

VAN CUTSEM tools

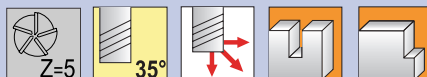
Quality tools for metalworking

MATERIAL SPECIFIC COATINGS

GARR TOOL[®]
High Performance Solid Carbide



Series X5, G5

3.967mm - 5.558mm
(.1562" - .2188")

TOLERANCES

d_1	+0.000" - .002" (+.000mm - .050mm)
d_2	h6
r	+0.001" - .001" (+.025 - .025mm)

X5 BALIQ ALCRONOS Coating (AlCrN-based)

G5 BALIQ TISINOS PRO Coating (AlTiSiN)

Solid submicron grain carbide end mill - center cutting
h6 shank tolerance

Engineered for High Efficiency Milling

Variable flute grind

Honed edge treatment

Polished fluting

Material and condition specific coating

X5 Recommended for Low, Medium, and High Carbon Tool Steels (up to 50 HRC), cast iron, and stainless steel (Inox)**G5** Recommended for tough machining materials such as Heat Resistant Super Alloys, PH Stainless steels (Inox), and conditioned tool steels (50-70 HRC)

Feinkorn-Hartmetallsubstrat - über Mitte schneidend

Schaft-Toleranz h6

Entwickelt für die hocheffiziente Fräsbearbeitung

Variabler Helix

Gehönte Schneidkanten

Polierte Spannuten

Spezielle Beschichtungen je nach Material- und Schnittdaten

X5 Empfohlen für Werkzeugstähle mit niedrigem, mittlerem und hohem Kohlenstoffgehalt (bis zu 50 HRC), Gusseisen und Edelstahl (Inox)**G5** Empfohlen für schwer zu zerspanende Stähle (Hitzebeständige Superlegierungen)

ausscheidungsgehärtete Rostfreie Stähle und wärmebehandelte Werkzeugstähle (50-70 HRC)



Carburo de grano submicrónico sólido - corte central

Tolerancia de vástago h6

Diseñado para el fresado de alta eficiencia

Afilado de flauta variable

Tratamiento de borde afilado

Flautas pulido

Recubrimientos para materiales y condiciones específicas

X5 Recomendado para aceros de bajo, medio y alto contenido de carbono (hasta 50 HRC), hierro fundido y acero inoxidable (Inox)**G5** Recomendado para materiales de mecanizado pesados como superaleaciones resistentes al calor, aceros inoxidables PH y aceros para herramientas acondicionados (50-70 HRC)

Carbure à grains submicroniques - coupe au centre

Tolérance de la queue h6

Conçu pour un fraisage haute efficacité

Goujures et hélices à géométrie variables

Traitement de honage du tranchant

Goujures polies

Revêtements spécifiques aux matériaux et aux conditions (d'usage)

X5 Recommandé pour les aciers à outils à faible, moyenne et haute teneur en carbone (jusqu'à 50 HRC), la fonte et l'acier inoxydable (Inox)**G5** Recommandé pour les matériaux d'usinage difficiles tels que les superalliages résistants à la chaleur, les aciers inoxydables PH et les aciers à outils conditionnés (50-70 HRC)

Metallo duro in Sub-micrograna - Taglio al centro

Tolleranza gambo in h6

Progettato per fresatura ad alta efficienza

Affilatura con Geometria ed elica variabile

Lucidatura spigolo tagliente

Trattamento di lucidatura vano elica

Rivestimenti specifici per materiali e condizioni di impiego

X5 Consigliato per acciai a basso, medio e alto tenore di carbonio, acciai per utensili (fino a 50 HRC), ghisa e acciaio inossidabile (Inox)**G5** Consigliato per materiali di lavorazione difficili come superleghe resistenti al calore, acciai inossidabili PH e acciai per utensili condizionati (50-70 HRC)

