TECNOLOGIA DI SBAVATURA

SIEF DEBURRING

Applicazioni ad alto rendimento

La precisione dal 1948.

MECCANOTECNICA

Dalla ricostruzione del dopoguerra
all'applicazione diffusa dei sistemi informatici:
un'ascesa tecnologica che ha profondamente
modificato i costumi e i metodi
della produzione industriale nel nostro paese.

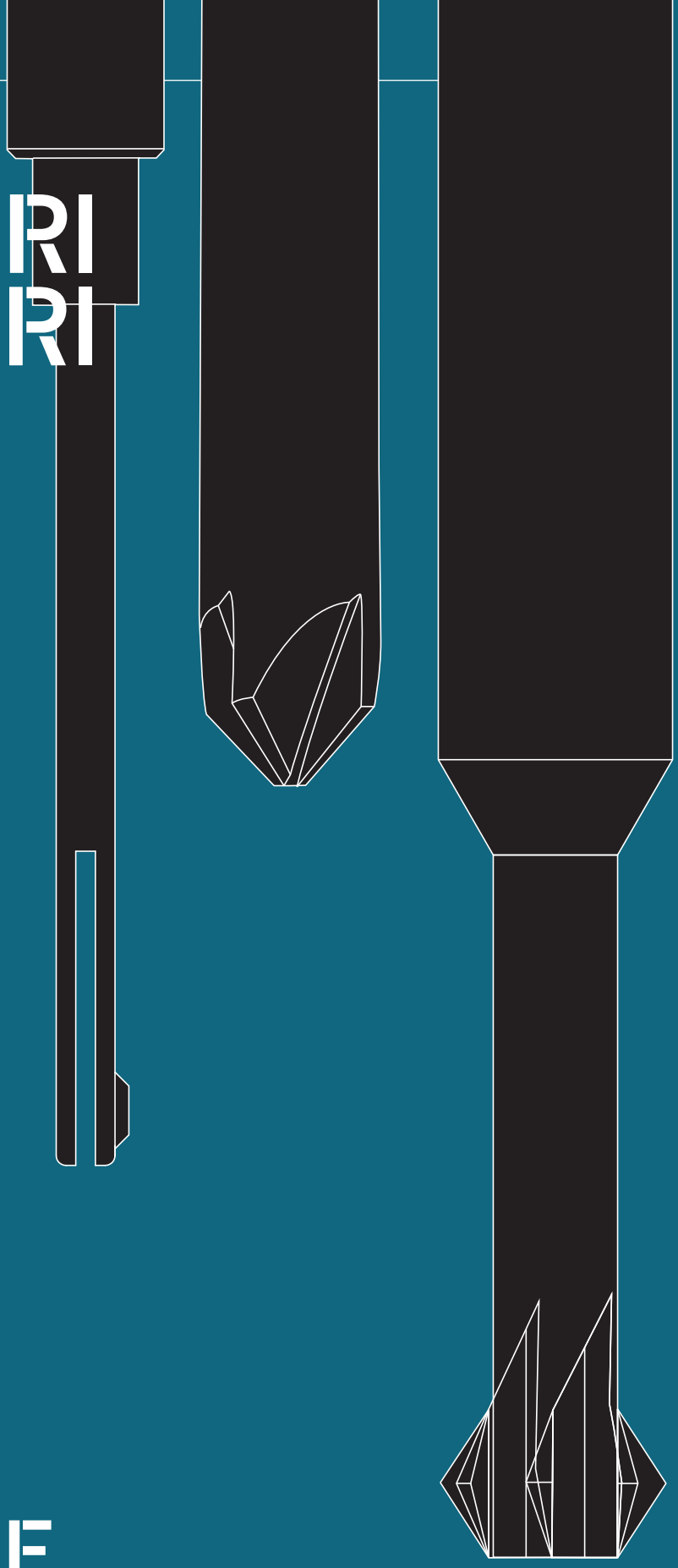
Oltre settant'anni, tre generazioni si sono
succedute alla guida della SEF, ma la matrice
che ha segnato lo sviluppo costante della nostra
società è sempre la medesima: il piacere
di cavalcare un'evoluzione straordinaria,
alla ricerca incessante di nuove tecnologie
per l'immediato futuro.

Con una passione che ci ha consentito di svolgere
un lavoro davvero importante: non tanto
in termini di volume, ma certamente
per la qualità dei servizi offerti e per lo sforzo
necessario a mantenere un livello
di specializzazione sempre al passo con i tempi.

Al di là del gratificante successo aziendale,
la nostra più grande soddisfazione si traduce
nell'aumento qualitativo del prodotto dei clienti
e nella maggiore competitività della loro
produzione.

Tanta dedizione ed operosità si confrontano oggi
con un nuovo impegno: quello di trasferire
ai più giovani un prezioso patrimonio fatto
di scuola tecnica e partecipazione umana,
fianco a fianco con il cliente per la soluzione
ottimale delle più diverse problematiche inerenti
ai processi produttivi.

FRESE SBAVATORI SVASATORI



SEFCARBIDE FRESE SBAVATORI SVASATORI

SEFCARBIDE

FW99

SEFCARBIDE

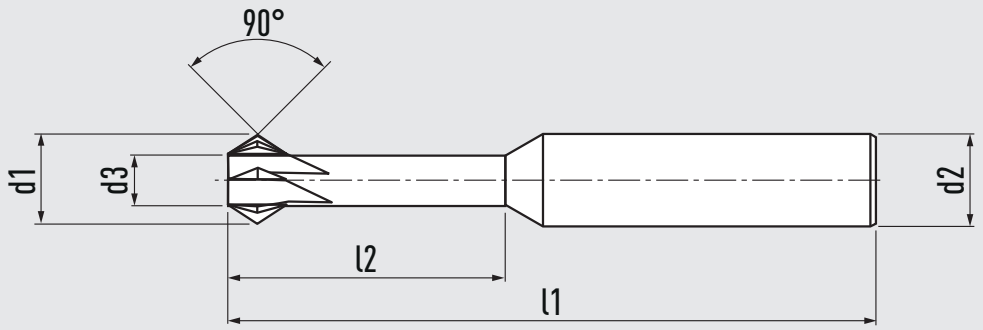
FRESE IN MDI PER SMUSSI IN TIRO E SPINTA

Geometria
Metallo duro integrale con gambo rinforzato secondo DIN 6535 forma HA.
Metallo duro micrograna.

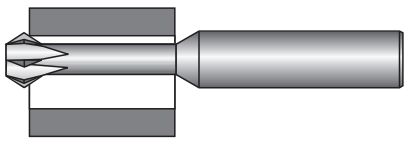
Esecuzioni speciali fornibili a richiesta, alcune lunghezze a disegno disponibili a stock.

Applicazioni
Smussatura di acciaio fuso, acciaio da costruzioni, acciaio da utensili, acciai al nickel, acciai refrattari.
Il rivestimento AF è particolarmente indicato per la lavorazione a secco.

FW99	Norme interne	rivestimento AF TiAlN

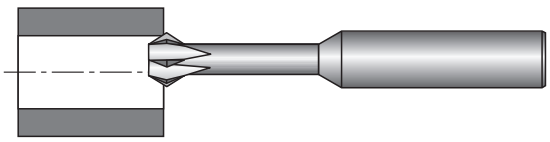


smussatura in tiro



codice	d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	Z
	h10	-2/h6				
399 0300	**3,0**	6	2,0	70	17	5
399 0450	**4,5**	6	2,5	70	15	7
399 0550	**5,5**	6	3,2	70	15	7
399 0650	**6,5**	8	4,0	70	20	7

smussatura in spinta



codice	d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	Z
	h10	-2/h6				
399 0760	**7,6**	8	4,7	70	20	7
399 0970	**9,7**	10	5,5	70	30	8
399 0115	**11,5**	12	7,5	70	30	9

4100

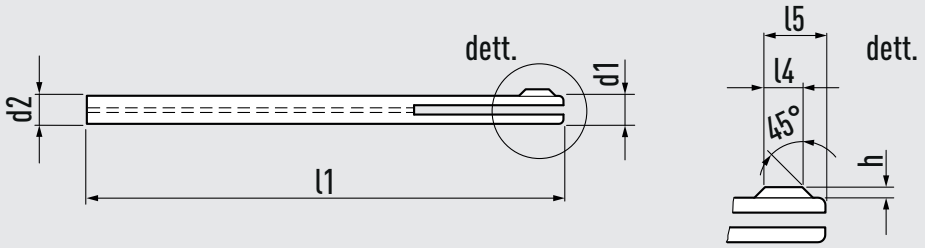
SEFCARBIDE

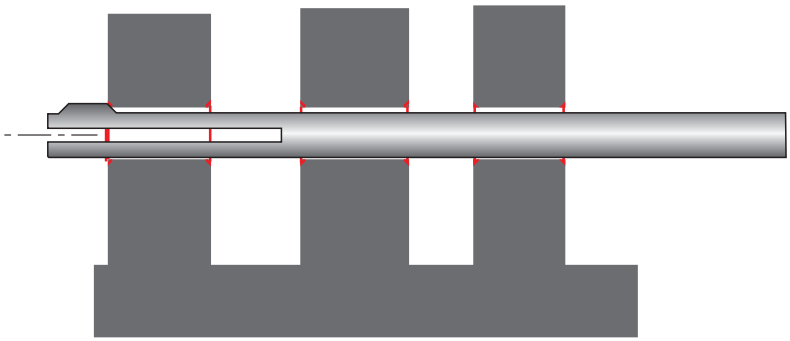
SBAVATORI A FORCELLA IN MDI PER PINZE

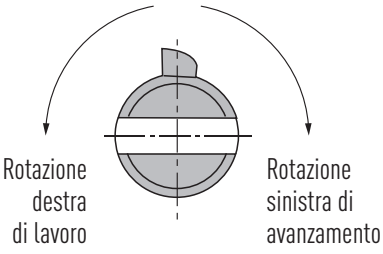
Geometria
Con refrigerazione interna e codolo cilindrico passante per impiego con pinze di serraggio. Per sbavatura interna ed esterna, di impiego universale su macchine utensili, fresatrici, torni e robots.

Applicazioni
- Smussatura di acciai, inox, ghisa, superleghe
- Possibile utilizzo su materiali duri e materiali non ferrosi

4100 Norme interne







per ø inclusi tra	d1 mm	d2 mm	l1 mm	l4 mm	l5 mm	h mm
1,91 - 2,15	1,9	1,9	80	1,0	2,05	0,35
2,16 - 2,40	2,1	2,1	80	1,5	2,60	0,40
2,41 - 2,70	2,4	2,4	80	1,5	2,90	0,40
2,71 - 2,90	2,6	2,6	90	1,5	2,95	0,45
2,91 - 3,25	2,9	2,9	90	2,0	3,65	0,45
3,26 - 3,60	3,2	3,2	90	2,0	3,80	0,60
3,61 - 4,25	3,6	3,6	90	2,0	4,10	0,70
4,26 - 4,75	4,2	4,2	90	2,5	4,60	0,70

per ø inclusi tra	d1 mm	d2 mm	l1 mm	l4 mm	l5 mm	h mm
4,76 - 5,30	4,7	4,7	100	2,5	4,85	0,75
5,31 - 5,80	5,2	5,2	100	2,5	4,85	0,75
5,81 - 6,20	5,6	5,6	110	3,0	5,80	0,80
6,21 - 6,70	6,0	6,0	110	3,0	5,90	0,90
6,71 - 7,10	6,5	6,5	110	3,0	5,85	0,85
7,11 - 7,60	6,9	6,9	110	3,5	6,95	0,95
7,61 - 8,05	7,3	7,3	110	3,5	7,00	1,00

4101

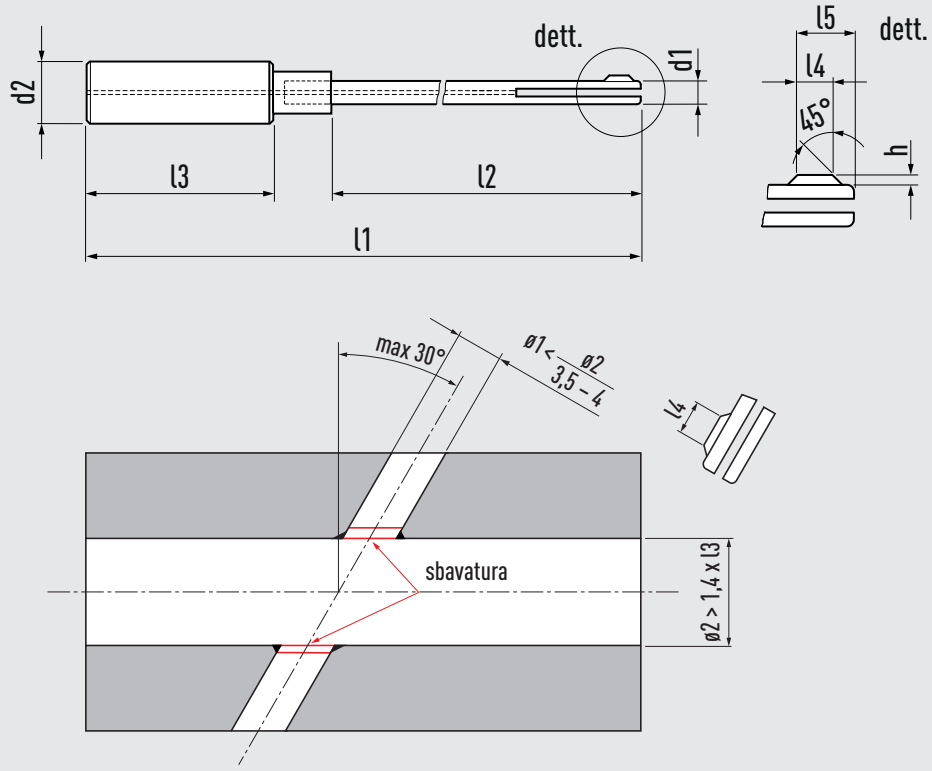
SEFCARBIDE

SBAVATORE A FORCELLA IN MDI PER MANDRINI IDRAULICI ED A CALETTAMENTO

Geometria
Con refrigerazione interna e codolo DIN 6535 passante per impiego in mandrini a espansione idraulica e per calettamento per sbavatura interna ed esterna, di impiego universale su macchine utensili, fresatrici, torni e robots.

Applicazioni
- Smussatura di acciai, inox, ghisa, superleghe
- Possibile utilizzo su materiali duri e materiali non ferrosi

4101 | **Norme interne**



per ø inclusi tra	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	l4 mm	l4 mm	h mm
1,91 - 2,15	1,9	6	120	69	36	1,0	2,05	0,35
2,16 - 2,40	2,1	6	120	69	36	1,5	2,60	0,40
2,41 - 2,70	2,4	6	120	69	36	1,5	2,90	0,40
2,71 - 2,90	2,6	6	130	79	36	1,5	2,95	0,45
2,91 - 3,25	2,9	6	130	79	36	2,0	3,65	0,45
3,26 - 3,60	3,2	10	135	80	40	2,0	3,80	0,60
3,61 - 4,25	3,6	10	135	80	40	2,0	4,10	0,70
4,26 - 4,75	4,2	10	135	80	40	2,5	4,60	0,70

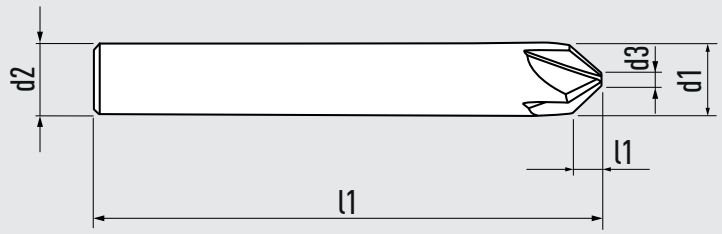
per ø inclusi tra	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	l4 mm	l4 mm	h mm
4,76 - 5,30	4,7	10	145	80	40	2,5	4,85	0,75
5,31 - 5,80	5,2	10	145	90	40	2,5	4,85	0,75
5,81 - 6,20	5,6	10	155	90	40	3,0	5,80	0,80
6,21 - 6,70	6,0	16	165	102	48	3,0	5,90	0,90
6,71 - 7,10	6,5	16	165	102	48	3,0	5,85	0,85
7,11 - 7,60	6,9	16	165	102	48	3,5	6,95	0,95
7,61 - 8,05	7,3	16	165	102	48	3,5	7,00	1,00

5001

SEFCARBIDE SVASATORI ELICOIDALI IN MDI

5001	Norme interne	60°

Rivestito, con taglio frontale, senza taglio al centro.



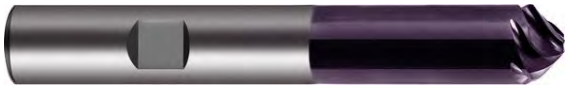
d1 js9 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	Z
6	6	1,5	57	3,9	5
8	8	2,0	63	5,2	5
10	10	2,5	72	6,5	5
12	12	3,0	83	7,8	5
16	16	4,0	92	10,4	5
20	20	5,0	104	13,0	5

5002
5003

SEFCARBIDE SVASATORI ELICOIDALI IN MDI

5002	Norme interne	90°

Rivestito, senza taglio al centro.

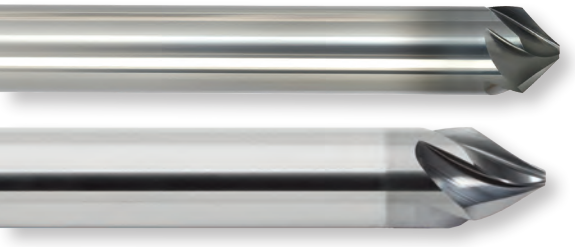


d1 js9 mm	d2 h6 mm	d3 mm	l1 mm	l2 mm	Z
6	6	1,5	57	2,25	5
8	8	2,0	63	3,0	5
10	10	2,5	72	3,75	5
12	12	3,0	83	4,5	5
16	16	4,0	92	6,0	5
20	20	5,0	104	7,5	5

5003	Norme interne	120°

Rivestito, senza taglio al centro.

d1 js9 mm	d2 h6 mm	l1 mm	l2 mm	Z
6	6	57	1,3	5
8	8	63	1,73	5
10	10	72	2,17	5
12	12	83	2,6	5
16	16	92	3,46	5
20	20	104	4,33	5



Our extensive range of high-performance solid carbide milling tools is engineered for chamfering, deburring, back chamfering, and profiling across a broad spectrum of materials. At the forefront of our offering is the 5HC Helical Chamfer Mill, renowned for its smooth cutting action and exceptional surface finish, guaranteeing optimal results with every application. Designed for both tough metals and delicate materials, our chamfer and profile tools deliver unmatched precision, durability, and efficiency, ensuring superior performance in every job.

FR

Notre large gamme d'outils de fraisage en carbure solide haute performance est conçue pour le chanfreinage, le déburring, le chanfreinage arrière et le profilage de divers matériaux. En tête de notre offre se trouve la Fraise Hélicoïdale 5HC, reconnue pour son action de coupe douce et sa finition de surface exceptionnelle, garantissant des résultats optimaux à chaque application. Conçus pour les métaux les plus durs comme pour les matériaux délicats, nos outils de chanfreinage et de profilage offrent une précision, une durabilité et une efficacité inégalées, assurant des performances supérieures dans toutes les applications.

DE

Unsere umfangreiche Auswahl an hochleistungsfähigen Fräswerkzeugen aus Vollhartmetall ist für das Fasen, Entgraten, Rückfasen und Profilieren einer Vielzahl von Materialien entwickelt. Unser Spitzenprodukt ist der 5HC Helix-Fasenfräser, bekannt für seine gleichmäßige Schnittbewegung und außergewöhnliche Oberflächenqualität, die bei jeder Anwendung optimale Ergebnisse gewährleistet. Ob bei der Bearbeitung von hochfesten Metallen oder empfindlichen Materialien – unsere Fasen- und Profilfräser bieten unvergleichliche Präzision, Haltbarkeit und Effizienz für herausragende Leistung in jeder Anwendung.

IT

La nostra vasta gamma di utensili per fresatura in metallo duro integrale ad alte prestazioni è progettata per smussatura, sbavatura, smussatura posteriore e profilatura su un ampio spettro di materiali. In prima linea nella nostra offerta c'è la Fresa per Smussatura Elicoidale 5HC, rinomata per la sua azione di taglio uniforme e l'eccezionale finitura superficiale, che garantisce risultati ottimali con ogni applicazione. Progettati sia per metalli tenaci che per materiali delicati, i nostri utensili per smussatura e profilatura offrono precisione, durata ed efficienza senza pari, garantendo prestazioni superiori in ogni lavoro.

PL

Nasza szeroka gama narzędzi skrawających z węglika spiekanego wysokiej wydajności została zaprojektowana do fazowania, usuwania zadziorów, fazowania tylnych i profilowania różnych materiałów. Naszym flagowym produktem jest Freza Helikalna 5HC, znana z gładkiej pracy skrawającej oraz doskonałej jakości wykończenia powierzchni, zapewniająca optymalne wyniki przy każdej aplikacji. Niezależnie od tego, czy pracujesz z twardymi metalami, czy delikatnymi materiałami, nasze frezy do fazowania i profilowania oferują niezrównaną precyzję, trwałość i wydajność, zapewniając doskonałą jakość pracy w każdej aplikacji.

Chamfer and Profile Mills

Fraises à Chanfreiner et à Profiler | Fasen- und Profilfräser | Frese per Smussi e Profili | Frezy do Fazowania i Profilowania

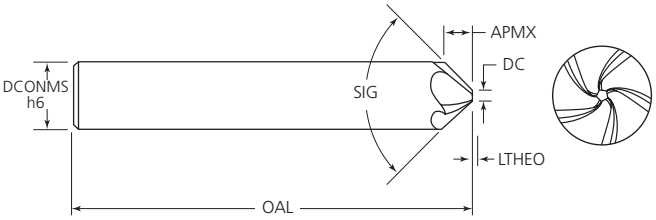
APG ADVANCED PRODUCT GROUP

Chamfer and Profile Mills

Fraises à Chanfreiner et à Profiler | Fasen- und Profilfräser | Frese per Smussi e Profili | Frezy do Fazowania i Profilowania

TuffCut® Series 5HC 90°

VHM | Z5 | <48HRC | HA DIN 6535 | ALtima® BLAZE

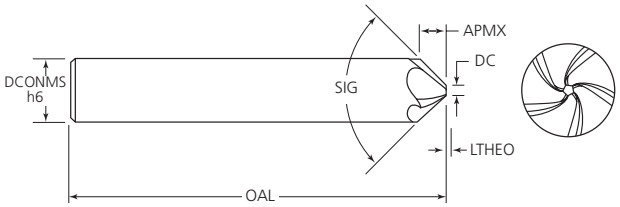


Tool No.	DCONMS	DC	SIG	OAL	APMX	LTHEO
5HCM06003B	6.0	1.5	90°	57.0	2.25	0.75
5HCM08003B	8.0	1.75	90°	63.0	3.125	0.875
5HCM10003B	10.0	1.75	90°	72.0	4.125	0.875
5HCM12003B	12.0	2.0	90°	83.0	5.0	1.0
5HCM16003B	16.0	2.25	90°	92.0	6.875	1.125

14

TuffCut® Series 5HC 60°

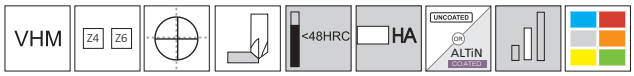
VHM | Z5 | <48HRC | HA DIN 6535 | ALtima® BLAZE

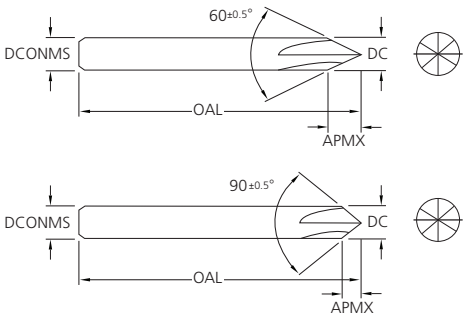


Tool Number	DCONMS	DC	SIG	OAL	APMX	LTHEO
5HCM06001B	6.0	1.5	60°	57.0	3.9	1.3
5HCM08001B	8.0	1.75	60°	63.0	5.4	1.5
5HCM10001B	10.0	1.75	60°	72.0	7.1	1.5
5HCM12001B	12.0	2.0	60°	83.0	8.7	1.7
5HCM16001B	16.0	2.25	60°	92.0	13.9	2.0

14

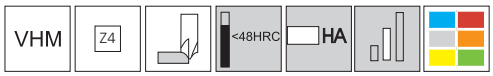
TuffCut® GP Chamfer Mills Series VCM 60°, VCM 90°

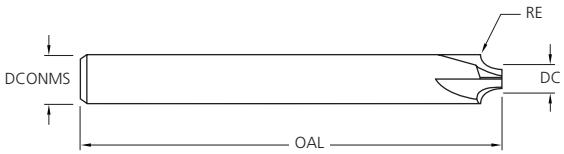




Series VCM 60°		Series VCM 90°		Tool Dimensions					
Uncoated	Coated	Uncoated	Coated	Ø DC	Ø DCONMS	SIG	OAL	APMX	NOF
VCM60 0400	VCM60 0400A	-	-	4.0	4.0	60°	51.0	3.3	4
-	-	VCM90 0400	VCM90 0400A	4.0	4.0	90°	51.0	1.8	4
VCM60 0600	VCM60 0600A	-	-	6.0	6.0	60°	64.0	5.0	4
-	-	VCM90 0600	VCM90 0600A	6.0	6.0	90°	64.0	2.8	4
VCM60 0800	VCM60 0800A	-	-	8.0	8.0	60°	64.0	6.8	4
-	-	VCM90 0800	VCM90 0800A	8.0	8.0	90°	64.0	3.8	4
VCM60 1000	VCM60 1000A	-	-	10.0	10.0	60°	73.0	8.5	6
-	-	VCM90 1000	VCM90 1000A	10.0	10.0	90°	73.0	4.8	6
VCM60 1200	VCM60 1200A	-	-	12.0	12.0	60°	84.0	10.0	6
-	-	VCM90 1200	VCM90 1200A	12.0	12.0	90°	84.0	5.8	6
VCM60 1600	VCM60 1600A	-	-	16.0	16.0	60°	93.0	13.5	6
-	-	VCM90 1600	VCM90 1600A	16.0	16.0	90°	93.0	7.8	6

TuffCut® GP Corner Rounding Series ACR





Series ACR	Tool Dimensions			
Tool No.	Ø DC	DCONMS	OAL	RE
ACR0300-0.25R	2.3 / 2.4	3.0	51.0	0.25
ACR0400-0.5R	2.8 / 2.9	4.0	51.0	0.5
ACR0500-0.75R	3.3 / 3.4	5.0	57.0	0.75
ACR0500-1.0R	2.7 / 2.9	5.0	57.0	1.0
ACR0600-1.5R	2.7 / 2.9	6.0	64.0	1.5
ACR0600-2.0R	1.7 / 1.9	6.0	64.0	2.0
ACR0800-2.0R	3.7 / 3.9	8.0	64.0	2.0
ACR1000-3.0R	3.7 / 3.9	10.0	73.0	3.0
ACR1200-4.0R	3.7 / 3.9	12.0	84.0	4.0
ACR1600-5.0R	5.7 / 5.9	16.0	93.0	5.0
ACR1600-6.0R	3.7 / 3.9	16.0	93.0	6.0

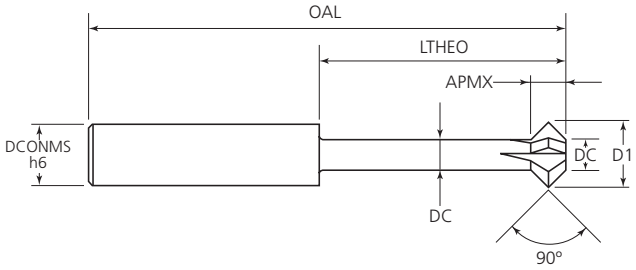
M.A. FORDMAX RANGE

Chamfer and Profile Mills

Fraises à Chanfreiner et à Profiler | Fasen- und Profilfräser | Frese per Smussi e Profili | Frezy do Fazowania i Profilowania

TuffCut® GP Series FBCM

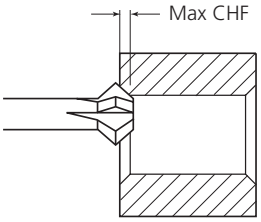
VHM | Multi | <55HRC | HA DIN 6535 | ALtima® Xtreme



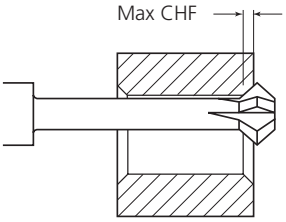
Tool No.	D1	DCONMS	DC	OAL	APMX	LTHEO	NOF	Max CHF
FBCM 03N3H	3.0	4.0	1.5	50.0	1.5	11.5	3	0.6
FBCM 04N3H	4.0	4.0	2.0	50.0	2.0	15.0	3	0.9
FBCM 05N3H	5.0	6.0	2.5	57.0	2.5	18.5	3	1.1
FBCM 06N3H	6.0	6.0	3.0	64.0	3.0	22.0	3	1.4
FBCM 08N3H	8.0	8.0	4.0	63.0	4.0	29.0	4	1.8
FBCM 10N3H	10.0	10.0	5.0	72.0	5.0	36.0	5	2.3
FBCM 12N3H	12.0	12.0	6.0	83.0	6.0	43.0	5	2.8

15

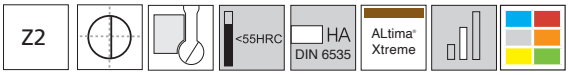
Front chamfer

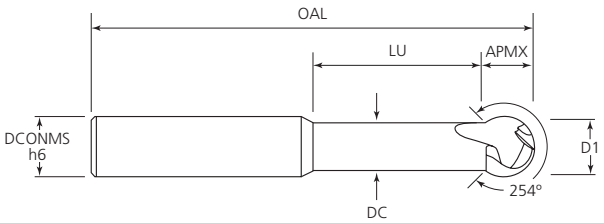


Back chamfer



TuffCut® GP Series FBPM





Tool No.	D1	DCONMS	DC	OAL	APMX	LU	RE
FBPM 03N3H	3.0	4.0	2.4	50.0	2.5	9.0	R1.5
FBPM 04N3H	4.0	4.0	3.2	50.0	3.5	11.5	R2.0
FBPM 05N3H	5.0	6.0	4.0	57.0	4.5	14.0	R2.5
FBPM 06N3H	6.0	6.0	4.8	64.0	5.4	16.6	R3.0
FBPM 08N3H	8.0	8.0	6.4	63.0	7.4	21.6	R4.0
FBPM 10N3H	10.0	10.0	8.0	72.0	9.4	26.6	R5.0
FBPM 12N3H	12.0	12.0	9.6	83.0	11.4	31.6	R6.0

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APG ADVANCED PRODUCT GROUP

Chamfers & Profile Mills - Technical Information

Informations Techniques | Technische Informationen | Informazioni Tecniche | Informacje Techniczne

TuffCut® Series 5HC

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

Workpiece Material Group		Material Type	Coolant			Vc-m/min	Tool Diameter				
			Max	Air	MMS		6mm	8mm	10mm	12mm	16mm
							fz-mm/tooth				
Steels	P	Low Carbon Steels	●	●	●	350	0.072	0.096	0.120	0.144	0.192
		Medium Carbon Steels	●	●	●	270	0.048	0.064	0.080	0.096	0.128
		Alloy Tool Steels	●	●	●	250	0.048	0.064	0.080	0.096	0.128
		Die/Tool Steels	●	●	●	220	0.042	0.056	0.070	0.084	0.112
Stainless Steels	M	Free Machining Stainless	●	X	○	180	0.042	0.056	0.070	0.084	0.112
		Austenitic Stainless	●	X	○	130	0.036	0.048	0.060	0.072	0.096
		Difficult Stainless	●	X	○	75	0.030	0.040	0.050	0.060	0.080
		PH Stainless	●	X	○	130	0.036	0.048	0.060	0.072	0.096
		Cobalt Chrome Alloys	●	X	○	75	0.030	0.040	0.050	0.060	0.080
		Duplex (22%)	●	X	○	75	0.030	0.040	0.050	0.060	0.080
		Super Duplex (25%)	●	X	○	55	0.030	0.040	0.050	0.060	0.080
Special Alloys	S	High Temp Alloys	●	X	X	45	0.030	0.040	0.050	0.060	0.080
		Titanium Alloys	●	X	X	100	0.036	0.048	0.060	0.072	0.096
Cast Irons	K	Grey Cast Iron	●	○	○	300	0.084	0.112	0.140	0.168	0.224
		Ductile Cast Iron	●	○	○	190	0.060	0.080	0.100	0.120	0.160
Hardened Steels	H	Hardened Steels 45 - 50HRC	○	●	○	80	0.030	0.040	0.050	0.060	0.080
		Hardened Steels 50 - 55HRC	○	●	○	60	0.036	0.048	0.060	0.072	0.096
Non Ferrous	N	Aluminium Alloys	●	X	○	600	0.072	0.096	0.120	0.144	0.192
		Brass / Bronze / Copper	●	X	○	350	0.054	0.072	0.090	0.108	0.144

● Preferred ○ Possible X Not Possible

Please note:

Technical data provided should be considered as advisory only and alterations may be necessary depending on the specific application.

Decreased feeds and/or a finish pass may be required to reach the desired surface finish requirements.

Decreased speeds and feeds may be required for heavy duty cutting.

Cutting speed (Vc) should be calculated from the effective cutting diameter using the following formula:

(Major diameter D2 + minor diameter D3) / 2.

Alternatively, estimate the actual diameter that is in contact with the workpiece.

TuffCut® GP Series FBCM

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

Recommended Speeds by Material Group

Workpiece Material Group		Material Type	Coolant			Deburr	Chamfer
			Max	Air	MMS	Vc-m/min	
Steels	P	Low Carbon Steels	●	●	●	230	220
		Medium Carbon Steels	●	●	●	200	185
		Alloy Tool Steels	●	●	●	175	165
		Die/Tool Steels	●	●	●	145	130
Stainless Steels	M	Free Machining Stainless	●	X	○	120	110
		Austenitic Stainless	●	X	○	110	100
		Difficult Stainless	●	X	○	75	65
		PH Stainless	●	X	○	110	100
		Cobalt Chrome Alloys	●	X	○	75	65
		Duplex (22%)	●	X	○	75	65
		Super Duplex (25%)	●	X	○	55	45
Special Alloys	S	High Temp Alloys	●	X	X	35	28
		Titanium Alloys	●	X	X	75	66
Cast Irons	K	Grey Cast Iron	●	○	○	200	175
		Ductile Cast Iron	●	○	○	185	165
Hardened Steels	H	Hardened Steels 45 - 50HRC	○	●	○	60	50
		Hardened Steels 50 - 55HRC	○	●	○	50	45
Non Ferrous	N	Aluminium Alloys	●	X	○	300	250
		Brass / Bronze / Copper	●	X	○	180	170

● Preferred ○ Possible X Not Possible

Please note:
Use the following formula to calculate the effective cutting diameter:
(Major diameter D1 + minor diameter D3) / 2. Alternatively, estimate the actual diameter that is in contact with the workpiece.

Recommended Feed per Tooth by Material Group

Workpiece Material Group		Type of Machining	Tool Diameter						
			3mm	4mm	5mm	6mm	8mm	10mm	12mm
			fz-mm/tooth						
Steels	P	Deburr	0.015	0.020	0.025	0.030	0.040	0.050	0.060
		Chamfer	0.008	0.010	0.013	0.015	0.020	0.025	0.030
Stainless Steels	M	Deburr	0.015	0.020	0.025	0.030	0.040	0.050	0.060
		Chamfer	0.008	0.010	0.013	0.015	0.020	0.025	0.030
High Temp Alloys	S	Deburr	0.004	0.006	0.007	0.016	0.019	0.022	0.026
		Chamfer	0.002	0.003	0.004	0.008	0.010	0.011	0.013
Titanium		Deburr	0.015	0.020	0.025	0.030	0.040	0.050	0.060
		Chamfer	0.008	0.010	0.013	0.015	0.020	0.025	0.030
Cast Irons	K	Deburr	0.015	0.020	0.025	0.030	0.040	0.050	0.060
		Chamfer	0.008	0.010	0.013	0.015	0.020	0.025	0.030
Hardened Steels 45 - 50HRC	H	Deburr	0.010	0.013	0.015	0.025	0.035	0.045	0.054
		Chamfer	0.005	0.007	0.008	0.013	0.018	0.023	0.027
Hardened Steels 50 - 55HRC		Deburr	0.008	0.010	0.011	0.020	0.030	0.040	0.050
		Chamfer	0.004	0.005	0.006	0.010	0.015	0.020	0.025
Non Ferrous	N	Deburr	0.015	0.020	0.025	0.030	0.040	0.050	0.050
		Chamfer	0.008	0.010	0.013	0.015	0.020	0.025	0.025

Please note: These are recommended starting conditions. However, please adjust the feed to suit the surface finish requirements.

M.A. FORDMAX RANGE

Chamfers & Profile Mills - Technical Information

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TuffCut® GP Series FBPM

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

Recommended Speeds and Depths of Cut by Material Group

Workpiece Material Group		Material Type	Ap	Ae		Roughing	Finishing
						0.05 - 0.1 x D	0.02 - 0.05 x D
						0.2 - 0.3 x D	0.02 - 0.05 x D
			Coolant			Vc-m/min	
			Max	Air	MMS		
Steels	P	Low Carbon Steels ≤180HB	○	●	●	250	280
		Med Carbon / Alloy Steels 180-350HB	○	●	●	200	220
		Pre-Hardened Steels 35-45HRC	○	●	●	180	200
Stainless Steels	M	Free Machining Stainless	●	○	○	160	180
		Austenitic Stainless	●	○	○	130	150
		Difficult Stainless	●	○	○	100	110
Special Alloys	S	High Temp Alloys	●	X	X	50	55
		Titanium Alloys	●	X	X	110	120
Cast Irons	K	Grey Cast Iron	○	●	X	220	250
		Ductile Cast Iron	○	●	X	180	200
Hardened Steels	H	Hardened Steels 45 - 50HRC	○	●	○	160	170
Non-Ferrous	N	Aluminium Alloys	●	X	○	300	500
		Brass / Bronze / Copper	●	X	○	250	400

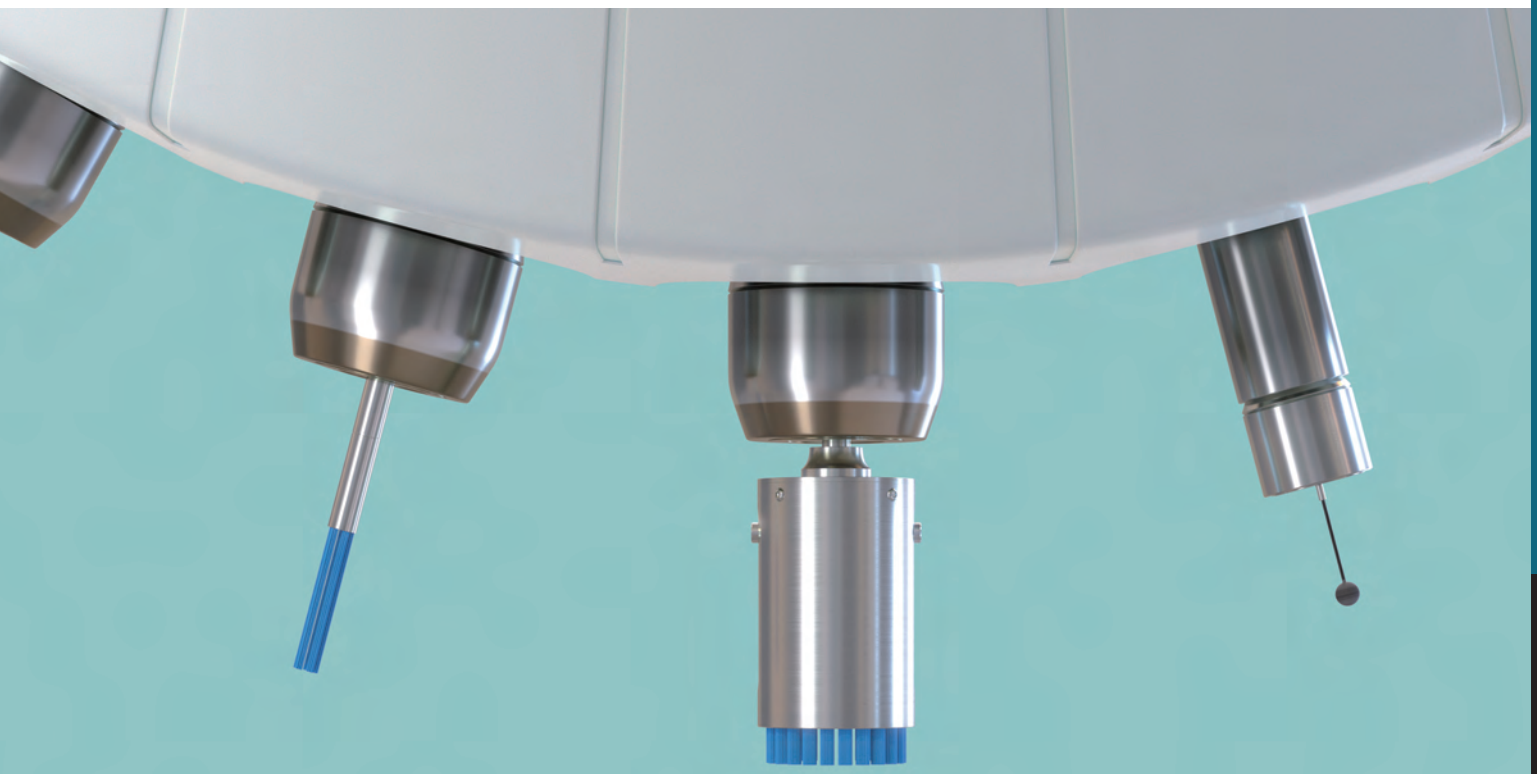
● Preferred ○ Possible X Not Possible

Recommended Feed per Tooth by Material Group

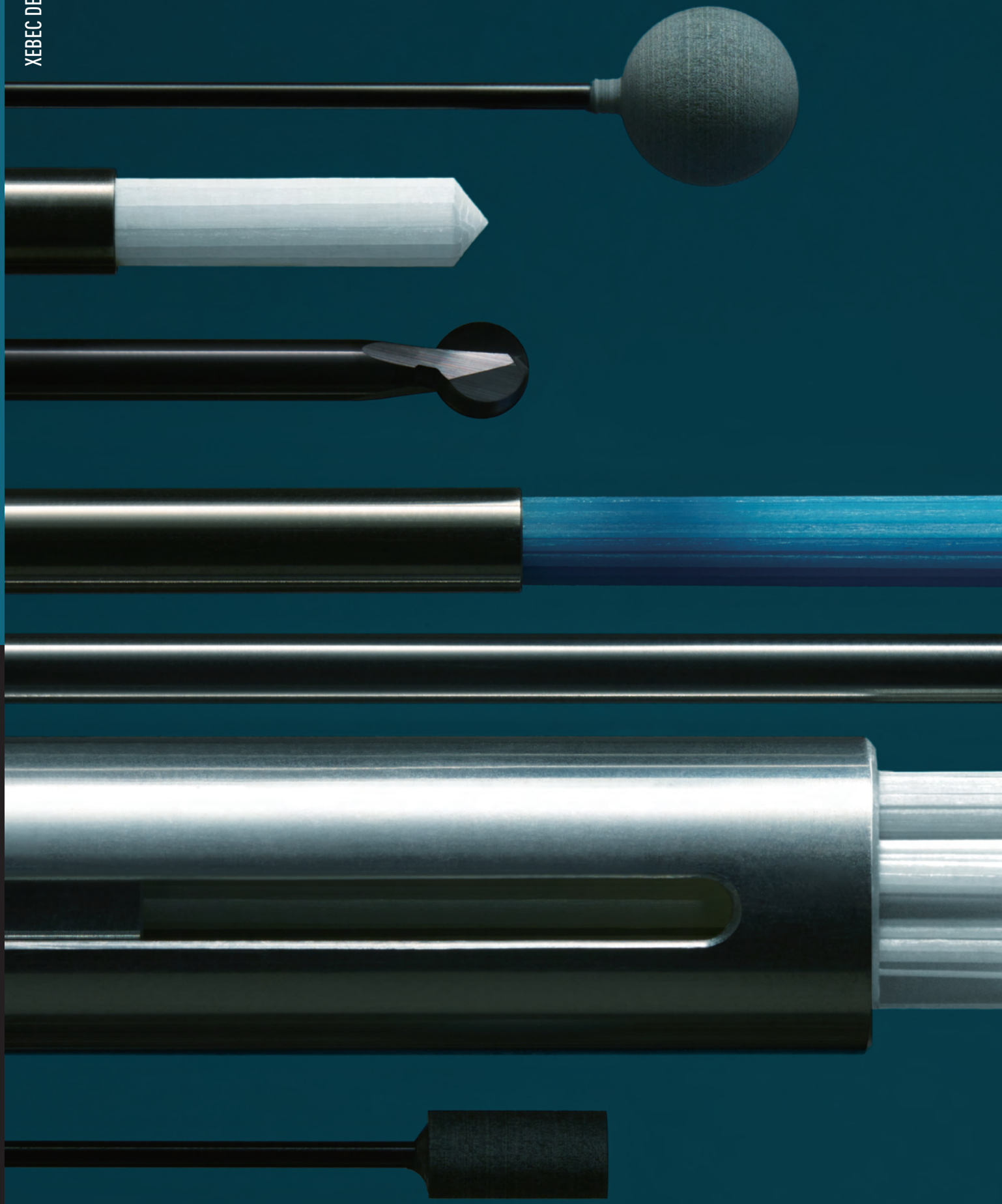
Workpiece Material Group		Material Type	Tool Diameter & Radius (mm)							
			3		4		5		6	
			1.5		2		2.5		3	
			Rough	Finish	Rough	Finish	Rough	Finish	Rough	Finish
			Fz - mm/tooth							
Steels	P	Low Carbon Steels ≤180HB	0.060	0.045	0.080	0.060	0.100	0.075	0.120	0.090
		Med Carbon / Alloy Steels 180-350HB	0.060	0.045	0.080	0.060	0.100	0.075	0.120	0.090
		Pre-Hardened Steels 35-45HRC	0.054	0.045	0.072	0.060	0.090	0.075	0.108	0.090
Stainless Steels	M	Free Machining Stainless	0.054	0.045	0.072	0.060	0.090	0.075	0.108	0.090
		Austenitic Stainless	0.045	0.045	0.060	0.060	0.075	0.075	0.090	0.090
		Difficult Stainless	0.045	0.045	0.060	0.060	0.075	0.075	0.090	0.090
Special Alloys	S	High Temp Alloys	0.024	0.030	0.032	0.040	0.040	0.050	0.048	0.060
		Titanium Alloys	0.036	0.030	0.048	0.040	0.060	0.050	0.072	0.060
Cast Irons	K	Grey Cast Iron	0.060	0.045	0.080	0.060	0.100	0.075	0.120	0.090
		Ductile Cast Iron	0.054	0.045	0.072	0.060	0.090	0.075	0.108	0.090
Hardened Steels	H	Hardened Steels 45 - 50HRC	0.039	0.038	0.052	0.050	0.065	0.063	0.078	0.075
Non-Ferrous	N	Aluminium Alloys	0.075	0.045	0.100	0.060	0.125	0.075	0.150	0.090
		Brass / Bronze / Copper	0.060	0.045	0.080	0.060	0.100	0.075	0.120	0.090

