

NEW SERIES

MATERIAL SPECIFIC COATINGS

GARR TOOL[®]
High Performance Solid Carbide



X3

G3



TM

SERIES HIGHLIGHT

S M P K

High Performance End Mills

X3 BALIQ® ALCRONOS Coating (AlCrN)

G3 BALIQ® TISINOS PRO Coating (AlTiSiN)

X3 Target Materials:

Stainless Steel (Inox, Austenitic/Martensitic)

Carbon Tools Steels (Up to 50 HRC)

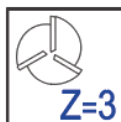
Cast Iron

G3 Target Materials:

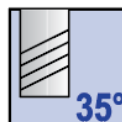
Heat Resistant Super Alloys

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

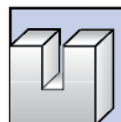
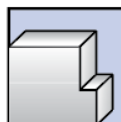
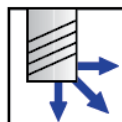
Conditioned Tool Steels (50-70 HRC)



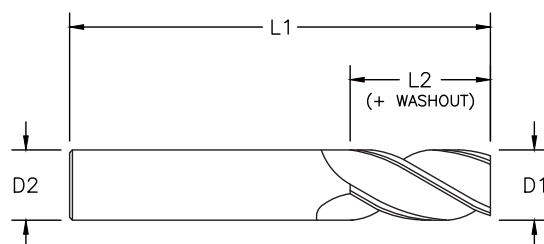
Z=3



35°



CALCULATE IDEAL PARAMETERS
FOR THE X3 AND G3 IN YOUR
APPLICATION WITH THE GARR
TECHNICAL ADVISOR



X3

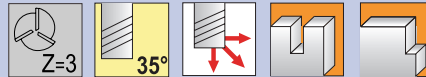
G3

View the G3 →

← View the X3

TOLERANCES

d_1	$+.000" \text{ } -.002" (+.000\text{mm } -.050\text{mm})$
d_2	$h6$
r	$+.001" \text{ } -.001" (+.025 \text{ } -.025\text{mm})$



Series X3, G3

0.792mm - 2.000mm
(.0312" - .0787")

HIGH PERFORMANCE
END MILLS

X3 BALIQ® ALCRONOS Coating (AlCrN-based) G3 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

X3 Recommended for Low, Medium, and High Carbon Tool Steels (up to 50 HRC), cast iron, and stainless steel (Inox)

G3 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

X3 Empfohlen für Werkzeugstähle mit niedrigem, mittlerem und hohem Kohlenstoffgehalt (bis zu 50 HRC), Gusseisen und Edelstahl (Inox)

G3 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

X3 Recomendado para aceros de bajo, medio y alto contenido de carbono (hasta 50 HRC), hierro fundido y acero inoxidable (Inox)

G3 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)

X3 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)

G3 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

X3 Consigliato per acciai a basso, medio e alto tenore di carbonio, acciai per utensili (fino a 50 HRC), ghisa e acciaio inossidabile (Inox)

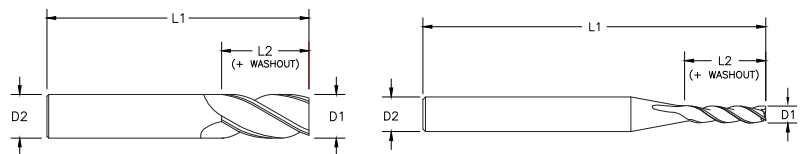
G3 Consigliato per materiali di lavorazione difficili come superleghe resistenti al calore, acciai inossidabili PH e acciai per utensili condizionati (50-70 HRC)



