80	0.75	6,000~10,000	40~80
2.0	2.0	5,000~8,000	40~80	2.0	3,000~6,000	40~80	1.0	3,000~6,000	40~80
2.5	2.5	4,500~7,000	40~80	2.5	2,500~5,000	40~80	1.25	2,500~5,000	40~80
3.0	3.0	4,000~6,000	40~80	3.0	2,000~4,000	40~80	1.5	2,000~4,000	40~80
4.0	4.0	3,000~5,000	50~100	4.0	1,500~3,000	50~100	2.0	1,500~3,000	50~100
5.0	5.0	2,500~4,500	50~100	5.0	1,500~2,500	50~100	2.5	1,500~2,500	50~100
6.0	6.0	2,000~4,000	50~100	6.0	1,500~2,000	50~100	3.0	1,500~2,000	50~100
8.0	8.0	1,800~2,500	50~100	8.0	1,800~2,500	50~100	4.0	1,800~2,500	50~100
10.0	10.0	1,500~2,000	50~100	10.0	1,500~2,000	50~100	5.0	1,500~2,000	50~100
12.0	12.0	1,200~1,800	40~80	12.0	600~1,000	40~80	6.0	600~1,000	40~80
16.0	16.0	800~1,500	40~80	16.0	400~800	40~80	8.0	400~800	40~80
20.0	20.0	700~1,200	40~80	20.0	300~700	40~80	10.0	300~700	40~80
25.0	25.0	500~800	40~80	25.0	250~600	40~80	12.5	250~600	40~80

Profondità di taglio Depth of Cut	 Rd=0.05D	 Rd=0.02D



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

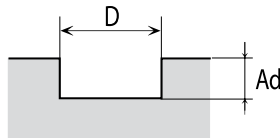
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KERH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC 30 ~ 45			HRC 45 ~ 55			HRC 55 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
0.8	0.005~0.040	15,000~28,000	250~900	0.005~0.025	12,000~25,000	250~900	0.002~0.040	10,000~20,000	100~650
1.0	0.010~0.050	12,000~25,000	400~2,000	0.003~0.030	10,000~20,000	300~1,800	0.002~0.040	8,000~18,000	200~1,200
1.2	0.010~0.050	10,000~25,000	500~2,000	0.007~0.050	9,000~20,000	300~1,600	0.003~0.040	7,000~18,000	200~1,200
1.5	0.020~0.060	9,000~23,000	700~2,000	0.010~0.030	8,000~20,000	400~1,600	0.005~0.040	7,000~18,000	200~1,200
2.0	0.030~0.080	7,000~20,000	800~2,000	0.015~0.050	6,000~18,000	400~1,600	0.010~0.050	5,000~15,000	200~1,200
3.0	0.050~0.100	5,000~16,000	800~2,000	0.020~0.060	5,000~15,000	400~1,600	0.015~0.070	4,000~10,000	200~1,200
4.0	0.050~0.150	4,500~14,000	800~2,000	0.025~0.080	4,000~10,000	400~2,000	0.025~0.070	3,000~8,000	200~1,200
5.0	0.050~0.120	3,500~12,000	600~1,500	0.040~0.100	3,000~8,000	400~1,000	0.030~0.080	2,500~6,000	250~800
6.0	0.050~0.120	3,500~12,000	600~1,500	0.040~0.120	3,000~8,000	400~1,000	0.030~0.080	2,500~6,000	250~800
8.0	0.060~0.150	4,500~10,000	450~1,000	0.050~0.120	2,500~7,000	350~900	0.040~0.100	2,000~5,000	300~700
10.0	0.080~0.150	4,000~8,000	500~1,000	0.060~0.120	2,000~5,000	300~800	0.040~0.100	2,000~4,500	300~700
12.0	0.080~0.200	3,500~7,000	500~1,000	0.070~0.180	2,000~4,000	300~800	0.050~0.120	1,500~4,000	300~650

Profondità di taglio
Depth of Cut

**ATTENZIONE - WARNING**

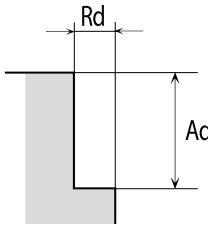
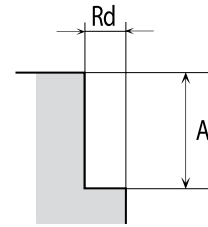
1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KEPH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC 30 ~ 45			HRC 45 ~ 55			HRC 55 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
1.0	1.0	10,000~15,000	40~80	1.0	7,000~12,000	40~80	0.5	7,000~12,000	40~80
1.5	1.5	9,000~13,000	40~80	1.5	6,000~10,000	40~80	0.75	6,000~10,000	40~80
2.0	2.0	5,000~8,000	40~80	2.0	3,000~6,000	40~80	1.0	3,000~6,000	40~80
2.5	2.5	4,500~7,000	40~80	2.5	2,500~5,000	40~80	1.25	2,500~5,000	40~80
3.0	3.0	4,000~6,000	40~80	3.0	2,000~4,000	40~80	1.5	2,000~4,000	40~80
4.0	4.0	3,000~5,000	50~100	4.0	1,500~3,000	50~100	2.0	1,500~3,000	50~100
5.0	5.0	2,500~4,500	50~100	5.0	1,500~2,500	50~100	2.5	1,500~2,500	50~100
6.0	6.0	2,000~4,000	50~100	6.0	1,500~2,000	50~100	3.0	1,500~2,000	50~100
8.0	8.0	1,800~2,500	50~100	8.0	1,800~2,500	50~100	4.0	1,800~2,500	50~100
10.0	10.0	1,500~2,000	50~100	10.0	1,500~2,000	50~100	5.0	1,500~2,000	50~100
12.0	12.0	1,200~1,800	40~80	12.0	600~1,000	40~80	6.0	600~1,000	40~80
16.0	16.0	800~1,500	40~80	16.0	400~800	40~80	8.0	400~800	40~80
20.0	20.0	700~1,200	40~80	20.0	300~700	40~80	10.0	300~700	40~80
25.0	25.0	500~800	40~80	25.0	250~600	40~80	12.5	250~600	40~80

Profondità di taglio Depth of Cut	 Ad=1.5D Rd=0.05D (0.8 ≤ D ≤ Ø2) Rd=0.10D (3 ≤ D ≤ Ø6) Rd=0.15D (7 ≤ D ≤ Ø12)	 Rd=0.03D
--------------------------------------	---	--



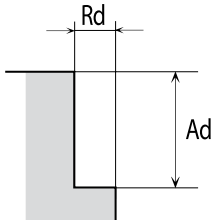
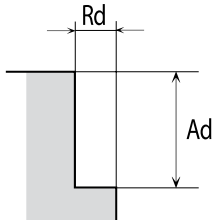
ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KELH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC 30 ~ 45			HRC 45 ~ 55			HRC 55 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
1.0	1.0	10,000~15,000	40~80	1.0	7,000~12,000	40~80	0.5	7,000~12,000	40~80
1.5	1.5	9,000~13,000	40~80	1.5	6,000~10,000	40~80	0.75	6,000~10,000	40~80
2.0	2.0	5,000~8,000	40~80	2.0	3,000~6,000	40~80	1.0	3,000~6,000	40~80
2.5	2.5	4,500~7,000	40~80	2.5	2,500~5,000	40~80	1.25	2,500~5,000	40~80
3.0	3.0	4,000~6,000	40~80	3.0	2,000~4,000	40~80	1.5	2,000~4,000	40~80
4.0	4.0	3,000~5,000	50~100	4.0	1,500~3,000	50~100	2.0	1,500~3,000	50~100
5.0	5.0	2,500~4,500	50~100	5.0	1,500~2,500	50~100	2.5	1,500~2,500	50~100
6.0	6.0	2,000~4,000	50~100	6.0	1,500~2,000	50~100	3.0	1,500~2,000	50~100
8.0	8.0	1,800~2,500	50~100	8.0	1,800~2,500	50~100	4.0	1,800~2,500	50~100
10.0	10.0	1,500~2,000	50~100	10.0	1,500~2,000	50~100	5.0	1,500~2,000	50~100
12.0	12.0	1,200~1,800	40~80	12.0	600~1,000	40~80	6.0	600~1,000	40~80
16.0	16.0	800~1,500	40~80	16.0	400~800	40~80	8.0	400~800	40~80
20.0	20.0	700~1,200	40~80	20.0	300~700	40~80	10.0	300~700	40~80
25.0	25.0	500~800	40~80	25.0	250~600	40~80	12.5	250~600	40~80
Profondità di taglio Depth of Cut									
	Rd=0.05D			Rd=0.05D					



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

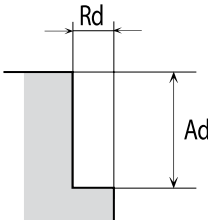
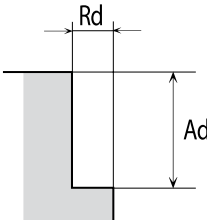
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



4KEHH

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC 30 ~ 45			HRC 45 ~ 55			HRC 55 ~ 65		
Diametro esterno	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
1.0	0.05	12,000~25,000	400~2,000	0.05	10,000~20,000	300~1,800	0.02	8,000~18,000	200~1,200
1.2	0.06	10,000~25,000	500~2,000	0.06	9,000~20,000	300~1,600	0.02	7,000~18,000	200~1,200
1.5	0.08	9,000~23,000	700~2,000	0.08	8,000~20,000	400~1,600	0.03	7,000~18,000	200~1,200
2.0	0.10	7,000~20,000	800~2,000	0.10	6,000~18,000	400~1,600	0.04	5,000~15,000	200~1,200
3.0	0.30	5,000~16,000	800~2,000	0.30	5,000~15,000	400~1,600	0.06	4,000~10,000	200~1,200
4.0	0.40	4,500~14,000	800~2,000	0.40	4,000~10,000	400~2,000	0.08	3,000~8,000	200~1,200
5.0	0.50	3,500~12,000	600~1,500	0.50	3,000~8,000	400~1,000	0.10	2,500~6,000	250~800
6.0	0.60	3,500~12,000	600~1,500	0.60	3,000~8,000	400~1,000	0.12	2,500~6,000	250~800
8.0	1.20	2,500~10,000	450~1,000	1.20	2,500~7,000	350~900	0.16	2,000~5,000	300~700
10.0	1.50	2,000~7,500	500~1,000	1.50	2,000~5,000	300~800	0.20	2,000~4,500	300~700
12.0	1.80	1,800~7,000	500~1,000	1.80	2,000~4,000	300~800	0.24	1,500~4,000	300~650

Profondità di taglio Depth of Cut	 Ad=1.5D Rd=0.05D (0.8 ≤ D ≤ Ø2) Rd=0.10D (3 ≤ D ≤ Ø6) Rd=0.15D (7 ≤ D ≤ Ø12)	 Rd=0.03D
--------------------------------------	---	--



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

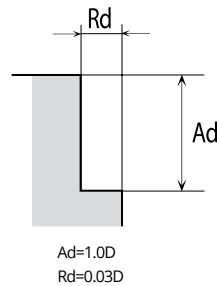
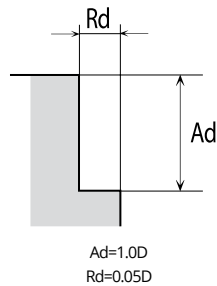
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

6KEPH

*Fresatura in alta velocità
High Speed Milling Condition*

HRC	HRC 30 ~ 45		HRC 45 ~ 55		HRC 55 ~ 65		HRC 65 ~ 70	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
6.0	13,000	4,400	11,000	3,300	8,000	2,200	5,300	1,300
8.0	10,000	4,500	8,000	3,200	6,000	2,200	4,000	1,300
10.0	8,000	4,300	6,400	3,050	4,800	2,100	3,200	1,250
12.0	6,600	4,000	5,300	2	800	4,000	1,900	2,700 1,170
16.0	5,000	3,800	4,000	2,650	3,000	1,800	2,000	1,100
20.0	4,000	3,600	3,200	2,530	2,400	1,730	1,600	1,050

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

6KEPH

Fresatura in alta velocità
High Speed Milling Condition

Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
<i>Outside Diameter</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>
1.9	3,000~3,500	200~500	2,000~2,500	150~400	2,300~2,800	100~300
2.9	2,300~2,800	200~500	1,500~2,000	150~400	1,500~2,000	100~300
3.9	1,500~2,000	200~500	1,300~1,800	150~400	1,300~1,800	100~300
4.9	1,300~1,800	200~500	1,200~1,700	150~400	1,200~1,700	100~300
5.9	1,200~1,700	200~500	700~1,200	150~400	700~1,200	100~300



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KCRI

Fresatura in alta velocità
High Speed Milling Condition

Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
<i>Outside Diameter</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>
1.9	5,500~6,500	300~800	5,000~6,000	200~700	3,800~4,800	150~650
2.9	5,000~6,000	300~800	4,000~5,000	200~700	3,200~4,200	150~650
3.9	4,000~5,000	300~800	3,800~4,800	200~700	2,800~3,800	150~650
4.9	3,800~4,800	300~800	3,200~4,200	200~700	2,500~3,500	150~650
5.9	3,200~4,200	300~800	2,500~3,500	200~700	2,000~3,000	150~650



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.





IBEX *SERIES*





KOBOL



TUTTI I TIPI ALL TYPE

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)
ALL	0 ~ -0.020

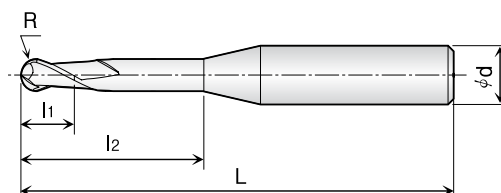
- Design innovativo per proteggere il tagliente e migliorare le prestazioni di taglio
- Consigliata nelle lavorazioni meccaniche generiche
- Adatta alle lavorazioni convenzionali
- *Geometry design to protect the breakage of cutting edge and improve the cutting performance*
- *Optimized to use shrink-fit chuck*
- *Suitable to side cutting*
- *Innovatives Design zum Schutz der Schneidkante und Verbesserung der Schnittleistung*
- *Empfohlen für die allgemeine mechanische Bearbeitung*
- *Geeignet für die konventionelle Bearbeitung*

2KBRA

Fresa sferica a 2 taglienti
2 Flutes Rib Ball End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KBRA-004-010-445	R0.2	0,4	1	4	45
2KBRA-004-020-445	R0.2	0,4	2	4	45
2KBRA-005-020-445	R0.25	0,5	2	4	45
2KBRA-005-040-445	R0.25	0,5	4	4	45
2KBRA-006-020-445	R0.3	0,6	2	4	45
2KBRA-006-030-445	R0.3	0,6	3	4	45
2KBRA-006-040-445	R0.3	0,6	4	4	45
2KBRA-006-050-445	R0.3	0,6	5	4	45
2KBRA-006-060-445	R0.3	0,6	6	4	45
2KBRA-008-020-445	R0.4	0,8	2	4	45
2KBRA-008-030-445	R0.4	0,8	3	4	45
2KBRA-008-040-445	R0.4	0,8	4	4	45
2KBRA-008-050-445	R0.4	0,8	5	4	45
2KBRA-008-060-445	R0.4	0,8	6	4	45
2KBRA-008-080-445	R0.4	0,8	8	4	45
2KBRA-010-030-445	R0.5	1	3	4	45
2KBRA-010-040-445	R0.5	1	4	4	45
2KBRA-010-050-445	R0.5	1	5	4	45
2KBRA-010-060-445	R0.5	1	6	4	45
2KBRA-010-080-445	R0.5	1	8	4	45
2KBRA-010-100-445	R0.5	1	10	4	45
2KBRA-010-120-445	R0.5	1	12	4	45
2KBRA-012-080-445	R0.6	1,2	8	4	45
2KBRA-012-100-445	R0.6	1,2	10	4	45
2KBRA-012-120-445	R0.6	1,2	12	4	45

2KBRA

Fresa sferica a 2 taglienti
2 Flutes Rib Ball End Mills



CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Radius of ball Nose (R)</i>	<i>Lenght of cut (l₁)</i>	<i>Effective Lenght (l₂)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
2KBRA-015-060-445	R0.75	1,5	6	4	45
2KBRA-015-080-445	R0.75	1,5	8	4	45
2KBRA-015-100-445	R0.75	1,5	10	4	45
2KBRA-015-120-445	R0.75	1,5	12	4	45
2KBRA-015-160-450	R0.75	1,5	16	4	50
2KBRA-016-080-445	R0.8	1,6	8	4	45
2KBRA-016-120-445	R0.8	1,6	12	4	45
2KBRA-020-080-445	R1.0	2	8	4	45
2KBRA-020-100-445	R1.0	2	10	4	45
2KBRA-020-120-445	R1.0	2	12	4	45
2KBRA-020-160-450	R1.0	2	16	4	50
2KBRA-020-200-450	R1.0	2	20	4	50
2KBRA-025-080-650	R1.25	2,5	8	6	50
2KBRA-030-120-650	R1.5	3	12	6	50
2KBRA-030-160-660	R1.5	3	16	6	60
2KBRA-030-200-660	R1.5	3	20	6	60
2KBRA-030-250-665	R1.5	3	25	6	65
2KBRA-040-120-650	R2.0	4	12	6	50
2KBRA-040-160-660	R2.0	4	16	6	60
2KBRA-040-200-660	R2.0	4	20	6	60
2KBRA-040-250-665	R2.0	4	25	6	65
2KBRA-040-300-670	R2.0	4	30	6	70

IBEX

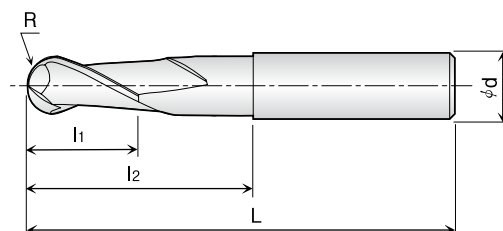


2KBSA

Fresa sferica corta a 2 taglienti
2 Flutes Short Ball End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

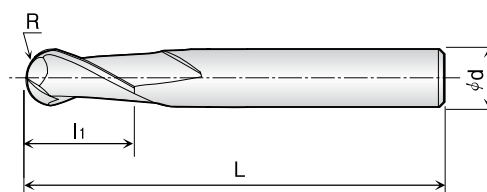
CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KBSA-004-010-650	R0.2	0,4	1	6	50
2KBSA-005-015-650	R0.25	0,5	1,5	6	50
2KBSA-006-015-650	R0.3	0,6	1,5	6	50
2KBSA-008-020-650	R0.4	0,8	2	6	50
2KBSA-010-025-650	R0.5	1	2,5	6	50
2KBSA-015-040-650	R0.75	1,5	4	6	50
2KBSA-020-060-650	R1.0	2	6	6	50
2KBSA-025-060-650	R1.25	2,5	6	6	50
2KBSA-030-080-650	R1.5	3	8	6	50
2KBSA-040-100-650	R2.0	4	10	6	50
2KBSA-050-120-650	R2.5	5	12	6	50
2KBSA-060-150-660	R3.0	7	15	6	60
2KBSA-080-200-860	R4.0	10	20	8	60
2KBSA-100-250-A70	R5.0	12	25	10	70
2KBSA-120-300-C80	R6.0	14	30	12	80

2KBPA

Fresa sferica a 2 taglienti
2 Flutes Ball End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*



IBEX



	Diametro (D)	Tolleranza (D)
	Size (D)	Tolerance (D)
	Tutte - All	0 -0,020

CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
2KBPA-004-008-445	R0.2	0,8	4	45
2KBPA-005-010-445	R0.25	1	4	45
2KBPA-006-012-445	R0.3	1,2	4	45
2KBPA-008-015-445	R0.4	1,5	4	45
2KBPA-010-020-650	R0.5	2	6	50
2KBPA-015-040-650	R0.75	4	6	50
2KBPA-020-050-660	R1.0	5	6	60
2KBPA-025-060-660	R1.25	6	6	60
2KBPA-030-080-360	R1.5	8	3	60
2KBPA-030-080-660	R1.5	8	6	60
2KBPA-035-080-660	R1.75	8	6	60
2KBPA-040-080-470	R2.0	8	4	70
2KBPA-040-080-670	R2.0	8	6	70
2KBPA-045-100-670	R2.25	10	6	70
2KBPA-050-100-680	R2.5	10	6	80
2KBPA-055-120-680	R2.75	12	6	80
2KBPA-060-120-690	R3.0	12	6	90
2KBPA-065-140-890	R3.25	14	8	90
2KBPA-070-140-890	R3.5	14	8	90
2KBPA-080-140-8A0	R4.0	14	8	100
2KBPA-090-180-AA0	R4.5	18	10	100
2KBPA-100-180-AA0	R5.0	18	10	100
2KBPA-100-250-AF0	R5.0	25	10	150
2KBPA-120-220-CB0	R6.0	22	12	110
2KBPA-120-300-CF0	R6.0	30	12	150

2KBPA

Fresa sferica a 2 taglienti
2 Flutes Short Ball End Mills



IBEX



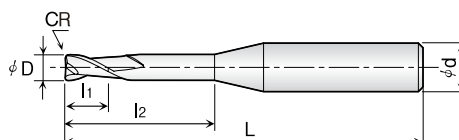
CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Radius of ball Nose (R)</i>	<i>Lenght of cut (l₁)</i>	<i>Effective Lenght (l₂)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
2KBPA-160-300-GA0	R8.0	30	16	100	50
2KBPA-160-300-GF0	R8.0	30	16	150	
2KBPA-200-380-KA0	R10.0	38	20	100	
2KBPA-200-380-KF0	R10.0	38	20	150	

2KRRA

Fresa torica a 2 taglienti
2 Flutes Rib Corner Radius End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



IBEX



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
2KRRA-010-R02-030-650	1	R0.2	1,5	3	6	50
2KRRA-010-R02-060-650	1	R0.2	1,5	6	6	50
2KRRA-010-R02-080-650	1	R0.2	1,5	8	6	50
2KRRA-015-R02-045-650	1,5	R0.2	2,3	4,5	6	50
2KRRA-015-R02-100-650	1,5	R0.2	2,3	10	6	50
2KRRA-015-R02-120-650	1,5	R0.2	2,3	12	6	50
2KRRA-015-R05-045-650	1,5	R0.5	2,3	4,5	6	50
2KRRA-020-R02-060-650	2	R0.2	3	6	6	50
2KRRA-020-R02-120-650	2	R0.2	3	12	6	50
2KRRA-020-R02-160-660	2	R0.2	3	16	6	60
2KRRA-020-R05-060-650	2	R0.5	3	6	6	50
2KRRA-025-R02-080-650	2,5	R0.2	4	8	6	50
2KRRA-025-R05-080-650	2,5	R0.5	4	8	6	50
2KRRA-030-R03-120-650	3	R0.3	4,5	12	6	50
2KRRA-030-R03-160-660	3	R0.3	4,5	16	6	60
2KRRA-030-R05-120-650	3	R0.5	4,5	12	6	50
2KRRA-030-R05-160-660	3	R0.5	4,5	16	6	60
2KRRA-030-R10-120-650	3	R1.0	4,5	12	6	50
2KRRA-040-R03-150-660	4	R0.3	6	15	6	60
2KRRA-040-R05-150-660	4	R0.5	6	15	6	60
2KRRA-040-R05-200-660	4	R0.5	6	20	6	60
2KRRA-040-R10-150-660	4	R1.0	6	15	6	60
2KRRA-050-R03-180-660	5	R0.3	7,5	18	6	60
2KRRA-050-R05-180-660	5	R0.5	7,5	18	6	60
2KRRA-060-R03-180-660	6	R0.3	9	18	6	60

2KRRA

Fresa torica a 2 taglienti
 2 Flutes Rib Corner Radius End Mills



IBEX



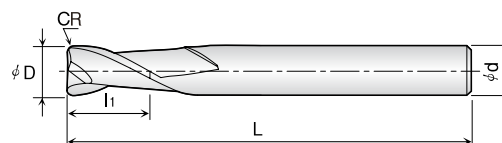
CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Outside Diameter (D)</i>	<i>Corner Radius (CR)</i>	<i>Lenght of cut (l₁)</i>	<i>Effective Lenght (l₂)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
2KRRA-060-R05-180-660	6	R0.5	9	18	6	60
2KRRA-060-R10-180-660	6	R1.0	9	18	6	60
2KRRA-060-R15-180-660	6	R1.5	9	18	6	60
2KRRA-080-R03-240-865	8	R0.3	12	24	8	65
2KRRA-080-R05-240-865	8	R0.5	12	24	8	65
2KRRA-080-R10-240-865	8	R1.0	12	24	8	65
2KRRA-080-R15-240-865	8	R1.5	12	24	8	65
2KRRA-100-R03-300-A70	10	R0.3	15	30	10	70
2KRRA-100-R05-300-A70	10	R0.5	15	30	10	70
2KRRA-100-R10-300-A70	10	R1.0	15	30	10	70
2KRRA-100-R15-300-A70	10	R1.5	15	30	10	70
2KRRA-120-R05-300-C80	12	R0.5	18	30	12	80
2KRRA-120-R10-300-C80	12	R1.0	18	30	12	80
2KRRA-120-R15-300-C80	12	R1.5	18	30	12	80

2KRCA

Fresa torica a 2 taglienti
2 Flutes Corner Radius End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 μm
- *4 μm ultra-micro grain*



IBEX



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

CODICE	Diametro di testa (D)	"Raggio Torico (CR)"	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
2KRCA-060-R05-130-690	6	R0.5	13	6	90
2KRCA-060-R10-130-690	6	R1.0	13	6	90
2KRCA-080-R05-190-8A0	8	R0.5	19	8	100
2KRCA-080-R10-190-8A0	8	R1.0	19	8	100
2KRCA-100-R05-220-AA0	10	R0.5	22	10	100
2KRCA-100-R10-220-AA0	10	R1.0	22	10	100
2KRCA-120-R05-260-CB0	12	R0.5	26	12	110
2KRCA-120-R10-260-CB0	12	R1.0	26	12	110

2KRLA

Fresa torica lunga a 2 taglienti
2 Flutes Long Shank Corner Radius End Mills

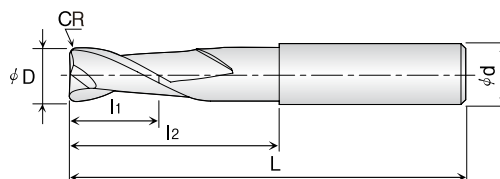
- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain

A

2

CR

35°

 PAGE
No. 263


Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

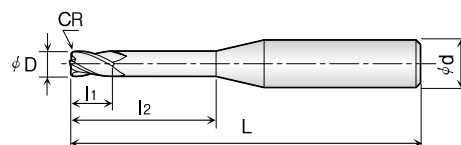
CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KRLA-060-R05-180-680	6	R0.5	9	18	6	80
2KRLA-060-R10-180-680	6	R1.0	9	18	6	80
2KRLA-080-R05-240-890	8	R0.5	12	24	8	90
2KRLA-080-R10-240-890	8	R1.0	12	24	8	90
2KRLA-100-R05-300-AA0	10	R0.5	15	30	10	100
2KRLA-100-R10-300-AA0	10	R1.0	15	30	10	100
2KRLA-120-R05-300-CB0	12	R0.5	18	30	12	110
2KRLA-120-R10-300-CB0	12	R1.0	18	30	12	110

4KRRA

Fresa torica a 4 taglienti
4 Flutes Rib Corner Radius End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 μ m
- 4 μ m ultra-micro grain



IBEX



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

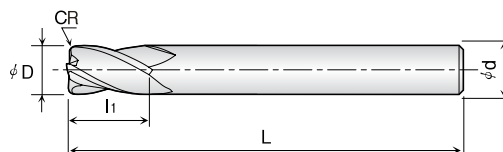
CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
4KRRA-020-R03-060-650	2	R0.3	3	6	6	50
4KRRA-030-R03-120-650	3	R0.3	4,5	12	6	50
4KRRA-030-R03-160-660	3	R0.3	4,5	16	6	60
4KRRA-030-R05-120-650	3	R0.5	4,5	12	6	50
4KRRA-030-R05-160-660	3	R0.5	4,5	16	6	60
4KRRA-040-R03-150-660	4	R0.3	6	15	6	60
4KRRA-040-R03-200-660	4	R0.3	6	20	6	60
4KRRA-040-R05-150-660	4	R0.5	6	15	6	60
4KRRA-040-R05-200-660	4	R0.5	6	20	6	60
4KRRA-040-R10-150-660	4	R1.0	6	15	6	60
4KRRA-060-R05-180-660	6	R0.5	9	18	6	60
4KRRA-060-R10-180-660	6	R1.0	9	18	6	60
4KRRA-060-R15-180-660	6	R1.5	9	18	6	60
4KRRA-080-R05-240-865	8	R0.5	12	24	8	65
4KRRA-080-R10-240-865	8	R1.0	12	24	8	65
4KRRA-080-R15-240-865	8	R1.5	12	24	8	65
4KRRA-080-R20-240-865	8	R2.0	12	24	8	65
4KRRA-100-R05-300-A70	10	R0.5	15	30	10	70
4KRRA-100-R10-300-A70	10	R1.0	15	30	10	70
4KRRA-100-R15-300-A70	10	R1.5	15	30	10	70
4KRRA-100-R20-300-A70	10	R2.0	15	30	10	70
4KRRA-120-R05-300-C80	12	R0.5	18	30	12	80
4KRRA-120-R10-300-C80	12	R1.0	18	30	12	80
4KRRA-120-R15-300-C80	12	R1.5	18	30	12	80
4KRRA-120-R20-300-C80	12	R2.0	18	30	12	80

4KRCA

Fresa torica a 4 taglienti
 4 Flutes Corner Radius End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

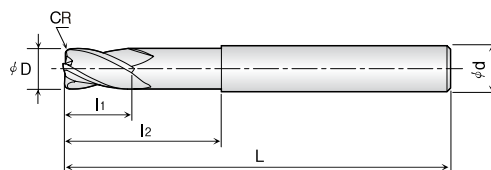
CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
4KRCA-060-R05-130-690	6	R0.5	13	6	90
4KRCA-060-R10-130-690	6	R1.0	13	6	90
4KRCA-080-R05-190-8A0	8	R0.5	19	8	100
4KRCA-080-R10-190-8A0	8	R1.0	19	8	100
4KRCA-100-R05-220-AA0	10	R0.5	22	10	100
4KRCA-100-R10-220-AA0	10	R1.0	22	10	100
4KRCA-120-R05-260-CB0	12	R0.5	26	12	110
4KRCA-120-R10-260-CB0	12	R1.0	26	12	110

4KRLA

Fresa torica lunga a 4 taglienti
4 Flutes Long Shank Corner Radius End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



IBEX



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

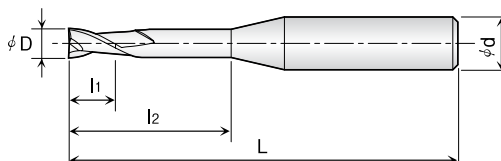
CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
4KRLA-060-R05-180-680	6	R0.5	9	18	6	80
4KRLA-060-R10-180-680	6	R1.0	9	18	6	80
4KRLA-080-R05-240-8A0	8	R0.5	12	24	8	100
4KRLA-080-R10-240-8A0	8	R1.0	12	24	8	100
4KRLA-100-R05-300-AA0	10	R0.5	15	30	10	100
4KRLA-100-R10-300-AA0	10	R1.0	15	30	10	100
4KRLA-120-R05-300-CB0	12	R0.5	18	30	12	110
4KRLA-120-R10-300-CB0	12	R1.0	18	30	12	110

2KERA

Fresa piana a 2 taglienti
2 Flutes Rib Flat End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KERA-004-010-445	0,4	0,6	1	4	45
2KERA-004-020-445	0,4	0,6	2	4	45
2KERA-005-020-445	0,5	0,7	2	4	45
2KERA-005-030-445	0,5	0,7	3	4	45
2KERA-005-040-445	0,5	0,7	4	4	45
2KERA-006-020-445	0,6	0,9	2	4	45
2KERA-006-030-445	0,6	0,9	3	4	45
2KERA-006-040-445	0,6	0,9	4	4	45
2KERA-006-050-445	0,6	0,9	5	4	45
2KERA-006-060-445	0,6	0,9	6	4	45
2KERA-007-030-445	0,7	1	3	4	45
2KERA-007-040-445	0,7	1	4	4	45
2KERA-007-060-445	0,7	1	6	4	45
2KERA-008-020-445	0,8	1,2	2	4	45
2KERA-008-030-445	0,8	1,2	3	4	45
2KERA-008-040-445	0,8	1,2	4	4	45
2KERA-008-050-445	0,8	1,2	5	4	45
2KERA-008-060-445	0,8	1,2	6	4	45
2KERA-008-080-445	0,8	1,2	8	4	45
2KERA-010-030-445	1	1,5	3	4	45
2KERA-010-040-445	1	1,5	4	4	45
2KERA-010-050-445	1	1,5	5	4	45
2KERA-010-060-445	1	1,5	6	4	45
2KERA-010-080-445	1	1,5	8	4	45
2KERA-010-100-445	1	1,5	10	4	45

2KERA

Fresa piana a 2 taglienti
2 Flutes Rib Flat End Mills



CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Outside Diameter (D)</i>	<i>Lenght of cut (l₁)</i>	<i>Effective Lenght (l₂)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
2KERA-010-120-445	1	1,5	12	4	45
2KERA-012-080-445	1,2	1,8	8	4	45
2KERA-012-100-445	1,2	1,8	10	4	45
2KERA-012-120-445	1,2	1,8	12	4	45
2KERA-015-060-445	1,5	2,3	6	4	45
2KERA-015-080-445	1,5	2,3	8	4	45
2KERA-015-100-445	1,5	2,3	10	4	45
2KERA-015-120-445	1,5	2,3	12	4	45
2KERA-015-160-450	1,5	2,3	16	4	50
2KERA-020-080-445	2	3	8	4	45
2KERA-020-100-445	2	3	10	4	45
2KERA-020-120-445	2	3	12	4	45
2KERA-020-160-450	2	3	16	4	50
2KERA-020-200-450	2	3	20	4	50
2KERA-025-080-650	2,5	3,8	8	6	50
2KERA-025-120-650	2,5	3,8	12	6	50
2KERA-030-120-650	3	4,5	12	6	50
2KERA-030-160-660	3	4,5	16	6	60
2KERA-030-200-660	3	4,5	20	6	60
2KERA-040-120-650	4	6	12	6	50
2KERA-040-160-660	4	6	16	6	60
2KERA-040-200-660	4	6	20	6	60
2KERA-040-250-665	4	6	25	6	65

IBEX

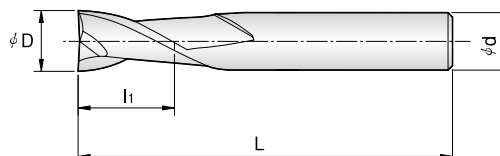


2KEPA

Fresa piana a 2 taglienti
2 Flutes Flat End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 μ m
- 4 μ m ultra-micro grain



	Diametro (D)	Tolleranza (D)		
	Size (D)	Tolerance (D)		
	Tutte - All	0 -0,020		
CODICE	Diametro di testa (D)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
2KEPA-004-008-445	0,4	0,8	4	45
2KEPA-005-010-445	0,5	1	4	45
2KEPA-006-012-445	0,6	1,2	4	45
2KEPA-007-014-445	0,7	1,4	4	45
2KEPA-008-016-445	0,8	1,6	4	45
2KEPA-010-025-645	1	2,5	6	45
2KEPA-012-040-645	1,2	4	6	45
2KEPA-015-040-645	1,5	4	6	45
2KEPA-020-060-645	2	6	6	45
2KEPA-025-080-650	2,5	8	6	50
2KEPA-030-100-350	3	10	3	50
2KEPA-030-100-650	3	10	6	50
2KEPA-035-100-650	3,5	10	6	50
2KEPA-040-120-455	4	12	4	55
2KEPA-040-120-650	4	12	6	50
2KEPA-045-120-650	4,5	12	6	50
2KEPA-050-150-650	5	15	6	50
2KEPA-055-150-650	5,5	15	6	50
2KEPA-060-150-650	6	15	6	50
2KEPA-065-150-865	6,5	15	8	65
2KEPA-070-200-865	7	20	8	65
2KEPA-075-200-865	7,5	20	8	65
2KEPA-080-200-865	8	20	8	65
2KEPA-085-200-A65	8,5	20	10	65
2KEPA-090-250-A70	9	25	10	70

2KEPA

Fresa piana a 2 taglienti
2 Flutes Flat End Mills



CODICE	Diametro di testa (D)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Outside Diameter (D)</i>	<i>Lenght of cut (L₁)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
2KEPA-095-250-A70	9,5	25	10	70
2KEPA-100-250-A70	10	25	10	70
2KEPA-105-280-C80	10,5	25	12	70
2KEPA-110-300-C80	11	25	12	70
2KEPA-115-250-C70	11,5	25	12	70
2KEPA-120-300-C80	12	30	12	80
2KEPA-130-350-E90	13	35	14	90
2KEPA-140-350-E90	14	35	14	90
2KEPA-160-400-GA0	16	40	16	100
2KEPA-180-450-IA0	18	45	18	100
2KEPA-200-450-KA0	20	45	20	100

IBEX

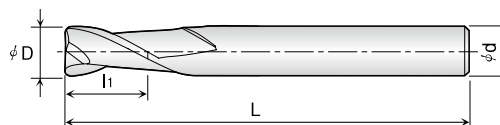


2KLEA

Fresa piana lunga a 2 taglienti
2 Flutes Long Length Flat End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

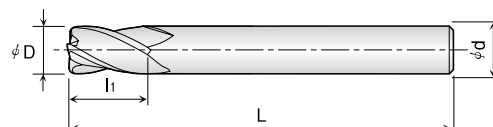
CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
2KLEA-010-040-645	1	4	6	45
2KLEA-020-080-645	2	8	6	45
2KLEA-030-120-650	3	12	6	50
2KLEA-030-150-660	3	15	6	60
2KLEA-040-160-660	4	16	6	60
2KLEA-040-200-670	4	20	6	70
2KLEA-050-250-680	5	25	6	80
2KLEA-060-200-670	6	20	6	70
2KLEA-060-250-680	6	25	6	80
2KLEA-080-280-890	8	28	8	90
2KLEA-080-350-890	8	35	8	90
2KLEA-100-350-AA0	10	35	10	100
2KLEA-100-450-AB0	10	45	10	110
2KLEA-120-400-CB0	12	40	12	110