Workpiece Material Group		Material Type	Tool Diameter & Radius (mm)					
			8		10		12	
			4		5		6	
			Rough	Finish	Rough	Finish	Rough	Finish
			Fz - mm/tooth					
Steels	P	Low Carbon Steels ≤180HB	0.160	0.120	0.200	0.150	0.240	0.180
		Med Carbon / Alloy Steels 180-350HB	0.160	0.120	0.200	0.150	0.240	0.180
		Pre-Hardened Steels 35-45HRC	0.144	0.120	0.180	0.150	0.216	0.180
Stainless Steels	M	Free Machining Stainless	0.144	0.120	0.180	0.150	0.216	0.180
		Austenitic Stainless	0.120	0.120	0.150	0.150	0.180	0.180
		Difficult Stainless	0.120	0.120	0.150	0.150	0.180	0.180
Special Alloys	S	High Temp Alloys	0.064	0.080	0.080	0.100	0.096	0.120
		Titanium Alloys	0.096	0.080	0.120	0.100	0.144	0.120
Cast Irons	K	Grey Cast Iron	0.160	0.120	0.200	0.150	0.240	0.180
		Ductile Cast Iron	0.144	0.120	0.180	0.150	0.216	0.180
Hardened Steels	H	Hardened Steels 45 - 50HRC	0.104	0.100	0.130	0.125	0.156	0.150
Non-Ferrous	N	Aluminium Alloys	0.200	0.120	0.250	0.150	0.300	0.180
		Brass / Bronze / Copper	0.160	0.120	0.200	0.150	0.240	0.180

XEBEC®

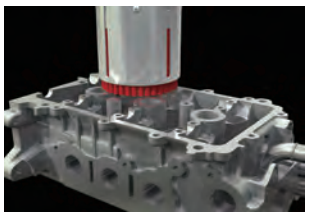


BEAUTIFUL DEBURRING®



Automotive

CNC deburring of cylinder head



Material: ADC12
Follows: Face milling
Tool:
XEBEC Brush Surface
A11-CB100M, p. 24

VIDEO

CNC deburring of scroll compressor

Material: Aluminum
Follows: Face milling
Tool:
XEBEC Brush Surface
A11-CB40M, p. 24

VIDEO

CNC deburring of inverter case

Material: ADC12
Follows: Face milling
Tool:
XEBEC Brush Surface
A32-CB25M, p. 24

VIDEO

CNC deburring of pinion gear

Material: S45C
Follows: Gear hobbing
Tool:
XEBEC Brush Surface
A32-CB40M, p. 24

VIDEO

CNC removal of coating on combustor part

Material: Ceramics
Follows: Face milling
Tool:
XEBEC Brush Surface
A11-CB15M, p. 24

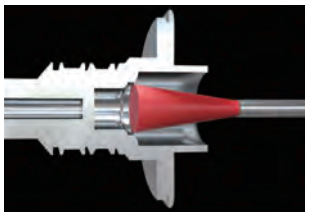
VIDEO

CNC polishing of metal mold for car body panel

Material: SKD11
Follows: End milling
Tool:
XEBEC Brush Surface
A32-CB25M & A11-CB25M, p. 24

VIDEO

CNC deburring of input shaft



Material: SCM
Follows: Drilling
Tool:
XEBEC Brush Crosshole
CH-A12-7M-TL, p. 28

VIDEO

CNC deburring of yoke

Material: SCM
Follows: Drilling
Tool:
Back Burr Cutter & Deburring Tool
Path, XC-58-A, p. 47

VIDEO

Manual polishing of tire mold

Material: Aluminum
Follows: Ball end milling
Tool:
XEBEC Brush Surface End Type
A11-EB06M, p. 26

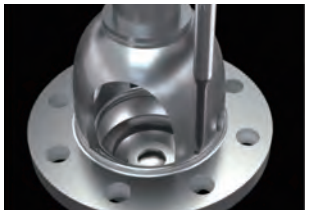
VIDEO

CNC deburring of camshaft

Material: FCD
Follows: Drilling
Tool:
Back Burr Cutter & Deburring Tool
Path, XC-38-A, p. 47

VIDEO

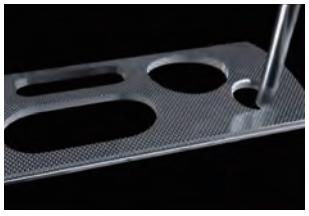
CNC deburring of differential case



Material: FCD
Follows: Drilling
Tool:
Back Burr Cutter & Deburring Tool
Path, XC-78-A, p. 47

VIDEO

Chamfering of exterior part



Material: CFRP
Follows: Tapping
Tool:
Burrless Chamfering Cutter
XC-C-06-N, p. 53

VIDEO

■ Material names are JIS. Common names are used when the JIS name is unavailable.

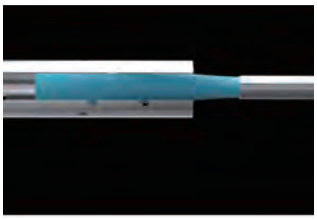
Industrial Machinery

CNC deburring of gearbox

Material: FC250
Follows: Face milling
Tool:
XEBEC Brush Surface
A32-CB60M, p. 24

VIDEO

CNC deburring of pipe



Material: Stainless steel
Follows: Drilling
Tool:
XEBEC Brush Crosshole
CH-A33-7M, p. 28

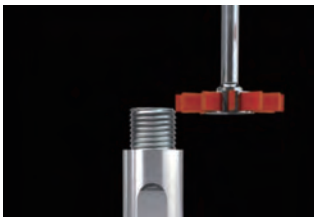
VIDEO

CNC deburring of slide cylinder

Material: Aluminum
Follows: End milling
Tool:
XEBEC Brush Surface
A21-CB25M, p. 24

VIDEO

CNC deburring of shaft



Material: SCM
Follows: Threading
Tool:
XEBEC Brush Wheel Type
W-A11-50, p. 32

VIDEO

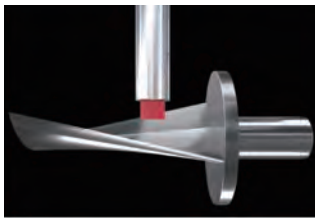
CNC roughing of brake disc

Material: SPHC
Follows: Turning
Tool:
XEBEC Brush Surface
A21-CB25M, p. 24

VIDEO

Aerospace

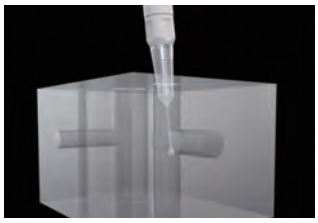
CNC polishing of turbine blade



Material: SUS630
Follows: Ball end milling
Tool:
XEBEC Brush Surface
A32-CB25M & A11-CB25M, p. 24

VIDEO

Manual deburring of hydraulic manifold



Material: Aluminum
Follows: Drilling
Tool:
XEBEC Stone Flexible Shaft
CH-PM-6B, p. 57

VIDEO

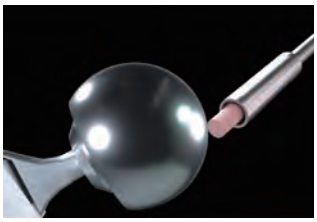
Manual deburring of shaft

Material: Aluminum
Follows: Casting
Tool:
XEBEC Stone Mounted Point
AX-PM-6T, p. 59

VIDEO

Orthopedic Medical Devices

CNC polishing of artificial hip joint



Material: CoCrMo
Follows: Turning
Tool:
XEBEC Brush Surface
A13-CB06M, p. 24

VIDEO

CNC deburring of osteosynthesis screw

Material: Titanium
Follows: End milling
Tool:
XEBEC Brush Surface End Type
A11-EB06M, p. 26

VIDEO

CNC deburring of spinal implant

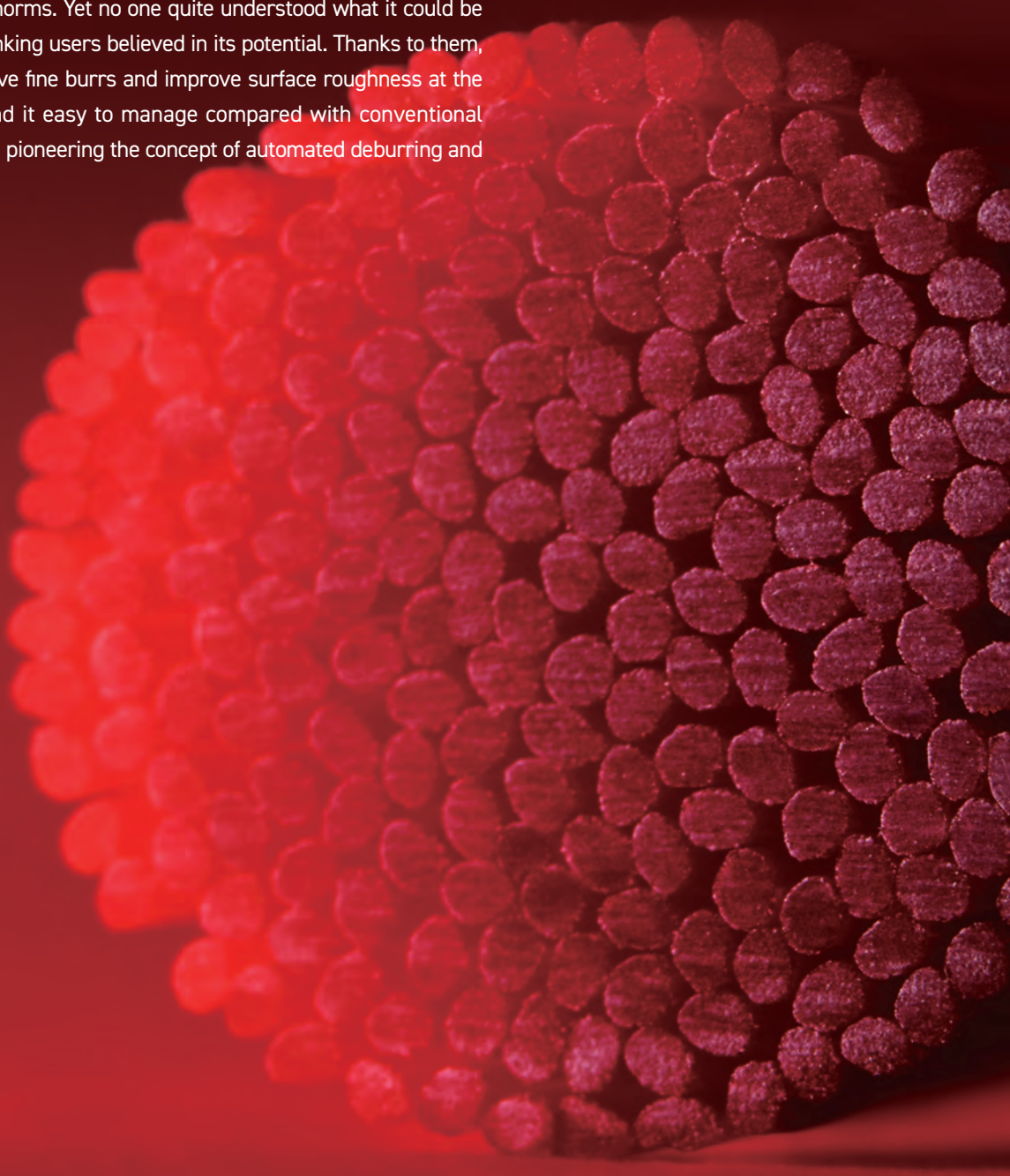
Material: PEEK resin
Follows: End milling
Tool:
Back Burr Cutter & Deburring Tool Path, XC-18-A, p. 47

VIDEO

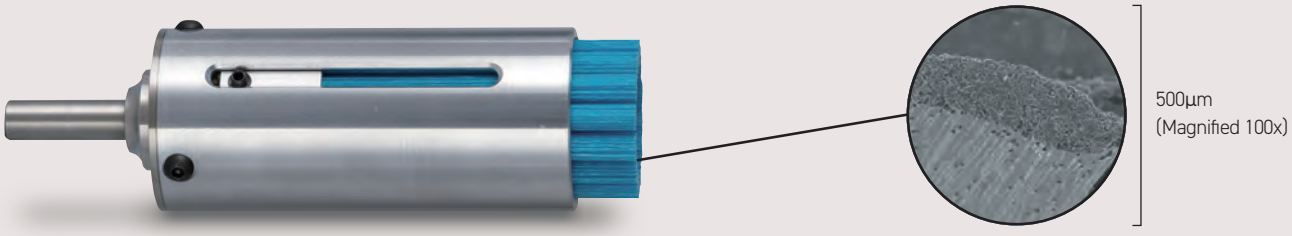
Automate deburring and polishing in your CNC machine

XEBEC Brush™

"What if we could make a brush out of the same material as ceramic grinding stones. It would be truly groundbreaking!"
And so, the ceramic brush was born. It was one of a kind; the result of a desire to challenge technological norms. Yet no one quite understood what it could be used for. Some forward-thinking users believed in its potential. Thanks to them, we found out it could remove fine burrs and improve surface roughness at the same time. They also found it easy to manage compared with conventional brushes. This resulted in us pioneering the concept of automated deburring and polishing.

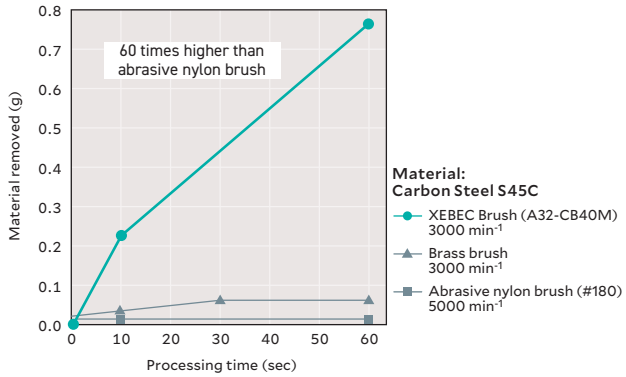


XEBEC Brush uses unique abrasive ceramic fiber material instead of abrasive grain. Each bristle consists of 1,000 ceramic fibers that work as cutting edges. Overwhelming grinding power, consistent cutting performance, and no deformation enables CNC deburring immediately after machining operations inside the same machine tool.



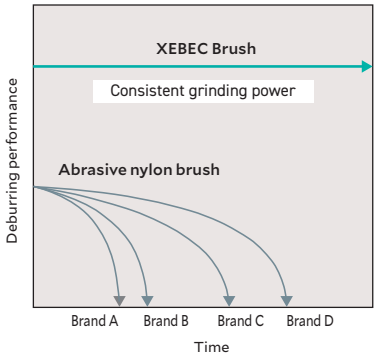
High grinding power

The content ratio of ceramic fiber is approximately 80%.
Cutting edges on the brush tips offer excellent grinding power.



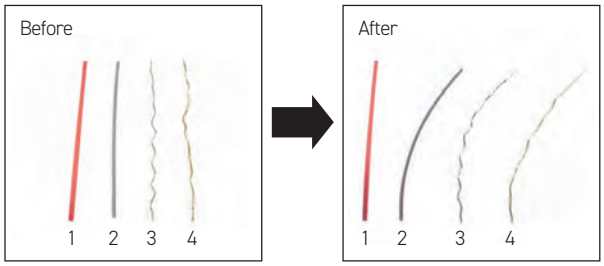
Consistent grinding performance

New cutting edges are always exposed. Consistent grinding performance throughout due to the uniform structure of the fiber.



No deformation

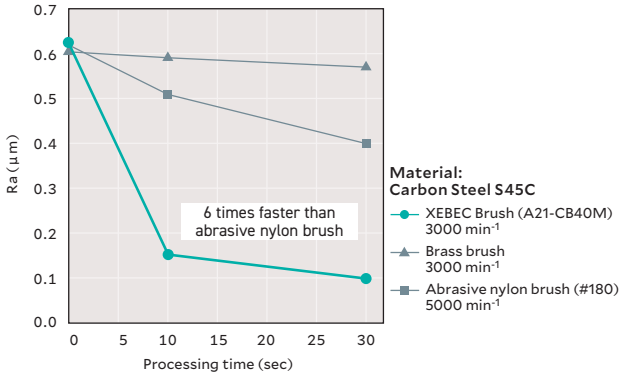
Maintains its straight shape and does not spread out like an old toothbrush. Easy to manage on mass production lines.



1. XEBEC Brush (A11 red bristle)
2. Abrasive nylon brush
3. Steel wire brush
4. Brass wire brush

Optimal for polishing

The high grinding power of ceramic fiber makes this tool optimal for polishing. Achievable surface roughness is Ra = 0.1 µm (Rz = 0.4 µm).

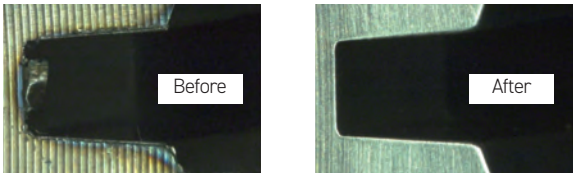


Brush selection

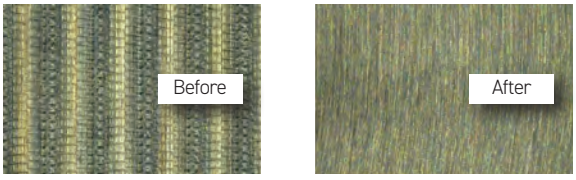
Workpiece material	Resin	Copper, Brass		
		Aluminum		
		Steel		
				Stainless steel
				HRSA steel
				Cast iron
				Hard material
Burr size	Micro fine burrs			
		Burr thickness (≤ 0.1 mm)		
			Burr thickness (0.1 - 0.2 mm)	
Brush (color)	A13 (pink)	A11 (red)	A21 (white)	A32 (blue)
Grinding power				High

■ Not all brush colors are available in all sizes.
■ HRSA (heat resistant super alloy)

Deburring



Polishing



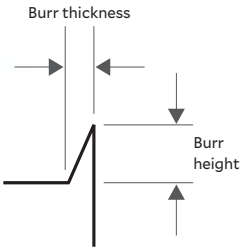
XEBEC Brush™ Surface

Patented

Deburring, cutter mark removal, and surface polishing

Applicable burr size

Burr thickness ≤ 0.2 mm
(Burrs this size can be bent by fingernails)



VIDEO

Applicable equipment

This tool can be mounted on equipment shown below.

Machining center | Lathe (with live tools) | Dedicated machine | Robot

Tool composition

Brush and sleeve are sold separately.
Assemble brush and sleeve before use.

Brush | Sleeve

Brushes

Brush (color)	Product code	Brush diameter (mm)	Bristle length ℓ (mm)	Matching sleeve	Fig.
A13 (pink)	A13-CB06M	ϕ6	30	S06M	1
	A13-CB15M	ϕ15	50	S15M-P	1
A11 (red)	A11-CB06M	ϕ6	30	S06M	1
	A11-CB15M	ϕ15	50	S15M-P	1
	A11-CB25M	ϕ25	75	S25M	1
	A11-CB40M	ϕ40	75	S40M-SD10	1
	A11-CB60M	ϕ60	75	S60M	1
	A11-CB100M	ϕ100	75	S100M	1
A21 (white)	A21-CB06M	ϕ6	30	S06M	1
	A21-CB15M	ϕ15	50	S15M-P	1
	A21-CB25M	ϕ25	75	S25M	1
	A21-CB40M	ϕ40	75	S40M-SD10	1
	A21-CB60M	ϕ60	75	S60M	1
	A21-CB100M	ϕ100	75	S100M	1
A32 (blue)	A32-CB06M	ϕ6	30	S06M	1
	A32-CB15M	ϕ15	50	S15M-P	1
	A32-CB25M	ϕ25	75	S25M	1
	A32-CB40M	ϕ40	75	S40M-SD10	1
	A32-CB60M	ϕ60	75	S60M	1
	A32-CB100M	ϕ100	75	S100M	1

Fig. 1

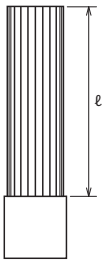
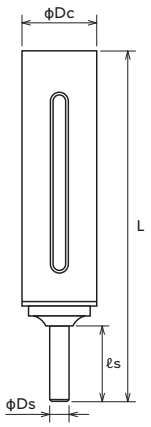


Fig. 2



- Bristle bundles are embedded in a single line on the periphery (except for ϕ6 type).
- Brush size is approximate as the tip expands with rotation.
- Brushes larger than ϕ100 are available by special order. Refer to page 27.

MANUAL

Sleeves

Product code	Brush dia. (mm)	External dia. Dc (mm)	Shank dia. Ds (mm)	Overall length L (mm)	Shank length ℓs (mm)	Matching brush	Fig.
S06M	ϕ6	ϕ10	ϕ6	70	29	A13/A11/A21/A32-CB06M	2
S15M-P	ϕ15	ϕ18.5	ϕ6	90	29	A13/A11/A21/A32-CB15M	2
S25M	ϕ25	ϕ30	ϕ8	140	30	A11/A21/A32-CB25M	2
S40M-SD10	ϕ40	ϕ45	ϕ10	140	30	A11/A21/A32-CB40M	2
S60M	ϕ60	ϕ65	ϕ12	150	35	A11/A21/A32-CB60M	2
S100M	ϕ100	ϕ110	ϕ16	162	40	A11/A21/A32-CB100M	2

- Overall length L is sleeve length not including brush projecton.
- The case of the S15M-P is made of fiber-reinforced plastic (FRP).

Refer to p. 63 to select brush color

Applications

Higher quality automated deburring

Cylinder head

Material: Aluminum
Follows: Face milling
Tool: A11-CB100M

Before

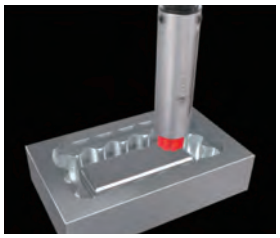
Abrasive nylon brush was used. It was time-consuming and not able to remove all burrs.

After

All burrs are removed by high grinding power. Quality is stable. The cycle time is shortened by a high feed rate.

Automation of time-consuming polishing

Metal mold



Material: Hard material
Follows: End milling
Tool: A11-CB25M

Before

40 minutes hand polishing per workpiece. Uneven quality resulted in complaints.

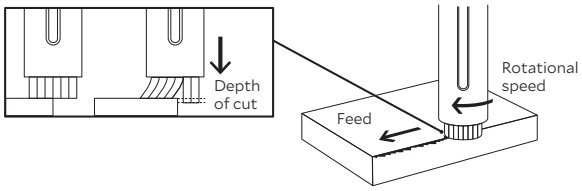
After

Shortened the polishing time to one minute per workpiece by automation. Achieved uniform polishing quality.

How to use

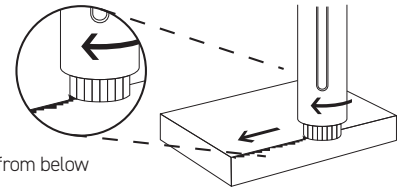
Rotational speed

Recommended parameters differ depending on brush size.
Refer to the chart below for starting parameters for each brush size.



Rotational direction

Set the rotational direction so that the brush pushes the burrs up from below.



Upcut against burrs from below

Feed rate - Deburring

Burr thickness: 0.05 mm (Very easily bent by fingernails)	4000 mm/min
Burr thickness: 0.1 mm (Easily bent by fingernails)	2500 mm/min

Feed rate - Polishing

Cutter mark removal, polishing	250 - 850 mm/min

Depth of cut - Vertical burrs

Formed by end milling & drilling (Are vertical to brush tip)	0.5 mm

Depth of cut - Horizontal burrs

Formed by face milling (Are horizontal to brush tip)	1.0 mm

Depth of cut - Polishing

Cutter mark removal, polishing	0.3 - 0.5 mm

Starting parameters

Product code	Rotational speed (min^{-1})			Depth of cut (mm)			Feed rate (mm/min)			Brush protrusion (mm)	
	Deburring	Cutter mark removal, polishing	Maximum	Vertical burrs	Horizontal burrs	Cutter mark removal, polishing	Burr thickness 0.05 mm	Burr thickness 0.1 mm	Cutter mark removal, polishing	Deburring	Cutter mark removal, polishing
A13-CB06M A11-CB06M A21-CB06M	8000	10000	10000	0.5	0.5	0.3	4000	2500	250	10	10
A32-CB06M	8000	10000	10000	0.3	0.3	0.3	4000	2500	250	10	10
A13-CB15M	4800	6000	6000	1.0	1.0	0.5	4000	2500	450	10	10
A11-CB15M A21-CB15M A32-CB15M	4800	6000	6000	0.5	1.0	0.5	4000	2500	450	10	10
A11-CB25M A21-CB25M A32-CB25M	4000	5000	5000	0.5	1.0	0.5	4000	2500	700	15	10
A11-CB40M A21-CB40M A32-CB40M	2400	3000	3000	0.5	1.0	0.5	4000	2500	800	15	10
A11-CB60M A21-CB60M A32-CB60M	1600	2000	2000	0.5	1.0	0.5	4000	2500	850	15	10
A11-CB100M A21-CB100M A32-CB100M	960	1200	1200	0.5	1.0	0.5	4000	2500	850	15	10

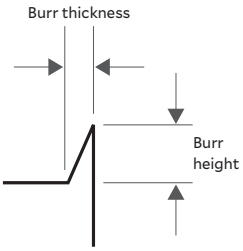
■ Plastic workpieces may deform or discolor. If this occurs, reducing rotational speed to approximately 10% of the starting parameter may solve the problem.

XEBEC Brush™ Surface End Type

Cutter mark removal and polishing on sealing surfaces

Applicable burr size

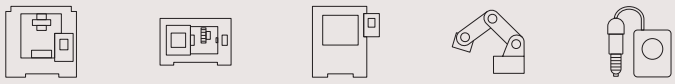
Burr thickness ≤ 0.1 mm
(Burrs this size can be easily bent by fingernails)



VIDEO

Applicable equipment

This tool can be used with equipment that controls rotational speed.



Machining center | Lathe (with live tools) | Dedicated machine | Robot | Rotary tool (electric)

Brushes

Brush (color)	Product code	Brush dia. (mm)	Shank dia. Dc (mm)	Bristle length ℓ (mm)	Overall length L (mm)	Standard rotational speed (min^{-1})	Maximum rotational speed (min^{-1})	Fig.
A13 (pink)	A13-EB01S	ϕ1	ϕ3	15	52	7000 - 12000	15000	3
	A13-EB015S	ϕ1.5	ϕ3	15	52	7000 - 12000	15000	3
	A13-EB02S	ϕ2	ϕ3	15	52	7000 - 12000	15000	3
	A13-EB025S	ϕ2.5	ϕ3	15	52	7000 - 12000	15000	3
	A13-EB03M	ϕ3	ϕ3	30	67	4000	6000	3
A11 (red)	A11-EB01S	ϕ1	ϕ3	15	52	7000 - 12000	15000	3
	A11-EB015S	ϕ1.5	ϕ3	15	52	7000 - 12000	15000	3
	A11-EB02S	ϕ2	ϕ3	15	52	7000 - 12000	15000	3
	A11-EB025S	ϕ2.5	ϕ3	15	52	7000 - 12000	15000	3
	A11-EB06M	ϕ5	ϕ3	20	57	7000	12000	4
A21 (white)	A21-EB06M	ϕ5	ϕ3	20	57	7000	12000	4
A32 (blue)	A32-EB06M	ϕ5	ϕ3	20	57	7000	12000	4

■ Brush size is approximate as the tip expands with rotation.

Precautions for use

The grinding load must less be than 2 N for hand use.
The brush will break if:

- used beyond the maximum rotational speed
- used beyond the maximum indentation load
- used with a pneumatic rotary tool

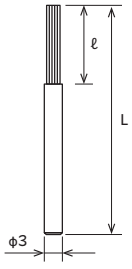


Fig. 3

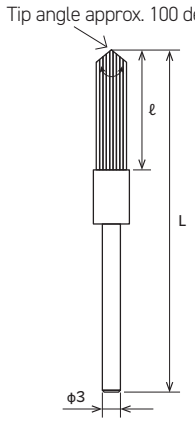


Fig. 4

A11-EB06M
A21-EB06M
A32-EB06M

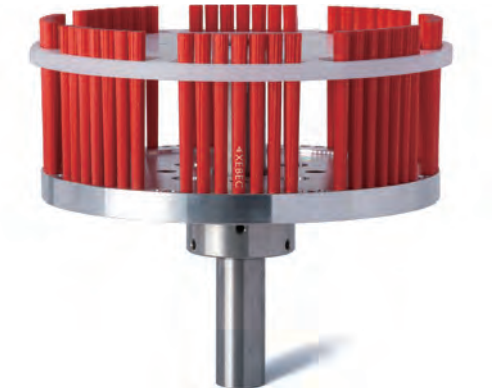
MANUAL

Refer to p. 63 to select brush color

XEBEC Brush™ Surface Extra-Large

Patented

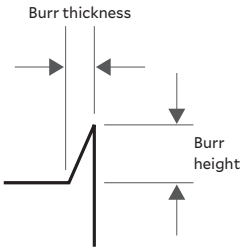
Deburring, cutter mark removal, surface polishing (› 100 mm)



Applicable burr size

Burr thickness ‹ 0.2 mm

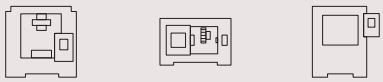
(Burrs this size can be bent by fingernails)



VIDEO

Applicable equipment

This tool can be mounted on equipment shown below.



Machining center | Lathe (with live tools) | Dedicated machine

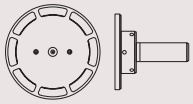
Tool composition

The brush main unit and slide ring are separate items.
Assemble the main unit and slide ring before use.

Brush

Slide ring

- Ring
- Base holder
- Shank



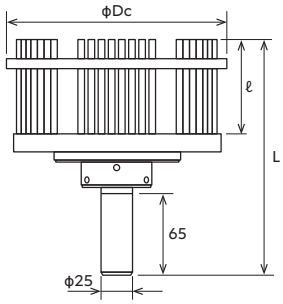
Brushes

Brush (color)	Product code	Brush diameter (mm)	Bristle length ℓ (mm)	Matching slide ring (Product code)	Fig.
A11 (red)	A11-CB125M	ϕ125	75	SR125M	5
	A11-CB165M	ϕ165	75	SR165M	5
	A11-CB200M	ϕ200	75	SR200M	5
A21 (white)	A21-CB125M	ϕ125	75	SR125M	5
	A21-CB165M	ϕ165	75	SR165M	5
	A21-CB200M	ϕ200	75	SR200M	5
A32 (blue)	A32-CB125M	ϕ125	75	SR125M	5
	A32-CB165M	ϕ165	75	SR165M	5
	A32-CB200M	ϕ200	75	SR200M	5

MANUAL

■ Brush size is approximate as the tip expands with rotation.

Fig. 5



Slide rings

Product code	Brush diameter (mm)	Outer dia. Dc (mm)	Shank diameter (mm)	Overall length L (mm)	Fig.
SR125M	ϕ125	ϕ135	ϕ25	187	5
SR165M	ϕ165	ϕ176	ϕ25	187	5
SR200M	ϕ200	ϕ211	ϕ25	187	5

■ The slide ring consists of a ring, base holder and shank.
■ Base holder and shank sizes are the same for all brush diameters. Ring size varies with brush diameter.
■ Combined weights of brushes and slide rings are: ϕ125: 1920 g, ϕ165: 2320 g and ϕ200: 2750 g.

Starting parameters

Product code	Rotational speed (min^{-1})			Depth of cut (mm)			Feed rate (mm/min)			Brush protrusion (mm)	
	Deburring	Cutter mark removal, polishing	Maximum	Vertical burrs	Horizontal burrs	Cutter mark removal, polishing	Burr thickness 0.05 mm	Burr thickness 0.1 mm	Cutter mark removal, polishing	Deburring	Cutter mark removal, polishing
A11-CB125M A21-CB125M A32-CB125M	800	1000	1000	0.5	1.0	0.5	4000	2500	700	15	10
A11-CB165M A21-CB165M A32-CB165M	600	750	750	0.5	1.0	0.5	4000	2500	700	15	10
A11-CB200M A21-CB200M A32-CB200M	480	600	600	0.5	1.0	0.5	4000	2500	650	15	10

■ In event of problems, refer to p. 63 (XEBEC Brush Surface) for possible adjustments.

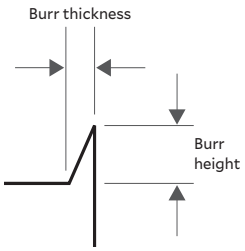
Refer to p. 63 to select brush color

XEBEC Brush™ Crosshole

Deburring, cutter mark removal, polishing on inner diameters & counterbores (≤ ϕ20 mm)

Applicable burr size

Burr thickness ≤ 0.1 mm
(Burrs this size can be easily bent by fingernails)



VIDEO

Applicable equipment

This tool is used on equipment with rotational speed control (> 6500 min^{-1}).

Machining center | Lathe (with live tools) | Dedicated machine | Robot

Brushes

Brush (color)	Product code	Brush dia. (mm)	Shank dia. (mm) Dc	Shank dia. (mm) Ds	Shank length ℓs (mm)	Bristle length ℓ (mm)	Overall length L (mm)	Maximum rotational speed (min^{-1})	Target hole diameter (mm)	Fig.
A12 (red)	CH-A12-1.5M	ϕ1.5	ϕ2.5	ϕ3	30	50	120	20000	ϕ3.5 – 5	6
	CH-A12-3M-TL	ϕ3	ϕ4	ϕ3	30	50	120	14000	ϕ5 – 8	6
	CH-A12-3L-TL	ϕ3	ϕ4	ϕ4	30	50	170	12000	ϕ5 – 8	6
	CH-A12-5M-TL	ϕ5	ϕ6	ϕ6	30	50	120	14000	ϕ8 – 10	6
	CH-A12-5L-TL	ϕ5	ϕ6	ϕ6	30	50	170	12000	ϕ8 – 10	6
	CH-A12-7M-TL	ϕ7	ϕ8	ϕ6	30	50	120	14000	ϕ10 – 20	6
	CH-A12-7L-TL	ϕ7	ϕ8	ϕ8	30	50	170	12000	ϕ10 – 20	6
	CH-A12-11M	ϕ11	ϕ12	ϕ12	30	50	120	14000	ϕ14 – 20	6
	CH-A12-11L	ϕ11	ϕ12	ϕ12	30	50	170	12000	ϕ14 – 20	6
A33 (blue)	CH-A33-3M	ϕ3	ϕ4	ϕ3	30	60	130	14000	ϕ5 – 8	6
	CH-A33-3L	ϕ3	ϕ4	ϕ4	30	60	180	12000	ϕ5 – 8	6
	CH-A33-5M	ϕ5	ϕ6	ϕ6	30	60	130	14000	ϕ8 – 10	6
	CH-A33-5L	ϕ5	ϕ6	ϕ6	30	60	180	12000	ϕ8 – 10	6
	CH-A33-7M	ϕ7	ϕ8	ϕ6	30	60	130	14000	ϕ10 – 14	6
	CH-A33-7L	ϕ7	ϕ8	ϕ8	30	60	180	12000	ϕ10 – 14	6
	CH-A33-11M	ϕ11	ϕ12	ϕ12	30	60	130	14000	ϕ14 – 20	6
	CH-A33-11L	ϕ11	ϕ12	ϕ12	30	60	180	12000	ϕ14 – 20	6

■ Brush size is approximate as the tip expands with rotation.

Precautions for use

The shank must be inserted ≥ 30 mm in the holder to secure it properly.

The brush will break if:
- used beyond the maximum rotational speed
- used with pneumatic or electric rotary tools
- rotated outside of the bore (outside workpiece)
- used with brush tip < 20 mm inside bore

The brush may break when used with:
- off-center or angled crossholes
- t-shaped holes, when secondary bore diameter ≥ main bore
- crossholes, when secondary bore diameter ≥ 70 % main bore

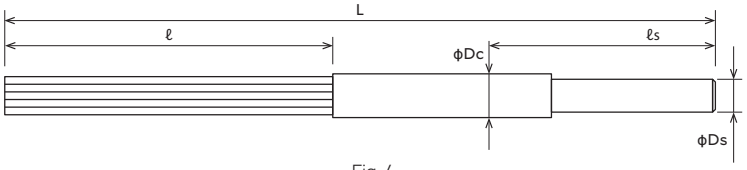


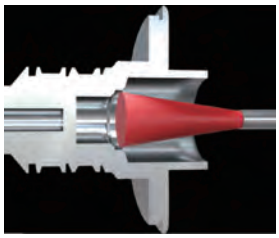
Fig. 6

Refer to p. 63 to select brush color

Applications

Automation of crosshole deburring

Input shaft



Material: SCM
Follows: Drilling
Tool: CH-A12-7M-TL

Before

Manual deburring by abrasive nylon brush. Not all burrs were removed and output was low.

After

A dedicated machine is used to automate deburring. All burrs are removed by high grinding power. Quality is stable.

Automation of crosshole deburring

Valve case

Material: Resin
Follows: Drilling
Tool: CH-A12-5M-TL

Before

Manual deburring by cutter was time-consuming. Cutter left scratches on inner surface.

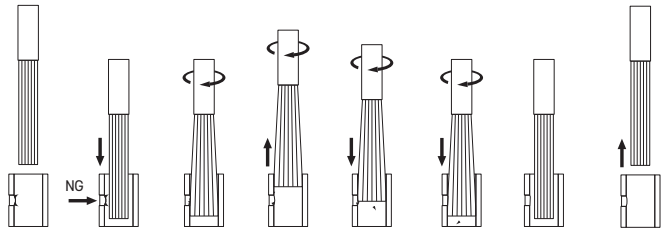
After

Deburring inside the machine reduced cycle time significantly. No scratching on inner surface and finish quality is stable.

How to use

Caution: Rotating the brush outside of the bore may damage the brush and cause injury to the operator.

Step 1 Step 2 Step 3 Step 4 Step 5 Step 6

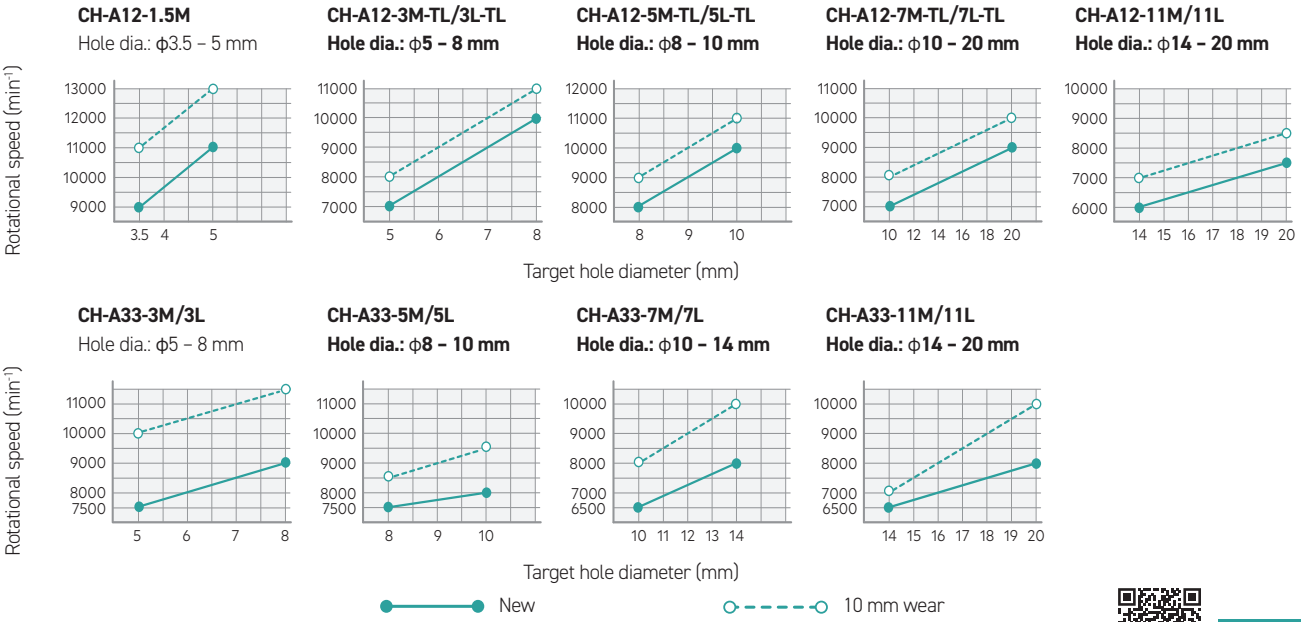


1. Insert the brush stationary into the bore.
2. Rotate the tool once past the crosshole.
3. Machine while pulling the brush back.
4. Machine while pushing the brush forward.
5. Stop the brush rotation.
6. Remove the brush when it is stationary.

Machining parameter adjustments

Rotational speed

Brush performance can be optimized by adjusting rotational speed in accordance with brush size, target hole diameter and brush wear. Refer below for recommended rotational speeds.



