

d_1	+0.000 -0.050mm (+0.000" -0.002")
d_2	h6
r	+0.025 -0.025mm (+0.001" -0.001")

.4724"
(12.000mm)



TECH
PAGES
304-305

Multi-Flute End Mill - Corner Radius - AlCrN-based Coated

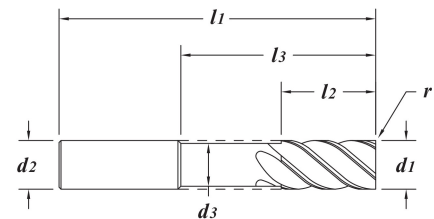
Mehrzähne fräser - Eckenradius - AlCrN-Basierende Beschichtet

Fresa de Multi Labio - Ángulo Redondeado - Recubrimiento Basado en AlCrN

Fraise de Multi-lèvre - Rayon de Coin - Revêtement à base de AlCrN

Fresa di Multitagliente - Raggio - Rivestimento in Base AlCrN

多刃加工铣刀 - 圆角半径 - 涂层铝氮化铬



Solid submicron grain carbide end mill - non-center cutting
Engineered for Titanium
Multiple flutes for increased feed rates
Odd number of flutes to naturally break up harmonics
Engineered for High Efficiency Milling
Up to 8% Radial (ap) engagement
Can be used to finish most steels <40Hrc, as well as aluminium.
Conventional grind for better finish cutting and less push off when finishing
Regrindable



Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - ohne zentrumsschnitt
Entwickelt für die Bearbeitung von Titan
Mehr Zähne für höhere Vorschube
Ungleiche Spannutenzahl, um Vibrationen zu vermeiden
Entwickelt für hocheffizientes Fräsen
Bis zu 8% radialen (ap) eintauchen
Geeignet für das Schlichten in den meisten Stählen < 40 HRC, und Aluminium.
Konventionelle Konstruktion für einen besseren Oberflächenzustand und weniger
Schneiddruck auf der Seite
Nachschleifbar



Fresa de submicrograno sólido carburo de alto rendimiento - no corte centrado
Diseñada para titanio
Múltiples labios para aumentar las gamas de avance
Número de labios impar para rotura natural de armónicos
Diseñado para el fresado de alta eficiencia
Hasta 8% radial (ap)
Puede ser utilizada para acabado en la mayoría de aceros < 40Hrc, y Aluminio.
Afilado convencional para un mejor acabado y menor empuje
Posibilidad de afilado



Fraises carbure submicrograin - pas de coupe au centre
Développé pour l'usinage du titane
Fraise multi-lèvres pour de plus grandes avances
Nombre impair de lèvres pour empêcher naturellement les vibrations
Conçu pour un fraisage à haute efficacité
Jusqu'à 8% amorce radiale (ap)
Adapté pour un usinage de finition dans la plupart des aciers < 40 HRC, et Aluminium.
Construction conventionnelle pour une meilleure finition et moins d'effort de coupe
Affûtable



Fresa sub-micrograno metallo duro - no taglio al centro
Progettata per titanio
Taglienti multipli per alti avanzamenti
Numero taglienti alternato per rompere le vibrazioni armoniche
Progettata per la fresatura ad alta efficienza
Fino a 8% radiale (ap)
Può essere usata per la finitura su acciai <40Hrc, e Alluminio.
Affilatura per una migliore finitura
Riaffilabile



高效超细晶粒
专用于钛合金
多刃提高进给
奇数刃自然破
有效的抑振减
设计并已成功
可用于精加工
常规刃磨提高
可以重磨

EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter	Number Flutes
98502	.4724	12.000	12.0	75	26	0.30	-	-	7
98504	.4724	12.000	12.0	75	26	0.50	-	-	7
98508	.4724	12.000	12.0	75	26	1.00	-	-	7
98516	.4724	12.000	12.0	75	26	4.00	-	-	7
98518	.4724	12.000	12.0	75	32	0.50	-	-	7
98522	.4724	12.000	12.0	75	32	1.00	-	-	7
98524	.4724	12.000	12.0	75	32	1.50	-	-	7
98528	.4724	12.000	12.0	75	32	3.00	-	-	7
98532	.4724	12.000	12.0	100	42	0.50	-	-	7
98538	.4724	12.000	12.0	100	42	1.50	-	-	7
98544	.4724	12.000	12.0	100	42	4.00	-	-	7
98546	.4724	12.000	12.0	100	52	0.50	-	-	7
98550	.4724	12.000	12.0	100	52	1.00	-	-	7
98552	.4724	12.000	12.0	100	52	1.50	-	-	7
98556	.4724	12.000	12.0	100	52	3.00	-	-	7
98560	.4724	12.000	12.0	150	19	0.50	105	11.4	7
98564	.4724	12.000	12.0	150	19	1.00	105	11.4	7
98570	.4724	12.000	12.0	150	19	3.00	105	11.4	7