超微硬质合金-刀具底刃过中心
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

X3 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

G3 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）



X3 EDP#	G3 EDP#	d_1 †		d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
		Decimal	Diameter				
87100	88100	.0312	1/32"	0.792	1/4"	2"	1/16"
87101	88101	.0312	1/32"	0.792	1/4"	2"	3/32"
87102	88102	.0312	1/32"	0.792	1/4"	2"	1/8"
87103	88103	.0315		0.800	6	50	2.40
87104	88104	.0354		0.900	6	50	2.70
87105	88105	.0394		1.000	6	50	3
87106	88106	.0400	.040"	1.016	1/4"	2"	.120"
87107	88107	.0450	.045"	1.143	1/4"	2"	.135"
87108	88108	.0469	3/64"	1.191	1/4"	2"	5/32"
87109	88109	.0500	.050"	1.270	1/4"	2"	.150"
87110	88110	.0550	.055"	1.397	1/4"	2"	.250"
87111	88111	.0591		1.500	6	50	3
87112	88112	.0591		1.500	6	50	3
87113	88113	.0591		1.500	6	50	6
87114	88114	.0591		1.500	6	50	6
87115	88115	.0600	.060"	1.524	1/4"	2"	.090"
87116	88116	.0600	.060"	1.524	1/4"	2"	.180"
87117	88117	.0625	1/16"	1.587	1/4"	2"	1/8"
87118	88118	.0625	1/16"	1.587	1/4"	2"	1/8"
87119	88119	.0625	1/16"	1.587	1/4"	2"	1/8"
87120	88120	.0625	1/16"	1.587	1/4"	2"	1/4"
87121	88121	.0625	1/16"	1.587	1/4"	2"	1/4"
87122	88122	.0625	1/16"	1.587	1/4"	2"	1/4"
87123	88123	.0700	.070"	1.778	1/4"	2"	.210"
87124	88124	.0781	5/64"	1.983	1/4"	2"	1/4"
87125	88125	.0781	5/64"	1.983	1/4"	2"	1/4"
87126	88126	.0781	5/64"	1.983	1/4"	2"	1/4"
87127	88127	.0787		2.000	6	50	8
87128	88128	.0787		2.000	6	50	8
87129	88129	.0787		2.000	6	50	8

continued →

Series X3, G3 (continued)

2.032mm - 3.967mm
(.0800" - .1562")

HIGH PERFORMANCE
END MILLS

G3 70

X3

35

MATERIAL HARDNESS (Rc)

0

X3 EDP#	G3 EDP#	$d1$ †		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	r Corner Radius	
		Decimal	Metric					
87130	88130	.0800	.080"	2.032	1/4"	2"	1/4"	-
87131	88131	.0900	.090"	2.286	1/4"	2"	9/32"	-
87132	88132	.0938	3/32"	2.382	1/4"	2"	3/16"	-
87133	88133	.0938	3/32"	2.382	1/4"	2"	3/16"	.005"
87134	88134	.0938	3/32"	2.382	1/4"	2"	3/16"	.010"
87135	88135	.0938	3/32"	2.382	1/4"	2"	3/8"	-