MANUAL

Feed rate

300 mm/min

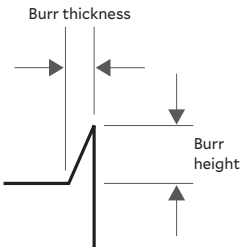
Rotational direction

Uniform deburring and edge quality can be achieved by rotating the tool in both clockwise and counter-clockwise directions.

XEBEC Brush™ Crosshole Extra-Large

Deburring, cutter mark removal, polishing on inner diameters & counterbores (› ϕ20 mm)

Applicable burr size
Burr thickness ‹ 0.1 mm
(Burrs this size can be easily bent by fingernails)



VIDEO

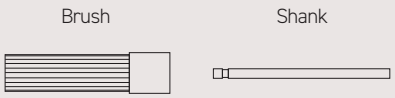
Applicable equipment

This tool is used on equipment with rotational speed control (> 4000 min^{-1}).

Machining center | Lathe (with live tools) | Dedicated machine | Robot

Tool composition

Brush and shank are sold separately.
Assemble before use.

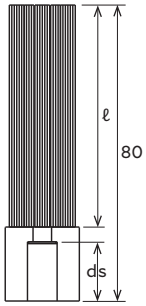


Brushes

Brush (color)	Product code	Brush dia. (mm)	Bristle length ℓ (mm)	Shank insertion depth ds (mm)	Max. rotational speed (min^{-1})	Target hole diameter (mm)	Matching shank	Fig.
A34 (dark blue)	CH-A34-15	ϕ15	60	10	9000	ϕ20 – 25	CH-SH-6	7
	CH-A34-20	ϕ20	60	16	9000	ϕ25 – 30	CH-SH-8	7
	CH-A34-25	ϕ25	60	16	9000	ϕ30 – 35	CH-SH-8	7

■ Brush size is approximate as the tip expands with rotation.
■ Overall length of assembled brush and shank is 150 mm.

Fig. 7

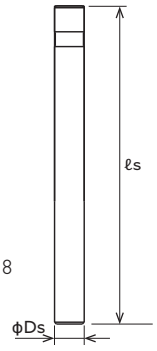


Shanks

Product code	Shaft dia. Ds (mm)	Shank length ℓs (mm)	Matching brush	Fig.
CH-SH-6	ϕ6	80	CH-A34-15	8
CH-SH-8	ϕ8	86	CH-A34-20, CH-A34-25	8

MANUAL

Fig. 8



Precautions for use

The shank must be inserted › 30 mm in the holder to secure it properly.

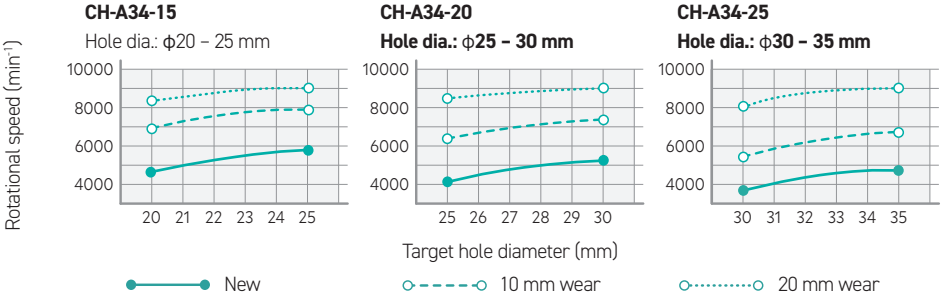
The brush will break if:
- used beyond the maximum rotational speed
- used with pneumatic or electric rotary tools
- rotated outside of the bore (outside workpiece)
- used with brush tip < 20 mm inside bore

The brush may break when used with:
- crossholes larger than ϕ12

Contact XEBEC technical support before using on crossholes > ϕ12.

Machining parameters

Brush performance can be optimized by adjusting rotational speed in accordance with brush size, target hole diameter, and brush wear. Refer below for recommended rotational speeds.



Rotational speed:
7000 min^{-1}
Feed rate:
300 mm/min
Rotational direction:
Uniform deburring and edge quality can be achieved by rotating the tool in both clockwise and counter-clockwise directions.

Applicable materials:
Plastics, nonferrous materials, steel, stainless steel.

Refer to p. 27 for 'How to use'

XEBEC Brush™ Crosshole Extra-Long

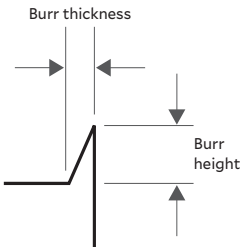
Patented

Deburring, cutter mark removal, polishing on bores over ϕ150 mm in depth

Custom-made item

Applicable burr size

Burr thickness ≤ 0.1 mm
(Burrs this size can be easily bent by fingernails)



Applicable equipment

This tool is used on full cover type equipment with rotational speed control (> 6500 min^{-1}).


Machining center


Lathe (with live tools)


Dedicated machine

Tool composition

Brush, collar and shank are sold separately. Assemble before use.

Brushes

Brush (color)	Product code	Brush diameter (mm)	Shank diameter Ds (mm)	Overall length L (mm)	Maximum rotational speed (min^{-1})
A12 (red)	*	ϕ3	ϕ4	400	12000
	*	ϕ5	ϕ6	400	12000
	*	ϕ7	ϕ8	400	12000
	*	ϕ11	ϕ12	400	12000
A33 (blue)	*	ϕ3	ϕ4	410	12000
	*	ϕ5	ϕ6	410	12000
	*	ϕ7	ϕ8	410	12000
	*	ϕ11	ϕ12	410	12000

■ This is a custom-made item. Contact XEBEC technical support for details.
■ Brush size is approximate as the tip expands with rotation.

Precautions for use

The brush will break if:
- used beyond the maximum rotational speed
- used with pneumatic or electric rotary tools
- rotated outside of the bore (outside workpiece)

The brush may break when used with:
- off-center or angled crossholes
- t-shaped holes, when the secondary bore diameter is > 50 % of the main bore
- crossholes, when the secondary bore diameter is > 25 % of the main bore

MANUAL

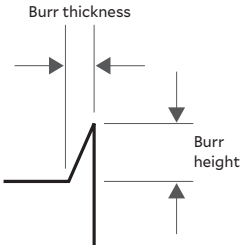
Refer to p. 29 for machining parameters
Refer to p. 66 to select brush color

XEBEC Brush™ Wheel Type

Deburring, polishing on inner diameters, side walls, and outside diameter threads

Applicable burr size

Burr thickness ≤ 0.1 mm
(Burrs this size can be easily bent by fingernails)



VIDEO

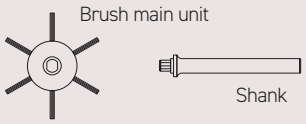
Applicable equipment

This tool can be mounted on equipment shown below.

Machining center | Lathe (with live tools) | Dedicated machine | Robot

Tool composition

Brush and shank are sold separately.
Assemble before use.



Brushes

Brush (color)	Product code	Brush diameter (mm)	Number of bundles	Matching shank	Fig.
A11 (red)	W-A11-50	ϕ50	6	W-SH-M/L	9
	W-A11-75	ϕ75	6		

Shanks

Product code	Shank diameter Ds (mm)	Shank length ℓs (mm)	Fig.
W-SH-M	ϕ8	70	10
W-SH-L	ϕ12	150	10

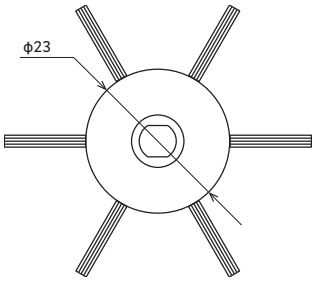


Fig. 9

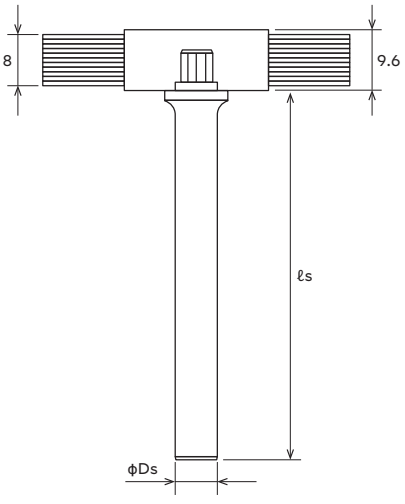


Fig. 10

Applications

Automation of thread deburring

Output shaft

Before

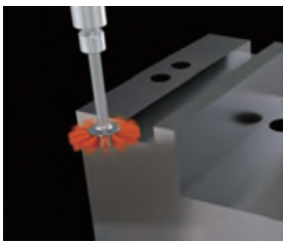
A file was used to manually deburr the thread but failed to remove all burrs. Quality was unstable.

After

All burrs are removed and quality is stable.

Material: SCM
Follows: Turning
Tool: W-A11-50

Automated deburring of face



Before

Burrs formed on the face were removed manually.

After

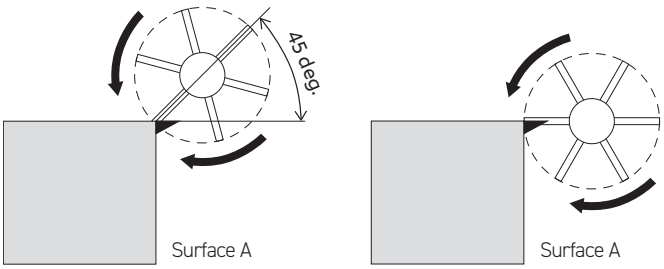
Burrs are completely removed inside the machining center.

Material: S50C
Follows: End milling
Tool: W-A11-50

How to use

As shown in the drawing at right, the best approach to removing burrs formed on surface A is to place the center of the brush at a 45-degree angle to the edge. Burrs are removed by rotating the brush both clockwise and counter-clockwise.

If this is not possible, position the brush as show at far right. The brush should also be rotated in both clockwise and counter-clockwise directions.



Machining parameters

Starting parameters

Product code	Cutting speed (m/min)	Rotational speed (min^{-1})	Feed per bundle (mm/bundle)	Depth of cut (mm)	Feed (mm/min)
W-A11-50	250	1600	0.5	0.2	4800
W-A11-75	250	1000	0.5	0.2	3000

Maximum parameters

Product code	Cutting speed (m/min)	Maximum rotational speed (min^{-1})	Feed per bundle (mm/bundle)	Depth of cut (mm)
W-A11-50 W-A11-75	150 - 350	3000	≤ 1.5	≤ 0.5

■ Bristle stiffness increases as brushes shorten with wear. Reduce the depth of cut if bristles break.

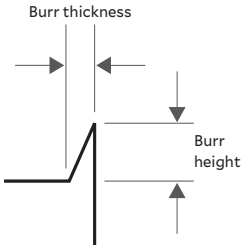
MANUAL

XEBEC Brush™ Turning

Deburring and polishing on CNC lathes without live tooling

Applicable burr size

Burr thickness ≤ 0.1 mm
(Burrs this size can be easily bent by fingernails)



VIDEO

Applicable equipment

This tool can be mounted on:

Lathe (with live tools) | Lathe (without live tools)

Tool composition

Brush and shank are sold separately. Assemble before use.

Brushes

Brush (color)	Product code	Brush diameter (mm)	Brush length ℓ (mm)	Matching holder	Fig.
A11 (red)	A11-TB025	ϕ2.5	15	TM-SH-06	1a
	A11-TB06	ϕ6	30	TM-SH-S2020 / TM-SH-S2525 / TM-SH-12	1a
	A11-CB06M	ϕ6	30	TM-SH-S2020 / TM-SH-S2525	1b
A21 (white)	A21-TB06	ϕ6	30	TM-SH-S2020 / TM-SH-S2525 / TM-SH-12	1a
	A21-CB06M	ϕ6	30	TM-SH-S2020 / TM-SH-S2525	1b
A32 (blue)	A32-TB06	ϕ6	30	TM-SH-S2020 / TM-SH-S2525 / TM-SH-12	1a
	A32-CB06M	ϕ6	30	TM-SH-S2020 / TM-SH-S2525	1b

■ Holders must be at least 30 mm inside tool blocks and securely fastened.

Round shanks

Product code	Length L (mm)	Shank dia. Ds (mm)	Bore size D (mm)	Cutting dia. (mm)	Max. side hole (mm)	Matching brush	Fig.
TM-SH-06	107	ϕ6	≥ 11	≥ ϕ12	< ϕ3	A11-TB025	2
TM-SH-12	133	ϕ12	≥ 20	≥ ϕ21	No limit	A11-TB06 / A21-TB06 / A32-TB06	2

■ Brush angle is fixed.

Square shanks

Product code	Length L (mm)	Shank height Hs (mm)	Height H (mm)	Shank width Ws (mm)	Width W (mm)	Shank length Ls (mm)	Matching brush	Fig.
TM-SH-S2020	124	20	26	20	24	90	A11-TB06 / A21-TB06 / A32-TB06 A11-CB06M / A21-CB06M / A32-CB06M	3
TM-SH-S2525	134	25	31	25	24	100	A11-TB06 / A21-TB06 / A32-TB06 A11-CB06M / A21-CB06M / A32-CB06M	3

■ Brush angle is set by the user. Refer to "How to use: External thread deburring mechanism" for brush angle recommendations.

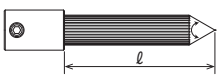


Fig. 1a

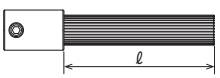


Fig. 1b

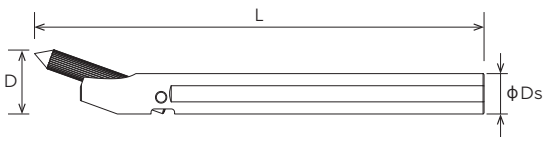


Fig. 2

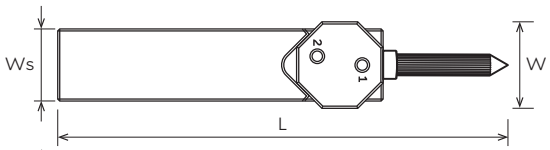


Fig. 3a

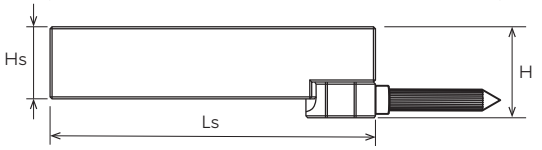
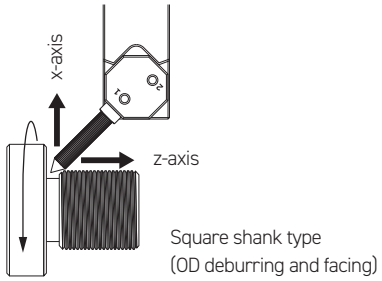


Fig. 3b

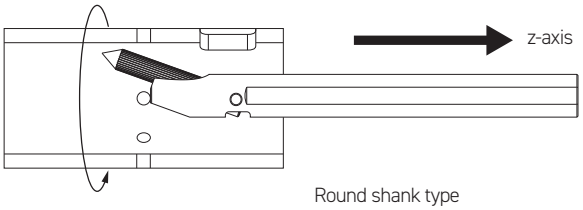
How to use

Pull the brush, do not push

This is a specialist pull turning and facing tool. Pulling the brush reduces bristle deflection and negotiates discontinuous geometries such as crossholes. The bristles will break if the brush is pushed. The tool must be pulled in the x-axis away from the main spindle when facing and pulled in the z-axis away from the main spindle when ID or OD deburring.



Square shank type
(OD deburring and facing)



Round shank type
(ID deburring)

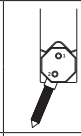
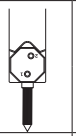
Depth of cut (Round shank)

The brush angle of XEBEC Brush Turning Round Shank is fixed at 20 degrees. Maximum depth of cut is 2.0 mm. Usable bristle length varies with the brush diameter.

Brush diameter (mm)	Brush angle	Max. usable bristle length
ϕ2.5 (TB025)	20 deg. (Fixed)	3.0 mm
ϕ6 (TB06)		5.5 mm

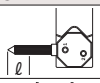
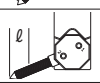
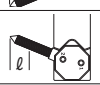
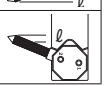
Brush angle (Square shank)

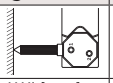
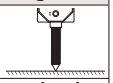
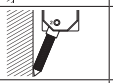
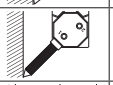
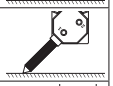
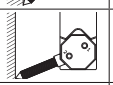
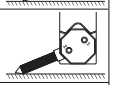
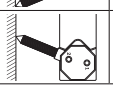
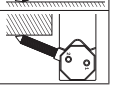
The square shank has eleven different angles to match the deburring edge. Arrows indicate permissible cutting direction.

Angle (degrees)	112.5	90	67.5	45	22.5	0	-22.5	-45	-67.5	-90	-112.5
Z-axis ⟷ Spindle Tailstock											
Cutting direction											

Depth of cut (Square shank)

The usable bristle length and maximum depth of cut of the square shank vary with the brush angle. Depth of cut is no more than 2.0 mm. Refer to the following tables for details.

Brush angle	Max. usable bristle length ℓ	
	Facing	OD turning
90 / 0 deg.	15 mm 	15 mm 
22.5 deg.	5 mm 	15 mm 
45 deg.	15 mm 	15 mm 
67.5 deg.	15 mm 	5 mm 
112.5 deg.	15 mm 	5 mm 

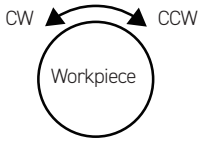
Brush angle	Max. depth of cut	
	Facing	OD turning
90 / 0 deg.	0.5 mm 	0.5 mm 
22.5 deg.	2.0 mm 	1.0 mm 
45 deg.	1.5 mm 	1.5 mm 
67.5 deg.	1.0 mm 	2.0 mm 
112.5 deg.	1.0 mm 	2.0 mm 

■ Refer to "How to use: External thread deburring mechanism" for brush angle recommendations.

How to use (cont'd)

Crosshole deburring mechanism (Round shank)

A shallow brush angle and large depth of cut are required to remove burrs on crossholes. The pressure exerted on the brush pushes it into a crosshole, with its tapered tip scraping off burrs as the brush is pulled back and out of the hole. If cycle time permits, the workpiece should be rotated both clockwise (CW) and counter-clockwise (CCW) for uniform edge quality.

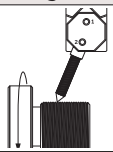


Rotate the workpiece in both directions if cycle time permits.

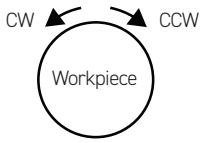
The maximum crosshole size for the small brush (A11-TB025) is ϕ3 mm. The bristles of the small brush are stiffer than the larger brush because they are only half the length. This limits the size of crosshole which can be deburred. The large brush (A11-TB06) has no crosshole size restriction.

External thread deburring mechanism (Square shank)

A steep brush angle is required to remove burrs on an external thread. The recommended brush angle for deburring the crests is 22.5 degrees. This concentrates most of the grinding power in the tip of the brush, while preventing bristles from being deflected on either side of a crest. Spreading and deflection of the brush results in a loss of grinding power and should be avoided.

Shank type	Target edges	Brush type	Brush angle
Square shank	Full thread (incl. start and end)	TB06 (Turning)	22.5 deg. 
	Thread (incl. start)		
	Thread (start only)	CB06 (Chamfer)	45 deg. 

The workpiece should be rotated clockwise (CW) for a right-hand thread and counter-clockwise (CCW) for a left-hand thread. If the correct rotational direction and brush angle (22.5 deg.) are used, the brush can be pulled easily along the thread. However, the angled brush will catch on the thread and break if the incorrect rotational direction is used.



Rotate the workpiece CW for a right-hand thread. Rotate CCW for a left-hand thread.

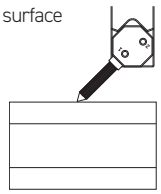
Machining parameters

Parameter	Range (same for all sizes)	Starting parameters (same for all sizes)
Cutting speed (m/min)	60 - 250	150
Feed (mm/rev)	0.1 - 0.5	0.3
Depth of cut (mm)	0.5 - 2.0	1.0 (continuous cutting surface)
		0.5 (discontinuous cutting surface)

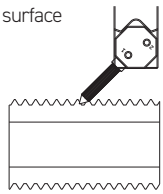
MANUAL

- Use on large burrs will greatly increase brush wear and shorten tool life.
- Starting parameters vary depending on the brush angle of the square shank. Refer to the manual for details.

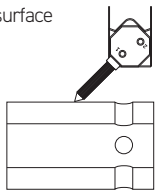
Continuous surface



Continuous surface

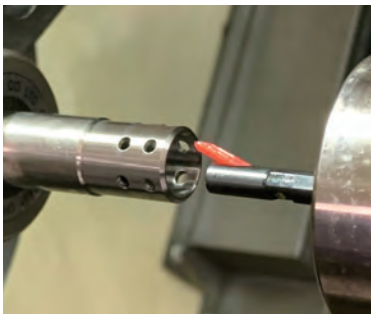


Discontinuous surface



Applications

Crosshole deburring



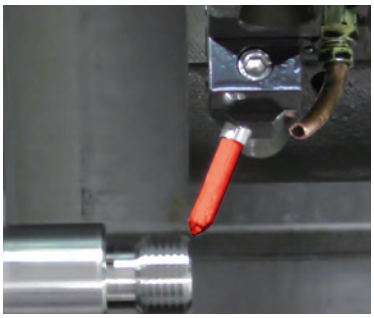
Material: Carbon steel

Main bore diameter: Outer 16 mm, Inner 12 mm

Crosshole diameter: 3 mm

Brush (color)	Holder	Angle (deg.)	Depth of cut (mm)	Cutting speed (m/min)	Feed rate (mm/rev)	Rotational direction
A11-TB025 (red)	TM-SH-06	20 (Fixed)	1.5	150	0.1	CW + CCW

Thread deburring

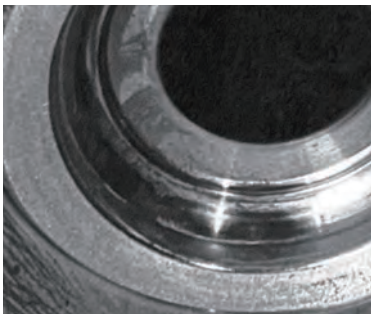


Material: Stainless steel

Thread size: 24 x 2 mm

Brush (color)	Holder	Angle (deg.)	Depth of cut (mm)	Cutting speed (m/min)	Feed rate (mm/rev)	Rotational direction
A32-TB06 (blue)	TM-SH-S2020	22.5	0.5	150	0.1	CW

Groove polishing



Material: YXR3 (HRC 60)

Brush (color)	Holder	Angle (deg.)	Depth of cut (mm)	Spindle speed (min^{-1})
A32-CB06M (blue)	TM-SH-2020	90	1.0	720

XEBEC Optional Tools

XEBEC Optional Tools

Reduce the burden of adjusting for brush wear and achieve more consistent deburring and polishing results.

Holder with brush

XEBEC Floating Holder™

A built-in spring helps to maintain stable load, reducing the frequency of wear offsets and brush protrusion length adjustments.

Floating holder in use

VIDEO

Sleeve with brush

XEBEC Self-Adjusting Sleeve™

A built-in gear mechanism automatically adjusts brush protrusion length, reducing human error and providing consistent machining performance.

Self-adjusting sleeve in use

VIDEO

Brush in setter tool

XEBEC Brush Length Adjustment Tool™

A tool for quick in-machine brush length adjustment.

XEBEC Floating Holder™

Straight Shank Type
BT Shank Type

Patented

Straight Shank Type used with XEBEC Brush Surface (ϕ6 – 100)

BT Shank Type used with XEBEC Brush Surface (ϕ6 – 25)

A built-in spring helps to maintain stable load, reducing the frequency of wear offsets and brush protrusion length adjustments.




VIDEO

Applicable equipment [Straight Shank Type]

This holder can be used on equipment shown below.


Machining center


Lathe (with live tools)


Dedicated machine


Robot

Applicable equipment [BT Shank Type]

This holder can be used with machine tools that are compatible with BT30/40 shanks.

Straight Shank Type

Product code	Matching brush dia. (mm)	Sleeve shank diameter (mm)	Maximum rotational speed (min^{-1})	Attachments	Fig.
FH-ST12-SL10	ϕ6	ϕ6 (use with bush 1●)	10000	1. ϕ6 bush 2. ϕ8 bush 3. Low-pressure spring 4. Standard spring♦ 5. High-pressure spring	11
	ϕ15	ϕ6 (use with bush 1●)	6000		
	ϕ25	ϕ8 (use with bush 2●)	5000		
	ϕ40	ϕ10	3000		
FH-ST20-60	ϕ60	ϕ12	2000	ϕ12 bush	12
FH-ST20-100	ϕ100	ϕ16	1200	ϕ16 bush	12

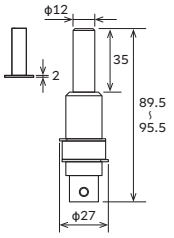


Fig. 11

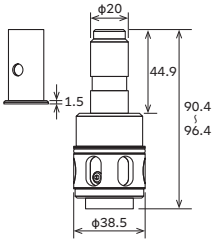


Fig. 12

♦ Installed when shipped.
● Attachments included when shipped.
■ Optional ϕ3 bush is available.
■ Refer to p. 41 for the spring load.

BT Shank Type

Product code	Matching brush dia. (mm)	Sleeve shank diameter (mm)	Maximum rotational speed (min^{-1})	Length under gauge line (mm)	Fig.
FH-BT30	ϕ6	ϕ6 (with ϕ6 bush○)	10000	75	13
	ϕ15	ϕ6 (with ϕ6 bush○)	6000		
	ϕ25	ϕ8	5000		
FH-BT40	ϕ6	ϕ6 (with ϕ6 bush○)	10000	60	14
	ϕ15	ϕ6 (with ϕ6 bush○)	6000		
	ϕ25	ϕ8	5000		

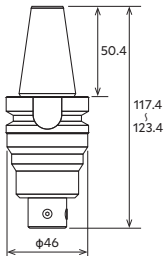


Fig. 13

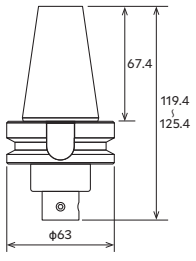


Fig. 14

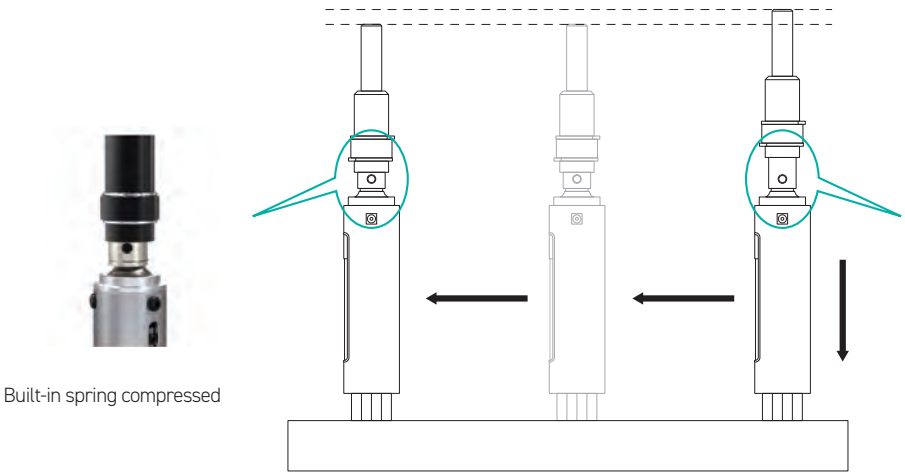
○ ϕ6 bush sold separately.
■ Refer to p. 41 for the spring load.

Precautions for use

- Lower the tool vertically onto the workpiece.
- The tool cannot be used on surfaces that are discontinuous or have protrusions.
- The tool may not function correctly on a horizontal machining center when spring load is low.

Mechanism

This tool has a built-in spring. The spring is compressed when the brush contacts the workpiece surface.



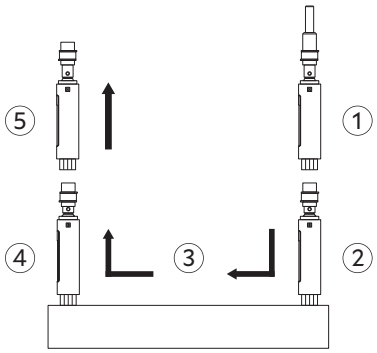
Built-in spring compressed

Lower the brush to compress the built-in spring. The spring contracts up to 6 mm.

Built-in spring without load

How to use

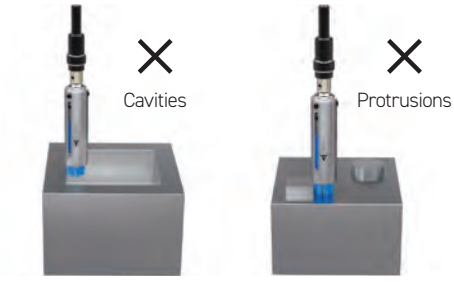
Product in use



The diagram to the left shows how to use the tool effectively.

1. Approach the workpiece surface from above without rotating the brush.
2. Set the depth of cut and compress the spring.
3. Rotate the brush and start feeding with the spring compressed.
4. Stop rotation and feed when finished machining.
5. Remove the brush upward from the workpiece surface.

Unacceptable workpiece shapes



Avoid cavities and protrusions to ensure proper operation of the floating mechanism.

FH-ST12-SL10 spring specifications

Spring type	Outer diameter (mm)	Spring constant (N/mm)	Overall length (mm)	Load by stroke (N)	
				0 mm	6 mm
Standard spring (installed)	ϕ10	0.30	40	4.5	6.3
Low-pressure spring (attachment)	ϕ10	0.30	30	1.5	3.3
High-pressure spring (attachment)	ϕ10	0.55	38	7.7	11.0
Maximum load spring (sold separately)	ϕ10	3.03	30	15.2	33.4

FH-ST20-60/100 and FH-BT30/40 load adjustment

Load adjustment	Load by stroke (N)		Load adjustment screw position
	0 mm	6 mm	
Standard float	2	6	When load adjustment screw is flush with shaft end.
Higher float	6	10	When load adjustment screw is fully inside shaft.

MANUAL

XEBEC Self-Adjusting Sleeve™

Patented

Used with
XEBEC Brush Surface (ϕ6 – 40)

A built-in gear mechanism automatically adjusts brush protrusion length, reducing human error and providing consistent machining performance.

VIDEO

Applicable equipment

This tool is used on equipment capable of precise angular control of the sleeve.


Machining center

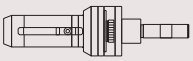

Dedicated machine


Robot

Tool composition

Consists of a sleeve and rack gear. Brushes are sold separately.

Sleeve



Rack gear

Sleeves

Product code	Matching brush	Sleeve outer dia. Dc (mm)	Maximum outer dia. Df (mm)	Shank diameter Ds (mm)	Overall length L (mm)	Shank length ℓs (mm)	Main body mass (g)	Maximum rotational speed (min^{-1})	Fig.
XP-AUT06M	A13-CB06M A11-CB06M A21-CB06M A32-CB06M	ϕ14.2	ϕ37	ϕ10	124.1	35.0	220	10000	15
XP-AUT15M	A13-CB15M A11-CB15M A21-CB15M A32-CB15M	ϕ23.4	ϕ37	ϕ10	136.3	35.0	270	6000	15
XP-AUT25M	A11-CB25M A21-CB25M A32-CB25M	ϕ34.6	ϕ60	ϕ16	189.0	41.5	795	5000	15
XP-AUT40M	A11-CB40M A21-CB40M A32-CB40M	ϕ50.0	ϕ60	ϕ16	189.0	41.5	910	3000	15

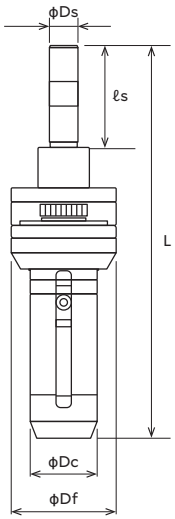
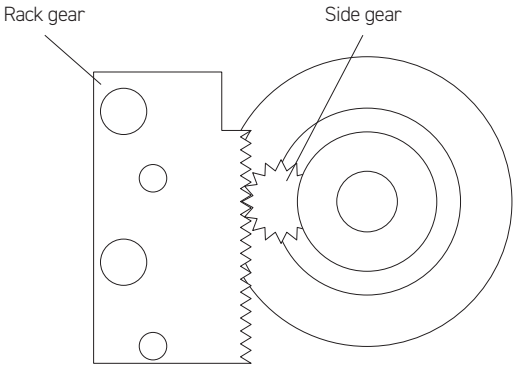


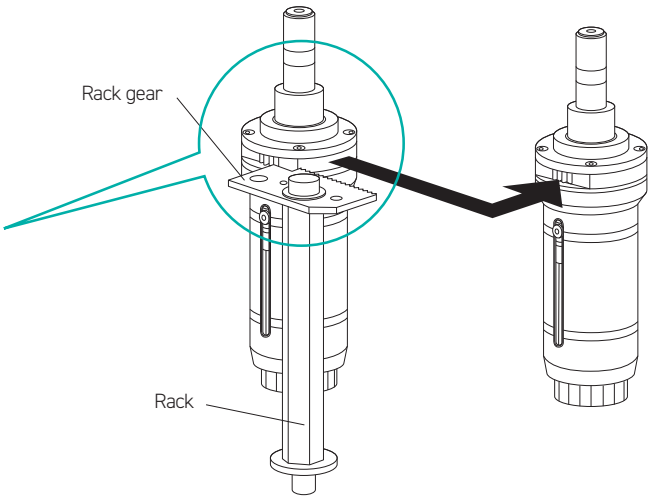
Fig. 15

How to use

Mount the rack gear inside the machine.
The brush protrusion length is adjusted by rotating the side gear built inside the sleeve with the rack gear.



The main body side gear and the rack gear are meshed.



As shown above, the main body passes through the rack.

Brush protrusion length

The brush protrusion length can be adjusted in increments of 0.05 mm.
It is possible to make an adjustment of up to 1 mm in a single pass. This allows adjustments to be made at a predetermined interval corresponding to tool wear.

MANUAL

XEBEC Short BT Holder™

Used with
XEBEC Brush Surface
XEBEC Self-Adjusting Sleeve
XEBEC Floating Holder

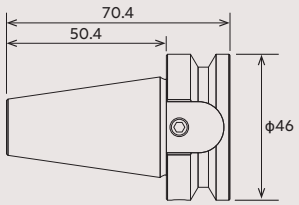
Compact tool holder whose length under the gauge line is 23.5 mm (including bush flange thickness 1.5 mm). Optimal when space is limited.

■ Only for use with XEBEC tools

Applicable equipment

This tool can be used with machine tools that are compatible with BT30 shanks.

Tool outline



XEBEC Brush Length Adjustment Tool™

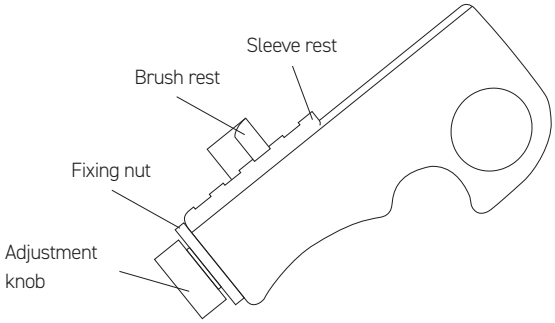
Used with
XEBEC Brush Surface (ϕ15 – 100)

A tool for quick in-machine brush length adjustment.

Product code	Matching brush diameter (mm)	Built-in hexagonal wrench size (mm)
XP-EZ-001	ϕ15 / ϕ25 / ϕ40 / ϕ60 / ϕ100	1.5, 2.0

How to use

- Move the brush rest using the adjustment knob to set the amount of brush protrusion.
- Tighten the fixing nut.
- Hold the unit in one hand and align the sleeve rest with the sleeve end.
- Loosen the adjustment screw on the sleeve to allow the bristles to drop to the brush rest.
- Tighten the adjustment screw to secure the brush in place.



Special deburring cutter and made-to-order tool path

XEBEC Back Burr Cutter and Deburring Tool Path™

"There must be a way to automate crosshole deburring!"
Our efforts to automate deburring made us aware of other problems requiring innovative solutions. We started developing a means to remove somewhat larger burrs from the edges of complex shaped workpieces, without scratching adjacent surfaces. The result was a product that combines optimal tool geometry for deburring with tool paths that inhibit burr formation. It was also symbolic of our approach to development— drawing from whatever field necessary to solve a problem.

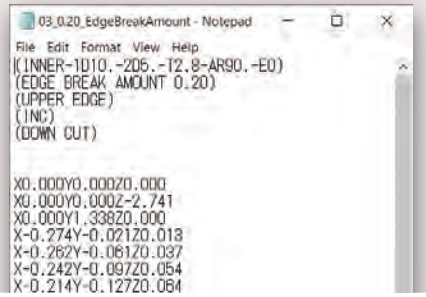
A solution combining a made-to-order tool path program with a dedicated cutting tool for high quality finish, extended tool life and the world's fastest automated deburring of drill holes. The ready-to-use CNC program is easy to install and greatly reduces programming time.

XEBEC Back Burr Cutter

This cutter is made of micro-grain cemented carbide for longer life. It is heat-resistant with a AlTiCrN coating and can be used with a wide range of materials including non-ferrous metals, such as aluminum alloy, and heat-sensitive materials such as titanium. Cutting performance is improved through optimal blade geometry that inhibits formation of secondary burrs.

XEBEC Deburring Tool Path

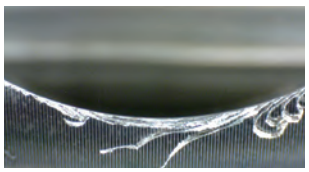
Made-to-order CNC tool path program



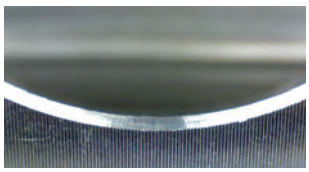
High quality

An optimized tool path and use of the ideal approach angle enables uniform break width on edges, while inhibiting formation of secondary burrs.

Before



After

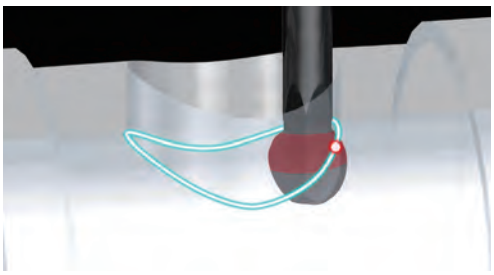


Five different tool paths provide a choice of edge break widths.
(Refer to p. 49 for cutter diameters and corresponding edge break widths.)

Long tool life

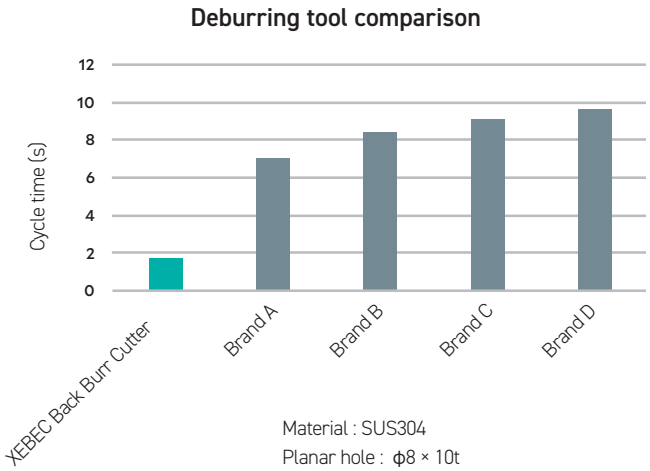
Tool life is increased by continuous displacement of the cutter contact point.

Area of tool used (contact range)



World's fastest deburring

Cycle time is reduced because there is no wasted motion in the cutter path. Cycle time is up 10 times faster than conventional deburring tools.



Material : SUS304
Planar hole : ϕ8 × 10t

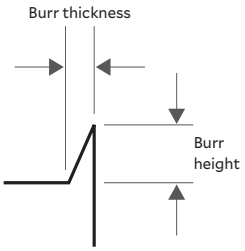
XEBEC Back Burr Cutter™

Ideal for deburring both front and back of drilled holes.

VIDEO

Applicable burr size

Burr thickness ≤ 0.2 mm
(Burrs this size can be bent by fingernails)



Applicable equipment

This tool is used on equipment with 3-axis simultaneous control.

Machining center

Lathe (with live tools)

Tool composition

Consists of a spherical deburring cutter and made-to-order tool path. Refer to p. 49 - 50 for information on the made-to-order tool path (CNC machining program).

AlTiCrN coated

P: Steel | M: Stainless steel | K: Cast iron | S: Heat-resistant super alloy | N: Non-ferrous metal

Type	Product code	Cutter dia. Dc (mm)	Cutter rad. R (mm)	Neck dia. dn (mm)	Neck length L2 (mm)	Overall length L1 (mm)	Shank dia. Ds (mm)	Number of blades	Fig.
Short	XC-08-AS-3F	ϕ0.8	0.40	ϕ0.48	3.0	60	ϕ3.0	3	16
	XC-13-AS-3F	ϕ1.3	0.65	ϕ0.78	5.0	60	ϕ3.0	3	16
	XC-18-AS-3F	ϕ1.8	0.90	ϕ1.10	6.0	60	ϕ3.0	3	16
	XC-23-AS-3F	ϕ2.3	1.15	ϕ1.40	7.5	70	ϕ3.0	3	16
	XC-28-AS-3F	ϕ2.8	1.40	ϕ1.70	9.0	70	ϕ4.0	3	16
	XC-33-AS-3F	ϕ3.3	1.65	ϕ2.00	10.5	70	ϕ4.0	3	16
	XC-38-AS-3F	ϕ3.8	1.90	ϕ2.40	12.0	70	ϕ4.0	3	16
	XC-48-AS-3F	ϕ4.8	2.40	ϕ3.00	15.0	70	ϕ6.0	3	16
	XC-58-AS-3F	ϕ5.8	2.90	ϕ3.50	18.0	70	ϕ6.0	3	16
	XC-78-AS-3F	ϕ7.8	3.90	ϕ4.70	24.0	100	ϕ8.0	3	16
	XC-98-AS-3F	ϕ9.8	4.90	ϕ5.90	30.0	120	ϕ10.0	3	16
Regular	XC-08-A	ϕ0.8	0.40	ϕ0.48	5.0	60	ϕ3.0	2	16
	XC-13-A	ϕ1.3	0.65	ϕ0.78	8.0	60	ϕ3.0	2	16
	XC-18-A	ϕ1.8	0.90	ϕ1.10	10.0	60	ϕ3.0	2	16
	XC-23-A	ϕ2.3	1.15	ϕ1.40	12.5	70	ϕ3.0	2	16
	XC-28-A	ϕ2.8	1.40	ϕ1.70	15.0	70	ϕ4.0	2	16
	XC-33-A	ϕ3.3	1.65	ϕ2.00	17.5	70	ϕ4.0	2	16
	XC-38-A	ϕ3.8	1.90	ϕ2.40	20.0	70	ϕ4.0	2	16
	XC-48-A	ϕ4.8	2.40	ϕ3.00	25.0	70	ϕ6.0	2	16
	XC-58-A	ϕ5.8	2.90	ϕ3.50	30.0	70	ϕ6.0	2	16
	XC-78-A	ϕ7.8	3.90	ϕ4.70	40.0	100	ϕ8.0	3	16
	XC-98-A	ϕ9.8	4.90	ϕ5.90	50.0	120	ϕ10.0	3	16
Straight	XC-18-B	ϕ1.8	0.90	ϕ1.10	—	50	ϕ1.1	2	17
	XC-23-B	ϕ2.3	1.15	ϕ1.40	—	60	ϕ1.4	2	17
	XC-28-B	ϕ2.8	1.40	ϕ1.70	—	70	ϕ1.7	2	17
	XC-33-B	ϕ3.3	1.65	ϕ2.00	—	80	ϕ2.0	2	17
	XC-38-B	ϕ3.8	1.90	ϕ2.40	—	85	ϕ2.4	2	17
	XC-48-B	ϕ4.8	2.40	ϕ3.00	—	105	ϕ3.0	2	17
	XC-58-B	ϕ5.8	2.90	ϕ3.50	—	120	ϕ3.5	2	17
	XC-78-B	ϕ7.8	3.90	ϕ4.70	—	150	ϕ4.7	3	17
	XC-98-B	ϕ9.8	4.90	ϕ5.90	—	180	ϕ5.9	3	17

Uncoated

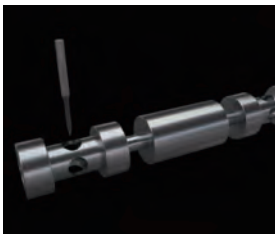
N: Non-ferrous metal | O: Resin

Type	Product code	Cutter dia. Dc (mm)	Cutter rad. R (mm)	Neck dia. dn (mm)	Neck length L2 (mm)	Overall length L1 (mm)	Shank dia. Ds (mm)	Number of blades	Fig.
Regular	XC-08-A-N	ϕ0.8	0.40	ϕ0.48	5.0	60	ϕ3	2	16
	XC-13-A-N	ϕ1.3	0.65	ϕ0.78	8.0	60	ϕ3	2	16
	XC-18-A-N	ϕ1.8	0.90	ϕ1.10	10.0	60	ϕ3	2	16
	XC-23-A-N	ϕ2.3	1.15	ϕ1.40	12.5	70	ϕ3	2	16
	XC-28-A-N	ϕ2.8	1.40	ϕ1.70	15.0	70	ϕ4	2	16
	XC-33-A-N	ϕ3.3	1.65	ϕ2.00	17.5	70	ϕ4	2	16
	XC-38-A-N	ϕ3.8	1.90	ϕ2.40	20.0	70	ϕ4	2	16
	XC-48-A-N	ϕ4.8	2.40	ϕ3.00	25.0	70	ϕ6	2	16
	XC-58-A-N	ϕ5.8	2.90	ϕ3.50	30.0	70	ϕ6	2	16
	XC-78-A-N	ϕ7.8	3.90	ϕ4.70	40.0	100	ϕ8	3	16
	XC-98-A-N	ϕ9.8	4.90	ϕ5.90	50.0	120	ϕ10	3	16

Applications

Automation of deburring

Valve



Material: Free cutting steel
Follows: Drilling
Tool: XC-18-A

Before

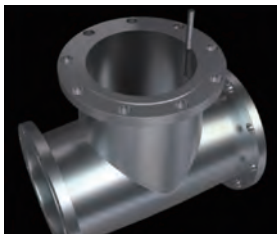
Deburring was done in 3 steps (ϕ2 zero cut, nylon brush deburring, ϕ3 zero cut), with a different tool for each. This resulted in a long cycle time.

