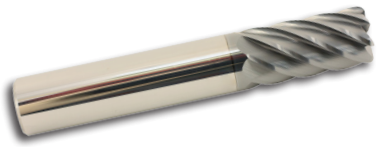
75th ANNIVERSARY CATALOG

COMPLETE PRODUCT LINE

CARR TOOL®

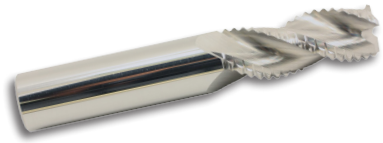
ISO 9001:2015 Certified

TMR



Page 148

ARC



Page 114

1160/1180

Page 17

VRX-6

Page 166

V5-C

Page 164

H-45

Page 181

HUNDREDS OF NEW ITEMS!

V4-B

Page 157

Celebrating seventy-five years in the cutting tool industry, Garr Tool Company maintains its commitment to manufacturing the highest quality carbide cutting tools, offering competitive prices and providing unequaled customer service.

Located in Alma, Michigan USA, our current 208,000 square foot facility contains clean, efficient production space. Our state-of-the-art CNC grinding equipment is run by experienced, conscientious operators. Oerlikon Balzers Coating USA manages our in-house coating facility. Garr Tool Company will continue to invest in new technology to meet the future needs of our customers.

With a continued focus on maintaining our fast, reliable service, we operate an inventory and shipping center in England to better service our customers in the UK and throughout Europe. Being your trusted source for carbide tooling is paramount at Garr Tool Company. Standard catalog items are shipped from stock within 24 hours at a 99% fill rate. GARR TOOL continues to introduce new series of standard tools to meet the demands of material specific machining. We also take pride in shipping custom tools within two weeks. We encourage you to visit our website, www.garrtool.com.

All of us at Garr Tool Company, as well as our trusted network of distributors, look forward to helping you with your solid carbide round tooling needs.

GARR TOOL®

Welcome to
Garr Tool Company

TABLE OF CONTENTS

TOOL RECOMMENDATIONS

	PAGE
Aluminum	8
Titanium	9
Stainless Steel	10
Inconel, High Nickel Alloys	11
Brass, Bronze, Copper, Magnesium	12
Hardened Tool Steels	13
Composite Materials	14
Carbon Steels, Medium Alloy Steels	15
Cast Iron	16

DRILLS - HIGH PERFORMANCE

	1550H	2 Flute	3xD	AlTiN-Based Coated	23
	1580HD	2 Flute	3xD	AlTiN-Based Coated	29
	1580H	2 Flute	3xD	AlTiN-Based Coated	33
	1580KD	2 Flute	3xD	Coolant Fed, AlTiN-Based Coated	38
	1580KH	2 Flute	3xD	Coolant Fed, AlTiN-Based Coated	45
	1250H	2 Flute	5xD	AlTiN-Based Coated	23
	1280H	2 Flute	5xD	AlTiN-Based Coated	33
	1280KD	2 Flute	5xD	Coolant Fed, AlTiN-Based Coated	38
	1280KH	2 Flute	5xD	Coolant Fed, AlTiN-Based Coated	45
	1880KH	2 Flute	7xD	Coolant Fed, AlTiN-Based Coated	45
	1850H	2 Flute	12xD	AlTiN-Based Coated	23
NEW SERIES	1160	3 Flute	5xD	ALUMASTAR Coated	17
NEW SIZES	1180	3 Flute	5xD	ALUMASTAR Coated	17

DRILLS - GENERAL PURPOSE

	1600	2 Flute	25° Helix	N/C Spotting, Bright Finish	52
	1400	2 Flute	10° Helix	Combined Drill/Countersink, Bright Finish	53
	1500	2 Flute 3xD	Straight	Hard Metal, Bright Finish	54
	1500H	2 Flute 3xD	Straight	Hard Metal, Hardlube Coated	56
	1510	2 Flute 3xD		Slow Spiral, Bright Finish	58
	1510H	2 Flute 3xD		Slow Spiral, Hardlube Coated	61
	1520	2 Flute 3xD		Bright Finish	64
	1520H	2 Flute 3xD		Hardlube Coated	67
	1205	2 Flute 5xD		Bright Finish	72
	1205H	2 Flute 5xD		Hardlube Coated	75
	1200	2 Flute 5xD		Bright Finish	78
	1200H	2 Flute 5xD		Hardlube Coated	81
	1800H	2 Flute 8xD		Parabolic, Hardlube Coated	87
	1100	3 Flute 5xD		Bright Finish	83
	1100H	3 Flute 5xD		Hardlube Coated	85
	1120H	3 Flute 3xD		Hardlube Coated	70

REAMERS

4100	Standard	Bright Finish	90
4100	Standard Metric	Bright Finish	102

DRILL MILLS

152M	2 Flute	Bright Finish - Angle to a Point	104
152MA	2 Flute	TiALN Coated - Angle to a Point	105
152DA	2 Flute	TiALN Coated - 120° Drill Point	108
154M	4 Flute	Bright Finish - Angle to a Point	106
154MA	4 Flute	TiALN Coated - Angle to a Point	107

ROUGHERS

				PAGE
ARC	3 Flute	Chamfer	Staggered, Bright Finish	114
VHM	4 Flute	Chamfer	Staggered, AlTiN Coated	116

END MILLS - HIGH PERFORMANCE

	142M	2 Flute	Square	ALUMASTAR Coated	118
	142R	2 Flute	Radius	ALUMASTAR Coated	119
NEW SIZES	142B	2 Flute	Ball	ALUMASTAR Coated	121
	242M/842M	2 Flute	Square	Bright Finish	127
	350MX/950MX	2 Flute	Ball	AlTiN Coated	182
NEW SIZES	143M	3 Flute	Square	ALUMASTAR Coated	122
NEW SIZES	143R	3 Flute	Radius	ALUMASTAR Coated	124
	253MA/853MA	3 Flute	Square	AlTiN Coated	128
	253M/853M	3 Flute	Square	Bright Finish	130
	253MC	3 Flute	Square	TiCN Coated	132
	263M	3 Flute	Square	Bright Finish	133
	263MC	3 Flute	Square	TiCN Coated	134
	263MA/863MA	3 Flute	Square	AlTiN Coated	135
NEW SIZES	V4-S	4 Flute	Square	AlCrN Coated	153
NEW SIZES	V4-R	4 Flute	Radius	AlCrN Coated	154
NEW SIZES	V4-B	4 Flute	Ball	AlCrN Coated	157
NEW SIZES	VRX	4 Flute	S, R, B	AlTiN Coated	168
	210D	4 Flute	Square	DIAMOND Coated	183
	210RD	4 Flute	Radius	DIAMOND Coated	184
	310D	4 Flute	Ball	DIAMOND Coated	185
	610D	4 Flute	Square	DIAMOND Coated	186
	710D	4 Flute	Ball	DIAMOND Coated	187
	H-45	4 Flute	Radius	AlTiN Coated	181
	545MA	4/5 Flute	Square	AlTiN Coated	178
	545RA	4/5 Flute	Radius	AlTiN Coated	179
	545BA	4/5 Flute	Ball	AlTiN Coated	180
	255MA/855MA	5 Flute	Square	AlTiN Coated	136
	255M/855M	5 Flute	Square	Bright Finish	138
	255MC	5 Flute	Square	TiCN Coated	140
	255RA/855RA	5 Flute	Radius	AlTiN Coated	141
NEW SIZES	V5	5 Flute	S, R	AlCrN Coated	158
NEW SIZES	V5 Chip Splitter	5 Flute	S, R	AlCrN Coated	164
NEW SIZES	VRX-6	6 Flute	S, R	AlTiN Coated	166
	246M/846M	6 Flute	Square	Bright Finish	143
	246MC	6 Flute	Square	TiCN Coated	144
	246MA/846MA	6 Flute	Square	AlTiN Coated	145
	TMS	Multi-Flute	Square	AlCrN Coated	146
	TMR	Multi-Flute	Radius	AlCrN Coated	148

END MILLS - STUB LENGTH - GENERAL PURPOSE

160M/860M	2 Flute	Square	Bright Finish	189
160MA/860MA	2 Flute	Square	TiALN Coated	191
180M/980M	2 Flute	Ball	Bright Finish	192
180MA/980MA	2 Flute	Ball	TiALN Coated	193
170M/870M	4 Flute	Square	Bright Finish	189
170MA/870MA	4 Flute	Square	TiALN Coated	191
190M/990M	4 Flute	Ball	Bright Finish	192
190MA/990MA	4 Flute	Ball	TiALN Coated	193
175M/875M	4 Flute	Square	Double End, Bright Finish	194
175MA/875MA	4 Flute	Square	Double End, TiALN Coated	195
195M/995M	4 Flute	Ball	Double End, Bright Finish	196
195MA/995MA	4 Flute	Ball	Double End, TiALN Coated	197

END MILLS - STANDARD LENGTH - GENERAL PURPOSE

					PAGE
	220M/820M	2 Flute	Square	Bright Finish	198
	220MT	2 Flute	Square	TiN Coated	200
	220MC	2 Flute	Square	TiCN Coated	201
	220MA/820MA	2 Flute	Square	TiALN Coated	202
	220R	2 Flute	Radius	Bright Finish	204
	220RA	2 Flute	Radius	TiALN Coated	206
	320M/920M	2 Flute	Ball	Bright Finish	209
	320MT	2 Flute	Ball	TiN Coated	211
	320MC	2 Flute	Ball	TiCN Coated	212
	320MA/920MA	2 Flute	Ball	TiALN Coated	213
	222M	2 Flute	Square	Straight Flute, Bright Finish	216
	280M	2 Flute	Square	N/C Tolerance, Bright Finish	220
	380M	2 Flute	Ball	N/C Tolerance, Bright Finish	221
	425M	2 Flute	Square	Double End, 3/8" Shank, Bright Finish	222
	425MA	2 Flute	Square	Double End, 3/8" Shank, TiALN Coated	223
	223M/823M	3 Flute	Square	Bright Finish	198
	223MC	3 Flute	Square	TiCN Coated	201
	223MA/823MA	3 Flute	Square	TiALN Coated	202
	323M/923M	3 Flute	Ball	Bright Finish	209
	323MC	3 Flute	Ball	TiCN Coated	212
	323MA/923MA	3 Flute	Ball	TiALN Coated	213
	273M	3 Flute	Square	Tapered, Bright Finish	218
	373M	3 Flute	Ball	Tapered, Bright Finish	219
	230M/830M	4 Flute	Square	Bright Finish	198
	230MT	4 Flute	Square	TiN Coated	200
	230MC	4 Flute	Square	TiCN Coated	201
	230MA/830MA	4 Flute	Square	TiALN Coated	202
	230R	4 Flute	Radius	Bright Finish	204
	230RA/830RA	4 Flute	Radius	TiALN Coated	206
	330M/930M	4 Flute	Ball	Bright Finish	209
	330MT	4 Flute	Ball	TiN Coated	211
	330MC	4 Flute	Ball	TiCN Coated	212
	330MA/930MA	4 Flute	Ball	TiALN Coated	213
	234M	4 Flute	Square	Straight Flute, Bright Finish	216
NEW SIZES	334MA	4 Flute	Ball	Straight Flute, TiALN Coated	217
	290M	4 Flute	Square	N/C Tolerance, Bright Finish	220
	390M	4 Flute	Ball	N/C Tolerance, Bright Finish	221
	435M	4 Flute	Square	Double End, 3/8" Shank, Bright Finish	222
	435MA	4 Flute	Square	Double End, 3/8" Shank, TiALN Coated	223
	535M	4 Flute	Ball	Double End, 3/8" Shank, Bright Finish	224
	535MA	4 Flute	Ball	Double End, 3/8" Shank, TiALN Coated	225
	430M	4 Flute	Square	Double End, Bright Finish	226
	430MA/450MA	4 Flute	Square	Double End, TiALN Coated	227
	530M	4 Flute	Ball	Double End, Bright Finish	228
	530MA	4 Flute	Ball	Double End, TiALN Coated	229

ROTARY FILES

			PAGE
1/4" Diameter	Standard Shape	Steel Shank	246
3/16" Diameter		Solid Carbide	258
1/4" Diameter		1/8" Diameter Steel Shank	259
1/8" Diameter		Solid Carbide	260

END MILLS - EXTRA LENGTH - GENERAL PURPOSE

				PAGE
620M/640M	2 Flute	Square	Bright Finish	230
620MC	2 Flute	Square	TiCN Coated	232
620MA/640MA	2 Flute	Square	TiALN Coated	233
720M/740M	2 Flute	Ball	Bright Finish	241
720MC	2 Flute	Ball	TiCN Coated	243
720MA/740MA	2 Flute	Ball	TiALN Coated	244
623M/643M	3 Flute	Square	Bright Finish	230
623MC	3 Flute	Square	TiCN Coated	232
623MA/643MA	3 Flute	Square	TiALN Coated	233
723M/743M	3 Flute	Ball	Bright Finish	241
723MC	3 Flute	Ball	TiCN Coated	243
723MA/743MA	3 Flute	Ball	TiALN Coated	244
630M/650M	4 Flute	Square	Bright Finish	230
630MC	4 Flute	Square	TiCN Coated	232
630MA/650MA	4 Flute	Square	TiALN Coated	233
630R	4 Flute	Radius	Bright Finish	235
630RA	4 Flute	Radius	TiALN Coated	238
730M/750M	4 Flute	Ball	Bright Finish	241
730MC	4 Flute	Ball	TiCN Coated	243
730MA/750MA	4 Flute	Ball	TiALN Coated	244

TECHNICAL DATA

	PAGE
Tool Coatings	266
General Milling Guide - *fractional*	268
High Performance Milling Guide - *fractional*	269
General Milling Guide - *metric*	270
High Performance Milling Guide - *metric*	271
Alumastar Coated Milling Guide	272
VRX Milling Guide	273
VRX-6 Milling Guide	274
ARC Milling Guide	276
VHM Milling Guide	277
TMS/TMR Milling Guide - *fractional*	278
TMS/TMR Milling Guide - *metric*	279
TMS/TMR Chip Thinning Calculations - *fractional*	280
TMS/TMR Chip Thinning Calculations - *metric*	281
V4 High Speed Milling Guide - *fractional*	282
V4 High Speed Milling Guide - *metric*	283
V5 High Speed Milling Guide - *fractional*	284
V5 High Speed Milling Guide - *metric*	285
High Rc Finisher Milling Guide - *fractional*	286
High Rc Finisher Milling Guide - *metric*	287
Die Mold Cutter Milling Guide - *fractional*	288
Die Mold Cutter Milling Guide - *metric*	289
High Feed Milling Guide	290
Diamond Coated Milling Guide	291
Reaming Guide - *fractional*	292
Reaming Guide - *metric*	293
Drill Mills, Chamfering - *fractional*	294
Drill Mills, Chamfering - *metric*	295
Drill Mills, Through Hole - *fractional*	296
Drill Mills, Through Hole - *metric*	297
Drill Mills, Solids - *fractional*	298
Drill Mills, Solids - *metric*	299
General Drilling Guide - *fractional*	300
General Drilling Guide - *metric*	302
High Performance Mini Drills Guide - *fractional*	304
High Performance Mini Drills Guide - *metric*	305
High Performance Drilling Guide - *fractional*	306
High Performance Drilling Guide - *metric*	307
3-Flute for Aluminum Drilling Guide	308
Length Deviation Chart for Spotting Drills	309

Series / Page Number Search

Series	Page	Series	Page	Series	Page	Series	Page
142B	121	263M	133	640M	230	980M	192
142M	118	263MA	135	640MA	233	980MA	193
142R	119	263MC	134	643M	230	990M	192
143M	122	273M	218	643MA	233	990MA	193
143R	124	280M	220	650M	230	995M	196
152DA	108	290M	220	650MA	233	995MA	197
152M	104	310D	185	710D	187	1100	83
152MA	105	320M	209	720M	241	1100H	85
154M	106	320MA	213	720MA	244	1120H	70
154MA	107	320MC	212	720MC	243	1160	17
160M	189	320MT	211	723M	241	1180	17
160MA	191	323M	209	723MA	244	1200	78
170M	189	323MA	213	723MC	243	1200H	81
170MA	191	323MC	212	730M	241	1205	72
175M	194	330M	209	730MA	244	1205H	75
175MA	195	330MA	213	730MC	243	1250H	23
180M	192	330MC	212	740M	241	1280H	33
180MA	193	330MT	211	740MA	244	1280KD	38
190M	192	334MA	217	743M	241	1280KH	45
190MA	193	350MX	182	743MA	244	1400	53
195M	196	373M	219	750M	241	1500	54
195MA	197	380M	221	750MA	244	1500H	56
210D	183	390M	221	820M	198	1510	58
210RD	184	425M	222	820MA	202	1510H	61
220M	198	425MA	223	823M	198	1520	64
220MA	202	430M	226	823MA	202	1520H	67
220MC	201	430MA	227	830M	198	1550H	23
220MT	200	435M	222	830MA	202	1580H	33
220R	204	435MA	223	830RA	206	1580HD	29
220RA	206	450MA	227	842M	127	1580KD	38
222M	216	530M	228	846M	143	1580KH	45
223M	198	530MA	229	846MA	145	1600	52
223MA	202	535M	224	853M	130	1800H	87
223MC	201	535MA	225	853MA	128	1850H	23
230M	198	545BA	180	855M	138	1880KH	45
230MA	202	545MA	178	855MA	136	4100	90
230MC	201	545RA	179	855RA	141	ARC	114
230MT	200	610D	186	860M	189	BURRS	246
230R	204	620M	230	860MA	191	H-45	181
230RA	206	620MA	233	863MA	135	TMR	148
234M	216	620MC	232	870M	189	TMS	146
242M	127	623M	230	870MA	191	V4B	157
246M	143	623MA	233	875M	194	V4R	154
246MA	145	623MC	232	875MA	195	V4S	153
246MC	144	630M	230	920M	209	V5	158
253M	130	630MA	233	920MA	213	VHM	116
253MA	128	630MC	232	923M	209	VRX	168
253MC	132	630R	235	923MA	213	VRX-6	166
255M	138	630RA	238	930M	209		
255MA	136			930MA	213		
255MC	140			950MX	182		
255RA	141						

EDP / Page Number Search

EDP	Page	EDP	Page	EDP	Page	EDP	Page
00***	23	23**0	133	44**0	241	70***	256
01**0	189	23**4	134	44**4	243	70***	17
01**7	191	23**7	135	44**7	244	71***	257
02**0	189	24**7	206	45**0	198	72***	258
02**7	191	24**8	184	45**7	202	73***	259
03**0	192	25***	38	46***	114	74***	260
03**7	193	25**0	220	46**0	198	77**0, 77**5	64
04**0	192	25**1, 25**6	45	46**7	202	77**1, 77**6	67
04**7	193	25**5	38	46**8	183	78**1, 78**6	70
06**0	194	26**0	42	47**0	209	79**0	204
06**7	195	26**0	220	47**7	213	79**7	206
08**0	127	26**1, 26**6	45	48**0	209	80**0	204
08**0	196	27***	168	48**7	213	80**7	206
08**7	197	27**0	221	48**8	185	80**8	184
09**0	127	27**5	38	48**0, 48**5	181	81**0	216
10**0	130	28***	169	49***	116	82**0	216
10**7	128	28***	172	49**0	218	83***	141
10**8	183	28**0	221	50***	153	84***	217
11**0	198	28**5	38	50***	154	84**0, 84**7	142
11**3	200	29***	41	50***	157	85**0	127
11**4	201	30**0	226	50***	158	85**7	142
11**7	202	30**7	227	50***	164	86**0	130
12**0	198	32**0	228	50**0	219	86**4	132
12**4	201	32**7	229	51***	158	86**7	128
12**7	202	33**0	222	51**0	143	89**0, 89**5	72
13**0	198	33**7	223	51**4	144	89**1, 89**6	75
13**3	200	34**0	222	51**7	145	90**0, 90**5	83
13**4	201	34**7	223	52**0	138	90**1, 90**6	85
13**7	202	36**0	224	52**4	140	91***	52
13**8	183	36**7	225	52**7	136	92**0	230
14**0	182	37**0	198	54**0	230	92**7	233
15**0	182	37**7	202	54**4	232	93**0	230
15**8	185	38**0	209	54**7	233	93**7	233
16**0	209	38**7	213	55**0	241	94**0	230
16**3	211	38**8	186	55**4	243	94**7	233
16**4	212	39***	122	55**7	244	94**8	186
16**7	213	39***	124	56**0, 56**5	78	95***	90
17**0	209	39**0	54	56**1, 56**6	81	96***	97
17**4	212	39**1	56	57***	106	97**0	241
17**7	213	39**2	119	57***	118	97**7	244
18**0	209	40***	126	57**0	104	98***	146
18**3	211	40**0	138	57**7	105	98***	148
18**4	212	40**2	120	58***	106	98**0	241
18**7	213	40**7	136	58***	107	98**7	244
18**8	185	40**8	187	58**0	53	99**0	241
19**0, 19**5	58	41**0	230	59**0, 59**5	54	99**7	244
19**1, 19**6	61	41**2	118	59**1, 59**6	56	99**8	187
20***	29	41**3	122	60***	166		
20**0	235	41**4	232	60***	246		
20**1, 20**6	33	41**7	233	61***	168		
20**7	238	42***	123	61***	247		
21***	31	42**0	230	62***	169		
21**0	237	42**2	118	62***	248		
21**0	178	42**2	121	62**5, 62**7	171		
21**2	179	42**3	122	63***	173		
21**4	180	42**4	232	63***	249		
21**1, 21**6	33	42**7	233	64***	250		
21**7	239	43**0	241	65***	251		
22**0, 22**5	45	43**2	121	66***	252		
22**1, 22**6	87	43**4	243	67***	253		
		43**7	244	68***	254		
				69***	255		

Recommended tools for: **ALUMINUM**

Aluminium / Aluminio / Aluminium / Alluminio / 铝

DRILLS

SERIES		PAGE	COATING	DESCRIPTION
1180, 1160		17	ALUMASTAR	3 flute, High performance
1520, 1205		64, 72	BRIGHT	2 flute, General purpose
1520H, 1205H		67, 75	HARDLUBE	2 flute, General purpose
1800H		87	HARDLUBE	2 flute, Parabolic

END MILLS

SERIES		PAGE	COATING	DESCRIPTION
143M, 143R		122, 124	ALUMASTAR	High velocity, 3 flute, High metal removal rate
142B		121	ALUMASTAR	High velocity, 2 flute, High metal removal rate
142M, 142R		118, 119	ALUMASTAR	High velocity, 2 flute, High metal removal rate
242M, 842M		127	BRIGHT	High performance, 2 flute, For 3000-8000 RPM
ARC		114	BRIGHT	High performance, 3 flute, Staggered helix rougher
253M, 853M		130	BRIGHT	High performance, 3 flute, Profiling and finishing
253MC		132	TiCN	High performance, 3 flute, Profiling and finishing
220M, 820M		198	BRIGHT	2 flute, General purpose, Square end
220MC		201	TiCN	2 flute, General purpose, Square end
320M, 920M		209	BRIGHT	2 flute, General purpose, Ball end
320MC		212	TiCN	2 flute, General purpose, Ball end

Titanlegierungen / Aleaciones de Titanio / Alliage de Titane / Leghe di Titanio / 钛合金

DRILLS

SERIES		PAGE	COATING	DESCRIPTION
1510H		61	HARDLUBE	2 flute, General purpose, Slow spiral
1550H, 1250H, 1850H		23	AlTiN-Based	2 flute, High performance, Small diameter, 1/8" or 3mm shank
1580HD		29	AlTiN-Based	2 flute, High performance, Common shank
1580H, 1280H		33	AlTiN-Based	2 flute, High performance
1580KD, 1280KD		38	AlTiN-Based	2 flute, High performance, Coolant fed, Common shank
1580KH, 1280KH, 1880KH		45	AlTiN-Based	2 flute, High performance, Coolant fed
1520H, 1205H		67, 75	HARDLUBE	2 flute, General purpose
1180, 1160		17	ALUMASTAR	3 flute, High performance

END MILLS

SERIES		PAGE	COATING	DESCRIPTION
V4		153	AlCrN	High performance, 4 flute, Variable helix
V5		158	AlCrN	High performance, 5 flute, Variable helix
VRX		168	AlTiN	High performance, 4 flute, Staggered flute
VRX-6		166	AlTiN	High performance, 6 flute, Staggered flute
TMS, TMR		146, 148	AlCrN	High performance, Multiple flute finisher
VHM		116	AlTiN	High performance, 4 flute, Staggered flute rougher
253MA, 853MA		128	AlTiN	High performance, 3 flute, Profiling and finishing
255MA, 855MA		136	AlTiN	High performance, 5 flute
255RA, 855RA		141	AlTiN	High performance, 5 flute, Corner radius
242M, 842M		127	BRIGHT	High performance, 2 flute, For 3000-8000 RPM
246MA, 846MA		145	AlTiN	High performance, 6 flute, Finisher
223MA, 823MA		202	TiAlN	3 flute, General purpose, Square end
230MA, 830MA		202	TiAlN	4 flute, General purpose, Square end
230RA, 830RA		206	TiAlN	4 flute, General purpose, Corner radius
323MA, 923MA		213	TiAlN	3 flute, General purpose, Ball end
330MA, 930MA		213	TiAlN	4 flute, General purpose, Ball end

Recommended tools for: **STAINLESS STEEL**

Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金

DRILLS

SERIES		PAGE	COATING	DESCRIPTION
1510H		61	HARDLUBE	2 flute, General purpose, Slow spiral
1550H, 1250H, 1850H		23	AlTiN-Based	2 flute, High performance, Small diameter, 1/8" or 3mm shank
1580HD		29	AlTiN-Based	2 flute, High performance, Common shank
1580H, 1280H		33	AlTiN-Based	2 flute, High performance
1580KD, 1280KD		38	AlTiN-Based	2 flute, High performance, Coolant fed, Common shank
1580KH, 1280KH, 1880KH		45	AlTiN-Based	2 flute, High performance, Coolant fed
1520H, 1205H		67, 75	HARDLUBE	2 flute, General purpose
1180, 1160		17	ALUMASTAR	3 flute, High performance

END MILLS

SERIES		PAGE	COATING	DESCRIPTION
V4		153	AlCrN	High performance, 4 flute, Variable helix
V5		158	AlCrN	High performance, 5 flute, Variable helix
VRX		168	AlTiN	High performance, 4 flute, Staggered flute
VRX-6		166	AlTiN	High performance, 6 flute, Staggered flute
253MA, 853MA		128	AlTiN	High performance, 3 flute, Profiling and finishing
255MA, 855MA		136	AlTiN	High performance, 5 flute, Square end
255RA, 855RA		141	AlTiN	High performance, 5 flute, Corner radius
VHM		116	AlTiN	High performance, 4 flute, Staggered flute rougher
ARC		114	BRIGHT	High performance, 3 flute, Staggered helix rougher
TMS, TMR		146, 148	AlCrN	High performance, Multiple flute finisher
253MC		132	TiCN	High performance, 3 flute, Profiling and finishing
246MA, 846MA		145	AlTiN	High performance, 6 flute, Finisher, Square end
223MA, 823MA		202	TiAlN	3 flute, General purpose, Square end
230MA, 830MA		202	TiAlN	4 flute, General purpose, Square end
230RA, 830RA		206	TiAlN	4 flute, General purpose, Corner radius
323MA, 923MA		213	TiAlN	3 flute, General purpose, Ball end
330MA, 930MA		213	TiAlN	4 flute, General purpose, Ball end

DRILLS

SERIES		PAGE	COATING	DESCRIPTION
1510H		61	HARDLUBE	2 flute, General purpose, Slow spiral
1550H, 1250H, 1850H		23	AlTiN-Based	2 flute, High performance, Small diameter, 1/8" or 3mm shank
1580HD		29	AlTiN-Based	2 flute, High performance, Common shank
1580H, 1280H		33	AlTiN-Based	2 flute, High performance
1580KD, 1280KD		38	AlTiN-Based	2 flute, High performance, Coolant fed, Common shank
1580KH, 1280KH, 1880KH		45	AlTiN-Based	2 flute, High performance, Coolant fed
1520H, 1205H		67, 75	HARDLUBE	2 flute, General purpose
1120H, 1100H		70, 85	HARDLUBE	3 flute, General purpose

END MILLS

SERIES		PAGE	COATING	DESCRIPTION
V5		158	AlCrN	High performance, 5 flute, Variable helix
V4		153	AlCrN	High performance, 4 flute, Variable helix
VRX-6		166	AlTiN	High performance, 6 flute, Staggered flute
VRX		168	AlTiN	High performance, 4 flute, Staggered flute
VHM		116	AlTiN	High performance, 4 flute, Staggered flute rougher
255MA, 855MA		136	AlTiN	High performance, 5 flute, Square end
255RA, 855RA		141	AlTiN	High performance, 5 flute, Corner radius
246MA, 846MA		145	AlTiN	High performance, 6 flute, Finisher, Square end
TMS, TMR		146, 148	AlCrN	High performance, Multiple flute finisher
230MA, 830MA		202	TiAlN	4 flute, General purpose, Square end
230RA, 830RA		206	TiAlN	4 flute, General purpose, Corner radius
330MA, 930MA		213	TiAlN	4 flute, General purpose, Ball end

Recommended tools for: **BRASS, BRONZE, COPPER, MAGNESIUM**

Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜
Kupfer / Cobre / Cuivre / Rame / 铜 ， Magnesium / Magnesio / Magnésium / Magnesio / 镁

DRILLS

SERIES		PAGE	COATING	DESCRIPTION
1180, 1160		17	ALUMASTAR	3 flute, High performance
1510H		61	HARDLUBE	2 flute, General purpose, Slow spiral
1520, 1205		64, 72	BRIGHT	2 flute, General purpose
1520H, 1205H		67, 75	HARDLUBE	2 flute, General purpose
1500H		56	HARDLUBE	2 flute, Straight flute
1800H		87	HARDLUBE	2 flute, Parabolic

END MILLS

SERIES		PAGE	COATING	DESCRIPTION
143M, 143R		122, 124	ALUMASTAR	High velocity, 3 flute, High metal removal rate
142B		121	ALUMASTAR	High velocity, 2 flute, High metal removal rate
142M, 142R		118, 119	ALUMASTAR	High velocity, 2 flute, High metal removal rate
ARC		114	BRIGHT	High performance, 3 flute, Staggered helix rougher
242M, 842M		127	BRIGHT	High performance, 2 flute, For 3000-8000 RPM
253M, 853M		130	BRIGHT	High performance, 3 flute, Profiling and finishing
253MC		132	TiCN	High performance, 3 flute, Profiling and finishing
220M, 820M		198	BRIGHT	2 flute, General purpose, Square end
220MC		201	TiCN	2 flute, General purpose, Square end
320M, 920M		209	BRIGHT	2 flute, General purpose, Ball end
320MC		212	TiCN	2 flute, General purpose, Ball end

Recommended tools for:

HARDENED TOOL STEELS

(generally over 45 Rc)

Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢

DRILLS

SERIES		PAGE	COATING	DESCRIPTION
1500H		56	HARDLUBE	2 flute, Straight flute
1510H		61	HARDLUBE	2 flute, General purpose, Slow spiral
1550H, 1250H, 1850H		23	AlTiN-Based	2 flute, High performance, Small diameter, 1/8" or 3mm shank
1580HD		29	AlTiN-Based	2 flute, High performance, Common shank
1580H, 1280H		33	AlTiN-Based	2 flute, High performance
1580KD, 1280KD		38	AlTiN-Based	2 flute, High performance, Coolant fed, Common shank
1580KH, 1280KH, 1880KH		45	AlTiN-Based	2 flute, High performance, Coolant fed
1520H, 1205H		67, 75	HARDLUBE	2 flute, General purpose

END MILLS

SERIES		PAGE	COATING	DESCRIPTION
H-45		181	AlTiN	High performance, High feed, Ball end
350MX, 950MX		182	AlTiN	High performance, High Rc finisher, Die mold
545MA		178	AlTiN	High performance, High Rc finisher, Square end
545RA		179	AlTiN	High performance, High Rc finisher, Corner radius
545BA		180	AlTiN	High performance, High Rc finisher, Ball end
VRX		168	AlTiN	High performance, 4 flute, Staggered flute
VRX-6		166	AlTiN	High performance, 6 flute, Staggered flute
230MA, 830MA		202	TiAlN	4 flute, General purpose, Square end
230RA, 830RA		206	TiAlN	4 flute, General purpose, Corner radius
330MA, 930MA		213	TiAlN	4 flute, General purpose, Ball end

Recommended tools for:

COMPOSITE MATERIALS
(Graphite, Plastics, Carbon Fiber)

Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料

DRILLS

SERIES		PAGE	COATING	DESCRIPTION
1180, 1160		17	ALUMASTAR	3 flute, High performance
154MA		107	TiAlN	4 flute, Center cutting angle
1510H		61	HARDLUBE	2 flute, General purpose, Slow spiral
1520H, 1205H		67, 75	HARDLUBE	2 flute, General purpose
1800H		87	HARDLUBE	2 flute, Parabolic
1500H		56	HARDLUBE	2 flute, Straight flute

END MILLS

SERIES		PAGE	COATING	DESCRIPTION
210D		183	DIAMOND	4 flute, Square end
310D		185	DIAMOND	4 flute, Ball end
210RD		184	DIAMOND	4 flute, Corner radius
143M, 143R		122, 124	ALUMASTAR	High velocity, 3 flute, High metal removal rate
142M, 142R		118, 119	ALUMASTAR	High velocity, 2 flute, High metal removal rate
142B		121	ALUMASTAR	High velocity, 2 flute, High metal removal rate
253M, 853M		130	BRIGHT	High performance, 3 flute, Profiling and finishing
253MC		132	TiCN	High performance, 3 flute, Profiling and finishing
255MC		140	TiCN	High performance, 5 flute, Profiling and finishing
220MC		201	TiCN	2 flute, General purpose, Square end
320MC		212	TiCN	2 flute, General purpose, Ball end
154M, 154MA		106, 107	BRIGHT/TiAlN	4 flute, Drill/Mill, Center cutting to a point
152M, 152MA		104, 105	BRIGHT/TiAlN	2 flute, Drill/Mill, Center cutting to a point

Recommended tools for: **CARBON STEELS, MEDIUM ALLOY STEELS**

(generally under 45 Rc)

Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢

Mittel Legierte Werkzeugstähle / Aceros herramienta medios de la aleación / Aciers à outils alliages / Acciaio da utensili di media durezza / 中碳合金钢

DRILLS

SERIES		PAGE	COATING	DESCRIPTION
1580HD		29	AlTiN-Based	2 flute, High performance, Common shank
1550H, 1250H, 1850H		23	AlTiN-Based	2 flute, High performance, Small diameter, 1/8" or 3mm shank
1580H, 1280H		33	AlTiN-Based	2 flute, High performance
1580KD, 1280KD		38	AlTiN-Based	2 flute, High performance, Coolant fed, Common shank
1580KH, 1280KH, 1880KH		45	AlTiN-Based	2 flute, High performance, Coolant fed
1510H		61	HARDLUBE	2 flute, General purpose, Slow spiral
1520H, 1205H		67, 75	HARDLUBE	2 flute, General purpose
1180, 1160		17	ALUMASTAR	3 flute, High performance

END MILLS

SERIES		PAGE	COATING	DESCRIPTION
V4		153	AlCrN	High performance, 4 flute, Variable helix
V5		158	AlCrN	High performance, 5 flute, Variable helix
VRX		168	AlTiN	High performance, 4 flute, Staggered flute
VRX-6		166	AlTiN	High performance, 6 flute, Staggered flute
VHM		116	AlTiN	High performance, 4 flute, Staggered flute rougher
255MA, 855MA		136	AlTiN	High performance, 5 flute
255RA, 855RA		141	AlTiN	High performance, 5 flute, Corner radius
253MA, 853MA		128	AlTiN	High performance, 3 flute, Profiling and finishing
230MA, 830MA		202	TiAlN	4 flute, General purpose, Square end
230RA, 830RA		206	TiAlN	4 flute, General purpose, Corner radius
330MA, 930MA		213	TiAlN	4 flute, General purpose, Ball end

Recommended tools for: **CAST IRON**

Gusseisen / Reparto de Hierro / Cast Fer / Ghisa / 铸铁

DRILLS

SERIES		PAGE	COATING	DESCRIPTION
1120H, 1100H		70, 85	HARDLUBE	3 flute, General purpose
1520H, 1205H		67, 75	HARDLUBE	2 flute, General purpose
1510H		61	HARDLUBE	2 flute, General purpose, Slow spiral
1580H, 1280H		33	AlTiN-Based	2 flute, High performance
1550H, 1250H, 1850H		23	AlTiN-Based	2 flute, High performance, Small diameter, 1/8" or 3mm shank
1580HD		29	AlTiN-Based	2 flute, High performance, Common shank
1580KH, 1280KH, 1880KH		45	AlTiN-Based	2 flute, High performance, Coolant fed
1580KD, 1280KD		38	AlTiN-Based	2 flute, High performance, Coolant fed, Common shank

END MILLS

SERIES		PAGE	COATING	DESCRIPTION
VRX		168	AlTiN	High performance, 4 flute, Staggered flute
VRX-6		166	AlTiN	High performance, 6 flute, Staggered flute
V4		153	AlCrN	High performance, 4 flute, Variable helix
V5		158	AlCrN	High performance, 5 flute, Variable helix
255MA, 855MA		136	AlTiN	High performance, 5 flute, Square end
255RA, 855RA		141	AlTiN	High performance, 5 flute, Corner radius
143M, 143R		122, 124	ALUMASTAR	High velocity, 3 flute, High metal removal rate
253MA, 853MA		128	AlTiN	High performance, 3 flute, Profiling and finishing
230MC		201	TiCN	4 flute, General purpose, Square end
230MA, 830MA		202	TiAlN	4 flute, General purpose, Square end
230RA, 830RA		206	TiAlN	4 flute, General purpose, Corner radius

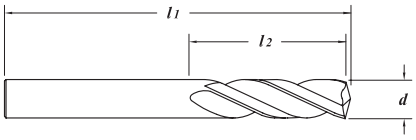
TOLERANCES	
d	+0,0000 –0,0127mm (+.0000" –.0005")
l_1	+3,175 –3,175mm (+.125" –.125")
l_2	+3,175 –3,175mm (+.125" –.125")

Z=3 | 30° | 140° | 3xD | 5xD | TECH PAGES 308

Series 1160, 1180

3,967mm - 4,914mm
(.1562" - .1935")

ALUMASTAR Coated
ALUMASTAR-Beschichtet
Recubrimiento de ALUMASTAR
Revêtement ALUMASTAR
Rivestimento in ALUMASTAR
ALUMASTAR 涂层



High performance solid submicron grain carbide drill
Designed for drilling aluminum and other soft materials <40Rc
No spot drilling required
Unique point geometry and coating for higher speeds and feeds
Up to 5x longer tool life than Zrn coated drills
High performance drill point
Live tooling recommended on lathe processes
Shank tolerance: h6

Hochleistungs- Vollhartmetallbohrer aus Feinkornhartmetall
Entwickelt für das Bohren von Aluminium und anderen weichen Werkstoffen <40HRc
Anzentrieren nicht empfohlen
Einzigartige Spitzengeometrie und Beschichtung für höhere Schnittgeschwindigkeiten und Vorschübe
Bis zu 5x höhere Standzeit als Zrn Beschichtete Bohrer
Hochleistungsspitzengeometrie
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6

Broca de submicrograno sólido carburo de alto rendimiento
Diseñada para taladrado de aluminio y otros materiales blandos <40HRc
No require pretaladrado
Geometría de punto único y recibrimiento para altas velocidades y alimentaciones
Durabilidad de la herramienta hasta 5 veces mayor que en brocas con recubrimiento Zrn
Ángulo de punta de la broca de alto rendimiento
Recomendación para la aplicación en torno
Tolerancia del vástago: h6

Forets carbure submicrograin a haute performances
Developpes pour le percage des aluminium et autres matieres tendres <40HRc
Pas de point de centre recommande
Geometrie et revetement unique pour de plus grandes vitesses et avances
Duree de vie 5 fois plus longue que les forest revetus Zrn
Foret a haute performance
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6

Punta in metallo duro ad alte prestazioni
Progettata per foratura di alluminio e altri materiali non ferrosi <40Hrc
Non richiede centrino
Geometria e rivestimento per alta velocità
Vita utensile fino a 5 volte superiore al rivestimento Zrn
Punta ad alte prestazioni
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6

高效整体硬质合金钻头
适合钻削铝合金和其它软性材质 <40HRc
不需要定位钻
独一无二的刀尖几何形状和涂层适合更高转速和更大进给量
刀具使用寿命比氮化锆 (ZrN) 涂层钻头长达5倍
140° 高效钻尖
不建议在车床，或工具必须纺纱
柄部公差: h6

	3xD (1160) EDP#	5xD (1180) EDP#	d † Diameter Decimal	Diameter	Metric	l_1 Overall Length	l_2 Flute Length
NEW	70631		.1562	5/32"	3.967	2-1/16"	9/16"
NEW		70161	.1562	5/32"	3.967	2-1/2"	1"
NEW	70633		.1570	#22	3.988	2-1/8"	5/8"
NEW		70163	.1570	#22	3.988	2-1/2"	1"
NEW	70635		.1575		4.000	54	16
		70166	.1575		4.000	65	24
NEW	70637		.1590	#21	4.039	2-1/8"	5/8"
NEW		70177	.1590	#21	4.039	2-1/2"	1"
NEW	70639		.1610	#20	4.089	2-1/8"	5/8"
NEW		70179	.1610	#20	4.089	2-1/2"	1"
NEW	70641		.1660	#19	4.216	2-1/8"	5/8"
NEW		70181	.1660	#19	4.216	2-3/4"	1-1/8"
NEW	70643		.1695	#18	4.305	2-1/8"	5/8"
NEW		70183	.1695	#18	4.305	2-3/4"	1-1/8"
NEW	70645		.1719	11/64"	4.366	2-1/8"	5/8"
NEW		70185	.1719	11/64"	4.366	2-3/4"	1-1/8"
NEW	70647		.1730	#17	4.394	2-3/16"	11/16"
NEW		70187	.1730	#17	4.394	2-3/4"	1-1/8"
NEW	70649		.1770	#16	4.496	2-3/16"	11/16"
NEW		70189	.1770	#16	4.496	2-3/4"	1-1/8"
NEW	70651		.1772		4.500	55	18
NEW		70191	.1772		4.500	65	25
NEW	70653		.1800	#15	4.572	2-3/16"	11/16"
NEW		70196	.1800	#15	4.572	2-3/4"	1-1/4"
NEW	70655		.1820	#14	4.623	2-3/16"	11/16"
NEW		70201	.1820	#14	4.623	2-3/4"	1-1/4"
NEW	70657		.1850	#13	4.700	2-3/16"	11/16"
NEW		70206	.1850	#13	4.700	2-3/4"	1-1/4"
NEW	70659		.1875	3/16"	4.763	2-3/16"	11/16"
		70211	.1875	3/16"	4.763	2-3/4"	1-1/4"
NEW	70661		.1890	#12	4.801	2-1/4"	3/4"
		70216	.1890	#12	4.801	2-3/4"	1-1/4"
NEW	70663		.1910	#11	4.851	2-1/4"	3/4"
		70221	.1910	#11	4.851	2-3/4"	1-1/4"
NEW	70665		.1935	#10	4.914	2-1/4"	3/4"
		70226	.1935	#10	4.914	2-3/4"	1-1/4"

continued →

Series 1160, 1180 *(continued)*

4,978mm - 6,756mm
(.1960" - .2660")

	3xD (1160) EDP#	5xD (1180) EDP#	Decimal	*d* † Diameter	Metric	*l1* Overall Length	*l2* Flute Length
NEW	70667		.1960	#9	4.978	2-1/4"	3/4"
NEW		70229	.1960	#9	4.978	3"	1-5/16"
NEW	70669		.1969		5.000	57	19
		70231	.1969		5.000	75	32
NEW	70671		.1990	#8	5.055	2-1/4"	3/4"
		70236	.1990	#8	5.055	3"	1-5/16"
NEW	70673		.2010	#7	5.105	2-1/4"	3/4"
		70241	.2010	#7	5.105	3"	1-5/16"
NEW	70675		.2031	13/64"	5.159	2-1/4"	3/4"
		70246	.2031	13/64"	5.159	3"	1-5/16"
NEW	70677		.2040	#6	5.182	2-3/8"	7/8"
		70251	.2040	#6	5.182	3"	1-3/8"
NEW	70679		.2055	#5	5.220	2-3/8"	7/8"
		70256	.2055	#5	5.220	3"	1-3/8"
NEW	70681		.2090	#4	5.309	2-3/8"	7/8"
		70261	.2090	#4	5.309	3"	1-3/8"
NEW	70683		.2130	#3	5.410	2-3/8"	7/8"
		70266	.2130	#3	5.410	3"	1-3/8"
NEW	70685		.2165		5.500	60	22
		70271	.2165		5.500	75	35
NEW	70687		.2188	7/32"	5.558	2-3/8"	7/8"
		70276	.2188	7/32"	5.558	3"	1-3/8"
NEW	70689		.2210	#2	5.613	2-7/16"	15/16"
		70281	.2210	#2	5.613	3"	1-3/8"
NEW	70691		.2280	#1	5.791	2-7/16"	15/16"
		70286	.2280	#1	5.791	3"	1-3/8"
NEW	70693		.2340	A	5.944	2-7/16"	15/16"
NEW		70294	.2340	A	5.944	3-1/4"	1-1/2"
NEW	70695		.2344	15/64"	5.954	2-7/16"	15/16"
		70296	.2344	15/64"	5.954	3-1/4"	1-1/2"
NEW	70697		.2362		6.000	64	26
		70301	.2362		6.000	82	38
NEW	70699		.2380	B	6.045	2-1/2"	1"
		70306	.2380	B	6.045	3-1/4"	1-5/8"
NEW	70701		.2420	C	6.147	2-1/2"	1"
		70311	.2420	C	6.147	3-1/4"	1-5/8"
NEW	70703		.2460	D	6.248	2-1/2"	1"
		70316	.2460	D	6.248	3-1/4"	1-5/8"
NEW	70705		.2500	1/4" / E	6.350	2-1/2"	1"
		70321	.2500	1/4" / E	6.350	3-1/4"	1-5/8"
NEW	70707		.2510		6.375	2-1/2"	1"
NEW		70911	.2510		6.375	3-1/4"	1-5/8"
NEW	70709		.2559		6.500	66	28
		70326	.2559		6.500	82	41
NEW	70711		.2570	F	6.528	2-5/8"	1-1/8"
		70331	.2570	F	6.528	3-1/4"	1-11/16"
NEW	70713		.2610	G	6.629	2-5/8"	1-1/8"
		70336	.2610	G	6.629	3-1/2"	1-11/16"
NEW	70715		.2656	17/64"	6.746	2-5/8"	1-1/8"
		70341	.2656	17/64"	6.746	3-1/2"	1-11/16"
NEW	70717		.2660	H	6.756	2-11/16"	1-3/16"
		70346	.2660	H	6.756	3-1/2"	1-11/16"

† *Metric equivalents are for reference only*

	3xD (1160) EDP#	5xD (1180) EDP#	Decimal	*d* † Diameter	Metric	*l1* Overall Length	*l2* Flute Length
NEW	70719		.2720	I	6.909	2-11/16"	1-3/16"
		70351	.2720	I	6.909	3-1/2"	1-11/16"
NEW	70721		.2756		7.000	68	30
		70356	.2756		7.000	88	43
NEW	70723		.2770	J	7.036	2-11/16"	1-3/16"
		70361	.2770	J	7.036	3-1/2"	1-11/16"
NEW	70725		.2812	9/32"	7.142	2-11/16"	1-3/16"
		70371	.2812	9/32"	7.142	3-1/2"	1-3/4"
NEW	70727		.2900	L	7.366	2-3/4"	1-1/4"
		70376	.2900	L	7.366	3-1/2"	1-3/4"
NEW	70728		.2950	M	7.493	2-3/4"	1-1/4"
NEW		70378	.2950	M	7.493	3-3/4"	1-7/8"
NEW	70729		.2953		7.500	70	32
		70381	.2953		7.500	95	44
NEW	70731		.2969	19/64"	7.541	2-3/4"	1-1/4"
		70386	.2969	19/64"	7.541	3-3/4"	1-7/8"
NEW	70733		.3020	N	7.671	2-15/16"	1-7/16"
		70391	.3020	N	7.671	3-3/4"	1-7/8"
NEW	70735		.3125	5/16"	7.938	2-15/16"	1-7/16"
		70396	.3125	5/16"	7.938	3-3/4"	1-7/8"
NEW	70737		.3150		8.000	76	36
		70401	.3150		8.000	95	48
NEW	70739		.3160	O	8.026	2-15/16"	1-7/16"
		70406	.3160	O	8.026	3-3/4"	1-7/8"
NEW	70741		.3230	P	8.204	2-15/16"	1-7/16"
		70411	.3230	P	8.204	3-3/4"	2-3/32"
NEW	70743		.3281	21/64"	8.334	2-15/16"	1-7/16"
		70416	.3281	21/64"	8.334	4"	2-3/32"
NEW	70745		.3320	Q	8.433	3"	1-7/16"
		70421	.3320	Q	8.433	4"	2-3/32"
NEW	70747		.3346		8.500	76	36
		70426	.3346		8.500	100	53
NEW	70749		.3390	R	8.611	3"	1-7/16"
		70431	.3390	R	8.611	4"	2-3/32"
NEW	70751		.3438	11/32"	8.733	3"	1-7/16"
		70436	.3438	11/32"	8.733	4"	2-3/16"
NEW	70753		.3480	S	8.839	3-1/16"	1-1/2"
		70441	.3480	S	8.839	4"	2-3/16"
NEW	70755		.3543		9.000	78	38
		70446	.3543		9.000	100	55
NEW	70757		.3580	T	9.093	3-1/16"	1-1/2"
		70451	.3580	T	9.093	4-1/4"	2-9/32"
NEW	70759		.3594	23/64"	9.129	3-1/16"	1-1/2"
		70456	.3594	23/64"	9.129	4-1/4"	2-9/32"
NEW	70761		.3680	U	9.347	3-1/8"	1-9/16"
		70461	.3680	U	9.347	4-1/4"	2-9/32"
NEW	70763		.3740		9.500	79	39
		70466	.3740		9.500	108	58
NEW	70765		.3750	3/8"	9.525	3-1/8"	1-9/16"
		70471	.3750	3/8"	9.525	4-1/4"	2-3/8"
NEW	70767		.3760		9.550	3-1/8"	1-9/16"
NEW		70913	.3760		9.550	4-1/4"	2-3/8"
NEW	70769		.3770	V	9.576	3-1/4"	1-5/8"
		70476	.3770	V	9.576	4-1/4"	2-3/8"

continued →

Series 1160, 1180 *(continued)*

9,804mm - 15,000mm
(.3860" - .5906")

	3xD (1160) EDP#	5xD (1180) EDP#	Decimal	*d* † Diameter	Metric	*l1* Overall Length	*l2* Flute Length
NEW	70771		.3860	W	9.804	3-1/4"	1-5/8"
		70481	.3860	W	9.804	4-1/2"	2-3/8"
NEW	70773		.3906	25/64"	9.921	3-1/4"	1-5/8"
		70486	.3906	25/64"	9.921	4-1/2"	2-3/8"
NEW	70775		.3937		10.000	85	43
		70491	.3937		10.000	114	60
NEW	70777		.3970	X	10.084	3-5/16"	1-11/16"
		70496	.3970	X	10.084	4-1/2"	2-1/2"
NEW	70779		.4040	Y	10.262	3-5/16"	1-11/16"
		70501	.4040	Y	10.262	4-1/2"	2-9/16"
NEW	70781		.4062	13/32"	10.317	3-5/16"	1-11/16"
		70506	.4062	13/32"	10.317	4-1/2"	2-9/16"
NEW	70783		.4134		10.500	85	43
		70511	.4134		10.500	114	67
NEW	70785		.4219	27/64"	10.716	3-3/8"	1-11/16"
		70516	.4219	27/64"	10.716	4-1/2"	2-11/16"
NEW	70787		.4331		11.000	87	45
		70521	.4331		11.000	114	68
NEW	70789		.4375	7/16"	11.113	3-7/16"	1-3/4"
		70526	.4375	7/16"	11.113	4-3/4"	2-13/16"
NEW	70791		.4528		11.500	90	47
		70531	.4528		11.500	120	70
NEW	70793		.4531	29/64"	11.509	3-9/16"	1-13/16"
		70536	.4531	29/64"	11.509	4-3/4"	2-7/8"
NEW	70795		.4688	15/32"	11.909	3-11/16"	2-1/16"
		70541	.4688	15/32"	11.909	4-3/4"	2-7/8"
NEW	70797		.4724		12.000	93	53
		70546	.4724		12.000	120	73
NEW	70799		.4844	31/64"	12.304	3-11/16"	2-1/16"
		70551	.4844	31/64"	12.304	5-5/16"	3"
NEW	70801		.4921		12.500	95	53
		70556	.4921		12.500	135	75
NEW	70803		.5000	1/2"	12.700	3-3/4"	2-1/16"
		70561	.5000	1/2"	12.700	5-3/8"	3-1/16"
NEW	70805		.5010		12.725	3-3/4"	2-1/16"
NEW		70915	.5010		12.725	5-3/8"	3-1/16"
NEW	70807		.5118		13.000	107	55
		70566	.5118		13.000	136	78
NEW	70809		.5156	33/64"	13.096	4-1/4"	2-3/16"
		70571	.5156	33/64"	13.096	5-3/8"	3-1/8"
NEW	70811		.5312	17/32"	13.492	4-1/4"	2-1/4"
		70576	.5312	17/32"	13.492	5-11/16"	3-5/16"
NEW	70813		.5469	35/64"	13.891	4-1/4"	2-1/4"
		70581	.5469	35/64"	13.891	5-13/16"	3-3/8"
NEW	70815		.5512		14.000	107	59
		70586	.5512		14.000	148	86
NEW	70817		.5625	9/16"	14.287	4-1/2"	2-3/8"
		70591	.5625	9/16"	14.287	5-15/16"	3-1/2"
NEW	70819		.5781	37/64"	14.684	4-1/2"	2-1/2"
		70596	.5781	37/64"	14.684	6"	3-1/2"
NEW	70821		.5906		15.000	115	64
		70601	.5906		15.000	152	90

† *Metric equivalents are for reference only*

	3xD (1160) EDP#	5xD (1180) EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
NEW	70823		.5938	19/32"	15.082	4-1/2"	2-1/2"
		70606	.5938	19/32"	15.082	6"	3-9/16"
NEW	70825		.6094	39/64"	15.478	4-1/2"	2-9/16"
		70611	.6094	39/64"	15.478	6-3/16"	3-11/16"
NEW	70827		.6250	5/8"	15.875	4-1/2"	2-5/8"
		70616	.6250	5/8"	15.875	6-5/16"	3-3/4"
NEW	70829		.6299		16.000	115	66
		70621	.6299		16.000	160	95

Blank Prep

GARR TOOL is now on social media!

Follow us on your favorite platform(s) for product updates, company announcements, tips, and more! Or if you just want to say hello, we always love hearing from our customers. See you around!

garrtool.com/instagram

garrtool.com/twitter

garrtool.com/facebook

garrtool.com/youtube

garrtool.com/linkedin

garrtool.com/vimeo

Add your voice to our community!

We accept user videos of GARR TOOL products in action. Send us an email with your machine info, speeds and feeds, and a link to your high-quality video to **social@garrtool.com** . We'll add them to our online video resource and occasionally highlight some of our user videos across our social media accounts.

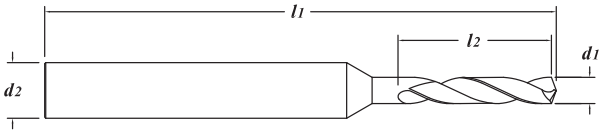
† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,010mm (+.0000" –.0004")
d_2	h6

Series 1550H,1250H,1850H

0,792mm - 0,900mm
(.0312" - .0354")

AlTiN-based Coating
AlTiN-basierte-Beschichtet
Recubrimiento a base de AlTiN
Revêtement à base de AlTiN
Rivestimento in a base AlTiN
AlTiN基涂层



High performance solid submicron grain carbide drill on 3mm or 1/8" diameter shank
30° helix for better chip evacuation
Recommended to run in high nickel, high temperature alloys, cobalt-based alloys, stainless steels and tool steels >40Rc
Live tooling recommended on lathe processes

HochleistungsBohrer aus Feinkornhartmetall mit SchaftDurchmesser 3 mm oder 1/8 Zoll
30° Spirale für bessere Spanabfuhr
Empfohlen für Hoch Nickelhaltige und Hochwarmfeste Stähle, Kobaltbasislegierungen, Rostfreier- und Werkzeugstahl >40HRc
Empfehlung fuer den Einsatz auf der Drehmaschine

De alto rendimiento Broca de metal duro con un diámetro de mango 3mm ó 1/ 8"
Hélice de 30° para una mejor evacuación de viruta
Recomendado para aleaciones con alto contenido de níquel, aleaciones de alta temperatura, aleaciones con base de cobalto, aceros inoxidables, y aceros de herramienta >40HRc
Recomendación para la aplicación en torno

Haute prestation solide submicron foret carbure avec un de queue diameter de 3 mm ou 1/8"
Helice a 30° pour une meilleure evacuation de copeaux
Recommander pour base nickel, alliages a hautes temperatures, alliages de cobalt, aciers inoxydables et aciers a outils >40HRc
Outil de filature nécessaires pour une utilisation sur un processus de tournage

Sub-micro grana Punte in Metallo duro con gambo diametro 3 mm o 1/8"
Elica a 30° per una migliore evacuazione del truciolo
Raccomandata per lavorazioni su nickel, superleghe, leghe ad alta percentuale di cobalto, inox e acciai per utensili >40Hrc
Utensili rotanti sono consigliate se usato su un tornio

带加强的超细高效硬质合金钻头, 柄径3mm或1/8"
30° 螺旋角更便于排屑
高镍耐高温合金、钴基合金、不锈钢和工具钢 >40HRc
不建议在车床，或工具必须纺纱

3xD (1550H) EDP#	5xD (1250H) EDP#	12xD (1850H) EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
00100			.0312	1/32"	0.792	1/8"	2"	5/32"
	00304		.0312	1/32"	0.792	1/8"	2"	15/64"
		00510	.0312	1/32"	0.792	1/8"	2"	7/16"
00102			.0315		0.800	3.0	50	4.0
	00306		.0315		0.800	3.0	50	6.0
		00512	.0315		0.800	3.0	50	12.0
00104			.0319		0.810	3.0	50	4.0
	00308		.0319		0.810	3.0	50	6.0
00106			.0320	#67	0.812	1/8"	2"	11/64"
	00310		.0320	#67	0.812	1/8"	2"	15/64"
		00516	.0320	#67	0.812	1/8"	2"	7/16"
		00518	.0323		0.820	3.0	50	12.0
00112			.0330	#66	0.838	1/8"	2"	11/64"
	00316		.0330	#66	0.838	1/8"	2"	15/64"
		00522	.0330	#66	0.838	1/8"	2"	7/16"
	00318		.0331		0.840	3.0	50	6.0
		00524	.0331		0.840	3.0	50	12.0
00116			.0335		0.850	3.0	50	4.5
		00526	.0335		0.850	3.0	50	12.0
	00322		.0339		0.860	3.0	50	6.5
		00528	.0339		0.860	3.0	50	13.0
00120			.0343		0.870	3.0	50	4.5
		00530	.0343		0.870	3.0	50	13.0
00122			.0346		0.880	3.0	50	4.5
00124			.0350	#65	0.890	3.0	50	4.5
	00328		.0350	#65	0.890	3.0	50	6.5
		00534	.0350	#65	0.890	3.0	50	13.0
	00330		.0354		0.900	3.0	50	6.5
		00536	.0354		0.900	3.0	50	13.0

continued →

Series 1550H,1250H,1850H *(continued)*

0,910mm - 1,150mm
(.0358" - .0453")

3xD (1550H) EDP#	5xD (1250H) EDP#	12xD (1850H) EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
	00332		.0358		0.910	3.0	50	6.5
00130			.0360	#64	0.914	1/8"	2"	3/16"
	00334		.0360	#64	0.914	1/8"	2"	1/4"
		00540	.0360	#64	0.914	1/8"	2"	1/2"
00134			.0366		0.930	3.0	50	5.0
00136			.0370	#63	0.940	3.0	50	5.0
	00340		.0370	#63	0.940	3.0	50	7.0
		00546	.0370	#63	0.940	3.0	50	14.0
00138			.0374		0.950	3.0	50	5.0
00142			.0380	#62	0.965	1/8"	2"	3/16"
	00346		.0380	#62	0.965	1/8"	2"	17/64"
		00552	.0380	#62	0.965	1/8"	2"	9/16"
		00556	.0386		0.980	3.0	50	14.0
00148			.0390	#61	0.990	3.0	50	5.0
	00352		.0390	#61	0.990	3.0	50	7.0
		00558	.0390	#61	0.990	3.0	50	14.0
00150			.0394		1.000	3.0	50	5.0
	00354		.0394		1.000	3.0	50	7.0
		00560	.0394		1.000	3.0	50	14.0
00152			.0400	#60	1.016	1/8"	2"	13/64"
	00356		.0400	#60	1.016	1/8"	2"	9/32"
		00562	.0400	#60	1.016	1/8"	2"	9/16"
00154			.0410	#59	1.041	1/8"	2"	13/64"
	00358		.0410	#59	1.041	1/8"	2"	9/32"
		00564	.0410	#59	1.041	1/8"	2"	9/16"
00156			.0413		1.050	3.0	50	5.5
	00360		.0413		1.050	3.0	50	7.5
		00566	.0413		1.050	3.0	50	15.0
00158			.0420	#58	1.066	1/8"	2"	7/32"
	00362		.0420	#58	1.066	1/8"	2"	5/16"
00160			.0430	#57	1.092	1/8"	2"	7/32"
	00364		.0430	#57	1.092	1/8"	2"	5/16"
		00570	.0430	#57	1.092	1/8"	2"	9/16"
00162			.0433		1.100	3.0	50	5.5
	00366		.0433		1.100	3.0	50	8.0
		00572	.0433		1.100	3.0	50	16.0
00164			.0453		1.150	3.0	50	6.0
	00368		.0453		1.150	3.0	50	8.0
		00574	.0453		1.150	3.0	50	16.0

† *Metric equivalents are for reference only*

3xD (1550H) EDP#	5xD (1250H) EDP#	12xD (1850H) EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
00166			.0465	#56	1.181	1/8"	2"	15/64"
	00370		.0465	#56	1.181	1/8"	2"	11/32"
		00576	.0465	#56	1.181	1/8"	2"	5/8"
00168			.0469	3/64"	1.191	1/8"	2"	15/64"
	00372		.0469	3/64"	1.191	1/8"	2"	11/32"
		00578	.0469	3/64"	1.191	1/8"	2"	5/8"
00170			.0472		1.200	3.0	50	6.0
	00374		.0472		1.200	3.0	50	9.0
		00580	.0472		1.200	3.0	50	18.0
00172			.0492		1.250	3.0	50	6.5
	00376		.0492		1.250	3.0	50	9.0
		00582	.0492		1.250	3.0	50	18.0
00174			.0512		1.300	3.0	50	6.5
	00378		.0512		1.300	3.0	50	9.0
		00584	.0512		1.300	3.0	50	18.0
00176			.0520	#55	1.320	1/8"	2"	17/64"
	00380		.0520	#55	1.320	1/8"	2"	3/8"
		00586	.0520	#55	1.320	1/8"	2"	3/4"
00178			.0531		1.350	3.0	50	6.5
	00382		.0531		1.350	3.0	50	9.5
		00588	.0531		1.350	3.0	50	19.0
00180			.0550	#54	1.397	1/8"	2"	9/32"
	00384		.0550	#54	1.397	1/8"	2"	3/8"
		00590	.0550	#54	1.397	1/8"	2"	3/4"
00182			.0551		1.400	3.0	50	7.0
	00386		.0551		1.400	3.0	50	10.0
		00592	.0551		1.400	3.0	65	20.0
00184			.0571		1.450	3.0	50	7.0
	00388		.0571		1.450	3.0	50	10.5
		00594	.0571		1.450	3.0	65	21.0
00186			.0591		1.500	3.0	50	7.5
	00390		.0591		1.500	3.0	50	10.5
		00596	.0591		1.500	3.0	65	21.0
00188			.0595	#53	1.511	1/8"	2"	19/64"
	00392		.0595	#53	1.511	1/8"	2"	7/16"
		00598	.0595	#53	1.511	1/8"	2-1/2"	13/16"
00190			.0610		1.550	3.0	50	7.5
	00394		.0610		1.550	3.0	50	11.0
		00600	.0610		1.550	3.0	65	22.0
00192			.0625	1/16"	1.587	1/8"	2"	5/16"
	00396		.0625	1/16"	1.587	1/8"	2"	7/16"
		00602	.0625	1/16"	1.587	1/8"	2-1/2"	13/16"
00194			.0630		1.600	3.0	50	7.5
	00398		.0630		1.600	3.0	50	11.0
		00604	.0630		1.600	3.0	65	22.0
00196			.0635	#52	1.613	1/8"	2"	5/16"
	00400		.0635	#52	1.613	1/8"	2"	15/32"
		00606	.0635	#52	1.613	1/8"	2-1/2"	7/8"
00198			.0650		1.650	3.0	50	8.5
	00402		.0650		1.650	3.0	50	11.5
		00608	.0650		1.650	3.0	65	23.0
00200			.0669		1.700	3.0	50	8.5
	00404		.0669		1.700	3.0	50	11.5
		00610	.0669		1.700	3.0	65	23.0
00202			.0670	#51	1.702	1/8"	2"	11/32"
	00406		.0670	#51	1.702	1/8"	2"	15/32"
		00612	.0670	#51	1.702	1/8"	2-1/2"	7/8"

continued →

Series 1550H,1250H,1850H *(continued)*

1,750mm - 2,150mm
(.0689" - .0846")

TECH PAGES 304-305

TOLERANCES	
d_1	+0,000 –0,010mm (+.0000" –.0004")
d_2	h6

AlTiN-based Coating
AlTiN-basierte-Beschichtet
Recubrimiento a base de AlTiN
Revêtement à base de AlTiN
Rivestimento in a base AlTiN
AlTiN基涂层

3xD (1550H) EDP#	5xD (1250H) EDP#	12xD (1850H) EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
00204			.0689		1.750	3.0	50	9.0
	00408		.0689		1.750	3.0	50	12.0
		00614	.0689		1.750	3.0	65	24.0
00206			.0700	#50	1.778	1/8"	2"	23/64"
	00410		.0700	#50	1.778	1/8"	2"	1/2"
		00616	.0700	#50	1.778	1/8"	2-1/2"	1"
00208			.0709		1.800	3.0	50	9.0
	00412		.0709		1.800	3.0	50	13.0
		00618	.0709		1.800	3.0	65	26.0
00210			.0728		1.850	3.0	50	9.5
		00620	.0728		1.850	3.0	65	26.0
00212			.0730	#49	1.854	1/8"	2"	3/8"
	00416		.0730	#49	1.854	1/8"	2"	1/2"
		00622	.0730	#49	1.854	1/8"	2-1/2"	1"
00214			.0748		1.900	3.0	50	9.5
	00418		.0748		1.900	3.0	50	13.5
		00624	.0748		1.900	3.0	65	27.0
00216			.0760	#48	1.930	1/8"	2"	3/8"
	00420		.0760	#48	1.930	1/8"	2"	17/32"
		00626	.0760	#48	1.930	1/8"	2-1/2"	1-1/8"
00218			.0768		1.950	3.0	50	10.0
	00422		.0768		1.950	3.0	50	14.0
		00628	.0768		1.950	3.0	65	28.0
00220			.0781	5/64"	1.983	1/8"	2"	13/32"
	00424		.0781	5/64"	1.983	1/8"	2"	9/16"
		00630	.0781	5/64"	1.983	1/8"	2-1/2"	1-1/8"
00222			.0785	#47	1.994	1/8"	2"	13/32"
	00426		.0785	#47	1.994	1/8"	2"	9/16"
		00632	.0785	#47	1.994	1/8"	2-1/2"	1-1/8"
00224			.0787		2.000	3.0	50	10.0
	00428		.0787		2.000	3.0	50	14.0
		00634	.0787		2.000	3.0	65	28.0
00226			.0807		2.050	3.0	50	10.5
	00430		.0807		2.050	3.0	50	14.0
		00636	.0807		2.050	3.0	65	28.0
00228			.0810	#46	2.057	1/8"	2"	27/64"
	00432		.0810	#46	2.057	1/8"	2"	9/16"
		00638	.0810	#46	2.057	1/8"	2-1/2"	1-1/8"
00230			.0820	#45	2.083	1/8"	2"	27/64"
	00434		.0820	#45	2.083	1/8"	2"	9/16"
		00640	.0820	#45	2.083	1/8"	2-1/2"	1-1/8"
00232			.0827		2.100	3.0	50	10.5
	00436		.0827		2.100	3.0	50	14.5
		00642	.0827		2.100	3.0	65	29.0
00234			.0846		2.150	3.0	50	11.0
	00438		.0846		2.150	3.0	50	14.5
		00644	.0846		2.150	3.0	65	29.0

† *Metric equivalents are for reference only*

3xD (1550H) EDP#	5xD (1250H) EDP#	12xD (1850H) EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
00236			.0860	#44	2.184	1/8"	2"	7/16"
	00440		.0860	#44	2.184	1/8"	2"	19/32"
		00646	.0860	#44	2.184	1/8"	2-1/2"	1-3/16"
00238			.0866		2.200	3.0	50	11.0
	00442		.0866		2.200	3.0	50	15.5
		00648	.0866		2.200	3.0	65	31.0
00240			.0886		2.250	3.0	50	11.5
00242			.0890	#43	2.260	1/8"	2"	29/64"
	00446		.0890	#43	2.260	1/8"	2"	5/8"
		00652	.0890	#43	2.260	1/8"	2-1/2"	1-1/4"
00244			.0906		2.300	3.0	50	11.5
	00448		.0906		2.300	3.0	50	16.0
		00654	.0906		2.300	3.0	65	32.0
00246			.0925		2.350	3.0	50	12.0
	00450		.0925		2.350	3.0	50	16.0
		00656	.0925		2.350	3.0	65	32.0
00248			.0935	#42	2.375	1/8"	2"	31/64"
	00452		.0935	#42	2.375	1/8"	2"	21/32"
		00658	.0935	#42	2.375	1/8"	3"	1-5/16"
00250			.0938	3/32"	2.382	1/8"	2"	31/64"
	00454		.0938	3/32"	2.382	1/8"	2"	21/32"
		00660	.0938	3/32"	2.382	1/8"	3"	1-5/16"
00252			.0945		2.400	3.0	50	12.0
	00456		.0945		2.400	3.0	50	17.0
		00662	.0945		2.400	3.0	75	34.0
00254			.0960	#41	2.438	1/8"	2"	31/64"
	00458		.0960	#41	2.438	1/8"	2"	43/64"
		00664	.0960	#41	2.438	1/8"	3"	1-11/32"
00256			.0965		2.450	3.0	50	12.5
		00666	.0965		2.450	3.0	75	34.0
00258			.0980	#40	2.489	1/8"	2"	1/2"
	00462		.0980	#40	2.489	1/8"	2"	11/16"
		00668	.0980	#40	2.489	1/8"	3"	1-3/8"
00260			.0984		2.500	3.0	50	12.5
	00464		.0984		2.500	3.0	50	17.5
		00670	.0984		2.500	3.0	75	35.0
00262			.0995	#39	2.527	1/8"	2"	1/2"
	00466		.0995	#39	2.527	1/8"	2"	11/16"
		00672	.0995	#39	2.527	1/8"	3"	1-3/8"
00264			.1004		2.550	3.0	50	13.0
	00468		.1004		2.550	3.0	50	17.5
		00674	.1004		2.550	3.0	75	35.0
00266			.1015	#38	2.578	1/8"	2"	17/32"
	00470		.1015	#38	2.578	1/8"	2"	45/64"
		00676	.1015	#38	2.578	1/8"	3"	1-13/32"
00268			.1024		2.600	3.0	50	13.0
	00472		.1024		2.600	3.0	50	18.0
		00678	.1024		2.600	3.0	75	36.0
00270			.1040	#37	2.641	1/8"	2"	17/32"
	00474		.1040	#37	2.641	1/8"	2"	23/32"
		00680	.1040	#37	2.641	1/8"	3"	1-7/16"
00272			.1043		2.650	3.0	50	13.5
	00476		.1043		2.650	3.0	50	18.5
		00682	.1043		2.650	3.0	75	37.0

continued →

Series 1550H,1250H,1850H *(continued)*

2,700mm - 3,175mm
(.1063" - .1250")

3xD (1550H) EDP#	5xD (1250H) EDP#	12xD (1850H) EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
00274			.1063		2.700	3.0	50	13.5
	00478		.1063		2.700	3.0	50	19.0
		00684	.1063		2.700	3.0	75	38.0
00276			.1065	#36	2.705	1/8"	2"	17/32"
	00480		.1065	#36	2.705	1/8"	2"	3/4"
		00686	.1065	#36	2.705	1/8"	3"	1-1/2"
00278			.1083		2.750	3.0	50	14.0
	00482		.1083		2.750	3.0	50	19.5
		00688	.1083		2.750	3.0	75	39.0
00280			.1094	7/64"	2.778	1/8"	2"	9/16"
	00484		.1094	7/64"	2.778	1/8"	2"	49/64"
		00690	.1094	7/64"	2.778	1/8"	3"	1-9/16"
00282			.1100	#35	2.794	1/8"	2"	9/16"
	00486		.1100	#35	2.794	1/8"	2"	49/64"
		00692	.1100	#35	2.794	1/8"	3"	1-9/16"
00284			.1102		2.800	3.0	50	14.0
	00488		.1102		2.800	3.0	50	19.5
		00694	.1102		2.800	3.0	75	39.0
00286			.1110	#34	2.819	1/8"	2"	9/16"
	00490		.1110	#34	2.819	1/8"	2"	25/32"
		00696	.1110	#34	2.819	1/8"	3"	1-5/8"
00288			.1122		2.850	3.0	50	14.5
		00698	.1122		2.850	3.0	75	40.0
00290			.1130	#33	2.870	1/8"	2"	19/32"
	00494		.1130	#33	2.870	1/8"	2"	51/64"
		00700	.1130	#33	2.870	1/8"	3"	1-5/8"
00292			.1142		2.900	3.0	50	14.5
	00496		.1142		2.900	3.0	50	20.0
		00702	.1142		2.900	3.0	75	40.0
00294			.1160	#32	2.946	1/8"	2"	19/32"
	00498		.1160	#32	2.946	1/8"	2"	13/16"
		00704	.1160	#32	2.946	1/8"	3"	1-5/8"
00296			.1161		2.950	3.0	50	15.0
		00706	.1161		2.950	3.0	75	42.0
00298			.1181		3.000	3.0	50	15.0
	00502		.1181		3.000	3.0	50	21.0
		00708	.1181		3.000	3.0	75	42.0
00300			.1200	#31	3.048	1/8"	2"	5/8"
	00504		.1200	#31	3.048	1/8"	2"	7/8"
		00710	.1200	#31	3.048	1/8"	3"	1-3/4"
00302			.1250	1/8"	3.175	1/8"	2"	5/8"
	00506		.1250	1/8"	3.175	1/8"	2"	7/8"
		00712	.1250	1/8"	3.175	1/8"	3"	1-3/4"

† *Metric equivalents are for reference only*

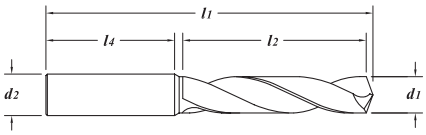
TOLERANCES		
d_1 *	3mm - 6mm	+0,016 +0,004mm (+.00063" +.00015")
	> 6mm - 10mm	+0,021 +0,006mm (+.00082" +.00023")
	> 10mm - 18mm	+0,025 +0,007mm (+.00098" +.00027")
	> 18mm - 20mm	+0,029 +0,008mm (+.00114" +.00031")
d_2	6mm	+0,000 –0,008mm (+.00000" –.00030")
	8mm - 10mm	+0,000 –0,009mm (+.00000" –.00035")
	12mm - 18mm	+0,000 –0,011mm (+.00000" –.00040")
	20mm	+0,000 –0,013mm (+.00000" –.00050")

Z=2 | 30° | 140° | 3xD | TECH PAGES 306-307

Series 1580HD

3,000mm - 5,950mm
(.1181" - .2342")

AlTiN-based Coating
AlTiN-basierte-Beschichtet
Recubrimiento a base de AlTiN
Revêtement à base de AlTiN
Rivestimento in a base AlTiN
AlTiN基涂层



High performance solid submicron grain carbide drill with reinforced shank
Up to 50% faster than standard carbide drills
30° helix for better chip evacuation
Honed cutting edge
Can be used as a pilot drill
Recommended to run in high nickel, high temperature alloys, cobalt-based alloys, stainless steels and tool steels > 40Rc
Live tooling recommended on lathe processes

Hochleistungs Bohrer aus Feinkornhartmetall mit verstärktem Schaft
Bis zu 50% schneller als Standard Hartmetallbohrer
30° Spirale für bessere Spanabfuhr
Gehonte Schneidkante
Kann als Pilotbohrer verwendet werden
Empfohlen für Hoch Nickelhaltige und Hochwarmfeste Stähle, Kobaltbasislegierungen, Rostfreier- und Werkzeugstahl > 40HRc
Empfehlung fuer den Einsatz auf der Drehmaschine

Taladro de alto rendimiento de metal submicrónico duro con vástago
Hasta un 50% más rápidas que las brocas de carburo convencionales
Hélice de 30° para una mejor evacuación de viruta
Labio cortante afilado
Puede ser utilizada como broca piloto
Recomendado para aleaciones con alto contenido de níquel, aleaciones de alta temperatura, aleaciones con base de cobalto, aceros inoxidables, y aceros de herramienta > 40Rc
Recomendación para la aplicación en torno

Haute prestation avec drille à grain solide submicron carbure avec tige renforcé
50% plus rapide que les forets carbure standarts
Helice a 30° pour une meilleure evacuation de copeaux
Preparation de l'arete de coupe
Peut être utilisé comme foret pilote
Recommander pour base nickel, alliages a hautes temperatures, alliages de cobalt, aciers inoxydables et aciers a outils > 40HRC
Outil de filature nécessaires pour une utilisation sur un processus de tournage

Punte in sub-micro grana con gambo rinforzato per alte prestazioni
Fino al 50% più veloce rispetto alle punte in metallo duro standard
Elica a 30° per una migliore evacuazione del truciolo
Tagliente onato
Può essere usata come punta pilota
Raccomandata per lavorazioni su nickel, superleghe, leghe ad alta percentuale di cobalto, inox e acciai per utensili > 40Hrc
Utensili rotanti sono consigliate se usato su un tornio

带加强柄的超细高效整体硬质合金钻头
跟普通的硬质合金钻头相比可提高速度高达50%
30° 螺旋角更便于排屑
切削刃口经过珩磨
可做定心钻使用
高镍耐高温合金、钴基合金、不锈钢和工具钢 > 40HRC
不建议在车床，或工具必须纺纱

Note - These drills are made to a plus/plus tolerance on the drill diameter. If you are in need of a minus tolerance drill, please refer to our other high performance drills.

EDP#	d_1† Diameter Decimal	d_1† Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_4 Shank Length
20085	.1181	3.000	6.0	62	20	36
20095	.1220	3.100	6.0	62	20	36
20105	.1248	3.170	6.0	62	20	36
20115	.1260	3.200	6.0	62	20	36
20125	.1280	3.250	6.0	62	20	36
20135	.1299	3.300	6.0	62	20	36
20145	.1339	3.400	6.0	62	20	36
20155	.1378	3.500	6.0	62	20	36
20165	.1417	3.600	6.0	62	20	36
20175	.1457	3.700	6.0	62	20	36
20185	.1476	3.750	6.0	62	20	36
20195	.1496	3.800	6.0	66	24	36
20205	.1535	3.900	6.0	66	24	36
20215	.1575	4.000	6.0	66	24	36
20225	.1614	4.100	6.0	66	24	36
20235	.1654	4.200	6.0	66	24	36
20245	.1673	4.250	6.0	66	24	36
20255	.1693	4.300	6.0	66	24	36
20265	.1732	4.400	6.0	66	24	36
20275	.1772	4.500	6.0	66	24	36
20285	.1811	4.600	6.0	66	24	36
20295	.1831	4.650	6.0	66	24	36
20305	.1850	4.700	6.0	66	24	36
20315	.1870	4.750	6.0	66	24	36
20325	.1890	4.800	6.0	66	28	36
20335	.1929	4.900	6.0	66	28	36
20345	.1969	5.000	6.0	66	28	36
20355	.2008	5.100	6.0	66	28	36
20365	.2027	5.150	6.0	66	28	36
20375	.2047	5.200	6.0	66	28	36
20385	.2087	5.300	6.0	66	28	36
20395	.2165	5.500	6.0	66	28	36
20405	.2185	5.550	6.0	66	28	36
20408	.2205	5.600	6.0	66	28	36
20412	.2244	5.700	6.0	66	28	36
20415	.2283	5.800	6.0	66	28	36
20425	.2323	5.900	6.0	66	28	36
20435	.2342	5.950	6.0	66	28	36

continued →

Series 1580HD *(continued)*

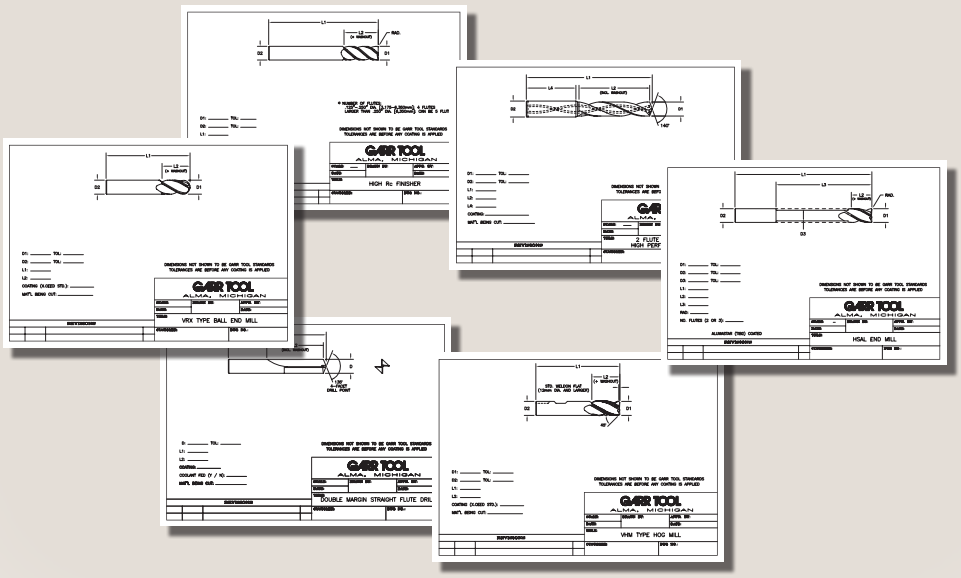
6,000mm - 10,800mm
(.2362" - .4252")

EDP#	d_1 † Diameter Decimal	Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_4 Shank Length
20445	.2362	6.000	6.0	66	28	36
20448	.2402	6.100	8.0	79	34	36
20452	.2441	6.200	8.0	79	34	36
20454	.2480	6.300	8.0	79	34	36
20455	.2500	6.350	8.0	79	34	36
20462	.2520	6.400	8.0	79	34	36
20465	.2559	6.500	8.0	79	34	36
20468	.2571	6.530	8.0	79	34	36
20472	.2598	6.600	8.0	79	34	36
20473	.2638	6.700	8.0	79	34	36
20475	.2657	6.750	8.0	79	34	36
20485	.2677	6.800	8.0	79	34	36
20495	.2717	6.900	8.0	79	34	36
20505	.2756	7.000	8.0	79	34	36
20515	.2795	7.100	8.0	79	41	36
20525	.2815	7.150	8.0	79	41	36
20535	.2835	7.200	8.0	79	41	36
20542	.2874	7.300	8.0	79	41	36
20545	.2913	7.400	8.0	79	41	36
20555	.2953	7.500	8.0	79	41	36
20565	.2972	7.550	8.0	79	41	36
20575	.2992	7.600	8.0	79	41	36
20585	.3031	7.700	8.0	79	41	36
20595	.3071	7.800	8.0	79	41	36
20605	.3130	7.950	8.0	79	41	36
20615	.3150	8.000	8.0	79	41	36
20622	.3189	8.100	10.0	89	47	40
20625	.3228	8.200	10.0	89	47	40
20635	.3268	8.300	10.0	89	47	40
20645	.3287	8.350	10.0	89	47	40
20652	.3307	8.400	10.0	89	47	40
20655	.3346	8.500	10.0	89	47	40
20665	.3386	8.600	10.0	89	47	40
20675	.3425	8.700	10.0	89	47	40
20685	.3445	8.750	10.0	89	47	40
20695	.3465	8.800	10.0	89	47	40
20705	.3504	8.900	10.0	89	47	40
20715	.3543	9.000	10.0	89	47	40
20725	.3583	9.100	10.0	89	47	40
20735	.3602	9.150	10.0	89	47	40
20745	.3622	9.200	10.0	89	47	40
20755	.3661	9.300	10.0	89	47	40
20762	.3701	9.400	10.0	89	47	40
20765	.3740	9.500	10.0	89	47	40
20775	.3760	9.550	10.0	89	47	40
20778	.3780	9.600	10.0	89	47	40
20782	.3819	9.700	10.0	89	47	40
20785	.3858	9.800	10.0	89	47	40
20795	.3898	9.900	10.0	89	47	40
20805	.3937	10.000	10.0	89	47	40
20812	.3976	10.100	12.0	102	55	45
20815	.4016	10.200	12.0	102	55	45
20825	.4055	10.300	12.0	102	55	45
20835	.4134	10.500	12.0	102	55	45
20842	.4173	10.600	12.0	102	55	45
20845	.4213	10.700	12.0	102	55	45
20855	.4252	10.800	12.0	102	55	45

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_4 Shank Length
20865	.4331	11.000	12.0	102	55	45
20875	.4370	11.100	12.0	102	55	45
20885	.4409	11.200	12.0	102	55	45
20892	.4488	11.400	12.0	102	55	45
20895	.4528	11.500	12.0	102	55	45
20905	.4606	11.700	12.0	102	55	45
20915	.4685	11.900	12.0	102	55	45
20925	.4724	12.000	12.0	102	55	45
20935	.4764	12.100	14.0	107	60	45
20941	.4803	12.200	14.0	107	60	45
20945	.4842	12.300	14.0	107	60	45
20955	.4921	12.500	14.0	107	60	45
20961	.4961	12.600	14.0	107	60	45
20965	.5000	12.700	14.0	107	60	45
20975	.5039	12.800	14.0	107	60	45
20978	.5051	12.830	14.0	107	60	45
20981	.5079	12.900	14.0	107	60	45
20982	.5098	12.950	14.0	107	60	45
20985	.5118	13.000	14.0	107	60	45
20995	.5157	13.100	14.0	107	60	45
20998	.5236	13.300	14.0	107	60	45
21005	.5315	13.500	14.0	107	60	45
21015	.5394	13.700	14.0	107	60	45
21025	.5433	13.800	14.0	107	60	45
21035	.5512	14.000	14.0	107	60	45
21045	.5551	14.100	16.0	115	65	48
21053	.5591	14.200	16.0	115	65	48
21055	.5610	14.250	16.0	115	65	48
21065	.5630	14.300	16.0	115	65	48
21075	.5709	14.500	16.0	115	65	48
21085	.5787	14.700	16.0	115	65	48
21105	.5906	15.000	16.0	115	65	48
21115	.5945	15.100	16.0	115	65	48
21125	.6102	15.500	16.0	115	65	48
21135	.6181	15.700	16.0	115	65	48
21145	.6220	15.800	16.0	115	65	48
21155	.6299	16.000	16.0	115	65	48
21159	.6331	16.080	18.0	123	73	48
21175	.6496	16.500	18.0	123	73	48
21185	.6555	16.650	18.0	123	73	48
21195	.6693	17.000	18.0	123	73	48
21215	.6870	17.450	18.0	123	73	48
21225	.6890	17.500	18.0	123	73	48
21235	.7027	17.850	18.0	123	73	48
21245	.7087	18.000	18.0	123	73	48
21255	.7185	18.250	20.0	131	79	50
21265	.7283	18.500	20.0	131	79	50
21275	.7342	18.650	20.0	131	79	50
21295	.7500	19.050	20.0	131	79	50
21304	.7598	19.300	20.0	131	79	50
21315	.7677	19.500	20.0	131	79	50
21325	.7815	19.850	20.0	131	79	50
21335	.7874	20.000	20.0	131	79	50

Garr Tool Company is your source for solid carbide, custom round tooling with a two-week delivery on uncoated specials.



