

NEW SERIES

MATERIAL SPECIFIC COATINGS

GARR TOOL[®]
High Performance Solid Carbide



X9

G9



Series X9, G9

HIGH PERFORMANCE
END MILLS

SERIES HIGHLIGHT

S M P K

High Performance End Mills

X9 BALIQ® ALCRONOS Coating (AlCrN)

G9 BALIQ® TISINOS PRO Coating (AlTiSiN)

X9 Target Materials:

Stainless Steel (Inox, Austenitic/Martensitic)

Carbon Tools Steels (Up to 50 HRC)

Cast Iron

G9 Target Materials:

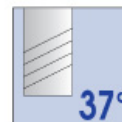
Heat Resistant Super Alloys

PH Stainless Steels (Inox, 13-8, 15-5, 17-4, Martensitic)

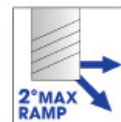
Conditioned Tool Steels (50-70 HRC)



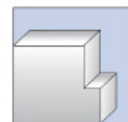
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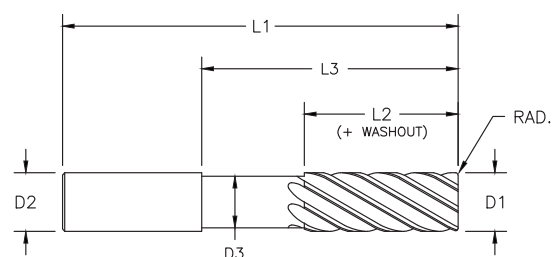
37°



2° MAX
RAMP



CALCULATE IDEAL PARAMETERS
FOR THE X9 AND G9 IN YOUR
APPLICATION WITH THE GARR
TECHNICAL ADVISOR

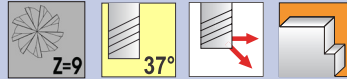


View the G9 →

← View the X9

TOLERANCES

d_1	$+0.000^{\circ} - .002^{\circ}$ (+.000mm -.050mm)
d_2	h6
r	$+0.001^{\circ} - .001^{\circ}$ (+.025 -.025mm)



Series X9, G9 (continued)

12.700mm - 19.050mm
(.5000" - .7500")

HIGH PERFORMANCE
END MILLS

X9 BALIQ® ALCRONOS Coating (AlCrN-based) G9 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

X9 Recommended for Low, Medium, and High Carbon Tool Steels (up to 50 HRC), cast iron, and stainless steel (Inox)

G9 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 Spannruten
Spezielle Beschichtungen je nach Material- und Schnittdaten

X9 Empfohlen für Werkzeugstähle mit niedrigem, mittlerem und hohem Kohlenstoffgehalt (bis zu 50 HRC), Gusseisen und Edelstahl (Inox)

G9 Empfohlen für schwer zu zerspanende Stähle

(Hitzebeständige Superlegierungen, ausschweißungsgehärtete

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

X9 Recomendado para aceros de bajo, medio y alto contenido de carbono (hasta 50 HRC), hierro fundido y acero inoxidable (Inox)

G9 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'usinage)

X9 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)

G9 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

X9 Consigliato per acciai a basso, medio e alto tenore di carbonio, acciai per utensili (fino a 50 HRC), ghisa e acciaio inossidabile (Inox)

G9 Consigliato per materiali di lavorazione difficili come superleghe resistenti al calore, acciai inossidabili PH e acciai per utensili condizionati (50-70 HRC)