EDP#	$d1$ † Diameter			$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	r Corner Radius	$l3$ Reach Length	$d3$ Neck Diameter	Number Flutes
	Decimal		Metric							
98574	.5000	1/2"	12.700	1/2"	3"	1"	.010"	-	-	7
98576	.5000	1/2"	12.700	1/2"	3"	1"	.020"	-	-	7
98578	.5000	1/2"	12.700	1/2"	3"	1"	.030"	-	-	7
98580	.5000	1/2"	12.700	1/2"	3"	1"	.060"	-	-	7
98582	.5000	1/2"	12.700	1/2"	3"	1"	.090"	-	-	7
98584	.5000	1/2"	12.700	1/2"	3"	1"	.120"	-	-	7
98586	.5000	1/2"	12.700	1/2"	3"	1"	.125"	-	-	7
98588	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.010"	-	-	7
98590	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.020"	-	-	7
98592	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	-	-	7
98594	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.060"	-	-	7
98598	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.120"	-	-	7
98600	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.125"	-	-	7
98602	.5000	1/2"	12.700	1/2"	4"	5/8"	.010"	2-1/8"	.470"	7
98604	.5000	1/2"	12.700	1/2"	4"	5/8"	.020"	2-1/8"	.470"	7
98606	.5000	1/2"	12.700	1/2"	4"	5/8"	.030"	2-1/8"	.470"	7
98608	.5000	1/2"	12.700	1/2"	4"	5/8"	.060"	2-1/8"	.470"	7
98610	.5000	1/2"	12.700	1/2"	4"	5/8"	.120"	2-1/8"	.470"	7
98612	.5000	1/2"	12.700	1/2"	4"	5/8"	.125"	2-1/8"	.470"	7
98614	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.010"	-	-	7
98616	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.020"	-	-	7
98618	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.030"	-	-	7
98620	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.060"	-	-	7
98622	.5000	1/2"	12.700	1/2"	4"	2-1/8"	.010"	-	-	7
98626	.5000	1/2"	12.700	1/2"	4"	2-1/8"	.030"	-	-	7
98628	.5000	1/2"	12.700	1/2"	4"	2-1/8"	.060"	-	-	7
98630	.5000	1/2"	12.700	1/2"	4"	2-1/8"	.120"	-	-	7
98632	.5000	1/2"	12.700	1/2"	4"	2-1/8"	.125"	-	-	7
98634	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.010"	-	-	7
98636	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.020"	-	-	7
98638	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"	-	-	7
98640	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.060"	-	-	7
98642	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.120"	-	-	7
98644	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.125"	-	-	7
98646	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.010"	-	-	7
98648	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.020"	-	-	7
98652	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.060"	-	-	7
98654	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.120"	-	-	7
98658	.6250	5/8"	15.875	5/8"	6"	3-1/4"	.010"	-	-	7
98660	.6250	5/8"	15.875	5/8"	6"	3-1/4"	.020"	-	-	7
98662	.6250	5/8"	15.875	5/8"	6"	3-1/4"	.030"	-	-	7
98666	.6250	5/8"	15.875	5/8"	6"	3-1/4"	.120"	-	-	7
98670	.6250	5/8"	15.875	5/8"	6"	3/4"	.010"	4-1/8"	.590"	7
98672	.6250	5/8"	15.875	5/8"	6"	3/4"	.020"	4-1/8"	.590"	7
98674	.6250	5/8"	15.875	5/8"	6"	3/4"	.030"	4-1/8"	.590"	7
98678	.6250	5/8"	15.875	5/8"	6"	3/4"	.120"	4-1/8"	.590"	7

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MATERIAL HARDNESS (Rc)

0

continued →

Series TMR (continued)

.6299" - .7874"
(16.000mm - 20.000mm)