87136	88136	.0938	3/32"	2.382	1/4"	2"	3/8"	.005"
87137	88137	.0938	3/32"	2.382	1/4"	2"	3/8"	.010"
87138	88138	.0984		2.500	6	50	8	-
87139	88139	.0984		2.500	6	50	8	0.10
87140	88140	.0984		2.500	6	50	8	0.20
87141	88141	.1000	.100"	2.540	1/4"	2"	3/16"	-
87142	88142	.1000	.100"	2.540	1/4"	2"	5/16"	-
87143	88143	.1094	7/64"	2.778	1/4"	2"	1/4"	-
87144	88144	.1094	7/64"	2.778	1/4"	2"	1/4"	.005"
87145	88145	.1094	7/64"	2.778	1/4"	2"	1/4"	.010"
87146	88146	.1094	7/64"	2.778	1/4"	2"	3/8"	-
87147	88147	.1094	7/64"	2.778	1/4"	2"	3/8"	.005"
87148	88148	.1094	7/64"	2.778	1/4"	2"	3/8"	.010"
87149	88149	.1181		3.000	6.0	50	6	-
87150	88150	.1181		3.000	6.0	50	6	0.10
87151	88151	.1181		3.000	6.0	50	6	0.20
87152	88152	.1181		3.000	6.0	50	6	0.30
87153	88153	.1181		3.000	6.0	50	6	0.50
87154	88154	.1181		3.000	6.0	50	9	-
87155	88155	.1181		3.000	6.0	50	9	0.20
87156	88156	.1181		3.000	6.0	50	9	0.30
87157	88157	.1181		3.000	6.0	50	9	0.50
87158	88158	.1181		3.000	6.0	65	12	-
87159	88159	.1181		3.000	6.0	65	12	0.10
87160	88160	.1181		3.000	6.0	65	12	0.20
87161	88161	.1181		3.000	6.0	65	12	0.30
87162	88162	.1181		3.000	6.0	65	12	0.50
87163	88163	.1250	1/8"	3.175	1/4"	2"	1/4"	-
87164	88164	.1250	1/8"	3.175	1/4"	2"	1/4"	.010"
87165	88165	.1250	1/8"	3.175	1/4"	2"	1/4"	.015"
87166	88166	.1250	1/8"	3.175	1/4"	2"	1/4"	.020"
87167	88167	.1250	1/8"	3.175	1/4"	2"	3/8"	-
87168	88168	.1250	1/8"	3.175	1/4"	2"	3/8"	.010"
87169	88169	.1250	1/8"	3.175	1/4"	2"	3/8"	.015"
87170	88170	.1250	1/8"	3.175	1/4"	2-1/2"	1/2"	-
87171	88171	.1250	1/8"	3.175	1/4"	2-1/2"	1/2"	.005"
87172	88172	.1250	1/8"	3.175	1/4"	2-1/2"	1/2"	.010"
87173	88173	.1250	1/8"	3.175	1/4"	2-1/2"	1/2"	.015"
87174	88174	.1250	1/8"	3.175	1/4"	2-1/2"	1/2"	.020"
87175	88175	.1562	5/32"	3.967	1/4"	2"	5/16"	-
87176	88176	.1562	5/32"	3.967	1/4"	2"	5/16"	.010"
87177	88177	.1562	5/32"	3.967	1/4"	2"	7/16"	-
87178	88178	.1562	5/32"	3.967	1/4"	2"	7/16"	.010"
87179	88179	.1562	5/32"	3.967	1/4"	2-1/2"	9/16"	-
87180	88180	.1562	5/32"	3.967	1/4"	2-1/2"	9/16"	.010"