4KEPA

Fresa piana a 4 taglienti
4 Flutes Flat End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 μm
- *4 μm ultra-micro grain*



IBEX



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

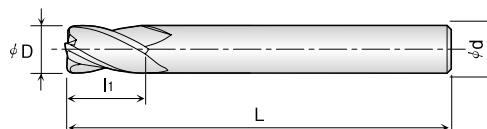
CODICE	Diametro di testa (D)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
4KEPA-020-060-645	2	6	6	45
4KEPA-025-080-645	2,5	8	6	45
4KEPA-030-100-650	3	10	6	50
4KEPA-035-100-650	3,5	10	6	50
4KEPA-040-120-650	4	12	6	50
4KEPA-045-120-650	4,5	12	6	50
4KEPA-050-150-650	5	15	6	50
4KEPA-055-150-650	5,5	15	6	50
4KEPA-060-150-650	6	15	6	50
4KEPA-065-180-865	6,5	18	8	65
4KEPA-070-200-865	7	20	8	65
4KEPA-075-200-865	7,5	20	8	65
4KEPA-080-200-865	8	20	8	65
4KEPA-085-230-A65	8,5	23	10	65
4KEPA-090-250-A70	9	25	10	70
4KEPA-095-250-A70	9,5	25	10	70
4KEPA-100-250-A70	10	25	10	70
4KEPA-105-280-C70	10,5	28	12	70
4KEPA-110-280-C70	11	28	12	70
4KEPA-115-300-C70	11,5	30	12	70
4KEPA-120-300-C80	12	30	12	80
4KEPA-130-350-E90	13	35	14	90
4KEPA-140-350-E90	14	35	14	90
4KEPA-160-400-GA0	16	40	16	100
4KEPA-180-450-IA0	18	45	18	100
4KEPA-200-450-KA0	20	45	20	100

4KLEA

Fresa piana lunga a 4 taglienti
4 Flutes Long Length Flat End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

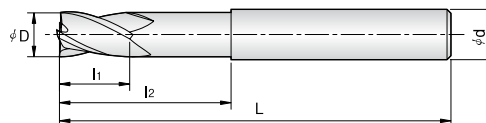
CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (R)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
4KLEA-020-080-645	2	8	6	45
4KLEA-030-150-660	3	15	6	60
4KLEA-040-200-670	4	20	6	70
4KLEA-050-250-680	5	25	6	80
4KLEA-060-200-670	6	20	6	70
4KLEA-060-250-680	6	25	6	80
4KLEA-080-300-890	8	30	8	90
4KLEA-080-350-890	8	35	8	90
4KLEA-100-350-AA0	10	35	10	100
4KLEA-100-450-AB0	10	45	10	110
4KLEA-120-400-CB0	12	40	12	110
4KLEA-120-500-CB0	12	50	12	110
4KLEA-120-600-CC0	12	60	12	120

4KLPA

Fresa piana lunga a 4 taglienti
4 Flutes Long Shank Flat End Mills



- Acciai generici fino a 45 HRC
- *Generic steels at 45 HRC*
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



IBEX



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
Tutte - All	0 -0,020

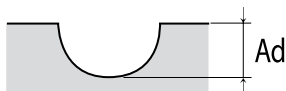
CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Lenght of cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
4KLPA-040-180-470	4	6	18	4	70
4KLPA-060-180-680	6	9	18	6	80
4KLPA-080-240-8A0	8	12	24	8	100
4KLPA-100-300-AA0	10	15	30	10	100
4KLPA-120-300-CB0	12	18	30	12	110

2KBRA

Fresatura in alta velocità
High Speed Milling Condition

HRC	HRC <45			HRC 45 ~ 55			Rame - Copper Alloy		
Raggio di testa	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
R0.25	0.006~0.010	20,000~40,000	300~600	0.003~0.010	20,000~40,000	200~400	0.010~0.020	20,000~40,000	300~600
R0.3	0.010~0.030	20,000~40,000	600~1,000	0.003~0.030	20,000~40,000	400~800	0.020~0.040	20,000~40,000	600~1,000
R0.4	0.005~0.050	17,000~40,000	400~1,200	0.006~0.030	20,000~40,000	250~1,000	0.010~0.030	17,000~40,000	400~1,200
R0.5	0.010~0.050	15,000~38,000	400~1,400	0.010~0.030	15,000~38,000	300~1,200	0.050~0.100	15,000~40,000	800~3,000
R0.6	0.030~0.050	15,000~30,000	500~1,000	0.020~0.030	15,000~30,000	400~800	0.050~0.100	15,000~30,000	1,000~1,400
R0.75	0.030~0.050	12,000~30,000	400~1,900	0.030~0.050	12,000~30,000	300~1,400	0.050~0.100	12,000~30,000	1,000~3,000
R1.0	0.050~0.100	8,000~20,000	600~2,200	0.050~0.100	8,000~20,000	500~1,700	0.050~0.300	12,000~20,000	1,000~3,000
R1.5	0.050~0.100	12,000~20,000	1,000~2,600	0.050~0.100	12,000~20,000	1,000~2,100	0.100~0.300	12,000~20,000	1,600~3,500
R2.0	0.050~0.100	12,000~20,000	1,200~2,700	0.050~0.100	12,000~20,000	1,000~2,200	0.100~0.300	12,000~20,000	1,800~4,000

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

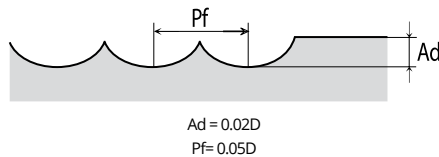
2KBSA

Fresatura in alta velocità
High Speed Milling Condition

IBEX

HRC	~ HRC 30		HRC 45 ~ 55		HRC 55 ~ 65	
Raggio di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Radius of Ball Nose	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
R0.5	34,000	2,000	32,000	1,600	30,000	1,500
R0.75	32,000	2,500	30,000	2,050	28,000	1,900
R1.0	30,000	2,700	28,000	2,250	25,000	2,000
R1.5	27,000	3,200	25,000	2,500	22,000	2,200
R2.0	24,000	3,300	20,000	2,700	18,300	2,450
R3.0	16,000	3,500	13,500	2,650	12,200	2,450
R4.0	12,000	3,100	10,000	2,500	9,200	2,450
R5.0	9,500	2,850	8,000	2,300	7,350	2,150
R6.0	8,000	2,800	6,700	2,250	6,100	2,100

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

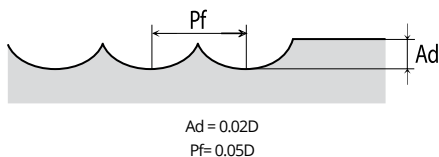
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KBPA

Fresatura in alta velocità
High Speed Milling Condition

HRC	~ HRC 30		HRC 45 ~ 55		HRC 55 ~ 65	
Raggio di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Radius of Ball Nose	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
R0.5	34,000	2,000	32,000	1,600	30,000	1,500
R0.75	32,000	2,500	30,000	2,050	28,000	1,900
R1.0	30,000	2,700	28,000	2,250	25,000	2,000
R1.5	27,000	3,200	25,000	2,500	22,000	2,200
R2.0	24,000	3,300	20,000	2,700	18,300	2,450
R3.0	16,000	3,500	13,500	2,650	12,200	2,450
R4.0	12,000	3,100	10,000	2,500	9,200	2,450
R5.0	9,500	2,850	8,000	2,300	7,350	2,150
R6.0	8,000	2,800	6,700	2,250	6,100	2,100

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm): Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

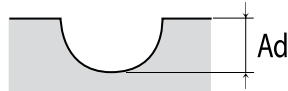
2KRRA

Fresatura in alta velocità
High Speed Milling Condition

IBEX

HRC	HRC <45			HRC 45 ~ 55			Rame - Copper Alloy		
Raggio di testa	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
1.0 0	0.020~0.030	14,000~25,000	340~1,260	0.020~0.030	14,000~25,000	170~1,050	0.030~0.050	17,000~30,000	1,200~3,000
1.5	0.020~0.030	14,000~25,000	680~1,680	0.020~0.030	14,000~25,000	510~1,470	0.050~0.100	17,000~30,000	1,500~3,000
2.0	0.020~0.030	9,000~20,000	480~1,360	0.020~0.030	9,000~20,000	360~1,190	0.050~0.100	17,000~30,000	1,500~3,000
3.0	0.040~0.060	12,000~18,000	1,800~2,100	0.040~0.060	9,000~20,000	1,500~1,800	0.050~0.100	17,000~25,000	3,000~3,500
4.0	0.040~0.060	5,000~18,000	1,950~2,250	0.040~0.060	4,000~18,000	1,650~1,950	0.080~0.120	15,000~25,000	3,200~3,500
6.0	0.040~0.060	5,000~13,000	2,400~2,800	0.040~0.060	4,000~13,000	2,200~2,400	0.080~0.120	15,000~25,000	3,800~4,200
8.0	0.040~0.060	4,000~9,000	2,200~2,400	0.040~0.060	4,000~9,000	1,800~2,100	0.080~0.120	7,000~15,000	3,800~4,200
10.0	0.080~0.120	3,000~6,000	1,500~1,900	0.080~0.120	3,000~6,000	1,500~1,900	0.080~0.120	5,000~13,000	4,200~4,800
12.0	0.080~0.120	2,000~5,000	1,400~1,800	0.080~0.120	3,000~5,000	1,400~1,800	0.080~0.120	3,000~9,000	4,200~4,800

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

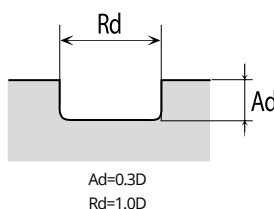
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KRCA

Fresatura in alta velocità
High Speed Milling Condition

HRC	~ HRC 30		HRC 45 ~ 55		HRC 55 ~ 65	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
6	3,800	250	2,700	130	1,600	55
8	2,900	240	2,100	120	1,200	50
10	2,300	230	1,700	100	1,000	50
12	2,000	230	1,400	100	800	45

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

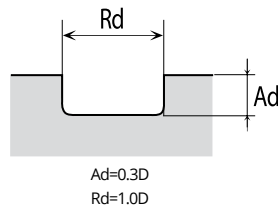
2KRLA

Fresatura in alta velocità
High Speed Milling Condition

IBEX

HRC	~ HRC 30		HRC 45 ~ 55		HRC 55 ~ 65	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
6	3,800	250	2,700	130	1,600	55
8	2,900	240	2,100	120	1,200	50
10	2,300	230	1,700	100	1,000	50
12	2,000	230	1,400	100	800	45

Profondità di taglio
Depth of Cut



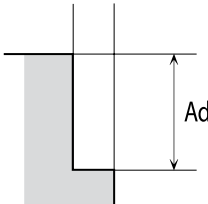
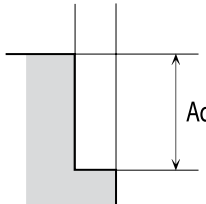
ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KRRA

Fresatura in alta velocità
 High Speed Milling Condition

HRC	~ HRC 30		HRC 45 ~ 55		HRC 55 ~ 65	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
<i>Outside Diameter</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>
3	21,000	3,200	19,100	2,900	17,000	2,300
4	16,000	3,200	14,300	2,850	12,800	2,350
6	10,500	4,250	9,500	3,800	8,500	3,050
8	8,000	3,500	7,200	3,200	6,400	2,500
10	6,400	3,050	5,750	2,750	5,100	2,250
12	5,300	2,750	4,800	2,500	4,250	2,050
Profondità di taglio <i>Depth of Cut</i>	 Ad=0.1D Rd=1.0D				 Ad=0.02D Rd=1.0D	



ATTENZIONE - WARNING

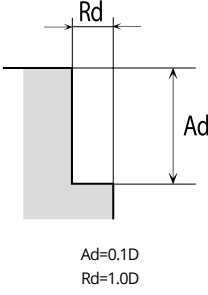
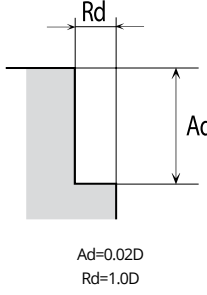
1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KRCA

Fresatura in alta velocità
High Speed Milling Condition

IBEX

HRC	~ HRC 30		HRC 45 ~ 55		HRC 55 ~ 65	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
6	3,800	440	2,800	140	1,600	70
8	2,900	420	2,100	140	1,200	65
10	2,400	400	1,700	120	1,000	65
12	2,000	400	1,400	120	800	60
Profondità di taglio Depth of Cut	 Ad=0.1D Rd=1.0D				 Ad=0.02D Rd=1.0D	



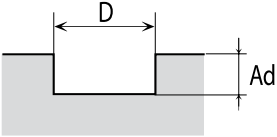
ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KRLA

Fresatura in alta velocità
High Speed Milling Condition

HRC	~ HRC 30		HRC 45 ~ 55		HRC 55 ~ 65	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
6	10,500	3,850	9,000	3,450	8,000	2,700
8	7,500	3,200	6,750	2,850	6,000	2,250
10	6,050	2,800	5,400	2,500	4,750	2,000
12	5,050	2,500	4,500	2,250	4,000	1,830
Profondità di taglio Depth of Cut						



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

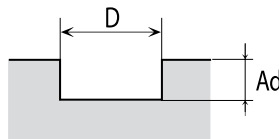
2KERA

Fresatura in alta velocità
High Speed Milling Condition

IBEX

HRC	~ HRC 30			HRC 30 ~ 45			Rame - Copper Alloy		
Diametro esterno	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
0.5	0.004~0.015	20,000~40,000	200~500	0.002~0.015	20,000~32,000	100~400	0.005~0.015	20,000~30,000	100~800
0.6	0.004~0.020	17,000~33,000	230~620	0.003~0.015	15,000~30,000	150~420	0.005~0.030	15,000~30,000	200~980
0.7	0.010~0.020	18,000~32,000	250~450	0.006~0.010	15,000~22,000	150~300	0.010~0.030	15,000~30,000	300~820
0.8	0.005~0.030	16,000~32,000	250~650	0.004~0.018	12,000~25,000	150~350	0.007~0.030	15,000~30,000	300~1,170
1.0	0.007~0.040	13,000~27,000	250~600	0.004~0.035	10,000~17,000	160~400	0.009~0.050	15,000~22,000	430~1,200
1.2	0.015~0.050	11,000~20,000	250~500	0.010~0.030	8,000~14,000	200~350	0.020~0.050	15,000~22,000	500~980
1.5	0.010~0.050	9,000~16,000	270~550	0.008~0.040	6,000~14,000	190~400	0.025~0.070	15,000~22,000	500~1,100
2.0	0.017~0.050	6,000~15,000	250~550	0.010~0.035	5,000~12,000	200~400	0.025~0.070	10,000~17,000	500~1,100
3.0	0.030~0.070	5,000~10,000	250~600	0.020~0.050	4,000~10,000	200~400	0.050~0.110	7,000~11,000	500~1150
4.0	0.040~0.100	5,000~7,000	250~650	0.030~0.070	2,800~10,000	200~410	0.060~0.150	5,000~8,500	530~1,200

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

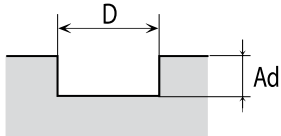
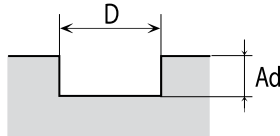
1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KEPA

Fresatura in alta velocità
 High Speed Milling Condition

HRC	~ HRC 30		HRC 45 ~ 55		HRC 55 ~ 65	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
1.0	29,000	520	19,000	260	12,000	120
1.5	20,000	530	13,000	270	8,500	120
2.0	16,000	530	10,000	270	6,500	120
3.0	11,000	580	6,500	290	4,500	140
4.0	8,800	560	5,500	270	3,500	130
6.0	6,500	540	3,700	250	2,500	130
8.0	4,800	540	2,800	250	2,000	130
10.0	3,800	540	2,300	250	1,500	130
12.0	3,200	540	1,900	250	1,300	130

Profondità di taglio Depth of Cut	 Ad=0.15D (D ≤ Ø3) Ad=0.20D (D > Ø3)	 Ad=0.10D (D ≤ Ø6) Ad=0.15D (D > Ø6)
--------------------------------------	--	--



ATTENZIONE - WARNING

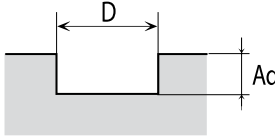
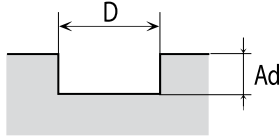
- Utilizzare macchine e attrezzature precise e rigide
- Ad(mm) : Profondità di taglio ASSIALE
- Per la fresatura si consiglia aria o lubrificazione
- Adattare giri e avanzamenti con la stessa proporzione
- I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

- Use a rigid precise machine and holder.
- Ad(mm): Axial Depth of Cut.
- For milling steels, air blow or MQL(Oil Mist) are recommended.
- Adjust both Spindle speed and Feedrate by the same proportion.
- The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KLEA

Fresatura in alta velocità
High Speed Milling Condition

IBEX

HRC	~ HRC 30		HRC 45 ~ 55		HRC 55 ~ 65	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
1.0	29,000	520	19,000	260	12,000	120
1.5	20,000	530	13,000	270	8,500	120
2.0	16,000	530	10,000	270	6,500	120
3.0	11,000	580	6,500	290	4,500	140
4.0	8,800	560	5,500	270	3,500	130
6.0	6,500	540	3,700	250	2,500	130
8.0	4,800	540	2,800	250	2,000	130
10.0	3,800	540	2,300	250	1,500	130
12.0	3,200	540	1,900	250	1,300	130
Profondità di taglio Depth of Cut	 Ad=0.15D (D ≤ Ø3) Ad=0.20D (D > Ø3)				 Ad=0.10D (D ≤ Ø6) Ad=0.15D (D > Ø6)	



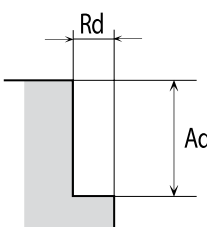
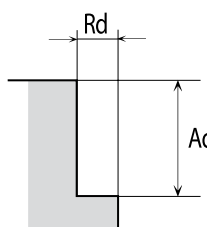
ATTENZIONE - WARNING

- Utilizzare macchine e attrezzature precise e rigide
- Ad(mm) : Profondità di taglio ASSIALE
- Per la fresatura si consiglia aria o lubrificazione
- Adattare giri e avanzamenti con la stessa proporzione
- I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

- Use a rigid precise machine and holder.
- Ad(mm): Axial Depth of Cut.
- For milling steels, air blow or MQL(Oil Mist) are recommended.
- Adjust both Spindle speed and Feedrate by the same proportion.
- The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KEPA

Fresatura in alta velocità
High Speed Milling Condition

HRC	~ HRC 30		HRC 45 ~ 55		HRC 55 ~ 65	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
2.0	19,000	750	15,000	650	12,000	350
3.0	15,000	1,000	12,500	800	10,000	500
4.0	11,000	1,100	9,500	850	7,900	600
6.0	7,500	1,100	6,500	850	5,200	600
8.0	5,500	1,000	4,800	750	4,000	500
10.0	4,500	1,000	3,800	750	3,200	500
12.0	3,700	1,000	3,200	750	2,500	500
Profondità di taglio Depth of Cut	 Ad=1.0D, Rd=0.02D (D ≤ Ø6) Ad=1.0D, Rd=0.05D (D > Ø6)				 Ad=1.0D, Rd=0.01D (D ≤ Ø6) Ad=1.0D, Rd=0.02D (D > Ø6)	



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KLEA

Fresatura in alta velocità
High Speed Milling Condition

IBEX

HRC	~ HRC 30		HRC 45 ~ 55		HRC 55 ~ 65	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
2.0	19,000	750	15,000	650	12,000	350
3.0	15,000	1,000	12,500	800	10,000	500
4.0	11,000	1,100	9,500	850	7,900	600
6.0	7,500	1,100	6,500	850	5,200	600
8.0	5,500	1,000	4,800	750	4,000	500
10.0	4,500	1,000	3,800	750	3,200	500
12.0	3,700	1,000	3,200	750	2,500	500
Profondità di taglio Depth of Cut	Ad=1.0D, Rd=0.02D (D ≤ Ø6) Ad=1.0D, Rd=0.05D (D > Ø6)			Ad=1.0D, Rd=0.01D (D ≤ Ø6) Ad=1.0D, Rd=0.02D (D > Ø6)		



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

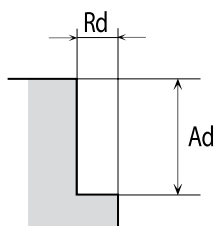
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KLPA

Fresatura in alta velocità
High Speed Milling Condition

HRC	~ HRC 30		HRC 45 ~ 55	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
<i>Outside Diameter</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>
4.0	4,000	190	2,800	130
6.0	2,600	190	1,800	130
8.0	1,900	190	1,300	130
10.0	1,500	190	1,100	130
12.0	1,300	190	900	110

Profondità di taglio
Depth of Cut



Ad=2.5D, Rd=0.05D (D ≤ Ø10)
 Ad=2.5D, Rd=0.5mm (D > Ø10)



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



SAIGA SERIES

- Lavorazione di Sgrossatura Pesante
- Migliore evacuazione dei trucioli
- Maggiore durata e resistenza dell'utensile
- *Rapid and rough machining*
- *Easy to chips disposal*
- *Increased tool life by reducing cutting resistance.*
- *Schwere Schruppbearbeitung*
- *Bessere Spanabfuhr*
- *Längere Standzeit und Festigkeit*





SGROSSATURA
ROUGHING

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)
6 ~ 12	0 ~ -0.04
14 ~ 20	0 ~ -0.05

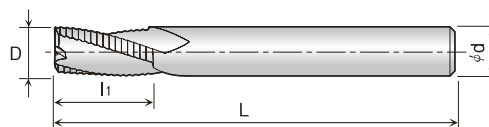
PIANA
FLAT

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)
6 ~ 12	0 ~ -0.025
14 ~ 20	0 ~ -0.030

3KEOX

Fresa Sgrossare a 3 taglienti
3 Flutes Roughing End Mills

- Acciai generici fino a 50 HRC
- *Generic steels at 50 HRC*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*
- Adatta per sgrossatura pesante
- *Suitable for heavy roughing*
- Denti passo medio
- *Medium pitch teeth*



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
6-12	0 -0,04
14-20	0 -0,05

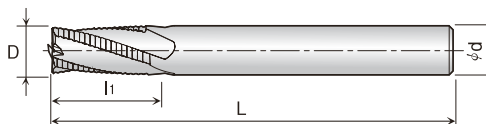
CODICE	Diametro di testa (R)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (R)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
3KEOX-030-100-650	3	10	6	50
3KEOX-040-100-650	4	10	6	50
3KEOX-060-090-660	6	9	6	60
3KEOX-060-150-660	6	15	6	60
3KEOX-080-120-865	8	12	8	65
3KEOX-080-200-865	8	20	8	65

SAIGA

4KEOX

Fresa Sgrossare a 4 taglienti
4 Flutes Roughing End Mills

- Acciai generici fino a 50 HRC
- *Generic steels at 50 HRC*
- Ultramicrograna 4 μm
- *4 μm ultra-micro grain*
- Adatta per sgrossatura pesante
- *Suitable for heavy roughing*
- Denti passo medio
- *Medium pitch teeth*



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
6-12	0 -0,04
14-20	0 -0,05

CODICE	Diametro di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
4KEOX-100-150-A70	10	15	10	70
4KEOX-100-250-A70	10	25	10	70
4KEOX-120-180-C80	12	18	12	80
4KEOX-120-300-C80	12	30	12	80
4KEOX-140-250-EA0	14	25	14	100
4KEOX-160-250-GA0	16	25	16	100
4KEOX-160-400-GA0	16	40	16	100

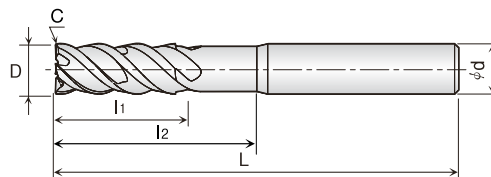
SAIGA



4KVERX

Fresa Sgrosso a 4 taglienti 46° Protetta "C"
4 Flutes Chamfer Rib Flat End Mills

- Acciai generici fino a 50 HRC
- *Generic steels at 50 HRC*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*
- Basso sforzo di taglio con asportazioni elevate
- *Low cutting effort with high stock removal*
- Collare di scarico
- *Drain pipe*



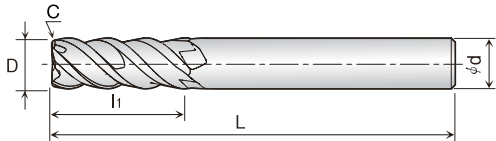
Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
6-12	0 -0,025
14-20	0 -0,030

CODICE	Diametro di testa (D)	Protezione (C)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Chamfer (C)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
4KVERX-030-100-660	3	0,05	8	10	6	60
4KVERX-040-150-660	4	0,05	11	15	6	60
4KVERX-050-180-660	5	0,05	13	18	6	60
4KVERX-060-200-660	6	0,06	13	20	6	60
4KVERX-080-260-870	8	0,08	19	26	8	70
4KVERX-100-300-A75	10	0,1	22	30	10	75
4KVERX-120-360-C80	12	0,12	26	36	12	80
4KVERX-140-360-EB0	14	0,14	26	36	14	110
4KVERX-160-420-GB0	16	0,16	32	42	16	110
4KVERX-200-520-KB0	20	0,2	38	52	20	110

4KVEPX

Fresa Sgrossare a 4 taglienti 46° Protetta "C"
4 Flutes Chamfer Rib Flat End Mills

- Acciai generici fino a 50 HRC
- *Generic steels at 50 HRC*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*
- Basso sforzo di taglio con asportazioni elevate
- *Low cutting effort with high stock removal*



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
6-12	0 -0,025
14-20	0 -0,030

CODICE	Diametro di testa (D)	Protezione (C)	Lunghezza elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Chamfer (C)	Lenght of cut (L ₁)	Shank diameter (d)	Overall lenght (L)
4KVEPX-030-100-660	3	0,05	8	6	60
4KVEPX-040-150-660	4	0,05	11	6	60
4KVEPX-050-180-660	5	0,05	13	6	60
4KVEPX-060-130-660	6	0,1	13	6	60
4KVEPX-080-190-870	8	0,1	19	8	70
4KVEPX-100-220-A75	10	0,1	22	10	75
4KVEPX-120-260-C80	12	0,1	26	12	80
4KVEPX-140-260-EB0	14	0,15	26	14	110
4KVEPX-160-320-GB0	16	0,15	32	16	110
4KVEPX-200-380-KB0	20	0,15	38	20	110

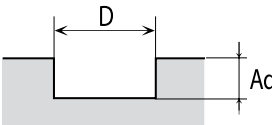
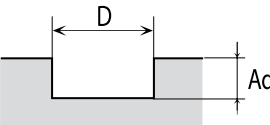
SAIGA



3KEOX & 4KEOX

Fresatura in alta velocità
High Speed Milling Condition

SAIGA

HRC	~ HRC 30		HRC 30 ~ 35		HRC 35 ~ 45	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
6.0	4,000	230	2,900	160	2,200	130
8.0	3,500	250	2,700	180	1,700	150
10.0	2,500	280	2,100	210	1,350	170
12.0	2,000	310	1,800	240	1,200	210
16.0	1,500	330	1,700	250	900	210
Profondità di taglio Depth of Cut	 Ad : 0.75D Ad Max = 12mm		 Ad : 0.5D			



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

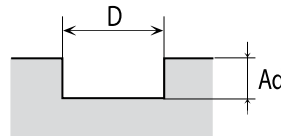
4KVERX

Fresatura in alta velocità
High Speed Milling Condition

HRC	~ HRC 30		HRC 30 ~ 35		HRC 35 ~ 45	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
6.0	8,300	1,100	7,000	850	6,500	600
8.0	6,000	1,100	6,500	850	5,500	600
10.0	5,500	1,000	4,300	750	4,000	500
12.0	4,300	1,000	3,700	750	3,200	500
16.0	3,500	800	3,500	750	2,500	450

SAIGA

Profondità di taglio
Depth of Cut



D MAX : 0.4D
Ad MAX : 1.5D



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

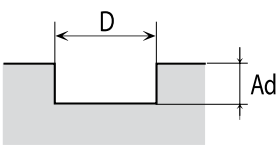
1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KVEP

Fresatura in alta velocità
High Speed Milling Condition

SAIGA

HRC	~ HRC 30		HRC 30 ~ 35		HRC 35 ~ 45	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
6.0	7,500	1,100	6,500	850	5,200	600
8.0	5,500	1,100	4,800	850	4,000	600
10.0	4,500	1,000	3,800	750	3,200	500
12.0	3,700	1,000	3,200	750	2,500	500
16.0	3,200	800	2,700	750	1,850	450

Profondità di taglio <i>Depth of Cut</i>	 D MAX: 0.4D Ad MAX: 1.5D
---	--



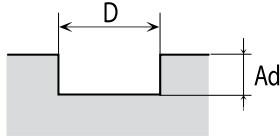
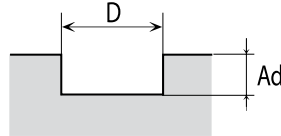
ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KEPX

Fresatura in alta velocità
High Speed Milling Condition

HRC	~ HRC 30		HRC 30 ~ 35		HRC 35 ~ 45	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
1.0	29,000	520	19,000	260	12,000	120
1.5	20,000	530	13,000	270	8,500	120
2.0	16,000	530	10,000	270	6,500	120
3.0	11,000	580	6,500	290	4,500	140
4.0	8,800	560	5,500	270	3,500	130
6.0	6,500	540	3,700	250	2,500	130
8.0	4,800	540	2,800	250	2,000	130
10.0	3,800	540	2,300	250	1,500	130
12.0	3,200	540	1,900	250	1,300	130
Profondità di taglio Depth of Cut	 Ad=0.15D (D ≤ Ø3) Ad=0.20D (D > Ø3)				 Ad=0.10D (D ≤ Ø6) Ad=0.15D (D > Ø6)	

SAIGA



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

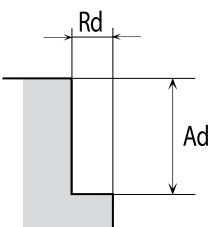
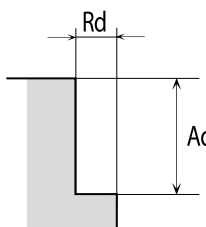
1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



4KEPX

Fresatura in alta velocità
High Speed Milling Condition

SAIGA

HRC	~ HRC 30		HRC 30 ~ 35		HRC 35 ~ 45	
Diametro esterno	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
2	19,000	750	15,000	650	12,000	350
3	15,000	1,000	12,500	800	10,000	500
4	11,000	1,100	9,500	850	7,900	600
6	7,500	1,100	6,500	850	5,200	600
8	5,500	1,000	4,800	750	4,000	500
10	4,500	1,000	3,800	750	3,200	500
12	3,700	1,000	3,200	750	2,500	500
Profondità di taglio Depth of Cut	 Ad=1.0D, Rd=0.02D (D ≤ Ø6) Ad=1.0D, Rd=0.05D (D > Ø6)		 Ad=1.0D, Rd=0.01D (D ≤ Ø6) Ad=1.0D, Rd=0.02D (D > Ø6)			



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

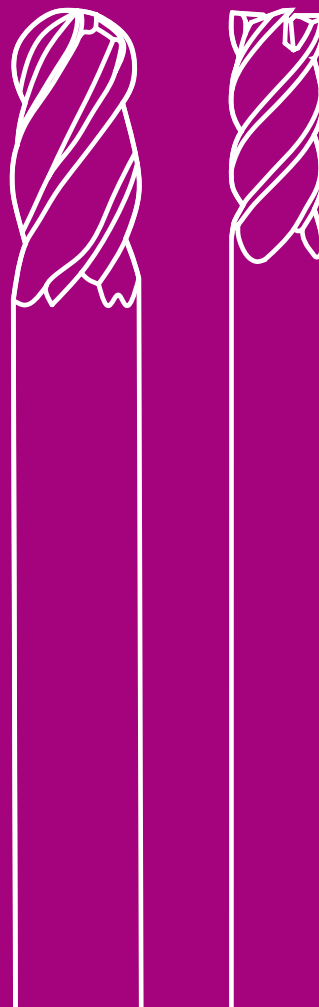


CARIBOU SERIES

- Disegn differenziato dei taglienti per ridurre le vibrazioni
- Eccellente finitura superficiale con vani gola profondi
- Eccellente resistenza all'usura con materiali difficili da lavorare come acciai legati, inox, superleghe, titanio, alloy, hastelloy, inconel e aerospace

- *Unequal flute*
- *Excellent surface roughness and smooth chip disposal*
- *Outstanding performance for Alloy steels, SUS, Titanium and hard to cut materials*

- *Differenziertes Design der Schneidkanten zur Reduzierung von Vibrationen*
- *Hervorragende Oberflächengüte mit tiefen Rillenfächern*
- *Hervorragende Verschleißfestigkeit bei schwer zerspanbaren Materialien wie legierten Stählen, rostfreiem Stahl, Superlegierungen, Titan, Legierungen, Hastelloy, Inconel und Luft- und Raumfahrt*





KOBLO



SFERICA BALL

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)	Raggio R Size R	Tolleranza Tolerance
3 ~ 5	0 ~ -0.010	R1.5 ~ R2.5	±0.010
6 ~ 12	0 ~ -0.015	R3 ~ R6	±0.010
16 ~ 20	0 ~ -0.025	R8 ~ R10	±0.015

TORICA CORNER RADIUS

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)	Raggio R Size R	Tolleranza Tolerance
1 ~ 5	0 ~ -0.010	R0.1 ~ R0.5	±0.005
6 ~ 12	0 ~ -0.015	R1 ~ R1.5	±0.010
14 ~ 20	0 ~ -0.025	R2 ~ R3	±0.015

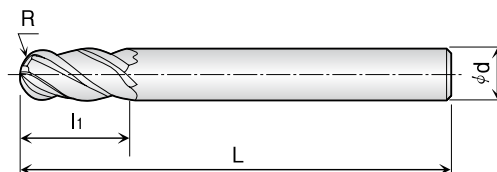
PIANA FLAT

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)
1 ~ 5	0 ~ -0.010
6 ~ 12	0 ~ -0.015
14 ~ 20	0 ~ -0.025

4KBUS

Fresa Sferica a 4 taglienti per INOX
4 Flutes Ball End Mills for SUS

- Acciai legati, acciai difficili da lavorare, Alloy, Hastelloy, Inconel, Superleghe, Inox, titanio e materiali aeronautici
- Alloy steels, difficult-to-machine steels, Alloy, Hastelloy, Inconel, Superalloys, Inox, titanium and aeronautical materials
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



CARIBOU



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
3 - 5	0 -0,010	R1,5-R2,5	$\pm 0,010$
6 - 12	0 -0,015	R3-R6	$\pm 0,010$
16 - 20	0 -0,025	R8-R10	$\pm 0,015$

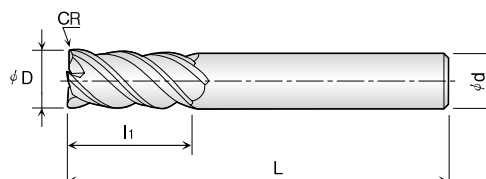
CODICE	Raggio di Testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of Ball Nose (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
4KBUS-030-080-660	R1.5	8	6	60
4KBUS-040-080-670	R2.0	8	6	70
4KBUS-050-120-680	R2.5	12	6	80
4KBUS-060-120-690	R3.0	12	6	90
4KBUS-080-160-8A0	R4.0	16	8	100
4KBUS-100-200-AA0	R5.0	20	10	100
4KBUS-120-250-CA0	R6.0	25	12	100
4KBUS-160-300-GA0	R8.0	30	16	100
4KBUS-200-380-KA0	R10.0	38	20	100

4KRUS

Fresa Torica a 4 taglienti per INOX
4 Flutes Corner Radius End Mills for SUS



- Acciai legati, acciai difficili da lavorare, Alloy, Hastelloy, Inconel, Superleghe, Inox, titanio e materiali aeronautici
- Alloy steels, difficult-to-machine steels, Alloy, Hastelloy, Inconel, Superalloys, Inox, titanium and aeronautical materials
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
1 - 5	0 -0,010	R0,1-R0,5	$\pm 0,005$
6 - 12	0 -0,015	R1-R1,5	$\pm 0,010$
14 - 20	0 -0,025	R2-R3	$\pm 0,015$

CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Shank diameter (L ₁)	Shank diameter (d)	Overall length (L)
4KRUS-010-R01-025-650	1	R0.1	2,5	6	50
4KRUS-010-R02-025-650	1	R0.2	2,5	6	50
4KRUS-012-R01-030-650	1,2	R0.1	3	6	50
4KRUS-015-R01-040-650	1,5	R0.1	4	6	50
4KRUS-015-R02-040-650	1,5	R0.2	4	6	50
4KRUS-020-R01-060-650	2	R0.1	6	6	50
4KRUS-020-R02-060-650	2	R0.2	6	6	50
4KRUS-025-R02-070-650	2,5	R0.2	7	6	50
4KRUS-030-R02-080-655	3	R0.2	8	6	55
4KRUS-030-R03-080-655	3	R0.3	8	6	55
4KRUS-030-R05-080-655	3	R0.5	8	6	55
4KRUS-040-R02-100-655	4	R0.2	10	6	55
4KRUS-040-R03-100-655	4	R0.3	10	6	55
4KRUS-040-R05-100-655	4	R0.5	10	6	55
4KRUS-050-R02-150-660	5	R0.2	15	6	60
4KRUS-050-R03-150-660	5	R0.3	15	6	60
4KRUS-050-R05-150-660	5	R0.5	15	6	60
4KRUS-060-R02-150-660	6	R0.2	15	6	60
4KRUS-060-R03-130-660	6	R0.3	13	6	60
4KRUS-060-R03-150-660	6	R0.3	15	6	60
4KRUS-060-R05-150-660	6	R0.5	15	6	60
4KRUS-070-R03-160-865	7	R0.3	16	8	65
4KRUS-080-R03-200-870	8	R0.3	20	8	70
4KRUS-080-R05-200-870	8	R0.5	20	8	70