超微硬合金-刀具底刃过中心

H6柄部公差

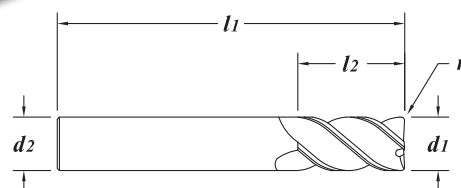
专为高效铣削设计

不等分刃

刃口钝化处理

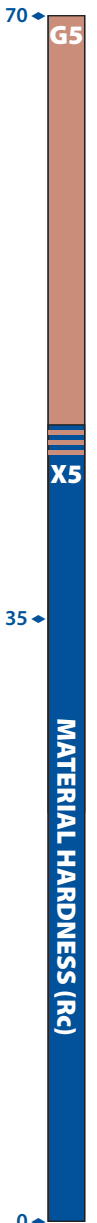
抛光螺旋槽

原材料及特定涂层

X5 推荐用于低、中、高碳工具钢（硬度高达HRC50），铸铁以及不锈钢（Inox）加工**G5** 推荐用于粗加工材料，如高温合金，PH不锈钢，及调质工具钢（硬度范围HRC50-70）

X5 EDP#	G5 EDP#	d_1 †			d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
		Decimal	Diameter	Metric				
31400	34700	.1562	5/32"	3.967	1/4"	2"	5/16"	-
31401	34701	.1562	5/32"	3.967	1/4"	2"	5/16"	.010"
31402	34702	.1562	5/32"	3.967	1/4"	2"	7/16"	-
31403	34703	.1562	5/32"	3.967	1/4"	2"	7/16"	.010"
31404	34704	.1562	5/32"	3.967	1/4"	2-1/2"	9/16"	-
31405	34705	.1562	5/32"	3.967	1/4"	2-1/2"	9/16"	.010"
31406	34706	.1575		4.000	6.0	50	8	-
31407	34707	.1575		4.000	6.0	50	8	0.30
31408	34708	.1575		4.000	6.0	50	8	0.50
31409	34709	.1575		4.000	6.0	50	16	-
31410	34710	.1575		4.000	6.0	50	16	0.30
31411	34711	.1575		4.000	6.0	50	16	0.50
31412	34712	.1875	3/16"	4.763	1/4"	2"	5/16"	-
31413	34713	.1875	3/16"	4.763	1/4"	2"	5/16"	.010"
31414	34714	.1875	3/16"	4.763	1/4"	2"	5/16"	.015"
31415	34715	.1875	3/16"	4.763	1/4"	2"	7/16"	-
31416	34716	.1875	3/16"	4.763	1/4"	2"	7/16"	.010"
31417	34717	.1875	3/16"	4.763	1/4"	2"	7/16"	.015"
31418	34718	.1875	3/16"	4.763	1/4"	2-1/2"	9/16"	-
31419	34719	.1875	3/16"	4.763	1/4"	2-1/2"	9/16"	.010"
31420	34720	.1875	3/16"	4.763	1/4"	2-1/2"	9/16"	.015"
31421	34721	.1969		5.000	6.0	50	10	-
31422	34722	.1969		5.000	6.0	50	10	0.30
31423	34723	.1969		5.000	6.0	50	10	0.50
31424	34724	.1969		5.000	6.0	65	15	-
31425	34725	.1969		5.000	6.0	65	15	0.30
31426	34726	.1969		5.000	6.0	65	15	0.50
31427	34727	.2188	7/32"	5.558	1/4"	2"	3/8"	-
31428	34728	.2188	7/32"	5.558	1/4"	2"	3/8"	.015"
31429	34729	.2188	7/32"	5.558	1/4"	2-1/2"	3/4"	-
31430	34730	.2188	7/32"	5.558	1/4"	2-1/2"	3/4"	.015"