X3 EDP#	G3 EDP#	$d1$ † Diameter		$d2$ Shank Diameter	$l1$ Overall Length	$l2$ Flute Length	r Corner Radius
		Decimal	Metric				
87181	88181	.1575	4.000	6	50	8	-
87182	88182	.1575	4.000	6	50	8	0.30
87183	88183	.1575	4.000	6	50	8	0.50
87184	88184	.1875	3/16"	1/4"	2"	5/16"	-
87185	88185	.1875	3/16"	1/4"	2"	5/16"	.010"
87186	88186	.1875	3/16"	1/4"	2"	5/16"	.015"
87187	88187	.1875	3/16"	1/4"	2"	7/16"	-
87188	88188	.1875	3/16"	1/4"	2"	7/16"	.010"
87189	88189	.1875	3/16"	1/4"	2"	7/16"	.015"
87190	88190	.1875	3/16"	1/4"	2-1/2"	9/16"	-
87191	88191	.1875	3/16"	1/4"	2-1/2"	9/16"	.010"
87192	88192	.1875	3/16"	1/4"	2-1/2"	9/16"	.015"
87193	88193	.1969	5.000	6	50	10	-
87194	88194	.1969	5.000	6	50	10	0.30
87195	88195	.1969	5.000	6	50	10	0.50
87196	88196	.1969	5.000	6	65	15	-
87197	88197	.1969	5.000	6	65	15	0.30
87198	88198	.1969	5.000	6	65	15	0.50
87199	88199	.2188	7/32"	1/4"	2"	3/8"	-
87200	88200	.2188	7/32"	1/4"	2"	3/8"	.015"
87201	88201	.2188	7/32"	1/4"	2-1/2"	3/4"	-
87202	88202	.2188	7/32"	1/4"	2-1/2"	3/4"	.015"
87203	88203	.2362	6.000	6	50	13	-
87204	88204	.2362	6.000	6	50	13	0.30
87205	88205	.2362	6.000	6	50	13	0.50
87206	88206	.2362	6.000	6	65	19	-
87207	88207	.2362	6.000	6	65	19	0.30
87208	88208	.2362	6.000	6	65	19	0.50
87209	88209	.2362	6.000	6	75	26	-
87210	88210	.2362	6.000	6	75	26	0.30
87211	88211	.2362	6.000	6	75	26	0.50
87212	88212	.2500	1/4"	1/4"	2-1/2"	1/2"	-
87213	88213	.2500	1/4"	1/4"	2-1/2"	1/2"	.010"
87214	88214	.2500	1/4"	1/4"	2-1/2"	1/2"	.015"
87215	88215	.2500	1/4"	1/4"	2-1/2"	1/2"	.020"
87216	88216	.2500	1/4"	1/4"	2-1/2"	1/2"	.030"
87217	88217	.2500	1/4"	1/4"	2-1/2"	5/8"	-
87218	88218	.2500	1/4"	1/4"	2-1/2"	5/8"	.010"
87219	88219	.2500	1/4"	1/4"	2-1/2"	5/8"	.015"
87220	88220	.2500	1/4"	1/4"	2-1/2"	5/8"	.020"
87221	88221	.2500	1/4"	1/4"	2-1/2"	5/8"	.030"
87222	88222	.2500	1/4"	1/4"	2-1/2"	3/4"	-
87223	88223	.2500	1/4"	1/4"	2-1/2"	3/4"	.010"
87224	88224	.2500	1/4"	1/4"	2-1/2"	3/4"	.015"
87225	88225	.2500	1/4"	1/4"	2-1/2"	3/4"	.020"
87226	88226	.2500	1/4"	1/4"	2-1/2"	3/4"	.030"
87227	88227	.2500	1/4"	1/4"	2-1/2"	3/4"	.060"
87228	88228	.2500	1/4"	1/4"	3"	1"	-
87229	88229	.2500	1/4"	1/4"	3"	1"	.015"
87230	88230	.2500	1/4"	1/4"	3"	1"	.030"