HIGH PERFORMANCE
END MILLS

EDP#	$d1$ † Diameter		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	r Corner Radius	$l3$ Reach Length	$d3$ Neck Diameter	Number Flutes
	Decimal	Metric							
98680	.6299	16.000	16.0	88	32	0.50	-	-	7
98690	.6299	16.000	16.0	88	32	3.00	-	-	7
98696	.6299	16.000	16.0	100	42	0.50	-	-	7
98700	.6299	16.000	16.0	100	42	1.00	-	-	7
98704	.6299	16.000	16.0	100	42	2.00	-	-	7
98706	.6299	16.000	16.0	100	42	3.00	-	-	7
98708	.6299	16.000	16.0	100	42	4.00	-	-	7
98710	.6299	16.000	16.0	100	42	5.00	-	-	7
98712	.6299	16.000	16.0	150	60	0.50	-	-	7
98716	.6299	16.000	16.0	150	60	1.00	-	-	7
98720	.6299	16.000	16.0	150	60	2.00	-	-	7
98722	.6299	16.000	16.0	150	60	3.00	-	-	7
98724	.6299	16.000	16.0	150	60	4.00	-	-	7
98726	.6299	16.000	16.0	150	60	5.00	-	-	7
98732	.6299	16.000	16.0	150	80	1.00	-	-	7
98738	.6299	16.000	16.0	150	80	3.00	-	-	7
98744	.6299	16.000	16.0	150	22	0.50	102	15.4	7
98752	.6299	16.000	16.0	150	22	2.00	102	15.4	7
98754	.6299	16.000	16.0	150	22	3.00	102	15.4	7
98760	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.010"	-	9
98764	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"	-	9
98766	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"	-	9
98770	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.190"	-	9
98772	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.250"	-	9
98774	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.010"	-	9
98778	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.030"	-	9
98784	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.190"	-	9
98788	.7500	3/4"	19.050	3/4"	5"	2-1/8"	.010"	-	9
98790	.7500	3/4"	19.050	3/4"	5"	2-1/8"	.020"	-	9
98794	.7500	3/4"	19.050	3/4"	5"	2-1/8"	.060"	-	9
98796	.7500	3/4"	19.050	3/4"	5"	2-1/8"	.120"	-	9
98800	.7500	3/4"	19.050	3/4"	5"	2-1/8"	.250"	-	9
98802	.7500	3/4"	19.050	3/4"	6"	3-1/4"	.010"	-	9
98804	.7500	3/4"	19.050	3/4"	6"	3-1/4"	.020"	-	9
98806	.7500	3/4"	19.050	3/4"	6"	3-1/4"	.030"	-	9
98808	.7500	3/4"	19.050	3/4"	6"	3-1/4"	.060"	-	9
98814	.7500	3/4"	19.050	3/4"	6"	3-1/4"	.250"	-	9
98816	.7500	3/4"	19.050	3/4"	6"	1"	.010"	4-1/8"	9
98820	.7500	3/4"	19.050	3/4"	6"	1"	.030"	4-1/8"	9
98822	.7500	3/4"	19.050	3/4"	6"	1"	.060"	4-1/8"	9
98830	.7874	20.000	20.0	100	26	0.50	-	-	9
98834	.7874	20.000	20.0	100	26	1.00	-	-	9
98864	.7874	20.000	20.0	100	38	6.00	-	-	9
98866	.7874	20.000	20.0	150	60	0.50	-	-	9
98876	.7874	20.000	20.0	150	60	3.00	-	-	9
98882	.7874	20.000	20.0	150	60	6.00	-	-	9
98884	.7874	20.000	20.0	150	80	0.50	-	-	9

MATERIAL HARDNESS (Rc)

EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter	Number Flutes
	Decimal	Metric							
98920	1.000	1"	25.400	1"	4"	1-1/2"	.015"	-	11
98924	1.000	1"	25.400	1"	4"	1-1/2"	.060"	-	11
98928	1.000	1"	25.400	1"	4"	1-1/2"	.120"	-	11
98934	1.000	1"	25.400	1"	5"	2-1/4"	.015"	-	11
98936	1.000	1"	25.400	1"	5"	2-1/4"	.030"	-	11
98942	1.000	1"	25.400	1"	5"	2-1/4"	.120"	-	11
98944	1.000	1"	25.400	1"	5"	2-1/4"	.190"	-	11
98946	1.000	1"	25.400	1"	5"	2-1/4"	.250"	-	11
98948	1.000	1"	25.400	1"	6"	3-1/4"	.030"	-	11
98950	1.000	1"	25.400	1"	6"	3-1/4"	.060"	-	11
98954	1.000	1"	25.400	1"	6"	3-1/4"	.190"	-	11
98958	1.000	1"	25.400	1"	7"	4-1/4"	.030"	-	11
98966	1.000	1"	25.400	1"	7"	4-1/4"	.250"	-	11