X5 EDP#	G5 EDP#	$d1$ †		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	r Corner Radius	
		Decimal	Metric					
31431	34731	.2362		6.000	6	50	13	-
31432	34732	.2362		6.000	6	50	13	0.30
31433	34733	.2362		6.000	6	50	13	0.50
31434	34734	.2362		6.000	6	65	19	-
31435	34735	.2362		6.000	6	65	19	0.30
31436	34736	.2362		6.000	6	65	19	0.50
31437	34737	.2362		6.000	6	75	26	-
31438	34738	.2362		6.000	6	75	26	0.30
31439	34739	.2362		6.000	6	75	26	0.50
31440	34740	.2500	1/4"	6.350	1/4"	2-1/2"	1/2"	-
31441	34741	.2500	1/4"	6.350	1/4"	2-1/2"	1/2"	.015"
31442	34742	.2500	1/4"	6.350	1/4"	2-1/2"	1/2"	.030"
31443	34743	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	-
31444	34744	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"
31445	34745	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"
31446	34746	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"
31447	34747	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"
31448	34748	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.060"
31449	34749	.2500	1/4"	6.350	1/4"	3"	1"	-
31450	34750	.2500	1/4"	6.350	1/4"	3"	1"	.015"
31451	34751	.2500	1/4"	6.350	1/4"	3"	1"	.030"
31452	34752	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	-
31453	34753	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.015"
31454	34754	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.020"
31455	34755	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.030"
31456	34756	.3150		8.000	8	65	22	-
31457	34757	.3150		8.000	8	65	22	0.50
31458	34758	.3150		8.000	8	65	22	1.00
31459	34759	.3150		8.000	8	75	32	-
31460	34760	.3150		8.000	8	75	32	0.50
31461	34761	.3150		8.000	8	75	32	1.00
31462	34762	.3750	3/8"	9.525	3/8"	2"	1/2"	-
31463	34763	.3750	3/8"	9.525	3/8"	2"	1/2"	.015"
31464	34764	.3750	3/8"	9.525	3/8"	2"	1/2"	.020"
31465	34765	.3750	3/8"	9.525	3/8"	2"	1/2"	.030"
31466	34766	.3750	3/8"	9.525	3/8"	2"	5/8"	-
31467	34767	.3750	3/8"	9.525	3/8"	2"	5/8"	.015"
31468	34768	.3750	3/8"	9.525	3/8"	2"	5/8"	.020"
31469	34769	.3750	3/8"	9.525	3/8"	2"	5/8"	.030"
31470	34770	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	-
31471	34771	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.015"
31472	34772	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.020"
31473	34773	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"
31474	34774	.3750	3/8"	9.525	3/8"	3"	1"	-
31475	34775	.3750	3/8"	9.525	3/8"	3"	1"	.015"
31476	34776	.3750	3/8"	9.525	3/8"	3"	1"	.020"
31477	34777	.3750	3/8"	9.525	3/8"	3"	1"	.030"
31478	34778	.3750	3/8"	9.525	3/8"	3"	1-1/4"	-
31479	34779	.3750	3/8"	9.525	3/8"	3"	1-1/4"	.015"
31480	34780	.3937		10.000	10	70	26	-
31481	34781	.3937		10.000	10	70	26	0.50
31482	34782	.3937		10.000	10	70	26	1.00
31483	34783	.3937		10.000	10	75	32	-
31484	34784	.3937		10.000	10	75	32	0.50
31485	34785	.3937		10.000	10	75	32	1.00



continued →

Series X5, G5 (continued)

12.000mm - 15.875mm
(.4724" - .6250")

HIGH PERFORMANCE
END MILLS

G5 70

X5

35

MATERIAL HARDNESS (Rc)