CARIBOU



4KRUS

Fresa Torica a 4 taglienti per INOX
4 Flutes Corner Radius End Mills for SUS



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Shank diameter (l ₁)	Shank diameter (d)	Overall lenght (L)
4KRUS-080-R10-200-870	8	R1.0	20	8	70
4KRUS-090-R03-190-A70	9	R0.3	19	10	70
4KRUS-100-R03-220-A70	10	R0.3	22	10	70
4KRUS-100-R03-250-A75	10	R0.3	25	10	75
4KRUS-100-R05-250-A75	10	R0.5	25	10	75
4KRUS-100-R10-250-A75	10	R1.0	25	10	75
4KRUS-100-R15-250-A75	10	R1.5	25	10	75
4KRUS-100-R20-250-A75	10	R2.0	25	10	75
4KRUS-100-R30-250-A75	10	R3.0	25	10	75
4KRUS-120-R03-260-C80	12	R0.3	26	12	80
4KRUS-120-R05-300-C80	12	R0.5	30	12	80
4KRUS-120-R10-300-C80	12	R1.0	30	12	80
4KRUS-120-R15-300-C80	12	R1.5	30	12	80
4KRUS-120-R20-300-C80	12	R2.0	30	12	80
4KRUS-120-R30-300-C80	12	R3.0	30	12	80
4KRUS-120-R40-300-C80	12	R4.0	30	12	80
4KRUS-140-R03-260-E90	14	R0.3	26	14	90
4KRUS-160-R03-320-GA0	16	R0.3	32	16	100
4KRUS-180-R03-320-IA0	18	R0.3	32	18	100
4KRUS-200-R03-380-KA0	20	R0.3	38	20	100

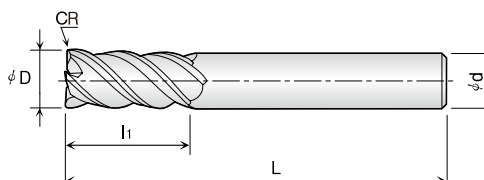
CARIBOU



4KARUS

Fresa Torica a 4 taglienti per INCONEL
4 Flutes Corner Radius End Mills for INCONEL

- Acciai legati, acciai difficili da lavorare, Alloy, Hastelloy, Inconel, Superleghe, Inox, titanio e materiali aeronautici
- Alloy steels, difficult-to-machine steels, Alloy, Hastelloy, Inconel, Superalloys, Inox, titanium and aeronautical materials
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
1 - 5	0 -0,010	R0,1-R0,5	$\pm 0,005$
6 - 12	0 -0,015	R1-R1,5	$\pm 0,010$
14 - 20	0 -0,025	R2-R3	$\pm 0,015$

CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Shank diameter (L ₁)	Shank diameter (d)	Overall length (L)
4KARUS-010-R01-025-650	1	R0.1	2,5	6	50
4KARUS-010-R02-025-650	1	R0.2	2,5	6	50
4KARUS-012-R01-030-650	1,2	R0.1	3	6	50
4KARUS-015-R01-040-650	1,5	R0.1	4	6	50
4KARUS-015-R02-040-650	1,5	R0.2	4	6	50
4KARUS-020-R01-060-650	2	R0.1	6	6	50
4KARUS-020-R02-060-650	2	R0.2	6	6	50
4KARUS-025-R02-070-650	2,5	R0.2	7	6	50
4KARUS-030-R02-080-655	3	R0.2	8	6	55
4KARUS-030-R03-080-655	3	R0.3	8	6	55
4KARUS-030-R05-080-655	3	R0.5	8	6	55
4KARUS-040-R02-100-655	4	R0.2	10	6	55
4KARUS-040-R03-100-655	4	R0.3	10	6	55
4KARUS-040-R05-100-655	4	R0.5	10	6	55
4KARUS-050-R02-150-660	5	R0.2	15	6	60
4KARUS-050-R03-150-660	5	R0.3	15	6	60
4KARUS-050-R05-150-660	5	R0.5	15	6	60
4KARUS-060-R02-150-660	6	R0.2	15	6	60
4KARUS-060-R03-130-660	6	R0.3	13	6	60
4KARUS-060-R03-150-660	6	R0.3	15	6	60
4KARUS-060-R05-150-660	6	R0.5	15	6	60
4KARUS-070-R03-160-865	7	R0.3	16	8	65
4KARUS-080-R03-200-870	8	R0.3	20	8	70
4KARUS-080-R05-200-870	8	R0.5	20	8	70

CARIBOU



4KARUS

Fresa Torica a 4 taglienti per
INCONEL

4 Flutes Corner Radius End
Mills for INCONEL



CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Shank diameter (l ₁)	Shank diameter (d)	Overall lenght (L)
4KARUS-080-R10-200-870	8	R1.0	20	8	70
4KARUS-090-R03-190-A70	9	R0.3	19	10	70
4KARUS-100-R03-220-A70	10	R0.3	22	10	70
4KARUS-100-R03-250-A75	10	R0.3	25	10	75
4KARUS-100-R05-250-A75	10	R0.5	25	10	75
4KARUS-100-R10-250-A75	10	R1.0	25	10	75
4KARUS-100-R15-250-A75	10	R1.5	25	10	75
4KARUS-100-R20-250-A75	10	R2.0	25	10	75
4KARUS-100-R30-250-A75	10	R3.0	25	10	75
4KARUS-120-R03-260-C80	12	R0.3	26	12	80
4KARUS-120-R05-300-C80	12	R0.5	30	12	80
4KARUS-120-R10-300-C80	12	R1.0	30	12	80
4KARUS-120-R15-300-C80	12	R1.5	30	12	80
4KARUS-120-R20-300-C80	12	R2.0	30	12	80
4KARUS-120-R30-300-C80	12	R3.0	30	12	80
4KARUS-120-R40-300-C80	12	R4.0	30	12	80
4KARUS-140-R03-260-E90	14	R0.3	26	14	90
4KARUS-160-R03-320-GA0	16	R0.3	32	16	100
4KARUS-180-R03-320-IA0	18	R0.3	32	18	100
4KARUS-200-R03-380-KA0	20	R0.3	38	20	100

CARIBOU

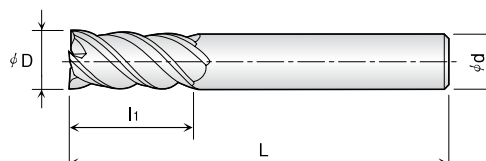


4KEUS

Fresa Piana a 4 taglienti per INOX
4 Flutes Flat End Mills for SUS



- Acciai legati, acciai difficili da lavorare, Alloy, Hastelloy, Inconel, Superleghe, Inox, titanio e materiali aeronautici
- Alloy steels, difficult-to-machine steels, Alloy, Hastelloy, Inconel, Superalloys, Inox, titanium and aeronautical materials
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
1 - 5	0 -0,010
6 - 12	0 -0,015
14 - 20	0 -0,025

CODICE	Diametro di testa (D)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
4KEUS-010-025-650	1	2,5	6	50
4KEUS-012-030-650	1,2	3	6	50
4KEUS-015-040-650	1,5	4	6	50
4KEUS-020-060-650	2	6	6	50
4KEUS-025-070-650	2,5	7	6	50
4KEUS-030-080-655	3	8	6	55
4KEUS-030-100-660	3	10	6	60
4KEUS-035-100-655	3,5	10	6	55
4KEUS-040-100-655	4	10	6	55
4KEUS-040-120-660	4	12	6	60
4KEUS-045-120-655	4,5	12	6	55
4KEUS-050-150-655	5	15	6	55
4KEUS-055-150-660	5,5	15	6	60
4KEUS-060-130-660	6	13	6	60
4KEUS-060-150-660	6	15	6	60
4KEUS-060-200-665	6	20	6	65
4KEUS-065-150-860	6,5	15	8	60
4KEUS-070-160-865	7	16	8	65
4KEUS-070-200-870	7	20	8	70
4KEUS-080-160-865	8	16	8	65
4KEUS-080-200-870	8	20	8	70
4KEUS-080-250-870	8	25	8	70
4KEUS-080-300-880	8	30	8	80
4KEUS-085-200-A70	8,5	20	10	70

CARIBOU



4KEUS

Fresa Piana a 4 taglienti per INOX
 4 Flutes Flat End Mills for SUS



CODICE	Diametro di testa (D)	Lunghezza Elica (L _e)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Lenght of cut (L _e)	Shank diameter (d)	Overall lenght (L)
4KEUS-090-190-A70	9	19	10	70
4KEUS-090-250-A80	9	25	10	80
4KEUS-100-220-A70	10	22	10	70
4KEUS-100-250-A75	10	25	10	75
4KEUS-100-350-A85	10	35	10	85
4KEUS-120-260-C80	12	26	12	80
4KEUS-120-300-C80	12	30	12	80
4KEUS-120-400-C90	12	40	12	90
4KEUS-140-260-E90	14	26	14	90
4KEUS-160-320-GA0	16	32	16	100
4KEUS-180-320-IA0	18	32	18	100
4KEUS-200-380-KA0	20	38	20	100

CARIBOU

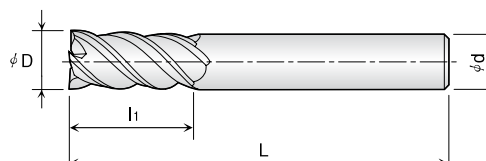


4KAEUS

Fresa Piana a 4 taglienti per INCONEL
4 Flutes Flat End Mills for INCONEL



- Acciai legati, acciai difficili da lavorare, Alloy, Hastelloy, Inconel, Superleghe, Inox, titanio e materiali aeronautici
- Alloy steels, difficult-to-machine steels, Alloy, Hastelloy, Inconel, Superalloys, Inox, titanium and aeronautical materials
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
1 - 5	0 -0,010
6 - 12	0 -0,015
14 - 20	0 -0,025

CODICE	Diametro di testa (D)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
4KAEUS-010-025-650	1	2,5	6	50
4KAEUS-012-030-650	1,2	3	6	50
4KAEUS-015-040-650	1,5	4	6	50
4KAEUS-020-060-650	2	6	6	50
4KAEUS-025-070-650	2,5	7	6	50
4KAEUS-030-080-655	3	8	6	55
4KAEUS-030-100-660	3	10	6	60
4KAEUS-035-100-655	3,5	10	6	55
4KAEUS-040-100-655	4	10	6	55
4KAEUS-040-120-660	4	12	6	60
4KAEUS-045-120-655	4,5	12	6	55
4KAEUS-050-150-655	5	15	6	55
4KAEUS-055-150-660	5,5	15	6	60
4KAEUS-060-130-660	6	13	6	60
4KAEUS-060-150-660	6	15	6	60
4KAEUS-060-200-665	6	20	6	65
4KAEUS-065-150-860	6,5	15	8	60
4KAEUS-070-160-865	7	16	8	65
4KAEUS-070-200-870	7	20	8	70
4KAEUS-080-160-865	8	16	8	65
4KAEUS-080-200-870	8	20	8	70
4KAEUS-080-250-870	8	25	8	70
4KAEUS-080-300-880	8	30	8	80

CARIBOU



4KAEUS

Fresa Piana a 4 taglienti per INCONEL
4 Flutes Flat End Mills for INCONEL



CODICE	Diametro di testa (D)	Lunghezza Elica (l _e)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Lenght of cut (l _e)	Shank diameter (d)	Overall lenght (L)
4KAEUS-085-200-A70	8,5	20	10	70
4KAEUS-090-190-A70	9	19	10	70
4KAEUS-090-250-A80	9	25	10	80
4KAEUS-100-220-A70	10	22	10	70
4KAEUS-100-250-A75	10	25	10	75
4KAEUS-100-350-A85	10	35	10	85
4KAEUS-120-260-C80	12	26	12	80
4KAEUS-120-300-C80	12	30	12	80
4KAEUS-120-400-C90	12	40	12	90
4KAEUS-140-260-E90	14	26	14	90
4KAEUS-160-320-GA0	16	32	16	100
4KAEUS-180-320-IA0	18	32	18	100
4KAEUS-200-380-KA0	20	38	20	100

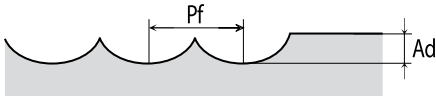
CARIBOU



4KBUS

Fresatura
Milling Condition

CARIBOU

	LEGA DI TATANIO - ALLOY TITANIUM		INOX 300		INOX 400	
Raggio di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Radius of Ball Nose	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
R1.5	12,000~15,000	250~300	6,000~8,000	80~150	8,000~12,000	130~180
R2.0	8,000~12,000	300~400	4,500~7,000	100~150	6,000~8,000	150~200
R2.5	7,000~9,000	400~500	3,000~5,000	150~200	4,500~7,000	200~250
R3.0	6,000~8,000	450~600	2,500~4,500	180~230	3,000~5,000	230~280
R4.0	4,500~7,000	500~700	2,300~3,500	230~280	2,500~4,500	400~500
R5.0	3,000~5,000	700~900	1,500~2,500	280~330	2,300~3,500	400~500
R6.0	2,500~4,500	700~900	1,200~2,000	280~330	1,500~2,500	300~400
R8.0	2,300~3,500	700~900	1,000~1,600	280~330	1,500~2,500	380~430
R10.0	1,500~2,500	600~900	800~1,200	280~330	1,300~1,800	350~400
Profondità di taglio Depth of Cut						



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



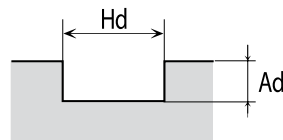
4KRUS & 4KARUS

Fresatura
Milling Condition

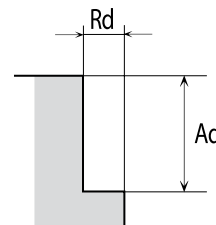
	LEGA DI TATANIO - ALLOY TITANIUM		INOX 300		INOX 400	
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
1.0	35,000~42,000	250~300	18,000~25,000	230~280	18,000~25,000	150~200
2.0	18,000~25,000	250~300	12,000~18,000	150~200	12,000~20,000	150~200
3.0	12,000~20,000	250~350	6,000~10,000	80~120	8,000~13,000	120~170
4.0	8,000~13,000	320~420	4,000~6,000	100~150	6,000~10,000	150~200
5.0	6,000~10,000	230~280	3,500~4,000	150~200	5,000~6,000	300~500
6.0	5,500~6,000	500~700	3,200~3,700	150~200	5,000~6,000	400~600
8.0	4,000~4,500	600~750	2,500~3,000	230~280	3,200~3,700	500~700
10.0	3,200~3,700	650~850	1,800~2,300	300~350	2,800~3,300	600~750
12.0	2,800~3,300	700~800	1,500~2,000	300~350	2,300~2,800	600~750
16.0	2,000~2,500	550~650	1,200~2,000	250~300	1,800~2,300	400~500
18.0	1,800~2,300	500~650	1,000~1,600	250~300	1,500~2,000	400~500
20.0	1,500~2,000	500~650	800~1,200	250~300	1,200~1,800	350~450

CARIBOU

Profondità di taglio
Depth of Cut



Ad=1.0D
Rd=1.0D(Max.)



Ad=1.0D(Max.)
Rd=0.5D(Max.)



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



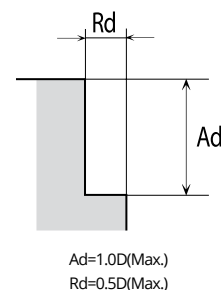
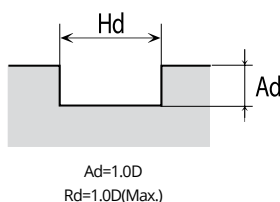
4KEUS & 4KAEUS

Fresatura
Milling Condition

CARIBOU

	LEGA DI TATANIO - ALLOY TITANIUM		INOX 300		INOX 400	
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
1.0	35,000~42,000	250~300	18,000~25,000	230~280	18,000~25,000	150~200
2.0	18,000~25,000	250~300	12,000~18,000	150~200	12,000~20,000	150~200
3.0	12,000~20,000	250~350	6,000~10,000	80~120	8,000~13,000	120~170
4.0	8,000~13,000	320~420	4,000~6,000	100~150	6,000~10,000	150~200
5.0	6,000~10,000	230~280	3,500~4,000	150~200	5,000~6,000	300~500
6.0	5,500~6,000	500~700	3,200~3,700	150~200	5,000~6,000	400~600
8.0	4,000~4,500	600~750	2,500~3,000	230~280	3,200~3,700	500~700
10.0	3,200~3,700	650~850	1,800~2,300	300~350	2,800~3,300	600~750
12.0	2,800~3,300	700~800	1,500~2,000	300~350	2,300~2,800	600~750
16.0	2,000~2,500	550~650	1,200~2,000	250~300	1,800~2,300	400~500
18.0	1,800~2,300	500~650	1,000~1,600	250~300	1,500~2,000	400~500
20.0	1,500~2,000	500~650	800~1,200	250~300	1,200~1,800	350~450

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



MARKHOR SERIES

- Lavorazione materiali non ferrosi Grafite, Elettrodi Rame, Fibra Carbonio, Vetro
- Ampia gamma di lunghezze e tipologie per tutte le applicazioni
- Prestazione ottimizzata con rivestimento in diamante puro (CVD)

- *Unequal flute*
- *Excellent surface roughness and smooth chip disposal*
- *Outstanding performance for Alloy steels, SUS, Titanium and hard to cut materials*

- *NE-Materialbearbeitung Graphit, Kupferelektroden, Kohlefaser, Glas*
- *Große Auswahl an Längen und Typen für alle Anwendungen*
- *Optimierte Leistung durch reine Diamantbeschichtung (CVD)*





KOBAL



SFERICA BALL

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)	Raggio R Size R	Tolleranza Tolerance
3 ~ 5	0 ~ -0.010 R1.5 ~	R2.5	±0.010
6 ~ 12	0 ~ -0.015 R3 ~	R6	±0.010
16 ~ 20	0 ~ -0.025	R8 ~ R10	±0.015

TORICA CORNER RADIUS

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)	Raggio R Size R	Tolleranza Tolerance
1 ~ 5	0 ~ -0.010	R0.1 ~ R0.5	±0.005
6 ~ 12	0 ~ -0.015	R1 ~ R1.5	±0.010
14 ~ 20	0 ~ -0.025	R2 ~ R3	±0.015

PIANA FLAT

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)
1 ~ 5	0 ~ -0.010
6 ~ 12	0 ~ -0.015
14 ~ 20	0 ~ -0.025

2KBRD

Fresa Sferica a 2 Taglienti
2 Flutes Diamond Coated Rib Ball End Mills

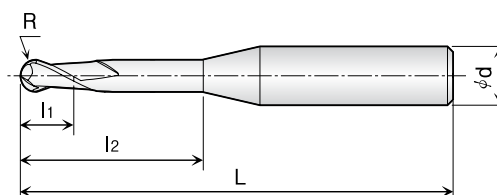
- Lavorazione materiali non ferrosi Grafite, Elettrodi Rame, Fibra Carbonio, Vetro
- *Processing of non-ferrous materials*
- Prestazione ottimizzata con rivestimento in diamante puro (CVD)
- *Optimized performance with pure diamond coating (CVD)*

DIA

2

R

30°

 PAGE
 No. 281


MARKHOR



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,2-5	0 -0,010	R0,1-R2,5	±0,005
6-12	0 -0,015	R3-R6	±0,010

CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Shank diameter (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
2KBRD-002-010-445	R0.1	0,2	1	4	45
2KBRD-002-015-445	R0.1	0,2	1,5	4	45
2KBRD-003-010-445	R0.15	0,3	1	4	45
2KBRD-003-020-445	R0.15	0,3	2	4	45
2KBRD-004-010-445	R0.2	0,4	1	4	45
2KBRD-004-020-445	R0.2	0,4	2	4	45
2KBRD-004-030-445	R0.2	0,4	3	4	45
2KBRD-004-040-445	R0.2	0,4	4	4	45
2KBRD-004-050-445	R0.2	0,4	5	4	45
2KBRD-004-060-445	R0.2	0,4	6	4	45
2KBRD-005-020-445	R0.25	0,5	2	4	45
2KBRD-005-030-445	R0.25	0,5	3	4	45
2KBRD-005-040-445	R0.25	0,5	4	4	45
2KBRD-005-050-445	R0.25	0,5	5	4	45
2KBRD-005-060-445	R0.25	0,5	6	4	45
2KBRD-005-080-445	R0.25	0,5	8	4	45
2KBRD-006-020-445	R0.3	0,6	2	4	45
2KBRD-006-030-445	R0.3	0,6	3	4	45
2KBRD-006-040-445	R0.3	0,6	4	4	45
2KBRD-006-050-445	R0.3	0,6	5	4	45
2KBRD-006-060-445	R0.3	0,6	6	4	45
2KBRD-006-080-445	R0.3	0,6	8	4	45
2KBRD-006-100-445	R0.3	0,6	10	4	45
2KBRD-006-120-445	R0.3	0,6	12	4	45
2KBRD-008-030-445	R0.4	0,8	3	4	45

2KBRD

Fresa Sferica a 2 Taglienti
2 Flutes Diamond Coated Rib Ball End Mills



CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Shank diameter (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KBRD-008-040-445	R0.4	0,8	4	4	45
2KBRD-008-050-445	R0.4	0,8	5	4	45
2KBRD-008-060-445	R0.4	0,8	6	4	45
2KBRD-008-080-445	R0.4	0,8	8	4	45
2KBRD-008-100-445	R0.4	0,8	10	4	45
2KBRD-008-150-445	R0.4	0,8	15	4	45
2KBRD-008-200-445	R0.4	0,8	20	4	45
2KBRD-010-030-450	R0.5	2	3	4	50
2KBRD-010-040-450	R0.5	2	4	4	50
2KBRD-010-050-450	R0.5	2	5	4	50
2KBRD-010-060-450	R0.5	2	6	4	50
2KBRD-010-100-450	R0.5	2	10	4	50
2KBRD-010-120-450	R0.5	2	12	4	50
2KBRD-010-160-460	R0.5	3	16	4	60
2KBRD-010-180-460	R0.5	3	18	4	60
2KBRD-010-200-460	R0.5	3	20	4	60
2KBRD-010-250-480	R0.5	3	25	4	80
2KBRD-010-300-480	R0.5	3	30	4	80
2KBRD-010-350-480	R0.5	3	35	4	80
2KBRD-010-400-480	R0.5	3	40	4	80
2KBRD-015-100-460	R0.75	4	10	4	60
2KBRD-015-150-460	R0.75	4	15	4	60
2KBRD-015-200-460	R0.75	4	20	4	60
2KBRD-015-100-480	R0.75	4,5	10	4	80
2KBRD-015-120-480	R0.75	4,5	12	4	80
2KBRD-015-150-480	R0.75	4,5	15	4	80
2KBRD-015-180-480	R0.75	4,5	18	4	80
2KBRD-015-200-480	R0.75	4,5	20	4	80
2KBRD-015-250-480	R0.75	4,5	25	4	80
2KBRD-015-300-480	R0.75	4,5	30	4	80
2KBRD-015-350-480	R0.75	4,5	35	4	80
2KBRD-015-400-480	R0.75	4,5	40	4	80
2KBRD-020-100-460	R1.0	5	10	4	60
2KBRD-020-150-460	R1.0	5	15	4	60
2KBRD-020-200-460	R1.0	5	20	4	60
2KBRD-020-100-480	R1.0	6	10	4	80
2KBRD-020-150-480	R1.0	6	15	4	80
2KBRD-020-200-480	R1.0	6	20	4	80

MARKHOR



2KBRD

Fresa Sferica a 2 Taglienti
 2 Flutes Diamond Coated Rib Ball End Mills



MARKHOR



CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Shank diameter (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
2KBRD-020-250-480	R1.0	6	25	4	80
2KBRD-020-300-480	R1.0	6	30	4	80
2KBRD-020-350-480	R1.0	6	35	4	80
2KBRD-020-400-4A0	R1.0	6	40	4	100
2KBRD-020-450-4A0	R1.0	6	45	4	100
2KBRD-020-500-4A0	R1.0	6	50	4	100
2KBRD-020-600-4A0	R1.0	6	60	4	100
2KBRD-030-150-4A0	R1.5	9	15	4	100
2KBRD-030-200-4A0	R1.5	9	20	4	100
2KBRD-030-250-4A0	R1.5	9	25	4	100
2KBRD-030-300-4A0	R1.5	9	30	4	100
2KBRD-030-350-4A0	R1.5	9	35	4	100
2KBRD-030-400-4A0	R1.5	9	40	4	100
2KBRD-030-500-4A0	R1.5	9	50	4	100
2KBRD-030-600-4A0	R1.5	9	60	4	100
2KBRD-030-160-660	R1.5	8	16	6	60
2KBRD-030-200-660	R1.5	8	20	6	60
2KBRD-030-300-675	R1.5	12	30	6	75
2KBRD-030-350-680	R1.5	12	35	6	80
2KBRD-040-300-480	R2.0	16	30	4	80
2KBRD-040-400-4A0	R2.0	16	40	4	100
2KBRD-040-400-4D0	R2.0	16	40	4	130
2KBRD-040-500-4F0	R2.0	16	50	4	150
2KBRD-040-160-660	R2.0	8	16	6	60
2KBRD-040-200-670	R2.0	8	20	6	70
2KBRD-040-300-680	R2.0	12	30	6	80
2KBRD-040-400-685	R2.0	12	40	6	85
2KBRD-060-250-680	R3.0	16	25	6	80
2KBRD-060-250-6B0	R3.0	16	25	6	110
2KBRD-060-300-6F0	R3.0	16	30	6	150
2KBRD-060-400-6B0	R3.0	16	40	6	110
2KBRD-060-500-6F0	R3.0	16	50	6	150
2KBRD-080-300-880	R4.0	20	30	8	80
2KBRD-080-300-8B0	R4.0	20	30	8	110
2KBRD-080-400-8B0	R4.0	20	40	8	110
2KBRD-080-400-8K0	R4.0	20	40	8	200

2KBRD

Fresa Sferica a 2 Taglienti
2 Flutes Diamond Coated Rib Ball End Mills



CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Shank diameter (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KBRD-080-500-8G0	R4.0	20	50	8	160
2KBRD-100-350-AB0	R5.0	22	35	10	110
2KBRD-100-500-AB0	R5.0	22	50	10	110
2KBRD-100-500-AK0	R5.0	22	50	10	200
2KBRD-100-600-AG0	R5.0	22	60	10	160
2KBRD-120-500-CB0	R6.0	25	50	12	110
2KBRD-120-500-CG0	R6.0	25	50	12	160
2KBRD-120-600-CK0	R6.0	25	60	12	200

MARKHOR



2KBPD

Fresa Sferica a 2 Taglienti
2 Flutes Diamond Coated Ball End Mills

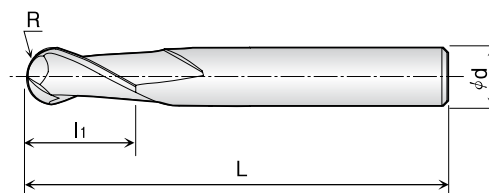
- Lavorazione materiali non ferrosi Grafite, Elettrodi Rame, Fibra Carbonio, Vetro
- *Processing of non-ferrous materials*
- Prestazione ottimizzata con rivestimento in diamante puro (CVD)
- *Optimized performance with pure diamond coating (CVD)*

DIA

2

R

30°

 PAGE
 No. 282


MARKHOR



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,2-5	0 -0,010	R0,1-R2,5	±0,005
6-12	0 -0,015	R3-R6	±0,010

CODICE	Raggio di testa (R)	Lunghezza Elica (L1)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (L1)	Shank diameter (d)	Overall length (L)
2KBPD-006-012-445	R0.3	1,2	4	45
2KBPD-008-015-445	R0.4	1,5	4	45
2KBPD-010-030-450	R0.5	3	4	50
2KBPD-015-050-450	R0.75	5	4	50
2KBPD-020-070-460	R1.0	7	4	60
2KBPD-030-100-660	R1.5	10	6	60
2KBPD-040-120-670	R2.0	12	6	70
2KBPD-040-200-4A0	R2.0	20	4	100
2KBPD-050-200-6A0	R2.5	20	6	100
2KBPD-060-200-6B0	R3.0	20	6	110
2KBPD-060-300-6F0	R3.0	30	6	150
2KBPD-080-200-8B0	R4.0	20	8	110
2KBPD-080-300-8F0	R4.0	30	8	150
2KBPD-100-200-AB0	R5.0	20	10	110
2KBPD-100-350-AF0	R5.0	35	10	150
2KBPD-120-200-CB0	R6.0	20	12	110
2KBPD-120-400-CF0	R6.0	40	12	150

2KRRD

Fresa Torica a 2 Taglienti
2 Flutes Diamond Coated Rib Corner
Radius End Mills



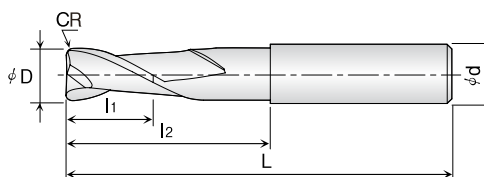
- Lavorazione materiali non ferrosi Grafite, Elettrodi Rame, Fibra Carbonio, Vetro
- *Processing of non-ferrous materials*
- Prestazione ottimizzata con rivestimento in diamante puro (CVD)
- *Optimized performance with pure diamond coating (CVD)*

DIA

2

CR

30°

PAGE
No. 283

Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
2 - 5	0 -0,010	R0,05-R0,5	±0,005
6 - 12	0 -0,015	R1	±0,010

CODICE	Diametro di Testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
2KRRD-002-R002-015-460	0,2	R0.02	0,4	1,5	4	60
2KRRD-003-R002-015-460	0,3	R0.02	0,6	1,5	4	60
2KRRD-003-R002-030-460	0,3	R0.02	0,6	3	4	60
2KRRD-003-R002-045-460	0,3	R0.02	0,6	4,5	4	60
2KRRD-003-R002-060-460	0,3	R0.02	0,6	6	4	60
2KRRD-004-R002-020-460	0,4	R0.02	0,8	2	4	60
2KRRD-004-R002-040-460	0,4	R0.02	0,8	4	4	60
2KRRD-004-R002-060-460	0,4	R0.02	0,8	6	4	60
2KRRD-004-R002-080-460	0,4	R0.02	0,8	8	4	60
2KRRD-005-R005-015-460	0,5	R0.05	1	1,5	4	60
2KRRD-005-R005-025-460	0,5	R0.05	1	2,5	4	60
2KRRD-005-R005-035-460	0,5	R0.05	1	3,5	4	60
2KRRD-005-R005-050-460	0,5	R0.05	1	5	4	60
2KRRD-005-R005-075-460	0,5	R0.05	1	7,5	4	60
2KRRD-005-R005-100-460	0,5	R0.05	1	10	4	60
2KRRD-006-R005-020-460	0,6	R0.05	1,2	2	4	60
2KRRD-006-R005-030-460	0,6	R0.05	1,2	3	4	60
2KRRD-006-R005-060-460	0,6	R0.05	1,2	6	4	60
2KRRD-006-R005-090-460	0,6	R0.05	1,2	9	4	60
2KRRD-006-R005-120-460	0,6	R0.05	1,2	12	4	60
2KRRD-008-R005-025-460	0,8	R0.05	1,6	2,5	4	60
2KRRD-008-R005-040-460	0,8	R0.05	1,6	4	4	60
2KRRD-008-R005-080-460	0,8	R0.05	1,6	8	4	60
2KRRD-008-R005-100-460	0,8	R0.05	1,6	10	4	60
2KRRD-008-R005-160-460	0,8	R0.05	1,6	16	4	60

MARKHOR



2KRRD

Fresa Torica a 2 Taglienti
 2 Flutes Diamond Coated Rib Corner
 Radius End Mills



CODICE	Diametro di Testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KRRD-010-R005-030-460	1	R0.05	2	3	4	60
2KRRD-010-R005-050-460	1	R0.05	2	5	4	60
2KRRD-010-R005-100-460	1	R0.05	2	10	4	60
2KRRD-010-R005-150-460	1	R0.05	2	15	4	60
2KRRD-010-R005-200-460	1	R0.05	2	20	4	60
2KRRD-010-R01-030-460	1	R0.1	2	3	4	60
2KRRD-010-R01-050-460	1	R0.1	2	5	4	60
2KRRD-010-R01-100-460	1	R0.1	2	10	4	60
2KRRD-010-R01-150-460	1	R0.1	2	15	4	60
2KRRD-010-R01-200-460	1	R0.1	2	20	4	60
2KRRD-010-R02-030-460	1	R0.2	2	3	4	60
2KRRD-010-R02-050-460	1	R0.2	2	5	4	60
2KRRD-010-R02-100-460	1	R0.2	2	10	4	60
2KRRD-010-R02-150-460	1	R0.2	2	15	4	60
2KRRD-010-R02-200-460	1	R0.2	2	20	4	60
2KRRD-015-R005-040-460	1,5	R0.05	3	4	4	60
2KRRD-015-R005-050-460	1,5	R0.05	3	5	4	60
2KRRD-015-R005-100-460	1,5	R0.05	3	10	4	60
2KRRD-015-R005-150-460	1,5	R0.05	3	15	4	60
2KRRD-015-R005-200-460	1,5	R0.05	3	20	4	60
2KRRD-015-R01-040-460	1,5	R0.1	3	4	4	60
2KRRD-015-R01-050-460	1,5	R0.1	3	5	4	60
2KRRD-015-R01-100-460	1,5	R0.1	3	10	4	60
2KRRD-015-R01-150-460	1,5	R0.1	3	15	4	60
2KRRD-015-R01-200-460	1,5	R0.1	3	20	4	60
2KRRD-015-R015-040-460	1,5	R0.15	3	4	4	60
2KRRD-015-R015-050-460	1,5	R0.15	3	5	4	60
2KRRD-015-R015-100-460	1,5	R0.15	3	10	4	60
2KRRD-015-R015-150-460	1,5	R0.15	3	15	4	60
2KRRD-015-R015-200-460	1,5	R0.15	3	20	4	60
2KRRD-015-R02-040-460	1,5	R0.2	3	4	4	60
2KRRD-015-R02-050-460	1,5	R0.2	3	5	4	60
2KRRD-015-R02-100-460	1,5	R0.2	3	10	4	60
2KRRD-015-R02-150-460	1,5	R0.2	3	15	4	60
2KRRD-015-R02-200-460	1,5	R0.2	3	20	4	60

MARKHOR



2KRRD

Fresa Torica a 2 Taglienti
 2 Flutes Diamond Coated Rib Corner
 Radius End Mills



CODICE	Diametro di Testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Lenght of cut (L ₁)	Effective Lenght (L ₂)	Shank diameter (d)	Overall lenght (L)
2KRRD-015-R03-040-460	1,5	R0.3	3	4	4	60
2KRRD-015-R03-050-460	1,5	R0.3	3	5	4	60
2KRRD-015-R03-100-460	1,5	R0.3	3	10	4	60
2KRRD-015-R03-150-460	1,5	R0.3	3	15	4	60
2KRRD-015-R03-200-460	1,5	R0.3	3	20	4	60
2KRRD-020-R005-040-460	2	R0.05	3	4	4	60
2KRRD-020-R005-060-460	2	R0.05	3	6	4	60
2KRRD-020-R005-120-460	2	R0.05	3	12	4	60
2KRRD-020-R005-180-460	2	R0.05	3	18	4	60
2KRRD-020-R005-250-460	2	R0.05	3	25	4	60
2KRRD-020-R005-300-460	2	R0.05	3	30	4	60
2KRRD-020-R01-040-460	2	R0.1	3	4	4	60
2KRRD-020-R01-060-460	2	R0.1	3	6	4	60
2KRRD-020-R01-120-460	2	R0.1	3	12	4	60
2KRRD-020-R01-180-460	2	R0.1	3	18	4	60
2KRRD-020-R01-250-460	2	R0.1	3	25	4	60
2KRRD-020-R01-300-460	2	R0.1	3	30	4	60
2KRRD-020-R02-040-460	2	R0.2	3	4	4	60
2KRRD-020-R02-060-460	2	R0.2	3	6	4	60
2KRRD-020-R02-120-460	2	R0.2	3	12	4	60
2KRRD-020-R02-180-460	2	R0.2	3	18	4	60
2KRRD-020-R02-250-460	2	R0.2	3	25	4	60
2KRRD-020-R02-300-460	2	R0.2	3	30	4	60
2KRRD-020-R03-040-460	2	R0.3	3	4	4	60
2KRRD-020-R03-060-460	2	R0.3	3	6	4	60
2KRRD-020-R03-120-460	2	R0.3	3	12	4	60
2KRRD-020-R03-180-460	2	R0.3	3	18	4	60
2KRRD-020-R03-250-460	2	R0.3	3	25	4	60
2KRRD-020-R03-300-460	2	R0.3	3	30	4	60
2KRRD-020-R05-040-460	2	R0.5	3	4	4	60
2KRRD-020-R05-060-460	2	R0.5	3	6	4	60
2KRRD-020-R05-120-460	2	R0.5	3	12	4	60
2KRRD-020-R05-180-460	2	R0.5	3	18	4	60
2KRRD-020-R05-250-460	2	R0.5	3	25	4	60
2KRRD-020-R05-300-460	2	R0.5	3	30	4	60