超微硬质合金-刀具底刃过中心

柄柄部公差

专为高效铣削设计

不等分刃

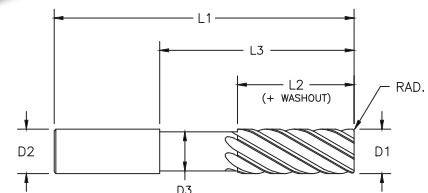
刃口钝化处理

抛光螺旋槽

原材料及特定涂层

X9 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

G9 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）



X9 EDP#	G9 EDP#	d_1 † Decimal Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	d_3 Neck Diameter	l_3 Reach Length
31100	31101	.5000 1/2" 12.700	1/2"	3"	1-1/4"	.015"	-	-
31102	31103	.5000 1/2" 12.700	1/2"	3"	1-1/4"	.030"	-	-
31104	31105	.6250 5/8" 15.875	5/8"	3"	3/4"	.030"	-	-
31106	31107	.6250 5/8" 15.875	5/8"	3-1/2"	3/4"	.060"	-	-
31108	31109	.6250 5/8" 15.875	5/8"	3-1/2"	3/4"	.090"	-	-
31110	31111	.6250 5/8" 15.875	5/8"	3-1/2"	1-1/4"	.015"	-	-
31112	31113	.6250 5/8" 15.875	5/8"	3-1/2"	1-1/4"	.030"	-	-
31114	31115	.6250 5/8" 15.875	5/8"	3-1/2"	1-1/4"	.060"	-	-
31116	31117	.6250 5/8" 15.875	5/8"	3-1/2"	1-1/4"	.090"	-	-
31118	31119	.6250 5/8" 15.875	5/8"	3-1/2"	1-1/2"	.020"	-	-
31122	31121	.6250 5/8" 15.875	5/8"	3-1/2"	1-5/8"	.020"	-	-
31124	31123	.6250 5/8" 15.875	5/8"	4"	1-7/8"	.030"	-	-
31126	31125	.6250 5/8" 15.875	5/8"	5"	1-1/4"	.015"	.595"	2-1/2"
31128	31129	.6250 5/8" 15.875	5/8"	5"	1-1/4"	.030"	.595"	2-1/2"
31130	31131	.6250 5/8" 15.875	5/8"	5"	1-1/4"	.015"	.595"	3-1/8"
31132	31133	.6250 5/8" 15.875	5/8"	5"	1-1/4"	.030"	.595"	3-1/8"
31134	31135	.6299 16.000	16	100	42	1.00	-	-
31136	31137	.6299 16.000	16	120	65	0.50	-	-
31138	31139	.6299 16.000	16	120	40	0.50	15.2	65
31140	31141	.7500 3/4" 19.050	3/4"	3"	1"	.030"	-	-
31142	31143	.7500 3/4" 19.050	3/4"	3"	1"	.060"	-	-
31144	31145	.7500 3/4" 19.050	3/4"	3"	1"	.120"	-	-
31146	31147	.7500 3/4" 19.050	3/4"	4"	1-1/2"	.015"	-	-
31148	31149	.7500 3/4" 19.050	3/4"	4"	1-1/2"	.030"	-	-
31152	31151	.7500 3/4" 19.050	3/4"	4"	1-1/2"	.060"	-	-
31154	31153	.7500 3/4" 19.050	3/4"	4"	1-1/2"	.120"	-	-
31156	31155	.7500 3/4" 19.050	3/4"	5"	2-1/4"	.030"	-	-
31158	31159	.7500 3/4" 19.050	3/4"	6"	1-1/2"	.015"	.720"	3"
31162	31161	.7500 3/4" 19.050	3/4"	6"	1-1/2"	.030"	.720"	3"
31164	31163	.7500 3/4" 19.050	3/4"	6"	1-1/2"	.015"	.720"	3-3/4"
31166	31165	.7500 3/4" 19.050	3/4"	6"	1-1/2"	.030"	.720"	3-3/4"

70

G9

X9

35

MATERIAL HARDNESS (Rc)

0

Series X9C, G9C

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S M P K

High Performance End Mills

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Carbon Tools Steels (Up to 50 HRC)

Cast Iron

G9C Target Materials:

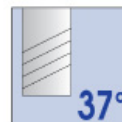
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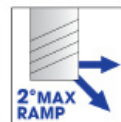
Conditioned Tool Steels (50-70 HRC)



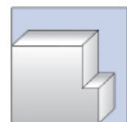
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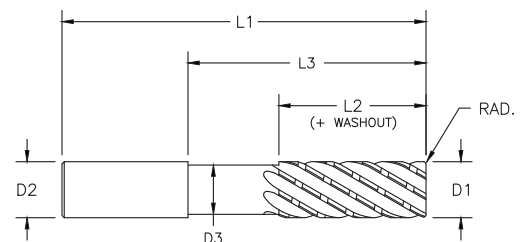
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RAMP



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X9C

G9C

MATERIAL HARDNESS (Rc)

G9

X9

35

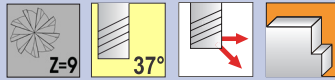
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← View the X9C

View the G9C →



12.700mm - 19.050mm
(.5000" - .7500")HIGH PERFORMANCE
END MILLS

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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

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G9C Recommandé pour les matériaux d'usage 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

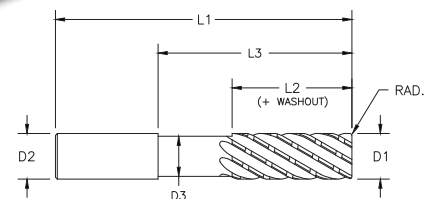
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超微硬质合金-刀具底刃过中心
B6柄部公差
专为高效铣削设计
不等分刃
刃口钝化处理
抛光螺旋槽
原材料及特定涂层