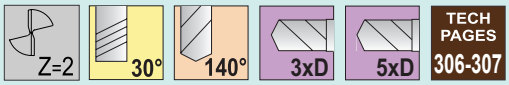
Access an assortment of 'fill-in-the-blank' prints from our website to aid in the quoting of custom tooling.

www.garrtool.com

† *Metric equivalents are for reference only*

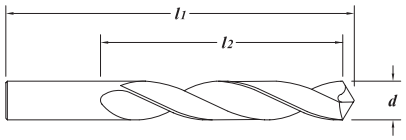
Series 1580H, 1280H

TOLERANCES		
d		+0,0000 –0,0127mm (+.0000" –.0005")
l_1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l_2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")



3,000mm - 4,366mm
(.1181" - .1719")

AlTiN-based Coating
AlTiN-basierte-Beschichtet
Recubrimiento a base de AlTiN
Revêtement à base de AlTiN
Rivestimento in a base AlTiN
AlTiN基涂层



High performance - high penetration solid submicron grain carbide drill
Extended tool life and greater surface finish through faster SFM rates
Up to 50% faster than standard carbide drills
30° helix for better chip evacuation
Honed cutting edge
Recommended to run in high nickel, high temperature alloys, cobalt-based alloys, stainless steels and tool steels >40Rc
Live tooling recommended on lathe processes
Shank tolerance: h6

Hochleistungs- Vollhartmetallbohrer aus Feinkornhartmetall
Hohe Leistung – Hohe Vorschubgeschwindigkeiten
Bis zu 50% schneller als Standard Hartmetallbohrer
30° Spirale für bessere Spanabfuhr
Gehonte Schneidkante
Empfohlen für Hoch Nickelhaltige und Hochwarmfeste Stähle, Kobaltbasislegierungen, Rostfreier- und Werkzeugstahl >40HRc
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6

Broca de submicrograno sólido carburo de alto rendimiento
Mayor duración de la herramienta y mejores acabados superficiales gracias al mayor índice SFM
Hasta un 50% más rápidas que las brocas de carburo convencionales
Hélice de 30° para una mejor evacuación de viruta
Labio cortante afilado
Recomendado para aleaciones con alto contenido de níquel, aleaciones de alta temperatura, aleaciones con base de cobalto, aceros inoxidables, y aceros de herramienta >40Rc
Recomendación para la aplicación en torno
Tolerancia del vástago: h6

Forets carbure submicrograin a haute performance – haut pouvoir de coupe
Amelioration de la duree de vie et de l'etat de surface en finition aussi avec des avances plus elevees
50% plus rapide que les forets carbure standarts
Helice a 30° pour une meilleure evacuation de copeaux
Preparation de l'arete de coupe
Recommander pour base nickel, alliages a hautes temperatures, alliages de cobalt, aciers inoxydables et aciers a outils >40HRC
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6

Alte prestazioni – Alta penetrazioni Super sub-micrograno metallo duro
Vita utensile più lunga e ottima finitura della superficie con maggiori avanzamenti
Fino al 50% più veloce rispetto alle punte in metallo duro standard
Elica a 30° per una migliore evacuazione del truciolo
Tagliente onato
Raccomandata per lavorazioni su nickel, superleghe, leghe ad alta percentuale di cobalto, inox e acciai per utensili >40Hrc
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6

高效率—高进给 高效整体硬质合金钻头
通过加快切削速度延长刀具使用寿命、提高表面光洁度
跟普通的硬质合金钻头相比可提高速度高达50%
30° 螺旋角更便于排屑
切削刃口经过珩磨
高镍耐高温合金、钴基合金、不锈钢和工具钢 >40HRC
不建议在车床，或工具必须纺纱
柄部公差: h6

3xD (1580H) EDP#	5xD (1280H) EDP#	d † Diameter Decimal	Diameter	Metric	l_1 Overall Length	l_2 Flute Length
20301		.1181		3.000	46	16
	21301	.1181		3.000	50	19
20306		.1200	#31	3.048	1-13/16"	5/8"
	21306	.1200	#31	3.048	2"	3/4"
20311		.1250	1/8"	3.175	1-15/16"	11/16"
	21311	.1250	1/8"	3.175	2"	3/4"
20316		.1285	#30	3.264	1-15/16"	11/16"
	21316	.1285	#30	3.264	2-1/4"	3/4"
20321		.1360	#29	3.454	2-1/16"	3/4"
	21321	.1360	#29	3.454	2-1/4"	7/8"
20326		.1378		3.500	52	19
	21326	.1378		3.500	57	22
20331		.1405	#28	3.569	2-1/16"	3/4"
	21331	.1405	#28	3.569	2-1/4"	7/8"
20336		.1406	9/64"	3.571	2-1/16"	3/4"
	21336	.1406	9/64"	3.571	2-1/4"	7/8"
20341		.1440	#27	3.658	2-1/16"	3/4"
	21341	.1440	#27	3.658	2-1/4"	7/8"
20346		.1470	#26	3.734	2-3/16"	13/16"
	21346	.1470	#26	3.734	2-1/4"	7/8"
20351		.1495	#25	3.797	2-3/16"	13/16"
	21351	.1495	#25	3.797	2-1/4"	15/16"
20356		.1520	#24	3.861	2-3/16"	13/16"
	21356	.1520	#24	3.861	2-1/4"	15/16"
20361		.1540	#23	3.912	2-3/16"	13/16"
	21361	.1540	#23	3.912	2-1/4"	15/16"
20366		.1562	5/32"	3.967	2-3/16"	13/16"
	21366	.1562	5/32"	3.967	2-1/2"	15/16"
20371		.1570	#22	3.988	2-3/16"	13/16"
	21371	.1570	#22	3.988	2-1/2"	15/16"
20376		.1575		4.000	56	21
	21376	.1575		4.000	65	24
20381		.1590	#21	4.039	2-3/16"	13/16"
	21381	.1590	#21	4.039	2-1/2"	15/16"
20386		.1610	#20	4.089	2-3/16"	13/16"
	21386	.1610	#20	4.089	2-1/2"	15/16"
20391		.1660	#19	4.216	2-9/32"	15/16"
	21391	.1660	#19	4.216	2-1/2"	1"
20396		.1695	#18	4.305	2-9/32"	15/16"
	21396	.1695	#18	4.305	2-1/2"	1"
20401		.1719	11/64"	4.366	2-9/32"	15/16"
	21401	.1719	11/64"	4.366	2-1/2"	1"

continued →

Series 1580H, 1280H *(continued)*

4,394mm - 6,045mm
(.1730" - .2380")

3xD (1580H) EDP#	5xD (1280H) EDP#	*d* † Diameter Decimal	*d* † Diameter	*d* † Diameter Metric	*l*1 Overall Length	*l*2 Flute Length
20406		.1730	#17	4.394	2-9/32"	15/16"
	21406	.1730	#17	4.394	2-1/2"	1"
20411		.1770	#16	4.496	2-9/32"	15/16"
	21411	.1770	#16	4.496	2-1/2"	1"
20416		.1772		4.500	58	24
	21416	.1772		4.500	65	25
20421		.1800	#15	4.572	2-9/32"	15/16"
	21421	.1800	#15	4.572	2-3/4"	1"
20426		.1820	#14	4.623	2-9/32"	15/16"
	21426	.1820	#14	4.623	2-3/4"	1"
20431		.1850	#13	4.700	2-9/32"	15/16"
	21431	.1850	#13	4.700	2-3/4"	1-1/4"
20436		.1875	3/16"	4.763	2-13/32"	1"
	21436	.1875	3/16"	4.763	2-3/4"	1-1/4"
20441		.1890	#12	4.801	2-13/32"	1"
	21441	.1890	#12	4.801	2-3/4"	1-1/4"
20446		.1910	#11	4.851	2-13/32"	1"
	21446	.1910	#11	4.851	2-3/4"	1-1/4"
20451		.1935	#10	4.915	2-13/32"	1"
	21451	.1935	#10	4.915	2-3/4"	1-1/4"
20456		.1960	#9	4.978	2-13/32"	1"
	21456	.1960	#9	4.978	3"	1-5/16"
20461		.1969		5.000	61	25
	21461	.1969		5.000	75	33
20466		.1990	#8	5.055	2-13/32"	1"
	21466	.1990	#8	5.055	3"	1-5/16"
20471		.2010	#7	5.105	2-13/32"	1"
	21471	.2010	#7	5.105	3"	1-5/16"
20476		.2031	13/64"	5.159	2-13/32"	1"
	21476	.2031	13/64"	5.159	3"	1-5/16"
20481		.2040	#6	5.182	2-13/32"	1"
	21481	.2040	#6	5.182	3"	1-3/8"
20486		.2055	#5	5.220	2-13/32"	1"
	21486	.2055	#5	5.220	3"	1-3/8"
20491		.2090	#4	5.309	2-13/32"	1"
	21491	.2090	#4	5.309	3"	1-3/8"
20496		.2130	#3	5.410	2-5/8"	1-3/32"
	21496	.2130	#3	5.410	3"	1-3/8"
20501		.2165		5.500	67	28
	21501	.2165		5.500	75	35
20506		.2188	7/32"	5.558	2-5/8"	1-3/32"
	21506	.2188	7/32"	5.558	3"	1-3/8"
20511		.2210	#2	5.613	2-5/8"	1-3/32"
	21511	.2210	#2	5.613	3"	1-3/8"
20516		.2280	#1	5.791	2-5/8"	1-3/32"
	21516	.2280	#1	5.791	3"	1-3/8"
20521		.2340	A	5.944	2-5/8"	1-3/32"
	21521	.2340	A	5.944	3-1/4"	1-1/2"
20526		.2344	15/64"	5.954	2-5/8"	1-3/32"
	21526	.2344	15/64"	5.954	3-1/4"	1-1/2"
20531		.2362		6.000	67	28
	21531	.2362		6.000	80	38
20536		.2380	B	6.045	2-3/4"	1-7/32"
	21536	.2380	B	6.045	3-1/4"	1-5/8"

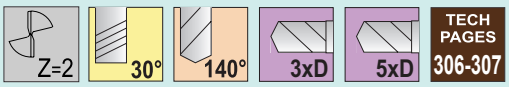
† *Metric equivalents are for reference only*

3xD (1580H) EDP#	5xD (1280H) EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
20541		.2420	C	6.147	2-3/4"	1-7/32"
	21541	.2420	C	6.147	3-1/4"	1-5/8"
20546		.2460	D	6.248	2-3/4"	1-7/32"
	21546	.2460	D	6.248	3-1/4"	1-5/8"
20551		.2500	1/4" / E	6.350	2-3/4"	1-7/32"
	21551	.2500	1/4" / E	6.350	3-1/4"	1-5/8"
20556		.2559		6.500	70	31
	21556	.2559		6.500	80	41
20561		.2570	F	6.528	2-3/4"	1-7/32"
	21561	.2570	F	6.528	3-1/4"	1-11/16"
20566		.2610	G	6.629	2-3/4"	1-7/32"
	21566	.2610	G	6.629	3-1/2"	1-11/16"
20571		.2656	17/64"	6.746	2-15/16"	1-11/32"
	21571	.2656	17/64"	6.746	3-1/2"	1-11/16"
20576		.2660	H	6.756	2-15/16"	1-11/32"
	21576	.2660	H	6.756	3-1/2"	1-11/16"
20581		.2720	I	6.909	2-15/16"	1-11/32"
	21581	.2720	I	6.909	3-1/2"	1-11/16"
20586		.2756		7.000	75	34
	21586	.2756		7.000	88	43
20591		.2770	J	7.036	2-15/16"	1-11/32"
	21591	.2770	J	7.036	3-1/2"	1-11/16"
20596		.2810	K	7.137	2-15/16"	1-11/32"
	21596	.2810	K	7.137	3-1/2"	1-3/4"
20601		.2812	9/32"	7.142	2-15/16"	1-11/32"
	21601	.2812	9/32"	7.142	3-1/2"	1-3/4"
20606		.2900	L	7.366	2-15/16"	1-11/32"
	21606	.2900	L	7.366	3-1/2"	1-3/4"
20611		.2950	M	7.493	2-15/16"	1-11/32"
	21611	.2950	M	7.493	3-3/4"	1-3/4"
20616		.2953		7.500	75	34
	21616	.2953		7.500	95	44
20621		.2969	19/64"	7.541	3-3/32"	1-15/32"
	21621	.2969	19/64"	7.541	3-3/4"	1-7/8"
20626		.3020	N	7.671	3-3/32"	1-15/32"
	21626	.3020	N	7.671	3-3/4"	1-7/8"
20631		.3125	5/16"	7.938	3-3/32"	1-15/32"
	21631	.3125	5/16"	7.938	3-3/4"	1-7/8"
20636		.3150		8.000	79	37
	21636	.3150		8.000	95	48
20641		.3160	O	8.026	3-3/32"	1-15/32"
	21641	.3160	O	8.026	3-3/4"	1-7/8"
20646		.3230	P	8.204	3-3/32"	1-15/32"
	21646	.3230	P	8.204	3-3/4"	2-3/32"
20651		.3281	21/64"	8.334	3-3/32"	1-15/32"
	21651	.3281	21/64"	8.334	4"	2-3/32"
20656		.3320	Q	8.433	3-3/32"	1-15/32"
	21656	.3320	Q	8.433	4"	2-3/32"
20661		.3346		8.500	79	37
	21661	.3346		8.500	100	53
20666		.3390	R	8.611	3-5/16"	1-9/16"
	21666	.3390	R	8.611	4"	2-3/32"
20671		.3438	11/32"	8.733	3-5/16"	1-9/16"
	21671	.3438	11/32"	8.733	4"	2-3/16"

continued →

Series 1580H, 1280H *(continued)*

8,839mm - 11,509mm
(.3480" - .4531")



TOLERANCES

d	+0,0000 –0,0127mm (+.0000" –.0005")	
l1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")

AlTiN-based Coating
AlTiN-basierte-Beschichtet
Recubrimiento a base de AlTiN
Revêtement à base de AlTiN
Rivestimento in a base AlTiN
AlTiN基涂层

3xD (1580H) EDP#	5xD (1280H) EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
20676		.3480	S	8.839	3-5/16"	1-9/16"
	21676	.3480	S	8.839	4"	2-3/16"
20681		.3543		9.000	84	40
	21681	.3543		9.000	100	56
20686		.3580	T	9.093	3-5/16"	1-9/16"
	21686	.3580	T	9.093	4-1/4"	2-9/32"
20691		.3594	23/64"	9.129	3-5/16"	1-9/16"
	21691	.3594	23/64"	9.129	4-1/4"	2-9/32"
20696		.3680	U	9.347	3-5/16"	1-9/16"
	21696	.3680	U	9.347	4-1/4"	2-9/32"
20701		.3740		9.500	84	40
	21701	.3740		9.500	105	58
20706		.3750	3/8"	9.525	3-1/2"	1-11/16"
	21706	.3750	3/8"	9.525	4-1/4"	2-3/8"
20711		.3770	V	9.576	3-1/2"	1-11/16"
	21711	.3770	V	9.576	4-1/4"	2-3/8"
20716		.3860	W	9.804	3-1/2"	1-11/16"
	21716	.3860	W	9.804	4-1/2"	2-3/8"
20721		.3906	25/64"	9.921	3-1/2"	1-11/16"
	21721	.3906	25/64"	9.921	4-1/2"	2-3/8"
20726		.3937		10.000	89	43
	21726	.3937		10.000	115	60
20731		.3970	X	10.084	3-1/2"	1-11/16"
	21731	.3970	X	10.084	4-1/2"	2-1/2"
20736		.4040	Y	10.262	3-1/2"	1-11/16"
	21736	.4040	Y	10.262	4-1/2"	2-9/16"
20741		.4062	13/32"	10.317	3-1/2"	1-11/16"
	21741	.4062	13/32"	10.317	4-1/2"	2-9/16"
20746		.4130	Z	10.490	3-1/2"	1-11/16"
	21746	.4130	Z	10.490	4-1/2"	2-5/8"
20751		.4134		10.500	89	43
	21751	.4134		10.500	115	67
20756		.4219	27/64"	10.716	3-3/4"	1-13/16"
	21756	.4219	27/64"	10.716	4-1/2"	2-11/16"
20761		.4331		11.000	95	46
	21761	.4331		11.000	115	68
20766		.4375	7/16"	11.113	3-3/4"	1-13/16"
	21766	.4375	7/16"	11.113	4-3/4"	2-13/16"
20771		.4528		11.500	95	46
	21771	.4528		11.500	120	71
20776		.4531	29/64"	11.509	3-3/4"	1-13/16"
	21776	.4531	29/64"	11.509	4-3/4"	2-7/8"

† *Metric equivalents are for reference only*

3xD (1580H) EDP#	5xD (1280H) EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
20781		.4688	15/32"	11.908	4"	1-15/16"
	21781	.4688	15/32"	11.908	4-3/4"	2-7/8"
20786		.4724		12.000	102	49
	21786	.4724		12.000	120	73
20791		.4844	31/64"	12.304	4"	1-15/16"
	21791	.4844	31/64"	12.304	5-5/16"	3"
20796		.4921		12.500	102	49
	21796	.4921		12.500	135	76
20801		.5000	1/2"	12.700	4"	1-15/16"
	21801	.5000	1/2"	12.700	5-3/8"	3-1/16"
20806		.5118		13.000	107	53
	21806	.5118		13.000	135	78
20811		.5156	33/64"	13.096	4-7/32"	2-3/32"
	21811	.5156	33/64"	13.096	5-3/8"	3-1/8"
20816		.5312	17/32"	13.492	4-7/32"	2-3/32"
	21816	.5312	17/32"	13.492	5-11/16"	3-5/16"
20821		.5315		13.500	110	56
	21821	.5315		13.500	145	84
20826		.5469	35/64"	13.891	4-5/16"	2-7/32"
	21826	.5469	35/64"	13.891	5-13/16"	3-3/8"
20831		.5512		14.000	110	56
	21831	.5512		14.000	145	86
20836		.5625	9/16"	14.288	4-9/16"	2-15/32"
	21836	.5625	9/16"	14.288	5-15/16"	3-1/2"
20841		.5709		14.500	116	63
	21841	.5709		14.500	150	89
20846		.5781	37/64"	14.684	4-15/16"	2-9/16"
	21846	.5781	37/64"	14.684	6"	3-1/2"
20851		.5906		15.000	125	65
	21851	.5906		15.000	150	90
20856		.5938	19/32"	15.083	4-15/16"	2-9/16"
	21856	.5938	19/32"	15.083	6"	3-9/16"
20861		.6094	39/64"	15.479	5-1/16"	2-13/16"
	21861	.6094	39/64"	15.479	6-3/16"	3-11/16"
20866		.6102		15.500	129	71
	21866	.6102		15.500	160	94
20871		.6250	5/8"	15.875	5-1/4"	3-1/8"
	21871	.6250	5/8"	15.875	6-5/16"	3-3/4"
20876		.6299		16.000	133	79
	21876	.6299		16.000	160	95

Series 1580KD, 1280KD

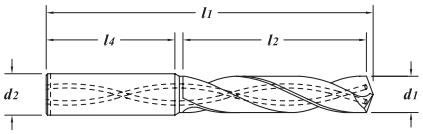
3,000mm - 4,200mm
(.1181" - .1654")

TECH PAGES 306-307

TOLERANCES

d_1 *	3mm - 6mm	+0,016 +0,004mm (+.00063" +.00015")
	> 6mm - 10mm	+0,021 +0,006mm (+.00082" +.00023")
	> 10mm - 18mm	+0,025 +0,007mm (+.00098" +.00027")
	> 18mm - 20mm	+0,029 +0,008mm (+.00114" +.00031")
d_2	6mm	+0,000 –0,008mm (+.00000" –.00030")
	8mm - 10mm	+0,000 –0,009mm (+.00000" –.00035")
	12mm - 18mm	+0,000 –0,011mm (+.00000" –.00040")
	20mm	+0,000 –0,013mm (+.00000" –.00050")

AlTiN-based Coating
AlTiN-basierte-Beschichtet
Recubrimiento a base de AlTiN
Revêtement à base de AlTiN
Rivestimento in a base AlTiN
AlTiN基涂层



High performance solid submicron grain carbide drill with reinforced shank
Coolant through for high pressure coolant systems
Up to 70% faster than standard carbide drills
30° helix for better chip evacuation
Honed cutting edge
Can be used as a pilot drill
Recommended to run in high nickel, high temperature alloys, cobalt-based alloys, stainless steels and tool steels > 40Rc
Live tooling recommended on lathe processes

Hochleistungs Bohrer aus Feinkornhartmetall mit verstärktem Schaft
Mit Innenkühlung für Systeme mit hohen Kühlmitteldruck
Bis zu 70% schneller als Standard Hartmetallbohrer
30° Spirale für bessere Spanabfuhr
Gehonte Schneidkante
Kann als Pilotbohrer verwendet werden
Empfohlen für Hoch Nickelhaltige und Hochwarmfeste Stähle, Kobaltbasislegierungen, Rostfreier- und Werkzeugstah > 40HRc
Empfehlung fuer den Einsatz auf der Drehmaschine

Taladro de alto rendimiento de metal submicrónico duro con vástago
Refrigeración interior para sistemas con refrigeración de alta presión
Hasta un 70% más rápidas que las brocas de carburo convencionales
Hélice de 30° para una mejor evacuación de viruta
Labio cortante afilado
Puede ser utilizada como broca piloto
Recomendado para aleaciones con alto contenido de níquel, aleaciones de alta temperatura, aleaciones con base de cobalto, aceros inoxidables, y aceros de herramienta > 40Rc
Recomendación para la aplicación en torno

Haute prestation avec drille à grain solide submicron carbure avec tige renforcé
Lubrification central pour système de lubrification haute pression
70% plus rapide que les forets carbure standarts
Helice a 30° pour une meilleure evacuation de copeaux
Preparation de l'arete de coupe
Peut être utilisé comme foret pilote
Recommander pour base nickel, alliages a hautes temperatures, alliages de cobalt, aciers inoxydables et aciers a outils > 40HRC
Outil de filature nécessaires pour une utilisation sur un processus de tournage

Punte in sub-micro grana con gambo rinforzato per alte prestazioni
Lubrificazione interna per sistemi ad alta pressione
Fino al 70% più veloce rispetto alle punte in metallo duro standard
Elica a 30° per una migliore evacuazione del truciolo
Tagliente onato
Può essere usata come punta pilota
Raccomandata per lavorazioni su nickel, superleghe, leghe ad alta percentuale di cobalto, inox e acciai per utensili > 40Hrc
Utensili rotanti sono consigliate se usato su un tornio

带加强柄的超细高效整体硬质合金钻头
内冷孔用于高压内冷系统
跟普通的硬质合金钻头相比可提高速度高达70%
30° 螺旋角更便于排屑
切削刃口经过珩磨
可做定心钻使用
高镍耐高温合金、钴基合金、不锈钢和工具钢 >40HRC
不建议在车床，或工具必须纺纱

** Note - These drills are made to a plus/plus tolerance on the drill diameter. If you are in need of a minus tolerance drill, please refer to our other high performance drills.*

3xD (1580KD) EDP#	5xD (1280KD) EDP#	d_1 † Diameter Decimal	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_4 Shank Length
27995		.1181	3.000	6.0	62	20	36
	25065	.1181	3.000	6.0	66	28	36
28005		.1220	3.100	6.0	62	20	36
	25075	.1220	3.100	6.0	66	28	36
28015		.1248	3.170	6.0	62	20	36
	25085	.1248	3.170	6.0	66	28	36
28025		.1260	3.200	6.0	62	20	36
	25095	.1260	3.200	6.0	66	28	36
28035		.1280	3.250	6.0	62	20	36
	25105	.1280	3.250	6.0	66	28	36
28045		.1299	3.300	6.0	62	20	36
	25115	.1299	3.300	6.0	66	28	36
28055		.1339	3.400	6.0	62	20	36
	25125	.1339	3.400	6.0	66	28	36
28065		.1378	3.500	6.0	62	20	36
	25135	.1378	3.500	6.0	66	28	36
28075		.1417	3.600	6.0	62	20	36
	25145	.1417	3.600	6.0	66	28	36
28085		.1457	3.700	6.0	62	20	36
	25155	.1457	3.700	6.0	66	28	36
28095		.1476	3.750	6.0	62	20	36
	25165	.1476	3.750	6.0	66	28	36
28105		.1496	3.800	6.0	66	24	36
	25175	.1496	3.800	6.0	74	36	36
28115		.1535	3.900	6.0	66	24	36
	25185	.1535	3.900	6.0	74	36	36
28125		.1563	3.970	6.0	66	24	36
	25195	.1563	3.970	6.0	74	36	36
28135		.1575	4.000	6.0	66	24	36
	25205	.1575	4.000	6.0	74	36	36
28145		.1614	4.100	6.0	66	24	36
	25215	.1614	4.100	6.0	74	36	36
28155		.1654	4.200	6.0	66	24	36
	25225	.1654	4.200	6.0	74	36	36

† *Metric equivalents are for reference only*

3xD (1580KD) EDP#	5xD (1280KD) EDP#	d_1 † Diameter Decimal	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_4 Shank Length
28165		.1673	4.250	6.0	66	24	36
	25235	.1673	4.250	6.0	74	36	36
28175		.1693	4.300	6.0	66	24	36
	25245	.1693	4.300	6.0	74	36	36
28185		.1732	4.400	6.0	66	24	36
	25255	.1732	4.400	6.0	74	36	36
28195		.1772	4.500	6.0	66	24	36
	25265	.1772	4.500	6.0	74	36	36
28205		.1811	4.600	6.0	66	24	36
	25275	.1811	4.600	6.0	74	36	36
	25285	.1831	4.650	6.0	74	36	36
28225		.1850	4.700	6.0	66	24	36
	25295	.1850	4.700	6.0	74	36	36
28235		.1870	4.750	6.0	66	24	36
	25305	.1870	4.750	6.0	74	36	36
28245		.1890	4.800	6.0	66	28	36
	25315	.1890	4.800	6.0	82	44	36
28255		.1929	4.900	6.0	66	28	36
	25325	.1929	4.900	6.0	82	44	36
28265		.1969	5.000	6.0	66	28	36
	25335	.1969	5.000	6.0	82	44	36
28275		.2008	5.100	6.0	66	28	36
	25345	.2008	5.100	6.0	82	44	36
28285		.2027	5.150	6.0	66	28	36
	25355	.2027	5.150	6.0	82	44	36
28295		.2047	5.200	6.0	66	28	36
	25365	.2047	5.200	6.0	82	44	36
28305		.2087	5.300	6.0	66	28	36
	25375	.2087	5.300	6.0	82	44	36
28315		.2165	5.500	6.0	66	28	36
	25385	.2165	5.500	6.0	82	44	36
28325		.2185	5.550	6.0	66	28	36
	25395	.2185	5.550	6.0	82	44	36
28335		.2205	5.600	6.0	66	28	36
	25397	.2205	5.600	6.0	82	44	36
28345		.2244	5.700	6.0	66	28	36
	25400	.2244	5.700	6.0	82	44	36
28355		.2283	5.800	6.0	66	28	36
	25405	.2283	5.800	6.0	82	44	36
28365		.2323	5.900	6.0	66	28	36
	25415	.2323	5.900	6.0	82	44	36
28375		.2342	5.950	6.0	66	28	36
	25425	.2342	5.950	6.0	82	44	36
28385		.2362	6.000	6.0	66	28	36
	25435	.2362	6.000	6.0	82	44	36
28395		.2402	6.100	8.0	79	34	36
	25437	.2402	6.100	8.0	91	53	36
28405		.2441	6.200	8.0	79	34	36
	25440	.2441	6.200	8.0	91	53	36
28415		.2480	6.300	8.0	79	34	36
	25443	.2480	6.300	8.0	91	53	36
28425		.2500	6.350	8.0	79	34	36
	25445	.2500	6.350	8.0	91	53	36

continued →

Series 1580KD, 1280KD *(continued)*

6,400mm - 8,500mm
(.2520" - .3346")

3xD (1580KD) EDP#	5xD (1280KD) EDP#	d_1 † Diameter Decimal	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_4 Shank Length
28435		.2520	6.400	8.0	79	34	36
	25450	.2520	6.400	8.0	91	53	36
28445		.2559	6.500	8.0	79	34	36
	25455	.2559	6.500	8.0	91	53	36
28446		.2571	6.530	8.0	79	34	36
	25457	.2571	6.530	8.0	91	53	36
28455		.2598	6.600	8.0	79	34	36
	25460	.2598	6.600	8.0	91	53	36
	25463	.2638	6.700	8.0	91	53	36
28465		.2657	6.750	8.0	79	34	36
	25465	.2657	6.750	8.0	91	53	36
28475		.2677	6.800	8.0	79	34	36
	25475	.2677	6.800	8.0	91	53	36
28485		.2717	6.900	8.0	79	34	36
	25485	.2717	6.900	8.0	91	53	36
28495		.2756	7.000	8.0	79	34	36
	25495	.2756	7.000	8.0	91	53	36
28505		.2795	7.100	8.0	79	41	36
	25505	.2795	7.100	8.0	91	53	36
28515		.2815	7.150	8.0	79	41	36
	25515	.2815	7.150	8.0	91	53	36
28525		.2835	7.200	8.0	79	41	36
	25525	.2835	7.200	8.0	91	53	36
28535		.2874	7.300	8.0	79	41	36
	25530	.2874	7.300	8.0	91	53	36
28545		.2913	7.400	8.0	79	41	36
	25535	.2913	7.400	8.0	91	53	36
28555		.2953	7.500	8.0	79	41	36
	25545	.2953	7.500	8.0	91	53	36
28565		.2972	7.550	8.0	79	41	36
	25555	.2972	7.550	8.0	91	53	36
28575		.2992	7.600	8.0	79	41	36
	25565	.2992	7.600	8.0	91	53	36
28585		.3031	7.700	8.0	79	41	36
	25575	.3031	7.700	8.0	91	53	36
28595		.3071	7.800	8.0	79	41	36
	25585	.3071	7.800	8.0	91	53	36
28605		.3130	7.950	8.0	79	41	36
	25595	.3130	7.950	8.0	91	53	36
28615		.3150	8.000	8.0	79	41	36
	25605	.3150	8.000	8.0	91	53	36
28625		.3189	8.100	10.0	89	47	40
	25610	.3189	8.100	10.0	103	61	40
28635		.3228	8.200	10.0	89	47	40
	25615	.3228	8.200	10.0	103	61	40
28645		.3268	8.300	10.0	89	47	40
	25625	.3268	8.300	10.0	103	61	40
28655		.3287	8.350	10.0	89	47	40
	25635	.3287	8.350	10.0	103	61	40
28665		.3307	8.400	10.0	89	47	40
	25640	.3307	8.400	10.0	103	61	40
28675		.3346	8.500	10.0	89	47	40
	25645	.3346	8.500	10.0	103	61	40

† *Metric equivalents are for reference only*

3xD (1580KD) EDP#	5xD (1280KD) EDP#	d_1 † Diameter Decimal	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_4 Shank Length
28685		.3386	8.600	10.0	89	47	40
	25655	.3386	8.600	10.0	103	61	40
28695		.3425	8.700	10.0	89	47	40
	25665	.3425	8.700	10.0	103	61	40
28725		.3445	8.750	10.0	89	47	40
	25675	.3445	8.750	10.0	103	61	40
28735		.3465	8.800	10.0	89	47	40
	25685	.3465	8.800	10.0	103	61	40
28745		.3504	8.900	10.0	89	47	40
	25695	.3504	8.900	10.0	103	61	40
28755		.3543	9.000	10.0	89	47	40
	25705	.3543	9.000	10.0	103	61	40
28765		.3583	9.100	10.0	89	47	40
	25715	.3583	9.100	10.0	103	61	40
	25725	.3602	9.150	10.0	103	61	40
28815		.3622	9.200	10.0	89	47	40
	25735	.3622	9.200	10.0	103	61	40
28825		.3661	9.300	10.0	89	47	40
	25745	.3661	9.300	10.0	103	61	40
28845		.3701	9.400	10.0	89	47	40
	25750	.3701	9.400	10.0	103	61	40
28855		.3740	9.500	10.0	89	47	40
	25755	.3740	9.500	10.0	103	61	40
28875		.3760	9.550	10.0	89	47	40
	25765	.3760	9.550	10.0	103	61	40
28878		.3780	9.600	10.0	89	47	40
	25767	.3780	9.600	10.0	103	61	40
28882		.3819	9.700	10.0	89	47	40
	25770	.3819	9.700	10.0	103	61	40
28885		.3858	9.800	10.0	89	47	40
	25775	.3858	9.800	10.0	103	61	40
28895		.3898	9.900	10.0	89	47	40
	25785	.3898	9.900	10.0	103	61	40
28905		.3937	10.000	10.0	89	47	40
	25795	.3937	10.000	10.0	103	61	40
28925		.3976	10.100	12.0	102	55	45
	25800	.3976	10.100	12.0	118	71	45
28935		.4016	10.200	12.0	102	55	45
	25805	.4016	10.200	12.0	118	71	45
28945		.4055	10.300	12.0	102	55	45
	25815	.4055	10.300	12.0	118	71	45
28955		.4134	10.500	12.0	102	55	45
	25825	.4134	10.500	12.0	118	71	45
28965		.4173	10.600	12.0	102	55	45
	25830	.4173	10.600	12.0	118	71	45
28975		.4213	10.700	12.0	102	55	45
	25835	.4213	10.700	12.0	118	71	45
28985		.4252	10.800	12.0	102	55	45
	25845	.4252	10.800	12.0	118	71	45
28995		.4331	11.000	12.0	102	55	45
	25855	.4331	11.000	12.0	118	71	45
29005		.4370	11.100	12.0	102	55	45
	25865	.4370	11.100	12.0	118	71	45

continued →

Series 1580KD, 1280KD *(continued)*

11,200mm - 13,800mm
(.4409" - .5433")

TECH PAGES 306-307

TOLERANCES

d_1 *	3mm - 6mm	+0,016 +0,004mm (+.00063" +.00015")
	> 6mm - 10mm	+0,021 +0,006mm (+.00082" +.00023")
	> 10mm - 18mm	+0,025 +0,007mm (+.00098" +.00027")
	> 18mm - 20mm	+0,029 +0,008mm (+.00114" +.00031")
d_2	6mm	+0,000 –0,008mm (+.00000" –.00030")
	8mm - 10mm	+0,000 –0,009mm (+.00000" –.00035")
	12mm - 18mm	+0,000 –0,011mm (+.00000" –.00040")
	20mm	+0,000 –0,013mm (+.00000" –.00050")

AlTiN-based Coating
AlTiN-basierte-Beschichtet
Recubrimiento a base de AlTiN
Revêtement à base de AlTiN
Rivestimento in a base AlTiN
AlTiN基涂层

3xD (1580KD) EDP#	5xD (1280KD) EDP#	d_1 † Diameter Decimal	Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_4 Shank Length
29015		.4409	11.200	12.0	102	55	45
	25875	.4409	11.200	12.0	118	71	45
29025		.4488	11.400	12.0	102	55	45
	25880	.4488	11.400	12.0	118	71	45
29035		.4528	11.500	12.0	102	55	45
	25885	.4528	11.500	12.0	118	71	45
29045		.4606	11.700	12.0	102	55	45
	25895	.4606	11.700	12.0	118	71	45
29055		.4685	11.900	12.0	102	55	45
29065		.4724	12.000	12.0	102	55	45
	25915	.4724	12.000	12.0	118	71	45
29075		.4764	12.100	14.0	107	60	45
	25925	.4764	12.100	14.0	124	77	45
29085		.4803	12.200	14.0	107	60	45
	25930	.4803	12.200	14.0	124	77	45
29095		.4842	12.300	14.0	107	60	45
	25935	.4842	12.300	14.0	124	77	45
29115		.4921	12.500	14.0	107	60	45
	25945	.4921	12.500	14.0	124	77	45
29125		.4961	12.600	14.0	107	60	45
	25950	.4961	12.600	14.0	124	77	45
29135		.5000	12.700	14.0	107	60	45
	25955	.5000	12.700	14.0	124	77	45
29145		.5039	12.800	14.0	107	60	45
	25960	.5039	12.800	14.0	124	77	45
29148		.5051	12.830	14.0	107	60	45
	25961	.5051	12.830	14.0	124	77	45
29155		.5079	12.900	14.0	107	60	45
29161		.5098	12.950	14.0	107	60	45
29165		.5118	13.000	14.0	107	60	45
	25965	.5118	13.000	14.0	124	77	45
29175		.5157	13.100	14.0	107	60	45
	25975	.5157	13.100	14.0	124	77	45
29181		.5236	13.300	14.0	107	60	45
29185		.5315	13.500	14.0	107	60	45
	25985	.5315	13.500	14.0	124	77	45
29195		.5394	13.700	14.0	107	60	45
	25995	.5394	13.700	14.0	124	77	45
29205		.5433	13.800	14.0	107	60	45
	26005	.5433	13.800	14.0	124	77	45

† *Metric equivalents are for reference only*

3xD (1580KD) EDP#	5xD (1280KD) EDP#	d_1 † Diameter Decimal	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_4 Shank Length
29215		.5512	14.000	14.0	107	60	45
	26015	.5512	14.000	14.0	124	77	45
29225		.5551	14.100	16.0	115	65	48
	26025	.5551	14.100	16.0	133	83	48
29235		.5591	14.200	16.0	115	65	48
	26027	.5591	14.200	16.0	133	83	48
29245		.5610	14.250	16.0	115	65	48
29255		.5630	14.300	16.0	115	65	48
	26045	.5630	14.300	16.0	133	83	48
29265		.5709	14.500	16.0	115	65	48
	26055	.5709	14.500	16.0	133	83	48
29275		.5787	14.700	16.0	115	65	48
	26065	.5787	14.700	16.0	133	83	48
29285		.5827	14.800	16.0	115	65	48
	26067	.5827	14.800	16.0	133	83	48
29305		.5906	15.000	16.0	115	65	48
	26075	.5906	15.000	16.0	133	83	48
29315		.5945	15.100	16.0	115	65	48
	26085	.5945	15.100	16.0	133	83	48
29325		.6102	15.500	16.0	115	65	48
	26095	.6102	15.500	16.0	133	83	48
	26105	.6181	15.700	16.0	133	83	48
29345		.6220	15.800	16.0	115	65	48
	26107	.6220	15.800	16.0	133	83	48
	26115	.6299	16.000	16.0	133	83	48
29363		.6331	16.080	18.0	123	73	48
	26118	.6331	16.080	18.0	143	93	48
29365		.6339	16.100	18.0	123	73	48
	26119	.6339	16.100	18.0	143	93	48
	26123	.6378	16.200	18.0	143	93	48
29375		.6398	16.250	18.0	123	73	48
	26125	.6398	16.250	18.0	143	93	48
29385		.6496	16.500	18.0	123	73	48
	26135	.6496	16.500	18.0	143	93	48
29395		.6555	16.650	18.0	123	73	48
	26145	.6555	16.650	18.0	143	93	48
29405		.6693	17.000	18.0	123	73	48
	26155	.6693	17.000	18.0	143	93	48
29415		.6713	17.050	18.0	123	73	48
	26165	.6713	17.050	18.0	143	93	48
29425		.6870	17.450	18.0	123	73	48
	26175	.6870	17.450	18.0	143	93	48
29435		.6890	17.500	18.0	123	73	48
	26185	.6890	17.500	18.0	143	93	48
29445		.7027	17.850	18.0	123	73	48
	26195	.7027	17.850	18.0	143	93	48
29455		.7087	18.000	18.0	123	73	48
	26205	.7087	18.000	18.0	143	93	48
29465		.7185	18.250	20.0	131	79	50
	26215	.7185	18.250	20.0	153	101	50
	26225	.7283	18.500	20.0	153	101	50
	26235	.7342	18.650	20.0	153	101	50

continued →

Series 1580KD, 1280KD *(continued)*

19,000mm - 20,000mm
(.7480" - .7874")

3xD (1580KD) EDP#	5xD (1280KD) EDP#	d_1 † Diameter Decimal	Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_4 Shank Length
	26245	.7480	19.000	20.0	153	101	50
29505		.7500	19.050	20.0	131	79	50
	26255	.7500	19.050	20.0	153	101	50
29545		.7579	19.250	20.0	131	79	50
29546		.7590	19.280	20.0	131	79	50
	26260	.7590	19.280	20.0	153	101	50
29551		.7598	19.300	20.0	131	79	50
	26261	.7598	19.300	20.0	153	101	50
29565		.7677	19.500	20.0	131	79	50
	26281	.7795	19.800	20.0	153	101	50
29595		.7815	19.850	20.0	131	79	50
	26285	.7815	19.850	20.0	153	101	50
29605		.7874	20.000	20.0	131	79	50

† *Metric equivalents are for reference only*

Series 1580KH, 1280KH, 1880KH

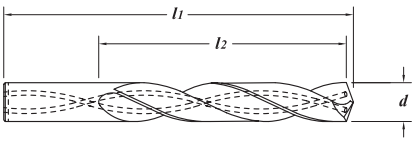
TOLERANCES

d	+0,0000 –0,0127mm (+.0000" –.0005")	
l1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")

TECH PAGES 306-307

3,000mm - 3,912mm
(.1181" - .1540")

AlTiN-based Coating
AlTiN-basierte-Beschichtet
Recubrimiento a base de AlTiN
Revêtement à base de AlTiN
Rivestimento in a base AlTiN
AlTiN基涂层



High performance - high penetration solid submicron grain carbide drill
Coolant through capabilities for high pressure coolant systems
Extended tool life and greater surface finish through faster SFM rates
Up to 70% faster than standard carbide drills
30° helix for better chip evacuation
Honed cutting edge
Recommended to run in high nickel, high temperature alloys, cobalt-based alloys, stainless steels and tool steels > 40Rc
Live tooling recommended on lathe processes
Shank tolerance: h6

Hohe Leistung – Hohe Vorschubgeschwindigkeiten- Vollhartmetallbohrer aus Feinkornhartmetall
Kühlkanäle für Hochdruck Kühlmittelsysteme
Bis zu 70% schneller als Standard Hartmetallbohrer
30° Spirale für bessere Spanabfuhr
Gehonte Schneidkante
Empfohlen für Hoch Nickelhaltige und Hochwarmfeste Stähle, Kobaltbasislegierungen, Rostfreier- und Werkzeugstahl > 40HRc
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6

Broca de submicrograno sólido carburo de alto rendimiento
Orificios de paso refrigerante concebidos para sistemas de refrigeración de alta presión
Hasta un 70% más rápidas que las brocas de carburo convencionales
Hélice de 30° para una mejor evacuación de viruta
Labio cortante afilado
Recomendado para aleaciones con alto contenido de níquel, aleaciones de alta temperatura, aleaciones con base de cobalto, aceros inoxidables, y aceros de herramienta > 40Rc
Recomendación para la aplicación en torno
Tolerancia del vástago: h6

Forets carbure submicrograin a haute performance – haut pouvoir de coupe
Canaux de refroidissement pour forte pression de systèmes de liquide de refroidissement
70% plus rapide que les forets carbure standarts
Helice a 30° pour une meilleure evacuation de copeaux
Preparation de l'arete de coupe
Recommander pour base nickel, alliages a hautes temperatures, alliages de cobalt, aciers inoxydables et aciers a outils > 40HRC
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6

Alte prestazioni – Alta penetrazioni Super sub-micrograno metallo duro
Lubrificazione interna per sistemi ad alta pressione
Fino al 70% più veloce rispetto alle punte in metallo duro standard
Elica a 30° per una migliore evacuazione del truciolo
Tagliente onato
Raccomandata per lavorazioni su nickel, superleghe, leghe ad alta percentuale di cobalto, inox e acciai per utensili > 40HrcUtensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6

高效率—高进给 高效整体硬质合金钻头
通过加快切削速度延长刀具使用寿命、提高表面光洁度
跟普通的硬质合金钻头相比可提高速度高达70%
30° 螺旋角更便于排屑
切削刃口经过珩磨
高镍耐高温合金、钴基合金、不锈钢和工具钢 > 40HRC
不建议在车床，或工具必须纺纱
柄部公差: h6

3xD (1580KH) EDP#	5xD (1280KH) EDP#	7xD (1880KH) EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
22010			.1181		3.000	46	16
	25366		.1181		3.000	50	19
		26366	.1181		3.000	65	28
22015			.1200	#31	3.048	1-13/16"	5/8"
	25371		.1200	#31	3.048	2"	3/4"
		26371	.1200	#31	3.048	2-1/2"	1-1/8"
22020			.1250	1/8"	3.175	1-15/16"	11/16"
	25376		.1250	1/8"	3.175	2"	3/4"
		26376	.1250	1/8"	3.175	2-1/2"	1-1/8"
22025			.1285	#30	3.264	1-15/16"	11/16"
	25381		.1285	#30	3.264	2-1/4"	3/4"
		26381	.1285	#30	3.264	2-1/2"	1-1/8"
22030			.1360	#29	3.454	2-1/16"	3/4"
	25386		.1360	#29	3.454	2-1/4"	7/8"
		26386	.1360	#29	3.454	3"	1-1/4"
22035			.1378		3.500	52	19
	25391		.1378		3.500	57	22
		26391	.1378		3.500	75	32
22040			.1405	#28	3.569	2-1/16"	3/4"
	25396		.1405	#28	3.569	2-1/4"	7/8"
		26396	.1405	#28	3.569	3"	1-1/4"
22045			.1406	9/64"	3.571	2-1/16"	3/4"
	25401		.1406	9/64"	3.571	2-1/4"	7/8"
		26401	.1406	9/64"	3.571	3"	1-1/4"
22050			.1440	#27	3.658	2-1/16"	3/4"
	25406		.1440	#27	3.658	2-1/4"	7/8"
		26406	.1440	#27	3.658	3"	1-3/8"
22055			.1470	#26	3.734	2-3/16"	13/16"
	25411		.1470	#26	3.734	2-1/4"	7/8"
		26411	.1470	#26	3.734	3"	1-3/8"
22060			.1495	#25	3.797	2-3/16"	13/16"
	25416		.1495	#25	3.797	2-1/4"	15/16"
		26416	.1495	#25	3.797	3"	1-3/8"
22065			.1520	#24	3.861	2-3/16"	13/16"
	25421		.1520	#24	3.861	2-1/4"	15/16"
		26421	.1520	#24	3.861	3"	1-1/2"
22070			.1540	#23	3.912	2-3/16"	13/16"
	25426		.1540	#23	3.912	2-1/4"	15/16"
		26426	.1540	#23	3.912	3"	1-1/2"

continued →

Series 1580KH, 1280KH, 1880KH *(continued)*

3,967mm - 4,915mm
(.1562" - .1935")

3xD (1580KH) EDP#	5xD (1280KH) EDP#	7xD (1880KH) EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
22075			.1562	5/32"	3.967	2-3/16"	13/16"
	25431		.1562	5/32"	3.967	2-1/2"	15/16"
		26431	.1562	5/32"	3.967	3"	1-1/2"
22080			.1570	#22	3.988	2-3/16"	13/16"
	25436		.1570	#22	3.988	2-1/2"	15/16"
		26436	.1570	#22	3.988	3"	1-1/2"
22085			.1575		4.000	56	21
	25441		.1575		4.000	65	24
		26441	.1575		4.000	75	38
22090			.1590	#21	4.039	2-3/16"	13/16"
	25446		.1590	#21	4.039	2-1/2"	15/16"
		26446	.1590	#21	4.039	3"	1-1/2"
22095			.1610	#20	4.089	2-3/16"	13/16"
	25451		.1610	#20	4.089	2-1/2"	15/16"
		26451	.1610	#20	4.089	3"	1-1/2"
22100			.1660	#19	4.216	2-9/32"	15/16"
	25456		.1660	#19	4.216	2-1/2"	1"
		26456	.1660	#19	4.216	3"	1-1/2"
22105			.1695	#18	4.305	2-9/32"	15/16"
	25461		.1695	#18	4.305	2-1/2"	1"
		26461	.1695	#18	4.305	3-1/2"	1-3/4"
22110			.1719	11/64"	4.366	2-9/32"	15/16"
	25466		.1719	11/64"	4.366	2-1/2"	1"
		26466	.1719	11/64"	4.366	3-1/2"	1-3/4"
22115			.1730	#17	4.394	2-9/32"	15/16"
	25471		.1730	#17	4.394	2-1/2"	1"
		26471	.1730	#17	4.394	3-1/2"	1-3/4"
22120			.1770	#16	4.496	2-9/32"	15/16"
	25476		.1770	#16	4.496	2-1/2"	1"
		26476	.1770	#16	4.496	3-1/2"	1-3/4"
22125			.1772		4.500	58	24
	25481		.1772		4.500	65	25
		26481	.1772		4.500	88	45
22130			.1800	#15	4.572	2-9/32"	15/16"
	25486		.1800	#15	4.572	2-3/4"	1"
		26486	.1800	#15	4.572	3-1/2"	1-3/4"
22135			.1820	#14	4.623	2-9/32"	15/16"
	25491		.1820	#14	4.623	2-3/4"	1"
		26491	.1820	#14	4.623	3-1/2"	1-3/4"
22140			.1850	#13	4.699	2-9/32"	15/16"
	25496		.1850	#13	4.699	2-3/4"	1-1/4"
		26496	.1850	#13	4.699	3-1/2"	1-3/4"
22145			.1875	3/16"	4.763	2-13/32"	1"
	25501		.1875	3/16"	4.763	2-3/4"	1-1/4"
		26501	.1875	3/16"	4.763	4"	2"
22150			.1890	#12	4.801	2-13/32"	1"
	25506		.1890	#12	4.801	2-3/4"	1-1/4"
		26506	.1890	#12	4.801	4"	2"
22155			.1910	#11	4.851	2-13/32"	1"
	25511		.1910	#11	4.851	2-3/4"	1-1/4"
		26511	.1910	#11	4.851	4"	2"
22160			.1935	#10	4.915	2-13/32"	1"
	25516		.1935	#10	4.915	2-3/4"	1-1/4"
		26516	.1935	#10	4.915	4"	2"

† *Metric equivalents are for reference only*

3xD (1580KH) EDP#	5xD (1280KH) EDP#	7xD (1880KH) EDP#	Decimal	*d* † Diameter	Metric	*l1* Overall Length	*l2* Flute Length
22165			.1960	#9	4.978	2-13/32"	1"
	25521		.1960	#9	4.978	3"	1-5/16"
		26521	.1960	#9	4.978	4"	2"
22170			.1969		5.000	61	25
	25526		.1969		5.000	75	33
		26526	.1969		5.000	100	50
22175			.1990	#8	5.055	2-13/32"	1"
	25531		.1990	#8	5.055	3"	1-5/16"
		26531	.1990	#8	5.055	4"	2"
22180			.2010	#7	5.105	2-13/32"	1"
	25536		.2010	#7	5.105	3"	1-5/16"
		26536	.2010	#7	5.105	4"	2"
22185			.2031	13/64"	5.159	2-13/32"	1"
	25541		.2031	13/64"	5.159	3"	1-5/16"
		26541	.2031	13/64"	5.159	4"	2"
22190			.2040	#6	5.182	2-13/32"	1"
	25546		.2040	#6	5.182	3"	1-3/8"
		26546	.2040	#6	5.182	4"	2"
22195			.2055	#5	5.220	2-13/32"	1"
	25551		.2055	#5	5.220	3"	1-3/8"
		26551	.2055	#5	5.220	4"	2"
22200			.2090	#4	5.309	2-13/32"	1"
	25556		.2090	#4	5.309	3"	1-3/8"
		26556	.2090	#4	5.309	4"	2"
22205			.2130	#3	5.410	2-5/8"	1-3/32"
	25561		.2130	#3	5.410	3"	1-3/8"
		26561	.2130	#3	5.410	4"	2"
22210			.2165		5.500	67	28
	25566		.2165		5.500	75	35
		26566	.2165		5.500	100	50
22215			.2188	7/32"	5.558	2-5/8"	1-3/32"
	25571		.2188	7/32"	5.558	3"	1-3/8"
		26571	.2188	7/32"	5.558	4"	2"
22220			.2210	#2	5.613	2-5/8"	1-3/32"
	25576		.2210	#2	5.613	3"	1-3/8"
		26576	.2210	#2	5.613	4"	2"
22225			.2280	#1	5.791	2-5/8"	1-3/32"
	25581		.2280	#1	5.791	3"	1-3/8"
		26581	.2280	#1	5.791	4-1/8"	2-1/8"
22230			.2340	A	5.944	2-5/8"	1-3/32"
	25586		.2340	A	5.944	3-1/4"	1-1/2"
		26586	.2340	A	5.944	4-1/8"	2-1/8"
22235			.2344	15/64"	5.954	2-5/8"	1-3/32"
	25591		.2344	15/64"	5.954	3-1/4"	1-1/2"
		26591	.2344	15/64"	5.954	4-1/8"	2-1/8"
22240			.2362		6.000	67	28
	25596		.2362		6.000	80	38
		26596	.2362		6.000	105	55
22245			.2380	B	6.045	2-3/4"	1-7/32"
	25601		.2380	B	6.045	3-1/4"	1-5/8"
		26601	.2380	B	6.045	4-1/8"	2-1/8"
22250			.2420	C	6.147	2-3/4"	1-7/32"
	25606		.2420	C	6.147	3-1/4"	1-5/8"
		26606	.2420	C	6.147	4-1/4"	2-1/4"

continued →

Series 1580KH, 1280KH, 1880KH *(continued)*

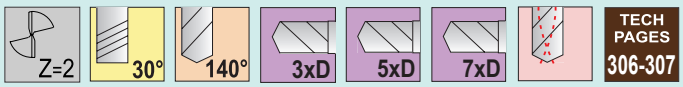
6,248mm - 7,938mm
(.2460" - .3125")

3xD (1580KH) EDP#	5xD (1280KH) EDP#	7xD (1880KH) EDP#	Decimal	*d* † Diameter	Metric	*l1* Overall Length	*l2* Flute Length
22255			.2460	D	6.248	2-3/4"	1-7/32"
	25611		.2460	D	6.248	3-1/4"	1-5/8"
		26611	.2460	D	6.248	4-1/4"	2-1/4"
22260			.2500	1/4" / E	6.350	2-3/4"	1-7/32"
	25616		.2500	1/4" / E	6.350	3-1/4"	1-5/8"
		26616	.2500	1/4" / E	6.350	4-1/4"	2-1/4"
22265			.2559		6.500	70	31
	25621		.2559		6.500	80	41
		26621	.2559		6.500	105	58
22270			.2570	F	6.528	2-3/4"	1-7/32"
	25626		.2570	F	6.528	3-1/4"	1-11/16"
		26626	.2570	F	6.528	4-3/8"	2-3/8"
22275			.2610	G	6.629	2-3/4"	1-7/32"
	25631		.2610	G	6.629	3-1/2"	1-11/16"
		26631	.2610	G	6.629	4-3/8"	2-3/8"
22280			.2656	17/64"	6.746	2-15/16"	1-11/32"
	25636		.2656	17/64"	6.746	3-1/2"	1-11/16"
		26636	.2656	17/64"	6.746	4-3/8"	2-3/8"
22285			.2660	H	6.756	2-15/16"	1-11/32"
	25641		.2660	H	6.756	3-1/2"	1-11/16"
		26641	.2660	H	6.756	4-3/8"	2-3/8"
22290			.2720	I	6.909	2-15/16"	1-11/32"
	25646		.2720	I	6.909	3-1/2"	1-11/16"
		26646	.2720	I	6.909	4-3/8"	2-3/8"
22295			.2756		7.000	75	34
	25651		.2756		7.000	88	43
		26651	.2756		7.000	110	61
22300			.2770	J	7.036	2-15/16"	1-11/32"
	25656		.2770	J	7.036	3-1/2"	1-11/16"
		26656	.2770	J	7.036	4-3/8"	2-3/8"
22305			.2810	K	7.137	2-15/16"	1-11/32"
	25661		.2810	K	7.137	3-1/2"	1-3/4"
		26661	.2810	K	7.137	4-7/16"	2-7/16"
22310			.2812	9/32"	7.142	2-15/16"	1-11/32"
	25666		.2812	9/32"	7.142	3-1/2"	1-3/4"
		26666	.2812	9/32"	7.142	4-7/16"	2-7/16"
22315			.2900	L	7.366	2-15/16"	1-11/32"
	25671		.2900	L	7.366	3-1/2"	1-3/4"
		26671	.2900	L	7.366	4-7/16"	2-7/16"
22320			.2950	M	7.493	2-15/16"	1-11/32"
	25676		.2950	M	7.493	3-3/4"	1-3/4"
		26676	.2950	M	7.493	4-7/16"	2-7/16"
22325			.2953		7.500	75	34
	25681		.2953		7.500	95	44
		26681	.2953		7.500	115	66
22330			.2969	19/64"	7.541	3-3/32"	1-15/32"
	25686		.2969	19/64"	7.541	3-3/4"	1-7/8"
		26686	.2969	19/64"	7.541	4-9/16"	2-9/16"
22335			.3020	N	7.671	3-3/32"	1-15/32"
	25691		.3020	N	7.671	3-3/4"	1-7/8"
		26691	.3020	N	7.671	4-9/16"	2-9/16"
22340			.3125	5/16"	7.938	3-3/32"	1-15/32"
	25696		.3125	5/16"	7.938	3-3/4"	1-7/8"
		26696	.3125	5/16"	7.938	4-11/16"	2-9/16"

† *Metric equivalents are for reference only*

TOLERANCES		
d	+0,0000 –0,0127mm (+.0000" –.0005")	
l1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")

Series 1580KH, 1280KH, 1880KH *(continued)*



8,000mm - 9,347mm
(.3150" - .3680")

AlTiN-based Coating
AlTiN-basierte-Beschichtet
Recubrimiento a base de AlTiN
Revêtement à base de AlTiN
Rivestimento in a base AlTiN
AlTiN基涂层

3xD (1580KH) EDP#	5xD (1280KH) EDP#	7xD (1880KH) EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
22345			.3150		8.000	79	37
	25701		.3150		8.000	95	48
		26701	.3150		8.000	120	69
22350			.3160	O	8.026	3-3/32"	1-15/32"
	25706		.3160	O	8.026	3-3/4"	1-7/8"
		26706	.3160	O	8.026	4-11/16"	2-11/16"
22355			.3230	P	8.204	3-3/32"	1-15/32"
	25711		.3230	P	8.204	3-3/4"	2-3/32"
		26711	.3230	P	8.204	4-11/16"	2-11/16"
22360			.3281	21/64"	8.334	3-3/32"	1-15/32"
	25716		.3281	21/64"	8.334	4"	2-3/32"
		26716	.3281	21/64"	8.334	4-11/16"	2-11/16"
22365			.3320	Q	8.433	3-3/32"	1-15/32"
	25721		.3320	Q	8.433	4"	2-3/32"
		26721	.3320	Q	8.433	4-15/16"	2-15/16"
22370			.3346		8.500	79	37
	25726		.3346		8.500	100	53
		26726	.3346		8.500	125	75
22375			.3390	R	8.611	3-5/16"	1-9/16"
	25731		.3390	R	8.611	4"	2-3/32"
		26731	.3390	R	8.611	4-15/16"	2-15/16"
22380			.3438	11/32"	8.733	3-5/16"	1-9/16"
	25736		.3438	11/32"	8.733	4"	2-3/16"
		26736	.3438	11/32"	8.733	4-15/16"	2-15/16"
22385			.3480	S	8.839	3-5/16"	1-9/16"
	25741		.3480	S	8.839	4"	2-3/16"
		26741	.3480	S	8.839	5"	3"
22390			.3543		9.000	84	40
	25746		.3543		9.000	100	56
		26746	.3543		9.000	125	77
22395			.3580	T	9.093	3-5/16"	1-9/16"
	25751		.3580	T	9.093	4-1/4"	2-9/32"
		26751	.3580	T	9.093	5"	3"
22400			.3594	23/64"	9.129	3-5/16"	1-9/16"
	25756		.3594	23/64"	9.129	4-1/4"	2-9/32"
		26756	.3594	23/64"	9.129	5"	3"
22405			.3680	U	9.347	3-5/16"	1-9/16"
	25761		.3680	U	9.347	4-1/4"	2-9/32"
		26761	.3680	U	9.347	5"	3"

continued →

Series 1580KH, 1280KH, 1880KH *(continued)*

9,500mm - 12,000mm
(.3740" - .4724")

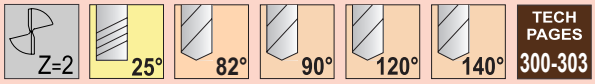
3xD (1580KH) EDP#	5xD (1280KH) EDP#	7xD (1880KH) EDP#	Decimal	*d* † Diameter	Metric	*l1* Overall Length	*l2* Flute Length
22410			.3740		9.500	84	40
	25766		.3740		9.500	105	58
		26766	.3740		9.500	130	80
22415			.3750	3/8"	9.525	3-1/2"	1-11/16"
	25771		.3750	3/8"	9.525	4-1/4"	2-3/8"
		26771	.3750	3/8"	9.525	5-1/8"	3-1/8"
22420			.3770	V	9.576	3-1/2"	1-11/16"
	25776		.3770	V	9.576	4-1/4"	2-3/8"
		26776	.3770	V	9.576	5-1/8"	3-1/8"
22425			.3860	W	9.804	3-1/2"	1-11/16"
	25781		.3860	W	9.804	4-1/2"	2-3/8"
		26781	.3860	W	9.804	5-1/8"	3-1/8"
22430			.3906	25/64"	9.921	3-1/2"	1-11/16"
	25786		.3906	25/64"	9.921	4-1/2"	2-3/8"
		26786	.3906	25/64"	9.921	5-1/4"	3-1/4"
22435			.3937		10.000	89	43
	25791		.3937		10.000	115	60
		26791	.3937		10.000	135	83
22440			.3970	X	10.084	3-1/2"	1-11/16"
	25796		.3970	X	10.084	4-1/2"	2-1/2"
		26796	.3970	X	10.084	5-1/4"	3-1/4"
22445			.4040	Y	10.262	3-1/2"	1-11/16"
	25801		.4040	Y	10.262	4-1/2"	2-9/16"
		26801	.4040	Y	10.262	5-3/8"	3-3/8"
22450			.4062	13/32"	10.317	3-1/2"	1-11/16"
	25806		.4062	13/32"	10.317	4-1/2"	2-9/16"
		26806	.4062	13/32"	10.317	5-3/8"	3-3/8"
22455			.4130	Z	10.490	3-1/2"	1-11/16"
	25811		.4130	Z	10.490	4-1/2"	2-5/8"
		26811	.4130	Z	10.490	5-3/8"	3-3/8"
22460			.4134		10.500	89	43
	25816		.4134		10.500	115	67
		26816	.4134		10.500	135	86
22465			.4219	27/64"	10.716	3-3/4"	1-13/16"
	25821		.4219	27/64"	10.716	4-1/2"	2-11/16"
		26821	.4219	27/64"	10.716	5-7/16"	3-7/16"
22470			.4331		11.000	95	46
	25826		.4331		11.000	115	68
		26826	.4331		11.000	135	88
22475			.4375	7/16"	11.113	3-3/4"	1-13/16"
	25831		.4375	7/16"	11.113	4-3/4"	2-13/16"
		26831	.4375	7/16"	11.113	5-7/16"	3-7/16"
22480			.4528		11.500	95	46
	25836		.4528		11.500	120	71
		26836	.4528		11.500	140	91
22485			.4531	29/64"	11.509	3-3/4"	1-13/16"
	25841		.4531	29/64"	11.509	4-3/4"	2-7/8"
		26841	.4531	29/64"	11.509	5-9/16"	3-13/16"
22490			.4688	15/32"	11.908	4"	1-15/16"
	25846		.4688	15/32"	11.908	4-3/4"	2-7/8"
		26846	.4688	15/32"	11.908	5-9/16"	3-13/16"
22495			.4724		12.000	102	49
	25851		.4724		12.000	120	73
		26851	.4724		12.000	140	98

† *Metric equivalents are for reference only*

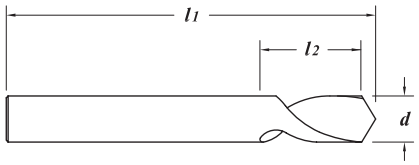
3xD (1580KH) EDP#	5xD (1280KH) EDP#	7xD (1880KH) EDP#	*d* † Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
22500			.4844	31/64"	12.304	4"	1-15/16"
	25856		.4844	31/64"	12.304	5-5/16"	3"
		26856	.4844	31/64"	12.304	5-9/16"	3-13/16"
22505			.4921		12.500	102	49
	25861		.4921		12.500	135	76
		26861	.4921		12.500	150	102
22510			.5000	1/2"	12.700	4"	1-15/16"
	25866		.5000	1/2"	12.700	5-3/8"	3-1/16"
		26866	.5000	1/2"	12.700	6"	4"
22515			.5118		13.000	107	53
	25871		.5118		13.000	135	78
		26871	.5118		13.000	150	102
22520			.5156	33/64"	13.096	4-7/32"	2-3/32"
	25876		.5156	33/64"	13.096	5-3/8"	3-1/8"
		26876	.5156	33/64"	13.096	6"	4"
22525			.5312	17/32"	13.492	4-7/32"	2-3/32"
	25881		.5312	17/32"	13.492	5-11/16"	3-5/16"
		26881	.5312	17/32"	13.492	6-1/8"	4-1/8"
22530			.5315		13.500	110	56
	25886		.5315		13.500	145	84
		26886	.5315		13.500	155	105
22535			.5469	35/64"	13.891	4-5/16"	2-7/32"
	25891		.5469	35/64"	13.891	5-13/16"	3-3/8"
		26891	.5469	35/64"	13.891	6-1/8"	4-1/8"
22540			.5512		14.000	110	56
	25896		.5512		14.000	145	86
		26896	.5512		14.000	155	105
22545			.5625	9/16"	14.288	4-9/16"	2-15/32"
	25901		.5625	9/16"	14.288	5-15/16"	3-1/2"
		26901	.5625	9/16"	14.288	6-1/4"	4-3/8"
22550			.5709		14.500	116	63
	25906		.5709		14.500	150	89
		26906	.5709		14.500	160	109
22555			.5781	37/64"	14.684	4-15/16"	2-9/16"
	25911		.5781	37/64"	14.684	6"	3-1/2"
		26911	.5781	37/64"	14.684	6-1/4"	4-3/8"
22560			.5906		15.000	125	65
	25916		.5906		15.000	150	90
		26916	.5906		15.000	160	112
22565			.5938	19/32"	15.083	4-15/16"	2-9/16"
	25921		.5938	19/32"	15.083	6"	3-9/16"
		26921	.5938	19/32"	15.083	6-3/8"	4-3/8"
22570			.6094	39/64"	15.479	5-1/16"	2-13/16"
	25926		.6094	39/64"	15.479	6-3/16"	3-11/16"
		26926	.6094	39/64"	15.479	6-7/16"	4-7/16"
22575			.6102		15.500	129	71
	25931		.6102		15.500	160	94
		26931	.6102		15.500	165	113
22580			.6250	5/8"	15.875	5-1/4"	3-1/8"
	25936		.6250	5/8"	15.875	6-5/16"	3-3/4"
		26936	.6250	5/8"	15.875	6-9/16"	4-9/16"
22585			.6299		16.000	133	79
	25941		.6299		16.000	160	95
		26941	.6299		16.000	165	117

Series 1600

TOLERANCES	
d	+0,0000 –0,0127mm (+.0000" –.0005")
l1	+3,175 –3,175mm (+.125" –.125")



N/C Spotting
NC-Anbohrer
Marcado N/C
Forets a Pointer, N/C Pointage
Punta da Centro per Controlli Numerici
数控定位



Solid submicron grain carbide drill
For spotting to stabilize long drills
Can be used for chamfering
Rough, angled or spherical surfaces
No O.D. clearance
For locating on true position
Live tooling recommended on lathe processes
Shank tolerance: h6

Vollhartmetallbohrer aus Feinkornhartmetall
Vorzentrieren zum stabilisieren von langen Bohrern
Kann zum Erstellen einer Fase verwendet werden
Grobe, Winklige oder Kugelförmige Oberflächen
Aufbohrer
Für höhere Positioniergenauigkeit
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6

Broca de submicrograno sólido carburo
Pretaladrado para estabilizar brocas largas
Se puede utilizar para crear un chaflán
Superficies rugosas, angulosas o esféricas
Sin holgura de D.E.
Para situarla en posición real
Recomendación para la aplicación en torno
Tolerancia del vástago: h6

Forets carbure submicrograin
Pour repérer pour stabiliser forets longs
Peut être utilisé pour créer un chanfrein
Rugueux, surfaces angulaires ou sphériques
Pas de dia dédouanement
Pour localiser la position réelle
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6

Punte in sub-micro grana
Centrino per stabilizzare punti lunghe
Può essere usato per creare uno smusso
Adatto su pareti inclinate o sferiche
Posizionamento preciso
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6

整体硬质合金钻头
定位稳定长钻头
可用于创建倒角
粗加工面、斜面或者球面
没有外径间隙
供准确位置上定位用
不建议在车床，或工具必须纺纱
柄部公差: h6

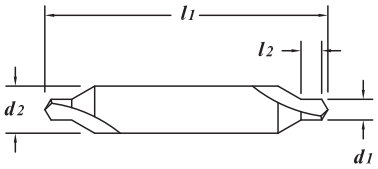
82° EDP#	90° EDP#	120° EDP#	140° EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
91650	91500	91572	91240	.0787		2.000	50	10
91652	91505	91575	91245	.0938	3/32"	2.383	2"	3/8"
-	91510	91580	91250	.1181		3.000	50	10
91656	91000	91100	91260	.1250	1/8"	3.175	2"	3/8"
91658	91520	91590	91270	.1575		4.000	50	12
91660	91010	91110	91280	.1875	3/16"	4.763	3"	3/4"
-	91530	91600	91290	.1969		5.000	65	15
91664	91540	91610	91300	.2362		6.000	65	20
91666	91020	91120	91310	.2500	1/4"	6.350	3"	3/4"
91668	91025	91125	91315	.3125	5/16"	7.938	3"	1"
91670	91550	91620	91320	.3150		8.000	75	25
91672	91030	91130	91330	.3750	3/8"	9.525	3"	1"
-	91560	91630	91340	.3937		10.000	88	25
91676	91565	91635	91345	.4375	7/16"	11.113	4"	1"
-	91570	91640	91350	.4724		12.000	100	30
91680	91040	91140	91360	.5000	1/2"	12.700	4"	1"
-	91050	91170	91370	.5512		14.000	100	30
91684	91060	91180	-	.5625	9/16"	14.287	4"	1"
91686	91070	91190	91390	.6250	5/8"	15.875	5"	1"
91688	91080	91200	91400	.6299		16.000	125	30
91690	91090	91210	-	.7087		18.000	125	30
91692	91150	91220	91420	.7500	3/4"	19.050	5"	1"
-	91160	91230	91430	.7874		20.000	125	30

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,0762 –0,0000mm (+.003" –.000")
d_2	h6
l_1	+3,175 –3,175mm (+.125" –.125")
l_2	+0,203 –0,203mm (+.008" –.008")

Z=2 | 10° | 118° | TECH PAGES 300-303

Combined Drill and Countersink
Kobiniertes Bohren- und Ansenken
Broca y Avellanadora Combinadas
Percage et Chanfreinage
Centrino a Doppia Punta
组合式钻孔和锪孔钻头



Solid submicron grain carbide drill
For center drilling applications
60° ±0°30' included countersink angle
Live tooling recommended on lathe processes
Drill length (l_2) is equal to drill diameter (d_1)
Not able to be altered

Vollhartmetallbohrer aus Feinkornhartmetall
Zentrierbohrer Anwendungen
60° ±0°30' inclusive Ansenkwinkel
Empfehlung fuer den Einsatz auf der Drehmaschine
Bohrerlänge (l_2) ist gleich wie Bohrdurchmesser (d_1)
Kann nicht modifiziert werden

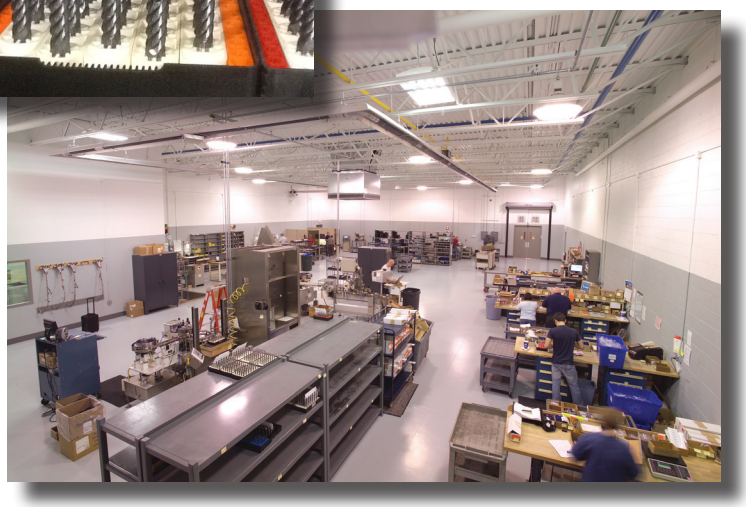
Broca de submicrograno sólido carburo
Aplicaciones de perforación central
Ángulo de avellanado entre caras de 60° ±0°30'
Recomendación para la aplicación en torno
Drill length (l_2) is equal to drill diameter (d_1)
No es possible modificar

Forets carbure submicrograin
Pour applications pour percage au centre
Inclus angle de chanfreinage a 60° ±0°30'
Outil de filature nécessaires pour une utilisation sur un processus de tournage
La longueur de coupe (l_2) est égale au diamètre (d_1)
Outil non modifiable

Punte in sub-micro grana
Centrinatura
60° ±0°30' di svasatura
Utensili rotanti sono consigliate se usato su un tornio
Lunghezza punta (l_2) uguale a diametro punta (d_1)
Non può essere modificata

整体硬质合金钻头
钻中心孔用途
60° ±0°30' 锪孔夹角
不建议在车床，或工具必须纺纱
钻头长度 (l_2) 等于钻头直径 (d_1)
无法改制

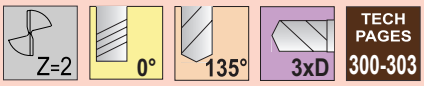
EDP #	Number	d_1 † Diameter Decimal	Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Drill Length
58030	1	.0469	1.191	1/8"	1-1/2"	.0469
58040	2	.0781	1.984	3/16"	2"	.0781
58050	3	.1094	2.779	1/4"	2"	.1094
58060	4	.1250	3.175	5/16"	2-1/8"	.1250
58070	5	.1875	4.763	7/16"	2-3/4"	.1875
58080	6	.2188	5.558	1/2"	3"	.2188



Tool prep, Coating inspection

Series 1500

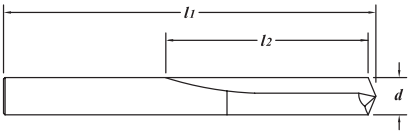
1,588mm - 4,216mm
(.0625" - .1660")



TECH PAGES 300-303

TOLERANCES		
d	+0,0000 –0,0127mm (+.0000" –.0005")	
l_1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l_2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")

Hard Metal
Hartmetall
Metal Duroe
Métal Dur
Metallo Duro
硬金属



Solid submicron grain carbide drill
Straight flute design provides excellent rigidity
Materials 40 Rc and higher
Excellent heat resistance and lubricity
Recommended for high nickel, cobalt based and powdered metals
Live tooling recommended on lathe processes
Shank tolerance: h6
Hardlube Coating - Page 55

Vollhartmetallbohrer aus Feinkornhartmetall
Gerades Spannutendesign für exzellente Stabilität
Werkstoffe mit 40HRc und höher
Exzellente Hitzebeständigkeit und Schmiereigenschaften
Empfohlen für Hoch Nickelhaltige und Kobaltbasislegierungen, Pulvermetall
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Hardlube Beschichtung - Seite 55

Broca de submicrograno sólido carburo
El diseño de ranuras rectas proporciona excelente rigidez
Materiales 40Rc y superiores
Excelente resistencia térmica y lubricación
Recomendado para alto contenido en níquel, aleaciones con base de cobalto y metal pulverizado
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Recubrimiento de Hardlube - Página 55

Forets carbure submicrograin
Le design de la goujure apporte une excellente rigidite
Materiaux de 40 HRC et plus
Excellente resistance a la haute temperature et glissement
Recommander pour alliages a hautes teneur en nickel, base cobalt et metal fritte
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Revêtement Hardlube - Page 55

Punte in sub-micro grana
Tagliente dritto che consente un'ottima rigidità
Materiali a 40 Hrc e superiori
Eccellente resistenza al calore e autolubrificante
Raccomandata per lavorazioni su leghe di nickel, cobalto e sinterizzati
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Rivestimento in Hardlube - Pagina 55

整体硬质合金钻头
直排屑槽结构保证了极好的刚性
推荐加工洛氏硬度40或40以上的材质
耐热性和润滑性特好
推荐加工高镍合金、钴基合金和粉末冶金
不建议在车床，或工具必须纺纱
柄部公差: h6
涂层 Hardlube - 55页

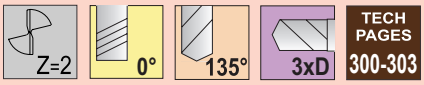
EDP#	d † Diameter Decimal	Diameter	Metric	l_1 Overall Length	l_2 Flute Length
59165	.0625	1/16"	1.588	1-3/4"	5/8"
59180	.0700	#50	1.778	1-3/4"	3/4"
59185	.0730	#49	1.854	1-3/4"	3/4"
59190	.0760	#48	1.930	1-3/4"	3/4"
59195	.0781	5/64"	1.984	1-3/4"	3/4"
59200	.0785	#47	1.994	1-3/4"	7/8"
39000	.0787		2.000	50	22
59210	.0810	#46	2.057	2"	7/8"
59215	.0820	#45	2.083	2"	7/8"
59220	.0860	#44	2.184	2"	7/8"
59225	.0890	#43	2.261	2"	7/8"
59230	.0935	#42	2.375	2"	7/8"
59235	.0938	3/32"	2.383	2"	7/8"
59240	.0960	#41	2.438	2"	7/8"
59245	.0980	#40	2.489	2"	7/8"
39050	.0984		2.500	50	22
59255	.0995	#39	2.527	2"	7/8"
59260	.1015	#38	2.578	2"	7/8"
59265	.1040	#37	2.642	2"	7/8"
59270	.1065	#36	2.705	2"	7/8"
59275	.1094	7/64"	2.779	2"	1"
59280	.1100	#35	2.794	2"	1"
59285	.1110	#34	2.819	2"	1"
59290	.1130	#33	2.870	2"	1"
59295	.1160	#32	2.946	2"	1"
39100	.1181		3.000	50	25
59305	.1200	#31	3.048	2"	1"
59310	.1250	1/8"	3.175	2"	1"
59315	.1285	#30	3.264	2"	1"
59320	.1360	#29	3.454	2"	1"
39150	.1378		3.500	50	25
59330	.1405	#28	3.569	2"	1"
59335	.1406	9/64"	3.571	2"	1"
59340	.1440	#27	3.658	2"	1"
59345	.1470	#26	3.734	2"	1"
59350	.1495	#25	3.797	2"	1"
59355	.1520	#24	3.861	2"	1"
59360	.1540	#23	3.912	2"	1"
59365	.1562	5/32"	3.967	2-1/2"	1-1/8"
59370	.1570	#22	3.988	2-1/2"	1-1/8"
39200	.1575		4.000	63	28
59380	.1590	#21	4.039	2-1/2"	1-1/8"
59385	.1610	#20	4.089	2-1/2"	1-1/8"
59390	.1660	#19	4.216	2-1/2"	1-1/8"

† *Metric equivalents are for reference only*

EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
59395	.1695	#18	4.305	2-1/2"	1-3/16"
59400	.1719	11/64"	4.366	2-1/2"	1-3/16"
59405	.1730	#17	4.394	2-1/2"	1-3/16"
59410	.1770	#16	4.496	2-1/2"	1-3/16"
39250	.1772		4.500	63	28
59420	.1800	#15	4.572	2-1/2"	1-3/16"
59425	.1820	#14	4.623	2-1/2"	1-3/16"
59430	.1850	#13	4.700	2-1/2"	1-3/16"
59435	.1875	3/16"	4.763	2-1/2"	1-3/16"
59440	.1890	#12	4.801	2-1/2"	1-3/16"
59445	.1910	#11	4.851	2-1/2"	1-3/16"
59450	.1935	#10	4.915	2-1/2"	1-1/4"
59455	.1960	#9	4.978	2-1/2"	1-1/4"
39300	.1969		5.000	63	32
59465	.1990	#8	5.055	2-1/2"	1-1/4"
59470	.2010	#7	5.105	2-1/2"	1-1/4"
59475	.2031	13/64"	5.159	2-1/2"	1-1/4"
59480	.2040	#6	5.182	2-1/2"	1-1/4"
59485	.2055	#5	5.220	2-1/2"	1-1/4"
59490	.2090	#4	5.309	2-1/2"	1-1/4"
59495	.2130	#3	5.410	2-1/2"	1-1/4"
39350	.2165		5.500	63	32
59505	.2188	7/32"	5.558	2-1/2"	1-1/2"
59510	.2210	#2	5.613	2-1/2"	1-1/2"
59515	.2280	#1	5.791	2-1/2"	1-1/2"
59525	.2344	15/64"	5.954	2-1/2"	1-1/2"
39400	.2362		6.000	63	38
59550	.2500	1/4"	6.350	2-1/2"	1-1/2"
39450	.2559		6.500	63	38
59570	.2656	17/64"	6.746	2-1/2"	1-1/2"
39500	.2756		7.000	63	38
59600	.2812	9/32"	7.142	2-1/2"	1-1/2"
39520	.2953		7.500	63	41
59620	.2969	19/64"	7.541	2-1/2"	1-5/8"
59630	.3125	5/16"	7.938	2-1/2"	1-5/8"
39540	.3150		8.000	63	41
59650	.3281	21/64"	8.334	3"	1-5/8"
39560	.3346		8.500	76	41
59670	.3438	11/32"	8.733	3"	1-5/8"
39580	.3543		9.000	76	41
59690	.3594	23/64"	9.129	3"	1-3/4"
39600	.3740		9.500	76	41
59705	.3750	3/8"	9.525	3"	1-3/4"
59720	.3906	25/64"	9.921	3"	1-3/4"
39620	.3937		10.000	76	44
59740	.4062	13/32"	10.317	3"	1-3/4"
39640	.4134		10.500	76	44
59755	.4219	27/64"	10.716	3"	1-3/4"
39660	.4331		11.000	76	44
59765	.4375	7/16"	11.113	3"	1-3/4"
59775	.4531	29/64"	11.509	3"	1-3/4"
59780	.4688	15/32"	11.908	3"	1-3/4"
39700	.4724		12.000	76	44
59790	.4844	31/64"	12.304	3"	1-3/4"
39720	.4921		12.500	76	44
59800	.5000	1/2"	12.700	3"	1-3/4"

Series 1500H

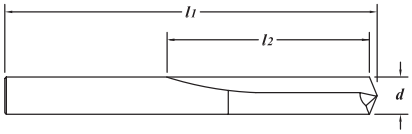
1,588mm - 4,216mm
(.0625" - .1660")



TECH PAGES 300-303

TOLERANCES		
d	+0,0000 –0,0127mm (+.0000" –.0005")	
l_1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l_2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")

Hard Metal - Hardlube Coated
Hartmetall - Hardlube-Beschichtet
Metal Duro - Recubrimiento de Hardlube
Métal Dur - Revêtement Hardlube
Metallo Duro - Rivestimento in Hardlube
硬金属 - Hardlube 涂层



Solid submicron grain carbide drill
Straight flute design provides excellent rigidity
Materials 40 Rc and higher
Excellent heat resistance and lubricity
Recommended for high nickel, cobalt based and powdered metals
Live tooling recommended on lathe processes
Shank tolerance: h6
Uncoated - Page 53

Vollhartmetallbohrer aus Feinkornhartmetall
Gerades Spannutendesign für exzellente Stabilität
Werkstoffe mit 40HRc und höher
Exzellente Hitzebeständigkeit und Schmiereigenschaften
Empfohlen für Hoch Nickelhaltige und Kobaltbasislegierungen, Pulvermetall
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Unbeschichtet - Seite 53

Broca de submicrograno sólido carburo
El diseño de ranuras rectas proporciona excelente rigidez
Materiales 40Rc y superiores
Excelente resistencia térmica y lubricación
Recomendado para alto contenido en níquel, aleaciones con base de cobalto y metal pulverizado
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Sin recubrimiento - Página 53

Forets carbure submicrograin
Le design de la goujure apporte une excellente rigidite
Materiaux de 40HRC et plus
Excellente resistance a la haute temperature et glissement
Recommander pour alliages a hautes teneur en nickel, base cobalt et metal fritte
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Non revêtu - Page 53

Punte in sub-micro grana
Tagliente dritto che consente un'ottima rigidità
Materiali a 40Hrc e superiori
Eccellente resistenza al calore e autolubrificante
Raccomandata per lavorazioni su leghe di nickel, cobalto e sinterizzati
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Non rivestito - Pagina 53

整体硬质合金钻头
直排屑槽结构保证了极好的刚性
推荐加工洛氏硬度40或40以上的材质
耐热性和润滑性特好
推荐加工高镍合金、钴基合金和粉末冶金
不建议在车床，或工具必须纺纱
柄部公差: h6
无涂层 - 53页

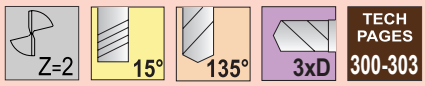
EDP#	d † Diameter Decimal	Diameter	Metric	l_1 Overall Length	l_2 Flute Length
59166	.0625	1/16"	1.588	1-3/4"	5/8"
59181	.0700	#50	1.778	1-3/4"	3/4"
59186	.0730	#49	1.854	1-3/4"	3/4"
59191	.0760	#48	1.930	1-3/4"	3/4"
59196	.0781	5/64"	1.984	1-3/4"	3/4"
59201	.0785	#47	1.994	1-3/4"	7/8"
39001	.0787		2.000	50	22
59211	.0810	#46	2.057	2"	7/8"
59216	.0820	#45	2.083	2"	7/8"
59221	.0860	#44	2.184	2"	7/8"
59226	.0890	#43	2.261	2"	7/8"
59231	.0935	#42	2.375	2"	7/8"
59236	.0938	3/32"	2.383	2"	7/8"
59241	.0960	#41	2.438	2"	7/8"
59246	.0980	#40	2.489	2"	7/8"
39051	.0984		2.500	50	22
59256	.0995	#39	2.527	2"	7/8"
59261	.1015	#38	2.578	2"	7/8"
59266	.1040	#37	2.642	2"	7/8"
59271	.1065	#36	2.705	2"	7/8"
59276	.1094	7/64"	2.779	2"	1"
59281	.1100	#35	2.794	2"	1"
59286	.1110	#34	2.819	2"	1"
59291	.1130	#33	2.870	2"	1"
59296	.1160	#32	2.946	2"	1"
39101	.1181		3.000	50	25
59306	.1200	#31	3.048	2"	1"
59311	.1250	1/8"	3.175	2"	1"
59316	.1285	#30	3.264	2"	1"
59321	.1360	#29	3.454	2"	1"
39151	.1378		3.500	50	25
59331	.1405	#28	3.569	2"	1"
59336	.1406	9/64"	3.571	2"	1"
59341	.1440	#27	3.658	2"	1"
59346	.1470	#26	3.734	2"	1"
59351	.1495	#25	3.797	2"	1"
59356	.1520	#24	3.861	2"	1"
59361	.1540	#23	3.912	2"	1"
59366	.1562	5/32"	3.967	2-1/2"	1-1/8"
59371	.1570	#22	3.988	2-1/2"	1-1/8"
39201	.1575		4.000	63	28
59381	.1590	#21	4.039	2-1/2"	1-1/8"
59386	.1610	#20	4.089	2-1/2"	1-1/8"
59391	.1660	#19	4.216	2-1/2"	1-1/8"

† *Metric equivalents are for reference only*

EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
59396	.1695	#18	4.305	2-1/2"	1-3/16"
59401	.1719	11/64"	4.366	2-1/2"	1-3/16"
59406	.1730	#17	4.394	2-1/2"	1-3/16"
59411	.1770	#16	4.496	2-1/2"	1-3/16"
39251	.1772		4.500	63	28
59421	.1800	#15	4.572	2-1/2"	1-3/16"
59426	.1820	#14	4.623	2-1/2"	1-3/16"
59431	.1850	#13	4.700	2-1/2"	1-3/16"
59436	.1875	3/16"	4.763	2-1/2"	1-3/16"
59441	.1890	#12	4.801	2-1/2"	1-3/16"
59446	.1910	#11	4.851	2-1/2"	1-3/16"
59451	.1935	#10	4.915	2-1/2"	1-1/4"
59456	.1960	#9	4.978	2-1/2"	1-1/4"
39301	.1969		5.000	63	32
59466	.1990	#8	5.055	2-1/2"	1-1/4"
59471	.2010	#7	5.105	2-1/2"	1-1/4"
59476	.2031	13/64"	5.159	2-1/2"	1-1/4"
59481	.2040	#6	5.182	2-1/2"	1-1/4"
59486	.2055	#5	5.220	2-1/2"	1-1/4"
59491	.2090	#4	5.309	2-1/2"	1-1/4"
59496	.2130	#3	5.410	2-1/2"	1-1/4"
39351	.2165		5.500	63	32
59506	.2188	7/32"	5.558	2-1/2"	1-1/2"
59511	.2210	#2	5.613	2-1/2"	1-1/2"
59516	.2280	#1	5.791	2-1/2"	1-1/2"
59526	.2344	15/64"	5.954	2-1/2"	1-1/2"
39401	.2362		6.000	63	38
59551	.2500	1/4"	6.350	2-1/2"	1-1/2"
39451	.2559		6.500	63	38
59571	.2656	17/64"	6.746	2-1/2"	1-1/2"
39501	.2756		7.000	63	38
59601	.2812	9/32"	7.142	2-1/2"	1-1/2"
39521	.2953		7.500	63	41
59621	.2969	19/64"	7.541	2-1/2"	1-5/8"
59631	.3125	5/16"	7.938	2-1/2"	1-5/8"
39541	.3150		8.000	63	41
59651	.3281	21/64"	8.334	3"	1-5/8"
39561	.3346		8.500	76	41
59671	.3438	11/32"	8.733	3"	1-5/8"
39581	.3543		9.000	76	41
59691	.3594	23/64"	9.129	3"	1-3/4"
39601	.3740		9.500	76	41
59706	.3750	3/8"	9.525	3"	1-3/4"
59721	.3906	25/64"	9.921	3"	1-3/4"
39621	.3937		10.000	76	44
59741	.4062	13/32"	10.317	3"	1-3/4"
59756	.4219	27/64"	10.716	3"	1-3/4"
39661	.4331		11.000	76	44
59766	.4375	7/16"	11.113	3"	1-3/4"
39681	.4528		11.500	76	44
59776	.4531	29/64"	11.509	3"	1-3/4"
59781	.4688	15/32"	11.908	3"	1-3/4"
39701	.4724		12.000	76	44
59791	.4844	31/64"	12.304	3"	1-3/4"
39721	.4921		12.500	76	44
59801	.5000	1/2"	12.700	3"	1-3/4"

Series 1510

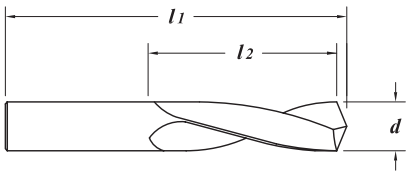
1,588mm - 4,000mm
(.0625" - .1575")



TECH PAGES 300-303

TOLERANCES		
d	+0,0000 –0,0127mm (+.0000" –.0005")	
l_1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l_2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")

Slow Helix
Reduzierte Helix
Hélice Lenta
Hélice Réduite
Lento a Spirale
缓螺旋



Solid submicron grain carbide drill
Heavy web for extra rigidity and added strength
Thinned point
Recommended to run in titanium, inconel, hastalloy, waspalloy, and stainless steel
Live tooling recommended on lathe processes
Shank tolerance: h6
Hardlube Coating - page 60

Vollhartmetallbohrer aus Feinkornhartmetall
Starke Schneidkante für hohe Stabilität
Ausspitzung
Empfohlen für Titan, Inconel, Hastalloy, Waspalloy, und Rostfreie Stähle
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Hardlube-Beschichtet - Seite 60

Broca de submicrograno sólido carburo
Cuerpo resistente para mayor rigidez y resistencia
Punta rebajada
Recomendado para titanio, inconel, hastalloy, waspalloy y acero inoxidable
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Recubrimiento de Hardlube - Página 60

Forets carbure submicrograin
Corps lourd pour plus de rigidite
Ame amincie
Recommander pour titane, inconel, hastalloy, waspalloy et acier inoxydable
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Revêtement Hardlube - Page 60

Punte in sub-micro grana
Gambo robusto per una massimia rigidità
Centro scaricato
Raccomandata per lavorazioni su titanio, inconel, hastalloy, waspalloy e acciaio inox
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Rivestimento in Hardlube - Pagina 60

整体硬质合金钻头
大的中心刃产生超强刚性和强度
经过修磨的刀尖
推荐加工钛合金、铬镍铁耐热耐蚀合金、耐盐酸镍基合金、耐高热镍基合金和不锈钢合金
不建议在车床，或工具必须纺纱
柄部公差: h6
Hardlube 涂层 - 60页

EDP#	d † Diameter Decimal	Diameter	Metric	l_1 Overall Length	l_2 Flute Length
19070	.0625	1/16"	1.588	1-3/4"	5/8"
19075	.0635	#52	1.613	1-3/4"	11/16"
19080	.0670	#51	1.702	1-3/4"	11/16"
19085	.0700	#50	1.778	1-3/4"	11/16"
19090	.0730	#49	1.854	1-3/4"	11/16"
19095	.0760	#48	1.930	1-3/4"	11/16"
19100	.0781	5/64"	1.984	1-3/4"	11/16"
19105	.0785	#47	1.994	1-3/4"	3/4"
19115	.0787		2.000	45	19
19120	.0810	#46	2.057	1-3/4"	3/4"
19125	.0820	#45	2.083	1-3/4"	3/4"
19130	.0860	#44	2.184	1-3/4"	3/4"
19135	.0890	#43	2.261	1-3/4"	3/4"
19140	.0935	#42	2.375	1-3/4"	3/4"
19145	.0938	3/32"	2.383	1-3/4"	3/4"
19150	.0960	#41	2.438	1-13/16"	13/16"
19155	.0980	#40	2.489	1-13/16"	13/16"
19160	.0984		2.500	46	21
19165	.0995	#39	2.527	1-13/16"	13/16"
19170	.1015	#38	2.578	1-13/16"	13/16"
19175	.1040	#37	2.642	1-13/16"	13/16"
19180	.1065	#36	2.705	1-13/16"	13/16"
19185	.1094	7/64"	2.779	1-13/16"	13/16"
19190	.1100	#35	2.794	1-7/8"	7/8"
19195	.1110	#34	2.819	1-7/8"	7/8"
19200	.1130	#33	2.870	1-7/8"	7/8"
19205	.1160	#32	2.946	1-7/8"	7/8"
19210	.1181		3.000	48	22
19215	.1200	#31	3.048	1-7/8"	7/8"
19220	.1250	1/8"	3.175	1-7/8"	7/8"
19225	.1285	#30	3.264	1-15/16"	15/16"
19230	.1360	#29	3.454	1-15/16"	15/16"
19235	.1378		3.500	49	24
19240	.1405	#28	3.569	1-15/16"	15/16"
19245	.1406	9/64"	3.571	1-15/16"	15/16"
19250	.1440	#27	3.658	2-1/16"	1"
19255	.1470	#26	3.734	2-1/16"	1"
19260	.1495	#25	3.797	2-1/16"	1"
19265	.1520	#24	3.861	2-1/16"	1"
19270	.1540	#23	3.912	2-1/16"	1"
19275	.1562	5/32"	3.967	2-1/16"	1"
19280	.1570	#22	3.988	2-1/8"	1-1/16"
19285	.1575		4.000	54	27

† *Metric equivalents are for reference only*

EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
19290	.1590	#21	4.039	2-1/8"	1-1/16"
19295	.1610	#20	4.089	2-1/8"	1-1/16"
19300	.1660	#19	4.216	2-1/8"	1-1/16"
19305	.1695	#18	4.305	2-1/8"	1-1/16"
19310	.1719	11/64"	4.366	2-1/8"	1-1/16"
19315	.1730	#17	4.394	2-3/16"	1-1/8"
19320	.1770	#16	4.496	2-3/16"	1-1/8"
19325	.1772		4.500	56	29
19330	.1800	#15	4.572	2-3/16"	1-1/8"
19335	.1820	#14	4.623	2-3/16"	1-1/8"
19340	.1850	#13	4.700	2-3/16"	1-1/8"
19345	.1875	3/16"	4.763	2-3/16"	1-1/8"
19350	.1890	#12	4.801	2-1/4"	1-3/16"
19355	.1910	#11	4.851	2-1/4"	1-3/16"
19360	.1935	#10	4.915	2-1/4"	1-3/16"
19365	.1960	#9	4.978	2-1/4"	1-3/16"
19370	.1969		5.000	57	30
19375	.1990	#8	5.055	2-1/4"	1-3/16"
19380	.2010	#7	5.105	2-1/4"	1-3/16"
19385	.2031	13/64"	5.159	2-1/4"	1-3/16"
19390	.2040	#6	5.182	2-3/8"	1-1/4"
19395	.2055	#5	5.220	2-3/8"	1-1/4"
19400	.2090	#4	5.309	2-3/8"	1-1/4"
19405	.2130	#3	5.410	2-3/8"	1-1/4"
19410	.2165		5.500	60	32
19415	.2188	7/32"	5.558	2-3/8"	1-1/4"
19420	.2210	#2	5.613	2-7/16"	1-5/16"
19425	.2280	#1	5.791	2-7/16"	1-5/16"
19430	.2340	A	5.944	2-7/16"	1-5/16"
19435	.2344	15/64"	5.954	2-7/16"	1-5/16"
19440	.2362		6.000	64	35
19445	.2380	B	6.045	2-1/2"	1-3/8"
19450	.2420	C	6.147	2-1/2"	1-3/8"
19455	.2460	D	6.248	2-1/2"	1-3/8"
19460	.2500	1/4" / E	6.350	2-1/2"	1-3/8"
19465	.2559		6.500	67	37
19470	.2570	F	6.528	2-5/8"	1-7/16"
19475	.2610	G	6.629	2-5/8"	1-7/16"
19480	.2656	17/64"	6.746	2-5/8"	1-7/16"
19485	.2660	H	6.756	2-11/16"	1-1/2"
19490	.2720	I	6.909	2-11/16"	1-1/2"
19495	.2756		7.000	68	38
19500	.2770	J	7.036	2-11/16"	1-1/2"
19505	.2810	K	7.137	2-11/16"	1-1/2"
19510	.2812	9/32"	7.142	2-11/16"	1-1/2"
19515	.2900	L	7.366	2-3/4"	1-9/16"
19520	.2950	M	7.493	2-3/4"	1-9/16"
19525	.2953		7.500	70	40
19530	.2969	19/64"	7.541	2-3/4"	1-9/16"
19535	.3020	N	7.671	2-15/16"	1-5/8"
19540	.3125	5/16"	7.938	2-15/16"	1-5/8"
19545	.3150		8.000	75	43
19550	.3160	O	8.026	2-15/16"	1-11/16"
19555	.3230	P	8.204	2-15/16"	1-11/16"
19560	.3281	21/64"	8.334	2-15/16"	1-11/16"
19565	.3320	Q	8.433	3"	1-11/16"
19570	.3346		8.500	76	43

continued →

Series 1510 *(continued)*

8,611mm - 16,000mm
(.3390" - .6299")

EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
19575	.3390	R	8.611	3"	1-11/16"
19580	.3438	11/32"	8.733	3"	1-11/16"
19585	.3480	S	8.839	3-1/16"	1-3/4"
19590	.3543		9.000	78	44
19595	.3580	T	9.093	3-1/16"	1-3/4"
19600	.3594	23/64"	9.129	3-1/16"	1-3/4"
19605	.3680	U	9.347	3-1/8"	1-13/16"
19610	.3740		9.500	79	46
19615	.3750	3/8"	9.525	3-1/8"	1-13/16"
19620	.3770	V	9.576	3-1/4"	1-7/8"
19625	.3860	W	9.804	3-1/4"	1-7/8"
19630	.3906	25/64"	9.921	3-1/4"	1-7/8"
19635	.3937		10.000	84	49
19640	.3970	X	10.084	3-5/16"	1-15/16"
19645	.4040	Y	10.262	3-5/16"	1-15/16"
19650	.4062	13/32"	10.317	3-5/16"	1-15/16"
19655	.4130	Z	10.490	3-3/8"	2"
19660	.4134		10.500	86	51
19665	.4219	27/64"	10.716	3-3/8"	2"
19670	.4331		11.000	87	52
19675	.4375	7/16"	11.113	3-7/16"	2-1/16"
19680	.4528		11.500	91	54
19685	.4531	29/64"	11.509	3-9/16"	2-1/8"
19690	.4688	15/32"	11.908	3-5/8"	2-1/8"
19695	.4724		12.000	94	56
19700	.4844	31/64"	12.304	3-11/16"	2-3/16"
19705	.4921		12.500	95	56
19710	.5000	1/2"	12.700	3-3/4"	2-1/4"
19715	.5118		13.000	107	60
19720	.5156	33/64"	13.096	4-1/4"	2-3/8"
19725	.5312	17/32"	13.492	4-1/4"	2-3/8"
19730	.5315		13.500	107	60
19735	.5469	35/64"	13.891	4-1/4"	2-3/8"
19740	.5512		14.000	107	60
19745	.5625	9/16"	14.287	4-1/2"	2-1/2"
19750	.5709		14.500	115	65
19755	.5781	37/64"	14.683	4-1/2"	2-1/2"
19760	.5906		15.000	115	65
19765	.5938	19/32"	15.082	4-1/2"	2-1/2"
19770	.6094	39/64"	15.478	4-1/2"	2-1/2"
19780	.6250	5/8"	15.875	4-1/2"	2-1/2"
19785	.6299		16.000	115	65

† *Metric equivalents are for reference only*

TOLERANCES

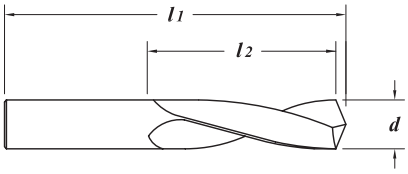
d	+0,0000 –0,0127mm (+.0000" –.0005")	
l1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")

Z=2 | 15° | 135° | 3xD | TECH PAGES 300-303

Series 1510H

1,588mm - 4,000mm
(.0625" - .1575")

Slow Helix - HARDLUBE Coated
Reduzierte Helix - HARDLUBE-Beschichtet
Hélice Lenta - Recubrimiento de HARDLUBE
Hélice Réduite - Revêtement HARDLUBE
Elica Dolce - Rivestimento in HARDLUBE
缓螺旋 - HARDLUBE 涂层



Solid submicron grain carbide drill
Excellent heat resistance and lubricity
Heavy web for extra rigidity and added strength
Thinned point
Recommended to run in titanium, inconel, hastalloy, waspalloy, and stainless steel
Live tooling recommended on lathe processes
Shank tolerance: h6
Uncoated - page 57

Vollhartmetallbohrer aus Feinkornhartmetall
Exzellente Hitzebeständigkeit und Schmiereigenschaften
Starke Schneidkante für hohe Stabilität
Ausspitzung
Empfohlen für Titan, Inconel, Hastalloy, Waspalloy, und Rostfreie Stähle
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Unbeschichtet - Seite 57

Broca de submicrograno sólido carburo
Excelente resistencia térmica y lubricación
Cuerpo resistente para mayor rigidez y resistencia
Punta rebajada
Recomendado para titanio, inconel, hastalloy, waspalloy y acero inoxidable
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Sin recubrimiento - Página 57

Forets carbure submicrograin
Excellente resistance a la haute temperature et glissement
Corps lourd pour plus de rigidite
Ame amincie
Recommander pour titane, inconel, hastalloy, waspalloy et acier inoxydable
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Sans revêtement - Page 57

Punte in sub-micro grana
Eccellente resistenza al calore e autolubrificante
Gambo robusto per una massimia rigidità
Centro scaricato
Raccomandata per lavorazioni su titanio, inconel, hastalloy, waspalloy e acciaio inox
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Non Rivestito - Pagina 57

整体硬质合金钻头
耐热性和润滑性特好
大的中心刃产生超强刚性和强度
经过修磨的刀尖
推荐加工钛合金、铬镍铁耐热耐蚀合金、耐盐酸镍基合金、耐高热镍基合金和不锈钢合金
不建议在车床，或工具必须纺纱
柄部公差: h6
未涂层 - 57页

EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
19071	.0625	1/16"	1.588	1-3/4"	5/8"
19076	.0635	#52	1.613	1-3/4"	11/16"
19081	.0670	#51	1.702	1-3/4"	11/16"
19086	.0700	#50	1.778	1-3/4"	11/16"
19091	.0730	#49	1.854	1-3/4"	11/16"
19096	.0760	#48	1.930	1-3/4"	11/16"
19101	.0781	5/64"	1.984	1-3/4"	11/16"
19106	.0785	#47	1.994	1-3/4"	3/4"
19116	.0787		2.000	45	19
19121	.0810	#46	2.057	1-3/4"	3/4"
19126	.0820	#45	2.083	1-3/4"	3/4"
19131	.0860	#44	2.184	1-3/4"	3/4"
19136	.0890	#43	2.261	1-3/4"	3/4"
19141	.0935	#42	2.375	1-3/4"	3/4"
19146	.0938	3/32"	2.383	1-3/4"	3/4"
19151	.0960	#41	2.438	1-13/16"	13/16"
19156	.0980	#40	2.489	1-13/16"	13/16"
19161	.0984		2.500	46	21
19166	.0995	#39	2.527	1-13/16"	13/16"
19171	.1015	#38	2.578	1-13/16"	13/16"
19176	.1040	#37	2.642	1-13/16"	13/16"
19181	.1065	#36	2.705	1-13/16"	13/16"
19186	.1094	7/64"	2.779	1-13/16"	13/16"
19191	.1100	#35	2.794	1-7/8"	7/8"
19196	.1110	#34	2.819	1-7/8"	7/8"
19201	.1130	#33	2.870	1-7/8"	7/8"
19206	.1160	#32	2.946	1-7/8"	7/8"
19211	.1181		3.000	48	22
19216	.1200	#31	3.048	1-7/8"	7/8"
19221	.1250	1/8"	3.175	1-7/8"	7/8"
19226	.1285	#30	3.264	1-15/16"	15/16"
19231	.1360	#29	3.454	1-15/16"	15/16"
19236	.1378		3.500	49	24
19241	.1405	#28	3.569	1-15/16"	15/16"
19246	.1406	9/64"	3.571	1-15/16"	15/16"
19251	.1440	#27	3.658	2-1/16"	1"
19256	.1470	#26	3.734	2-1/16"	1"
19261	.1495	#25	3.797	2-1/16"	1"
19266	.1520	#24	3.861	2-1/16"	1"
19271	.1540	#23	3.912	2-1/16"	1"
19276	.1562	5/32"	3.967	2-1/16"	1"
19281	.1570	#22	3.988	2-1/8"	1-1/16"
19286	.1575		4.000	54	27

continued →

Series 1510H *(continued)*

4,039mm - 8,500mm
(.1590" - .3346")

EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
19291	.1590	#21	4.039	2-1/8"	1-1/16"
19296	.1610	#20	4.089	2-1/8"	1-1/16"
19301	.1660	#19	4.216	2-1/8"	1-1/16"
19306	.1695	#18	4.305	2-1/8"	1-1/16"
19311	.1719	11/64"	4.366	2-1/8"	1-1/16"
19316	.1730	#17	4.394	2-3/16"	1-1/8"
19321	.1770	#16	4.496	2-3/16"	1-1/8"
19326	.1772		4.500	56	29
19331	.1800	#15	4.572	2-3/16"	1-1/8"
19336	.1820	#14	4.623	2-3/16"	1-1/8"
19341	.1850	#13	4.700	2-3/16"	1-1/8"
19346	.1875	3/16"	4.763	2-3/16"	1-1/8"
19351	.1890	#12	4.801	2-1/4"	1-3/16"
19356	.1910	#11	4.851	2-1/4"	1-3/16"
19361	.1935	#10	4.915	2-1/4"	1-3/16"
19366	.1960	#9	4.978	2-1/4"	1-3/16"
19371	.1969		5.000	57	30
19376	.1990	#8	5.055	2-1/4"	1-3/16"
19381	.2010	#7	5.105	2-1/4"	1-3/16"
19386	.2031	13/64"	5.159	2-1/4"	1-3/16"
19391	.2040	#6	5.182	2-3/8"	1-1/4"
19396	.2055	#5	5.220	2-3/8"	1-1/4"
19401	.2090	#4	5.309	2-3/8"	1-1/4"
19406	.2130	#3	5.410	2-3/8"	1-1/4"
19411	.2165		5.500	60	32
19416	.2188	7/32"	5.558	2-3/8"	1-1/4"
19421	.2210	#2	5.613	2-7/16"	1-5/16"
19426	.2280	#1	5.791	2-7/16"	1-5/16"
19431	.2340	A	5.944	2-7/16"	1-5/16"
19436	.2344	15/64"	5.954	2-7/16"	1-5/16"
19441	.2362		6.000	64	35
19446	.2380	B	6.045	2-1/2"	1-3/8"
19451	.2420	C	6.147	2-1/2"	1-3/8"
19456	.2460	D	6.248	2-1/2"	1-3/8"
19461	.2500	1/4" / E	6.350	2-1/2"	1-3/8"
19466	.2559		6.500	67	37
19471	.2570	F	6.528	2-5/8"	1-7/16"
19476	.2610	G	6.629	2-5/8"	1-7/16"
19481	.2656	17/64"	6.746	2-5/8"	1-7/16"
19486	.2660	H	6.756	2-11/16"	1-1/2"
19491	.2720	I	6.909	2-11/16"	1-1/2"
19496	.2756		7.000	68	38
19501	.2770	J	7.036	2-11/16"	1-1/2"
19506	.2810	K	7.137	2-11/16"	1-1/2"
19511	.2812	9/32"	7.142	2-11/16"	1-1/2"
19516	.2900	L	7.366	2-3/4"	1-9/16"
19521	.2950	M	7.493	2-3/4"	1-9/16"
19526	.2953		7.500	70	40
19531	.2969	19/64"	7.541	2-3/4"	1-9/16"
19536	.3020	N	7.671	2-15/16"	1-5/8"
19541	.3125	5/16"	7.938	2-15/16"	1-5/8"
19546	.3150		8.000	75	43
19551	.3160	O	8.026	2-15/16"	1-11/16"
19556	.3230	P	8.204	2-15/16"	1-11/16"
19561	.3281	21/64"	8.334	2-15/16"	1-11/16"
19566	.3320	Q	8.433	3"	1-11/16"
19571	.3346		8.500	76	43

† *Metric equivalents are for reference only*

EDP#	d † Diameter Decimal	Diameter	Metric	l_1 Overall Length	l_2 Flute Length
19576	.3390	R	8.611	3"	1-11/16"
19581	.3438	11/32"	8.733	3"	1-11/16"
19586	.3480	S	8.839	3-1/16"	1-3/4"
19591	.3543		9.000	78	44
19596	.3580	T	9.093	3-1/16"	1-3/4"
19601	.3594	23/64"	9.129	3-1/16"	1-3/4"
19606	.3680	U	9.347	3-1/8"	1-13/16"
19611	.3740		9.500	79	46
19616	.3750	3/8"	9.525	3-1/8"	1-13/16"
19621	.3770	V	9.576	3-1/4"	1-7/8"
19626	.3860	W	9.804	3-1/4"	1-7/8"
19631	.3906	25/64"	9.921	3-1/4"	1-7/8"
19636	.3937		10.000	84	49
19641	.3970	X	10.084	3-5/16"	1-15/16"
19646	.4040	Y	10.262	3-5/16"	1-15/16"
19651	.4062	13/32"	10.317	3-5/16"	1-15/16"
19656	.4130	Z	10.490	3-3/8"	2"
19661	.4134		10.500	86	51
19666	.4219	27/64"	10.716	3-3/8"	2"
19671	.4331		11.000	87	52
19676	.4375	7/16"	11.113	3-7/16"	2-1/16"
19681	.4528		11.500	91	54
19686	.4531	29/64"	11.509	3-9/16"	2-1/8"
19691	.4688	15/32"	11.908	3-5/8"	2-1/8"
19696	.4724		12.000	94	56
19701	.4844	31/64"	12.304	3-11/16"	2-3/16"
19706	.4921		12.500	95	56
19711	.5000	1/2"	12.700	3-3/4"	2-1/4"
19716	.5118		13.000	107	60
19721	.5156	33/64"	13.096	4-1/4"	2-3/8"
19726	.5312	17/32"	13.492	4-1/4"	2-3/8"
19731	.5315		13.500	107	60
19736	.5469	35/64"	13.891	4-1/4"	2-3/8"
19741	.5512		14.000	107	60
19746	.5625	9/16"	14.287	4-1/2"	2-1/2"
19751	.5709		14.500	115	65
19756	.5781	37/64"	14.683	4-1/2"	2-1/2"
19761	.5906		15.000	115	65
19766	.5938	19/32"	15.082	4-1/2"	2-1/2"
19771	.6094	39/64"	15.478	4-1/2"	2-1/2"
19776	.6102		15.500	115	65
19781	.6250	5/8"	15.875	4-1/2"	2-1/2"
19786	.6299		16.000	115	65

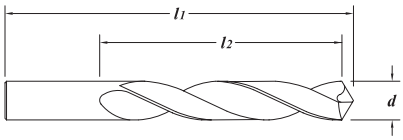
Series 1520

1,588mm - 4,000mm
(.0625" - .1575")

Z=2 | 25° | 135° | 3xD | TECH PAGES 300-303

TOLERANCES

d	+0,0000 –0,0127mm (+.0000" –.0005")	
l1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")



Solid submicron grain carbide drill
No spotting required in most applications
4-facet self-centering point
General purpose for all material groups
Live tooling recommended on lathe processes
Shank tolerance: h6
Hardlube Coating - page 66

Vollhartmetallbohrer aus Feinkornhartmetall
Vorzentrieren bei den meisten Anwendungen nicht notwendig
4-Fasen-Anschliff Selbstzentrierend Punkt
Allzweck für alle Materialgruppen
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Hardlube-Beschichtet - Seite 66

Broca de submicrograno sólido carburo
No se requiere pretaladrado para la mayoría de las aplicaciones
Punta de 4 caras autocentrada
De uso general para todos los grupos de materiales
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Recubrimiento de Hardlube - Página 66

Forets carbure submicrograin
Pas de point de centre requis pour la plupart des applications
Pointe auto centrante avec 4 faces de depouille
Usage général pour tous les groupes de matériaux
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Revêtement Hardlube - Page 66

Punte in sub-micro grana
Pre-centraggio non richiesto nella maggior parte delle applicazioni
Punto 4 facce autocentrante
Scopo generale per tutte le materie
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Rivestimento in Hardlube - Pagina 66

整体硬质合金钻头
自定心刀尖
在多数用途中不需要定心
4-小平面刀尖
通用使用的所有材料组
不建议在车床，或工具必须纺纱
柄部公差: h6
Hardlube 涂层 - 66页

EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
77165	.0625	1/16"	1.588	1-3/4"	5/8"
77170	.0635	#52	1.613	1-3/4"	11/16"
77175	.0670	#51	1.702	1-3/4"	11/16"
77180	.0700	#50	1.778	1-3/4"	11/16"
77185	.0730	#49	1.854	1-3/4"	11/16"
77190	.0760	#48	1.930	1-3/4"	11/16"
77195	.0781	5/64"	1.984	1-3/4"	11/16"
77200	.0785	#47	1.994	1-3/4"	3/4"
77205	.0787		2.000	45	19
77210	.0810	#46	2.057	1-3/4"	3/4"
77215	.0820	#45	2.083	1-3/4"	3/4"
77220	.0860	#44	2.184	1-3/4"	3/4"
77225	.0890	#43	2.261	1-3/4"	3/4"
77230	.0935	#42	2.375	1-3/4"	3/4"
77235	.0938	3/32"	2.383	1-3/4"	3/4"
77240	.0960	#41	2.438	1-13/16"	13/16"
77245	.0980	#40	2.489	1-13/16"	13/16"
77250	.0984		2.500	46	21
77255	.0995	#39	2.527	1-13/16"	13/16"
77260	.1015	#38	2.578	1-13/16"	13/16"
77265	.1040	#37	2.642	1-13/16"	13/16"
77270	.1065	#36	2.705	1-13/16"	13/16"
77275	.1094	7/64"	2.779	1-13/16"	13/16"
77280	.1100	#35	2.794	1-7/8"	7/8"
77285	.1110	#34	2.819	1-7/8"	7/8"
77290	.1130	#33	2.870	1-7/8"	7/8"
77295	.1160	#32	2.946	1-7/8"	7/8"
77300	.1181		3.000	48	22
77305	.1200	#31	3.048	1-7/8"	7/8"
77310	.1250	1/8"	3.175	1-7/8"	7/8"
77315	.1285	#30	3.264	1-15/16"	15/16"
77320	.1360	#29	3.454	1-15/16"	15/16"
77325	.1378		3.500	49	24
77330	.1405	#28	3.569	1-15/16"	15/16"
77335	.1406	9/64"	3.571	1-15/16"	15/16"
77340	.1440	#27	3.658	2-1/16"	1"
77345	.1470	#26	3.734	2-1/16"	1"
77350	.1495	#25	3.797	2-1/16"	1"
77355	.1520	#24	3.861	2-1/16"	1"
77360	.1540	#23	3.912	2-1/16"	1"
77365	.1562	5/32"	3.967	2-1/16"	1"
77370	.1570	#22	3.988	2-1/8"	1-1/16"
77375	.1575		4.000	54	27

† *Metric equivalents are for reference only*

EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
77380	.1590	#21	4.039	2-1/8"	1-1/16"
77385	.1610	#20	4.089	2-1/8"	1-1/16"
77390	.1660	#19	4.216	2-1/8"	1-1/16"
77395	.1695	#18	4.305	2-1/8"	1-1/16"
77400	.1719	11/64"	4.366	2-1/8"	1-1/16"
77405	.1730	#17	4.394	2-3/16"	1-1/8"
77410	.1770	#16	4.496	2-3/16"	1-1/8"
77415	.1772		4.500	56	29
77420	.1800	#15	4.572	2-3/16"	1-1/8"
77425	.1820	#14	4.623	2-3/16"	1-1/8"
77430	.1850	#13	4.700	2-3/16"	1-1/8"
77435	.1875	3/16"	4.763	2-3/16"	1-1/8"
77440	.1890	#12	4.801	2-1/4"	1-3/16"
77445	.1910	#11	4.851	2-1/4"	1-3/16"
77450	.1935	#10	4.915	2-1/4"	1-3/16"
77455	.1960	#9	4.978	2-1/4"	1-3/16"
77460	.1969		5.000	57	30
77465	.1990	#8	5.055	2-1/4"	1-3/16"
77470	.2010	#7	5.105	2-1/4"	1-3/16"
77475	.2031	13/64"	5.159	2-1/4"	1-3/16"
77480	.2040	#6	5.182	2-3/8"	1-1/4"
77485	.2055	#5	5.220	2-3/8"	1-1/4"
77490	.2090	#4	5.309	2-3/8"	1-1/4"
77495	.2130	#3	5.410	2-3/8"	1-1/4"
77500	.2165		5.500	60	32
77505	.2188	7/32"	5.558	2-3/8"	1-1/4"
77510	.2210	#2	5.613	2-7/16"	1-5/16"
77515	.2280	#1	5.791	2-7/16"	1-5/16"
77520	.2340	A	5.944	2-7/16"	1-5/16"
77525	.2344	15/64"	5.954	2-7/16"	1-5/16"
77530	.2362		6.000	64	35
77535	.2380	B	6.045	2-1/2"	1-3/8"
77540	.2420	C	6.147	2-1/2"	1-3/8"
77545	.2460	D	6.248	2-1/2"	1-3/8"
77550	.2500	1/4" / E	6.350	2-1/2"	1-3/8"
77555	.2559		6.500	67	37
77560	.2570	F	6.528	2-5/8"	1-7/16"
77565	.2610	G	6.629	2-5/8"	1-7/16"
77570	.2656	17/64"	6.746	2-5/8"	1-7/16"
77575	.2660	H	6.756	2-11/16"	1-1/2"
77580	.2720	I	6.909	2-11/16"	1-1/2"
77585	.2756		7.000	68	38
77590	.2770	J	7.036	2-11/16"	1-1/2"
77595	.2810	K	7.137	2-11/16"	1-1/2"
77600	.2812	9/32"	7.142	2-11/16"	1-1/2"
77605	.2900	L	7.366	2-3/4"	1-9/16"
77610	.2950	M	7.493	2-3/4"	1-9/16"
77615	.2953		7.500	70	40
77620	.2969	19/64"	7.541	2-3/4"	1-9/16"
77625	.3020	N	7.671	2-15/16"	1-5/8"
77630	.3125	5/16"	7.938	2-15/16"	1-5/8"
77635	.3150		8.000	75	43
77640	.3160	O	8.026	2-15/16"	1-11/16"
77645	.3230	P	8.204	2-15/16"	1-11/16"
77650	.3281	21/64"	8.334	2-15/16"	1-11/16"
77655	.3320	Q	8.433	3"	1-11/16"
77660	.3346		8.500	76	43

continued →

Series 1520 *(continued)*

8,611mm - 12,700mm
(.3390" - .5000")

EDP#	*d* † Diameter Decimal		*d* † Diameter Metric	*l1* Overall Length	*l2* Flute Length
77665	.3390	R	8.611	3"	1-11/16"
77670	.3438	11/32"	8.733	3"	1-11/16"
77675	.3480	S	8.839	3-1/16"	1-3/4"
77680	.3543		9.000	78	44
77685	.3580	T	9.093	3-1/16"	1-3/4"
77690	.3594	23/64"	9.129	3-1/16"	1-3/4"
77695	.3680	U	9.347	3-1/8"	1-13/16"
77700	.3740		9.500	79	46
77705	.3750	3/8"	9.525	3-1/8"	1-13/16"
77710	.3770	V	9.576	3-1/4"	1-7/8"
77715	.3860	W	9.804	3-1/4"	1-7/8"
77720	.3906	25/64"	9.921	3-1/4"	1-7/8"
77725	.3937		10.000	84	49
77730	.3970	X	10.084	3-5/16"	1-15/16"
77735	.4040	Y	10.262	3-5/16"	1-15/16"
77740	.4062	13/32"	10.317	3-5/16"	1-15/16"
77745	.4130	Z	10.490	3-3/8"	2"
77750	.4134		10.500	86	51
77755	.4219	27/64"	10.716	3-3/8"	2"
77760	.4331		11.000	87	52
77765	.4375	7/16"	11.113	3-7/16"	2-1/16"
77770	.4528		11.500	91	54
77775	.4531	29/64"	11.509	3-9/16"	2-1/8"
77780	.4688	15/32"	11.908	3-5/8"	2-1/8"
77785	.4724		12.000	94	56
77790	.4844	31/64"	12.304	3-11/16"	2-3/16"
77795	.4921		12.500	95	56
77800	.5000	1/2"	12.700	3-3/4"	2-1/4"

Drill and Reamer Manufacturing

† *Metric equivalents are for reference only*

TOLERANCES

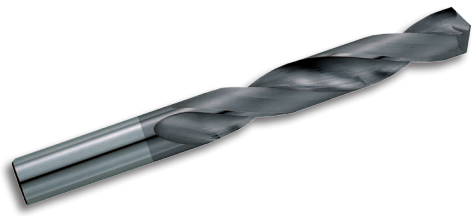
d	+0,0000 –0,0127mm (+.0000" –.0005")	
l1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")

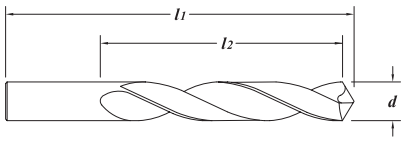
Z=2 | 25° | 135° | 3xD | TECH PAGES 300-303

Series 1520H

1,588mm - 4,000mm
(.0625" - .1575")

HARDLUBE Coated
HARDLUBE-Beschichtet
Recubrimiento de HARDLUBE
Revêtement HARDLUBE
Rivestimento in HARDLUBE
HARDLUBE 涂层





Solid submicron grain carbide drill
Excellent heat resistance and lubricity
No spotting required in most applications
4-facet self-centering point
General purpose for all material groups
Live tooling recommended on lathe processes
Shank tolerance: h6
Uncoated - page 63

Vollhartmetallbohrer aus Feinkornhartmetall
Exzellente Hitzebeständigkeit und Schmiereigenschaften
Vorzentrieren bei den meisten Anwendungen nicht notwendig
4-Fasen-Anschliff Selbstzentrierend Punkt
Allzweck für alle Materialgruppen
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Unbeschichtet - Seite 63

Broca de submicrograno sólido carburo
Excelente resistencia térmica y lubricación
No se requiere pretaladrado para la mayoría de las aplicaciones
Punta de 4 caras autocentrada
De uso general para todos los grupos de materiales
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Sin recubrimiento - Página 63

Forets carbure submicrograin
Excellente resistance a la haute temperature et glissement
Pas de point de centre requis pour la plupart des applications
Pointe auto centrante avec 4 faces de depouille
Usage général pour tous les groupes de matériaux
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Sans revêtement - Page 63

Punte in sub-micro grana
Eccellente resistenza al calore e autolubrificante
Pre-centraggio non richiesto nella maggior parte delle applicazioni
Punto 4 facce autocentrante
Scopo generale per tutte le materie
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Non Rivestito - Pagina 63

整体硬质合金钻头
耐热性和润滑性特好
自定心刀尖
在多数用途中不需要定心
通用使用的所有材料组
不建议在车床，或工具必须纺纱
柄部公差: h6
未涂层 - 63页

EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
77166	.0625	1/16"	1.588	1-3/4"	5/8"
77171	.0635	#52	1.613	1-3/4"	11/16"
77176	.0670	#51	1.702	1-3/4"	11/16"
77181	.0700	#50	1.778	1-3/4"	11/16"
77186	.0730	#49	1.854	1-3/4"	11/16"
77191	.0760	#48	1.930	1-3/4"	11/16"
77196	.0781	5/64"	1.984	1-3/4"	11/16"
77201	.0785	#47	1.994	1-3/4"	3/4"
77206	.0787		2.000	45	19
77211	.0810	#46	2.057	1-3/4"	3/4"
77216	.0820	#45	2.083	1-3/4"	3/4"
77221	.0860	#44	2.184	1-3/4"	3/4"
77226	.0890	#43	2.261	1-3/4"	3/4"
77231	.0935	#42	2.375	1-3/4"	3/4"
77236	.0938	3/32"	2.383	1-3/4"	3/4"
77241	.0960	#41	2.438	1-13/16"	13/16"
77246	.0980	#40	2.489	1-13/16"	13/16"
77251	.0984		2.500	46	21
77256	.0995	#39	2.527	1-13/16"	13/16"
77261	.1015	#38	2.578	1-13/16"	13/16"
77266	.1040	#37	2.642	1-13/16"	13/16"
77271	.1065	#36	2.705	1-13/16"	13/16"
77276	.1094	7/64"	2.779	1-13/16"	13/16"
77281	.1100	#35	2.794	1-7/8"	7/8"
77286	.1110	#34	2.819	1-7/8"	7/8"
77291	.1130	#33	2.870	1-7/8"	7/8"
77296	.1160	#32	2.946	1-7/8"	7/8"
77301	.1181		3.000	48	22
77306	.1200	#31	3.048	1-7/8"	7/8"
77311	.1250	1/8"	3.175	1-7/8"	7/8"
77316	.1285	#30	3.264	1-15/16"	15/16"
77321	.1360	#29	3.454	1-15/16"	15/16"
77326	.1378		3.500	49	24
77331	.1405	#28	3.569	1-15/16"	15/16"
77336	.1406	9/64"	3.571	1-15/16"	15/16"
77341	.1440	#27	3.658	2-1/16"	1"
77346	.1470	#26	3.734	2-1/16"	1"
77351	.1495	#25	3.797	2-1/16"	1"
77356	.1520	#24	3.861	2-1/16"	1"
77361	.1540	#23	3.912	2-1/16"	1"
77366	.1562	5/32"	3.967	2-1/16"	1"
77371	.1570	#22	3.988	2-1/8"	1-1/16"
77376	.1575		4.000	54	27

continued →

Series 1520H *(continued)*

4,039mm - 8,500mm
(.1590" - .3346")

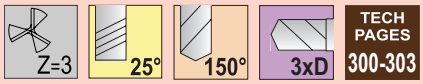
EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
77381	.1590	#21	4.039	2-1/8"	1-1/16"
77386	.1610	#20	4.089	2-1/8"	1-1/16"
77391	.1660	#19	4.216	2-1/8"	1-1/16"
77396	.1695	#18	4.305	2-1/8"	1-1/16"
77401	.1719	11/64"	4.366	2-1/8"	1-1/16"
77406	.1730	#17	4.394	2-3/16"	1-1/8"
77411	.1770	#16	4.496	2-3/16"	1-1/8"
77416	.1772		4.500	56	29
77421	.1800	#15	4.572	2-3/16"	1-1/8"
77426	.1820	#14	4.623	2-3/16"	1-1/8"
77431	.1850	#13	4.700	2-3/16"	1-1/8"
77436	.1875	3/16"	4.763	2-3/16"	1-1/8"
77441	.1890	#12	4.801	2-1/4"	1-3/16"
77446	.1910	#11	4.851	2-1/4"	1-3/16"
77451	.1935	#10	4.915	2-1/4"	1-3/16"
77456	.1960	#9	4.978	2-1/4"	1-3/16"
77461	.1969		5.000	57	30
77466	.1990	#8	5.055	2-1/4"	1-3/16"
77471	.2010	#7	5.105	2-1/4"	1-3/16"
77476	.2031	13/64"	5.159	2-1/4"	1-3/16"
77481	.2040	#6	5.182	2-3/8"	1-1/4"
77486	.2055	#5	5.220	2-3/8"	1-1/4"
77491	.2090	#4	5.309	2-3/8"	1-1/4"
77496	.2130	#3	5.410	2-3/8"	1-1/4"
77501	.2165		5.500	60	32
77506	.2188	7/32"	5.558	2-3/8"	1-1/4"
77511	.2210	#2	5.613	2-7/16"	1-5/16"
77516	.2280	#1	5.791	2-7/16"	1-5/16"
77521	.2340	A	5.944	2-7/16"	1-5/16"
77526	.2344	15/64"	5.954	2-7/16"	1-5/16"
77531	.2362		6.000	64	35
77536	.2380	B	6.045	2-1/2"	1-3/8"
77541	.2420	C	6.147	2-1/2"	1-3/8"
77546	.2460	D	6.248	2-1/2"	1-3/8"
77551	.2500	1/4" / E	6.350	2-1/2"	1-3/8"
77556	.2559		6.500	67	37
77561	.2570	F	6.528	2-5/8"	1-7/16"
77566	.2610	G	6.629	2-5/8"	1-7/16"
77571	.2656	17/64"	6.746	2-5/8"	1-7/16"
77576	.2660	H	6.756	2-11/16"	1-1/2"
77581	.2720	I	6.909	2-11/16"	1-1/2"
77586	.2756		7.000	68	38
77591	.2770	J	7.036	2-11/16"	1-1/2"
77596	.2810	K	7.137	2-11/16"	1-1/2"
77601	.2812	9/32"	7.142	2-11/16"	1-1/2"
77606	.2900	L	7.366	2-3/4"	1-9/16"
77611	.2950	M	7.493	2-3/4"	1-9/16"
77616	.2953		7.500	70	40
77621	.2969	19/64"	7.541	2-3/4"	1-9/16"
77626	.3020	N	7.671	2-15/16"	1-5/8"
77631	.3125	5/16"	7.938	2-15/16"	1-5/8"
77636	.3150		8.000	75	43
77641	.3160	O	8.026	2-15/16"	1-11/16"
77646	.3230	P	8.204	2-15/16"	1-11/16"
77651	.3281	21/64"	8.334	2-15/16"	1-11/16"
77656	.3320	Q	8.433	3"	1-11/16"
77661	.3346		8.500	76	43

† *Metric equivalents are for reference only*

EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
77666	.3390	R	8.611	3"	1-11/16"
77671	.3438	11/32"	8.733	3"	1-11/16"
77676	.3480	S	8.839	3-1/16"	1-3/4"
77681	.3543		9.000	78	44
77686	.3580	T	9.093	3-1/16"	1-3/4"
77691	.3594	23/64"	9.129	3-1/16"	1-3/4"
77696	.3680	U	9.347	3-1/8"	1-13/16"
77701	.3740		9.500	79	46
77706	.3750	3/8"	9.525	3-1/8"	1-13/16"
77711	.3770	V	9.576	3-1/4"	1-7/8"
77716	.3860	W	9.804	3-1/4"	1-7/8"
77721	.3906	25/64"	9.921	3-1/4"	1-7/8"
77726	.3937		10.000	84	49
77731	.3970	X	10.084	3-5/16"	1-15/16"
77736	.4040	Y	10.262	3-5/16"	1-15/16"
77741	.4062	13/32"	10.317	3-5/16"	1-15/16"
77746	.4130	Z	10.490	3-3/8"	2"
77751	.4134		10.500	86	51
77756	.4219	27/64"	10.716	3-3/8"	2"
77761	.4331		11.000	87	52
77766	.4375	7/16"	11.113	3-7/16"	2-1/16"
77771	.4528		11.500	91	54
77776	.4531	29/64"	11.509	3-9/16"	2-1/8"
77781	.4688	15/32"	11.908	3-5/8"	2-1/8"
77786	.4724		12.000	94	56
77791	.4844	31/64"	12.304	3-11/16"	2-3/16"
77796	.4921		12.500	95	56
77801	.5000	1/2"	12.700	3-3/4"	2-1/4"

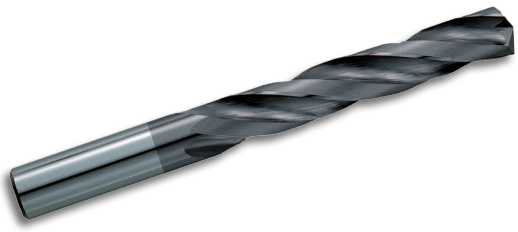
Series 1120H

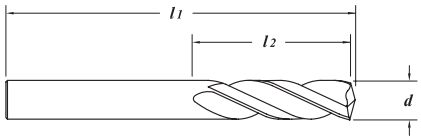
2,779mm - 5,309mm
(.1094" - .2090")



TOLERANCES		
d	+0,0000 –0,0127mm (+.0000" –.0005")	
l_1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l_2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")

HARDLUBE Coated
HARDLUBE-Beschichtet
Recubrimiento de HARDLUBE
Revêtement HARDLUBE
Rivestimento in HARDLUBE
HARDLUBE 涂层





Solid submicron grain carbide drill
Self-centering point
Near reamer finishes
Can be used as a core drill
Excellent heat resistance and lubricity
Stub length reduces deflection and vibration
Tighter tolerance holes
Improved roundness and straightness
Recommended for cast aluminum, cast iron and materials with high silicon content
Live tooling recommended on lathe processes
Shank tolerance: h6
Uncoated - page 69

Vollhartmetallbohrer aus Feinkornhartmetall
Anschliff Selbstzentrierend Punkt
Nahe an geriebenen Oberflächen
Kann als Aufbohrer verwendet werden
Exzellente Hitzebeständigkeit und Schmiereigenschaften
Kurze Ausführung Reduziert Abdrängung und Vibrationen
Bessere Bohrungstoleranzen
Verbesserter Rundlauf und Genauigkeit
Empfohlen für Aluminiumguss, Grauguss und Werkstoffe mit hohem Silizium Gehalt
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Unbeschichtet - Seite 69

Broca de submicrograno sólido carburo
Punta autocentrada caras
Acabado similar al escariado
Puede ser utilizada para taladrado directo
Excelente resistencia térmica y lubricación
Longitud corta reduce desviaciones y vibraciones
Orificios de alta tolerancia y precisión
Mejor acabado redondeado y recto
Recomendado para aluminio fundido, hierro fundido y materiales con alto contenido de silicio
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Sin recubrimiento - Página 69

Forets carbure submicrograin
Pointe auto centrante
Près de finitions alésoir
Peut être utilisé comme foret-aléseur
Excellente resistance a la haute temperature et glissement
Longueur Stub réduit flexion et de vibration
Le resserrement des trous de tolérance
Amélioration rondeur et de rectitude
Recommander pour fonte d'aluminium, fonte grise et matieres a haute teneur en silicium
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Sans revêtement - Page 69

Punte in sub-micro grana
Punto autocentrante
Ottimo grado di finitura
Può essere usata come punta da centro
Eccellente resistenza al calore e autolubrificante
Serie corta riduce la flessione e la vibrazione
Alta tolleranza dei fori
Migliore rotondità e linearità
Raccomandata per lavorazioni su alluminio, ghisa e materiali ad alto contenuto di silicio
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Non Rivestito - Pagina 69

整体硬质合金钻头
自定心刀尖
接近铰孔光洁度
可做套料钻使用
耐热性和润滑性特好
短型长度减少挠曲、减少振动
紧公差孔
提高正圆度和直线度
推荐加工铸铝、铸铁和硅含量高的材质
不建议在车床，或工具必须纺纱
柄部公差: h6
未涂层 - 69页

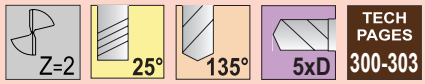
EDP#	d † Diameter Decimal	Diameter	Metric	l_1 Overall Length	l_2 Flute Length
78276	.1094	7/64"	2.779	1-13/16"	13/16"
78281	.1100	#35	2.794	1-7/8"	7/8"
78286	.1110	#34	2.819	1-7/8"	7/8"
78291	.1130	#33	2.870	1-7/8"	7/8"
78296	.1160	#32	2.946	1-7/8"	7/8"
78301	.1181		3.000	48	22
78306	.1200	#31	3.048	1-7/8"	7/8"
78311	.1250	1/8"	3.175	1-7/8"	7/8"
78316	.1285	#30	3.264	1-15/16"	15/16"
78321	.1360	#29	3.454	1-15/16"	15/16"
78326	.1378		3.500	49	24
78331	.1405	#28	3.569	1-15/16"	15/16"
78336	.1406	9/64"	3.571	1-15/16"	15/16"
78341	.1440	#27	3.658	2-1/16"	1"
78346	.1470	#26	3.734	2-1/16"	1"
78351	.1495	#25	3.797	2-1/16"	1"
78356	.1520	#24	3.861	2-1/16"	1"
78361	.1540	#23	3.912	2-1/16"	1"
78366	.1562	5/32"	3.967	2-1/16"	1"
78371	.1570	#22	3.988	2-1/8"	1-1/16"
78376	.1575		4.000	54	27
78381	.1590	#21	4.039	2-1/8"	1-1/16"
78386	.1610	#20	4.089	2-1/8"	1-1/16"
78391	.1660	#19	4.216	2-1/8"	1-1/16"
78396	.1695	#18	4.305	2-1/8"	1-1/16"
78401	.1719	11/64"	4.366	2-1/8"	1-1/16"
78406	.1730	#17	4.394	2-3/16"	1-1/8"
78411	.1770	#16	4.496	2-3/16"	1-1/8"
78416	.1772		4.500	56	29
78421	.1800	#15	4.572	2-3/16"	1-1/8"
78426	.1820	#14	4.623	2-3/16"	1-1/8"
78431	.1850	#13	4.700	2-3/16"	1-1/8"
78436	.1875	3/16"	4.763	2-3/16"	1-1/8"
78441	.1890	#12	4.801	2-1/4"	1-3/16"
78446	.1910	#11	4.851	2-1/4"	1-3/16"
78451	.1935	#10	4.915	2-1/4"	1-3/16"
78456	.1960	#9	4.978	2-1/4"	1-3/16"
78461	.1969		5.000	57	30
78466	.1990	#8	5.055	2-1/4"	1-3/16"
78471	.2010	#7	5.105	2-1/4"	1-3/16"
78476	.2031	13/64"	5.159	2-1/4"	1-3/16"
78486	.2055	#5	5.220	2-3/8"	1-1/4"
78491	.2090	#4	5.309	2-3/8"	1-1/4"

† *Metric equivalents are for reference only*

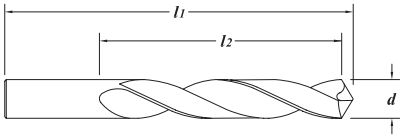
EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
78496	.2130	#3	5.410	2-3/8"	1-1/4"
78501	.2165		5.500	60	32
78506	.2188	7/32"	5.558	2-3/8"	1-1/4"
78511	.2210	#2	5.613	2-7/16"	1-5/16"
78516	.2280	#1	5.791	2-7/16"	1-5/16"
78521	.2340	A	5.944	2-7/16"	1-5/16"
78526	.2344	15/64"	5.954	2-7/16"	1-5/16"
78531	.2362		6.000	64	35
78536	.2380	B	6.045	2-1/2"	1-3/8"
78541	.2420	C	6.147	2-1/2"	1-3/8"
78546	.2460	D	6.248	2-1/2"	1-3/8"
78551	.2500	1/4" / E	6.350	2-1/2"	1-3/8"
78556	.2559		6.500	67	37
78561	.2570	F	6.528	2-5/8"	1-7/16"
78566	.2610	G	6.629	2-5/8"	1-7/16"
78571	.2656	17/64"	6.746	2-5/8"	1-7/16"
78576	.2660	H	6.756	2-11/16"	1-1/2"
78581	.2720	I	6.909	2-11/16"	1-1/2"
78586	.2756		7.000	68	38
78591	.2770	J	7.036	2-11/16"	1-1/2"
78596	.2810	K	7.137	2-11/16"	1-1/2"
78601	.2812	9/32"	7.142	2-11/16"	1-1/2"
78606	.2900	L	7.366	2-3/4"	1-9/16"
78611	.2950	M	7.493	2-3/4"	1-9/16"
78616	.2953		7.500	70	40
78621	.2969	19/64"	7.541	2-3/4"	1-9/16"
78626	.3020	N	7.671	2-15/16"	1-5/8"
78631	.3125	5/16"	7.938	2-15/16"	1-5/8"
78636	.3150		8.000	75	43
78641	.3160	O	8.026	2-15/16"	1-11/16"
78646	.3230	P	8.204	2-15/16"	1-11/16"
78651	.3281	21/64"	8.334	2-15/16"	1-11/16"
78656	.3320	Q	8.433	3"	1-11/16"
78661	.3346		8.500	76	43
78666	.3390	R	8.611	3"	1-11/16"
78671	.3438	11/32"	8.733	3"	1-11/16"
78676	.3480	S	8.839	3-1/16"	1-3/4"
78681	.3543		9.000	78	44
78686	.3580	T	9.093	3-1/16"	1-3/4"
78691	.3594	23/64"	9.129	3-1/16"	1-3/4"
78696	.3680	U	9.347	3-1/8"	1-13/16"
78701	.3740		9.500	79	46
78706	.3750	3/8"	9.525	3-1/8"	1-13/16"
78711	.3770	V	9.576	3-1/4"	1-7/8"
78716	.3860	W	9.804	3-1/4"	1-7/8"
78721	.3906	25/64"	9.921	3-1/4"	1-7/8"
78726	.3937		10.000	84	49
78736	.4040	Y	10.262	3-5/16"	1-15/16"
78741	.4062	13/32"	10.317	3-5/16"	1-15/16"
78746	.4130	Z	10.490	3-3/8"	2"
78751	.4134		10.500	86	51
78756	.4219	27/64"	10.716	3-3/8"	2"
78761	.4331		11.000	87	52
78766	.4375	7/16"	11.113	3-7/16"	2-1/16"
78776	.4531	29/64"	11.509	3-9/16"	2-1/8"
78781	.4688	15/32"	11.908	3-5/8"	2-1/8"
78786	.4724		12.000	94	56
78791	.4844	31/64"	12.304	3-11/16"	2-3/16"
78796	.4921		12.500	95	56
78801	.5000	1/2"	12.700	3-3/4"	2-1/4"

Series 1205

1,588mm - 4,000mm
(.0625" - .1575")



TOLERANCES		
d	+0,0000 –0,0127mm (+.0000" –.0005")	
l_1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l_2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")



Solid submicron grain carbide drill
No spotting required in most applications
4-facet self-centering point
Adaptability when converting from high-speed steel
General purpose for all material groups
Live tooling recommended on lathe processes
Shank tolerance: h6
Hardlube Coating - page 76

Vollhartmetallbohrer aus Feinkornhartmetall
Vorzentrieren bei den meisten Anwendungen nicht notwendig
4-Fasen-Anschliff Selbstzentrierend Punkt
Anpassungsfähig beim Umstieg von Hochleistungsschnellstahl (HSS)
Allzweck für alle Materialgruppen
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Hardlube-Beschichtet - Seite 76

Broca de submicrograno sólido carburo
No se requiere pretaladrado para la mayoría de las aplicaciones
Punta de 4 caras autocentrada
Adaptable para trabajos con aceros de alta velocidad
De uso general para todos los grupos de materiales
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Recubrimiento de Hardlube - Página 76

Forets carbure submicrograin
Pas de point de centre requis pour la plupart des applications
Pointe auto centrante avec 4 faces de depouille
Usage général pour tous les groupes de matériaux
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Revêtement Hardlube - Page 76

Punte in sub-micro grana
Pre-centraggio non richiesto nella maggior parte delle applicazioni
Punto 4 facce autocentrante
Alternativa alle punte tradizionali in HSS
Scopo generale per tutte le materie
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Rivestimento in Hardlube - Pagina 76

整体硬质合金钻头
自定心刀尖
在多数用途中不需要定心
4-小平面自定心刀尖
能适应从高速钢转换
通用使用的所有材料组
不建议在车床，或工具必须纺纱
柄部公差: h6
Hardlube 涂层 - 76页

EDP#	d † Diameter Decimal	Diameter	Metric	l_1 Overall Length	l_2 Flute Length
89165	.0625	1/16"	1.588	1-3/4"	3/4"
89170	.0635	#52	1.613	1-3/4"	3/4"
89175	.0670	#51	1.702	1-3/4"	3/4"
89180	.0700	#50	1.778	1-3/4"	7/8"
89185	.0730	#49	1.854	1-3/4"	7/8"
89190	.0760	#48	1.930	1-3/4"	7/8"
89195	.0781	5/64"	1.984	1-3/4"	7/8"
89200	.0785	#47	1.994	1-3/4"	7/8"
89205	.0787		2.000	44	22
89210	.0810	#46	2.057	1-3/4"	7/8"
89215	.0820	#45	2.083	1-3/4"	7/8"
89220	.0860	#44	2.184	2"	1"
89225	.0890	#43	2.261	2"	1"
89230	.0935	#42	2.375	2"	1"
89235	.0938	3/32"	2.383	2"	1"
89240	.0960	#41	2.438	2"	1"
89245	.0980	#40	2.489	2"	1"
89250	.0984		2.500	57	32
89255	.0995	#39	2.527	2-1/4"	1-1/4"
89260	.1015	#38	2.578	2-1/4"	1-1/4"
89265	.1040	#37	2.642	2-1/4"	1-1/4"
89270	.1065	#36	2.705	2-1/4"	1-1/4"
89275	.1094	7/64"	2.779	2-1/4"	1-1/4"
89280	.1100	#35	2.794	2-1/4"	1-1/4"
89285	.1110	#34	2.819	2-1/4"	1-1/4"
89290	.1130	#33	2.870	2-1/4"	1-1/4"
89295	.1160	#32	2.946	2-1/4"	1-1/4"
89300	.1181		3.000	57	32
89305	.1200	#31	3.048	2-1/4"	1-1/4"
89310	.1250	1/8"	3.175	2-1/4"	1-1/4"
89315	.1285	#30	3.264	2-1/4"	1-1/4"
89320	.1360	#29	3.454	2-1/2"	1-3/8"
89325	.1378		3.500	63	35
89330	.1405	#28	3.569	2-1/2"	1-3/8"
89335	.1406	9/64"	3.571	2-1/2"	1-3/8"
89340	.1440	#27	3.658	2-1/2"	1-3/8"
89345	.1470	#26	3.734	2-1/2"	1-3/8"
89350	.1495	#25	3.797	2-1/2"	1-3/8"
89355	.1520	#24	3.861	2-1/2"	1-3/8"
89360	.1540	#23	3.912	2-1/2"	1-3/8"
89365	.1562	5/32"	3.967	2-1/2"	1-3/8"
89370	.1570	#22	3.988	2-1/2"	1-3/8"
89375	.1575		4.000	63	35

† *Metric equivalents are for reference only*

EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
89380	.1590	#21	4.039	2-1/2"	1-3/8"
89385	.1610	#20	4.089	2-1/2"	1-3/8"
89390	.1660	#19	4.216	2-3/4"	1-5/8"
89395	.1695	#18	4.305	2-3/4"	1-5/8"
89400	.1719	11/64"	4.366	2-3/4"	1-5/8"
89405	.1730	#17	4.394	2-3/4"	1-5/8"
89410	.1770	#16	4.496	2-3/4"	1-5/8"
89415	.1772		4.500	70	41
89420	.1800	#15	4.572	2-3/4"	1-5/8"
89425	.1820	#14	4.623	2-3/4"	1-5/8"
89430	.1850	#13	4.700	2-3/4"	1-5/8"
89435	.1875	3/16"	4.763	2-3/4"	1-5/8"
89440	.1890	#12	4.801	2-3/4"	1-5/8"
89445	.1910	#11	4.851	2-3/4"	1-5/8"
89450	.1935	#10	4.915	2-3/4"	1-5/8"
89455	.1960	#9	4.978	3"	1-3/4"
89460	.1969		5.000	76	44
89465	.1990	#8	5.055	3"	1-3/4"
89470	.2010	#7	5.105	3"	1-3/4"
89475	.2031	13/64"	5.159	3"	1-3/4"
89480	.2040	#6	5.182	3"	1-3/4"
89485	.2055	#5	5.220	3"	1-3/4"
89490	.2090	#4	5.309	3"	1-3/4"
89495	.2130	#3	5.410	3"	1-3/4"
89500	.2165		5.500	76	44
89505	.2188	7/32"	5.558	3"	1-3/4"
89510	.2210	#2	5.613	3"	1-3/4"
89515	.2280	#1	5.791	3"	1-3/4"
89520	.2340	A	5.944	3-1/4"	2"
89525	.2344	15/64"	5.954	3-1/4"	2"
89530	.2362		6.000	82	50
89535	.2380	B	6.045	3-1/4"	2"
89540	.2420	C	6.147	3-1/4"	2"
89545	.2460	D	6.248	3-1/4"	2"
89550	.2500	1/4" / E	6.350	3-1/4"	2"
89555	.2559		6.500	82	50
89560	.2570	F	6.528	3-1/4"	2"
89565	.2610	G	6.629	3-1/2"	2-1/8"
89570	.2656	17/64"	6.746	3-1/2"	2-1/8"
89575	.2660	H	6.756	3-1/2"	2-1/8"
89580	.2720	I	6.909	3-1/2"	2-1/8"
89585	.2756		7.000	88	54
89590	.2770	J	7.036	3-1/2"	2-1/8"
89595	.2810	K	7.137	3-1/2"	2-1/8"
89600	.2812	9/32"	7.142	3-1/2"	2-1/8"
89605	.2900	L	7.366	3-1/2"	2-1/8"
89610	.2950	M	7.493	3-3/4"	2-3/8"
89615	.2953		7.500	95	60
89620	.2969	19/64"	7.541	3-3/4"	2-3/8"
89625	.3020	N	7.671	3-3/4"	2-3/8"
89630	.3125	5/16"	7.938	3-3/4"	2-3/8"
89635	.3150		8.000	95	60
89640	.3160	O	8.026	3-3/4"	2-3/8"
89645	.3230	P	8.204	3-3/4"	2-3/8"
89650	.3281	21/64"	8.334	4"	2-1/2"
89655	.3320	Q	8.433	4"	2-1/2"
89660	.3346		8.500	101	63

continued →

Series 1205 *(continued)*

8,611mm - 16,000mm
(.3390" - .6299")

EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
89665	.3390	R	8.611	4"	2-1/2"
89670	.3438	11/32"	8.733	4"	2-1/2"
89675	.3480	S	8.839	4"	2-1/2"
89680	.3543		9.000	101	63
89685	.3580	T	9.093	4-1/4"	2-3/4"
89690	.3594	23/64"	9.129	4-1/4"	2-3/4"
89695	.3680	U	9.347	4-1/4"	2-3/4"
89700	.3740		9.500	107	70
89705	.3750	3/8"	9.525	4-1/4"	2-3/4"
89710	.3770	V	9.576	4-1/4"	2-3/4"
89715	.3860	W	9.804	4-1/2"	2-7/8"
89720	.3906	25/64"	9.921	4-1/2"	2-7/8"
89725	.3937		10.000	114	73
89730	.3970	X	10.084	4-1/2"	2-7/8"
89735	.4040	Y	10.262	4-1/2"	2-7/8"
89740	.4062	13/32"	10.317	4-1/2"	2-7/8"
89745	.4130	Z	10.490	4-1/2"	2-7/8"
89750	.4134		10.500	114	73
89755	.4219	27/64"	10.716	4-1/2"	2-7/8"
89760	.4331		11.000	114	73
89765	.4375	7/16"	11.113	4-1/2"	2-7/8"
89770	.4528		11.500	120	76
89775	.4531	29/64"	11.509	4-3/4"	3"
89780	.4688	15/32"	11.908	4-3/4"	3"
89785	.4724		12.000	120	76
89790	.4844	31/64"	12.304	4-3/4"	3"
89795	.4921		12.500	120	76
89800	.5000	1/2"	12.700	4-3/4"	3"
89805	.5118		13.000	127	83
89810	.5156	33/64"	13.096	5"	3-1/4"
89815	.5312	17/32"	13.492	5"	3-1/4"
89820	.5315		13.500	127	83
89825	.5469	35/64"	13.891	5"	3-1/4"
89830	.5512		14.000	127	83
89835	.5625	9/16"	14.287	5"	3-1/4"
89840	.5709		14.500	127	83
89845	.5781	37/64"	14.683	5-1/4"	3-1/2"
89850	.5906		15.000	133	89
89855	.5938	19/32"	15.082	5-1/4"	3-1/2"
89860	.6094	39/64"	15.478	5-1/4"	3-1/2"
89865	.6102		15.500	133	89
89870	.6250	5/8"	15.875	5-1/4"	3-1/2"
89875	.6299		16.000	133	89

† *Metric equivalents are for reference only*

TOLERANCES

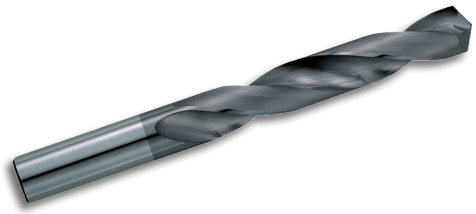
d	+0,0000 –0,0127mm (+.0000" –.0005")	
l_1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l_2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")

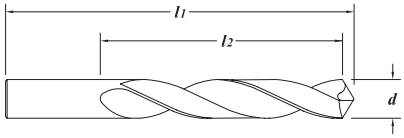
Z=2 | 25° | 135° | 5xD | TECH PAGES 300-303

Series 1205H

1,588mm - 4,000mm
(.0625" - .1575")

HARDLUBE Coated
HARDLUBE-Beschichtet
Recubrimiento de HARDLUBE
Revêtement HARDLUBE
Rivestimento in HARDLUBE
HARDLUBE 涂层





Solid submicron grain carbide drill
Excellent heat resistance and lubricity
No spotting required in most applications
4-facet self-centering point
Adaptability when converting from high-speed steel
General purpose for all material groups
Live tooling recommended on lathe processes
Shank tolerance: h6
Uncoated - page 73

Vollhartmetallbohrer aus Feinkornhartmetall
Exzellente Hitzebeständigkeit und Schmiereigenschaften
Vorzentrieren bei den meisten Anwendungen nicht notwendig
4-Fasen-Anschliff Selbstzentrierend Punkt
Anpassungsfähig beim Umstieg von Hochleistungsschnellstahl (HSS)
Allzweck für alle Materialgruppen
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Unbeschichtet - Seite 73

Broca de submicrograno sólido carburo
Excelente resistencia térmica y lubricación
No se requiere pretaladrado para la mayoría de las aplicaciones
Punta de 4 caras autocentrada
Adaptable para trabajos con aceros de alta velocidad
De uso general para todos los grupos de materiales
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Sin recubrimiento - Página 73

Forets carbure submicrograin
Excellente resistance a la haute temperature et glissement
Pas de point de centre requis pour la plupart des applications
Pointe auto centrante avec 4 faces de depouille
Usage général pour tous les groupes de matériaux
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Sans revêtement - Page 73

Punte in sub-micro grana
Eccellente resistenza al calore e autolubrificante
Pre-centraggio non richiesto nella maggior parte delle applicazioni
Punto 4 facce autocentrante
Alternativa alle punte tradizionali in HSS
Scopo generale per tutte le materie
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Non Rivestito - Pagina 73

整体硬质合金钻头
耐热性和润滑性特好
4-小平面自定心刃尖
在多数用途中不需要定心
能适应从高速钢转换
通用使用的所有材料组
不建议在车床，或工具必须纺纱
柄部公差: h6
未涂层 - 73页

EDP#	*d* † Diameter Decimal		Metric	l_1 Overall Length	l_2 Flute Length
89166	.0625	1/16"	1.588	1-3/4"	3/4"
89171	.0635	#52	1.613	1-3/4"	3/4"
89176	.0670	#51	1.702	1-3/4"	3/4"
89181	.0700	#50	1.778	1-3/4"	7/8"
89186	.0730	#49	1.854	1-3/4"	7/8"
89191	.0760	#48	1.930	1-3/4"	7/8"
89196	.0781	5/64"	1.984	1-3/4"	7/8"
89201	.0785	#47	1.994	1-3/4"	7/8"
89206	.0787		2.000	44	22
89211	.0810	#46	2.057	1-3/4"	7/8"
89216	.0820	#45	2.083	1-3/4"	7/8"
89221	.0860	#44	2.184	2"	1"
89226	.0890	#43	2.261	2"	1"
89231	.0935	#42	2.375	2"	1"
89236	.0938	3/32"	2.383	2"	1"
89241	.0960	#41	2.438	2"	1"
89246	.0980	#40	2.489	2"	1"
89251	.0984		2.500	57	32
89256	.0995	#39	2.527	2-1/4"	1-1/4"
89261	.1015	#38	2.578	2-1/4"	1-1/4"
89266	.1040	#37	2.642	2-1/4"	1-1/4"
89271	.1065	#36	2.705	2-1/4"	1-1/4"
89276	.1094	7/64"	2.779	2-1/4"	1-1/4"
89281	.1100	#35	2.794	2-1/4"	1-1/4"
89286	.1110	#34	2.819	2-1/4"	1-1/4"
89291	.1130	#33	2.870	2-1/4"	1-1/4"
89296	.1160	#32	2.946	2-1/4"	1-1/4"
89301	.1181		3.000	57	32
89306	.1200	#31	3.048	2-1/4"	1-1/4"
89311	.1250	1/8"	3.175	2-1/4"	1-1/4"
89316	.1285	#30	3.264	2-1/4"	1-1/4"
89321	.1360	#29	3.454	2-1/2"	1-3/8"
89326	.1378		3.500	63	35
89331	.1405	#28	3.569	2-1/2"	1-3/8"
89336	.1406	9/64"	3.571	2-1/2"	1-3/8"
89341	.1440	#27	3.658	2-1/2"	1-3/8"
89346	.1470	#26	3.734	2-1/2"	1-3/8"
89351	.1495	#25	3.797	2-1/2"	1-3/8"
89356	.1520	#24	3.861	2-1/2"	1-3/8"
89361	.1540	#23	3.912	2-1/2"	1-3/8"
89366	.1562	5/32"	3.967	2-1/2"	1-3/8"
89371	.1570	#22	3.988	2-1/2"	1-3/8"
89376	.1575		4.000	63	35

Series 1205H *(continued)*

4,039mm - 8,500mm
(.1590" - .3346")

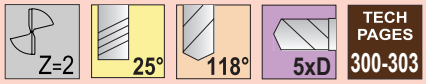
EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
89381	.1590	#21	4.039	2-1/2"	1-3/8"
89386	.1610	#20	4.089	2-1/2"	1-3/8"
89391	.1660	#19	4.216	2-3/4"	1-5/8"
89396	.1695	#18	4.305	2-3/4"	1-5/8"
89401	.1719	11/64"	4.366	2-3/4"	1-5/8"
89406	.1730	#17	4.394	2-3/4"	1-5/8"
89411	.1770	#16	4.496	2-3/4"	1-5/8"
89416	.1772		4.500	70	41
89421	.1800	#15	4.572	2-3/4"	1-5/8"
89426	.1820	#14	4.623	2-3/4"	1-5/8"
89431	.1850	#13	4.700	2-3/4"	1-5/8"
89436	.1875	3/16"	4.763	2-3/4"	1-5/8"
89441	.1890	#12	4.801	2-3/4"	1-5/8"
89446	.1910	#11	4.851	2-3/4"	1-5/8"
89451	.1935	#10	4.915	2-3/4"	1-5/8"
89456	.1960	#9	4.978	3"	1-3/4"
89461	.1969		5.000	76	44
89466	.1990	#8	5.055	3"	1-3/4"
89471	.2010	#7	5.105	3"	1-3/4"
89476	.2031	13/64"	5.159	3"	1-3/4"
89481	.2040	#6	5.182	3"	1-3/4"
89486	.2055	#5	5.220	3"	1-3/4"
89491	.2090	#4	5.309	3"	1-3/4"
89496	.2130	#3	5.410	3"	1-3/4"
89501	.2165		5.500	76	44
89506	.2188	7/32"	5.558	3"	1-3/4"
89511	.2210	#2	5.613	3"	1-3/4"
89516	.2280	#1	5.791	3"	1-3/4"
89521	.2340	A	5.944	3-1/4"	2"
89526	.2344	15/64"	5.954	3-1/4"	2"
89531	.2362		6.000	82	50
89536	.2380	B	6.045	3-1/4"	2"
89541	.2420	C	6.147	3-1/4"	2"
89546	.2460	D	6.248	3-1/4"	2"
89551	.2500	1/4" / E	6.350	3-1/4"	2"
89556	.2559		6.500	82	50
89561	.2570	F	6.528	3-1/4"	2"
89566	.2610	G	6.629	3-1/2"	2-1/8"
89571	.2656	17/64"	6.746	3-1/2"	2-1/8"
89576	.2660	H	6.756	3-1/2"	2-1/8"
89581	.2720	I	6.909	3-1/2"	2-1/8"
89586	.2756		7.000	88	54
89591	.2770	J	7.036	3-1/2"	2-1/8"
89596	.2810	K	7.137	3-1/2"	2-1/8"
89601	.2812	9/32"	7.142	3-1/2"	2-1/8"
89606	.2900	L	7.366	3-1/2"	2-1/8"
89611	.2950	M	7.493	3-3/4"	2-3/8"
89616	.2953		7.500	95	60
89621	.2969	19/64"	7.541	3-3/4"	2-3/8"
89626	.3020	N	7.671	3-3/4"	2-3/8"
89631	.3125	5/16"	7.938	3-3/4"	2-3/8"
89636	.3150		8.000	95	60
89641	.3160	O	8.026	3-3/4"	2-3/8"
89646	.3230	P	8.204	3-3/4"	2-3/8"
89651	.3281	21/64"	8.334	4"	2-1/2"
89656	.3320	Q	8.433	4"	2-1/2"
89661	.3346		8.500	101	63

† *Metric equivalents are for reference only*

EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
89666	.3390	R	8.611	4"	2-1/2"
89671	.3438	11/32"	8.733	4"	2-1/2"
89676	.3480	S	8.839	4"	2-1/2"
89681	.3543		9.000	101	63
89686	.3580	T	9.093	4-1/4"	2-3/4"
89691	.3594	23/64"	9.129	4-1/4"	2-3/4"
89696	.3680	U	9.347	4-1/4"	2-3/4"
89701	.3740		9.500	107	70
89706	.3750	3/8"	9.525	4-1/4"	2-3/4"
89711	.3770	V	9.576	4-1/4"	2-3/4"
89716	.3860	W	9.804	4-1/2"	2-7/8"
89721	.3906	25/64"	9.921	4-1/2"	2-7/8"
89726	.3937		10.000	114	73
89731	.3970	X	10.084	4-1/2"	2-7/8"
89736	.4040	Y	10.262	4-1/2"	2-7/8"
89741	.4062	13/32"	10.317	4-1/2"	2-7/8"
89746	.4130	Z	10.490	4-1/2"	2-7/8"
89751	.4134		10.500	114	73
89756	.4219	27/64"	10.716	4-1/2"	2-7/8"
89761	.4331		11.000	114	73
89766	.4375	7/16"	11.113	4-1/2"	2-7/8"
89771	.4528		11.500	120	76
89776	.4531	29/64"	11.509	4-3/4"	3"
89781	.4688	15/32"	11.908	4-3/4"	3"
89786	.4724		12.000	120	76
89791	.4844	31/64"	12.304	4-3/4"	3"
89796	.4921		12.500	120	76
89801	.5000	1/2"	12.700	4-3/4"	3"
89806	.5118		13.000	127	83
89811	.5156	33/64"	13.096	5"	3-1/4"
89816	.5312	17/32"	13.492	5"	3-1/4"
89821	.5315		13.500	127	83
89826	.5469	35/64"	13.891	5"	3-1/4"
89831	.5512		14.000	127	83
89836	.5625	9/16"	14.287	5"	3-1/4"
89841	.5709		14.500	127	83
89846	.5781	37/64"	14.683	5-1/4"	3-1/2"
89851	.5906		15.000	133	89
89856	.5938	19/32"	15.082	5-1/4"	3-1/2"
89861	.6094	39/64"	15.478	5-1/4"	3-1/2"
89866	.6102		15.500	133	89
89871	.6250	5/8"	15.875	5-1/4"	3-1/2"
89876	.6299		16.000	133	89

Series 1200

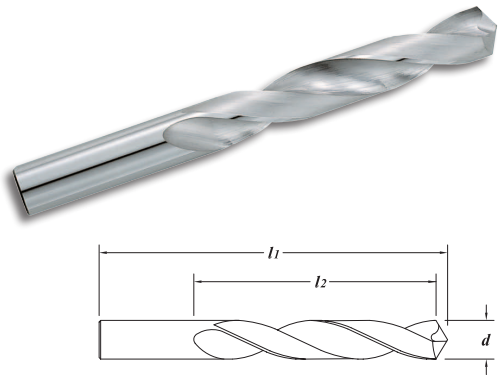
1,588mm - 4,000mm
(.0625" - .1575")



TECH PAGES 300-303

TOLERANCES

d	+0,0000 –0,0127mm (+.0000" –.0005")	
l1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")



Solid submicron grain carbide drill
General purpose jobber style
Cam point (≤1/8" diameter - 4-facet point)
Live tooling recommended on lathe processes
Shank tolerance: h6
Hardlube Coated - page 82

Vollhartmetallbohrer aus Feinkornhartmetall
Universeller Bohrer
Durchmesser 3 mm (1/8") und kleiner – 118° Spitzenwinkel und 4-Fasen-Anschliff
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Hardlube-Beschichtet - Seite 82

Broca de submicrograno sólido carburo
Broca para uso general
Para diámetros de 1/8" e inferiores – punta de 4 caras de 118°
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Recubrimiento de Hardlube - Página 82

Forets carbure submicrograin
Forets pour application generale
D1/8 et plus petit - 118° avec 4 faces de depouille
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Revêtement Hardlube - Page 82

Punte in sub-micro grana
Punta per impieghi generali
Affilatura a 118° punto
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Rivestimento in Hardlube - Pagina 82

整体硬质合金钻头
通用型机用钻头
(1/8英寸直径和 1/8英寸以下直径 - 118° 4-小平面刀尖)
不建议在车床，或工具必须纺纱
柄部公差: h6
Hardlube 涂层 - 82页

EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
56165	.0625	1/16"	1.588	1-3/4"	3/4"
56170	.0635	#52	1.613	1-3/4"	3/4"
56175	.0670	#51	1.702	1-3/4"	3/4"
56180	.0700	#50	1.778	1-3/4"	7/8"
56185	.0730	#49	1.854	1-3/4"	7/8"
56190	.0760	#48	1.930	1-3/4"	7/8"
56195	.0781	5/64"	1.984	1-3/4"	7/8"
56200	.0785	#47	1.994	1-3/4"	7/8"
56205	.0787		2.000	44	22
56210	.0810	#46	2.057	1-3/4"	7/8"
56215	.0820	#45	2.083	1-3/4"	7/8"
56220	.0860	#44	2.184	2"	1"
56225	.0890	#43	2.261	2"	1"
56230	.0935	#42	2.375	2"	1"
56235	.0938	3/32"	2.383	2"	1"
56240	.0960	#41	2.438	2"	1"
56245	.0980	#40	2.489	2"	1"
56250	.0984		2.500	57	32
56255	.0995	#39	2.527	2-1/4"	1-1/4"
56260	.1015	#38	2.578	2-1/4"	1-1/4"
56265	.1040	#37	2.642	2-1/4"	1-1/4"
56270	.1065	#36	2.705	2-1/4"	1-1/4"
56275	.1094	7/64"	2.779	2-1/4"	1-1/4"
56280	.1100	#35	2.794	2-1/4"	1-1/4"
56285	.1110	#34	2.819	2-1/4"	1-1/4"
56290	.1130	#33	2.870	2-1/4"	1-1/4"
56295	.1160	#32	2.946	2-1/4"	1-1/4"
56300	.1181		3.000	57	32
56305	.1200	#31	3.048	2-1/4"	1-1/4"
56310	.1250	1/8"	3.175	2-1/4"	1-1/4"
56315	.1285	#30	3.264	2-1/4"	1-1/4"
56320	.1360	#29	3.454	2-1/2"	1-3/8"
56325	.1378		3.500	63	35
56330	.1405	#28	3.569	2-1/2"	1-3/8"
56335	.1406	9/64"	3.571	2-1/2"	1-3/8"
56340	.1440	#27	3.658	2-1/2"	1-3/8"
56345	.1470	#26	3.734	2-1/2"	1-3/8"
56350	.1495	#25	3.797	2-1/2"	1-3/8"
56355	.1520	#24	3.861	2-1/2"	1-3/8"
56360	.1540	#23	3.912	2-1/2"	1-3/8"
56365	.1562	5/32"	3.967	2-1/2"	1-3/8"
56370	.1570	#22	3.988	2-1/2"	1-3/8"
56375	.1575		4.000	63	35

† *Metric equivalents are for reference only*

EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
56380	.1590	#21	4.039	2-1/2"	1-3/8"
56385	.1610	#20	4.089	2-1/2"	1-3/8"
56390	.1660	#19	4.216	2-3/4"	1-5/8"
56395	.1695	#18	4.305	2-3/4"	1-5/8"
56400	.1719	11/64"	4.366	2-3/4"	1-5/8"
56405	.1730	#17	4.394	2-3/4"	1-5/8"
56410	.1770	#16	4.496	2-3/4"	1-5/8"
56415	.1772		4.500	70	41
56420	.1800	#15	4.572	2-3/4"	1-5/8"
56425	.1820	#14	4.623	2-3/4"	1-5/8"
56430	.1850	#13	4.700	2-3/4"	1-5/8"
56435	.1875	3/16"	4.763	2-3/4"	1-5/8"
56440	.1890	#12	4.801	2-3/4"	1-5/8"
56445	.1910	#11	4.851	2-3/4"	1-5/8"
56450	.1935	#10	4.915	2-3/4"	1-5/8"
56455	.1960	#9	4.978	3"	1-3/4"
56460	.1969		5.000	76	44
56465	.1990	#8	5.055	3"	1-3/4"
56470	.2010	#7	5.105	3"	1-3/4"
56475	.2031	13/64"	5.159	3"	1-3/4"
56480	.2040	#6	5.182	3"	1-3/4"
56485	.2055	#5	5.220	3"	1-3/4"
56490	.2090	#4	5.309	3"	1-3/4"
56495	.2130	#3	5.410	3"	1-3/4"
56500	.2165		5.500	76	44
56505	.2188	7/32"	5.558	3"	1-3/4"
56510	.2210	#2	5.613	3"	1-3/4"
56515	.2280	#1	5.791	3"	1-3/4"
56520	.2340	A	5.944	3-1/4"	2"
56525	.2344	15/64"	5.954	3-1/4"	2"
56530	.2362		6.000	82	50
56535	.2380	B	6.045	3-1/4"	2"
56540	.2420	C	6.147	3-1/4"	2"
56545	.2460	D	6.248	3-1/4"	2"
56550	.2500	1/4" / E	6.350	3-1/4"	2"
56555	.2559		6.500	82	50
56560	.2570	F	6.528	3-1/4"	2"
56565	.2610	G	6.629	3-1/2"	2-1/8"
56570	.2656	17/64"	6.746	3-1/2"	2-1/8"
56575	.2660	H	6.756	3-1/2"	2-1/8"
56580	.2720	I	6.909	3-1/2"	2-1/8"
56585	.2756		7.000	88	54
56590	.2770	J	7.036	3-1/2"	2-1/8"
56595	.2810	K	7.137	3-1/2"	2-1/8"
56600	.2812	9/32"	7.142	3-1/2"	2-1/8"
56605	.2900	L	7.366	3-1/2"	2-1/8"
56610	.2950	M	7.493	3-3/4"	2-3/8"
56615	.2953		7.500	95	60
56620	.2969	19/64"	7.541	3-3/4"	2-3/8"
56625	.3020	N	7.671	3-3/4"	2-3/8"
56630	.3125	5/16"	7.938	3-3/4"	2-3/8"
56635	.3150		8.000	95	60
56640	.3160	O	8.026	3-3/4"	2-3/8"
56645	.3230	P	8.204	3-3/4"	2-3/8"
56650	.3281	21/64"	8.334	4"	2-1/2"
56655	.3320	Q	8.433	4"	2-1/2"
56660	.3346		8.500	101	63

continued →

Series 1200 *(continued)*

8,611mm - 12,700mm
(.3390" - .5000")

EDP#	*d* † Diameter Decimal		*d* † Diameter Metric	*l1* Overall Length	*l2* Flute Length
56665	.3390	R	8.611	4"	2-1/2"
56670	.3438	11/32"	8.733	4"	2-1/2"
56675	.3480	S	8.839	4"	2-1/2"
56680	.3543		9.000	101	63
56685	.3580	T	9.093	4-1/4"	2-3/4"
56690	.3594	23/64"	9.129	4-1/4"	2-3/4"
56695	.3680	U	9.347	4-1/4"	2-3/4"
56700	.3740		9.500	107	70
56705	.3750	3/8"	9.525	4-1/4"	2-3/4"
56710	.3770	V	9.576	4-1/4"	2-3/4"
56715	.3860	W	9.804	4-1/2"	2-7/8"
56720	.3906	25/64"	9.921	4-1/2"	2-7/8"
56725	.3937		10.000	114	73
56730	.3970	X	10.084	4-1/2"	2-7/8"
56735	.4040	Y	10.262	4-1/2"	2-7/8"
56740	.4062	13/32"	10.317	4-1/2"	2-7/8"
56745	.4130	Z	10.490	4-1/2"	2-7/8"
56750	.4134		10.500	114	73
56755	.4219	27/64"	10.716	4-1/2"	2-7/8"
56760	.4331		11.000	114	73
56765	.4375	7/16"	11.113	4-1/2"	2-7/8"
56770	.4528		11.500	120	76
56775	.4531	29/64"	11.509	4-3/4"	3"
56780	.4688	15/32"	11.908	4-3/4"	3"
56785	.4724		12.000	120	76
56790	.4844	31/64"	12.304	4-3/4"	3"
56795	.4921		12.500	120	76
56800	.5000	1/2"	12.700	4-3/4"	3"

Drill Manufacturing

† *Metric equivalents are for reference only*

TOLERANCES

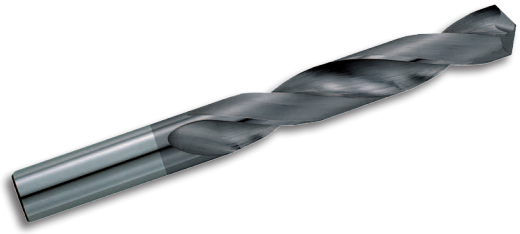
d	+0,0000 –0,0127mm (+.0000" –.0005")	
l1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")

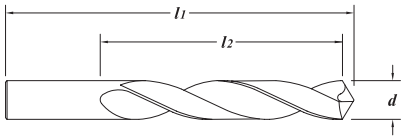
Z=2 | 25° | 118° | 5xD | TECH PAGES 300-303

Series 1200H

1,588mm - 4,000mm
(.0625" - .1575")

HARDLUBE Coated
HARDLUBE-Beschichtet
Recubrimiento de HARDLUBE
Revêtement HARDLUBE
Rivestimento in HARDLUBE
HARDLUBE 涂层





Solid submicron grain carbide drill
General purpose jobber style
Excellent heat resistance and lubricity
Cam point (≤1/8" diameter - 4-facet point)
Live tooling recommended on lathe processes
Shank tolerance: h6
Uncoated - page 79

Vollhartmetallbohrer aus Feinkornhartmetall
Universeller Bohrer
Exzellente Hitzebeständigkeit und Schmiereigenschaften
Durchmesser 3 mm (1/8") und kleiner – 118° Spitzenwinkel und 4-Fasen-Anschliff
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Unbeschichtet - Seite 79

Broca de submicrograno sólido carburo
Broca para uso general
Excelente resistencia térmica y lubricación
Para diámetros de 1/8" e inferiores – punta de 4 caras de 118°
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Sin recubrimiento - Página 79

Forets carbure submicrograin
Forets pour application generale
Excellente resistance a la haute temperature et glissement
D1/8 et plus petit - 118° avec 4 faces de depouille
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Sans revêtement - Page 79

Punte in sub-micro grana
Punta per impieghi generali
Eccellente resistenza al calore e autolubrificante
Affilatura a 118° punto
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Non Rivestito - Pagina 79

整体硬质合金钻头
通用型机用钻头
耐热性和润滑性特好
(1/8英寸直径和 1/8英寸以下直径 - 118° 4-小平面刀尖)
不建议在车床，或工具必须纺纱
柄部公差: h6
未涂层 - 79页

EDP#	*d* † Diameter Decimal		Metric	*l1* Overall Length	*l2* Flute Length
56166	.0625	1/16"	1.588	1-3/4"	3/4"
56171	.0635	#52	1.613	1-3/4"	3/4"
56181	.0700	#50	1.778	1-3/4"	7/8"
56186	.0730	#49	1.854	1-3/4"	7/8"
56191	.0760	#48	1.930	1-3/4"	7/8"
56196	.0781	5/64"	1.984	1-3/4"	7/8"
56206	.0787		2.000	44	22
56216	.0820	#45	2.083	1-3/4"	7/8"
56221	.0860	#44	2.184	2"	1"
56226	.0890	#43	2.261	2"	1"
56231	.0935	#42	2.375	2"	1"
56236	.0938	3/32"	2.383	2"	1"
56241	.0960	#41	2.438	2"	1"
56246	.0980	#40	2.489	2"	1"
56251	.0984		2.500	57	32
56256	.0995	#39	2.527	2-1/4"	1-1/4"
56261	.1015	#38	2.578	2-1/4"	1-1/4"
56266	.1040	#37	2.642	2-1/4"	1-1/4"
56271	.1065	#36	2.705	2-1/4"	1-1/4"
56276	.1094	7/64"	2.779	2-1/4"	1-1/4"
56281	.1100	#35	2.794	2-1/4"	1-1/4"
56286	.1110	#34	2.819	2-1/4"	1-1/4"
56291	.1130	#33	2.870	2-1/4"	1-1/4"
56296	.1160	#32	2.946	2-1/4"	1-1/4"
56301	.1181		3.000	57	32
56306	.1200	#31	3.048	2-1/4"	1-1/4"
56311	.1250	1/8"	3.175	2-1/4"	1-1/4"
56316	.1285	#30	3.264	2-1/4"	1-1/4"
56321	.1360	#29	3.454	2-1/2"	1-3/8"
56331	.1405	#28	3.569	2-1/2"	1-3/8"
56336	.1406	9/64"	3.571	2-1/2"	1-3/8"
56341	.1440	#27	3.658	2-1/2"	1-3/8"
56346	.1470	#26	3.734	2-1/2"	1-3/8"
56351	.1495	#25	3.797	2-1/2"	1-3/8"
56356	.1520	#24	3.861	2-1/2"	1-3/8"
56361	.1540	#23	3.912	2-1/2"	1-3/8"
56366	.1562	5/32"	3.967	2-1/2"	1-3/8"
56371	.1570	#22	3.988	2-1/2"	1-3/8"

continued →

Series 1200H *(continued)*

4,039mm - 12,700mm
(.1590" - .5000")

EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
56381	.1590	#21	4.039	2-1/2"	1-3/8"
56386	.1610	#20	4.089	2-1/2"	1-3/8"
56391	.1660	#19	4.216	2-3/4"	1-5/8"
56396	.1695	#18	4.305	2-3/4"	1-5/8"
56401	.1719	11/64"	4.366	2-3/4"	1-5/8"
56411	.1770	#16	4.496	2-3/4"	1-5/8"
56421	.1800	#15	4.572	2-3/4"	1-5/8"
56426	.1820	#14	4.623	2-3/4"	1-5/8"
56436	.1875	3/16"	4.763	2-3/4"	1-5/8"
56441	.1890	#12	4.801	2-3/4"	1-5/8"
56446	.1910	#11	4.851	2-3/4"	1-5/8"
56451	.1935	#10	4.915	2-3/4"	1-5/8"
56471	.2010	#7	5.105	3"	1-3/4"
56481	.2040	#6	5.182	3"	1-3/4"
56486	.2055	#5	5.220	3"	1-3/4"
56491	.2090	#4	5.309	3"	1-3/4"
56496	.2130	#3	5.410	3"	1-3/4"
56506	.2188	7/32"	5.558	3"	1-3/4"
56516	.2280	#1	5.791	3"	1-3/4"
56526	.2344	15/64"	5.954	3-1/4"	2"
56541	.2420	C	6.147	3-1/4"	2"
56551	.2500	1/4" / E	6.350	3-1/4"	2"
56561	.2570	F	6.528	3-1/4"	2"
56566	.2610	G	6.629	3-1/2"	2-1/8"
56571	.2656	17/64"	6.746	3-1/2"	2-1/8"
56601	.2812	9/32"	7.142	3-1/2"	2-1/8"
56606	.2900	L	7.366	3-1/2"	2-1/8"
56626	.3020	N	7.671	3-3/4"	2-3/8"
56631	.3125	5/16"	7.938	3-3/4"	2-3/8"
56646	.3230	P	8.204	3-3/4"	2-3/8"
56651	.3281	21/64"	8.334	4"	2-1/2"
56671	.3438	11/32"	8.733	4"	2-1/2"
56696	.3680	U	9.347	4-1/4"	2-3/4"
56706	.3750	3/8"	9.525	4-1/4"	2-3/4"
56731	.3970	X	10.084	4-1/2"	2-7/8"
56741	.4062	13/32"	10.317	4-1/2"	2-7/8"
56756	.4219	27/64"	10.716	4-1/2"	2-7/8"
56766	.4375	7/16"	11.113	4-1/2"	2-7/8"
56801	.5000	1/2"	12.700	4-3/4"	3"

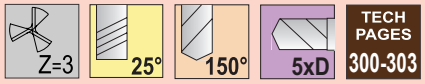
† *Metric equivalents are for reference only*

Series 1100

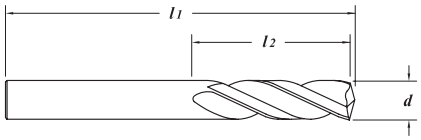
2,779mm - 5,182mm
(.1094" - .2040")

TOLERANCES

d		+0,0000 –0,0127mm (+.0000" –.0005")
l_1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l_2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")



TECH PAGES 300-303



Solid submicron grain carbide drill
Self-centering drill point
Near reamer finishes
Can be used as a core drill
Tighter tolerance holes
Improved roundness and straightness
Recommended for cast aluminum, cast iron and materials with high silicon content
Live tooling recommended on lathe processes
Shank tolerance: h6
Hardlube Coated - page 88

Vollhartmetallbohrer aus Feinkornhartmetall
Selbstzentrierend Punkt
Nahe an geriebenen Oberflächen
Kann als Aufbohrer verwendet werden
Bessere Bohrungstoleranzen
Verbesserter Rundlauf und Genauigkeit
Empfohlen für Aluminiumguss, Grauguss und Werkstoffe mit hohem Silizium Gehalt
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Hardlube-Beschichtet - Seite 88

Broca de submicrograno sólido carburo
Uno mismo punto de centrado
Acabado similar al escariado
Puede ser utilizada para taladrado directo
Orificios de alta tolerancia y precisión
Mejor acabado redondeado y recto
Recomendado para aluminio fundido, hierro fundido y materiales con alto contenido de silicio
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Recubrimiento de Hardlube - Página 88

Forets carbure submicrograin
Pointe auto centrante
Près de finitions alésoir
Peut être utilisé comme foret-aléseur
Le resserrement des trous de tolérance
Amélioration rondeur et de rectitude
Recommander pour fonte d'aluminium, fonte grise et matieres a haute teneur en silicium
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Revêtement Hardlube - Page 88

Punte in sub-micro grana
Punto auto centrante
Ottimo grado di finitura
Può essere usata come punta da centro
Alta tolleranza dei fori
Migliore rotondità e linearità
Raccomandata per lavorazioni su alluminio, ghisa e materiali ad alto contenuto di silicio
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Rivestimento in Hardlube - Pagina 88

整体硬质合金钻头
自定心刀尖
接近铰孔光洁度
可做套料钻使用
紧公差孔
提高正圆度和直线度
推荐加工铸铝、铸铁和硅含量高的材质
不建议在车床，或工具必须纺纱
柄部公差: h6
Hardlube 涂层 - 88页

EDP#	d † Diameter Decimal	Diameter	Metric	l_1 Overall Length	l_2 Flute Length
90275	.1094	7/64"	2.779	2-1/4"	1-1/4"
90280	.1100	#35	2.794	2-1/4"	1-1/4"
90285	.1110	#34	2.819	2-1/4"	1-1/4"
90290	.1130	#33	2.870	2-1/4"	1-1/4"
90295	.1160	#32	2.946	2-1/4"	1-1/4"
90300	.1181		3.000	57	32
90305	.1200	#31	3.048	2-1/4"	1-1/4"
90310	.1250	1/8"	3.175	2-1/4"	1-1/4"
90315	.1285	#30	3.264	2-1/4"	1-1/4"
90320	.1360	#29	3.454	2-1/2"	1-3/8"
90325	.1378		3.500	63	35
90330	.1405	#28	3.569	2-1/2"	1-3/8"
90335	.1406	9/64"	3.571	2-1/2"	1-3/8"
90340	.1440	#27	3.658	2-1/2"	1-3/8"
90345	.1470	#26	3.734	2-1/2"	1-3/8"
90350	.1495	#25	3.797	2-1/2"	1-3/8"
90355	.1520	#24	3.861	2-1/2"	1-3/8"
90365	.1562	5/32"	3.967	2-1/2"	1-3/8"
90375	.1575		4.000	63	35
90380	.1590	#21	4.039	2-1/2"	1-3/8"
90385	.1610	#20	4.089	2-1/2"	1-3/8"
90390	.1660	#19	4.216	2-3/4"	1-5/8"
90395	.1695	#18	4.305	2-3/4"	1-5/8"
90400	.1719	11/64"	4.366	2-3/4"	1-5/8"
90420	.1800	#15	4.572	2-3/4"	1-5/8"
90425	.1820	#14	4.623	2-3/4"	1-5/8"
90435	.1875	3/16"	4.763	2-3/4"	1-5/8"
90440	.1890	#12	4.801	2-3/4"	1-5/8"
90455	.1960	#9	4.978	3"	1-3/4"
90460	.1969		5.000	76	44
90470	.2010	#7	5.105	3"	1-3/4"
90475	.2031	13/64"	5.159	3"	1-3/4"
90480	.2040	#6	5.182	3"	1-3/4"

continued →

Series 1100 *(continued)*

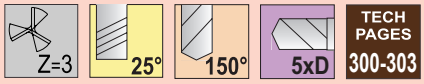
5,220mm - 10,500mm
(.2055" - .4134")

EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
90485	.2055	#5	5.220	3"	1-3/4"
90500	.2165		5.500	76	44
90505	.2188	7/32"	5.558	3"	1-3/4"
90510	.2210	#2	5.613	3"	1-3/4"
90515	.2280	#1	5.791	3"	1-3/4"
90525	.2344	15/64"	5.954	3-1/4"	2"
90530	.2362		6.000	82	50
90550	.2500	1/4" / E	6.350	3-1/4"	2"
90555	.2559		6.500	82	50
90560	.2570	F	6.528	3-1/4"	2"
90565	.2610	G	6.629	3-1/2"	2-1/8"
90570	.2656	17/64"	6.746	3-1/2"	2-1/8"
90575	.2660	H	6.756	3-1/2"	2-1/8"
90580	.2720	I	6.909	3-1/2"	2-1/8"
90585	.2756		7.000	88	54
90600	.2812	9/32"	7.142	3-1/2"	2-1/8"
90605	.2900	L	7.366	3-1/2"	2-1/8"
90620	.2969	19/64"	7.541	3-3/4"	2-3/8"
90625	.3020	N	7.671	3-3/4"	2-3/8"
90630	.3125	5/16"	7.938	3-3/4"	2-3/8"
90635	.3150		8.000	95	60
90640	.3160	O	8.026	3-3/4"	2-3/8"
90650	.3281	21/64"	8.334	4"	2-1/2"
90655	.3320	Q	8.433	4"	2-1/2"
90660	.3346		8.500	101	63
90665	.3390	R	8.611	4"	2-1/2"
90670	.3438	11/32"	8.733	4"	2-1/2"
90680	.3543		9.000	101	63
90690	.3594	23/64"	9.129	4-1/4"	2-3/4"
90705	.3750	3/8"	9.525	4-1/4"	2-3/4"
90725	.3937		10.000	114	73
90745	.4130	Z	10.490	4-1/2"	2-7/8"
90755	.4219	27/64"	10.716	4-1/2"	2-7/8"
90760	.4331		11.000	114	73
90765	.4375	7/16"	11.113	4-1/2"	2-7/8"
90775	.4531	29/64"	11.509	4-3/4"	3"
90780	.4688	15/32"	11.908	4-3/4"	3"
90790	.4844	31/64"	12.304	4-3/4"	3"
90800	.5000	1/2"	12.700	4-3/4"	3"

† *Metric equivalents are for reference only*

TOLERANCES

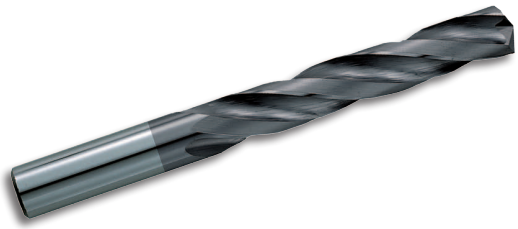
d		+0,0000 –0,0127mm (+.0000" –.0005")
l_1	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	> 1/8"	+3,175 –3,175mm (+.125" –.125")
l_2	≤ 1/8"	+3,175 –1,588mm (+.125" –.062")
	>1/8"	+3,175 –3,175mm (+.125" –.125")

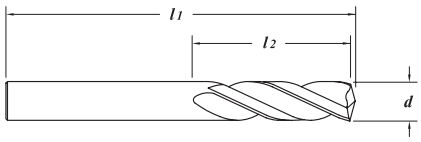


Series 1100H

2,779mm - 5,500mm
(.1094" - .2165")

HARDLUBE Coated
HARDLUBE-Beschichtet
Recubrimiento de HARDLUBE
Revêtement HARDLUBE
Rivestimento in HARDLUBE
HARDLUBE 涂层





Solid submicron grain carbide drill
Self-centering drill point
Near reamer finishes
Can be used as a core drill
Excellent heat resistance and lubricity
Tighter tolerance holes
Improved roundness and straightness
Recommended for cast aluminum, cast iron and materials with high silicon content
Live tooling recommended on lathe processes
Shank tolerance: h6
Uncoated - page 85

Vollhartmetallbohrer aus Feinkornhartmetall
Selbstzentrierend Punkt
Nahe an geriebenen Oberflächen
Kann als Aufbohrer verwendet werden
Exzellente Hitzebeständigkeit und Schmiereigenschaften
Bessere Bohrungstoleranzen
Verbesserter Rundlauf und Genauigkeit
Empfohlen für Aluminiumguss, Grauguss und Werkstoffe mit hohem Silizium Gehalt
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6
Unbeschichtet - Seite 85

Broca de submicrograno sólido carburo
Uno mismo punto de centrado
Acabado similar al escariado
Puede ser utilizada para taladrado directo
Excelente resistencia térmica y lubricación
Orificios de alta tolerancia y precisión
Mejor acabado redondeado y recto
Recomendado para aluminio fundido, hierro fundido y materiales con alto contenido de silicio
Recomendación para la aplicación en torno
Tolerancia del vástago: h6
Sin recubrimiento - Página 85

Forets carbure submicrograin
Pointe auto centrante
Près de finitions alésoir
Peut être utilisé comme foret-aléseur
Excellente resistance a la haute temperature et glissement
Le resserrement des trous de tolérance
Amélioration rondeur et de rectitude
Recommander pour fonte d'aluminium, fonte grise et matieres a haute teneur en silicium
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6
Sans revêtement - Page 85

Punte in sub-micro grana
Punto auto centrante
Ottimo grado di finitura
Può essere usata come punta da centro
Eccellente resistenza al calore e autolubrificante
Alta tolleranza dei fori
Migliore rotondità e linearità
Raccomandata per lavorazioni su alluminio, ghisa e materiali ad alto contenuto di silicio
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6
Non Rivestito - Pagina 85

整体硬质合金钻头
自定心刀尖
接近铰孔光洁度
可做套料钻使用
耐热性和润滑性特好
紧公差孔
提高正圆度和直线度
推荐加工铸铝、铸铁和硅含量高的材质
不建议在车床，或工具必须纺纱
柄部公差: h6
未涂层 - 85页

EDP#	d † Diameter Decimal	Diameter	Metric	l_1 Overall Length	l_2 Flute Length
90276	.1094	7/64"	2.779	2-1/4"	1-1/4"
90281	.1100	#35	2.794	2-1/4"	1-1/4"
90291	.1130	#33	2.870	2-1/4"	1-1/4"
90296	.1160	#32	2.946	2-1/4"	1-1/4"
90301	.1181		3.000	57	32
90306	.1200	#31	3.048	2-1/4"	1-1/4"
90311	.1250	1/8"	3.175	2-1/4"	1-1/4"
90316	.1285	#30	3.264	2-1/4"	1-1/4"
90321	.1360	#29	3.454	2-1/2"	1-3/8"
90326	.1378		3.500	63	35
90331	.1405	#28	3.569	2-1/2"	1-3/8"
90336	.1406	9/64"	3.571	2-1/2"	1-3/8"
90341	.1440	#27	3.658	2-1/2"	1-3/8"
90346	.1470	#26	3.734	2-1/2"	1-3/8"
90351	.1495	#25	3.797	2-1/2"	1-3/8"
90356	.1520	#24	3.861	2-1/2"	1-3/8"
90361	.1540	#23	3.912	2-1/2"	1-3/8"
90366	.1562	5/32"	3.967	2-1/2"	1-3/8"
90371	.1570	#22	3.988	2-1/2"	1-3/8"
90376	.1575		4.000	63	35
90381	.1590	#21	4.039	2-1/2"	1-3/8"
90386	.1610	#20	4.089	2-1/2"	1-3/8"
90391	.1660	#19	4.216	2-3/4"	1-5/8"
90396	.1695	#18	4.305	2-3/4"	1-5/8"
90401	.1719	11/64"	4.366	2-3/4"	1-5/8"
90406	.1730	#17	4.394	2-3/4"	1-5/8"
90411	.1770	#16	4.496	2-3/4"	1-5/8"
90416	.1772		4.500	70	41
90421	.1800	#15	4.572	2-3/4"	1-5/8"
90426	.1820	#14	4.623	2-3/4"	1-5/8"
90431	.1850	#13	4.700	2-3/4"	1-5/8"
90436	.1875	3/16"	4.763	2-3/4"	1-5/8"
90441	.1890	#12	4.801	2-3/4"	1-5/8"
90446	.1910	#11	4.851	2-3/4"	1-5/8"
90451	.1935	#10	4.915	2-3/4"	1-5/8"
90456	.1960	#9	4.978	3"	1-3/4"
90461	.1969		5.000	76	44
90466	.1990	#8	5.055	3"	1-3/4"
90471	.2010	#7	5.105	3"	1-3/4"
90476	.2031	13/64"	5.159	3"	1-3/4"
90481	.2040	#6	5.182	3"	1-3/4"
90486	.2055	#5	5.220	3"	1-3/4"
90491	.2090	#4	5.309	3"	1-3/4"
90496	.2130	#3	5.410	3"	1-3/4"
90501	.2165		5.500	76	44

continued →

Series 1100H *(continued)*

5,558mm - 12,700mm
(.2188" - .5000")

EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
90506	.2188	7/32"	5.558	3"	1-3/4"
90511	.2210	#2	5.613	3"	1-3/4"
90516	.2280	#1	5.791	3"	1-3/4"
90521	.2340	A	5.944	3-1/4"	2"
90526	.2344	15/64"	5.954	3-1/4"	2"
90531	.2362		6.000	82	50
90536	.2380	B	6.045	3-1/4"	2"
90541	.2420	C	6.147	3-1/4"	2"
90546	.2460	D	6.248	3-1/4"	2"
90551	.2500	1/4" / E	6.350	3-1/4"	2"
90556	.2559		6.500	82	50
90561	.2570	F	6.528	3-1/4"	2"
90566	.2610	G	6.629	3-1/2"	2-1/8"
90571	.2656	17/64"	6.746	3-1/2"	2-1/8"
90576	.2660	H	6.756	3-1/2"	2-1/8"
90581	.2720	I	6.909	3-1/2"	2-1/8"
90586	.2756		7.000	88	54
90591	.2770	J	7.036	3-1/2"	2-1/8"
90596	.2810	K	7.137	3-1/2"	2-1/8"
90601	.2812	9/32"	7.142	3-1/2"	2-1/8"
90606	.2900	L	7.366	3-1/2"	2-1/8"
90611	.2950	M	7.493	3-3/4"	2-3/8"
90616	.2953		7.500	95	60
90621	.2969	19/64"	7.541	3-3/4"	2-3/8"
90626	.3020	N	7.671	3-3/4"	2-3/8"
90631	.3125	5/16"	7.938	3-3/4"	2-3/8"
90636	.3150		8.000	95	60
90641	.3160	O	8.026	3-3/4"	2-3/8"
90646	.3230	P	8.204	3-3/4"	2-3/8"
90651	.3281	21/64"	8.334	4"	2-1/2"
90656	.3320	Q	8.433	4"	2-1/2"
90661	.3346		8.500	101	63
90666	.3390	R	8.611	4"	2-1/2"
90671	.3438	11/32"	8.733	4"	2-1/2"
90676	.3480	S	8.839	4"	2-1/2"
90681	.3543		9.000	101	63
90691	.3594	23/64"	9.129	4-1/4"	2-3/4"
90696	.3680	U	9.347	4-1/4"	2-3/4"
90701	.3740		9.500	107	70
90706	.3750	3/8"	9.525	4-1/4"	2-3/4"
90711	.3770	V	9.576	4-1/4"	2-3/4"
90716	.3860	W	9.804	4-1/2"	2-7/8"
90721	.3906	25/64"	9.921	4-1/2"	2-7/8"
90726	.3937		10.000	114	73
90736	.4040	Y	10.262	4-1/2"	2-7/8"
90741	.4062	13/32"	10.317	4-1/2"	2-7/8"
90746	.4130	Z	10.490	4-1/2"	2-7/8"
90751	.4134		10.500	114	73
90756	.4219	27/64"	10.716	4-1/2"	2-7/8"
90761	.4331		11.000	114	73
90766	.4375	7/16"	11.113	4-1/2"	2-7/8"
90771	.4528		11.500	120	76
90776	.4531	29/64"	11.509	4-3/4"	3"
90781	.4688	15/32"	11.908	4-3/4"	3"
90786	.4724		12.000	120	76
90791	.4844	31/64"	12.304	4-3/4"	3"
90796	.4921		12.500	120	76
90801	.5000	1/2"	12.700	4-3/4"	3"

† *Metric equivalents are for reference only*

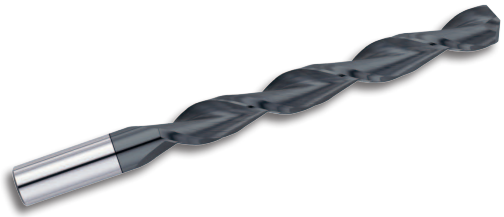
TOLERANCES	
d	+0,0000 –0,0127mm (+.0000" –.0005")
l_1	+3,175 –3,175mm (+.125" –.125")
l_2	+3,175 –3,175mm (+.125" –.125")

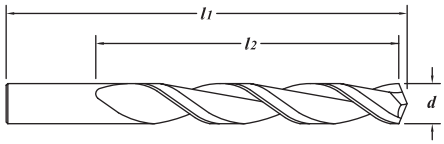
Z=2 | 35° | 135° | 8xD | TECH PAGES 300-303

Series 1800H

4,763mm - 7,938mm
(.1875" - .3125")

Parabolic - HARDLUBE Coated
Parabolische - HARDLUBE-Beschichtet
Parabólica - Recubrimiento de HARDLUBE
Parabolique - Revêtement HARDLUBE
Elicoidale - Rivestimento in HARDLUBE
抛物线排屑槽 - HARDLUBE 涂层





Solid submicron grain carbide drill
Wide open flutes and high helix remove chips quickly
4-facet point
Recommended for deep holes in soft, non-ferrous materials (aluminum, brass and bronze)
Live tooling recommended on lathe processes
Shank tolerance: h6

Vollhartmetallbohrer aus Feinkornhartmetall
Grosse Spannuten und grösserer Spiralwinkel für schnelle Spanentfernung
4-Fasen-Anschliff Punkt
Empfohlen für Tiefe Bohrungen in Weiche Nichteisenmetalle (Aluminium, Messing und Bronze)
Empfehlung fuer den Einsatz auf der Drehmaschine
Schaft-Toleranz: h6

Broca de submicrograno sólido carburo
Ranuras anchas y abiertas y la hélice más alta evacúan las virutas con la máxima rapidez
Punta de 4 caras
Recomendado para orificios profundos en material no ferroso blando (aluminio, latón, bronce)
Recomendación para la aplicación en torno
Tolerancia del vástago: h6

Forets carbure submicrograin
Goujures tres larges egle d'helice eleve pour une evacuation plus rapide des copeaux
Pointe avec 4 faces de depouille
Recommander pour trous profonds dans matieres tenders non ferreuses
Outil de filature nécessaires pour une utilisation sur un processus de tournage
Tolerance queue: h6

Punte in sub-micro grana
Elica accentuata per una più veloce evacuazione del truciolo
Punto 4 facce
Fori profondi su materiali non ferrosi (alluminio, ottone, bronzo)
Utensili rotanti sono consigliate se usato su un tornio
Tolleranza gambo: h6

整体硬质合金钻头
开放式宽容屑槽和大螺旋角能快速清除切屑
4-小平面刀尖
推荐加工在软质有色金属（铝、黄铜和青铜）内钻深孔
不建议在车床，或工具必须纺纱
柄部公差: h6