MARKHOR



2KRRD

Fresa Torica a 2 Taglienti
 2 Flutes Diamond Coated Rib Corner
 Radius End Mills



CODICE	Diametro di Testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KRRD-040-R01-150-480	4	R0.1	6	15	4	80
2KRRD-040-R01-250-480	4	R0.1	6	25	4	80
2KRRD-040-R01-400-480	4	R0.1	6	40	4	80
2KRRD-040-R02-100-480	4	R0.2	6	10	4	80
2KRRD-040-R02-150-480	4	R0.2	6	15	4	80
2KRRD-040-R02-250-480	4	R0.2	6	25	4	80
2KRRD-040-R02-400-480	4	R0.2	6	40	4	80
2KRRD-040-R05-100-480	4	R0.5	6	10	4	80
2KRRD-040-R05-150-480	4	R0.5	6	15	4	80
2KRRD-040-R05-250-480	4	R0.5	6	25	4	80
2KRRD-040-R05-400-480	4	R0.5	6	40	4	80
2KRRD-040-R10-100-480	4	R1.0	6	10	4	80
2KRRD-040-R10-150-480	4	R1.0	6	15	4	80
2KRRD-040-R10-250-480	4	R1.0	6	25	4	80
2KRRD-040-R10-400-480	4	R1.0	6	40	4	80
2KRRD-050-R005-100-6B0	5	R0.05	7,5	10	6	110
2KRRD-050-R005-150-6B0	5	R0.05	7,5	15	6	110
2KRRD-050-R005-300-6B0	5	R0.05	7,5	30	6	110
2KRRD-050-R005-500-6B0	5	R0.05	7,5	50	6	110
2KRRD-050-R01-100-6B0	5	R0.1	7,5	10	6	110
2KRRD-050-R01-150-6B0	5	R0.1	7,5	15	6	110
2KRRD-050-R01-300-6B0	5	R0.1	7,5	30	6	110
2KRRD-050-R01-500-6B0	5	R0.1	7,5	50	6	110
2KRRD-050-R02-100-6B0	5	R0.2	7,5	10	6	110
2KRRD-050-R02-150-6B0	5	R0.2	7,5	15	6	110
2KRRD-050-R02-300-6B0	5	R0.2	7,5	30	6	110
2KRRD-050-R02-500-6B0	5	R0.2	7,5	50	6	110
2KRRD-050-R05-100-6B0	5	R0.5	7,5	10	6	110
2KRRD-050-R05-150-6B0	5	R0.5	7,5	15	6	110
2KRRD-050-R05-300-6B0	5	R0.5	7,5	30	6	110
2KRRD-050-R05-500-6B0	5	R0.5	7,5	50	6	110
2KRRD-060-R005-150-6B0	6	R0.05	9	15	6	110
2KRRD-060-R005-200-6B0	6	R0.05	9	20	6	110
2KRRD-060-R005-300-6B0	6	R0.05	9	30	6	110
2KRRD-060-R005-500-6B0	6	R0.05	9	50	6	110

MARKHOR



2KRRD

Fresa Torica a 2 Taglienti
 2 Flutes Diamond Coated Rib Corner
 Radius End Mills



CODICE	Diametro di Testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Lenght of cut (L ₁)	Effective Lenght (L ₂)	Shank diameter (d)	Overall lenght (L)
2KRRD-060-R01-150-6B0	6	R0.1	9	15	6	110
2KRRD-060-R01-200-6B0	6	R0.1	9	20	6	110
2KRRD-060-R01-300-6B0	6	R0.1	9	30	6	110
2KRRD-060-R01-500-6B0	6	R0.1	9	50	6	110
2KRRD-060-R02-150-6B0	6	R0.2	9	15	6	110
2KRRD-060-R02-200-6B0	6	R0.2	9	20	6	110
2KRRD-060-R02-300-6B0	6	R0.2	9	30	6	110
2KRRD-060-R02-500-6B0	6	R0.2	9	50	6	110
2KRRD-060-R05-150-6B0	6	R0.5	9	15	6	110
2KRRD-060-R05-200-6B0	6	R0.5	9	20	6	110
2KRRD-060-R05-300-6B0	6	R0.5	9	30	6	110
2KRRD-060-R05-500-6B0	6	R0.5	9	50	6	110
2KRRD-060-R10-150-6B0	6	R1.0	9	15	6	110
2KRRD-060-R10-200-6B0	6	R1.0	9	20	6	110
2KRRD-060-R10-300-6B0	6	R1.0	9	30	6	110
2KRRD-060-R10-500-6B0	6	R1.0	9	50	6	110

MARKHOR

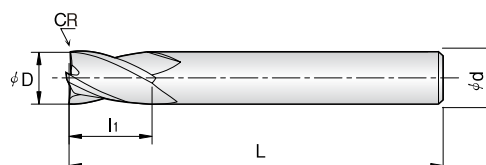


4KRRD

Fresa Torica a 4 Taglienti
4 Flutes Diamond Coated Rib Corner
Radius End Mills



- Lavorazione materiali non ferrosi Grafite, Elettrodi Rame, Fibra Carbonio, Vetro
- *Processing of non-ferrous materials*
- Prestazione ottimizzata con rivestimento in diamante puro (CVD)
- *Optimized performance with pure diamond coating (CVD)*



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
2 - 5	0 -0,010	R0,05-R0,5	±0,005
6 - 12	0 -0,015	R1	±0,010

CODICE	Diametro di Testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
4KRRD-020-R005-040-460	2	R0.05	3	4	4	60
4KRRD-020-R005-060-460	2	R0.05	3	6	4	60
4KRRD-020-R005-120-460	2	R0.05	3	12	4	60
4KRRD-020-R005-180-460	2	R0.05	3	18	4	60
4KRRD-020-R005-250-460	2	R0.05	3	25	4	60
4KRRD-020-R005-300-460	2	R0.05	3	30	4	60
4KRRD-020-R01-040-460	2	R0.1	3	4	4	60
4KRRD-020-R01-060-460	2	R0.1	3	6	4	60
4KRRD-020-R01-120-460	2	R0.1	3	12	4	60
4KRRD-020-R01-180-460	2	R0.1	3	18	4	60
4KRRD-020-R01-250-460	2	R0.1	3	25	4	60
4KRRD-020-R01-300-460	2	R0.1	3	30	4	60
4KRRD-020-R02-040-460	2	R0.2	3	4	4	60
4KRRD-020-R02-060-460	2	R0.2	3	6	4	60
4KRRD-020-R02-120-460	2	R0.2	3	12	4	60
4KRRD-020-R02-180-460	2	R0.2	3	18	4	60
4KRRD-020-R02-250-460	2	R0.2	3	25	4	60
4KRRD-020-R02-300-460	2	R0.2	3	30	4	60
4KRRD-020-R03-040-460	2	R0.3	3	4	4	60
4KRRD-020-R03-060-460	2	R0.3	3	6	4	60
4KRRD-020-R03-120-460	2	R0.3	3	12	4	60
4KRRD-020-R03-180-460	2	R0.3	3	18	4	60
4KRRD-020-R03-250-460	2	R0.3	3	25	4	60
4KRRD-020-R03-300-460	2	R0.3	3	30	4	60
4KRRD-020-R05-040-460	2	R0.5	3	4	4	60



4KRRD

Fresa Torica a 4 Taglienti
 4 Flutes Diamond Coated Rib Corner
 Radius End Mills



CODICE	Diametro di Testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Lenght of cut (L ₁)	Effective Lenght (L ₂)	Shank diameter (d)	Overall lenght (L)
4KRRD-020-R05-060-460	2	R0.5	3	6	4	60
4KRRD-020-R05-120-460	2	R0.5	3	12	4	60
4KRRD-020-R05-180-460	2	R0.5	3	18	4	60
4KRRD-020-R05-250-460	2	R0.5	3	25	4	60
4KRRD-020-R05-300-460	2	R0.5	3	30	4	60
4KRRD-030-R005-060-480	3	R0.05	4,5	6	4	80
4KRRD-030-R005-100-480	3	R0.05	4,5	10	4	80
4KRRD-030-R005-200-480	3	R0.05	4,5	20	4	80
4KRRD-030-R005-300-480	3	R0.05	4,5	30	4	80
4KRRD-030-R005-400-480	3	R0.05	4,5	40	4	80
4KRRD-030-R01-060-480	3	R0.1	4,5	6	4	80
4KRRD-030-R01-100-480	3	R0.1	4,5	10	4	80
4KRRD-030-R01-200-480	3	R0.1	4,5	20	4	80
4KRRD-030-R01-300-480	3	R0.1	4,5	30	4	80
4KRRD-030-R01-400-480	3	R0.1	4,5	40	4	80
4KRRD-030-R02-060-480	3	R0.2	4,5	6	4	80
4KRRD-030-R02-100-480	3	R0.2	4,5	10	4	80
4KRRD-030-R02-200-480	3	R0.2	4,5	20	4	80
4KRRD-030-R02-300-480	3	R0.2	4,5	30	4	80
4KRRD-030-R02-400-480	3	R0.2	4,5	40	4	80
4KRRD-030-R03-060-480	3	R0.3	4,5	6	4	80
4KRRD-030-R03-100-480	3	R0.3	4,5	10	4	80
4KRRD-030-R03-200-480	3	R0.3	4,5	20	4	80
4KRRD-030-R03-300-480	3	R0.3	4,5	30	4	80
4KRRD-030-R03-400-480	3	R0.3	4,5	40	4	80
4KRRD-030-R05-060-480	3	R0.5	4,5	6	4	80
4KRRD-030-R05-100-480	3	R0.5	4,5	10	4	80
4KRRD-030-R05-200-480	3	R0.5	4,5	20	4	80
4KRRD-030-R05-300-480	3	R0.5	4,5	30	4	80
4KRRD-030-R05-400-480	3	R0.5	4,5	40	4	80
4KRRD-030-R10-060-480	3	R1.0	4,5	6	4	80
4KRRD-030-R10-100-480	3	R1.0	4,5	10	4	80
4KRRD-030-R10-200-480	3	R1.0	4,5	20	4	80
4KRRD-030-R10-300-480	3	R1.0	4,5	30	4	80
4KRRD-030-R10-400-480	3	R1.0	4,5	40	4	80

MARKHOR



4KRRD

Fresa Torica a 4 Taglienti
 4 Flutes Diamond Coated Rib Corner
 Radius End Mills



CODICE	Diametro di Testa (D)	Raggio Torico (CR)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
4KRRD-040-R03-200-4A0	4	R0.3	6	20	4	100
4KRRD-040-R05-200-4A0	4	R0.5	6	20	4	100
4KRRD-040-R10-200-4A0	4	R1.0	6	20	4	100
4KRRD-060-R03-250-6B0	6	R0.3	9	25	6	110
4KRRD-060-R05-250-6B0	6	R0.5	9	25	6	110
4KRRD-060-R05-300-6F0	6	R0.5	9	30	6	150
4KRRD-060-R10-250-6B0	6	R1.0	9	25	6	110
4KRRD-060-R10-300-6F0	6	R1.0	9	30	6	150
4KRRD-080-R03-300-8B0	8	R0.3	12	30	8	110
4KRRD-080-R05-300-8B0	8	R0.5	12	30	8	110
4KRRD-080-R05-400-8G0	8	R0.5	12	40	8	160
4KRRD-080-R10-300-8B0	8	R1.0	12	30	8	110
4KRRD-080-R10-400-8G0	8	R1.0	12	40	8	160
4KRRD-100-R05-350-AB0	10	R0.5	15	35	10	110
4KRRD-100-R05-450-AG0	10	R0.5	15	45	10	160
4KRRD-100-R10-350-AB0	10	R1.0	15	35	10	110
4KRRD-100-R10-450-AG0	10	R1.0	15	45	10	160
4KRRD-120-R05-400-CB0	12	R0.5	18	40	12	110
4KRRD-120-R05-450-CG0	12	R0.5	18	45	12	160
4KRRD-120-R10-400-CB0	12	R1.0	18	40	12	110
4KRRD-120-R10-450-CG0	12	R1.0	18	45	12	160

MARKHOR



2KERD

Fresa Piana a 2 Taglienti
2 Flutes Diamond Coated Rib Flat End Mills



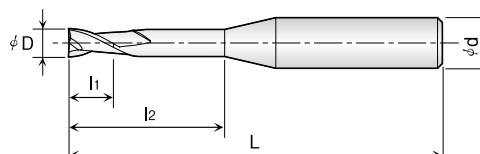
- Lavorazione materiali non ferrosi Grafite, Elettrodi Rame, Fibra Carbonio, Vetro
- *Processing of non-ferrous materials*
- Prestazione ottimizzata con rivestimento in diamante puro (CVD)
- *Optimized performance with pure diamond coating (CVD)*

DIA

2

OD

30°

PAGE
No. 285

Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
2 - 5	0 - 0,010	R0,05-R0,5	±0,005
6 - 12	0 - 0,015	R1	±0,010

CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside diameter (d)	Shank diameter (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KERD-010-050-460	1	3	5	4	60
2KERD-010-100-460	1	3	10	4	60
2KERD-010-150-460	1	3	15	4	60
2KERD-010-200-460	1	3	20	4	60
2KERD-010-250-460	1	3	25	4	60
2KERD-015-100-460	1,5	6	10	4	60
2KERD-015-150-460	1,5	6	15	4	60
2KERD-015-200-460	1,5	6	20	4	60
2KERD-015-250-460	1,5	6	25	4	60
2KERD-020-120-480	2	8	12	4	80
2KERD-020-150-480	2	8	15	4	80
2KERD-020-200-480	2	8	20	4	80
2KERD-020-250-480	2	8	25	4	80
2KERD-020-300-480	2	8	30	4	80
2KERD-020-400-480	2	8	40	4	80
2KERD-030-200-480	3	12	20	4	80
2KERD-030-250-480	3	12	25	4	80
2KERD-030-300-480	3	12	30	4	80
2KERD-030-400-480	3	12	40	4	80
2KERD-080-400-8G0	8	25	40	8	160
2KERD-100-500-AG0	10	25	50	10	160
2KERD-120-600-CG0	12	25	60	12	160

MARKHOR

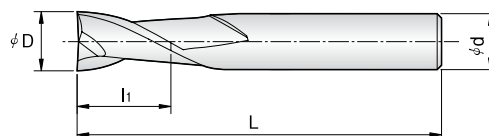


2KEPD

Fresa Piana a 2 Taglienti
2 Flutes Diamond Coated Flat End Mills



- Lavorazione materiali non ferrosi Grafite, Elettrodi Rame, Fibra Carbonio, Vetro
- *Processing of non-ferrous materials*
- Prestazione ottimizzata con rivestimento in diamante puro (CVD)
- *Optimized performance with pure diamond coating (CVD)*

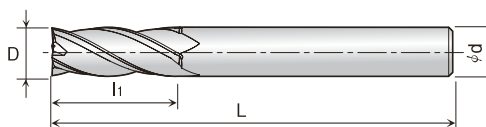


MARKHOR

	Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
	Size (D)	Tolerance (D)	Size R	Tolerance
	2 - 5	0 -0,010	R0,05-R0,5	±0,005
	6 - 12	0 -0,015	R1	±0,010

CODICE	Diametro di testa (d)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside diameter (d)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
2KEPD-002-004-445	0,2	0,4	4	45
2KEPD-003-006-445	0,3	0,6	4	45
2KEPD-004-008-445	0,4	0,8	4	45
2KEPD-005-010-445	0,5	1	4	45
2KEPD-006-012-445	0,6	1,2	4	45
2KEPD-007-014-445	0,7	1,4	4	45
2KEPD-008-016-445	0,8	1,6	4	45
2KEPD-009-018-445	0,9	1,8	4	45
2KEPD-010-030-450	1	3	4	50
2KEPD-015-040-450	1,5	4	4	50
2KEPD-020-060-460	2	6	4	60
2KEPD-020-080-480	2	8	4	80
2KEPD-025-080-460	2,5	8	4	60
2KEPD-030-100-660	3	10	6	60
2KEPD-030-120-480	3	12	4	80
2KEPD-040-120-660	4	12	6	60
2KEPD-050-150-660	5	15	6	60
2KEPD-050-200-6B0	5	20	6	110
2KEPD-050-300-680	5	30	6	80
2KEPD-060-150-670	6	15	6	70
2KEPD-060-250-6B0	6	25	6	110
2KEPD-060-250-6F0	6	25	6	150
2KEPD-060-300-670	6	30	6	70
2KEPD-070-200-870	7	20	8	70
2KEPD-080-200-870	8	20	8	70
2KEPD-080-300-880	8	30	8	80

- 



CODICE	Diametro di testa (d)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Outside diameter (d)</i>	<i>Lenght of cut (l₁)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
4KEPD-020-060-445	2	6	4	45
4KEPD-020-100-460	2	10	4	60
4KEPD-030-090-650	3	9	6	50
4KEPD-030-150-360	3	15	3	60
4KEPD-030-150-460	3	15	4	60
4KEPD-040-120-650	4	12	6	50
4KEPD-040-200-480	4	20	4	80
4KEPD-060-180-660	6	18	6	60
4KEPD-060-250-6B0	6	25	6	110
4KEPD-060-250-6F0	6	25	6	150
4KEPD-080-240-870	8	24	8	70
4KEPD-080-350-8B0	8	35	8	110
4KEPD-080-350-8G0	8	35	8	160
4KEPD-100-250-A80	10	25	10	80
4KEPD-100-400-AB0	10	40	10	110
4KEPD-100-500-AG0	10	50	10	160
4KEPD-120-250-C80	12	25	12	80
4KEPD-120-450-CB0	12	45	12	110
4KEPD-120-550-CG0	12	55	12	160

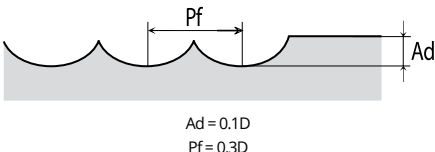
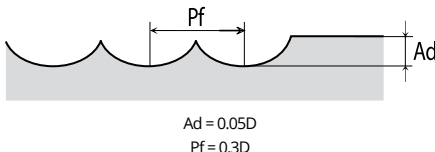
MARKHOR



2KBRD

Fresatura
Milling Condition

MARKHOR

	Grafite - Graphite		Rame - Copper Alloys	
Raggio di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Radius of Ball Nose	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
R0.05	38,000~50,000	50~100	38,000~50,000	50~100
R0.1	38,000~50,000	80~150	38,000~50,000	200~500
R0.15	38,000~50,000	100~300	38,000~50,000	300~800
R0.2	30,000~42,000	200~500	30,000~42,000	300~1,000
R0.25	30,000~42,000	400~800	30,000~42,000	500~1,400
R0.3	20,000~40,000	500~900	24,000~40,000	350~1,600
R0.4	20,000~40,000	600~1,000	20,000~40,000	450~2,000
R0.5	20,000~40,000	800~2,000	20,000~40,000	800~3,000
R0.75	18,000~35,000	1,200~2,000	18,000~30,000	1,200~3,000
R1.0	12,000~30,000	1,200~2,000	12,000~20,000	1,200~3,000
R1.5	10,000~20,000	1,200~2,000	16,000~20,000	1,800~4,000
R2.0	10,000~15,000	1,300~2,000	16,000~20,000	2,100~4,000
R3.0	9,000~16,000	1,500~2,100	13,300~20,000	1,600~4,000
R4.0	8,000~12,000	1,400~2,200	10,000~16,000	1,400~3,200
R5.0	6,000~10,000	1,200~2,400	8,000~12,800	1,500~3,000
R6.0	4,000~8,000	1,200~1,900	6,600~10,000	1,300~2,600
Profondità di taglio Depth of Cut	 Ad = 0.1D Pf = 0.3D		 Ad = 0.05D Pf = 0.3D	



ATTENZIONE - WARNING

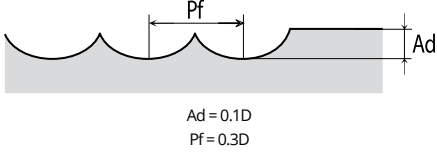
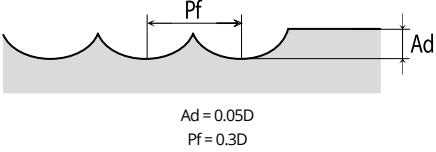
1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



2KBPD

Fresatura Milling Condition

	Grafite - Graphite		Rame - Copper Alloys	
Raggio di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Radius of Ball Nose	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
R0.3	20,000~40,000	800~2,000	20,000~40,000	800~3,000
R0.4	20,000~40,000	800~2,000	20,000~40,000	800~3,000
R0.5	20,000~40,000	800~2,000	20,000~40,000	800~3,000
R0.75	18,000~35,000	1,200~2,000	18,000~30,000	1,200~3,000
R1.0	12,000~30,000	1,200~2,000	12,000~20,000	1,200~3,000
R1.5	10,000~20,000	1,200~2,000	16,000~20,000	1,800~4,000
R2.0	10,000~15,000	1,300~2,000	16,000~20,000	2,100~4,000
R3.0	9,000~16,000	1,500~2,100	13,300~20,000	1,600~4,000
R4.0	8,000~12,000	1,400~2,200	10,000~16,000	1,400~3,200
R5.0	6,000~10,000	1,280~2,400	8,000~12,800	1,500~3,000
R6.0	4,000~8,000	1,200~1,900	6,600~10,000	1,300~2,600
Profondità di taglio Depth of Cut	 Ad = 0.1D Pf = 0.3D		 Ad = 0.05D Pf = 0.3D	



ATTENZIONE - WARNING

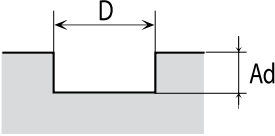
1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KBPD

Fresatura
Milling Condition

MARKHOR

	Grafite - Graphite	
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)
0.2	38,000~50,000	80~150
0.3	38,000~50,000	100~300
0.4	30,000~42,000	200~500
0.5	30,000~42,000	400~800
0.6	20,000~40,000	500~900
0.8	20,000~40,000	600~1,000
1.0	20,000~40,000	800~2,000
1.5	18,000~35,000	1,200~2,000
2.0	12,000~30,000	1,200~2,000
3.0	10,000~20,000	1,200~2,000
4.0	10,000~15,000	1,300~2,000
6.0	9,000~16,000	1,500~2,100
Profondità di taglio Depth of Cut	 Ad = 0.25D (D ≤ Ø3) Ad = 0.5 D (D > Ø3)	



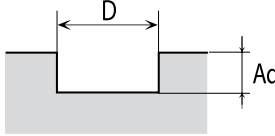
ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KRRD

Fresatura
Milling Condition

Grafite - Graphite		
Diametro di testa <i>Outside Diameter</i>	Velocità (min ⁻¹) <i>Speed (min⁻¹)</i>	Avanzamento (mm/min) <i>Feed (mm/min)</i>
2.0	12,000~30,000	2,500~4,000
3.0	10,000~20,000	2,500~4,000
4.0	10,000~15,000	3,000~5,000
6.0	9,000~16,000	4,000~6,000
8.0	8,000~12,000	4,000~6,000
10.0	6,000~10,000	4,000~6,000
12.0	4,000~8,000	4,000~6,000
Profondità di taglio <i>Depth of Cut</i>	 Ad = 0.25D (D ≤ Ø3) Ad = 0.5 D (D > Ø3)	



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

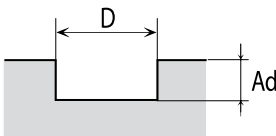
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KBRD

Fresatura
Milling Condition

MARKHOR

	Grafite - Graphite		Rame - Copper Alloys	
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
1.0	13,000~17,000	600~900	25,000~32,000	800~1,200
1.5	13,000~17,000	800~1,200	25,000~32,000	900~1,300
2.0	13,000~17,000	1,000~1,300	23,000~30,000	1,000~1,500
3.0	13,000~17,000	1,500~1,800	13,000~17,000	1,000~1,500
4.0	13,000~17,000	1,300~2,000	10,000~16,000	1,000~1,500
6.0	13,000~17,000	1,800~2,300	8,000~12,000	1,000~1,500
8.0	13,000~17,000	2,000~2,500	5,000~8,000	1,000~1,500
10.0	10,000~13,000	1,800~2,200	4,000~7,000	1,200~1,600
12.0	8,000~11,000	1,800~2,200	3,000~6,000	1,000~1,500

Profondità di taglio Depth of Cut	 Ad = 0.25D (D ≤ Ø3) Ad = 0.5 D (D > Ø3)
--------------------------------------	--



ATTENZIONE - WARNING

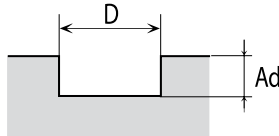
- Utilizzare macchine e attrezzature precise e rigide
- Ad(mm) : Profondità di taglio ASSIALE
- Per la fresatura si consiglia aria o lubrificazione
- Adattare giri e avanzamenti con la stessa proporzione
- I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

- Use a rigid precise machine and holder.
- Ad(mm): Axial Depth of Cut.
- For milling steels, air blow or MQL(Oil Mist) are recommended.
- Adjust both Spindle speed and Feedrate by the same proportion.
- The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KEPD

Fresatura
Milling Condition

	Grafite - Graphite		Rame - Copper Alloys	
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
0.2	30,000~40,000	350~800	30,000~40,000	250~600
0.3	30,000~40,000	350~800	30,000~40,000	250~600
0.4	28,000~35,000	500~800	28,000~35,000	300~650
0.5	25,000~32,000	500~800	25,000~32,000	300~650
0.6	25,000~32,000	500~800	25,000~32,000	300~650
0.7	23,000~30,000	500~800	23,000~30,000	400~700
0.8	20,000~30,000	500~800	20,000~30,000	500~800
1.0	13,000~17,000	600~900	25,000~32,000	800~1,200
1.5	13,000~17,000	800~1,200	25,000~32,000	900~1,300
2.0	13,000~17,000	1,000~1,300	23,000~30,000	1,000~1,500
3.0	13,000~17,000	1,500~1,800	13,000~17,000	1,000~1,500
4.0	13,000~17,000	1,300~2,000	10,000~16,000	1,000~1,500
6.0	13,000~17,000	1,800~2,300	8,000~12,000	1,000~1,500
8.0	13,000~17,000	2,000~2,500	5,000~8,000	1,000~1,500
10.0	10,000~13,000	1,800~2,200	4,000~7,000	1,200~1,600
12.0	8,000~11,000	1,800~2,200	3,000~6,000	1,000~1,500

Profondità di taglio Depth of Cut	 Ad = 0.25D (D ≤ Ø3) Ad = 0.5 D (D > Ø3)
--------------------------------------	--



ATTENZIONE - WARNING

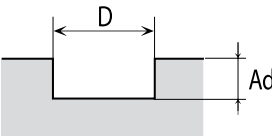
1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

4KEPD

Fresatura
Milling Condition

MARKHOR

Grafite - Graphite		
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)
22.0	13,000~17,000	1,300~1,800
3.0	13,000~17,000	1,800~2,300
4.0	13,000~17,000	2,000~2,500
6.0	13,000~17,000	2,300~2,800
8.0	13,000~17,000	2,200~2,800
10.0	10,000~13,000	2,200~2,800
12.0	8,000~11,000	2,200~2,800
Profondità di taglio Depth of Cut	 Ad = 0.25D (D ≤ Ø3) Ad = 0.5 D (D > Ø3)	



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



SERIES

MARKHOR

PARAMETRI DI LAVORAZIONE
TECHNICAL DATA



MARKHOR





RHINOCEROS SERIES

- Progettata per lavorazione Rame e materiali non ferrosi
 - Rivestimento speciale per ottimizzare la resistenza all'usura e la lubrificazione
 - Design geometrico per perfetta evacuazione truciolo
-
- *Copper, graphite and non-ferrous metal*
 - *Special coating to maximize the wear-resistance and lubrication*
 - *Smooth chip disposal*
-
- *Konzipiert für die Kupferbearbeitung und NE-Werkstoffe*
 - *Spezielle Beschichtung zur Optimierung der Verschleißfestigkeit und Schmierung*
 - *Geometrisches Design für perfekte Spanabfuhr*





SFERICA BALL

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)	Raggio R Size R	Tolleranza Tolerance
0.4 ~ 5	0 ~ -0.010	R0.2 ~ R2.5	±0.005
6 ~ 12	0 ~ -0.015	R3 ~ R6	±0.010

TORICA CORNER RADIUS

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)	Raggio R Size R	Tolleranza Tolerance
1.5 ~ 5	0 ~ -0.010	R0.05 ~ R0.5	±0.005
6 ~ 12	0 ~ -0.015	R1 ~ R1.5	±0.010

PIANA FLAT

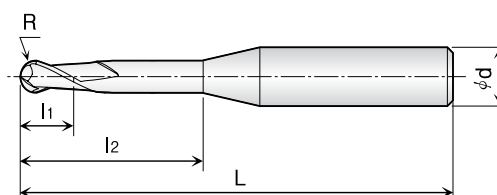
Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)
0.5 ~ 5	0 ~ -0.010
6 ~ 12	0 ~ -0.015

2KBRK

Fresa Sferica a 2 taglienti
 2 Flutes Rib Ball End Mills



- Rame e materiali non ferrosi
- *Copper and non-ferrous materials*
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain
- Rivestimento DLC
- *DLC coating*



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,4-5	0 -0,010	R0,2-R2,5	±0,005
6-12	0 -0,015	R3-R6	±0,010

CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length Cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KBRK-001-003-445	R0.05	0,1	0,3	4	45
2KBRK-002-005-445	R0.1	0,2	0,5	4	45
2KBRK-002-010-445	R0.1	0,2	1	4	45
2KBRK-002-015-445	R0.1	0,2	1,5	4	45
2KBRK-002-020-445	R0.1	0,2	2	4	45
2KBRK-003-005-445	R0.15	0,3	0,5	4	45
2KBRK-003-010-445	R0.15	0,3	1	4	45
2KBRK-003-015-445	R0.15	0,3	1,5	4	45
2KBRK-003-020-445	R0.15	0,3	2	4	45
2KBRK-004-010-445	R0.2	0,4	1	4	45
2KBRK-004-020-445	R0.2	0,4	2	4	45
2KBRK-004-030-445	R0.2	0,4	3	4	45
2KBRK-004-040-445	R0.2	0,4	4	4	45
2KBRK-004-050-445	R0.2	0,4	5	4	45
2KBRK-005-020-445	R0.25	0,5	2	4	45
2KBRK-005-030-445	R0.25	0,5	3	4	45
2KBRK-005-040-445	R0.25	0,5	4	4	45
2KBRK-005-060-445	R0.25	0,5	6	4	45
2KBRK-006-020-445	R0.3	0,6	2	4	45
2KBRK-006-040-445	R0.3	0,6	4	4	45
2KBRK-006-060-445	R0.3	0,6	6	4	45
2KBRK-006-080-445	R0.3	0,6	8	4	45
2KBRK-006-100-445	R0.3	0,6	10	4	45
2KBRK-008-020-445	R0.4	0,8	2	4	45
2KBRK-008-040-445	R0.4	0,8	4	4	45



2KBRK

Fresa Sferica a 2 taglienti
 2 Flutes Rib Ball End Mills



CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length Cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KBRK-008-060-445	R0.4	0,8	6	4	45
2KBRK-008-080-445	R0.4	0,8	8	4	45
2KBRK-008-100-445	R0.4	0,8	10	4	45
2KBRK-010-040-445	R0.5	1	4	4	45
2KBRK-010-060-445	R0.5	1	6	4	45
2KBRK-010-080-445	R0.5	1	8	4	45
2KBRK-010-100-445	R0.5	1	10	4	45
2KBRK-015-060-445	R0.75	1,5	6	4	45
2KBRK-015-080-445	R0.75	1,5	8	4	45
2KBRK-015-100-445	R0.75	1,5	10	4	45
2KBRK-015-120-445	R0.75	1,5	12	4	45
2KBRK-015-160-450	R0.75	1,5	16	4	50
2KBRK-020-060-445	R1.0	2	6	4	45
2KBRK-020-080-445	R1.0	2	8	4	45
2KBRK-020-100-445	R1.0	2	10	4	45
2KBRK-020-120-445	R1.0	2	12	4	45
2KBRK-020-140-450	R1.0	2	14	4	50
2KBRK-030-120-650	R1.5	3	12	6	50
2KBRK-030-160-660	R1.5	3	16	6	60
2KBRK-030-200-660	R1.5	3	20	6	60
2KBRK-040-120-650	R2.0	4	12	6	50
2KBRK-040-160-660	R2.0	4	16	6	60
2KBRK-040-200-660	R2.0	4	20	6	60
2KBRK-040-250-665	R2.0	4	25	6	65

RHINOCEROS



2KBSK

Fresa Sferica a 2 taglienti Corta
 2 Flutes Short Ball End Mills

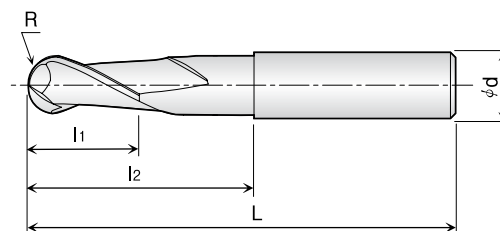
- Rame e materiali non ferrosi
- *Copper and non-ferrous materials*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*
- Rivestimento DLC
- *DLC coating*

DLC

2

R

30°

 PAGE
 No. 289


RHINOCEROS

	Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
	Size (D)	Tolerance (D)	Size R	Tolerance
	0,4-5	0 -0,010	R0,2-R2,5	±0,005
	6-12	0 -0,015	R3-R6	±0,010

CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length Cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
2KBSK-004-010-650	R0.2	0,4	1	6	50
2KBSK-005-015-650	R0.25	0,5	1,5	6	50
2KBSK-006-015-650	R0.3	0,6	1,5	6	50
2KBSK-008-020-650	R0.4	0,8	2	6	50
2KBSK-010-025-650	R0.5	1	2,5	6	50
2KBSK-012-030-650	R0.6	1,2	3	6	50
2KBSK-015-040-650	R0.75	1,5	4	6	50
2KBSK-020-060-650	R1.0	2	6	6	50
2KBSK-025-060-650	R1.25	2,5	6	6	50
2KBSK-030-080-650	R1.5	3	8	6	50
2KBSK-040-100-650	R2.0	4	10	6	50
2KBSK-050-120-650	R2.5	5	12	6	50
2KBSK-060-150-660	R3.0	7	15	6	60
2KBSK-080-200-860	R4.0	10	20	8	60
2KBSK-100-250-A70	R5.0	12	25	10	70
2KBSK-120-300-C80	R6.0	14	30	12	80
2KBLK-010-030-650	R0.5	1,5	3	6	50

2KBSK

Fresa Sferica a 2 taglienti Corta
2 Flutes Short Ball End Mills



CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length Cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KBLK-010-030-650	R0.5	1,5	3	6	50
2KBLK-015-040-650	R0.75	2	4	6	50
2KBLK-020-060-660	R1.0	3	6	6	60
2KBLK-030-080-660	R1.5	4	8	6	60
2KBLK-040-100-670	R2.0	6	10	6	70
2KBLK-050-120-680	R2.5	8	12	6	80
2KBLK-060-150-690	R3.0	9	15	6	90
2KBLK-080-200-8A0	R4.0	12	20	8	100
2KBLK-100-250-AA0	R5.0	15	25	10	100
2KBLK-120-300-CB0	R6.0	18	30	12	110

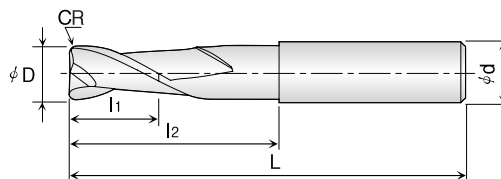


2KRRK

Fresa Torica a 2 taglienti
 2 Flutes Rib Corner Radius End Mills



- Rame e materiali non ferrosi
- *Copper and non-ferrous materials*
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain
- Rivestimento DLC
- *DLC coating*



Diametro (D)	Tolleranza (D)	Raggio R	Tolleranza
Size (D)	Tolerance (D)	Size R	Tolerance
0,4-5	0 -0,010	R0,2-R2,5	±0,005
6-12	0 -0,015	R3-R6	±0,010

CODICE	Diametro di testa (D)	Raggio Torico (CR)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Corner Radius (CR)	Length of cut (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
2KRRK-015-R02-040-445	1,5	R0.2	2,3	4	4	45
2KRRK-020-R03-060-445	2	R0.3	3	6	4	45
2KRRK-020-R03-100-445	2	R0.3	3	10	4	45
2KRRK-020-R05-060-445	2	R0.5	3	6	4	45
2KRRK-020-R05-100-445	2	R0.5	3	10	4	45
2KRRK-020-R05-140-450	2	R0.5	3	14	4	50
2KRRK-020-R10-060-445	2	R1.0	3	6	4	45
2KRRK-020-R10-100-445	2	R1.0	3	10	4	45
2KRRK-030-R05-100-650	3	R0.5	4,5	10	6	50
2KRRK-030-R05-120-650	3	R0.5	4,5	12	6	50
2KRRK-030-R05-160-660	3	R0.5	4,5	16	6	60
2KRRK-030-R05-200-660	3	R0.5	4,5	20	6	60
2KRRK-040-R05-120-650	4	R0.5	6	12	6	50
2KRRK-040-R05-160-660	4	R0.5	6	16	6	60
2KRRK-040-R05-200-660	4	R0.5	6	20	6	60
2KRRK-060-R05-180-660	6	R0.5	9	18	6	60
2KRRK-060-R10-180-660	6	R1.0	9	18	6	60
2KRRK-060-R15-180-660	6	R1.5	9	18	6	60
2KRRK-080-R05-240-865	8	R0.5	12	24	8	65
2KRRK-080-R10-240-865	8	R1.0	12	24	8	65
2KRRK-080-R15-240-865	8	R1.5	12	24	8	65
2KRRK-100-R05-300-A70	10	R0.5	15	30	10	70
2KRRK-100-R10-300-A70	10	R1.0	15	30	10	70
2KRRK-100-R15-300-A70	10	R1.5	15	30	10	70
2KRRK-120-R05-300-C80	12	R0.5	18	30	12	80
2KRRK-120-R10-300-C80	12	R1.0	18	30	12	80
2KRRK-120-R15-300-C80	12	R1.5	18	30	12	80