0

X5 EDP#	G5 EDP#	$d1$ † Diameter		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	r Corner Radius
		Decimal	Metric				
31486	34786	.4724	12.000	12	65	19	-
31487	34787	.4724	12.000	12	65	19	0.30
31488	34788	.4724	12.000	12	65	19	0.50
31489	34789	.4724	12.000	12	65	19	1.00
31490	34790	.4724	12.000	12	75	26	-
31491	34791	.4724	12.000	12	75	26	0.30
31492	34792	.4724	12.000	12	75	26	0.50
31493	34793	.4724	12.000	12	75	26	1.00
31494	34794	.4724	12.000	12	75	32	-
31495	34795	.4724	12.000	12	75	32	0.30
31496	34796	.4724	12.000	12	75	32	0.50
31497	34797	.4724	12.000	12	75	32	1.00
31498	34798	.4724	12.000	12	100	42	-
31499	34799	.4724	12.000	12	100	42	0.30
31500	34800	.4724	12.000	12	100	42	0.50
31501	34801	.4724	12.000	12	100	42	1.00
31502	34802	.4724	12.000	12	100	50	-
31503	34803	.4724	12.000	12	100	50	0.30
31504	34804	.4724	12.000	12	100	50	0.50
31505	34805	.4724	12.000	12	100	50	1.00
31506	34806	.5000	12.700	1/2"	2-1/2"	5/8"	-
31507	34807	.5000	12.700	1/2"	2-1/2"	5/8"	.010"
31508	34808	.5000	12.700	1/2"	2-1/2"	5/8"	.015"
31509	34809	.5000	12.700	1/2"	2-1/2"	5/8"	.020"
31511	34810	.5000	12.700	1/2"	2-1/2"	5/8"	.030"
31512	34811	.5000	12.700	1/2"	3"	1"	-
31513	34812	.5000	12.700	1/2"	3"	1"	.015"
31514	34813	.5000	12.700	1/2"	3"	1"	.030"
31515	34814	.5000	12.700	1/2"	3"	1"	.060"
31516	34815	.5000	12.700	1/2"	3"	1-1/4"	-
31517	34816	.5000	12.700	1/2"	3"	1-1/4"	.010"
31518	34817	.5000	12.700	1/2"	3"	1-1/4"	.015"
31519	34818	.5000	12.700	1/2"	3"	1-1/4"	.020"
31521	34819	.5000	12.700	1/2"	3"	1-1/4"	.030"
31522	34820	.5000	12.700	1/2"	3"	1-1/4"	.060"
31523	34821	.5000	12.700	1/2"	3"	1-1/4"	.125"
31524	34822	.5000	12.700	1/2"	4"	1-5/8"	-
31525	34823	.5000	12.700	1/2"	4"	1-5/8"	.015"
31526	34824	.5000	12.700	1/2"	4"	1-5/8"	.020"
31527	34825	.5000	12.700	1/2"	4"	1-5/8"	.030"
31528	34826	.5000	12.700	1/2"	4"	2-1/8"	-
31529	34827	.5000	12.700	1/2"	4"	2-1/8"	.015"
31530	34828	.5000	12.700	1/2"	4"	2-1/8"	.030"
31531	34829	.6250	15.875	5/8"	3"	1"	-
31532	34830	.6250	15.875	5/8"	3"	1"	.015"
31533	34831	.6250	15.875	5/8"	3"	1"	.030"
31534	34832	.6250	15.875	5/8"	3-1/2"	1-1/2"	-
31535	34833	.6250	15.875	5/8"	3-1/2"	1-1/2"	.015"
31536	34834	.6250	15.875	5/8"	3-1/2"	1-1/2"	.030"
31537	34835	.6250	15.875	5/8"	3-1/2"	1-1/2"	.060"
31538	34836	.6250	15.875	5/8"	4"	1-3/4"	-
31539	34837	.6250	15.875	5/8"	4"	1-3/4"	.015"
31541	34838	.6250	15.875	5/8"	4"	1-3/4"	.030"
31542	34839	.6250	15.875	5/8"	4"	2-1/8"	-
31543	34840	.6250	15.875	5/8"	4"	2-1/8"	.015"
31544	34841	.6250	15.875	5/8"	4"	2-1/8"	.030"

X5 EDP#	G5 EDP#	$d1^{\dagger}$ Diameter		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	r Corner Radius
		Decimal	Metric				
31545	34842	.6299	16.000	16	88	32	-
31546	34843	.6299	16.000	16	88	32	0.50
31548	34844	.6299	16.000	16	88	32	1.00
31549	34845	.6299	16.000	16	100	40	-
31550	34846	.6299	16.000	16	100	40	0.50
31551	34847	.6299	16.000	16	100	40	1.00
31552	34848	.6299	16.000	16	100	50	-
31553	34849	.6299	16.000	16	100	50	0.50
31554	34850	.6299	16.000	16	100	50	1.00
31555	34851	.7500	3/4"	19.050	3/4"	4"	1-5/8"
31556	34852	.7500	3/4"	19.050	3/4"	4"	1-5/8"
31558	34853	.7500	3/4"	19.050	3/4"	4"	1-5/8"
31559	34854	.7500	3/4"	19.050	3/4"	4"	1-5/8"
31561	34855	.7500	3/4"	19.050	3/4"	4"	1-5/8"
31562	34856	.7500	3/4"	19.050	3/4"	4"	1-5/8"
31563	34857	.7500	3/4"	19.050	3/4"	4"	1-5/8"
31564	34858	.7500	3/4"	19.050	3/4"	4"	1-5/8"
31565	34859	.7500	3/4"	19.050	3/4"	5"	2-1/4"
31566	34860	.7500	3/4"	19.050	3/4"	5"	2-1/4"
31567	34861	.7500	3/4"	19.050	3/4"	5"	2-1/4"
31568	34862	.7500	3/4"	19.050	3/4"	5"	2-1/4"
31569	34863	.7500	3/4"	19.050	3/4"	6"	3-1/4"
31571	34864	.7500	3/4"	19.050	3/4"	6"	3-1/4"
31572	34865	.7500	3/4"	19.050	3/4"	6"	3-1/4"
31573	34866	.7500	3/4"	19.050	3/4"	6"	3-1/4"
31574	34867	.7874	20.000	20	100	38	-
31575	34868	.7874	20.000	20	100	38	0.50
31576	34869	.7874	20.000	20	100	38	1.00
31578	34870	.7874	20.000	20	100	50	-
31579	34871	.7874	20.000	20	100	50	0.50
31581	34872	.7874	20.000	20	100	50	1.00
31582	34873	1.000	1"	25.400	1"	4"	1-1/2"
31583	34874	1.000	1"	25.400	1"	4"	1-1/2"
31584	34875	1.000	1"	25.400	1"	4"	1-1/2"
31585	34876	1.000	1"	25.400	1"	4"	1-1/2"
31586	34877	1.000	1"	25.400	1"	5"	2-1/2"
31587	34878	1.000	1"	25.400	1"	5"	2-1/2"