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VAN CUTSEM tools
Quality tools for metalworking

GARR TOOL Milling Guide for TMS / TMR

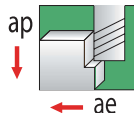
(High Efficiency Milling)

NOTE - CHIP THINNING CALCULATION ALREADY APPLIED

CHIPLOAD PER TOOTH (Fz) AT 2% RADIAL ENGAGEMENT (USING PROGRAMMED CALCULATION - SEE PAGE 307)

SPINDLE INTERFACE MUST BE SCRUTINIZED WHEN USING 16mm DIAMETER AND LARGER END MILLS

ISO Material		M/Min. (Vc)	CHIPLOAD PER TOOTH (Fz)						
			6,0mm	8,0mm	10,0mm	12,0mm	16,0mm	20,0mm	25,0mm
S	TITANIUM ALLOYS / Titanlegierungen / Aleaciones de Titanio / Alliage de Titane / Leghe di Titanio / 钛合金								
	6Al-4V	98 - 157	0,051 - 0,107	0,076 - 0,132	0,089 - 0,165	0,109 - 0,198	0,132 - 0,241	0,165 - 0,292	0,132 - 0,363
	5553	59 - 98	0,038 - 0,071	0,046 - 0,089	0,064 - 0,109	0,076 - 0,140	0,089 - 0,165	0,107 - 0,203	0,132 - 0,241
M	STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金								
	Free Machining (303)	118 - 157	0,051 - 0,107	0,069 - 132	0,089 - 0,165	0,109 - 0,198	0,132 - 0,241	0,165 - 0,292	0,132 - 0,363
	Austenitic (304 / 304L)	89 - 138	0,043 - 0,089	0,064 - 0,109	0,076 - 0,132	0,089 - 0,165	0,109 - 0,198	0,132 - 0,241	0,165 - 0,292
	Martensitic (17-4 / 416)	79 - 98	0,038 - 0,071	0,046 - 0,089	0,064 - 0,109	0,076 - 0,140	0,089 - 0,165	0,107 - 0,203	0,132 - 0,241
P	MEDIUM ALLOY TOOL STEELS / Mittel Legierte Werkzeugstähle / Aceros herramienta medios de la aleación / Aciers à outils alliés / Acciaio da utensili di media durezza / 中碳合金钢								
	8620	98 - 157	0,043 - 0,089	0,064 - 0,109	0,076 - 0,132	0,089 - 0,165	0,109 - 0,198	0,132 - 0,241	0,165 - 0,292
	4140, D2, S7	98 - 138	0,038 - 0,071	0,046 - 0,089	0,064 - 0,109	0,076 - 0,140	0,089 - 0,165	0,107 - 0,203	0,132 - 0,241
	CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢								
	1000 Series, A36, 12L14	118 - 197	0,051 - 0,107	0,069 - 0,132	0,089 - 0,165	0,109 - 0,198	0,132 - 0,241	0,165 - 0,292	0,203 - 0,363
	CAST STEELS / Gegossenes Stahl / Acero bastidor vertidos / Acier fontes / Acciaio fuso / 铸钢								
	Steel	98 - 138	0,051 - 0,107	0,069 - 0,132	0,089 - 0,165	0,109 - 0,198	0,132 - 0,241	0,165 - 0,292	0,203 - 0,363
K	CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件								
	Ductile Iron	98 - 138	0,051 - 0,107	0,069 - 0,132	0,089 - 0,165	0,109 - 0,198	0,132 - 0,241	0,165 - 0,292	0,203 - 0,363
	Gray Iron	98 - 138	0,051 - 0,107	0,069 - 0,132	0,089 - 0,165	0,109 - 0,198	0,132 - 0,241	0,165 - 0,292	0,203 - 0,363
N	NON-FERROUS / Nichteisenmetalle / Metal no ferroso / métal non ferreux / metallo non ferroso / 有色金属								
	Aluminum (6061-T6)	90 - 150	0,050 - 0,105	0,075 - 0,130	0,090 - 0,165	0,105 - 0,200	0,130 - 0,240	0,165 - 0,292	0,203 - 0,363
	Copper, Brass	60 - 110	0,043 - 0,105	0,064 - 0,130	0,076 - 0,165	0,089 - 0,200	0,109 - 0,240	0,132 - 0,292	0,165 - 0,363



ap = full flute length

ae = 2%

NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.