RHINOCEROS

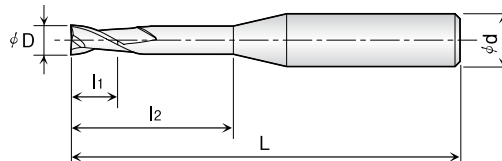


2KERK

Fresa Piana a 2 taglienti
2 Flutes Rib Flat End Mills



- Rame e materiali non ferrosi
- *Copper and non-ferrous materials*
- Ultramicrograna 4 μm
- *4 μm ultra-micro grain*
- Rivestimento DLC
- *DLC coating*



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,5-5	0 -0,010
6-12	0 -0,015

CODICE	Diametro di testa (D)	Lunghezza Elica (L ₁)	Lunghezza effettiva (L ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside diameter (D)	Shank diameter (L ₁)	Effective Length (L ₂)	Shank diameter (d)	Overall length (L)
2KERK-001-003-445	0,1	0,15	0,3	4	45
2KERK-001-005-445	0,1	0,15	0,5	4	45
2KERK-002-005-445	0,2	0,3	0,5	4	45
2KERK-002-010-445	0,2	0,3	1	4	45
2KERK-002-015-445	0,2	0,3	1,5	4	45
2KERK-002-020-445	0,2	0,3	2	4	45
2KERK-003-005-445	0,3	0,45	0,5	4	45
2KERK-003-010-445	0,3	0,45	1	4	45
2KERK-003-015-445	0,3	0,45	1,5	4	45
2KERK-003-020-445	0,3	0,45	2	4	45
2KERK-004-010-445	0,4	0,6	1	4	45
2KERK-004-020-445	0,4	0,6	2	4	45
2KERK-004-030-445	0,4	0,6	3	4	45
2KERK-004-040-445	0,4	0,6	4	4	45
2KERK-004-050-445	0,4	0,6	5	4	45
2KERK-005-020-445	0,5	0,7	2	4	45
2KERK-005-040-445	0,5	0,7	4	4	45
2KERK-005-060-445	0,5	0,7	6	4	45
2KERK-006-020-445	0,6	0,9	2	4	45
2KERK-006-040-445	0,6	0,9	4	4	45
2KERK-006-060-445	0,6	0,9	6	4	45
2KERK-008-020-445	0,8	1,2	2	4	45
2KERK-008-040-445	0,8	1,2	4	4	45
2KERK-008-060-445	0,8	1,2	6	4	45
2KERK-008-080-445	0,8	1,2	8	4	45

RHINOCEROS



2KERK

Fresa Piana a 2 taglienti
 2 Flutes Rib Flat End Mills



CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside diameter (R)	Shank diameter (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KERK-010-040-445	1	1,5	4	4	45
2KERK-010-060-445	1	1,5	6	4	45
2KERK-010-080-445	1	1,5	8	4	45
2KERK-010-100-445	1	1,5	10	4	45
2KERK-015-060-445	1,5	2,3	6	4	45
2KERK-015-080-445	1,5	2,3	8	4	45
2KERK-015-100-445	1,5	2,3	10	4	45
2KERK-015-120-445	1,5	2,3	12	4	45
2KERK-015-160-450	1,5	2,3	16	4	50
2KERK-020-060-445	2	3	6	4	45
2KERK-020-080-445	2	3	8	4	45
2KERK-020-100-445	2	3	10	4	45
2KERK-020-120-445	2	3	12	4	45
2KERK-020-140-450	2	3	14	4	50
2KERK-030-120-650	3	4,5	12	6	50
2KERK-030-160-660	3	4,5	16	6	60
2KERK-030-200-660	3	4,5	20	6	60
2KERK-040-120-650	4	6	12	6	50
2KERK-040-160-660	4	6	16	6	60
2KERK-040-200-660	4	6	20	6	60
2KERK-040-250-665	4	6	25	6	65

RHINOCEROS

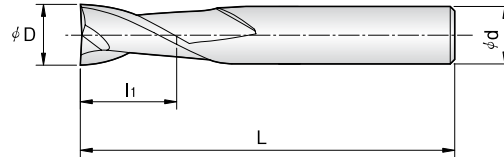


2KEPK

Fresa Piana a 2 taglienti
 2 Flutes Rib Flat End Mills



- Rame e materiali non ferrosi
- *Copper and non-ferrous materials*
- Ultramicrograna 4 μm
- *4 μm ultra-micro grain*
- Rivestimento DLC
- *DLC coating*



DLC

2

OD

30°

PAGE
No. 293

Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
0,5-5	0 -0,010
6-12	0 -0,015

CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
2KEPK-004-008-445	0,4	0,8	4	45
2KEPK-005-010-445	0,5	1	4	45
2KEPK-006-012-445	0,6	1,2	4	45
2KEPK-007-014-445	0,7	1,4	4	45
2KEPK-008-016-445	0,8	1,6	4	45
2KEPK-010-025-645	1	2,5	6	45
2KEPK-010-040-645	1	4	6	45
2KEPK-012-040-645	1,2	4	6	45
2KEPK-015-040-645	1,5	4	6	45
2KEPK-020-060-645	2	6	6	45
2KEPK-020-080-645	2	8	6	45
2KEPK-025-080-650	2,5	8	6	50
2KEPK-030-100-650	3	10	6	50
2KEPK-030-120-650	3	12	6	50
2KEPK-035-100-650	3,5	10	6	50
2KEPK-040-120-650	4	12	6	50
2KEPK-040-160-660	4	16	6	60
2KEPK-050-150-650	5	15	6	50
2KEPK-060-150-660	6	15	6	60
2KEPK-060-240-660	6	24	6	60
2KEPK-080-200-865	8	20	8	65
2KEPK-100-250-A70	10	25	10	70
2KEPK-120-300-C80	12	30	12	80

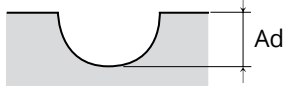
RHINOCEROS



2KBRD

Fresatura in alta velocità
High Speed Milling Condition

	Rame - Copper Alloys		
Raggio di testa	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
R0.05	0.003~0.010	38,000~50,000	50~100
R0.1	0.010~0.020	38,000~50,000	200~500
R0.15	0.010~0.025	38,000~50,000	300~800
R0.2	0.010~0.030	30,000~42,000	300~1,000
R0.25	0.010~0.030	30,000~42,000	500~1,400
R0.3	0.010~0.100	24,000~40,000	350~1,600
R0.4	0.030~0.100	20,000~40,000	450~2,000
R0.5	0.050~0.200	20,000~40,000	800~3,000
R0.75	0.100~0.300	18,000~30,000	1,200~3,000
R1.0	0.100~0.400	12,000~20,000	1,200~3,000
R1.5	0.200~0.500	16,000~20,000	1,800~4,000
R2.0	0.300~0.500	16,000~20,000	2,100~4,000

Profondità di taglio Depth of Cut	
--------------------------------------	--



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KBSK

Fresatura in alta velocità
High Speed Milling Condition

	Rame - Copper Alloys		
Raggio di testa	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Radius of Ball Nose	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
R0.2	0.010~0.030	30,000~42,000	300~1,000
R0.25	0.010~0.030	30,000~42,000	500~1,400
R0.3	0.010~0.100	24,000~40,000	350~1,600
R0.4	0.030~0.100	20,000~40,000	450~2,000
R0.5	0.050~0.200	20,000~40,000	800~3,000
R0.75	0.100~0.300	18,000~30,000	1,200~3,000
R1.0	0.100~0.400	12,000~20,000	1,200~3,000
R1.5	0.200~0.500	16,000~20,000	1,800~4,000
R2.0	0.300~0.500	16,000~20,000	2,100~4,000
R3.0	0.300~0.600	13,300~20,000	1,600~4,000
R4.0	0.300~0.800	10,000~16,000	1,400~3,200
R5.0	0.300~1.000	8,000~12,800	1,280~3,000
R6.0	0.300~1.200	6,600~10,000	1,190~2,660

Profondità di taglio Depth of Cut	$Pf \leq 0.6D$
--------------------------------------	----------------------------------



ATTENZIONE - WARNING

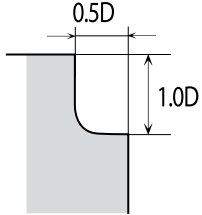
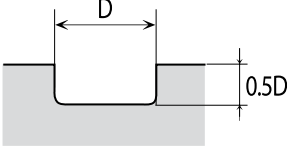
1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KRRRK

Fresatura in alta velocità
High Speed Milling Condition

Diametro di testa	Rame - Copper		Velocità (min ⁻¹)	Avanzamento (mm/min)
	Velocità (min ⁻¹)	Avanzamento (mm/min)		
<i>Outside Diameter</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>
2.0	15,000~25,000	3,000	15,000~25,000	1,500
3.0	15,000~25,000	3,200	15,000~25,000	1,600
4.0	15,000~25,000	3,500	15,000~25,000	1,800
6.0	10,000~20,000	4,000	10,000~20,000	2,000
8.0	7,000~15,000	4,000	7,000~15,000	2,000
10.0	5,000~13,000	4,500	5,000~13,000	2,200
12.0	3,000~9,000	4,500	3,000~9,000	2,200

Profondità di taglio <i>Depth of Cut</i>				



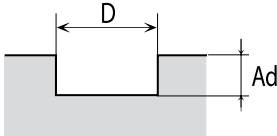
ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KERK

Fresatura in alta velocità
High Speed Milling Condition

Rame - Copper			
Diametro di testa	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
<i>Outside Diameter</i>	<i>Depth of Cut Ad(mm)</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>
0.1	0.001~0.005	39,000~50,000	50~100
0.2	0.002~0.006	39,000~50,000	300~450
0.3	0.003~0.008	39,000~50,000	350~550
0.4	0.004~0.010	39,000~50,000	390~620
0.5	0.005~0.020	34,000~50,000	430~800
0.6	0.005~0.030	34,000~50,000	400~980
0.8	0.007~0.040	21,000~42,000	420~1,170
1.0	0.009~0.060	17,000~34,000	430~1,200
1.5	0.025~0.070	15,000~22,000	500~1,100
2.0	0.025~0.070	10,000~17,000	500~1,100
3.0	0.050~0.110	7,000~11,000	600~1150
4.0	0.060~0.150	5,000~8,500	630~1,200
Profondità di taglio <i>Depth of Cut</i>			



ATTENZIONE - WARNING

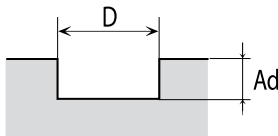
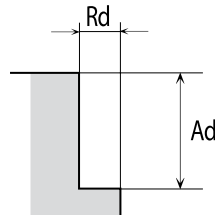
1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KEPK

Fresatura in alta velocità
 High Speed Milling Condition

RHINOCEROS

Rame - Copper				
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
0.4	30,000~40,000	100	30,000~40,000	80
0.5	28,000~35,000	120	28,000~35,000	100
0.6	27,000~33,000	150	23,000~28,000	120
0.8	20,000~25,000	180	18,000~24,000	150
1	15,000~20,000	180	14,000~20,000	150
1.2	14,000~20,000	200	10,000~15,000	150
1.5	14,000~20,000	250	10,000~15,000	150
2	13,000~18,000	320	5,000~10,000	150
2.5	13,000~18,000	420	5,000~10,000	150
3.0	12,000~17,000	600	4,000~8,000	170
4.0	10,000~15,000	650	4,000~8,000	200
5.0	8,000~12,000	700	4,000~8,000	250
6.0	5,000~10,000	750	3,500~7,000	250
8.0	4,000~9,000	650	3,000~6,000	250
10.0	4,000~8,000	600	3,000~6,000	350
12.0	3,000~6,000	500	3,000~6,000	450
Profondità di taglio Depth of Cut	 Ad=1.5D, Rd=0.02D (D ≤ Ø1) Ad=1.5D, Rd=0.10D (D > Ø1)		 Ad=0.05D (D ≤ Ø1) Ad=0.10D (D > Ø1)	



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.





BHARAL *SERIES*





TUTTI I TIPI ALL TYPE

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)
ALL	-0.005 ~ -0.015

- Progettata per lavorazione Alluminio, Leghe Alluminio, Resine e ABS
- Vano Gola Rettificato e Lappato per migliore evacuazione truciolo
- Varie geometrie e lunghezze per ogni applicazione

- *Aluminum and Aluminum alloy.*
- *Excellent surface clean and chip disposal*
- *Variety of cutting length and overall length*

- *Entwickelt für die Bearbeitung von Aluminium, Aluminiumlegierungen, Harzen und ABS*
- *Rektifiziertes und geläpptes Rillenfach für eine bessere Spanabfuhr*
- *Verschiedene Geometrien und Längen für jede Anwendung*

1KELA

Fresa Piana a 1 tagliente
 1 Flutes Flat End Mills

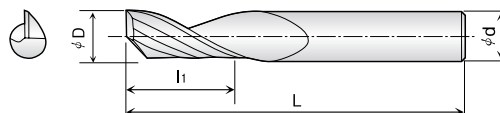
- Alluminio, Leghe Alluminio, Resine e ABS
- Aluminum, Aluminum alloys, Resins and ABS
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain

NON

1

OD

30°

 PAGE
 No. 294


Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
All	-0,005 -0,015

CODICE	Diametro (D)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
1KELA-005-010-440	0,5	1	4	40
1KELA-006-012-440	0,6	1,2	4	40
1KELA-007-014-440	0,7	1,4	4	40
1KELA-008-016-440	0,8	1,6	4	40
1KELA-009-018-440	0,9	1,8	4	40
1KELA-010-030-645	1	3	6	45
1KELA-010-040-645	1	4	6	45
1KELA-010-050-645	1	5	6	45
1KELA-010-060-650	1	6	6	50
1KELA-015-040-645	1,5	4	6	45
1KELA-015-060-650	1,5	6	6	50
1KELA-015-080-650	1,5	8	6	50
1KELA-015-100-650	1,5	10	6	50
1KELA-020-060-650	2	6	6	50
1KELA-020-080-650	2	8	6	50
1KELA-020-100-650	2	10	6	50
1KELA-020-120-650	2	12	6	50
1KELA-030-080-650	3	8	6	50
1KELA-030-100-650	3	10	6	50
1KELA-030-120-650	3	12	6	50
1KELA-030-160-650	3	16	6	50
1KELA-040-120-650	4	12	6	50
1KELA-040-160-650	4	16	6	50
1KELA-040-210-660	4	21	6	60

BHARAL

1KELA

Fresa Piana a 1 tagliente
 1 Flutes Flat End Mills



CODICE	Diametro (D)	Lunghezza Elica (l _e)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (l _e)	Shank diameter (d)	Overall length (L)
1KELA-050-160-660	5	16	6	60
1KELA-050-210-660	5	21	6	60
1KELA-050-260-660	5	26	6	60
1KELA-060-160-660	6	16	6	60
1KELA-060-210-660	6	21	6	60
1KELA-060-260-665	6	26	6	65
1KELA-060-320-670	6	32	6	70
1KELA-080-210-870	8	21	8	70
1KELA-080-260-875	8	26	8	75
1KELA-080-320-880	8	32	8	80
1KELA-080-360-890	8	36	8	90
1KELA-100-260-A75	10	26	10	75
1KELA-100-320-A80	10	32	10	80
1KELA-120-260-C80	12	26	12	80
1KELA-120-360-C90	12	36	12	90

BHARAL



2KELA

Fresa Piana a 2 taglienti 45°
 2 Flutes 45° Helix End Mills

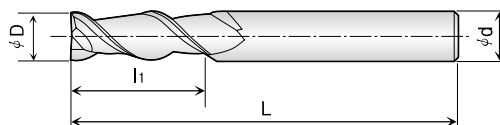
- Alluminio, Leghe Alluminio, Resine e ABS
- *Aluminum, Aluminum alloys, Resins and ABS*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*

NON

2

OD

45°

 PAGE
 No. 295


Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
All	-0,005 -0,015

CODICE	Diametro (D)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
2KELA-010-030-650	1	3	6	50
2KELA-010-060-660	1	6	6	60
2KELA-012-040-650	1,2	4	6	50
2KELA-015-060-650	1,5	6	6	50
2KELA-015-080-660	1,5	8	6	60
2KELA-020-060-650	2	6	6	50
2KELA-020-100-660	2	10	6	60
2KELA-025-120-660	2,5	12	6	60
2KELA-030-120-660	3	12	6	60
2KELA-030-150-665	3	15	6	65
2KELA-040-140-660	4	14	6	60
2KELA-040-160-665	4	16	6	65
2KELA-050-170-660	5	17	6	60
2KELA-050-220-660	5	22	6	60
2KELA-060-170-660	6	17	6	60
2KELA-060-220-660	6	22	6	60
2KELA-070-230-865	7	23	8	65
2KELA-080-230-870	8	23	8	70
2KELA-080-310-880	8	31	8	80
2KELA-100-280-A75	10	28	10	75
2KELA-100-360-A90	10	36	10	90
2KELA-120-330-C80	12	33	12	80
2KELA-120-410-CA0	12	41	12	100
2KELA-120-450-CA0	12	45	12	100

BHARAL



2KELA

Fresa Piana a 2 taglienti 45°
2 Flutes 45° Helix End Mills



CODICE	Diametro (D)	Lunghezza Elica (L _e)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (L _e)	Shank diameter (d)	Overall length (L)
2KELA-140-380-E90	14	38	14	90
2KELA-160-450-GA0	16	45	16	100
2KELA-160-530-GB0	16	53	16	110
2KELA-180-490-IA0	18	49	18	100
2KELA-200-500-KA0	20	50	20	100
2KELA-200-550-KB0	20	55	20	110
2KELA-250-500-PC0	25	50	25	120

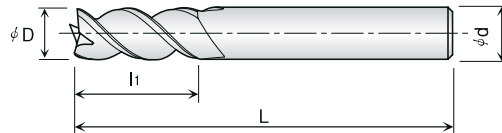
BHARAL



3KELA

Fresa Piana a 3 taglienti 45°
3 Flutes 45° Helix End Mills

- Alluminio, Leghe Alluminio, Resine e ABS
- *Aluminum, Aluminum alloys, Resins and ABS*
- Ultramicrograna 4 µm
- *4 µm ultra-micro grain*



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
All	-0,005 -0,015

CODICE	Diametro (D)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
3KELA-010-020-640	1	2	6	40
3KELA-010-025-640	1	2,5	6	40
3KELA-010-030-650	1	3	6	50
3KELA-010-040-660	1	4	6	60
3KELA-010-060-660	1	6	6	60
3KELA-012-040-650	1,2	4	6	50
3KELA-015-030-640	1,5	3	6	40
3KELA-015-050-650	1,5	5	6	50
3KELA-015-060-660	1,5	6	6	60
3KELA-015-080-660	1,5	8	6	60
3KELA-015-100-660	1,5	10	6	60
3KELA-020-030-640	2	3	6	40
3KELA-020-060-650	2	6	6	50
3KELA-020-080-660	2	8	6	60
3KELA-020-100-660	2	10	6	60
3KELA-020-120-660	2	12	6	60
3KELA-025-080-640	2,5	8	6	40
3KELA-025-100-660	2,5	10	6	60
3KELA-025-120-660	2,5	12	6	60
3KELA-030-040-645	3	4	6	45
3KELA-030-080-645	3	8	6	45
3KELA-030-110-660	3	11	6	60
3KELA-030-150-665	3	15	6	65
3KELA-030-200-670	3	20	6	70

BHARAL

3KELA

Fresa Piana a 3 taglienti 45°
 3 Flutes 45° Helix End Mills



CODICE	Diametro (D)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
3KELA-030-250-675	3	25	6	75
3KELA-030-300-680	3	30	6	80
3KELA-035-120-660	3,5	12	6	60
3KELA-040-050-645	4	5	6	45
3KELA-040-080-645	4	8	6	45
3KELA-040-110-645	4	11	6	45
3KELA-040-130-660	4	13	6	60
3KELA-040-160-665	4	16	6	65
3KELA-040-200-670	4	20	6	70
3KELA-040-260-675	4	26	6	75
3KELA-040-300-680	4	30	6	80
3KELA-045-150-660	4,5	15	6	60
3KELA-050-060-645	5	6	6	45
3KELA-050-170-660	5	17	6	60
3KELA-050-220-660	5	22	6	60
3KELA-050-250-670	5	25	6	70
3KELA-050-300-675	5	30	6	75
3KELA-050-350-680	5	35	6	80
3KELA-050-400-685	5	40	6	85
3KELA-050-450-690	5	45	6	90
3KELA-055-170-660	5,5	17	6	60
3KELA-060-070-650	6	7	6	50
3KELA-060-130-650	6	13	6	50
3KELA-060-170-660	6	17	6	60
3KELA-060-220-660	6	22	6	60
3KELA-060-250-670	6	25	6	70
3KELA-060-300-675	6	30	6	75
3KELA-060-350-680	6	35	6	80
3KELA-060-420-690	6	42	6	90
3KELA-060-500-6A0	6	50	6	100
3KELA-070-220-865	7	22	8	65
3KELA-080-090-860	8	9	8	60
3KELA-080-190-860	8	19	8	60
3KELA-080-220-870	8	22	8	70

BHARAL



3KELA

Fresa Piana a 3 taglienti 45°
3 Flutes 45° Helix End Mills



CODICE	Diametro (D)	Lunghezza Elica (l _e)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Lenght of cut (l _e)	Shank diameter (d)	Overall lenght (L)
3KELA-080-280-880	8	28	8	80
3KELA-080-300-880	8	30	8	80
3KELA-080-350-885	8	35	8	85
3KELA-080-400-890	8	40	8	90
3KELA-080-450-895	8	45	8	95
3KELA-080-500-8A0	8	50	8	100
3KELA-080-550-8B0	8	55	8	110
3KELA-080-660-8B0	8	66	8	110
3KELA-090-270-A70	9	27	10	70
3KELA-100-110-A65	10	11	10	65
3KELA-100-220-A65	10	22	10	65
3KELA-100-270-A75	10	27	10	75
3KELA-100-320-A90	10	32	10	90
3KELA-100-350-A90	10	35	10	90
3KELA-100-400-A90	10	40	10	90
3KELA-100-450-AA0	10	45	10	100
3KELA-100-500-AA0	10	50	10	100
3KELA-100-550-AB0	10	55	10	110
3KELA-100-600-AB0	10	60	10	110
3KELA-100-650-AC0	10	65	10	120
3KELA-120-130-C70	12	13	12	70
3KELA-120-260-C70	12	26	12	70
3KELA-120-320-C80	12	32	12	80
3KELA-120-400-CA0	12	40	12	100
3KELA-120-450-CA0	12	45	12	100
3KELA-120-500-CA0	12	50	12	100
3KELA-120-550-CB0	12	55	12	110
3KELA-120-600-CB0	12	60	12	110
3KELA-120-650-CC0	12	65	12	120
3KELA-120-700-CC0	12	70	12	120
3KELA-120-750-CE0	12	75	12	140
3KELA-140-370-E90	14	37	14	90
3KELA-140-370-G90	14	37	16	90
3KELA-160-180-G90	16	18	16	90

BHARAL



3KELA

Fresa Piana a 3 taglienti 45°
 3 Flutes 45° Helix End Mills



CODICE	Diametro (D)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Outside Diameter (D)</i>	<i>Lenght of cut (l₁)</i>	<i>Shank diameter (d)</i>	<i>Overall lenght (L)</i>
3KELA-160-320-G90	16	32	16	90
3KELA-160-420-GA0	16	42	16	100
3KELA-160-520-GB0	16	52	16	110
3KELA-160-550-GB0	16	55	16	110
3KELA-160-650-GD0	16	65	16	130
3KELA-160-750-GF0	16	75	16	150
3KELA-180-450-IA0	18	45	18	100
3KELA-200-1250-KM0	20	125	20	220
3KELA-200-230-K90	20	23	20	90
3KELA-200-380-K90	20	38	20	90
3KELA-200-480-KA0	20	48	20	100
3KELA-200-550-KB0	20	55	20	110
3KELA-200-650-KD0	20	65	20	130
3KELA-200-750-KF0	20	75	20	150
3KELA-250-500-PC0	25	50	25	120

BHARAL

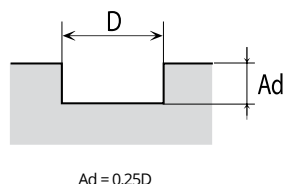


2KRRK

Fresatura
Milling Condition

	Alluminio/Plastica - Acrylic, Aluminium		Lega non ferrosa - Alloy Steels, Cast Iron	
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
1.0	30,000~35,000	1,500~2,000	25,000~30,000	1,500~2,000
2.0	28,000~32,000	1,800~2,300	20,000~25,000	1,300~1,800
3.0	22,000~26,000	2,200~2,500	16,000~20,000	1,500~2,000
4.0	18,000~22,000	2,200~2,500	13,000~18,000	1,500~2,000
6.0	12,000~15,000	2,200~2,500	8,000~12,000	1,500~2,000
8.0	8,000~12,000	2,300~2,700	6,000~9,000	1,800~2,200
10.0	7,000~9,000	2,300~2,700	5,000~8,000	1,800~2,200
12.0	6,000~8,500	2,300~2,700	4,000~7,000	1,800~2,200

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KELA

Fresatura
Milling Condition

	Alluminio/Plastica - Acrylic, Aluminium		Lega non ferrosa - Alloy Steels, Cast Iron	
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
1.0	15,000~20,000	700~1,000	15,000~20,000	500~800
1.5	15,000~20,000	700~1,000	10,000~15,000	500~800
2.0	10,000~15,000	700~1,000	10,000~15,000	400~700
3.0	8,000~12,000	800~1,200	8,000~12,000	400~700
4.0	8,000~12,000	1,000~1,300	8,000~12,000	800~1,200
6.0	8,000~12,000	1,200~1,500	8,000~12,000	1,000~1,500
8.0 6	,500~9,000	1,500~2,000	6,500~9,000	1,200~1,600
10.0	6,500~9,000	1,800~2,300	6,500~9,000	1,500~2,000
12.0	6,000~8,500	2,000~2,500	6,000~8,500	2,000~2,500
14.0	5,500~8,000	2,000~2,500	5,500~8,000	1,500~2,000
16.0	5,000~8,000	2,300~2,700	5,000~8,000	1,500~2,000
18.0	3,500~5,000	1,800~2,300	3,500~5,000	1,300~1,800
20.0	3,500~5,000	1,800~2,300	3,500~5,000	1,300~1,800

Profondità di taglio Depth of Cut	Ad = 0.5D	Ad = 1.0D, Rd = 0.25D (D ≤ Ø10) Ad = 1.0D, Rd = 0.5D (D ≤ Ø20)



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

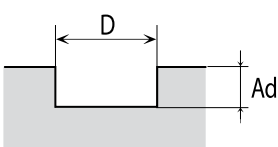
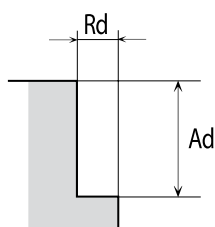
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



3KELA

Fresatura
Milling Condition

	Alluminio/Plastica - Acrylic, Aluminium		Alluminio/Plastica - Acrylic, Aluminium	
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
1.0	15,000~20,000	400~800 1	5,000~20,000	800~1,200
1.5	10,000~15,000	400~800	10,000~15,000	800~1,200
2.0	8,000~12,000	300~700	8,000~12,000	600~1,000
3.0	6,500~9,000	300~700	6,500~9,000	300~700
4.0	6,500~9,000	300~700	6,500~9,000	300~700
6.0	6,500~9,000	500~800	6,500~9,000	600~1,000
8.0	5,000~8,000	600~1,000	5,000~8,000	600~1,000
10.0	5,000~8,000	600~1,000	5,000~8,000	800~1,200
12.0	5,000~8,000	800~1,200	5,000~8,000	600~1,000
14.0	3,500~5,000	800~1,200	3,500~5,000	800~1,200
16.0	3,500~5,000	800~1,200	3,500~5,000	800~1,200
18.0	2,500~4,000	600~1,000	2,500~4,000	800~1,200
20.0	2,500~4,000	600~1,000	2,500~4,000	800~1,200

Profondità di taglio Depth of Cut	 Ad = 0.2D	 Ad=0.15D Rd=1.0~2.5D



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



ELAND *SERIES*





KOBOL
D



TUTTI I TIPI ALL TYPE

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)
ALL	-0.005 ~ -0.020

- Frese progettate per Polimeri Termoplastici, ABS, Resina, Plastica
- Progettata con Design geometrico per perfetto controllo e evacuazione truciolo
- Vano gola tagliente affilato per avanzamenti rapidi
- Spoglia rinforzata per lavorazioni di precisione
- *Cutters designed for Thermoplastic Polymers, ABS, Resin, Plastic*
- *Designed with geometric design for perfect chip control and evacuation*
- *Sharp cutting throat compartment for fast feeds*
- *Reinforced strip for precision machining*
- *Schneider für thermoplastische Polymere, ABS, Harz, Kunststoff*
- *Entwickelt mit geometrischem Design für perfekte Spankontrolle und -abfuhr*
- *Rillenfach mit scharfen Kanten für schnelles Einziehen*
- *Verstärkter Rechen für Präzisionsbearbeitung*

2KBRM

Fresa Sferica a 2 Taglienti
 2 Flutes Rib Ball End Mills



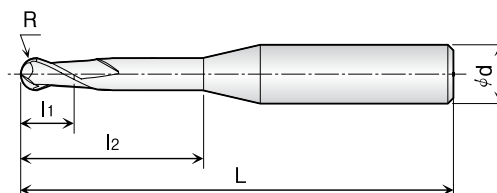
- Polimeri Termoplastici, ABS, Resina, Plastica
- *Thermoplastic Polymers, ABS, Resin, Plastic*
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain

NON

2

R

30°

 PAGE
 No. 297


Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
All	-0,005 -0,020

CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length Cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KBRM-002-010-345	R0.1	0,4	1	3	45
2KBRM-002-015-345	R0.1	0,4	1,5	3	45
2KBRM-002-020-345	R0.1	0,4	2	3	45
2KBRM-003-015-345	R0.15	1	1,5	3	45
2KBRM-003-020-345	R0.15	1	2	3	45
2KBRM-003-025-345	R0.15	1	2,5	3	45
2KBRM-003-030-345	R0.15	1	3	3	45
2KBRM-004-030-345	R0.2	1,2	3	3	45
2KBRM-005-050-350	R0.25	1,5	5	3	50
2KBRM-006-060-350	R0.3	3	6	3	50
2KBRM-007-070-350	R0.35	3	7	3	50
2KBRM-008-080-350	R0.4	4	8	3	50
2KBRM-009-100-350	R0.45	4	10	3	50
2KBRM-010-060-660	R0.5	3	6	6	60
2KBRM-010-070-660	R0.5	3	7	6	60
2KBRM-010-100-365	R0.5	5	10	3	65
2KBRM-010-100-660	R0.5	5	10	6	60
2KBRM-010-150-365	R0.5	5	15	3	65
2KBRM-010-200-380	R0.5	5	20	3	80
2KBRM-010-250-380	R0.5	5	25	3	80
2KBRM-015-100-660	R0.75	5	10	6	60
2KBRM-015-150-380	R0.75	10	15	3	80
2KBRM-015-150-660	R0.75	10	15	6	60
2KBRM-015-200-380	R0.75	10	20	3	80
2KBRM-015-250-380	R0.75	10	25	3	80

ELAND



2KBRM

Fresa Sferica a 2 Taglienti
2 Flutes Rib Ball End Mills

NON

2

R

30°

PAGE
No. 297

CODICE	Raggio di testa (R)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length Cut (l ₁)	Effective Lenght (l ₂)	Shank diameter (d)	Overall lenght (L)
2KBRM-020-100-665	R1.0	5	10	6	65
2KBRM-020-150-380	R1.0	10	15	3	80
2KBRM-020-150-665	R1.0	10	15	6	65
2KBRM-020-200-380	R1.0	10	20	3	80
2KBRM-020-250-380	R1.0	10	25	3	80
2KBRM-020-300-380	R1.0	10	30	3	80
2KBRM-025-200-380	R1.25	15	20	3	80
2KBRM-030-150-680	R1.5	8	15	6	80
2KBRM-040-250-680	R2.0	20	25	6	80
2KBRM-040-300-680	R2.0	20	30	6	80
2KBRM-040-400-6A0	R2.0	20	40	6	100



2KBMM

Fresa Sferica a 2 Taglienti
 2 Flutes Rib Ball End Mills



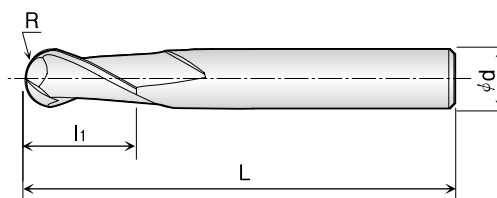
- Polimeri Termoplastici, ABS, Resina, Plastica
- *Thermoplastic Polymers, ABS, Resin, Plastic*
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain

NON

2

R

30°

 PAGE
 No. 297


	Diametro (D)	Tolleranza (D)		
	Size (D)	Tolerance (D)		
	All	-0,005 -0,020		
CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
2KBMM-003-010-345	R0.15	1	3	45
2KBMM-004-012-345	R0.2	1,2	3	45
2KBMM-004-020-345	R0.2	2	3	45
2KBMM-005-015-350	R0.25	1,5	3	50
2KBMM-005-020-350	R0.25	2	3	50
2KBMM-006-030-350	R0.3	3	3	50
2KBMM-007-030-350	R0.35	3	3	50
2KBMM-008-040-350	R0.4	4	3	50
2KBMM-009-040-350	R0.45	4	3	50
2KBMM-010-050-365	R0.5	5	3	65
2KBMM-015-100-380	R0.75	10	3	80
2KBMM-020-100-380	R1.0	10	3	80
2KBMM-025-100-380	R1.25	10	3	80
2KBMM-025-150-380	R1.25	15	3	80
2KBMM-030-100-365	R1.5	10	3	65
2KBMM-030-200-380	R1.5	20	3	80
2KBMM-030-200-3A0	R1.5	20	3	100
2KBMM-040-200-480	R2.0	20	4	80
2KBMM-040-200-4A0	R2.0	20	4	100
2KBMM-040-200-680	R2.0	20	6	80
2KBMM-050-300-5A0	R2.5	30	5	100
2KBMM-050-300-5C0	R2.5	30	5	120
2KBMM-060-250-690	R3.0	25	6	90
2KBMM-060-300-6A0	R3.0	30	6	100
2KBMM-060-400-6C0	R3.0	40	6	120

ELAND



2KBMM

Fresa Sferica a 2 Taglienti
2 Flutes Rib Ball End Mills



CODICE	Raggio di testa (R)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of ball Nose (R)	Lenght of cut (L ₁)	Shank diameter (d)	Overall lenght (L)
2KBMM-060-400-6F0	R3.0	40	6	150
2KBMM-080-450-8C0	R4.0	45	8	120
2KBMM-080-450-8F0	R4.0	45	8	150
2KBMM-100-500-AC0	R5.0	50	10	120
2KBMM-100-500-AF0	R5.0	50	10	150
2KBMM-120-500-CC0	R6.0	50	12	120
2KBMM-120-500-CF0	R6.0	50	12	150

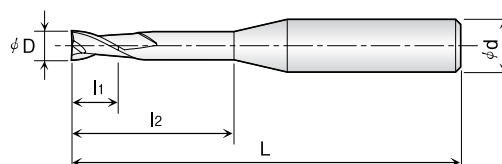


2KERM

Fresa Piana a 2 Taglienti
 2 Flutes Rib Square End Mills



- Polimeri Termoplastici, ABS, Resina, Plastica
- *Thermoplastic Polymers, ABS, Resin, Plastic*
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
All	-0,005 -0,020

CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (l ₁)	Effective Length (l ₂)	Shank diameter (d)	Overall length (L)
2KERM-002-010-345	0,2	0,4	1	3	45
2KERM-002-015-345	0,2	0,4	1,5	3	45
2KERM-002-020-345	0,2	0,4	2	3	45
2KERM-003-015-345	0,3	1	1,5	3	45
2KERM-003-020-345	0,3	1	2	3	45
2KERM-003-025-345	0,3	1	2,5	3	45
2KERM-003-030-345	0,3	1	3	3	45
2KERM-004-030-345	0,4	1,2	3	3	45
2KERM-005-050-350	0,5	2	5	3	50
2KERM-006-060-350	0,6	3	6	3	50
2KERM-007-070-350	0,7	3	7	3	50
2KERM-008-080-350	0,8	4	8	3	50
2KERM-009-090-350	0,9	4	9	3	50
2KERM-010-050-660	1	2,5	5	6	60
2KERM-010-100-365	1	5	10	3	65
2KERM-010-100-660	1	5	10	6	60
2KERM-010-150-365	1	5	15	3	65
2KERM-010-200-380	1	5	20	3	80
2KERM-010-250-380	1	5	25	3	80
2KERM-015-100-660	1,5	5	10	6	60
2KERM-015-150-380	1,5	10	15	3	80
2KERM-015-150-660	1,5	10	15	6	60
2KERM-015-200-380	1,5	10	20	3	80
2KERM-020-100-660	2	5	10	6	60
2KERM-020-150-380	2	10	15	3	80



2KERM

Fresa Piana a 2 Taglienti
 2 Flutes Rib Square End Mills



CODICE	Diametro di testa (D)	Lunghezza Elica (l ₁)	Lunghezza effettiva (l ₂)	Diametro Gambo (d)	Lunghezza totale (L)
<i>Model Nr.</i>	<i>Outside Diameter (D)</i>	<i>Length of cut (l₁)</i>	<i>Effective Length (l₂)</i>	<i>Shank diameter (d)</i>	<i>Overall length (L)</i>
2KERM-020-150-660	2	10	15	6	60
2KERM-020-200-380	2	10	20	3	80
2KERM-020-250-380	2	10	25	3	80
2KERM-020-300-380	2	10	30	3	80
2KERM-025-200-380	2,5	15	20	3	80
2KERM-030-150-680	3	10	15	6	80