After

Deburring is performed with a single cutter. Cycle time is 9 seconds shorter and tool cost is reduced.

Automation of deburring

Industrial robot part



Material: SUS304
Follows: Tapping
Tool: XC-18-A

Before

A lengthy manual deburring was followed by a tap zero cut and air blow. This resulted in a very long cycle time.

After

XEBEC deburring tool path reduces the deburring time from 120 to 40 seconds. The workplace is safer as manual deburring is no longer used.

Starting parameters

AlTiCrN coated

P: Steel | M: Stainless steel | K: Cast iron | S: Heat-resistant super alloy | N: Non-ferrous metal

Type	Product code	Cutter dia. Dc (mm)	Tool protrusion length (mm)	Number of blades	Steel, SS, cast iron, HRSA		Non-ferrous metal	
					Rotational speed n (min-1)	Feed rate Vf (mm/min)	Rotational speed n (min-1)	Feed rate Vf (mm/min)
Short	XC-08-AS-3F	ϕ0.8	3Dc	3	20000	1080	20000	1170
	XC-13-AS-3F	ϕ1.3	3Dc	3	20000	1080	20000	1170
	XC-18-AS-3F	ϕ1.8	3Dc	3	20000	1080	20000	1170
	XC-23-AS-3F	ϕ2.3	3Dc	3	15000	1350	18000	1710
	XC-28-AS-3F	ϕ2.8	3Dc	3	12500	1800	15000	2520
	XC-33-AS-3F	ϕ3.3	3Dc	3	10600	1890	12700	2250
	XC-38-AS-3F	ϕ3.8	3Dc	3	9200	2160	11000	2880
	XC-48-AS-3F	ϕ4.8	3Dc	3	7200	1980	8500	2880
	XC-58-AS-3F	ϕ5.8	3Dc	3	6000	1620	7000	2160
	XC-78-AS-3F	ϕ7.8	3Dc	3	4500	1620	5400	1920
	XC-98-AS-3F	ϕ9.8	3Dc	3	3600	1320	4300	1560
Regular	XC-08-A	ϕ0.8	5Dc	2	20000	600	20000	650
	XC-13-A	ϕ1.3	5Dc	2	20000	600	20000	650
	XC-18-A	ϕ1.8	5Dc	2	20000	600	20000	650
	XC-23-A	ϕ2.3	5Dc	2	15000	750	18000	950
	XC-28-A	ϕ2.8	5Dc	2	12500	1000	15000	1400
	XC-33-A	ϕ3.3	5Dc	2	10600	1050	12700	1250
	XC-38-A	ϕ3.8	5Dc	2	9200	1200	11000	1600
	XC-48-A	ϕ4.8	5Dc	2	7200	1100	8500	1600
	XC-58-A	ϕ5.8	5Dc	2	6000	900	7000	1200
	XC-78-A	ϕ7.8	5Dc	3	4500	1350	5400	1600
	XC-98-A	ϕ9.8	5Dc	3	3600	1100	4300	1300
Straight	XC-18-B	ϕ1.8	10Dc	2	4400	220	4400	220
	XC-23-B	ϕ2.3	10Dc	2	3500	220	3500	220
	XC-28-B	ϕ2.8	10Dc	2	2800	220	2800	220
	XC-33-B	ϕ3.3	10Dc	2	2400	190	2400	190
	XC-38-B	ϕ3.8	10Dc	2	2000	160	2000	160
	XC-48-B	ϕ4.8	10Dc	2	1600	120	1600	120
	XC-58-B	ϕ5.8	10Dc	2	1300	100	1300	100
	XC-78-B	ϕ7.8	10Dc	3	650	70	650	70
	XC-98-B	ϕ9.8	10Dc	3	500	50	500	50

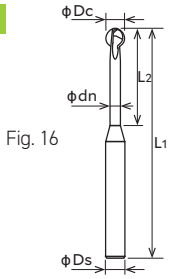


Fig. 16

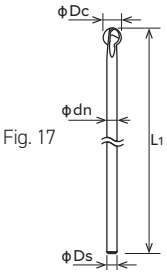


Fig. 17

Uncoated

N: Non-ferrous metal | O: Resin

Type	Product code	Cutter dia. Dc (mm)	Tool protrusion length (mm)	Number of blades	Rotational speed n (min-1)	Feed rate Vf (mm/min)
Regular	XC-08-A-N	ϕ0.8	5Dc	2	20000	650
	XC-13-A-N	ϕ1.3	5Dc	2	20000	650
	XC-18-A-N	ϕ1.8	5Dc	2	20000	650
	XC-23-A-N	ϕ2.3	5Dc	2	18000	950
	XC-28-A-N	ϕ2.8	5Dc	2	15000	1400
	XC-33-A-N	ϕ3.3	5Dc	2	12700	1250
	XC-38-A-N	ϕ3.8	5Dc	2	11000	1600
	XC-48-A-N	ϕ4.8	5Dc	2	8500	1600
	XC-58-A-N	ϕ5.8	5Dc	2	7000	1200
	XC-78-A-N	ϕ7.8	5Dc	3	5400	1600
	XC-98-A-N	ϕ9.8	5Dc	3	4300	1300

Precautions for use

- XEBEC Back Burr Cutter is designed for CNC machines. Never use it as a hand tool.
- Turning on advanced preview control on the machine tool results in uniform edges.
- The machining error on holes must be kept as small as possible.

MANUAL

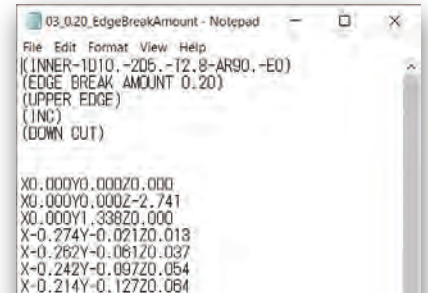
Parameter adjustments

- Machining parameters will vary for the straight type when protrusion lengths other than 10D (shown in table) are used.
- Rotational speed and feed rates shown are intended as guides for setting starting parameters.
- In the event of abnormal vibration or noise, reduce the rotational speed and feed rate proportionally.
- If the maximum rotational speed and feed of the machine is below the starting parameters, reduce them both proportionally to the machine's capability.

XEBEC Deburring Tool Path™

Patented

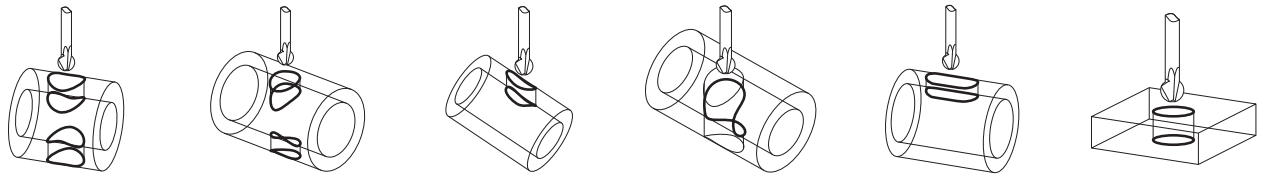
An integral component of this deburring solution, XEBEC Deburring Tool Path is a made-to-order CNC tool path program that ensures optimal performance of the XEBEC Back Burr Cutter.



Standard paths

Standard paths are readily available for the commonly encountered crosshole configurations shown below.

The same cutter can be used for many different types and sizes of hole. This reduces the number of tools in the ATC and the cycle time.



Orthogonal crosshole | Off-center crosshole | Angled crosshole | Broken crosshole | Slotted hole | Planar hole

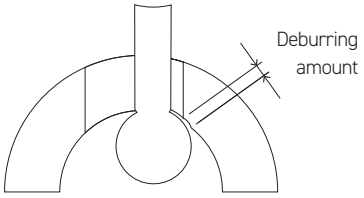
Deburring amount and allowable cumulative error

Product code	Cutter dia. Dc (mm)	Edge break length (mm)					Max. allowed accumulated variance (mm)
		1	2	3	4	5	
XC-08-AS-3F/A/A-N	ϕ0.8	0.02	0.04	0.06	0.08	0.10	0.03
XC-13-AS-3F/A/A-N	ϕ 1.3	0.04	0.06	0.08	0.10	0.12	0.05
XC-18-AS-3F/A/B/A-N	ϕ1.8	0.07	0.09	0.11	0.13	0.15	0.08
XC-23-AS-3F/A/B/A-N	ϕ2.3	0.07	0.09	0.11	0.13	0.15	0.09
XC-28-AS-3F/A/B/A-N	ϕ2.8	0.08	0.11	0.14	0.17	0.20	0.10
XC-33-AS-3F/A/B/A-N	ϕ3.3	0.08	0.11	0.14	0.17	0.20	0.11
XC-38-AS-3F/A/B/A-N	ϕ3.8	0.09	0.13	0.17	0.21	0.25	0.12
XC-48-AS-3F/A/B/A-N	ϕ4.8	0.10	0.15	0.20	0.25	0.30	0.15
XC-58-AS-3F/A/B/A-N	ϕ5.8	0.10	0.15	0.20	0.25	0.30	0.18
XC-78-AS-3F/A/B/A-N	ϕ7.8	0.10	0.15	0.20	0.25	0.30	0.18
XC-98-AS-3F/A/B/A-N	ϕ9.8	0.10	0.15	0.20	0.25	0.30	0.18

Standard path for tapped holes

Tap size	Matching cutter product code	Cutter dia. Dc (mm)	Deburring amount (mm)
M3	XC-23-AS-3F/A/B/A-N	ϕ2.3	0.11
M4	XC-28-AS-3F/A/B/A-N	ϕ2.8	0.14
M5	XC-33-AS-3F/A/B/A-N	ϕ3.3	0.14
M6	XC-38-AS-3F/A/B/A-N	ϕ3.8	0.17
M8	XC-48-AS-3F/A/B/A-N	ϕ4.8	0.20
M10	XC-58-AS-3F/A/B/A-N	ϕ5.8	0.20
M12	XC-78-AS-3F/A/B/A-N	ϕ7.8	0.20
M16 - 24	XC-98-AS-3F/A/B/A-N	ϕ9.8	0.20

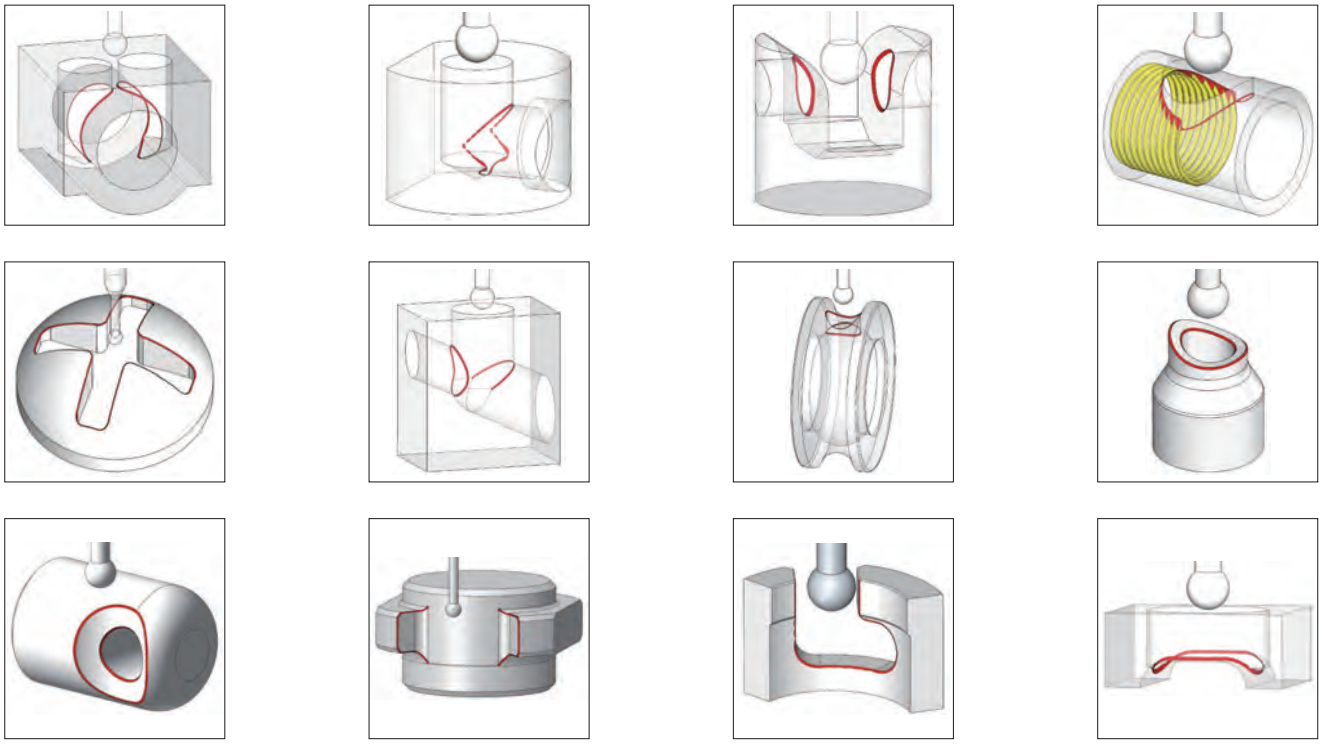
Standard paths are available for thread sizes from M3 to M24.



■ Deburring amount is the chamfer width after an edge is deburred.

XEBEC Deburring Tool Path All Edges

A customized tool path for extremely complex edge profiles.



How to order standard paths

A made-to-order tool path for commonly encountered crosshole configurations.

STEP 1

Free assessment

You check whether the XEBEC Back Burr Cutter and Deburring Tool Path can be used with your workpiece and machine. The result is available immediately.

STEP 2

Quotation

You receive a quotation by submitting your contact information.

STEP 3

Order

Send your order to the XEBEC distributor in your region after confirming the details.

Online Application Form

All you need to do is to enter a few dimensions including hole diameters and to specify the orientation of the workpiece inside the machine.

Visit the special website below to conduct a self-assessment and submit a request for quotation.

https://xebec-backburr-cutter.com WEBSITE

Ordering XEBEC Deburring Tool Path All Edges

Please contact XEBEC directly to request XEBEC Deburring Tool Path All Edges, a customized solution for deburring paths which to do not belong to the six standard types shown on p. 49.

Burrless chamfering with the world's first V-shaped blade

XEBEC Burrless Chamfering Cutter™

"Let's make a chamfering tool that only XEBEC would think of."
At the time, we were looking for additional ways to automate the deburring process and reduce the burden on users. The tools we offered could not provide an exact chamfer. In many cases, users had to alter break edge instructions on drawings to permit edge blending. After much consideration, we came up with the concept of a chamfering tool that does not produce secondary burrs. And settled on the world's first V-shaped blades as the optimal choice for this best-in-category tool.

WINNER 2023
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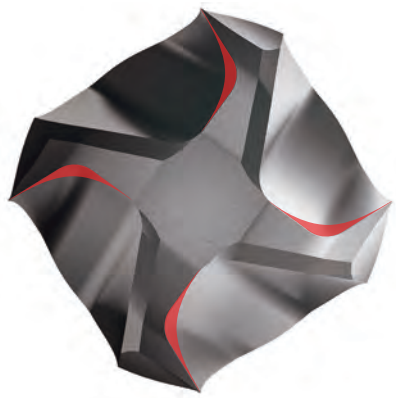
BEST OF INDUSTRY AWARD

The unique V-shaped blades eliminate the need for deburring after chamfering, reducing man-hours required for deburring, the cost of tools, and machining times.

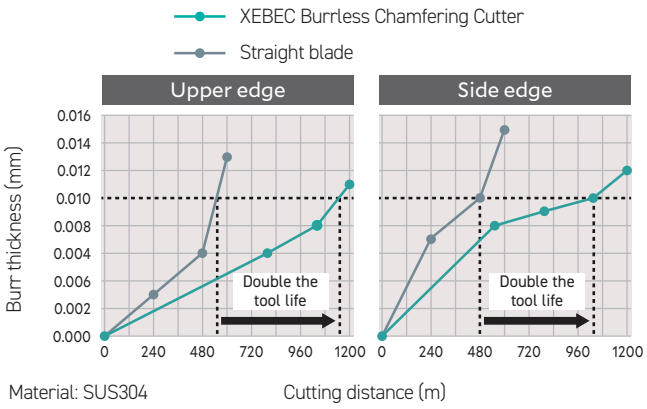
Reduction of deburring man-hours

The world's first V-shaped blades (patented) chamfer without creating secondary burrs, eliminating the need for deburring after chamfering.



Reduction of tool costs

This cutter has twice the tool life of conventional chamfering tools.

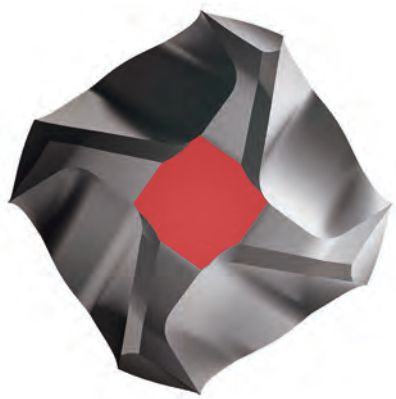


Reduced machining times

The multi-blade design enables high feed rates for reduced machining time.

Flat tip

Flat tool tip prevents rounding and chipping of the tool tip, reducing tool length measurement errors and improving machining positional accuracy.



XEBEC Burrless Chamfering Cutter™

Patented

Burrless chamfering with world's first V-shaped blade

VIDEO

Applicable equipment

This tool can be mounted on equipment shown below.

Machining center

Lathe (with live tools)

AlTiCrN coated

P: Steel | M: Stainless steel | K: Cast iron | S: Heat-resistant super alloy | N: Non-ferrous metal

Product code	Chamfer alignment dia. Dc (mm)	Shank diameter Dcon (mm)	Overall length LF (mm)	Neck length L1 (mm)	Maximum depth of cut APMX (mm)	Cutting angle KAPR (deg.)	Number of blades	Chamfering size (mm)	Fig.
XC-C-03-M	ϕ2	ϕ6	50	5	1	45	3	C0.3 - C0.6	18
XC-C-06-M	ϕ4	ϕ6	60	—	2	45	4	C0.7 - C1.5	19

Uncoated

N: Non-ferrous metal | O: Resin

Product code	Chamfer alignment dia. Dc (mm)	Shank diameter Dcon (mm)	Overall length LF (mm)	Neck length L1 (mm)	Maximum depth of cut APMX (mm)	Cutting angle KAPR (deg.)	Number of blades	Chamfering size (mm)	Fig.
XC-C-03-N	ϕ2	ϕ6	50	5	1	45	3	C0.3 - C0.6	18
XC-C-06-N	ϕ4	ϕ6	60	—	2	45	4	C0.7 - C1.5	19

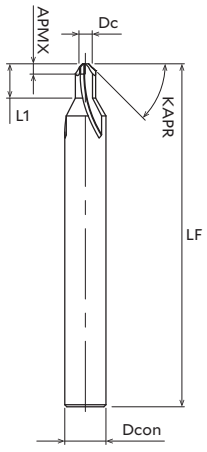


Fig. 18

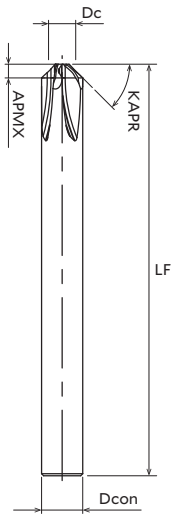
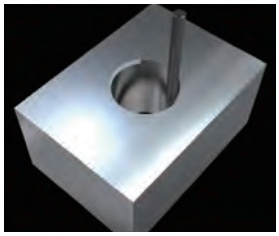


Fig. 19

Applications

Automation of chamfering

Cooling water pipe block



Before

Burrs were formed when chamfering. Manual deburring was required.

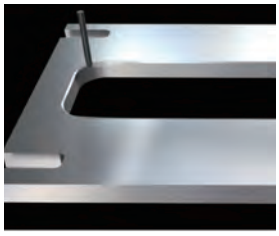
After

Shortened the chamfering time. Manual deburring is no longer required after chamfering.

Material: SUS304
Follows: Drilling
Tool: XC-C-06-M

Automation of chamfering

Machine tool jig



Before

Oil stone was used to remove burrs after chamfering. However, it scarred the surface.

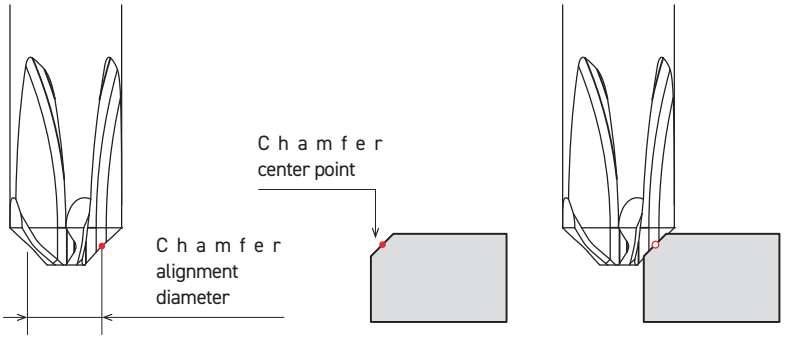
After

Oil stone is no longer needed and quality is improved.

Material: S50C
Follows: End milling
Tool: XC-C-06-M

How to use

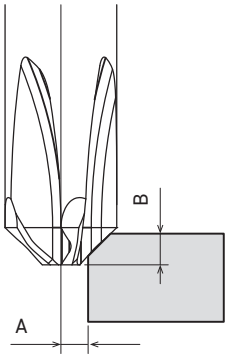
Position the chamfering alignment diameter at the chamfering center point of the workpiece.



Machining parameters

Offsets

Product code	Chamfering size (mm)	Offsets (mm)	
		A	B
XC-C-03-M/N	C0.3	0.85	0.65
	C0.4	0.80	0.70
	C0.5	0.75	0.75
	C0.6	0.70	0.80
XC-C-06-M/N	C0.7	1.65	1.35
	C0.8	1.60	1.40
	C0.9	1.55	1.45
	C1.0	1.50	1.50
	C1.1	1.45	1.55
	C1.2	1.40	1.60
	C1.3	1.35	1.65
	C1.4	1.30	1.70
	C1.5	1.25	1.75



Starting parameters

Product code	Workpiece material	Cutting speed (m/min)	Rotational speed (min^{-1})	Feed rate (mm/min)	Feed per tooth (mm/t)
XC-C-03-M	Steel	60 - 100	12000	1800	0.05
	Stainless steel	40 - 80	9000	1350	0.05
	64 titanium	45 - 60	8000	1200	0.05
	Inconel	20 - 30	4000	600	0.05
XC-C-03-N	Aluminum alloy	200 - 300	40000	6000	0.05
	Resin	60 - 100	12000	1800	0.05
XC-C-06-M	Steel	60 - 100	6300	1260	0.05
	Stainless steel	40 - 80	4800	960	0.05
	64 titanium	45 - 60	4000	800	0.05
	Inconel	20 - 30	2000	400	0.05
XC-C-06-N	Aluminum alloy	200 - 300	20000	4000	0.05
	Resin	60 - 100	6300	1760	0.07

MANUAL

XEBEC Ceramic Stone™

XEBEC Ceramic Stone™

"A friend with a dream worth realizing."
XEBEC was founded from a belief in the invention of a childhood friend. A grindstone that can be molded, but does not bend, break, or chip. With the vision of the world's best ceramic grindstone firmly in their minds, two friends teamed up with a materials manufacturer and developed a unique ceramic fiber suited to grinding. They also received a patent for a grindstone with an original structure that maximizes strength and polishing performance. Known as XEBEC Ceramic Stone, this product now dominates the market for the polishing of intricate features in molds, such as ribs, bosses and corners, and has a reputation for making manual deburring safer and more efficient.

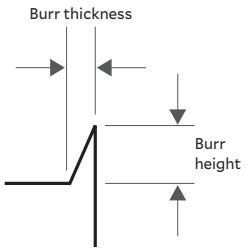
XEBEC Stone™ Flexible Shaft

Patented

Deburring and polishing front and back of crossholes, grooves and areas deep inside the workpiece. The spring steel shaft absorbs vibrations for a soft surface contact.

Applicable burr size

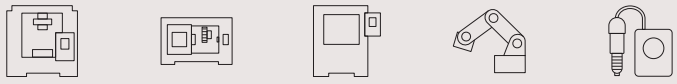
Burr thickness ≤ 0.2 mm
(Burrs this size can be bent by fingernails)



VIDEO

Applicable equipment

This tool is used on equipment with rotational speed control.



Machining center | Lathe (with live tools) | Dedicated machine | Robot | Rotary tool (electric)

Ball type

Equivalent grit (color)	Product code	Head size (mm)	Shaft dia. (mm)	Shank dia. (mm)	Overall length L (mm)	Standard rotational speed (min⁻¹)	Maximum rotational speed (min⁻¹)	Fig.
#800 (blue)	CH-PB-3B	ϕ3	ϕ1.5	ϕ3.0	71.5	5000 - 8000	15000	20
	CH-PB-4B	ϕ4	ϕ1.5	ϕ3.0	72.0	5000 - 8000	13000	20
	CH-PB-5B	ϕ5	ϕ1.5	ϕ3.0	72.5	5000 - 8000	12000	20
	CH-PB-6B	ϕ6	ϕ1.5	ϕ3.0	73.0	5000 - 8000	10000	20
#400 (orange)	CH-PO-3B	ϕ3	ϕ1.5	ϕ3.0	71.5	5000 - 8000	15000	20
	CH-PO-4B	ϕ4	ϕ1.5	ϕ3.0	72.0	5000 - 8000	13000	20
	CH-PO-5B	ϕ5	ϕ1.5	ϕ3.0	72.5	5000 - 8000	12000	20
	CH-PO-6B	ϕ6	ϕ1.5	ϕ3.0	73.0	5000 - 8000	10000	20
#220 (gray)	CH-PM-3B	ϕ3	ϕ1.5	ϕ3.0	71.5	5000 - 8000	15000	20
	CH-PM-4B	ϕ4	ϕ1.5	ϕ3.0	72.0	5000 - 8000	13000	20
	CH-PM-5B	ϕ5	ϕ1.5	ϕ3.0	72.5	5000 - 8000	12000	20
	CH-PM-6B	ϕ6	ϕ1.5	ϕ3.0	73.0	5000 - 8000	10000	20
	CH-PM-10B	ϕ10	ϕ1.5	ϕ3.0	75.0	4000 - 5000	6000	20
	CH-PM-3B-L	ϕ3	ϕ1.5	ϕ3.0	71.5	—	1000	20
	CH-PM-4B-L	ϕ4	ϕ2.3	ϕ2.3	72.0	—	3000	21
	CH-PM-5B-L	ϕ5	ϕ2.3	ϕ2.3	72.5	—	3000	21
	CH-PM-6B-L	ϕ6	ϕ2.3	ϕ2.3	73.0	—	3000	21
	CH-PM-10B-L	ϕ10	ϕ2.3	ϕ2.3	75.0	—	2000	21

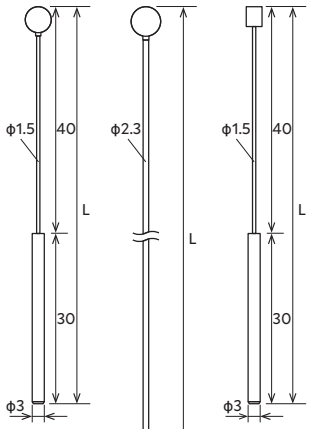


Fig. 20 | Fig. 22

Fig. 21

CH-PM-4B-L
CH-PM-5B-L
CH-PM-6B-L
CH-PM-10B-L

Cylinder type

Equivalent grit (color)	Product code	Head size (mm)	Shaft dia. (mm)	Shank dia. (mm)	Overall length L (mm)	Standard rotational speed (min⁻¹)	Maximum rotational speed (min⁻¹)	Fig.
#800 (blue)	CH-PB-3R	ϕ3 × 3	ϕ1.5	ϕ3	71.5	5000 - 8000	15000	22
	CH-PB-4R	ϕ4 × 4	ϕ1.5	ϕ3	72.0	5000 - 8000	13000	22
	CH-PB-5R	ϕ5 × 5	ϕ1.5	ϕ3	72.5	5000 - 8000	12000	22
#400 (orange)	CH-PO-3R	ϕ3 × 3	ϕ1.5	ϕ3	71.5	5000 - 8000	15000	22
	CH-PO-4R	ϕ4 × 4	ϕ1.5	ϕ3	72.0	5000 - 8000	13000	22
	CH-PO-5R	ϕ5 × 5	ϕ1.5	ϕ3	72.5	5000 - 8000	12000	22
#220 (gray)	CH-PM-3R	ϕ3 × 3	ϕ1.5	ϕ3	71.5	5000 - 8000	15000	22
	CH-PM-4R	ϕ4 × 4	ϕ1.5	ϕ3	72.0	5000 - 8000	13000	22
	CH-PM-5R	ϕ5 × 5	ϕ1.5	ϕ3	72.5	5000 - 8000	12000	22
	CH-PM-5R-C01	ϕ5 x 10	ϕ1.5	ϕ3	72.5	5000 - 8000	12000	22

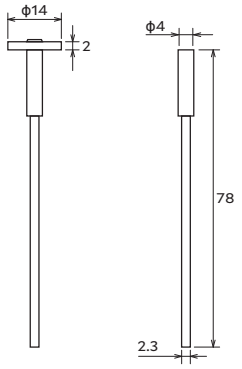


Fig. 23 | Fig. 24

Disc type - stone

Equivalent grit (color)	Product code	Head dia. x thickness (mm)	Max. rotational speed (min-1)	Fig.
#220 (gray)	CH-PM-14D	ϕ14 × 2	5000	23

Disc type - shaft

Product code	Shaft dia. (mm)	Overall length (mm)	Mounting screw	Max. rotational speed (min⁻¹)	Fig.
CH-D-SH	ϕ2.3	78	M2 × 6	5000	24

Applications

Deburring crosshole

Aircraft pipe part

Material: Stainless steel
Follows: Drilling
Tool: CH-PM-6B

Before

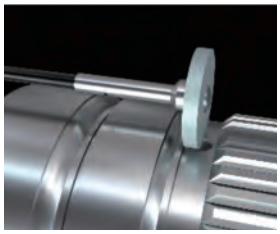
Deburring was carried out with a rubber grinding stone on a rotary tool. Finish quality varied depending on the workers' skill. 40 minutes was required to deburr 16 crossholes.

After

The tool is inserted in a crosshole and retracted gently while tracing around the hole edge. Quality of finish is uniform and less time is required for deburring.

Deburring groove hole

Shaft



Material: SCM
Follows: Drilling
Tool: CH-PM-14D

Before

An oil-impregnated grinding disc was used. The grinding stone shaft was short, making it difficult to access the deburring area. Tool life was poor.

After

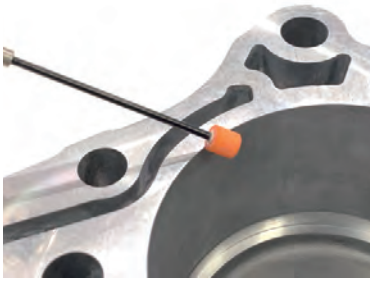
The longer shaft of the disc type grinding stone makes it easy to access the groove. The ceramic fiber stone is replaced less often because it has a longer tool life. The shaft is reusable. Only the grinding stone is replaced.

How to use

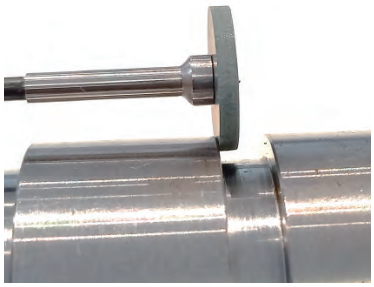
The entire surface of the ceramic stone is abrasive and therefore can be used for deburring and polishing.

Ball type

Cylinder type

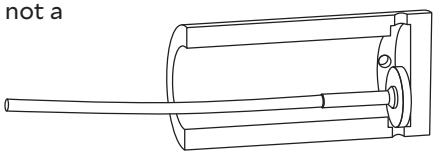


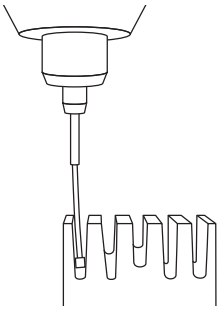
Disc type



Characteristics

The spring steel shaft absorbs vibrations for soft contact with the workpiece surface. The ceramic stone does not bounce around, thereby reducing the risk of scratching the workpiece. This makes this tool ideal for polishing and deburring areas that are deep inside the workpiece. The stone is safe to touch as it is not a cutting tool.





Trial set

This set includes a disc type stone and shaft.

Product code
CHPM14D-SET

ϕ2.3 to ϕ3 Collet Adapter

Adapts the ϕ2.3 shaft to fit on rotary tools with ϕ3 shanks.

Product code
RMP3024X

Precautions for use

A ceramic stone tool will be damaged when:
- used beyond the maximum rotation speed
- used with a pneumatic rotary tool

Users of the disc type should be careful to use only normal (clockwise) rotation. Reverse (counter-clockwise) rotation may cause the screw to loosen and the head to fly off.

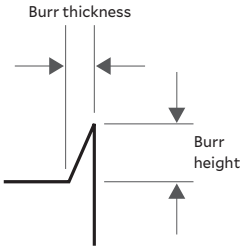
MANUAL

XEBEC Stone™ Mounted Point

Suitable for use with pneumatic rotary tools at high rotational speed.

Applicable burr size

Burr thickness ≤ 0.2 mm
(Burrs this size can be bent by fingernails)



VIDEO

Applicable equipment

This tool can be mounted on rotary tools.

Rotary tool (electric)

Rotary tool (pneumatic)

Equivalent grit (color)	Product code	Head size (mm)	Shank dia. (mm)	Head length (mm)	Overall length (mm)	Maximum rotational speed (min^{-1})	Fig.
#220 (gray)	AX-PM-3R	ϕ3	ϕ3	20	48	60000	25
	AX-PM-5RF	ϕ5	ϕ3	8	48	30000	26
	AX-PM-6T	ϕ6	ϕ3	20	48	60000	27

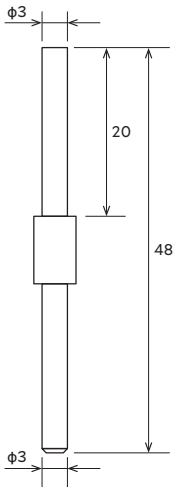


Fig. 25
AX-PM-3R

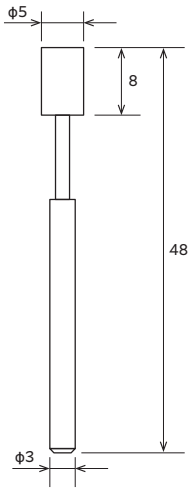


Fig. 26
AX-PM-5RF

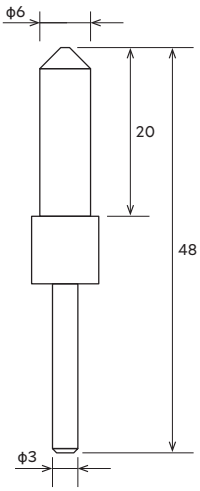


Fig. 27
AX-PM-6T

Applications

Deburring of edges

Material: Stainless steel
Tool: AX-PM-6T

Before

A file was used for deburring. However, it caused secondary burrs and a quality problem.

After

Secondary burrs are not formed and edge quality is improved.

Deburring of parting lines

Material: Aluminum
Tool: AX-PM-6T

Before

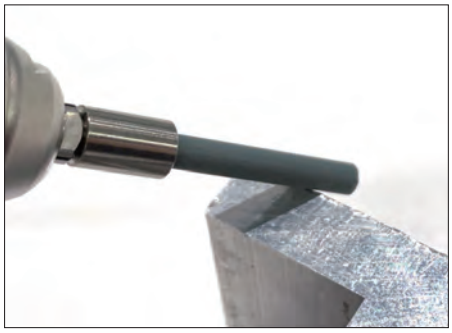
A rotary bar was used because the burrs were large. However, there was a safety problem.

After

The switch to abrasive stone makes the process safer to perform. The ceramic fiber stone's grinding power improves work efficiency.

How to use

All surfaces of the ceramic stone are abrasive and all of them can be used for deburring and polishing.
These ceramic stones are capable of withstanding high speed. As such they can be used with pneumatic rotary tools in addition to electric rotary tools.



MANUAL

Mobile Micromotor System

Battery-powered rotary tool for use at workstations where power supply is unavailable.

The handpiece is ultra-lightweight, ideal for manual operation without causing fatigue.

Product code	Matching shank diameter (mm)	Maximum rotational speed (min^{-1})	Standard components
M2P33STX	ϕ3 mm shank	30000	Handpiece with stand, controller, ON/OFF foot switch, power cable for charging

■ Capable of about 5 hours of continuous use on a single charge.

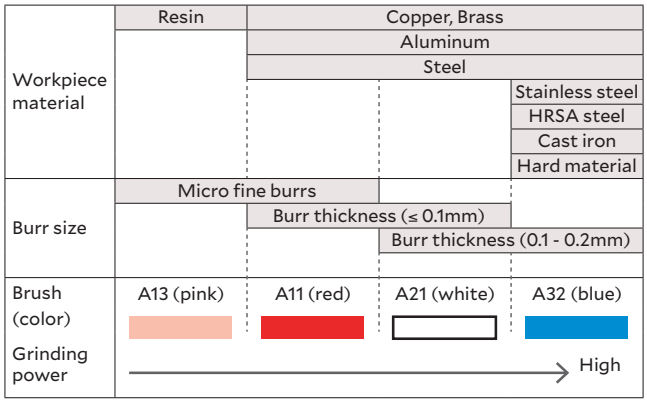
Technical Information

XEBEC Brush™ Surface

How to select

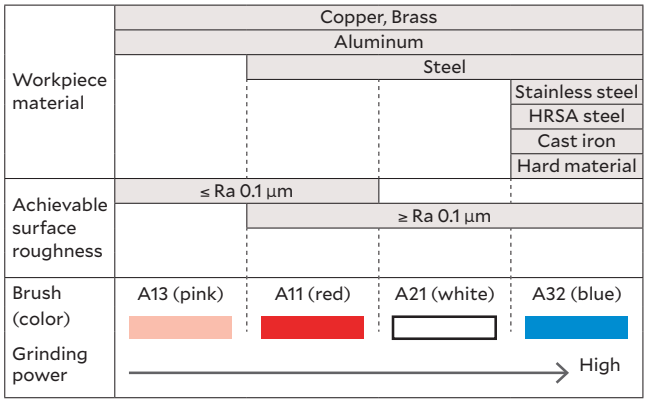
Refer to the charts below and select the brush color based on the workpiece material, burr thickness and surface roughness.

Deburring



- Not all brush colors are available in all sizes.
- HRSA (heat resistant super alloy)

Cutter mark removal and polishing



- Not all brush colors are available in all sizes.
- HRSA (heat resistant super alloy)

Machining adjustments - Burrs remain

Take the following actions, if burrs remain despite using the recommended depth of cut for the given burr size.

1. Increase rotational speed

Increase the rotational speed to the maximum.

Brush size (mm)	Product code	Initial rotational speed (min^{-1})	Maximum rotational speed (min^{-1})
ϕ6	A13-CB06M, A11-CB06M, A21-CB06M, A32-CB06M	8000	10000
ϕ15	A13-CB15M, A11-CB15M, A21-CB15M, A32-CB15M	4800	6000
ϕ25	A11-CB25M, A21-CB25M, A32-CB25M	4000	5000
ϕ40	A11-CB40M, A21-CB40M, A32-CB40M	2400	3000
ϕ60	A11-CB60M, A21-CB60M, A32-CB60M	1600	2000
ϕ100	A11-CB100M, A21-CB100M, A32-CB100M	960	1200
ϕ125	A11-CB125M, A21-CB125M, A32-CB125M	800	1000
ϕ165	A11-CB165M, A21-CB165M, A32-CB165M	600	750
ϕ200	A11-CB200M, A21-CB200M, A32-CB200M	480	600

2. Check the rotational direction of the brush

XEBEC recommends cutting upwards so that the bristles lift burrs up.

3. Change the brush color

Check whether the brush color is suitable for the workpiece material and burr size.
The grinding power of colors increases as follows: pink < red < white < blue.

Machining adjustments - Edges too rounded

It is not possible to remove burrs with brushes without rounding edges to some extent. Take the following actions to improve edge sharpness.

1. Increase feed rate

To make a sharper edge, increase the feed rate in 1,000 mm/min increments within the range where burrs can be removed. Increasing the feed rate also helps reduce the cycle time.

2. Decrease rotational speed

Decrease rotational speed in 10 to 20 percent increments within the range where burrs can be removed.

3. Check the brush color

Check whether the brush color is suitable for the workpiece material and burr size.
Rounding of edges increases as follows: pink < red < white < blue.

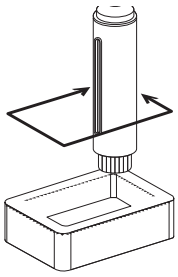
Reference data - Tool life

Example 1

Material	Aluminum die-casting
Follows	Face milling
Burr thickness	0.1 mm
Tool path length	1000 mm/piece

Tool	A11-CB25M
Rotational speed	4000 min^{-1}
Feed rate	2400 mm/min
Depth of cut	1 mm
Wear amount	50 mm out of 75 mm

Tool life	10 km (10000 pieces)

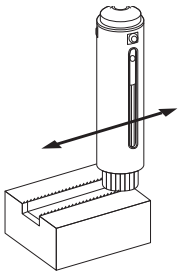


Example 2

Material	S45C
Follows	End milling
Burr thickness	0.1 mm
Tool path length	200 mm/piece

Tool	A21-CB25M
Rotational speed	4000 min^{-1}
Feed rate	2000 mm/min
Depth of cut	0.5 mm
Wear amount	50 mm out of 75 mm

Tool life	3 km (15000 pieces)



- Tool life varies greatly depending on the material, machining conditions, and burr size and direction.
- The above data is not guaranteed. Please use as a guide.