EDP#	*d* † Diameter Decimal	Diameter	Metric	l_1 Overall Length	l_2 Flute Length
22436	.1875	3/16"	4.763	3-13/16"	2-5/16"
22441	.1890	#12	4.801	3-13/16"	2-5/16"
22456	.1960	#9	4.978	3-15/16"	2-7/16"
22461	.1969		5.000	100	62
22466	.1990	#8	5.055	3-15/16"	2-7/16"
22471	.2010	#7	5.105	3-15/16"	2-7/16"
22476	.2031	13/64"	5.159	3-15/16"	2-7/16"
22486	.2055	#5	5.220	4"	2-1/2"
22496	.2130	#3	5.410	4"	2-1/2"
22501	.2165		5.499	102	64
22506	.2188	7/32"	5.558	4"	2-1/2"
22511	.2210	#2	5.613	4"	2-1/2"
22516	.2280	#1	5.791	4-1/8"	2-5/8"
22531	.2362		6.000	105	67
22541	.2420	C	6.147	4-1/4"	2-3/4"
22546	.2460	D	6.248	4-1/4"	2-3/4"
22551	.2500	1/4" / E	6.350	4-1/4"	2-3/4"
22556	.2559		6.500	108	70
22561	.2570	F	6.528	4-3/8"	2-7/8"
22566	.2610	G	6.629	4-3/8"	2-7/8"
22571	.2656	17/64"	6.746	4-3/8"	2-7/8"
22576	.2660	H	6.756	4-3/8"	2-7/8"
22581	.2720	I	6.909	4-3/8"	2-7/8"
22586	.2756		7.000	111	73
22596	.2810	K	7.137	4-7/16"	2-15/16"
22606	.2900	L	7.366	4-7/16"	2-15/16"
22631	.3125	5/16"	7.938	4-11/16"	3-3/16"

continued →

Series 1800H *(continued)*

8,000mm - 16,000mm
(.3150" - .6299")

EDP#	*d* † Diameter Decimal	Diameter	Metric	*l1* Overall Length	*l2* Flute Length
22636	.3150		8.000	119	81
22646	.3230	P	8.204	4-11/16"	3-3/16"
22656	.3320	Q	8.433	4-15/16"	3-7/16"
22661	.3346		8.500	125	87
22666	.3390	R	8.611	4-15/16"	3-7/16"
22696	.3680	U	9.347	5"	3-1/2"
22706	.3750	3/8"	9.525	5-1/8"	3-5/8"
22721	.3906	25/64"	9.921	5-1/4"	3-3/4"
22726	.3937		10.000	133	95
22751	.4134		10.500	137	98
22761	.4331		11.000	138	100
22766	.4375	7/16"	11.113	5-7/16"	3-15/16"
22776	.4531	29/64"	11.509	5-9/16"	4-5/16"
22801	.5000	1/2"	12.700	6"	4-1/2"
22811	.5156	33/64"	13.096	6"	4-1/2"
22826	.5469	35/64"	13.891	6-1/8"	4-5/8"
22831	.5512		14.000	156	117

† *Metric equivalents are for reference only*

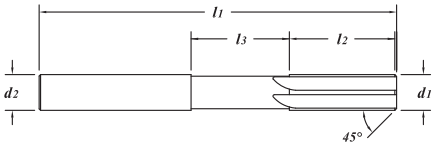
Series 4100

1,499mm - 2,083mm
(.0590" - .0820")

Z=4 | Z=6 | 0° | 45° | TECH PAGES 292-293

TOLERANCES		
d_1	1,498 – 6,372mm (.0590" – .2509")	+0,0050 –0,0000mm (+.0002" –.0000")
	6,375 – 12,750mm (.2510" – .5020")	+0,0075 –0,0000mm (+.0003" –.0000")
d_2	1,498 – 6,372mm (.0590" – .2509")	+0,0050 –0,0000mm (+.0002" –.0000")
	6,375 – 12,750mm (.2510" – .5020")	+0,0075 –0,0000mm (+.0003" –.0000")

Standard Reamers
Standard Reibahlen
Escariadores Estándar
Alesoirs Standarts
Alesatori Standard
标准铰刀



Solid Carbide Submicron Grain
Straight - RHC Flutes
Standard 45° Lead Chamfer
Neck diameter is 0,250 ±0,050mm (.010" ±.002") less than fluted diameter (d_1)

Vollhartmetall aus Feinkornhartmetall
Gerade RHC-Spannuten
Standard 45° Führungsfase
Hals-Durchmesser ist 0,250 ±0,050 mm (0,010 Zoll ±0,002 Zoll) kleiner als der Nenn-Durchmesser (d_1)

Carburo sólido de grano submicrónico
Rectos – ranuras RHC
Chaflán de guía estándar de 45°
Diámetro de cuello de 0,250 ±0,050mm (.010" ±.002") menor que diámetro de corte (d_1)

Carbure plein submicrograin
droites goujures - RHC
Une norme chanfrein à 45°
Diamètre de la nuque est 0,250 ± 0,050 mm (.010 "±.002") plus petit que le diamètre de coupe (d_1)

Super sub-micrograno metallo duro
Taglienti dritti
Inclinazione standard a 45°
Diametro del collo di 0,250 ± 0,050 mm (.010 "±.002") inferiore rispetto al diametro di taglio (d_1)

超细晶粒整体硬质合金
直线型一洛氏硬度C级出屑槽
标准45° 导程倒角
颈部直径为 0,250 ± 0,050 mm (.010 "±.002"), 小于刃部直径 (d_1)

EDP#	d_1 † Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Neck Length	z Number Flutes
95066	.0590		1.499	.0590"	1-1/2"	3/8"	.250"	4
95069	.0591		1.500	.0591"	1-1/2"	3/8"	.250"	4
95072	.0595	#53	1.511	.0595"	1-1/2"	3/8"	.250"	4
95075	.0600		1.524	.0600"	1-1/2"	3/8"	.250"	4
95078	.0605		1.537	.0605"	1-1/2"	3/8"	.250"	4
95081	.0610		1.549	.0610"	1-1/2"	3/8"	.250"	4
95084	.0615		1.562	.0615"	1-1/2"	3/8"	.250"	4
95087	.0620		1.575	.0620"	1-1/2"	3/8"	.250"	4
95090	.0625	1/16"	1.588	.0625"	1-1/2"	3/8"	.250"	4
95093	.0630		1.600	.0630"	1-1/2"	3/8"	.250"	4
95096	.0635	#52	1.613	.0635"	1-1/2"	3/8"	.250"	4
95099	.0640		1.626	.0640"	1-1/2"	3/8"	.250"	4
95102	.0645		1.638	.0645"	1-1/2"	3/8"	.250"	4
95105	.0650		1.651	.0650"	1-1/2"	3/8"	.250"	4
95108	.0660		1.676	.0660"	1-3/4"	1/2"	.250"	4
95111	.0670	#51	1.702	.0670"	1-3/4"	1/2"	.250"	4
95114	.0680		1.727	.0680"	1-3/4"	1/2"	.375"	4
95117	.0690		1.753	.0690"	1-3/4"	1/2"	.375"	4
95120	.0700	#50	1.778	.0700"	1-3/4"	1/2"	.375"	4
95123	.0710		1.803	.0710"	1-3/4"	1/2"	.375"	4
95126	.0720		1.829	.0720"	1-3/4"	1/2"	.375"	4
95129	.0730	#49	1.854	.0730"	1-3/4"	1/2"	.375"	4
95132	.0740		1.880	.0740"	1-3/4"	1/2"	.375"	4
95135	.0750		1.905	.0750"	1-3/4"	1/2"	.375"	4
95138	.0760	#48	1.930	.0760"	1-3/4"	1/2"	.375"	4
95141	.0770		1.956	.0770"	1-3/4"	1/2"	.375"	4
95144	.0780		1.981	.0780"	1-3/4"	1/2"	.375"	4
95147	.0781	5/64"	1.984	.0781"	1-3/4"	1/2"	.375"	4
95150	.0785	#47	1.994	.0785"	1-3/4"	1/2"	.375"	4
95153	.0787		2.000	.0787"	1-3/4"	1/2"	.375"	4
95156	.0790		2.007	.0790"	1-3/4"	1/2"	.375"	4
95159	.0800		2.032	.0800"	1-3/4"	1/2"	.375"	4
95162	.0810	#46	2.057	.0810"	2"	1/2"	.375"	4
95165	.0820	#45	2.083	.0820"	2"	1/2"	.375"	4

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Neck Length	z Number Flutes
95168	.0830		2.108	.0830"	2"	1/2"	.375"	4
95171	.0840		2.134	.0840"	2"	1/2"	.375"	4
95174	.0850		2.159	.0850"	2"	1/2"	.375"	4
95177	.0860	#44	2.184	.0860"	2"	1/2"	.375"	4
95180	.0870		2.210	.0870"	2"	1/2"	.375"	4
95183	.0880		2.235	.0880"	2"	1/2"	.375"	4
95186	.0890	#43	2.261	.0890"	2"	1/2"	.375"	4
95189	.0900		2.286	.0900"	2"	1/2"	.375"	4
95192	.0910		2.311	.0910"	2"	1/2"	.375"	4
95195	.0915		2.324	.0915"	2"	1/2"	.375"	4
95198	.0920		2.337	.0920"	2"	1/2"	.375"	4
95201	.0925		2.350	.0925"	2"	1/2"	.375"	4
95204	.0930		2.362	.0930"	2"	1/2"	.375"	4
95207	.0935	#42	2.375	.0935"	2"	1/2"	.375"	4
95210	.0938	3/32"	2.383	.0938"	2"	1/2"	.375"	4
95213	.0940		2.388	.0940"	2"	1/2"	.375"	4
95216	.0945		2.400	.0945"	2"	1/2"	.375"	4
95219	.0950		2.413	.0950"	2"	1/2"	.375"	4
95222	.0960	#41	2.438	.0960"	2-1/4"	5/8"	.375"	4
95225	.0970		2.464	.0970"	2-1/4"	5/8"	.375"	4
95228	.0980	#40	2.489	.0980"	2-1/4"	5/8"	.375"	4
95231	.0984		2.500	.0984"	2-1/4"	5/8"	.375"	4
95234	.0990		2.515	.0990"	2-1/4"	5/8"	.500"	4
95237	.0995	#39	2.527	.0995"	2-1/4"	5/8"	.500"	4
95240	.1000		2.540	.1000"	2-1/4"	5/8"	.500"	4
95243	.1010		2.565	.1010"	2-1/4"	5/8"	.500"	4
95246	.1015	#38	2.578	.1015"	2-1/4"	5/8"	.500"	4
95249	.1020		2.591	.1020"	2-1/4"	5/8"	.500"	4
95252	.1030		2.616	.1030"	2-1/4"	5/8"	.500"	4
95255	.1040	#37	2.642	.1040"	2-1/4"	5/8"	.500"	4
95258	.1050		2.667	.1050"	2-1/4"	5/8"	.500"	4
95261	.1060		2.692	.1060"	2-1/4"	5/8"	.500"	4
95264	.1065	#36	2.705	.1065"	2-1/4"	5/8"	.500"	4
95267	.1070		2.718	.1070"	2-1/4"	5/8"	.500"	4
95270	.1080		2.743	.1080"	2-1/4"	5/8"	.500"	4
95273	.1090		2.769	.1090"	2-1/4"	5/8"	.500"	4
95276	.1094	7/64"	2.779	.1094"	2-1/4"	5/8"	.500"	4
95279	.1100	#35	2.794	.1100"	2-1/4"	5/8"	.500"	4
95282	.1110	#34	2.819	.1110"	2-1/4"	5/8"	.500"	4
95285	.1120		2.845	.1120"	2-1/4"	5/8"	.500"	4
95288	.1130	#33	2.870	.1130"	2-1/4"	5/8"	.500"	4
95291	.1140		2.896	.1140"	2-1/4"	5/8"	.500"	4
95294	.1150		2.921	.1150"	2-1/4"	5/8"	.500"	4
95297	.1160	#32	2.946	.1160"	2-1/4"	5/8"	.500"	4
95300	.1170		2.972	.1170"	2-1/4"	5/8"	.500"	4
95303	.1180		2.997	.1180"	2-1/4"	5/8"	.500"	4
95306	.1181		3.000	.1181"	2-1/4"	5/8"	.500"	4
95309	.1190		3.023	.1190"	2-1/4"	5/8"	.500"	4

continued →

Series 4100 *(continued)*

3,048mm - 3,937mm
(.1200" - .1550")

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Neck Length	z Number Flutes
95312	.1200	#31	3.048	.1200"	2-1/4"	5/8"	.500"	4
95315	.1210		3.073	.1210"	2-1/4"	5/8"	.500"	4
95318	.1220		3.099	.1220"	2-1/4"	5/8"	.500"	4
95321	.1230		3.124	.1230"	2-1/4"	5/8"	.500"	4
95324	.1235		3.137	.1235"	2-1/4"	5/8"	.500"	4
95327	.1240		3.150	.1240"	2-1/4"	5/8"	.500"	4
95330	.1245		3.162	.1245"	2-1/4"	5/8"	.500"	4
95333	.1248		3.170	.1248"	2-1/4"	5/8"	.500"	4
95336	.1250	1/8"	3.175	.1250"	2-1/4"	5/8"	.500"	4
95339	.1255		3.188	.1255"	2-1/4"	5/8"	.500"	4
95342	.1260		3.200	.1260"	2-1/4"	5/8"	.500"	4
95345	.1265		3.213	.1265"	2-1/4"	5/8"	.500"	4
95348	.1270		3.226	.1270"	2-1/4"	5/8"	.500"	4
95351	.1275		3.239	.1275"	2-1/4"	5/8"	.500"	4
95354	.1280		3.251	.1280"	2-1/4"	5/8"	.500"	4
95357	.1285	#30	3.264	.1285"	2-1/4"	5/8"	.500"	4
95360	.1290		3.277	.1290"	2-1/4"	5/8"	.500"	4
95363	.1300		3.302	.1300"	2-1/4"	5/8"	.500"	4
95366	.1310		3.327	.1310"	2-1/2"	3/4"	.500"	4
95369	.1320		3.353	.1320"	2-1/2"	3/4"	.500"	4
95372	.1330		3.378	.1330"	2-1/2"	3/4"	.500"	4
95375	.1340		3.404	.1340"	2-1/2"	3/4"	.500"	4
95378	.1350		3.429	.1350"	2-1/2"	3/4"	.500"	4
95381	.1360	#29	3.454	.1360"	2-1/2"	3/4"	.500"	4
95384	.1370		3.480	.1370"	2-1/2"	3/4"	.500"	4
95387	.1378		3.500	.1378"	2-1/2"	3/4"	.500"	4
95390	.1380		3.505	.1380"	2-1/2"	3/4"	.500"	4
95393	.1390		3.531	.1390"	2-1/2"	3/4"	.500"	4
95396	.1400		3.556	.1400"	2-1/2"	3/4"	.500"	4
95399	.1405	#28	3.569	.1405"	2-1/2"	3/4"	.500"	4
95402	.1406	9/64"	3.571	.1406"	2-1/2"	3/4"	.500"	4
95405	.1410		3.581	.1410"	2-1/2"	3/4"	.500"	4
95408	.1420		3.607	.1420"	2-1/2"	3/4"	.500"	4
95411	.1430		3.632	.1430"	2-1/2"	3/4"	.500"	4
95414	.1440	#27	3.658	.1440"	2-1/2"	3/4"	.500"	4
95417	.1450		3.683	.1450"	2-1/2"	3/4"	.500"	4
95420	.1460		3.708	.1460"	2-1/2"	3/4"	.500"	4
95423	.1470	#26	3.734	.1470"	2-1/2"	3/4"	.500"	4
95426	.1480		3.759	.1480"	2-1/2"	3/4"	.500"	4
95429	.1490		3.785	.1490"	2-1/2"	3/4"	.500"	4
95432	.1495	#25	3.797	.1495"	2-1/2"	3/4"	.500"	4
95435	.1500		3.810	.1500"	2-1/2"	3/4"	.500"	4
95438	.1510		3.835	.1510"	2-1/2"	3/4"	.500"	4
95441	.1520	#24	3.861	.1520"	2-1/2"	3/4"	.500"	4
95444	.1530		3.886	.1530"	2-1/2"	3/4"	.500"	4
95447	.1540	#23	3.912	.1540"	2-1/2"	3/4"	.500"	4
95450	.1545		3.924	.1545"	2-1/2"	3/4"	.500"	4
95453	.1550		3.937	.1550"	2-1/2"	3/4"	.500"	4

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Neck Length	z Number Flutes
95456	.1555		3.950	.1555"	2-1/2"	3/4"	.500"	4
95459	.1560		3.962	.1560"	2-1/2"	3/4"	.500"	4
95462	.1562	5/32"	3.967	.1562"	2-1/2"	3/4"	.500"	4
95465	.1565		3.975	.1565"	2-1/2"	3/4"	.500"	4
95468	.1570	#22	3.988	.1570"	2-1/2"	3/4"	.500"	4
95471	.1575		4.000	.1575"	2-1/2"	3/4"	.500"	4
95474	.1580		4.013	.1580"	2-1/2"	3/4"	.500"	4
95477	.1590	#21	4.039	.1590"	2-1/2"	3/4"	.500"	4
95480	.1600		4.064	.1600"	2-3/4"	7/8"	.625"	4
95483	.1610	#20	4.089	.1610"	2-3/4"	7/8"	.625"	4
95486	.1620		4.115	.1620"	2-3/4"	7/8"	.625"	4
95489	.1630		4.140	.1630"	2-3/4"	7/8"	.625"	4
95492	.1640		4.166	.1640"	2-3/4"	7/8"	.625"	4
95495	.1650		4.191	.1650"	2-3/4"	7/8"	.625"	4
95498	.1660	#19	4.216	.1660"	2-3/4"	7/8"	.625"	4
95501	.1670		4.242	.1670"	2-3/4"	7/8"	.625"	4
95504	.1680		4.267	.1680"	2-3/4"	7/8"	.625"	4
95507	.1690		4.293	.1690"	2-3/4"	7/8"	.625"	4
95510	.1695	#18	4.305	.1695"	2-3/4"	7/8"	.625"	4
95513	.1700		4.318	.1700"	2-3/4"	7/8"	.625"	4
95516	.1710		4.343	.1710"	2-3/4"	7/8"	.625"	4
95519	.1719	11/64"	4.366	.1719"	2-3/4"	7/8"	.625"	4
95522	.1720		4.369	.1720"	2-3/4"	7/8"	.625"	4
95525	.1730	#17	4.394	.1730"	2-3/4"	7/8"	.625"	4
95528	.1740		4.420	.1740"	2-3/4"	7/8"	.625"	4
95531	.1750		4.445	.1750"	2-3/4"	7/8"	.625"	4
95534	.1760		4.470	.1760"	2-3/4"	7/8"	.625"	4
95537	.1770	#16	4.496	.1770"	2-3/4"	7/8"	.625"	4
95540	.1772		4.500	.1772"	2-3/4"	7/8"	.625"	4
95543	.1780		4.521	.1780"	2-3/4"	7/8"	.625"	4
95546	.1790		4.547	.1790"	2-3/4"	7/8"	.625"	4
95549	.1800	#15	4.572	.1800"	2-3/4"	7/8"	.625"	4
95552	.1810		4.597	.1810"	2-3/4"	7/8"	.625"	4
95555	.1820	#14	4.623	.1820"	2-3/4"	7/8"	.625"	4
95558	.1830		4.648	.1830"	2-3/4"	7/8"	.625"	4
95561	.1840		4.674	.1840"	2-3/4"	7/8"	.625"	4
95564	.1850	#13	4.699	.1850"	2-3/4"	7/8"	.625"	4
95567	.1855		4.712	.1855"	2-3/4"	7/8"	.625"	4
95570	.1860		4.724	.1860"	2-3/4"	7/8"	.625"	4
95573	.1865		4.737	.1865"	2-3/4"	7/8"	.625"	4
95576	.1870		4.750	.1870"	2-3/4"	7/8"	.625"	4
95577	.1873		4.757	.1873"	2-3/4"	7/8"	.625"	4
95579	.1875	3/16"	4.763	.1875"	2-3/4"	7/8"	.625"	4
95582	.1880		4.775	.1880"	2-3/4"	7/8"	.625"	4
95585	.1885		4.788	.1885"	2-3/4"	7/8"	.625"	4
95588	.1890	#12	4.801	.1890"	2-3/4"	7/8"	.625"	4
95591	.1900		4.826	.1900"	2-3/4"	7/8"	.625"	4
95594	.1910	#11	4.851	.1910"	2-3/4"	7/8"	.625"	4

continued →

Series 4100 *(continued)*

4,877mm - 5,715mm
(.1920" - .2250")

Z=4 | Z=6 | 0° | 45° | TECH PAGES 292-293

TOLERANCES

d_1	1,498 – 6,372mm (.0590" – .2509")	+0,0050 –0,0000mm (+.0002" –.0000")
	6,375 – 12,750mm (.2510" – .5020")	+0,0075 –0,0000mm (+.0003" –.0000")
d_2	1,498 – 6,372mm (.0590" – .2509")	+0,0050 –0,0000mm (+.0002" –.0000")
	6,375 – 12,750mm (.2510" – .5020")	+0,0075 –0,0000mm (+.0003" –.0000")

Standard Reamers
Standard Reibahlen
Escariadores Estándar
Alesoirs Standarts
Alesatori Standard
标准铰刀

Solid Carbide Submicron Grain
Straight - RHC Flutes
Standard 45° Lead Chamfer
Neck diameter is 0,250 ±0,050mm (.010" ±.002") less than fluted diameter (d_1)

Vollhartmetall aus Feinkornhartmetall
Gerade RHC-Spannuten
Standard 45° Führungsfase
Hals-Durchmesser ist 0,250 ±0,050 mm (0,010 Zoll ±0,002 Zoll) kleiner als der Nenn-Durchmesser (d_1)

Carburo sólido de grano submicrónico
Rectos – ranuras RHC
Chaflán de guía estándar de 45°
Diámetro de cuello de 0,250 ±0,050mm (.010" ±.002") menor que diámetro de corte (d_1)

Carbure plein submicrograin
droites goujures - RHC
Une norme chanfrein à 45°
Diamètre de la nuque est 0,250 ± 0,050 mm (.010 "±.002") plus petit que le diamètre de coupe (d_1)

Super sub-micrograno metallo duro
Taglienti dritti
Inclinazione standard a 45°
Diametro del collo di 0,250 ± 0,050 mm (.010 "±.002") inferiore rispetto al diametro di taglio (d_1)

超细晶粒整体硬质合金
直线型一洛氏硬度C级出屑槽
标准45° 导程倒角
颈部直径为 0,250 ± 0,050 mm (.010 "±.002"), 小于刃部直径 (d_1)

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Neck Length	z Number Flutes
95597	.1920		4.877	.1920"	2-3/4"	7/8"	.625"	4
95600	.1930		4.902	.1930"	2-3/4"	7/8"	.625"	4
95603	.1935	#10	4.915	.1935"	2-3/4"	7/8"	.625"	4
95606	.1940		4.928	.1940"	2-3/4"	7/8"	.625"	4
95609	.1950		4.953	.1950"	2-3/4"	7/8"	.625"	4
95612	.1960	#9	4.978	.1960"	3"	1"	.625"	4
95615	.1969		5.000	.1969"	3"	1"	.625"	4
95618	.1970		5.004	.1970"	3"	1"	.625"	4
95621	.1980		5.029	.1980"	3"	1"	.625"	4
95624	.1990	#8	5.055	.1990"	3"	1"	.625"	4
95627	.2000		5.080	.2000"	3"	1"	.625"	4
95630	.2010	#7	5.105	.2010"	3"	1"	.625"	4
95633	.2020		5.131	.2020"	3"	1"	.625"	4
95636	.2030		5.156	.2030"	3"	1"	.625"	4
95639	.2031	13/64"	5.159	.2031"	3"	1"	.625"	4
95642	.2040	#6	5.182	.2040"	3"	1"	.625"	4
95645	.2050		5.207	.2050"	3"	1"	.625"	4
95648	.2055	#5	5.220	.2055"	3"	1"	.625"	4
95651	.2060		5.232	.2060"	3"	1"	.625"	4
95654	.2070		5.258	.2070"	3"	1"	.625"	4
95657	.2080		5.283	.2080"	3"	1"	.625"	4
95660	.2090	#4	5.309	.2090"	3"	1"	.625"	4
95663	.2100		5.334	.2100"	3"	1"	.625"	4
95666	.2110		5.359	.2110"	3"	1"	.625"	4
95669	.2120		5.385	.2120"	3"	1"	.625"	4
95672	.2130	#3	5.410	.2130"	3"	1"	.625"	4
95675	.2140		5.436	.2140"	3"	1"	.625"	4
95678	.2150		5.461	.2150"	3"	1"	.625"	4
95681	.2160		5.486	.2160"	3"	1"	.625"	4
95684	.2165		5.500	.2165"	3"	1"	.625"	4
95687	.2170		5.512	.2170"	3"	1"	.625"	4
95690	.2180		5.537	.2180"	3"	1"	.625"	4
95693	.2188	7/32"	5.558	.2188"	3"	1"	.625"	4
95696	.2190		5.563	.2190"	3"	1"	.625"	4
95699	.2200		5.588	.2200"	3"	1"	.625"	4
95702	.2210	#2	5.613	.2210"	3"	1"	.625"	4
95705	.2220		5.639	.2220"	3"	1"	.625"	4
95708	.2230		5.664	.2230"	3"	1"	.625"	4
95711	.2240		5.690	.2240"	3"	1"	.625"	4
95714	.2250		5.715	.2250"	3"	1"	.625"	4

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Neck Length	z Number Flutes
95717	.2260		5.740	.2260"	3"	1"	.625"	4
95720	.2270		5.766	.2270"	3"	1"	.625"	4
95723	.2280	#1	5.791	.2280"	3"	1"	.625"	4
95726	.2290		5.817	.2290"	3"	1"	.625"	4
95729	.2300		5.842	.2300"	3"	1"	.625"	4
95732	.2310		5.867	.2310"	3"	1"	.625"	4
95735	.2320		5.893	.2320"	3"	1"	.625"	4
95738	.2330		5.918	.2330"	3"	1"	.625"	4
95741	.2340	A	5.944	.2340"	3"	1"	.625"	4
95744	.2344	15/64"	5.954	.2344"	3"	1"	.625"	4
95747	.2350		5.969	.2350"	3"	1"	.625"	4
95750	.2360		5.994	.2360"	3"	1"	.625"	4
95753	.2362		6.000	.2362"	3"	1"	.625"	4
95756	.2370		6.020	.2370"	3"	1"	.625"	4
95759	.2380	B	6.045	.2380"	3"	1"	.625"	4
95762	.2390		6.071	.2390"	3"	1"	.625"	4
95765	.2400		6.096	.2400"	3"	1"	.625"	4
95768	.2410		6.121	.2410"	3"	1"	.625"	4
95771	.2420	C	6.147	.2420"	3"	1"	.625"	4
95774	.2430		6.172	.2430"	3"	1"	.625"	4
95777	.2440		6.198	.2440"	3"	1"	.625"	4
95780	.2450		6.223	.2450"	3"	1"	.625"	4
95783	.2460	D	6.248	.2460"	3"	1"	.625"	4
95786	.2470		6.274	.2470"	3"	1"	.625"	4
95789	.2480		6.299	.2480"	3"	1"	.625"	4
95792	.2485		6.312	.2485"	3"	1"	.625"	4
95795	.2490		6.325	.2490"	3"	1"	.625"	4
95798	.2495		6.337	.2495"	3"	1"	.625"	4
95799	.2498		6.345	.2498"	3"	1"	.625"	4
95801	.2500	1/4" / E	6.350	.2500"	3"	1"	.625"	4
95802	.2502		6.355	.2502"	3"	1"	.625"	4
95804	.2505		6.363	.2505"	3"	1"	.625"	4
95807	.2510		6.375	.2510"	3"	1"	.625"	4
95810	.2515		6.388	.2515"	3"	1"	.625"	4
95813	.2520		6.401	.2520"	3"	1"	.625"	4
95816	.2530		6.426	.2530"	3"	1"	.625"	4
95819	.2540		6.452	.2540"	3"	1"	.625"	4
95822	.2550		6.477	.2550"	3-1/4"	1-1/8"	.625"	6
95825	.2559		6.500	.2559"	3-1/4"	1-1/8"	.625"	6
95828	.2560		6.502	.2560"	3-1/4"	1-1/8"	.625"	6
95831	.2570	F	6.528	.2570"	3-1/4"	1-1/8"	.625"	6
95834	.2580		6.553	.2580"	3-1/4"	1-1/8"	.625"	6
95837	.2590		6.579	.2590"	3-1/4"	1-1/8"	.625"	6
95840	.2600		6.604	.2600"	3-1/4"	1-1/8"	.625"	6
95843	.2610	G	6.629	.2610"	3-1/4"	1-1/8"	.625"	6
95846	.2620		6.655	.2620"	3-1/4"	1-1/8"	.625"	6
95849	.2630		6.680	.2630"	3-1/4"	1-1/8"	.625"	6
95852	.2640		6.706	.2640"	3-1/4"	1-1/8"	.625"	6

continued →

Series 4100 *(continued)*

6,731mm - 7,798mm
(.2650" - .3070")

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Neck Length	z Number Flutes
95855	.2650		6.731	.2650"	3-1/4"	1-1/8"	.625"	6
95858	.2656	17/64"	6.746	.2656"	3-1/4"	1-1/8"	.625"	6
95861	.2660	H	6.756	.2660"	3-1/4"	1-1/8"	.625"	6
95864	.2670		6.782	.2670"	3-1/4"	1-1/8"	.625"	6
95867	.2680		6.807	.2680"	3-1/4"	1-1/8"	.625"	6
95870	.2690		6.833	.2690"	3-1/4"	1-1/8"	.625"	6
95873	.2700		6.858	.2700"	3-1/4"	1-1/8"	.625"	6
95876	.2710		6.883	.2710"	3-1/4"	1-1/8"	.625"	6
95879	.2720	I	6.909	.2720"	3-1/4"	1-1/8"	.750"	6
95882	.2730		6.934	.2730"	3-1/4"	1-1/8"	.750"	6
95885	.2740		6.960	.2740"	3-1/4"	1-1/8"	.750"	6
95888	.2750		6.985	.2750"	3-1/4"	1-1/8"	.750"	6
95891	.2756		7.000	.2756"	3-1/4"	1-1/8"	.750"	6
95894	.2760		7.010	.2760"	3-1/4"	1-1/8"	.750"	6
95897	.2770	J	7.036	.2770"	3-1/4"	1-1/8"	.750"	6
95900	.2780		7.061	.2780"	3-1/4"	1-1/8"	.750"	6
95903	.2790		7.087	.2790"	3-1/4"	1-1/8"	.750"	6
95906	.2800		7.112	.2800"	3-1/4"	1-1/8"	.750"	6
95909	.2810	K	7.137	.2810"	3-1/4"	1-1/8"	.750"	6
95912	.2812	9/32"	7.142	.2812"	3-1/4"	1-1/8"	.750"	6
95915	.2820		7.163	.2820"	3-1/4"	1-1/8"	.750"	6
95918	.2830		7.188	.2830"	3-1/4"	1-1/8"	.750"	6
95921	.2840		7.214	.2840"	3-1/4"	1-1/8"	.750"	6
95924	.2850		7.239	.2850"	3-1/4"	1-1/8"	.750"	6
95927	.2860		7.264	.2860"	3-1/4"	1-1/8"	.750"	6
95930	.2870		7.290	.2870"	3-1/4"	1-1/8"	.750"	6
95933	.2880		7.315	.2880"	3-1/4"	1-1/8"	.750"	6
95936	.2890		7.341	.2890"	3-1/4"	1-1/8"	.750"	6
95939	.2900	L	7.366	.2900"	3-1/4"	1-1/8"	.750"	6
95942	.2910		7.391	.2910"	3-1/4"	1-1/8"	.750"	6
95945	.2920		7.417	.2920"	3-1/4"	1-1/8"	.750"	6
95948	.2930		7.442	.2930"	3-1/4"	1-1/8"	.750"	6
95951	.2940		7.468	.2940"	3-1/4"	1-1/8"	.750"	6
95954	.2950	M	7.493	.2950"	3-1/4"	1-1/8"	.750"	6
95957	.2953		7.500	.2953"	3-1/4"	1-1/8"	.750"	6
95960	.2960		7.518	.2960"	3-1/4"	1-1/8"	.750"	6
95963	.2969	19/64"	7.541	.2969"	3-1/4"	1-1/8"	.750"	6
95966	.2970		7.544	.2970"	3-1/4"	1-1/8"	.750"	6
95969	.2980		7.569	.2980"	3-1/4"	1-1/8"	.750"	6
95972	.2990		7.595	.2990"	3-1/4"	1-1/8"	.750"	6
95975	.3000		7.620	.3000"	3-1/4"	1-1/8"	.750"	6
95978	.3010		7.645	.3010"	3-1/4"	1-1/8"	.750"	6
95981	.3020	N	7.671	.3020"	3-1/4"	1-1/8"	.750"	6
95984	.3030		7.696	.3030"	3-1/4"	1-1/8"	.750"	6
95987	.3040		7.722	.3040"	3-1/4"	1-1/8"	.750"	6
95990	.3050		7.747	.3050"	3-1/4"	1-1/8"	.750"	6
95993	.3060		7.772	.3060"	3-1/4"	1-1/8"	.750"	6
95996	.3070		7.798	.3070"	3-1/4"	1-1/8"	.750"	6

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Neck Length	z Number Flutes
95999	.3080		7.823	.3080"	3-1/4"	1-1/8"	.750"	6
96002	.3090		7.849	.3090"	3-1/4"	1-1/8"	.750"	6
96005	.3100		7.874	.3100"	3-1/4"	1-1/8"	.750"	6
96006	.3105		7.887	.3105"	3-1/4"	1-1/8"	.750"	6
96008	.3110		7.899	.3110"	3-1/4"	1-1/8"	.750"	6
96011	.3115		7.912	.3115"	3-1/4"	1-1/8"	.750"	6
96014	.3120		7.925	.3120"	3-1/4"	1-1/8"	.750"	6
96015	.3123		7.932	.3123"	3-1/4"	1-1/8"	.750"	6
96017	.3125	5/16"	7.938	.3125"	3-1/4"	1-1/8"	.750"	6
96021	.3130		7.950	.3130"	3-1/4"	1-1/8"	.750"	6
96023	.3135		7.963	.3135"	3-1/4"	1-1/8"	.750"	6
96026	.3140		7.976	.3140"	3-1/4"	1-1/8"	.750"	6
96029	.3150		8.000	.3150"	3-1/4"	1-1/8"	.750"	6
96032	.3160	O	8.026	.3160"	3-1/4"	1-1/8"	.750"	6
96035	.3170		8.052	.3170"	3-1/4"	1-1/8"	.750"	6
96038	.3180		8.077	.3180"	3-1/4"	1-1/8"	.750"	6
96041	.3190		8.103	.3190"	3-1/2"	1-1/4"	.750"	6
96044	.3200		8.128	.3200"	3-1/2"	1-1/4"	.750"	6
96047	.3210		8.153	.3210"	3-1/2"	1-1/4"	.750"	6
96050	.3220		8.179	.3220"	3-1/2"	1-1/4"	.750"	6
96053	.3230	P	8.204	.3230"	3-1/2"	1-1/4"	.750"	6
96056	.3240		8.230	.3240"	3-1/2"	1-1/4"	.750"	6
96059	.3250		8.255	.3250"	3-1/2"	1-1/4"	.750"	6
96062	.3260		8.280	.3260"	3-1/2"	1-1/4"	.750"	6
96065	.3270		8.306	.3270"	3-1/2"	1-1/4"	.750"	6
96068	.3280		8.331	.3280"	3-1/2"	1-1/4"	.750"	6
96071	.3281	21/64"	8.334	.3281"	3-1/2"	1-1/4"	.750"	6
96074	.3290		8.357	.3290"	3-1/2"	1-1/4"	.750"	6
96077	.3300		8.382	.3300"	3-1/2"	1-1/4"	.750"	6
96079	.3310		8.407	.3310"	3-1/2"	1-1/4"	.750"	6
96083	.3320	Q	8.433	.3320"	3-1/2"	1-1/4"	.750"	6
96086	.3330		8.458	.3330"	3-1/2"	1-1/4"	.750"	6
96089	.3340		8.484	.3340"	3-1/2"	1-1/4"	.750"	6
96092	.3346		8.500	.3346"	3-1/2"	1-1/4"	.750"	6
96095	.3350		8.509	.3350"	3-1/2"	1-1/4"	.750"	6
96098	.3360		8.534	.3360"	3-1/2"	1-1/4"	.750"	6
96101	.3370		8.560	.3370"	3-1/2"	1-1/4"	.750"	6
96104	.3380		8.585	.3380"	3-1/2"	1-1/4"	.750"	6
96107	.3390	R	8.611	.3390"	3-1/2"	1-1/4"	.750"	6
96110	.3400		8.636	.3400"	3-1/2"	1-1/4"	.750"	6
96113	.3410		8.661	.3410"	3-1/2"	1-1/4"	.750"	6
96116	.3420		8.687	.3420"	3-1/2"	1-1/4"	.750"	6
96119	.3430		8.712	.3430"	3-1/2"	1-1/4"	.750"	6
96122	.3438	11/32"	8.733	.3438"	3-1/2"	1-1/4"	.750"	6
96125	.3440		8.738	.3440"	3-1/2"	1-1/4"	.750"	6
96128	.3450		8.763	.3450"	3-1/2"	1-1/4"	.750"	6
96131	.3460		8.788	.3460"	3-1/2"	1-1/4"	.750"	6
96134	.3470		8.814	.3470"	3-1/2"	1-1/4"	.750"	6

continued →

Series 4100 *(continued)*

8,839mm - 9,677mm
(.3480" - .3810")

Z=4 | Z=6 | 0° | 45° | TECH PAGES 292-293

TOLERANCES

d_1	1,498 – 6,372mm (.0590" – .2509")	+0,0050 –0,0000mm (+.0002" –.0000")
	6,375 – 12,750mm (.2510" – .5020")	+0,0075 –0,0000mm (+.0003" –.0000")
d_2	1,498 – 6,372mm (.0590" – .2509")	+0,0050 –0,0000mm (+.0002" –.0000")
	6,375 – 12,750mm (.2510" – .5020")	+0,0075 –0,0000mm (+.0003" –.0000")

Standard Reamers
Standard Reibahlen
Escariadores Estándar
Alesoirs Standarts
Alesatori Standard
标准铰刀

Solid Carbide Submicron Grain
Straight - RHC Flutes
Standard 45° Lead Chamfer
Neck diameter is 0,250 ±0,050mm (.010" ±.002") less than fluted diameter (d_1)

Vollhartmetall aus Feinkornhartmetall
Gerade RHC-Spannuten
Standard 45° Führungsfase
Hals-Durchmesser ist 0,250 ±0,050 mm (0,010 Zoll ±0,002 Zoll) kleiner als der Nenn-Durchmesser (d_1)

Carburo sólido de grano submicrónico
Rectos – ranuras RHC
Chaflán de guía estándar de 45°
Diámetro de cuello de 0,250 ±0,050mm (.010" ±.002") menor que diámetro de corte (d_1)

Carbure plein submicrograin
droites goujures - RHC
Une norme chanfrein à 45°
Diamètre de la nuque est 0,250 ± 0,050 mm (.010 "±.002") plus petit que le diamètre de coupe (d_1)

Super sub-micrograno metallo duro
Taglienti dritti
Inclinazione standard a 45°
Diametro del collo di 0,250 ± 0,050 mm (.010 "±.002") inferiore rispetto al diametro di taglio (d_1)

超细晶粒整体硬质合金
直线型一洛氏硬度C级出屑槽
标准45° 导程倒角
颈部直径为 0,250 ± 0,050 mm (.010 "±.002"), 小于刃部直径 (d_1)

EDP#	d_1 † Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Neck Length	z Number Flutes
96137	.3480	S	8.839	.3480"	3-1/2"	1-1/4"	.750"	6
96141	.3490		8.865	.3490"	3-1/2"	1-1/4"	.750"	6
96143	.3500		8.890	.3500"	3-1/2"	1-1/4"	.750"	6
96146	.3510		8.915	.3510"	3-1/2"	1-1/4"	.750"	6
96149	.3520		8.941	.3520"	3-1/2"	1-1/4"	.750"	6
96152	.3530		8.966	.3530"	3-1/2"	1-1/4"	.750"	6
96155	.3540		8.992	.3540"	3-1/2"	1-1/4"	.750"	6
96158	.3543		9.000	.3543"	3-1/2"	1-1/4"	.750"	6
96161	.3550		9.017	.3550"	3-1/2"	1-1/4"	.750"	6
96164	.3560		9.042	.3560"	3-1/2"	1-1/4"	.750"	6
96167	.3570		9.068	.3570"	3-1/2"	1-1/4"	.750"	6
96170	.3580	T	9.093	.3580"	3-1/2"	1-1/4"	.750"	6
96173	.3590		9.119	.3590"	3-1/2"	1-1/4"	.750"	6
96176	.3594	23/64"	9.129	.3594"	3-1/2"	1-1/4"	.750"	6
96179	.3600		9.144	.3600"	3-1/2"	1-1/4"	.750"	6
96182	.3610		9.169	.3610"	3-1/2"	1-1/4"	.750"	6
96185	.3620		9.195	.3620"	3-1/2"	1-1/4"	.750"	6
96191	.3640		9.246	.3640"	3-1/2"	1-1/4"	.750"	6
96194	.3650		9.271	.3650"	3-1/2"	1-1/4"	.750"	6
96197	.3660		9.296	.3660"	3-1/2"	1-1/4"	.750"	6
96199	.3670		9.322	.3670"	3-1/2"	1-1/4"	.750"	6
96203	.3680	U	9.347	.3680"	3-1/2"	1-1/4"	.750"	6
96206	.3690		9.373	.3690"	3-1/2"	1-1/4"	.750"	6
96209	.3700		9.398	.3700"	3-1/2"	1-1/4"	.750"	6
96212	.3710		9.423	.3710"	3-1/2"	1-1/4"	.750"	6
96215	.3720		9.449	.3720"	3-1/2"	1-1/4"	.750"	6
96218	.3730		9.474	.3730"	3-1/2"	1-1/4"	.750"	6
96221	.3740		9.500	.3740"	3-1/2"	1-1/4"	.750"	6
96224	.3745		9.512	.3745"	3-1/2"	1-1/4"	.750"	6
96225	.3748		9.520	.3748"	3-1/2"	1-1/4"	.750"	6
96227	.3750	3/8"	9.525	.3750"	3-1/2"	1-1/4"	.750"	6
96230	.3755		9.538	.3755"	3-1/2"	1-1/4"	.750"	6
96233	.3760		9.550	.3760"	3-1/2"	1-1/4"	.750"	6
96236	.3765		9.563	.3765"	3-1/2"	1-1/4"	.750"	6
96239	.3770	V	9.576	.3770"	3-1/2"	1-1/4"	.750"	6
96242	.3780		9.601	.3780"	3-1/2"	1-1/4"	.750"	6
96245	.3790		9.627	.3790"	3-1/2"	1-1/4"	.750"	6
96248	.3800		9.652	.3800"	3-1/2"	1-1/4"	.750"	6
96251	.3810		9.677	.3810"	3-1/2"	1-1/4"	.750"	6

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Neck Length	z Number Flutes
96254	.3820		9.703	.3820"	3-1/2"	1-1/4"	.750"	6
96257	.3830		9.728	.3830"	3-1/2"	1-1/4"	.750"	6
96260	.3840		9.754	.3840"	3-1/2"	1-1/4"	.750"	6
96263	.3850		9.779	.3850"	3-1/2"	1-1/4"	.750"	6
96266	.3860	W	9.804	.3860"	3-1/2"	1-1/4"	.750"	6
96269	.3870		9.830	.3870"	3-1/2"	1-1/4"	.750"	6
96272	.3880		9.855	.3880"	3-1/2"	1-1/4"	.750"	6
96275	.3890		9.881	.3890"	3-1/2"	1-1/4"	.750"	6
96278	.3900		9.906	.3900"	3-1/2"	1-1/4"	.750"	6
96281	.3906	25/64"	9.921	.3906"	3-1/2"	1-1/4"	.750"	6
96284	.3910		9.931	.3910"	3-1/2"	1-1/4"	.750"	6
96287	.3920		9.957	.3920"	3-1/2"	1-1/4"	.750"	6
96290	.3930		9.982	.3930"	3-1/2"	1-1/4"	.750"	6
96293	.3937		10.000	.3937"	3-1/2"	1-1/4"	.750"	6
96296	.3940		10.008	.3940"	3-1/2"	1-1/4"	.750"	6
96299	.3950		10.033	.3950"	3-1/2"	1-1/4"	.750"	6
96302	.3960		10.058	.3960"	3-1/2"	1-1/4"	.750"	6
96305	.3970	X	10.084	.3970"	3-1/2"	1-1/4"	.750"	6
96308	.3980		10.109	.3980"	3-1/2"	1-1/4"	.750"	6
96311	.3990		10.135	.3990"	3-1/2"	1-1/4"	.750"	6
96314	.4000		10.160	.4000"	3-1/2"	1-1/4"	.750"	6
96317	.4010		10.185	.4010"	3-1/2"	1-1/4"	.750"	6
96319	.4020		10.211	.4020"	3-1/2"	1-1/4"	.750"	6
96323	.4030		10.236	.4030"	3-1/2"	1-1/4"	.750"	6
96326	.4040	Y	10.262	.4040"	3-1/2"	1-1/4"	.750"	6
96329	.4050		10.287	.4050"	3-1/2"	1-1/4"	.750"	6
96332	.4060		10.312	.4060"	3-1/2"	1-1/4"	.750"	6
96335	.4062	13/32"	10.317	.4062"	3-1/2"	1-1/4"	.750"	6
96338	.4070		10.338	.4070"	3-1/2"	1-1/4"	.750"	6
96341	.4080		10.363	.4080"	3-1/2"	1-1/4"	.750"	6
96344	.4090		10.389	.4090"	3-1/2"	1-1/4"	.750"	6
96347	.4100		10.414	.4100"	3-1/2"	1-1/4"	.750"	6
96350	.4110		10.439	.4110"	3-1/2"	1-1/4"	.750"	6
96353	.4120		10.465	.4120"	3-1/2"	1-1/4"	.750"	6
96356	.4130	Z	10.490	.4130"	3-1/2"	1-1/4"	.750"	6
96359	.4134		10.500	.4134"	3-1/2"	1-1/4"	.750"	6
96362	.4140		10.516	.4140"	3-1/2"	1-1/4"	.750"	6
96365	.4150		10.541	.4150"	3-1/2"	1-1/4"	.750"	6
96366	.4160		10.566	.4160"	4"	1-3/8"	.750"	6
96367	.4170		10.592	.4170"	4"	1-3/8"	.750"	6
96369	.4190		10.643	.4190"	4"	1-3/8"	.750"	6
96374	.4210		10.693	.4210"	4"	1-3/8"	.750"	6
96377	.4219	27/64"	10.716	.4219"	4"	1-3/8"	.750"	6
96380	.4220		10.719	.4220"	4"	1-3/8"	.750"	6
96383	.4230		10.744	.4230"	4"	1-3/8"	.750"	6
96386	.4240		10.770	.4240"	4"	1-3/8"	.750"	6

continued →

Series 4100 *(continued)*

10,795mm - 11,811mm
(.4250" - .4650")

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Neck Length	z Number Flutes
96389	.4250		10.795	.4250"	4"	1-3/8"	.750"	6
96392	.4260		10.820	.4260"	4"	1-3/8"	.750"	6
96395	.4270		10.846	.4270"	4"	1-3/8"	.750"	6
96398	.4280		10.871	.4280"	4"	1-3/8"	.750"	6
96404	.4300		10.922	.4300"	4"	1-3/8"	.750"	6
96407	.4310		10.947	.4310"	4"	1-3/8"	.750"	6
96410	.4320		10.973	.4320"	4"	1-3/8"	.750"	6
96413	.4330		10.998	.4330"	4"	1-3/8"	.750"	6
96416	.4331		11.000	.4331"	4"	1-3/8"	.750"	6
96419	.4340		11.024	.4340"	4"	1-3/8"	.750"	6
96422	.4350		11.049	.4350"	4"	1-3/8"	.750"	6
96425	.4360		11.074	.4360"	4"	1-3/8"	.750"	6
96428	.4365		11.087	.4365"	4"	1-3/8"	.750"	6
96431	.4370		11.100	.4370"	4"	1-3/8"	.750"	6
96432	.4373		11.107	.4373"	4"	1-3/8"	.750"	6
96434	.4375	7/16"	11.113	.4375"	4"	1-3/8"	.750"	6
96437	.4380		11.125	.4380"	4"	1-3/8"	.750"	6
96440	.4385		11.138	.4385"	4"	1-3/8"	.750"	6
96443	.4390		11.151	.4390"	4"	1-3/8"	.750"	6
96446	.4400		11.176	.4400"	4"	1-3/8"	.750"	6
96449	.4410		11.201	.4410"	4"	1-3/8"	.750"	6
96455	.4430		11.252	.4430"	4"	1-3/8"	.750"	6
96458	.4440		11.278	.4440"	4"	1-3/8"	.750"	6
96461	.4450		11.303	.4450"	4"	1-3/8"	.750"	6
96467	.4470		11.354	.4470"	4"	1-3/8"	.750"	6
96470	.4480		11.379	.4480"	4"	1-3/8"	.750"	6
96473	.4490		11.405	.4490"	4"	1-3/8"	.750"	6
96476	.4500		11.430	.4500"	4"	1-3/8"	.750"	6
96479	.4510		11.455	.4510"	4"	1-3/8"	.750"	6
96485	.4528		11.500	.4528"	4"	1-3/8"	.750"	6
96488	.4530		11.506	.4530"	4"	1-3/8"	.750"	6
96491	.4531	29/64"	11.509	.4531"	4"	1-3/8"	.750"	6
96494	.4540		11.532	.4540"	4"	1-3/8"	.750"	6
96497	.4550		11.557	.4550"	4"	1-3/8"	.750"	6
96500	.4560		11.582	.4560"	4"	1-3/8"	.750"	6
96503	.4570		11.608	.4570"	4"	1-3/8"	.750"	6
96506	.4580		11.633	.4580"	4"	1-3/8"	.750"	6
96512	.4600		11.684	.4600"	4"	1-3/8"	.750"	6
96515	.4610		11.709	.4610"	4"	1-3/8"	.750"	6
96527	.4650		11.811	.4650"	4"	1-3/8"	.750"	6

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Neck Length	z Number Flutes
96530	.4660		11.836	.4660"	4"	1-3/8"	.750"	6
96533	.4670		11.862	.4670"	4"	1-3/8"	.750"	6
96539	.4688	15/32"	11.908	.4688"	4"	1-3/8"	.750"	6
96542	.4690		11.913	.4690"	4"	1-3/8"	.750"	6
96545	.4700		11.938	.4700"	4"	1-1/2"	.750"	6
96548	.4710		11.963	.4710"	4"	1-1/2"	.750"	6
96551	.4720		11.989	.4720"	4"	1-1/2"	.750"	6
96554	.4724		12.000	.4724"	4"	1-1/2"	.750"	6
96557	.4730		12.014	.4730"	4"	1-1/2"	.750"	6
96561	.4740		12.040	.4740"	4"	1-1/2"	.750"	6
96563	.4750		12.065	.4750"	4"	1-1/2"	.750"	6
96566	.4760		12.090	.4760"	4"	1-1/2"	.750"	6
96569	.4770		12.116	.4770"	4"	1-1/2"	.750"	6
96572	.4780		12.141	.4780"	4"	1-1/2"	.750"	6
96578	.4800		12.192	.4800"	4"	1-1/2"	.750"	6
96581	.4810		12.217	.4810"	4"	1-1/2"	.750"	6
96584	.4820		12.243	.4820"	4"	1-1/2"	.750"	6
96590	.4840		12.294	.4840"	4"	1-1/2"	.750"	6
96593	.4844	31/64"	12.304	.4844"	4"	1-1/2"	.750"	6
96596	.4850		12.319	.4850"	4"	1-1/2"	.750"	6
96602	.4870		12.370	.4870"	4"	1-1/2"	.750"	6
96608	.4890		12.421	.4890"	4"	1-1/2"	.750"	6
96617	.4920		12.497	.4920"	4"	1-1/2"	.750"	6
96620	.4921		12.500	.4921"	4"	1-1/2"	.750"	6
96623	.4930		12.522	.4930"	4"	1-1/2"	.750"	6
96629	.4950		12.573	.4950"	4"	1-1/2"	.750"	6
96632	.4960		12.598	.4960"	4"	1-1/2"	.750"	6
96635	.4970		12.624	.4970"	4"	1-1/2"	.750"	6
96638	.4980		12.649	.4980"	4"	1-1/2"	.750"	6
96641	.4990		12.675	.4990"	4"	1-1/2"	.750"	6
96644	.4995		12.687	.4995"	4"	1-1/2"	.750"	6
96645	.4998		12.695	.4998"	4"	1-1/2"	.750"	6
96647	.5000	1/2"	12.700	.5000"	4"	1-1/2"	.750"	6
96650	.5005		12.713	.5005"	4"	1-1/2"	.750"	6
96653	.5010		12.725	.5010"	4"	1-1/2"	.750"	6
96656	.5020		12.751	.5020"	4"	1-1/2"	.750"	6

Series 4100 (Metric)

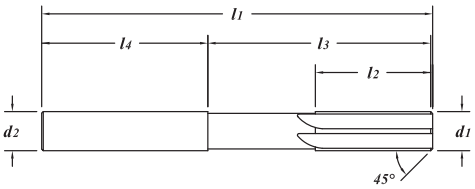
1,990mm - 10,040mm
(.07835" - .39528")

Z=4 | Z=6 | 0° | 45° | TECH PAGES 293

TOLERANCES

d_1	1,500 – 6,372mm	+0,0050mm –0,0000
	6,375 – 12,750mm	+0,0075mm –0,0000
d_2	1,500 – 6,372mm	+0,0050mm –0,0000
	6,375 – 12,750mm	+0,0075mm –0,0000

Metric Reamers
metrisch Reibahlen
Escariadores métrico
Alesoirs métrique
Alesatori metrico
公制铰刀



Solid Carbide Submicron Grain
Straight - RHC Flutes
Standard 45° Lead Chamfer
Neck diameter is 0,250 ±0,050mm (.010" ±.002") less than fluted diameter (d_1)

Vollhartmetall aus Feinkornhartmetall
Gerade RHC-Spannuten
Standard 45° Führungsfase
Hals-Durchmesser ist 0,250 ±0,050 mm (0,010 Zoll ±0,002 Zoll) kleiner als der Nenn-Durchmesser (d_1)

Carburo sólido de grano submicrónico
Rectos – ranuras RHC
Chaflán de guía estándar de 45°
Diámetro de cuello de 0,250 ±0,050mm (.010" ±.002") menor que diámetro de corte (d_1)

Carbure plein submicrograin
droites goujures - RHC
Une norme chanfrein à 45°
Diamètre de la nuque est 0,250 ± 0,050 mm (.010 "±.002") plus petit que le diamètre de coupe (d_1)

Super sub-micrograno metallo duro
Taglienti dritti
Inclinazione standard a 45°
Diametro del collo di 0,250 ± 0,050 mm (.010 "±.002") inferiore rispetto al diametro di taglio (d_1)

超细晶粒整体硬质合金
直线型一洛氏硬度C级出屑槽
标准45° 导程倒角
颈部直径为 0,250 ± 0,050 mm (.010 "±.002"), 小于刃部直径 (d_1)

EDP#	d_1 Decimal	d_1 Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Reach Length	l_4 Shank Length	z Number Flutes
96659	.07835	1.990	1.990	50	12	32	18	4
96662	.07874	2.000	2.000	50	12	32	18	4
96665	.07913	2.010	2.010	50	12	32	18	4
96668	.07953	2.020	2.020	50	12	32	18	4
96671	.11772	2.990	2.990	65	16	36	29	4
96674	.11811	3.000	3.000	65	16	36	29	4
96677	.11850	3.010	3.010	65	16	36	29	4
96680	.11890	3.020	3.020	65	16	36	29	4
96683	.15709	3.990	3.990	75	20	45	30	4
96686	.15748	4.000	4.000	75	20	45	30	4
96689	.15787	4.010	4.010	75	20	45	30	4
96692	.15827	4.020	4.020	75	20	45	30	4
96695	.15866	4.030	4.030	75	20	45	30	4
96698	.19646	4.990	4.990	100	25	60	40	4
96701	.19685	5.000	5.000	100	25	60	40	4
96704	.19724	5.010	5.010	100	25	60	40	4
96707	.19764	5.020	5.020	100	25	60	40	4
96710	.19803	5.030	5.030	100	25	60	40	4
96713	.23583	5.990	5.990	100	25	60	40	4
96716	.23622	6.000	6.000	100	25	60	40	4
96719	.23661	6.010	6.010	100	25	60	40	4
96722	.23701	6.020	6.020	100	25	60	40	4
96725	.27559	7.000	7.000	100	25	60	40	6
96728	.31457	7.990	7.990	120	32	75	45	6
96731	.31496	8.000	8.000	120	32	75	45	6
96734	.31535	8.010	8.010	120	32	75	45	6
96737	.31575	8.020	8.020	120	32	75	45	6
96740	.31614	8.030	8.030	120	32	75	45	6
96743	.35433	9.000	9.000	120	32	75	45	6
96746	.39291	9.980	9.980	130	32	75	55	6
96749	.39331	9.990	9.990	130	32	75	55	6
96752	.39370	10.000	10.000	130	32	75	55	6
96755	.39409	10.010	10.010	130	32	75	55	6
96758	.39449	10.020	10.020	130	32	75	55	6
96761	.39488	10.030	10.030	130	32	75	55	6
96764	.39528	10.040	10.040	130	32	75	55	6

EDP#	d_1 Decimal	d_1 Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Reach Length	l_4 Shank Length	z Number Flutes
96767	.47165	11.980	11.980	150	40	100	50	6
96770	.47205	11.990	11.990	150	40	100	50	6
96773	.47244	12.000	12.000	150	40	100	50	6
96776	.47283	12.010	12.010	150	40	100	50	6
96779	.47323	12.020	12.020	150	40	100	50	6
96782	.47362	12.030	12.030	150	40	100	50	6

Reamer Manufacturing

LHS / RHC

STR / RHC

RHS / RHC

Special Reamers - Solid Carbide - 2 Week Delivery

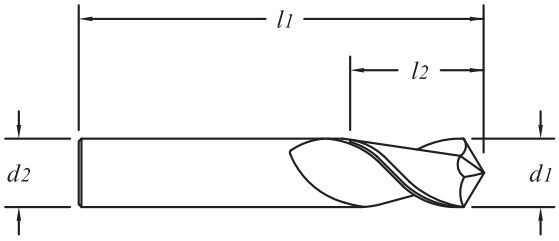
Solid Carbide Submicron Grain
All reamers furnished with a standard 45° Lead Chamfer
All reamers furnished with a standard neck for reach
Neck diameter is .010" ±.002" less than fluted diameter

Diameter Decimal	Diameter Metric	Overall Length	Flute Length	No. of Flutes
.0590" - .0650"	1.499 - 1.651	1-1/2"	3/8"	4
.0660" - .0800"	1.676 - 2.032	1-3/4"	1/2"	4
.0810" - .0950"	2.057 - 2.413	2"	1/2"	4
.0960" - .1300"	2.438 - 3.302	2-1/4"	5/8"	4
.1310" - .1590"	3.327 - 4.039	2-1/2"	3/4"	4
.1600" - .1950"	4.064 - 4.953	2-3/4"	7/8"	4
.1960" - .2540"	4.978 - 6.452	3"	1"	4
.2550" - .3180"	6.477 - 8.077	3-1/4"	1-1/8"	6
.3190" - .4150"	8.103 - 10.541	3-1/2"	1-1/4"	6
.4160" - .4690"	10.566 - 11.913	4"	1-3/8"	6
.4700" - .5020"	11.938 - 12.751	4"	1-1/2"	6
.5030" - .5700"	12.776 - 14.478	4"	1-5/8"	6
.5710" - .7500"	14.503 - 19.050	4"	1-3/4"	6

Series 152M

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=2 | 30° | 90° | TECH PAGES 294-299



MATERIAL HARDNESS (Rc)
70
35
0

Solid submicron grain carbide drill/end mill
Included angle to a point - center cutting
Tools do not have drill point geometry
Extremely versatile
Point tolerance: ±0°30'

Hochleistungs- VollhartmetallBohrer und fräser aus Feinkornhartmetall
Inklusive Winkel zum Zentrum - Zentrumsschnitt
Werkzeuge haben keine Ausspitzung
Extrem Vielseitig
Punkt-Toleranz: ±0°30'

Fresa/Broca de submicrograno sólido carburo
Ángulo de la punta - corte centrado
Herramientas sin punta para taladrado
Extremadamente versátil
Tolerancia del punta: ±0°30'

Forets/Fraises carbure submicrograin
L'angle se prolonge vers à un point - coupe au centre
Outils n'ont pas la géométrie pointe du foret
Utilisations variables
Point tolerance: ±0°30'

Punte / Fresa de sub-micro grano metallo duro
Incluso l'angolo al punto - taglio al centro
Gli utensili non hanno la geometria drill point
Estremamente varsatile
Tolleranza punto: ±0°30'

整体硬质合金立铣刀/钻头
夹角逐渐变细并形成尖端 - 中心切削
刀具没有钻尖部份
功能极多
钻点允差: ±0°30'

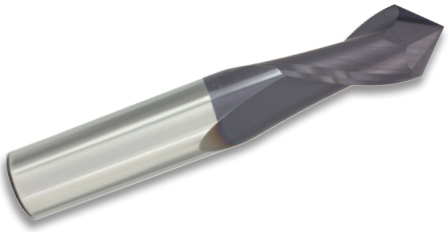
EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
57200	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
57210	.1875	3/16"	4.763	3/16"	2"	5/8"
57220	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
57230	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
57240	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
57250	.4375	7/16"	11.113	7/16"	2-3/4"	1"
57260	.5000	1/2"	12.700	1/2"	3"	1"
57270	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
57280	.7500	3/4"	19.050	3/4"	4"	1-1/2"

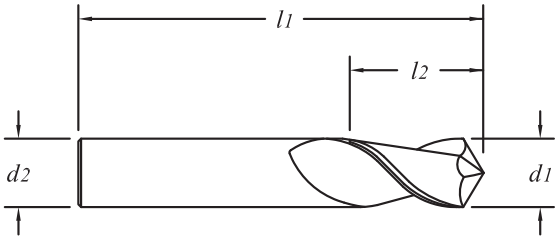
† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=2 | 30° | 90° | TECH PAGES 294-299

TiAlN Coated
TiAlN-Beschichtet
Recubrimiento de TiAlN
Revêtement TiAlN
Rivestimento in TiAlN
TiAlN 涂层





Solid submicron grain carbide drill/end mill
Included angle to a point - center cutting
Tools do not have drill point geometry
Extremely versatile
Point tolerance: ±0°30'

Hochleistungs- VollhartmetallBohrer und fräser aus Feinkornhartmetall
Inklusive Winkel zum Zentrum - Zentrumsschnitt
Werkzeuge haben keine Ausspitzung
Extrem Vielseitig
Punkt-Toleranz: ±0°30'

Fresa/Broca de submicrograno sólido carburo
Ángulo de la punta - corte centrado
Herramientas sin punta para taladrado
Extremadamente versátil
Tolerancia del punta: ±0°30'

Forets/Fraises carbure submicrograin
L'angle se prolonge vers à un point - coupe au centre
Outils n'ont pas la géométrie pointe du foret
Utilisations variables
Point tolerance: ±0°30'

Punte / Fresa de sub-micro grano metallo duro
Incluso l'angolo al punto - taglio al centro
Gli utensili non hanno la geometria drill point
Estremamente varsatile
Tolleranza punto: ±0°30'

整体硬质合金立铣刀/钻头
夹角逐渐变细并形成尖端 – 中心切削
刀具没有钻尖部份
功能极多
钻点允差: ±0°30'

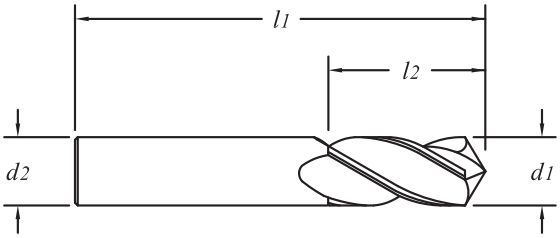
EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
57207	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
57217	.1875	3/16"	4.763	3/16"	2"	5/8"
57227	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
57237	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
57247	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
57257	.4375	7/16"	11.113	7/16"	2-3/4"	1"
57267	.5000	1/2"	12.700	1/2"	3"	1"
57277	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
57287	.7500	3/4"	19.050	3/4"	4"	1-1/2"

MATERIAL HARDNESS (Rc)
70
35
0

Series 154M

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=4 | 30° | 60° | 82° | 90° | 100° | TECH PAGES 294-299



MATERIAL HARDNESS (Rc) 70 35 0

Solid submicron grain carbide drill/end mill
Included angle to a point - center cutting
Tools do not have drill point geometry
Extremely versatile
Point tolerance: ±0°30'

Hochleistungs- VollhartmetallBohrer und fräser aus Feinkornhartmetall
Inklusive Winkel zum Zentrum - Zentrumsschnitt
Werkzeuge haben keine Ausspitzung
Extrem Vielseitig
Punkt-Toleranz: ±0°30'

Fresa/Broca de submicrograno sólido carburo
Ángulo de la punta - corte centrado
Herramientas sin punta para taladrado
Extremadamente versátil
Tolerancia del punta: ±0°30'

Forets/Fraises carbure submicrograin
L'angle se prolonge vers à un point - coupe au centre
Outils n'ont pas la géométrie pointe du foret
Utilisations variables
Point tolerance: ±0°30'

Punte / Fresa de sub-micro grano metallo duro
Incluso l'angolo al punto - taglio al centro
Gli utensili non hanno la geometria drill point
Estremamente varsatile
Tolleranza punto: ±0°30'

整体硬质合金立铣刀/钻头
夹角逐渐变细并形成尖端 - 中心切削
刀具没有钻尖部份
功能极多
钻点允差: ±0°30'

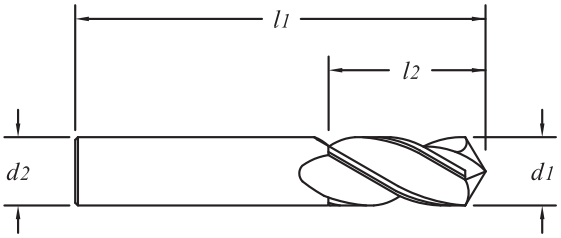
60° EDP#	82° EDP#	90° EDP#	100° EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
-	57344	58198	-	.1181		3.000	3.0	38	12
-	57346	58200	57386	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
-	-	58202	57388	.1575		4.000	4.0	50	14
-	57350	58210	57390	.1875	3/16"	4.763	3/16"	2"	5/8"
-	57352	58212	57392	.1969		5.000	5.0	65	16
57314	57354	58214	57394	.2362		6.000	6.0	65	19
57316	57356	58220	57396	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
57318	57358	58230	57398	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
57320	-	58232	57400	.3150		8.000	8.0	65	22
57322	57362	58240	57402	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
57324	57364	58242	57404	.3937		10.000	10.0	70	25
57326	57366	58250	-	.4375	7/16"	11.113	7/16"	2-3/4"	1"
57328	57368	58252	57408	.4724		12.000	12.0	75	25
57330	57370	58260	57410	.5000	1/2"	12.700	1/2"	3"	1"
57332	57372	58270	57412	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
57334	57374	58272	57414	.6299		16.000	16.0	88	32
57336	57376	58280	57416	.7500	3/4"	19.050	3/4"	4"	1-1/2"
-	57378	58282	-	.7874		20.000	20.0	100	38

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=4 | 30° | 60° | 82° | 90° | 100° | TECH PAGES 294-299

TiAlN Coated
TiAlN-Beschichtet
Recubrimiento de TiAlN
Revêtement TiAlN
Rivestimento in TiAlN
TiAlN 涂层



Solid submicron grain carbide drill/end mill
Included angle to a point - center cutting
Tools do not have drill point geometry
Extremely versatile
Point tolerance: ±0°30'

Hochleistungs- VollhartmetallBohrer und fräser aus Feinkornhartmetall
Inklusive Winkel zum Zentrum - Zentrumsschnitt
Werkzeuge haben keine Ausspitzung
Extrem Vielseitig
Punkt-Toleranz: ±0°30'

Fresa/Broca de submicrograno sólido carburo
Ángulo de la punta - corte centrado
Herramientas sin punta para taladrado
Extremadamente versátil
Tolerancia del punta: ±0°30'

Forets/Fraises carbure submicrograin
L'angle se prolonge vers à un point - coupe au centre
Outils n'ont pas la géométrie pointe du foret
Utilisations variables
Point tolerance: ±0°30'

Punte / Fresa de sub-micro grano metallo duro
Incluso l'angolo al punto - taglio al centro
Gli utensili non hanno la geometria drill point
Estremamente varsatile
Tolleranza punto: ±0°30'

整体硬质合金立铣刀/钻头
夹角逐渐变细并形成尖端 - 中心切削
刀具没有钻尖部份
功能极多
钻点允差: ±0°30'

60° EDP#	82° EDP#	90° EDP#	100° EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
-	-	58205	-	.1181		3.000	3.0	38	12
-	58346	58207	-	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
-	58348	58209	58388	.1575		4.000	4.0	50	14
-	58350	58217	58390	.1875	3/16"	4.763	3/16"	2"	5/8"
-	-	58219	-	.1969		5.000	5.0	65	16
58314	58354	58221	58394	.2362		6.000	6.0	65	19
58316	58356	58227	58396	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
58318	58358	58237	58398	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
58320	-	58239	58400	.3150		8.000	8.0	65	22
58322	58362	58247	58402	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
58324	58364	58249	58404	.3937		10.000	10.0	70	25
58326	58366	58257	-	.4375	7/16"	11.113	7/16"	2-3/4"	1"
58328	58368	58259	58408	.4724		12.000	12.0	75	25
58330	58370	58267	58410	.5000	1/2"	12.700	1/2"	3"	1"
58332	58372	58277	58412	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
-	58374	58279	-	.6299		16.000	16.0	88	32
58336	58376	58287	58416	.7500	3/4"	19.050	3/4"	4"	1-1/2"
-	58378	58289	-	.7874		20.000	20.0	100	38

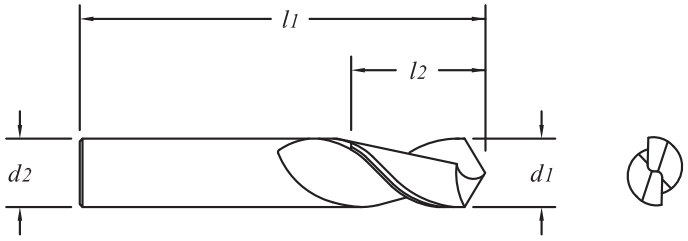
MATERIAL HARDNESS (Rc)
70
35
0

Series 152DA

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=2 | 30° | 120° | TECH PAGES 294-299

TiAlN Coated
TiAlN-Beschichtet
Recubrimiento de TiAlN
Revêtement TiAlN
Rivestimento in TiAlN
TiAlN 涂层



MATERIAL HARDNESS (Rc)
70
35
0

Solid submicron grain carbide drill/end mill
Recommended for drilling and milling of mild steels and non-ferrous materials
4-facet drill point geometry
Extremely versatile
Drill point tolerance: ±1°

Hochleistungs- VollhartmetallBohrer und fräser aus Feinkornhartmetall
Empfohlen für das Bohren und Fräsen von weichen Stählen und Nicht-Eisen-Werkstoffen
4-Fasen-Anschliff Punkt
Extrem Vielseitig
Punkt-Toleranz: ±1°

Fresa/Broca de submicrograno sólido carburo
Recomendado para el taladrado y fresado de aceros dulces y materiales no férricos
Punta de 4 caras
Extremadamente versátil
Tolerancia del punta: ±1°

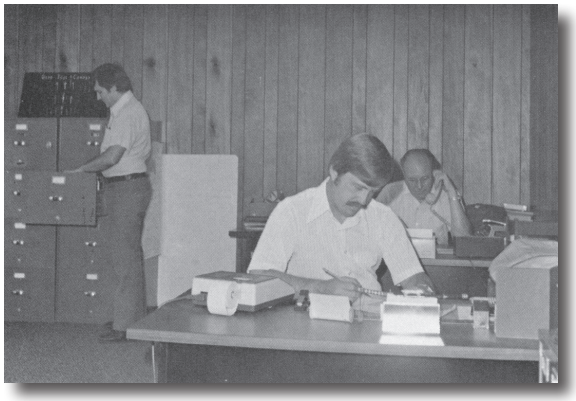
Forets/Fraises carbure submicrograin
Recommandé pour perçage et le fraisage des aciers doux et des matériaux de non-ferreux
Géométrie de pointe du foret a 4 facettes
Utilisations variables
Point tolerance: ±1°

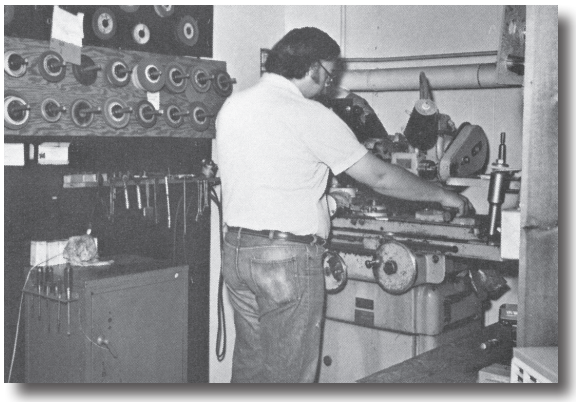
Punte / Fresa de sub-micro grano metallo duro
Raccomandata per foratura e fresatura di acciai morbidi e materiali non ferrosi
Punto 4 facce
Estremamente varsatile
Tolleranza punto: ±1°

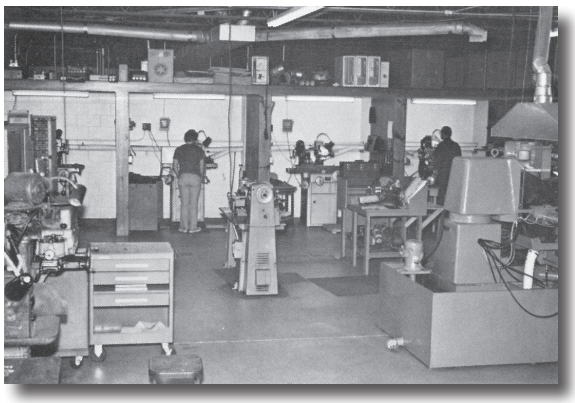
整体硬质合金立铣刀/钻头
推荐用于钻和铣削软钢和非铁材料
4-小平面刀尖
功能极多
钻点允差: ±1°

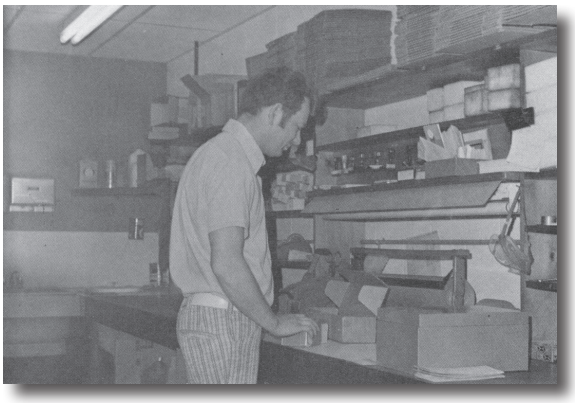
EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
57421	.1181		3.000	3.0	38	12
57423	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
57425	.1575		4.000	4.0	50	14
57427	.1875	3/16"	4.762	3/16"	2"	5/8"
57429	.1969		5.000	5.0	65	16
57431	.2362		6.000	6.0	65	19
57433	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
57435	.3125	5/16"	7.937	5/16"	2-1/2"	7/8"
57437	.3150		8.000	8.0	65	22
57439	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
57441	.3937		10.000	10.0	70	25
57443	.4375	7/16"	11.112	7/16"	2-3/4"	1"
57445	.4724		12.000	12.0	75	25
57447	.5000	1/2"	12.700	1/2"	3"	1"
57449	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
57451	.6299		16.000	16.0	88	32
57453	.7500	3/4"	19.050	3/4"	4"	1-1/2"
57455	.7874		20.000	20.0	100	38

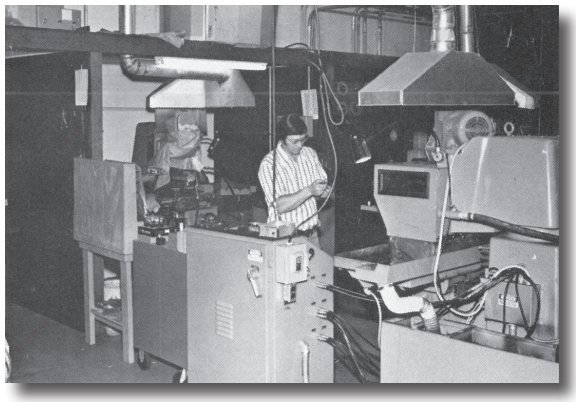
† *Metric equivalents are for reference only*











HARD CARBON COATING

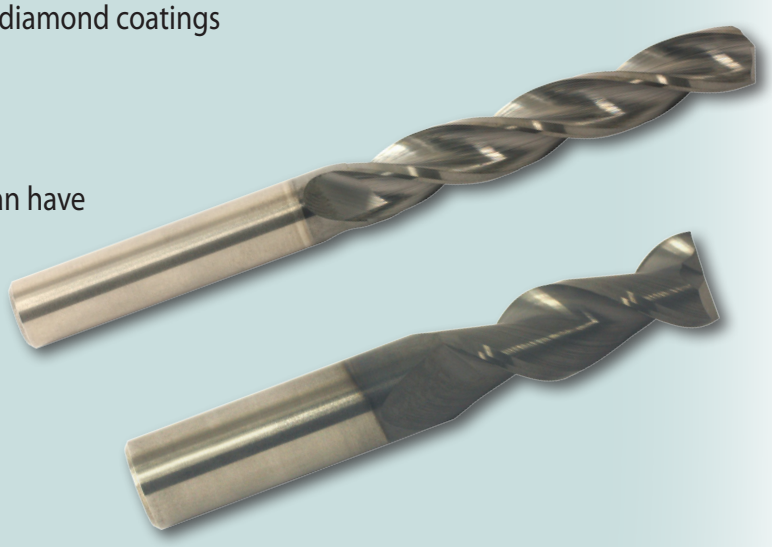
An addition to the Garr Tool lineup of quality coating options

Recommended applications:

Aluminum and aluminum alloys with up to 12% silicon
Non-ferrous metals such as copper, bronze, and platinum
Composites such as GRP, CFK, CFRP, and PEEK
Applications involving combined abrasion and adhesion

Advantages of using Hard Carbon:

Excellent wear resistance due to high hardness
Sharp cutting edges in comparison with diamond coatings
Very good adhesion
Thin, smooth, high density
Can be used on end mills and drills
Most standard products in our catalog can have Hard Carbon added in 2 weeks



**** Sample Pricing:***

<u>50-100 pc. pricing column</u>

<13157> 230MA 1/4" TiAlN Coated - $17.46 each
<13150> 230M 1/4" Hard Carbon Coated - $24.24 each
<10158> 210D 1/4" Diamond Coated - $103.39 each

* Pricing listed as of 2/1/2019, and is meant for comparison only.
For specific and current pricing, please contact our sales office to request a quote.

These specials are built to order uncoated in two weeks

Solid micrograin carbide tested for drilling of carbon fiber and glass-filled composites

Having a quality dust collection system helps prolong tool life and quality of parts

'Clamping' of part to table can cause stress fractures in material

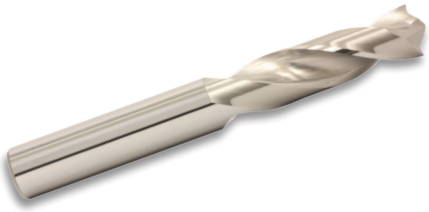
SERIES 780 - 8-FACET POINT

Double angle drill point geometry reduces cutting forces to eliminate exit burrs

Works well in carbon fiber especially when the honeycomb core is either titanium or aluminum

Works in glass-filled epoxy, harder plastics, softer steels, CFRP (Carbon Fiber Reinforced Plastic), and aluminum

Can be coated with a variety of coatings depending on your application



SERIES 790 - MODIFIED BRAD POINT

Designed for drilling CFRP

Excellent entry and exit hole quality

Designed to prevent delamination

Good for drilling panels and paper honeycomb core

Coatings of choice for this drill are Polycrystalline Diamond, Amorphous Diamond / Hard Carbon (DLC, TAC), or TiAlN-based for extra tool life

SERIES 805 - CARBON FIBER

Designed for drilling CFRP and plastics

Good in both multidirectional fibers and unidirectional fibers

90° center cutting point for better entry and exit hole with little to no delamination

Parabolic flute shape for less tool pressure on the material, and also for better chip flow in soft plastics

Add Hard Carbon coating for longer tool life than uncoated tools, and shorter lead times than Diamond coating

ROUTERS

These specials are built to order uncoated in two weeks

Solid micrograin carbide tested for milling of carbon fiber and glass-filled composites

There are many challenges to machining composite materials. Keeping the material from delaminating is key. Our tools have higher rake angles and combinations of left hand and/or right hand spirals to help eliminate 'fraying' of the laminate.

Please specify what type of end cut your job requires (*i.e. - no end cut, burr type, end mill type, or drill point*)

Having a quality dust collection system helps prolong tool life and quality of parts

'Clamping' of part to table can cause stress fractures in material

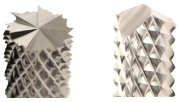
Please specify what coating, if any, your job requires:

- Polycrystalline Diamond
- Amorphous Diamond / Hard Carbon
- AlCrN Coated

SERIES 700 - FIBERGLASS ROUTER

For cutting glass-filled epoxies

End cut examples



Burr Type | Drill Point

SERIES 701 - KEVLAR ROUTER

Gives a clean edge when trimming Aramid Fibers (Kevlar)

End cut examples

Burr Type | Drill Point

SERIES 702 - CARBON FIBER ROUTER

For trim milling of single-layer panels

SERIES 703 - CARBON FIBER ROUTER

For rough cutting of stacked panels with or without honeycomb cores

These specials are built to order uncoated in two weeks

Solid micrograin carbide tested for milling of carbon fiber and glass-filled composites

There are many challenges to machining composite materials. Keeping the material from delaminating is key. Our tools have higher rake angles and combinations of left hand and/or right hand spirals to help eliminate 'fraying' of the laminate.

Please specify what type of end cut your job requires (*i.e. - no end cut, burr type, end mill type, or drill point*)

Having a quality dust collection system helps prolong tool life and quality of parts

'Clamping' of part to table can cause stress fractures in material

Please specify what coating, if any, your job requires:

- Polycrystalline Diamond
- Amorphous Diamond / Hard Carbon
- AlCrN Coated

SERIES 704 - COMPRESSION ROUTER - 4 FLUTE

For profile milling of carbon fiber

SERIES 705 - COMPRESSION ROUTER - 2 FLUTE

For slotting of carbon fiber

SERIES 706 - SINGLE FLUTE ROUTER

For aluminum and soft plastics

Series ARC

4,000mm - 9,525mm
(.1575" - .3750")

Z=3 | VAR | 45° | TECH PAGES 276

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
d_3	+0,000 –0,127mm (+.000" –.005")

Aluminum Rough Cut Mill - Bright Finish (Uncoated)
Aluminium Schruppfräser - Bright Fertig (Ohne Beschichtung)
Fresa de Desbaste Para Aluminio - Acabado Brillante (Sin Recubrimiento)
Fraise Ravageuse Pour l´Usinage de l´Aluminium - Finition Brillante (Sans Revêtement)
Fresa per Sgrossatura su Alluminio - Eccellente Finitura (Non Rivestito)
粗加工铝合金铣刀 - 高亮光洁度(未涂层)

MATERIAL HARDNESS (Rc)
70
35
0

Solid submicron grain carbide end mill - center cutting
Standard 45° Lead Chamfer
Wave knuckle design to break up chips
Each flute has individual helix angle to break up harmonics
Reduces tool pressure requiring less machine power
Designed for roughing aluminum alloys and non-ferrous materials

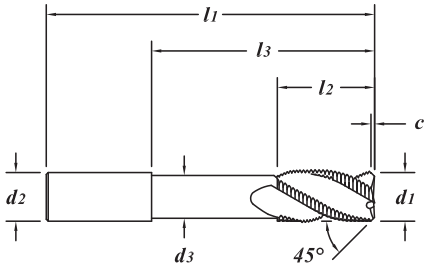
Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Standard 45° Führungsfase
Schruppprofil entwickelt, um die Spänne zu brechen
Jede Spannnute hat einen Spiralwinkel, um die Vibrationen zu vermeiden
Reduziert den Druck auf das Werkzeug und erfordert weniger Maschinenleistung
Entwickelt für das Schruppen von Aluminium Legierungen und Nicht-Eisen Materialien

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Chaflán de guía estándar de 45°
Diseño ondulado para rotura de viruta
Cada labio tiene ángulo de hélice individual para rotura de armónicos
Reduce la presión de la herramienta necesitando menos potencia de máquina
Diseñada para desbaste de aleaciones de aluminio y materiales no férricos

Fraises carbure submicrograin - coupe au centre
Une norme chanfrein à 45°
Profile en vagues pour casser le copeau
Chaque dent a un angle d´hélice particulier pour éviter les vibrations
Réduit le stress sur l'outil et nécessite moins de puissance de la machine
Adapté pour l´ébauche des alliages d´aluminium et des matières non-ferreuses

Fresa sub-micrograno metallo duro - taglio al centro
Inclinazione standard a 45°
Geometria ondulata per rompere il truciolo
Ogni elica ha uno specifico angolo per rompere le vibrazioni armoniche
Riduce la pressione e richiede meno potenza alla macchina
Geometria per sgrossatura su leghe di alluminio e materiali non ferrosi

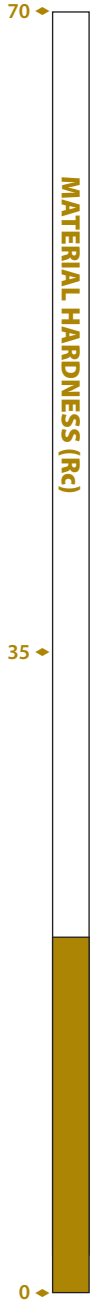
高效超细晶粒整体硬质合金立铣刀 - 中心切削
标准45° 导程倒角
波刃设计利于断屑
每刃有独立螺旋角破坏共振利于排屑
降低刀具切削阻力，减小机床功耗
专为铝合金及有色金属粗加工设计



EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	c Chamfer Length	l_3 Reach Length	d_3 Neck Diameter
46219	.1575		4.000	6.0	50	8	0.30	-	-
46222	.1575		4.000	6.0	50	12	0.30	-	-
46225	.1575		4.000	6.0	65	10	0.30	30	3.2
46228	.1575		4.000	6.0	75	15	0.30	40	3.2
46231	.1875	3/16"	4.763	3/16"	2"	5/16"	.015"	-	-
46234	.1875	3/16"	4.763	3/16"	2"	9/16"	.015"	-	-
46237	.1875	3/16"	4.763	3/16"	3"	1"	.015"	-	-
46240	.1875	3/16"	4.763	3/16"	3"	1/2"	.015"	1-1/2"	.160"
46243	.2362		6.000	6.0	50	12	0.50	-	-
46246	.2362		6.000	6.0	65	19	0.50	-	-
46249	.2362		6.000	6.0	100	20	0.50	60	5.2
46252	.2500	1/4"	6.350	1/4"	2"	3/8"	.020"	-	-
46255	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"	-	-
46258	.2500	1/4"	6.350	1/4"	4"	1-1/2"	.020"	-	-
46261	.2500	1/4"	6.350	1/4"	4"	1"	.020"	2"	.220"
46264	.3125	5/16"	7.938	5/16"	2"	7/16"	.020"	-	-
46267	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.020"	-	-
46270	.3125	5/16"	7.938	5/16"	4"	1-1/2"	.020"	-	-
46273	.3125	5/16"	7.938	5/16"	4"	1"	.020"	2"	.285"
46276	.3150		8.000	8.0	50	12	0.50	-	-
46279	.3150		8.000	8.0	65	22	0.50	-	-
46282	.3150		8.000	8.0	100	40	0.50	-	-
46285	.3150		8.000	8.0	100	20	0.50	60	7.2
46288	.3150		8.000	8.0	150	40	0.50	100	7.2
46291	.3750	3/8"	9.525	3/8"	2"	1/2"	.025"	-	-
46294	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.025"	-	-
46297	.3750	3/8"	9.525	3/8"	3"	1-1/4"	.025"	-	-
46300	.3750	3/8"	9.525	3/8"	4"	1-5/8"	.025"	-	-
46303	.3750	3/8"	9.525	3/8"	4"	1"	.025"	2"	.345"
46306	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.025"	4"	.345"

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	d_1 † Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	c Chamfer Length	l_3 Reach Length	d_3 Neck Diameter
46309	.3937		10.000	10.0	50	16	0.50	-	-
46312	.3937		10.000	10.0	70	22	0.50	-	-
46315	.3937		10.000	10.0	100	40	0.50	-	-
46318	.3937		10.000	10.0	100	20	0.50	60	9.2
46321	.3937		10.000	10.0	150	40	0.50	100	9.2
46324	.4724		12.000	12.0	65	19	0.80	-	-
46327	.4724		12.000	12.0	75	32	0.80	-	-
46330	.4724		12.000	12.0	100	50	0.80	-	-
46333	.4724		12.000	12.0	100	25	0.80	60	11.2
46336	.4724		12.000	12.0	150	40	0.80	100	11.2
46339	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.030"	-	-
46342	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	-	-
46345	.5000	1/2"	12.700	1/2"	4"	2"	.030"	-	-
46348	.5000	1/2"	12.700	1/2"	4"	1"	.030"	2"	.470"
46351	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.030"	4"	.470"
46354	.6250	5/8"	15.875	5/8"	3"	3/4"	.035"	-	-
46357	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.035"	-	-
46360	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.035"	-	-
46363	.6250	5/8"	15.875	5/8"	4"	1"	.035"	2"	.595"
46366	.6250	5/8"	15.875	5/8"	6"	1-1/2"	.035"	3"	.595"
46369	.6250	5/8"	15.875	5/8"	6"	1-1/2"	.035"	4"	.595"
46372	.6299		16.000	16.0	75	19	1.00	-	-
46375	.6299		16.000	16.0	88	32	1.00	-	-
46378	.6299		16.000	16.0	100	50	1.00	-	-
46381	.6299		16.000	16.0	100	20	1.00	50	15.2
46384	.6299		16.000	16.0	150	40	1.00	100	15.2
46387	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.040"	-	-
46390	.7500	3/4"	19.050	3/4"	5"	2-1/4"	.040"	-	-
46393	.7500	3/4"	19.050	3/4"	4"	7/8"	.040"	2"	.720"
46396	.7500	3/4"	19.050	3/4"	6"	1-1/2"	.040"	3"	.720"
46399	.7500	3/4"	19.050	3/4"	6"	1-1/2"	.040"	4"	.720"
46402	.7874		20.000	20.0	100	22	1.00	-	-
46405	.7874		20.000	20.0	100	40	1.00	-	-
46408	.7874		20.000	20.0	100	30	1.00	50	19.2
46411	.7874		20.000	20.0	150	40	1.00	100	19.2
46414	1.000	1"	25.400	1"	4"	1-1/2"	.040"	-	-
46417	1.000	1"	25.400	1"	5"	2"	.040"	-	-
46420	1.000	1"	25.400	1"	6"	2"	.040"	3-1/2"	.970"
46423	1.000	1"	25.400	1"	7"	2"	.040"	4-1/2"	.970"



Series VHM

4,000mm - 9,000mm
(.1575" - .3543")

Z=4 | 30° | 45° | TECH PAGES 277

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
d_3	+0,000 –0,127mm (+.000" –.005")

Staggered Flute Hog Mill - AlTiN Coated

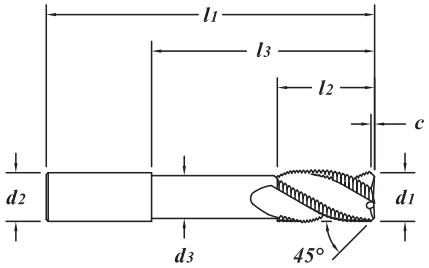
Schruppfräser mit Speziellen Spannut-Design - AlTiN-Beschichtet

Fresa de Labio Escalonado - Recubrimiento de AlTiN

Fraise Ébauche à Denture Variable - Revêtement AlTiN

Fresa Rompitruciolo - Rivestimento in AlTiN

错齿波纹铣刀 - AlTiN 涂层



MATERIAL HARDNESS (Rc): 70 – 35 – 0

Solid submicron grain carbide end mill - center cutting
State-of-the-art rougher using VRX technology
Reduces tool pressure for more aggresive machining
Recommended for stainless steel, inconel, pH materials, cold rolled steel, titanium, cast iron and tool steels <40Rc
Variable flute geometry

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Herkömmliche Vollhartmetallschrupper
Reduziert Schnittdruck für eine aggressivere Bearbeitung
Empfohlen für Rostfreien Stahl, Inconel, Pulvermetalle, Kaltformstähle, Titan, Grauguss und Werkzeugstähle <40HRc
Variable Spannut-Geometrie

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Desbaste de la mejor calidad con la tecnología VRX
Reduce la presión en la herramienta para los mecanizados más agresivos
Recomendado para acero inoxidable, inconel, materiales pH, acero laminado en frío, hierro de fundición y aceros herramienta <40Rc
Geometria variable de ranura de viruta

Fraises carbure submicrograin - coupe au centre
La maitrise de l'art pour le fraisage d'ebauche avec technologie des VRX
Reduction de la pression outil pour un fraisage plus agressif
Recommandee pour les aciers inoxydables, inconel, inoxs pH, aciers a outils, aciers forges, titane, fonts et aciers a outils <40HRC
Géometrie variable de la helix

Fresa sub-micrograno metallo duro - taglio al centro
Metallo duro per sgrossatura con tecnologia VRX
Riduce lo sforzo di taglio per lavorazioni aggressive
Raccomandata per lavorazioni su inox, inconel, acciai pressati a freddo, titanio, ghisa e acciai per utensili <40Hrc
Geometria ad elica variabile

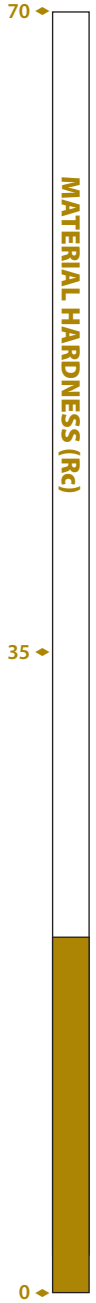
超细晶粒整体硬质合金立铣刀 - 中心切削
最先进的整体硬质合金粗切刀具/用途 VRX 技术
减少刀具压力，用于更高速度，更大进给的加工
推荐加工不锈钢、铬镍铁耐热耐蚀合金、含磷材质、冷轧钢、钛钢、铸铁和工具钢
不等分刃设计

EDP#	d_1 † Decimal	d_1 † Diameter	d_1 † Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	c Chamfer Length	l_3 Reach Length	d_3 Neck Diameter
49450	.1575		4.000	6.0	50	8	0.30	-	-
49455	.1575		4.000	6.0	50	12	0.30	-	-
49460	.1575		4.000	6.0	65	10	0.30	30	3.4
49465	.1575		4.000	6.0	75	15	0.30	40	3.4
49470	.1875	3/16"	4.763	3/16"	2"	5/16"	.015"	-	-
49475	.1875	3/16"	4.763	3/16"	2"	9/16"	.015"	-	-
49480	.1875	3/16"	4.763	3/16"	3"	1"	.015"	-	-
49485	.1875	3/16"	4.763	3/16"	3"	1/2"	.015"	1-1/2"	.165"
49490	.2362		6.000	6.0	50	12	0.50	-	-
49500	.2362		6.000	6.0	65	19	0.50	-	-
49505	.2362		6.000	6.0	100	15	0.50	40	5.4
49510	.2362		6.000	6.0	100	20	0.50	60	5.4
49520	.2500	1/4"	6.350	1/4"	2"	3/8"	.020"	-	-
49540	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"	-	-
49543	.2500	1/4"	6.350	1/4"	4"	1-1/2"	.020"	-	-
49547	.2500	1/4"	6.350	1/4"	4"	1"	.020"	2"	.225"
49550	.2756		7.000	8.0	50	12	0.50	-	-
49555	.2756		7.000	8.0	65	22	0.50	-	-
49570	.2812	9/32"	7.142	5/16"	2"	7/16"	.020"	-	-
49575	.2812	9/32"	7.142	5/16"	2-1/2"	13/16"	.020"	-	-
49580	.3125	5/16"	7.938	5/16"	2"	7/16"	.020"	-	-
49600	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.020"	-	-
49603	.3125	5/16"	7.938	5/16"	4"	1-1/2"	.020"	-	-
49605	.3125	5/16"	7.938	5/16"	4"	1"	.020"	2"	.285"
49610	.3150		8.000	8.0	50	12	0.50	-	-
49620	.3150		8.000	8.0	65	22	0.50	-	-
49622	.3150		8.000	8.0	100	40	0.50	-	-
49623	.3150		8.000	8.0	100	20	0.50	60	7.4
49624	.3150		8.000	8.0	150	40	0.50	100	7.4
49625	.3438	11/32"	8.733	3/8"	2"	1/2"	.025"	-	-
49630	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"	.025"	-	-
49635	.3543		9.000	10.0	50	14	0.50	-	-
49637	.3543		9.000	10.0	65	22	0.50	-	-