ELAND

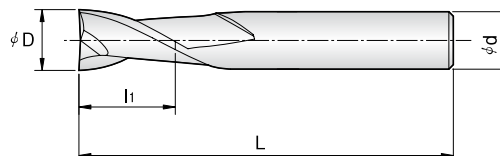


2KEMM

Fresa Piana a 2 Taglienti
2 Flutes Rib Square End Mills



- Polimeri Termoplastici, ABS, Resina, Plastica
- *Thermoplastic Polymers, ABS, Resin, Plastic*
- Ultramicrograna 4 µm
- 4 µm ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
All	-0,005 -0,020

CODICE	Diametro di testa (D)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
2KEMM-003-010-345	0,3	1	3	45
2KEMM-003-018-345	0,3	1,8	3	45
2KEMM-004-012-345	0,4	1,2	3	45
2KEMM-004-020-345	0,4	2	3	45
2KEMM-005-015-350	0,5	1,5	3	50
2KEMM-005-020-350	0,5	2	3	50
2KEMM-006-030-350	0,6	3	3	50
2KEMM-007-030-350	0,7	3	3	50
2KEMM-008-040-350	0,8	4	3	50
2KEMM-009-040-350	0,9	4	3	50
2KEMM-010-050-365	1	5	3	65
2KEMM-015-100-380	1,5	10	3	80
2KEMM-020-100-380	2	10	3	80
2KEMM-025-150-380	2,5	15	3	80
2KEMM-030-100-365	3	10	3	65
2KEMM-030-100-665	3	10	6	65
2KEMM-030-200-380	3	20	3	80
2KEMM-030-200-3A0	3	20	3	100
2KEMM-030-200-3C0	3	20	3	120
2KEMM-040-200-480	4	20	4	80
2KEMM-040-200-4A0	4	20	4	100
2KEMM-040-250-4C0	4	25	4	120
2KEMM-050-300-5A0	5	30	5	100
2KEMM-050-300-5C0	5	30	5	120
2KEMM-060-250-680	6	25	6	80

ELAND



2KEMM

Fresa Piana a 2 Taglienti
2 Flutes Rib Square End Mills



CODICE	Diametro di testa (D)	Lunghezza Elica (L _e)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (L _e)	Shank diameter (d)	Overall length (L)
2KEMM-060-300-680	6	30	6	80
2KEMM-060-400-6A0	6	40	6	100
2KEMM-060-400-6C0	6	40	6	120
2KEMM-060-400-6F0	6	40	6	150
2KEMM-080-350-8A0	8	35	8	100
2KEMM-080-450-8C0	8	45	8	120
2KEMM-080-450-8G0	8	45	8	160
2KEMM-100-400-AA0	10	40	10	100
2KEMM-100-500-AC0	10	50	10	120
2KEMM-100-500-AG0	10	50	10	160
2KEMM-120-400-CA0	12	40	12	100
2KEMM-120-500-CC0	12	50	12	120
2KEMM-120-500-CG0	12	50	12	160

ELAND

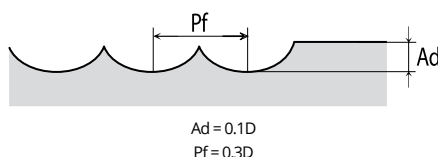


2KBRM & 2KBMM

Fresatura in alta velocità
High Speed Milling Condition

	Plastica , ABS - ABS, Acrylic		Alluminio/Plastica - Aluminium Alloys	
Raggio di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
<i>Radius of Ball Nose</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>	<i>Speed (min⁻¹)</i>	<i>Feed (mm/min)</i>
R0.1	20,000	200	17,500	500
R0.15	20,000	300	17,500	800
R0.2	20,000	300	16,000	1,000
R0.25	19,000	500	16,000	1,400
R0.3	19,000	500	16,000	1,600
R0.4	19,000	500	16,000	2,000
R0.5	18,000	800	15,000	3,000
R0.75	18,000	1,200	14,000	3,000
R1.0	16,000	1,200	13,000	3,000
R1.5	16,000	1,800	10,000	4,000
R2.0	15,000	2,100	8,500	4,000
R3.0	10,000	1,600	7,000	4,000
R4.0	7,000	1,400	6,000	3,200
R5.0	5,500	1,300	4,500	3,000
R6.0	4,500	1,200	3,500	2,700

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

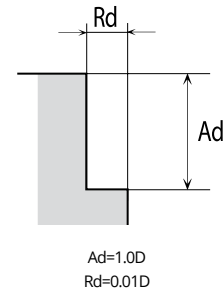
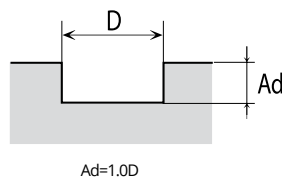
1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KERM & 2KEMM

Fresatura in alta velocità
High Speed Milling Condition

	Plastica , ABS - ABS, Acrylic		Alluminio/Plastica - Aluminium Alloys		Plastica , ABS - ABS, Acrylic		Alluminio/Plastica - Aluminium Alloys	
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
0.2	17,500	110	17,500	220	20,000	210	17,500	120
0.3	17,500	120	17,500	240	20,000	260	17,500	140
0.4	16,000	120	16,000	240	20,000	340	16,000	140
0.5	16,000	125	16,000	250	19,000	410	16,000	160
0.6	16,000	140	16,000	280	19,000	520	16,000	260
0.8	16,000	180	16,000	360	19,000	680	16,000	350
1.0	15,000	250	15,000	500	18,000	850	15,000	400
1.5	14,000	350	14,000	700	18,000	900	14,000	430
2.0	13,000	380	13,000	760	16,000	1,000	13,000	500
3.0	10,000	380	10,000	760	16,000	1,000	10,000	500
4.0	8,500	370	8,500	740	15,000	1,000	8,500	360
6.0	7,000	250	7,000	500	10,000	750	7,000	270
8.0	6,000	200	6,000	400	7,000	550	6,000	220
10.0	4,500	150	4,500	300	5,500	430	4,500	200
12.0	3,500	130	3,500	260	4,500	320	3,500	180

Profondità di taglio
Depth of Cut



ELAND



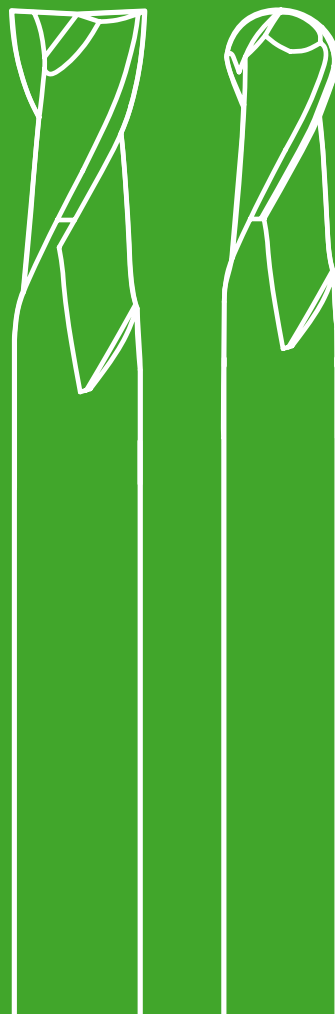
ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



YAK *SERIES*





KOBO



TUTTI I TIPI ALL TYPE

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)
ALL	-0.005 ~ -0.020

- Adatta per lavorazione acciai dolci e materiali non ferrosi
- Tagliente affilato per lavorazioni ad alta velocità
- Eccellente qualità di finitura

- *Mild steel and non-ferrous materials*
- *Sharp cutting edge for high speed cutting*
- *Excellent finishing quality*

- *Geeignet für die Bearbeitung von Weichstählen und NE-Werkstoffen*
- *Scharfe Kante für Hochgeschwindigkeitsbearbeitung*
- *Hervorragende Oberflächenqualität*

2KBGM

Fresa Sferica a 2 Taglienti
2 Flutes Ball End Mills



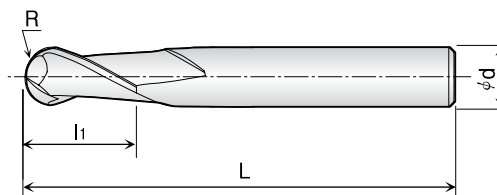
- Adatta per lavorazione ACCIAI DOLCI con basso tenore di Carbonio e materiali Non Ferrosi
- Suitable for processing SOFT STEELS with low carbon content and Non-ferrous materials
- Ultramicrograna 6 μm
- 6 μm ultra-micro grain

NON

2

R

30°

 PAGE
No. 299


Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
All	-0,005 -0,020

CODICE	Raggio di Testa (R)	Lunghezza Elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Radius of Ball Nose (R)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
2KBGM-010-020-650	R0.5	2	6	50
2KBGM-015-040-650	R0.75	4	6	50
2KBGM-020-050-660	R1.0	5	6	60
2KBGM-025-060-660	R1.25	6	6	60
2KBGM-030-080-660	R1.5	8	6	60
2KBGM-035-080-660	R1.75	8	6	60
2KBGM-040-080-670	R2.0	8	6	70
2KBGM-045-080-670	R2.25	8	6	70
2KBGM-050-100-680	R2.5	10	6	80
2KBGM-055-100-690	R2.75	10	6	90
2KBGM-060-120-690	R3.0	12	6	90
2KBGM-080-140-8A0	R4.0	14	8	100
2KBGM-100-180-AA0	R5.0	18	10	100
2KBGM-120-220-CB0	R6.0	22	12	110

YAK



2KEGM

Fresa Piana a 2 Taglienti
2 Flutes Flat End Mills



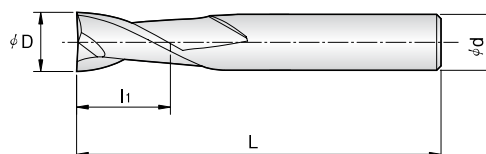
- Adatta per lavorazione ACCIAI DOLCI con basso tenore di Carbonio e materiali Non Ferrosi
- Suitable for processing *SOFT STEELS* with low carbon content and Non-ferrous materials
- Ultramicrograna 6 μ m
- 6 μ m ultra-micro grain

NON

2

OD

30°

PAGE
No. 300

Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
All	-0,005 -0,020

CODICE	Diametro di testa (D)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
2KEGM-010-030-645	1	3	6	45
2KEGM-012-040-645	1,2	4	6	45
2KEGM-015-040-645	1,5	4	6	45
2KEGM-020-060-645	2	6	6	45
2KEGM-025-080-650	2,5	8	6	50
2KEGM-030-100-650	3	10	6	50
2KEGM-035-100-650	3,5	10	6	50
2KEGM-040-120-650	4	12	6	50
2KEGM-045-120-650	4,5	12	6	50
2KEGM-050-150-650	5	15	6	50
2KEGM-055-150-650	5,5	15	6	50
2KEGM-060-150-650	6	15	6	50
2KEGM-065-180-865	6,5	18	8	65
2KEGM-070-200-865	7	20	8	65
2KEGM-075-200-865	7,5	20	8	65
2KEGM-080-200-865	8	20	8	65
2KEGM-085-230-A70	8,5	23	10	70
2KEGM-090-230-A70	9	23	10	70
2KEGM-095-230-A70	9,5	23	10	70
2KEGM-100-250-A70	10	25	10	70
2KEGM-105-280-C80	10,5	28	12	80
2KEGM-110-280-C80	11	28	12	80
2KEGM-115-280-C80	11,5	28	12	80
2KEGM-120-300-C80	12	30	12	80

YAK



2KEGM

Fresa Piana a 2 Taglienti
 2 Flutes Flat End Mills



CODICE	Diametro di testa (D)	Lunghezza Elica (L _e)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (L _e)	Shank diameter (d)	Overall length (L)
2KEGM-130-350-E90	13	35	14	90
2KEGM-140-350-E90	14	35	14	90
2KEGM-160-400-G90	16	40	16	90
2KEGM-180-450-IA0	18	45	18	100
2KEGM-200-450-KA0	20	45	20	100

YAK

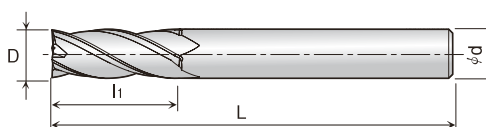


4KEGM

Fresa Piana a 4 Taglienti
4 Flutes Flat End Mills



- Adatta per lavorazione ACCIAI DOLCI con basso tenore di Carbonio e materiali Non Ferrosi
- Suitable for processing *SOFT STEELS* with low carbon content and Non-ferrous materials
- Ultramicrograna 6 μ m
- 6 μ m ultra-micro grain



Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
All	-0,005 -0,020

CODICE	Diametro di testa (D)	Lunghezza Elica (L ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Length of cut (L ₁)	Shank diameter (d)	Overall length (L)
4KEGM-010-030-645	1	3	6	45
4KEGM-015-040-645	1,5	4	6	45
4KEGM-020-060-645	2	6	6	45
4KEGM-025-080-650	2,5	8	6	50
4KEGM-030-100-650	3	10	6	50
4KEGM-035-100-650	3,5	10	6	50
4KEGM-040-120-650	4	12	6	50
4KEGM-045-120-650	4,5	12	6	50
4KEGM-050-150-650	5	15	6	50
4KEGM-055-150-650	5,5	15	6	50
4KEGM-060-150-650	6	15	6	50
4KEGM-065-180-865	6,5	18	8	65
4KEGM-070-200-865	7	20	8	65
4KEGM-075-200-865	7,5	20	8	65
4KEGM-080-200-865	8	20	8	65
4KEGM-085-230-A70	8,5	23	10	70
4KEGM-090-230-A70	9	23	10	70
4KEGM-095-230-A70	9,5	23	10	70
4KEGM-100-250-A70	10	25	10	70
4KEGM-105-280-C80	10,5	28	12	80
4KEGM-110-280-C80	11	28	12	80
4KEGM-115-280-C80	11,5	28	12	80
4KEGM-120-300-C80	12	30	12	80
4KEGM-130-350-E90	13	35	14	90
4KEGM-140-350-E90	14	35	14	90
4KEGM-160-400-G90	16	40	16	90
4KEGM-180-450-IA0	18	45	18	100
4KEGM-200-450-KA0	20	45	20	100

YAK

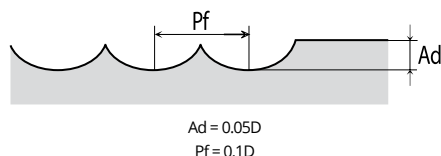


2KBGM

Fresatura
Milling Condition

	Acciaio - Carbon Steels		Acciaio legato - Alloy Steels		Acciaio bonificato - Prehardened Steels	
Raggio di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Radius of Ball Nose	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
R 0.5	16,000	500	14,000	350	12,000	200
R 0.75	14,000	600	12,000	400	10,000	300
R 1.0	12,000	700	11,000	550	9,000	450
R 1.5	8,500	700	7,000	550	6,200	450
R 2.0	6,200	700	5,500	550	4,600	450
R 3.0	4,200	700	3,600	550	3,500	450
R 4.0	3,200	700	2,700	550	2,300	450
R 5.0	2,500	700	2,200	550	1,800	450
R 6.0	2,100	700	1,800	550	1,500	450

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

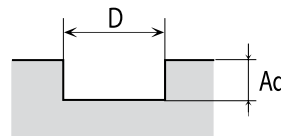
1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KEGM

Fresatura
Milling Condition

	Acciaio - Carbon Steels		Acciaio legato - Alloy Steels		Acciaio bonificato - Prehardened Steels	
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
1.0	12,000	100	10,000	40	30,000	250
1.5	8,500	100	7,000	45	20,000	250
2.0	6,300	100	5,500	60	17,000	300
3.0	4,000	100	3,600	80	15,000	500
4.0	3,000	100	2,700	80	11,000	550
5.0	2,500	100	2,100	80	9,000	600
6.0	2,100	100	1,800	80	7,000	650
8.0	1,500	100	1,400	80	5,000	700
10.0	1,300	100	1,000	80	4,000	750
12.0	1,100	100	900	80	3,200	800

Profondità di taglio
Depth of Cut



$$Ad = 0.3D \quad (D < \varnothing 3)$$

$$Ad = 0.5D \quad (D \geq \varnothing 3)$$



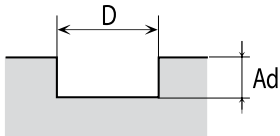
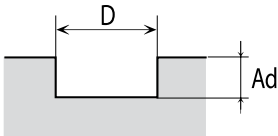
ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

2KEGM

Fresatura
Milling Condition

	Acciaio - Carbon Steels		Acciaio legato - Alloy Steels		Acciaio bonificato - Prehardened Steels	
Diametro di testa	Velocità (min ⁻¹)	Avanzamento (mm/min)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)	Velocità (min ⁻¹)	Avanzamento (min ⁻¹)
Outside diameter	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)	Speed (min ⁻¹)	Feed (mm/min)
2.0	6,000	150	5,000	50	15,000	400
3.0	3,500	150	3,300	50	13,000	600
4.0	2,500	150	2,400	80	9,000	600
6.0	2,000	150	1,500	100	6,000	700
8.0	1,300	150	1,200	100	4,000	800
10.0	1,100	150	800	100	3,000	800
12.0	900	150	700	100	2,500	1,000
Profondità di taglio Depth of Cut						
	Ad = 1.0D, Rd = 0.02D (D ≤ Ø6) Ad = 1.0D, Rd = 0.05D (D > Ø6)		Ad = 1.0D, Rd = 0.01D (D ≤ Ø6) Ad = 1.0D, Rd = 0.02D (D > Ø6)			



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm) : Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.



ORICE *SERIES*





KOYO

TUTTI I TIPI ALL TYPE

Diametro (D) Size (D)	Tolleranza (D) Tolerance (D)
1 ~ 5	-0.005 ~ -0.015
6 ~ 12	-0.005 ~ -0.025
14 ~ 16	-0.005 ~ -0.030

- Fresa multifunzionale per centrature, smussi e contornature
- Ottima finitura superficiale
- Massima resistenza all'usura

- *Multi-purpose Endmill for Centering, Corner Chamfering,*
- *Sharp cutting edge for high speed cutting*
- *Optimized wear-resistant*

- *Multifunktionsfräser zum Zentrieren, Anfasen und Konturieren*
- *Hervorragende Oberflächengüte*
- *Maximale Verschleißfestigkeit*



2KNEC

Fresa a 2 Taglienti
2 Flutes Centering End Mills

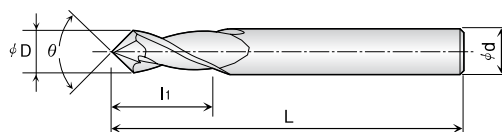
- Ultramicrograna 4 μm
- 4 μm ultra-micro grain

NON

2

OD

30°

PAGE
No. 302


Diametro (D)	Tolleranza (D)
Size (D)	Tolerance (D)
1-5	-0,005 -0,015
6-12	-0,005 -0,025
14-16	-0,005 -0,030

CODICE	Diametro di testa (D)	Angolo (θ)	Lunghezza elica (L_1)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Angle (θ)	Length of cut (L_1)	Shank diameter (d)	Overall length (L)
2KNEC-003-60°-006-345	0,3	60°	0,6	3	45
2KNEC-003-90°-006-345	0,3	90°	0,6	3	45
2KNEC-005-60°-010-350	0,5	60°	1	3	50
2KNEC-005-90°-010-350	0,5	90°	1	3	50
2KNEC-008-60°-016-350	0,8	60°	1,6	3	50
2KNEC-008-90°-016-350	0,8	90°	1,6	3	50
2KNEC-010-60°-020-350	1	60°	2	3	50
2KNEC-010-90°-020-350	1	90°	2	3	50
2KNEC-020-60°-040-350	2	60°	4	3	50
2KNEC-020-90°-040-350	2	90°	4	3	50
2KNEC-030-60°-060-350	3	60°	6	3	50
2KNEC-030-60°-060-650	3	60°	6	6	50
2KNEC-030-90°-060-350	3	90°	6	3	50
2KNEC-030-90°-060-650	3	90°	6	6	50
2KNEC-030-90°-060-6A0	3	90°	6	6	100
2KNEC-040-60°-080-650	4	60°	8	6	50
2KNEC-040-90°-080-650	4	90°	8	6	50
2KNEC-040-90°-080-6A0	4	90°	8	6	100
2KNEC-050-60°-100-650	5	60°	10	6	50
2KNEC-050-90°-100-650	5	90°	10	6	50
2KNEC-060-60°-120-660	6	60°	12	6	60
2KNEC-060-90°-120-660	6	90°	12	6	60
2KNEC-060-90°-120-6A0	6	90°	12	6	100
2KNEC-080-60°-160-860	8	60°	16	8	60
2KNEC-080-90°-160-860	8	90°	16	8	60

ORICE



2KNEC

Fresa a 2 Taglienti
2 Flutes Centering End Mills



CODICE	Diametro di testa (D)	Angolo (θ)	Lunghezza elica (l ₁)	Diametro Gambo (d)	Lunghezza totale (L)
Model Nr.	Outside Diameter (D)	Angle (θ)	Length of cut (l ₁)	Shank diameter (d)	Overall length (L)
2KNEC-080-90°-160-8A0	8	90°	16	8	100
2KNEC-100-60°-180-A70	10	60°	18	10	70
2KNEC-100-90°-180-A70	10	90°	18	10	70
2KNEC-100-90°-200-AA0	10	90°	20	10	100
2KNEC-120-60°-200-C80	12	60°	20	12	80
2KNEC-120-90°-200-C80	12	90°	20	12	80
2KNEC-120-90°-200-CA0	12	90°	20	12	100
2KNEC-140-60°-260-E80	14	60°	26	14	80
2KNEC-140-90°-260-E80	14	90°	26	14	80
2KNEC-160-60°-320-GA0	16	60°	32	16	100
2KNEC-160-90°-320-GA0	16	90°	32	16	100

ORICE

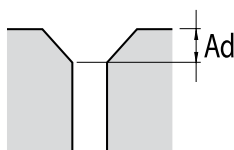


2KNEC

Fresatura
Milling Condition

	Acciaio - Carbon Steels			Acciaio bonificato - Prehardened Steels			Alluminio - Aluminium Alloys		
Diametro di testa	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)	Profondità di taglio Ad (mm)	Velocità (min ⁻¹)	Avanzamento (mm/min)
Outside Diameter	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)	Depth of Cut Ad(mm)	Speed (min ⁻¹)	Feed (mm/min)
R0.05	0.003	50,000	170	0.002	42,000	150	0.001	40,000	100
R0.1	0.004	50,000	200	0.003	42,000	180	0.002	40,000	120
R0.15	0.005	45,000	320	0.004	42,000	300	0.003	40,000	180
R0.2	0.006	45,000	420	0.005	42,000	400	0.004	40,000	240
R0.25	0.007	45,000	530	0.006	42,000	500	0.005	40,000	300
R0.3	0.008	42,000	1,000	0.007	40,000	1,200	0.006	40,000	800
R0.4	0.100	42,000	1,400	0.009	40,000	1,600	0.008	40,000	1,000
R0.5	0.10	40,000	2,600	0.10	30,000	2,000	0.10	25,000	1,300
R0.75	0.15	30,000	3,000	0.10	30,000	2,500	0.10	25,000	1,800
R1.0	0.20	25,000	3,000	0.20	25,000	2,500	0.15	20,000	1,800
R1.25	0.20	25,000	3,000	0.20	20,000	2,500	0.15	16,000	1,800
R1.5	0.20	20,000	3,000	0.20	18,000	2,500	0.15	14,000	2,000
R2.0	0.25	20,000	3,000	0.20	16,000	2,500	0.15	12,000	2,000
R2.5	0.25	18,000	3,000	0.20	14,000	2,500	0.15	9,000	2,000
R3.0	0.30	18,000	3,300	0.25	16,000	2,800	0.15	8,000	2,000
R4.0	0.40	16,000	3,300	0.30	12,000	2,800	0.20	7,000	1,500
R5.0	0.50	13,000	3,400	0.40	10,000	2,600	0.30	5,000	1,300
R6.0	0.60	7,000	2,000	0.50	6,000	1,800	0.40	4,000	1,100

Profondità di taglio
Depth of Cut



ATTENZIONE - WARNING

1. Utilizzare macchine e attrezzature precise e rigide
2. Ad(mm) : Profondità di taglio ASSIALE
3. Per la fresatura si consiglia aria o lubrificazione
4. Adattare giri e avanzamenti con la stessa proporzione
5. I dati riportati sono di riferimento. Adattare i parametri alle condizioni della macchina, dell'attrezzatura, allo staffaggio e alla tipologia di lavoro.

1. Use a rigid precise machine and holder.
2. Ad(mm): Axial Depth of Cut.
3. For milling steels, air blow or MQL(Oil Mist) are recommended.
4. Adjust both Spindle speed and Feedrate by the same proportion.
5. The above condition are only reference. In actual machining conditions adjust these parameters according to the milling shape, machine capability and the operation environment.

SUGGERIMENTI SU COME UTILIZZARE GLI UTENSILI DA TAGLIO

SUGGESTIONS ON HOW TO USE CUTTING TOOLS

TIPPS ZUR VERWENDUNG VON SCHNEIDWERKZEUGEN

Prodotti Products Produkte	Rischio Hazard Risiko	Contromisura Countermeasure Gegenmaßnahme
Tutti gli utensili da taglio	Gli utensili da taglio hanno taglienti affilati. Maneggiarli a mani nude può causare lesioni.	* Prendere precauzioni come indossare guanti soprattutto durante la manipolazione degli strumenti e durante l'installazione.
	L'uso improprio degli utensili e l'applicazione di condizioni di taglio inadeguate possono causare la rottura dell'utensile e l'espulsione dalla macchina con rischio di lesioni.	* Assicurarsi che vengano utilizzate protezioni di sicurezza e occhiali. * Fare riferimento alla gestione delle note esplicative e dei cataloghi. Utilizzare gli utensili nelle condizioni di taglio consigliate.
	Il carico d'urto e il rapido aumento della resistenza al taglio dovuto all'eccessiva usura possono causare la rottura dell'utensile e l'espulsione dalla macchina con rischio di lesioni.	* Assicurarsi che vengano utilizzate protezioni di sicurezza e occhiali. * Sostituire gli strumenti prima che si verifichi un'usura eccessiva.
	Gli utensili da taglio e i pezzi in lavorazione diventano estremamente caldi durante il taglio. Toccarli a mani nude può causare ustioni.	* Prendere precauzioni come indossare guanti.
	I trucioli caldi espulsi prodotti durante il taglio comportano il rischio di lesioni e ustioni.	* Assicurarsi che vengano utilizzate protezioni di sicurezza e occhiali. * Durante la rimozione dei trucioli e la pulizia della macchina assicurarsi che la macchina sia ferma e indossare guanti. Si prega di utilizzare strumenti, come tronchesi e tronchesi.
	Durante il taglio, scintille, trucioli caldi e generazione di calore causati dalla rottura dell'utensile possono provocare l'accensione di un incendio.	* Evitare di utilizzare utensili da taglio in luoghi in cui esiste la possibilità di accendere un incendio. * In caso di utilizzo di olio non solubile in acqua, assicurarsi di avere una contromisura antincendio.
	L'uso di macchine, mandrini e utensili con uno scarso equilibrio ad alti giri può causare la rottura degli utensili con rischio di lesioni.	* Assicurarsi che vengano utilizzate protezioni di sicurezza e occhiali. * Controllare la macchina per vibrazioni, vibrazioni e rumori anomali.
	La manipolazione di parti lavorate con bave a mani nude può causare lesioni.	* Indossare i guanti.
All Cutting Tools	Cutting tools have sharp cutting edges. Handling them with bare hands may cause injuries.	* Take precautions such as wearing gloves especially when handling tools and during installation.
	Improper use of tools and application of inappropriate cutting conditions may cause the tool to break and be expelled from the machine providing risk of injury.	* Ensure safety guards and goggles are used. * Refer to handling explanatory notes and catalogues. Use tools under recommended cutting conditions.
	Impact load and rapid increase of cutting resistance due to excessive wear may cause the tool to break and be expelled from the machine providing risk of injury.	* Ensure safety guards and goggles are used. * Exchange tools before excessive wear occurs.
	Cutting tools and workpieces become extremely hot during cutting. Touching them with bare hands may cause burns.	* Take precautions such as wearing gloves.
	Expelled hot chips produced in cutting produces risk of injuries and burns.	* Ensure safety guards and goggles are used. * During swarf removal and machine cleaning ensure the machine is stopped and wear gloves. Please use tools, such as cutting nippers and cutting clippers.

Prodotti Products Produkte	Rischio Hazard Risiko	Contromisura Countermeasure Gegenmaßnahme
All Cutting Tools	<i>In cutting, sparks, hot chips and heat generation caused by tool breakage provides a risk of igniting a fire.</i>	* Avoid using cutting tools in places where there is a possibility of igniting a fire. * In case of using non-water soluble oil, make sure to have a fire prevention countermeasure.
	<i>Using machines, chucks, and tools with poor balance at high revolutions may cause tools to break providing risk of injuries.</i>	* Ensure safety guards and goggles are used. * Check the machine for vibration, chattering, and abnormal noise.
	<i>Handling machined parts with burrs using bare hands may cause injuries.</i>	* Wear gloves.
Alle Schneidwerkzeuge	<i>Schneidwerkzeuge haben scharfe Schneidkanten. Die Handhabung mit bloßen Händen kann zu Verletzungen führen.</i>	* Treffen Sie Vorsichtsmaßnahmen wie das Tragen von Handschuhen, insbesondere beim Umgang mit Werkzeugen und während der Installation.
	<i>Die unsachgemäße Verwendung von Werkzeugen und die Anwendung ungeeigneter Schnittbedingungen können dazu führen, dass das Werkzeug bricht und aus der Maschine geschleudert wird, was zu Verletzungen führt.</i>	* Stellen Sie sicher, dass Schutzvorrichtungen und Schutzbrillen verwendet werden. * Siehe Handhabungshinweise und Kataloge. Verwenden Sie Werkzeuge unter den empfohlenen Schnittbedingungen.
	<i>Stoßbelastung und schneller Anstieg des Schneidwiderstands aufgrund übermäßigen Verschleißes können dazu führen, dass das Werkzeug bricht und aus der Maschine geschleudert wird, was zu Verletzungen führt.</i>	* Stellen Sie sicher, dass Schutzvorrichtungen und Schutzbrillen verwendet werden. * Werkzeuge wechseln, bevor übermäßiger Verschleiß auftritt.
	<i>Schneidwerkzeuge und Werkstücke werden beim Schneiden sehr heiß. Das Berühren mit bloßen Händen kann zu Verbrennungen führen.</i>	* Treffen Sie Vorsichtsmaßnahmen wie das Tragen von Handschuhen.
	<i>Austretende heiße Späne, die beim Schneiden entstehen, führen zu Verletzungs- und Verbrennungsgefahr.</i>	* Stellen Sie sicher, dass Schutzvorrichtungen und Schutzbrillen verwendet werden. * Stellen Sie sicher, dass die Maschine während der Entfernung von Spänen und der Maschinenreinigung angehalten ist, und tragen Sie Handschuhe. Bitte verwenden Sie Werkzeuge, wie z. B. Schneidezangen und Schneidemaschinen.
	<i>Beim Schneiden besteht durch Funken, heiße Späne und Hitzeentwicklung durch Werkzeugbruch die Gefahr, dass ein Brand entzündet wird.</i>	* Vermeiden Sie die Verwendung von Schneidwerkzeugen an Orten, an denen die Möglichkeit besteht, ein Feuer zu entzünden. * Falls Sie nicht wasserlösliches Öl verwenden, stellen Sie sicher, dass Sie eine Brandschutzmaßnahme getroffen haben.
	<i>Die Verwendung von Maschinen, Spannfuttern und Werkzeugen mit schlechter Balance bei hohen Drehzahlen kann dazu führen, dass Werkzeuge brechen und Verletzungen verursachen.</i>	* Stellen Sie sicher, dass Schutzvorrichtungen und Schutzbrillen verwendet werden. * Überprüfen Sie die Maschine auf Vibrationen, Rattern und anormale Geräusche.
	<i>Die Handhabung von bearbeiteten Teilen mit Graten mit bloßen Händen kann zu Verletzungen führen.</i>	* Trag Handschuhe.
Strumenti per il tipo di inserti indicizzabili	Se gli inserti e i pezzi di ricambio non sono fissati saldamente, possono allentarsi ed essere espulsi causando il rischio di lesioni.	* Pulire la sede di posizionamento dell'inserto e i pezzi di ricambio prima di impostare gli inserti. * Utilizzare lo strumento fornito per l'impostazione degli inserti e assicurarsi che gli inserti e le parti di ricambio siano fissati saldamente. Non utilizzare lo strumento fornito per cose diverse da inserti e pezzi di ricambio prescritti.
	Il serraggio eccessivo di inserti e pezzi di ricambio mediante l'uso di strumenti come i tubi di prolunga può provocare la rottura e l'espulsione.	* Non utilizzare strumenti aggiuntivi per una maggiore leva. Utilizzare solo lo strumento fornito.

Prodotti Products Produkte	Rischio Hazard Risiko	Contromisura Countermeasure Gegenmaßnahme
Strumenti per il tipo di inserti indicizzabili	Quando si applica un'elevata velocità di taglio, i pezzi di ricambio e gli inserti possono essere espulsi a causa della forza centrifuga. Prestare particolare attenzione a ciascuna linea guida di sicurezza.	* Fare riferimento alle note esplicative e ai cataloghi di manipolazione. Utilizzare gli strumenti nelle condizioni di taglio consigliate.
Indexable Inserts Type Tools	<i>If inserts and spare parts are not held securely, they may become loose and be expelled producing risk of injuries.</i>	* Clean insert locating seat and spare parts before setting inserts. * Use the tool provided for setting inserts, and ensure the inserts and spare parts are clamped securely. Do not use the tool provided for things other than prescribed inserts and spare parts.
	<i>Clamping inserts and spare parts too tightly by using tools such as extension pipes may cause them to break and be expelled.</i>	* Do not use extra tools for more leverage. Only use the tool provided.
	<i>When applying high cutting speed, spare parts and inserts may be expelled due to centrifugal force. Pay special attention on each safety guideline.</i>	* Refer to the handling explanatory notes and catalogues. Use tools under recommended cutting conditions.
Wendeschneidplatten Geben Sie Werkzeuge ein	<i>Wenn die Einsätze und Ersatzteile nicht sicher befestigt sind, können sie sich lösen und herausgeschleudert werden, wodurch Verletzungsgefahr besteht.</i>	* Plattensitz und Ersatzteile vorher reinigen Einstelleinsätze. * Verwenden Sie das mitgelieferte Werkzeug zum Setzen von Einsätzen und stellen Sie sicher, dass die Einsätze und Ersatzteile sicher geklemmt sind. Verwenden Sie das mitgelieferte Werkzeug nur für vorgeschriebene Einsätze und Ersatzteile.
	<i>Übermäßiges Anziehen von Einsätzen und Ersatzteilen durch die Verwendung von Werkzeugen wie Verlängerungsrohren kann dazu führen, dass sie brechen und herausgeschleudert werden.</i>	* Verwenden Sie keine zusätzlichen Tools für mehr Hebelwirkung. Benutz nur das bereitgestellte Werkzeug.
	<i>Bei hoher Schnittgeschwindigkeit können Ersatzteile und Wendeschneidplatten durch die Zentrifugalkraft herausgeschleudert werden. Achten Sie besonders auf jede Sicherheitsrichtlinie.</i>	* Siehe Handhabungserläuterungen und Kataloge. Verwenden Sie Werkzeuge unter den empfohlenen Schnittwerten Bedingungen.
Taglierine e altro Strumenti rotanti	Le frese hanno spigoli vivi. Maneggiarli a mani nude può causare lesioni.	* Prendere precauzioni come indossare guanti.
	Può causare uno scarso equilibrio o una rotazione fuori centro degli utensili vibrazioni e vibrazioni che potrebbero causare lo strumento rompere ed essere espulso.	* Applicare la velocità di taglio entro l'intervallo consigliato condizioni di taglio. * Regola la precisione e l'equilibrio dei mandrini e cuscinetti periodicamente per prevenire la rotazione fuori centro e vibrazioni causate dall'usura di queste parti.
Cutters and Other Rotating Tools	<i>Milling cutters have sharp edges. Handling them with bare hands may cause injuries.</i>	* Take precautions such as wearing gloves.
	<i>Poor balance or off center revolving of tools may cause vibration and chattering which could cause the tool to break and be expelled.</i>	* Apply cutting speed within the range of recommended cutting conditions. * Adjust accuracy and balance of spindles and bearings periodically to prevent off center revolving and chattering caused by wear on these parts.
Fräser und Sonstiges Rotierende Werkzeuge	<i>Fräser haben scharfe Kanten. Die Handhabung mit bloßen Händen kann zu Verletzungen führen.</i>	* Treffen Sie Vorsichtsmaßnahmen wie das Tragen von Handschuhen.
	<i>Ein schlechtes Gleichgewicht oder ein außermittiges Drehen von Werkzeugen kann Vibrationen und Rattern verursachen, die dazu führen können, dass das Werkzeug bricht und herausgeschleudert wird.</i>	* Wenden Sie die Schnittgeschwindigkeit innerhalb des empfohlenen Bereichs an Schnittbedingungen. * Passen Sie die Genauigkeit und das Gleichgewicht der Spindeln an Lager regelmäßig, um ein außermittiges Drehen und Rattern durch Verschleiß an diesen Teilen zu verhindern.