70

G3

X3

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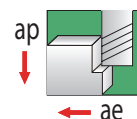
MATERIAL HARDNESS (Rc)

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GARR TOOL X3, G3 High Performance Milling Guide

ISO Material		HRC	SFM (Vc)	CHIPLOAD PER TOOTH (Fz)						
				1/32"	1/16"	3/32"	1/8"	5/32"	3/16"	1/4"
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	.0001" - .0003" .0001" - .0003"	.0002" - .0007" .0001" - .0005"	.0002" - .0008" .0001" - .0006"	.0004" - .0010" .0003" - .0009"	.0006" - .0011" .0004" - .0010"	.0007" - .0015" .0005" - .0013"	.0008" - .0020" .0006" - .0018"
	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	120 - 240 100 - 195	.0001" - .0003" .0001" - .0003"	.0002" - .0007" .0001" - .0005"	.0002" - .0008" .0001" - .0006"	.0004" - .0010" .0003" - .0009"	.0006" - .0011" .0004" - .0010"	.0007" - .0015" .0005" - .0013"	.0008" - .0020" .0006" - .0018"
	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	.0001" - .0003" .0001" - .0003"	.0002" - .0007" .0001" - .0005"	.0002" - .0008" .0001" - .0006"	.0004" - .0010" .0003" - .0009"	.0006" - .0011" .0004" - .0010"	.0007" - .0015" .0005" - .0013"	.0008" - .0020" .0006" - .0018"
	MONEL									
	Monel - 65% Nickel		160 - 290	.0001" - .0003"	.0002" - .0007"	.0002" - .0008"	.0005" - .0010"	.0006" - .0011"	.0007" - .0015"	.0008" - .0020"
	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	.0001" - .0003"	.0003" - .0007"	.0003" - .0008"	.0005" - .0010"	.0006" - .0011"	.0007" - .0015"	.0009" - .0019"
5553 / Beta Titanium		195 - 365	.0001" - .0003"	.0002" - .0007"	.0003" - .0007"	.0005" - .0010"	.0006" - .0011"	.0006" - .0014"	.0009" - .0017"	
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	.0001" - .0003" .0001" - .0003"	.0002" - .0007" .0001" - .0005"	.0003" - .0008" .0002" - .0006"	.0004" - .0010" .0003" - .0009"	.0006" - .0011" .0004" - .0010"	.0007" - .0015" .0005" - .0013"	.0007" - .0018" .0006" - .0015"
	200 Series, 300 Series	< 40 > 40	355 - 555 290 - 455	.0001" - .0003" .0001" - .0003"	.0002" - .0007" .0001" - .0005"	.0003" - .0008" .0002" - .0006"	.0004" - .0010" .0003" - .0009"	.0006" - .0011" .0004" - .0010"	.0007" - .0015" .0005" - .0014"	.0007" - .0018" .0006" - .0015"
	304L, 316L, Nitronic 50	< 40 > 40	325 - 520 225 - 360	.0001" - .0003" .0001" - .0003"	.0002" - .0007" .0001" - .0005"	.0003" - .0008" .0002" - .0006"	.0004" - .0010" .0003" - .0009"	.0006" - .0011" .0004" - .0010"	.0007" - .0015" .0005" - .0014"	.0007" - .0018" .0006" - .0014"
	400 Series	< 40 > 40	290 - 555 225 - 425	.0001" - .0003" .0001" - .0003"	.0002" - .0007" .0001" - .0005"	.0003" - .0008" .0002" - .0006"	.0004" - .0010" .0003" - .0009"	.0006" - .0011" .0004" - .0010"	.0007" - .0015" .0005" - .0014"	.0007" - .0018" .0006" - .0014"
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	290 - 520 195 - 425	.0001" - .0003" .0001" - .0003"	.0002" - .0007" .0001" - .0005"	.0003" - .0008" .0002" - .0006"	.0004" - .0010" .0003" - .0009"	.0006" - .0011" .0004" - .0010"	.0007" - .0014" .0005" - .0011"	.0008" - .0018" .0007" - .0014"
	MEDIUM ALLOY TOOL STEELS / Mittel Legierte Werkzeugstähle / Aceros herramienta medios de la aleación / Aciers à outils allés / Acciaio da utensili di media durezza / 中碳合金钢									
	4140, 4340, 52100, 6150, 8620	< 40 > 40	455 - 650 325 - 490	.0001" - .0003" .0001" - .0003"	.0002" - .0007" .0001" - .0005"	.0003" - .0008" .0002" - .0006"	.0004" - .0011" .0003" - .0010"	.0006" - .0011" .0004" - .0010"	.0007" - .0015" .0005" - .0014"	.0008" - .0019" .0007" - .0014"
	CARBON STEELS/ Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢									
	1000's - 1018, 1020, 12L14	< 40	490 - 780	.0001" - .0003"	.0002" - .0007"	.0003" - .0008"	.0004" - .0012"	.0006" - .0011"	.0005" - .0016"	.0001" - .0015"
K	CAST MATERIAL/ Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件									
	Steel (Malleable)		455 - 685	.0001" - .0003"	.0002" - .0007"	.0003" - .0008"	.0005" - .0010"	.0006" - .0011"	.0007" - .0018"	.0009" - .0023"
	Ductile Iron		455 - 685	.0001" - .0003"	.0002" - .0007"	.0003" - .0008"	.0005" - .0010"	.0006" - .0011"	.0007" - .0018"	.0009" - .0023"
	Gray Iron		585 - 770	.0001" - .0003"	.0002" - .0007"	.0003" - .0008"	.0005" - .0010"	.0006" - .0011"	.0007" - .0018"	.0010" - .0022"

	Profile/Trochoidal Milling	Slotting
Axial (ap)	MAX	0.5 to 1xD
Radial (ae)	Up to 15% Dia.	1xD



NOTE - DATA DOES NOT REFLECT CHIP THINNING.

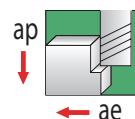
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GARR TOOL X3, G3 High Performance Milling Guide