Machining adjustments - Surface roughness worsens

It may be possible to improve the surface finish. Try the following.

1. Check the brush color

The ability to improve surface roughness is inversely proportional to the grinding power, meaning that A13 (pink) achieves the best surface roughness, followed by A11 (red), A21 (white), and A32 (blue). Make sure to select the appropriate brush color based on the workpiece material and target surface roughness.

2. Wet machining

The brush can be used for both dry and wet (oil-based and water-soluble) machining. Wet machining may improve surface roughness and tool life.

3. Increase the number of passes

When comparing with the same cycle time, increasing the number of passes makes a bigger difference than decreasing the feed rate.

Example

Rotational speed	4000 min^{-1}
Depth of cut	0.5 mm
Feed rate	600 mm/min
Number of passes	1

▼

Rotational speed	4000 min^{-1}
Depth of cut	0.5 mm
Feed rate	1200 mm/min
Number of passes	2

Reference data - Surface roughness after deburring

Material	A11 (red)	A21 (white)	A32 (blue)
A5052	Approx. Ra 0.6 µm, Rz 5.0 µm		
S50C		Approx. Ra 0.2 µm, Rz 1.6 µm	
SUS304			Approx. Ra 0.3 µm, Rz 2.4 µm

XEBEC Brush™ Surface End Type

How to select

Refer to the chart below and select the brush color based on the workpiece material, burr thickness and surface roughness.

Workpiece material	Resin	Copper, Brass Aluminum Steel		Stainless steel HRSA steel Cast iron Hard material
Burr size	Micro fine burrs	Burr thickness (≤ 0.1mm)		
Achievable surface roughness	≤ Ra 0.1 µm	≥ Ra 0.1 µm		
Brush (color)	A13 (pink)	A11 (red)	A21 (white)	A32 (blue)
Grinding power	→ High			

■ HRSA (heat resistant super alloy)

XEBEC Brush™ Turning

How to select

Refer to the charts below to select the brush color based on the workpiece material and burr thickness, and the holder based on the machining process.

Brush selection

Burr size	Micro fine burrs	Burr thickness (≤ 0.1 mm)	
Brush (color)	A11 (red)	A21 (white)	A32 (blue)
Grinding power	→ High		

■ Micro fine burrs have a burr height ≤ 0.01 mm.

Holder selection

Process		Holder	Brush angle
Crosshole deburring		XEBEC Brush Turning Round Shank	Fixed
Thread deburring	ID threads	XEBEC Brush Turning Round Shank	Fixed
	OD threads	XEBEC Brush Turning Square Shank	Set by user

■ Refer to "How to use: External thread deburring mechanism" for brush angle recommendations.

XEBEC Brush™ Crosshole

How to select

Refer to the chart below and select the brush color based on the workpiece material, burr thickness and surface roughness.

Workpiece material	Resin	Steel
	Copper, Brass	Stainless steel
	Aluminum	
		HRSA steel
		Cast iron
		Hard material
Burr size	Micro fine burrs	
	Burr thickness (≤ 0.1mm)	
Achievable surface roughness	≤ Ra 0.1 µm	
		≥ Ra 0.1 µm
Brush (color)	A12 (red)	A33 (blue)
		A34 (dark blue)
Grinding power	High	

■ HRSA (heat resistant super alloy)

Machining adjustments - Burrs remain

Take the following actions, if burrs remain despite using the correct brush and rotational speed for the given burr size.

1. Check the brush color

2. Increase rotational speed to the maximum

3. Increase the number of passes

4. Decrease the feed rate

Machining adjustments - Extending tool life

Try the following, if tool life is short despite using the correct brush for the given burr size.

1. Decrease the rotational speed

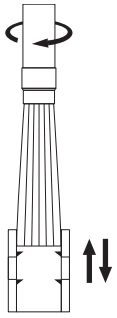
2. Increase the feed rate

Example

Material	S45C
Follows	Drilling
Burr thickness	0.1 mm
Main bore	ϕ10 mm
Crosshole	ϕ5 mm

Tool	CH-A12-5M-TL
Rotational speed	10000 min^{-1}
Feed rate	300 mm/min
Depth of cut	1 mm
Wear amount	10 mm out of 50 mm

Tool life	4500 holes



■ Tool life varies greatly depending on the material, machining conditions, and burr size and direction.
■ The above data is not guaranteed. Please use as a guide.

XEBEC Brush™ Surface Wheel Type

Machining adjustments - Burrs remain

Take the following actions, if burrs remain despite using the recommended depth of cut for the given burr size.

Increase the feed amount

Increase the feed amount in increments of 10 to 20 percent.

Machining adjustments - Extending tool life

Try the following, if tool life is short despite using the correct brush for the given burr size.

Increase the feed amount

Increase the feed rate in increments of 10 to 20 percent.

Reference data - Tool life

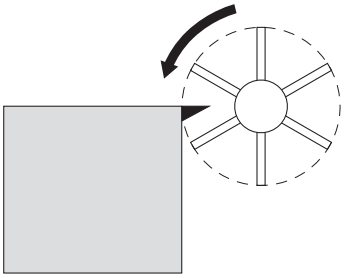
It is not possible to remove burrs with brushes without rounding edges to some extent. Take the following actions to improve edge sharpness.

Example

Material	S45C
Follows	End milling
Burr thickness	0.1 mm
Tool path length	120 mm/piece

Tool	W-A11-50
Cutting speed (Rotational speed)	250 m/min ($1600\ min^{-1}$)
Feed per bundle (Feed rate)	0.7 mm/bundle (7000 mm/min)
Depth of cut	0.2 mm
Wear amount	50 mm out of 75 mm

Tool life	600 m (5000 pieces)



- Tool life varies greatly depending on the material, machining conditions, and burr size and direction.
- The above data is not guaranteed. Please use as a guide.

XEBEC Floating Holder™

Maintenance

Schedule a regular maintenance for cleaning and greasing sliding parts to ensure smooth movement and functioning. Recommended grease: Lithium soap grease (NLGI Grade #2).

Safety Precautions

- **Please make sure to read the instruction manual before use.**
- **In order to ensure safety, be sure to observe the operator safety measures and operational precautions listed below.**

The following precautions exist to ensure safe use of the products and prevent injury to persons using the products and other persons in the vicinity, as well as prevent property damage. They are classified as "Warnings" and "Cautions" depending on the level of potential injury and danger involved. "Warnings" and "Cautions" should be strictly observed as they all are related to safety.

[WARNINGS]

These have the potential to cause death or serious injury to persons or serious property damage if handled improperly.

[CAUTIONS]

These have the potential to cause injury to persons or property damage if handled improperly.

Warnings

[Use of protective clothing and equipment]

Wear safety glasses, protective gloves and masks when using the tools. Wear clothing with long sleeves or other clothing that does not expose the skin. Cuffs and hems of clothing should be tightly fastened.

[Use of protective covers]

Machine tools and dedicated machines should be equipped with covers and other safety measures capable of protecting users from injury in the event of tool fragmentation.

[Cutting dust and particles]

Cutting dust and burrs are scattered into the air with the rotation of the tool. These should be removed by a dust collector and persons should not enter the affected area.

[Work surroundings]

An enclosure should be installed around the work area to prevent persons other than the operator from entering the work area. Persons who enter the work area should always wear protective clothing and use protective equipment.

Ignoring the aforementioned warnings may result in the following:

- *Fragments and cutting particles may enter the eyes, causing loss of sight in severe cases.*
- *Fragments and cutting particles may cause injury by cutting into skin.*
- *Cutting dust resulting from tool use may irritate the skin, cause allergic reactions and damage lungs.*

Cautions

[Prior to machining]

Operate the tool for at least one minute (3 minutes after the tool has been replaced) before conducting any actual cutting. Cease operation immediately in the event of any sign of abnormality with the machine or loosening of the tool shank. Continued use may result in the shank flying out of the holder, causing damage to the machine, the jig, and workpiece, as well as injury or loss of sight to the operator.

[Abnormal vibration]

Cease operation immediately at the first sign of abnormalities such as vibration. Continued use may result in the shank flying out of the holder, causing damage to the machine, the jig, and workpiece, as well as injury or loss of sight to the operator.

[Maximum rotational speed]

Do not operate the tool beyond its maximum rotational speed. Set the machining conditions based on the instruction manual. Operation at speeds beyond the maximum rotational speed may damage the tool, the machine, the workpiece, and also cause loss of sight or other injury to the operator.

- *A dust collector should be used during machining and cleaned thoroughly afterwards.*
- *Insufficient removal of dust and cleaning of dust collectors may result in damage to machine tool slides and other exposed sliding surfaces.*

SPAZZOLE CON ABRASIVO CERAMICO NERO

CERASEF

Y100

CERASEF

SPAZZOLE A RUOTA CON FILAMENTI CON ABRASIVO CERAMICO NERO PER SBAVATURA A MACCHINA E IN CELLA DI SBAVATURA

Caratteristiche

Spazzole a ruota con mozzo in metallo composito (in attesa di brevetto) che permette un significativo aumento della densità di riempimento e previene la rottura dei filamenti.

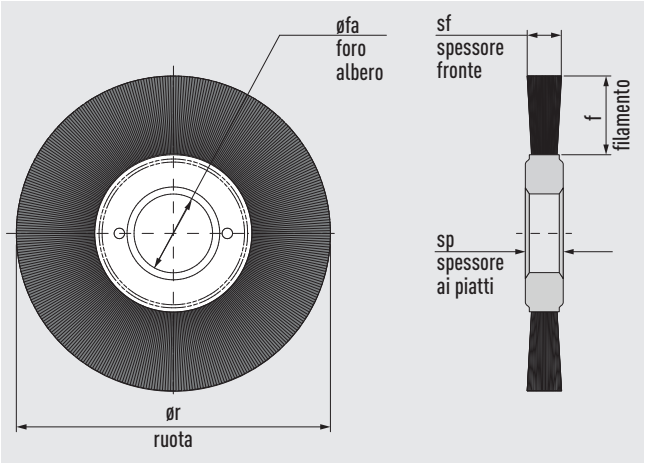
Precise, stabili e costanti, assicurano prestazioni efficienti.
Il foro albero da 2" (50,8 mm) consente il montaggio diretto su vari tipi di macchina, senza la necessità di adattatori. Le ruote CERASEF sono dotate di un filamento ceramico nero avanzato, che offre un'azione di taglio in testa fino al 400% superiore rispetto ai filamenti tradizionali in carburo di silicio e ossido di alluminio, per un'azione di sbavatura più rapida e aggressiva che riduce al minimo i tempi di ciclo.
Le spazzole a ruota Y100 hanno setole in filamento ceramico nero ondulato a sezione circolare.

Applicazioni

- Sbavatura di precisione di componenti dopo lavorazione o rettifica
- Miglioramento della finitura delle superfici lavorate
- Pulizia e finitura leggera di metalli; levigatura leggera di legno e compositi

Y13S168

Y53S168



ør ruota mm	codice spazzola a ruota	ø/grana filamento	øfa mm	sf mm	f mm	sp mm	max RPM min-1
150	Y32S168	0,70 / 120	50,8	19	25	24,0	4.000
150	Y18S168	0,90 / 80	50,8	19	25	24,0	4.000
150	Y42S168	1,10 / 120	50,8	19	25	24,0	4.000
150	Y02S168	1,40 / 80	50,8	19	25	24,0	4.000
200	Y62S168	0,70 / 120	50,8	22	50	24,0	4.000
200	Y72S168	1,10 / 120	50,8	22	50	24,0	4.000
200	Y82S168	1,40 / 80	50,8	22	50	24,0	4.000
250	Y92S168	0,70 / 120	50,8 **	28	50	22,2	1.800
250	Y28S168 •	0,90 / 80	50,8 **	28	50	22,2	1.800
250	Y03S168	1,10 / 120	50,8 **	28	50	22,2	1.800
250	Y13S168	1,40 / 80	50,8 **	28	50	22,2	1.800
305	Y23S168	0,70 / 120	50,8 **	32	75	22,2	1.800
305	Y33S168	1,10 / 120	50,8 **	32	75	22,2	1.800
305	Y43S168	1,40 / 80	50,8 **	32	75	22,2	1.800
355	Y53S168	0,70 / 120	50,8 **	25	45	19,0	1.800
355	Y80S168	0,90 / 80	50,8 **	25	45	19,0	1.800
355	Y63S168	1,10 / 120	50,8 **	25	45	19,0	1.800
355	Y73S168	1,40 / 80	50,8 **	25	45	19,0	1.800
355	Y93S168	1,10 / 120	50,8 **	32	100	22,2	1.800
355	Y04S168	1,40 / 80	50,8 **	32	100	22,2	1.800

** Doppia sede di chiavetta 12,7 x 6,35 (1/2" x 1/4") • a richiesta

Y115

CERASEF

SPAZZOLE A RUOTA TIPO STRETTO CON FILAMENTI CON ABRASIVO CERAMICO NERO PER SBAVATURA A MACCHINA Y115 (PER APPLICAZIONI GRAVOSE) E Y116

Caratteristiche
Le spazzole a ruota tipo stretto Y115 per applicazioni gravose hanno mozzo in metallo e setole ad alta densità in filamento ceramico nero ondulato a sezione circolare.

Y01S113

ø mm	codice spazzola a ruota	ø/grana filamento	foro albero mm	spessore fronte mm	lunghezza filamento mm	spessore albero mm	max RPM min-1
75	Y04S213	0,70 / 120	15,8 - 12,7	14	12,7	11,1	6.000
75	Y14S213	0,90 / 80	15,8 - 12,7	14	12,7	11,1	6.000
100	Y01S113	0,70 / 120	15,8 - 12,7	16	25,4	11,1	6.000
100	Y07S213	0,90 / 80	15,8 - 12,7	16	25,4	11,1	6.000
100	Y08S213	1,10 / 120	15,8 - 12,7	16	25,4	11,1	6.000
100	Y09S213	1,40 / 80	15,8 - 12,7	16	25,4	11,1	6.000

Y116

CERASEF

Y56S168

Caratteristiche
Le spazzole a ruota tipo stretto Y116 hanno mozzo in metallo e setole ad alta densità in filamento ceramico nero ondulato a sezione circolare.

ø mm	codice spazzola a ruota	ø/grana filamento	foro albero mm	spessore fronte mm	lunghezza filamento mm	spessore albero mm	max RPM min-1
75	Y20S113	0,90 / 80	12,7 - 9,5	9,5	12,7	11,1	6.000
100	Y56S168	0,70 / 120	12,7 - 9,5	12,7	22,0	11,1	6.000
100	Y30S113	0,90 / 80	12,7 - 9,5	12,7	22,0	11,1	6.000
100	Y00S113	1,10 / 120	12,7 - 9,5	12,7	22,0	11,1	6.000
100	Y50S113	1,40 / 80	12,7 - 9,5	12,7	22,0	11,1	6.000
150	Y43S113	0,70 / 120	15,8 - 12,7	16,0	22,0	17,5	4.500
150	Y53S113	0,90 / 80	15,8 - 12,7	16,0	22,0	17,5	4.500
150	Y63S113	1,10 / 120	15,8 - 12,7	16,0	22,0	17,5	4.500

Y120

CERASEF

SPAZZOLE A RUOTA PER PICCOLI DIAMETRI CON FILAMENTI CON ABRASIVO CERAMICO NERO PER SBAVATURA A MACCHINA Y120

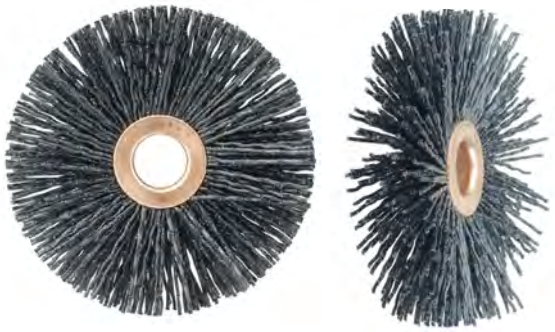
Caratteristiche
Ideali per le rientranze e gli elementi interni o per un'azione di spazzolatura mirata su un'area specifica.
Le ruote CeraSef sono dotate di un filamento ceramico nero avanzato, che offre un'azione di taglio in testa fino al 400% superiore rispetto ai filamenti tradizionali in carburo di silicio e ossido di alluminio. Consentono un'azione di sbavatura più rapida e aggressiva che riduce al minimo i tempi di ciclo.

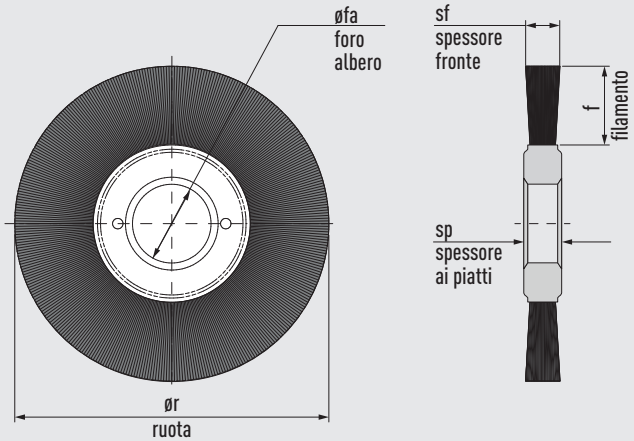
Le spazzole a ruota Y120 hanno mozzo in metallo e setole ad alta densità in filamento ceramico nero ondulato a sezione circolare.

Applicazioni
- Sbavatura di sedi di chiavette, scanalature, fori incrociati
- Lucidatura e finitura delle superfici interne di fori cilindrici

Y15S571

Y56S571





ør ruota mm	codice spazzola a ruota	ø/grana filamento	øfa mm	sf mm	f mm	max RPM min-1
38	Y14S571	0,70 / 120	12,7 - (1/2")	9,5	6,4	10.000
50	Y84S571	0,70 / 120	12,7 - (1/2")	9,5	12,7	10.000
50	Y55S571	0,90 / 80	12,7 - (1/2")	9,5	12,7	10.000
75	Y56S571	0,70 / 120	12,7 - (1/2")	12,7	25,4	10.000
75	Y76S571	0,90 / 80	12,7 - (1/2")	12,7	25,4	10.000
75	Y86S571	1,10 / 120	12,7 - (1/2")	12,7	25,4	10.000

Y115-Y116 Y120 CERASEF

ACCESSORI PER SPAZZOLE A RUOTA SERIE Y115 - Y116 E SERIE Y120

Alberi per spazzole a ruota di piccolo diametro Y120 per il montaggio su pinza o mandrino

Y32S770

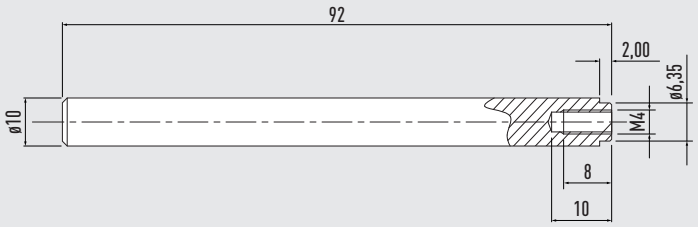
Y42S770

Y92S770

Y12S770

ø stelo mm	codice	ø albero mm	L albero mm	L fusto mm	per spazzole ø max	max RPM min -1
senza filetto						
6,35 - (1/4")	Y32S770	6,35 - (1/4")	29	4,8	50	20.000
filettati						
12,7 - (1/2")	Y42S770	6,35 - (1/4")	19	19,0 filettato	75	25.000
15,9 - (5/8")	Y92S770	6,35 - (1/4")	19	19,0 filettato	75	25.000
12,7 - (1/2")	Y12S770	6,35 - (1/4")	22	19,0 filettato	75	20.000

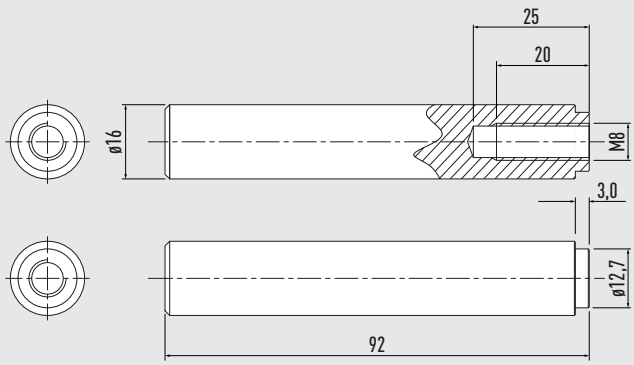
Albero ø10 mm per spazzole a ruota Y120 con foro albero 1/4" (6,35 mm), filetto M4



ø stelo mm	codice	ø albero mm	L totale mm	filetto
6,35 - (1/4")	Y990009	10	92	M4

Albero ø16 mm per spazzole a ruota con foro 1/2" (12,7 mm), filetto M8, Y115, Y116, Y120

Y50S113



ø stelo mm	codice	ø albero mm	L totale mm	filetto
12,7 - (1/2")	Y990010	16	92	M8

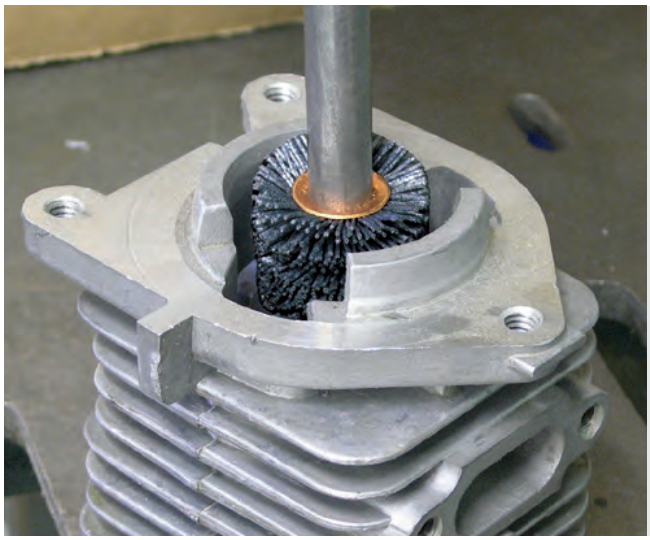
Y125

CERASEF

SPAZZOLE CROSS-HOLE PER FORI INCROCIATI E DIAMETRI INTERNI CON FILAMENTI CON ABRASIVO CERAMICO NERO Y125

Caratteristiche
Le spazzole Y125 sono progettate per applicazioni automatizzate su CNC e macchine dedicate.
Sono ideali per sbavare/finire l'interno fori e l'intersezione tra fori.
Eliminando la sbavatura a mano, migliorano la costanza ed uniformità tra i pezzi riducendo la manodopera diretta.

Sono disponibili in dimensioni che vanno da 22 mm (7/8") a 100 mm (4") e possono essere facilmente adattate al cambio utensili di un centro di lavoro utilizzando un mandrino porta-fresa o una pinza da 3/8".
Le spazzole per fori incrociati Y125 hanno setole ad alta densità in filamento ceramico nero ondulato a sezione circolare.
Hanno gambo integrato Ø 9,52 mm (3/8").



Sbavatura interna
di una testa di cilindro

Y60S271

Y21S271

Y65S168

Y125

CERASEF

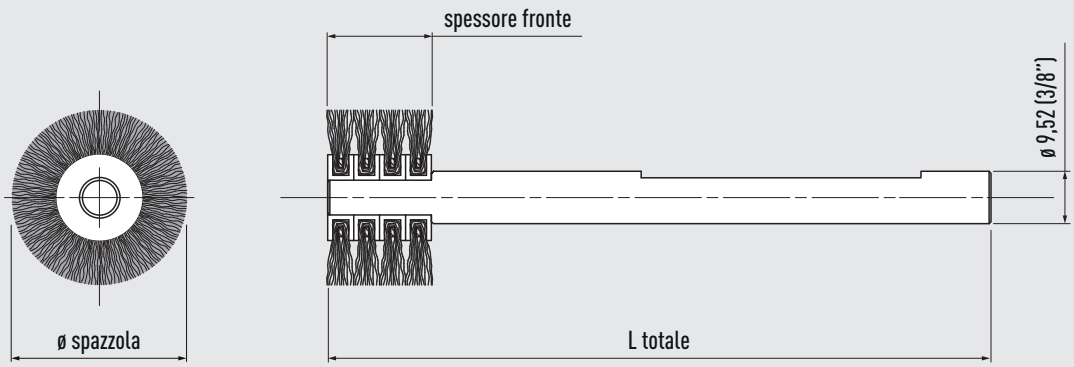
SPAZZOLE CROSS-HOLE PER FORI INCROCIATI E DIAMETRI INTERNI CON FILAMENTI CON ABRASIVO CERAMICO NERO Y125

Percorso utensile per la sbavatura di fori incrociati
Un percorso utensile efficace per la maggior parte dei lavori di sbavatura di fori incrociati è l'interpolazione circolare, che utilizza le seguenti linee guida per determinare il diametro dell'interpolazione.

Questa deve avvenire all'interno del foro primario ad una profondità alla quale il centro del fronte della spazzola si trovi in corrispondenza del centro del foro secondario che genera la bava.

Percorso utensile per la finitura dei fori
Le spazzole Cross Hole Y125 possono essere utilizzate per migliorare il grado di finitura superficiale dei fori.
Il miglior percorso utensile consiste normalmente nell'interpolazione elicoidale del foro. Le raccomandazioni di cui sopra per velocità, avanzamento e diametro di interpolazione sono valide anche per la finitura di fori. L'uso del refrigerante è altamente raccomandato per ottenere la migliore finitura possibile.

Diametro di interpolazione = (ø foro principale - 0,975) x ø spazzola



ø spazzola mm	codice spazzola	ø/grana filamento	L totale mm	spessore fronte mm	max RPM min-1
22	Y60S271	0,70 / 120	120	20	8.000
25	Y80S271	0,70 / 120	120	20	8.000
32	Y01S271	0,70 / 120	120	20	8.000
38	Y21S271	0,70 / 120	127	25	8.000
50	Y51S271	0,70 / 120	83	25	6.000
75	Y15S168	1,10 / 120	83	25	6.000
75	Y25S168	1,40 / 80	83	25	6.000
100	Y45S168	0,70 / 120	83	25	6.000
100	Y55S168	1,10 / 120	83	25	6.000
100	Y65S168	1,40 / 80	83	25	6.000

Nota: tutte le spazzole Cross Hole Y125 hanno un pianetto di lunghezza 50 mm sul gambo per poter essere utilizzate in mandrini porta fresa.
In alternativa possono essere prese su pinza da 3/8".

Y130

CERASEF

SPAZZOLE A TAZZA MASSIMA DENSITÀ DI FILAMENTO IMPREGNATO DI ABRASIVO CERAMICO NERO PER SBAVATURA A MACCHINA Y130

Caratteristiche

Realizzate con una configurazione di filamenti a settore e una lunghezza delle setole maggiore per una maggiore aggressività, una maggiore conformabilità e una maggiore durata del prodotto rispetto alle spazzole a disco monofilamento, che presentano una distribuzione di setole singole e corte.

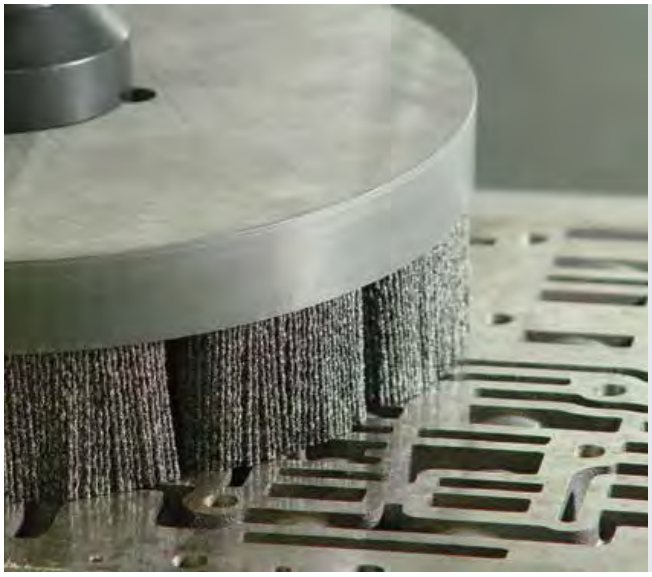
Le spazzole a disco CeraSef Y130 sono dotate dell'avanzato filamento in ceramica nera, che offre un'azione di taglio fino al 400% superiore rispetto ai filamenti tradizionali in carburo di silicio e ossido di alluminio, per un'azione di sbavatura più rapida e aggressiva, con tempi di ciclo minimi e massima durata.

Tutte le spazzole a disco CeraSef sono prodotte con un nuovo processo che consente di ottenere una superficie della spazzola molto uniforme e piatta rispetto alla costruzione tradizionale, che utilizza un supporto stampato.

L'elevata precisione dimensionale di questi utensili fa sì che le spazzole siano adatte alle applicazioni più critiche e che abbiano prestazioni più costanti dal primo all'ultimo pezzo. Inoltre, i supporti in polimero lavorati sono progettati per essere montati direttamente su un mandrino portafresa standard, per un comodo utilizzo nei centri di lavorazione CNC.

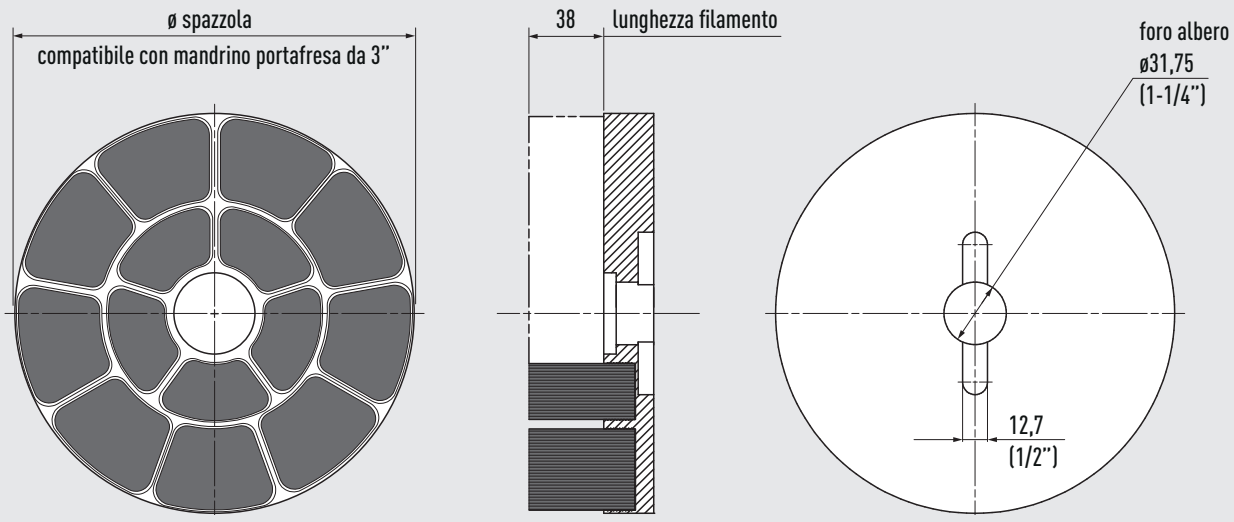
Applicazioni

- Sbavatura di superfici piane su componenti lavorati
- Miglioramento delle caratteristiche della texture su superfici lavorate
- Sbavatura di fusioni o forgiati dopo la spianatura
- Sfumatura dei testimoni di lavorazione dopo la fresatura o la rettifica



Raccomandazioni per l'avanzamento

La velocità di avanzamento è determinata dalla portata della sbavatura, della raggiatura degli spigoli o della finitura superficiale richiesta e dal tipo di materiale da lavorare.
In genere è specifica per l'applicazione.
Un avanzamento più ridotto comporta un'azione di spazzolatura più aggressiva.
In base all'azione di spazzolatura desiderata per un'applicazione specifica, la velocità di avanzamento può essere aumentata o diminuita.



Y130

CERASEF

SPAZZOLE A TAZZA MASSIMA DENSITÀ DI FILAMENTO IMPREGNATO DI ABRASIVO CERAMICO NERO PER SBAVATURA A MACCHINA Y130

ø100
Y21S168

ø150
Y51S168

ø200
Y34S168

ø250
Y22S168

ø spazzola mm	codice spazzola	ø/grana filamento	lungh filamento mm	ø foro albero mm	max RPM min-1
100	Y21S168	0,70 / 120	38	31,75	2.500
100	Y31S168	1,10 / 120	38	31,75	2.500
100	Y41S168*	1,40 / 80	38	31,75	2.500
150	Y51S168	0,70 / 120	38	31,75	2.500
150	Y61S168	1,10 / 120	38	31,75	2.500
150	Y71S168*	1,40 / 80	38	31,75	2.500
200	Y24S168	1,10 / 120	38	31,75	2.000
200	Y34S168*	1,40 / 80	38	31,75	2.000
250	Y12S168	1,10 / 120	38	31,75	2.000
250	Y22S168*	1,40 / 80	38	31,75	2.000
filamento rettangolare					
100	Y76S168*	■ / 80	38	31,75	2.500
150	Y89S168*	■ / 80	38	31,75	2.500
200	Y99S168*●	■ / 80	38	31,75	2.000

* massima densità ● a richiesta

Y135
Y135R

CERASEF

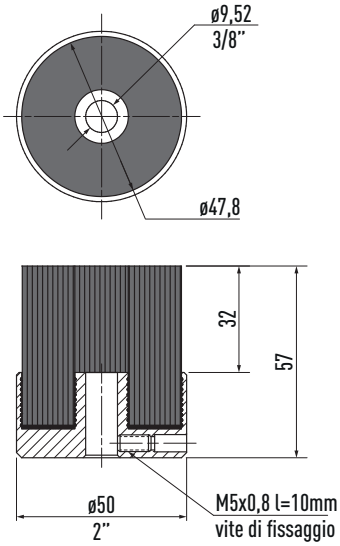
SPAZZOLE A MINI TAZZA MASSIMA DENSITÀ DI FILAMENTO IMPREGNATO DI ABRASIVO CERAMICO NERO PER SBAVATURA A MACCHINA Y135 - Y135R

Applicazioni
Spazzole a tazza di piccoli diametri con filamenti impregnati di abrasivo ceramico nero ad alta intensità, per sbavatura e finitura di superfici piane.

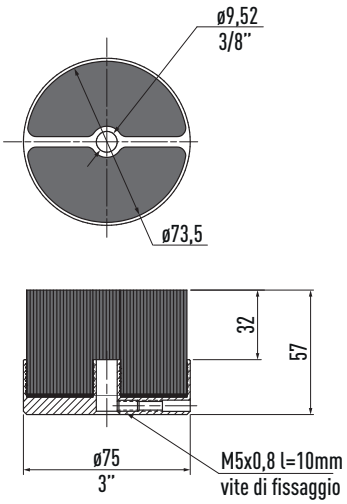
Y135R ha filamento rettangolare

Y135
Y33S758

ø mini tazza mm	codice spazzola mini disco	ø-■/grana filam.	lungh filam. mm	max RPM min-1
art. 135				
50	Y60S168	0,70 / 120	32	4.500
50	Y83S758	0,90 / 80	32	4.500
50	Y70S168	1,10 / 120	32	4.500
50	Y33S758	1,40 / 80	32	4.500
art. 135R				
50	Y63S758	■ / 80	32	4.500



ø mini tazza mm	codice spazzola mini disco	ø-■/grana filam.	lungh filam. mm	max RPM min-1
art. 135				
75	Y90S168	0,70 / 120	32	4.500
75	Y31S068	0,90 / 80	32	4.500
75	Y01S168	1,10 / 120	32	4.500
75	Y11S168	1,40 / 80	32	4.500
art. 135R				
75	Y41S068	■ / 80	32	4.500



Y135
Y135R

CERASEF

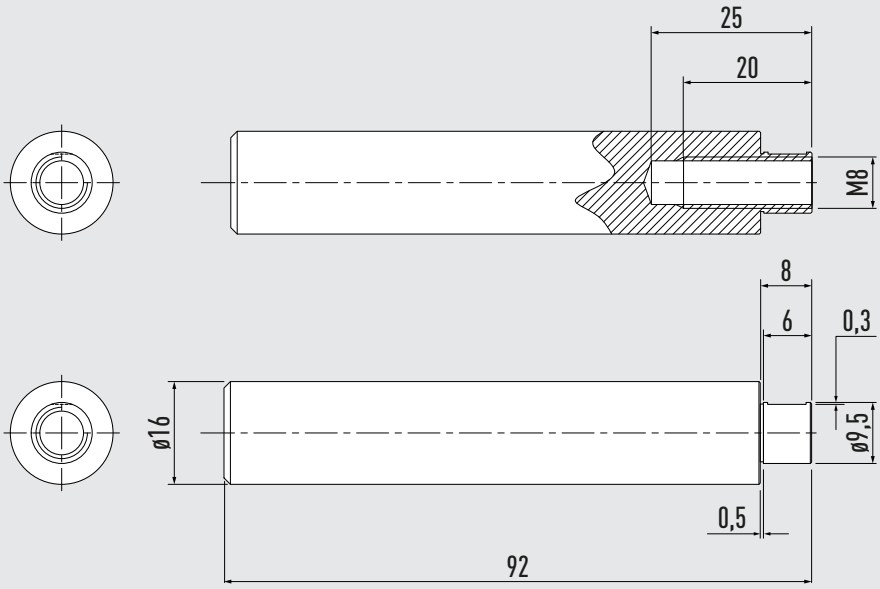
ACCESSORI PER SPAZZOLE A TAZZA MASSIMA DENSITÀ DI FILAMENTO IMPREGNATO DI ABRASIVO CERAMICO NERO PER SBAVATURA A MACCHINA Y135 - Y135R

Alberi per spazzole a tazza con trascinamento Y135 - Y135R

codice	ø stelo mm
Y33S098	12,7

Y33S098

Albero ø16 mm per spazzole a mini tazza ø50 e ø75 serie Y135 e Y135R



codice	ø stelo mm	ø albero mm	L totale mm	filetto
Y990011	9,5 - (3/8")	16	92	M8

Y140

CERASEF

SPAZZOLE TIPO PENNELLO IMPREGNATE DI ABRASIVO CERAMICO NERO PER SBAVATURA A MACCHINA Y140

Caratteristiche

Dotate di uno stelo integrato ø6,35 mm (1/4") per un comodo montaggio in un portautensile o pinza, le spazzole tipo pennello CeraSef Y140 sono adatte per trattare recessi e particolari interni, o per fornire un'azione di spazzolatura mirata su un'area specifica di un pezzo.

Applicazioni

- Sbavatura di piccole aree incassate e dettagli interni dei pezzi
- Finitura di scanalature e superfici incassate su pezzi lavorati

Y99S068

Y00S168

Y20S168

Y40S168

ø mm	codice spazzola a ruota	ø/grana filamento*	esposizione filamento mm	lungh tot. mm	RPM raccom. min-1	max RPM min-1
10	Y99S068	1,10 / 120	6,35	60	4.500-5.000	10.000
13	Y00S168	0,70 / 120	6,35	62	4.500-5.000	10.000
13	Y10S168	1,10 / 120	6,35	62	4.500-5.000	10.000
20	Y20S168	0,70 / 120	6,35	62	4.200-4.500	10.000
20	Y30S168	1,10 / 120	6,35	62	4.200-4.500	10.000
25	Y40S168	0,70 / 120	6,35	67	3.500-3.800	10.000
25	Y50S168	1,10 / 120	6,35	67	3.500-3.800	10.000
25	Y79S068	1,40 / 80	6,35	67	3.500-3.800	10.000

*lunghezza del filamento oltre la banda termoretraibile

Y150

CERASEF

SCOVOLI CON SETOLE IMPREGNATE DI ABRASIVO CERAMICO NERO PER SBAVATURA A MANO E A MACCHINA Y150

Caratteristiche

Assicurano una sbavatura e finitura rapida in aree di difficile accesso come fori, fessure, superfici filettate ed altro.
Sono adatti sia ai centri di lavoro che a trapani a colonna o utensili pneumatici.

Applicazioni

- Sbavatura intersezione tra fori in corpi valvola e collettori lavorati a macchina
- Finitura e pulitura di fori di piccolo diametro

Y85S712
Y95S712

Y16S712
Y26S712

Y36S712

Y56S712

ø mm	codice spazzola a ruota	ø/grana filamento*	ø gambo mm	lungh parte abrasiva mm	lungh totale mm
9,53	Y85S712	0,70 / 120	6,35	25	90
12,7	Y95S712	0,70 / 120	6,35	25	90
15,88	Y16S712	0,70 / 120	6,35	25	90
19,05	Y26S712	0,70 / 120	6,35	25	90
22,23	Y36S712	0,70 / 120	6,35	25	90
25,4	Y46S712	0,70 / 120	6,35	25	90
31,75	Y56S712 •	0,70 / 120	6,35	25	90

• a richiesta

Y335

CERASEF

SCOVOLI PER PICCOLI DIAMETRI CON SETOLE IMPREGNATE DI MICRO ABRASIVO (OSSIDO DI ALLUMINIO) PER SBAVATURA A MANO E A MACCHINA Y335

Applicazioni

- Sbavatura ultra fine e pulitura di fori di piccolo diametro

Y40S962

Y50S962

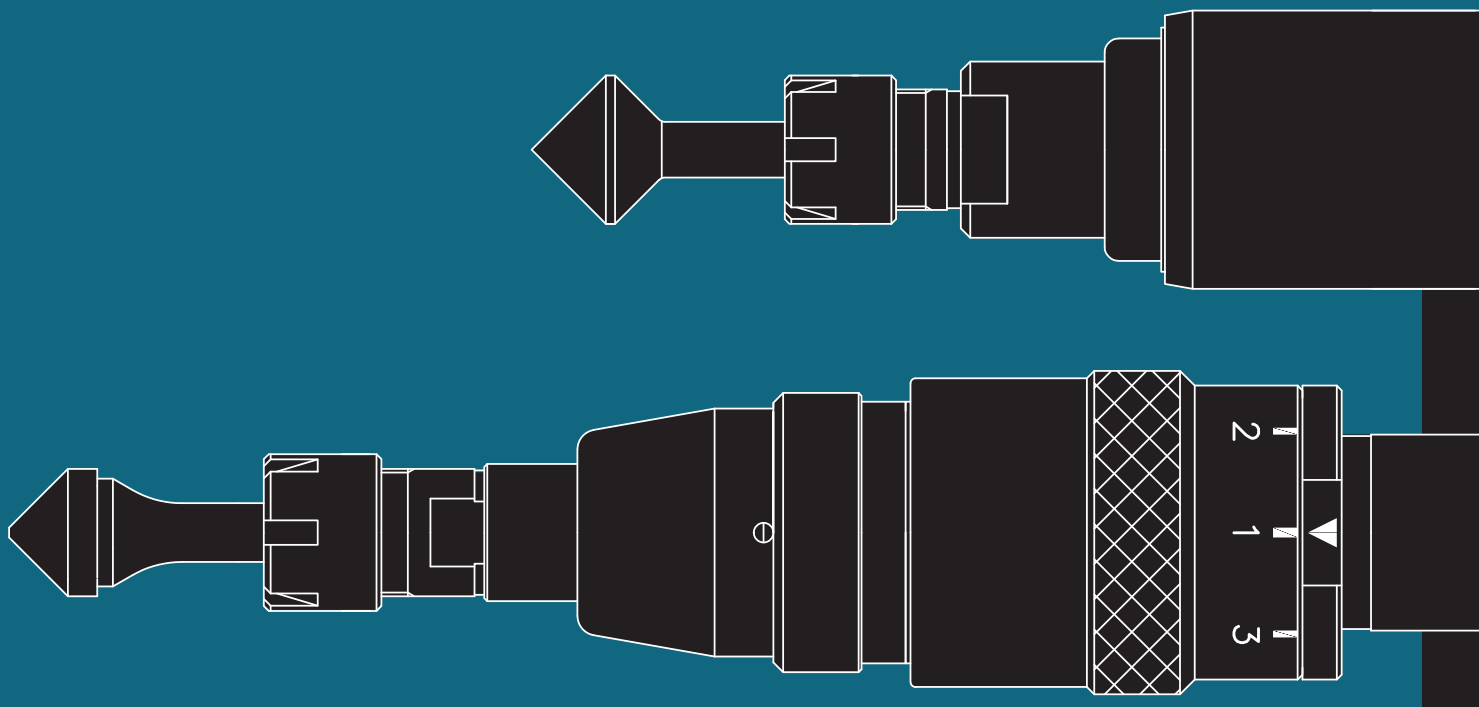
Y80S962

Y21S962

ø mm	codice scovolo	per foro ø mm	ø gambo mm	lungh parte abrasiva mm	lungh totale mm
grana 2.000					
0,76	**Y00S962**	0,79	0,4	12,7	100
1,27	**Y10S962**	1,19	0,6	12,7	100
1,91	**Y20S962**	1,60	0,8	19,1	100
2,29	**Y30S962**	1,98	1,0	19,1	100
2,67	**Y40S962**	2,39	1,0	25,4	100
3,18	**Y50S962**	2,77	1,6	25,4	100
3,43	**Y60S962**	3,18	1,9	25,4	100
grana 600					
4,19	**Y70S962**	4,0	2,2	25,4	127
4,83	**Y80S962**	4,8	2,2	25,4	127
6,60	**Y90S962**	6,4	2,9	25,4	127
8,26	**Y01S962**	8,0	2,9	25,4	127
9,78	**Y11S962**	9,5	3,7	25,4	127
13,08	**Y21S962**	12,7	4,9	25,4	127
16,26	**Y31S962** •	15,9	4,9	25,4	127
19,43	**Y41S962** •	19,1	5,4	25,4	127

• a richiesta

MANDRINI COMPENSATORI PER SBAVATURA E SMUSSATURA



SEFDEBURRING

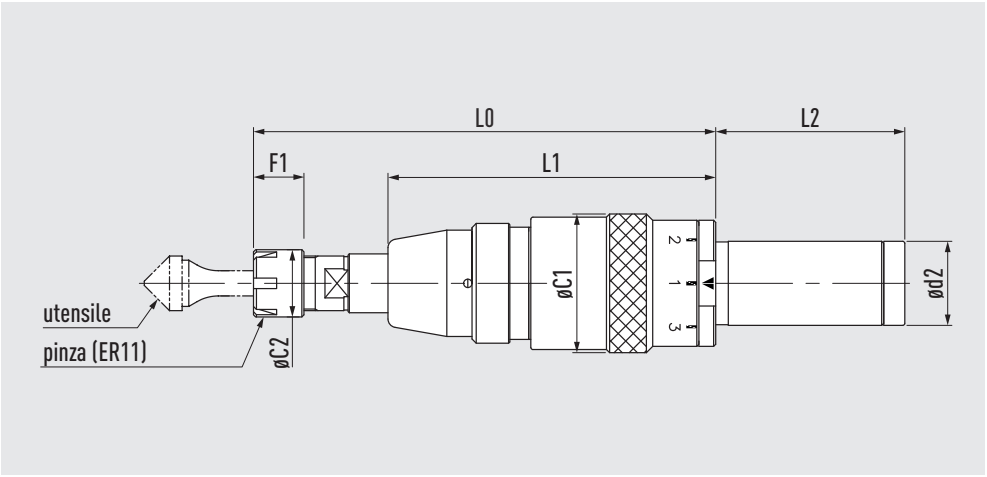
DBR7-SC

SEFDEBURRING

MANDRINI COMPENSATORI PER SBAVATURA E SMUSSATURA

Sbavatura in spinta.
Corsa 10 mm, 4 differenti settaggi di carico, esclusivo sistema di protezione dalla polvere, compensazione degli errori dimensionali.