Prodotti Products Produkte	Rischio Hazard Risiko	Contromisura Countermeasure Gegenmaßnahme
strumenti di perforazione	Attraverso il taglio nei casi in cui il pezzo gira può produrre un pezzo a forma di disco con spigoli vivi quando l'utensile da taglio si rompe.	* Assicurarsi che le protezioni di sicurezza e gli occhiali siano utilizzati. Installare anche una copertura sul mandrino.
	Le frese con un diametro estremamente piccolo hanno una punta molto affilata che può perforare la pelle se non maneggiate con cura. Se la punta si rompe durante il taglio, i pezzi rotti possono essere espulsi.	* Maneggiare con cura. Prendere precauzioni come indossare guanti e occhiali.
Drilling tools	Through cutting in cases when the workpiece revolves may produce a disk shaped peice with sharp edges when the cutting tool breaks through.	* Ensure safety guards and goggles are used. Also install a cover on the chuck.
	Drills with an extremely small diameter have a very sharp point which may puncture the skin if not handled carefully. If the drill breaks during cutting, the broken pieces may be expelled.	* Handle with care. Take precautions such as wearing gloves and goggles.
Bohrwerkzeuge	Durchschneiden in Fällen, in denen sich das Werkstück dreht, kann ein scheibenförmiges Stück mit scharfen Kanten erzeugen, wenn das Schneidwerkzeug durchbricht.	* Stellen Sie sicher, dass Schutzvorrichtungen und Schutzbrillen verwendet werden. Bringen Sie auch eine Abdeckung am Spannfutter an.
	Bohrer mit einem extrem kleinen Durchmesser haben eine sehr scharfe Spitze, die bei unsachgemäßer Handhabung die Haut durchstechen kann. Wenn der Bohrer beim Schneiden bricht, können die Bruchstücke herausgeschleudert werden.	* Mit Vorsicht behandeln. Treffen Sie Vorsichtsmaßnahmen wie das Tragen von Handschuhen und Schutzbrillen.
Strumenti brasati	L'indebolimento della brasatura e la rottura degli inserti possono causare lesioni.	* Prima di utilizzarli, assicurarsi che siano brasati in modo sicuro. * Non utilizzarli in condizioni che producono temperatura molto elevate.
Brazed Tools	Weakening of the braze and breakage of inserts may cause injury.	* Before using them, ensure they are brazed securely. * Do not use them under conditions which produce very high temperature.
Gelötete Werkzeuge	Eine Schwächung der Lötstelle und ein Bruch der Einsätze können zu Verletzungen führen.	* Stellen Sie vor der Verwendung sicher, dass sie fest gelötet sind. * Verwenden Sie sie nicht unter Bedingungen, die sehr hohe Temperaturen erzeugen.

INFORMAZIONE

Questo catalogo completa le precauzioni di base per l'uso in sicurezza dei prodotti della nostra azienda. Per ulteriori informazioni, consultare le linee guida, i cataloghi o contattarci. Non siamo responsabili per eventuali incidenti causati dalla modifica degli strumenti senza la nostra autorizzazione.

INFORMATION

This catalogue completes the basic precautions for safety use of our company's products.

For further information, please refer to the guideline, catalogues or contact us. We are not responsible for any accidents causing by modifying tools without our permission.

INFORMATION

This catalogue completes the basic precautions for safety use of our company's products.

For further information, please refer to the guideline, catalogues or contact us. We are not responsible for any accidents causing by modifying tools without our permission.

SICUREZZA DEI PRODOTTI DI UTENSILI DA TAGLIO

SAFETY OF CUTTING TOOL PRODUCTS

SICHERHEIT VON SCHNEIDWERKZEUGPRODUKTEN

1. Uso di prodotti per utensili da taglio

Le confezioni dei prodotti KOBO sono munite di un'etichetta di avvertenza di sicurezza. Tuttavia, gli strumenti non sono etichettati con indicazioni di avvertenza dettagliate. Leggere la sezione "Sicurezza dei prodotti per utensili da taglio" in questo catalogo prima di maneggiare prodotti per utensili da taglio e materiali in metallo duro. Inoltre, come parte dell'educazione alla sicurezza dei tuoi lavoratori, ti preghiamo di notificare il contenuto della "Sicurezza dei prodotti degli utensili da taglio" a tutti i lavoratori.

1. Use of Cutting Tool Products

Packages of KOBO products carry a safety warning label. However, tools are not labeled with detailed warning indications. Please read the "Safety of Cutting Tool Products" in this catalogue before handling cutting tool products and cemented carbide materials. Moreover, as a part of your workers' safety education, please notify the contents of the "Safety of Cutting Tool Products" to all workers.

1. Verwendung von Schneidwerkzeugprodukten

Verpackungen von KOBO-Produkten tragen ein Sicherheitsswarnetikett. Werkzeuge sind jedoch nicht mit detaillierten Warnhinweisen gekennzeichnet. Bitte lesen Sie den Abschnitt „Sicherheit von Schneidwerkzeugprodukten“ in diesem Katalog, bevor Sie Schneidwerkzeugprodukte und Hartmetallmaterialien handhaben. Teilen Sie außerdem als Teil Ihrer Sicherheitserziehung den Inhalt der „Sicherheit von Schneidwerkzeugprodukten“ allen Arbeitern mit.

2. Caratteristiche di base dei materiali per utensili duri

In termini di "Sicurezza dei prodotti per utensili da taglio" Materiali per utensili duri: termine generico per materiali per utensili come leghe di carburo cementato, cermet, ceramica, CBN sinterizzato, diamante sinterizzato, acciaio rapido e acciaio legato, ecc.

Caratteristiche fisiche

Aspetto : Varia a seconda del tipo di materiale.

Per esempio. grigio, nero, oro, ecc.

Odore: Nessuno

Durezza, gravità specifica:

Costituenti

Carburo, nitruro, nitruro di carbonio, ossido, come W, Ti, Al, Si, Ta, B, V e metalli come Fe, Co, Ni, Cr, Mo.

2. Basic Characteristics of Hard Tool Materials

In Terms of "Safety of Cutting Tool Products"

Hard Tool Materials : General term for tool materials like cemented carbide alloy, cermet, ceramics, sintered CBN, sintered diamond, high speed steel and alloy steel, etc.

Physical Characteristics

Appearance : Varies depending on the type of material. Eg. grey, black, gold, etc.

Smell : None

Hardness, Specific Gravity :

Strumento duro Hard Tool Materials Hartes Werkzeug	Durezza (HV) Hardness (HV) Härte (HV)	Peso specifico Specific Gravity Spezifisches Gewicht	Durezza dei materiali per utensili duri Hard Tool Materials Hardness Härte der harten Werkzeugmaterialien	(HV) Gravità specifica (HV) Specific Gravity (HV) Spezifisches Gewicht
Acciaio ad alta velocità (HSS) High Speed Steel (HSS) Schnellarbeitsstahl (HSS)	200 - 1200kg/mm ²	7 - 9 Sintered CBN	2000 - 5000kg/mm ²	3 - 5
Carburo cementato Cemented Carbide Hartmetall	500 - 3000kg/mm ²	9 - 16 Sintered Diamond	8000 - 12000kg/mm ²	3 - 5
Cermet Cermet Cermet	500 - 3000kg/mm ²	5 - 9 Alloy Steel	200 - 1200kg/mm ²	7 - 9
Ceramica Ceramics Keramik	1000 - 4000kg/mm ²	2 - 7 Diamond Electroforming Product	8000 - 12000kg/mm ²	3 - 5

Constituents

Carbide, nitride, carbon nitride, oxide, such as W, Ti, Al, Si, Ta, B, V and metals such as Fe, Co, Ni, Cr, Mo.

2. Grundlegende Eigenschaften harter Werkzeugmaterialien

In Bezug auf „Sicherheit von Schneidwerkzeugprodukten“

Harte Werkzeugmaterialien: Allgemeiner Begriff für Werkzeugmaterialien wie Hartmetalllegierungen, Cermet, Keramik, gesintertes CBN, gesinterter Diamant, Schnellarbeitsstahl und legierter Stahl usw.

Physikalische Eigenschaften

Aussehen: Variiert je nach Art des Materials. Z.B. grau, schwarz, gold usw.

Geruch: Keiner

Härte, spezifisches Gewicht:

Bestandteile

Carbid, Nitrid, Kohlenstoffnitrid, Oxid, wie W, Ti, Al, Si, Ta, B, V und Metalle wie Fe, Co, Ni, Cr, Mo.

3. Sicurezza dei prodotti degli utensili da taglio

- I materiali per utensili duri hanno un peso specifico elevato. Pertanto, richiedono un'attenzione particolare come materiali pesanti quando le dimensioni o la quantità è grande.
- I prodotti degli utensili da taglio generano polvere e nebbia durante le operazioni di rettifica o riscaldamento. Questa polvere e nebbia possono essere dannose quando venendo a contatto con gli occhi o con la pelle, o se ne vengono ingerite quantità sostanziali. Durante la molatura e la lavorazione, si consiglia di utilizzare ventilazione e respiratori di scarico locali, una maschera protettiva contro la polvere, occhiali, guanti, ecc. Se la polvere viene a contatto con le mani, lavare accuratamente l'area interessata con acqua e sapone. Non mangiare nella zona esposta e lavarsi accuratamente le mani prima di mangiare. Rimuovere la polvere dagli indumenti pulendo o lavando, ma non scrollarsi di dosso.
- Il cobalto e il nichel contenuti nel carburo o in altri materiali per utensili da taglio sono segnalati come possibilmente cancerogeni per l'uomo. È stato anche riferito che la polvere e la nebbia di cobalto e nichel possono influenzare la pelle, gli organi respiratori e il cuore attraverso contatti ripetuti o prolungati.
- Per ulteriori informazioni, fare riferimento alla Scheda di Sicurezza.

<https://www.kobotools.com/sicurezza>

3. Safety of Cutting Tool Products

- Hard tool materials have a large specific gravity. Thus, they require special attention as heavy materials when the size or quantity is large.
- Cutting tool products generate dust and mist during grinding operations or heating. This dust and mist can be harmful when coming in contact with the eyes or skin, or if substantial quantities are swallowed. When grinding and machining, it is recommended to use local exhaust ventilation and respirators, a dust protective mask, glasses, gloves etc. If dust makes contact with the hands, thoroughly wash the affected area with soap and water. Don't eat in the exposed area, and wash hands thoroughly before eating. Remove dust from the clothing by a cleaning or washing, but don't shake off.
- Cobalt and nickel contained in carbide or other cutting tool materials are reported as possibly carcinogenic to humans. It is also reported that cobalt and nickel dust and mist can affect the skin, respiratory organs and heart through repeated or prolonged contact.
- For further information, please refer to Safety Data Sheet.
<https://www.kobotools.com/sicurezza>

3. Sicherheit von Schneidwerkzeugprodukten

- Harte Werkzeugmaterialien haben ein großes spezifisches Gewicht. Somit bedürfen sie bei der Größe bzw. als schwere Materialien besonderer Aufmerksamkeit Menge ist groß.
- Schneidwerkzeugprodukte erzeugen beim Schleifen oder Erhitzen Staub und Nebel. Dieser Staub und Nebel kann gesundheitsschädlich sein Kontakt mit den Augen oder der Haut oder wenn größere Mengen verschluckt werden. Beim Schleifen und Bearbeiten wird empfohlen, eine lokale Absaugung und Atemschutzgeräte, eine Staubschutzmaske, eine Brille, Handschuhe usw. zu verwenden. Wenn Staub mit den Händen in Kontakt kommt, waschen Sie die betroffene Stelle gründlich mit Wasser und Seife. Essen Sie nicht im exponierten Bereich und waschen Sie sich vor dem Essen gründlich die Hände. Staub durch Reinigen oder Waschen von der Kleidung entfernen, aber nicht abschütteln.
- Kobalt und Nickel, die in Hartmetall oder anderen Schneidwerkzeugmaterialien enthalten sind, gelten als möglicherweise krebserregend für den Menschen. Es wird auch berichtet, dass Kobalt- und Nickelstaub und -nebel bei wiederholtem oder längerem Kontakt die Haut, die Atmungsorgane und das Herz beeinträchtigen können.
- Weitere Informationen entnehmen Sie bitte dem Sicherheitsdatenblatt.

<https://www.kobotools.com/sicurezza>

4. Gestione dei prodotti degli utensili da taglio

- Le condizioni della superficie influiscono sulla tenacità degli utensili da taglio. Pertanto, utilizzare una mola diamantata per la finitura.
- I materiali per utensili duri sono estremamente duri e fragili allo stesso tempo. Pertanto, possono essere rotti da urti e serrati con forza eccessiva.
- I materiali per utensili duri e i materiali ferrosi hanno diversi rapporti di espansione termica. I prodotti che si restringono o si adattano al rigonfiamento possono presentare crepe quando la temperatura applicata è superiore o inferiore alla temperatura appropriata per l'utensile.
- Prestare particolare attenzione allo stoccaggio di materiali per utensili duri. La tenacità dei materiali per utensili duri si riduce quando si corrodono a causa del refrigerante e di altri liquidi.
- Durante la brasatura di materiali per utensili duri, se la temperatura è troppo alta o troppo bassa rispetto al punto di fusione del materiale di brasatura, possono verificarsi allentamenti e rotture.
- Dopo aver riaffilato gli utensili da taglio, assicurarsi che non siano presenti crepe.
- La lavorazione di materiali per utensili duri sull'elettroerosione può causare crepe sulla superficie a causa degli elettroni rimasti dopo l'operazione di elettroerosione, con conseguente abbassamento della tenacità. Elimina queste crepe macinando, ecc.

4. Handling Cutting Tool Products

- *Surface conditions affect toughness of cutting tools. Therefore, use a diamond grinding wheel for finishing.*
- *Hard tool materials are extremely hard and brittle at the same time. Thus, they may be broken by shocks and tightening with excess force.*
- *Hard tool materials and ferrous materials have different thermal expansion ratios. Shrinkage or swell fit products may suffer from cracks when applied temperature is higher or lower than the appropriate temperature for the tool.*
- *Pay special attention on storing hard tool materials. Toughness of hard tool materials is lowered when they corrode due to coolant and other liquid.*
- *When brazing hard tool materials, if the temperature is too high or too low from the melting point of the brazing material, loosening and breakage may occur.*
- *After regrinding cutting tools, make sure that there are no cracks.*
- *Machining hard tool materials on EDM may cause cracks on the surface due to electrons remaining after the EDM operation, resulting in lowering of the toughness. Eliminate these cracks by grinding, etc.*

4. Umgang mit Schneidwerkzeugprodukten

- *Oberflächenbedingungen beeinflussen die Zähigkeit von Schneidwerkzeugen. Verwenden Sie daher zum Schlichten eine Diamantschleifscheibe.*
- *Harte Werkzeugwerkstoffe sind gleichzeitig extrem hart und spröde. Daher können sie durch Stöße und zu starkes Anziehen brechen.*
- *Harte Werkzeugmaterialien und Eisenwerkstoffe haben unterschiedliche Wärmeausdehnungsverhältnisse. Produkte mit Schrumpf- oder Quellschwindung können Risse bekommen, wenn die angewandte Temperatur höher oder niedriger als die geeignete Temperatur für das Werkzeug ist.*
- *Achten Sie besonders auf die Lagerung von harten Werkzeugmaterialien. Die Zähigkeit von harten Werkzeugmaterialien wird verringert, wenn sie aufgrund von Kühlmittel und anderen Flüssigkeiten korrodieren.*
- *Wenn beim Löten von harten Werkzeugmaterialien die Temperatur vom Schmelzpunkt des Lötmaterials zu hoch oder zu niedrig ist, kann es zu Lockerung und Bruch kommen.*
- *Achten Sie nach dem Nachschleifen von Schneidwerkzeugen darauf, dass keine Risse vorhanden sind.*
- *Die Bearbeitung harter Werkzeugmaterialien auf EDM kann aufgrund von Elektronen, die nach dem EDM-Vorgang verbleiben, Risse auf der Oberfläche verursachen, was zu einer Verringerung der Zähigkeit führt. Beseitigen Sie diese Risse durch Schleifen usw.*

VELOCITÀ DI TAGLIO | CUTTING SPEED | SCHNITTGESCHWINDIGKEIT

$$V_c = \frac{D \times \pi \times n}{1000} \text{ m/min}$$

VELOCITÀ DI ROTAZIONE MANDRINO | SPLINDLE SPEED | SPINDELGESCHWINDIGKEIT

$$n = \frac{V_c \times 1000}{\pi \times D} \text{ rpm}$$

AVANZAMENTO PER GIRO | FEED PER REVOLUTION | VORSCHUB PRO UMDREHUNG

$$f_n = \frac{V_f}{n} \text{ mmlrev} \quad f_n = f_z \times z \text{ mmlrev}$$

VELOCITÀ DI AVANZAMENTO | FEED RATE | VORSCHUBSGESCHWINDIGKEIT

$$V_f = f_n \times n \text{ mmlmin}$$

AVANZAMENTO/TAGLIENTE | FEED/TOOTH | VORSCHUB/SCHNEIDE

$$f_z = \frac{V_f}{n \times z} \text{ mm}$$

VOLUME TRUCIOLO ASPORTATO | METAL (CHIP) REMOVAL RATE | VOLUMEN ABGETRAGENER SPANE

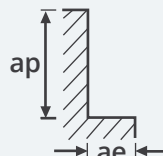
$$Q = \frac{a_p \times a_e \times V_f}{1000} \text{ cm}^3/\text{min}$$

D DIAMETRO | DIAMETER | DURCHMESSER

Z NUMERO TAGLIENTI | NUMBER OF TEETH | SCHNEIDENANZAHL

ap

ae



MATERIALI - MATERIALS - MATERIALIEN		DUREZZA/RM - HARDNESS/Rm - HÄRTE/Rm
P1	Acciai automatici e acciai strutturali <i>Free cutting steel and structural steel</i> <i>Automatenstahle und Baustahle</i>	< 500 N/mm ²
P2	Acciai al carbonio e acciai basso legati <i>Carbon steel and low alloy steel</i> <i>Kohlenstoff-Stahle und niedriglegierte Stahle</i>	500 + 700 N/mm ²
P3	Acciai medio legati e acciai di bonifica <i>Medium alloy steel and heat treated steel</i> <i>Mittellegierte Stahle und Vergutungsstahle</i>	600 + 800 N/mm ²
P4	Acciaio alto legati <i>Hgh alloy steel</i> <i>Hochlegierte Stähle</i>	800 + 1000 N/mm ²
P5	Acciai per utensili <i>Tool steel</i> <i>Werkzeugstähle</i>	900 + 1200 N/mm ²
P6	Acciai ad alta resistenza <i>High tensile strength steel</i> <i>HSLA-Stähle</i>	1200 + 1480 N/mm ² 38 + 45 HRC
P7	Acciai inossidabili ferritici e martensitici <i>Ferritic - Martensitic stainless steel</i> <i>Ferritische-Martensitische Stähle</i>	
P8	Acciai inossidabili PH - indurenti per precipitazione <i>PH Stainless Steel</i> <i>Ausscheidungshartbare Edelstahl</i>	
M1	Acciai inossidabili austenitici (buona lavorabilità) <i>Austenitic stainless steel (good machinability)</i> <i>Austenitische Edelstahl (niedriglegiert)</i>	
M2	Acciai inossidabili austenitici (buona lavorabilità) <i>Austenitic stainless steel (medium machinability) and Duplex</i> <i>Austenitische Edelstahl (niedriglegiert)</i>	
M3	Acciai inossidabili austenitici (media lavorabilità) e Duplex <i>Super austenitic stainless steel and super Duplex</i> <i>Austenitische Edelstahl (mittel-legiert) und Duplex</i>	

MATERIALI - MATERIALS - MATERIALIEN		DUREZZA/RM - HARDNESS/Rm - HÄRTE/Rm
K1	Ghise grige <i>Grey cast iron</i> <i>Grauguss</i>	150 + 250 HB
K2	Nodular cast iron <i>Ghise sferoidali</i> <i>Sphäroguss</i>	150 + 350 HB
K3	Ghise austenitiche <i>Austenitic cast iron</i> <i>Austenitischer Guss</i>	120 + 260 HB
K4	Ghise ADI <i>ADI cast iron</i> <i>ADI guss</i>	250 + 500 HB
N1	Leghe di alluminio $\leq 12\%$ Si <i>Aluminium alloys $\leq 12\%$ Si</i> <i>Aluminiumlegierungen $\leq 12\%$ Si</i>	
N2	Leghe di alluminio $> 12\%$ Si e alluminio-magnesio <i>Aluminium alloy $> 12\%$ Si and Aluminium-Magnesium</i> <i>Aluminiumlegierungen $> 12\%$ Si und Aluminium-Magnesium</i>	
N3	Leghe di rame <i>Copper alloy</i> <i>Kupferlegierungen</i>	
N4	Leghe di ottone e leghe di bronzo <i>Brass alloy and Bronze alloy</i> <i>Bronze - und Messinglegierungen</i>	
N5	Polimeri <i>Plastic material</i> <i>Polymere</i>	
N6	Fibra di carbonio e compositi <i>Carbon fiber and composite</i> <i>Faserwerkstoffe und Verbundwerkstoffe</i>	

MATERIALI - MATERIALS - MATERIALIEN		DUREZZA/RM - HARDNESS/Rm - HÄRTE/Rm
S1	Leghe a base di nichel resistenti al calore (buona lavorabilità) <i>Heat resistant super alloys (HRSA} Ni base (good machinability)</i> <i>Warmfeste Superlegierungen (HRSA} Nickel-Legierungen (einfach zu bearbeiten)</i>	< 25 HRC
S2	Leghe a base di nichel resistenti al calore (media lavorabilità) <i>Heat resistant super alloys (HRSA} Ni base (medium machinability)</i> <i>Warmfeste Superlegierungen (HRSA} Nickel-Legierungen (mittlere Bearbeitbarkeit)</i>	25 + 35 HRC
S3	Leghe a base di nichel resistenti al calore (difficile lavorabilità) <i>Heat resistant super alloys (HRSA} Ni base (low machinability)</i> <i>Warmfeste Superlegierungen (HRSA} Nickel-Legierungen (schwierig zu bearbeiten)</i>	35 + 45 HRC
S4	Leghe di titanio basso legate (buona lavorabilità) <i>Low Titanium base alloy (good machinability)</i> <i>Titanlegierung (gut Bearbeitbarkeit)</i>	
S5	Leghe di titanio alto legate (media lavorabilità) <i>High Titanium base alloy (medium machinability)</i> <i>Hochfeste Titanlegierung (mittlere Bearbeitbarkeit)</i>	
H1	Acciai temprati generali <i>Hardened steel</i> <i>Allgemeine gehärtete Stähle</i>	50 ÷ 56HRC
H2	Acciai temprati per cuscinetti <i>Hardened bearing steel</i> <i>Gehärtete Kugellagerstähle</i>	54 ÷ 62 HRC
H3	Acciai temprati per utensili <i>Hardened tool steel</i> <i>Gehärtete Werkzeugstähle</i>	60 ÷ 65 HRC
H4	Acciai inossidabili martensitici temprati <i>Hardened martensitic stainless steel</i> <i>Gehärtete martensitische Edelstähle</i>	50 ÷ 56HRC
H5	Ghise bianche tembrate <i>Hardened white cast iron</i> <i>Gehärteter Weißguss</i>	48 ÷ 55HRC

Gr.	Materiali Materials Materialien	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
P1	Acciaio a taglio libero e acciaio strutturale <i>Free cutting steel and structural steel</i> <i>Automatenstahl und Baustahl</i> Rm < 500 N/mm ²	1.0037	St 37-2	1.0037	S235JR	Fe 360 B		STKM 12 C	E 24-2
		1.0116	St 37-3	1.0038	S235JRG2	Fe 360 D FF	4360-40 C		E 24-3, E 24-4
		1.0144	St 44-3 N	1.0144	S275J2G3	Fe 430 D FF	4360-43 C	SM 41 C	E 28-3, E 28-4
		1.0301	C 10	1.0301	C 10	C 10	045 M 10	S 10 C	34 C 10, XC 10
		1.0401	C 15			C 15, C 16	080 M 15		37 C 12, XC 18
		1.0402	C 22	1.0402	C 22	C 20, C 21	050 A 20		C 20
		1.0570	St 52-3	1.0570	S355JR	Fe 510 B	4360-50 C	SM 50 YA	E 36-3, E 36-4
		1.0715	9 SMn 28	1.0715	11 SMn 30	CF 9 SMn 28	230 M 07	SUM 22	S 250
		1.0718	9 SMnPb 28	1.0718	11 SMnPb 30	CF 9 SMnPb 28		SUM 22 L	S 250 Pb
		1.0721	10 S 20	1.0721	10 S 20	CF 10 S 20	210 M 15		10 F 1
		1.0722	10 SPb 20			CF 10 SPb 20			10 PbF 2
		1.0723	15 S 20	1.0725	15 SMn 13		210 A 15	SUM 32	
		1.0726	35 S 20	1.0726	35 S20		212 M 36		35 MF 4
		1.0727	46 S 20	1.0727	46 S20		212 M 44		45 MF 4
		1.0736	9 SMn 36	1.0736	11 SMn 37	CF 9 SMn 36	240 M 07		S 300
		1.0765	36 SMnPb 14		36 SMnPb 14	CF 35 SMnPb 10	216 M 36		35 MF 6 Pb
		1.1141	Ck 15	1.1141	C 15R	C 15, C 16	080 M 15	S 15 C, S 15 CK	XC 15, XC 18
			Ck 25			C 25	060 A 25	S 25 C	XC 25
P2	Acciaio al carbonio e acciaio basso-legato <i>Carbon steel and low alloy steel</i> <i>Kohlenstoffstahl und niedriglegierter Stahl</i> Rm 500+ 700 N/mm ²	1.0501	C 35		C 35	C 35	060 A 35		55 C 35
		1.0503	C 45	1.0503	E 335	C 45	80 M 46	S 45 C	65 C 45
		1.0511	C 40		C 40	C 40	080 M 40	S 40 C	60 C 40
		1.0535	St 70-2	1.0070	E 360	Fe 690			A 70-2
		1.0601	C 60	1.0601	C60	C 60	080 A 62		CC 55
		1.1157	40 Mn 4				150 M 36		35 M 5
		1.1165	30 Mn 5	1.1165	G 28 Mn6		120 M 36	SMn 1 H, SCMn 2	
		1.1181	Ck 35	1.1181	C 35E	C 35	080 M 36	S 35 C	XC 38 H1
		1.1191	Ck 45	1.1191	C 45E	C 45	080 M 46	S 45 C	XC 42
		1.1221	Ck 60	1.1221	C 60E	C 60	080 A 62	S 58 C	XC 60
		1.1740	C 60 W					SK 7	Y3 55
		1.2162	21 MnCr 5					SCR 420 H	20 NC 5
		1.5415	15 Mo 3	1.5415	16 Mo 3	16 Mo 3	1501-240		15 D 3
		1.5423	16 Mo 5			16 Mo 5	1503-245-420	SB 450 M	
		1.5752	14 NiCr 14	1.5752	14 NiCr 14		655 M 13	SNC 815 (H)	12 NC 15
		1.5919	15 CrNi 6			16 CrNi 4	S 107		16 NC 6
		1.6587	18 CrNiMo 7 6	1.6587	18 NiCrMo 7 6	18 NiCrMo 7	820 A 16		18 NCD 6
		1.7131	16 MnCr 5	1.7131	16 MnCr 5	16 MnCr 5	527 M 17	SCR 415	16 MC 5
		1.7139	16 MnCrS 5	1.7139	16 MnCrS 5				
		1.7147	20 MnCr 5	1.7147	20 MnCr 5	20 MnCr 5		SMnC 420 (H)	20 MC 5
		1.7149	20 MnCrS 5	1.7149	20 MnCrS 5			SMnC 21 H	20 MnCrS 5
		1.7335	13 CrMo 4 4	1.7335	13 CrMo 4 5	14 CrMo 4 5	1501-620 Gr. 27		15 CD 3.5
		1.7337	16 CrMo 4 4			14 CrMo 4 5	1501-620 Gr. 27		15 CD 4.5
		1.7380	10 CrMo 9 10	1.7380	10 CrMo 9 10	12 CrMo 9 10	1501-622 Gr. 31		10 CD 9.10
P3	Acciaio medio legato <i>Medium alloy steel</i> <i>Mittellegierter Stahl</i> Rm 600+800 N/mm ²	1.0904	55 Si 7	1.7100	55 SiCr7	55 Si 8	250 A 53		55 S 7
		1.2330	35 CrMo 4			35 CrMo 4	708 A 37		34 CD 4
		1.2542	45 WCrV 7			45 WCrV 8 KU	BS 1		
		1.2714	56 NiCrMoV 7	1.2714		56 NiCrMoV7-KU	BH 224-5	SKT 4	
		1.5121	46 MnSi 4						
		1.5710	36 NiCr 6				640 A 35	SNC 236	35 NC 6
		1.5736	36 NiCr 10			35 NiCr 9		SNC 631 (H)	35 NC 11
		1.6511	36 CrNiMo 4		36 CrNiMo 4	38 NiCrMo 4 (KB)	816 M 40		40 NCD 3
		1.6582	34 CrNiMo 6	1.6582	34 CrNiMo 6	35 NiCrMo 6 (KW)	817 M 40	SNCM 447	35 NCD 6
		1.7033	34 Cr 4	1.7033	34 Cr 4	34 Cr 4 (KB)	530 A 32	SCR 430 (H)	32 C 4
		1.7035	41 Cr 4	1.7035	41 Cr 4	41 Cr 4	530 M 40	SCR 440 (H)	42 C 4
		1.7218	25 CrMo 4	1.7218	25 CrMo 4	25 CrMo 4 (KB)	708 M 25	SCM 425	25 CD 4 S
		1.7225	42 CrMo 4	1.7225	42 CrMo 4	42 CrMo 4	708 M 40	SCM 440 (H)	42 CD 4
		1.7361	32 CrMo 12			32 CrMo 12	722 M 24		30 CD 12
		1.8159	50 CrV 4	1.8159	50 CrV 4	51 CrV 4	735 A 50	SUP 10	50 CV 4
		1.8509	41 CrAlMo 7	1.8509	41 CrAlMo 7 10	41 CrAlMo 7	905 M 39	SACM 645	40 CAD 6.12

Gr.	Materiali Materials Materialien	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
P4	Acciaio alto legato <i>High alloy steel</i> <i>Hochlegierter Stahl</i> Rm 800+ 1000 N/mm ²	1.1231	Ck 67	1.1231	C 67S	C 70	060 A 67		XC 68
		1.1274	Ck 101	1.1274	C 100S		060 A 96	SUP 4	
		1.1545	C 105 W1	1.1545	C 105U	C 100 KU			Y1 105
		1.1645	C 105 W2			C 100 KU		SK 3	Y1 105
		1.1663	C 125 W			C 120 KU		SK 2	Y2 120
		1.2210	115 CrV 3	1.2210	107 CrV 3	107 CrV 3 KU			100 C 3
		1.2510	100 MnCrW 4			95 MnW Cr 5 KU	BO 1	SKS 3	90 MWCV 5
		1.2842	90 MnCrV 8	1.2842	90 MnCrV 8	90 MnVCr 8 KU	BO 2		90 MV 8
P5	Acciaio per utensili <i>Tool steel</i> <i>Werkzeugstahl</i> Rm 900+ 1200 N/mm ²	1.2350	100 Cr 6	1.3505	100 Cr 6	100 Cr 6	534 A 99	SUJ 2	100 C 6
		1.2080	X 210 Cr 12	1.2080	X 210 Cr 12	X 210 Cr 13 KU	BD 3	SKD 1	Z 200 C 12
		1.2311	40 CrMnMo 7						
		1.2312	40 CrMnMoS 86						
		1.2343	X 38 CrMoV 5 1			X 37 CrMoV 5 1 KU	BH 11	SKD 6	Z 38 CDV 5
		1.2344	X 40 CrMoV 5 1	1.2344	X 40 CrMoV 5 1	X 40 CrMo 5 1 1 KU	BH 13	SKD 61	Z 40 CDV 5
		1.2363	X 100 CrMoV 5	1.2363	X 100 CrMoV 5 1	X 100 CrMoV 5 1 KU	BA 2	SKD 12	Z 100 CDV 5
		1.2365	X 32 CrMoV 3 3			30 CrMoV 12 27 KU	BH 10	SKD 7	32 DCV 28
		1.2379	X 155 CrVMo 12 1			X 155 CrMo 12 KU			
		1.2436	X 210 CrW 12			X 215 CrW 12 1 KU		SKD 2	
		1.2601	X 165 CrMoV 12			X 165 CrMoW 12 KU			
		1.2713	55 Ni CrMoV 6					SKT 4	55 NCDV 7
		1.2714	56 Ni CrMoV 7			56 Ni CrMoV7 KU			
		1.3243	S 6-5-2-5	1.3243	HS 6-5-2-5	HS 6-5-2-5		SKH 55	Z 85 WDKCV 06-05-05-04-02
		1.3247	S 2-10-1-8	1.3247	HS 2-10-1-8	HS 2-9-1-8	BM 42	SKH 51	Z 110 DKCWW 09-08-04
		1.3255	S 18-1-2-5	1.3255	HS 18-1-2-5	HS 18-1-1-5	BT 4	SKH 3	Z 80 WKCVC 18-05-04-01
P6	Acciaio ad alta resistenza <i>High tensile strength steel</i> <i>Hochfester Stahl</i> Rm 1200+ 1480 N/mm ² HRC 38+45	1.3343	S 6-5-2	1.3343	HS 6-5-2	HS 6-5-2	BM 2	SKH 9, SKH 51	Z 85 WDCVC 06-05-04-02
		1.3348	S 2-9-2	1.3348	HS 2-9-2	HS 2-9-2		SKH 58	Z 100 DCWW 09-04-02-02
		1.3355	S 18-0-1	1.3355	HS 18-0-1	HS 18-0-1	BT 1	SKH 2	Z 80 WCV 18-04-01
		1.6546	40 Ni CrMo2 2	1.6546	40 Ni CrMo2 KD	40Ni CrMo2	311 - Type 7	SNM 240	40 NCD 2
P7	Acciaio inossidabile PH <i>PH stainless steel</i> <i>PH-Edelstahl</i>	1.7045	42 Cr 4	1.7045		41Cr4	530 A 40	SCR 440	42 C 4 TS
P8	Acciaio inossidabile PH <i>PH stainless steel</i> <i>PH-Edelstahl</i>	1.4000	X 6 Cr 13	1.4000	X 6 Cr 13	X 6 Cr 13	403 S 17	SUS 403	Z 6 C 12
		1.4006	X 10 Cr 13	1.4006	X 12 Cr 13	X 12 Cr 13	410 S 21	SUS 410	Z 10 C 13
		1.4016	X 6 Cr 17	1.4016	X 6 Cr 17	X 8 Cr 17	430 S 15	SUS 430	Z 8 C 17
		1.4021	X 20 Cr 13	1.4021	X 20 Cr 13	X 20 Cr 13	420 S 37	SUS 420 J 1	Z 20 C 13
		1.4031	X 40 Cr 13	1.4031	X 39 Cr 13	X 40 Cr 14	420 S 45	SUS 420	Z 40 C 14
		1.4109	X 65 CrMo 14	1.4109	X 70 CrMo 15			SUS 440 A	Z 70 D 14
		1.4112	X 90 CrMoV 18	1.4112	X 90 CrMoV 18	X CrTi 12	409 S 19	SUS 440 B	Z 2 CND 18 05
		1.4125	X 105 CrMo 17	1.4125	X 105 CrMo 17	X 105 CrMo 17		SUS 440 C	Z 100 CD 17
		1.4313	X 5 CrNi 13 4	1.4313	X 5 CrNiMo 13 3	X 6 CrNi 13 04	425 C 11	SCS 5	Z 5 CN 13.4
		1.4749	X 18 CrN 28	1.4749	X 18 CrN 28				Z 18 C 25
P8	Acciaio inossidabile PH <i>PH stainless steel</i> <i>PH-Edelstahl</i>	1.4534	X 3 CrNi MoAl13 8 2	1.4534	X 6 Ni CrTiMoV25 15				
		1.4540	X 4 CrNi CuNb16 4	1.4540	X 4 CrNi CuNb16 4	Z 4 CNUNb 16.4 M			Z 4 CNUNb 16.4 M
		1.4548	X 5 CrNi CuNb17 4	1.4548	X 5 CrNi CuNb17 4	Z 6 CNU 17.4		SCS 24, SUS 630	
		1.4568	X 7 CrNi Al17 7	1.4564	X 3 CrNiMoAl 13 8 2	X 7 CrNi Al17 7	301 S 81	SUS 631	Z 9 CAN 17.7
		1.6356	X 2 Ni CoMoTi18 12 4	1.6356	X 2 Ni CoMoTi18 12 4				

SS	UNS	U.N.E./I.H.A.	AISI-ASTM	GOST	ČSN	Marchio Trade Mark Warenzeichen	Struttura Structure Struktur
1311				16D			
1312, 1313			A573 Grade 58	18kp	11 378		
1412, 1414			A573 Grade 70	St14kP	11 448		
	G10100		1010	10			
1350	G10170	F.1110	1015	15			
1450	G10200		1020, 1023	20	12 024		
2172, 2132				17G1S	11 523		
1912	G12130		1213			AVP	
1914	G12134		12 L 13				
			1108				
			11 L 08				
1922							
1957	G11400		1140	40			
1973	G11460		1146				
	G12150		12 L14			AVZ	
			11 L 37	AS35G2		PR80	
1370	G10170	F.1511	1015	15			
	G10250	F.1120	1025	25			
1550	G10350	F.1130	1035	35	12 040		
1650	G10430	F.5110	1045	45	12 050		
			1040	40	12 041		
1655		F.1150	1055	55			
	G10600		1060	60	12 061		
	G10390		1039	40G			
	G13300		1330	30G2			
1572	G10340	F.1135	1035	35			
1672	G10420	F.1140	1045	45	12 050		
1665, 1678	G10640	F.1150	1064	60			
			1060	60			
2912			A204 Grade A		15 020		
	G45200		4520				
	G33106		3310, 9314	20X2H4A	16 420		
			4320		16 220		
2511	G51170	F.1516	5115	12KHN2	14 220		
				18HG			
	G51200		5120	20KH	14 221		
			5120 H	20KH			
2216			A182-F11, A182-F12	12KHM	15 121		
2216			A387 Grade 12 Cl. 2				
2218	J21890	F.155	A182-F22	12KH8	15 313		
2085, 2090		F.144	9255	55S2			
2234	T51620	F.1250	4135	35KHM			
2710	T41901	F.5241	S1	5KHV2S			
	T61206		L6	5KHNV			
			5045				
			3135				
			3435				
	G98400		9840				
2541	G43400	F.1280	4340	38H2N2MA	16 343		
	G51320		5132	35KH			
	G51400		5140	40H	14 140		
2225	G41300	F.1251	4130	20KHM	15 130		
2244	G41400	F.1252	4142, 4140	38HM	15 142		
2240							
2230	H61500	F.143	6150	50KHFA	15 260		
2940	K24065	F.1740	A355 Cl. A				