X9C 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
G9C 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）



X9C EDP#	G9C EDP#	d_1 † Diameter		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	d_3 Neck Diameter	l_3 Reach Length
		Decimal	Metric						
31168	31167	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.015"	-
31172	31169	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	-
31174	31171	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.015"	-
31176	31173	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"	-
31178	31175	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.060"	-
31182	31177	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.090"	-
31184	31179	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/2"	.020"	-
31186	31181	.6250	5/8"	15.875	5/8"	3-1/2"	1-5/8"	.020"	-
31188	31183	.6250	5/8"	15.875	5/8"	4"	1-7/8"	.030"	-
31190	31185	.6299		16.000	16	100	42	1.00	-
31192	31187	.6299		16.000	16	120	65	0.50	-
31194	31189	.6299		16.000	16	120	40	0.50	15.2
31196	31191	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.015"	-
31198	31193	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"	-
31200	31195	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"	-
31202	31197	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.120"	-
31204	31199	.7500	3/4"	19.050	3/4"	5"	2-1/4"	.030"	-

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G9

X9

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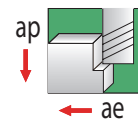
MATERIAL HARDNESS (RC)

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GARR TOOL X9, G9 High Performance Milling Guide

ISO Material		HRC	SFM (Vc)	CHIPLOAD PER TOOTH (Fz)			
				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	.0019" - .0036" .0014" - .0031"	.0021" - .0043" .0017" - .0038"	.0026" - .0052" .0020" - .0048"	.0038" - .0072" .0028" - .0062"
	NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nickel / 镍基合金						
	Invar, Kovar, Inconel-625/718, Waspaloy, Rene, Hastelloy, A286	< 40 > 40	120 - 240 100 - 195	.0019" - .0036" .0014" - .0031"	.0021" - .0043" .0017" - .0038"	.0026" - .0052" .0020" - .0048"	.0038" - .0072" .0028" - .0062"
	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	.0019" - .0036" .0014" - .0031"	.0021" - .0043" .0017" - .0038"	.0026" - .0052" .0020" - .0048"	.0038" - .0072" .0028" - .0062"
	MONEL						
	Monel - 65% Nickel		160 - 290	.0019" - .0036"	.0021" - .0043"	.0026" - .0052"	.0038" - .0072"
	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	.0021" - .0040"	.0026" - .0048"	.0028" - .0056"	.0042" - .0080"
5553 / Beta Titanium		195 - 365	.0021" - .0036"	.0026" - .0043"	.0028" - .0052"	.0042" - .0072"	
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	.0019" - .0036" .0014" - .0031"	.0022" - .0043" .0017" - .0039"	.0026" - .0052" .0020" - .0048"	.0038" - .0072" .0028" - .0062"
	200 Series, 300 Series	< 40 > 40	355 - 555 290 - 455	.0019" - .0041" .0014" - .0031"	.0022" - .0048" .0017" - .0039"	.0026" - .0058" .0020" - .0048"	.0038" - .0082" .0028" - .0062"
	304L, 316L, Nitronic 50	< 40 > 40	325 - 520 225 - 360	.0019" - .0036" .0014" - .0031"	.0022" - .0043" .0017" - .0039"	.0026" - .0052" .0020" - .0048"	.0038" - .0072" .0028" - .0062"
	400 Series	< 40 > 40	290 - 555 225 - 425	.0019" - .0038" .0014" - .0034"	.0022" - .0046" .0017" - .0041"	.0026" - .0056" .0020" - .0050"	.0038" - .0076" .0028" - .0068"
	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	290 - 520 195 - 425	.0024" - .0038" .0022" - .0031"	.0026" - .0046" .0024" - .0038"	.0032" - .0056" .0028" - .0048"	.0048" - .0076" .0044" - .0062"	
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						
	4140, 4340, 52100, 6150, 8620	< 40 > 40	455 - 650 325 - 490	.0024" - .0040" .0022" - .0033"	.0026" - .0048" .0024" - .0040"	.0032" - .0058" .0028" - .0048"	.0048" - .0080" .0044" - .0066"
	CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢						
1000's - 1018, 1020, 12L14	< 40	490 - 780	.0024" - .0043"	.0026" - .0050"	.0032" - .0060"	.0048" - .0086"	
K	CAST MATERIAL/ Gegossenes Material / Material bastidor vertidos / Matériaux fontes / Materiale fuso / 铸造件						
	Steel (Malleable)		455 - 685	.0029" - .0046"	.0031" - .0053"	.0036" - .0062"	.0058" - .0092"
	Ductile Iron		455 - 685	.0029" - .0046"	.0031" - .0053"	.0036" - .0062"	.0058" - .0092"
	Gray Iron		585 - 770	.0031" - .0048"	.0034" - .0055"	.0038" - .0064"	.0062" - .0096"