QUICKLY CALCULATE IDEAL PARAMETERS FOR THE
X5 OR G5 IN YOUR APPLICATION WITH OUR
ONLINE CALCULATOR.

NO REGISTRATION REQUIRED.

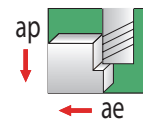
CHECK OUT THE
GARR TECHNICAL ADVISOR



GARR TOOL X5, G5 High Performance Milling Guide

ISO Material		HRC	SFM (Vc)	CHIPLOAD PER TOOTH (Fz)							
				3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
S	COBALT BASE ALLOYS / Kobaltlegierungen / Aleaciones del cobalto / Alliages de cobalt / Leghe del cobalto / 钴基合金										
	Powdered Metal, Stellite, Hs-21, Haynes 25/188, X-40, L-605	< 40 > 40	120 - 240 100 - 195	.0005" - .0015" .0004" - .0012"	.0008" - .0020" .0006" - .0018"	.0009" - .0022" .0008" - .0020"	.0011" - .0024" .0009" - .0022"	.0016" - .0034" .0012" - .0029"	.0018" - .0041" .0014" - .0036"	.0022" - .0050" .0018 - .0046	.0032" - .0070" .0024" - .0060"
	NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 镍基合金										
	Invar, Kovar, Inconel-625/718, Waspaloy, Rene, Hastelloy, A286	< 40 > 40	120 - 240 100 - 195	.0005" - .0015" .0004" - .0012"	.0008" - .0020" .0006" - .0018"	.0009" - .0022" .0008" - .0020"	.0011" - .0024" .0009" - .0022"	.0016" - .0034" .0012" - .0029"	.0018" - .0041" .0014" - .0036"	.0022" - .0050" .0018 - .0046	.0032" - .0070" .0024" - .0060"
	IRON BASE ALLOYS / Eisenlegierungen / Aleaciones ferrosas / Alliages ferreux / Leghe ferrose / 铁基合金										
	Incoloy 800-802, Multimet N-155, Timkin 16-25-6, Carpenter 22-b3	< 40 > 40	120 - 240 100 - 195	.0005" - .0015" .0004" - .0012"	.0008" - .0020" .0006" - .0018"	.0009" - .0022" .0008" - .0020"	.0011" - .0024" .0009" - .0022"	.0016" - .0034" .0012" - .0029"	.0018" - .0041" .0014" - .0036"	.0022" - .0050" .0018 - .0046	.0032" - .0070" .0024" - .0060"
	MONEL										
	Monel - 65% Nickel		160 - 290	.0005" - .0015"	.0008" - .0020"	.0009" - .0022"	.0011" - .0024"	.0016" - .0034"	.0018" - .0041"	.0022" - .0050"	.0032" - .0070"
	TITANIUM ALLOYS / Titanlegierungen / Aleaciones de Titanio / Alliage de Titane / Leghe di Titanio / 钛合金										
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		260 - 490	.0005" - .0015"	.0009" - .0019"	.0010" - .0020"	.0012" - .0026"	.0018" - .0038"	.0020" - .0046"	.0024" - .0054"	.0036" - .0078"	
5553 / Beta Titanium		195 - 365	.0004" - .0012"	.0009" - .0017"	.0010" - .0019"	.0012" - .0024"	.0018" - .0034"	.0020" - .0041"	.0024" - .0050"	.0032" - .0070"	
M	STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金										
	13/8, 15/5, 17-4, pH Types	< 40 > 40	290 - 490 225 - 360	.0005" - .0015" .0004" - .0011"	.0007" - .0018" .0006" - .0015"	.0008" - .0020" .0007" - .0019"	.0011" - .0024" .0009" - .0022"	.0016" - .0034" .0012" - .0029"	.0018" - .0041" .0014" - .0037"	.0022" - .0050" .0018" - .0046"	.0032" - .0070" .0024" - .0060"