† Metric equivalents are for reference only

EDP#	Decimal	d_1 † Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	c Chamfer Length	l_3 Reach Length	d_3 Neck Diameter
49640	.3750	3/8"	9.525	3/8"	2"	1/2"	.025"	-	-
49660	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.025"	-	-
49662	.3750	3/8"	9.525	3/8"	3"	1-1/4"	.025"	-	-
49664	.3750	3/8"	9.525	3/8"	4"	1-5/8"	.025"	-	-
49667	.3750	3/8"	9.525	3/8"	4"	1"	.025"	2"	.355"
49670	.3937		10.000	10.0	50	16	0.50	-	-
49680	.3937		10.000	10.0	70	22	0.50	-	-
49682	.3937		10.000	10.0	100	40	0.50	-	-
49684	.3937		10.000	10.0	100	20	0.50	40	9.4
49686	.3937		10.000	10.0	100	30	0.50	60	9.4
49690	.4375	7/16"	11.113	7/16"	2-1/2"	5/8"	.025"	-	-
49700	.4375	7/16"	11.113	7/16"	2-3/4"	1"	.025"	-	-
49710	.4724		12.000	12.0	65	19	0.80	-	-
49720	.4724		12.000	12.0	75	32	0.80	-	-
49725	.4724		12.000	12.0	100	50	0.80	-	-
49730	.4724		12.000	12.0	100	25	0.80	60	11.4
49735	.4724		12.000	12.0	150	40	0.80	100	11.4
* 49740	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.030"	-	-
* 49760	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	-	-
* 49761	.5000	1/2"	12.700	1/2"	4"	2"	.030"	-	-
* 49762	.5000	1/2"	12.700	1/2"	4"	1"	.030"	2"	.480"
* 49764	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.030"	4"	.480"
* 49765	.5512		14.000	14.0	75	19	0.80	-	-
* 49770	.5512		14.000	14.0	88	32	0.80	-	-
* 49780	.6250	5/8"	15.875	5/8"	3"	3/4"	.035"	-	-
* 49800	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.035"	-	-
* 49820	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.035"	-	-
* 49824	.6250	5/8"	15.875	5/8"	4"	1"	.035"	2"	.605"
* 49826	.6250	5/8"	15.875	5/8"	6"	1-1/2"	.035"	3"	.605"
* 49828	.6250	5/8"	15.875	5/8"	6"	1-1/2"	.035"	4"	.605"
* 49830	.6299		16.000	16.0	75	19	1.00	-	-
* 49840	.6299		16.000	16.0	88	32	1.00	-	-
* 49842	.6299		16.000	16.0	100	50	1.00	-	-
* 49843	.6299		16.000	16.0	100	20	1.00	50	15.4
* 49844	.6299		16.000	16.0	150	40	1.00	100	15.4
* 49850	.7087		18.000	18.0	100	38	1.00	-	-
* 49860	.7500	3/4"	19.050	3/4"	3"	7/8"	.040"	-	-
* 49880	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.040"	-	-
* 49882	.7500	3/4"	19.050	3/4"	5"	2-1/4"	.040"	-	-
* 49886	.7500	3/4"	19.050	3/4"	6"	1-1/2"	.040"	3"	.730"
* 49887	.7500	3/4"	19.050	3/4"	6"	1-1/2"	.040"	4"	.730"
* 49890	.7874		20.000	20.0	75	22	1.00	-	-
* 49900	.7874		20.000	20.0	100	38	1.00	-	-
* 49902	.7874		20.000	20.0	100	30	1.00	50	19.4
* 49904	.7874		20.000	20.0	150	40	1.00	100	19.4
* 49915	.9843		25.000	25.0	100	25	1.00	-	-
* 49920	.9843		25.000	25.0	100	38	1.00	-	-
* 49925	1.000	1"	25.400	1"	4"	1"	.040"	-	-
* 49930	1.000	1"	25.400	1"	4"	1-1/2"	.040"	-	-
* 49940	1.000	1"	25.400	1"	5"	2"	.040"	-	-

* - Tools with weldon flats

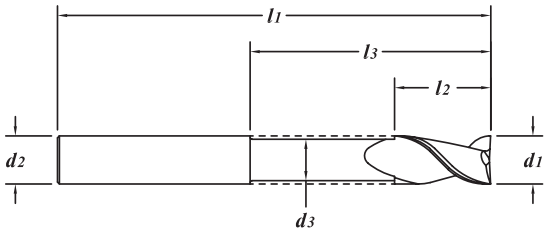


Series 142M

TOLERANCES	
d_1	+0,000 –0,025mm (+.000" –.001")
d_2	h6

Z=2 | 41° | TECH PAGES 272

HSAL - Square End - ALUMASTAR Coated
HSAL - Ohne Eckenradius - ALUMASTAR-Beschichtet
HSAL - Extremo Sin Radio - Recubrimiento de ALUMASTAR
HSAL - Extrémité Carré - Revêtement ALUMASTAR
HSAL - Piatte - Rivestimento in ALUMASTAR
HSAL - 平头 - ALUMASTAR 涂层



MATERIAL HARDNESS (Rc)
70
35
0

Solid submicron grain carbide end mill - center cutting
Specific coating engineered to repel aluminum
Engineered to run at 750-2500 SFM (225-750 M/Min.)
For high speed machining of aluminum
High velocity - high metal removal rate (for spindles 10,000 RPM and above)
Need to use properly balanced holders
Holds perpendicularity
Flats can be added within 48 hours

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Spezielle Beschichtung entwickelt zu abstoßen Aluminium
Entwickelt für Vorschübe von 225 - 750 M/Min. (750 – 2500 SFM)
Für die Hochgeschwindigkeitsbearbeitung von Aluminium
Hohe Geschwindigkeit – Hohe Abtragungsraten (Für Spindeldrehzahlen über 10.000 min-1)
Benutzen Sie korrekt gewuchtete Spannmittel
Hilft die Perpendicularität zu halten
Kann mit einer Fläche innerhalb von 48 Stunden warden

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Recubrimiento concebido específicamente para repeler el aluminio
Diseñado para trabajar a 225-750 M/Min. (750-2500 SFM)
Para el mecanizado a alta velocidad de aluminio
Alta velocidad – alto índice de desalojo de viruta (Para husillos de 10.000 r.p.m. o mas)
Use portaherramientas adecuadaente equilibrados
Ayuda a mantener la perpendicularidad
Puede ser modificado con un plano en 48 horas

Fraises carbure submicrograin - coupe au centre
Revetement special conçu pour l'aluminium
Developpement pour usiner a 225-750 M/Min. (750-2500 SFM)
Pour haute vitesse usinage pour l'aluminium
Haute velocite et haut volume copeaux (Pour les mandrins 10,000 RPM et plus)
Utilisation avec porte outils équilibrés
Aide a tenir la perpendicularite
Peut etre modifier avec un surface plat sous un delai de 48 heures

Fresa sub-micrograno metallo duro - taglio al centro
Rivestimento specifico costruito per respingere alluminio
Costruito per alta velocità 225-750 M/Min. (750-2500 SFM)
Per lavorazioni ad alta velocità su alluminio
Alta velocità - Alto volume di materiale asportato (Per 10.000 Giri al minuto e superiori)
Usare mandrini bilanciati
Rispettare la perpendicolarità
Può essere modificata in 48 ore

高速加工铝合金整体硬质合金立铣刀 – 中心切削
特殊涂层专为加工铝合金
适用于按750-2500英尺/分(225-750 米/分) 线速度运转的专用涂层
适合高速加工铝合金
高速一高切屑率 用于主轴转速在10,000 RPM及更高
使用动平衡的刀夹
保持垂直
可在48小时内磨成削平柄

EDP#	d_1 † Diameter Decimal	Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Reach Length	d_3 Neck Diameter
41222	.1575	4.000	6.0	50	12	-	-
41232	.1575	4.000	6.0	65	6	20	3.7
41282	.1875	3/16" 4.763	3/16"	2"	9/16"	-	-
41342	.1969	5.000	6.0	65	16	-	-
41352	.1969	5.000	6.0	75	8	20	4.7
41402	.2362	6.000	6.0	65	19	-	-
41412	.2362	6.000	6.0	75	10	25	5.7
41462	.2500	1/4" 6.350	1/4"	2-1/2"	3/4"	-	-
41542	.2756	7.000	8.0	65	19	-	-
41602	.3125	5/16" 7.938	5/16"	2-1/2"	3/4"	-	-
41662	.3150	8.000	8.0	65	19	-	-
41672	.3150	8.000	8.0	75	12	25	7.4
41722	.3750	3/8" 9.525	3/8"	2-1/2"	7/8"	-	-
41802	.3937	10.000	10.0	70	24	-	-
41812	.3937	10.000	10.0	75	12	30	9.4
41822	.3937	10.000	10.0	100	12	35	9.4
41882	.4724	12.000	12.0	75	32	-	-
41892	.4724	12.000	12.0	75	16	30	11.4
41902	.4724	12.000	12.0	100	16	35	11.4
41912	.4724	12.000	12.0	100	16	40	11.4
41942	.5000	1/2" 12.700	1/2"	3"	1-1/4"	-	-
42022	.6250	5/8" 15.875	5/8"	4"	1-5/8"	-	-
42072	.6299	16.000	16.0	75	16	30	15.4
42082	.6299	16.000	16.0	100	40	-	-
42092	.6299	16.000	16.0	100	20	40	15.4
42102	.6299	16.000	16.0	125	20	60	15.4
42142	.7500	3/4" 19.050	3/4"	4"	1-5/8"	-	-
42212	.7874	20.000	20.0	100	32	-	-
42222	.7874	20.000	20.0	100	20	40	19
42232	.7874	20.000	20.0	125	20	60	19
42302	1.000	1" 25.400	1"	4"	1-5/8"	-	-

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,025mm (+.000" –.001")
d_2	h6
r	+0,0127 –0,0127mm (+.0005" –.0005")

Z=2 | 41° | TECH PAGES 272

Series 142R

4,000mm - 12,000mm
(.1575" - .4724")

HSAL - Corner Radius - ALUMASTAR Coated
HSAL - Eckenradius - ALUMASTAR-Beschichtet
HSAL - Ángulo Redondeado - Recubrimiento de ALUMASTAR
HSAL - Rayon de Coin - Revêtement ALUMASTAR
HSAL - Torica - Rivestimento in ALUMASTAR
HSAL - 圓角半径 - ALUMASTAR 涂层

Solid submicron grain carbide end mill - center cutting
Specific coating engineered to repel aluminum
Engineered to run at 750-2500 SFM (225-750 M/Min.)
For high speed machining of aluminum
High velocity - high metal removal rate (for spindles 10,000 RPM and above)
Need to use properly balanced holders
Holds perpendicularity
Flats can be added within 48 hours

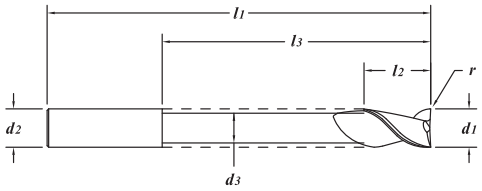
Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Spezielle Beschichtung entwickelt zu abstoßen Aluminium
Entwickelt für Vorschübe von 225 - 750 M/Min. (750 – 2500 SFM)
Für die Hochgeschwindigkeitsbearbeitung von Aluminium
Hohe Geschwindigkeit – Hohe Abtragungsraten
(Für Spindeldrehzahlen über 10.000 min^{-1})
Benutzen Sie korrekt gewuchtete Spannmittel
Hilft die Perpendicularität zu halten
Kann mit einer Fläche innerhalb von 48 Stunden warden

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Recubrimiento concebido específicamente para repeler el aluminio
Diseñado para trabajar a 225-750 M/Min. (750-2500 SFM)
Para el mecanizado a alta velocidad de aluminio
Alta velocidad – alto índice de desalojo de viruta
(Para husillos de 10.000 r.p.m. o mas)
Use portaherramientas adecuadaente equilibrados
Ayuda a mantener la perpendicularidad
Puede ser modificado con un plano en 48 horas

Fraises carbure submicrograin - coupe au centre
Revetement special conçu pour l'aluminium
Developpement pour usiner a 225-750 M/Min. (750-2500 SFM)
Pour haute vitesse usinage pour l'aluminium
Haute velocite et haut volume copeaux
(Pour les mandrins 10,000 RPM et plus)
Utilisation avec porte outils équilibrés
Aide a tenir la perpendicularite
Peut etre modifier avec un surface plat sous un delai de 48 heures

Fresa sub-micrograno metallo duro - taglio al centro
Rivestimento specifico costruito per respingere alluminio
Costruito per alta velocità 225-750 M/Min. (750-2500 SFM)
Per lavorazioni ad alta velocità su alluminio
Alta velocità - Alto volume di materiale asportato
(Per 10.000 Giri al minuto e superiori)
Usare mandrini bilanciati
Rispettare la perpendicolarità
Può essere modificata in 48 ore

高速加工铝合金整体硬质合金立铣刀 - 中心切削
特殊涂层专为加工铝合金
适用于按750-2500英尺/分(225-750 米/分) 线速度运转的专用涂层
适合高速加工铝合金
高速—高切屑率 用于主轴转速在10,000 RPM及更高
使用动平衡的刀夹
保持垂直
可在48小时内磨成削平柄



EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
39222	.1575		4.000	6.0	50	12	0.30	-	-
39232	.1575		4.000	6.0	65	6	0.50	20	3.7
39242	.1575		4.000	6.0	65	6	1.00	20	3.7
39282	.1875	3/16"	4.763	3/16"	2"	9/16"	.010"	-	-
39342	.1969		5.000	6.0	65	16	0.30	-	-
39352	.1969		5.000	6.0	75	8	0.50	20	4.7
39362	.1969		5.000	6.0	75	8	1.00	20	4.7
39402	.2362		6.000	6.0	65	19	0.30	-	-
39412	.2362		6.000	6.0	75	10	0.50	25	5.7
39422	.2362		6.000	6.0	75	10	1.00	25	5.7
39432	.2362		6.000	6.0	75	10	1.50	25	5.7
39442	.2362		6.000	6.0	75	10	2.00	25	5.7
39462	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"	-	-
39602	.3125	5/16"	7.938	5/16"	2-1/2"	3/4"	.015"	-	-
39662	.3150		8.000	8.0	65	19	0.50	-	-
39672	.3150		8.000	8.0	75	12	0.50	25	7.4
39682	.3150		8.000	8.0	75	12	1.00	25	7.4
39692	.3150		8.000	8.0	75	12	2.00	25	7.4
39702	.3150		8.000	8.0	75	12	3.00	25	7.4
39722	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"	-	-
39802	.3937		10.000	10.0	70	24	0.50	-	-
39812	.3937		10.000	10.0	100	12	1.00	35	9.4
39822	.3937		10.000	10.0	100	12	1.50	35	9.4
39832	.3937		10.000	10.0	100	12	2.00	35	9.4
39842	.3937		10.000	10.0	100	12	3.00	35	9.4
39882	.4724		12.000	12.0	75	32	0.50	-	-
39892	.4724		12.000	12.0	100	16	0.50	40	11.4
39902	.4724		12.000	12.0	100	16	1.00	40	11.4
39912	.4724		12.000	12.0	100	16	1.50	40	11.4
39922	.4724		12.000	12.0	100	16	2.00	40	11.4
39932	.4724		12.000	12.0	100	16	3.00	40	11.4

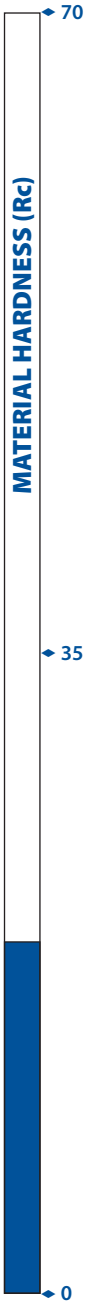
MATERIAL HARDNESS (Rc)
70
35
0

continued →

Series 142R *(continued)*

12,700mm - 20,000mm
(.5000" - .7874")

EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
39942	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	-	-
40022	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.030"	-	-
40082	.6299		16.000	16.0	100	40	1.00	-	-
40092	.6299		16.000	16.0	125	20	1.00	60	15.4
40102	.6299		16.000	16.0	125	20	2.00	60	15.4
40142	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.030"	-	-
40182	.7874		20.000	20.0	100	40	1.00	-	-
40192	.7874		20.000	20.0	150	20	1.00	65	19.0
40202	.7874		20.000	20.0	150	20	2.00	65	19.0
40212	.7874		20.000	20.0	150	20	3.00	65	19.0

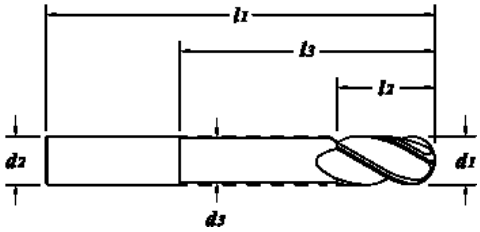


† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,025mm (+.000" –.001")
d_2	h6
ball radius	+0,0000 –0,0127mm (+.0000" –.0005")

Z=2 | 41° | TECH PAGES 272

HSAL - Ball End - ALUMASTAR Coated
HSAL - Vollradius - ALUMASTAR-Beschichtet
HSAL - Cabeza Esférica - Recubrimiento de ALUMASTAR
HSAL - Hemispherique - Revêtement ALUMASTAR
HSAL - Sferica - Rivestimento in ALUMASTAR
HSAL - 球头 - ALUMASTAR 涂层



Solid submicron grain carbide end mill - center cutting
Specific coating engineered to repel aluminum
Engineered to run at 750-2500 SFM (225-750 M/Min.)
For high speed machining of aluminum
High velocity - high metal removal rate (for spindles 10,000 RPM and above)
Need to use properly balanced holders
Holds perpendicularity
Honed edge on radius for improved finish
Flats can be added within 48 hours

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Spezielle Beschichtung entwickelt zu abstoßen Aluminium
Entwickelt für Vorschübe von 225 - 750 M/Min. (750 – 2500 SFM)
Für die Hochgeschwindigkeitsbearbeitung von Aluminium
Hohe Geschwindigkeit – Hohe Abtragungsraten (Für Spindeldrehzahlen über 10.000 min-1)
Benutzen Sie korrekt gewuchtete Spannmittel
Hilft die Perpendicularität zu halten
Gehonte Schneidkante für einen besseren Oberfläschezustand
Kann mit einer Fläche innerhalb von 48 Stunden warden
Vollradius Toleranz: +0,0000 –0,0127mm (+.0000" –.0005")

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Recubrimiento concebido específicamente para repeler el aluminio
Diseñado para trabajar a 225-750 M/Min. (750-2500 SFM)
Para el mecanizado a alta velocidad de aluminio
Alta velocidad – alto índice de desalojo de viruta (Para husillos de 10.000 r.p.m. o mas)
Use portaherramientas adecuadaente equilibrados
Ayuda a mantener la perpendicularidad
Radio perfilado para un mejor acabado
Puede ser modificado con un plano en 48 horas
Tolerancia de la cabeza esférica +0,0000 –0,0127mm (+.0000" –.0005")

Fraises carbure submicrograin - coupe au centre
Revetement special conçu pour l'aluminium
Developpement pour usiner a 225-750 M/Min. (750-2500 SFM)
Pour haute vitesse usinage pour l'aluminium
Haute velocite et haut volume copeaux (Pour les mandrins 10,000 RPM et plus)
Utilisation avec porte outils équilibrés
Aide a tenir la perpendicularite
Arête de coupe polie sur le rayon pour obtenir un meilleur état de surface
Peut etre modifier avec un surface plat sous un delai de 48 heures
Tolerance du rayon de hemispherique +0,0000 –0,0127mm (+.0000" –.0005")

Fresa sub-micrograno metallo duro - taglio al centro
Rivestimento specifico costruito per respingere alluminio
Costruito per alta velocità 225-750 M/Min. (750-2500 SFM)
Per lavorazioni ad alta velocità su alluminio
Alta velocità - Alto volume di materiale asportato (Per 10.000 Giri al minuto e superiori)
Usare mandrini bilanciati
Rispettare la perpendicolarità
Tagliente onato per una migliore finitura
Può essere modificata in 48 ore
Tolleranza del raggio +0,0000 –0,0127mm (+.0000" –.0005")

高速加工铝合金整体硬质合金立铣刀 - 中心切削
特殊涂层专为加工铝合金
适用于按750-2500英尺/分 (225-750 米/分) 线速度运转的专用涂层
适合高速加工铝合金
高速一高切屑率 用于主轴转速在10,000 RPM及更高
使用动平衡的刀夹
保持垂直
研磨圆弧角改善光洁度
可在48小时内磨成削平柄
半径允差 +0,0000 –0,0127mm (+.0000" –.0005")

	EDP#	d_1 † Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Reach Length	d_3 Neck Diameter
	42522	.1575		4.000	6.0	50	12	-	-
	42582	.1875	3/16"	4.763	3/16"	2"	9/16"	-	-
	42642	.1969		5.000	6.0	65	16	-	-
	42702	.2362		6.000	6.0	65	19	-	-
	42762	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	-	-
NEW	42764	.2500	1/4"	6.350	1/4"	4"	3/8"	1-1/8"	.235"
	42842	.2756		7.000	8.0	65	19	-	-
	42902	.3125	5/16"	7.938	5/16"	2-1/2"	3/4"	-	-
	42962	.3150		8.000	8.0	65	19	-	-
	43022	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	-	-
NEW	43023	.3750	3/8"	9.525	3/8"	4"	1/2"	1-1/8"	.355"
	43102	.3937		10.000	10.0	70	24	-	-
	43182	.4724		12.000	12.0	75	32	-	-
	43242	.5000	1/2"	12.700	1/2"	3"	1-1/4"	-	-
NEW	43243	.5000	1/2"	12.700	1/2"	4"	5/8"	2-1/4"	.475"
	43322	.6250	5/8"	15.875	5/8"	4"	1-5/8"	-	-
	43382	.6299		16.000	16.0	100	40	-	-
	43442	.7500	3/4"	19.050	3/4"	4"	1-5/8"	-	-
NEW	43444	.7500	3/4"	19.050	3/4"	5"	1"	3-1/16"	.715"
	43482	.7874		20.000	20.0	100	32	-	-
	43542	.9843		25.000	25.0	100	38	-	-
	43602	1.000	1"	25.400	1"	4"	1-5/8"	-	-

MATERIAL HARDNESS (Rc)
70
35
0

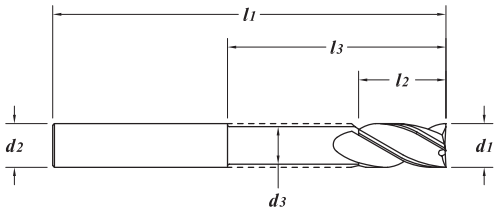
Series 143M

3,000mm - 9,525mm
(.1181" - .3750")

Z=3 | 38° | TECH PAGES 272

TOLERANCES	
d_1	+0,000 –0,025mm (+.000" –.001")
d_2	h6

HSAL - Square End - ALUMASTAR Coated
HSAL - Ohne Eckenradius - ALUMASTAR-Beschichtet
HSAL - Extremo Sin Radio - Recubrimiento de ALUMASTAR
HSAL - Extrémité Carré - Revêtement ALUMASTAR
HSAL - Piatte - Rivestimento in ALUMASTAR
HSAL - 平头 - ALUMASTAR 涂层



MATERIAL HARDNESS (Rc)
70
35
0

Solid submicron grain carbide end mill - center cutting
Specific coating engineered to repel aluminum
Engineered to run at 750-2500 SFM (225-750 M/Min.)
For high speed machining of aluminum
High velocity - high metal removal rate (for spindles 5,000-20,000 RPM)
Need to use properly balanced holders
Holds perpendicularity
Flats can be added within 48 hours

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Spezielle Beschichtung entwickelt zu abstoßen Aluminium
Entwickelt für Vorschübe von 225 - 750 M/Min. (750 – 2500 SFM)
Für die Hochgeschwindigkeitsbearbeitung von Aluminium
Hohe Geschwindigkeit – Hohe Abtragungsraten (Für Spindeldrehzahlen 5.000-20.000 min-1)
Benutzen Sie korrekt gewuchtete Spannmittel
Hilft die Perpendicularität zu halten
Kann mit einer Fläche innerhalb von 48 Stunden warden

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Recubrimiento concebido específicamente para repeler el aluminio
Diseñado para trabajar a 225-750 M/Min. (750-2500 SFM)
Para el mecanizado a alta velocidad de aluminio
Alta velocidad – alto índice de desalojo de viruta (Para husillos de 5.000-20.000 r.p.m.)
Use portaherramientas adecuadaente equilibrados
Ayuda a mantener la perpendicularidad
Puede ser modificado con un plano en 48 horas

Fraises carbure submicrograin - coupe au centre
Revetement special conçu pour l'aluminium
Developpement pour usiner a 225-750 M/Min. (750-2500 SFM)
Pour haute vitesse usinage pour l'aluminium
Haute velocite et haut volume copeaux (Pour les mandrins 5,000-20,000 RPM)
Utilisation avec porte outils équilibrés
Aide a tenir la perpendicularite
Peut etre modifier avec un surface plat sous un delai de 48 heures

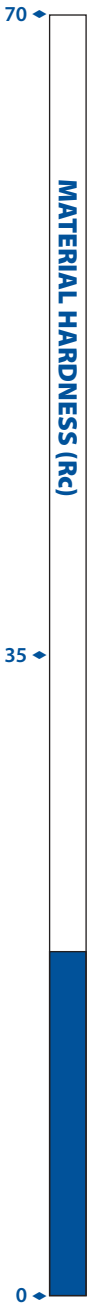
Fresa sub-micrograno metallo duro - taglio al centro
Rivestimento specifico costruito per respingere alluminio
Costruito per alta velocità 225-750 M/Min. (750-2500 SFM)
Per lavorazioni ad alta velocità su alluminio
Alta velocità - Alto volume di materiale asportato (Per 5.000-20.000 Giri al minuto)
Usare mandrini bilanciati
Rispettare la perpendicolarità
Può essere modificata in 48 ore

高速加工铝合金整体硬质合金立铣刀 - 中心切削
特殊涂层专为加工铝合金
适用于按750-2500英尺/分(225-750 米/分) 线速度运转的专用涂层
适合高速加工铝合金
高速—高切屑率 用于主轴转速在5,000-20,000 RPM
使用动平衡的刀夹
保持垂直
可在48小时内磨成削平柄

EDP#	d_1 † Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Reach Length	d_3 Neck Diameter
41173	.1181		3.000	3.0	38	6	-	-
41183	.1181		3.000	3.0	38	12	-	-
41193	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	-	-
41203	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	-	-
41213	.1575		4.000	6.0	50	8	-	-
41223	.1575		4.000	6.0	50	12	-	-
41243	.1575		4.000	6.0	65	6	20	3.7
41273	.1875	3/16"	4.763	3/16"	2"	5/16"	-	-
41283	.1875	3/16"	4.763	3/16"	2"	9/16"	-	-
41303	.1875	3/16"	4.763	3/16"	3"	7/32"	3/4"	.170"
41313	.1875	3/16"	4.763	3/16"	3"	1"	-	-
41343	.1969		5.000	6.0	65	16	-	-
41363	.1969		5.000	6.0	75	8	20	4.7
41403	.2362		6.000	6.0	65	19	-	-
41423	.2362		6.000	6.0	75	10	25	5.7
NEW 39735	.2500	1/4"	6.350	1/4"	2"	3/8"	-	-
NEW 39737	.2500	1/4"	6.350	1/4"	2"	1/2"	-	-
41453	.2500	1/4"	6.350	1/4"	2-1/2"	3/8"	-	-
41463	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	-	-
41473	.2500	1/4"	6.350	1/4"	3"	1"	-	-
41493	.2500	1/4"	6.350	1/4"	4"	3/8"	1-1/8"	.235"
41503	.2500	1/4"	6.350	1/4"	4"	3/8"	2-1/8"	.235"
41513	.2500	1/4"	6.350	1/4"	4"	1-5/8"	-	-
41543	.2756		7.000	8.0	65	19	-	-
41563	.2756		7.000	8.0	75	12	25	6.4
41593	.3125	5/16"	7.938	5/16"	2-1/2"	7/16"	-	-
41603	.3125	5/16"	7.938	5/16"	2-1/2"	3/4"	-	-
41623	.3125	5/16"	7.938	5/16"	4"	7/16"	1-1/8"	.297"
NEW 39739	.3150		8.000	8.0	50	12	-	-
41663	.3150		8.000	8.0	65	19	-	-
41683	.3150		8.000	8.0	75	12	25	7.4
41693	.3150		8.000	8.0	100	12	55	7.4
NEW 39741	.3750	3/8"	9.525	3/8"	2"	1/2"	-	-
41713	.3750	3/8"	9.525	3/8"	2-1/2"	1/2"	-	-
NEW 39743	.3750	3/8"	9.525	3/8"	2-1/2"	3/4"	-	-
41723	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	-	-
41733	.3750	3/8"	9.525	3/8"	3"	1"	-	-
41763	.3750	3/8"	9.525	3/8"	4"	1/2"	2-1/8"	.355"
41773	.3750	3/8"	9.525	3/8"	4"	1-5/8"	-	-
42363	.3750	3/8"	9.525	3/8"	4"	2"	-	-
41783	.3750	3/8"	9.525	3/8"	6"	1/2"	4"	.355"

† Metric equivalents are for reference only

	EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Reach Length	d_3 Neck Diameter
NEW	39745	.3937		10.000	10.0	50	14	-	-
	41803	.3937		10.000	10.0	70	24	-	-
	41843	.3937		10.000	10.0	100	12	35	9.4
	41853	.3937		10.000	10.0	100	12	55	9.4
	41863	.3937		10.000	10.0	150	12	110	9.4
NEW	39747	.4724		12.000	12.0	65	16	-	-
NEW	39749	.4724		12.000	12.0	75	26	-	-
	41883	.4724		12.000	12.0	75	32	-	-
	41893	.4724		12.000	12.0	100	50	-	-
	41903	.4724		12.000	12.0	100	16	40	11.4
	41913	.4724		12.000	12.0	100	16	55	11.4
	41923	.4724		12.000	12.0	150	16	110	11.4
NEW	39751	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	-	-
NEW	39753	.5000	1/2"	12.700	1/2"	2-1/2"	3/4"	-	-
	41933	.5000	1/2"	12.700	1/2"	3"	5/8"	-	-
NEW	39755	.5000	1/2"	12.700	1/2"	3"	1"	-	-
	41943	.5000	1/2"	12.700	1/2"	3"	1-1/4"	-	-
	41963	.5000	1/2"	12.700	1/2"	4"	1-5/8"	-	-
	41973	.5000	1/2"	12.700	1/2"	4"	2"	-	-
	41983	.5000	1/2"	12.700	1/2"	4"	5/8"	2-1/8"	.475"
	41993	.5000	1/2"	12.700	1/2"	6"	5/8"	4-1/8"	.475"
	42003	.5000	1/2"	12.700	1/2"	6"	3-1/8"	-	-
NEW	39757	.6250	5/8"	15.875	5/8"	3"	3/4"	-	-
	42013	.6250	5/8"	15.875	5/8"	3-1/2"	3/4"	-	-
NEW	39759	.6250	5/8"	15.875	5/8"	3-1/2"	1"	-	-
	42016	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	-	-
	42021	.6250	5/8"	15.875	5/8"	4"	1-1/2"	-	-
	42023	.6250	5/8"	15.875	5/8"	4"	1-5/8"	-	-
	42373	.6250	5/8"	15.875	5/8"	4"	2-1/8"	-	-
	42033	.6250	5/8"	15.875	5/8"	6"	3/4"	2-3/8"	.590"
	42043	.6250	5/8"	15.875	5/8"	6"	3/4"	4-3/8"	.590"
	42053	.6250	5/8"	15.875	5/8"	6"	3-1/4"	-	-
	42083	.6299		16.000	16.0	100	40	-	-
	42103	.6299		16.000	16.0	100	20	40	15.4
	42113	.6299		16.000	16.0	125	20	60	15.4
	42123	.6299		16.000	16.0	150	20	110	15.4
	42133	.7500	3/4"	19.050	3/4"	4"	1"	-	-
	42136	.7500	3/4"	19.050	3/4"	4"	1-1/4"	-	-
	42141	.7500	3/4"	19.050	3/4"	4"	1-1/2"	-	-
	42143	.7500	3/4"	19.050	3/4"	4"	1-5/8"	-	-
	42153	.7500	3/4"	19.050	3/4"	5"	2-1/4"	-	-
	42163	.7500	3/4"	19.050	3/4"	6"	1"	2-1/2"	.715"
	42173	.7500	3/4"	19.050	3/4"	6"	1"	4-3/8"	.715"
	42193	.7500	3/4"	19.050	3/4"	6"	3-1/4"	-	-
	42203	.7874		20.000	20.0	100	25	-	-
	42213	.7874		20.000	20.0	100	32	-	-
	42223	.7874		20.000	20.0	100	20	40	19.0
	42226	.7874		20.000	20.0	125	20	60	19.0
	42233	.7874		20.000	20.0	150	20	85	19.0
	42236	.7874		20.000	20.0	150	20	110	19.0
	42243	.9843		25.000	25.0	100	38	-	-
	42283	.9843		25.000	25.0	100	25	50	24.0
	42286	.9843		25.000	25.0	125	25	65	24.0
	42291	.9843		25.000	25.0	150	25	90	24.0
	42293	1.000	1"	25.400	1"	4"	1"	-	-
	42303	1.000	1"	25.400	1"	4"	1-5/8"	-	-
	42313	1.000	1"	25.400	1"	5"	2"	-	-
	42343	1.000	1"	25.400	1"	6"	1-1/4"	3-3/8"	.960"
	42353	1.000	1"	25.400	1"	6"	3-1/4"	-	-



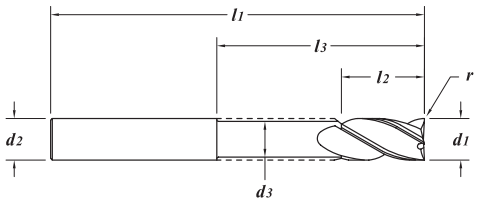
Series 143R

3,000mm - 6,000mm
(.1181" - .2362")

Z=3 | 38° | TECH PAGES 272

TOLERANCES	
d_1	+0,000 –0,025mm (+.000" –.001")
d_2	h6
r	+0,0127 –0,0127mm (+.0005" –.0005")

HSAL - Corner Radius - ALUMASTAR Coated
HSAL - Eckenradius - ALUMASTAR-Beschichtet
HSAL - Ángulo Redondeado - Recubrimiento de ALUMASTAR
HSAL - Rayon de Coin - Revêtement ALUMASTAR
HSAL - Torica - Rivestimento in ALUMASTAR
HSAL - 圆角半径 - ALUMASTAR 涂层



MATERIAL HARDNESS (Rc) ◆70 ◆35 ◆0

Solid submicron grain carbide end mill - center cutting
Specific coating engineered to repel aluminum
Engineered to run at 750-2500 SFM (225-750 M/Min.)
For high speed machining of aluminum
High velocity - high metal removal rate (for spindles 5,000-20,000 RPM)
Need to use properly balanced holders
Holds perpendicularity
Flats can be added within 48 hours

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Spezielle Beschichtung entwickelt zu abstoßen Aluminium
Entwickelt für Vorschübe von 225 - 750 M/Min. (750 – 2500 SFM)
Für die Hochgeschwindigkeitsbearbeitung von Aluminium
Hohe Geschwindigkeit – Hohe Abtragungsraten (Für Spindeldrehzahlen 5.000-20.000 min^{-1})
Benutzen Sie korrekt gewuchtete Spannmittel
Hilft die Perpendicularität zu halten
Kann mit einer Fläche innerhalb von 48 Stunden warden

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Recubrimiento concebido específicamente para repeler el aluminio
Diseñado para trabajar a 225-750 M/Min. (750-2500 SFM)
Para el mecanizado a alta velocidad de aluminio
Alta velocidad – alto índice de desalojo de viruta (Para husillos de 5.000-20.000 r.p.m.)
Use portaherramientas adecuadaente equilibrados
Ayuda a mantener la perpendicularidad
Puede ser modificado con un plano en 48 horas

Fraises carbure submicrograin - coupe au centre
Revetement special conçu pour l'aluminium
Developpement pour usiner a 225-750 M/Min. (750-2500 SFM)
Pour haute vitesse usinage pour l'aluminium
Haute velocite et haut volume copeaux (Pour les mandrins 5,000-20,000 RPM)
Utilisation avec porte outils équilibrés
Aide a tenir la perpendicularite
Peut etre modifier avec un surface plat sous un delai de 48 heures

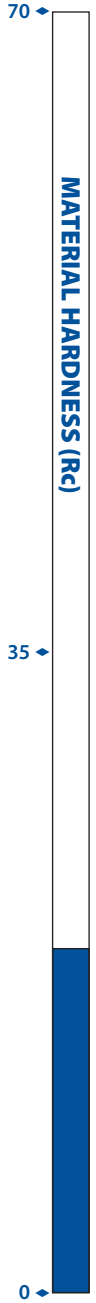
Fresa sub-micrograno metallo duro - taglio al centro
Rivestimento specifico costruito per respingere alluminio
Costruito per alta velocità 225-750 M/Min. (750-2500 SFM)
Per lavorazioni ad alta velocità su alluminio
Alta velocità - Alto volume di materiale asportato (Per 5.000-20.000 Giri al minuto)
Usare mandrini bilanciati
Rispettare la perpendicolarità
Può essere modificata in 48 ore

高速加工铝合金整体硬质合金立铣刀 - 中心切削
特殊涂层专为加工铝合金
适用于按750-2500英尺/分(225-750 米/分) 线速度运转的专用涂层
适合高速加工铝合金
高速—高切屑率 用于主轴转速在5,000-20,000 RPM
使用动平衡的刀夹
保持垂直
可在48小时内磨成削平柄

EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
39113	.1181		3.000	3.0	38	6	0.20	-	-
39123	.1181		3.000	3.0	38	6	0.50	-	-
39133	.1181		3.000	3.0	38	12	0.20	-	-
39143	.1181		3.000	3.0	38	12	0.50	-	-
39153	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	.010"	-	-
39163	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	.020"	-	-
39173	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.010"	-	-
39183	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.020"	-	-
39193	.1575		4.000	6.0	50	8	0.20	-	-
39203	.1575		4.000	6.0	50	8	0.50	-	-
39213	.1575		4.000	6.0	50	12	0.20	-	-
39223	.1575		4.000	6.0	50	12	0.30	-	-
39225	.1575		4.000	6.0	50	12	0.50	-	-
39243	.1575		4.000	6.0	65	6	0.30	20	3.7
39253	.1575		4.000	6.0	65	6	0.50	20	3.7
39263	.1575		4.000	6.0	65	6	1.00	20	3.7
39265	.1875	3/16"	4.763	3/16"	2"	5/16"	.010"	-	-
39275	.1875	3/16"	4.763	3/16"	2"	5/16"	.020"	-	-
39280	.1875	3/16"	4.763	3/16"	2"	5/16"	.030"	-	-
39283	.1875	3/16"	4.763	3/16"	2"	9/16"	.010"	-	-
39285	.1875	3/16"	4.763	3/16"	2"	9/16"	.020"	-	-
39293	.1875	3/16"	4.763	3/16"	2"	9/16"	.030"	-	-
39303	.1875	3/16"	4.763	3/16"	3"	7/32"	.010"	3/4"	.170"
39313	.1875	3/16"	4.763	3/16"	3"	7/32"	.030"	3/4"	.170"
39343	.1969		5.000	6.0	65	16	0.30	-	-
39363	.1969		5.000	6.0	75	8	0.30	20	4.7
39373	.1969		5.000	6.0	75	8	0.50	20	4.7
39383	.1969		5.000	6.0	75	8	1.00	20	4.7
39403	.2362		6.000	6.0	65	19	0.30	-	-
39423	.2362		6.000	6.0	75	10	0.30	25	5.7
39433	.2362		6.000	6.0	75	10	0.50	25	5.7
39436	.2362		6.000	6.0	75	10	1.00	25	5.7
39439	.2362		6.000	6.0	75	10	1.50	25	5.7
39443	.2362		6.000	6.0	75	10	2.00	25	5.7

† *Metric equivalents are for reference only*

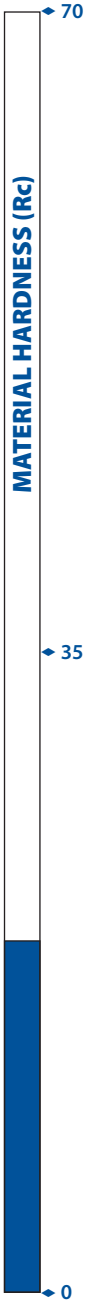
	EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
NEW	39314	.2500	1/4"	6.350	1/4"	2"	1/2"	.010"	-	-
NEW	39316	.2500	1/4"	6.350	1/4"	2"	1/2"	.015"	-	-
NEW	39318	.2500	1/4"	6.350	1/4"	2"	1/2"	.020"	-	-
	39453	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"	-	-
	39463	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"	-	-
NEW	39320	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"	-	-
	39473	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"	-	-
	39493	.2500	1/4"	6.350	1/4"	4"	3/8"	.015"	1-1/8"	.235"
	40403	.2500	1/4"	6.350	1/4"	4"	3/8"	.030"	1-1/8"	.235"
	39503	.2500	1/4"	6.350	1/4"	4"	3/8"	.015"	2-1/8"	.235"
	39543	.2756		7.000	8.0	65	19	0.30	-	-
	39563	.2756		7.000	8.0	75	12	0.30	25	6.4
NEW	39322	.3125	5/16"	7.938	5/16"	2"	1/2"	.010"	-	-
NEW	39324	.3125	5/16"	7.938	5/16"	2"	1/2"	.020"	-	-
	39593	.3125	5/16"	7.938	5/16"	2-1/2"	3/4"	.010"	-	-
	39603	.3125	5/16"	7.938	5/16"	2-1/2"	3/4"	.015"	-	-
NEW	39326	.3125	5/16"	7.938	5/16"	2-1/2"	3/4"	.020"	-	-
	39613	.3125	5/16"	7.938	5/16"	2-1/2"	3/4"	.030"	-	-
	39623	.3125	5/16"	7.938	5/16"	4"	7/16"	.015"	1-1/8"	.297"
	39633	.3125	5/16"	7.938	5/16"	4"	7/16"	.030"	1-1/8"	.297"
NEW	39328	.3150		8.000	8.0	50	12	0.50	-	-
	39663	.3150		8.000	8.0	65	19	0.50	-	-
	39683	.3150		8.000	8.0	75	12	0.50	25	7.4
	39688	.3150		8.000	8.0	75	12	1.00	25	7.4
	39693	.3150		8.000	8.0	75	12	2.00	25	7.4
	39698	.3150		8.000	8.0	75	12	3.00	25	7.4
NEW	39330	.3750	3/8"	9.525	3/8"	2"	1/2"	.010"	-	-
NEW	39332	.3750	3/8"	9.525	3/8"	2"	1/2"	.020"	-	-
	39703	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.010"	-	-
	39713	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.015"	-	-
NEW	39334	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.020"	-	-
	39723	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"	-	-
	39733	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.060"	-	-
	39763	.3750	3/8"	9.525	3/8"	4"	1/2"	.030"	2-1/8"	.355"
	39773	.3750	3/8"	9.525	3/8"	4"	1/2"	.060"	2-1/8"	.355"
	39783	.3750	3/8"	9.525	3/8"	6"	1/2"	.030"	4"	.355"
NEW	39336	.3937		10.000	10.0	50	14	0.50	-	-
	39803	.3937		10.000	10.0	70	24	0.50	-	-
	39843	.3937		10.000	10.0	100	12	0.50	35	9.4
	39848	.3937		10.000	10.0	100	12	1.00	35	9.4
	39853	.3937		10.000	10.0	100	12	1.50	35	9.4
	39863	.3937		10.000	10.0	100	12	2.00	35	9.4
	39873	.3937		10.000	10.0	100	12	3.00	35	9.4
NEW	39344	.4724		12.000	12.0	65	16	0.50	-	-
	39883	.4724		12.000	12.0	75	32	0.50	-	-
NEW	39346	.4724		12.000	12.0	75	32	0.75	-	-
NEW	39348	.4724		12.000	12.0	75	32	1.00	-	-
	39903	.4724		12.000	12.0	100	16	0.50	40	11.4
	39907	.4724		12.000	12.0	100	16	1.00	40	11.4
	39911	.4724		12.000	12.0	100	16	1.50	40	11.4
	39915	.4724		12.000	12.0	100	16	2.00	40	11.4
	39919	.4724		12.000	12.0	100	16	3.00	40	11.4



continued →

Series 143R *(continued)*

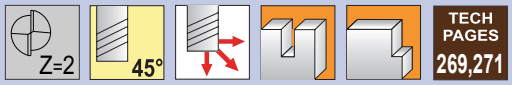
15,875mm - 25,400mm
(.6250" - 1.000")



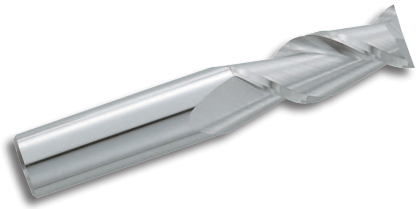
	EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
NEW	39353	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.010"	-	-
NEW	39355	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.020"	-	-
	39923	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.010"	-	-
	39933	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.015"	-	-
NEW	39356	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.020"	-	-
	39943	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	-	-
	39953	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.060"	-	-
	39963	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.120"	-	-
NEW	39972	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.015"	-	-
	39973	.5000	1/2"	12.700	1/2"	4"	2"	.010"	-	-
	40413	.5000	1/2"	12.700	1/2"	4"	2"	.030"	-	-
	40423	.5000	1/2"	12.700	1/2"	4"	2"	.060"	-	-
	40433	.5000	1/2"	12.700	1/2"	4"	5/8"	.010"	2-1/8"	.475"
	39983	.5000	1/2"	12.700	1/2"	4"	5/8"	.030"	2-1/8"	.475"
	40443	.5000	1/2"	12.700	1/2"	4"	5/8"	.060"	2-1/8"	.475"
	40453	.5000	1/2"	12.700	1/2"	4"	5/8"	.120"	2-1/8"	.475"
	39993	.5000	1/2"	12.700	1/2"	6"	5/8"	.030"	4-1/8"	.475"
NEW	39366	.6250	5/8"	15.875	5/8"	3"	3/4"	.010"	-	-
NEW	39368	.6250	5/8"	15.875	5/8"	3"	3/4"	.020"	-	-
NEW	39369	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.015"	-	-
	39370	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.020"	-	-
	40463	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.015"	-	-
NEW	39372	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.020"	-	-
	40023	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.030"	-	-
	40473	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.060"	-	-
	40483	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.120"	-	-
	40033	.6250	5/8"	15.875	5/8"	6"	3/4"	.030"	2-3/8"	.590"
	40043	.6250	5/8"	15.875	5/8"	6"	3/4"	.030"	4-3/8"	.590"
	40083	.6299		16.000	16.0	100	40	1.00	-	-
	40103	.6299		16.000	16.0	100	20	1.00	40	15.4
	40113	.6299		16.000	16.0	125	20	2.00	60	15.4
	40118	.6299		16.000	16.0	125	20	3.00	60	15.4
	40123	.6299		16.000	16.0	125	20	4.00	60	15.4
NEW	39374	.7500	3/4"	19.050	3/4"	4"	1-1/4"	.020"	-	-
	40133	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.015"	-	-
NEW	39376	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.020"	-	-
	40143	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.030"	-	-
	40153	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.060"	-	-
	40493	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.120"	-	-
	40503	.7500	3/4"	19.050	3/4"	6"	1"	.015"	2-1/2"	.715"
	40163	.7500	3/4"	19.050	3/4"	6"	1"	.030"	2-1/2"	.715"
	40513	.7500	3/4"	19.050	3/4"	6"	1"	.060"	2-1/2"	.715"
	40523	.7500	3/4"	19.050	3/4"	6"	1"	.120"	2-1/2"	.715"
NEW	40171	.7500	3/4"	19.050	3/4"	6"	1"	.015"	4"	.715"
	40173	.7500	3/4"	19.050	3/4"	6"	1"	.030"	4-3/8"	.715"
	40183	.7874		20.000	20.0	100	32	1.00	-	-
	40223	.7874		20.000	20.0	100	20	1.00	40	19.0
	40225	.7874		20.000	20.0	150	20	1.00	65	19.0
	40226	.7874		20.000	20.0	150	20	2.00	65	19.0
	40229	.7874		20.000	20.0	150	20	3.00	65	19.0
	40231	.7874		20.000	20.0	150	20	4.00	65	19.0
	40243	.9843		25.000	25.0	100	38	1.00	-	-
	40293	1.000	1"	25.400	1"	4"	1-5/8"	.030"	-	-
	40303	1.000	1"	25.400	1"	4"	1-5/8"	.060"	-	-
	40313	1.000	1"	25.400	1"	4"	1-5/8"	.120"	-	-
	40343	1.000	1"	25.400	1"	6"	1-1/4"	.030"	3-3/8"	.960"
	40353	1.000	1"	25.400	1"	6"	1-1/4"	.060"	3-3/8"	.960"
	40363	1.000	1"	25.400	1"	6"	1-1/4"	.120"	3-3/8"	.960"
NEW	40366	1.000	1"	25.400	1"	6"	1-1/4"	.030"	4"	.960"

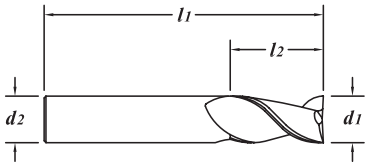
† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,025mm (+.000" –.001")
d_2	h6



Square End
Ohne Eckenradius
Extremo Sin Radio
Extrémité Carré
Piatte
平头





Solid submicron grain carbide end mill - center cutting
High performance machining
Rigid work holding, machine stability and part integrity are critical!
Excellent choice for slotting
Polished cylindrical O.D. margin reduces chatter
Recommended for aluminum and titanium
Sharp corners (Can be modified with a corner radius)
Designed for spindle speeds between 3,000 - 8,000 RPM, 1% diameter for chip load

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Exzellente Wahl zum Nutfräsen
Polierter Durchmesser O.D. Führungsfase reduziert Vibrationen
Empfohlen für Aluminium und Titan
Scharfe Schneidecken (Kann mit einem Eckenradius modifiziert werden)
Entwickelt für Drehzahlen von 3.000 bis 8.000 min^{-1}, 1% Durchmesser für Spanformung

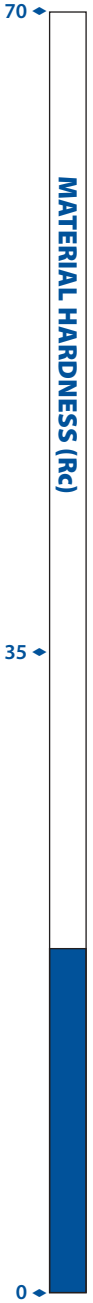
Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Excelente elección para ranurado
El margen de D.E. cilíndrico pulido reduce las vibraciones
Recomendado para aluminio y titanio
Esquinas afiladas (Se puede modificar con un ángulo redondeado)
Diseñado para velocidades de cabezal entre 3000-8000 RPM, 1% del diámetro para evacuación de viruta

Fraises carbure submicrograin - coupe au centre
Pour haute performance l'usinage
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Choix excellent pour le rainurage
La marge sur le diamètre contribue à réduire les bavardages
Recommandee pour l'aluminium et titane
Angles pointus (Peut etre modifier avec un rayon de coin)
Conçu pour des vitesses de broches de 3000 a 8000 Tours / minute, 1% du diamètre pour la charge de copeaux

Fresa sub-micrograno metallo duro - taglio al centro
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Scelta eccellente per cave
Il margine cilindrico lucidato di O.D. riduce la vibrazione
Raccomandata per alte prestazioni per lavorazioni di alluminio e titanio
Tagliente vivo (Può essere modificata con un raggio)
Progettato per impiego su mandrini tra 3.000-8.000 giri al minuto

高效超细晶粒整体硬质合金立铣刀 - 中心切削
推荐加工高效加工铝材质和钛材质
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素！
外圆余量经过抛光可减少振纹
是铣槽的极好选择
尖角（可以改为圆角）
适合转速3,000 - 8,000转/分，1%直径用于切屑负载

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
08910	.1181		3.000	3.0	38	8
08920	.1181		3.000	3.0	50	12
85160	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
85170	.1250	1/8"	3.175	1/8"	2"	1/2"
08950	.1575		4.000	6.0	50	8
08960	.1575		4.000	6.0	50	12
85180	.1875	3/16"	4.763	3/16"	2"	5/16"
85190	.1875	3/16"	4.763	3/16"	2"	9/16"
08990	.1969		5.000	6.0	50	10
09000	.1969		5.000	6.0	65	15
09010	.2362		6.000	6.0	50	12
09020	.2362		6.000	6.0	65	25
09030	.2362		6.000	6.0	100	50
85200	.2500	1/4"	6.350	1/4"	2"	1/2"
85220	.2500	1/4"	6.350	1/4"	2-1/2"	1"
85240	.2500	1/4"	6.350	1/4"	4"	2"
85300	.3125	5/16"	7.938	5/16"	3"	1-1/8"
09240	.3150		8.000	8.0	65	20
09040	.3150		8.000	8.0	75	30
09050	.3150		8.000	8.0	100	50
85400	.3750	3/8"	9.525	3/8"	2"	5/8"
85420	.3750	3/8"	9.525	3/8"	2-1/2"	1"
85440	.3750	3/8"	9.525	3/8"	4"	2"
09060	.3937		10.000	10.0	50	16
09070	.3937		10.000	10.0	70	25
09080	.3937		10.000	10.0	100	50
09090	.4724		12.000	12.0	65	20
09100	.4724		12.000	12.0	75	32
09110	.4724		12.000	12.0	100	50
85500	.5000	1/2"	12.700	1/2"	2-1/2"	3/4"
85520	.5000	1/2"	12.700	1/2"	3"	1-1/4"
85540	.5000	1/2"	12.700	1/2"	4"	2"
85600	.6250	5/8"	15.875	5/8"	3-1/2"	1-5/8"
85620	.6250	5/8"	15.875	5/8"	6"	3"
09120	.6299		16.000	16.0	88	40
09130	.6299		16.000	16.0	150	75
09140	.7087		18.000	18.0	100	45
85700	.7500	3/4"	19.050	3/4"	4"	1-3/4"
85720	.7500	3/4"	19.050	3/4"	6"	3"
09350	.7874		20.000	20.0	100	38
09150	.7874		20.000	20.0	150	75
09160	.9843		25.000	25.0	100	45
09170	.9843		25.000	25.0	150	75
85800	1.000	1"	25.400	1"	4"	1-3/4"
85820	1.000	1"	25.400	1"	6"	3"



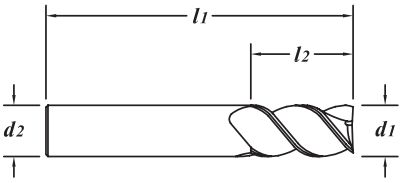
Series 253MA, 853MA

3,000mm - 14,000mm
(.1181" - .5512")

Z=3 | 50° | TECH PAGES 269,271

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Square End - AlTiN Coated
Ohne Eckenradius - AlTiN-Beschichtet
Extremo Sin Radio - Recubrimiento de AlTiN
Extrémité Carré - Revêtement AlTiN
Piatte - Rivestimento in AlTiN
平头 - AlTiN 涂层



MATERIAL HARDNESS (Rc)
70
35
0

Solid submicron grain carbide end mill - center cutting
High performance machining
Rigid work holding, machine stability and part integrity are critical!
Dry or semi-dry machining
Slots stainless steel at an axial depth of 25% of diameter
Recommended for stainless steel
Sharp corners (Can be modified with a corner radius)
Uncoated - page 132
TiCN Coated - page 134

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Trocken oder Halbtrockene Bearbeitung
Nutfräsen von Rostfreiem Stahl mit einer Axialzustellung von 25% des Durchmessers
Empfohlen für Rostfreiem Stahl
Scharfe Schneidecken (Kann mit einem Eckenradius modifiziert werden)
Unbeschichtet - Seite 115
TiCN-Beschichtet - Seite 117

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Mecanizado seco o semiseco
Ranurado de acero inoxidable a una profundidad axial del 25% del diámetro
Recomendado para acero inoxidable
Esquinas afiladas (Se puede modificar con un ángulo redondeado)
Sin recubrimiento - Página 115
Recubrimiento de TiCN - Página 117

Fraises carbure submicrograin - coupe au centre
Pour haute performance l'usinage
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Usinage a sec ou avec l'air
Rainurage de l'acier inoxydable avec profondeur de coupe axiale equivalente a 25% du diametre
Recommandee pour aciers inoxydables
Angles pointus (Peut etre modifier avec un rayon de coin)
Sans revêtement - Page 115
Revêtement TiCN - Page 117

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni per lavorazioni di inox
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Lavorazione a secco o a umido
Lavorazione dal pieno su inox con profondità di taglio consigliata pari al 25% del diametro
Raccomandata per lavorazioni su inox
Tagliente vivo (Può essere modificata con un raggio)
Non Rivestito - Pagina 115
Rivestimento in TiCN - Pagina 117

高效超细晶粒整体硬质合金立铣刀 - 中心切削
高效加工铝合金
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
干式或半干式机加工
以25%直径的轴向深度在铝材上铣槽
推荐加工不锈钢
尖角（可以改为圆角）
未涂层 - 115页
TiCN 涂层 - 117页

EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
10347	.1181		3.000	3.0	38	8
10357	.1181		3.000	3.0	50	12
86137	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
86147	.1250	1/8"	3.175	1/8"	2"	1/2"
10387	.1575		4.000	6.0	50	8
10397	.1575		4.000	6.0	50	12
86157	.1875	3/16"	4.763	3/16"	2"	5/16"
86167	.1875	3/16"	4.763	3/16"	2"	9/16"
86187	.1875	3/16"	4.763	3/16"	3"	1"
10407	.1969		5.000	5.0	50	8
10417	.1969		5.000	5.0	50	14
10507	.1969		5.000	6.0	50	8
10517	.1969		5.000	6.0	65	16
10017	.2362		6.000	6.0	50	12
10027	.2362		6.000	6.0	65	19
10037	.2362		6.000	6.0	75	32
86207	.2500	1/4"	6.350	1/4"	2"	1/2"
86227	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
86247	.2500	1/4"	6.350	1/4"	3"	1-1/4"
86267	.3125	5/16"	7.938	5/16"	2"	7/16"
86277	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"
86287	.3125	5/16"	7.938	5/16"	4"	1-1/4"
10427	.3150		8.000	8.0	50	11
10047	.3150		8.000	8.0	65	20
10057	.3150		8.000	8.0	75	32
86307	.3750	3/8"	9.525	3/8"	2"	1/2"
86327	.3750	3/8"	9.525	3/8"	2-1/2"	1"
86347	.3750	3/8"	9.525	3/8"	3-1/2"	1-1/2"
10067	.3937		10.000	10.0	50	12
10077	.3937		10.000	10.0	75	25
10087	.3937		10.000	10.0	88	38
86367	.4375	7/16"	11.113	7/16"	2-1/2"	9/16"
86377	.4375	7/16"	11.113	7/16"	2-3/4"	1"
86387	.4375	7/16"	11.113	7/16"	4"	2"
10097	.4724		12.000	12.0	65	16
10107	.4724		12.000	12.0	75	25
10117	.4724		12.000	12.0	100	50
86407	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"
86427	.5000	1/2"	12.700	1/2"	3"	1"
86447	.5000	1/2"	12.700	1/2"	4"	2"
10437	.5512		14.000	14.0	65	16
10447	.5512		14.000	14.0	75	25
10457	.5512		14.000	14.0	100	50

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
86467	.5625	9/16"	14.288	9/16"	3"	7/8"
86477	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"
86507	.6250	5/8"	15.875	5/8"	3"	7/8"
86527	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
86547	.6250	5/8"	15.875	5/8"	6"	2-1/2"
10137	.6299		16.000	16.0	88	32
10147	.6299		16.000	16.0	150	65
10167	.7087		18.000	18.0	100	38
86607	.7500	3/4"	19.050	3/4"	3-1/2"	1"
86627	.7500	3/4"	19.050	3/4"	4"	1-1/2"
86647	.7500	3/4"	19.050	3/4"	6"	3"
10187	.7874		20.000	20.0	100	38
10197	.7874		20.000	20.0	150	75
86697	1.000	1"	25.400	1"	4"	1-1/8"
86727	1.000	1"	25.400	1"	4"	2"
86747	1.000	1"	25.400	1"	6"	3-1/4"

1180 Series
High Performance Drill in aluminum
(reference page 17)

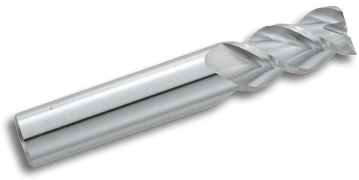
Series 253M, 853M

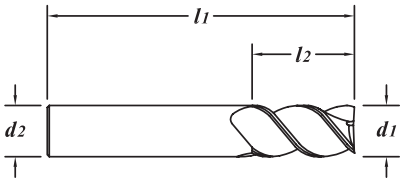
3,000mm - 14,000mm
(.1181" - .5512")

Z=3 | 50° | TECH PAGES 269,271

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Square End
Ohne Eckenradius
Extremo Sin Radio
Extrémité Carré
Piatte
平头





Solid submicron grain carbide end mill - center cutting
High performance milling
Rigid work holding, machine stability and part integrity are critical!
Slots aluminum at an axial depth of 25% of diameter
Sharp corners (Can be modified with a corner radius)
Recommended for steels, stainless steel and exotics
AlTiN Coated - page 130
TiCN Coated - page 134

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Verbessertes Schlichten von Titan
Starker Kern, Scharfe Schneidecken
Empfohlen für Stahl, Rostfreiem Stahl und exotischen Werkstoffen
X.CEED-Beschichtet - Seite 130
TiCN-Beschichtet - Seite 134

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Acabados mejorados en titanio
Núcleo pesado, Esquinas afiladas
Recomendado para aceros, acero inoxidable y materiales exóticos
Recubrimiento de X.CEED - Página 130
Recubrimiento de TiCN - Página 134

Fraises carbure submicrograin - coupe au centre
Pour haute performance fraisage
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Amelioration des finitions dans le Titane
Angles pointus
Recommandee pour aciers, aciers inoxydables et alliages exotiques
Revêtement X.CEED - Page 130
Revêtement TiCN - Page 134

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni per lavorazioni di acciai, inox e materiali esotici
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Consigliata per una migliore finitura sul titanio
Nocciolo rinforzato
Tagliente vivo
Rivestimento in X.CEED - Pagina 130
Rivestimento in TiCN - Pagina 134

高效超细晶粒整体硬质合金立铣刀 – 中心切削
在钢件、不锈钢和稀有材质上作高效铣削
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
改善钛合金的光洁度
强力芯部
尖角
X.CEED 涂层 - 130页
TiCN 涂层 - 134页

MATERIAL HARDNESS (Rc)
70
35
0

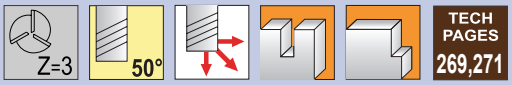
EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
10340	.1181		3.000	3.0	38	8
10350	.1181		3.000	3.0	50	12
86130	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
86140	.1250	1/8"	3.175	1/8"	2"	1/2"
10380	.1575		4.000	6.0	50	8
10390	.1575		4.000	6.0	50	12
86150	.1875	3/16"	4.763	3/16"	2"	5/16"
86160	.1875	3/16"	4.763	3/16"	2"	9/16"
86180	.1875	3/16"	4.763	3/16"	3"	1"
10400	.1969		5.000	5.0	50	8
10410	.1969		5.000	5.0	50	14
10010	.2362		6.000	6.0	50	12
10020	.2362		6.000	6.0	65	19
10030	.2362		6.000	6.0	75	32
86200	.2500	1/4"	6.350	1/4"	2"	1/2"
86220	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
86240	.2500	1/4"	6.350	1/4"	3"	1-1/4"
86260	.3125	5/16"	7.938	5/16"	2"	7/16"
86270	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"
86280	.3125	5/16"	7.938	5/16"	4"	1-1/4"
10420	.3150		8.000	8.0	50	11
10040	.3150		8.000	8.0	65	20
10050	.3150		8.000	8.0	75	32
86300	.3750	3/8"	9.525	3/8"	2"	1/2"
86320	.3750	3/8"	9.525	3/8"	2-1/2"	1"
86340	.3750	3/8"	9.525	3/8"	3-1/2"	1-1/2"
10060	.3937		10.000	10.0	50	12
10070	.3937		10.000	10.0	75	25
10080	.3937		10.000	10.0	88	38
86360	.4375	7/16"	11.113	7/16"	2-1/2"	9/16"
86370	.4375	7/16"	11.113	7/16"	2-3/4"	1"
86380	.4375	7/16"	11.113	7/16"	4"	2"
10090	.4724		12.000	12.0	65	16
10100	.4724		12.000	12.0	75	25
10110	.4724		12.000	12.0	100	50
86400	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"
86420	.5000	1/2"	12.700	1/2"	3"	1"
86440	.5000	1/2"	12.700	1/2"	4"	2"
10430	.5512		14.000	14.0	65	16
10440	.5512		14.000	14.0	75	25
10450	.5512		14.000	14.0	100	50

† *Metric equivalents are for reference only*

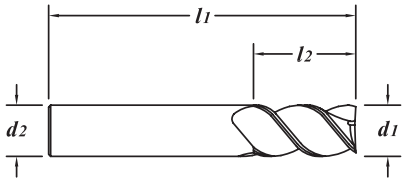
EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
86460	.5625	9/16"	14.288	9/16"	3"	7/8"
86470	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"
86480	.5625	9/16"	14.288	9/16"	6"	2-1/2"
86500	.6250	5/8"	15.875	5/8"	3"	7/8"
86520	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
86540	.6250	5/8"	15.875	5/8"	6"	2-1/2"
10120	.6299		16.000	16.0	75	20
10130	.6299		16.000	16.0	88	32
10140	.6299		16.000	16.0	150	65
10160	.7087		18.000	18.0	100	38
10170	.7087		18.000	18.0	150	75
86600	.7500	3/4"	19.050	3/4"	3-1/2"	1"
86620	.7500	3/4"	19.050	3/4"	4"	1-1/2"
86640	.7500	3/4"	19.050	3/4"	6"	3"
10460	.7874		20.000	20.0	75	22
10180	.7874		20.000	20.0	100	38
10190	.7874		20.000	20.0	150	75
10480	.9843		25.000	25.0	100	50
10490	.9843		25.000	25.0	150	82
86690	1.000	1"	25.400	1"	4"	1-1/8"
86720	1.000	1"	25.400	1"	4"	2"
86740	1.000	1"	25.400	1"	6"	3-1/4"

Series 253MC

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6



Square End - TiCN Coated
Ohne Eckenradius - TiCN-Beschichtet
Extremo Sin Radio - Recubrimiento de TiCN
Extrémité Carré - Revêtement TiCN
Piatte - Rivestimento in TiCN
平头 - TiCN 涂层



70
35
0

MATERIAL HARDNESS (Rc)

Solid submicron grain carbide end mill - center cutting
High performance machining
Rigid work holding, machine stability and part integrity are critical!
Improved abrasion resistance and lubricity
Slots aluminum and stainless steel at an axial depth of 25% of diameter
Recommended for aluminum and stainless steel
Sharp corners (Can be modified with a corner radius)
AlTiN Coated - page 130
Uncoated - page 132

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Verbesserte Verschleissbeständigkeit und Schmiereienschaft
Nutfräsen von Rostfreiem Stahl und Aluminium mit einer Axialzustellung von 25% des Durchmessers
Empfohlen für Rostfreiem Stahl und Aluminium
Scharfe Schneidecken (Kann mit einem Eckenradius modifiziert werden)
X.CEED-Beschichtet - Seite 130
Unbeschichtet - Seite 132

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Mejoradas la resistencia a la abrasión y la lubricación
Ranurado de acero inoxidable y aluminio a una profundidad axial del 25% del diámetro
Recomendado para acero inoxidable y aluminio
Esquinas afiladas (Se puede modificar con un ángulo redondeado)
Recubrimiento de X.CEED - Página 130
Sin recubrimiento - Página 132

Fraises carbure submicrograin - coupe au centre
Pour haute performance l'usinage
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Amelioration de la resistance a l'abrasion et au glissement
Rainurage de l'acier inoxydable et aluminium avec profondeur de coupe axiale equivalente a 25% du diametre
Recommandee pour aciers inoxydables et aluminium
Angles pointus (Peut etre modifier avec un rayon de coin)
Revêtement X.CEED - Page 130
Sans revêtement - Page 132

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni per lavorazioni di inox e alluminio
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Maggiore resistenza all'abrasione
Lavorazione dal pieno su alluminio con profondità di taglio consigliata pari al 25% del diametro
Raccomandata per lavorazioni su inox e alluminio
Tagliente vivo (Può essere modificata con un raggio)
Rivestimento in X.CEED - Pagina 130
Non Rivestito - Pagina 132

高效超细晶粒整体硬质合金立铣刀 - 中心切削
高效加工铝合金
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
改善耐磨性和润滑性
以25%直径的轴向深度在铝材上铣槽
推荐加工不锈钢，铝
尖角（可以改为圆角）
X.CEED 涂层 - 130页
未涂层 - 132页

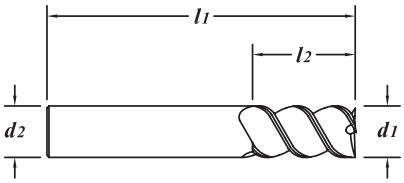
EDP#	d_1 † Diameter Decimal	d_1 † Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
86154	.1875	3/16"	4.763	3/16"	2"	5/16"
86164	.1875	3/16"	4.763	3/16"	2"	9/16"
86184	.1875	3/16"	4.763	3/16"	3"	1"
86204	.2500	1/4"	6.350	1/4"	2"	1/2"
86224	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
86244	.2500	1/4"	6.350	1/4"	3"	1-1/4"
86264	.3125	5/16"	7.938	5/16"	2"	7/16"
86274	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"
86284	.3125	5/16"	7.938	5/16"	4"	1-1/4"
86304	.3750	3/8"	9.525	3/8"	2"	1/2"
86324	.3750	3/8"	9.525	3/8"	2-1/2"	1"
86344	.3750	3/8"	9.525	3/8"	3-1/2"	1-1/2"
86364	.4375	7/16"	11.113	7/16"	2-1/2"	9/16"
86374	.4375	7/16"	11.113	7/16"	2-3/4"	1"
86384	.4375	7/16"	11.113	7/16"	4"	2"
86404	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"
86424	.5000	1/2"	12.700	1/2"	3"	1"
86444	.5000	1/2"	12.700	1/2"	4"	2"
86464	.5625	9/16	14.288	9/16"	3"	7/8"
86474	.5625	9/16	14.288	9/16"	3-1/2"	1-1/4"
86484	.5625	9/16	14.288	9/16"	6"	2-1/2"
86504	.6250	5/8"	15.875	5/8"	3"	7/8"
86524	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
86544	.6250	5/8"	15.875	5/8"	6"	2-1/2"
86604	.7500	3/4"	19.050	3/4"	3-1/2"	1"
86624	.7500	3/4"	19.050	3/4"	4"	1-1/2"
86644	.7500	3/4"	19.050	3/4"	6"	3"
86694	1.000	1"	25.400	1"	4"	1-1/8"
86724	1.000	1"	25.400	1"	4"	2"
86744	1.000	1"	25.400	1"	6"	3-1/4"

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=3 | 60° | TECH PAGES 269,271

Square End
Ohne Eckenradius
Extremo Sin Radio
Extrémité Carré
Piatte
平头



Solid submicron grain carbide end mill - center cutting
High performance profiling
Rigid work holding, machine stability and part integrity are critical!
Modified end gash - will not cut square corner
Recommended for steels, stainless steel and high-temperature alloys
Can be modified with a corner radius
AlTiN Coated - page 137
TiCN Coated - page 136

Vollhartmetallbohrer aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Modifizierte Endgeometrie – Schneidet keine quadratischen Ecken
Empfohlen für Stahl, Rostfreiem Stahl und Hochwarmfesten Legierungen
Kann mit einem Eckenradius modifiziert werden
AlTiN-Beschichtet - Seite 137
TiCN-Beschichtet - Seite 136

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Acanaladura final modificada – No adecuada para cortar en esquinas cuadradas
Recomendado para aceros, acero inoxidable y aleaciones de alta temperatura
Se puede modificar con un ángulo redondeado
Recubrimiento de AlTiN - Página 137
Recubrimiento de TiCN - Página 136

Fraises carbure submicrograin - coupe au centre
Haute performance pour l'usinage
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Coupe au centre spécifique
Recommandee pour aciers, aciers inoxydables et alliages hautes temperatures
Peut etre modifier avec un rayon de coin
Revêtement AlTiN - Page 137
Revêtement TiCN - Page 136

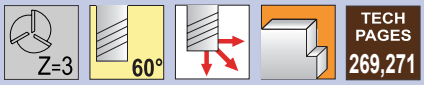
Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni in contornitura su acciaio, inox, superleghe
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Non consigliata per lavorazioni assiali
Può essere modificata con un raggio
Rivestimento in AlTiN - Pagina 137
Rivestimento in TiCN - Pagina 136

高效超细晶粒整体硬质合金立铣刀 - 中心切削
在钢件、不锈钢和耐高温合金钢上作仿形切削
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
修整底端面—不能切削直形角
可以改为圆角
AlTiN 涂层 - 137页
TiCN 涂层 - 136页

EDP#	d_1 † Diameter Decimal	d_1 † Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
23010	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
23020	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
23030	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
23040	.4375	7/16"	11.113	7/16"	2-3/4"	1"
23050	.5000	1/2"	12.700	1/2"	3"	1"
23060	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
23070	.7500	3/4"	19.050	3/4"	4"	1-1/2"
23080	1.000	1"	25.400	1"	4"	1-1/2"

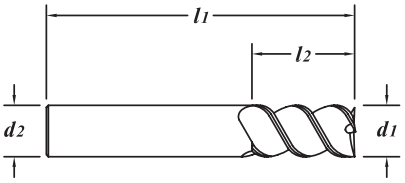
Series 263MC

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6



TECH PAGES 269,271

Square End - TiCN Coated
Ohne Eckenradius - TiCN-Beschichtet
Extremo Sin Radio - Recubrimiento de TiCN
Extrémité Carré - Revêtement TiCN
Piatte - Rivestimento in TiCN
平头 - TiCN 涂层



Solid submicron grain carbide end mill - center cutting
High performance profiling
Rigid work holding, machine stability and part integrity are critical!
Improved abrasion resistance and lubricity
Modified end gash - will not cut square corner
Recommended for steels, stainless steel and high-temperature alloys
Can be modified with a corner radius
AlTiN Coated - page 137
Uncoated - page 135

Vollhartmetallbohrer aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Verbesserte Verschleissbeständigkeit und Schmiereienschaft
Modifizierte Endgeometrie – Schneidet keine quadratischen Ecken
Empfohlen für Stahl, Rostfreiem Stahl und Hochwarmfesten Legierungen
Kann mit einem Eckenradius modifiziert werden
AlTiN-Beschichtet - Seite 137
Unbeschichtet - Seite 135

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Mejoradas la resistencia a la abrasión y la lubricación
Acanaladura final modificada – No adecuada para cortar en esquinas cuadradas
Recomendado para aceros, acero inoxidable y aleaciones de alta temperatura
Se puede modificar con un ángulo redondeado
Recubrimiento de AlTiN - Página 137
Sin recubrimiento - Página 135

Fraises carbure submicrograin - coupe au centre
Haute performance pour l'usinage
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Amelioration de la resistance a l'abrasion et au glissement
Coupe au centre spécifique
Recommandee pour aciers, aciers inoxydables et alliages hautes temperatures
Peut etre modifier avec un rayon de coin
Revêtement AlTiN - Page 137
Sans revêtement - Page 135

Fresa sub-micrograno metallo duro - taglio al centro
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Maggiore resistenza all'abrasione
Non consigliata per lavorazioni assiali
Alte prestazioni in contornitura su acciaio, inox, superleghe
Può essere modificata con un raggio
Rivestimento in AlTiN - Pagina 137
Non Rivestito - Pagina 135

高效超细晶粒整体硬质合金立铣刀 - 中心切削
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
改善耐磨性和润滑性
修整底端面—不能切削直形角
在钢件、不锈钢和耐高温合金钢上作仿形切削
可以改为圆角
AlTiN 涂层 - 137页
未涂层 - 135页

EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
23014	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
23024	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
23034	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
23044	.4375	7/16"	11.113	7/16"	2-3/4"	1"
23054	.5000	1/2"	12.700	1/2"	3"	1"
23064	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
23074	.7500	3/4"	19.050	3/4"	4"	1-1/2"
23084	1.000	1"	25.400	1"	4"	1-1/2"

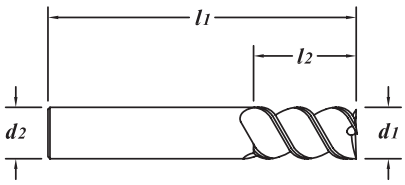
MATERIAL HARDNESS (Rc)
70
35
0

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

TECH PAGES 269,271

Square End - AlTiN Coated
Ohne Eckenradius - AlTiN-Beschichtet
Extremo Sin Radio - Recubrimiento de AlTiN
Extrémité Carré - Revêtement AlTiN
Piatte - Rivestimento in AlTiN
平头 - AlTiN 涂层



Solid submicron grain carbide end mill - center cutting
High performance profiling
Rigid work holding, machine stability and part integrity are critical!
Dry or semi-dry machining
Modified end gash - will not cut square corner
Recommended for steels, stainless steel and high-temperature alloys
Can be modified with a corner radius
TiCN Coated - page 136
Uncoated - page 135

Vollhartmetallbohrer aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Trocken oder Halbtrockene Bearbeitung
Modifizierte Endgeometrie – Schneidet keine quadratischen Ecken
Empfohlen für Stahl, Rostfreiem Stahl und Hochwarmfesten Legierungen
Kann mit einem Eckenradius modifiziert werden
TiCN-Beschichtet - Seite 136
Unbeschichtet - Seite 135

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Mecanizado seco o semiseco
Acanaladura final modificada – No adecuada para cortar en esquinas cuadradas
Recomendado para aceros, acero inoxidable y aleaciones de alta temperatura
Se puede modificar con un ángulo redondeado
Recubrimiento de TiCN - Página 136
Sin recubrimiento - Página 135

Fraises carbure submicrograin - coupe au centre
Haute performance pour l'usinage
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Usinage a sec ou avec l'air
Coupe au centre spécifique
Recommandee pour aciers, aciers inoxydables et alliages hautes temperatures
Peut etre modifier avec un rayon de coin
Revêtement TiCN - Page 136
Sans revêtement - Page 135

Fresa sub-micrograno metallo duro - taglio al centro
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Lavorazione a secco o a umido
Non consigliata per lavorazioni assiali
Alte prestazioni in contornitura su acciaio, inox, superleghe
Può essere modificata con un raggio
Rivestimento in TiCN - Pagina 136
Non Rivestito - Pagina 135

高效超细晶粒整体硬质合金立铣刀 - 中心切削
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
干式或半干式机加工
修整底端面—不能切削直形角
在钢件、不锈钢和耐高温合金钢上作仿形切削
可以改为圆角
TiCN 涂层 - 136页
未涂层 - 135页

EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
23517	.2362		6.000	6.0	65	13
23017	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
23027	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
23527	.3150		8.000	8.0	65	19
23037	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
23537	.3937		10.000	10.0	70	22
23047	.4375	7/16"	11.113	7/16"	2-3/4"	1"
23547	.4724		12.000	12.0	75	26
23057	.5000	1/2"	12.700	1/2"	3"	1"
23067	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
23557	.6299		16.000	16.0	88	32
23077	.7500	3/4"	19.050	3/4"	4"	1-1/2"
23087	1.000	1"	25.400	1"	4"	1-1/2"

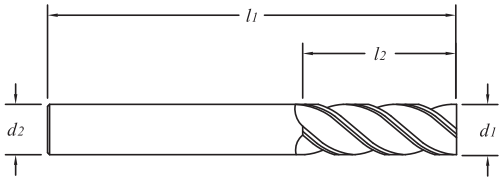
Series 255MA, 855MA

3,000mm - 12,000mm
(.1181" - .4724")

Z=5 | 45° | TECH PAGES 269,271

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Square End - AlTiN Coated
Ohne Eckenradius - AlTiN-Beschichtet
Extremo Sin Radio - Recubrimiento de AlTiN
Extrémité Carré - Revêtement AlTiN
Piatte - Rivestimento in AlTiN
平头 - AlTiN 涂层



Solid submicron grain carbide end mill - center cutting
High performance milling
Rigid work holding, machine stability and part integrity are critical!
Dry or semi-dry machining
Improved finishes in titanium
Heavy core, Sharp corners
Recommended for steels, stainless steel and exotics
Uncoated - page 140
TiCN Coated - page 142

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Trocken oder Halbtrockene Bearbeitung
Verbessertes Schlichten von Titan
Starker Kern, Scharfe Schneidecken
Empfohlen für Stahl, Rostfreiem Stahl und exotischen Werkstoffen
Unbeschichtet - Seite 140
TiCN-Beschichtet - Seite 142

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Mecanizado seco o semiseco
Acabados mejorados en titanio
Núcleo pesado, Esquinas afiladas
Recomendado para aceros, acero inoxidable y materiales exóticos
Sin recubrimiento - Página 140
Recubrimiento de TiCN - Página 142

Fraises carbure submicrograin - coupe au centre
Pour haute performance fraisage
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Usinage a sec ou avec l'air
Amelioration des finitions dans le Titane
Angles pointus
Recommandee pour aciers, aciers inoxydables et alliages exotiques
Sans revêtement - Page 140
Revêtement TiCN - Page 142

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni per lavorazioni
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Lavorazione a secco o a umido
Migliore finitura sul titanio
Dovere nucleo pesante, tagliente vivo
Consigliata per una di acciai, inox e materiali esotici
Non Rivestito - Pagina 140
Rivestimento in TiCN - Pagina 142

高效超细晶粒整体硬质合金立铣刀 - 中心切削
在钢件、不锈钢和稀有材质上作高效铣削
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
干式或半干式机加工
改善钛合金的光洁度
强力芯部
尖角
未涂层 - 140页
TiCN 涂层 - 142页

MATERIAL HARDNESS (Rc)
70
35
0

EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
40047	.1181		3.000	3.0	38	8
40057	.1181		3.000	3.0	50	12
52087	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
52097	.1250	1/8"	3.175	1/8"	2"	1/2"
40087	.1575		4.000	6.0	50	8
40097	.1575		4.000	6.0	50	12
52107	.1875	3/16"	4.763	3/16"	2"	5/16"
52127	.1875	3/16"	4.763	3/16"	2"	9/16"
40107	.1969		5.000	5.0	50	8
40127	.1969		5.000	5.0	50	14
40117	.1969		5.000	6.0	50	8
40137	.1969		5.000	6.0	65	16
40207	.2362		6.000	6.0	50	10
40227	.2362		6.000	6.0	65	20
40247	.2362		6.000	6.0	100	32
52207	.2500	1/4"	6.350	1/4"	2"	3/8"
52227	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
52247	.2500	1/4"	6.350	1/4"	4"	1-1/4"
52307	.3125	5/16"	7.938	5/16"	2"	7/16"
52327	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"
52347	.3125	5/16"	7.938	5/16"	4"	1-1/4"
40307	.3150		8.000	8.0	50	11
40327	.3150		8.000	8.0	65	21
40347	.3150		8.000	8.0	100	32
40367	.3543		9.000	10.0	65	22
52407	.3750	3/8"	9.525	3/8"	2"	1/2"
52427	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
52447	.3750	3/8"	9.525	3/8"	3-1/2"	1-1/2"
40407	.3937		10.000	10.0	50	12
40427	.3937		10.000	10.0	70	22
40447	.3937		10.000	10.0	88	38
52507	.4375	7/16"	11.113	7/16"	2-1/2"	9/16"
52527	.4375	7/16"	11.113	7/16"	2-3/4"	1"
52547	.4375	7/16"	11.113	7/16"	4"	2"
40507	.4724		12.000	12.0	65	16
40527	.4724		12.000	12.0	75	32
40547	.4724		12.000	12.0	100	50

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
52607	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"
52627	.5000	1/2"	12.700	1/2"	3"	1-1/4"
52647	.5000	1/2"	12.700	1/2"	4"	2"
52707	.6250	5/8"	15.875	5/8"	3"	3/4"
52727	.6250	5/8"	15.875	5/8"	3-1/2"	1-5/8"
52747	.6250	5/8"	15.875	5/8"	6"	2-1/2"
40607	.6299		16.000	16.0	75	20
40627	.6299		16.000	16.0	88	41
40647	.6299		16.000	16.0	150	63
52807	.7500	3/4"	19.050	3/4"	3"	7/8"
52827	.7500	3/4"	19.050	3/4"	4"	1-5/8"
52837	.7500	3/4"	19.050	3/4"	5"	2"
52847	.7500	3/4"	19.050	3/4"	6"	3-1/4"
40727	.7874		20.000	20.0	100	41
40747	.7874		20.000	20.0	150	82
40787	.9843		25.000	25.0	100	28
40827	.9843		25.000	25.0	100	50
40847	.9843		25.000	25.0	150	82
52897	1.000	1"	25.400	1"	4"	1-1/8"
52927	1.000	1"	25.400	1"	4"	2"
52947	1.000	1"	25.400	1"	6"	3-1/4"

End Mill Manufacturing

Series 255M, 855M

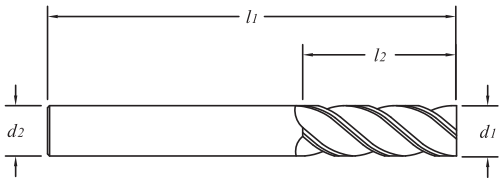
3,000mm - 12,700mm
(.1181" - .5000")

Z=5 | 45° | TECH PAGES 269,271

TOLERANCES

d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Square End
Ohne Eckenradius
Extremo Sin Radio
Extrémité Carré
Piatte
平头



MATERIAL HARDNESS (Rc)
70
35
0

Solid submicron grain carbide end mill - center cutting
High performance milling
Rigid work holding, machine stability and part integrity are critical!
Improved finishes in titanium
Heavy core, Sharp corners
Recommended for steels, stainless steel and exotics
AlTiN Coated - page 138
TiCN Coated - page 142

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Verbessertes Schlichten von Titan
Starker Kern, Scharfe Schneidecken
Empfohlen für Stahl, Rostfreiem Stahl und exotischen Werkstoffen
AlTiN-Beschichtet - Seite 138
TiCN-Beschichtet - Seite 142

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Acabados mejorados en titanio
Núcleo pesado, Esquinas afiladas
Recomendado para aceros, acero inoxidable y materiales exóticos
Recubrimiento de AlTiN - Página 138
Recubrimiento de TiCN - Página 142

Fraises carbure submicrograin - coupe au centre
Pour haute performance fraisage
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Amelioration des finitions dans le Titane
Angles pointus
Recommandee pour aciers, aciers inoxydables et alliages exotiques
Revêtement AlTiN - Page 138
Revêtement TiCN - Page 142

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni per lavorazioni
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Migliore finitura sul titanio
Dovere nucleo pesante, tagliente vivo
Consigliata per una di acciai, inox e materiali esotici
Rivestimento in AlTiN - Pagina 138
Rivestimento in TiCN - Pagina 142

高效超细晶粒整体硬质合金立铣刀 – 中心切削
在钢件、不锈钢和稀有材质上作高效铣削
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
改善钛合金的光洁度
强力芯部
尖角
AlTiN 涂层 - 138页
TiCN 涂层 - 142页

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
40040	.1181		3.000	3.0	38	8
40050	.1181		3.000	3.0	50	12
52080	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
52090	.1250	1/8"	3.175	1/8"	2"	1/2"
40080	.1575		4.000	6.0	50	8
40090	.1575		4.000	6.0	50	12
52100	.1875	3/16"	4.763	3/16"	2"	5/16"
52120	.1875	3/16"	4.763	3/16"	2"	9/16"
40100	.1969		5.000	5.0	50	8
40120	.1969		5.000	5.0	50	14
40200	.2362		6.000	6.0	50	10
40220	.2362		6.000	6.0	65	20
40240	.2362		6.000	6.0	100	32
52200	.2500	1/4"	6.350	1/4"	2"	3/8"
52220	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
52240	.2500	1/4"	6.350	1/4"	4"	1-1/4"
52300	.3125	5/16"	7.938	5/16"	2"	7/16"
52320	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"
52340	.3125	5/16"	7.938	5/16"	4"	1-1/4"
40320	.3150		8.000	8.0	65	21
40340	.3150		8.000	8.0	100	32
52400	.3750	3/8"	9.525	3/8"	2"	1/2"
52420	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
52440	.3750	3/8"	9.525	3/8"	3-1/2"	1-1/2"
40420	.3937		10.000	10.0	70	22
40440	.3937		10.000	10.0	88	38
52500	.4375	7/16"	11.113	7/16"	2-1/2"	9/16"
52520	.4375	7/16"	11.113	7/16"	2-3/4"	1"
52540	.4375	7/16"	11.113	7/16"	4"	2"
40520	.4724		12.000	12.0	75	32
40540	.4724		12.000	12.0	100	50
52600	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"
52620	.5000	1/2"	12.700	1/2"	3"	1-1/4"
52640	.5000	1/2"	12.700	1/2"	4"	2"

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
52700	.6250	5/8"	15.875	5/8"	3"	3/4"
52720	.6250	5/8"	15.875	5/8"	3-1/2"	1-5/8"
52740	.6250	5/8"	15.875	5/8"	6"	2-1/2"
40600	.6299		16.000	16.0	75	20
40620	.6299		16.000	16.0	88	41
40640	.6299		16.000	16.0	150	63
52800	.7500	3/4"	19.050	3/4"	3"	7/8"
52820	.7500	3/4"	19.050	3/4"	4"	1-5/8"
52830	.7500	3/4"	19.050	3/4"	5"	2"
52840	.7500	3/4"	19.050	3/4"	6"	3-1/4"
40700	.7874		20.000	20.0	75	22
40720	.7874		20.000	20.0	100	41
40740	.7874		20.000	20.0	150	82
40780	.9843		25.000	25.0	100	28
40820	.9843		25.000	25.0	100	50
40840	.9843		25.000	25.0	150	82
52890	1.000	1"	25.400	1"	4"	1-1/8"
52920	1.000	1"	25.400	1"	4"	2"
52940	1.000	1"	25.400	1"	6"	3-1/4"

Series 255MC

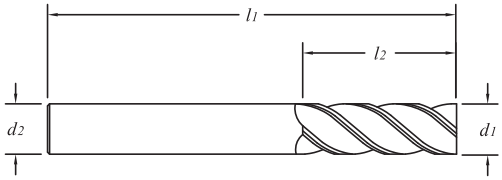
4,763mm - 25,400mm
(.1875" - 1.000")

Z=5 | 45° | TECH PAGES 269,271

TOLERANCES

d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Square End - TiCN Coated
Ohne Eckenradius - TiCN-Beschichtet
Extremo Sin Radio - Recubrimiento de TiCN
Extrémité Carré - Revêtement TiCN
Piatte - Rivestimento in TiCN
平头 - TiCN 涂层



70
35
0

MATERIAL HARDNESS (Rc)

Solid submicron grain carbide end mill - center cutting
High performance milling
Rigid work holding, machine stability and part integrity are critical!
Improved abrasion resistance and lubricity
Improved finishes in titanium
Heavy core, Sharp corners
Recommended for steels, stainless steel and exotics
AlTiN Coated - page 138
Uncoated - page 140

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Verbesserte Verschleissbeständigkeit und Schmiereieenschaft
Verbessertes Schlichten von Titan
Starker Kern, Scharfe Schneidecken
Empfohlen für Stahl, Rostfreiem Stahl und exotischen Werkstoffen
AlTiN-Beschichtet - Seite 138
Unbeschichtet - Seite 140

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Mejoradas la resistencia a la abrasión y la lubricación
Acabados mejorados en titanio
Núcleo pesado, Esquinas afiladas
Recomendado para aceros, acero inoxidable y materiales exóticos
Recubrimiento de AlTiN - Página 138
Sin recubrimiento - Página 140

Fraises carbure submicrograin - coupe au centre
Pour haute performance fraisage
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Amelioration de la resistance a l'abrasion et au glissement
Amelioration des finitions dans le Titane
Angles pointus
Recommandee pour aciers, aciers inoxydables et alliages exotiques
Revêtement AlTiN - Page 138
Sans revêtement - Page 140

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni per lavorazioni
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Lavorazione a secco o a umido
Migliore finitura sul titanio
Dovere nucleo pesante, tagliente vivo
Consigliata per una di acciai, inox e materiali esotici
Rivestimento in AlTiN - Pagina 138
Non Rivestito - Pagina 140

高效超细晶粒整体硬质合金立铣刀 - 中心切削
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素！
改善耐磨性和润滑性
改善钛合金的光洁度
强力芯部
尖角
在钢件、不锈钢和稀有材质上作高效铣削
AlTiN 涂层 - 138页
未涂层 - 140页

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
52104	.1875	3/16"	4.763	3/16"	2"	5/16"
52124	.1875	3/16"	4.763	3/16"	2"	9/16"
52204	.2500	1/4"	6.350	1/4"	2"	3/8"
52224	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
52244	.2500	1/4"	6.350	1/4"	4"	1-1/4"
52304	.3125	5/16"	7.938	5/16"	2"	7/16"
52324	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"
52344	.3125	5/16"	7.938	5/16"	4"	1-1/4"
52404	.3750	3/8"	9.525	3/8"	2"	1/2"
52424	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
52444	.3750	3/8"	9.525	3/8"	3-1/2"	1-1/2"
52504	.4375	7/16"	11.113	7/16"	2-1/2"	9/16"
52524	.4375	7/16"	11.113	7/16"	2-3/4"	1"
52544	.4375	7/16"	11.113	7/16"	4"	2"
52604	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"
52624	.5000	1/2"	12.700	1/2"	3"	1-1/4"
52644	.5000	1/2"	12.700	1/2"	4"	2"
52704	.6250	5/8"	15.875	5/8"	3"	3/4"
52724	.6250	5/8"	15.875	5/8"	3-1/2"	1-5/8"
52744	.6250	5/8"	15.875	5/8"	6"	2-1/2"
52804	.7500	3/4"	19.050	3/4"	3"	7/8"
52824	.7500	3/4"	19.050	3/4"	4"	1-5/8"
52844	.7500	3/4"	19.050	3/4"	6"	3-1/4"
52894	1.000	1"	25.400	1"	4"	1-1/8"
52924	1.000	1"	25.400	1"	4"	2"
52944	1.000	1"	25.400	1"	6"	3-1/4"

† *Metric equivalents are for reference only*

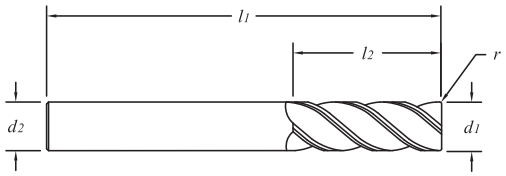
TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
r	+0,025 –0,025mm (+.001" –.001")

Z=5 | 45° | TECH PAGES 269,271

Series 255RA, 855RA

3,000mm - 7,938mm
(.1181" - .3125")

Corner Radius - AlTiN Coated
Eckenradius - AlTiN-Beschichtet
Ángulo Redondeado - Recubrimiento de AlTiN
Rayon de Coin - Revêtement AlTiN
Torica - Rivestimento in AlTiN
圆角半径 - AlTiN 涂层



Solid submicron grain carbide end mill - center cutting
High performance milling
Rigid work holding, machine stability and part integrity are critical!
Dry or semi-dry machining
Improved finishes in titanium
Heavy core
An ideal tool for finishing applications after using the VRX end mill (see page 170)
Recommended for steels, stainless steel and exotics

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Trocken oder Halbtrockene Bearbeitung
Verbessertes Schlichten von Titan
Starker Kern
Ein ideales Werkzeug zum Schlichten nach der Benutzung des VRX Fräsers (Siehe Seite 170)
Empfohlen für Stahl, Rostfreiem Stahl und exotischen Werkstoffen

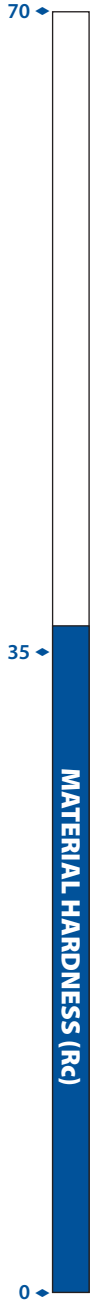
Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Mecanizado seco o semiseco
Acabados mejorados en titanio
Núcleo pesado
Herramienta ideal para aplicaciones de acabado después de la utilización de fresas VRX (Véase página 170)
Recomendado para aceros, acero inoxidable y materiales exóticos

Fraises carbure submicrograin - coupe au centre
Pour haute performance fraisage
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Usinage a sec ou avec l'air
Amelioration des finitions dans le Titane
Un outil ideal pour la finition apres l'utilisation des fraises VRX (voir page 170)
Recommandee pour aciers, aciers inoxydables et alliages exotiques

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni per lavorazioni
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Lavorazione a secco o a umido
Migliore finitura sul titanio
Dovere nucleo pesante
Utensile ideale per operazioni di finitura dopo l'utilizzo della fresa VRX (Vedi pagina 170)
Consigliata per una di acciai, inox e materiali esotici