Caratteristiche
- Velocità di rotazione massima: 10.000 giri/min
- Portautensili: pinza ER11, diametro massimo del gambo 8,0 mm con pinze oversize
- Compressione (A) per sbavatura in spinta: compensazione massima 10 mm
- Attacco macchina: ST20
- Refrigerante: solo lavorazioni a secco
- Utensili compatibili: lime rotative, mole abrasive, ecc
- Risultati ottimali con utensile sbavatore serie KW616



utensile	L0 mm	L1 mm	ø C1 mm	ø C2 mm	F1 mm
K-DBR7-SC	110	79	30	16	10

gambo ø d2 mm	gambo L2 mm	pinza	chiave	peso kg
20	45	ER11	ES11M	0,44

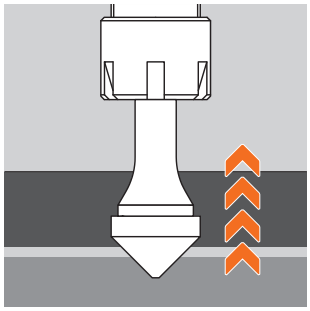
Ogni mandrino compensatore viene fornito con una ghiera ER11 tipo MINI.
Ordinare separatamente la chiave di serraggio e la pinza ER11.

KATO

DBR7-SC

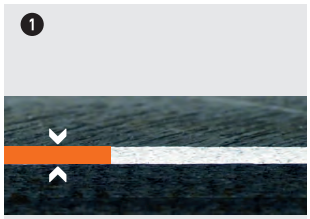
SEFDEBURRING

MANDRINI COMPENSATORI PER SBAVATURA E SMUSSATURA

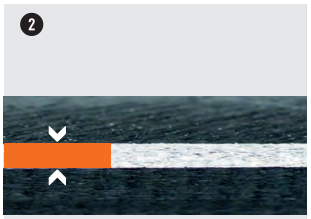


Non sbavato

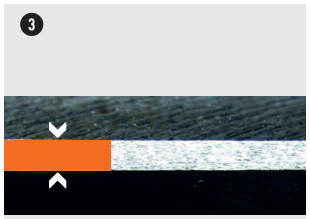
- Velocità di rotazione massima: 10.000 giri/min
- Portautensili: pinza ER11, diametro massimo del gambo 8,0 mm con pinze oversize
- Compressione (A) per sbavatura in spinta: compensazione massima 10 mm
- Il carico di sbavatura può essere regolato in 4 step, da basso ad alto, a seconda del materiale da lavorare: ① Minimo, ② Medio, ③ Alto, ④ Massimo



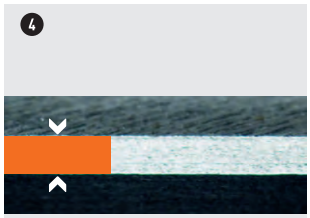
Minimo



Medio

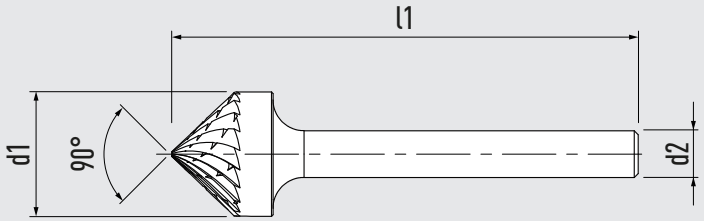


Alto



Massimo

SP-F **Sbavatura in spinta**



codice	d1 mm	d2 mm	l1 mm	Z	spinta	tiro
KW608060-SP-F	8	6	60	24	•	x
KW613060-SP-F	13	6	60	28	•	x
KW616060-SP-F	16	6	60	28	•	x
KW616120-SP-F	16	6	120	28	•	x
KW825060-SP-F	25	8	60	28	•	x

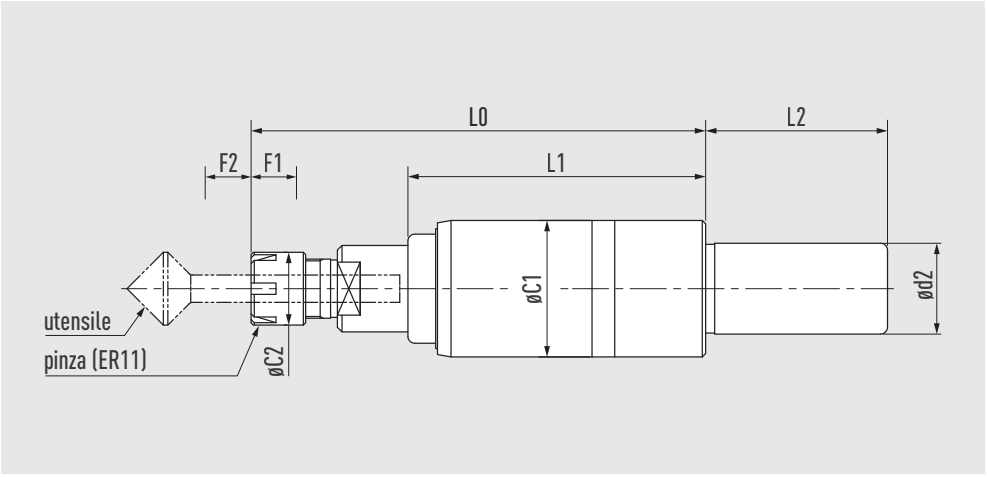
DBR7-1D

SEFDEBURRING

MANDRINI COMPENSATORI PER SBAVATURA E SMUSSATURA

Sbavatura in spinta e in tiro con un unico compensatore.
Lavora sia in trazione che in compressione, compensazione degli errori dimensionali, grande riduzione dei costi rispetto alla sbavatura convenzionale.

- Attacco macchina: ST20
- Refrigerante: solo lavorazioni a secco
- Utensili compatibili: lime rotative, mole abrasive, ecc.
- Risultati ottimali con utensile sbavatore serie KW616



utensile	L0 mm	L1 mm	C1 mm	C2 mm
K-DBR7-1D Y	100	65,5	30	16
K-DBR7-1D G	100	65,5	30	16
K-DBR7-1D R	100	65,5	30	16

F1/F2 mm	gambo d2 mm	gambo L2 mm	pinza	chiave	peso kg
±10	20	40	ER11	ES11M	0,41
±10	20	40	ER11	ES11M	0,41
±10	20	40	ER11	ES11M	0,41

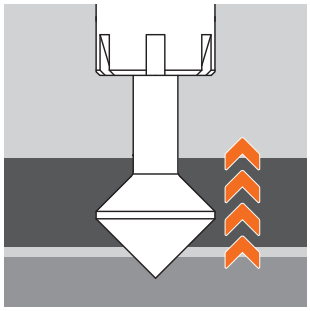
Ogni mandrino compensatore viene fornito con una ghiera ER11 tipo MINI.
Ordinare separatamente la chiave di serraggio e la pinza ER11.

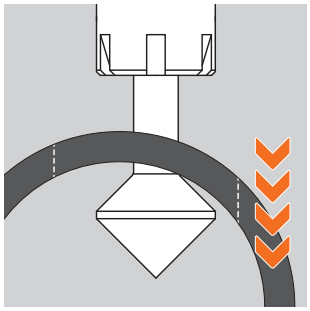
KATO

DBR7-1D

SEFDEBURRING

MANDRINI COMPENSATORI PER SBAVATURA E SMUSSATURA

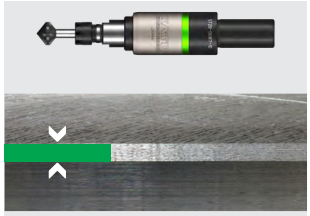




- Velocità di rotazione massima: 10.000 giri/min
- Portautensili: pinza ER11, diametro massimo del gambo 7,0 mm
- Compressione (A) e Trazione (B) per sbavatura in spinta e in tiro: compensazione massima +/-10 mm
- 3 carichi di sbavatura disponibili per la lavorazione dei diversi materiali:
  - Basso carico (tipo Giallo)
  - Medio carico (tipo Verde)
  - Alto carico (tipo Rosso)

Senza sbavatura

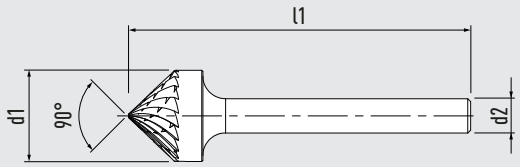
Tipo Giallo (basso carico)



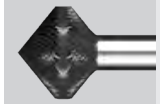
Tipo Verde (medio carico)

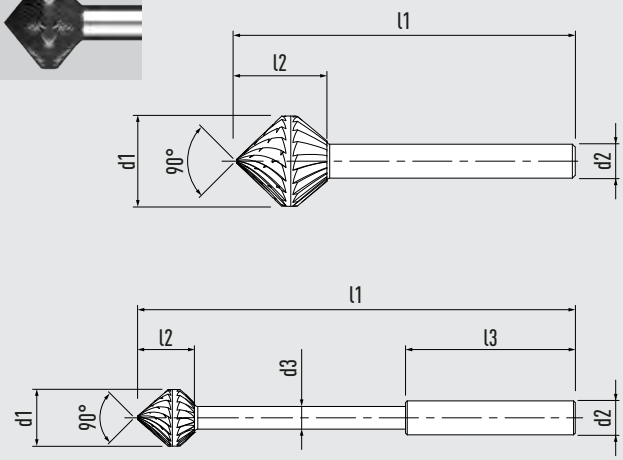
Tipo Rosso (alto carico)

SP-F **Sbavatura in spinta**



SP-F **Sbavatura in spinta e in tiro**





codice	d1 mm	d2 mm	d3 mm	l1 mm	l2 mm	l3 mm	Z	spinta	tiro
KW608060-SP-F	8	6	-	60	-	-	24	•	x
KW613060-SP-F	13	6	-	60	-	-	28	•	x
KW616060-SP-F	16	6	-	60	-	-	28	•	x
KW616120-SP-F	16	6	-	120	-	-	28	•	x
KW825060-SP-F	25	8	-	60	-	-	28	•	x
KW610060-SP-FB	10	6	4	60	11	20	24	•	•
KW610100-SP-FB	10	6	4	100	11	20	24	•	•
KW616060-SP-FB	16	6	-	60	13	-	28	•	•
KW616120-SP-FB	16	6	-	120	13	-	28	•	•

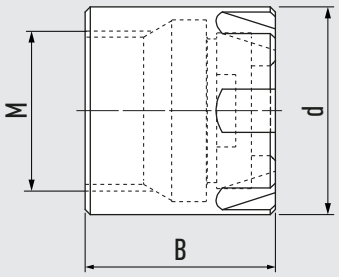
DBR7-SC
DBR7-1D

SEFDEBURRING

RICAMBI E ACCESSORI PER MANDRINI COMPENSATORI PER SBAVATURA E SMUSSATURA

Ghiera ER11 tipo MINI

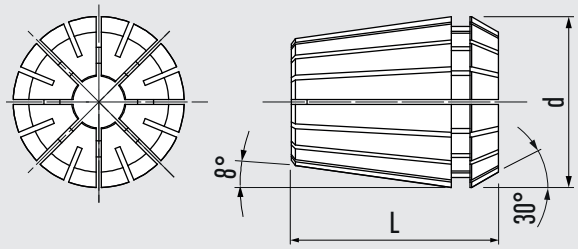
Ricambio



codice	d	B	M
KG0432	16	12	13 x 0,75

Pinza ER11 HP

Accessorio



codice	impiego	d	L
T11045	ø3 mm	11,5	18
T11053	ø6 mm	11,5	18
T11058	ø8 mm	11,5	15

Chiave CH11 per Ghiera ER11 tipo MINI

Accessorio

codice	impiego
KC5718	per ghiera KG0432

For aggressive cutting action, smooth operation and long tool life, M.A.Ford® Edgehog® carbide burrs are by far the most effective solution for even the most demanding de-burring and pre-finishing applications. With more than 160 different tool shapes and sizes available in our Edgehog range, including cylindrical, conical, ball and countersink styles, there's a burr to meet virtually every application.

FR

"Pour les actions de coupe agressives, un bon fonctionnement et une longue durée de vie de l'outil, les fraises en carbure M.A.Ford® Edgehog® sont de loin la solution la plus efficace pour les applications d'ébavurage et de pré-finition même les plus exigeantes. Avec plus de 160 différentes formes et tailles d'outils disponibles dans notre gamme Edgehog, incluant les formes de fraises cylindriques, coniques, ronds: il existe un outil d'ébavurage pour pratiquement n'importe quel type d'application."

DE

Bei sehr intensiven Schnittvorgängen und für eine reibungslose Funktion sowie lange Werkzeugstandzeiten stellen die Edgehog®-Hartmetallentgrater von M.A.Ford® bei Weitem die effektivste Lösung sogar bei den anspruchsvollsten Entgratungs- und Nachbearbeitungsanwendungen dar. Unser Edgehog-Sortiment umfasst mehr als 160 verschiedene Werkzeugformen und -größen, einschließlich zylindrische, konische, kugelförmige sowie Senker-Formen, und daher steht für nahezu jede Anwendung ein Entgrater zur Verfügung.

IT

Per un taglio aggressivo ma scorrevole ed una lunga vita utensile, le lime rotative in metallo duro M.A.Ford® Edgehog® sono certamente la soluzione più efficace, anche per le operazioni di sbavatura e pre-finitura più impegnative. Con più di 160 utensili di diverse geometrie (tra cui cilindriche, coniche, sferiche e tipo svasatore) e misure disponibili, nella gamma Edgehog c'è la lima rotative idonea per qualsiasi applicazione.

PL

Pilniki obrotowe z węglika M.A.Ford® Edgehog® umożliwiają pracę w wymagajacych warunkach przy zachowaniu długiej żywotności narzędzia. Są zdecydowanie najbardziej efektywnym rozwiązaniem dla najbardziej wymagających operacji szlifowania. W naszej ofercie M.A.Ford® Edgehog® znajduje się ponad 160 narzędzi o różnych średnicach i kształtach(cylindryczne, kulowe, stożkowe.

M.A. FORD High Performance Cutting Tools

M.A. FORDMAX RANGE

Edgehog®

Carbide Burrs

Fraise Lime Rotative Carbure | Hartmetall-Fräs(„Frässtifte") Lime rotative in MD | Zadziory

M.A. FORDMAX RANGE

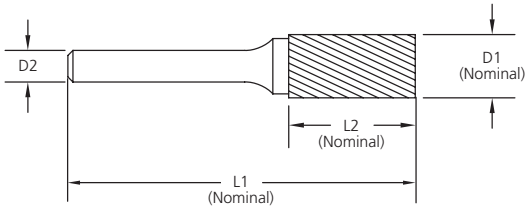
Burrs

Fraises Limes | Frässtifte | Lime Rotative | Zadziory (Pilniki Obrotowe)

Edgehog® Carbide Burrs Series SA

Type A

Cylinder



3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SA-41M	SA-41M-D	SA-41M-F	-	1.6	3.0	38.0	6.0
SA-42M	SA-42M-D	SA-42M-F	-	2.4	3.0	38.0	11.1
SA-43M	SA-43M-D	SA-43M-F	-	3.0	3.0	38.0	14.3
SA-52M	SA-52M-D	SA-52M-F	-	4.0	3.0	38.0	12.7
SA-53M	SA-53M-D	SA-53M-F	-	4.8	3.0	38.0	12.7
SA-51M	SA-51M-D	SA-51M-F	-	6.4	3.0	51.0	12.7

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SA-11M	SA-11M-D	-	-	3.0	6.0	50.0	12.7
SA-13M	-	-	-	4.0	6.0	50.0	16.0
-	SA-14M-D	-	-	4.8	6.0	50.0	16.0
SA-1M	SA-1M-D	SA-1M-F	-	6.0	6.0	50.0	16.0
SA-2M	SA-2M-D	-	-	8.0	6.0	64.0	19.0
SA-3M	SA-3M-D	SA-3M-F	SA-3NFM	9.5	6.0	64.0	19.0
SA-3MZ	SA-3MZ-D	SA-3MZ-F	-	10.0	6.0	65.0	20.0
SA-4M	SA-4M-D	-	-	11.0	6.0	70.0	25.0
SA-5MZ	SA-5MZ-D	-	-	12.0	6.0	70.0	25.0
SA-5M	SA-5M-D	SA-5M-F	SA-5NFM	12.7	6.0	70.0	25.0
SA-6M	SA-6M-D	SA-6M-F	SA-6NFM	16.0	6.0	70.0	25.0
SA-15M	-	-	-	19.0	6.0	58.0	12.7
SA-7M	SA-7M-D	SA-7M-F	-	19.0	6.0	70.0	25.0
SA-9M	SA-9M-D	SA-9M-F	-	25.0	6.0	70.0	25.0

3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SA-43L76M	SA-43L76M-D	-	-	3.0	3.0	76.0	14.3

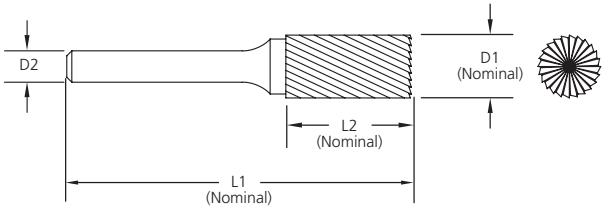
Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P103

Edgehog® Carbide Burrs Series SB

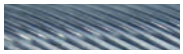
Type B

Cylinder - With End Cut



3mm Shank Burrs

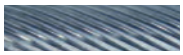





Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SB-51M	SB-51M-D	SB-51M-F	-	6.4	3.0	43.0	4.8

6mm Shank Burrs






Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SB-11M	SB-11M-D	-	-	3.0	6.0	50.0	12.7
SB-13M	SB-13M-D	-	-	4.0	6.0	50.0	16.0
-	SB-14M-D	-	-	4.8	6.0	50.0	16.0
SB-1M	SB-1M-D	SB-1M-F	-	6.0	6.0	50.0	16.0
SB-2M	SB-2M-D	SB-2M-F	-	8.0	6.0	64.0	19.0
SB-3M	SB-3M-D	SB-3M-F	SB-3NFM	9.5	6.0	64.0	19.0
SB-3MZ	SB-3MZ-D	SB-3MZ-F	-	10.0	6.0	65.0	20.0
SB-4M	SB-4M-D	-	-	11.0	6.0	70.0	25.0
SB-5MZ	SB-5MZ-D	SB-5MZ-F	-	12.0	6.0	70.0	25.0
SB-5M	SB-5M-D	-	SB-5NFM	12.7	6.0	70.0	25.0
SB-6M	SB-6M-D	-	-	16.0	6.0	70.0	25.0
-	SB-16M-D	-	-	19.0	6.0	64.0	19.0
-	SB-7M-D	SB-7M-F	-	19.0	6.0	70.0	25.0
SB-9M	SB-9M-D	-	-	25.0	6.0	70.0	25.0

P103

M.A. FORDMAX RANGE

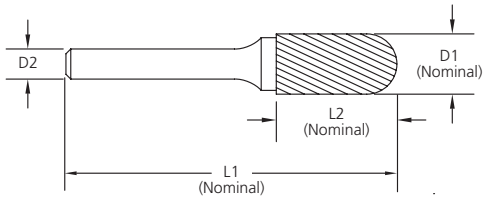
Burrs

Fraises Limes | Frässtifte | Lime Rotative | Zadziory (Pilniki Obrotowe)

Edgehog® Carbide Burrs Series SC

Type C

Ball Nosed Cylinder



3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SC-41M	SC-41M-D	SC-41M-F	-	2.4	3.0	38.0	11.1
SC-42M	SC-42M-D	SC-42M-F	-	3.0	3.0	38.0	14.3
SC-52M	SC-52M-D	SC-52M-F	-	4.0	3.0	38.0	12.7
SC-53M	SC-53M-D	SC-53M-F	-	4.8	3.0	38.0	12.7
SC-51M	SC-51M-D	SC-51M-F	-	6.4	3.0	51.0	12.7

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
-	SC-11M-D	-	-	3.0	6.0	50.0	12.7
SC-13M	SC-13M-D	-	-	4.0	6.0	50.0	16.0
SC-14M	SC-14M-D	-	-	4.8	6.0	50.0	16.0
SC-1M	SC-1M-D	SC-1M-F	-	6.0	6.0	50.0	16.0
SC-2M	SC-2M-D	SC-2M-F	-	8.0	6.0	64.0	19.0
SC-3M	SC-3M-D	SC-3M-F	SC-3NFM	9.5	6.0	64.0	19.0
SC-3MZ	SC-3MZ-D	SC-3MZ-F	-	10.0	6.0	65.0	20.0
SC-4M	SC-4M-D	-	-	11.0	6.0	70.0	25.0
SC-5MZ	SC-5MZ-D	SC-5MZ-F	-	12.0	6.0	70.0	25.0
SC-5M	SC-5M-D	SC-5M-F	SC-5NFM	12.7	6.0	70.0	25.0
SC-6M	SC-6M-D	SC-6M-F	SC-6NFM	16.0	6.0	70.0	25.0
SC-7M	SC-7M-D	-	-	19.0	6.0	70.0	25.0
SC-9M	SC-9M-D	-	-	25.0	6.0	70.0	25.0

3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SC-42L76M	SC-42L76M-D	-	-	3.0	3.0	76.0	14.3

6mm Shank Burrs

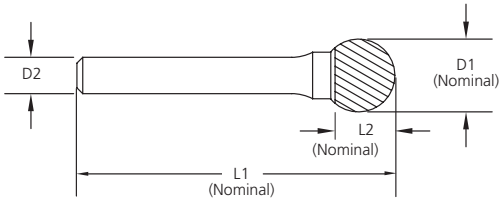
Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SC-1L6M	-	-	-	6.0	6.0	166.0	16.0
SC-3L6M	-	-	-	9.5	6.0	169.0	19.0
SC-5L6M	SC-5L6M-D	SC-5L6M-F	-	12.7	6.0	175.0	25.0

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P103

Edgehog® Carbide Burrs Series SD

Type D — **Ball**



3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SD-41M	SD-41M-D	SD-41M-F	-	2.4	3.0	38.0	2.0
SD-42M	SD-42M-D	SD-42M-F	-	3.0	3.0	38.0	2.8
SD-53M	SD-53M-D	SD-53M-F	-	4.8	3.0	38.0	4.0
SD-51M	SD-51M-D	SD-51M-F	-	6.4	3.0	44.0	5.6

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SD-11M	SD-11M-D	-	-	3.0	6.0	50.0	2.8
SD-14M	SD-14M-D	SD-14M-F	-	4.8	6.0	50.0	4.0
SD-1M	SD-1M-D	SD-1M-F	-	6.0	6.0	50.0	5.0
SD-2M	SD-2M-D	-	-	8.0	6.0	51.0	6.0
SD-3M	SD-3M-D	SD-3M-F	SD-3NFM	9.5	6.0	53.0	7.0
SD-3MZ	SD-3MZ-D	SD-3MZ-F	-	10.0	6.0	54.0	7.0
SD-4M	SD-4M-D	SD-4M-F	-	11.0	6.0	54.0	8.0
SD-5MZ	-	-	-	12.0	6.0	56.0	9.5
SD-5M	SD-5M-D	SD-5M-F	SD-5NFM	12.7	6.0	56.0	10.0
SD-6M	SD-6M-D	SD-6M-F	SD-6NFM	16.0	6.0	59.0	13.0
SD-7M	SD-7M-D	-	-	19.0	6.0	62.0	16.0
SD-9M	SD-9M-D	-	-	25.0	6.0	68.0	21.0

3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SD-42L76M	SD-42L76M-D	-	-	3.0	3.0	76.0	2.8

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
-	SD-1L6M-D	-	-	6.0	6.0	155.0	5.0
-	SD-2L6M-D	-	-	8.0	6.0	159.0	6.0
SD-3L6M	SD-3L6M-D	SD-3L6M-F	-	9.5	6.0	161.0	7.0
SD-5L6M	SD-5L6M-D	SD-5L6M-F	-	12.7	6.0	164.0	10.0

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P103

M.A.FORDMAX RANGE

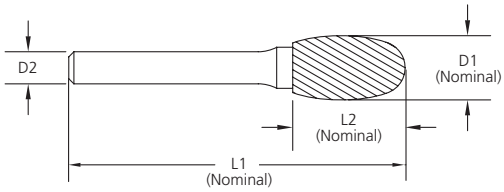
Burrs

Fraises Limes | Frässtifte | Lime Rotative | Zadziory (Pilniki Obrotowe)

Edgehog® Carbide Burrs Series SE

Type E

Oval



3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SE-41M	SE-41M-D	SE-41M-F	-	3.0	3.0	38.0	5.6
SE-53M	SE-53M-D	-	-	4.8	3.0	38.0	7.0
SE-51M	SE-51M-D	SE-51M-F	-	6.4	3.0	48.0	9.5

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SE-1M	SE-1M-D	-	-	6.0	6.0	50.0	9.5
-	SE-2M-D	-	-	8.0	6.0	60.0	16.0
SE-3M	SE-3M-D	SE-3M-F	SE-3NFM	9.5	6.0	60.0	16.0
SE-5M	SE-5M-D	SE-5M-F	SE-5NFM	12.7	6.0	67.0	22.0
SE-6M	SE-6M-D	-	SE-6NFM	16.0	6.0	70.0	25.0
SE-7M	SE-7M-D	-	-	19.0	6.0	70.0	25.0

3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SE-41L76M	-	-	-	3.0	3.0	76.0	5.6

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SE-3L6M	SE-3L6M-D	-	-	9.5	6.0	166.0	16.0
SE-5L6M	SE-5L6M-D	-	-	12.7	6.0	172.0	22.0

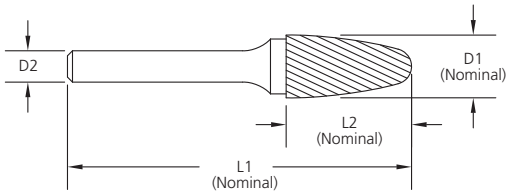
Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P103

Edgehog® Carbide Burrs Series SF

Type F

Ball Nosed Tree



3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SF-41M	SF-41M-D	SF-41M-F	-	3.0	3.0	38.0	6.0
SF-42M	SF-42M-D	SF-42M-F	-	3.0	3.0	38.0	12.7
SF-53M	SF-53M-D	SF-53M-F	-	4.8	3.0	38.0	12.7
SF-51M	SF-51M-D	SF-51M-F	-	6.4	3.0	51.0	12.7

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Standard Cut Tool No.	Alt Diamond Tool No.	Tool Dimensions D1	D2	L1	L2
SF-11M	SF-11M-D	SF-11M-F	-	3.0	6.0	50.0	12.7
SF-1M	SF-1M-D	SF-1M-F	-	6.0	6.0	50.0	16.0
SF-3M	SF-3M-D	-	SF-3NFM	9.5	6.0	64.0	19.0
SF-4M	SF-4M-D	-	-	11.0	6.0	70.0	25.0
SF-5MZ	SF-5MZ-D	SF-5MZ-F	-	12.0	6.0	70.0	25.0
SF-13M	SF-13M-D	SF-13M-F	-	12.7	6.0	64.0	19.0
SF-5M	SF-5M-D	SF-5M-F	SF-5NFM	12.7	6.0	70.0	25.0
SF-6M	SF-6M-D	SF-6M-F	SF-6NFM	16.0	6.0	70.0	25.0
SF-7M	SF-7M-D	SF-7M-F	-	19.0	6.0	70.0	25.0
SF-14M	SF-14M-D	-	-	19.0	6.0	76.0	31.0

3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SF-42L76M	SF-42L76M-D	-	-	3.0	3.0	76.0	12.7

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SF-1L6M	SF-1L6M-D	SF-1L6M-F	-	6.0	6.0	166.0	16.0
SF-3L6M	SF-3L6M-D	-	-	9.5	6.0	169.0	19.0
SF-5L6M	SF-5L6M-D	-	-	12.7	6.0	175.0	25.0

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P103

M.A. FORDMAX RANGE

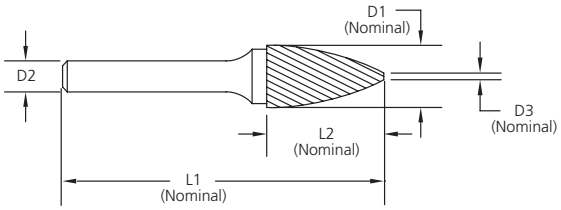
Burrs

Fraises Limes | Frässtifte | Lime Rotative | Zadziory (Pilniki Obrotowe)

Edgehog® Carbide Burrs Series SG

Type G

Tree



3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2	D3
SG-41M	SG-41M-D	SG-41M-F	-	3.0	3.0	38.0	6.0	0.46
SG-42M	SG-42M-D	SG-42M-F	-	3.0	3.0	38.0	8.0	0.46
SG-43M	SG-43M-D	SG-43M-F	-	3.0	3.0	38.0	9.5	0.46
SG-53M	SG-53M-D	SG-53M-F	-	4.8	3.0	38.0	12.7	0.64
SG-51M	SG-51M-D	SG-51M-F	-	6.4	3.0	51.0	12.7	0.76

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2	D3
SG-1M	SG-1M-D	SG-1M-F	-	6.0	6.0	50.0	16.0	0.76
SG-2M	SG-2M-D	SG-2M-F	-	8.0	6.0	64.0	19.0	1.02
SG-3M	SG-3M-D	SG-3M-F	-	9.5	6.0	64.0	19.0	1.02
SG-3MZ	SG-3MZ-D	SG-3MZ-F	-	10.0	6.0	65.0	20.0	1.14
SG-5MZ	SG-5MZ-D	SG-5MZ-F	-	12.0	6.0	70.0	25.0	1.27
SG-13M	SG-13M-D	SG-13M-F	-	12.7	6.0	64.0	19.0	1.27
SG-5M	SG-5M-D	SG-5M-F	-	12.7	6.0	70.0	25.0	1.27
SG-6M	SG-6M-D	SG-6M-F	-	16.0	6.0	70.0	25.0	1.27
SG-7M	SG-7M-D	SG-7M-F	-	19.0	6.0	70.0	25.0	1.27
SG-15M	SG-15M-D	SG-15M-F	-	19.0	6.0	84.0	38.0	1.78

3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2	D3
SG-42L76M	SG-42L76M-D	-	-	3.0	3.0	76.0	8.0	0.46
SG-43L76M	SG-43L76M-D	-	-	3.0	3.0	76.0	9.5	0.46

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2	D3
SG-1L6M	SG-1L6M-D	SG-1L6M-F	-	6.0	6.0	166.0	16.0	0.76
-	SG-3L6M-D	SG-3L6M-F	-	9.5	6.0	169.0	19.0	1.02
-	SG-5L6M-D	SG-5L6M-F	-	12.7	6.0	175.0	25.0	1.27

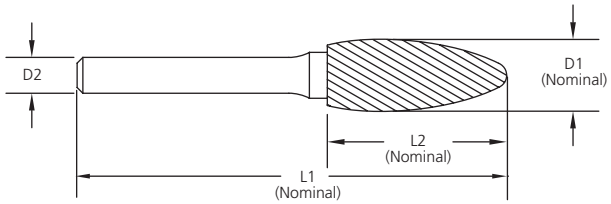
Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P103

Edgehog® Carbide Burrs Series SH

Type H

Flame



3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SH-41M	SH-41M-D	SH-41M-F	-	3.0	3.0	38.0	6.0
SH-53M	SH-53M-D	SH-53M-F	-	4.8	3.0	38.0	9.5

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SH-1M	SH-1M-D	SH-1M-F	-	6.0	6.0	50.0	16.0
SH-2M	SH-2M-D	SH-2M-F	-	8.0	6.0	64.0	19.0
SH-5M	SH-5M-D	SH-5M-F	-	12.7	6.0	76.0	31.0
SH-6M	SH-6M-D	SH-6M-F	-	16.0	6.0	81.0	36.0
SH-7M	SH-7M-D	SH-7M-F	-	19.0	6.0	86.0	41.0

3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SH-41L76M	SH-41L76M-D	-	-	3.0	3.0	76.0	6.0

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Standard Cut Tool No.	Alt Diamond Tool No.	Tool Dimensions D1	D2	L1	L2
SH-2L6M	SH-2L6M-D	SH-2L6M-F	-	8.0	6.0	169.0	19.0
SH-5L6M	SH-5L6M-D	SH-5L6M-F	-	12.7	6.0	181.0	31.0

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P103

M.A. FORDMAX RANGE

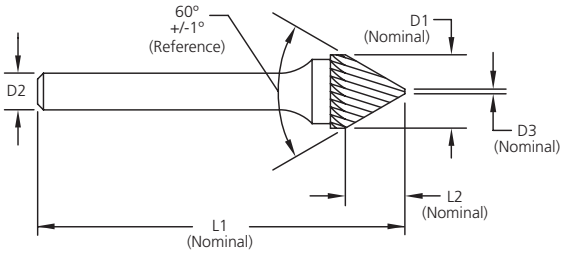
Burrs

Fraises Limes | Frässtifte | Lime Rotative | Zadziory (Pilniki Obrotowe)

Edgehog® Carbide Burrs Series SJ

Type J

Countersink 60°



3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SJ-42M	SJ-42M-D	SJ-42M-F	-	3.0	3.0	38.0	2.4
-	SJ-82M-D*	-	-	3.0	3.0	38.0	2.4

* SJ-82M-D is double ended

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SJ-1M	SJ-1M-D	-	-	6.0	6.0	50.0	4.8
SJ-3M	SJ-3M-D	-	-	9.5	6.0	55.0	8.0
SJ-5M	SJ-5M-D	-	-	12.7	6.0	58.0	11.0
SJ-6M	SJ-6M-D	-	-	16.0	6.0	62.0	12.7
SJ-7M	SJ-7M-D	-	-	19.0	6.0	64.0	14.0
SJ-9M	SJ-9M-D	-	-	25.0	6.0	70.0	21.0

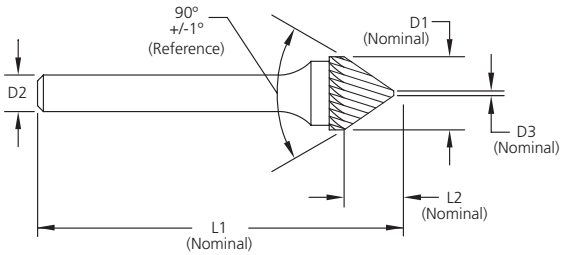
Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P103

Edgehog® Carbide Burrs Series SK

Type K

Countersink 90°



3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SK-42M	SK-42M-D	-	-	3.0	3.0	38.0	1.6
SK-82M*	SK-82M-D*	-	-	3.0	3.0	38.0	1.6

* SK-82M is double ended

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2
SK-1M	SK-1M-D	-	-	6.0	6.0	50.0	3.0
SK-3M	SK-3M-D	-	-	9.5	6.0	52.0	4.8
SK-5M	SK-5M-D	-	-	12.7	6.0	53.0	6.4
SK-6M	SK-6M-D	-	-	16.0	6.0	56.0	8.0
SK-7M	SK-7M-D	-	-	19.0	6.0	58.0	9.5
SK-9M	SK-9M-D	-	-	25.0	6.0	61.0	12.7

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P103

M.A. FORDMAX RANGE

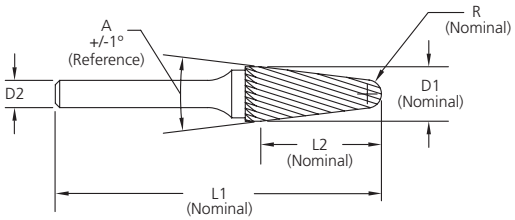
Burrs

Fraises Limes | Frässtifte | Lime Rotative | Zadziory (Pilniki Obrotowe)

Edgehog® Carbide Burrs Series SL

Type L

Ball Nosed Cone



3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2	A°
SL-41M	SL-41M-D	SL-41M-F	-	3.0	3.0	38.0	9.5	8°
SL-42M	SL-42M-D	SL-42M-F	-	3.0	3.0	38.0	12.7	8°
SL-53M	SL-53M-D	SL-53M-F	-	4.8	3.0	38.0	12.7	14°

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2	A°
SL-1M	SL-1M-D	SL-1M-F	-	6.0	6.0	50.0	16.0	14°
SL-2M	SL-2M-D	SL-2M-F	-	8.0	6.0	71.0	24.0	14°
SL-3M	SL-3M-D	SL-3M-F	SL-3NFM	9.5	6.0	75.0	28.0	14°
SL-4M	SL-4M-D	SL-4M-F	SL-4NFM	12.7	6.0	76.0	30.0	14°
-	SL-6M-D	SL-6M-F	SL-6NFM	16.0	6.0	80.0	33.0	14°
SL-7M	SL-7M-D	SL-7M-F	-	19.0	6.0	86.0	39.0	14°

3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2	A°
SL-42L76M	SL-42L76M-D	-	-	3.0	3.0	76.0	12.7	8°

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions D1	D2	L1	L2	A°
-	-	SL-2L6M-F	-	8.0	6.0	176.0	24.0	14°
SL-3L6M	SL-3L6M-D	SL-3L6M-F	-	9.5	6.0	180.0	28.0	14°
SL-4L6M	SL-4L6M-D	SL-4L6M-F	-	12.7	6.0	182.0	30.0	14°

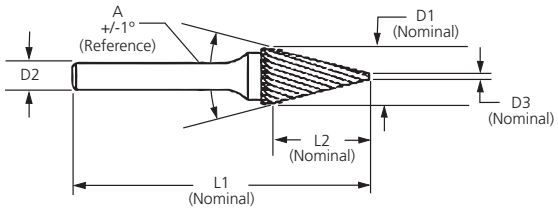
Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P103

Edgehog® Carbide Burrs Series SM

Type M

Cone



3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions					
				D1	D2	L1	L2	A°	D³
SM-45M	SM-45M-D	SM-45M-F	-	3.0	3.0	38.0	4.8	32°	0.46
SM-41M	SM-41M-D	SM-41M-F	-	3.0	3.0	38.0	9.5	12°	1.09
SM-42M	SM-42M-D	SM-42M-F	-	3.0	3.0	38.0	11.1	14°	0.36
SM-43M	SM-43M-D	SM-43M-F	-	3.0	3.0	38.0	16.0	7°	1.14
SM-53M	SM-53M-D	SM-53M-F	-	4.8	3.0	38.0	12.7	16°	0.97
SM-51M	SM-51M-D	SM-51M-F	-	6.4	3.0	54.0	12.7	22°	1.32

6mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions					
				D1	D2	L1	L2	A°	D³
SM-1M	SM-1M-D	SM-1M-F	-	6.0	6.0	50.0	12.7	22°	1.17
SM-2M	SM-2M-D	SM-2M-F	-	6.0	6.0	50.0	19.0	14°	1.42
SM-3M	SM-3M-D	SM-3M-F	-	6.0	6.0	50.0	25.0	10°	1.65
SM-4M	SM-4M-D	SM-4M-F	-	9.5	6.0	63.0	16.0	28°	1.32
SM-5M	SM-5M-D	SM-5M-F	-	12.7	6.0	69.0	22.0	28°	1.32
SM-6M	SM-6M-D	SM-6M-F	-	16.0	6.0	72.0	25.0	31°	1.52

3mm Shank Burrs

Standard Cut Tool No.	Alt Diamond Tool No.	Fine Cut Tool No.	Shear Cut Tool No.	Tool Dimensions					
				D1	D2	L1	L2	A°	D³
SM-42L76M	SM-42L76M-D	-	-	3.0	3.0	76.0	11.0	14°	0.36

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P103

M.A. FORDMAX RANGE

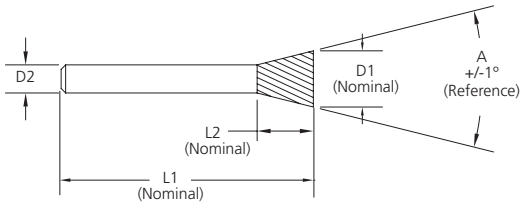
Burrs

Fraises Limes | Frässtifte | Lime Rotative | Zadziory (Pilniki Obrotowe)

Edgehog® Carbide Burrs Series SN

Type N

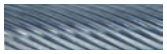
Inverted Cone



3mm Shank Burrs

				Tool Dimensions				
Standard Cut Tool No.	**Alt Diamond Tool No.**	**Fine Cut Tool No.**	**Shear Cut Tool No.**	**D1**	**D2**	**L1**	**L2**	**A°**
SN-41M	SN-41M-D	SN-41M-F	-	2.4	3.0	38.0	3.0	10°
SN-42M	SN-42M-D	SN-42M-F	-	3.0	3.0	38.0	4.8	10°
SN-53M	SN-53M-D	SN-53M-F	-	4.8	3.0	38.0	6.4	10°
SN-51M	SN-51M-D	SN-51M-F	-	6.4	3.0	44.0	6.4	10°

6mm Shank Burrs

				Tool Dimensions				
Standard Cut Tool No.	**Alt Diamond Tool No.**	**Fine Cut Tool No.**	**Shear Cut Tool No.**	**D1**	**D2**	**L1**	**L2**	**A°**
-	SN-1M-D	SN-1M-F	-	6.0	6.0	50.0	8.0	10°
SN-2M	SN-2M-D	SN-2M-F	-	9.5	6.0	55.0	9.5	13°
SN-4M	SN-4M-D	SN-4M-F	-	12.7	6.0	58.0	12.7	28°
SN-6M	SN-6M-D	SN-6M-F	-	16.0	6.0	64.0	19.0	18°
-	SN-7M-D	SN-7M-F	-	19.0	6.0	61.0	16.0	30°

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Edgehog® Carbide Burrs

Burr Fluting Chart | Tableau de denture par fraise | Tabelle der Fräserschneiden | Numero di taglienti | Tabela pilników obrotowych

Number Of Flutes (± 10%)			
Burr Ø	Standard Cut	Fine Cut	Shear Cut
1.6	10	12	-
2.0	10	12	-
2.4	12	16	-
3.0	12	20	-
4.0	14	24	-
4.8	15	24	-
6.0	16	25	-
8.0	18	30	-
9.5	20	30	6
11.0	22	30	-
12.7	24	35	8*
16.0	26	40	8**
19.0	30	40	-
25.0	35	45	-

* Except SL-4NFM - 6 Flutes
** Except SD-6NFM, SE-6NFM and SF-6NFM - 10 Flutes.