Gr.	Materiali Materials Materialien	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
M1	Acciaio inossidabile austenitico (buona lavorabilità) <i>Austenitic stainless steel (good machinability)</i> <i>Edelstahl (gute Bearbeitbarkeit)</i>	1.4300	X 12 CrNi 18 8	1.4300	X 12 CrNi 18 8		302 S 25	SUS 302	Z 12 CN 18
		1.4301	X 5 CrNi 18 10	1.4301	X 5 CrNi 18 10	X 5 CrNi 18 11	304 S 31	SUS 304	Z 6 CN 18.09
		1.4305	X 10 CrNiS 18 9	1.4305	X 10 CrNiS 18 9	X 10 CrNi 18 09	303 S 31	SUS 303	Z 10 CNF 18.09
		1.4306	X 2 CrNi 19 11	1.4306	X 2 CrNi 19 11	X 3 CrNi 18 11	304 S 12	SUS 304 L	Z 2 CN 18.10
		1.4310	X 12 CrNi 17 7	1.4310	X 9 CrNi 18 8	X 12 CrNi 17 07	301 S 21	SUS 301	Z 12 CN 17.07
		1.4550	X 6 CrNiNb 18 10	1.4550	X 6 CrNiNb 18 10	X 6 CrNiNb 18 11	347 S 31	SUS 347	Z 6 CNNb 18.10
M2	Acciaio inossidabile austenitico (lavorabilità media) e Duplex <i>Austenitic stainless steel (medium machinability) and Duplex</i> <i>Austenitischer Edelstahl (mittlere Bearbeitbarkeit) und Duplex</i>	1.4311	X 2 CrNiN 19 11	1.4311	X 2 CrNiN 18 10	X 2 CrNiN 18 11	304 S 62	SUS 304 LN	Z 2 CN 18.10 Az
		1.4335	X 12 CrNi 25 21	1.4335	X 12 CrNi 25 21	X 6 CrNi 26 20	310 S 24	SUH 310, SUS 310 S	Z 12 CN 25.20
		1.4401	X 5 CrNiMo 17 12 2	1.4401	X 5 CrNiMo 17 12 2	X 5 CrNiMo 17 12	316 S 31	SUS 316	Z 3 CND 17.11.1
		1.4417	X 2 CrNiMoSi 19 5	1.4424	X 2 CrNiMoSi 19 5				Z 2 CND 18.05.03
		1.4429	X 2 CrNiMoN 17 13 3	1.4429	X 2 CrNiMoN 17 13 3	X 2 CrNiMoN 17 13 3	316 S 62	SUS 316 LN	Z 2 CND 17.13 Az
		1.4435	X 2 CrNiMo 18 14 3	1.4435	X 2 CrNiMo 18 14 3	X 2 CrNiMo 17 13 2	316 S 12	SCS 16, SUS 316 L	Z 2 CND 17.13
		1.4438	X 2 CrNiMo 18 16			X 2 CrNiMo 18 16	317 S 12	SUS 317 L	Z 2 CND 19.15
		1.4460	X 4 CrNiMo 27 5 2	1.4460	X 3 CrNiMo 27 5 2	X 3 CrNiMo 27 5 2		SUS 329 J 1	Z 3 CND 25.7 Az
		1.4462	X 2 CrNiMoN 22 5	1.4462	X 2 CrNiMoN 22 5 3	X 2 CrNiMoN 22 5	332 S 15		Z 2 CND 22.05 Az
		1.4466	X 5 CrNi 18 15	1.4466	X 3 CrNiMo 18 12 3	X 5 CrNi 18 15	317 S 16	SUS 317	
		1.4541	X 10 CrNiTi 18 9	1.4541		X 6 CrNiTi 18 11	321 S 12	SUS 321	Z 6 CND 18.10
		1.4550	X 6 CrNiNb 18 10	1.4550	X 6 CrNiNb 18 10	X 6 CrNiNb 18 11	347 S 31	SUS 347	Z 6 CNNb 18.10
M3	Acciaio inossidabile super austenitico e super Duplex <i>Super austenitic stainless steel and super Duplex</i> <i>Super-austenitischer Edelstahl und Super-Duplex</i>	1.4410	X 2 CrNiMoN 25 7 4	1.4410	X 2 CrNiMoN 25 7 4	X 2 CrNiMoN 25 7 4			Z 3 CND 25.07 Az
		1.4501	X 2 CrNiMoCuWN 15 7 4			X 2 CrNiMoCuWN 15 7 4			
		1.4529	X 1 CrNiMoN 20 18 7	1.4547	X 1 CrNiMoN 20 18 7	X 1 CrNiMoN 20 18 7			Z 1 CNDU 20.18.05 Az
		1.4539	X 2 NiCrMoCu 25 20 5	1.4539	X 2 NiCrMoCu 25 20 5		904 S 13		Z 2 NCDU 25 20
		1.4652	X 2 CrNiMoN 25 22 7	1.4652	X 1 CrNiMoN 25 22 8				
		1.4876	X 10 NiCrAlTi 32 20	1.4876	X 10 NiCrAlTi 32 20			NCF 800	Z 10 NC 32.21
K1	Ghisa grigia <i>Grey cast iron</i> <i>Graues Schmiedeeisen</i> 150 ÷ 250 HB	0.6015	GG-15	5.1200	EN-GJL-150	G15	Grade 150	FC 150	Ft 15 D
		0.6020	GG-20	5.1300	EN-GJL-200	G20	Grade 220	FC 200	Ft 20 D
		0.6025	GG-25	5.1301	EN-GJL-250	G25	Grade 260	FC 250	Ft 25 D
		0.6027	GG-220 HB		EN-GJL-215				
		0.6035	GG-35	5.1303	EN-GJL-350	G35	Grade 350	FC 350	Ft 35 D
K2	Ghisa nodulare <i>Nodular cast iron</i> <i>Sphäroguss</i> 150 ÷ 350 HB	0.7033	GGG 35.3	5.3100	EN-GJS-350-22		Grade 350/22	FCD 350-22L	FGS 370-17
		0.7040	GGG 40	5.3106	EN-GJS-400-15	GS400-12	Grade 420/12		FGS 400-12
		0.7043	GGG40.3	5.3105	EN-GJS-400-18	GSO 42/17	Grade 370/17	FCD 400-18L	FGS 370-17
		0.7050	GGG 50	5.3200	EN-GJS-500-7	GS500-7	Grade 500/7	FCD 500-7	FGS 500-7
		0.7060	GGG 60	5.3201	EN-GJS-600-3	GS600-3	Grade 600/3	FCD 600-3	FGS 600-3
		0.7070	GGG 70	5.3300	EN-GJS-700-2	GS700-2	Grade 700/2	FCD 700-2	FGS 700-2
		0.8 155	GTS-55-04		EN-GJMB-550-4	P 55-04	P 540/5	PCMP55-04	P 540/5
		0.9990	GGV-40	5.2201	EN-GJV-400				
			GGV-45	5.2300	EN-GJV-450				
K3	Ghisa ADI <i>ADI cast iron</i> <i>ADI-Gusseisen</i> 250 ÷ 500 HB		GJS-8 00-8	5.3301	EN-GJS-8 00-8				
			GJS-1000-5		EN-GJS-1000-5				
			GJS-1200-2		EN-GJS-1200-2				
			GJS-1400-1	5.3405	EN-GJS-1400-1				
K4	Ghisa austenitica <i>Austenitic cast iron</i> <i>Austenitisches Gusseisen</i> 120 ÷ 260 HB	0.6655	GGL-NiCuCr 15 6 2		EN-GJLA-XNiCuCr 15-6-2		Grade F1		FGL Ni15 Cu6 Cr2
		0.6660	GGL-NiCr 20 2		EN-GJLA-XNiCr 20-2		Grade F2		FGL Ni20 Cr2
		0.6676	GGL-NiCr 30 3		EN-GJLA-XNiCr 30-3		Grade F3		FGL Ni30 Cr3
		0.7652	GGG-NiMn 13 7		EN-GJSA-XNiMn 13-7		Grade S6		FGS Ni13 Mn7
		0.7660	GGG-NiCr 20 2	5.3500	EN-GJSA-XNiCr 20-2		Grade S2		FGS Ni20 Cr2
		0.7673	GGG-NiMn 23 4		EN-GJSA-XNiMn 23-4		Grade S2M		FGS Ni23 Mn4
		0.7676	GGG-NiCr 30 3	5.3507	EN-GJSA-XNiCr 30-3		Grade S3		FGS Ni30 Cr3
		0.7683	GGG-Ni 35	5.3504	EN-GJSA-XNi 35				FGS Ni35

SS	UNS	U.N.E./I.H.A.	AISI-ASTM	GOST	ČSN	Marchio Trade Mark Warenzeichen	Struttura Structure Struktur
2331	S30200		302	12KH18N9			Austenitic
2333	S30400	F.3504	304	08KH18N10	17 240		Austenitic
2346	S30300	F.3508	303	12KH19N9			Austenitic
2352	S30403	F.3504	304 L	03KH18N11			Austenitic
	S30100	F.3517	301	07KH16N6			Austenitic
2338	S34700		347	08KH18N12B			Austenitic
2371	S30453	F.3541	304 LN	03KH18N11			Austenitic
2361	S31008		310 S	12KH25N20			Austenitic
2347	S31600	F.3534	316	08KH17H13M2T	17 346		Austenitic
2376	S31500						Duplex
2375	S31653		316 LN	03KH16N15M3			Austenitic
2353	S31603	F.3533	316 L	03KH17N14M3	17 349		Austenitic
2367			317 L				Austenitic
2324	S32900		329				Duplex
2377	S31803		329 LN				Duplex
2366	S31700		317	08KH17H15M3T			Austenitic
2337			321				Austenitic
2338	S34700	F.3524	347	08KH18N12B			Austenitic
2350			316 Ti				Austenitic
2368	S30815						Austenitic
2328	S32750		F 53				Super duplex
	S32760		F 55-329 S				Super duplex
2778	S31254						Super Austenitic
2562	N08904		904L				Super Austenitic
	S32654						Super Austenitic
	N08800					Alloy 800	Austenitic
2570	S66286		660			A286	Austenitic
01 15-00	F11601		A48 25 B	Sc 15	422 415		Lamellar
01 20-00	F12101		A48 30 B	Sc 20	422 420		Lamellar
01 25-00	F12401		A48 35 B	Sc 25	422 425		Lamellar
02 19							Lamellar
01 35-00	F13502		A48 50 B	Sc 35			Lamellar
07 17-15					422 303		Nodular
07 17-02		FGE 38-17		Vc 42-12	422 304		Nodular
07 17-12	F32800		60-40-18	Vc 42-12	422 314		Nodular
07 27-02	F33800	FGE 50-7	A536, 80-55-06	Vc 50-2	422 305		Nodular
07 32-03	F34100	FGE 60-2	A476, 80-60-03	Vc 60-2	422 306		Nodular
07 37-01	F34800	FGE 70-2	A536, 100-70-03	Vc 70-2	422 307		Nodular
08 54-00	F24130		A220 60004				Malleable
			Grade 400-15				Vermicular
			Grade 450				Vermicular
			Grade 500				Vermicular
	ADI grade 1		850/550/10			ADI 800	Ductile austempered
	ADI grade 2		1050/700/7			ADI 1000	Ductile austempered
	ADI grade 3		1200/850/4			ADI 1200	Ductile austempered
	ADI grade 4		1400/1100/1			ADI 1400	Ductile austempered
	F41000		A436 Type 1			Ni-Resist 1	Lamellar
05 23-00	F41002		A436 Type 2			Ni-Resist 2	Lamellar
	F41004		A436 Type 3			Ni-Resist 3	Lamellar
07 72-00						Nodumag	Nodular
	F43000		A436 Type D-2			Ni-Resist D-2	Nodular
	F43010		A439 Type D-2M			Ni-Resist D-2M	Nodular
	F43003		A436 Type D-3			Ni-Resist D-3	Nodular
	F43006		A439 Type D-5			Ni-Resist D-5	Nodular

Gr.	Materiali Materials Materialien	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
N1	Lega di alluminio < 12% Si Aluminium alloy < 12% Si Aluminiumlegierung < 12 % Si	3.0205	Al 99			9001/1	1C	A1x3	A4
		3.0255	Al99.5	Al99.5	AW-1050A	9001/2	1B	(A1050)	A-5/1050A
		3.0505	AlMn0,5Mg0,5				N31		
		3.0517	AlMn1Cu	AlMn1Cu	AW-3003			A3003	A-M1/3003
		3.0615	AlMgSiPb						ASGPB
		3.1255	AlCuSiMn	AlCuSiMn	AW-2014		H15		A-U4SG
		3.1305	AlCuMg0,5			9002/1	L86		AU2G
		3.1325	AlCuMg 1			9002/2	(H14)	A3x2	AU4G
		3.1355	AlCuMg 2			9002/4	DTD5090	A3x4	AU4G1
		3.1645	AlCuMgPb			9002/8	-	-	AU4Pb
		3.1655	AlCuBiPb	AlCuBiPb	AW-2011		FC1	A2011	A-U5PbBi
		3.2161	G-AlSi8Cu3	AlSi8Cu3(Si)	AC-46200				
		3.2315	AlSi1MgMn	AlMgSi1	AW-6082	90006/4	H30		A-SGM0.7
		3.2341	G-AlSi5Mg		AC-42000	3599	LM25	AC 4C	A-S7G
		3.2381	G-AlSi10Mg	AlSi10Mg(Fe)	AC-43400		LM9		A-S10G
		3.2383	G-AlSi10Mg (Cu)		43200		(LM9)		A-S10UG
		33.206	AlMgSi0.5	AlMgSi0.5	AW-6060		(H9)		A-GS/6060
		3.3210	AlMgSi0.7	AlMgSi0.7	AW-6063		(H10)	(A6063)	A-GSUC/6061
		3.3211	AlMg1SiCu			9006/2	H20	A2x4	AGSUC
		3.3315	AlMg1	AlMg1	AW-5005		N41		A-G0.6
		3.3316	AlMg1,5			9005/7			
		3.3523	AlMg2,5			9005/2		A2x1	AG2,5C
		3.3535	AlMg3			9005/8	N5/N56		AG3
		3.3547	AlMg4.5Mn0.7			9005/5	N8	A2x7	AG4,5MC
		3.3555	AlMg5				N6		A-G5
		3.4335	AlZn4.5Mg1	AlZn4.5Mg1	AW-7020		H17		A-Z5G
		34.365	AlZn5.5MgCu		AW-7075	9007/2	2L95	A7075	A-Z5GU
		3.5612	G-MgAl6Zn	MgAl6Zn	MG-P-63		MAG-E-121		G-A6-Z1
		3.5812	G-MgAl8Zn	MgAl8Zn	MG-P-61				(G-A7-Z1)
N2	Lega di alluminio < 12% Si e Alluminio- Magnesio Aluminium alloy < 12% Si and Alumi- nium-Magnesium Aluminiumlegierung < 12 % Si und Alumi- nium-Magnesium	32.382	G-AlSi12	AlSi12	AC-44200	4514	LM6	AC3A	AS 13
		3.2583	G-AlSi12 (Cu)	AlSi12 (Cu)	AC-47000		LM20	Al-Si12Cu	
		3.5101	G-MgZn4SE1Zr1				MAG5		G-Z4TR
		3.5102	G-MgZn5Th2Zr1						
		35.103	G-MgSe3Zn2Zr1	MgSe3Zn2Zr1	MN65120		MAG6-TE		ZRE1
		3.5106	G-MgAg3SE2Zr1				MAG 12		G-Ag22,5
		3.5312	G-MgAl3Zn				MAG-E-111		
		3.5912	G-MgAl9Zn1				MAG7		G-A9Z1
N3	Lega di alluminio < 12% Si Aluminium alloy < 12% Si Aluminiumlegierung < 12 % Si	2.0040	OF Cu		CW008A		C103	C1020	Cu/c1
		2.0060	E-Cu57		CW004A	E-Cu57	C101	C1100	Cu/a1
		2.0070	SE Cu		CW021A				
		2.0090	SF Cu		CW024A		C106	C1220	Cu/b
		2.0240	CuZn15	CuZn15	CW502L		CZ102	C2300	CuZn15
		2.0321	CuZn37		CW508L		CZ108		CuZn37
		2.0401	CuZn39Pb3	CuZn39Pb3	CW614N		CZ121		CuZn39Pb3
		2.0402	CuZn40Pb2	CuZn40Pb2	CW612N		CZ120		CuZn39Pb2
		20.530	CuZn38Sn1	CuZn38Sn1	CW717R				
		2.0790	CuNi18Zn19Pb	CW408J					CuNi18Zn19Pb1
		2.0872	CuNi10Fe1Mn	CuNi10Fe1Mn			CN102		CuNi10Fe1Mn
		2.0940	CuAl10Fe		CC331G		AB1		CuAl10Fe
		2.0975	CuAl10Ni		CC333G		AB2		CuAl10Ni5Fe5
		2.1050	CuSn10		CC480K		CT1		CuSn10
		2.1087	CuSn10Zn						
		2.1176	CuPb10Sn		CW352H		LB2		CuSn10Pb10
		2.1202	SB Cu				C107		

SS	UNS	U.N.E./I.H.A.	AISI-ASTM	GOST	ČSN	Marchio Trade Mark Warenzeichen	Struttura Structure Struktur
4010			A1200				
4007	AA1050A		A1050/1050A				
			3105				
	AA3003					Aluman 100	
			6012				
4338	AA2014		2014			Avional 660	
			2117			Avional 050	
			2017			Avional 100	
			2024			Avional 150	
4335			2030				
4355	AA2011		2011			Recidal 11	
4251	A13800		A380				
4212	A96082		6082			Anticorodal 100	
4244			B26				
4253	A13600		B85				
4103	AA6060					Anticorodal 063	
4104, 4105	AA6005						
			6061			Anticorodal 061	
4106	AA5005					Peraluman 080	
			5050			Peraluman 150	
4120			5052			Peraluman 250	
			5154			Peraluman 350	
4140	A95083		5083			Peraluman 440	
			5056			Peraluman 500	
4425	AA7020		7020				
	A97075		7075	B95		Ergal	
	M11600		AZ61A				
			AZ80A				
			A413.2				
	M12330		AMS 4442				
			AZ31B				
	C10200						
	C11000						
	C10300						
	C12200						
5112	C23000			L90			
5150	C27200						
5170	C38500						
5168	C37800						
	C46400			LO60-1			
	C76300						
5667	C70600						
5710	C95200		CA952	BrA9ZH3L			
5716	C95500		CA955	BrA10ZH4N4L			
5443	C90700						
5458	C90500						
5640	C93700		CA937				
	C14200						

Gr.	Materiali Materials Materialien	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
N4	Lega di ottone e lega di Bronzo Brass alloy and Bronze alloy Messinglegierung und Bronzelegierung	2.0220	CuZn5		CW500L		CZ125	C2100	
		2.0230	CuZn10		CW501L		CZ101	C2200	
		2.0250	CuZn20		CW503L		CZ103	C2400	
		2.0265	CuZn30		CW505L		CZ106	C2600	
		2.0331	CuZn36Pb1.5		CW600N		CZ119	C3501	
		2.0360	CuZn40		CW509L		CZ109	C2800	
		2.0372	CuZn39Pb0.5		CW610N		CZ123		
		2.0375	CuZn36Pb3		CW603N		CZ124	C3601	
		2.0380	CuZn39Pb2		CW612N		CZ 131	C3771	
		2.0401	CuZn39Pb3	12164	CW614N	5705	CZ121	C3603	
		2.0402	CuZn40Pb2		CW617N		CZ122		
		2.0410	CuZn44Pb2	CuZn44Pb2	CW622N		CZ104		
		2.0460	CuZn20Al2				CZ110		
		2.0470	CuZn28Sn1	CuZn28Sn1	CW706R				CuZn29Sn1
		2.0932	CuAl8Fe3		CW303G				
		2.0966	CuAl10Ni5Fe4		CW307G		CA104		
		2.1010	CuSn2				-	-	
		2.1016	CuSn4				PB101	C5111	
		21.020	CuSn6	CuSn6	CW452K		PB103	C5191	CuSn6
		2.1030	CUSn8				PB104	C5212	
N5	Plastic materials								
N6	Fibra di carbonio e composito Carbon fiber and composite Kohlefaser und Verbundwerkstoff								
S1	Superlega resistente al calore (HRSA) Base Ni (buona lavorabilità) < 25 HRC Heat resistant super alloy (HRSA) Ni base (good machinability) < 25 HRC Hitzebeständige Super- legierung (HRSA) Ni-Basis (gute Zerspanbarkeit) < 25 HRC	1.4980							Z3NCT25
		2.4617							NiMo28
			NiCr17Mo17FeW						NC17DWY
		2.4816	NiCr15Fe						NC15Fe
		2.4851	NiCr23Fe						NC15FeA
		2.4856	NiCr22Mo9Nb						NC22DNb
		2.4669	NiCr 15 Fe 7 TiAl				HR505		NC19FeNB
S2	Superlega resistente al calore (HRSA) Base Ni (media lavorabilità) 25 ÷ 35 HRC Heat resistant super alloy (HRSA) Ni base (medium machinability) 25 ÷ 35 HRC Hitzebeständige Super- legierung (HRSA) Ni-Basis (Mittel Zerspanbarkeit) 25 ÷ 35 HRC	1.4876	X10NiCrAlTi32-21				3075		
		2.4858	NiCr21Mo						NC21FeDU
		2.4665	NiCr22FeMo				HR6,204		NC22FeD
		2.4856	NiCr22Mo9Nb						NC22DNb
		2.4856	NiCr22Mo9Nb						NC22DNb
		2.4668	NiCr19Fe19NbMo				HR8		Nc19FeNb
		2.4668	NiCr19Fe19NbMo				HR8		Nc19FeNb
		2.4630	NiCr20Ti				HR5,203-4		NC20T
		2.4631	NiCr20TiAl				HR401,601		NC20TA
		2.4654	NiCr20Co14MoTi						NC20K14
S3	Superlega resistente al calore (HRSA) Base Ni (bassa lavorabilità) 35 ÷ 45 HRC Heat resistant super alloy (HRSA) Ni base (low machinability) 35 ÷ 45 HRC Hitzebeständige Super- legierung (HRSA) Ni-Basis (Niedrig Zerspanbarkeit) 35 ÷ 45 HRC	2.4654	NiCr20Co14MoTi						NC20K14
		2.4668	NiCr19Fe19NbMo				HR8		Nc19FeNb
		2.4669	NiCr 15 Fe 7 TiAl				HR505		NC19FeNB
			NiW13Co10Cr9AlTi						
			NiCo10W10Cr9AlTi						
			NiCr18cCoMoAlTi						NCK19DAT
			NiCo15Cr15MoAlTi						NCKD20AT

SS	UNS	U.N.E./I.H.A.	AISI-ASTM	GOST	ČSN	Marchio Trade Mark Warenzeichen	Struttura Structure Struktur
	C21000						
	C22000						
	C24000						
	C26000						
	C34000						
	C28000						
	C36500						
	C36000						
	C37700						
	C38500					OT-58	
	C38000						
5272	C68700			LAMsh77-2-0.05			
	C68700						
5220	C44300			LOMsh70-1-0.05			
	C61400						
	C63000						
	C50700						
	C51100						
5428	C51900			BrOF6.5-0.15			
	C52100						
							Polycarbonate
							E-glass
							Epoxy
							HTA
							HX
							Kevlar
							PEEK
							PPS
							T300
							T700
							T800
			5725			Discalloy	HRSA Iron-based
	N10665					Hastelloy B-2	HRSA Nickel-based
	N10002					Hastelloy C (casting)	HRSA Nickel-based
	N06600					Inconel 600	HRSA Nickel-based
	N06601					Inconel 601	HRSA Nickel-based
	N06625					Inconel 625 (casting)	HRSA Nickel-based
						Inconel 706	HRSA Nickel-based
	N07750					Inconel X750 (solubilized)	HRSA Nickel-based
						Stellite	HRSA Cobalt-based
	N08800					Incoloy 800	HRSA Iron-based
	N08825					Incoloy 825	HRSA Iron-based
	N06002					Hastelloy X	HRSA Nickel-based
	N06625					Inconel 625 (forged)	HRSA Nickel-based
	N06625					Inconel 625 (pipe)	HRSA Nickel-based
	N07718					Inconel 718 (casting)	HRSA Nickel-based
	N07718					Inconel 718 (pipe)	HRSA Nickel-based
	N06075					Nimonic 80	HRSA Nickel-based
	N07080					Nimonic 81	HRSA Nickel-based
	N07001					Waspalloy (casting)	HRSA Nickel-based
						Haynes	HRSA Cobalt-based
	N07001					Waspalloy (forged)	HRSA Nickel-based
	N07718					Inconel 718 (forged)	HRSA Nickel-based
	N07750					Inconel X750 (precipitation)	HRSA Nickel-based
						Mar-M 200	HRSA Nickel-based
						Mar-M 247	HRSA Nickel-based
						Rene 95	HRSA Nickel-based
						Udimet 500	HRSA Nickel-based
						Udimet700	HRSA Nickel-based

Gr.	Materiali Materials Materialien	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
S4	Lega di titanio buona lavorabilità <i>Titanium alloy good machinability</i> <i>Titanlegierung gute Bearbeitbarkeit</i>		TiAl2Sn4Zr2MoSi						
			TiAl2Sn4Zr6Mo						
		3.7055	Ti 99,6						
		3.7195	Ti3Al2.5V						
		3.7115	TiAl5Sn2.5				TA14/17		
		3.7124	TiCu 2,5						
		3.7155	TiAl6Zr5Mo0,5						
		3.7165	TiAl6V4 ELI				TA11		
		3.7175	TiAl6V6Sn2						
		3.7185	TiAl4Mo4Sn2						
S5	Lega di titanio media lavorabilità <i>Titanium alloy me- dium machinability</i> <i>Titanlegierung Mittel Bearbeitbarkeit</i>								
		3.7164	TiAl6V4						
			Ti5Al2.5SN						
			TiAl2Sn4Zr2MoSi						
			TiAl2Sn4Zr6Mo						
H1	Acciaio rinforzato 50 ÷ 56 HRC <i>Hardened steel 50 ÷ 56 HRC</i> <i>Gehärteter Stahl 50 ÷ 56 HRC</i>	1.1231	Ck 67	1.1231	C 67S	C 70	060 A 67		XC 68
		1.1248	Ck 75	1.1248	C 75S	C 75	060 A 78		XC 75
		1.1274	Ck 101	1.1274	C 100S		060 A 96	SUP 4	
		1.1545	C 105 W1	1.1545	C 105U	C 100 KU			Y1 105
		1.2550	60 WC-V 7			55 WC-V 8 KU			55 WC 20
		1.7131	16 MnCr 5	1.7131	16 MnCr 5	16 MnCr 5	527 M 17	SCR 415	16 MC5
		1.7176	55 Cr 3	1.7176	55 Cr 3	55 Cr 3	527 A 60	SUP 9 (A)	55 C 3
		2.4669	NiCr 15 Fe 7 TiAl				HR505		NC19FeNB
H2	Acciaio per cuscinetti temprato 54 ÷ 62 HRC <i>Hardened bearing steel 54 ÷ 62 HRC</i> <i>Gehärteter Lagerstahl 54 ÷ 62 HRC</i>	1.2210	115 Cr-V 3	1.2210	107 Cr-V 3	107 Cr-V 3 KU			100 C 3
		1.2510	100 MnCr-W 4			95 MnWCr 5 KU	BO 1	SKS 3	90 MWCV5
		1.2842	90 MnCrV 8	1.2842	90 MnCrV 8	90 MnVCr 8 KU	BO 2		90 MV 8
		1.3505	100 Cr 6	1.3505	100 Cr 6	100 Cr 6	534 A 99	SUJ 2	100 C 6
H3	Acciaio per utensili temprato 60 ÷ 65 HRC <i>Hardened tool steel 60 ÷ 65 HRC</i> <i>Gehärteter Werkzeugstahl 60 ÷ 65 HRC</i>	1.2344	X 40 CrMoV 5 1	1.2344	X 40 CrMoV 5 1	X 40 CrMo 5 1 1 KU	BH 13	SKD 61	Z 40 CDV 5
		1.2363	X 100 CrMoV 5 1	1.2363	X 100 CrMoV 5	X 100 CrMoV 5 1 KU	BA 2	SKD 12	Z 100 CDV 5
		1.2379	X 155 CrVMo 12 1		X 155 CrVMo 12 1	X 155 CrVMo 12 1 KU	BD 2	SKD 11	Z 160 CDV 12
		1.2436	X 210 CrW 12			X 215 CrW 12 1 KU		SKD 2	
		1.2601	X 165 CrMoV 12			X 165 CrMoW 12 KU			
		1.2713	55 NiCrMoV 6					SKT 4	55 NCDV 7
		1.3243	S 6-5-2-5	1.3243	HS 6-5-2-5	HS 6-5-2-5		SKH 55	Z 85 WDKCV 06-05-05-04-02
		1.3247	S 2-10-1-8	1.3247	HS 2-10-1-8	HS 2-9-1-8	BM 42	SKH 51	Z 110 DKCW 09-08-
		1.3355	S 18-0-1	1.3355	HS 18-0-1	HS 18-0-1	BT 1	SKH 2	Z 80 WCV 18-04-01
H4	Martensitico indurito acciaio inossidabile 50 ÷ 56 HRC <i>Hardened martensitic stainless steel 50 ÷ 56 HRC</i> <i>Gehärteter Martensit rostfreier Stahl 50 ÷ 56 HRC</i>	1.4021	X 20 Cr 13	1.4021	X 20 Cr 13	X 20 Cr 13	420 S 37	SUS 420 J 1	Z 20 C 13
		1.4109	X 65 CrMo 14	1.4109	X 70 CrMo 15			SUS 440 A	Z 70 D 14
		1.4112	X 90 CrMoV 18	1.4112	X 90 CrMoV 18	X CrTi 12	409 S 19	SUS 440 B	Z 2 CND 18 05
		1.4125	X 105 CrMo 17	1.4125	X 105 CrMo 17	X 105 CrMo 17		SUS 440 C	Z 100 CD 17
		1.4542	X 5 CrNiCuNb 16 4	1.4542	X 5 CrNiCuNb 16 4			SUS 630	
		1.4568	X 7 CrNiAl 17 7	1.4568	X 7 CrNiAl 17 7	X 7 CrNiAl 17 7	301 S 81	SUS 631	Z 9 CAN 17.7
		1.4943	X 4 NiCrTi 25 15	1.4980	X 6 NiCrTiMoV 25 15		HR 51	SUH 660	Z 6 NCTDV 25.15
H5	Ghisa bianca temprata 48 ÷ 55 HRC <i>Hardened white cast iron 48 ÷ 55 HRC</i> <i>Gehärteter Weißguss 48 ÷ 55 HRC</i>	0.9620	G-X330 NiCr 4 2	0.9620	EN-GJN-HV520		Grade 2 A		FB Ni4 G 2 BC
		0.9625	G-X260 NiCr 4 2	0.9625	EN-GJN-HV550		Grade 2 B		FB Ni4 G 2 HC
		0.9630	G-X300 CrNiSi 9 5 2	0.9630	EN-GJN-HV600		Grade 2 C, D, E		FB G 9 Ni5

[illegible]

HRC	VICKERS	DUREZZA BRINELL BRINELL HARDNESS BRINELLHÄRTE		DUREZZA ROCKWELL ROCKWELL HARDNESS ROCKWELL-HÄRTE			DUREZZA SUPERFICIALE ROCKWELL ROCKWELL SUPERFICIAL HARDNESS ROCKWELL OBERFLÄCHENHÄRTE			DUREZZA COSTA SHORE HARDNESS UFER HÄRTE	N/mm² TENSIONE FORZA N/mm² TENSILE STRENGTH N/mm² ZUG STÄRKE	HRC
		sfera standard ball Standard Ball	sfera in carburo di tungsteno tungsten carbide ball Kugel aus Wolfram karbid	A scale	B scale	D scale	15-N scale	30-N scale	45-N scale			
68	940	-	-	85.6	-	76.9	93.2	84.4	75.4	97	-	68
67	900	-	-	85.0	-	76.1	92.9	83.6	74.2	95	-	67
66	865	-	-	84.5	-	75.4	92.5	82.8	73.3	92	-	66
65	832	-	(739)	83.9	-	74.5	92.2	81.9	72.0	91	-	65
64	800	-	(722)	83.4	-	73.8	91.8	81.1	71.0	88	-	64
63	772	-	(705)	82.8	-	73.0	91.4	80.1	69.9	87	-	63
62	746	-	(688)	82.3	-	72.2	91.1	79.3	68.8	85	-	62
61	720	-	(670)	81.8	-	71.5	90.7	78.4	67.7	83	-	61
60	697	-	(654)	81.2	-	70.7	90.2	77.5	66.7	81	-	60
59	674	-	(634)	80.7	-	69.9	89.8	76.6	65.5	80	-	59
58	653	-	615	80.1	-	69.2	89.3	75.7	64.3	78	-	58
57	633	-	595	79.6	-	68.5	88.9	74.8	63.2	76	-	57
56	613	-	577	79.0	-	67.7	88.3	73.9	62.0	75	-	56
55	595	-	560	78.5	-	66.9	87.9	73.0	60.9	74	2075	55
54	577	-	543	78.0	-	66.1	87.4	72.0	59.8	72	2015	54
53	560	-	525	77.4	-	65.4	86.9	71.2	58.6	71	1950	53
52	544	(500)	512	76.8	-	64.6	86.4	70.2	57.4	69	1880	52
51	528	(487)	496	76.3	-	63.8	85.9	69.4	56.1	68	1820	51
50	513	(475)	481	75.9	-	63.1	85.5	68.5	55.0	67	1760	50
49	498	(464)	469	75.2	-	62.1	85.0	67.6	53.8	66	1695	49
48	484	451	455	74.7	-	61.4	84.5	66.7	52.5	64	1635	48
47	471	442	443	74.1	-	60.8	83.9	65.8	51.4	63	1580	47
46	458	432	432	73.6	-	60.0	83.5	64.8	50.3	62	1530	46
45	446	421	421	73.1	-	59.2	83.0	64.0	49.0	60	1480	45
44	434	409	409	72.5	-	58.5	82.5	63.1	47.8	58	1435	44
43	423	400	400	72.0	-	57.7	82.0	62.2	46.7	57	1385	43
42	412	390	390	71.5	-	56.9	81.5	61.3	45.5	56	1340	42
41	402	381	381	70.9	-	56.2	80.9	60.4	44.3	55	1295	41
40	392	371	371	70.4	-	55.4	80.4	59.5	43.1	54	1250	40
39	382	362	362	69.9	-	54.6	79.9	58.6	41.9	52	1215	39
38	372	353	353	69.4	-	53.8	79.4	57.7	40.8	51	1180	38
37	363	344	344	68.9	-	53.1	78.8	56.8	39.6	50	1160	37
36	354	336	336	68.4	(109.0)	52.3	78.3	55.9	38.4	49	1115	36
35	345	327	327	67.9	(108.5)	51.5	77.7	55.0	37.2	48	1080	35
34	336	319	319	67.4	(108.0)	50.8	77.2	54.2	36.1	47	1055	34
33	327	311	311	66.8	(107.5)	50.0	76.6	53.3	34.9	46	1025	33
32	318	301	301	66.3	(107.0)	49.2	76.1	52.1	33.7	44	1000	32
31	310	294	294	65.8	(106.0)	48.4	75.6	51.3	32.5	43	980	31
30	302	286	286	65.3	(105.5)	47.7	75.0	50.4	31.3	42	950	30
29	294	279	279	64.7	(104.5)	47.0	74.5	49.5	30.1	41	930	29
28	286	271	271	64.3	(104.0)	46.1	73.9	48.6	28.9	41	910	28
27	279	264	264	63.8	(103.0)	45.2	73.3	47.7	27.8	40	880	27
26	272	258	258	63.3	(102.5)	44.6	72.8	46.8	26.7	38	860	26
25	266	253	253	62.8	(101.5)	43.8	72.2	45.9	25.5	38	840	25
24	260	247	247	62.4	(101.0)	43.1	71.6	45.0	24.3	37	825	24
23	254	243	243	62.0	100.0	42.1	71.0	44.0	23.1	36	805	23
22	248	237	237	61.5	99.0	41.6	70.5	43.2	22.0	35	785	22
21	243	231	231	61.0	98.5	40.9	69.9	42.3	20.7	35	770	21
20	238	226	226	60.5	97.8	40.1	69.4	41.5	19.6	34	760	20
(18)	230	219	219	-	96.7	-	-	-	-	33	730	(18)
(16)	222	212	212	-	95.5	-	-	-	-	32	705	(16)
(14)	213	203	203	-	93.9	-	-	-	-	31	675	(14)
(12)	204	194	194	-	92.3	-	-	-	-	29	650	(12)
(10)	196	187	187	-	90.7	-	-	-	-	28	620	(10)
(8)	188	179	179	-	89.5	-	-	-	-	27	600	(8)
(6)	180	171	171	-	87.1	-	-	-	-	26	580	(6)
(4)	173	165	165	-	85.5	-	-	-	-	25	550	(4)
(2)	166	158	158	-	83.5	-	-	-	-	24	530	(2)
(0)	160	152	152	-	81.7	-	-	-	-	24	515	(0)



kobotool.com