高效超细晶粒整体硬质合金立铣刀 - 中心切削
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
干式或半干式机加工
改善钛合金的光洁度
强力芯部
VRX立铣刀是一种理想刀具，适合精加工 (见170页)
在钢件、不锈钢和稀有材质上作高效铣削

EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
83527	.1181		3.000	3.0	38	8	0.20
83537	.1181		3.000	3.0	38	8	0.50
83547	.1181		3.000	3.0	50	12	0.20
83550	.1181		3.000	3.0	50	12	0.30
83557	.1181		3.000	3.0	50	12	0.50
83567	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	.010"
83577	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	.020"
83587	.1250	1/8"	3.175	1/8"	2"	1/2"	.010"
83597	.1250	1/8"	3.175	1/8"	2"	1/2"	.020"
83600	.1250	1/8"	3.175	1/8"	2"	1/2"	.030"
83607	.1575		4.000	6.0	50	8	0.30
83617	.1575		4.000	6.0	50	8	0.50
83627	.1575		4.000	6.0	50	12	0.30
83637	.1575		4.000	6.0	50	12	0.50
83647	.1875	3/16"	4.763	3/16"	2"	5/16"	.010"
83657	.1875	3/16"	4.763	3/16"	2"	5/16"	.020"
83667	.1875	3/16"	4.763	3/16"	2"	9/16"	.010"
83677	.1875	3/16"	4.763	3/16"	2"	9/16"	.020"
83680	.1875	3/16"	4.763	3/16"	2"	9/16"	.030"
83707	.1969		5.000	6.0	65	15	0.30
83717	.1969		5.000	6.0	65	15	0.50
83767	.2362		6.000	6.0	50	12	0.30
83777	.2362		6.000	6.0	50	12	0.50
83780	.2362		6.000	6.0	65	19	0.20
83787	.2362		6.000	6.0	65	19	0.30
83797	.2362		6.000	6.0	65	19	0.50
83807	.2362		6.000	6.0	65	19	1.00
83827	.2500	1/4"	6.350	1/4"	2"	3/8"	.015"
83837	.2500	1/4"	6.350	1/4"	2"	3/8"	.030"
83845	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"
83847	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"
83857	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"
83877	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.060"
83927	.3125	5/16"	7.938	5/16"	2"	7/16"	.020"
83937	.3125	5/16"	7.938	5/16"	2"	7/16"	.030"
83940	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.010"
83947	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.020"
83957	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.030"
83977	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.060"



continued →

Series 255RA, 855RA *(continued)*

8,000mm - 25,400mm
(.3150" - 1.000")

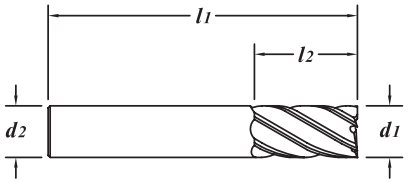
EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
83987	.3150		8.000	8.0	50	12	0.50
83997	.3150		8.000	8.0	50	12	1.00
84000	.3150		8.000	8.0	65	22	0.30
84007	.3150		8.000	8.0	65	22	0.50
84017	.3150		8.000	8.0	65	22	1.00
84027	.3150		8.000	8.0	65	22	1.50
84087	.3750	3/8"	9.525	3/8"	2"	1/2"	.020"
84097	.3750	3/8"	9.525	3/8"	2"	1/2"	.030"
84100	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.010"
84107	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.020"
84117	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"
84137	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.060"
84167	.3937		10.000	10.0	70	22	0.50
84177	.3937		10.000	10.0	70	22	1.00
84257	.4724		12.000	12.0	75	32	0.30
84267	.4724		12.000	12.0	75	32	0.50
84277	.4724		12.000	12.0	75	32	1.00
84287	.4724		12.000	12.0	75	32	1.50
84307	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.010"
84317	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.020"
84327	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"
84337	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.060"
84357	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.120"
84367	.5000	1/2"	12.700	1/2"	4"	2"	.030"
84377	.5000	1/2"	12.700	1/2"	4"	2"	.060"
84397	.5000	1/2"	12.700	1/2"	4"	2"	.120"
84467	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.015"
84487	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"
84497	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.060"
84507	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.120"
84567	.6299		16.000	16.0	88	32	1.00
84577	.6299		16.000	16.0	88	32	2.00
84587	.6299		16.000	16.0	150	65	1.00
84597	.6299		16.000	16.0	150	65	2.00
84667	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.015"
84687	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"
84697	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"
84700	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.120"
84707	.7500	3/4"	19.050	3/4"	5"	2"	.030"
84717	.7500	3/4"	19.050	3/4"	5"	2"	.060"
84747	.7500	3/4"	19.050	3/4"	5"	2"	.120"
84757	.7500	3/4"	19.050	3/4"	5"	2"	.190"
84767	.7874		20.000	20.0	100	38	1.00
84777	.7874		20.000	20.0	100	38	3.00
84887	.9843		25.000	25.0	100	38	1.00
84897	.9843		25.000	25.0	100	38	3.00
84957	1.000	1"	25.400	1"	4"	1-1/2"	.015"
84967	1.000	1"	25.400	1"	4"	1-1/2"	.030"
84970	1.000	1"	25.400	1"	4"	1-1/2"	.060"
84977	1.000	1"	25.400	1"	4"	1-1/2"	.120"
84980	1.000	1"	25.400	1"	4"	1-1/2"	.190"
84987	1.000	1"	25.400	1"	5"	2"	.030"
84990	1.000	1"	25.400	1"	5"	2"	.060"
84997	1.000	1"	25.400	1"	5"	2"	.120"
85007	1.000	1"	25.400	1"	5"	2"	.190"

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=6 | 40° | TECH PAGES 269,271

Square End
Ohne Eckenradius
Extremo Sin Radio
Extrémité Carré
Piatte
平头



Solid submicron grain carbide end mill - center cutting
High performance finishing in a variety of steels
Rigid work holding, machine stability and part integrity are critical!
Excellent durability
TiCN Coated - page 146
AlTiN Coated - page 147

Vollhartmetallbohrer aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung für Stahl
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Ausgezeichnete Haltbarkeit
TiCN-Beschichtet - Seite 146
AlTiN-Beschichtet - Seite 147

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento para aceros
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Excelente durabilidad
Recubrimiento de TiCN - Página 146
Recubrimiento de AlTiN - Página 147

Fraises carbure submicrograin - coupe au centre
Haute performance pour la finition pour aciers
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Excellente duree de vie
Revêtement TiCN - Page 146
Revêtement AlTiN - Page 147

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni per lavorazioni di utensile di finitura su acciaio
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Eccellente durata di vita utensile
Rivestimento in TiCN - Pagina 146
Rivestimento in AlTiN - Pagina 147

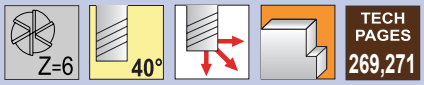
高效超细晶粒整体硬质合金立铣刀 - 中心切削
在钢件、高效精加工刀具
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
耐用性极好
TiCN 涂层 - 146页
AlTiN 涂层 - 147页

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
51110	.1875	3/16"	4.763	3/16"	2"	5/8"
51510	.1969		5.000	5.0	50	16
51520	.2362		6.000	6.0	65	20
51150	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
51190	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
51530	.3150		8.000	8.0	65	22
51230	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
51540	.3937		10.000	10.0	70	25
51270	.4375	7/16"	11.113	7/16"	2-3/4"	1"
51310	.5000	1/2"	12.700	1/2"	3"	1"
51330	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
51560	.6299		16.000	16.0	88	32
51350	.7500	3/4"	19.050	3/4"	4"	1-1/2"
51370	1.000	1"	25.400	1"	4"	1-1/2"
51400	1.250	1-1/4"	31.750	1-1/4"	4-1/2"	2"
51430	1.250	1-1/4"	31.750	1-1/4"	6"	3"

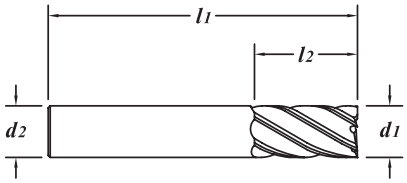
70
35
0
MATERIAL HARDNESS (Rc)

Series 246MC

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6



Square End - TiCN Coated
Ohne Eckenradius - TiCN-Beschichtet
Extremo Sin Radio - Recubrimiento de TiCN
Extrémité Carré - Revêtement TiCN
Piatte - Rivestimento in TiCN
平头 - TiCN 涂层



Solid submicron grain carbide end mill - center cutting
High performance finishing in a variety of steels
Rigid work holding, machine stability and part integrity are critical!
Excellent durability
Uncoated - page 145
AlTiN Coated - page 147

Vollhartmetallbohrer aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung für Stahl
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Ausgezeichnete Haltbarkeit
Unbeschichtet - Seite 145
AlTiN-Beschichtet - Seite 147

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento para aceros
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Excelente durabilidad
Sin recubrimiento - Página 145
Recubrimiento de AlTiN - Página 147

Fraises carbure submicrograin - coupe au centre
Haute performance pour la finition pour aciers
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Excellente duree de vie
Sans revêtement - Page 145
Revêtement AlTiN - Page 147

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni per lavorazioni di utensile di finitura su acciaio
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Eccellente durata di vita utensile
Non Rivestito - Pagina 145
Rivestimento in AlTiN - Pagina 147

高效超细晶粒整体硬质合金立铣刀 - 中心切削
在钢件、高效精加工刀具
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
耐用性极好
未涂层 - 145页
AlTiN 涂层 - 147页

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
51114	.1875	3/16"	4.763	3/16"	2"	5/8"
51154	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
51194	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
51234	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
51274	.4375	7/16"	11.113	7/16"	2-3/4"	1"
51314	.5000	1/2"	12.700	1/2"	3"	1"
51334	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
51354	.7500	3/4"	19.050	3/4"	4"	1-1/2"
51374	1.000	1"	25.400	1"	4"	1-1/2"
51404	1.250	1-1/4"	31.750	1-1/4"	4-1/2"	2"
51434	1.250	1-1/4"	31.750	1-1/4"	6"	3"

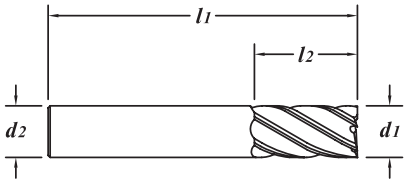
MATERIAL HARDNESS (Rc)
70
35
0

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=6 | 40° | TECH PAGES 269,271

Square End - AlTiN Coated
Ohne Eckenradius - AlTiN-Beschichtet
Extremo Sin Radio - Recubrimiento de AlTiN
Extrémité Carré - Revêtement AlTiN
Piatte - Rivestimento in AlTiN
平头 - AlTiN 涂层



Solid submicron grain carbide end mill - center cutting
High performance finishing in a variety of steels
Rigid work holding, machine stability and part integrity are critical!
Excellent durability
Uncoated - page 145
TiCN Coated - page 146

Vollhartmetallbohrer aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung für Stahl
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
Ausgezeichnete Haltbarkeit
Unbeschichtet - Seite 145
TiCN-Beschichtet - Seite 146

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento para aceros
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Excelente durabilidad
Sin recubrimiento - Página 145
Recubrimiento de TiCN - Página 146

Fraises carbure submicrograin - coupe au centre
Haute performance pour la finition pour aciers
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Excellente duree de vie
Sans revêtement - Page 145
Revêtement TiCN - Page 146

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni per lavorazioni di utensile di finitura su acciaio
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
Eccellente durata di vita utensile
Non Rivestito - Pagina 145
Rivestimento in TiCN - Pagina 146

高效超细晶粒整体硬质合金立铣刀 - 中心切削
在钢件、高效精加工刀具
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
耐用性极好
未涂层 - 145页
TiCN 涂层 - 146页

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
51117	.1875	3/16"	4.763	3/16"	2"	5/8"
51517	.1969		5.000	5.0	50	16
51597	.1969		5.000	6.0	65	16
51527	.2362		6.000	6.0	65	20
51157	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
51197	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
51537	.3150		8.000	8.0	65	22
51237	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
51547	.3937		10.000	10.0	70	25
51277	.4375	7/16"	11.113	7/16"	2-3/4"	1"
51557	.4724		12.000	12.0	75	25
51317	.5000	1/2"	12.700	1/2"	3"	1"
51337	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
51567	.6299		16.000	16.0	88	32
51357	.7500	3/4"	19.050	3/4"	4"	1-1/2"
51577	.7874		20.000	20.0	100	38
51587	.9843		25.000	25.0	100	38
51377	1.000	1"	25.400	1"	4"	1-1/2"
51407	1.250	1-1/4"	31.750	1-1/4"	4-1/2"	2"
51437	1.250	1-1/4"	31.750	1-1/4"	6"	3"

Series TMS

6,000mm - 12,700mm
(.2362" - .5000")

TECH PAGES 278-279

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Multi-Flute End Mill - Square End - AlCrN-based Coated

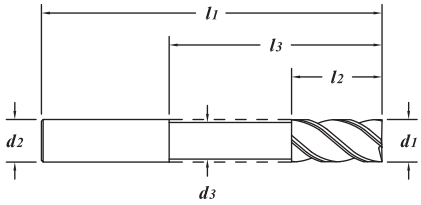
Mehrzähne fräser - Ohne Eckenradius - AlCrN-Basierende Beschichtet

Fresa de Multi Labio - Extremo Sin Radio - Recubrimiento Basado en AlCrN

Fraise de Multi-lèvre - Extrémité Carré - Revêtement à base de AlCrN

Fresa di Multitagliente - Piatte - Rivestimento in Base AlCrN

多刃加工铣刀 - 平头 - 涂层铝氮化铬



MATERIAL HARDNESS (Rc)
70
35
0

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
Effective for Trochoidal milling
Up to 8% Radial (ap) engagement
Can be used to finish most steels <40Rc, 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
Geeignet für trochoidales Fräsen
Bis zu 8% radialen (ap) eintauchen
Geeignet für das Schlichten in den meisten Stählen < 40 HRc, und Aluminium
Konventionelle Konstruktion für einen besseren Oberflächezustand 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
Adecuada para el fresado trocoidal
Hasta 8% radial (ap)
Puede ser utilizada para acabado en la mayoría de aceros < 40Rc, 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
Optimal pour un fraisage trochoidal
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
Efficace per fresatura trocoidale
Fino a 8% radiale (ap)
Può essere usata per la finitura su acciai <40Hrc, e Alluminio
Affilatura per una migliore finitura
Riaffilabile

高效超细晶粒整体硬质合金立铣刀 - 不切割在中心
专用于钛合金加工
多刃提高进给率
奇数刃自然破坏刀具共振
有效的摆线铣削
设计并已试加工0.08倍径切削宽度
可用于精加工硬度< 40Rc的钢件, 和铝
常规刃磨提高精加工质量、降低切削阻力
可以重磨

EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Reach Length	d_3 Neck Diameter	Number Flutes
98390	.2362		6.000	6.0	50	12	-	-	7
98392	.2362		6.000	6.0	65	19	-	-	7
98394	.2362		6.000	6.0	100	38	-	-	7
98396	.2362		6.000	6.0	100	10	60	5.4	7
98398	.2500	1/4"	6.350	1/4"	2"	3/8"	-	-	7
98400	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	-	-	7
98402	.2500	1/4"	6.350	1/4"	4"	1-1/2"	-	-	7
98404	.3125	5/16"	7.938	5/16"	2"	7/16"	-	-	7
98406	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	-	-	7
98408	.3125	5/16"	7.938	5/16"	4"	1-1/2"	-	-	7
98410	.3150		8.000	8.0	50	12	-	-	7
98412	.3150		8.000	8.0	65	22	-	-	7
98414	.3150		8.000	8.0	100	38	-	-	7
98416	.3150		8.000	8.0	100	12	60	7.4	7
98418	.3750	3/8"	9.525	3/8"	2"	1/2"	-	-	7
98420	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	-	-	7
98422	.3750	3/8"	9.525	3/8"	3"	1-1/4"	-	-	7
98424	.3750	3/8"	9.525	3/8"	4"	2"	-	-	7
98426	.3937		10.000	10.0	50	16	-	-	7
98428	.3937		10.000	10.0	70	22	-	-	7
98430	.3937		10.000	10.0	100	38	-	-	7
98432	.3937		10.000	10.0	100	50	-	-	7
98434	.3937		10.000	10.0	100	16	60	9.4	7
98436	.4724		12.000	12.0	75	26	-	-	9
98438	.4724		12.000	12.0	75	32	-	-	9
98440	.4724		12.000	12.0	100	42	-	-	9
98442	.4724		12.000	12.0	100	52	-	-	9
98444	.4724		12.000	12.0	150	19	105	11.4	9
98446	.5000	1/2"	12.700	1/2"	3"	1"	-	-	9
98448	.5000	1/2"	12.700	1/2"	3"	1-1/4"	-	-	9
98450	.5000	1/2"	12.700	1/2"	4"	5/8"	2-1/8"	.470"	9
98452	.5000	1/2"	12.700	1/2"	4"	1-1/2"	-	-	9
98454	.5000	1/2"	12.700	1/2"	4"	2-1/8"	-	-	9

GARR TOOL®

† Metric equivalents are for reference only

EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Reach Length	d_3 Neck Diameter	Number Flutes
98456	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	-	-	9
98458	.6250	5/8"	15.875	5/8"	4"	1-5/8"	-	-	9
98460	.6250	5/8"	15.875	5/8"	6"	3-1/4"	-	-	9
98462	.6250	5/8"	15.875	5/8"	6"	3/4"	4-1/8"	.590"	9
98464	.6299		16.000	16.0	88	32	-	-	9
98466	.6299		16.000	16.0	100	42	-	-	9
98468	.6299		16.000	16.0	150	60	-	-	9
98470	.6299		16.000	16.0	150	80	-	-	9
98472	.6299		16.000	16.0	150	22	102	15.4	9
98474	.7500	3/4"	19.050	3/4"	4"	1-1/2"	-	-	11
98476	.7500	3/4"	19.050	3/4"	4"	1-5/8"	-	-	11
98478	.7500	3/4"	19.050	3/4"	5"	2-1/8"	-	-	11
98480	.7500	3/4"	19.050	3/4"	6"	3-1/4"	-	-	11
98484	.7874		20.000	20.0	100	26	-	-	11
98486	.7874		20.000	20.0	100	38	-	-	11
98488	.7874		20.000	20.0	150	60	-	-	11
98490	.7874		20.000	20.0	150	80	-	-	11
98494	1.000	1"	25.400	1"	4"	1-1/2"	-	-	13
98496	1.000	1"	25.400	1"	5"	2-1/4"	-	-	13
98498	1.000	1"	25.400	1"	6"	3-1/4"	-	-	13
98500	1.000	1"	25.400	1"	7"	4-1/4"	-	-	13

Series TMR

12,000mm
(.4724")

TECH PAGES 278-279

TOLERANCES

d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
r	+0,025 –0,025mm (+.001" –.001")

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

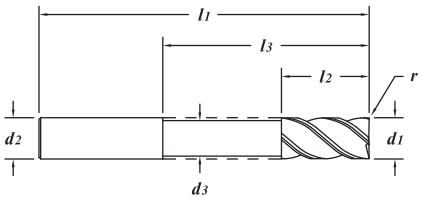
Mehrzähne fräser - Eckenradius - AlCrN-Basierende Beschichtet

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 - Torico - Rivestimento in Base AlCrN

多刃加工铣刀 - 圆角半径 - 涂层铝氮化铬



MATERIAL HARDNESS (Rc)
70
35
0

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
Effective for Trochoidal milling
Up to 8% Radial (ap) engagement
Can be used to finish most steels <40Rc, 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
Geeignet für trochoidales Fräsen
Bis zu 8% radialen (ap) eintauchen
Geeignet für das Schlichten in den meisten Stählen < 40 HRc, und Aluminium
Konventionelle Konstruktion für einen besseren Oberflächezustand 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
Adecuada para el fresado trocoidal
Hasta 8% radial (ap)
Puede ser utilizada para acabado en la mayoría de aceros < 40Rc, 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
Optimal pour un fraisage trochoidal
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
Efficace per fresatura trocoidale
Fino a 8% radiale (ap)
Può essere usata per la finitura su acciai <40Hrc, e Alluminio
Affilatura per una migliore finitura
Riaffilabile

高效超细晶粒整体硬质合金立铣刀 - 不切割在中心
专用于钛合金加工
多刃提高进给率
奇数刃自然破坏刀具共振
有效的摆线铣削
设计并已试加工0.08倍径切削宽度
可用于精加工硬度< 40Rc的钢件, 和铝
常规刃磨提高精加工质量、降低切削阻力
可以重磨

EDP#	d_1 † Diameter Decimal	Metric	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

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter	Metric	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
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

continued →

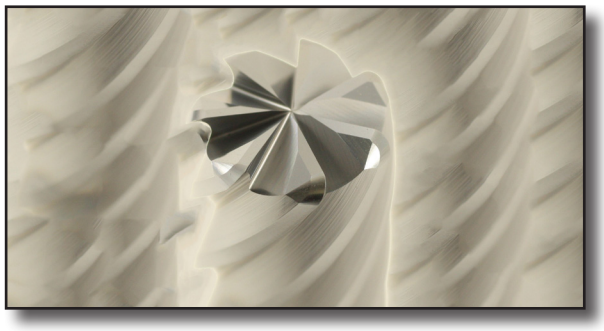
Series TMR *(continued)*

16,000mm - 20,000mm
(.6299" - .7874")

EDP#	d_1 † Diameter Decimal	Diameter	Metric	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
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"	.720"	9
98820	.7500	3/4"	19.050	3/4"	6"	1"	.030"	4-1/8"	.720"	9
98822	.7500	3/4"	19.050	3/4"	6"	1"	.060"	4-1/8"	.720"	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

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter	Metric	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
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



continued →

European facility based in High Wycombe, England

Garr Tool Company has made a significant investment in the future by establishing a sales and stock centre in the UK. This facility is our commitment to providing the best service to our European distributors. Security of supply is important to our customers and we want to build confidence that we will supply your round tooling needs.

- Over 8,000 products in stock
- 99.7% fill rate
- Next day shipping throughout Europe
- Order up to 17:30 CET
- Inside sales support
- Same day quotes

† *Metric equivalents are for reference only*

TOLERANCES

d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

TECH PAGES 282-283

Variable Helix End Mill - Square End - AlCrN-based Coated

Fräser mit Einer Variablen Spiralgeometrie - Ohne Eckenradius - AlCrN-Basierende Beschichtet

Fresa de Hélice Variable - Extremo Sin Radio - Recubrimiento Basado en AlCrN

Fraise Avec un Angle Hélice Variable - Extrémité Carré - Revêtement à base de AlCrN

Fresa ad Elica Variabile - Piatte - Rivestimento in Base AlCrN

不等螺旋铣刀 - 平头 - 涂层铝氮化铬

Solid submicron grain carbide end mill - center cutting
Helix geometry varies over length of flutes
Variable flute design helps with chip evacuation in slots and pockets
Variable rake aids in chip formation
Recommended for titanium, inconel, and steels (< 40 Rc)
PCT (Polish Carbide Treatment) enhances tool life by 20%
Minimizes burr on part
12mm and larger tools offered with weldon flat
Can be modified with a flat within 48 hours
V4 Corner Radius - page 156
V4 Ball End - page 159
The combination of an extended flute length with a weldon flat may cause the flute washout to reach inside some end mill holders

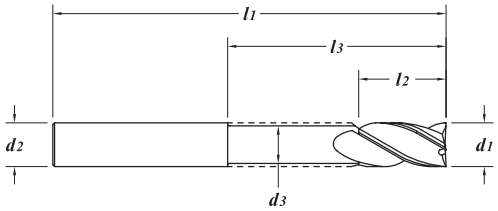
Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Empfohlen für Titan, Inconel, und Stahl (<40 HRc)
PCT (Polish Carbide Treatment, Treatment zum Polieren Hartmetall) steigert die Stanzeit bis zu +20%
Reduziert die Gratbildung am Werkstück
Spiralgeometrie variiert auf der gesamten Schneidenlänge
Variable Spannutgeometrie für eine bessere Spanabfuhr beim Schlitz- und Taschenfräsen
Variabler Winkel für bessere Spangeometrie
Ab Durchmesser 12 mm und grösser können die Werkzeuge mit Weldon-Spannfläche angeboten werden
Kleinere Durchmesser können innerhalb 48 Stunden mit einer Spannfläche geliefert werden
V4 Schaftfräser mit Eckenradius - Seite 156
V4 Vollradiusfräser - Seite 159
Die Kombination einer verlängerten Spannutlänge mit einer Weldon-Spannfläche kann die Ursache bei Spannut-Auswaschungen bei einigen Fräserspannfuttern sein

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Recomendado para Titanio, Inconel, y Acero (<40 Rc)
PCT (Polish Carbide Treatment, Tratamiento de pulido) aumenta la vida de la hta. hasta un 20%
Minimiza las rebabas en la pieza
La geometría de la hélice varía a lo largo de la longitud del labio
El diseño del labio variable contribuye a la evacuación de la viruta en ranuras y cajeras
El labio con filo variable que contribuye a la buena formación de la viruta
Htas de Ø12 mm. y mayores disponibles con mango Weldon
Es posible añadir un plano Weldon en diámetros menores en 48 horas
V4 Fresa de vástago con radio de cantos - Página 156
V4 Fresadora de radios - Página 159
La combinación de una gran longitud de corte con un mango con plano Weldon puede causar que del labio alcance el interior de algunos portaherramientas

Fraises carbure submicrograin - coupe au centre
Recommandé pour les titane, inconel, et aciers (<40 HRC)
PCT (le traitement pour polir le carbure) améliore la durée de vie de l'outil de 20 %
Minimise les bavures sur la pièce
La géométrie de l'hélice varie sur la longueur de l'hélice
Variable des dents de coupe est d'aider à l'évacuation des copeaux de fentes et des poches
Un pas variable améliore la formation des copeaux
Des outils d'un dia. 12 mm ou supérieur sont disponibles avec une queue weldon
Les petits diamètres peuvent être modifies avec une queue Weldon endéans 48 heures
V4 Rayon de Coin - Page 156
V4 Hemispherique - Page 159
La combinaison d'une grande longueur de goujure avec une queue Weldon peut causer des vibrations qui peuvent se prolonger dans le mandrin

Fresa sub-micrograno metallo duro - taglio al centro
Raccomandata per lavorazioni su Titanio, Inconel, e Acciai (<40 Hrc)
PCT (Polish Carbide Treatment, trattamento di lucidatura del metallo duro) incrementa la vita utensile del 20%
Non crea bava sul pezzo
La geometria dell'elica varia sulla lunghezza del tagliente
La geometria variabile del tagliente aiuta l'evacuazione del truciolo negli svuotamenti e nelle cave
L'angolo di spoglia variabile aiuta la formazione del truciolo
Dal diametro 12 mm in su disponibili con attacco weldon
Diametri più piccoli possono essere modificati in 48 ore
VRX Toriche - Pagina 156
VRX Sferiche - Pagina 159
Estendere la lunghezza del tagliente su un attacco Weldon può causare la rottura dell'utensile in alcune applicazioni

超细晶粒整体硬质合金立铣刀 - 中心切削
推荐的加工钛，铬镍铁合金，钢铁 (<40HRC)
PCT(硬质合金抛光处理)使刀具寿命提高20%
使工件的毛刺最少
整个切削刀的螺旋角可变
切削刀螺旋角可变的设计有利于碎屑在加工槽和型腔中排出
可变的前角有利于碎屑的形成
12mm及以上刀具提供侧固槽位设计
可在48小时内生产小直径的平底刀具
V4圆弧角 - 156页
V4球头 - 159页
过长的刀刃结合侧固槽的刀具可能会导致刀具夹头受到冲击而损坏



	EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Reach Length	d_3 Neck Diameter
	50236	-	.2362		6.000	6.0	65	12	-	-
	50237	-	.2362		6.000	6.0	65	19	-	-
	50540	-	.2500	1/4"	6.350	1/4"	2"	3/8"	-	-
	50238	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	-	-
NEW	50600	-	.2500	1/4"	6.350	1/4"	4"	3/8"	1-1/8"	.235"
	50541	-	.3125	5/16"	7.937	5/16"	2"	7/16"	-	-
	50239	-	.3125	5/16"	7.937	5/16"	2-1/2"	13/16"	-	-
NEW	50602		.3150		8.000	8.0	50	12	-	-
	50240	-	.3150		8.000	8.0	65	22	-	-
	50542	-	.3750	3/8"	9.525	3/8"	2"	1/2"	-	-
	50241	-	.3750	3/8"	9.525	3/8"	2-1/2"	1"	-	-
NEW	50604	-	.3750	3/8"	9.525	3/8"	4"	1/2"	1-1/8"	.355"
NEW	50606	-	.3937		10.000	10.0	50	14	-	-
	50242	-	.3937		10.000	10.0	70	22	-	-
NEW	50608	-	.3937		10.000	10.0	70	26	-	-
	50450	50449	.4724		12.000	12.0	75	26	-	-
	50243	50283	.4724		12.000	12.0	75	32	-	-
	50564	-	.4724		12.000	12.0	100	42	-	-
	50543	-	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	-	-
	50452	50453	.5000	1/2"	12.700	1/2"	3"	1"	-	-
	50244	50284	.5000	1/2"	12.700	1/2"	3"	1-1/4"	-	-
	50578	50579	.5000	1/2"	12.700	1/2"	4"	1-5/8"	-	-
	50245	50285	.5000	1/2"	12.700	1/2"	4"	2-1/8"	-	-
NEW	50610	-	.5000	1/2"	12.700	1/2"	4"	5/8"	2-1/4"	.475"
	50235	-	.5000	1/2"	12.700	1/2"	6"	5/8"	4-1/8"	.475"
	50545	50546	.6250	5/8"	15.875	5/8"	3"	3/4"	-	-
	50246	50286	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	-	-
NEW	50612	-	.6250	5/8"	15.875	5/8"	4"	1-5/8"	-	-
	50547	-	.6299		16.000	16.0	75	19	-	-
	50247	50287	.6299		16.000	16.0	88	32	-	-
	50549	50550	.7500	3/4"	19.050	3/4"	4"	1"	-	-
	50248	50288	.7500	3/4"	19.050	3/4"	4"	1-1/2"	-	-
	50551	50552	.7500	3/4"	19.050	3/4"	4"	1-3/4"	-	-
	50553	50554	.7500	3/4"	19.050	3/4"	5"	2-1/8"	-	-
	50555	-	.7874		20.000	20.0	100	25	-	-
	50249	50289	.7874		20.000	20.0	100	38	-	-
	50250	50290	1.000	1"	25.400	1"	4"	1-1/2"	-	-

Series V4R

6,000mm - 10,000mm
(.2362" - .3937")

Z=4 | VAR

TECH PAGES 282-283

TOLERANCES

d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
r	+0,025 –0,025mm (+.001" –.001")

Variable Helix End Mill - Corner Radius - AlCrN-based Coated

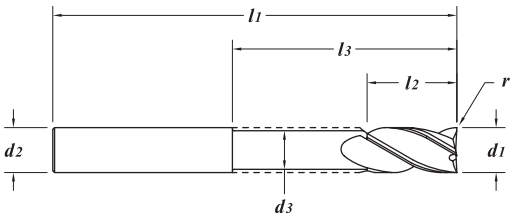
Fräser mit Einer Variablen Spiralgeometrie - Eckenradius - AlCrN-Basierende Beschichtet

Fresa de Hélice Variable - Ángulo Redondeado - Recubrimiento Basado en AlCrN

Fraise Avec un Angle Hélice Variable - Rayon de Coin - Revêtement à base de AlCrN

Fresa ad Elica Variabile - Torico - Rivestimento in Base AlCrN

不等螺旋铣刀 - 圆角半径 - 涂层铝氮化铬



MATERIAL HARDNESS (Rc)
70
35
0

Solid submicron grain carbide end mill - center cutting
Helix geometry varies of length of flutes
Variable flute design helps with chip evacuation in slots and pockets
Variable rake aids in chip formation
Recommended for titanium, inconel, and steels (< 40 Rc)
PCT (Polish Carbide Treatment) enhances tool life by 20%
Minimizes burr on part
12mm and larger tools offered with weldon flat
Smaller diameters can be modified with a flat within 48 hours
V4 Square End - page 155
V4 Ball End - page 159
The combination of an extended flute length with a weldon flat may cause the flute washout to reach inside some end mill holders

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Empfohlen für Titan, Inconel, und Stahl (<40 Hrc)
PCT (Polish Carbide Treatment, Treatment zum Polieren Hartmetall) steigert die Stanzeit bis zu +20%
Reduziert die Gratbildung am Werkstück
Spiralgeometrie variiert auf der gesamten Schneidenlänge
Variable Spannutgeometrie für eine bessere Spanabfuhr beim Schlitz- und Taschenfräsen
Variabler Winkel für bessere Spangeometrie
Ab Durchmesser 12 mm und grösser können die Werkzeuge mit Weldon-Spannfläche angeboten werden
Kleinere Durchmesser können innerhalb 48 Stunden mit einer Spannfläche geliefert werden
V4 Schaftfräser ohne Eckenradius - Seite 155
V4 Vollradiusfräser - Seite 159
Die Kombination einer verlängerten Spannutlänge mit einer Weldon-Spannfläche kann die Ursache bei Spannut-Auswaschungen bei einigen Fräserspannfuttern sein

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Recomendado para Titanio, Inconel, y Acero (<40 Hrc)
PCT (Polish Carbide Treatment, Tratamiento de pulido) aumenta la vida de la hta. hasta un 20%
Minimiza las rebabas en la pieza
La geometría de la hélice varía a lo largo de la longitud del labio
El diseño del labio variable contribuye a la evacuación de la viruta en ranuras y cajeras
El labio con filo variable que contribuye a la buena formación de la viruta
Htas de Ø12 mm. y mayores disponibles con mango Weldon
Es posible añadir un plano Weldon en diámetros menores en 48 horas
V4 Fresa de vástago sin radio de cantos - Página 155
V4 Fresadora de radios - Página 159
La combinación de una gran longitud de corte con un mango con plano Weldon puede causar que del labio alcance el interior de algunos portaherramientas

Fraises carbure submicrograin - coupe au centre
Recommandé pour les titane, inconel, et aciers (<40 Hrc)
PCT (le traitement pour polir le carbure) améliore la durée de vie de l'outil de 20 %
Minimise les bavures sur la pièce
La géométrie de l'hélice varie sur la longueur de l'hélice
Variable des dents de coupe est d'aider à l'évacuation des copeaux de fentes et des poches
Un pas variable améliore la formation des copeaux
Des outils d'un dia. 12 mm ou supérieur sont disponibles avec une queue weldon
Les petits diamètres peuvent être modifies avec une queue Weldon endéans 48 heures
V4 Rayon de Coin - Page 155
V4 Hemispherique - Page 159
La combinaison d'une grande longueur de goujure avec une queue Weldon peut causer des vibrations qui peuvent se prolonger dans le mandrin

Fresa sub-micrograno metallo duro - taglio al centro
Raccomandata per lavorazioni su Titanio, Inconel, e Acciai (<40 Hrc)
PCT (Polish Carbide Treatment, trattamento di lucidatura del metallo duro) incrementa la vita utensile del 20%
Non crea bava sul pezzo
La geometria dell'elica varia sulla lunghezza del tagliente
La geometria variabile del tagliente aiuta l'evacuazione del truciolo negli svuotamenti e nelle cave
L'angolo di spoglia variabile aiuta la formazione del truciolo
Dal diametro 12 mm in su disponibili con attacco weldon
Diametri più piccoli possono essere modificati in 48 ore
VRX Toriche - Pagina 155
VRX Sferiche - Pagina 159
Estendere la lunghezza del tagliente su un attacco Weldon può causare la rottura dell'utensile in alcune applicazioni

超细晶粒整体硬质合金立铣刀 - 中心切削
推荐的加工钛，铬镍铁合金，钢铁 (<40HRC)
PCT(硬质合金抛光处理) 使刀具寿命提高20%
使工件的毛刺最少
整个切削刀的螺旋角可变
切削刀螺旋角可变的设计有利于碎屑在加工槽和型腔中排出
可变的前角有利于碎屑的形成
12mm及以上刀具提供侧固槽位设计
可在48小时内生产小直径的平底刀具
V4圆弧角 - 155页
V4球头 - 159页
过长的刀刃结合侧固槽的刀具可能会导致刀具夹头受到冲击而损坏

	EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
	50199	-	.2362		6.000	6.0	65	12	0.30	-	-
	50200	-	.2362		6.000	6.0	65	12	0.50	-	-
	50201	-	.2362		6.000	6.0	65	12	0.75	-	-
	50202	-	.2362		6.000	6.0	65	12	1.00	-	-
	50203	-	.2362		6.000	6.0	65	12	1.50	-	-
	50204	-	.2362		6.000	6.0	65	19	0.30	-	-
	50205	-	.2362		6.000	6.0	65	19	0.50	-	-
	50206	-	.2362		6.000	6.0	65	19	1.00	-	-
	50490	-	.2500	1/4"	6.350	1/4"	2"	3/8"	.015"	-	-
NEW	50614	-	.2500	1/4"	6.350	1/4"	2"	1/2"	.010"	-	-
NEW	50616	-	.2500	1/4"	6.350	1/4"	2"	1/2"	.015"	-	-
NEW	50618	-	.2500	1/4"	6.350	1/4"	2"	1/2"	.020"	-	-
	50207	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"	-	-
	50208	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"	-	-
NEW	50620	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"	-	-
	50209	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"	-	-
	50210	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.060"	-	-
	50211	-	.2500	1/4"	6.350	1/4"	4"	3/8"	.015"	1-1/4"	.230"
NEW	50622	-	.3125	5/16"	7.937	5/16"	2"	7/16"	.010"	-	-
NEW	50624	-	.3125	5/16"	7.937	5/16"	2"	7/16"	.015"	-	-
	50492	-	.3125	5/16"	7.937	5/16"	2"	7/16"	.020"	-	-
NEW	50626	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.010"	-	-
NEW	50628	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.015"	-	-
	50212	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.020"	-	-
	50213	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.030"	-	-
NEW	50630	-	.3150		8.000	8.0	50	12	0.50	-	-
	50214	-	.3150		8.000	8.0	65	22	0.50	-	-
	50356	-	.3150		8.000	8.0	65	22	0.75	-	-
	50215	-	.3150		8.000	8.0	65	22	1.00	-	-
	50357	-	.3150		8.000	8.0	65	22	1.50	-	-
	50358	-	.3150		8.000	8.0	65	22	2.00	-	-
NEW	50632	-	.3750	3/8"	9.525	3/8"	2"	1/2"	.010"	-	-
	50494	-	.3750	3/8"	9.525	3/8"	2"	1/2"	.020"	-	-
NEW	50634	-	.3750	3/8"	9.525	3/8"	2"	1/2"	.030"	-	-
	50216	-	.3750	3/8"	9.525	3/8"	2-1/2"	1"	.010"	-	-
	50217	-	.3750	3/8"	9.525	3/8"	2-1/2"	1"	.020"	-	-
	50218	-	.3750	3/8"	9.525	3/8"	2-1/2"	1"	.030"	-	-
	50219	-	.3750	3/8"	9.525	3/8"	2-1/2"	1"	.060"	-	-
NEW	50636	-	.3750	3/8"	9.525	3/8"	2-1/2"	1"	.090"	-	-
	50220	-	.3750	3/8"	9.525	3/8"	4"	1/2"	.020"	1-7/8"	.350"

GARR TOOL®

† *Metric equivalents are for reference only*

	EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
NEW	50638	-	.3937		10.000	10.0	50	14	0.50	-	-
	50221	-	.3937		10.000	10.0	70	22	0.50	-	-
	50359	-	.3937		10.000	10.0	70	22	0.75	-	-
	50360	-	.3937		10.000	10.0	70	22	1.00	-	-
	50361	-	.3937		10.000	10.0	70	22	1.50	-	-
	50362	-	.3937		10.000	10.0	70	22	2.00	-	-
	50363	50369	.4724		12.000	12.0	75	26	0.30	-	-
	50364	50370	.4724		12.000	12.0	75	26	0.50	-	-
	50365	50366	.4724		12.000	12.0	75	26	0.75	-	-
	50367	50371	.4724		12.000	12.0	75	26	1.00	-	-
	50372	50373	.4724		12.000	12.0	75	26	1.50	-	-
	50374	50375	.4724		12.000	12.0	75	26	2.00	-	-
	50222	50270	.4724		12.000	12.0	75	32	0.50	-	-
	50223	50271	.4724		12.000	12.0	75	32	1.00	-	-
	50566	-	.4724		12.000	12.0	100	42	0.30	-	-
	50568	-	.4724		12.000	12.0	100	42	0.50	-	-
	50570	-	.4724		12.000	12.0	100	42	1.00	-	-
	50572	-	.4724		12.000	12.0	100	42	2.00	-	-
	50574	-	.4724		12.000	12.0	100	42	3.00	-	-
NEW	50640	50497	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.010"	-	-
	50496	50497	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.020"	-	-
NEW	50642	50497	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.030"	-	-
NEW	50644	50497	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.125"	-	-
	50379	50380	.5000	1/2"	12.700	1/2"	3"	1"	.010"	-	-
	50381	50382	.5000	1/2"	12.700	1/2"	3"	1"	.020"	-	-
	50383	50384	.5000	1/2"	12.700	1/2"	3"	1"	.030"	-	-
	50385	50386	.5000	1/2"	12.700	1/2"	3"	1"	.060"	-	-
	50224	50272	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.010"	-	-
	50225	50273	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.020"	-	-
	50226	50274	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	-	-
	50227	50275	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.060"	-	-
	50228	50276	.5000	1/2"	12.700	1/2"	4"	5/8"	.020"	2-1/4"	.470"
	50580	50581	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.010"	-	-
	50582	50583	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.020"	-	-
	50584	50585	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.030"	-	-
	50586	50587	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.040"	-	-
	50588	50589	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.060"	-	-
	50590	50591	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.120"	-	-
	50594	-	.5000	1/2"	12.700	1/2"	6"	5/8"	.020"	4-1/8"	.470"
	50596	-	.5000	1/2"	12.700	1/2"	6"	5/8"	.030"	4-1/8"	.470"
	50498	50499	.6250	5/8"	15.875	5/8"	3"	3/4"	.020"	-	-
	50500	50501	.6250	5/8"	15.875	5/8"	3"	3/4"	.030"	-	-
	50502	50503	.6250	5/8"	15.875	5/8"	3"	3/4"	.060"	-	-
	50229	50277	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.020"	-	-
	50534	50535	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"	-	-
	50536	50537	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.040"	-	-
	50538	50539	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.060"	-	-
	50230	50278	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.120"	-	-
	50504	-	.6299		16.000	16.0	75	19	0.50	-	-
	50506	-	.6299		16.000	16.0	75	19	1.00	-	-
	50508	-	.6299		16.000	16.0	75	19	3.00	-	-
	50231	50279	.6299		16.000	16.0	88	32	0.50	-	-
	50409	50410	.6299		16.000	16.0	88	32	0.75	-	-
	50411	50412	.6299		16.000	16.0	88	32	1.00	-	-
	50413	50414	.6299		16.000	16.0	88	32	1.50	-	-
	50415	50416	.6299		16.000	16.0	88	32	2.00	-	-
	50417	50418	.6299		16.000	16.0	88	32	3.00	-	-

continued →

Series V4R *(continued)*

19,050mm - 25,400mm
(.7500" - 1.000")

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
50510	50511	.7500	3/4"	19.050	3/4"	4"	1"	.020"	-	-
50512	50513	.7500	3/4"	19.050	3/4"	4"	1"	.030"	-	-
50514	50515	.7500	3/4"	19.050	3/4"	4"	1"	.060"	-	-
50516	50517	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.020"	-	-
50232	50280	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"	-	-
50518	50519	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"	-	-
50520	50521	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.120"	-	-
50522	50523	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.020"	-	-
50524	50525	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.030"	-	-
50526	50527	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.060"	-	-
50528	-	.7874		20.000	20.0	100	38	1.00	-	-
50530	-	.7874		20.000	20.0	100	38	2.00	-	-
50532	-	.7874		20.000	20.0	100	38	3.00	-	-
50233	50281	1.000	1"	25.400	1"	4"	1-1/2"	.030"	-	-
50234	50282	1.000	1"	25.400	1"	5"	2-1/8"	.030"	-	-

V4-S series in 1018 material

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000mm –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

Z=4 | VAR

TECH PAGES 282-283

HIGH PERFORMANCE END MILLS

Variable Helix End Mill - Ball End - AlCrN-based Coated

Fräser mit Einer Variablen Spiralgeometrie - Vollradius - AlCrN-Basierende Beschichtet

Fresa de Hélice Variable - Cabeza Esférica - Recubrimiento Basado en AlCrN

Fraise Avec un Angle Hélice Variable - Hemispherique - Revêtement à base de AlCrN

Fresa ad Elica Variabile - Sferica - Rivestimento in Base AlCrN

不等螺旋铣刀 - 球头 - 涂层铝氮化铬

Solid submicron grain carbide end mill - center cutting
Helix geometry varies over length of flutes
Variable flute design helps with chip evacuation in slots and pockets
Variable rake aids in chip formation
Recommended for titanium, inconel, and steels (< 40 Rc)
PCT (Polish Carbide Treatment) enhances tool life by 20%
Minimizes burr on part
12mm and larger tools offered with weldon flat
Smaller diameters can be modified with a flat within 48 hours
V4 Square End - page 155
V4 Corner Radius - page 156
The combination of an extended flute length with a weldon flat may cause the flute washout to reach inside some end mill holders

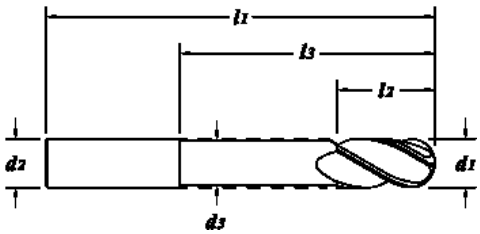
Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Empfohlen für Titan, Inconel, und Stahl (<40 Hrc)
PCT (Polish Carbide Treatment, Treatment zum Polieren Hartmetall) steigert die Stanzeit bis zu +20%
Reduziert die Gratbildung am Werkstück
Spiralgeometrie variiert auf der gesamten Schneidenlänge
Variable Spannutgeometrie für eine bessere Spanabfuhr beim Schlitz- und Taschenfräsen
Variabler Winkel für bessere Spangeometrie
Ab Durchmesser 12 mm und grösser können die Werkzeuge mit Weldon-Spannfläche angeboten werden
Kleinere Durchmesser können innerhalb 48 Stunden mit einer Spannfläche geliefert werden
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
V4 Schaftfräser ohne Eckenradius - Seite 155
V4 Schaftfräser mit Eckenradius - Seite 156
Die Kombination einer verlängerten Spannutlänge mit einer Weldon-Spannfläche kann die Ursache bei Spannut-Auswaschungen bei einigen Fräserspannfuttern sein

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Recomendado para Titanio, Inconel, y Acero (<40 Hrc)
PCT (Polish Carbide Treatment, Tratamiento de pulido) aumenta la vida de la hta. hasta un 20%
Minimiza las rebabas en la pieza
La geometría de la hélice varía a lo largo de la longitud del labio
El diseño del labio variable contribuye a la evacuación de la viruta en ranuras y cajeras
El labio con filo variable que contribuye a la buena formación de la viruta
Htas de Ø12 mm. y mayores disponibles con mango Weldon
Es posible añadir un plano Weldon en diámetros menores en 48 horas
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
V4 Fresa de vástago sin radio de cantos - Página 155
V4 Fresa de vástago con radio de cantos - Página 156
La combinación de una gran longitud de corte con un mango con plano Weldon puede causar que del labio alcance el interior de algunos portaherramientas

Fraises carbure submicrograin - coupe au centre
Recommandé pour les titane, inconel, et aciers (<40 Hrc)
PCT (le traitement pour polir le carbure) améliore la durée de vie de l'outil de 20 %
Minimise les bavures sur la pièce
La géométrie de l'hélice varie sur la longueur de l'hélice
Variable des dents de coupe est d'aider à l'évacuation des copeaux de fentes et des poches
Un pas variable améliore la formation des copeaux
Des outils d'un dia. 12 mm ou supérieur sont disponibles avec une queue weldon
Les petits diamètres peuvent être modifies avec une queue Weldon endéans 48 heures
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
V4 Rayon de Coin - Page 155
V4 Hemispherique - Page 156
La combinaison d'une grande longueur de goujure avec une queue Weldon peut causer des vibrations qui peuvent se prolonger dans le mandrin

Fresa sub-micrograno metallo duro - taglio al centro
Raccomandata per lavorazioni su Titanio, Inconel, e Acciai (<40 Hrc)
PCT (Polish Carbide Treatment, trattamento di lucidatura del metallo duro) incrementa la vita utensile del 20%
Non crea bava sul pezzo
La geometria dell'elica varia sulla lunghezza del tagliente
La geometria variabile del tagliente aiuta l'evacuazione del truciolo negli svuotamenti e nelle cave
L'angolo di spoglia variabile aiuta la formazione del truciolo
Dal diametro 12 mm in su disponibili con attacco weldon
Diametri più piccoli possono essere modificati in 48 ore
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
VRX Toriche - Pagina 155
VRX Sferiche - Pagina 156
Estendere la lunghezza del tagliente su un attacco Weldon può causare la rottura dell'utensile in alcune applicazioni

超细晶粒整体硬质合金立铣刀 - 中心切削
推荐的加工钛，铬镍铁合金，钢铁（<40HRC）
PCT（硬质合金抛光处理）使刀具寿命提高20%
使工件的毛刺最少
整个切削刀的螺旋角可变
切削刀螺旋角可变的设计有利于碎屑在加工槽和型腔中排出
可变的前角有利于碎屑的形成
12mm及以上刀具提供侧固槽位设计
可在48小时内生产小直径的平底刀具
半径允差 +0,000 /–0,025 (+.000"–.001")
V4圆弧角 - 155页
V4球头 - 156页
过长的刀刃结合侧固槽的刀具可能会导致刀具夹头受到冲击而损坏



EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	l_3 Reach Length	d_3 Neck Diameter
50252	-	.2362		6.000	6.0	65	12	-	-
50253	-	.2362		6.000	6.0	65	19	-	-
50560	-	.2500	1/4"	6.350	1/4"	2"	3/8"	-	-
50254	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	-	-
NEW 50474	-	.2500	1/4"	6.350	1/4"	4"	3/8"	1-1/8"	.235"
50561	-	.3125	5/16"	7.937	5/16"	2"	7/16"	-	-
50255	-	.3125	5/16"	7.937	5/16"	2-1/2"	13/16"	-	-
50256	-	.3150		8.000	8.0	65	22	-	-
50562	-	.3750	3/8"	9.525	3/8"	2"	1/2"	-	-
50257	-	.3750	3/8"	9.525	3/8"	2-1/2"	1"	-	-
NEW 50476	-	.3750	3/8"	9.525	3/8"	4"	1/2"	1-1/8"	.355"
50258	-	.3937		10.000	10.0	70	22	-	-
50470	-	.4724		12.000	12.0	75	26	-	-
50259	50291	.4724		12.000	12.0	75	32	-	-
50576	-	.4724		12.000	12.0	100	42	-	-
50563	-	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	-	-
50472	50473	.5000	1/2"	12.700	1/2"	3"	1"	-	-
50260	50292	.5000	1/2"	12.700	1/2"	3"	1-1/4"	-	-
50592	50593	.5000	1/2"	12.700	1/2"	4"	1-5/8"	-	-
50261	50293	.5000	1/2"	12.700	1/2"	4"	2-1/8"	-	-
NEW 50478	-	.5000	1/2"	12.700	1/2"	4"	5/8"	2-1/4"	.475"
50598	-	.5000	1/2"	12.700	1/2"	6"	5/8"	4-1/8"	.470"
50262	50294	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	-	-
50263	50295	.6299		16.000	16.0	88	32	-	-
50264	50296	.7500	3/4"	19.050	3/4"	4"	1-1/2"	-	-
50265	50297	.7874		20.000	20.0	100	38	-	-
50266	50298	1.000	1"	25.400	1"	4"	1-1/2"	-	-

70
35
0
MATERIAL HARDNESS (Rc)

Series V5

6,000mm - 7,938mm
(.2362" - .3125")

Z=5 | VAR

TECH PAGES 284-285

TOLERANCES

d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
r	+0,025 –0,025mm (+.001" –.001")

Variable Helix End Mill - AlCrN Coated

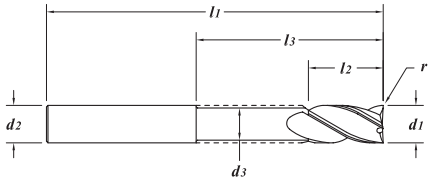
Fräser mit Einer Variablen Spiralgeometrie - AlCrN-Beschichtet

Fresa de Hélice Variable - Recubrimiento de AlCrN

Fraise Avec un Angle Hélice Variable - Revêtement AlCrN

Fresa ad Elica Variabile - Rivestimento in AlCrN

不等螺旋铣刀 - 涂层铝氮化铬



MATERIAL HARDNESS (Rc)
70
35
0

Solid submicron grain carbide end mill - center cutting
Effective for trochoidal milling
Recommended for titanium, inconel, and steels (< 40Rc)
Minimizes burr on part
Helix geometry varies over length of flutes
Staggered flutes to control harmonics
Variable flute design helps with chip evacuation in slots and pockets
Variable rake aids in chip formation
PCT (Polish Carbide Treatment) enhances tool life by 20%
12mm and larger tools offered with weldon flat
Smaller diameters can be modified with a flat within 48 hours
The combination of an extended flute length with a weldon flat may cause the flute washout to reach inside some end mill holders

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Geeignet für trochoidales Fräsen
Empfohlen für Titan, Inconel, und Rostfreie Stahl (<40HRc)
PCT (Polish Carbide Treatment) steigert die Werkzeugstandzeit um 20 %
Reduziert die Gratbildung am Werkstück
Spiralgeometrie variiert auf der gesamten Schneidenlänge
Spezielles Spannut-Design um Vibrationen zu reduzieren
Variable Spannutgeometrie für eine bessere Spanabfuhr beim Schlitz- und Taschenfräsen
Variabler Winkel für bessere Spangeometrie
12 mm oder größere Durchmesser auch mit Weldon Schaft erhältlich
Kleinere Durchmesser können innerhalb 48 Stunden mit einer Spannfläche geliefert werden
Die Kombination einer verlängerten Spannutlänge mit einer Weldon-Spannfläche kann die Ursachebei Spannut-Auswaschungen bei einigen Fräserspannfuttern sein

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Adecuada para el fresado trocoidal
Recomendado para Titanio, Inconel, y Acero (<40 Rc)
PCT (Polish Carbide Treatment, Tratamiento de pulido) aumenta la vida de la hta. hasta un 20%
Minimiza las rebabas en la pieza
La geometría de la hélice varía a lo largo de la longitud del labio
Labios escalonados para control de vibraciones
El diseño del labio variable contribuye a la evacuación de la viruta en ranuras y cajeras
El labio con filo variable que contribuye a la buena formación de la viruta
Htas de Ø12 mm. y mayores disponibles con mango Weldon
Es posible añadir un plano Weldon en diámetros menores en 48 horas
La combinación de una gran longitud de corte con un mango con plano Weldon puede causar que del labio alcance el interior de algunos portaherramientas

Fraises carbure submicrograin - coupe au centre
Optimal pour un fraisage trochoidal
Recommandé pour les titane, inconel, et aciers (<40 HRC)
PCT (le traitement pour polir le carbure) améliore la durée de vie de l'outil de 20 %
Minimise les bavures sur la pièce
La géométrie de l'hélice varie sur la longueur de l'hélice
Une denture variable réduit les vibrations
Un design à denture variable améliore l'évacuation des copeaux lors des opérations de rainurage et d'usinage de poches
Un pas variable améliore la formation des copeaux
Des outils d'un dia. 12 mm ou supérieur sont disponibles avec une queue weldon
Les petits diamètres peuvent être modifies avec une queue Weldon endéans 48 heures
La combinaison d'une grande longueur de goujure avec une queue Weldon peut causer des vibrations qui peuvent se prolonger dans le mandrin

Fresa sub-micrograno metallo duro - taglio al centro
Efficace per fresatura trocoidale
Raccomandata per lavorazioni su Titanio, Inconel, e Acciai (<40 Hrc)
PCT (Polish Carbide Treatment, trattamento di lucidatura del metallo duro) incrementa la vita utensile del 20%
Non crea bava sul pezzo
La geometria dell'elica varia sulla lunghezza del tagliente
Taglienti sfalsati per controllare le forze
La geometria variabile del tagliente aiuta l'evacuazione del truciolo negli svuotamenti e nelle cave
L'angolo di spoglia variabile aiuta la formazione del truciolo
Dal diametro 12 mm in su disponibili con attacco weldon
Diametri più piccoli possono essere modificati in 48 ore
Estendere la lunghezza del tagliente su un attacco Weldon può causare la rottura dell'utensile in alcune applicazioni

超细晶粒整体硬质合金立铣刀 - 中心切削
有效的摆线铣削
推荐的加工钛，铬镍铁合金，钢铁 (<40HRC)
PCT (硬质合金抛光处理) 使刀具寿命提高20%
使工件的毛刺最少
整个切削刃的螺旋角可变
交错式的刀刃能抑制噪音
切削刃螺旋角可变的设计有利于碎屑在加工槽和型腔中排出
可变的前角有利于碎屑的形成
12mm及以上刀具提供侧固槽位设计
可在48小时内生产小直径的平底刀具
过长的刀刃结合侧固槽的刀具可能会导致刀具夹头受到冲击而损坏

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
50000	-	.2362		6.000	6.0	50	13	-	-	-
50001	-	.2362		6.000	6.0	50	13	0.5	-	-
50002	-	.2362		6.000	6.0	65	19	-	-	-
50003	-	.2362		6.000	6.0	65	19	0.5	-	-
50004	-	.2362		6.000	6.0	65	13	-	20	5.4
50005	-	.2362		6.000	6.0	65	13	0.5	20	5.4
50006	-	.2362		6.000	6.0	65	13	1.0	20	5.4
50007	-	.2500	1/4"	6.350	1/4"	2"	3/8"	-	-	-
51000	-	.2500	1/4"	6.350	1/4"	2"	3/8"	.010"	-	-
50008	-	.2500	1/4"	6.350	1/4"	2"	3/8"	.015"	-	-
51001	-	.2500	1/4"	6.350	1/4"	2"	3/8"	.020"	-	-
50009	-	.2500	1/4"	6.350	1/4"	2"	3/8"	.030"	-	-
51002	-	.2500	1/4"	6.350	1/4"	2"	1/2"	-	-	-
51003	-	.2500	1/4"	6.350	1/4"	2"	1/2"	.010"	-	-
51004	-	.2500	1/4"	6.350	1/4"	2"	1/2"	.015"	-	-
50011	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	-	-	-
51005	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"	-	-
50012	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"	-	-
50013	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"	-	-
50014	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"	-	-
50015	-	.2500	1/4"	6.350	1/4"	3"	1"	-	-	-
51006	-	.2500	1/4"	6.350	1/4"	3"	1"	.010"	-	-
51007	-	.2500	1/4"	6.350	1/4"	3"	1"	.015"	-	-
50016	-	.2500	1/4"	6.350	1/4"	3"	1"	.030"	-	-
50017	-	.2500	1/4"	6.350	1/4"	4"	1/2"	.015"	1-1/4"	.235"
51008	-	.2500	1/4"	6.350	1/4"	4"	1/2"	.015"	2-1/8"	.235"
50023	-	.2756		7.000	8.0	65	22	0.2	-	-
50018	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	-	-	-
50019	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.015"	-	-
50021	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.020"	-	-
50022	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.030"	-	-

† *Metric equivalents are for reference only*

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal		d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
50024	-	.3150		8.000	8.0	65	22	0.2	-	-
50025	-	.3150		8.000	8.0	65	22	0.5	-	-
50026	-	.3150		8.000	8.0	75	19	-	26	7.2
50027	-	.3150		8.000	8.0	75	19	0.5	26	7.2
50028	-	.3150		8.000	8.0	75	19	1.0	26	7.2
50029	-	.3750	3/8"	9.525	3/8"	2"	1/2"	-	-	-
50031	-	.3750	3/8"	9.525	3/8"	2"	1/2"	.015"	-	-
50032	-	.3750	3/8"	9.525	3/8"	2"	1/2"	.020"	-	-
50033	-	.3750	3/8"	9.525	3/8"	2"	1/2"	.030"	-	-
50034	-	.3750	3/8"	9.525	3/8"	2-1/2"	1"	-	-	-
50035	-	.3750	3/8"	9.525	3/8"	2-1/2"	1"	.015"	-	-
50036	-	.3750	3/8"	9.525	3/8"	2-1/2"	1"	.020"	-	-
50037	-	.3750	3/8"	9.525	3/8"	2-1/2"	1"	.030"	-	-
50038	-	.3750	3/8"	9.525	3/8"	2-1/2"	1"	.060"	-	-
51009	-	.3750	3/8"	9.525	3/8"	3"	1-1/4"	.015"	-	-
51010	-	.3750	3/8"	9.525	3/8"	4"	1-1/2"	.015"	-	-
50039	-	.3750	3/8"	9.525	3/8"	4"	2"	-	-	-
50041	-	.3750	3/8"	9.525	3/8"	4"	2"	.030"	-	-
51011	-	.3750	3/8"	9.525	3/8"	4"	1/2"	.015"	1-1/8"	.355"
50042	-	.3750	3/8"	9.525	3/8"	4"	7/8"	.015"	1-7/8"	.355"
51012	-	.3750	3/8"	9.525	3/8"	6"	1/2"	.015"	2-1/8"	.355"
51013	-	.3750	3/8"	9.525	3/8"	6"	1/2"	.015"	3-1/8"	.355"
51014	-	.3750	3/8"	9.525	3/8"	6"	1/2"	.015"	4-1/8"	.355"
50043	-	.3937		10.000	10.0	70	22	-	-	-
51015	-	.3937		10.000	10.0	70	22	0.30	-	-
50044	-	.3937		10.000	10.0	70	22	0.50	-	-
51016	-	.3937		10.000	10.0	70	22	0.75	-	-
51017	-	.3937		10.000	10.0	70	22	1.00	-	-
50045	-	.3937		10.000	10.0	75	22	-	32	9.0
50046	-	.3937		10.000	10.0	75	22	0.50	32	9.0
51018	-	.3937		10.000	10.0	75	22	0.75	32	9.0
50047	-	.3937		10.000	10.0	75	22	1.00	32	9.0
51019	-	.4724		12.000	12.0	65	19	-	-	-
51020	-	.4724		12.000	12.0	65	19	0.50	-	-
50484	50485	.4724		12.000	12.0	75	26	-	-	-
51021	-	.4724		12.000	12.0	75	26	0.30	-	-
50486	50487	.4724		12.000	12.0	75	26	0.50	-	-
51022	-	.4724		12.000	12.0	75	26	0.75	-	-
51023	-	.4724		12.000	12.0	75	26	1.00	-	-
50112	-	.4724		12.000	12.0	75	26	2.00	-	-
50048	50299	.4724		12.000	12.0	75	32	-	-	-
51024	-	.4724		12.000	12.0	75	32	0.30	-	-
50049	50300	.4724		12.000	12.0	75	32	0.50	-	-
51025	-	.4724		12.000	12.0	75	32	0.75	-	-
51026	-	.4724		12.000	12.0	75	32	1.00	-	-
51027	-	.4724		12.000	12.0	100	38	-	-	-
51028	-	.4724		12.000	12.0	100	38	0.50	-	-
50423	-	.4724		12.000	12.0	100	42	-	-	-
50425	-	.4724		12.000	12.0	100	42	0.30	-	-
50427	-	.4724		12.000	12.0	100	42	0.50	-	-
50429	-	.4724		12.000	12.0	100	42	1.00	-	-
50431	-	.4724		12.000	12.0	100	42	2.00	-	-
51029	-	.4724		12.000	12.0	100	52	-	-	-
51030	-	.4724		12.000	12.0	100	52	0.50	-	-
50051	50301	.4724		12.000	12.0	100	26	-	38	10.8
50052	50302	.4724		12.000	12.0	100	26	0.50	38	10.8
50053	50303	.4724		12.000	12.0	100	26	1.00	38	10.8

continued →

Series V5 *(continued)*

12,700mm
(.5000")

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
50054	50304	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	-	-	-
50106	50305	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.010"	-	-
50055	50306	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.020"	-	-
50107	50307	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.030"	-	-
50056	50308	.5000	1/2"	12.700	1/2"	3"	1"	-	-	-
50108	50309	.5000	1/2"	12.700	1/2"	3"	1"	.010"	-	-
50057	50310	.5000	1/2"	12.700	1/2"	3"	1"	.020"	-	-
50109	50311	.5000	1/2"	12.700	1/2"	3"	1"	.030"	-	-
50058	50312	.5000	1/2"	12.700	1/2"	3"	1-1/4"	-	-	-
50111	50313	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.010"	-	-
50059	50314	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.015"	-	-
50061	50315	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.020"	-	-
50062	50316	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	-	-
50063	50317	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.045"	-	-
50064	50318	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.060"	-	-
50065	50319	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.090"	-	-
50433	50435	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.010"	-	-
51031	-	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.015"	-	-
51032	-	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.030"	-	-
50436	50437	.5000	1/2"	12.700	1/2"	4"	1-5/8"	-	-	-
50438	50439	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.010"	-	-
50440	50441	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.020"	-	-
50442	50443	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.030"	-	-
50444	50445	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.040"	-	-
50446	50447	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.060"	-	-
50067	50321	.5000	1/2"	12.700	1/2"	4"	2-1/8"	-	-	-
51033	-	.5000	1/2"	12.700	1/2"	4"	2-1/8"	.015"	-	-
50068	50322	.5000	1/2"	12.700	1/2"	4"	2-1/8"	.030"	-	-
51034	-	.5000	1/2"	12.700	1/2"	6"	1"	.030"	-	-
51035	-	.5000	1/2"	12.700	1/2"	6"	3-1/8"	-	-	-
51036	-	.5000	1/2"	12.700	1/2"	6"	3-1/8"	.030"	-	-
51037	-	.5000	1/2"	12.700	1/2"	4"	5/8"	.015"	1-1/2"	.475"
51038	-	.5000	1/2"	12.700	1/2"	4"	5/8"	.015"	2-1/4"	.475"
50066	50320	.5000	1/2"	12.700	1/2"	4"	1-1/4"	.030"	2-1/4"	.475"
51039	-	.5000	1/2"	12.700	1/2"	6"	5/8"	.015"	3-3/8"	.475"
51040	-	.5000	1/2"	12.700	1/2"	6"	5/8"	.015"	4-1/8"	.475"

† *Metric equivalents are for reference only*

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
50069	50323	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	-	-	-
51041	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.020"	-	-
50071	50324	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"	-	-
50072	50325	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.060"	-	-
50401	50402	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.120"	-	-
51042	-	.6250	5/8"	15.875	5/8"	4"	1-5/8"	-	-	-
51043	-	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.030"	-	-
51044	-	.6250	5/8"	15.875	5/8"	4"	2-1/8"	-	-	-
51045	-	.6250	5/8"	15.875	5/8"	4"	2-1/8"	.030"	-	-
51046	-	.6250	5/8"	15.875	5/8"	6"	2-1/2"	.030"	-	-
50403	50404	.6250	5/8"	15.875	5/8"	6"	3-1/8"	.030"	-	-
51047	-	.6250	5/8"	15.875	5/8"	6"	3-1/8"	.060"	-	-
51048	-	.6250	5/8"	15.875	5/8"	6"	3-1/2"	.030"	-	-
51049	-	.6250	5/8"	15.875	5/8"	4"	3/4"	.030"	1-5/8"	.590"
50073	50326	.6250	5/8"	15.875	5/8"	4"	1-1/4"	.030"	2-1/4"	.590"
51050	-	.6250	5/8"	15.875	5/8"	6"	3/4"	.030"	2-3/8"	.590"
51051	-	.6250	5/8"	15.875	5/8"	6"	3/4"	.030"	3-3/8"	.590"
51052	-	.6250	5/8"	15.875	5/8"	6"	3/4"	.030"	4-1/8"	.590"
51053	-	.6299		16.000	16.0	75	19	-	-	-
51054	-	.6299		16.000	16.0	75	19	0.50	-	-
50074	50327	.6299		16.000	16.0	88	32	-	-	-
50075	50328	.6299		16.000	16.0	88	32	0.50	-	-
50420	-	.6299		16.000	16.0	88	32	1.00	-	-
51055	-	.6299		16.000	16.0	88	32	2.00	-	-
50422	-	.6299		16.000	16.0	88	32	3.00	-	-
50424	-	.6299		16.000	16.0	88	32	4.00	-	-
50430	-	.6299		16.000	16.0	100	40	0.50	-	-
50432	-	.6299		16.000	16.0	100	40	1.00	-	-
50434	-	.6299		16.000	16.0	100	40	3.00	-	-
50076	50329	.6299		16.000	16.0	100	32	-	50	14.4
50077	-	.6299		16.000	16.0	100	32	0.50	50	14.4
50426	-	.6299		16.000	16.0	100	32	1.00	50	14.4
51056	-	.6299		16.000	16.0	100	32	2.00	50	14.4
50428	-	.6299		16.000	16.0	100	32	3.00	50	14.4
50078	-	.7087		18.000	18.0	100	32	0.75	-	-

continued →

Series V5 *(continued)*

19,050mm
(.7500")

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
50079	50332	.7500	3/4"	19.050	3/4"	3"	7/8"	-	-	-
51103	-	.7500	3/4"	19.050	3/4"	3"	7/8"	.015"	-	-
50081	50333	.7500	3/4"	19.050	3/4"	3"	7/8"	.030"	-	-
51057	-	.7500	3/4"	19.050	3/4"	3"	7/8"	.060"	-	-
51105	-	.7500	3/4"	19.050	3/4"	3"	7/8"	.120"	-	-
51107	-	.7500	3/4"	19.050	3/4"	4"	1-1/4"	.015"	-	-
51058	-	.7500	3/4"	19.050	3/4"	4"	1-1/4"	.030"	-	-
51109	-	.7500	3/4"	19.050	3/4"	4"	1-1/4"	.060"	-	-
50082	50334	.7500	3/4"	19.050	3/4"	4"	1-1/2"	-	-	-
51111	-	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.015"	-	-
50083	50335	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"	-	-
50084	50336	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"	-	-
51059	-	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.078"	-	-
50085	50337	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.120"	-	-
51113	-	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.190"	-	-
51060	-	.7500	3/4"	19.050	3/4"	4"	1-5/8"	-	-	-
51115	-	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.015"	-	-
51061	-	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.030"	-	-
51119	-	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.060"	-	-
51062	-	.7500	3/4"	19.050	3/4"	4"	1-3/4"	-	-	-
51121	-	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.015"	-	-
51063	-	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.030"	-	-
51123	-	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.060"	-	-
50086	50338	.7500	3/4"	19.050	3/4"	5"	2-1/8"	-	-	-
51125	-	.7500	3/4"	19.050	3/4"	5"	2-1/8"	.015"	-	-
50087	50339	.7500	3/4"	19.050	3/4"	5"	2-1/8"	.030"	-	-
51064	-	.7500	3/4"	19.050	3/4"	5"	2-1/8"	.060"	-	-
51065	-	.7500	3/4"	19.050	3/4"	5"	2-1/8"	.120"	-	-
51127	-	.7500	3/4"	19.050	3/4"	5"	2-1/4"	.015"	-	-
51066	-	.7500	3/4"	19.050	3/4"	5"	2-1/4"	.030"	-	-
51129	-	.7500	3/4"	19.050	3/4"	5"	2-1/4"	.060"	-	-
51131	-	.7500	3/4"	19.050	3/4"	5"	2-1/2"	.015"	-	-
51067	-	.7500	3/4"	19.050	3/4"	5"	2-1/2"	.030"	-	-
51133	-	.7500	3/4"	19.050	3/4"	5"	2-1/2"	.060"	-	-
51135	-	.7500	3/4"	19.050	3/4"	5"	2-3/4"	.015"	-	-
51068	-	.7500	3/4"	19.050	3/4"	5"	2-3/4"	.030"	-	-
51137	-	.7500	3/4"	19.050	3/4"	5"	2-3/4"	.060"	-	-
50089	50341	.7500	3/4"	19.050	3/4"	6"	3-1/4"	-	-	-
51139	-	.7500	3/4"	19.050	3/4"	6"	3-1/4"	.015"	-	-
50091	50342	.7500	3/4"	19.050	3/4"	6"	3-1/4"	.030"	-	-
51141	-	.7500	3/4"	19.050	3/4"	6"	3-1/4"	.060"	-	-
51143	-	.7500	3/4"	19.050	3/4"	7"	4-1/4"	.015"	-	-
51145	-	.7500	3/4"	19.050	3/4"	7"	4-1/4"	.030"	-	-
51147	-	.7500	3/4"	19.050	3/4"	7"	4-1/4"	.060"	-	-
51069	-	.7500	3/4"	19.050	3/4"	4"	1"	.030"	2"	.705"
51070	-	.7500	3/4"	19.050	3/4"	5"	1"	.030"	2-1/2"	.705"
50088	50340	.7500	3/4"	19.050	3/4"	5-1/2"	1-1/2"	.030"	3-1/4"	.705"
51071	-	.7500	3/4"	19.050	3/4"	6"	1"	.030"	4-1/8"	.705"

† *Metric equivalents are for reference only*

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal		d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
50092	50343	.7874		20.000	20.0	100	38	-	-	-
51072	-	.7874		20.000	20.0	100	38	0.50	-	-
50093	50344	.7874		20.000	20.0	100	38	0.75	-	-
51073	-	.7874		20.000	20.0	100	38	1.00	-	-
51074	-	.7874		20.000	20.0	100	38	1.50	-	-
51075	-	.7874		20.000	20.0	100	38	2.00	-	-
51076	-	.7874		20.000	20.0	100	38	3.00	-	-
51077	-	.9843		25.000	25.0	100	38	-	-	-
51078	-	.9843		25.000	25.0	100	38	0.50	-	-
51079	-	.9843		25.000	25.0	100	38	0.75	-	-
51080	-	.9843		25.000	25.0	100	38	1.50	-	-
51081	-	.9843		25.000	25.0	100	38	3.00	-	-
50094	-	1.000	1"	25.400	1"	4"	1-1/4"	-	-	-
50095	-	1.000	1"	25.400	1"	4"	1-1/4"	.030"	-	-
51082	-	1.000	1"	25.400	1"	4"	1-1/4"	.120"	-	-
-	50348	1.000	1"	25.400	1"	4"	1-1/2"	-	-	-
-	50349	1.000	1"	25.400	1"	4"	1-1/2"	.030"	-	-
-	50350	1.000	1"	25.400	1"	4"	1-1/2"	.060"	-	-
51083	-	1.000	1"	25.400	1"	4"	1-1/2"	.120"	-	-
50097	-	1.000	1"	25.400	1"	4"	1-3/4"	-	-	-
50098	-	1.000	1"	25.400	1"	4"	1-3/4"	.030"	-	-
50099	-	1.000	1"	25.400	1"	4"	1-3/4"	.060"	-	-
51084	-	1.000	1"	25.400	1"	4"	1-3/4"	.120"	-	-
51085	-	1.000	1"	25.400	1"	4-1/2"	2"	.030"	-	-
51086	-	1.000	1"	25.400	1"	4-1/2"	2"	.060"	-	-
51087	-	1.000	1"	25.400	1"	4-1/2"	2"	.120"	-	-
51088	-	1.000	1"	25.400	1"	4-1/2"	2"	.250"	-	-
51089	-	1.000	1"	25.400	1"	5"	2-1/2"	.030"	-	-
51090	-	1.000	1"	25.400	1"	5"	2-5/8"	.030"	-	-
50104	50354	1.000	1"	25.400	1"	6"	3-1/4"	-	-	-
50105	-	1.000	1"	25.400	1"	6"	3-1/4"	.030"	-	-
51091	-	1.000	1"	25.400	1"	6"	3-3/8"	.060"	-	-
51092	-	1.000	1"	25.400	1"	7"	4-1/4"	.030"	-	-
51093	-	1.000	1"	25.400	1"	7"	4-1/4"	.060"	-	-
51094	-	1.000	1"	25.400	1"	5"	1-1/4"	.030"	2-5/8"	.940"
50101	-	1.000	1"	25.400	1"	5-1/2"	1-3/4"	.030"	3-1/4"	.940"
50102	50352	1.000	1"	25.400	1"	5-1/2"	1-3/4"	.060"	3-1/4"	.940"
50103	-	1.000	1"	25.400	1"	5-1/2"	1-3/4"	.120"	3-1/4"	.940"
51095	-	1.000	1"	25.400	1"	6"	1-1/4"	.030"	3-3/8"	.940"
51096	-	1.000	1"	25.400	1"	7"	1-1/4"	.030"	4-1/4"	.940"

Series V5 CHIP SPLITTER

12,000mm - 15,875mm
(.4724" - .6250")

Z=5 | VAR

TECH PAGES 284-285

TOLERANCES	
d_1	+.000" –.002" (+.000mm –.050mm)
d_2	h6
r	+.001" –.001" (+.025 –.025mm)

Variable Helix End Mill - AlCrN Coated

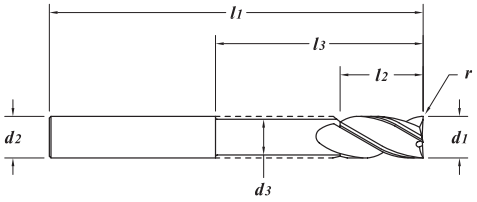
Fräser mit Einer Variablen Spiralgeometrie - AlCrN-Beschichtet

Fresa de Hélice Variable - Recubrimiento de AlCrN

Fraise Avec un Angle Hélice Variable - Revêtement AlCrN

Fresa ad Elica Variabile - Rivestimento in AlCrN

不等螺旋铣刀 - 涂层铝氮化铬



70

35

0

MATERIAL HARDNESS (Rc)

Solid submicron grain carbide end mill - center cutting
Chip splitter to help break long chips
Effective for trochoidal milling
Recommended for titanium, inconel, and steels (< 40Rc)
Staggered flutes to control harmonics
Variable flute design helps with chip evacuation in slots and pockets
PCT (Polish Carbide Treatment) enhances tool life

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Zu helfen, lange chips zu brechen
Geeignet für trochoidales Fräsen
Empfohlen für Titan, Inconel, und Rostfreie Stahl (<40HRc)
PCT (Polish Carbide Treatment) steigert die Werkzeugstandzeit
Spezielles Spannut-Design um Vibrationen zu reduzieren
Variable Spannutgeometrie für eine bessere Spanabfuhr beim Schlitz- und Taschenfräsen

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Chip splitter para ayudar a romper chips largas
Adecuada para el fresado trocoidal
Recomendado para Titanio, Inconel, y Acero (<40 Rc)
PCT (Polish Carbide Treatment, Tratamiento de pulido) aumenta la vida de la hta.
Labios escalonados para control de vibraciones
El diseño del labio variable contribuye a la evacuación de la viruta en ranuras y cajeras

Fraises carbure submicrograin - coupe au centre
Pour aider à briser de longues puce
Optimal pour un fraisage trochoidal
Recommandé pour les titane, inconel, et aciers (<40 HRC)
PCT (le traitement pour polir le carbure) améliore la durée de vie de l'outil
Une denture variable réduit les vibrations
Un design à denture variable améliore l'évacuation des copeaux lors des opérations de rainurage et d'usinage de poches

Fresa sub-micrograno metallo duro - taglio al centro
Per aiutare a rompere le lunghe chips
Efficace per fresatura trocoidale
Raccomandata per lavorazioni su Titanio, Inconel, e Acciai (<40 Hrc)
PCT (Polish Carbide Treatment, trattamento di lucidatura del metallo duro) incrementa la vita utensile
Taglienti sfalsati per controllare le forze
La geometria variabile del tagliente aiuta l'evacuazione del truciolo negli svuotamenti e nelle cave

超细晶粒整体硬质合金立铣刀 - 中心切削
芯片分路器有助於打破長芯片
有效的擺線銑削
推荐的加工钛，铬镍铁合金，钢铁 (<40HRC)
PCT (硬质合金抛光处理) 使刀具寿命提高
交错式的刀刃能抑制噪音
切削刃螺旋角可变的设计有利于碎屑在加工槽和型腔中排出

	EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal		d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
NEW	50801	-	.4724		12.000	12.0	100	42	0.30	-	-
	50800	-	.4724		12.000	12.0	100	42	1.00	-	-
NEW	50803	-	.5000	1/2"	12.700	1/2"	3"	1"	-	-	-
NEW	50807	-	.5000	1/2"	12.700	1/2"	3"	1"	.015"	-	-
	50805	-	.5000	1/2"	12.700	1/2"	3"	1"	.020"	-	-
NEW	50809	-	.5000	1/2"	12.700	1/2"	3"	1"	.030"	-	-
NEW	50811	-	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.015"	-	-
	50810	-	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.020"	-	-
	50815	-	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	-	-
NEW	50813	-	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.060"	-	-
	50820	-	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.090"	-	-
	50825	-	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.010"	-	-
NEW	50817	-	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.030"	-	-
	50830	-	.5000	1/2"	12.700	1/2"	4"	1-5/8"	-	-	-
NEW	50819	-	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.030"	-	-
	50835	-	.5000	1/2"	12.700	1/2"	4"	2-1/8"	-	-	-
NEW	50821	-	.5000	1/2"	12.700	1/2"	4"	5/8"	.015"	1-1/2"	.475"
NEW	50823	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.020"	-	-
	50840	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"	-	-
NEW	50827	-	.6250	5/8"	15.875	5/8"	4"	1-5/8"	-	-	-
NEW	50829	-	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.030"	-	-
	50845	-	.6250	5/8"	15.875	5/8"	4"	2-1/8"	.030"	-	-
NEW	50831	-	.6250	5/8"	15.875	5/8"	6"	2-1/2"	.030"	-	-

† Metric equivalents are for reference only

	EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
NEW	50833	-	.6299		16.000	16.0	100	40	0.50	-	-
NEW	50837	-	.6299		16.000	16.0	100	40	1.00	-	-
NEW	50839	-	.7500	3/4"	19.050	3/4"	3"	7/8"	-	-	-
NEW	50841	-	.7500	3/4"	19.050	3/4"	3"	7/8"	.030"	-	-
NEW	50843	-	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"	-	-
NEW	50847	-	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"	-	-
	50850	-	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.120"	-	-
NEW	50849	-	.7500	3/4"	19.050	3/4"	4"	1-3/4"	-	-	-
NEW	50851	-	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.030"	-	-
	50855	-	.7500	3/4"	19.050	3/4"	5"	2-1/8"	.030"	-	-
NEW	50853	-	.7500	3/4"	19.050	3/4"	5"	2-1/4"	.030"	-	-
NEW	50857	-	.7500	3/4"	19.050	3/4"	5"	2-1/2"	.030"	-	-
NEW	50859	-	.7500	3/4"	19.050	3/4"	5"	2-3/4"	.015"	-	-
NEW	50861	-	.7500	3/4"	19.050	3/4"	5"	2-3/4"	.030"	-	-
NEW	50863	-	.7500	3/4"	19.050	3/4"	6"	3-1/4"	-	-	-
	50860	-	.7500	3/4"	19.050	3/4"	6"	3-1/4"	.030"	-	-
NEW	50867	-	.7500	3/4"	19.050	3/4"	7"	4-1/4"	.015"	-	-
NEW	50869	-	1.000	1"	25.400	1"	5"	2-1/2"	.030"	-	-
NEW	50871	-	1.000	1"	25.400	1"	5"	2-5/8"	.030"	-	-
NEW	50873	-	1.000	1"	25.400	1"	6"	3-1/4"	.030"	-	-

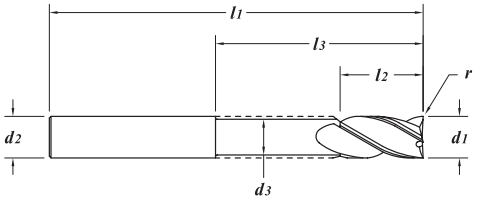
Series VRX-6

6,000mm - 12,000mm
(.2362" - .4724")

Z=6 | 41° | TECH PAGES 274-275

TOLERANCES	
d_1	+.000" –.002" (+.000mm –.050mm)
d_2	h6
r	+.001" –.001" (+.025 –.025mm)

Square End, Corner Radius - AlTiN Coated
Ohne Eckenradius, Eckenradius - AlTiN-Beschichtet
Extremo Sin Radio, Ángulo Redondeado - Recubrimiento de AlTiN
Extrémité Carré, Rayon de Coin - Revêtement AlTiN
Piatte, Torico - Rivestimento in AlTiN
平头，圆角半径 - AlTiN 涂层



Solid submicron grain carbide end mill - center cutting
Reduces vibration for more aggresive machining resulting in less cycle times and greater productivity
Recommended for stainless steel, inconel, titanium and tool steels
Staggered flute geometry
Effective for trochoidal / dynamic milling

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Reduziert Vibrationen für eine aggressivere Bearbeitung, um Bearbeitungszeit zu reduzieren und eine grössere Produktivität zu erzielen
Empfohlen für Rostfreien Stahl, Inconel, Titan, und Werkzeugstähle
Geeignet für trochoidales / dynamisch Fräsen

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Reduce las vibraciones hasta en los más agresivos mecanizados, obteniéndose bajos tiempos de ciclo y mayor productividad
Recomendado para acero inoxidable, inconel, acero laminado en frío, hierro de fundición y aceros herramienta
Adecuada para el fresado trocoidal / dinámica

Fraises carbure submicrograin - coupe au centre
Reduction des vibrations pour un fraisage plus agressif resultant des temps de cycles plus court et une meilleure productivite
Recommandee pour les aciers inoxydables, Inconel, aciers a outils, aciers forges, titane, fonts et aciers a outils
Optimal pour un fraisage trochoidal / dynamique

Fresa sub-micrograno metallo duro - taglio al centro
Riduzioni delle vibrazioni per lavorazioni aggressive per ridurre il tempo ciclo ed aumentare la produttività
Raccomandata per lavorazioni su inox, inconel, titanio e acciai per utensili
Efficace per fresatura trocoidale / dinamico

超细晶粒整体硬质合金立铣刀 - 中心切削
适合更高速度，更大进给的加工，可以减少振动，减少加工时间，提高生产效率
推荐加工不锈钢、铬镍铁耐热耐蚀合金、含磷材质、钛钢 和工具钢
有效的摆线 / 動態 銑削

MATERIAL HARDNESS (Rc)
70
35
0

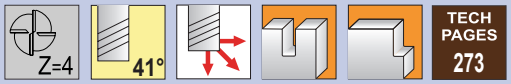
	EDP#	d_1 † Decimal	d_1 † Diameter	d_1 † Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
NEW	60101	.2362		6.000	6.0	65	20	-	-	-
NEW	60103	.2362		6.000	6.0	65	20	0.50	-	-
	60100	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	-	-	-
	60102	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"	-	-
	60104	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"	-	-
NEW	60105	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"	-	-
	60106	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"	-	-
	60162	.3150		8.000	8.0	65	22	-	-	-
NEW	60107	.3150		8.000	8.0	65	22	0.50	-	-
NEW	60109	.3750	3/8"	9.525	3/8"	2"	1/2"	-	-	-
NEW	60111	.3750	3/8"	9.525	3/8"	2"	1/2"	.020"	-	-
	60108	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	-	-	-
	60110	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.015"	-	-
NEW	60113	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.020"	-	-
	60112	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"	-	-
	60114	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.060"	-	-
NEW	60184	.3750	3/8"	9.525	3/8"	3"	1-1/4"	.030"	-	-
	60164	.3937		10.000	10.0	70	22	-	-	-
NEW	60115	.3937		10.000	10.0	70	22	0.50	-	-
NEW	60117	.3937		10.000	10.0	70	22	1.00	-	-
NEW	60119	.4724		12.000	12.0	65	20	-	-	-
NEW	60121	.4724		12.000	12.0	65	20	0.50	-	-
NEW	60123	.4724		12.000	12.0	75	26	-	-	-
NEW	60125	.4724		12.000	12.0	75	26	0.75	-	-
	60166	.4724		12.000	12.0	75	32	-	-	-
NEW	60127	.4724		12.000	12.0	75	32	0.50	-	-
NEW	60129	.4724		12.000	12.0	75	32	1.00	-	-

† Metric equivalents are for reference only

	EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
NEW	60131	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	-	-	-
NEW	60157	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.015"	-	-
NEW	60133	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.020"	-	-
NEW	60159	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.030"	-	-
NEW	60186	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.125"	-	-
NEW	60135	.5000	1/2"	12.700	1/2"	3"	1"	-	-	-
	60116	.5000	1/2"	12.700	1/2"	3"	1-1/4"	-	-	-
	60118	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.010"	-	-
	60120	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.015"	-	-
	60122	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.020"	-	-
	60124	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	-	-
	60126	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.060"	-	-
	60128	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.125"	-	-
NEW	60137	.5000	1/2"	12.700	1/2"	4"	1-1/2"	-	-	-
NEW	60139	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.030"	-	-
	60130	.5000	1/2"	12.700	1/2"	4"	2-1/8"	-	-	-
	60132	.5000	1/2"	12.700	1/2"	4"	2-1/8"	.010"	-	-
	60134	.5000	1/2"	12.700	1/2"	4"	2-1/8"	.020"	-	-
	60136	.5000	1/2"	12.700	1/2"	4"	2-1/8"	.030"	-	-
NEW	60141	.6250	5/8"	15.875	5/8"	3"	3/4"	-	-	-
NEW	60143	.6250	5/8"	15.875	5/8"	3"	3/4"	.020"	-	-
	60138	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	-	-	-
	60140	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.015"	-	-
NEW	60145	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.020"	-	-
	60142	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"	-	-
	60144	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.060"	-	-
	60146	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.125"	-	-
	60148	.6250	5/8"	15.875	5/8"	4"	1-5/8"	-	-	-
	60150	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.030"	-	-
	60168	.6299		16.000	16.0	88	32	-	-	-
NEW	60170	.6299		16.000	16.0	88	32	0.50	-	-
NEW	60174	.6299		16.000	16.0	100	40	-	-	-
NEW	60176	.6299		16.000	16.0	100	40	0.50	-	-
NEW	60180	.6299		16.000	16.0	100	32	-	50	14.5
NEW	60182	.6299		16.000	16.0	100	32	0.50	50	14.5
	60152	.7500	3/4"	19.050	3/4"	4"	1-1/2"	-	-	-
	60154	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.015"	-	-
NEW	60147	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.020"	-	-
	60156	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"	-	-
	60158	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"	-	-
	60160	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.125"	-	-
NEW	60149	.7500	3/4"	19.050	3/4"	6"	3"	-	-	-
NEW	60151	.7500	3/4"	19.050	3/4"	6"	3"	.030"	-	-
NEW	60153	1.000	1"	25.400	1"	6"	3"	.030"	-	-
NEW	60155	1.000	1"	25.400	1"	7"	1-1/4"	-	4-1/8"	.980"

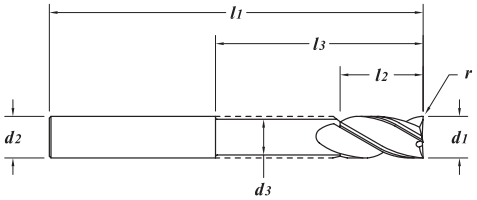
Series VRX

1,500mm - 3,000mm
(.0591" - .1181")



TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
r	+0,025 –0,025mm (+.001" –.001")

Square End, Corner Radius, Ball End - AlTiN Coated
Ohne Eckenradius, Eckenradius, Vollradius - AlTiN-Beschichtet
Extremo Sin Radio, Ángulo Redondeado, Cabeza Esférica - Recubrimiento de AlTiN
Extrémité Carré, Rayon de Coin, Hemispherique - Revêtement AlTiN
Piatte, Torico, Sferica - Rivestimento in AlTiN
平头，圆角半径，球头 - AlTiN 涂层



MATERIAL HARDNESS (Rc)
70
35
0

Solid submicron grain carbide end mill - center cutting
The standard in high performance milling
Reduces vibration for more aggresive machining resulting in less cycle times and greater productivity
Recommended for stainless steel, inconel, pH materials, titanium and tool steels
Variable flute geometry
The combination of an extended flute length with a weldon flat may cause the flute washout to reach inside some end mill holders

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Der Standard im Hochleistungsfräsen
Reduziert Vibrationen für eine aggressivere Bearbeitung, um Bearbeitungszeit zu reduzieren und eine grössere Produktivität zu erzielen
Empfohlen für Rostfreien Stahl, Inconel, Pulvermetalle, Titan, und Werkzeugstähle
Variable Spannut-Geometrie
Die Kombination einer verlängerten Spannutlänge mit einer Weldon-Spannfläche kann die Ursachebei Spannut-Auswaschungen bei einigen Fräserspannfuttern sein

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
El estándar en fresado de alto rendimiento
Reduce las vibraciones hasta en los más agresivos mecanizados, obteniéndose bajos tiempos de ciclo y mayor productividad
Recomendado para acero inoxidable, inconel, materiales pH, acero laminado en frío, hierro de fundición y aceros herramienta
Geometria variable de ranura de viruta
La combinación de una gran longitud de corte con un mango con plano Weldon puede causar que del labio alcance el interior de algunos portaherramientas

Fraises carbure submicrograin - coupe au centre
La norme en fraisage haute performance
Reduction des vibrations pour un fraisage plus agressif resultant des temps de cycles plus court et une meilleure productivite
Recommandee pour les aciers inoxydables, Inconel, inoxs pH, aciers a outils, aciers forges, titane, fonts et aciers a outils
Géometrie variable de la helix
La combinaison d'une grande longueur de goujure avec une queue Weldon peut causer des vibrations qui peuvent se prolonger dans le mandrin

Fresa sub-micrograno metallo duro - taglio al centro
Lo standard in fresatura ad alte prestazioni
Riduzioni delle vibrazioni per lavorazioni aggressive per ridurre il tempo ciclo ed aumentare la produttività
Raccomandata per lavorazioni su inox, inconel, titanio e acciai per utensili
Geometria ad elica variabile
Estendere la lunghezza del tagliente su un attacco Weldon può causare la rottura dell'utensile in alcune applicazioni

超细晶粒整体硬质合金立铣刀 - 中心切削
高性能铣削的标準
适合更高速度，更大进给的加工，可以减少振动，减少加工时间，提高生产效率
推荐加工不锈钢、铬镍铁耐热耐蚀合金、含磷材质、钛钢 和工具钢
不等分刃设计
过长的刀刃结合侧固槽的刀具可能会导致刀具夹头受到冲击而损坏

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
61084	-	.0591		1.500	3.0	38	3.0	-	-	-
61086	-	.0591		1.500	3.0	38	3.0	0.20	-	-
61088	-	.0591		1.500	3.0	38	3.0	BALL	-	-
61090	-	.0591		1.500	3.0	38	6.0	-	-	-
61092	-	.0591		1.500	3.0	38	6.0	0.20	-	-
61094	-	.0591		1.500	3.0	38	6.0	BALL	-	-
61096	-	.0625	1/16"	1.588	1/8"	1-1/2"	1/8"	-	-	-
61098	-	.0625	1/16"	1.588	1/8"	1-1/2"	1/8"	.010"	-	-
61100	-	.0625	1/16"	1.588	1/8"	1-1/2"	1/8"	BALL	-	-
61102	-	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"	-	-	-
61104	-	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"	.010"	-	-
61106	-	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"	BALL	-	-
61108	-	.0787		2.000	3.0	38	4.0	-	-	-
61110	-	.0787		2.000	3.0	38	4.0	0.20	-	-
61112	-	.0787		2.000	3.0	38	4.0	BALL	-	-
61114	-	.0787		2.000	3.0	38	8.0	-	-	-
61116	-	.0787		2.000	3.0	38	8.0	0.20	-	-
61118	-	.0787		2.000	3.0	38	8.0	BALL	-	-
61120	-	.0938	3/32"	2.383	1/8"	1-1/2"	3/16"	-	-	-
61122	-	.0938	3/32"	2.383	1/8"	1-1/2"	3/16"	.010"	-	-
61124	-	.0938	3/32"	2.383	1/8"	1-1/2"	3/16"	BALL	-	-
61126	-	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	-	-	-
61128	-	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	.010"	-	-
61130	-	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	BALL	-	-
61877	-	.1181		3.000	3.0	38	8	-	-	-
27420	-	.1181		3.000	3.0	50	8	0.20	-	-
61132	-	.1181		3.000	3.0	50	8	0.30	-	-
27425	-	.1181		3.000	3.0	50	8	0.50	-	-
61134	-	.1181		3.000	3.0	50	8	BALL	-	-
61887	-	.1181		3.000	3.0	38	12	-	-	-
27430	-	.1181		3.000	3.0	50	12	0.20	-	-
61136	-	.1181		3.000	3.0	50	12	0.30	-	-
27435	-	.1181		3.000	3.0	50	12	0.50	-	-
61138	-	.1181		3.000	3.0	50	12	BALL	-	-