Alternate Diamond Grind - LH Fluting 40% of RH Fluting
Diamond Grind - LH Fluting 80% of RH Fluting.

Recommended Operating Speeds

Vitesses d'utilisation recommandées | Empfohlene Betriebsdrehzahlen | Velocità di utilizzo consigliate | Zalecane prędkości pracy

Burr Diameter Ø mm	Operating Speed RPM	
	From	To
3.0	45,000	90,000
6.0	23,000	45,000
9.5	19,000	30,000
12.7	15,000	22,000
16.0	12,000	18,000
19.0	7,500	15,000

The speed guidelines above are general recommendations.
Speeds may require adjusting based on material and application.

Burr Application By Material | Type de denture de fraises par matière | Frässtift-Anwendungsgebiete nach Material | Scelta dell'utensile in funzione del materiale | Zastosowanie frezu (pilnika obrotowego) według materiału

Material	Standard Cut	Alt Diamond Cut	Fine Cut	Shear Cut
Aluminium	•	•	-	•
Brass, Bronze, Copper	•	•	-	-
Carbon	•	-	-	-
Cast Iron	•	-	-	-
Fibreglass	•	-	-	-
Hard Rubber	•	-	-	•
Magnesium	-	-	-	•
Masonite	•	-	-	•
Plastics	•	-	-	•
Steels - 40-60HRc	•	•	•	-
Steels, Alloy Steels	•	•	-	-
Nickel/Chrome Steels	•	•	-	-
Stainless Steels	•	•	•	-
Steel Weldments	•	•	-	-
Titanium	•	•	-	-
Wood	-	-	-	•
Zinc	-	-	-	•

Edgehog® Carbide Burrs

Problems and Solutions | Problèmes et Solutions | Probleme und Lösungen | Problemi e Soluzioni | Problemy i Rozwiązania

Possible Causes | Causes Possibles | Mögliche Ursachen | Cause Possibili | Możliwe Przyczyny

	Excessive Force	Shank Friction With Workpiece	Worn Burr	Incorrect Collet Location	Worn Grinder Bearings	Poor Shank Straight-ness	Unstable Workpiece	Working in Soft Materials	Cutting Abrasive Material	Low Setup Rigidity
Broken Brazed Joint	●	●	●	-	-	-	-	-	-	-
Poor Burr Control	-	-	-	●	●	●	●	-	-	●
Flutes Clogging	-	-	-	-	-	-	-	●	-	-
Excessive Vibration	-	-	-	●	●	●	●	-	-	●
Poor Finish	-	-	-	●	●	●	●	●	-	●
Poor Tool Life	-	●	-	●	●	●	●	-	●	●

Possible Causes | Causes Possibles | Mögliche Ursachen | Cause Possibili | Możliwe Przyczyny

	Reduce Cutting Pressure	Ensure Shank / Workpiece Clearance	Replace Worn Burr	Check Burr Location & Replace Collet if Necessary	Check & Replace Grinder Bearings if Necessary	Check Shank Straightness - Replace Burr if Necessary	Improve Workpiece Stability	Use a Coarser Cut Burr
Broken Brazed Joint	●	●	●	-	-	-	-	-
Poor Burr Control	-	-	-	●	●	●	●	-
Flutes Clogging	-	-	-	-	-	-	-	●
Excessive Vibration	-	-	-	●	●	●	●	-
Poor Finish	-	-	-	●	●	●	●	-
Poor Tool Life	-	●	-	●	●	●	-	-

Possible Causes | Causes Possibles | Mögliche Ursachen | Cause Possibili | Możliwe Przyczyny

	Use Lubricant or Anti-Sticking Agent	Increase RPM	Reduce RPM	Make Lighter Cuts	Change to a Finer Cut Burr	Faster Feed	Slower Feed
Broken Brazed Joint	-	-	-	-	-	-	-
Poor Burr Control	-	-	-	-	-	-	-
Flutes Clogging	●	●	●	●	-	-	-
Excessive Vibration	-	●	●	-	-	●	●
Poor Finish	-	●	●	-	●	●	●
Poor Tool Life	●	-	●	-	●	●	●

From the original M.A.Ford® single flute Uniflute® countersink for unrivalled economical, chatter free machining in both carbide and HSS options to multiple flute tools for increased feed rates for reduced chip loads, our wide choice and high quality countersinks provide the perfect solution.

FR

"Depuis la fraise originale M.A.Ford® une dent Uniflute® économiquement inégalable, ne générant pas de broutage, disponibles en carbure et HSS, en passant par les outils à goujures multiples pour des vitesses d'avance plus élevées et des copeaux réduits, notre large choix de fraises de grande qualité vous donnent accès aux meilleures solutions."

DE

Unsere große Auswahl an Senkern und deren hochwertige Qualität stellen die perfekte Lösung zur Verfügung: vom originalen M.A.Ford® Uniflute®-Senker mit einer Schneide zur einzigartigen, wirtschaftlichen und ratterfreien Bearbeitung in sowohl Hartmetall- als auch HSS-Ausführungen bis zu Werkzeugen mit mehreren Schneiden für erhöhte Vorschubgeschwindigkeiten und vermindertes Zerspanungsvolumen.

IT

La soluzione perfetta per la svasatura: ampia scelta e alta qualità. Svasatori originali M.A.Ford® Uniflute® monotagliente, disponibili sia in HSS che in metallo duro, per la svasatura efficiente e senza vibrazioni. Svasatori multitagliente per alto avanzamento con riduzione del carico per tagliente.

PL

W naszej ofercie znajduja się jednostrzowe pogblebiacze Uniflute® , które oferują nieporównywalne wartości ekonomiczne i techniczne. Polecamy również opcje z wieloma rowkami wiórowymi które oferują wysokie wartości posuwu. Obydwie grupy produktow dostępne sa w wersji HSS i z węglika.

M.A. FORD High Performance Cutting Tools

M.A. FORDMAX RANGE

Countersinks

Countersinks

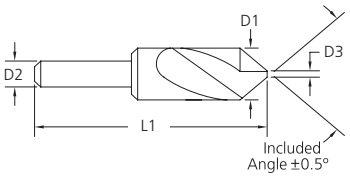
Fraises | Senker | Svasatori | Pogłębiacze

M.A. FORDMAX RANGE

Countersinks
Fraises | Senker | Svasatori | Pogłębiacze

Uniflute® Carbide Countersink - Single Flute Series 60 Uncoated

VHM | Z1 | 60° 82° 90° 100°



60°	82°	90°	100°	Tool Dimensions			
Tool No.	Tool No.	Tool No.	Tool No.	D1	D2	D3 (Max)	L1
60012501	60012502	60012503	60012504	1/8" 3.2mm	1/8" 3.2mm	0.030" 0.8mm	1-1/2" 38.1mm
60018701	60018702	60018703	60018704	3/16" 4.8mm	3/16" 4.8mm	0.045" 1.1mm	1-1/2" 38.1mm
60025001	60025002	60025003	60025004	1/4" 6.4mm	1/4" 6.4mm	0.045" 1.1mm	2" 50.8mm
60037501	60037502	60037503	60037504	3/8" 9.5mm	1/4" 6.4mm	0.06" 1.5mm	2" 50.8mm
60050001	60050002	60050003	60050004	1/2" 12.7mm	1/4" 6.4mm	0.06" 1.5mm	2-3/8" 60.3mm
60075001	60075002	60075003	60075004	3/4" 19.0mm	1/2" 12.7mm	0.120" 3.1mm	3" 76.2mm
60100001	60100002	60100003	60100004	1" 25.4mm	1/2" 12.7mm	0.120" 3.1mm	3" 76.2mm

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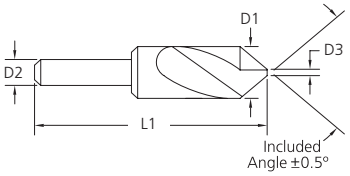
Uniflute® HSS Countersink - Single Flute Series 61 Steam Treated

HSS | Z1 | 60° 82° 90° 100° 120°

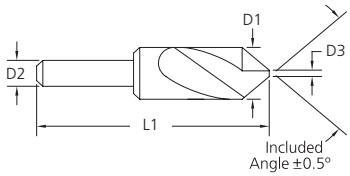


60°	82°	90°	100°	120°	Tool Dimensions			
Tool No.	Tool No.	Tool No.	Tool No.	Tool No.	D1	D2	D3 (Max)	L1
61012501	61012502	61012503	61012504	61012506	1/8" 3.2mm	1/8" 3.2mm	0.030" 0.8mm	1-1/2" 38.1mm
61018701	61018702	61018703	61018704	61018706	3/16" 4.8mm	3/16" 4.8mm	0.045" 1.1mm	1-1/2" 38.1mm
61025001	61025002	61025003	61025004	61025006	1/4" 6.4mm	1/4" 6.4mm	0.045" 1.1mm	2" 50.8mm
61037501	61037502	61037503	61037504	61037506	3/8" 9.5mm	1/4" 6.4mm	0.060" 1.5mm	2" 50.8mm
61050001	61050002	61050003	61050004	61050006	1/2" 12.7mm	1/4" 6.4mm	0.060" 1.5mm	2" 50.8mm
61062501	61062502	61062503	61062504	61062506	5/8" 15.9mm	1/4" 6.4mm	0.060" 1.5mm	2" 57.2mm
61075001	61075002	61075003	61075004	61075006	3/4" 19.0mm	1/2" 12.7mm	0.120" 3.1mm	2-3/4" 69.9mm
61100001	61100002	61100003	61100004	61100006	1" 25.4mm	1/2" 12.7mm	0.120" 3.1mm	2-3/4" 69.9mm
61125001	61125002	61125003	-	-	1-1/4" 31.8mm	1/2" 12.7mm	0.120" 3.1mm	3" 76.2mm
61150001	61150002	61150003	-	-	1-1/2" 38.1mm	3/4" 19.0mm	1/4" 6.4mm	3-1/2" 88.9mm
61200001	61200002	61200003	-	-	2" 50.8mm	3/4" 19.0mm	1/2" 12.7mm	3-3/4" 95.3mm
61250001	61250002	61250003	-	-	2-1/2" 63.5mm	3/4" 19.0mm	3/4" 19.0mm	5" 127.0mm
61300001	61300002	61300003	-	-	3" 76.2mm	3/4" 19.0mm	1" 25.4mm	5-1/4" 133.4mm

P114

Uniflute® HSS Countersink - Single Flute Series 61B Coated

HSS | ALtima® Blaze | Z1 | 60° 82° 90° 100° 120°



60°	82°	90°	100°	120°	Tool Dimensions			
Tool No.	Tool No.	Tool No.	Tool No.	Tool No.	D1	D2	D3 (Max)	L1
61B012501	61B012502	61B012503	61B012504	61B012506	1/8" 3.2mm	1/8" 3.2mm	0.030" 0.8mm	1-1/2" 38.1mm
61B018701	61B018702	61B018703	61B018704	61B018706	3/16" 4.8mm	3/16" 4.8mm	0.045" 1.1mm	1-1/2" 38.1mm
61B025001	61B025002	61B025003	61B025004	61B025006	1/4" 6.4mm	1/4" 6.4mm	0.045" 1.1mm	2" 50.8mm
61B037501	61B037502	61B037503	61B037504	61B037506	3/8" 9.5mm	1/4" 6.4mm	0.060" 1.5mm	2" 50.8mm
61B050001	61B050002	61B050003	61B050004	61B050006	1/2" 12.7mm	1/4" 6.4mm	0.060" 1.5mm	2" 50.8mm
61B062501	61B062502	61B062503	61B062504	61B062506	5/8" 15.9mm	1/4" 6.4mm	0.060" 1.5mm	2" 50.8mm
61B075001	61B075002	61B075003	61B075004	61B075006	3/4" 19.0mm	1/2" 12.7mm	0.120" 3.1mm	2-3/4" 69.9mm
61B100001	61B100002	61B100003	61B100004	61B100006	1" 25.4mm	1/2" 12.7mm	0.120" 3.1mm	2-3/4" 69.9mm

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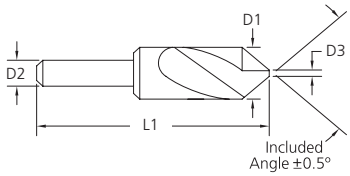
Uniflute® HSS Countersink - Single Flute Series 61T Coated

HSS | TiN | Z1 | 60° 82° 90° 100° 120°



60°	82°	90°	100°	120°	Tool Dimensions			
Tool No.	Tool No.	Tool No.	Tool No.	Tool No.	D1	D2	D3 (Max)	L1
61T012501	61T012502	61T012503	61T012504	61T012506	1/8" 3.2mm	1/8" 3.2mm	0.030" 0.8mm	1-1/2" 38.1mm
61T018701	61T018702	61T018703	61T018704	61T018706	3/16" 4.8mm	3/16" 4.8mm	0.045" 1.1mm	1-1/2" 38.1mm
61T025001	61T025002	61T025003	61T025004	61T025006	1/4" 6.4mm	1/4" 6.4mm	0.045" 1.1mm	2" 50.8mm
61T037501	61T037502	61T037503	61T037504	61T037506	3/8" 9.5mm	1/4" 6.4mm	0.060" 1.5mm	2" 50.8mm
61T050001	61T050002	61T050003	61T050004	61T050006	1/2" 12.7mm	1/4" 6.4mm	0.060" 1.5mm	2" 50.8mm
61T062501	61T062502	61T062503	61T062504	61T062506	5/8" 15.9mm	1/4" 6.4mm	0.060" 1.5mm	2" 50.8mm
61T075001	61T075002	61T075003	61T075004	61T075006	3/4" 19.0mm	1/2" 12.7mm	0.120" 3.1mm	2-3/4" 69.9mm
61T100001	61T100002	61T100003	61T100004	61T100006	1" 25.4mm	1/2" 12.7mm	0.120" 3.1mm	2-3/4" 69.9mm

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M.A. FORDMAX RANGE

Countersinks
Fraises | Senker | Svasatori | Pogłębiacze

Uniflute® HSS Countersink Sets - Single Flute Series 61 Steam Treated

HSS | Z1 | 60° 82° 90° 100° 120°

4pc Set - Series 61 Set Includes - 1/4" (6.4mm), 1/2" (12.7mm), 3/4" (19.0mm) & 1" (25.4mm)	
Set No.	**Angle**
64100001	60°
64100002	82°
64100003	90°
64100004	100°
64100006	120°

7pc Set - Series 61 Set Includes - 3/16" (4.8mm), 1/4" (6.4mm), 3/8" (9.5mm) 1/2" (12.7mm), 5/8" (15.9mm), 3/4" (19.0mm) & 1" (25.4mm)	
Set No.	**Angle**
64100071	60°
64100072	82°
64100073	90°
64100074	100°
64100076	120°

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Series 61T TiN Coated

HSS | TiN | Z1 | 60° 82° 90° 100° 120°

4pc Set - Series 61T Set Includes - 1/4"(6.4mm), 1/2"(12.7mm) 3/4"(19.0mm), 1"(25.4mm)	
Set No.	**Angle**
64T100001	60°
64T100002	82°
64T100003	90°

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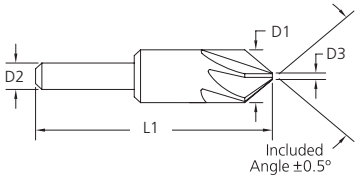
Vibration Free Countersink - 6 Flute Series 78 Uncoated

VHM | Z6 | 60° 82° 90° 100° 120°



60°	82°	90°	100°	120°	Tool Dimensions			
Tool No.	Tool No.	Tool No.	Tool No.	Tool No.	D1	D2	D3 (Max)	L1
78012501	78012502	78012503	78012504	78012506	1/8" 3.2mm	1/8" 3.2mm	0.030" 0.8mm	1-1/2" 38.1mm
78018701	78018702	78018703	78018704	78018706	3/16" 4.8mm	3/16" 4.8mm	0.045" 1.1mm	1-1/2" 38.1mm
78025001	78025002	78025003	78025004	78025006	1/4" 6.4mm	1/4" 6.4mm	0.060" 1.5mm	2" 50.8mm
78037501	78037502	78037503	78037504	78037506	3/8" 9.5mm	1/4" 6.4mm	0.090" 2.3mm	2" 50.8mm
78050001	78050002	78050003	78050004	78050006	1/2" 12.7mm	3/8" 9.5mm	0.150" 3.8mm	2-1/8" 54.0mm
78062501	78062502	78062503	78062504	78062506	5/8" 15.9mm	3/8" 9.5mm	0.180" 4.6mm	2-3/8" 60.3mm
78075001	78075002	78075003	78075004	78075006	3/4" 19.0mm	1/2" 12.7mm	0.210" 5.3mm	2-3/4" 69.9mm
78100001	78100002	78100003	78100004	78100006	1" 25.4mm	1/2" 12.7mm	1/4" 6.4mm	2-3/4" 69.9mm
78125001	78125002	78125003	-	-	1-1/4" 31.8mm	1/2" 12.7mm	0.370" 9.4mm	3" 76.2mm
78150001	78150002	78150003	-	-	1-1/2" 38.1mm	3/4" 19.0mm	0.430" 10.9mm	3-1/2" 88.9mm

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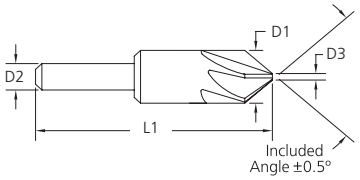
Vibration Free HSS Countersink - 6 Flute Series 79 Steam Treated

HSS | Z6 | 60° 82° 90° 100° 120°



60°	82°	90°	100°	120°	Tool Dimensions			
Tool No.	Tool No.	Tool No.	Tool No.	Tool No.	D1	D2	D3 (Max)	L1
79012501	79012502	79012503	79012504	79012506	1/8" 3.2mm	1/8" 3.2mm	0.030" 0.8mm	1-1/2" 38.1mm
79018701	79018702	79018703	79018704	79018706	3/16" 4.8mm	3/16" 4.8mm	0.045" 1.1mm	1-1/2" 38.1mm
79025001	79025002	79025003	79025004	79025006	1/4" 6.4mm	1/4" 6.4mm	0.060" 1.5mm	2" 50.8mm
79031201	79031202	79031203	79031204	79031206	5/16" 7.9mm	1/4" 6.4mm	0.080" 2.0mm	2" 50.8mm
79037501	79037502	79037503	79037504	79037506	3/8" 9.5mm	1/4" 6.4mm	0.090" 2.3mm	2" 50.8mm
79050001	79050002	79050003	79050004	79050006	1/2" 12.7mm	3/8" 9.5mm	0.150" 3.8mm	2" 50.8mm
79062501	79062502	79062503	79062504	79062506	5/8" 15.9mm	3/8" 9.5mm	0.180" 4.6mm	2-1/4" 57.1mm
79075001	79075002	79075003	79075004	79075006	3/4" 19.0mm	1/2" 12.7mm	0.210" 5.3mm	2-3/4" 69.9mm
79087501	79087502	79087503	79087504	79087506	7/8" 22.2mm	1/2" 12.7mm	0.230" 5.8mm	2-3/4" 69.9mm
79100001	79100002	79100003	79100004	79100006	1" 25.4mm	1/2" 12.7mm	1/4" 6.4mm	2-3/4" 69.9mm
79125001	79125002	79125003	79125004	79125006	1-1/4" 31.8mm	1/2" 12.7mm	0.370" 9.4mm	3" 76.2mm
79150001	79150002	79150003	79150004	79150006	1-1/2" 38.1mm	3/4" 19.0mm	0.430" 10.9mm	3-1/2" 88.9mm
79200001	79200002	79200003	79200004	79200006	2" 50.8mm	3/4" 19.0mm	0.620" 15.7mm	3-3/4" 95.2mm
79250001	79250002	79250003	-	-	2-1/2" 63.5mm	3/4" 19.0mm	3/4" 19.0mm	5" 127.0mm
79300001	79300002	79300003	-	-	3" 76.2mm	3/4" 19.0mm	1" 25.4mm	5-1/4" 133.4mm

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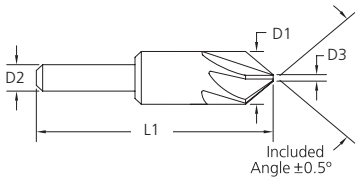
M.A. FORDMAX RANGE

Countersinks
Fraises | Senker | Svasatori | Pogłębiacze

Vibration Free HSS Countersink - 6 Flute Series 79B Coated

HSS | Z6 | 60° 82° 90° 100° 120° | ALtima® Blaze



60°	82°	90°	100°	120°	Tool Dimensions			
Tool No.	Tool No.	Tool No.	Tool No.	Tool No.	D1	D2	D3 (Max)	L1
79B012501	79B012502	79B012503	79B012504	79B012506	1/8" 3.2mm	1/8" 3.2mm	0.030" 0.8mm	1-1/2" 38.1mm
79B018701	79B018702	79B018703	79B018704	79B018706	3/16" 4.8mm	3/16" 4.8mm	0.045" 1.1mm	1-1/2" 38.1mm
79B025001	79B025002	79B025003	79B025004	79B025006	1/4" 6.4mm	1/4" 6.4mm	0.060" 1.5mm	2" 50.8mm
79B037501	79B037502	79B037503	79B037504	79B037506	3/8" 9.5mm	1/4" 6.4mm	0.090" 2.3mm	2" 50.8mm
79B050001	79B050002	79B050003	79B050004	79B050006	1/2" 12.7mm	3/8" 9.5mm	0.150" 3.8mm	2" 50.8mm
79B062501	79B062502	79B062503	79B062504	79B062506	5/8" 15.9mm	3/8" 9.5mm	0.180" 4.6mm	2-1/4" 57.1mm
79B075001	79B075002	79B075003	79B075004	79B075006	3/4" 19.0mm	1/2" 12.7mm	0.210" 5.3mm	2-3/4" 69.9mm
79B100001	79B100002	79B100003	79B100004	79B100006	1" 25.4mm	1/2" 12.7mm	1/4" 6.4mm	2-3/4" 69.9mm

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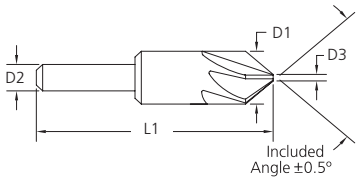
Vibration Free HSS Countersink - 6 Flute Series 79T Coated

HSS | TiN | Z6 | 60° 82° 90° 100° 120°



60°	82°	90°	100°	120°	Tool Dimensions			
Tool No.	Tool No.	Tool No.	Tool No.	Tool No.	D1	D2	D3 (Max)	L1
79T012501	79T012502	79T012503	79T012504	79T012506	1/8" 3.2mm	1/8" 3.2mm	0.030" 0.8mm	1-1/2" 38.1mm
79T018701	79T018702	79T018703	79T018704	79T018706	3/16" 4.8mm	3/16" 4.8mm	0.045" 1.1mm	1-1/2" 38.1mm
79T025001	79T025002	79T025003	79T025004	79T025006	1/4" 6.4mm	1/4" 6.4mm	0.060" 1.5mm	2" 50.8mm
79T037501	79T037502	79T037503	79T037504	79T037506	3/8" 9.5mm	1/4" 6.4mm	0.090" 2.3mm	2" 50.8mm
79T050001	79T050002	79T050003	79T050004	79T050006	1/2" 12.7mm	3/8" 9.5mm	0.150" 3.8mm	2" 50.8mm
79T062501	79T062502	79T062503	79T062504	79T062506	5/8" 15.9mm	3/8" 9.5mm	0.180" 4.6mm	2-1/4" 57.1mm
79T075001	79T075002	79T075003	79T075004	79T075006	3/4" 19.0mm	1/2" 12.7mm	0.210" 5.3mm	2-3/4" 69.9mm
79T100001	79T100002	79T100003	79T100004	79T100006	1" 25.4mm	1/2" 12.7mm	1/4" 6.4mm	2-3/4" 69.9mm

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Vibration Free HSS Countersink - 6 Flute Sets Series 79 Steam Treated

HSS | Z6 | 60° 82° 90° 100° 120°

4pc Set - Series 79 Set Includes - 1/4"(6.4mm), 1/2"(12.7mm) 3/4"(19.0mm), 1"(25.4mm)	
Set No.	**Angle**
79000011	60°
79000012	82°
79000013	90°
79000014	100°

7pc Set - Series 79 Set Includes - 1/4"(6.4mm), 5/16"(7.9mm), 3/8"(9.5mm) 1/2"(12.7mm), 5/8"(15.9mm), 3/4"(19.0mm), 1"(25.4mm)	
Set No.	**Angle**
79000001	60°
79000002	82°
79000003	90°
79000004	100°

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Vibration Free HSS Countersink - 6 Flute Set Series 79T Coated

HSS | TiN | Z6 | 60° 82° 90° 100° 120°

4pc Set - Series 79T Set Includes - 1/4"(6.4mm), 1/2"(12.7mm) 3/4"(19.0mm), 1"(25.4mm)	
Set No.	**Angle**
79T000011	60°
79T000012	82°
79T000013	90°

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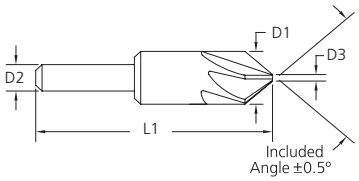
M.A. FORDMAX RANGE

Countersinks
Fraises | Senker | Svasatori | Pogłębiacze

HSS Aircraft Countersink - 3 Flute Series 92 Bright Finish

HSS | Z3 | 60° 82° 90° 100° 120°



60°	82°	90°	100°	120°	Tool Dimensions			
Tool No.	Tool No.	Tool No.	Tool No.	Tool No.	D1	D2	D3 (Max)	L1
92025001	92025002	92025003	92025004	92025006	1/4" 6.4mm	1/4" 6.4mm	0.070" 1.8mm	1-1/4" 31.8mm
92037501	92037502	92037503	92037504	92037506	3/8" 9.5mm	1/4" 6.4mm	0.110" 2.8mm	1-5/8" 41.3mm
92050001	92050002	92050003	92050004	92050006	1/2" 12.7mm	1/4" 6.4mm	0.150" 3.8mm	2" 50.8mm
92062501	92062502	92062503	92062504	92062506	5/8" 15.9mm	1/4" 6.4mm	0.190" 4.8mm	2-1/4" 57.1mm
92075001	92075002	92075003	92075004	92075006	3/4" 19.0mm	1/2" 12.7mm	0.230" 5.8mm	3" 76.2mm
92087501	92087502	92087503	92087504	92087506	7/8" 22.2mm	1/2" 12.7mm	0.260" 6.6mm	3" 76.2mm
92100001	92100002	92100003	92100004	92100006	1" 25.4mm	1/2" 12.7mm	0.300" 7.6mm	3-1/4" 82.5mm
92112501	92112502	92112503	92112504	92112506	1-1/8" 28.6mm	1/2" 12.7mm	0.340" 8.6mm	3-1/4" 82.5mm
92125001	92125002	92125003	92125004	92125006	1-1/4" 31.8mm	5/8" 15.9mm	0.380" 9.6mm	3-1/2" 88.9mm
92150001	92150002	92150003	92150004	92150006	1-1/2" 38.1mm	3/4" 19.0mm	0.450" 11.4mm	3-7/8" 98.4mm
92200001	92200002	92200003	92200004	92200006	2" 50.8mm	3/4" 19.0mm	0.600" 15.2mm	4-1/4" 107.9mm

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HSS Aircraft Countersink Set - 3 Flute Series 92 Bright Finish

HSS | Z3 | 60° 82° 90° 100° 120°

5pc Set - Series 92
Set Includes - 1/4"(6.4mm), 3/8"(9.5mm), 1/2"(12.7mm) 5/8"(15.9mm) & 3/4"(19.0mm)

Set No.	Angle
92000011	60°
92000012	82°
92000013	90°
92000014	100°
92000016	120°

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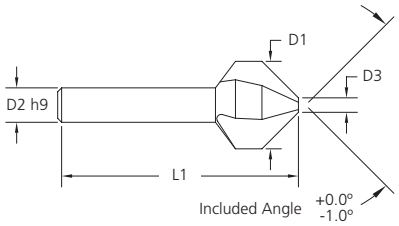
HSS Countersink - 3 Flute Series 893T Coated

HSS | TiN | Z3 | 90° | DIN 335



90°		Tool Dimensions			
Tool No.	**Fastner Size**	**D1**	**D2**	**D3 (Max)**	**L1**
893 0430T	M2	4.3	4.0	1.3	40.0
893 0500T	M2.5	5.0	4.0	1.5	40.0
893 0600T	M3	6.0	5.0	1.5	45.0
893 0630T	M3	6.3	5.0	1.5	45.0
893 0700T	M3.5	7.0	6.0	1.8	50.0
893 0800T	M4	8.0	6.0	2.0	50.0
893 0830T	M4	8.3	6.0	2.0	50.0
893 1000T	M5	10.0	6.0	2.5	50.0
893 1040T	M5	10.4	6.0	2.5	50.0
893 1150T	M6	11.5	8.0	2.8	56.0
893 1240T	M6	12.4	8.0	2.8	56.0
893 1500T	M8	15.0	10.0	3.2	60.0
893 1650T	M8	16.5	10.0	3.2	60.0
883 1900T	M10	19.0	10.0	3.5	63.0
893 2050T	M10	20.5	10.0	3.5	63.0
893 2300T	M12	23.0	10.0	3.8	67.0
893 2500T	M12	25.0	10.0	3.8	67.0
893 3100T	M16	31.0	12.0	4.2	71.0

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HSS Countersink Set - 3 Flute Series 893T

HSS | TiN | Z3 | 90° | DIN 335

6pc Set - Series 893T Set Includes - 6.3mm, 8.3mm, 10.4mm 12.4mm, 16.5mm & 20.5mm	
Set No.	**Angle**
893T 6PC 90 DEG	90°

HSS & Carbide Countersinks

Uniflute® Countersink Feed Rates

Uniflute® countersinks are designed with cam relief, therefore feed rates should not exceed 0.125mm per revolution on larger diameter holes. Reduced feeds are recommended for smaller diameter holes. A controlled feed results in vibration-free finishes associated with Uniflute® countersinks.

Multiple Flute Countersink Feed Rates

Multiple flute countersinks are designed for increased feed rates. Because there is more than one cutting edge, tooth loads are not excessive so vibration can be controlled, allowing higher feedrates.

Speeds

To determine optimum speed, start at the lower end of the cutting speed range shown in the chart below, increasing the speed until performance is maximized. When a countersink is operated at excessive RPM, vibration mayresult and the cutting edges can overheat and become prematurely worn.

			Vc (m/min)			
Workpiece Material Group		**Material Type**	**HSS**	**HSS TiN Coated**	**HSS ALtima® Blaze Coated**	**Carbide**
Steels	P	Low Carbon	25 - 30	30 - 40	40 - 50	40 - 50
		Medium Carbon	20 - 25	25 - 30	35 - 40	35 - 45
		Alloy Steels	15 - 20	20 - 25	25 - 30	20 - 30
Stainless Steels	M	Free Machining	10 - 25	10 - 30	15 - 40	25 - 40
		Difficult Stainless	5 - 10	5 - 20	10 - 25	15 - 25
Special Alloys	S	High Temperature Alloys	5 - 8	5 - 10	5 - 10	8 - 15
		Titanium Alloys	15 - 20	20 - 25	25 - 30	20 - 30
Cast Irons	K	Cast Iron	15 - 30	20 - 40	25 - 50	30 - 55
		Malleable Iron	25 - 30	30 - 35	40 - 45	30 - 45
Hardened Steels	H	45 - 50 HRc	5 - 10	5 - 10	8 - 10	8 - 15
		50 - 55 HRc	2 - 5	3 - 5	5 - 10	5 - 10
Non Ferrous	N	Aluminium Alloys	45 - 75	60 - 100	75 - 120	90 - 150
		Brass / Bronze	25 - 40	30 - 50	35 - 60	45 - 80

Conversion Formula

RPM = Vc (m/min) x 318.0 ÷ Countersink Ø *

* Countersink Ø Must Be Calculated in mm
(When making the calculation, use the diameter on the countersink where the cutting is actually taking place)

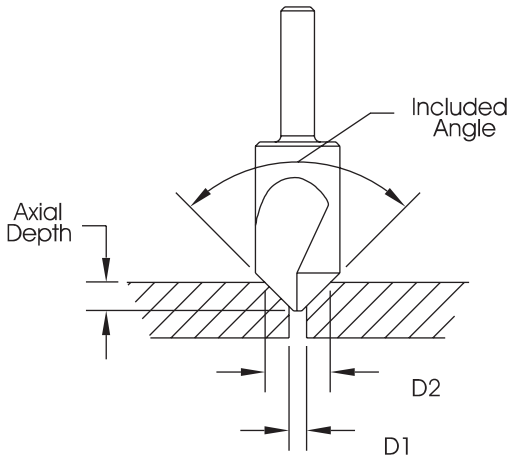
HSS & Carbide Countersinks

Minimum Body Diameter for 90° Flat Head Cap Screws (mm)

Cap Screw Size (mm)	Countersink Diameter (mm)
M3	7.0
M4	10.0
M5	12.0
M6	14.0
M8	19.0
M10	23.0
M12	25.0
M16	31.0

Size Diameter Gain for every 0.025mm of Axial Depth in to a Pre-Drilled Hole

Included Angle	Axial Depth (mm)	Diameter Gain (mm)
30°	0.025	0.0127
45°	0.025	0.0203
60°	0.025	0.0254
82°	0.025	0.0432
90°	0.025	0.0508
100°	0.025	0.0711
120°	0.025	0.0864



DIAMETER GAIN = D2-D1

HSS & Carbide Countersinks

All M.A. Ford® HSS countersinks are heat treated in an electronically controlled vacuum furnace. This assures precise hardening and eliminates the possibility of decarburization. All heat treating is done in our own facilities for maximum control and assurance of desired hardness and toughness.

Most M.A. Ford® HSS countersinks receive an additional heat treat process known as the Steam Homogeneous Process. This process is like a final tempering, relieving internal grinding stresses. The result is a much tougher cutting edge that stays sharper, longer. Additionally, the Steam Homogeneous Process provides a tough, hard, porous oxide film on the tool that is sufficient enough to retain cutting oil, further reducing frictional heat and extending tool life.

Coated Countersinks

ALtima® Blaze

TiN coating

Coating Properties

	TiN	ALtima® Blaze
Micro Hardness (HV)	2300	3200
Max. Working Temperature	600° C 1112° F	1100° C 2012° F
Friction Coefficient	0.40	0.35

ALtima® Blaze
features high temperature hardness and oxidation resistance that provides extreme wear resistance under all machining conditions.

TiN
provides a higher surface hardness and increased lubricity over an uncoated tool.

SHAVIV
Soluzioni per la sbavatura

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La Società VARGUS, fondata nel 1960, ha sviluppato, prodotto e distribuito in tutto il mondo utensili da taglio e di finitura per l'industria meccanica e della plastica. E' parte del Gruppo NEUMO Ehrenberg, una organizzazione multinazionale con sede in Germania. La nostra organizzazione internazionale serve i clienti in oltre 100 nazioni nel mondo ed è specializzata in tre prodotti: SHAVIV sbavatori manuali di finitura, VARDEX frese a filettare e GROOVEX utensili per gole e svasature.

Guarda

Completa gamma di soluzioni per la sbavatura con manici SHAVIV ergonomici

mango II Lavorazioni a lunga distanza

Il manico più raccomandato per comfort e controllo sulla sbavatura

Mango II Manico Codice nr.: 152-00019

Mango II - Lavora con tutti i supporti e tutte le lame.
Semplice dispositivo di supporto. Manico ergonomico confortevole per mani di dimensioni medie.

mango II B/E Lavorazioni a distanza ravvicinata

Il manico più raccomandato per comfort e controllo sulla sbavatura

Mango II B/E - Lavora con tutte le lame di tipo B e E.
Dispositivo permanente di sicurezza per la sostituzione delle lame.
Manico ergonomico confortevole per mani di dimensioni medie.

B10

Manico Mango II B Codice nr.: 152-00009

E100

Manico Mango II E Codice nr.: 152-00016

mango Click Distanza ravvicinata

Mango Click E

E100

Mango Click – La sbavatura non è mai stata così semplice!
Porta tutte le lame di tipo E. Facile da usare, confortevole e di lunga durata.
Indicato per mani di grandi dimensioni.

Manico Mango Click E Codice nr.: 152-00013

Manico Classico A

Manico universale. Accetta tutte le lame e tutti i supporti. Per conservare le lame nel manico svitare semplicamente il cappuccio posteriore.

Codice nr.: 152-00003

Manico A (In Alluminio)

Manico universale per applicazioni gravose, versione in alluminio. Porta tutte le lame e tutti i supporti.

Codice nr.: 152-00005

Manico 1

Manico non telescopico, eccellente nelle applicazioni gravose. Porta tutte le lame di tipo E.

Codice nr.: 152-00026

Manico Universale HC1 (Handy Chuck)

Può portare piccole punte, maschi, alesatori, lime, spazzole ed altri oggetti di diametro variabile tra 1 mm. e 8 mm. Può essere impiegato con le lame C50 e C60. Utile per riparare o montare orologi, apparecchiature elettriche ed elettroniche in miniatura.

Codice nr.: 155- 29057

mango II Set per accesso remoto

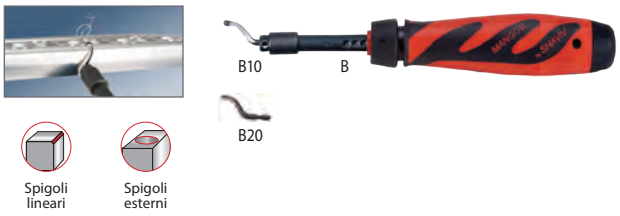
Il manico più raccomandato per comfort e controllo della sbavatura

- Porta tutti i supporti SHAVIV (vedere pag. 133)
- Meccanismo di supporto semplice
- Impugnatura confortevole ed ergonomica per mani di dimensioni medie

Manico Mango II per accesso remoto
Codice nr.:152-00019

Mango II Set B Modello Base

Il set più popolare per la sbavatura di fori, scanalature e spigoli. Monta tutte le lame di tipo B. Le lame possono essere inserite sia in senso longitudinale che perpendicolare.



Set	Manico	Supporto	Lama	Codice nr.
Mango II Set B	Mango II	B	B10,B20	155-90056

Mango II Set E Per Applicazioni Gravose

Per impieghi gravosi su fori, chiavette e spigoli.
Monta tutte le lame di tipo E.

Set	Manico	Supporto	Lama	Codice nr.
Mango II Set E	Mango II	E	E100,E200, E300	155-90065

Mango II Set D Per Lamierini

Combinazione perfetta per la sbavatura di lamiere sino a 3 mm di spessore. La lama elimina le bave su entrambi i lati in una singola passata.

Per maggiore sicurezza se ne consiglia l'utilizzo con il salvamano,
Codice nr.: 152-00030

Set	Manico	Supporto	Lama	Codice nr.
Mango II Set D	Mango II	D	D80C	155-90064
Shaviv Set D	Classico	D	D80C	155-29068

Mango II Set C Per Raschiatura

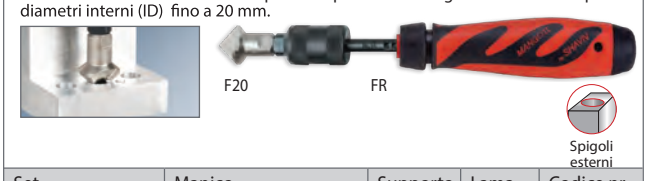
Disegnato per raschiature di grande precisione; è composto da lame triangolari con 3 taglienti. Il supporto telescopico permette di raggiungere le zone più inaccessibili. La chiave in dotazione permette di smontare le lame in sicurezza.

Set	Manico	Supporto	Lama	Codice nr.
Mango II Set C	Mango II	C	C42	155-90062

Mango II Set FR

Ratchet Burr per diametri interni (ID)

E' dotato di un supporto FR con arpionismo di non ritorno, ideale quando la sbavatura in rotazione diventa impossibile per motivi di ingombro. Svasatura per diametri interni (ID) fino a 20 mm.



Set	Manico	Supporto	Lama	Codice nr.
Mango II Set FR	Mango II	FR	F20	155-90072
Shaviv Set FR	Classico	FR	F20	155-29071
Set FR Alluminio	Alluminio	FR	F20	155-00223

Mango II Set F Lo Svasatore

Svasatore resistente per la svasatura e la sbavatura dei fori.
Utilizzare sugli spigoli esterni fino a 20 mm di diametro.

Set	Manico	Supporto	Lama	Codice nr.
Mango II Set F	Mango II	F	F20	155-90071
Shaviv Set F	Classico	F	F20	155-29070
Set F Alluminio	Alluminio	F	F20	155-00222

mango II Accesso remoto e set speciali

Mango II Set M* 2 in 1

Sbava fori, chiavette e spigoli. Il supporto M porta le lame sia di tipo B sia di tipo E.

Spigoli lineari | Spigoli esterni | Spigoli interni ed esterni fori passanti

Set	Manico	Supporto	Lama	Codice nr.
Mango II Set M	Mango II	M	B10, B20, B30, E100, E111, E200	155-00199
Shaviv Set M	Classico	M	B10, B20, B30, E100, E111, E200	155-29178

Mango II Set L

Sbavatura esterna di diametri
Concepito per la sbavatura esterna di tubi e cilindri.

Spigoli lineari | Spigoli tondi

Set	Manico	Supporto	Lama	Codice nr.
Mango II Set L	Mango II	L	L10	155-00220
Shaviv ExcaliBurr Set L	Classico	L	L10	155-29076

Mango II Set U

Raschiatura di finitura contiene tre tipi differenti di raschietti ed un supporto per operazioni lineari estremamente precise. Ideale per stampisti.

Superfici piane | Pareti interne

Set	Manico	Supporto	Lama	Codice nr.
Mango II Set U	Mango II	U	U1 (BUS1) U31(BUS31) U4 (BUS4)	155-00221
Shaviv Set U	Classico	U	U1 (BUS1) U31(BUS31) U4 (BUS4)	155-29119

Mango II Set Burr-Ex

Ratchet-Burr per Diametri Esterni (OD)

E' dotato di un supporto FR con arpionismo di non ritorno, ideale quando la sbavatura in rotazione diventa impossibile per motivi di ingombro. Svasatura per diametri esterni (OD) fino a 20 mm. In svasatura fino a 26 mm.

Spigoli tondi

Set	Manico	Supporto	Lama	Codice nr.
Mango II Set FRX	Mango II	FR	F26X	155-90073
Shaviv Set FRX	Classico	FR	F26X	155-29146
Set F Alluminio	Alluminio	FR	F26X	155-00224

Mango II Set G Sbavatura di Chiavette

Ideale per la sbavatura di spigoli e chiavette. Le lame hanno 8 spigoli taglienti e sbavano chiavette esterne o interne fino ad una larghezza di 15 mm.