TECHNICAL

ISO Material		HRC	M/Min. (Vc)	CHIPLOAD PER TOOTH (Fz)					
				1,0mm	2,0mm	3,0mm	4,0mm	5,0mm	6,0mm
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	0,003 - 0,008 0,003 - 0,008	0,005 - 0,020 0,003 - 0,015	0,010 - 0,025 0,008 - 0,023	0,015 - 0,028 0,010 - 0,025	0,018 - 0,038 0,013 - 0,033	0,020 - 0,051 0,015 - 0,046
	NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金								
	Invar, Kovar, Inconel-625/718, Waspaloy, Rene, Hastelloy, A286	< 40 > 40	37 - 75 30 - 60	0,003 - 0,008 0,003 - 0,008	0,005 - 0,020 0,003 - 0,015	0,010 - 0,025 0,008 - 0,023	0,015 - 0,028 0,010 - 0,025	0,018 - 0,038 0,013 - 0,033	0,020 - 0,051 0,015 - 0,046
	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	0,003 - 0,008 0,003 - 0,008	0,005 - 0,020 0,003 - 0,015	0,010 - 0,025 0,008 - 0,023	0,015 - 0,028 0,010 - 0,025	0,018 - 0,038 0,013 - 0,033	0,020 - 0,051 0,015 - 0,046
	MONEL								
	Monel - 65% Nickel		50 - 90	0,003 - 0,008	0,005 - 0,020	0,013 - 0,025	0,015 - 0,028	0,018 - 0,038	0,020 - 0,051
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	0,003 - 0,008	0,008 - 0,020	0,013 - 0,025	0,015 - 0,028	0,018 - 0,038	0,023 - 0,048
	5553 / Beta Titanium		60 - 110	0,003 - 0,008	0,008 - 0,018	0,013 - 0,025	0,015 - 0,028	0,015 - 0,036	0,023 - 0,043
	STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金								
M	13/8, 15/5, 17-4, pH Types	< 40 > 40	90 - 150 70 - 110	0,003 - 0,008 0,003 - 0,008	0,008 - 0,020 0,005 - 0,015	0,010 - 0,025 0,008 - 0,023	0,015 - 0,028 0,010 - 0,025	0,018 - 0,038 0,013 - 0,033	0,018 - 0,046 0,015 - 0,038
	200 Series, 300 Series	< 40 > 40	110 - 170 90 - 140	0,003 - 0,008 0,003 - 0,008	0,008 - 0,020 0,005 - 0,015	0,010 - 0,025 0,008 - 0,023	0,015 - 0,028 0,010 - 0,025	0,018 - 0,038 0,013 - 0,036	0,018 - 0,046 0,015 - 0,038
	304L, 316L, Nitronic 50	< 40 > 40	100 - 160 70 - 110	0,003 - 0,008 0,003 - 0,008	0,008 - 0,020 0,005 - 0,015	0,010 - 0,025 0,008 - 0,023	0,015 - 0,028 0,010 - 0,025	0,018 - 0,038 0,013 - 0,036	0,018 - 0,046 0,015 - 0,036
	400 Series	< 40 > 40	90 - 170 70 - 130	0,003 - 0,008 0,003 - 0,008	0,008 - 0,020 0,005 - 0,015	0,010 - 0,025 0,008 - 0,023	0,015 - 0,028 0,010 - 0,025	0,018 - 0,038 0,013 - 0,036	0,018 - 0,046 0,015 - 0,036
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	0,003 - 0,008 0,003 - 0,008	0,008 - 0,020 0,005 - 0,015	0,010 - 0,025 0,008 - 0,023	0,015 - 0,028 0,010 - 0,025	0,018 - 0,036 0,013 - 0,028	0,020 - 0,046 0,018 - 0,036
	MEDIUM ALLOY TOOL STEELS / Mittel Legierte Werkzeugstähle / Aceros herramienta medios de la aleación / Aciers à outils alliés / Acciaio da utensili di media durezza / 中合金钢								
	4140, 4340, 52100, 6150, 8620	< 40 > 40	140 - 200 100 - 150	0,003 - 0,008 0,003 - 0,008	0,008 - 0,020 0,005 - 0,015	0,010 - 0,028 0,008 - 0,025	0,015 - 0,028 0,010 - 0,025	0,018 - 0,038 0,013 - 0,036	0,020 - 0,048 0,018 - 0,036
K	CARBON STEELS/ Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢								
	1000's - 1018, 1020, 12L14	< 40	150 - 240	0,003 - 0,008	0,008 - 0,020	0,010 - 0,030	0,015 - 0,028	0,013 - 0,041	0,025 - 0,038
	CAST MATERIAL/ Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件								
K	Steel (Malleable)		140 - 210	0,003 - 0,008	0,008 - 0,020	0,013 - 0,025	0,015 - 0,028	0,018 - 0,046	0,023 - 0,058
	Ductile Iron		140 - 210	0,003 - 0,008	0,008 - 0,020	0,013 - 0,025	0,015 - 0,028	0,018 - 0,046	0,023 - 0,058
	Gray Iron		180 - 235	0,003 - 0,008	0,008 - 0,020	0,013 - 0,025	0,015 - 0,028	0,018 - 0,046	0,025 - 0,056

	Profile/Trochoidal Milling	Slotting
Axial (ap)	MAX	0.5 to 1xD
Radial (ae)	Up to 15% Dia.	1xD



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