	200 Series, 300 Series	< 40 > 40	355 - 555 290 - 455	.0005" - .0015" .0004" - .0010"	.0007" - .0018" .0006" - .0015"	.0008" - .0020" .0007" - .0019"	.0011" - .0024" .0009" - .0022"	.0016" - .0039" .0012" - .0029"	.0018" - .0046" .0014" - .0037"	.0022" - .0056" .0018" - .0046"	.0032" - .0080" .0024" - .0060"
	304L, 316L, Nitronic 50	< 40 > 40	325 - 520 225 - 360	.0005" - .0015" .0004" - .0009"	.0007" - .0018" .0006" - .0014"	.0008" - .0020" .0007" - .0019"	.0011" - .0024" .0009" - .0022"	.0016" - .0034" .0012" - .0029"	.0018" - .0041" .0014" - .0037"	.0022" - .0050" .0018" - .0046"	.0032" - .0070" .0024" - .0060"
	400 Series	< 40 > 40	290 - 555 225 - 425	.0005" - .0015" .0004" - .0009"	.0007" - .0018" .0006" - .0014"	.0008" - .0020" .0007" - .0019"	.0011" - .0026" .0009" - .0023"	.0016" - .0036" .0012" - .0032"	.0018" - .0044" .0014" - .0039"	.0022" - .0054" .0018" - .0048"	.0032" - .0074" .0024" - .0066"
P	HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto durezza / Aciers à outils à haute résistance / Acciaio da utensili molto duro / 高硬度工具鋼										
	A2, D2, P20, H13, S7, O1	< 40 > 40	290 - 520 195 - 425	.0006" - .0014" .0005" - .0010"	.0008" - .0018" .0007" - .0014"	.0009" - .0022" .0008" - .0018"	.0013" - .0026" .0012" - .0022"	.0016" - .0036" .0012" - .0029"	.0022" - .0044" .0020" - .0036"	.0026" - .0054" .0024" - .0046"	.0040" - .0074" .0036" - .0060"
	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										
	4140, 4340, 52100, 6150, 8620	< 40 > 40	455 - 650 325 - 490	.0006" - .0014" .0005" - .0010"	.0008" - .0019" .0007" - .0014"	.0009" - .0023" .0008" - .0018"	.0013" - .0027" .0012" - .0022"	.0016" - .0038" .0012" - .0031"	.0022" - .0046" .0020" - .0038"	.0026" - .0056" .0024" - .0046"	.0040" - .0078" .0036" - .0064"
	CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢										
1000's - 1018, 1020, 12L14	< 40	490 - 780	.0006" - .0014"	.0010" - .0015"	.0009" - .0018"	.0013" - .0028"	.0020" - .0041"	.0022" - .0048"	.0026" - .0058"	.0040" - .0084"	
K	CAST MATERIAL/ Gegossenes Material / Material bastidor vertidos / Matériaux fontes / Materiale fuso / 铸造件										
	Steel (Malleable)		455 - 685	.0006" - .0019"	.0009" - .0023"	.0010" - .0025"	.0015" - .0029"	.0020" - .0044"	.0026" - .0051"	.0030" - .0060"	.0040" - .0090"
	Ductile Iron		455 - 685	.0006" - .0019"	.0009" - .0023"	.0010" - .0025"	.0015" - .0029"	.0020" - .0044"	.0026" - .0051"	.0030" - .0060"	.0040" - .0090"
	Gray Iron		585 - 770	.0007" - .0019"	.0010" - .0022"	.0011" - .0026"	.0016" - .0030"	.0022" - .0046"	.0026" - .0053"	.0032" - .0062"	.0044" - .0094"

	Profile/Trochoidal Milling
Axial (ap)	up to 2xD
Radial (ae)	5% - 25% of Dia.