Spigoli lineari per chiavette

Set	Manico	Supporto	Lama	Codice nr.
Mango II Set G	Mango II	G	G10	155-90074
Shaviv Set G	Classico	G	G10	155-29072

Mango II Set Burr-Bi*

Per impieghi gravosi su lamiere - Sbavatura di lamiere

Per materiali di difficile lavorazione con uno o due spigoli lineari sino ad uno spessore di 14 mm. Il supporto porta due lame R10, R20 o R30 per la finitura sagomata dei pezzi sino a 16 mm di spessore. Il set include anche il salvamano per una lavorazione senza problemi.

R10

Lato A per materiali a truciolo lungo

Lato B per materiali a truciolo corto

Lamierini | Spigoli lineari

Set	Manico	Supporto	Lama	Chiave	Codice nr.
Mango II Set Burr-Bi	Mango II	BR	R10 x 2	BR	155-00206
Shaviv Set Burr-Bi	Classico	BR	R10 x 2	BR	155-29140

* Tutti i set sbavano acciaio, alluminio, rame, ottone, ghisa, acciai inossidabili e plastica

mango II Set per lavorazioni a distanza ravvicinata e Bonus Pack

Il manico più raccomandato per comfort e controllo della sbavatura

- Lavora con tutte le lame di tipo B e E
- Adattatore permanente per la sostituzione semplice delle lame
- Impugnatura confortevole ed ergonomica per mani di dimensioni medie

Manico Mango IIB 152-00009 Manico Mango IIE 152-00016

Set Mango IIB Con lame di tipo B per lavorazioni standard

Set Mango IIE Con lame di tipo E per lavorazioni gravose

Tutti i set contengono un manico per lavorazioni a distanza ravvicinata Mango IIE e una serie di lame per materiali a truciolo lungo e corto. Per sbavare acciaio, alluminio, rame, ottone, ghisa, acciai inossidabili e plastica.


Spigoli lineari


Spigoli esterni

Per la sbavatura di acciaio, alluminio, rame, ottone, ghisa e plastiche

Mango IIB+1

Mango IIB+2

Mango IIB+4

Set	Manico	Lama	Codice nr.
Mango IIB + 1	Mango IIB	B10	155-90058
Mango IIB + 2	Mango IIB	B10, B20	155-90060
Mango IIB + 4	Mango IIB	B10, B11, B20, B25	155-90061

Mango IIE+1

Mango IIE+3

Mango IIE+5

Set	Manico	Lama	Codice nr.
Mango IIE + 1	Mango IIE	E100	155-90066
Mango IIE + 3	Mango IIE	E100, E200, E300	155-90068
Mango IIE + 5	Mango IIE	E100, E111, E120, E200, E300	155-00162

Per lavorazioni a distanza ravvicinata

Ogni Bonus Pack comprende 10 lame. Il manico Mango II B/E è **GRATIS.** Disponibile con lame B10 o E100 in HSS o al cobalto

Manico GRATIS

HSS 10 X B10
HSS 10 X E100
Cobalto 10 X B10
Cobalto 10 X E100

- I bonus pack contengono una confezione da 10 lame per il loro facile impiego
- Le lame al cobalto garantiscono una lunga durata utile e sono la soluzione ottimale per materiali come l'acciaio inossidabile

Codice nr.	Bonus Pack
155-00177	10 x B10 **(HSS)**
155-00178	10 x E100 **(HSS)**
155-00183	10 x B10S **(Cobalto)**
155-00179	10 x E100S **(Cobalto)**

Per lavorazioni a lunga distanza

Ogni Bonus Pack comprende 10 lame + supporto. Il manico Mango II è **GRATIS.** Disponibile con lame B10 o E100 in HSS o al cobalto

Codice nr.	Bonus Pack
155-00180	10 x B10 **(HSS)** + Supporto B
155-00181	10 x E100 **(HSS)** + Supporto E
155-00184	10 x B10S **(Cobalto)** + Supporto B
155-00182	10 x E100S **(Cobalto)** + Supporto E

Prodotti

Kit Premium

I Kit Premium contengono i set e le lame più tradizionali per le applicazioni più frequenti. Ora sono disponibili 7 modelli!

- Ogni kit è concepito per una applicazione specifica
- Bella confezione ergonomica

Sbavatura e raschiatura
Applicazioni standard

Contiene: manico Mango II, supporto B, supporto C, B10, B20, B30, B60, B11, B70, C40, chiave C
154-00034

Sbavatura e raschiatura
Applicazioni gravose

Contiene: manico Mango II, supporto E, supporto C, C42, E100P, E111, E200, E300, E600, E700, chiave C
154-00036

Sbavatura e lucidatura

Contiene: manico Mango II, supporto B, supporto E, B10, B11, B25, E111, E250, E400, E707 e utensile Cera-Burr con lama in ceramica
154-00040

Sbavatura e svasatura

Contiene: manico Mango II, supporto E, supporto F, E100S, E111, E200, E300, E601, F20, F26X
154-00033

Limatura e sbavatura

Contiene: manico MB2020E, 5 lime differenti rivestite in diamante, E100S, E400
154-00030

Sbavatura e pulitura di lamierini

Contiene: manico Mango II, supporto D, supporto E, D80C, D82C, E100, E111, E200, E300, E700
154-00035

Rivestimento TIN
Per Materiali Esotici

Contiene:
Lama B: B10P, B11P, B20P, B30P
Lama E: E100P, E111P, E200P, E300P
Supporti B, E
Manico Alluminio
154-00045

AEROBURR Set

Set di sbavatura per aviazione, industria aerospaziale e medicale

Applicazioni standard

Set B11P

Manico Mango II
Supporto B
5 X B11P rivestite TiN
155-00231

Applicazioni gravose

Set E111P

Manico Mango II
Supporto E
5 X E111P rivestite TiN
155-00232

- Particolarmente concepito per applicazioni nell'industria aeronautica, eccellente anche nell'elettronica e nel medicale
- Per la sbavatura di curve e piccoli fori (1,5 mm)
- Le lame sono rivestite Tin (nitruro di titanio) per la sbavatura di diversi materiali quali acciaio, alluminio, rame, acciaio inossidabile e plastica
- Il rivestimento TIN garantisce una durata utile pari a cinque volte quella delle lame standard non rivestite
- Trova ottima applicazione nel settore degli stampi, dell'automobile e nella R&S

Prodotti

Shaviv set flessibili serie Golden

Novità

Set B flessibile serie Golden

Per sbavatura standard
Contenuto:
- Manico Alluminio
- Supporto per lame serie B
- 5 differenti coppie di lame rivestite TIN
  Multi proposta serie lame B :
  B10P x 2 pezzi, B11P x 2 pezzi,
  B12P x 2 pezzi; B20P x 2 pezzi;
  B30P x 2 pezzi

155-00258

Set E flessibile serie Golden

Per sbavatura gravosa
Contenuto:
- Manico Alluminio
- Supporto per lame serie E
- 5 differenti coppie di lame rivestite TIN
  Multi proposta serie lame E :
  E100P x 2 pezzi, E110P x 2 pezzi,
  E111P x 2 pezzi; E200P x 2 pezzi;
  E300P x 2 pezzi

155-00259

Kit di svasatura

L'ultimo kit per la svasatura e la sbavatura.
Utilizzare uno svasatore con un porta inserto (Codice nr. 156-0003) da 1/4" oppure un utensile ad aria. Angolo dell'elica 90°. Ogni kit contiene 3 svasatori in HSS di differenti misure per svasare un'ampia gamma di fori e di materiali. L'inserto di finitura è GRATIS.

154-00031

154-00032

Kit di svasatura a tre eliche

Utensile	Per fori sino a Ø mm	Per fori sino a Ø in
FC20	20mm	13/16 "
FC16	16mm	5/8"
FC12	12mm	1/2"
GRATIS	Inserto di finitura con 1 lama B12	

Kit di svasatura senza elica

Utensile	Gamma fori Ø mm	Gamma fori Ø in
FD20	7-20mm	9/32"-13/16 "
FD13	5-13mm	3/16"-1/2"
FD08	2-8mm	5/64"-5/16"
GRATIS	Inserto di finitura con 1 lama B12	

Nuovo svasatore a 3 eliche

Shaviv, il popolare svasatore a 3 eliche, oggi può essere acquistato singolarmente!

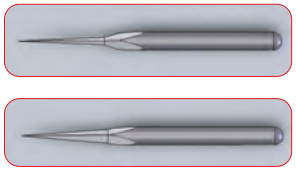
FC20 151-00139
FC16 151-00137
FC12 151-00138

Shaviv, il popolare svasatore a 3 eliche, può essere utilizzato sia sul supporto da 1/4" porta inserto (codice nr.: 156-0003) sia su ogni altro strumento.

Raschietti rotanti triangolari di alta precisione

- Raschietti rotanti triangolari di alta precisione
- Adatti per utensili ad aria con elevato numero di giri
- In HSS, resistenti ma flessibili
- Eccellenti nella lavorazione di materiali quali metalli, ceramica e plastica
- Impiegati in aviazione, elettronica, gioielleria, stampi ecc

Lama	Diametro gambo	Angolo al vertice	Codice nr.
C81-3	3.0 mm	5°	151-00129
C82-3	3.0 mm	10°	151-00130



mango Click n' Go

La sbavatura non è mai stata così semplice!

- Lavora con le lame di tipo E, basta un click!
- Facile da usare, comodo con lunga durata utile
- Particolarmente indicato per mani di grandi dimensioni

Mango Click Manico E 152-00013

Mango Click + 12 E100

mango Basta un click!

Manico GRATIS

155-29229

Semplice da usare, basta un click. Per mani di grandi dimensioni.

Mango Click Set E5

mango Basta un click!

Set	Manico	Lama	Codice nr.
Mango Click Set E5	Mango Click E	E100, E111,E120,E200,E300	155-00161

Mango Click Set E3

mango Basta un click!

Set	Manico	Lama	Codice nr.
Mango Click Set E3	Mango Click E	E100, E200, E300	155-90076

Inserti di finitura

Set Finishing Bit

Utensile di finitura combina il cacciavite portainserto il supporto e l'inserto.

Tipo D
Guida: esagonale 1/4"
DIN 3126-C6, 3
ISO 1173

Bit con lama per sbavare inserito in un supporto da 1/4". Utensile ideale per uso industriale, per elettricisti, idraulici, installatori e per il bricolage.

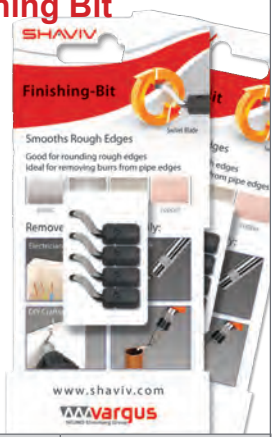
Set Finishing Bit x: 1 cacciavite per l'inserto
1 finishing-bit

Set	Manico	Lama	Codice nr.
Set Finishing Bit	Cacciavite per l'inserto	Finishing Bit	156-00003

Confezione da 4 Finishing Bit

Una nuova generazione di bit a finire.

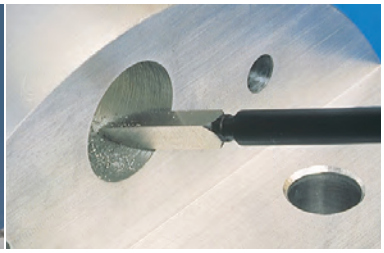
- Bit con lama per sbavare
- Inserito in un supporto da 1/4"
- Tipo D
  Guida: esagonale 1/4"
  DIN 3126-C6, 3, ISO 1173



Set	Lama	Codice nr.
Confezione da 4 Finishing Bit	4 Finishing Bit	156-00001

Set Classico





Set B* Modello base

Il set più popolare per la sbavatura di fori, scanalature e spigoli.
Monta tutte le lame di tipo B. Le lame possono essere inserite sia in senso longitudinale che perpendicolare.


Set	Manico	Supporto	Lama	Codice nr.
Shaviv Set B	Manico Classico A	B	B10, B20	155-29065

Set E* Per applicazioni gravose

Per impieghi gravosi su fori, chiavette e spigoli.
Porta tutte le lame di tipo E.


Set	Manico	Supporto	Lama	Codice nr.
Shaviv Set E	Manico Classico A	E	E100,E200,E300	155-29069

SHAVIV Set B Alluminio* Modello base

Il set più popolare per la sbavatura di fori, scanalature e spigoli.
Monta tutte le lame di tipo B. Le lame possono essere inserite sia in senso longitudinale che perpendicolare.


Set	Manico	Supporto	Lama	Codice nr.
Shaviv Set B in Alluminio	Alluminio	B	B10, B20	155-29066

SHAVIV Set E in Alluminio * Per applicazioni gravose

Per impieghi gravosi su fori, chiavette e spigoli.
Porta tutte le lame di tipo E.


Set	Manico	Supporto	Lama	Codice nr.
Shaviv Set E in Alluminio	Alluminio	E	E100, E200, E300	155-00019

Set C* Per Applicazioni Gravose

Manico universale. Accetta tutte le lame e tutti i supporti. Per conservare le lame nel manico svitare semplicemente il cappuccio posteriore.


Set	Manico	Supporto	Lama	Codice nr.
Shaviv Set C	Manico Classico A	C	C42	155-29067

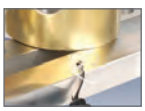
Set HC* HandyChuck

Estremamente versatile in finitura e raschiatura.
Può portare piccole punte, maschi, alesatori, lime ed altri oggetti di diametro variabile tra 1 e 8 mm. Utile per riparare o montare orologi, apparecchiature elettroniche ed elettriche in miniatura.


Set	Manico	Lama	Codice nr.
Shaviv Set HC5	Manico universale HC1	C50	155-00163
Shaviv Set HC6	Manico universale HC1	C60	155-00164

Set 1* Sbavatura degli spigoli

Lo sbavatore originale per applicazioni gravose su angoli e spigoli. Il supporto non telescopico tiene la lama molto vicino al manico.




Set	Manico	Lama	Codice nr.
Shaviv Set 1	Manico 1	E100, E200, E300	155-29078

Lama girevole

* Tutti i set descritti sbavano acciaio, alluminio, rame, ottone, ghisa, acciaio inossidabile e plastiche.

Soluzioni economiche di sbavatura - Set Glo-Burr

La serie Arcobaleno

GLO-BURR B/E Kit da 48 pz.

Sbavatore maneggevole con lame intercambiabili.

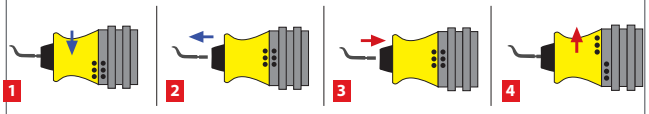
Manico resistente ma leggero con una pratica clip da taschino.
Per la sbavatura di acciaio, alluminio, rame e plastica.

Spigoli lineari Spigoli esterni

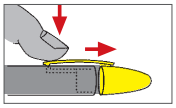
Glo-Burr	Codice nr.
Kit Glo-Burr B - 48 pz.	154-29136
Kit Glo-Burr E - 48 pz.	154-00013

Come sostituire le lame B + E dal Glo-Burr

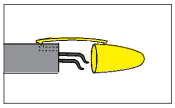
1. Girare il manico fino alla posizione di allineamento (sbloccato).
2. Estrarre le lame da sostituire.
3. Inserire le nuove lame intercambiabili.
4. Girare il manico fino alla posizione di allineamento.



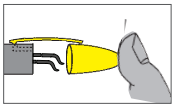
Spare Blades Storage



1. Premere verso il basso il tappo fino ad estrazione totale.



2. Inserire le lame intercambiabili all'interno del manico.



3. Richiudere il tappo fino a chiusura totale.

Glo-Burr B - Operazioni di sbavatura standard

B10 Glo-Burr Verde * | 155-29152
Rimuovono bave con truciolo a spirale

B20 Glo-Burr | 155-00274
Rotazione oraria ed antioraria per materiali a truciolo polveroso

B30 Glo-Burr | 155-00275
Rimuovono bave interne ed esterne nei fori fino a 4 mm di spessore

B11 Glo-Burr | 155-00273
Extra sottile. Rimuove bave da fori con micro diametri di 2 mm

* **Glo-Burr B10** Il modello B10 può essere fornito nei seguenti colori:

Colore	Blu	Giallo	Rosso
Codice nr.	155-29134	155-29154	155-29153

Spigoli lineari Spigoli esterni

Glo-Burr E - Operazioni di sbavatura gravose

E100 Glo-Burr Verde * | 155-29155
Rimuovono bave con truciolo a spirale

E200 Glo-Burr | 155-00268
Rotazione oraria ed antioraria per materiali a truciolo polveroso

E300 Glo-Burr | 155-00267
Rimuovono bave interne ed esterne nei fori fino a 6 mm di spessore

E111 Glo-Burr | 155-00270
Extra sottile. Rimuove bave da fori con micro diametri di 1.5 mm

* **Glo-Burr E100** Il modello E100 può essere fornito nei seguenti colori:

Colore	Blu	Giallo	Rosso
Codice nr.	155-29133	155-29157	155-29156

Spigoli lineari Spigoli esterni

Glo-Burr Handy Kit

Glo-Burr Handy Kit 4B

Una composizione per ogni tipo di sbavatura
Comprende 4 manici Glo-Burr B e lame
B10, B20, B30, B11

Set	Manico	Lama	Codice nr.
Handy Kit 4B	Glo-Burr	B10, B20, B30, B11	154-90042

Glo-Burr Handy Kit 4E

Una composizione per ogni tipo di sbavatura
Comprende 4 manici Glo-Burr E e lame
E100, E200, E300, E111

Set	Manico	Lama	Codice nr.
Handy Kit 4E	Glo-Burr	E100, E200, E300, E111	154-29144

Raschiatori ed altri utensili compatti

Scrape-Burr 42 Raschiatore per applicazioni gravose

Questo raschiatore è provvisto di una lama fissa triangolare con tre spigoli taglienti per la finitura e la raschiatura di qualità.

Spigoli lineari · Spigoli esterni · Superficie piana · Pareti interne

Set	Manico	Lama	Codice nr.
Scrape-Burr 42	Glo-Burr	C42	155-90079

Scrape-Burr 40 Raschiatore universale

Questo raschiatore è provvisto di una lama fissa triangolare con tre spigoli taglienti per la finitura e la raschiatura di qualità.

Spigoli lineari · Superficie piana · Pareti interne

Set	Manico	Lama	Codice nr.
Scrape-Burr 40	Glo-Burr	C40	155-90078

Scrape-Burr 400 Raschiatore per finitura

Questo mini utensile garantisce un'ottima finitura su pezzi di precisione. E' composto da una lama triangolare a tre taglienti, extra-sottile e resistente per raschiature e finiture di alta qualità.

Spigoli lineari · Superficie piana · Pareti interne

Set	Manico	Lama	Codice nr.
Scrape-Burr E400	Glo-Burr	E400	155-90080

Scrape-Burr Kit 3+1

I tre raschiatori in un unico kit!
In più, un manico Glo-Burr con lama B 10 **GRATIS**.

Spigoli lineari · Spigoli esterni · Superficie piana · Pareti interne

Set	Manico	Lama	Codice nr.
Scrape-Burr Kit	Glo-Burr	B10, C40, C42, E400	154-90081

UNIBURR Sbasatori universali

UB2 DisposaBurr

Fornito con lama B 10 non intercambiabile.

Spigoli lineari · Spigoli esterni

Codice nr.: 155-29190

Sbavatore maneggevole con pratica clip da taschino.
Per la sbavatura di acciaio, alluminio, rame e plastica. Disponibile in vari colori.

UNIBURR	Nero	Blu	Verde	Rosso
UB2	155-00168	155-29187	155-00169	155-29081

UB2000

Fornito con lama B 10 intercambiabile, che può essere inserita sia assialmente sia perpendicolarmente al manico.

Spigoli lineari · Spigoli esterni

Codice nr.: 155-29192

Sbavatore maneggevole con pratica clip da taschino.
Per la sbavatura di acciaio, alluminio, rame e plastica. Disponibile in vari colori.

UNIBURR	Nero	Blu	Verde	Rosso
UB2000	155-29202	155-29107	155-29203	155-29191

NOVITA'! Manici con alluminio anodizzato

UB1 DisposaBurr

Fornito con lama E 100 non intercambiabile.

Spigoli lineari · Spigoli esterni

Codice nr.: 155-29080

Sbavatore maneggevole con pratica clip da taschino.
Per la sbavatura di acciaio, alluminio, rame e plastica. Disponibile in vari colori.

UNIBURR	Nero	Blu	Verde	Rosso
UB1	155-00165	155-29181	155-00166	155-29184

MB2000

Manico esagonale resistente per applicazioni gravose. E' fornito con lama intercambiabile E 100.

Spigoli lineari · Spigoli esterni

Codice nr.: 155-29161

Sbavatore maneggevole con pratica clip da taschino.
Per la sbavatura di acciaio, alluminio, rame e plastica. Disponibile in vari colori.

UNIBURR	Nero	Blu	Verde	Rosso
MB2000	155-29158	155-29092	155-29159	155-29160

Utensili con lama in ceramica e pulitori di tubi



Cera-Burr Utensile con lama in ceramica

Spigoli lineari | Spigoli esterni | Spigoli lineari per chiavette | Lamierini | Segni di espulsore

Set	Manico	Lama	Codice nr.
Cera-Burr	Glo-Burr	Fissa	155-90084
Cera-Burr Curve Q11	Glo-Burr	Fissa	155-00239

Utensili in ceramica per la sbavatura di plastica e materiali teneri. La nuova lama raggiata permette di raggiungere posizioni angolate. La lama in ceramica di alta qualità è provvista di manico robusto ma leggero. E' l'utensile ideale per rimuovere i segni dell'espulsore su parti in plastica. Permette di evitare gli incidenti tipici dell'utilizzo delle lamette del cutter.

CERAMIX Set Q10

Manico per applicazioni gravose con lama in ceramica Q10

Per migliori risultati e per prevenire graffi regolare l'angolo tra lama e il materiale. Lama rovesciabile per due tipi di impiego.

Spigoli lineari

Superficie piana

Lama rovesciabile per due tipi di impiego:

Lato 1: Per pulire superfici

Lato 2: Per pulire lamierini

Lametta tipo cutter omaggio inclusa nel set

Set	Manico	Lama	Codice nr.
Set Ceramix Q10	Manico Ceramix	Q10	155-29238

CERAMIX Set raggiato Q12

Manico per applicazioni gravose con lama in ceramica Q11

Per migliori risultati e per prevenire graffi regolare l'angolo tra la lama ed il materiale. Lama rovesciabile per due tipi di impiego.

Spigoli lineari

Lama rovesciabile per due tipi di impiego:

Lato 1: Per pulire superfici

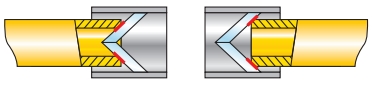
Lato 2: Per pulire lamierini

Lametta tipo cutter omaggio inclusa nel set

Set	Manico	Lama	Codice nr.
Set Ceramix Q12	Manico Ceramix	Q11	155-00238

Plum-Burr Pulitore di tubi per impieghi gravosi e standard

Per sbavare tubi sia sullo spigolo interno sia su quello esterno. Ideale per idraulici, installatori ed elettricisti.



ID | OD

Metallo

Plastica

Spigoli tondi

Spigoli interni

- Adatto per tubi di alluminio, rame e ottone
- Plum-Burr Metal - Per tubi di diametro compreso tra 6 e 41 mm
- Plum-Burr Plastic - Per tubi di diametro compreso tra 4,8 e 38 mm

Set	Codice nr.
Plum-Burr Metallo	155-90082
Plum-Burr Plastica	155-90083

Lame CERAMIX

Lato 2
Per pulire lamierini di spessore fino a 6 mm
Per pulire lamierini di spessore fino a 4 mm

Lato 1
Per pulire superfici

Lato 2
Per pulire lamierini fino a 6 mm di spessore
Per pulire lamierini fino a 4 mm di spessore

Lato 1
Per pulire angoli raggiati

Descrizione delle lame	Lama	Codice nr.
Lama Ceramix Q10	Q10	151-29236
Lama raggiata Ceramix Q11	Q11	151-00132

Kit Multimpiego

Top 3 Mango II Starter Kit

Il kit per tutto ciò che occorre in officina.
Comprende il manico Mango II con le tre tipologie di lame e di supporti più popolari per i differenti tipi di sbavatura.
Contiene:
* Manico Mango II
* Supporti - B, C, & E
* Lame - B10, B20, B30, B50, B60, C40, E100, & E300

Top 3 Mango II Starter Kit Codice nr.: 154-90085

Kit Classico KPC2 I 5 favoriti

I set più diffusi in un unico kit.
Contiene:
* Set B: per la sbavatura in rotazione
* Set C: per lavori di raschiatura
* Set D: per la sbavatura di lamierini
* Set E: per la sbavatura gravosa in rotazione
* Set F: per la svasatura e la sbavatura di fori

N.B. Ogni set è fornito con il manico classico A.

Kit Classico KPC2 Codice nr.: 154-29060

Kit TD Kit per stampisti

Utensili in miniatura per la finitura di precisione degli stampi. Il kit è fornito in un elegante astuccio di cuoio.
Contiene:
* UF1 - Lama piatta diamantata
* US1 - Raschietto triangolare
* US2 - Raschietto piatto
* US3 - Raschietto tondo
* US4 - Raschietto con spigolo
* UB38 - Microsbavatore per fori diametro 2 mm

UF1	Codice nr.: 155-00051
US1	Codice nr.: 155-00156
US2	Codice nr.: 155-00173
US3	Codice nr.: 155-00174
US4	Codice nr.: 155-00175
UB38	Codice nr.: 155-29084
Kit TD	Codice nr.: 154-29079

Kit U Finitura ultrafine

Per lavori di grande precisione.
Contiene:
* Manico in alluminio
*Supporto U fisso
* Supporto B rotante
* 4 lame di tipo B per la sbavatura in rotazione - B10, B11, B20 & B30
* 4 raschietti intercambiabili di tipo U - BUS1, BUS2, BUS31 & BUS4
* Punta a tracciare E500C

Kit U Codice nr.: 154-29228

Kit KWC Classico

Il kit universale con contenitore in plastica o in legno

Kit universale offre tutto ciò che occorre per 1000 e + impieghi.
Contiene:
* Manico Classico A
* Supporti - B, C, D, E & F
* Lame - B10, B20, B30, B50, B60, B70, C40, C42, D80C, E100, E200, E300, E350, E600 & F20

KWC Classico in plastica Codice nr.: 154-00008

Mango II Kit KWC Codice nr.: 154-00024

Kit KPA Mango II Per la sbavatura della plastica

Il kit perfetto per la sbavatura della plastica.
Contiene:
* Manico Mango II
* Sbavatore UB38
* Supporti - B, E, G3 & LP
* Lame - B12, B25, E110, E700, G30C & L10

N.B. fornibile anche con il manico classico A.

Kit Mango II KPA Codice nr.: 154-00037

Kit Classico KPA Codice nr.: 154-00012

TD kit intercambiabile

Lame intercambiali oggi disponibili per Shaviv linea professionale dedicata alle microsbavature e raschiatura per l'industria degli stampi
Contiene:
* Manico Alluminio
* lama raschiatore: BUS1 - raschiatore triangolare,
* BUS2 - raschiatore piatto, BUS3 - raschiatore arrotondato
* BUS4 - raschiatore ad uncino per angoli
* Shaviv UF1 Mini File - rivestito al diamante
* raschiatore serie BURR 400 per finitura extra fine
* supporto U fisso

TD Interchangeable Kit Codice nr.: 154-00046

Kit universale per lamierini

Perfetto per una grande varietà di applicazioni ed anche per la sbavatura di lamierini nei materiali più diversi, metalli, materie plastiche, materiali acrilici. Elimina gli angoli frastagliati un lato per volta ovvero contemporaneamente su entrambi i lati
Contiene:
* Manico Mango II
* Sbavatore – B, BR, D, D5 & E
* Lame – B10, B20, B30, B70, E100, E200, E300, D80C, D82C, D85, 2 x R10 & 2 x R30
* Salvamano

Kit universale per lamierini Codice nr.: 154-00038

Indice delle lame

Lama	Codice nr.	Descrizione	Lama (in figura la direzione della lavorazione)	Applicazioni										Materiale									
				Spigoli lineari	Spigoli esterni	Spigoli tondi	Spigoli interni ed esterni fori passanti	Spigoli posteriori	Pareti interne	Superficie piana	Lamierini	Chiavette	Angoli retti	Acciaio	Alluminio	Rame	Ottone	Ghisa	Acciai inossidabili	Acciai duri	Plastiche	Metallo duro e vetro	Legno
B1	151-29215	Lama al cobalto di lunga durata. Geometria N1.		●	●									●	●	●			●		●		
B10	151-29212	HSS. Sbava materiali a truciolo lungo.	★	●	●									●	●	●					●		
B10C	151-29013	Metallo duro integrale, geometria B10.		●	●									●	●	●				●	●		
B10D	151-29014	Diamantata. Geometria B10.		●	●																	●	
B10L	151-29095	B10 per mancini.		●	●									●	●	●					●		
B10P	151-29015	Rivestita TiN , alta resistenza all'usura. Geometria B10.		●	●									●	●	●			●		●		
B10PL	151-29096	B10 rivestita TiN. Per mancini.		●	●									●	●	●			●		●		
B10S	151-29210	Al cobalto.Geometria B10.		●	●									●	●	●			●		●		
B11	151-29108	Extrasottile, HSS. Sbava fori con Ø min. 2mm.		●	●									●	●	●					●		
B11P	151-00120	Rivestita TiN, alta resistenza all'usura. Geometria B11.		●	●									●	●	●			●		●		
B12	151-29016	Tipo corto, HSS.	★	●	●									●	●	●					●		
B12P	151-19017	Tipo corto, rivestita TiN, alta resistenza all'usura.		●	●									●	●	●			●		●		
B20	151-19019	HSS. Doppio senso di rotazione.	★	●	●												●	●			●		●
B20C	151-19020	Metallo duro integrale. Doppio senso di rotazione.		●	●												●	●	●		●		●
B20P	151-29021	Rivestita TiN, alta resistenza all'usura, Doppio senso di rotazione.		●	●												●	●	●		●		●
B25	151-29022	Lama sottile particolarmente concepita per plastiche.		●	●									●	●	●					●		
B25C	151-29110	Metallo duro integrale, lama sottile particolarmente concepita per plastiche dure.		●	●									●	●	●					●		
B30	151-29023	Sbava contemporaneamente gli spigoli interni ed esterni dei fori sino a 4 mm. di spessore.	★				●							●	●	●					●		
B30P	151-29024	Rivestita TiN, alta resistenza all'usura. Geometria B30.					●							●	●				●		●		
B32	151-29025	Doppio senso di rotazione. Geometria B30.					●										●	●			●		●
B50C	151-29026	Punta a tracciare. Può essere riaffilata.								●				●	●	●	●	●	●	●	●		
B60	151-29027	HSS. Adatta per la parte interna dei fori sino a 20 mm. di spessore.						●						●	●	●					●		
B70	151-29028	Con placchetta in metallo duro. Sbava lamierini sino a 3,5 mm. di spessore.									●			●	●	●	●	●	●	●	●		
C40	151-29029	Piccola, 4 mm., raschietto triangolare in HSS per lavori di precisione.	★					●	●	●				●	●	●	●	●	●		●		
C42	151-29030	Standard, 8 mm., raschietto triangolare in HSS.	★					●	●	●				●	●	●	●	●	●		●		
C50	151-29117	Doppia, 7,8 mm., raschietto triangolare.	★					●	●	●				●	●	●	●	●	●		●		
C60	151-29118	Doppia, 4.8 mm., raschietto triangolare.						●	●	●				●	●	●	●	●	●		●		
D80C	151-29031	Metallo duro integrale, 6 taglienti. Per sbavare lamierini sino a 3 mm. di spessore.	★							●	●			●	●	●	●	●	●	●	●		●
D82C	151-29032	Per applicazioni gravose. Lama doppia in metallo duro. Per sbavare lamierini sino a 9 mm. di spessore.									●			●	●	●	●	●	●	●	●		●
D85	151-29033	HSS con rompitruciolo e 6 taglienti. Per sbavare lamierini sino a 6 mm. di spessore.									●			●	●	●	●				●		

★ Lame più comuni

Lama	Codice nr.	Descrizione	Lama (in figura la direzione della lavorazione)	Applicazioni										Materiale									
				Spigoli lineari	Spigoli esterni	Spigoli tondi	Spigoli interni ed esterni fori passanti	Spigoli posteriori	Pareti interne	Superficie piana	Lamierini	Chiavette	Angoli retti	Acciaio	Alluminio	Rame	Ottone	Ghisa	Acciai inossidabili	Acciai duri	Plastiche	Metallo duro e vetro	Legno
E100	151-29034	HSS. Per applicazioni gravose. Sbava materiali a truciolo lungo.	★	●	●									●	●	●					●		
E100C	151-29035	Metallo duro integrale, resistente all'usura. Geometria E100.		●	●															●	●		
E100D	151-29036	Diamantata. Geometria E100.		●	●																	●	
E100L	151-29098	E100 per mancini.		●	●									●	●	●					●		
E100P	151-29037	Rivestita TiN, alta resistenza all'usura. Geometria E100.		●	●									●	●				●		●		
E100PL	151-00022	Rivestita TiN per mancini.		●	●									●	●				●		●		
E100S	151-29211	A lunga durata al cobalto. Geometria E100.		●	●									●	●	●			●		●		
E110	151-29038	gambo E, lama come B10 per materiali a truciolo lungo. Sbava fori a partire da un Ø min. di 2 mm.		●	●									●	●	●			●		●		
E110P	151-29039	Rivestita TiN, alta resistenza all'usura. Geometria E110.		●	●									●	●				●		●		
E111	151-29109	Sottile in HSS. Sbava fori a partire da un Ø min. di 1,5 mm.		●	●									●	●	●					●		
E111P	151-00099	Rivestita TiN, alta resistenza all'usura. Geometria E111.		●	●									●	●	●					●		
E120	151-29058	Gambo E tagliente come B20 per materiali a truciolo corto. Doppio senso di rotazione		●	●												●	●			●		
E200	151-29040	HSS per materiali a truciolo corto. Doppio senso di rotazione	★	●	●												●	●			●		●
E200P	151-29099	Rivestita TiN, alta resistenza all'usura. Geometria E200.		●	●												●	●			●		●
E200S	151-00107	Al cobalto. Geometria E200.		●	●												●	●			●		●
E200C	151-29041	Metallo duro integrale, resistente all'usura. Geometria E200.		●	●												●	●		●	●		●
E250	151-29106	Specialmente concepita per la plastica. Molto sottile per applicazioni gravose.		●	●									●	●	●					●		
E300	151-29042	HSS per materiali a truciolo lungo. Per sbavatura simultanea dello spigolo interno ed esterno dei fori sino a 6 mm. di spessore.	★				●							●	●	●							
E300P	151-29227	Rivestita TiN, alta resistenza all'usura. Geometria E300.					●							●	●	●			●		●		
E320	151-29043	HSS per materiali a truciolo corto. Per sbavatura simultanea dello spigolo interno ed esterno dei fori sino a 6 mm. di spessore. Doppio senso di rotazione.					●										●	●			●		●
E350	151-29044	HSS per materiali a truciolo corto. Doppio senso di rotazione.		●	●												●	●			●		
E400	151-29233	Miniraschietto triangolare.		●					●	●				●	●	●	●	●	●		●		●
E450	151-29234	Quattro lame in una.		●							●			●	●	●	●	●	●		●		
E500C	151-29111	Punta a tracciare in metallo duro. Può essere riaffilata.								●				●	●	●	●	●	●	●	●	●	
E600	151-29045	HSS.Sbava punti di difficile accesso in fori sino a 20 mm. di spessore.	★					●						●	●	●					●		
E601	151-29046	Extralunga in HSS. Sbava punti di difficile accesso in fori sino a 40 mm. di spessore.						●						●	●	●					●		
E604	151-29231	Sbava fori passanti e punti di difficile accesso. Naso corto						●						●	●	●					●		
E700	151-29047	HSS per materiali a truciolo lungo. Eccellente applicazione per la sbavatura di pareti tonde interne e fori passanti.							●					●	●	●					●		
E707	151-29232	Sbavatura di profili.			●									●	●	●	●	●	●	●	●		
E720	151-29048	HSS per materiali a truciolo corto. Eccellente applicazione per la sbavatura di pareti tonde interne e fori passanti. Doppio senso di rotazione.							●								●	●			●		●
E750	151-29113	HSS. Particolarmente concepita per la sbavatura di gomma e plastiche morbide.		●	●																●		
E755	151-29085	HSS. Per sbavare angoli retti con altezza pari a 1 mm.		●							●			●	●	●	●	●	●		●		
E800	151-29018	HSS per materiali a truciolo lungo. Sbava angoli retti di poca profondità.		●	●									●	●	●			●		●		
E10	151-29216	Lama al cobalto di lunga durata per materiali a truciolo lungo. Ideale per applicazioni gravose.		●	●									●	●	●			●		●		
ES10	151-29105	HSS durable blade. S10 geometry.		●	●									●	●	●					●		

★ Lame più comuni

Indice delle lame

Lama	Codice nr.	Descrizione	Lama (in figura la direzione della lavorazione)	Applicazioni: Spigoli lineari	Spigoli esterni	Spigoli tondi	Spigoli interni ed estremi fori passanti	Spigoli posteriori	Pareti interne	Superficie piana	Lamierini	Chiavette	Angoli retti	Materiale: Acciaio	Alluminio	Rame	Ottone	Ghisa	Acciai inossidabili	Acciai duri	Plastiche	Metallo duro e vetro	Legno
F12	151-29049	Sbavatore per spigoli esterni di fori sino a 12 mm. di diametro.			●									●	●	●	●	●	●		●		
F20	151-29050	Sbavatore per spigoli esterni di fori sino a 20 mm. di diametro.	★		●									●	●	●	●	●	●		●		
F30	151-29051	Sbavatore per spigoli esterni di fori sino a 30 mm. di diametro.			●									●	●	●	●	●	●		●		
F26X	151-29147	Eccellente applicazione per la sbavatura esterna di tubi, cilindri e similari sino a 26 mm. di diametro.	★			●								●	●	●	●	●	●		●		
G10	151-29052	HSS. Sbavatura di chiavette sino a 15 mm. di larghezza.	★									●		●	●	●	●	●	●		●		
G20	151-29053	HSS, 4 spigoli taglienti. Per chiavette sino a 10 mm. di larghezza.										●		●	●	●	●	●	●		●		
G30C	151-29115	Metallo duro integrale, 3 spigoli taglienti. Sbava angoli scanalati e elimina raggiature indesiderate.											●	●	●	●	●	●	●	●	●		
G40C	151-29103	Metallo duro integrale, 4 spigoli taglienti. Per chiavette sino a 10 mm. di larghezza.										●		●	●	●	●	●	●	●	●		
L10	151-29063	HSS, 4 spigoli taglienti.Sbava spigoli esterni sino a un diametro di 20 mm. e oltre. Il lato "A" sbava materiali a truciolo lungo; il lato "B" sbava materiali a truciolo corto.	A B	●		●								A ●	A ●	A ●	B ●	B ●	A ●		A ● B		●
R10	151-29141	Lama doppia tonda in HSS. Il lato "A" sbava materiali a truciolo lungo; il lato "B" sbava materiali a truciolo corto.	★ A B	●							●			A ●	A ●	A ●	B ●	B ●	A ●		A ● B		● B
R20	151-29142	Lama doppia tonda in HSS per applicazioni gravose in materiali a truciolo lungo.	★	●							●			●	●	●			●		●		
R30	151-29143	Produce sagome arcuate in materiali sino a 16 mm. di spessore. Utilizzare una lama singola R30 per uno spigolo diritto oppure due lame per sbavare simultaneamente entrambi gli spigoli.		●							●			●	●	●			●		●		
BUS1	151-29195	Raschietto triangolare per superfinitura.							●	●				●	●	●	●	●	●		●		●
BUS2	151-29196	Raschietto piatto per superfinitura.								●				●	●	●	●	●	●		●		
BUS31	151-29197	Raschietto rotondo per superfinitura.								●				●	●	●	●	●	●		●		
BUS4	151-29198	Raschietto con spigolo per superfinitura.								●				●	●	●	●	●	●		●		
Q10	151-29236	Lama doppia in ceramica.		●						●											●		●
Q11	151-00132	Double-sided deburring. Curved creamic blade for curved edges and small ridges.		●																	●		●
Finishing Bit	156-00001	Bit esagonale da D1/4" con lama (4 pz.).		●	●									●	●	●					●		

La scelta per gli usi industriali

Le lame, i set, i kit e gli utensili SHAVIV vengono utilizzati dalle aziende leader nel settore degli stampi, automotive, aviazione, materie plastiche, elettronica ed altro.

Stampi · Elettronica · Materie plastiche · Automotive · Lavorazione dei metalli · Idraulica · Aviazione

Due convenienti set con lame rivestite TiN per una maggior durata

Multi proposta serie lame B in set

Per sbavatura standard

- 5 coppie di lame serie B rivestite TIN: B10Px2, B11P x 2, B12P x 2, B20P x 2, B30P x 2

Multi proposta serie lame E in set

Per sbavatura gravosa

- 5 coppie di lame serie E rivestite TIN: E100Px2, E110P x 2, E111P x 2, E200P x 2,E300P x 2

Multi proposta serie lame B in set
Codice nr.: 155-00252

Multi proposta serie lame E in set
Codice nr.: 155-00251

★ Lame più comuni

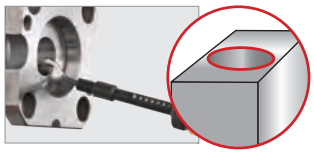
Supporti

Supporto E Porta tutte le lame di tipo E.	 Codice nr.: 153-29004
Supporto B Porta tutte le lame di tipo B. Usare assialmente o perpendicolarmente.	 Codice nr.: 153-29000
Supporto M Porta tutte le lame sia di tipo B sia di tipo E.	 Codice nr.: 153-29138
Supporto C Porta le lame C40 & C42.	 Codice nr.: 153-29001
Supporto D Porta le lame D80C & D82C.	 Codice nr.: 153-29002
Supporto D5 Porta la lama D85.	 Codice nr.: 153-29003
Supporto F Porta tutte le lame di tipo F.	 Codice nr.: 153-29005
Supporto BURR-BR.	 Codice nr.: 153-29139

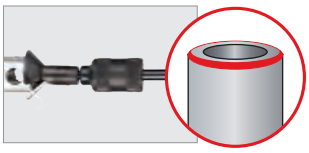
Supporto FR Con arpionismo di non ritorno porta tutte le lame di tipo F.	 Codice nr.: 153-29006
Supporto U Porta tutte le lame di tipo BUS.	 Codice nr.: 153-29121
Supporto L Porta la lama L10.	 Codice nr.: 153-29010
Supporto G Porta le lame G10, G20 & G40C.	 Codice nr.: 153-29007
Supporto G4 Angolato per rendere facile l'accesso all'area di lavoro. Porta le lame G10, G20 & G40C.	 Codice nr.: 153-29102
Supporto G3 Angolato per rendere facile l'accesso all'area di lavoro. Porta le lame G30C.	 Codice nr.: 153-29094
Salvamano Salvamano in acciaio inossidabile per proteggere la mano.	 Codice nr.: 152-00030

Applicazioni e guida alla scelta degli utensili

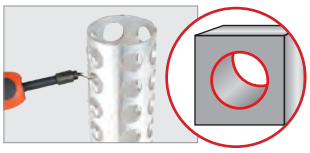
Spigoli lineari
Per i set: B, C, E, HC, M, 1, Burr-Bi



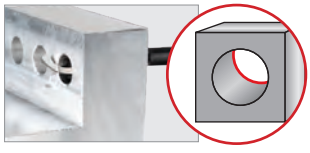
Spigoli esterni
Per i set: B, C, E, F, FR, HC, M, U, 1



Spigoli tondi
Per i set: Burr-Ex, L



Spigoli interni ed esterni fori passanti
Per i set: E, M, 1



Spigoli posteriori
Per i set: C, E, HC, U

Pareti interne
Per i set: C, HC, U

Superfici piane
Per i set: C, D, HC, U

Lamierini
Per i set: D, Burr-Bi

Spigolo interno
Plum-Burr

Chiavette
Per i set: G, U

Angoli retti
Per i set: G3

Testimone di iniezione
Cera-Burr

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