	Profile/Trochoidal Milling
Axial (ap)	MAX
Radial (ae)	Up to 10%



NOTE - DATA DOES NOT REFLECT CHIP THINNING.

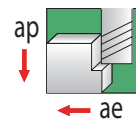
SPINDLE INTERFACE MUST BE SCRUTINIZED WHEN USING 5/8" DIAMETER AND LARGER END MILLS

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

GARR TOOL X9, G9 High Performance Milling Guide

ISO Material		HRC	M/Min. (Vc)	CHIPLOAD PER TOOTH (Fz)			
				12,0mm	16,0mm	20,0mm	25,0mm
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	0,048 - 0,091 0,036 - 0,079	0,053 - 0,109 0,043 - 0,097	0,066 - 0,132 0,051 - 0,122	0,097 - 0,183 0,071 - 0,157
	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	0,048 - 0,091 0,036 - 0,079	0,053 - 0,109 0,043 - 0,097	0,066 - 0,132 0,051 - 0,122	0,097 - 0,183 0,071 - 0,157
	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	0,048 - 0,091 0,036 - 0,079	0,053 - 0,109 0,043 - 0,097	0,066 - 0,132 0,051 - 0,122	0,097 - 0,183 0,071 - 0,157
	MONEL						
	Monel - 65% Nickel		50 - 90	0,048 - 0,091	0,053 - 0,109	0,066 - 0,132	0,097 - 0,183
M	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	0,053 - 0,102	0,066 - 0,122	0,071 - 0,142	0,107 - 0,203
	5553 / Beta Titanium		60 - 110	0,053 - 0,091	0,066 - 0,109	0,071 - 0,132	0,107 - 0,183
	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	0,048 - 0,091 0,036 - 0,079	0,056 - 0,109 0,043 - 0,099	0,066 - 0,132 0,051 - 0,122	0,097 - 0,183 0,071 - 0,157
	200 Series, 300 Series	< 40 > 40	110 - 170 90 - 140	0,048 - 0,104 0,036 - 0,079	0,056 - 0,122 0,043 - 0,099	0,066 - 0,147 0,051 - 0,122	0,097 - 0,208 0,071 - 0,157
	304L, 316L, Nitronic 50	< 40 > 40	100 - 160 70 - 110	0,048 - 0,091 0,036 - 0,079	0,056 - 0,109 0,043 - 0,099	0,066 - 0,132 0,051 - 0,122	0,097 - 0,183 0,071 - 0,157
	400 Series	< 40 > 40	90 - 170 70 - 130	0,048 - 0,097 0,036 - 0,086	0,056 - 0,117 0,043 - 0,104	0,066 - 0,142 0,051 - 0,127	0,097 - 0,193 0,071 - 0,173
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	0,061 - 0,097 0,056 - 0,079	0,066 - 0,117 0,061 - 0,097	0,081 - 0,142 0,071 - 0,122	0,122 - 0,193 0,112 - 0,157
	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	0,061 - 0,102 0,056 - 0,084	0,066 - 0,122 0,061 - 0,102	0,081 - 0,147 0,071 - 0,122	0,122 - 0,203 0,112 - 0,168
K	CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢						
	1000's - 1018, 1020, 12L14	< 40	150 - 240	0,061 - 0,109	0,066 - 0,127	0,081 - 0,152	0,122 - 0,218
	CAST MATERIAL/ Gegossenes Material / Material bastidor vertidos / Matériaux fontes / Materiale fuso / 铸造件						
	Steel (Malleable)		140 - 210	0,074 - 0,117	0,079 - 0,135	0,091 - 0,157	0,147 - 0,234
K	Ductile Iron		140 - 210	0,074 - 0,117	0,079 - 0,135	0,091 - 0,157	0,147 - 0,234
	Gray Iron		180 - 235	0,079 - 0,122	0,086 - 0,140	0,097 - 0,163	0,157 - 0,244

	Profile/Trochoidal Milling
Axial (ap)	MAX
Radial (ae)	Up to 10%



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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