NOTE - DATA DOES NOT REFLECT CHIP THINNING.

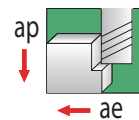
SPINDLE INTERFACE MUST BE SCRUTINIZED WHEN USING 5/8" DIAMETER AND LARGER END MILLS

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

GARR TOOL X5, G5 High Performance Milling Guide

ISO Material		HRC	M/Min. (Vc)	CHIPLOAD PER TOOTH (Fz)								
				4,0mm	5,0mm	6,0mm	8,0mm	10,0mm	12,0mm	16,0mm	20,0mm	
S	COBALT BASE ALLOYS / Kobaltlegierungen / Aleaciones del cobalto / Alliages de cobalt / Leghe del cobalto / 钴基合金											
	Powdered Metal, Stellite, Hs-21, Haynes 25/188, X-40, L-605	< 40 > 40	37 - 75 30 - 60	0,010 - 0,025 0,008 - 0,020	0,013 - 0,038 0,010 - 0,030	0,020 - 0,051 0,015 - 0,046	0,023 - 0,056 0,020 - 0,051	0,028 - 0,061 0,023 - 0,056	0,041 - 0,086 0,030 - 0,074	0,046 - 0,104 0,036 - 0,091	0,056 - 0,127 0,046 - 0,117	
	NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nickel / 高镍基合金											
	Invar, Kovar, Inconel-625/718, Waspaloy, Rene, Hastelloy, A286	< 40 > 40	37 - 75 30 - 60	0,010 - 0,025 0,008 - 0,020	0,013 - 0,038 0,010 - 0,030	0,020 - 0,051 0,015 - 0,046	0,023 - 0,056 0,020 - 0,051	0,028 - 0,061 0,023 - 0,056	0,041 - 0,086 0,030 - 0,074	0,046 - 0,104 0,036 - 0,091	0,056 - 0,127 0,046 - 0,117	
	IRON BASE ALLOYS / Eisenlegierungen / Aleaciones ferrosas / Alliages ferreux / Leghe ferrose / 铁基合金											
	Incoloy 800-802, Multimet N-155, Timkin 16-25-6, Carpenter 22-b3	< 40 > 40	37 - 75 30 - 60	0,010 - 0,025 0,008 - 0,020	0,013 - 0,038 0,010 - 0,030	0,020 - 0,051 0,015 - 0,046	0,023 - 0,056 0,020 - 0,051	0,028 - 0,061 0,023 - 0,056	0,041 - 0,086 0,030 - 0,074	0,046 - 0,104 0,036 - 0,091	0,056 - 0,127 0,046 - 0,117	
	MONEL											
	Monel - 65% Nickel		50 - 90	0,010 - 0,025	0,013 - 0,038	0,020 - 0,051	0,023 - 0,056	0,028 - 0,061	0,041 - 0,086	0,046 - 0,104	0,056 - 0,127	
	TITANIUM ALLOYS / Titanlegierungen / Aleaciones de Titanio / Alliage de Titane / Leghe di Titanio / 钛合金											
	Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		80 - 150	0,010 - 0,030	0,013 - 0,038	0,023 - 0,048	0,025 - 0,051	0,030 - 0,066	0,046 - 0,097	0,051 - 0,117	0,061 - 0,137	
5553 / Beta Titanium		60 - 110	0,008 - 0,025	0,010 - 0,030	0,023 - 0,043	0,025 - 0,048	0,030 - 0,061	0,046 - 0,086	0,051 - 0,104	0,061 - 0,127		
M	STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金											
	13/8, 15/5, 17-4, pH Types	< 40 > 40	90 - 150 70 - 110	0,010 - 0,025 0,008 - 0,020	0,013 - 0,038 0,010 - 0,028	0,018 - 0,046 0,015 - 0,038	0,020 - 0,051 0,018 - 0,048	0,028 - 0,061 0,023 - 0,056	0,041 - 0,086 0,030 - 0,074	0,046 - 0,104 0,036 - 0,094	0,056 - 0,127 0,046 - 0,117	