† *Metric equivalents are for reference only*

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
61917	-	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	-	-	-
27440	-	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	.010"	-	-
61140	-	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	.015"	-	-
61073	-	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	.030"	-	-
61142	-	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"	BALL	-	-
61144	-	.1250	1/8"	3.175	1/8"	1-1/2"	3/8"	-	-	-
61146	-	.1250	1/8"	3.175	1/8"	1-1/2"	3/8"	.010"	-	-
61148	-	.1250	1/8"	3.175	1/8"	1-1/2"	3/8"	.015"	-	-
61074	-	.1250	1/8"	3.175	1/8"	1-1/2"	3/8"	.030"	-	-
61149	-	.1250	1/8"	3.175	1/8"	1-1/2"	3/8"	BALL	-	-
61927	-	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	-	-	-
27450	-	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.010"	-	-
61150	-	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.015"	-	-
27455	-	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.020"	-	-
61075	-	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.030"	-	-
61152	-	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	BALL	-	-
61154	-	.1562	5/32"	3.967	3/16"	2"	5/16"	-	-	-
27460	-	.1562	5/32"	3.967	3/16"	2"	5/16"	.010"	-	-
61156	-	.1562	5/32"	3.967	3/16"	2"	5/16"	.015"	-	-
61076	-	.1562	5/32"	3.967	3/16"	2"	5/16"	.030"	-	-
61077	-	.1562	5/32"	3.967	3/16"	2"	5/16"	BALL	-	-
61158	-	.1562	5/32"	3.967	3/16"	2"	1/2"	-	-	-
27470	-	.1562	5/32"	3.967	3/16"	2"	1/2"	.010"	-	-
61160	-	.1562	5/32"	3.967	3/16"	2"	1/2"	.015"	-	-
61078	-	.1562	5/32"	3.967	3/16"	2"	1/2"	.030"	-	-
61079	-	.1562	5/32"	3.967	3/16"	2"	1/2"	BALL	-	-
61162	-	.1575		4.000	6.0	50	8	-	-	-
27480	-	.1575		4.000	6.0	50	8	0.30	-	-
61164	-	.1575		4.000	6.0	50	8	0.50	-	-
28470	-	.1575		4.000	6.0	50	8	BALL	-	-
61977	-	.1575		4.000	6.0	50	12	-	-	-
27490	-	.1575		4.000	6.0	50	12	0.30	-	-
27495	-	.1575		4.000	6.0	50	12	0.50	-	-
28480	-	.1575		4.000	6.0	50	12	BALL	-	-
61166	-	.1575		4.000	6.0	65	19	-	-	-
61168	-	.1575		4.000	6.0	65	19	0.30	-	-
62007	-	.1875	3/16"	4.763	3/16"	2"	5/16"	-	-	-
27500	-	.1875	3/16"	4.763	3/16"	2"	5/16"	.010"	-	-
61170	-	.1875	3/16"	4.763	3/16"	2"	5/16"	.015"	-	-
61172	-	.1875	3/16"	4.763	3/16"	2"	5/16"	.020"	-	-
28490	-	.1875	3/16"	4.763	3/16"	2"	5/16"	BALL	-	-
61174	-	.1875	3/16"	4.763	3/16"	2"	7/16"	-	-	-
61176	-	.1875	3/16"	4.763	3/16"	2"	7/16"	.010"	-	-
61178	-	.1875	3/16"	4.763	3/16"	2"	7/16"	.015"	-	-
62017	-	.1875	3/16"	4.763	3/16"	2"	9/16"	-	-	-
27520	-	.1875	3/16"	4.763	3/16"	2"	9/16"	.010"	-	-
61180	-	.1875	3/16"	4.763	3/16"	2"	9/16"	.015"	-	-
27521	-	.1875	3/16"	4.763	3/16"	2"	9/16"	.020"	-	-
61182	-	.1875	3/16"	4.763	3/16"	2"	9/16"	.030"	-	-
28500	-	.1875	3/16"	4.763	3/16"	2"	9/16"	BALL	-	-
61184	-	.1875	3/16"	4.763	3/16"	3"	1"	.010"	-	-
61186	-	.1875	3/16"	4.763	3/16"	3"	1-1/4"	.010"	-	-
63100	-	.1875	3/16"	4.763	3/16"	4"	5/16"	.010"	-	-
61188	-	.1969		5.000	6.0	50	10	-	-	-
27522	-	.1969		5.000	6.0	50	10	0.30	-	-
61190	-	.1969		5.000	6.0	50	10	0.50	-	-
28510	-	.1969		5.000	6.0	50	10	BALL	-	-

70
35
0
MATERIAL HARDNESS (Rc)

continued →

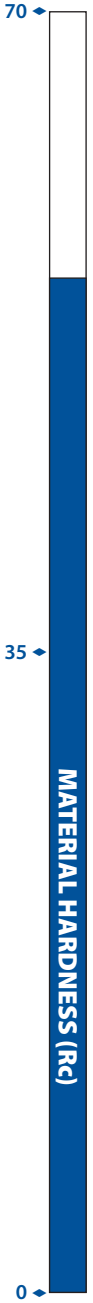
Series VRX *(continued)*

5,000mm - 6,350mm
(.1969" - .2500")

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
62057	-	.1969		5.000	6.0	65	15	-	-	-
27524	-	.1969		5.000	6.0	65	15	0.30	-	-
27526	-	.1969		5.000	6.0	65	15	0.50	-	-
27528	-	.1969		5.000	6.0	65	15	1.00	-	-
28520	-	.1969		5.000	6.0	65	15	BALL	-	-
63110	-	.1969		5.000	6.0	100	10	0.30	-	-
61192	-	.1969		5.000	6.0	100	10	0.30	55	4.70
61194	-	.2188	7/32"	5.558	1/4"	2"	3/8"	-	-	-
61196	-	.2188	7/32"	5.558	1/4"	2"	3/8"	.010"	-	-
27525	-	.2188	7/32"	5.558	1/4"	2"	3/8"	.015"	-	-
61198	-	.2188	7/32"	5.558	1/4"	2"	3/8"	BALL	-	-
61200	-	.2188	7/32"	5.558	1/4"	2-1/2"	3/4"	-	-	-
61202	-	.2188	7/32"	5.558	1/4"	2-1/2"	3/4"	.010"	-	-
27530	-	.2188	7/32"	5.558	1/4"	2-1/2"	3/4"	.015"	-	-
61204	-	.2188	7/32"	5.558	1/4"	2-1/2"	3/4"	.020"	-	-
61206	-	.2188	7/32"	5.558	1/4"	2-1/2"	3/4"	BALL	-	-
61208	-	.2188	7/32"	5.558	1/4"	3"	1-1/4"	.015"	-	-
63120	-	.2188	7/32"	5.558	1/4"	4"	3/8"	.015"	-	-
61210	-	.2188	7/32"	5.558	1/4"	4"	3/8"	.015"	2-1/4"	.205"
62077	-	.2362		6.000	6.0	50	12	-	-	-
27535	-	.2362		6.000	6.0	50	12	0.30	-	-
61212	-	.2362		6.000	6.0	50	12	0.50	-	-
61214	-	.2362		6.000	6.0	50	12	0.75	-	-
28530	-	.2362		6.000	6.0	50	12	BALL	-	-
62087	-	.2362		6.000	6.0	65	19	-	-	-
61216	-	.2362		6.000	6.0	65	19	0.20	-	-
27540	-	.2362		6.000	6.0	65	19	0.30	-	-
27545	-	.2362		6.000	6.0	65	19	0.50	-	-
61218	-	.2362		6.000	6.0	65	19	0.75	-	-
27547	-	.2362		6.000	6.0	65	19	1.00	-	-
27548	-	.2362		6.000	6.0	65	19	1.50	-	-
28540	-	.2362		6.000	6.0	65	19	BALL	-	-
61220	-	.2362		6.000	6.0	75	26	0.30	-	-
61222	-	.2362		6.000	6.0	75	26	0.50	-	-
61224	-	.2362		6.000	6.0	75	38	0.30	-	-
61226	-	.2362		6.000	6.0	75	38	0.50	-	-
63130	-	.2362		6.000	6.0	100	12	0.30	32	5.70
62137	-	.2500	1/4"	6.350	1/4"	2"	3/8"	-	-	-
61228	-	.2500	1/4"	6.350	1/4"	2"	3/8"	.010"	-	-
27560	-	.2500	1/4"	6.350	1/4"	2"	3/8"	.015"	-	-
61230	-	.2500	1/4"	6.350	1/4"	2"	3/8"	.020"	-	-
28570	-	.2500	1/4"	6.350	1/4"	2"	3/8"	BALL	-	-
61232	-	.2500	1/4"	6.350	1/4"	2"	1/2"	-	-	-
61234	-	.2500	1/4"	6.350	1/4"	2"	1/2"	.015"	-	-
62147	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	-	-	-
27570	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"	-	-
27580	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"	-	-
61236	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"	-	-
27581	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"	-	-
61238	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.040"	-	-
27583	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.060"	-	-
28580	-	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	BALL	-	-
61240	-	.2500	1/4"	6.350	1/4"	3"	1"	.015"	-	-

† *Metric equivalents are for reference only*

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
61242	-	.2500	1/4"	6.350	1/4"	3"	1-1/2"	.015"	-	-
61244	-	.2500	1/4"	6.350	1/4"	4"	3/8"	.015"	3/4"	.240"
63140	-	.2500	1/4"	6.350	1/4"	4"	3/8"	.015"	1-1/4"	.240"
61246	-	.2500	1/4"	6.350	1/4"	4"	3/8"	.015"	2-1/8"	.240"
27585	-	.2756		7.000	8.0	50	12	0.30	-	-
27590	-	.2756		7.000	8.0	65	22	0.30	-	-
61248	-	.2812	9/32"	7.142	5/16"	2"	7/16"	-	-	-
27595	-	.2812	9/32"	7.142	5/16"	2"	7/16"	.015"	-	-
61250	-	.2812	9/32"	7.142	5/16"	2-1/2"	13/16"	-	-	-
61252	-	.2812	9/32"	7.142	5/16"	2-1/2"	13/16"	.010"	-	-
27597	-	.2812	9/32"	7.142	5/16"	2-1/2"	13/16"	.015"	-	-
61254	-	.2812	9/32"	7.142	5/16"	2-1/2"	13/16"	.020"	-	-
63150	-	.2812	9/32"	7.142	5/16"	4"	7/16"	.015"	-	-
62207	-	.3125	5/16"	7.938	5/16"	2"	7/16"	-	-	-
61256	-	.3125	5/16"	7.938	5/16"	2"	7/16"	.010"	-	-
61258	-	.3125	5/16"	7.938	5/16"	2"	7/16"	.015"	-	-
27600	-	.3125	5/16"	7.938	5/16"	2"	7/16"	.020"	-	-
61260	-	.3125	5/16"	7.938	5/16"	2"	7/16"	.030"	-	-
28610	-	.3125	5/16"	7.938	5/16"	2"	7/16"	BALL	-	-
62217	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	-	-	-
27610	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.010"	-	-
61262	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.015"	-	-
27620	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.020"	-	-
27622	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.030"	-	-
61264	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.040"	-	-
27624	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.060"	-	-
28620	-	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	BALL	-	-
61266	-	.3125	5/16"	7.938	5/16"	3"	1-1/4"	.015"	-	-
63160	-	.3125	5/16"	7.938	5/16"	4"	7/16"	.020"	1-7/8"	.300"
62257	-	.3150		8.000	8.0	50	12	-	-	-
61268	-	.3150		8.000	8.0	50	12	0.30	-	-
27630	-	.3150		8.000	8.0	50	12	0.50	-	-
61270	-	.3150		8.000	8.0	50	12	0.75	-	-
28630	-	.3150		8.000	8.0	50	12	BALL	-	-
62267	-	.3150		8.000	8.0	65	22	-	-	-
27635	-	.3150		8.000	8.0	65	22	0.30	-	-
27640	-	.3150		8.000	8.0	65	22	0.50	-	-
61272	-	.3150		8.000	8.0	65	22	0.75	-	-
27642	-	.3150		8.000	8.0	65	22	1.00	-	-
27643	-	.3150		8.000	8.0	65	22	1.50	-	-
61274	-	.3150		8.000	8.0	65	22	2.00	-	-
28640	-	.3150		8.000	8.0	65	22	BALL	-	-
61276	-	.3150		8.000	8.0	75	38	0.50	-	-
61278	-	.3150		8.000	8.0	100	50	0.50	-	-
63170	-	.3150		8.000	8.0	100	12	0.50	47	7.60
61280	-	.3438	11/32"	8.733	3/8"	2"	1/2"	-	-	-
27645	-	.3438	11/32"	8.733	3/8"	2"	1/2"	.020"	-	-
61282	-	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"	-	-	-
27650	-	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"	.020"	-	-
61284	-	.3438	11/32"	8.733	3/8"	3"	1-1/4"	.015"	-	-
63180	-	.3438	11/32"	8.733	3/8"	4"	1/2"	.020"	-	-
27655	-	.3543		9.000	10.0	50	14	0.50	-	-
62287	-	.3543		9.000	10.0	65	22	-	-	-
27657	-	.3543		9.000	10.0	65	22	0.50	-	-



continued →

Series VRX *(continued)*

9,525mm - 11,113mm
(.3750" - .4375")

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
62317	-	.3750	3/8"	9.525	3/8"	2"	1/2"	-	-	-
27658	-	.3750	3/8"	9.525	3/8"	2"	1/2"	.010"	-	-
61286	-	.3750	3/8"	9.525	3/8"	2"	1/2"	.015"	-	-
27660	-	.3750	3/8"	9.525	3/8"	2"	1/2"	.020"	-	-
27662	-	.3750	3/8"	9.525	3/8"	2"	1/2"	.030"	-	-
61288	-	.3750	3/8"	9.525	3/8"	2"	1/2"	.060"	-	-
28670	-	.3750	3/8"	9.525	3/8"	2"	1/2"	BALL	-	-
62327	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	-	-	-
27670	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.010"	-	-
61290	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.015"	-	-
27680	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.020"	-	-
27682	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"	-	-
61292	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.040"	-	-
61294	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.050"	-	-
27684	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.060"	-	-
61296	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.094"	-	-
28680	-	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	BALL	-	-
61298	-	.3750	3/8"	9.525	3/8"	3"	1-1/4"	.015"	-	-
61300	-	.3750	3/8"	9.525	3/8"	4"	1-1/2"	.015"	-	-
61302	-	.3750	3/8"	9.525	3/8"	4"	1-1/2"	BALL	-	-
61304	-	.3750	3/8"	9.525	3/8"	4"	2"	.015"	-	-
61306	-	.3750	3/8"	9.525	3/8"	4"	1/2"	.015"	1-1/8"	.360"
63190	-	.3750	3/8"	9.525	3/8"	4"	1/2"	.020"	1-7/8"	.360"
61308	-	.3750	3/8"	9.525	3/8"	4"	1/2"	.015"	2-1/8"	.360"
61310	-	.3750	3/8"	9.525	3/8"	6"	1/2"	.015"	3-1/8"	.360"
61312	-	.3937		10.000	10.0	50	16	-	-	-
27690	-	.3937		10.000	10.0	50	16	0.50	-	-
61314	-	.3937		10.000	10.0	50	16	1.00	-	-
28690	-	.3937		10.000	10.0	50	16	BALL	-	-
62397	-	.3937		10.000	10.0	70	22	-	-	-
27698	-	.3937		10.000	10.0	70	22	0.30	-	-
27700	-	.3937		10.000	10.0	70	22	0.50	-	-
61316	-	.3937		10.000	10.0	70	22	0.75	-	-
27702	-	.3937		10.000	10.0	70	22	1.00	-	-
28700	-	.3937		10.000	10.0	70	22	BALL	-	-
61318	-	.3937		10.000	10.0	70	32	0.50	-	-
61320	-	.3937		10.000	10.0	100	38	0.50	-	-
61322	-	.3937		10.000	10.0	100	50	0.50	-	-
63200	-	.3937		10.000	10.0	100	14	0.50	47	9.50
27705	-	.4375	7/16"	11.113	7/16"	2-1/2"	5/8"	.020"	-	-
28705	-	.4375	7/16"	11.113	7/16"	2-1/2"	5/8"	BALL	-	-
62437	-	.4375	7/16"	11.113	7/16"	2-3/4"	7/8"	-	-	-
27708	-	.4375	7/16"	11.113	7/16"	2-3/4"	7/8"	.010"	-	-
27710	-	.4375	7/16"	11.113	7/16"	2-3/4"	7/8"	.020"	-	-
28710	-	.4375	7/16"	11.113	7/16"	2-3/4"	7/8"	BALL	-	-
63210	-	.4375	7/16"	11.113	7/16"	6"	1"	.020"	-	-

† *Metric equivalents are for reference only*

EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal		d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
62475	-	.4724		12.000	12.0	65	19	-	-	-
27712	-	.4724		12.000	12.0	65	19	0.30	-	-
27715	-	.4724		12.000	12.0	65	19	0.50	-	-
28715	-	.4724		12.000	12.0	65	19	BALL	-	-
61324	-	.4724		12.000	12.0	75	26	-	-	-
61326	-	.4724		12.000	12.0	75	26	0.50	-	-
62485	-	.4724		12.000	12.0	75	32	-	-	-
27718	-	.4724		12.000	12.0	75	32	0.30	-	-
27720	-	.4724		12.000	12.0	75	32	0.50	-	-
61328	-	.4724		12.000	12.0	75	32	0.75	-	-
27722	-	.4724		12.000	12.0	75	32	1.00	-	-
27730	-	.4724		12.000	12.0	75	32	1.50	-	-
27735	-	.4724		12.000	12.0	75	32	2.00	-	-
61330	-	.4724		12.000	12.0	75	32	3.00	-	-
28720	-	.4724		12.000	12.0	75	32	BALL	-	-
61332	-	.4724		12.000	12.0	100	38	-	-	-
61334	-	.4724		12.000	12.0	100	38	0.50	-	-
61336	-	.4724		12.000	12.0	100	42	-	-	-
61338	-	.4724		12.000	12.0	100	42	0.50	-	-
61340	-	.4724		12.000	12.0	100	52	-	-	-
61342	-	.4724		12.000	12.0	100	52	0.50	-	-
63220	-	.4724		12.000	12.0	150	19	0.50	57	11.50
62525	62527	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	-	-	-
27739	27738	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.010"	-	-
61344	-	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.015"	-	-
27741	27740	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.020"	-	-
27743	27742	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.030"	-	-
61346	-	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	.060"	-	-
28751	28750	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"	BALL	-	-
61348	-	.5000	1/2"	12.700	1/2"	3"	1"	-	-	-
61350	-	.5000	1/2"	12.700	1/2"	3"	1"	.015"	-	-
61352	-	.5000	1/2"	12.700	1/2"	3"	1"	.030"	-	-
61354	-	.5000	1/2"	12.700	1/2"	3"	1"	.060"	-	-
61356	-	.5000	1/2"	12.700	1/2"	3"	1"	.125"	-	-
61358	-	.5000	1/2"	12.700	1/2"	3"	1"	BALL	-	-
62535	62537	.5000	1/2"	12.700	1/2"	3"	1-1/4"	-	-	-
27751	27750	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.010"	-	-
61360	-	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.015"	-	-
27761	27760	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.020"	-	-
27763	27762	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	-	-
61362	-	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.040"	-	-
61364	-	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.050"	-	-
27767	27764	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.060"	-	-
61366	-	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.078"	-	-
63398	63399	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.090"	-	-
61368	-	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.094"	-	-
61370	-	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.100"	-	-
27769	27768	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.120"	-	-
61372	-	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.125"	-	-
28761	28760	.5000	1/2"	12.700	1/2"	3"	1-1/4"	BALL	-	-

continued →

Series VRX *(continued)*

12,700mm - 15,875mm
(.5000" - .6250")

Z=4 | 41° | TECH PAGES 273

TOLERANCES

d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
r	+0,025 –0,025mm (+.001" –.001")

Square End, Corner Radius, Ball End - AlTiN Coated

Ohne Eckenradius, Eckenradius, Vollradius - AlTiN-Beschichtet

Extremo Sin Radio, Ángulo Redondeado, Cabeza Esférica - Recubrimiento de AlTiN

Extrémité Carré, Rayon de Coin, Hemispherique - Revêtement AlTiN

Piatte, Torico, Sferica - Rivestimento in AlTiN

平头，圆角半径，球头 - AlTiN 涂层

	EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
	28771	28770	.5000	1/2"	12.700	1/2"	4"	5/8"	BALL	-	-
	61374	-	.5000	1/2"	12.700	1/2"	4"	1-1/2"	-	-	-
	63401	63400	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.010"	-	-
	61376	-	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.015"	-	-
	63411	63410	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.030"	-	-
	63421	63420	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.060"	-	-
NEW	63424	-	.5000	1/2"	12.700	1/2"	4"	1-1/2"	.125"	-	-
	61378	-	.5000	1/2"	12.700	1/2"	4"	1-1/2"	BALL	-	-
	61380	-	.5000	1/2"	12.700	1/2"	4"	1-5/8"	.015"	-	-
	61382	-	.5000	1/2"	12.700	1/2"	4"	1-3/4"	.015"	-	-
	62565	62567	.5000	1/2"	12.700	1/2"	4"	2"	-	-	-
	63431	63430	.5000	1/2"	12.700	1/2"	4"	2"	.010"	-	-
	61384	-	.5000	1/2"	12.700	1/2"	4"	2"	.015"	-	-
	63441	63440	.5000	1/2"	12.700	1/2"	4"	2"	.030"	-	-
	63451	63450	.5000	1/2"	12.700	1/2"	4"	2"	.060"	-	-
	61386	-	.5000	1/2"	12.700	1/2"	4"	2-1/8"	.015"	-	-
	63241	63240	.5000	1/2"	12.700	1/2"	6"	2"	.020"	-	-
	61388	-	.5000	1/2"	12.700	1/2"	6"	2-1/2"	.015"	-	-
	61390	-	.5000	1/2"	12.700	1/2"	6"	2-1/2"	.030"	-	-
	61392	-	.5000	1/2"	12.700	1/2"	6"	3-1/4"	.030"	-	-
	61394	-	.5000	1/2"	12.700	1/2"	4"	5/8"	.015"	1-1/2"	.480"
	61396	-	.5000	1/2"	12.700	1/2"	4"	5/8"	.015"	2-1/4"	.480"
	63231	63230	.5000	1/2"	12.700	1/2"	4"	5/8"	.020"	2-1/4"	.480"
	61398	-	.5000	1/2"	12.700	1/2"	6"	5/8"	.015"	3-3/8"	.480"
	61400	-	.5000	1/2"	12.700	1/2"	6"	5/8"	.015"	4-1/8"	.480"
	27766	27765	.5512		14.000	14.0	75	19	0.50	-	-
	28781	28780	.5512		14.000	14.0	75	19	BALL	-	-
	27771	27770	.5512		14.000	14.0	88	32	0.50	-	-
	28786	28785	.5512		14.000	14.0	88	32	BALL	-	-
	63261	63260	.5512		14.000	14.0	150	50	0.50	-	-
	63251	-	.5512		14.000	14.0	150	19	0.50	57	13.50
	62625	62627	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"	-	-	-
	61402	-	.6250	5/8"	15.875	5/8"	3"	3/4"	-	-	-
	63461	63460	.6250	5/8"	15.875	5/8"	3"	3/4"	.010"	-	-
	61404	-	.6250	5/8"	15.875	5/8"	3"	3/4"	.015"	-	-
	27781	27780	.6250	5/8"	15.875	5/8"	3"	3/4"	.025"	-	-
	61406	-	.6250	5/8"	15.875	5/8"	3"	3/4"	.060"	-	-
	28796	28795	.6250	5/8"	15.875	5/8"	3"	3/4"	BALL	-	-
	62655	62657	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	-	-	-
	27791	27790	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.010"	-	-
	61408	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.015"	-	-
	61410	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.020"	-	-
	27801	27800	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.025"	-	-
	61412	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"	-	-
	61414	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.040"	-	-
	27803	27802	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.060"	-	-
	61416	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.078"	-	-
	61418	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.094"	-	-
	27805	27804	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.120"	-	-
	61420	-	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.125"	-	-
	28801	28800	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	BALL	-	-

MATERIAL HARDNESS (Rc)
70
35
0

† *Metric equivalents are for reference only*

	EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
	61422	-	.6250	5/8"	15.875	5/8"	4"	1-1/2"	-	-	-
	63501	63500	.6250	5/8"	15.875	5/8"	4"	1-1/2"	.010"	-	-
	61424	-	.6250	5/8"	15.875	5/8"	4"	1-1/2"	.015"	-	-
	63511	63510	.6250	5/8"	15.875	5/8"	4"	1-1/2"	.030"	-	-
	63521	63520	.6250	5/8"	15.875	5/8"	4"	1-1/2"	.060"	-	-
	61426	-	.6250	5/8"	15.875	5/8"	4"	1-5/8"	-	-	-
	61428	-	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.015"	-	-
	61430	-	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.030"	-	-
	61432	-	.6250	5/8"	15.875	5/8"	4"	1-5/8"	.060"	-	-
	62675	62677	.6250	5/8"	15.875	5/8"	4"	1-3/4"	-	-	-
	63531	63530	.6250	5/8"	15.875	5/8"	4"	1-3/4"	.010"	-	-
	63541	63540	.6250	5/8"	15.875	5/8"	4"	1-3/4"	.030"	-	-
	63551	63550	.6250	5/8"	15.875	5/8"	4"	1-3/4"	.060"	-	-
	63281	63280	.6250	5/8"	15.875	5/8"	6"	2"	.025"	-	-
NEW	63283	-	.6250	5/8"	15.875	5/8"	6"	2"	.090"	-	-
NEW	63285	-	.6250	5/8"	15.875	5/8"	6"	2"	.125"	-	-
	28806	28805	.6250	5/8"	15.875	5/8"	6"	2"	BALL	-	-
	61434	-	.6250	5/8"	15.875	5/8"	6"	2-1/2"	.030"	-	-
	61436	-	.6250	5/8"	15.875	5/8"	6"	3-1/4"	.030"	-	-
	61438	-	.6250	5/8"	15.875	5/8"	4"	3/4"	.030"	1-5/8"	.600"
	61440	-	.6250	5/8"	15.875	5/8"	6"	3/4"	.030"	2-3/8"	.600"
	63271	63270	.6250	5/8"	15.875	5/8"	6"	3/4"	.025"	3-1/4"	.600"
	61442	-	.6250	5/8"	15.875	5/8"	6"	3/4"	.030"	4-1/8"	.600"
	61444	-	.6299		16.000	16.0	75	19	-	-	-
	27809	-	.6299		16.000	16.0	75	19	0.30	-	-
	27811	27810	.6299		16.000	16.0	75	19	0.50	-	-
	61446	-	.6299		16.000	16.0	75	19	1.00	-	-
	28811	28810	.6299		16.000	16.0	75	19	BALL	-	-
	62715	62717	.6299		16.000	16.0	88	32	-	-	-
	27819	27818	.6299		16.000	16.0	88	32	0.30	-	-
	27821	27820	.6299		16.000	16.0	88	32	0.50	-	-
	61448	-	.6299		16.000	16.0	88	32	0.75	-	-
	27823	27822	.6299		16.000	16.0	88	32	1.00	-	-
	61450	-	.6299		16.000	16.0	88	32	1.50	-	-
	27825	27824	.6299		16.000	16.0	88	32	2.00	-	-
	61452	-	.6299		16.000	16.0	88	32	3.00	-	-
	28821	28820	.6299		16.000	16.0	88	32	BALL	-	-
	63581	63580	.6299		16.000	16.0	100	38	0.30	-	-
	61454	-	.6299		16.000	16.0	100	38	0.50	-	-
	61456	-	.6299		16.000	16.0	100	42	0.50	-	-
	63291	63290	.6299		16.000	16.0	150	19	0.50	82	15.25
	27831	-	.7087		18.000	18.0	75	22	0.80	-	-
	28831	-	.7087		18.000	18.0	75	22	BALL	-	-
	27836	27835	.7087		18.000	18.0	100	38	0.80	-	-
	28836	28835	.7087		18.000	18.0	100	38	BALL	-	-
	63301	-	.7087		18.000	18.0	150	25	0.80	82	17.25

continued →

Series VRX *(continued)*

19,050mm - 20,000mm
(.7500" - .7874")

	EDP# (plain)	EDP# (weldon)	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
	61458	-	.7500	3/4"	19.050	3/4"	3"	7/8"	-	-	-
	27841	27840	.7500	3/4"	19.050	3/4"	3"	7/8"	.030"	-	-
	61460	-	.7500	3/4"	19.050	3/4"	3"	7/8"	.060"	-	-
	28841	28840	.7500	3/4"	19.050	3/4"	3"	7/8"	BALL	-	-
	61462	-	.7500	3/4"	19.050	3/4"	4"	1-1/4"	-	-	-
	61464	-	.7500	3/4"	19.050	3/4"	4"	1-1/4"	.030"	-	-
	62775	62777	.7500	3/4"	19.050	3/4"	4"	1-1/2"	-	-	-
	27851	27850	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.015"	-	-
	27861	27860	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"	-	-
	27865	27864	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"	-	-
	27867	27866	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.120"	-	-
	28861	28860	.7500	3/4"	19.050	3/4"	4"	1-1/2"	BALL	-	-
	61466	-	.7500	3/4"	19.050	3/4"	4"	1-5/8"	-	-	-
	61468	-	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.015"	-	-
	61470	-	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.030"	-	-
	61472	-	.7500	3/4"	19.050	3/4"	4"	1-5/8"	.060"	-	-
	61474	-	.7500	3/4"	19.050	3/4"	4"	1-5/8"	BALL	-	-
	62785	62787	.7500	3/4"	19.050	3/4"	4"	1-3/4"	-	-	-
	63601	63600	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.015"	-	-
	27869	27868	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.030"	-	-
	63611	63610	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.060"	-	-
	61476	-	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.094"	-	-
	63621	63620	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.120"	-	-
	61478	-	.7500	3/4"	19.050	3/4"	4"	1-3/4"	.190"	-	-
	61480	-	.7500	3/4"	19.050	3/4"	4"	1-3/4"	BALL	-	-
	62795	62797	.7500	3/4"	19.050	3/4"	5"	2"	-	-	-
	63631	63630	.7500	3/4"	19.050	3/4"	5"	2"	.015"	-	-
	63311	63310	.7500	3/4"	19.050	3/4"	5"	2"	.030"	-	-
	63641	63640	.7500	3/4"	19.050	3/4"	5"	2"	.060"	-	-
	61482	-	.7500	3/4"	19.050	3/4"	5"	2"	.094"	-	-
	61484	-	.7500	3/4"	19.050	3/4"	5"	2"	.125"	-	-
	28866	28865	.7500	3/4"	19.050	3/4"	5"	2"	BALL	-	-
	61486	-	.7500	3/4"	19.050	3/4"	5"	2-1/2"	-	-	-
	61488	-	.7500	3/4"	19.050	3/4"	5"	2-1/2"	.030"	-	-
	62805	62807	.7500	3/4"	19.050	3/4"	6"	3"	-	-	-
	63651	63650	.7500	3/4"	19.050	3/4"	6"	3"	.015"	-	-
	63661	63660	.7500	3/4"	19.050	3/4"	6"	3"	.030"	-	-
	63671	63670	.7500	3/4"	19.050	3/4"	6"	3"	.060"	-	-
	61490	-	.7500	3/4"	19.050	3/4"	6"	3-1/4"	-	-	-
	61492	-	.7500	3/4"	19.050	3/4"	6"	3-1/4"	.030"	-	-
	61494	-	.7500	3/4"	19.050	3/4"	7"	4-1/4"	-	-	-
	61496	-	.7500	3/4"	19.050	3/4"	7"	4-1/4"	.030"	-	-
	63321	63320	.7500	3/4"	19.050	3/4"	6"	1"	.030"	3-1/4"	.730"
NEW	63323	-	.7500	3/4"	19.050	3/4"	6"	1"	.060"	3-1/4"	.730"
NEW	63325	-	.7500	3/4"	19.050	3/4"	6"	1"	.090"	3-1/4"	.730"
NEW	63327	-	.7500	3/4"	19.050	3/4"	6"	1"	.125"	3-1/4"	.730"
NEW	63329	-	.7500	3/4"	19.050	3/4"	6"	1"	.190"	3-1/4"	.730"
	61498	-	.7874		20.000	20.0	75	22	-	-	-
	61500	-	.7874		20.000	20.0	75	22	0.50	-	-
	27871	27870	.7874		20.000	20.0	75	22	1.00	-	-
	28871	28870	.7874		20.000	20.0	75	22	BALL	-	-
	62825	62827	.7874		20.000	20.0	100	38	-	-	-
	27879	27878	.7874		20.000	20.0	100	38	0.50	-	-
	61502	-	.7874		20.000	20.0	100	38	0.75	-	-
	27881	27880	.7874		20.000	20.0	100	38	1.00	-	-
	27891	27890	.7874		20.000	20.0	100	38	1.50	-	-
	61504	-	.7874		20.000	20.0	100	38	3.00	-	-
	28881	28880	.7874		20.000	20.0	100	38	BALL	-	-

† *Metric equivalents are for reference only*

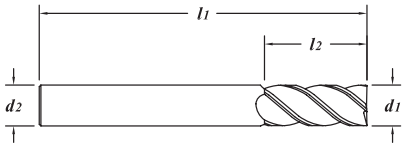
EDP# (plain)	EDP# (weldon)	*d1* † Diameter Decimal		*d1* † Diameter Metric	*d2* Shank Diameter	*l1* Overall Length	*l2* Flute Length	*r* Corner Radius	*l3* Reach Length	*d3* Neck Diameter
61506	-	.7874		20.000	20.0	100	42	0.50	-	-
61508	-	.7874		20.000	20.0	125	52	0.50	-	-
63331	63330	.7874		20.000	20.0	150	25	1.00	82	19.30
27911	-	.8661		22.000	22.0	100	38	1.00	-	-
61510	-	.9843		25.000	25.0	100	26	-	-	-
61512	-	.9843		25.000	25.0	100	26	0.50	-	-
62855	62857	.9843		25.000	25.0	100	38	-	-	-
61514	-	.9843		25.000	25.0	100	38	0.50	-	-
27941	27940	.9843		25.000	25.0	100	38	1.00	-	-
27951	-	.9843		25.000	25.0	100	38	1.50	-	-
61516	-	.9843		25.000	25.0	100	38	3.00	-	-
28901	28900	.9843		25.000	25.0	100	38	BALL	-	-
61518	-	.9843		25.000	25.0	100	42	-	-	-
61520	-	.9843		25.000	25.0	100	42	0.50	-	-
61522	-	.9843		25.000	25.0	125	50	0.50	-	-
63351	63350	.9843		25.000	25.0	125	50	1.00	-	-
63361	63360	.9843		25.000	25.0	150	32	1.00	82	24.40
61524	-	1.000	1"	25.400	1"	4"	1"	-	-	-
27959	27958	1.000	1"	25.400	1"	4"	1"	.015"	-	-
27961	27960	1.000	1"	25.400	1"	4"	1"	.035"	-	-
-	27962	1.000	1"	25.400	1"	4"	1"	.060"	-	-
28911	28910	1.000	1"	25.400	1"	4"	1"	BALL	-	-
62885	62887	1.000	1"	25.400	1"	4"	1-1/2"	-	-	-
27967	27966	1.000	1"	25.400	1"	4"	1-1/2"	.015"	-	-
61526	-	1.000	1"	25.400	1"	4"	1-1/2"	.025"	-	-
27971	27970	1.000	1"	25.400	1"	4"	1-1/2"	.035"	-	-
27981	27980	1.000	1"	25.400	1"	4"	1-1/2"	.060"	-	-
27991	-	1.000	1"	25.400	1"	4"	1-1/2"	.090"	-	-
61528	-	1.000	1"	25.400	1"	4"	1-1/2"	.125"	-	-
61530	-	1.000	1"	25.400	1"	4"	1-1/2"	.190"	-	-
61532	-	1.000	1"	25.400	1"	4"	1-1/2"	.250"	-	-
28916	28915	1.000	1"	25.400	1"	4"	1-1/2"	BALL	-	-
61534	-	1.000	1"	25.400	1"	4"	1-5/8"	.030"	-	-
62895	62897	1.000	1"	25.400	1"	4"	1-3/4"	-	-	-
28001	28000	1.000	1"	25.400	1"	4"	1-3/4"	.015"	-	-
61536	-	1.000	1"	25.400	1"	4"	1-3/4"	.030"	-	-
28011	28012	1.000	1"	25.400	1"	4"	1-3/4"	.060"	-	-
28021	-	1.000	1"	25.400	1"	4"	1-3/4"	.090"	-	-
61538	-	1.000	1"	25.400	1"	4"	1-3/4"	.125"	-	-
61540	-	1.000	1"	25.400	1"	4"	1-3/4"	.190"	-	-
61542	-	1.000	1"	25.400	1"	4"	1-3/4"	.250"	-	-
62905	62907	1.000	1"	25.400	1"	5"	2"	-	-	-
63369	63368	1.000	1"	25.400	1"	5"	2"	.015"	-	-
63371	63370	1.000	1"	25.400	1"	5"	2"	.035"	-	-
63373	63372	1.000	1"	25.400	1"	5"	2"	.060"	-	-
63375	63374	1.000	1"	25.400	1"	5"	2"	.090"	-	-
61544	-	1.000	1"	25.400	1"	5"	2"	.125"	-	-
61546	-	1.000	1"	25.400	1"	5"	2"	.250"	-	-
28931	28930	1.000	1"	25.400	1"	5"	2"	BALL	-	-
61548	-	1.000	1"	25.400	1"	5"	2-1/2"	-	-	-
61550	-	1.000	1"	25.400	1"	5"	2-1/2"	.030"	-	-
62915	62917	1.000	1"	25.400	1"	6"	3"	-	-	-
61552	-	1.000	1"	25.400	1"	6"	3-1/4"	.030"	-	-
61554	-	1.000	1"	25.400	1"	7"	4-1/4"	.030"	-	-
61556	-	1.000	1"	25.400	1"	7"	4-1/4"	.060"	-	-
61558	-	1.000	1"	25.400	1"	6"	1-1/4"	.030"	2-5/8"	.980"
63381	63380	1.000	1"	25.400	1"	6"	1-1/4"	.035"	3-1/4"	.980"
61560	-	1.000	1"	25.400	1"	6"	1-1/4"	.060"	3-1/4"	.980"
61562	-	1.000	1"	25.400	1"	7"	1-1/4"	.030"	4-1/4"	.980"

Series 545MA

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=4 | Z=5 | 45° | TECH PAGES 286-287

Square End - AlTiN Coated
Ohne Eckenradius - AlTiN-Beschichtet
Extremo Sin Radio - Recubrimiento de AlTiN
Extrémité Carré - Revêtement AlTiN
Piatte - Rivestimento in AlTiN
平头 - AlTiN 涂层



Solid submicron grain carbide end mill - center cutting
High performance tool for use in high Rockwell materials
Recommended for inconel, tool steels, and hardened die mold above 45 Rc
Corner Radius - page 181
Ball End - page 182

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Für die Bearbeitung von gehärteten Werkstoffen
Empfohlen für Empfohlen für die Bearbeitung von gehärteten Formenbaustählen, Inconel und Werkzeugstählen über 45 HRc
Schaftfräser mit Eckenradius - Seite 181
Vollradiusfräser - Seite 182

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Para uso con materiales de alta dureza Rockwell
Recomendadas para trabajar troqueles endurecidos, inconel y aceros de herramientas alrededor de 45Rc
Fresa de vástago con radio de cantos - Página 181
Fresadora de radios - Página 182

Fraises carbure submicrograin - coupe au centre
Haute performance outil pour durs material
Recommandee pour utilisation dans aciers a moules a haute durete, inconel, et aciers a outillage au dessus de 45HRC
Rayon de Coin - Page 181
Hemispherique - Page 182

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni da impiegare su materiali temprati
Raccomandata per lavorazioni su acciai temprati, inconel e acciai per utensili superiori a 45 Hrc
Toriche - Pagina 181
Sferiche - Pagina 182

高效超细晶粒整体硬质合金立铣刀 – 中心切削
适合加工洛氏硬度高的材质
推荐加工淬硬模具、铬镍铁耐热耐蚀合金和洛氏硬度45以上的工具钢
圆弧角 - 181页
球头 - 182页

MATERIAL HARDNESS (Rc)
70
35
0

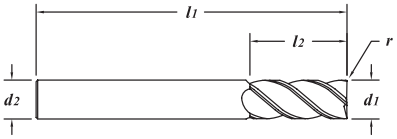
EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	Number of Flutes
21200	.1181		3.000	3.0	38	12	4
21230	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	4
21260	.1575		4.000	6.0	50	12	4
21290	.1875	3/16"	4.763	3/16"	2"	9/16"	4
21320	.1969		5.000	6.0	65	15	4
21350	.2362		6.000	6.0	65	19	4
21380	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	4
21410	.2756		7.000	8.0	65	22	5
21440	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	5
21470	.3150		8.000	8.0	65	22	5
21500	.3543		9.000	10.0	65	22	5
21530	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	5
21560	.3937		10.000	10.0	70	22	5
21620	.4724		12.000	12.0	75	32	5
21660	.5000	1/2"	12.700	1/2"	3"	1-1/4"	5
21710	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	5
21740	.6299		16.000	16.0	88	32	5
21800	.7500	3/4"	19.050	3/4"	4"	1-1/2"	5
21830	.7874		20.000	20.0	100	38	5
21890	.9843		25.000	25.0	100	38	5
21920	1.000	1"	25.400	1"	4"	1-1/2"	5

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
r	+0,025 –0,025mm (+.001" –.001")

Z=4 | Z=5 | 45° | TECH PAGES 286-287

Corner Radius - AlTiN Coated
Eckenradius - AlTiN-Beschichtet
Ángulo Redondeado - Recubrimiento de AlTiN
Rayon de Coin - Revêtement AlTiN
Torico - Rivestimento in AlTiN
圆角半径 - AlTiN 涂层



Solid submicron grain carbide end mill - center cutting
High performance tool for use in high Rockwell materials
Recommended for inconel, tool steels, and hardened die mold above 45 Rc
Square End - page 180
Ball End - page 182

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Für die Bearbeitung von gehärteten Werkstoffen
Empfohlen für Empfohlen für die Bearbeitung von gehärteten Formenbaustählen, Inconel und Werkzeugstählen über 45 HRc
Schaftfräser ohne Eckenradius - Seite 180
Vollradiusfräser - Seite 182

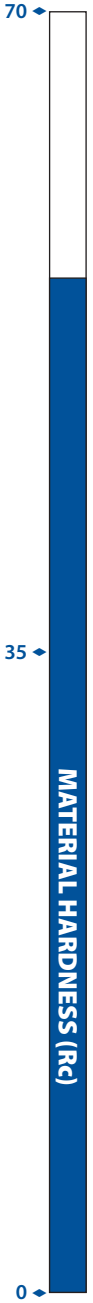
Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Para uso con materiales de alta dureza Rockwell
Recomendadas para trabajar troqueles endurecidos, inconel y aceros de herramientas alrededor de 45Rc
Fresa de vástago sin radio de cantos - Página 180
Fresadora de radios - Página 182

Fraises carbure submicrograin - coupe au centre
Haute performance outil pour durs material
Recommandee pour utilisation dans aciers a moules a haute durete, inconel, et aciers a outillage au dessus de 45HRC
Extrémité carré - Page 180
Hemispherique - Page 182

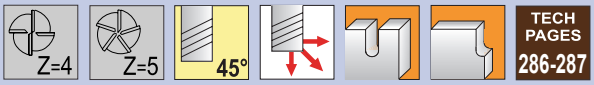
Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni da impiegare su materiali temprati
Raccomandata per lavorazioni su acciai temprati, inconel e acciai per utensili superiori a 45 Hrc
Piatte - Pagina 180
Sferiche - Pagina 182

高效超细晶粒整体硬质合金立铣刀 - 中心切削
适合加工洛氏硬度高的材质
推荐加工淬硬模具、铬镍铁耐热耐蚀合金和洛氏硬度45以上的工具钢
平头 - 180页
球头 - 182页

EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	Number of Flutes
21202	.1181		3.000	3.0	38	12	0.20	4
21212	.1181		3.000	3.0	38	12	0.50	4
21232	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.010"	4
21242	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.020"	4
21262	.1575		4.000	6.0	50	12	0.30	4
21292	.1875	3/16"	4.763	3/16"	2"	9/16"	.010"	4
21302	.1875	3/16"	4.763	3/16"	2"	9/16"	.020"	4
21322	.1969		5.000	6.0	65	15	0.30	4
21342	.2362		6.000	6.0	65	19	0.20	4
21352	.2362		6.000	6.0	65	19	0.50	4
21372	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"	4
21382	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"	4
21392	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"	4
21412	.2756		7.000	8.0	65	22	0.50	5
21432	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.010"	5
21442	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.015"	5
21452	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	.030"	5
21462	.3150		8.000	8.0	65	22	0.20	5
21472	.3150		8.000	8.0	65	22	0.50	5
21502	.3543		9.000	10.0	65	22	0.50	5
21522	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.010"	5
21532	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.015"	5
21542	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"	5
21552	.3937		10.000	10.0	70	22	0.20	5
21562	.3937		10.000	10.0	70	22	0.50	5
21612	.4724		12.000	12.0	75	32	0.50	5
21622	.4724		12.000	12.0	75	32	1.00	5
21642	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.010"	5
21652	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.015"	5
21662	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.030"	5
21672	.5000	1/2"	12.700	1/2"	3"	1-1/4"	.060"	5
21692	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.010"	5
21702	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.015"	5
21712	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"	5
21722	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.060"	5
21732	.6299		16.000	16.0	88	32	0.50	5
21742	.6299		16.000	16.0	88	32	1.00	5
21772	.7087		18.000	18.0	100	38	0.50	5
21802	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.015"	5
21812	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"	5
21822	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"	5
21832	.7874		20.000	20.0	100	38	0.50	5
21922	1.000	1"	25.400	1"	4"	1-1/2"	.015"	5
21932	1.000	1"	25.400	1"	4"	1-1/2"	.030"	5
21942	1.000	1"	25.400	1"	4"	1-1/2"	.060"	5

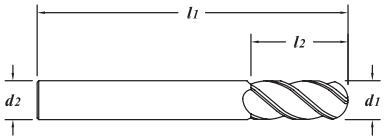


Series 545BA



TOLERANCES	
d_1	+0,000mm –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

Ball End - AlTiN Coated
Vollradius - AlTiN-Beschichtet
Cabeza Esférica - Recubrimiento de AlTiN
Hemispherique - Revêtement AlTiN
Sferica - Rivestimento in AlTiN
球头 - AlTiN 涂层



Solid submicron grain carbide end mill - center cutting
High performance tool for use in high Rockwell materials
Recommended for inconel, tool steels, and hardened die mold above 45 Rc
Square End - page 180
Corner Radius - page 181

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Für die Bearbeitung von gehärteten Werkstoffen
Empfohlen für Empfohlen für die Bearbeitung von gehärteten Formenbaustählen, Inconel und Werkzeugstählen über 45 HRc
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
Schaftfräser ohne Eckenradius - Seite 180
Schaftfräser mit Eckenradius - Seite 181

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Para uso con materiales de alta dureza Rockwell
Recomendadas para trabajar troqueles endurecidos, inconel y aceros de herramientas alrededor de 45Rc
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Fresa de vástago sin radio de cantos - Página 180
Fresa de vástago con radio de cantos - Página 181

Fraises carbure submicrograin - coupe au centre
Haute performance outil pour durs material
Recommandee pour utilisation dans aciers a moules a haute durete, inconel, et aciers a outillage au dessus de 45HRC
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Extrémité carré - Page 180
Rayon de Coin - Page 181

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni da impiegare su materiali temprati
Raccomandata per lavorazioni su acciai temprati, inconel e acciai per utensili superiori a 45 Hrc
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Piatte - Pagina 180
Toriche - Pagina 181

高效超细晶粒整体硬质合金立铣刀 - 中心切削
适合加工洛氏硬度高的材质
推荐加工淬硬模具、铬镍铁耐热耐蚀合金和洛氏硬度45以上的工具钢
半径允差 +0,000 /–0,025 (+.000"–.001")
平头 - 180页
圆弧角 - 181页

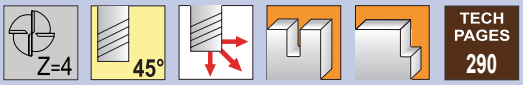
EDP#	d_1 † Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	Number of Flutes
21204	.1181		3.000	3.0	38	12	4
21234	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	4
21264	.1575		4.000	6.0	50	12	4
21294	.1875	3/16"	4.763	3/16"	2"	9/16"	4
21324	.1969		5.000	6.0	65	15	4
21354	.2362		6.000	6.0	65	19	4
21384	.2500	1/4"	6.353	1/4"	2-1/2"	3/4"	4
21414	.2756		7.000	8.0	65	22	5
21444	.3125	5/16"	7.938	5/16"	2-1/2"	13/16"	5
21474	.3150		8.000	8.0	65	22	5
21504	.3543		9.000	10.0	65	22	5
21534	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	5
21564	.3937		10.000	10.0	70	22	5
21624	.4724		12.000	12.0	75	32	5
21664	.5000	1/2"	12.700	1/2"	3"	1-1/4"	5
21714	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	5
21744	.6299		16.000	16.0	88	32	5
21774	.7087		18.000	18.0	100	38	5
21804	.7500	3/4"	19.050	3/4"	4"	1-1/2"	5
21924	1.000	1"	25.400	1"	4"	1-1/2"	5

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+.000" –.002" (+.000mm –.050mm)
d_2	h6
r	+.001" –.001" (+.025 –.025mm)

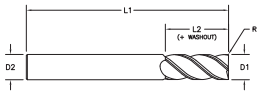
HIGH FEED END MILLS

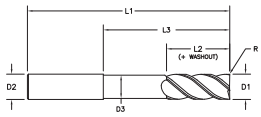
Series H-45

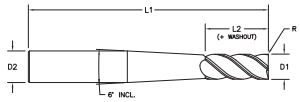


TECH PAGES 290

Corner Radius - AlTiN Coated
Eckenradius - AlTiN-Beschichtet
Ángulo Redondeado - Recubrimiento de AlTiN
Rayon de Coin - Revêtement AlTiN
Torico - Rivestimento in AlTiN
圆角半径 - AlTiN 涂层







Solid submicron grain carbide end mill - center cutting
For light axial / radial depths of cut
Recommended for die mold applications
Rigid work holding, machine stability and part integrity are critical!

* - tool has 3° blend angle to shank
* - tool has reduced diameter shank

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungswerkzeug für die Bearbeitung von Teilen mit kleinen axialen Schnittiefen
Empfohlen für Werkzeuganwendungen
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !

* - Das Werkzeug hat einen konischen Hals von 3°
* - Das Werkzeug hat einen reduzierten Schaftdurchmesser

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Herramienta de alto rendimiento para uso en profundidades axiales ligeras de corte
Recomendado para aplicaciones de Moldes
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales

* - la herramienta tiene un ángulo de mezcla de 3 ° con el vástago
* - la herramienta tiene un vástago de diámetro reducido

Fraises carbure submicrograin - coupe au centre
Outil haute performance pour un usinage avec des petites profondeurs de coupe axiales
Recommandé pour les applications de matrices
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes

* - L'outil a un angle de dégagement de 3° sur la queue
* - L'outil a un diamètre de queue réduit

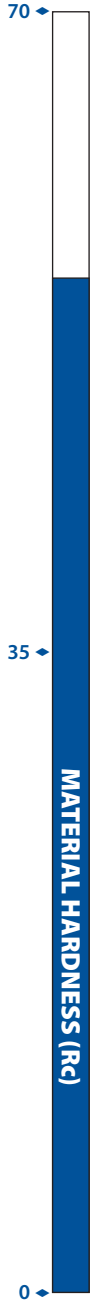
Fresa sub-micrograno metallo duro - taglio al centro
Utensile ad alte prestazioni per piccole profondità di taglio
Consigliato per le applicazioni Die Mold
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!

* - utensile con 3° di inclinazione rispetto al gambo
* - utensile con diametro ridotto del gambo

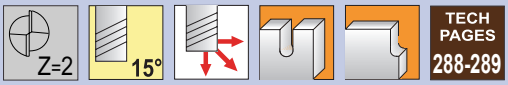
超细晶粒整体硬质合金立铣刀 - 中心切削
适用于轴向小切深加工的高性能铣刀
推薦用於模具應用
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素！

* - 部分型号柄部有3°过渡角
* - 部分型号柄径小于刃径

EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius	l_3 Reach Length	d_3 Neck Diameter
48300	.1181		3.000	6.0	65	3	0.75	15.0	2.80
48305	.1250	1/8"	3.175	1/8"	3"	1/8"	.015"	-	-
48310	.1250	1/8"	3.175	1/8"	3"	1/8"	.030"	-	-
48315	.1250	1/8"	3.175	3/16"	2-1/2"	1/8"	.010"	3/4"	.115"
48320	.1250	1/8"	3.175	3/16"	2-1/2"	1/8"	.015"	3/4"	.115"
48325	.1250	1/8"	3.175	3/16"	2-1/2"	1/8"	.020"	3/4"	.115"
*48330	.1250	1/8"	3.175	3/16"	3"	1/8"	.030"	*	-
48335	.1575		4.000	6.0	65	4	1.00	20.0	3.70
48340	.1875	3/16"	4.763	3/16"	3"	3/16"	.015"	-	-
48345	.1875	3/16"	4.763	3/16"	3"	3/16"	.030"	-	-
48350	.1875	3/16"	4.763	3/16"	3"	3/16"	.060"	-	-
48355	.1875	3/16"	4.763	1/4"	2-1/2"	3/16"	.020"	7/8"	.175"
48360	.1875	3/16"	4.763	1/4"	2-1/2"	3/16"	.030"	7/8"	.175"
48365	.1875	3/16"	4.763	1/4"	2-1/2"	3/16"	.060"	7/8"	.175"
48370	.1875	3/16"	4.763	1/4"	4"	3/16"	.020"	1-1/2"	.175"
48375	.1875	3/16"	4.763	1/4"	4"	3/16"	.030"	1-1/2"	.175"
*48380	.1875	3/16"	4.763	1/4"	4"	3/16"	.030"	*	-
*48385	.1969		5.000	6.0	100	5	1.20	*10.0	5.00
48390	.2362		6.000	6.0	100	6	1.50	30.0	5.70
48395	.2500	1/4"	6.350	1/4"	3"	1/4"	.015"	-	-
48400	.2500	1/4"	6.350	1/4"	3"	1/4"	.030"	-	-
48405	.2500	1/4"	6.350	1/4"	3"	1/4"	.060"	-	-
*48410	.2756		7.000	6.0	100	7	1.50	*	-
48415	.3125	5/16"	7.938	5/16"	2-1/2"	5/16"	.020"	-	-
48420	.3125	5/16"	7.938	5/16"	3"	5/16"	.078"	1-5/8"	.300"
48425	.3125	5/16"	7.938	5/16"	3"	5/16"	.094"	1-5/8"	.300"
48430	.3150		8.000	8.0	75	8	2.00	-	-
48435	.3150		8.000	8.0	100	8	2.00	40.0	7.70
48440	.3750	3/8"	9.525	3/8"	3"	3/8"	.015"	-	-
48445	.3750	3/8"	9.525	3/8"	3"	3/8"	.030"	-	-
48450	.3750	3/8"	9.525	3/8"	3"	3/8"	.060"	-	-
48455	.3750	3/8"	9.525	3/8"	3"	3/8"	.094"	2.00"	.365"
48460	.3750	3/8"	9.525	3/8"	4"	3/8"	.030"	2-1/2"	.365"
48465	.3750	3/8"	9.525	3/8"	4"	3/8"	.094"	2-1/2"	.365"
48470	.3937		10.000	10.0	100	10	2.00	50.0	9.70
48475	.4724		12.000	12.0	100	12	3.00	60.0	11.70
48480	.5000	1/2"	12.700	1/2"	3"	1/2"	.015"	-	-
48485	.5000	1/2"	12.700	1/2"	3"	1/2"	.030"	-	-
48490	.5000	1/2"	12.700	1/2"	3"	1/2"	.060"	-	-
48495	.5000	1/2"	12.700	1/2"	3"	1/2"	.125"	-	-
48500	.5000	1/2"	12.700	1/2"	4"	1/2"	.125"	-	-



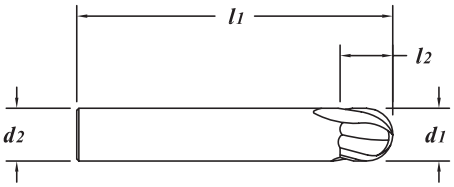
Series 350MX, 950MX



TOLERANCES

d_1	+0,000mm –0,025mm (+.000" –.001")
d_2	h6
ball radius	+0,0000 –0,0127mm (+.0000" –.0005")

Die Mold Cutter - Ball End - AlTiN Coated
Formenbau Werkzeuge - Vollradius - AlTiN-Beschichtet
Fresas Para Moldes Troquelados - Cabeza Esférica - Recubrimiento de AlTiN
Fraises pour Moules et Outillages - Hemispherique - Revêtement AlTiN
Utensile per Stampi - Sferica - Rivestimento in AlTiN
模具刀具 - 球头 - AlTiN 涂层



Solid submicron grain carbide end mill - center cutting
High performance machining in the die mold industry
Rigid work holding, machine stability and part integrity are critical!
≤5.0mm (.1969") diameter have 5° taper to shank
Recommended for high Rockwell materials
Can be modified with a neck in 48 hours

Hochleistungs- Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Hochleistungsbearbeitung in der Formenbau Industrie
Gute Werkstückspannung, Machschinenstabilität und Teileintegration sind entscheidend !
≤5,0mm (.1969") Durchmesser und kleiner haben 5° Kegel zum Schaft
Empfohlen für Gehärtete Werkstoffe
Kann innerhalb 48 Stunden am Schaft verjüngt werden
Vollradius Toleranz: +0,0000 / –0,0127 (+.0000" –.0005")

Fresa de submicrograno sólido carburo de alto rendimiento - corte centrado
Mecanizado de alto rendimiento para la industria troqueladora
La sujección firme del útil, la estabilidad de la máquina y la integridad de las piezas son cruciales
Diámetro de 5,0mm (.1969") e inferiores cuentan con un ahusamiento de 5° hasta el mango
Recomendado para materiales de alta Rc
Puede ser modificado con un cuello en 48 horas
Tolerancia de la cabeza esférica +0,0000 / –0,0127 (+.0000" –.0005")

Fraises carbure submicrograin - coupe au centre
Haute performance pour le fraisage dans l'industrie du moule
Le serrage et la stabilite de la piece, la rigidite de la machine et l'atatchment de l'outil sont tres importantes
Diametre 5,0mm (.1969") et plus petit ont un angle de depouille conique de 5° sur le queue
Recommandee pour matieres a haute durete
Peut etre modifier avec un col degage sous un delai de 48 heures
Tolerance du rayon de hemispherique +0,0000 / –0,0127 (+.0000" –.0005")

Fresa sub-micrograno metallo duro - taglio al centro
Alte prestazioni per lavorazioni di stampi
Serraggio rigido, macchina stabile e ottimo bloccaggio del pezzo sono necessari!
I diametri inferiori a 6mm sono rastremati a 5°
Materiali temprati
Può essere modificata in 48 ore
Tolleranza del raggio +0,0000 / –0,0127 (+.0000" –.0005")

高效超细晶粒整体硬质合金立铣刀 - 中心切削
用于模具行业高效机加工
高刚性工件夹持、机床稳定性以及零件的牢固性是至关重要的因素!
为特定用途测试并选择硬质合金
5,0mm (.1969")直径和大于5,0mm (.1969")直径都有一个5°锥度直到柄部
洛氏硬度高的材质
可用轴颈进行修正
半径允差 +0,0000 / –0,0127 (+.0000"–.0005")

MATERIAL HARDNESS (Rc)
70
35
0

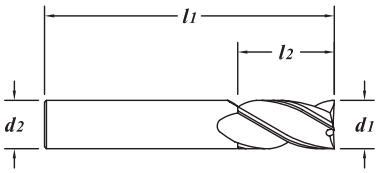
EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
14210	.0312	1/32"	0.792	1/4"	3"	1/32"
15210	.0394		1.000	6.0	75	1
15220	.0591		1.501	6.0	75	1.5
14220	.0625	1/16"	1.588	1/4"	3"	1/16"
15230	.0787		2.000	6.0	75	2
14230	.0938	3/32"	2.383	1/4"	3"	3/32"
15240	.1181		3.000	6.0	75	3
14240	.1250	1/8"	3.175	1/4"	3"	1/8"
15250	.1575		4.000	6.0	75	4
14250	.1875	3/16"	4.763	1/4"	3"	3/16"
15260	.1969		5.000	6.0	75	5
15270	.2362		6.000	6.0	75	6
14260	.2500	1/4"	6.350	1/4"	3"	1/4"
14270	.3125	5/16"	7.938	5/16"	4"	5/16"
15280	.3150		8.000	8.0	100	8
14280	.3750	3/8"	9.525	3/8"	4"	3/8"
15290	.3937		10.000	10.0	100	10
15300	.4724		12.000	12.0	100	12
14290	.5000	1/2"	12.700	1/2"	4"	1/2"

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=4 | 30° | TECH PAGES 269, 271, 291

Square End - Diamond Coated
Ohne Eckenradius - Diamant-Beschichtet
Extremo Sin Radio - Recubrimiento de Diamante
Extrémité Carré - Revêtement Diamant
Piatte - Rivestimento in Diamante
平头 - Diamond 涂层



Solid grade C-2 carbide end mill - center cutting
Crystalline diamond coating
Recommended for graphite, fiber-reinforced plastics, carbon fiber and high silicon aluminum

Hochleistungs- Vollhartmetallfräser Sorte C-2 - Zentrumsschnitt
Krystalline Beschichtung
Empfohlen für Grafit, Faserverstärkte Kunststoffe, Carbonfaserwerkstoffe und Hoch Silizumhalitge Aluminium Werkstoffe

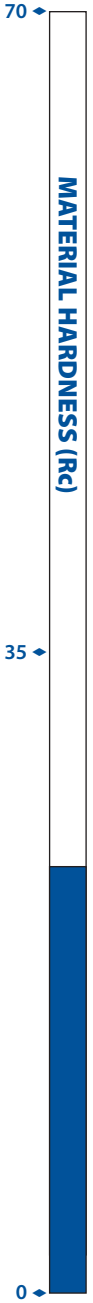
Fresa de grado C-2 sólido carburo de alto rendimiento - corte centrado
Recubrimiento cristalino
Recomendado para grafito, plásticos reforzados con fibra, fibra de carbono, aluminio con alto contenido de silicio

Carbure de classe C-2 - coupe au centre
Revêtement Crystalline
Recommandee pour graphite, plastiques renforcés par des fibres et fibre de carbone

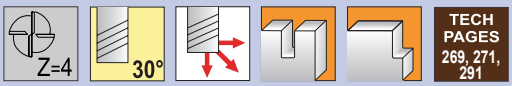
Fresa metallo duro di classificazione C-2 - taglio al centro
Rivestimento al diamante
Alte prestazioni per lavorazioni di Grafite, resine, fibre di carbonio e alluminio ad alta percentuale di silicio

高效C-2级硬质合金立铣刀 - 中心切削
晶体涂层
推荐加工石墨、纤维补强塑料、碳素纤维和硅含量高的铝材

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
10018	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"
46018	.0394		1.000	3.0	38	4
10028	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"
46028	.0591		1.500	3.0	38	6
10038	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"
46038	.0787		2.000	3.0	38	8
10058	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"
46058	.1181		3.000	3.0	38	12
10078	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
46078	.1575		4.000	4.0	50	14
10118	.1875	3/16"	4.763	3/16"	2"	5/8"
46098	.1969		5.000	5.0	50	16
46108	.2362		6.000	6.0	65	20
10158	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
10198	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
46128	.3150		8.000	8.0	65	20
10238	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
46148	.3937		10.000	10.0	70	25
46168	.4724		12.000	12.0	75	25
10318	.5000	1/2"	12.700	1/2"	3"	1"
13338	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
46188	.6299		16.000	16.0	88	32
13358	.7500	3/4"	19.050	3/4"	4"	1-1/2"
13378	1.000	1"	25.400	1"	4"	1-1/2"



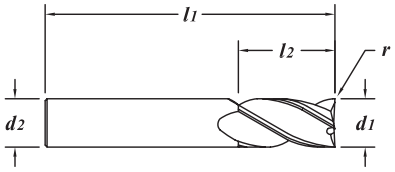
Series 210RD



TECH PAGES 269, 271, 291

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
r	+0,025 –0,025mm (+.001" –.001")

Corner Radius - Diamond Coated
Eckenradius - Diamant-Beschichtet
Ángulo Redondeado - Recubrimiento de Diamante
Rayon de Coin - Revêtement Diamant
Torica - Rivestimento in Diamante
圆角半径 – Diamond 涂层



MATERIAL HARDNESS (Rc)
70
35
0

Solid grade C-2 carbide end mill - center cutting
Crystalline diamond coating
For stronger corners and part radius
Recommended for graphite, fiber-reinforced plastics, carbon fiber and high silicon aluminum

Hochleistungs- Vollhartmetallfräser Sorte C-2 - Zentrumsschnitt
Krystalline Beschichtung
Für stärkere Schneidecken und Radiusteile
Empfohlen für Grafit, Faserverstärkte Kunststoffe, Carbonfaserwerkstoffe und Hoch Silizumhalitge Aluminium Werkstoffe

Fresa de grado C-2 sólido carburo de alto rendimiento - corte centrado
Recubrimiento cristalino
Para un mejor refuerzo de esquinas y zonas curvas
Recomendado para grafito, plásticos reforzados con fibra, fibra de carbono, aluminio con alto contenido de silicio

Carbure de classe C-2 - coupe au centre
Revêtement Crystalline
Pour rayons de pièce et angles renforcés
Recommandee pour graphite, plastiques renforcés par des fibres et fibre de carbone

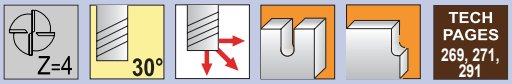
Fresa metallo duro di classificazione C-2 - taglio al centro
Rivestimento al diamante
Raggi rinforzati
Alte prestazioni per lavorazioni di Grafite, resine, fibre di carbonio e alluminio ad alta percentuale di silicio

高效C-2级硬质合金立铣刀 - 中心切削
晶体涂层
用于强化圆角和零件半径
推荐加工石墨、纤维补强塑料、碳素纤维和硅含量高的铝材

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
24118	.1181		3.000	3.0	38	12	0.50
80018	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.015"
80028	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.020"
24148	.1575		4.000	4.0	50	14	0.30
24158	.1575		4.000	4.0	50	14	0.50
80058	.1875	3/16"	4.763	3/16"	2"	5/8"	.015"
80068	.1875	3/16"	4.763	3/16"	2"	5/8"	.020"
24178	.2362		6.000	6.0	65	20	0.50
24208	.2362		6.000	6.0	65	20	1.50
80108	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"
80118	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"
80128	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"
24248	.3150		8.000	8.0	65	20	1.00
80248	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.020"
80258	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"
24318	.3937		10.000	10.0	70	25	1.00
24378	.4724		12.000	12.0	75	25	0.50
24398	.4724		12.000	12.0	75	25	1.00
80328	.5000	1/2"	12.700	1/2"	3"	1"	.030"
80348	.5000	1/2"	12.700	1/2"	3"	1"	.060"

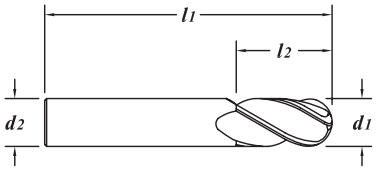
† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000mm –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")



TECH PAGES 269, 271, 291

Ball End - Diamond Coated
Vollradius - Diamant-Beschichtet
Cabeza Esférica - Recubrimiento de Diamante
Hemispherique - Revêtement Diamant
Sferica - Rivestimento in Diamante
球头 - Diamond 涂层



Solid grade C-2 carbide end mill - center cutting
Crystalline diamond coating
Recommended for graphite, fiber-reinforced plastics, carbon fiber and high silicon aluminum

Hochleistungs- Vollhartmetallfräser Sorte C-2 - Zentrumsschnitt
Krystalline Beschichtung
Empfohlen für Grafit, Faserverstärkte Kunststoffe, Carbonfaserwerkstoffe und Hoch Silizumhalitge Aluminium Werkstoffe
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")

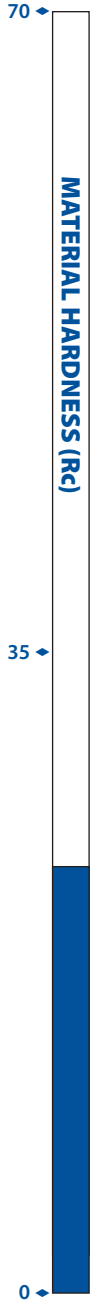
Fresa de grado C-2 sólido carburo de alto rendimiento - corte centrado
Recubrimiento cristalino
Recomendado para grafito, plásticos reforzados con fibra, fibra de carbono, aluminio con alto contenido de silicio
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")

Carbure de classe C-2 - coupe au centre
Revêtement Crystalline
Recommandee pour graphite, plastiques renforcés par des fibres et fibre de carbone
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")

Fresa metallo duro di classificazione C-2 - taglio al centro
Rivestimento al diamante
Alte prestazioni per lavorazioni di Grafite, resine, fibre di carbonio e alluminio ad alta percentuale di silicio
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")

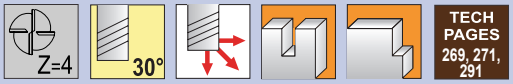
高效C-2级硬质合金立铣刀 - 中心切削
晶体涂层
推荐加工石墨、纤维补强塑料、碳素纤维和硅含量高的铝材
半径允差 +0,000 /–0,025 (+.000"–.001")

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
15018	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"
48018	.0394		1.000	3.0	38	4
15028	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"
48028	.0591		1.500	3.0	38	6
15038	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"
48038	.0787		2.000	3.0	38	8
15058	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"
48058	.1181		3.000	3.0	38	12
15078	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
48078	.1575		4.000	4.0	50	14
15118	.1875	3/16"	4.763	3/16"	2"	5/8"
48098	.1969		5.000	5.0	50	16
48108	.2362		6.000	6.0	65	20
15158	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
15198	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
48128	.3150		8.000	8.0	65	20
15238	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
48168	.4724		12.000	12.0	75	25
15318	.5000	1/2"	12.700	1/2"	3"	1"
18358	.7500	3/4"	19.050	3/4"	4"	1-1/2"
48208	.7874		20.000	20.0	100	38



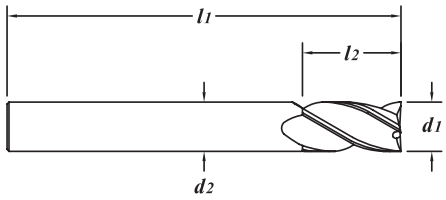
Series 610D

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6



TECH PAGES 269, 271, 291

Extra Length - Square End - Diamond Coated
Extra Länge - Ohne Eckenradius - Diamant-Beschichtet
Longitud Extra - Extremo Sin Radio - Recubrimiento de Diamante
Extra Longue - Extrémité Carré - Revêtement Diamant
Lunghezza Extra - Piatte - Rivestimento in Diamante
超长 - 平头 - Diamond 涂层



Solid grade C-2 carbide end mill - center cutting
Crystalline diamond coating
Recommended for graphite, fiber-reinforced plastics, carbon fiber and high silicon aluminum
Can be modified with a neck in 48 hours

Hochleistungs- Vollhartmetallfräser Sorte C-2 - Zentrumsschnitt
Krystalline Beschichtung
Empfohlen für Grafit, Faserverstärkte Kunststoffe, Carbonfaserwerkstoffe und Hoch Silizumhalitge Aluminium Werkstoffe
Kann innerhalb 48 Stunden am Schaft verjüngt werden

Fresa de grado C-2 sólido carburo de alto rendimiento - corte centrado
Recubrimiento cristalino
Recomendado para grafito, plásticos reforzados con fibra, fibra de carbono, aluminio con alto contenido de silicio
Puede ser modificado con un cuello en 48 horas

Carbure de classe C-2 - coupe au centre
Revêtement Crystalline
Recommandee pour graphite, plastiques renforcés par des fibres et fibre de carbone
Modification possible : gorge de dégagement (sous 48 Heures)

Fresa metallo duro di classificazione C-2 - taglio al centro
Rivestimento al diamante
Alte prestazioni per lavorazioni di Grafite, resine, fibre di carbonio e alluminio ad alta percentuale di silicio
Può essere modificata in 48 ore

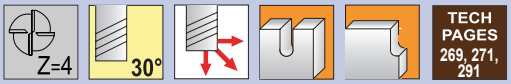
高效C-2级硬质合金立铣刀 - 中心切削
晶体涂层
推荐加工石墨、纤维补强塑料、碳素纤维和硅含量高的铝材
可用轴颈进行修正

MATERIAL HARDNESS (Rc)
70
35
0

EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
94028	.1181		3.000	3.0	75	20
38038	.1250	1/8"	3.175	1/8"	3"	1"
94068	.1575		4.000	4.0	75	25
38048	.1875	3/16"	4.763	3/16"	4"	1"
38058	.2500	1/4"	6.350	1/4"	3"	1"
38068	.2500	1/4"	6.350	1/4"	4"	1"
38078	.2500	1/4"	6.350	1/4"	6"	1-1/2"
38098	.3125	5/16"	7.938	5/16"	4"	1"
94168	.3150		8.000	8.0	100	25
38128	.3750	3/8"	9.525	3/8"	4"	1"
38138	.3750	3/8"	9.525	3/8"	6"	1-1/2"
94208	.3937		10.000	10.0	100	25
94248	.4724		12.000	12.0	100	25
38168	.5000	1/2"	12.700	1/2"	4"	1"
38178	.5000	1/2"	12.700	1/2"	4"	2"

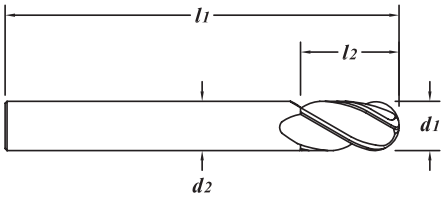
† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000mm –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")



TECH PAGES 269, 271, 291

Extra Length - Ball End - Diamond Coated
Extra Länge - Vollradius - Diamant-Beschichtet
Longitud Extra - Cabeza Esférica - Recubrimiento de Diamante
Extra Longue - Hemispherique - Revêtement Diamant
Lunghezza Extra - Sferica - Rivestimento in Diamante
超长 - 球头 - Diamond 涂层



Solid grade C-2 carbide end mill - center cutting
Crystalline diamond coating
Recommended for graphite, fiber-reinforced plastics, carbon fiber and high silicon aluminum
Can be modified with a neck in 48 hours

Hochleistungs- Vollhartmetallfräser Sorte C-2 - Zentrumsschnitt
Krystalline Beschichtung
Empfohlen für Grafit, Faserverstärkte Kunststoffe, Carbonfaserwerkstoffe und Hoch Silizumhalitge Aluminium Werkstoffe
Kann innerhalb 48 Stunden am Schaft verjüngt werden
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")

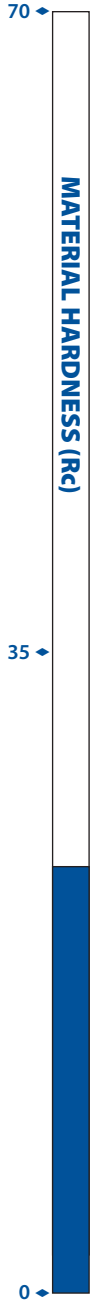
Fresa de grado C-2 sólido carburo de alto rendimiento - corte centrado
Recubrimiento cristalino
Recomendado para grafito, plásticos reforzados con fibra, fibra de carbono, aluminio con alto contenido de silicio
Puede ser modificado con un cuello en 48 horas
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")

Carbure de classe C-2 - coupe au centre
Revêtement Crystalline
Recommandee pour graphite, plastiques renforcés par des fibres et fibre de carbone
Modification possible : gorge de dégagement (sous 48 Heures)
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")

Fresa metallo duro di classificazione C-2 - taglio al centro
Rivestimento al diamante
Alte prestazioni per lavorazioni di Grafite, resine, fibre di carbonio e alluminio ad alta percentuale di silicio
Può essere modificata in 48 ore
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")

高效C-2级硬质合金立铣刀 - 中心切削
晶体涂层
推荐加工石墨、纤维补强塑料、碳素纤维和硅含量高的铝材
可用轴颈进行修正
半径允差 +0,000 /–0,025 (+.000"–.001")

EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
99028	.1181		3.000	3.0	75	20
40038	.1250	1/8"	3.175	1/8"	3"	1"
99068	.1575		4.000	4.0	75	25
40048	.1875	3/16"	4.763	3/16"	4"	1"
99108	.2362		6.000	6.0	100	25
99128	.2362		6.000	6.0	150	38
40058	.2500	1/4"	6.350	1/4"	3"	1"
40068	.2500	1/4"	6.350	1/4"	4"	1"
40078	.2500	1/4"	6.350	1/4"	6"	1-1/2"
40098	.3125	5/16"	7.938	5/16"	4"	1"
99168	.3150		8.000	8.0	100	25
40128	.3750	3/8"	9.525	3/8"	4"	1"
40138	.3750	3/8"	9.525	3/8"	6"	1-1/2"
99208	.3937		10.000	10.0	100	25
40168	.5000	1/2"	12.700	1/2"	4"	1"
40178	.5000	1/2"	12.700	1/2"	4"	2"



Coating Center

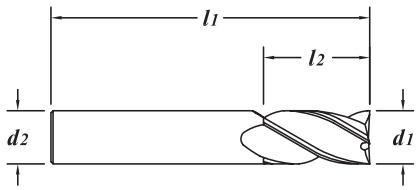
TOLERANCES		
d_1	≤ .030"	+0,000 –0,025mm (+.000" –.001")
	≥ 1/32"	+0,000 –0,050mm (+.000" –.002")
d_2	h6	

Series 160M, 170M, 860M, 870M

TECH PAGES 268,270

0,127mm - 2,000mm
(.0050" - .0787")

Stub Length - Square End
Kurze Länge - Ohne Eckenradius
Longitud Corta - Extremo Sin Radio
Longueur Courte - Extrémité Carré
Serie Corta - Piatte
短柱长度 - 平头



Solid submicron grain carbide end mill - center cutting
Shorter flute length for rigidity
Extremely versatile
TiAlN Coated - page 193
Standard Length - page 200
Extended Length - page 232

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Kürzere Spannuten für höhere Stabilität
Extrem Vielseitig
TiAlN-Beschichtet - Seite 193
Standard Länge - Seite 200
Extra Länge - Seite 232

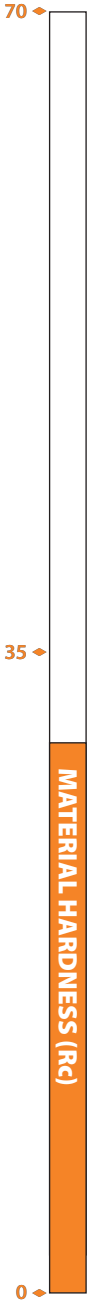
Fresa de submicrograno sólido carburo - corte centrado
Longitud de ranura más corta para proporcionar mayor rigidez
Extremadamente versátil
Recubrimiento de TiAlN - Página 193
Longitud Estándar - Página 200
Longitud Extra - Página 232

Fraises carbure submicrograin - coupe au centre
Longueur de coupe courte pour plus de rigidite
Utilisations variables
Revêtement TiAlN - Page 193
Longueur Standart - Page 200
Longueur Extra - Page 232

Fresa sub-micrograno metallo duro - taglio al centro
Tagliente più corto per maggiore rigidità
Estremamente varsatile
Rivestimento in TiAlN - Pagina 193
Lunghezza Standard - Pagina 200
Lunghezza Extra - Pagina 232

超细晶粒整体硬质合金立铣刀 - 中心切削
为了增加刚性应缩短出屑槽长度
功能极多
TiAlN 涂层 - 193页
标准长度 - 200页
超长 - 232页

(160M/860M) 2 Flute EDP#	(170M/870M) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
01200	-	.0050	.0050"	0.127	1/8"	1-1/2"	.008"
01210	-	.0060	.0060"	0.152	1/8"	1-1/2"	.009"
01220	-	.0070	.0070"	0.178	1/8"	1-1/2"	.011"
01250	-	.0100	.0100"	0.254	1/8"	1-1/2"	.015"
01270	-	.0120	.0120"	0.305	1/8"	1-1/2"	.018"
01280	-	.0130	.0130"	0.330	1/8"	1-1/2"	.020"
01290	-	.0140	.0140"	0.356	1/8"	1-1/2"	.021"
01300	-	.0150	.0150"	0.381	1/8"	1-1/2"	.023"
01310	-	.0160	.0160"	0.406	1/8"	1-1/2"	.024"
01320	-	.0170	.0170"	0.432	1/8"	1-1/2"	.026"
01330	-	.0180	.0180"	0.457	1/8"	1-1/2"	.027"
01340	-	.0190	.0190"	0.483	1/8"	1-1/2"	.029"
01350	-	.0200	.0200"	0.508	1/8"	1-1/2"	.030"
01360	-	.0210	.0210"	0.533	1/8"	1-1/2"	.032"
01370	-	.0220	.0220"	0.559	1/8"	1-1/2"	.033"
01380	-	.0230	.0230"	0.584	1/8"	1-1/2"	.035"
01390	-	.0240	.0240"	0.610	1/8"	1-1/2"	.036"
01400	-	.0250	.0250"	0.635	1/8"	1-1/2"	.038"
01410	-	.0260	.0260"	0.660	1/8"	1-1/2"	.039"
01420	-	.0270	.0270"	0.686	1/8"	1-1/2"	.041"
01430	-	.0280	.0280"	0.711	1/8"	1-1/2"	.042"
01440	-	.0290	.0290"	0.737	1/8"	1-1/2"	.044"
01450	-	.0300	.0300"	0.762	1/8"	1-1/2"	.045"
01010	02010	.0312	1/32"	0.792	1/8"	1-1/2"	1/16"
01510	02510	.0394		1.000	3.0	38	2
01020	02020	.0469	3/64"	1.191	1/8"	1-1/2"	3/32"
01520	02520	.0591		1.500	3.0	38	3
01030	02030	.0625	1/16"	1.588	1/8"	1-1/2"	1/8"
01530	02530	.0787		2.000	3.0	38	4



continued →

Series 160M, 170M, 860M, 870M *(continued)*

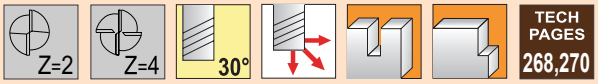
2,383mm - 25,400mm
(.0938" - 1.000")

(160M/860M) 2 Flute EDP#	(170M/870M) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
01040	02040	.0938	3/32"	2.383	1/8"	1-1/2"	3/16"
01540	02540	.0984		2.500	3.0	38	5
01550	02550	.1181		3.000	3.0	38	6
01050	02050	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
01560	02560	.1378		3.500	4.0	50	7
01060	02060	.1562	5/32"	3.967	3/16"	2"	5/16"
01570	02570	.1575		4.000	4.0	50	8
01580	02580	.1772		4.500	5.0	50	9.5
01070	02070	.1875	3/16"	4.763	3/16"	2"	3/8"
01590	02590	.1969		5.000	5.0	50	10
01080	02080	.2188	7/32"	5.558	1/4"	2"	7/16"
01600	02600	.2362		6.000	6.0	50	12
01090	02090	.2500	1/4"	6.350	1/4"	2"	1/2"
01610	02610	.2756		7.000	7.0	50	12
01100	02100	.3125	5/16"	7.938	5/16"	2"	1/2"
01620	02620	.3150		8.000	8.0	50	12
01630	02630	.3543		9.000	9.0	50	14
01110	02110	.3750	3/8"	9.525	3/8"	2"	5/8"
01640	02640	.3937		10.000	10.0	50	16
01650	02650	.4331		11.000	11.0	65	19
01120	02120	.4375	7/16"	11.113	7/16"	2-1/2"	5/8"
01660	02660	.4724		12.000	12.0	65	19
01130	02130	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"
01140	02140	.6250	5/8"	15.875	5/8"	3"	3/4"
01670	02670	.6299		16.000	16.0	75	19
01150	02150	.7500	3/4"	19.050	3/4"	3"	1"
-	02680	.7874		20.000	20.0	75	25
-	02160	1.000	1"	25.400	1"	3"	1"

End Mill Manufacturing

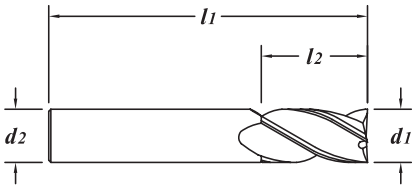
† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6



TECH PAGES 268,270

Stub Length - Square End - TiALN Coated
Kurze Länge - Ohne Eckenradius - TiALN-Beschichtet
Longitud Corta - Extremo Sin Radio - Recubrimiento de TiALN
Longueur Courte - Extrémité Carré - Revêtement TiALN
Serie Corta - Piatte - Rivestimento in TiALN
短柱长度 - 平头 - TiALN 涂层



Solid submicron grain carbide end mill - center cutting
Shorter flute length for rigidity
Dry or semi-dry machining
Extremely versatile
Uncoated - page 191
Standard Length - page 204
Extended Length - page 235

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Kürzere Spannuten für höhere Stabilität
Trocken oder Halbtrockene Bearbeitung
Extrem Vielseitig
Unbeschichtet - Seite 191
Standard Länge - Seite 204
Extra Länge - Seite 235

Fresa de submicrograno sólido carburo - corte centrado
Longitud de ranura más corta para proporcionar mayor rigidez
Mecanizado seco o semiseco
Extremadamente versátil
Sin recubrimiento - Página 191
Longitud Estándar - Página 204
Longitud Extra - Página 235

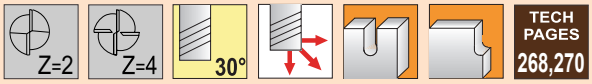
Fraises carbure submicrograin - coupe au centre
Longueur de coupe courte pour plus de rigidite
Usinage a sec ou avec l'air
Utilisations variables
Sans revêtement - Page 191
Longueur Standart - Page 204
Longueur Extra - Page 235

Fresa sub-micrograno metallo duro - taglio al centro
Tagliente più corto per maggiore rigidità
Lavorazione a secco o a umido
Estremamente varsatile
Non Rivestito - Pagina 191
Lunghezza Standard - Pagina 204
Lunghezza Extra - Pagina 235

超细晶粒整体硬质合金立铣刀 - 中心切削
为了增加刚性应缩短出屑槽长度
干式或半干式机加工
功能极多
未涂层 - 191页
标准长度 - 204页
超长 - 235页

(160MA/860MA) 2 Flute EDP#	(170MA/870MA) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
01017	02017	.0312	1/32"	0.792	1/8"	1-1/2"	1/16"
01517	02517	.0394		1.000	3.0	38	2
01027	02027	.0469	3/64"	1.191	1/8"	1-1/2"	3/32"
01527	02527	.0591		1.500	3.0	38	3
01037	02037	.0625	1/16"	1.588	1/8"	1-1/2"	1/8"
01537	02537	.0787		2.000	3.0	38	4
01047	02047	.0938	3/32"	2.383	1/8"	1-1/2"	3/16"
01547	02547	.0984		2.500	3.0	38	5
01557	02557	.1181		3.000	3.0	38	6
01057	02057	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
01567	02567	.1378		3.500	4.0	50	7
01067	02067	.1562	5/32"	3.967	3/16"	2"	5/16"
01577	02577	.1575		4.000	4.0	50	8
01587	02587	.1772		4.500	5.0	50	9.5
01077	02077	.1875	3/16"	4.763	3/16"	2"	3/8"
01597	02597	.1969		5.000	5.0	50	10
01087	02087	.2188	7/32"	5.558	1/4"	2"	7/16"
01607	02607	.2362		6.000	6.0	50	12
01097	02097	.2500	1/4"	6.350	1/4"	2"	1/2"
01617	02617	.2756		7.000	7.0	50	12
01107	02107	.3125	5/16"	7.938	5/16"	2"	1/2"
01627	02627	.3150		8.000	8.0	50	12
01637	02637	.3543		9.000	9.0	50	14
01117	02117	.3750	3/8"	9.525	3/8"	2"	5/8"
01647	02647	.3937		10.000	10.0	50	16
01657	02657	.4331		11.000	11.0	65	19
01127	02127	.4375	7/16"	11.113	7/16"	2-1/2"	5/8"
01667	02667	.4724		12.000	12.0	65	19
01137	02137	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"
01147	02147	.6250	5/8"	15.875	5/8"	3"	3/4"
01677	02677	.6299		16.000	16.0	75	19
01157	02157	.7500	3/4"	19.050	3/4"	3"	1"
-	02687	.7874		20.000	20.0	75	25
-	02167	1.000	1"	25.400	1"	3"	1"

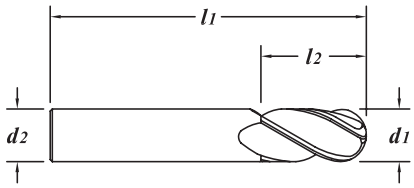
Series 180M, 190M, 980M, 990M



TECH PAGES 268,270

TOLERANCES		
d_1	≤ .030"	+0,000 –0,025mm (+.000" –.001")
	≥ 1/32"	+0,000 –0,050mm (+.000" –.002")
d_2	h6	

Stub Length - Ball End
Kurze Länge - Vollradius
Longitud Corta - Cabeza Esférica
Longueur Courte - Hemispherique
Serie Corta - Sferica
短柱长度 - 双头



Solid submicron grain carbide end mill - center cutting
Shorter flute length for rigidity
Extremely versatile
Radius Tolerance: +0,000 / –0.025mm (+.000" –.001")
TiAlN Coated - page 195
Standard Length - page 211
Extended Length - Page 243

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Kürzere Spannuten für höhere Stabilität
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025mm (+.000" –.001")
TiAlN-Beschichtet - Seite 195
Standard Länge - Seite 211
Extra Länge - Seite 243

Fresa de submicrograno sólido carburo - corte centrado
Longitud de ranura más corta para proporcionar mayor rigidez
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025mm (+.000" –.001")
Recubrimiento de TiAlN - Página 195
Longitud Estándar - Página 211
Longitud Extra - Página 243

Fraises carbure submicrograin - coupe au centre
Longueur de coupe courte pour plus de rigidite
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025mm (+.000" –.001")
Revêtement TiAlN - Page 195
Longueur Standart - Page 211
Longueur Extra - Page 243

Fresa sub-micrograno metallo duro - taglio al centro
Tagliente più corto per maggiore rigidità
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025mm (+.000" –.001")
Rivestimento in TiAlN - Pagina 195
Lunghezza Standard - Pagina 211
Lunghezza Extra - Pagina 243

超细晶粒整体硬质合金立铣刀 - 中心切削
为了增加刚性应缩短出屑槽长度
功能极多
半径允差 +0,000 /–0,025mm (+.000"–.001")
TiAlN 涂层 - 195页
标准长度 - 211页
超长 - 243页

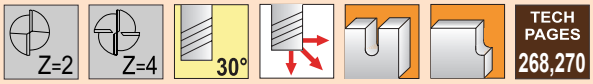
MATERIAL HARDNESS (Rc)
70
35
0

(180M/980M) 2 Flute EDP#	(190M/990M) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
03250	-	.0100	.0100"	0.254	1/8"	1-1/2"	.015"
03300	-	.0150	.0150"	0.381	1/8"	1-1/2"	.023"
03350	-	.0200	.0200"	0.508	1/8"	1-1/2"	.030"
03400	-	.0250	.0250"	0.635	1/8"	1-1/2"	.038"
03450	-	.0300	.0300"	0.762	1/8"	1-1/2"	.045"
03010	04010	.0312	1/32"	0.792	1/8"	1-1/2"	1/16"
03510	04510	.0394		1.000	3.0	38	2
03020	04020	.0469	3/64"	1.191	1/8"	1-1/2"	3/32"
03520	-	.0591		1.500	3.0	38	3
03030	04030	.0625	1/16"	1.588	1/8"	1-1/2"	1/8"
03530	04530	.0787		2.000	3.0	38	4
03040	04040	.0938	3/32"	2.383	1/8"	1-1/2"	3/16"
03540	04540	.0984		2.500	3.0	38	5
03550	04550	.1181		3.000	3.0	38	6
03050	04050	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
03560	04560	.1378		3.500	4.0	50	7
03060	04060	.1562	5/32"	3.967	3/16"	2"	5/16"
03570	04570	.1575		4.000	4.0	50	8
03580	04580	.1772		4.500	5.0	50	9.5
03070	04070	.1875	3/16"	4.763	3/16"	2"	3/8"
03590	04590	.1969		5.000	5.0	50	10
03080	04080	.2188	7/32"	5.558	1/4"	2"	7/16"
03600	04600	.2362		6.000	6.0	50	12
03090	04090	.2500	1/4"	6.350	1/4"	2"	1/2"
03610	04610	.2756		7.000	7.0	50	12
03100	04100	.3125	5/16"	7.938	5/16"	2"	1/2"
03620	04620	.3150		8.000	8.0	50	12
03630	04630	.3543		9.000	9.0	50	14
03110	04110	.3750	3/8"	9.525	3/8"	2"	5/8"
03640	04640	.3937		10.000	10.0	50	16
03120	04120	.4375	7/16"	11.113	7/16"	2-1/2"	5/8"
03660	04660	.4724		12.000	12.0	65	19
03130	04130	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"
03150	04150	.7500	3/4"	19.050	3/4"	3"	1"

† *Metric equivalents are for reference only*

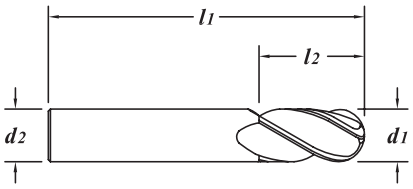
TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

Series 180MA, 190MA, 980MA, 990MA



TECH PAGES 268,270

Stub Length - Ball End - TiALN Coated
Kurze Länge - Vollradius - TiALN-Beschichtet
Longitud Corta - Cabeza Esférica - Recubrimiento de TiALN
Longueur Courte - Hemispherique - Revêtement TiALN
Serie Corta - Sferica - Rivestimento in TiALN
短柱长度 - 双头 - TiALN 涂层



Solid submicron grain carbide end mill - center cutting
Shorter flute length for rigidity
Dry or semi-dry machining
Extremely versatile
Radius Tolerance: +0.000 / –0.025mm (+.000" –.001")
Uncoated - page 194
Standard Length - page 215
Extended Length - page 246

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Kürzere Spannuten für höhere Stabilität
Trocken oder Halbtrockene Bearbeitung
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025mm (+.000" –.001")
Unbeschichtet - Seite 194
Standard Länge - Seite 215
Extra Länge - Seite 246

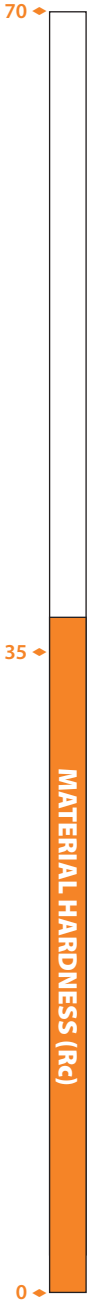
Fresa de submicrograno sólido carburo - corte centrado
Longitud de ranura más corta para proporcionar mayor rigidez
Mecanizado seco o semiseco
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025mm (+.000" –.001")
Sin recubrimiento - Página 194
Longitud Estándar - Página 215
Longitud Extra - Página 246

Fraises carbure submicrograin - coupe au centre
Longueur de coupe courte pour plus de rigidite
Usinage a sec ou avec l'air
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025mm (+.000" –.001")
Sans revêtement - Page 194
Longueur Standart - Page 215
Longueur Extra - Page 246

Fresa sub-micrograno metallo duro - taglio al centro
Tagliente più corto per maggiore rigidità
Lavorazione a secco o a umido
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025mm (+.000" –.001")
Non Rivestito - Pagina 194
Lunghezza Standard - Pagina 215
Lunghezza Extra - Pagina 246

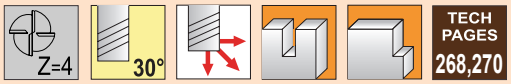
超细晶粒整体硬质合金立铣刀 - 中心切削
为了增加刚性应缩短出屑槽长度
干式或半干式机加工
功能极多
半径允差 +0,000 /–0,025mm (+.000"–.001")
未涂层 - 194页
标准长度 - 215页
超长 - 246页

(180MA/980MA) 2 Flute EDP#	(190MA/990MA) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
03017	04017	.0312	1/32"	0.792	1/8"	1-1/2"	1/16"
03517	04517	.0394		1.000	3.0	38	2
03027	04027	.0469	3/64"	1.191	1/8"	1-1/2"	3/32"
03527	04527	.0591		1.500	3.0	38	3
03037	04037	.0625	1/16"	1.588	1/8"	1-1/2"	1/8"
03537	04537	.0787		2.000	3.0	38	4
03047	04047	.0938	3/32"	2.383	1/8"	1-1/2"	3/16"
03547	04547	.0984		2.500	3.0	38	5
03557	04557	.1181		3.000	3.0	38	6
03057	04057	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
03567	04567	.1378		3.500	4.0	50	7
03067	04067	.1562	5/32"	3.967	3/16"	2"	5/16"
03577	04577	.1575		4.000	4.0	50	8
03587	04587	.1772		4.500	5.0	50	9.5
03077	04077	.1875	3/16"	4.763	3/16"	2"	3/8"
03597	04597	.1969		5.000	5.0	50	10
03087	04087	.2188	7/32"	5.558	1/4"	2"	7/16"
03607	04607	.2362		6.000	6.0	50	12
03097	04097	.2500	1/4"	6.350	1/4"	2"	1/2"
03617	04617	.2756		7.000	7.0	50	12
03107	04107	.3125	5/16"	7.938	5/16"	2"	1/2"
03627	04627	.3150		8.000	8.0	50	12
03637	04637	.3543		9.000	9.0	50	14
03117	04117	.3750	3/8"	9.525	3/8"	2"	5/8"
03647	04647	.3937		10.000	10.0	50	16
03657	04657	.4331		11.000	11.0	65	19
03127	04127	.4375	7/16"	11.113	7/16"	2-1/2"	5/8"
03667	04667	.4724		12.000	12.0	65	19
03137	04137	.5000	1/2"	12.700	1/2"	2-1/2"	5/8"
-	04147	.6250	5/8"	15.875	5/8"	3"	3/4"
-	04157	.7500	3/4"	19.050	3/4"	3"	1"
-	04687	.7874		20.000	20.0	75	25