	200 Series, 300 Series	< 40 > 40	110 - 170 90 - 140	0,010 - 0,025 0,008 - 0,020	0,013 - 0,038 0,010 - 0,025	0,018 - 0,046 0,015 - 0,038	0,020 - 0,051 0,018 - 0,048	0,028 - 0,061 0,023 - 0,056	0,041 - 0,099 0,030 - 0,074	0,046 - 0,117 0,036 - 0,094	0,056 - 0,142 0,046 - 0,117	
	304L, 316L, Nitronic 50	< 40 > 40	100 - 160 70 - 110	0,010 - 0,025 0,008 - 0,020	0,013 - 0,038 0,010 - 0,023	0,018 - 0,046 0,015 - 0,036	0,020 - 0,051 0,018 - 0,048	0,028 - 0,061 0,023 - 0,056	0,041 - 0,086 0,030 - 0,074	0,046 - 0,104 0,036 - 0,094	0,056 - 0,127 0,046 - 0,117	
	400 Series	< 40 > 40	90 - 170 70 - 130	0,010 - 0,028 0,008 - 0,023	0,013 - 0,038 0,010 - 0,023	0,018 - 0,046 0,015 - 0,036	0,020 - 0,051 0,018 - 0,048	0,028 - 0,066 0,023 - 0,058	0,041 - 0,091 0,030 - 0,081	0,046 - 0,112 0,036 - 0,099	0,056 - 0,137 0,046 - 0,122	
P	HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils à haute résistance / Acciaio da utensili molto duro / 高硬度工具钢											
	A2, D2, P20, H13, S7, O1	< 40 > 40	90 - 160 60 - 130	0,013 - 0,025 0,008 - 0,020	0,015 - 0,036 0,013 - 0,025	0,020 - 0,046 0,018 - 0,036	0,023 - 0,056 0,020 - 0,046	0,033 - 0,066 0,030 - 0,056	0,041 - 0,091 0,030 - 0,074	0,056 - 0,112 0,051 - 0,091	0,066 - 0,137 0,061 - 0,117	
	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											
	4140, 4340, 52100, 6150, 8620	< 40 > 40	140 - 200 100 - 150	0,013 - 0,030 0,008 - 0,020	0,015 - 0,036 0,013 - 0,025	0,020 - 0,048 0,018 - 0,036	0,023 - 0,058 0,020 - 0,046	0,033 - 0,069 0,030 - 0,056	0,041 - 0,097 0,030 - 0,079	0,056 - 0,117 0,051 - 0,097	0,066 - 0,142 0,061 - 0,117	
K	CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢											
	1000's - 1018, 1020, 12L14	< 40	150 - 240	0,013 - 0,030	0,015 - 0,036	0,025 - 0,038	0,023 - 0,046	0,033 - 0,071	0,051 - 0,104	0,056 - 0,122	0,066 - 0,147	
	CAST MATERIAL/ Gegossenes Material / Material bastidor vertidos / Matériaux fontes / Materiale fuso / 铸造件											
K	Steel (Malleable)		140 - 210	0,013 - 0,038	0,015 - 0,048	0,023 - 0,058	0,025 - 0,064	0,038 - 0,074	0,051 - 0,112	0,066 - 0,130	0,076 - 0,152	
	Ductile Iron		140 - 210	0,013 - 0,038	0,015 - 0,048	0,023 - 0,058	0,025 - 0,064	0,038 - 0,074	0,051 - 0,112	0,066 - 0,130	0,076 - 0,152	
	Gray Iron		180 - 235	0,018 - 0,038	0,018 - 0,048	0,025 - 0,056	0,028 - 0,066	0,041 - 0,076	0,056 - 0,117	0,066 - 0,135	0,081 - 0,157	

	Profile/Trochoidal Milling
Axial (ap)	up to 2xD
Radial (ae)	5% - 25% of Dia.



NOTE - DATA DOES NOT REFLECT CHIP THINNING.

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

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

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