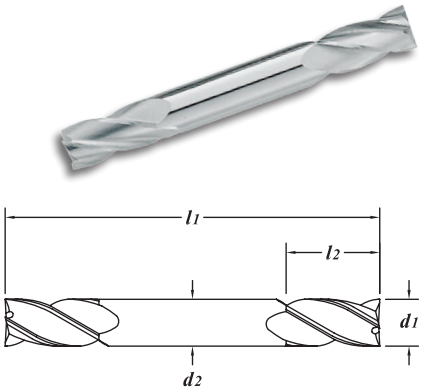
Series 175M, 875M

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6



TECH PAGES 268,270

Stub Length - Square End - Double End
Kurze Länge - Ohne Eckenradius - Dopple Ende
Longitud Corta - Extremo Sin Radio - Doble Punta
Longueur Courte - Extrémité Carré - Double Extrémité
Serie Corta - Piatte - Doppia Fresa
短柱长度 - 平头 - 球头



Solid submicron grain carbide end mill - center cutting
Shorter flute length for rigidity
Extremely versatile
TiAlN Coated - page 197
Standard Length - page 228

70

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Kürzere Spannuten für höhere Stabilität
Extrem Vielseitig
Radius Toleranz: +0,000 / –0,025 (+.000" –.001")
TiAlN-Beschichtet - Seite 197
Standard Länge - Seite 228

Fresa de submicrograno sólido carburo - corte centrado
Longitud de ranura más corta para proporcionar mayor rigidez
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Recubrimiento de TiAlN - Página 197
Longitud Estándar - Página 228

Fraises carbure submicrograin - coupe au centre
Longueur de coupe courte pour plus de rigidite
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Revêtement TiAlN - Page 197
Longueur Standart - Page 228

35

Fresa sub-micrograno metallo duro - taglio al centro
Tagliente più corto per maggiore rigidità
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Rivestimento in TiAlN - Pagina 197
Lunghezza Standard - Pagina 228

超细晶粒整体硬质合金立铣刀 - 中心切削
为了增加刚性应缩短出屑槽长度
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
TiAlN 涂层 - 197页
标准长度 - 228页

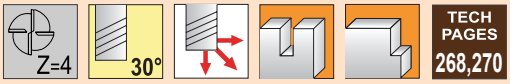
MATERIAL HARDNESS (Rc)

0

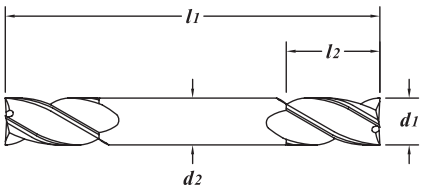
EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
06020	.0469	3/64"	1.191	1/8"	1-1/2"	3/32"
06030	.0625	1/16"	1.588	1/8"	1-1/2"	1/8"
06040	.0938	3/32"	2.383	1/8"	1-1/2"	3/16"
06540	.0984		2.500	3.0	38	5
06050	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
06560	.1378		3.500	4.0	50	7
06060	.1562	5/32"	3.967	3/16"	2"	5/16"
06570	.1575		4.000	4.0	50	8
06070	.1875	3/16"	4.763	3/16"	2"	3/8"
06080	.2188	7/32"	5.558	1/4"	2-1/2"	1/2"
06600	.2362		6.000	6.0	65	12
06090	.2500	1/4"	6.350	1/4"	2-1/2"	1/2"
06100	.3125	5/16"	7.938	5/16"	2-1/2"	1/2"
06110	.3750	3/8"	9.525	3/8"	2-1/2"	1/2"
06130	.5000	1/2"	12.700	1/2"	3"	5/8"

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6



Stub Length - Square End - Double End - TiALN Coated
Kurze Länge - Ohne Eckenradius - Dopple Ende - TiALN-Beschichtet
Longitud Corta - Extremo Sin Radio - Doble Punta - Recubrimiento de TiALN
Longueur Courte - Extrémité Carré - Double Extrémité - Revêtement TiALN
Serie Corta - Piatte - Doppia Fresa - Rivestimento in TiALN
短柱长度 - 平头 - 球头 - TiALN 涂层



Solid submicron grain carbide end mill - center cutting
Shorter flute length for rigidity
Dry or semi-dry machining
Extremely versatile
Uncoated - page 196
Standard Length - page 229

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Kürzere Spannuten für höhere Stabilität
Trocken oder Halbtrockene Bearbeitung
Extrem Vielseitig
Radius Toleranz: +0,000 / –0,025 (+.000" –.001")
Unbeschichtet - Seite 196
Standard Länge - Seite 229

Fresa de submicrograno sólido carburo - corte centrado
Longitud de ranura más corta para proporcionar mayor rigidez
Mecanizado seco o semiseco
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Sin recubrimiento - Página 196
Longitud Estándar - Página 229

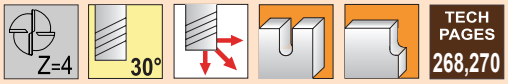
Fraises carbure submicrograin - coupe au centre
Longueur de coupe courte pour plus de rigidite
Usinage a sec ou avec l'air
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Sans revêtement - Page 196
Longueur Standart - Page 229

Fresa sub-micrograno metallo duro - taglio al centro
Tagliente più corto per maggiore rigidità
Lavorazione a secco o a umido
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Non Rivestito - Pagina 196
Lunghezza Standard - Pagina 229

超细晶粒整体硬质合金立铣刀 - 中心切削
为了增加刚性应缩短出屑槽长度
干式或半干式机加工
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
未涂层 - 196页
标准长度 - 229页

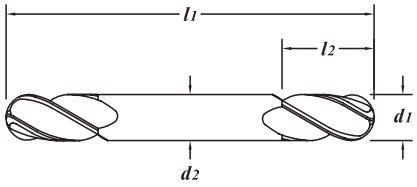
EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
06017	.0312	1/32"	0.792	1/8"	1-1/2"	1/16"
06517	.0394		1.000	3.0	38	2
06027	.0469	3/64"	1.191	1/8"	1-1/2"	3/32"
06527	.0591		1.500	3.0	38	3
06037	.0625	1/16"	1.588	1/8"	1-1/2"	1/8"
06537	.0787		2.000	3.0	38	4
06047	.0938	3/32"	2.383	1/8"	1-1/2"	3/16"
06547	.0984		2.500	3.0	38	5
06557	.1181		3.000	3.0	38	6
06057	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
06567	.1378		3.500	4.0	50	7
06067	.1562	5/32"	3.967	3/16"	2"	5/16"
06577	.1575		4.000	4.0	50	8
06077	.1875	3/16"	4.763	3/16"	2"	3/8"
06087	.2188	7/32"	5.558	1/4"	2-1/2"	1/2"
06607	.2362		6.000	6.0	65	12
06097	.2500	1/4"	6.350	1/4"	2-1/2"	1/2"
06107	.3125	5/16"	7.938	5/16"	2-1/2"	1/2"
06627	.3150		8.000	8.0	65	12
06117	.3750	3/8"	9.525	3/8"	2-1/2"	1/2"
06137	.5000	1/2"	12.700	1/2"	3"	5/8"

Series 195M, 995M



TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

Stub Length - Double End - Ball End
Kurze Länge - Dopple Ende - Vollradius
Longitud Corta - Doble Punta - Cabeza Esférica
Longueur Courte - Double Extrémité - Hemispherique
Serie Corta - Doppia Fresa - Sferica
短柱长度 - 球头 - 双头



Solid submicron grain carbide end mill - center cutting
Shorter flute length for rigidity
Extremely versatile
TiAlN Coated - page 199
Standard Length - page 226

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Kürzere Spannuten für höhere Stabilität
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
TiAlN-Beschichtet - Seite 199
Standard Länge - Seite 226

Fresa de submicrograno sólido carburo - corte centrado
Longitud de ranura más corta para proporcionar mayor rigidez
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Recubrimiento de TiAlN - Página 199
Longitud Estándar - Página 226

Fraises carbure submicrograin - coupe au centre
Longueur de coupe courte pour plus de rigidite
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Revêtement TiAlN - Page 199
Longueur Standart - Page 226

Fresa sub-micrograno metallo duro - taglio al centro
Tagliente più corto per maggiore rigidità
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Rivestimento in TiAlN - Pagina 199
Lunghezza Standard - Pagina 226

超细晶粒整体硬质合金立铣刀 - 中心切削
为了增加刚性应缩短出屑槽长度
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
TiAlN 涂层 - 199页
标准长度 - 226页

MATERIAL HARDNESS (Rc)
70
35
0

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
08010	.0312	1/32"	0.792	1/8"	1-1/2"	1/16"
08510	.0394		1.000	3.0	38	2
08020	.0469	3/64"	1.191	1/8"	1-1/2"	3/32"
08520	.0591		1.500	3.0	38	3
08030	.0625	1/16"	1.588	1/8"	1-1/2"	1/8"
08040	.0938	3/32"	2.383	1/8"	1-1/2"	3/16"
08050	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
08060	.1562	5/32"	3.967	3/16"	2"	5/16"
08070	.1875	3/16"	4.763	3/16"	2"	3/8"
08090	.2500	1/4"	6.350	1/4"	2-1/2"	1/2"

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

TECH PAGES 268,270

Stub Length - Double End - Ball End - TiALN Coated

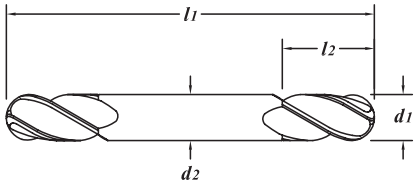
Kurze Länge - Dopple Ende - Vollradius - TiALN-Beschichtet

Longitud Corta - Doble Punta - Cabeza Esférica - Recubrimiento de TiALN

Longueur Courte - Double Extrémité - Hemispherique - Revêtement TiALN

Serie Corta - Doppia Fresa - Sferica - Rivestimento in TiALN

短柱长度 - 球头 - 双头 - TiALN 涂层



Solid submicron grain carbide end mill - center cutting
Shorter flute length for rigidity
Dry or semi-dry machining
Extremely versatile
Uncoated - page 198
Standard Length - page 231

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Kürzere Spannuten für höhere Stabilität
Trocken oder Halbtrockene Bearbeitung
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
Unbeschichtet - Seite 198
Standard Länge - Seite 231

Fresa de submicrograno sólido carburo - corte centrado
Longitud de ranura más corta para proporcionar mayor rigidez
Mecanizado seco o semiseco
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Sin recubrimiento - Página 198
Longitud Estándar - Página 231

Fraises carbure submicrograin - coupe au centre
Longueur de coupe courte pour plus de rigidite
Usinage a sec ou avec l'air
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Sans revêtement - Page 198
Longueur Standart - Page 231

Fresa sub-micrograno metallo duro - taglio al centro
Tagliente più corto per maggiore rigidità
Lavorazione a secco o a umido
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Non Rivestito - Pagina 198
Lunghezza Standard - Pagina 231

超细晶粒整体硬质合金立铣刀 - 中心切削
为了增加刚性应缩短出屑槽长度
干式或半干式机加工
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
未涂层 - 198页
标准长度 - 231页

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
08017	.0312	1/32"	0.792	1/8"	1-1/2"	1/16"
08517	.0394		1.000	3.0	38	2
08027	.0469	3/64"	1.191	1/8"	1-1/2"	3/32"
08037	.0625	1/16"	1.588	1/8"	1-1/2"	1/8"
08537	.0787		2.000	3.0	38	4
08047	.0938	3/32"	2.383	1/8"	1-1/2"	3/16"
08557	.1181		3.000	3.0	38	6
08057	.1250	1/8"	3.175	1/8"	1-1/2"	1/4"
08067	.1562	5/32"	3.967	3/16"	2"	5/16"
08577	.1575		4.000	4.0	50	8
08077	.1875	3/16"	4.763	3/16"	2"	3/8"
08597	.1969		5.000	5.0	65	10
08607	.2362		6.000	6.0	65	12
08097	.2500	1/4"	6.350	1/4"	2-1/2"	1/2"
08107	.3125	5/16"	7.938	5/16"	2-1/2"	1/2"
08117	.3750	3/8"	9.525	3/8"	2-1/2"	1/2"
08647	.3937		10.000	10.0	75	14
08137	.5000	1/2"	12.700	1/2"	3"	5/8"

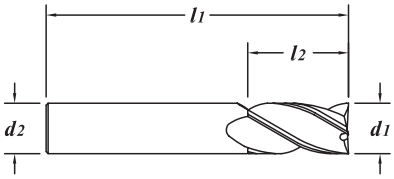
Series 220M, 223M, 230M, 820M, 823M, 830M

0,127mm - 2,500mm
(.0050" - .0984")

Z=2 | Z=3 | Z=4 | 30° | TECH PAGES 268,270

TOLERANCES		
d_1	≤ .030"	+0,000 –0,025mm (+.000" –.001")
	≥ 1/32"	+0,000 –0,050mm (+.000" –.002")
d_2	h6	

Standard Length - Square End
Standard Länge - Ohne Eckenradius
Longitud Estándar - Extremo Sin Radio
Longueur Standart - Extrémité Carré
Lunghezza Standard - Piatte
标准长度 - 平头



70

Solid submicron grain carbide end mill - center cutting
Extremely versatile
TiN Coated - page 202
TiCN Coated - page 203
TiAlN Coated - page 204
Stub Length - page 191
Extended Length - page 232

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Extrem Vielseitig
TiN-Beschichtet - Seite 202
TiCN-Beschichtet - Seite 203
TiAlN-Beschichtet - Seite 204
Kurze Länge - Seite 191
Extra Länge - Seite 232

Fresa de submicrograno sólido carburo - corte centrado
Extremadamente versátil
Recubrimiento de TiN - Página 202
Recubrimiento de TiCN - Página 203
Recubrimiento de TiAlN - Página 204
Longitud Corta - Página 191
Longitud Extra - Página 232

35

Fraises carbure submicrograin - coupe au centre
Utilisations variables
Revêtement TiN - Page 202
Revêtement TiCN - Page 203
Revêtement TiAlN - Page 204
Longueur Courte - Page 191
Longueur Extra - Page 232

Fresa sub-micrograno metallo duro - taglio al centro
Estremamente varsatile
Rivestimento in TiN - Pagina 202
Rivestimento in TiCN - Pagina 203
Rivestimento in TiAlN - Pagina 204
Serie Corta - Pagina 191
Lunghezza Extra - Pagina 232

超细晶粒整体硬质合金立铣刀 - 中心切削
功能极多
TiN 涂层 - 202页
TiCN 涂层 - 203页
TiAlN 涂层 - 204页
短柱长度 - 191页
超长 - 232页

MATERIAL HARDNESS (Rc)

0

(220M/820M) 2 Flute EDP#	(223M/823M) 3 Flute EDP#	(230M/830M) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
11500	-	-	.0050	.0050"	0.127	1/8"	1-1/2"	.015"
11510	-	-	.0060	.0060"	0.152	1/8"	1-1/2"	.018"
11520	-	-	.0070	.0070"	0.178	1/8"	1-1/2"	.021"
11530	-	-	.0080	.0080"	0.203	1/8"	1-1/2"	.024"
11540	-	-	.0090	.0090"	0.229	1/8"	1-1/2"	.027"
11550	-	13550	.0100	.0100"	0.254	1/8"	1-1/2"	.030"
11560	-	-	.0110	.0110"	0.279	1/8"	1-1/2"	.033"
11570	-	-	.0120	.0120"	0.305	1/8"	1-1/2"	.036"
11580	-	-	.0130	.0130"	0.330	1/8"	1-1/2"	.039"
11590	-	-	.0140	.0140"	0.356	1/8"	1-1/2"	.042"
11600	-	13600	.0150	.0150"	0.381	1/8"	1-1/2"	.045"
11610	-	-	.0160	.0160"	0.406	1/8"	1-1/2"	.048"
11620	-	-	.0170	.0170"	0.432	1/8"	1-1/2"	.051"
11630	-	-	.0180	.0180"	0.457	1/8"	1-1/2"	.054"
11640	-	-	.0190	.0190"	0.483	1/8"	1-1/2"	.057"
11650	-	13650	.0200	.0200"	0.508	1/8"	1-1/2"	.060"
11660	-	-	.0210	.0210"	0.533	1/8"	1-1/2"	.063"
11670	-	-	.0220	.0220"	0.559	1/8"	1-1/2"	.066"
11680	-	-	.0230	.0230"	0.584	1/8"	1-1/2"	.069"
11690	-	-	.0240	.0240"	0.610	1/8"	1-1/2"	.072"
11700	-	13700	.0250	.0250"	0.635	1/8"	1-1/2"	.075"
11710	-	-	.0260	.0260"	0.660	1/8"	1-1/2"	.078"
11720	-	-	.0270	.0270"	0.686	1/8"	1-1/2"	.081"
11730	-	-	.0280	.0280"	0.711	1/8"	1-1/2"	.084"
11740	-	-	.0290	.0290"	0.737	1/8"	1-1/2"	.087"
11750	-	13750	.0300	.0300"	0.762	1/8"	1-1/2"	.090"
11010	12010	13010	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"
45010	37010	46010	.0394		1.000	3.0	38	4
11020	12020	13020	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"
45020	37020	46020	.0591		1.500	3.0	38	6
11030	12030	13030	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"
11040	12040	13040	.0781	5/64"	1.984	1/8"	1-1/2"	1/4"
45030	37030	46030	.0787		2.000	3.0	38	8
11050	12050	13050	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"
45040	37040	46040	.0984		2.500	3.0	38	12

† *Metric equivalents are for reference only*

(220M/820M) 2 Flute EDP#	(223M/823M) 3 Flute EDP#	(230M/830M) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
11060	12060	13060	.1094	7/64"	2.779	1/8"	1-1/2"	3/8"
45050	37050	46050	.1181		3.000	3.0	38	12
11070	12070	13070	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
45060	37060	46060	.1378		3.500	4.0	50	12
11080	12080	13080	.1406	9/64"	3.571	3/16"	2"	9/16"
11090	12090	13090	.1562	5/32"	3.967	3/16"	2"	9/16"
45070	37070	46070	.1575		4.000	4.0	50	14
11100	12100	13100	.1719	11/64"	4.366	3/16"	2"	9/16"
45080	37080	46080	.1772		4.500	5.0	50	14
11110	12110	13110	.1875	3/16"	4.763	3/16"	2"	5/8"
45090	37090	46090	.1969		5.000	5.0	65	16
11120	12120	13120	.2031	13/64"	5.159	1/4"	2-1/2"	5/8"
11130	12130	13130	.2188	7/32"	5.558	1/4"	2-1/2"	5/8"
11140	12140	13140	.2344	15/64"	5.954	1/4"	2-1/2"	3/4"
45100	37100	46100	.2362		6.000	6.0	65	19
11150	12150	13150	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
11160	12160	13160	.2656	17/64"	6.746	5/16"	2-1/2"	7/8"
45110	37110	46110	.2756		7.000	7.0	65	22
11170	12170	13170	.2812	9/32"	7.142	5/16"	2-1/2"	7/8"
11180	12180	13180	.2969	19/64"	7.541	5/16"	2-1/2"	7/8"
11190	12190	13190	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
45120	37120	46120	.3150		8.000	8.0	65	22
11200	12200	13200	.3281	21/64"	8.334	3/8"	2-1/2"	7/8"
11210	12210	13210	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"
45130	37130	46130	.3543		9.000	9.0	65	22
11220	12220	13220	.3594	23/64"	9.129	3/8"	2-1/2"	7/8"
11230	12230	13230	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
11240	12240	13240	.3906	25/64"	9.921	7/16"	2-3/4"	7/8"
45140	37140	46140	.3937		10.000	10.0	70	25
11250	12250	13250	.4062	13/32"	10.317	7/16"	2-3/4"	7/8"
11260	12260	13260	.4219	27/64"	10.716	7/16"	2-3/4"	7/8"
45150	37150	46150	.4331		11.000	11.0	75	25
11270	12270	13270	.4375	7/16"	11.113	7/16"	2-3/4"	1"
11280	12280	13280	.4531	29/64"	11.509	1/2"	3"	1"
11290	-	13290	.4688	15/32"	11.908	1/2"	3"	1"
45160	37160	46160	.4724		12.000	12.0	75	25
11300	12300	13300	.4844	31/64"	12.304	1/2"	3"	1"
11310	12310	13310	.5000	1/2"	12.700	1/2"	3"	1"
45170	37170	46170	.5512		14.000	14.0	88	32
11320	12320	13320	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"
11330	12330	13330	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
45180	37180	46180	.6299		16.000	16.0	88	38
11340	12340	13340	.6875	11/16"	17.463	3/4"	4"	1-1/2"
45190	37190	46190	.7087		18.000	18.0	100	38
11350	12350	13350	.7500	3/4"	19.050	3/4"	4"	1-1/2"
45200	37200	46200	.7874		20.000	20.0	100	38
45210	37210	46210	.8661		22.000	22.0	100	38
11360	12360	13360	.8750	7/8"	22.225	7/8"	4"	1-1/2"
45220	37220	46220	.9843		25.000	25.0	100	38
11370	12370	13370	1.000	1"	25.400	1"	4"	1-1/2"
-	-	13390	1.250	1-1/4"	31.750	1-1/4"	4-1/2"	2"

Series 220MT, 230MT

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=2 | Z=4 | 30° | TECH PAGES 268,270

Standard Length - Square End - TiN Coated
Standard Länge - Ohne Eckenradius - TiN-Beschichtet
Longitud Estándar - Extremo Sin Radio - Recubrimiento de TiN
Longueur Standart - Extrémité Carré - Revêtement TiN
Lunghezza Standard - Piatte - Rivestimento in TiN
标准长度 - 平头 - TiN 涂层

Solid submicron grain carbide end mill - center cutting
Improved lubricity
Extremely versatile
Uncoated - page 200
TiCN Coated - page 203
TiAlN Coated - page 204

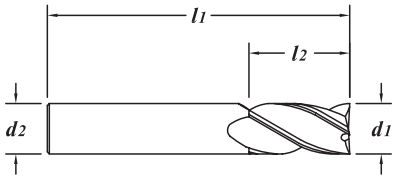
Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Verbessere Schmiereingenschaft
Extrem Vielseitig
Unbeschichtet - Seite 200
TiCN-Beschichtet - Seite 203
TiAlN-Beschichtet - Seite 204

Fresa de submicrograno sólido carburo - corte centrado
Majorada la lubricación
Extremadamente versátil
Sin recubrimiento - Página 200
Recubrimiento de TiCN - Página 203
Recubrimiento de TiAlN - Página 204

Fraises carbure submicrograin - coupe au centre
Amelioration du glissement
Utilisations variables
Sans revêtement - Page 200
Revêtement TiCN - Page 203
Revêtement TiAlN - Page 204

Fresa sub-micrograno metallo duro - taglio al centro
Migliore autolubrificazione
Estremamente varsatile
Non Rivestito - Pagina 200
Rivestimento in TiCN - Pagina 203
Rivestimento in TiAlN - Pagina 204

超细晶粒整体硬质合金立铣刀 - 中心切削
改善润滑性能
功能极多
未涂层 - 200页
TiCN 涂层 - 203页
TiAlN 涂层 - 204页



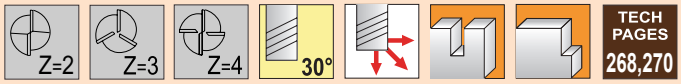
(220MT) 2 Flute EDP#	(230MT) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
11073	13073	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
11113	13113	.1875	3/16"	4.763	3/16"	2"	5/8"
11153	13153	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
11193	13193	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
11233	13233	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
11273	13273	.4375	7/16"	11.113	7/16"	2-3/4"	1"
11313	13313	.5000	1/2"	12.700	1/2"	3"	1"
11333	13333	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
11353	13353	.7500	3/4"	19.050	3/4"	4"	1-1/2"
-	13373	1.000	1"	25.400	1"	4"	1-1/2"

MATERIAL HARDNESS (Rc)
70
35
0

† *Metric equivalents are for reference only*

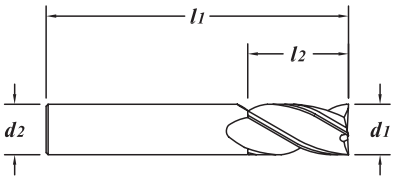
TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Series 220MC, 223MC, 230MC



TECH PAGES 268,270

Standard Length - Square End - TiCN Coated
Standard Länge - Ohne Eckenradius - TiCN-Beschichtet
Longitud Estándar - Extremo Sin Radio - Recubrimiento de TiCN
Longueur Standart - Extrémité Carré - Revêtement TiCN
Lunghezza Standard - Piatte - Rivestimento in TiCN
标准长度 - 平头 - TiCN 涂层



Solid submicron grain carbide end mill - center cutting
Improved abrasion resistance and lubricity
Extremely versatile
Uncoated - page 200
TiN Coated - page 202
TiALN Coated - page 204
Extended Length - Page 234

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Verbesserte Verschleissbeständigkeit und Schmiereieneschaft
Extrem Vielseitig
Unbeschichtet - Seite 200
TiN-Beschichtet - Seite 202
TiALN-Beschichtet - Seite 204
Extra Länge - Seite 234

Fresa de submicrograno sólido carburo - corte centrado
Mejoradas la resistencia a la abrasión y la lubricación
Extremadamente versátil
Sin recubrimiento - Página 200
Recubrimiento de TiN - Página 202
Recubrimiento de TiALN - Página 204
Longitud Extra - Página 234

Fraises carbure submicrograin - coupe au centre
Amelioration de la resistance a l'abrasion et au glissement
Utilisations variables
Sans revêtement - Page 200
Revêtement TiN - Page 202
Revêtement TiALN - Page 204
Extra Longue - Page 234

Fresa sub-micrograno metallo duro - taglio al centro
Maggiore resistenza all'abrasione
Estremamente varsatile
Non Rivestito - Pagina 200
Rivestimento in TiN - Pagina 202
Rivestimento in TiALN - Pagina 204
Lunghezza Extra - Pagina 234

超细晶粒整体硬质合金立铣刀 - 中心切削
改善耐磨性和润滑性
功能极多
未涂层 - 200页
TiN 涂层 - 202页
TiALN 涂层 - 204页
超长 - 234页

(220MC) 2 Flute EDP#	(223MC) 3 Flute EDP#	(230MC) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
11014	12014	13014	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"
11024	12024	13024	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"
11034	12034	13034	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"
11044	12044	13044	.0781	5/64"	1.984	1/8"	1-1/2"	1/4"
11054	12054	13054	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"
11064	12064	13064	.1094	7/64"	2.779	1/8"	1-1/2"	3/8"
11074	12074	13074	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
11084	12084	13084	.1406	9/64"	3.571	3/16"	2"	9/16"
11094	12094	13094	.1562	5/32"	3.967	3/16"	2"	9/16"
11104	12104	13104	.1719	11/64"	4.366	3/16"	2"	9/16"
11114	12114	13114	.1875	3/16"	4.763	3/16"	2"	5/8"
11124	12124	13124	.2031	13/64"	5.159	1/4"	2-1/2"	5/8"
11134	12134	13134	.2188	7/32"	5.558	1/4"	2-1/2"	5/8"
11144	12144	13144	.2344	15/64"	5.954	1/4"	2-1/2"	3/4"
11154	12154	13154	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
11164	12164	13164	.2656	17/64"	6.746	5/16"	2-1/2"	7/8"
11174	12174	13174	.2812	9/32"	7.142	5/16"	2-1/2"	7/8"
11184	12184	13184	.2969	19/64"	7.541	5/16"	2-1/2"	7/8"
11194	12194	13194	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
11204	12204	13204	.3281	21/64"	8.334	3/8"	2-1/2"	7/8"
11214	12214	13214	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"
11224	12224	13224	.3594	23/64"	9.129	3/8"	2-1/2"	7/8"
11234	12234	13234	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
11244	12244	13244	.3906	25/64"	9.921	7/16"	2-3/4"	7/8"
11254	12254	13254	.4062	13/32"	10.317	7/16"	2-3/4"	7/8"
11264	-	13264	.4219	27/64"	10.716	7/16"	2-3/4"	7/8"
11274	12274	13274	.4375	7/16"	11.113	7/16"	2-3/4"	1"
11284	-	13284	.4531	29/64"	11.509	1/2"	3"	1"
11294	12294	13294	.4688	15/32"	11.908	1/2"	3"	1"
-	12304	13304	.4844	31/64"	12.304	1/2"	3"	1"
11314	12314	13314	.5000	1/2"	12.700	1/2"	3"	1"
11324	12324	13324	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"
11334	12334	13334	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
11344	-	13344	.6875	11/16"	17.463	3/4"	4"	1-1/2"
11354	12354	13354	.7500	3/4"	19.050	3/4"	4"	1-1/2"
11364	-	13364	.8750	7/8"	22.225	7/8"	4"	1-1/2"
11374	12374	13374	1.000	1"	25.400	1"	4"	1-1/2"
-	-	13394	1.250	1-1/4"	31.750	1-1/4"	4-1/2"	2"

Series 220MA, 223MA, 230MA, 820MA, 823MA, 830MA

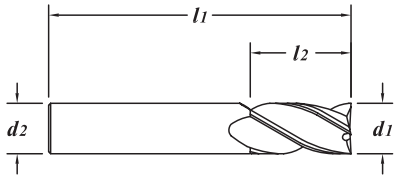
0,792mm - 9,129mm
(.0312" - .3594")

Z=2 Z=3 Z=4 30°

TECH PAGES 268,270

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Standard Length - Square End - TiALN Coated
Standard Länge - Ohne Eckenradius - TiALN-Beschichtet
Longitud Estándar - Extremo Sin Radio - Recubrimiento de TiALN
Longueur Standart - Extrémité Carré - Revêtement TiALN
Lunghezza Standard - Piatte - Rivestimento in TiALN
标准长度 - TiALN 涂层



Solid submicron grain carbide end mill - center cutting
Dry or semi-dry machining
Extremely versatile
Uncoated - page 200
TiN Coated - page 202
TiCN Coated - page 203
Stub Length - page 193
Extended Length - page 235

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Trocken oder Halbtrockene Bearbeitung
Extrem Vielseitig
Unbeschichtet - Seite 200
TiN-Beschichtet - Seite 202
TiCN-Beschichtet - Seite 203
Kurze Länge - Seite 193
Extra Länge - Seite 235

Fresa de submicrograno sólido carburo - corte centrado
Mecanizado seco o semiseco
Extremadamente versátil
Sin recubrimiento - Página 200
Recubrimiento de TiN - Página 202
Recubrimiento de TiCN - Página 203
Longitud Corta - Página 193
Longitud Extra - Página 235

Fraises carbure submicrograin - coupe au centre
Usinage a sec ou avec l'air
Utilisations variables
Sans revêtement - Page 200
Revêtement TiN - Page 202
Revêtement TiCN - Page 203
Longueur Courte - Page 193
Longueur Extra - Page 235

Fresa sub-micrograno metallo duro - taglio al centro
Lavorazione a secco o a umido
Estremamente versatile
Non Rivestito - Pagina 200
Rivestimento in TiN - Pagina 202
Rivestimento in TiCN - Pagina 203
Serie Corta - Pagina 193
Lunghezza Extra - Pagina 235

超细晶粒整体硬质合金立铣刀 - 中心切削
干式或半干式机加工
功能极多
未涂层 - 200页
TiN 涂层 - 202页
TiCN 涂层 - 203页
短柱长度 - 193页
超长 - 235页

MATERIAL HARDNESS (Rc)
70
35
0

(220MA/820MA) 2 Flute EDP#	(223MA/823MA) 3 Flute EDP#	(230MA/830MA) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
11017	12017	13017	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"
45017	37017	46017	.0394		1.000	3.0	38	4
11027	12027	13027	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"
45027	37027	46027	.0591		1.500	3.0	38	6
11037	12037	13037	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"
11047	12047	13047	.0781	5/64"	1.984	1/8"	1-1/2"	1/4"
45037	37037	46037	.0787		2.000	3.0	38	8
11057	12057	13057	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"
45047	37047	46047	.0984		2.500	3.0	38	12
11067	12067	13067	.1094	7/64"	2.779	1/8"	1-1/2"	3/8"
45057	37057	46057	.1181		3.000	3.0	38	12
11077	12077	13077	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
45067	37067	46067	.1378		3.500	4.0	50	12
11087	12087	13087	.1406	9/64"	3.571	3/16"	2"	9/16"
11097	12097	13097	.1562	5/32"	3.967	3/16"	2"	9/16"
45077	37077	46077	.1575		4.000	4.0	50	14
11107	12107	13107	.1719	11/64"	4.366	3/16"	2"	9/16"
45087	37087	46087	.1772		4.500	5.0	50	14
11117	12117	13117	.1875	3/16"	4.763	3/16"	2"	5/8"
45097	37097	46097	.1969		5.000	5.0	65	16
11127	12127	13127	.2031	13/64"	5.159	1/4"	2-1/2"	5/8"
11137	12137	13137	.2188	7/32"	5.558	1/4"	2-1/2"	5/8"
11147	12147	13147	.2344	15/64"	5.954	1/4"	2-1/2"	3/4"
45107	37107	46107	.2362		6.000	6.0	65	19
11157	12157	13157	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
11167	12167	13167	.2656	17/64"	6.746	5/16"	2-1/2"	7/8"
45117	37117	46117	.2756		7.000	7.0	65	22
11177	12177	13177	.2812	9/32"	7.142	5/16"	2-1/2"	7/8"
11187	12187	13187	.2969	19/64"	7.541	5/16"	2-1/2"	7/8"
11197	12197	13197	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
45127	37127	46127	.3150		8.000	8.0	65	22
11207	12207	13207	.3281	21/64"	8.334	3/8"	2-1/2"	7/8"
11217	12217	13217	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"
45137	37137	46137	.3543		9.000	9.0	65	22
11227	12227	13227	.3594	23/64"	9.129	3/8"	2-1/2"	7/8"

† *Metric equivalents are for reference only*

(220MA/820MA) 2 Flute EDP#	(223MA/823MA) 3 Flute EDP#	(230MA/830MA) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
11237	12237	13237	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
11247	12247	13247	.3906	25/64"	9.921	7/16"	2-3/4"	7/8"
45147	37147	46147	.3937		10.000	10.0	70	25
11257	12257	13257	.4062	13/32"	10.317	7/16"	2-3/4"	7/8"
11267	12267	13267	.4219	27/64"	10.716	7/16"	2-3/4"	7/8"
45157	37157	46157	.4331		11.000	11.0	75	25
11277	12277	13277	.4375	7/16"	11.113	7/16"	2-3/4"	1"
11287	12287	13287	.4531	29/64"	11.509	1/2"	3"	1"
11297	12297	13297	.4688	15/32"	11.908	1/2"	3"	1"
45167	37167	46167	.4724		12.000	12.0	75	25
11307	12307	13307	.4844	31/64"	12.304	1/2"	3"	1"
11317	12317	13317	.5000	1/2"	12.700	1/2"	3"	1"
45177	37177	46177	.5512		14.000	14.0	88	32
11327	12327	13327	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"
11337	12337	13337	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
45187	37187	46187	.6299		16.000	16.0	88	38
11347	12347	13347	.6875	11/16"	17.463	3/4"	4"	1-1/2"
45197	37197	46197	.7087		18.000	18.0	100	38
11357	12357	13357	.7500	3/4"	19.050	3/4"	4"	1-1/2"
45207	37207	46207	.7874		20.000	20.0	100	38
45217	37217	46217	.8661		22.000	22.0	100	38
11367	12367	13367	.8750	7/8"	22.225	7/8"	4"	1-1/2"
45227	37227	46227	.9843		25.000	25.0	100	38
11377	12377	13377	1.000	1"	25.400	1"	4"	1-1/2"
-	-	13397	1.250	1-1/4"	31.750	1-1/4"	4-1/2"	2"

End Mill Manufacturing

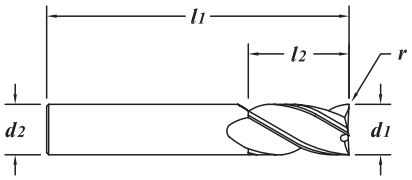
Series 220R, 230R

1,588mm - 12,700mm
(.0625" - .5000")

Z=2 | Z=4 | 30° | TECH PAGES 268,270

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
r	+0,025 –0,025mm (+.001" –.001")

Standard Length - Corner Radius
Standard Länge - Eckenradius
Longitud Estándar - Ángulo Redondeado
Longueur Standart - Rayon de Coin
Lunghezza Standard - Torico
标准长度 - 圆角半径



Solid submicron grain carbide end mill - center cutting
For stronger corners and part radius
Extremely versatile
TiAlN Coated - page 208
Extended Length - page 237

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Für stärkere Schneidecken und Radiusteile
Extrem Vielseitig
TiAlN-Beschichtet - Seite 208
Extra Länge - Seite 237

Fresa de submicrograno sólido carburo - corte centrado
Para un mejor refuerzo de esquinas y zonas curvas
Extremadamente versátil
Recubrimiento de TiAlN - Página 208
Longitud Extra - Página 237

Fraises carbure submicrograin - coupe au centre
Rayon de coin renforces
Utilisations variables
Revêtement TiAlN - Page 208
Extra Longueur - Page 237

Fresa sub-micrograno metallo duro - taglio al centro
Raggi rinforzati
Estremamente varsatile
Rivestimento in TiAlN - Pagina 208
Lunghezza Extra - Pagina 237

超细晶粒整体硬质合金立铣刀 - 中心切削
用于强化圆角和零件半径
功能极多
TiAlN 涂层 - 208页
超长 - 237页

(220R) 2 Flute EDP#	(230R) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
79580	80580	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"	.010"
79590	80590	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"	.015"
79600	80600	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	.010"
79610	80610	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	.015"
79620	80620	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	.020"
79000	80000	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.010"
79010	80010	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.015"
79020	80020	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.020"
79030	80030	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.030"
79040	80040	.1875	3/16"	4.763	3/16"	2"	5/8"	.010"
79050	80050	.1875	3/16"	4.763	3/16"	2"	5/8"	.015"
79060	80060	.1875	3/16"	4.763	3/16"	2"	5/8"	.020"
79070	80070	.1875	3/16"	4.763	3/16"	2"	5/8"	.030"
-	80090	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"
79100	80100	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"
79110	80110	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"
79120	80120	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"
79130	80130	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.045"
79140	80140	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.060"
79160	80160	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	.015"
79170	80170	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	.020"
79180	80180	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	.030"
79190	80190	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	.045"
79200	80200	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	.060"
-	80220	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.010"
79230	80230	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.015"
79240	80240	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.020"
79250	80250	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"
79260	80260	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.045"
79270	80270	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.060"
-	80290	.5000	1/2"	12.700	1/2"	3"	1"	.010"
79300	80300	.5000	1/2"	12.700	1/2"	3"	1"	.015"
79310	80310	.5000	1/2"	12.700	1/2"	3"	1"	.020"
79320	80320	.5000	1/2"	12.700	1/2"	3"	1"	.030"
79330	80330	.5000	1/2"	12.700	1/2"	3"	1"	.045"
79340	80340	.5000	1/2"	12.700	1/2"	3"	1"	.060"
79350	80350	.5000	1/2"	12.700	1/2"	3"	1"	.090"
79360	80360	.5000	1/2"	12.700	1/2"	3"	1"	.125"

† *Metric equivalents are for reference only*

(220R) 2 Flute EDP#	(230R) 4 Flute EDP#	*d1* † Diameter Decimal	Diameter	Metric	*d2* Shank Diameter	*l1* Overall Length	*l2* Flute Length	*r* Corner Radius
79370	80370	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.015"
79380	80380	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.020"
79390	80390	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"
79400	80400	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.045"
79410	80410	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.060"
79420	80420	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.090"
79440	80440	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.015"
79450	80450	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.020"
79460	80460	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"
79470	80470	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.045"
79480	80480	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"
79490	80490	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.090"
79500	80500	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.125"
79630	80630	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.250"
79510	80510	1.000	1"	25.400	1"	4"	1-1/2"	.015"
79520	80520	1.000	1"	25.400	1"	4"	1-1/2"	.020"
79530	80530	1.000	1"	25.400	1"	4"	1-1/2"	.030"
79540	80540	1.000	1"	25.400	1"	4"	1-1/2"	.045"
79550	80550	1.000	1"	25.400	1"	4"	1-1/2"	.060"
79560	80560	1.000	1"	25.400	1"	4"	1-1/2"	.090"
79570	80570	1.000	1"	25.400	1"	4"	1-1/2"	.125"
79640	80640	1.000	1"	25.400	1"	4"	1-1/2"	.250"

Tool Reconditioning Prep Area

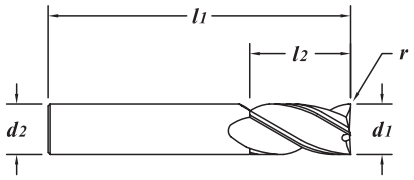
Series 220RA, 230RA, 830RA

1,588mm - 7,938mm
(.0625" - .3125")

Z=2 | Z=4 | 30° | TECH PAGES 268,270

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
r	+0,025 –0,025mm (+.001" –.001")

Standard Length - Corner Radius - TiALN Coated
Standard Länge - Eckenradius - TiALN-Beschichtet
Longitud Estándar - Ángulo Redondeado - Recubrimiento de TiALN
Longueur Standart - Rayon de Coin - Revêtement TiALN
Lunghezza Standard - Torico - Rivestimento in TiALN
标准长度 - 圆角半径 - TiALN 涂层



Solid submicron grain carbide end mill - center cutting
For stronger corners and part radius
Dry or semi-dry machining
Extremely versatile
Uncoated - page 206
Extended Length - page 240

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Für stärkere Schneidecken und Radiusteile
Trocken oder Halbtrockene Bearbeitung
Extrem Vielseitig
Unbeschichtet - Seite 206
Extra Länge - Seite 240

Fresa de submicrograno sólido carburo - corte centrado
Para un mejor refuerzo de esquinas y zonas curvas
Mecanizado seco o semiseco
Extremadamente versátil
Sin recubrimiento - Página 206
Longitud Extra - Página 240

Fraises carbure submicrograin - coupe au centre
Rayon de coin renforces
Usinage a sec ou avec l'air
Utilisations variables
Sans revêtement - Page 206
Extra Longueur - Page 240

Fresa sub-micrograno metallo duro - taglio al centro
Raggi rinforzati
Lavorazione a secco o a umido
Estremamente varsatile
Non Rivestito - Pagina 206
Lunghezza Extra - Pagina 240

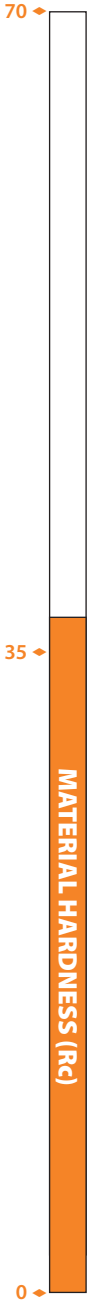
超细晶粒整体硬质合金立铣刀 - 中心切削
用于强化圆角和零件半径
干式或半干式机加工
功能极多
未涂层 - 206页
超长 - 240页

MATERIAL HARDNESS (Rc)
70
35
0

(220RA) 2 Flute EDP#	(230RA/830RA) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
79587	80587	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"	.010"
79597	80597	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"	.015"
79607	80607	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	.010"
79617	80617	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	.015"
79627	80627	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"	.020"
-	24077	.1181		3.000	3.0	38	12	0.20
-	24087	.1181		3.000	3.0	38	12	0.50
79007	80007	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.010"
79017	80017	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.015"
79027	80027	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.020"
79037	80037	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"	.030"
-	24097	.1575		4.000	4.0	50	14	0.30
-	24107	.1575		4.000	4.0	50	14	0.50
79047	80047	.1875	3/16"	4.763	3/16"	2"	5/8"	.010"
79057	80057	.1875	3/16"	4.763	3/16"	2"	5/8"	.015"
79067	80067	.1875	3/16"	4.763	3/16"	2"	5/8"	.020"
79077	80077	.1875	3/16"	4.763	3/16"	2"	5/8"	.030"
-	24117	.1969		5.000	5.0	50	16	0.30
-	24127	.1969		5.000	5.0	65	16	0.50
-	24177	.2362		6.000	6.0	65	19	0.50
-	24187	.2362		6.000	6.0	65	19	0.80
-	24197	.2362		6.000	6.0	65	19	1.00
-	24207	.2362		6.000	6.0	65	19	1.50
-	24217	.2362		6.000	6.0	65	19	2.00
-	80097	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.010"
79107	80107	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.015"
79117	80117	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.020"
79127	80127	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.030"
79137	80137	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.045"
79147	80147	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"	.060"
79167	80167	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	.015"
79177	80177	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	.020"
79187	80187	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	.030"
79197	80197	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	.045"
79207	80207	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"	.060"

† *Metric equivalents are for reference only*

(220RA) 2 Flute EDP#	(230RA/830RA) 4 Flute EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
-	24227	.3150		8.000	8.0	65	22	0.50
-	24237	.3150		8.000	8.0	65	22	0.80
-	24247	.3150		8.000	8.0	65	22	1.00
-	24257	.3150		8.000	8.0	65	22	1.50
-	24267	.3150		8.000	8.0	65	22	2.00
-	24277	.3150		8.000	8.0	65	22	2.50
-	24287	.3150		8.000	8.0	65	22	3.00
-	80227	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.010"
79237	80237	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.015"
79247	80247	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.020"
79257	80257	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.030"
79267	80267	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.045"
79277	80277	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"	.060"
-	24297	.3937		10.000	10.0	70	25	0.50
-	24307	.3937		10.000	10.0	70	25	0.80
-	24317	.3937		10.000	10.0	70	25	1.00
-	24327	.3937		10.000	10.0	70	25	1.50
-	24337	.3937		10.000	10.0	70	25	2.00
-	24347	.3937		10.000	10.0	70	25	2.50
-	24357	.3937		10.000	10.0	70	25	3.00
-	24367	.3937		10.000	10.0	70	25	3.20
-	80279	.4375	7/16"	11.113	7/16"	2-3/4"	1"	.010"
-	80281	.4375	7/16"	11.113	7/16"	2-3/4"	1"	.015"
-	80283	.4375	7/16"	11.113	7/16"	2-3/4"	1"	.020"
-	80285	.4375	7/16"	11.113	7/16"	2-3/4"	1"	.030"
-	80287	.4375	7/16"	11.113	7/16"	2-3/4"	1"	.045"
-	80289	.4375	7/16"	11.113	7/16"	2-3/4"	1"	.060"
-	80291	.4375	7/16"	11.113	7/16"	2-3/4"	1"	.090"
-	80293	.4375	7/16"	11.113	7/16"	2-3/4"	1"	.125"
-	24377	.4724		12.000	12.0	75	25	0.50
-	24387	.4724		12.000	12.0	75	25	0.80
-	24397	.4724		12.000	12.0	75	25	1.00
-	24407	.4724		12.000	12.0	75	25	1.50
-	24417	.4724		12.000	12.0	75	25	2.00
-	24427	.4724		12.000	12.0	75	25	2.50
-	24437	.4724		12.000	12.0	75	25	3.00
-	24447	.4724		12.000	12.0	75	25	3.20
-	80297	.5000	1/2"	12.700	1/2"	3"	1"	.010"
79307	80307	.5000	1/2"	12.700	1/2"	3"	1"	.015"
79317	80317	.5000	1/2"	12.700	1/2"	3"	1"	.020"
79327	80327	.5000	1/2"	12.700	1/2"	3"	1"	.030"
79337	80337	.5000	1/2"	12.700	1/2"	3"	1"	.045"
79347	80347	.5000	1/2"	12.700	1/2"	3"	1"	.060"
79357	80357	.5000	1/2"	12.700	1/2"	3"	1"	.090"
79367	80367	.5000	1/2"	12.700	1/2"	3"	1"	.125"
79377	80377	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.015"
-	80387	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.020"
79397	80397	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.030"
79407	80407	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.045"
79417	80417	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.060"
79427	80427	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"	.090"
-	24457	.6299		16.000	16.0	88	38	0.50
-	24467	.6299		16.000	16.0	88	38	1.00
-	24477	.6299		16.000	16.0	88	38	2.00
-	24487	.6299		16.000	16.0	88	38	2.50
-	24497	.6299		16.000	16.0	88	38	3.00
-	24507	.6299		16.000	16.0	88	38	4.00
-	24517	.6299		16.000	16.0	88	38	5.00



continued →

Series 220RA, 230RA, 830RA *(continued)*

19,050mm - 25,400mm
(.7500" - 1.000")

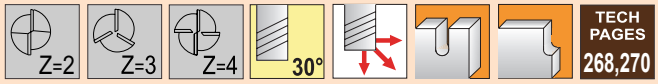
(220RA) 2 Flute EDP#	(230RA/830RA) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
79447	80447	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.015"
79457	80457	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.020"
79467	80467	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.030"
79477	80477	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.045"
79487	80487	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.060"
79497	80497	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.090"
79507	80507	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.125"
79637	80637	.7500	3/4"	19.050	3/4"	4"	1-1/2"	.250"
-	24527	.7874		20.000	20.0	100	38	0.50
-	24537	.7874		20.000	20.0	100	38	1.00
-	24547	.7874		20.000	20.0	100	38	2.00
-	24557	.7874		20.000	20.0	100	38	3.00
-	24567	.7874		20.000	20.0	100	38	5.00
-	80517	1.000	1"	25.400	1"	4"	1-1/2"	.015"
-	80527	1.000	1"	25.400	1"	4"	1-1/2"	.020"
79537	80537	1.000	1"	25.400	1"	4"	1-1/2"	.030"
-	80547	1.000	1"	25.400	1"	4"	1-1/2"	.045"
79557	80557	1.000	1"	25.400	1"	4"	1-1/2"	.060"
-	80567	1.000	1"	25.400	1"	4"	1-1/2"	.090"
79577	80577	1.000	1"	25.400	1"	4"	1-1/2"	.125"
79647	80647	1.000	1"	25.400	1"	4"	1-1/2"	.250"

End Mill Manufacturing

† *Metric equivalents are for reference only*

TOLERANCES		
d_1	≤ .030"	+0,000 –0,025mm (+.000" –.001")
	≥ 1/32"	+0,000 –0,050mm (+.000" –.002")
d_2	h6	
ball radius	+0,000 –0,025mm (+.000" –.001")	

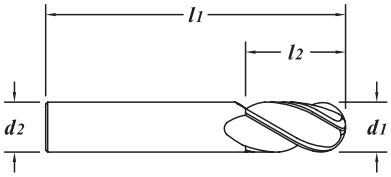
Series 320M, 323M, 330M, 920M, 923M, 930M



TECH PAGES 268,270

0,254mm - 6,746mm (.0100" - .2656")

Standard Length - Ball End
Standard Länge - Vollradius
Longitud Estándar - Cabeza Esférica
Longueur Standart - Hemispherique
Lunghezza Standard - Sferica
标准长度 - 球头



Solid submicron grain carbide end mill - center cutting
Extremely versatile
TiN Coated - page 213
TiCN Coated - page 214
TiAlN Coated - page 215
Stub Length - page 194
Extended Length - page 243

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
TiN-Beschichtet - Seite 213
TiCN-Beschichtet - Seite 214
TiAlN-Beschichtet - Seite 215
Kurze Länge - Seite 194
Extra Länge - Seite 243

Fresa de submicrograno sólido carburo - corte centrado
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Recubrimiento de TiN - Página 213
Recubrimiento de TiCN - Página 214
Recubrimiento de TiAlN - Página 215
Longitud Corta - Página 194
Longitud Extra - Página 243

Fraises carbure submicrograin - coupe au centre
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Revêtement TiN - Page 213
Revêtement TiCN - Page 214
Revêtement TiAlN - Page 215
Longueur Courte - Page 194
Longueur Extra - Page 243

Fresa sub-micrograno metallo duro - taglio al centro
Estremamente versatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Rivestimento in TiN - Pagina 213
Rivestimento in TiCN - Pagina 214
Rivestimento in TiAlN - Pagina 215
Serie Corta - Pagina 194
Lunghezza Extra - Pagina 243

超细晶粒整体硬质合金立铣刀 - 中心切削
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
TiN 涂层 - 213页
TiCN 涂层 - 214页
TiAlN 涂层 - 215页
短柱长度 - 194页
超长 - 243页

(320M/920M) 2 Flute EDP#	(323M/923M) 3 Flute EDP#	(330M/930M) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
16550	-	-	.0100	.0100"	0.254	1/8"	1-1/2"	.030"
16600	-	-	.0150	.0150"	0.381	1/8"	1-1/2"	.045"
16650	-	-	.0200	.0200"	0.508	1/8"	1-1/2"	.060"
16700	-	-	.0250	.0250"	0.635	1/8"	1-1/2"	.075"
16750	-	-	.0300	.0300"	0.762	1/8"	1-1/2"	.090"
16010	17010	18010	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"
47010	38010	48010	.0394		1.000	3.0	38	4
16020	17020	18020	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"
47020	38020	48020	.0591		1.500	3.0	38	6
16030	17030	18030	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"
16040	17040	18040	.0781	5/64"	1.984	1/8"	1-1/2"	1/4"
47030	38030	48030	.0787		2.000	3.0	38	8
16050	17050	18050	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"
47040	38040	48040	.0984		2.500	3.0	38	12
16060	17060	18060	.1094	7/64"	2.779	1/8"	1-1/2"	3/8"
47050	38050	48050	.1181		3.000	3.0	38	12
16070	17070	18070	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
47060	38060	48060	.1378		3.500	4.0	50	12
16080	17080	18080	.1406	9/64"	3.571	3/16"	2"	9/16"
16090	17090	18090	.1562	5/32"	3.967	3/16"	2"	9/16"
47070	38070	48070	.1575		4.000	4.0	50	14
16100	17100	18100	.1719	11/64"	4.366	3/16"	2"	9/16"
47080	38080	48080	.1772		4.500	5.0	50	14
16110	17110	18110	.1875	3/16"	4.763	3/16"	2"	5/8"
47090	38090	48090	.1969		5.000	5.0	65	16
16120	17120	18120	.2031	13/64"	5.159	1/4"	2-1/2"	5/8"
16130	17130	18130	.2188	7/32"	5.558	1/4"	2-1/2"	5/8"
16140	17140	18140	.2344	15/64"	5.954	1/4"	2-1/2"	3/4"
47100	38100	48100	.2362		6.000	6.0	65	19
16150	17150	18150	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
16160	17160	18160	.2656	17/64"	6.746	5/16"	2-1/2"	7/8"

continued →

Series 320M, 323M, 330M, 920M, 923M, 930M *(continued)*

7,000mm - 25,400mm
(.2756" - 1.000")

(320M/920M) 2 Flute EDP#	(323M/923M) 3 Flute EDP#	(330M/930M) 4 Flute EDP#	*d1* † Diameter Decimal		*d1* † Diameter Metric	*d2* Shank Diameter	*l1* Overall Length	*l2* Flute Length
47110	38110	48110	.2756		7.000	7.0	65	22
16170	17170	18170	.2812	9/32"	7.142	5/16"	2-1/2"	7/8"
16180	-	18180	.2969	19/64"	7.541	5/16"	2-1/2"	7/8"
16190	17190	18190	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
47120	38120	48120	.3150		8.000	8.0	65	22
16200	17200	18200	.3281	21/64"	8.334	3/8"	2-1/2"	7/8"
16210	17210	18210	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"
47130	38130	48130	.3543		9.000	9.0	65	22
16220	-	18220	.3594	23/64"	9.129	3/8"	2-1/2"	7/8"
16230	17230	18230	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
16240	17240	18240	.3906	25/64"	9.921	7/16"	2-3/4"	7/8"
47140	38140	48140	.3937		10.000	10.0	70	25
16250	17250	18250	.4062	13/32"	10.317	7/16"	2-3/4"	7/8"
16260	17260	18260	.4219	27/64"	10.716	7/16"	2-3/4"	7/8"
47150	38150	48150	.4331		11.000	11.0	75	25
16270	17270	18270	.4375	7/16"	11.113	7/16"	2-3/4"	1"
16280	17280	18280	.4531	29/64"	11.509	1/2"	3"	1"
16290	17290	18290	.4688	15/32"	11.908	1/2"	3"	1"
47160	38160	48160	.4724		12.000	12.0	75	25
16300	17300	18300	.4844	31/64"	12.304	1/2"	3"	1"
16310	17310	18310	.5000	1/2"	12.700	1/2"	3"	1"
47170	38170	48170	.5512		14.000	14.0	88	32
16320	17320	18320	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"
16330	17330	18330	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
47180	38180	48180	.6299		16.000	16.0	88	38
16340	17340	18340	.6875	11/16"	17.463	3/4"	4"	1-1/2"
47190	38190	48190	.7087		18.000	18.0	100	38
16350	17350	18350	.7500	3/4"	19.050	3/4"	4"	1-1/2"
47200	38200	48200	.7874		20.000	20.0	100	38
47210	38210	48210	.8661		22.000	22.0	100	38
16360	17360	18360	.8750	7/8"	22.225	7/8"	4"	1-1/2"
47220	-	-	.9843		25.000	25.0	100	38
16370	17370	18370	1.000	1"	25.400	1"	4"	1-1/2"

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

Z=2 Z=4 30° TECH PAGES 268,270

Standard Length - Ball End - TiN Coated

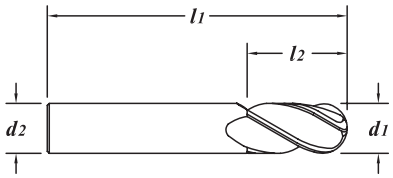
Standard Länge - Vollradius - TiN-Beschichtet

Longitud Estándar - Cabeza Esférica - Recubrimiento de TiN

Longueur Standart - Hemispherique - Revêtement TiN

Lunghezza Standard - Sferica - Rivestimento in TiN

标准长度 - 球头 - TiN 涂层



Solid submicron grain carbide end mill - center cutting
Improved lubricity
Extremely versatile
Uncoated - page 211
TiCN Coated - page 214
TiAlN Coated - page 215

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Verbessere Schmiereingenschaft
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
Unbeschichtet - Seite 211
TiCN-Beschichtet - Seite 214
TiAlN-Beschichtet - Seite 215

Fresa de submicrograno sólido carburo - corte centrado
Majorada la lubricación
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Sin recubrimiento - Página 211
Recubrimiento de TiCN - Página 214
Recubrimiento de TiAlN - Página 215

Fraises carbure submicrograin - coupe au centre
Amelioration du glissement
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Sans revêtement - Page 211
Revêtement TiCN - Page 214
Revêtement TiAlN - Page 215

Fresa sub-micrograno metallo duro - taglio al centro
Migliore autolubrificazione
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Non Rivestito - Pagina 211
Rivestimento in TiCN - Pagina 214
Rivestimento in TiAlN - Pagina 215

超细晶粒整体硬质合金立铣刀 - 中心切削
改善润滑性能
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
未涂层 - 211页
TiCN 涂层 - 214页
TiAlN 涂层 - 215页

(320MT) 2 Flute EDP#	(330MT) 4 Flute EDP#	d_1 † Decimal	d_1 †	d_1 † Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
16073	18073	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
16113	18113	.1875	3/16"	4.763	3/16"	2"	5/8"
16153	18153	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
16193	18193	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
16233	18233	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
16273	18273	.4375	7/16"	11.113	7/16"	2-3/4"	1"
16313	18313	.5000	1/2"	12.700	1/2"	3"	1"
16333	18333	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
16353	18353	.7500	3/4"	19.050	3/4"	4"	1-1/2"
16373	18373	1.000	1"	25.400	1"	4"	1-1/2"

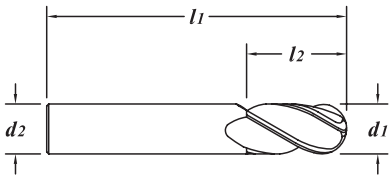
Series 320MC, 323MC, 330MC

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

Z=2 Z=3 Z=4 30°

TECH PAGES 268,270

Standard Length - Ball End - TiCN Coated
Standard Länge - Vollradius - TiCN-Beschichtet
Longitud Estándar - Cabeza Esférica - Recubrimiento de TiCN
Longueur Standart - Hemispherique - Revêtement TiCN
Lunghezza Standard - Sferica - Rivestimento in TiCN
标准长度 - 球头 - TiCN 涂层



70
35
0

MATERIAL HARDNESS (Rc)

Solid submicron grain carbide end mill - center cutting
Improved abrasion resistance and lubricity
Extremely versatile
Uncoated - page 211
TiN Coated - page 213
TiALN Coated - page 215
Extended Length - Page 245

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Verbesserte Verschleissbeständigkeit und Schmiereienschaft
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
Unbeschichtet - Seite 211
TiN-Beschichtet - Seite 213
TiALN-Beschichtet - Seite 215
Extra Länge - Seite 245

Fresa de submicrograno sólido carburo - corte centrado
Mejoradas la resistencia a la abrasión y la lubricación
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Sin recubrimiento - Página 211
Recubrimiento de TiN - Página 213
Recubrimiento de TiALN - Página 215
Longitud Extra - Página 245

Fraises carbure submicrograin - coupe au centre
Amelioration de la resistance a l'abrasion et au glissement
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Sans revêtement - Page 211
Revêtement TiN - Page 213
Revêtement TiALN - Page 215
Extra Longue - Page 245

Fresa sub-micrograno metallo duro - taglio al centro
Maggiore resistenza all'abrasione
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Non Rivestito - Pagina 211
Rivestimento in TiN - Pagina 213
Rivestimento in TiALN - Pagina 215
Lunghezza Extra - Pagina 245

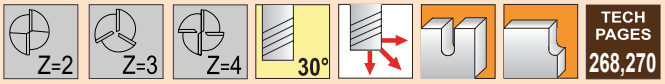
超细晶粒整体硬质合金立铣刀 - 中心切削
改善耐磨性和润滑性
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
未涂层 - 211页
TiN 涂层 - 213页
TiALN 涂层 - 215页
超长 - 245页

(320MC) 2 Flute EDP#	(323MC) 3 Flute EDP#	(330MC) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
16014	17014	18014	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"
16024	17024	18024	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"
16034	17034	18034	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"
16044	17044	18044	.0781	5/64"	1.984	1/8"	1-1/2"	1/4"
16054	17054	18054	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"
16064	17064	18064	.1094	7/64"	2.779	1/8"	1-1/2"	3/8"
16074	17074	18074	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
16084	17084	18084	.1406	9/64"	3.571	3/16"	2"	9/16"
16094	17094	18094	.1562	5/32"	3.967	3/16"	2"	9/16"
16104	-	18104	.1719	11/64"	4.366	3/16"	2"	9/16"
16114	17114	18114	.1875	3/16"	4.763	3/16"	2"	5/8"
16124	17124	18124	.2031	13/64"	5.159	1/4"	2-1/2"	5/8"
16134	17134	18134	.2188	7/32"	5.558	1/4"	2-1/2"	5/8"
16144	17144	18144	.2344	15/64"	5.954	1/4"	2-1/2"	3/4"
16154	17154	18154	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
-	17164	18164	.2656	17/64"	6.746	5/16"	2-1/2"	7/8"
16174	17174	18174	.2812	9/32"	7.142	5/16"	2-1/2"	7/8"
-	-	18184	.2969	19/64"	7.541	5/16"	2-1/2"	7/8"
16194	17194	18194	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
16204	-	-	.3281	21/64"	8.334	3/8"	2-1/2"	7/8"
-	17214	18214	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"
16224	-	18224	.3594	23/64"	9.129	3/8"	2-1/2"	7/8"
16234	17234	18234	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
16244	-	18244	.3906	25/64"	9.921	7/16"	2-3/4"	7/8"
16254	17254	18254	.4062	13/32"	10.317	7/16"	2-3/4"	7/8"
-	-	18264	.4219	27/64"	10.716	7/16"	2-3/4"	7/8"
16274	17274	18274	.4375	7/16"	11.113	7/16"	2-3/4"	1"
-	17284	18284	.4531	29/64"	11.509	1/2"	3"	1"
-	17294	18294	.4688	15/32"	11.908	1/2"	3"	1"
16304	17304	18304	.4844	31/64"	12.304	1/2"	3"	1"
16314	17314	18314	.5000	1/2"	12.700	1/2"	3"	1"
16324	17324	18324	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"
16334	17334	18334	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
-	17344	-	.6875	11/16"	17.463	3/4"	4"	1-1/2"
16354	17354	18354	.7500	3/4"	19.050	3/4"	4"	1-1/2"
16364	17364	18364	.8750	7/8"	22.225	7/8"	4"	1-1/2"
16374	17374	18374	1.000	1"	25.400	1"	4"	1-1/2"

† *Metric equivalents are for reference only*

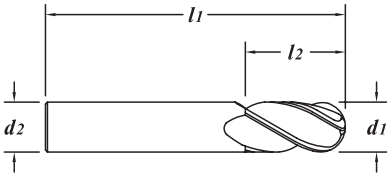
TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

Series 320MA, 323MA, 330MA, 920MA, 923MA, 930MA



0,792mm - 8,000mm
(.0312" - .3150")

Standard Length - Ball End - TiALN Coated
Standard Länge - Vollradius - TiALN-Beschichtet
Longitud Estándar - Cabeza Esférica - Recubrimiento de TiALN
Longueur Standart - Hemispherique - Revêtement TiALN
Lunghezza Standard - Sferica - Rivestimento in TiALN
标准长度 - 球头 - TiALN 涂层



Solid submicron grain carbide end mill - center cutting
Dry or semi-dry machining
Extremely versatile
Uncoated - page 211
TiN Coated - page 213
TiCN Coated - page 214
Stub Length - page 195
Extended Length - page 246

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Trocken oder Halbtrockene Bearbeitung
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
Unbeschichtet - Seite 211
TiN-Beschichtet - Seite 213
TiCN-Beschichtet - Seite 214
Kurze Länge - Seite 195
Extra Länge - Seite 246

Fresa de submicrograno sólido carburo - corte centrado
Mecanizado seco o semiseco
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Sin recubrimiento - Página 211
Recubrimiento de TiN - Página 213
Recubrimiento de TiCN - Página 214
Longitud Corta - Página 195
Longitud Extra - Página 246

Fraises carbure submicrograin - coupe au centre
Usinage a sec ou avec l'air
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Sans revêtement - Page 211
Revêtement TiN - Page 213
Revêtement TiCN - Page 214
Longueur Courte - Page 195
Longueur Extra - Page 246

Fresa sub-micrograno metallo duro - taglio al centro
Lavorazione a secco o a umido
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Non Rivestito - Pagina 211
Rivestimento in TiN - Pagina 213
Rivestimento in TiCN - Pagina 214
Serie Corta - Pagina 195
Lunghezza Extra - Pagina 246

超细晶粒整体硬质合金立铣刀 - 中心切削
干式或半干式机加工
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
未涂层 - 211页
TiN 涂层 - 213页
TiCN 涂层 - 214页
短柱长度 - 195页
超长 - 246页

(320MA/920MA) 2 Flute EDP#	(323MA/923MA) 3 Flute EDP#	(330MA/930MA) 4 Flute EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
16017	17017	18017	.0312	1/32"	0.792	1/8"	1-1/2"	3/32"
47017	38017	48017	.0394		1.000	3.0	38	4
16027	17027	18027	.0469	3/64"	1.191	1/8"	1-1/2"	1/8"
47027	38027	48027	.0591		1.500	3.0	38	6
16037	17037	18037	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"
16047	17047	18047	.0781	5/64"	1.984	1/8"	1-1/2"	1/4"
47037	38037	48037	.0787		2.000	3.0	38	8
16057	17057	18057	.0938	3/32"	2.383	1/8"	1-1/2"	3/8"
47047	38047	48047	.0984		2.500	3.0	38	12
16067	17067	18067	.1094	7/64"	2.779	1/8"	1-1/2"	3/8"
47057	38057	48057	.1181		3.000	3.0	38	12
16077	17077	18077	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
47067	38067	48067	.1378		3.500	4.0	50	12
16087	17087	18087	.1406	9/64"	3.571	3/16"	2"	9/16"
16097	17097	18097	.1562	5/32"	3.967	3/16"	2"	9/16"
47077	38077	48077	.1575		4.000	4.0	50	14
16107	17107	18107	.1719	11/64"	4.366	3/16"	2"	9/16"
47087	38087	48087	.1772		4.500	5.0	50	14
16117	17117	18117	.1875	3/16"	4.763	3/16"	2"	5/8"
47097	38097	48097	.1969		5.000	5.0	65	16
16127	17127	18127	.2031	13/64"	5.159	1/4"	2-1/2"	5/8"
16137	17137	18137	.2188	7/32"	5.558	1/4"	2-1/2"	5/8"
16147	17147	18147	.2344	15/64"	5.954	1/4"	2-1/2"	3/4"
47107	38107	48107	.2362		6.000	6.0	65	19
16157	17157	18157	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
16167	17167	18167	.2656	17/64"	6.746	5/16"	2-1/2"	7/8"
47117	38117	48117	.2756		7.000	7.0	65	22
16177	17177	18177	.2812	9/32"	7.142	5/16"	2-1/2"	7/8"
16187	17187	18187	.2969	19/64"	7.541	5/16"	2-1/2"	7/8"
16197	17197	18197	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
47127	38127	48127	.3150		8.000	8.0	65	22

continued →

Series 320MA, 323MA, 330MA, 920MA, 923MA, 930MA *(continued)*

8,334mm - 25,400mm
(.3281" - 1.000")

(320MA/920MA) 2 Flute EDP#	(323MA/923MA) 3 Flute EDP#	(330MA/930MA) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
16207	17207	18207	.3281	21/64"	8.334	3/8"	2-1/2"	7/8"
16217	17217	18217	.3438	11/32"	8.733	3/8"	2-1/2"	7/8"
47137	38137	48137	.3543		9.000	9.0	65	22
16227	17227	18227	.3594	23/64"	9.129	3/8"	2-1/2"	7/8"
16237	17237	18237	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
16247	17247	18247	.3906	25/64"	9.921	7/16"	2-3/4"	7/8"
47147	38147	48147	.3937		10.000	10.0	70	25
16257	17257	18257	.4062	13/32"	10.317	7/16"	2-3/4"	7/8"
16267	-	18267	.4219	27/64"	10.716	7/16"	2-3/4"	7/8"
47157	38157	48157	.4331		11.000	11.0	75	25
16277	17277	18277	.4375	7/16"	11.113	7/16"	2-3/4"	1"
16287	17287	18287	.4531	29/64"	11.509	1/2"	3"	1"
16297	17297	18297	.4688	15/32"	11.908	1/2"	3"	1"
47167	38167	48167	.4724		12.000	12.0	75	25
16307	17307	18307	.4844	31/64"	12.304	1/2"	3"	1"
16317	17317	18317	.5000	1/2"	12.700	1/2"	3"	1"
47177	38177	48177	.5512		14.000	14.0	88	32
16327	17327	18327	.5625	9/16"	14.288	9/16"	3-1/2"	1-1/4"
16337	17337	18337	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
47187	38187	48187	.6299		16.000	16.0	88	38
16347	17347	18347	.6875	11/16"	17.463	3/4"	4"	1-1/2"
47197	38197	48197	.7087		18.000	18.0	100	38
16357	17357	18357	.7500	3/4"	19.050	3/4"	4"	1-1/2"
47207	38207	48207	.7874		20.000	20.0	100	38
47217	38217	48217	.8661		22.000	22.0	100	38
-	17367	18367	.8750	7/8"	22.225	7/8"	4"	1-1/2"
47227	38227	48227	.9843		25.000	25.0	100	38
16377	17377	18377	1.000	1"	25.400	1"	4"	1-1/2"

† *Metric equivalents are for reference only*

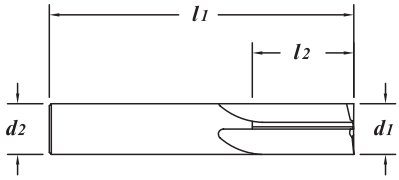
GARRTOOL

Series 222M, 234M

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=2 | Z=4 | 0° | TECH PAGES 268,270, 286,287

Standard Length - Straight Flute - Square End
Standard Länge - Gerade Spannut - Ohne Eckenradius
Longitud Estándar - Ranura Recta - Extremo Sin Radio
Longueur Standart - Goujures Droite - Extrémité Carré
Lunghezza Standard - Tagliente Dritto - Piatte
标准长度 - 直排屑槽 - 平头



Solid submicron grain carbide end mill - center cutting
For cutting high Rc materials
Helps to hold perpendicularity

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Für die Bearbeitung von gehärten Stählen
Hilft die Perpendicularität zu halten

Fresa de submicrograno sólido carburo - corte centrado
Para corte de materiales de alta dureza Rc
Ayuda a mantener la perpendicularidad

Fraises carbure submicrograin - coupe au centre
Pour la coupe de materiaux a haute durete
Aide a tenir la perpendicularite

Fresa sub-micrograno metallo duro - taglio al centro
Per lavorazioni su materiali temprati
Taglio perpendicolare

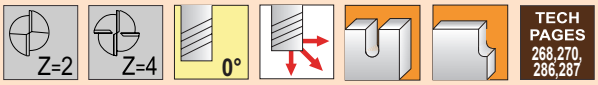
超细晶粒整体硬质合金立铣刀 - 中心切削
用于切削洛氏硬度高的材料
协助保持垂直度

MATERIAL HARDNESS (Rc)
70
35
0

(222M) 2 Flute EDP#	(234M) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
81070	82070	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
81110	82110	.1875	3/16"	4.763	3/16"	2"	5/8"
81150	82150	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
81190	82190	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
81230	82230	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
81270	82270	.4375	7/16"	11.113	7/16"	2-3/4"	1"
81310	82310	.5000	1/2"	12.700	1/2"	3"	1"
81330	82330	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"
-	82350	.7500	3/4"	19.050	3/4"	4"	1-1/2"
-	82370	1.000	1"	25.400	1"	4"	1-1/2"

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")



TECH PAGES 268,270, 286,287

Standard Length - Straight Flute - Ball End - TiALN Coated

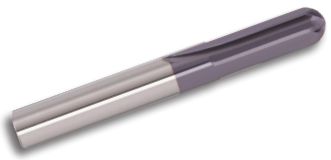
Standard Länge - Gerade Spannut - Vollradius - TiALN-Beschichtet

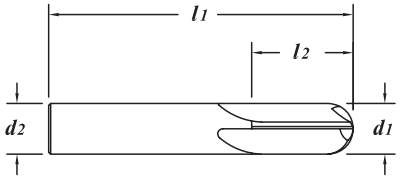
Longitud Estándar - Ranura Recta - Cabeza Esférica - Recubrimiento de TiALN

Longueur Standart - Goujures Droite - Hemispherique - Revêtement TiALN

Lunghezza Standard - Tagliente Dritto - Sferica - Rivestimento in TiALN

标准长度 - 直排屑槽 - 球头 - TiALN 涂层





Solid submicron grain carbide end mill - center cutting
For cutting high Rc materials
Helps to hold perpendicularity

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Für die Bearbeitung von gehärten Stählen
Hilft die Perpendicularität zu halten
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")

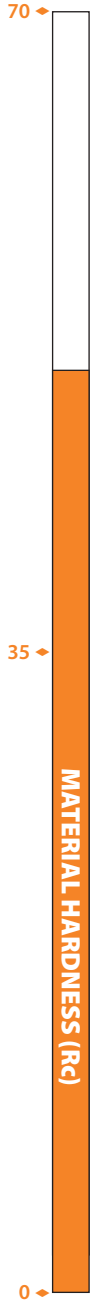
Fresa de submicrograno sólido carburo - corte centrado
Para corte de materiales de alta dureza Rc
Ayuda a mantener la perpendicularidad
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")

Fraises carbure submicrograin - coupe au centre
Pour la coupe de materiaux a haute durete
Aide a tenir la perpendicularite
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")

Fresa sub-micrograno metallo duro - taglio al centro
Per lavorazioni su materiali temprati
Taglio perpendicolare
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")

超细晶粒整体硬质合金立铣刀 - 中心切削
用于切削洛氏硬度高的材料
协助保持垂直度
半径允差 +0,000 /–0,025 (+.000" -.001")

	(334MA) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
NEW	84077	.1250	1/8" 3.175	1/8"	1-1/2"	1/2"
NEW	84115	.1875	3/16" 4.763	3/16"	2"	5/8"
NEW	84157	.2500	1/4" 6.350	1/4"	2-1/2"	3/4"
NEW	84237	.3750	3/8" 9.525	3/8"	2-1/2"	7/8"

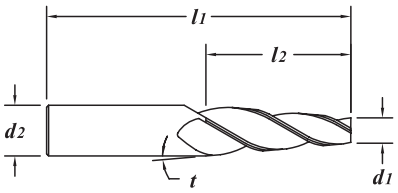


Series 273M

TOLERANCES	
d_1	+0,075 –0,000mm (+.003" –.000")
d_2	h6

Z=3 | 30° | TECH PAGES 268,270

Standard Length - Tapered - Square End
Standard Länge - Kegelig - Ohne Eckenradius
Longitud Estándar - Cónica - Extremo Sin Radio
Longueur Standart - Conique - Extrémité Carré
Lunghezza Standard - Frese per Nervature - Piatte
标准长度 - 锥度 - 平头



Solid submicron grain carbide end mill - center cutting
Excellent for holding draft angles in mold and die applications

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Ausgezeichnet zum halten von Entwurfwinkel bei Formenbau Anwendungen

Fresa de submicrograno sólido carburo - corte centrado
Excelente para mantener ángulos de desmoldeo en aplicaciones de troquelado

Fraises carbure submicrograin - coupe au centre
Excellent pour la tenue des arêtes en applications moules et outillages

Fresa sub-micrograno metallo duro - taglio al centro
Eccellente per lavorazioni di pareti inclinate sugli stampi

超细晶粒整体硬质合金立铣刀 - 中心切削
在模具用途中对于保持拔模角度非常好

273M EDP#	d_2 Shank Diameter	t Taper Per Side	d_1 † Tip Diameter Decimal	Tip Diameter	Metric	l_1 Overall Length	l_2 Flute Length
49010	1/4"	1°	.1250	1/8"	3.175	3"	1-1/2"
49020	1/4"	1° 30′	.1250	1/8"	3.175	3"	1-1/2"
49030	1/4"	2°	.1250	1/8"	3.175	3"	1"
49040	1/4"	3°	.1250	1/8"	3.175	3"	1-1/4"
49050	1/4"	5°	.1250	1/8"	3.175	3"	3/4"
49060	1/4"	7°	.1250	1/8"	3.175	3"	1/2"
49070	3/8"	1°	.1875	3/16"	4.763	3-1/2"	1-3/4"
49080	3/8"	1° 30′	.1875	3/16"	4.763	3-1/2"	1-3/4"
49090	3/8"	2°	.1875	3/16"	4.763	3-1/2"	1-3/4"
49100	3/8"	3°	.1562	5/32"	3.967	3-1/2"	1-3/4"
49110	3/8"	5°	.1250	1/8"	3.175	3-1/2"	1-1/2"
49120	3/8"	7°	.1562	5/32"	3.967	3-1/2"	1"
49130	1/2"	3°	.2500	1/4"	6.350	4"	2"
49140	1/2"	5°	.2500	1/4"	6.350	4"	1-1/2"
49150	1/2"	7°	.1875	3/16"	4.763	4"	1-5/16"

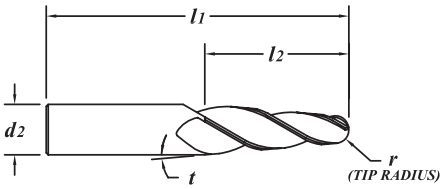
MATERIAL HARDNESS (Rc)
70
35
0

† Metric equivalents are for reference only

TOLERANCES	
r	+0,075 –0,000mm (+.003" –.000")
d2	h6

Z=3 | 30° | TECH PAGES 268,270

Standard Length - Tapered - Ball End
Standard Länge - Kegelig - Vollradius
Longitud Estándar - Cónica - Cabeza Esférica
Longueur Standart - Conique - Hemispherique
Lunghezza Standard - Frese per Nervature - Sferica
标准长度 - 锥度 - 球头



Solid submicron grain carbide end mill - center cutting
Excellent for holding draft angles in mold and die applications

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Ausgezeichnet zum halten von Entwurfwinkel bei Formenbau Anwendungen

Fresa de submicrograno sólido carburo - corte centrado
Excelente para mantener ángulos de desmoldeo en aplicaciones de troquelado

Fraises carbure submicrograin - coupe au centre
Excellent pour la tenue des arêtes en applications moules et outillages

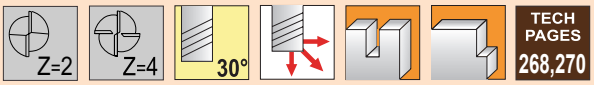
Fresa sub-micrograno metallo duro - taglio al centro
Eccellente per lavorazioni di pareti inclinate sugli stampi

超细晶粒整体硬质合金立铣刀 - 中心切削
在模具用途中对于保持拔模角度非常好

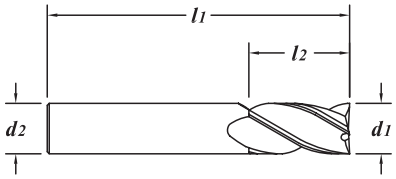
373M EDP#	*d2* Shank Diameter	*t* Taper Per Side	*r* † Tip Radius Decimal	Tip Radius Metric	*l1* Overall Length	*l2* Flute Length
50010	1/4"	1°	.0620	.062"	1.575	3"	1-1/2"
50020	1/4"	1° 30′	.0620	.062"	1.575	3"	1-1/2"
50030	1/4"	2°	.0620	.062"	1.575	3"	1"
50040	1/4"	3°	.0620	.062"	1.575	3"	1-1/4"
50050	1/4"	5°	.0620	.062"	1.575	3"	3/4"
50060	1/4"	7°	.0620	.062"	1.575	3"	1/2"
50070	3/8"	1°	.0930	.093"	2.362	3-1/2"	1-3/4"
50080	3/8"	1° 30′	.0930	.093"	2.362	3-1/2"	1-3/4"
50090	3/8"	2°	.0930	.093"	2.362	3-1/2"	1-3/4"
50100	3/8"	3°	.0780	.078"	1.981	3-1/2"	1-3/4"
50110	3/8"	5°	.0620	.062"	1.575	3-1/2"	1-1/2"
50120	3/8"	7°	.0780	.078"	1.981	3-1/2"	1"
50130	1/2"	3°	.1250	.125"	3.175	4"	2"
50140	1/2"	5°	.1250	.125"	3.175	4"	1-1/2"
50150	1/2"	7°	.0930	.093"	2.362	4"	1-5/16"

Series 280M, 290M

TOLERANCES	
d_1	+0,025 –0,000mm (+.001" –.000")
d_2	h6



Standard Length - N/C Tolerance - Square End
Standard Länge - N/C Toleranz - Ohne Eckenradius
Longitud Estándar - Tolerancia N/C - Extremo Sin Radio
Longueur Standart - Tolerance NC - Extrémité Carré
Lunghezza Standard - Precisa - Piatte
标准长度 - 数控允差 - 平头



Solid submicron grain carbide end mill - center cutting
Excellent for keyways
Tight tolerance for precision machining
For use when matching tools are necessary

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Ausgezeichnet für Keilnuten
Enge Toleranzen für präzise Bearbeitung
Wenn nötig zum zusammenlegen von Werkzeugen

Fresa de submicrograno sólido carburo - corte centrado
Excelente para chaveteras
Tolerancia ajustada para mecanizado de precisión
Para uso en aplicaciones de machihembrado

Fraises carbure submicrograin - coupe au centre
Excellent pour rainures de clavettes
Haute tolerance pour usinage de precision
Pour l'usage quand les outils assortis sont nécessaires

Fresa sub-micrograno metallo duro - taglio al centro
Eccellente per piccole cave
Alta tolleranza per lavorazioni di precisione
Consigliabile per esecuzione di chiavette

超细晶粒整体硬质合金立铣刀 - 中心切削
铣键槽极好
在精加工时保持紧公差
在需要匹配刀具时可供使用

MATERIAL HARDNESS (Rc)
70
35
0

(280M) 2 Flute EDP#	(290M) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
25010	26010	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"
25020	26020	.0938	3/32"	2.383	1/8"	1-1/2"	5/16"
25030	26030	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
25040	26040	.1875	3/16"	4.763	3/16"	2"	9/16"
25050	26050	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
*25070	*26070	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
*25090	*26090	.5000	1/2"	12.700	1/2"	3"	1"
-	*26100	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"

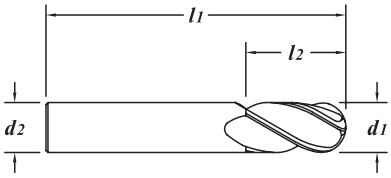
* - Tools with weldon flats

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,025 –0,000mm (+.001" –.000")
d_2	h6

Z=2 Z=4 30° TECH PAGES 268,270

Standard Length - N/C Tolerance - Ball End
Standard Länge - N/C Toleranz - Vollradius
Longitud Estándar - Tolerancia N/C - Cabeza Esférica
Longueur Standart - Tolerance NC - Hemispherique
Lunghezza Standard - Precisa - Sferica
标准长度 - 数控允差 - 球头



Solid submicron grain carbide end mill - center cutting
Excellent for keyways
Tight tolerance for precision machining
For use when matching tools are necessary
Ball radius tolerance +0.0127mm –0.0000mm (+.0005" –.0000")

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Ausgezeichnet für Keilnuten
Enge Toleranzen für präzise Bearbeitung
Wenn nötig zum zusammenlegen von Werkzeugen
Vollradius Toleranz: +0,0127 / –0,0000 (+.0005" –.0000")

Fresa de submicrograno sólido carburo - corte centrado
Excelente para chaveteras
Tolerancia ajustada para mecanizado de precisión
Para uso en aplicaciones de machihembrado
Tolerancia de la cabeza esférica +0,0127 / –0,0000 (+.0005" –.0000")

Fraises carbure submicrograin - coupe au centre
Excellent pour rainures de clavettes
Haute tolerance pour usinage de precision
Pour l'usage quand les outils assortis sont nécessaires
Tolerance du rayon de hemispherique +0,0127 / –0,0000 (+.0005" –.0000")

Fresa sub-micrograno metallo duro - taglio al centro
Eccellente per piccole cave
Alta tolleranza per lavorazioni di precisione
Consigliabile per esecuzione di chiavette
Tolleranza del raggio +0,0127 / –0,0000 (+.0005" –.0000")

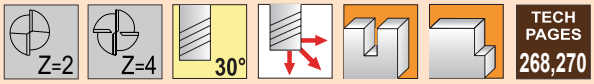
超细晶粒整体硬质合金立铣刀 - 中心切削
铣键槽极好
在精加工时保持紧公差
在需要匹配刀具时可供使用
半径允差 +0,0127 / –0,0000 (+.0005" –.0000")

(380M) 2 Flute EDP#	(390M) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
27010	28010	.0625	1/16"	1.588	1/8"	1-1/2"	1/4"
27030	28030	.1250	1/8"	3.175	1/8"	1-1/2"	1/2"
-	28040	.1875	3/16"	4.763	3/16"	2"	9/16"
27050	28050	.2500	1/4"	6.350	1/4"	2-1/2"	3/4"
-	28060	.3125	5/16"	7.938	5/16"	2-1/2"	7/8"
*27070	*28070	.3750	3/8"	9.525	3/8"	2-1/2"	7/8"
-	*28090	.5000	1/2"	12.700	1/2"	3"	1"
-	*28100	.6250	5/8"	15.875	5/8"	3-1/2"	1-1/4"

* - Tools with weldon flats

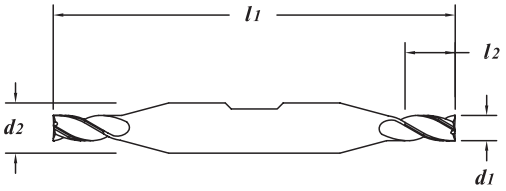
Series 425M, 435M

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6



TECH PAGES 268,270

Standard Length - Double End - 3/8" Shank
Standard Länge - Dopple Ende - 3/8" Schaft
Longitud Estándar - Doble Punta - Espiga de 3/8"
Longueur Standart - Double Extrémité - 3/8" Diametre de la Tige
Lunghezza Standard - Doppia Fresa - Stelo 3/8"
标准长度 - 双头 - 3/8" 刀杆



Solid submicron grain carbide end mill - center cutting
Common 3/8" diameter shank with weldon flat
For strength and adaptability when converting from high speed steel

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Gängiger 3/8" Schaft mit Weldon Spannfläche
Für Stärke und Anpassungsfähigkeit beim Umstieg von Hochleistungsschnellstahl (HSS)

Fresa de submicrograno sólido carburo - corte centrado
Espiga común de 3/8" con rebaje weldon
Para mayor resistencia y adaptabilidad al convertir de acero de alta velocidad

Fraises carbure submicrograin - coupe au centre
Queue de diametre 3/8 avec meplat weldon
Alternative au fraises HSS

Fresa sub-micrograno metallo duro - taglio al centro
Diametro 3/8" con attacco weldon
Alternativa alle frese tradizionali in HSS

超细晶粒整体硬质合金立铣刀 - 中心切削
具有Weldon平面（驱动平面一译注）的3/8"直径常用刀柄
从高速钢转换时用于增加强度、提高适应性

(425M) 2 Flute EDP#	(435M) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
33010	34010	.1250	1/8"	3.175	3/8"	3"	3/8"
33020	34020	.1562	5/32"	3.967	3/8"	3"	7/16"
33030	34030	.1875	3/16"	4.763	3/8"	3"	1/2"
33040	-	.2188	7/32"	5.558	3/8"	3"	9/16"
33050	34050	.2500	1/4"	6.350	3/8"	3"	5/8"
33060	34060	.2812	9/32"	7.142	3/8"	4"	11/16"
33070	34070	.3125	5/16"	7.938	3/8"	4"	3/4"
33090	34090	.3750	3/8"	9.525	3/8"	4"	3/4"

MATERIAL HARDNESS (Rc)
70
35
0

† Metric equivalents are for reference only

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=2 Z=4 30° TECH PAGES 268,270

Standard Length - Double End - 3/8" Shank - TiALN Coated

Standard Länge - Dopple Ende - 3/8" Schaft - TiALN-Beschichtet

Longitud Estándar - Doble Punta - Espiga de 3/8" - Recubrimiento de TiALN

Longueur Standart - Double Extrémité - 3/8" Diametre de la Tige - Revêtement TiALN

Lunghezza Standard - Doppia Fresa - Stelo 3/8" - Rivestimento in TiALN

标准长度 - 双头 - 3/8" 刀杆 - TiALN 涂层

Solid submicron grain carbide end mill - center cutting
Common 3/8" diameter shank with weldon flat
For strength and adaptability when converting from high speed steel
Dry or semi-dry machining

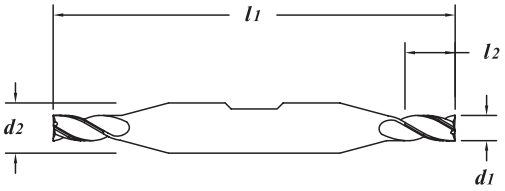
Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Gängiger 3/8" Schaft mit Weldon Spannfläche
Für Stärke und Anpassungsfähigkeit beim Umstieg von Hochleistungsschnellstahl (HSS)
Trocken oder Halbtrockene Bearbeitung

Fresa de submicrograno sólido carburo - corte centrado
Espiga común de 3/8" con rebaje weldon
Para mayor resistencia y adaptabilidad al convertir de acero de alta velocidad
Mecanizado seco o semiseco

Fraises carbure submicrograin - coupe au centre
Queue de diametre 3/8 avec meplat weldon
Alternative au fraises HSS
Usinage a sec ou avec l'air

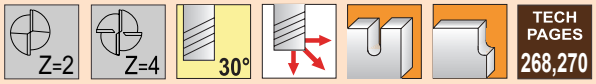
Fresa sub-micrograno metallo duro - taglio al centro
Diametro 3/8" con attacco weldon
Alternativa alle frese tradizionali in HSS
Lavorazione a secco o a umido

超细晶粒整体硬质合金立铣刀 - 中心切削
具有Weldon平面（驱动平面一译注）的3/8"直径常用刀柄
从高速钢转换时用于增加强度、提高适应性
干式或半干式机加工



(425MA) 2 Flute EDP#	(435MA) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
-	34017	.1250	1/8"	3.175	3/8"	3"	3/8"
-	34027	.1562	5/32"	3.967	3/8"	3"	7/16"
-	34037	.1875	3/16"	4.763	3/8"	3"	1/2"
-	34047	.2188	7/32"	5.558	3/8"	3"	9/16"
33057	34057	.2500	1/4"	6.350	3/8"	3"	5/8"
-	34067	.2812	9/32"	7.142	3/8"	4"	11/16"
-	34077	.3125	5/16"	7.938	3/8"	4"	3/4"
-	34097	.3750	3/8"	9.525	3/8"	4"	3/4"

Series 535M



TECH PAGES 268,270

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

Standard Length - Double End - 3/8" Shank - Ball End
Standard Länge - Dopple Ende - 3/8" Schaft - Vollradius
Longitud Estándar - Doble Punta - Espiga de 3/8" - Cabeza Esférica
Longueur Standart - Double Extrémité - 3/8" Diametre de la Tige - Hemispherique
Lunghezza Standard - Doppia Fresa - Stelo 3/8" - Sferica
标准长度 - 双头 - 3/8" 刀杆 - 球头

Solid submicron grain carbide end mill - center cutting
Common 3/8" diameter shank with weldon flat
For strength and adaptability when converting from high speed steel

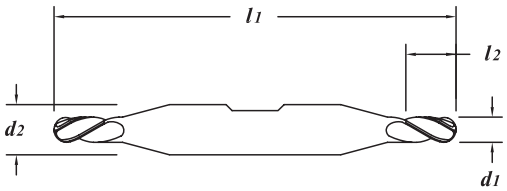
Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Gängiger 3/8" Schaft mit Weldon Spannfläche
Für Stärke und Anpassungsfähigkeit beim Umstieg von Hochleistungsschnellstahl (HSS)
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")

Fresa de submicrograno sólido carburo - corte centrado
Espiga común de 3/8" con rebaje weldon
Para mayor resistencia y adaptabilidad al convertir de acero de alta velocidad
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")

Fraises carbure submicrograin - coupe au centre
Queue de diametre 3/8 avec meplat weldon
Alternative au fraises HSS
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")

Fresa sub-micrograno metallo duro - taglio al centro
Diametro 3/8" con attacco weldon
Alternativa alle frese tradizionali in HSS
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")

超细晶粒整体硬质合金立铣刀 - 中心切削
具有Weldon平面（驱动平面一译注）的3/8"直径常用刀柄
从高速钢转换时用于增加强度、提高适应性
半径允差 +0,000 /–0,025 (+.000"-.001")

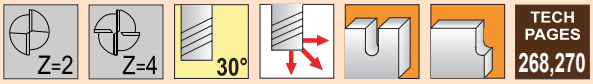


EDP#	d_1 † Diameter Decimal	Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
36010	.1250	3.175	3/8"	3"	3/8"
36030	.1875	3/16"	4.763	3/8"	3"	1/2"
36050	.2500	1/4"	6.350	3/8"	3"	5/8"

MATERIAL HARDNESS (Rc)
70
35
0

† Metric equivalents are for reference only

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")



TECH PAGES 268,270

Standard Length - Double End - 3/8" Shank - Ball End - TiALN Coated

Standard Länge - Dopple Ende - 3/8" Schaft - Vollradius - TiALN-Beschichtet

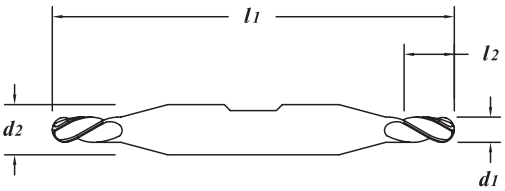
Longitud Estándar - Doble Punta - Espiga de 3/8" - Cabeza Esférica - Recubrimiento de TiALN

Longueur Standart - Double Extrémité - 3/8" Diametre de la Tige - Hemispherique - Revêtement TiALN

Lunghezza Standard - Doppia Fresa - Stelo 3/8" - Sferica - Rivestimento in TiALN

标准长度 - 双头 - 3/8" 刀杆 - 球头 - TiALN 涂层

Solid submicron grain carbide end mill - center cutting
Common 3/8" diameter shank with weldon flat
For strength and adaptability when converting from high speed steel
Dry or semi-dry machining



EDP#	d_1 † Diameter Decimal	Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
36017	.1250	1/8" 3.175	3/8"	3"	3/8"
36027	.1562	5/32" 3.967	3/8"	3"	7/16"
36037	.1875	3/16" 4.763	3/8"	3"	1/2"
36057	.2500	1/4" 6.350	3/8"	3"	5/8"
36077	.3125	5/16" 7.938	3/8"	4"	3/4"

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Gängiger 3/8" Schaft mit Weldon Spannfläche
Für Stärke und Anpassungsfähigkeit beim Umstieg von Hochleistungsschnellstahl (HSS)
Trocken oder Halbtrockene Bearbeitung
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")

Fresa de submicrograno sólido carburo - corte centrado
Espiga común de 3/8" con rebaje weldon
Para mayor resistencia y adaptabilidad al convertir de acero de alta velocidad
Mecanizado seco o semiseco
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")

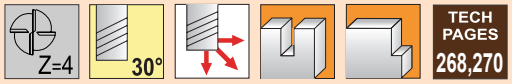
Fraises carbure submicrograin - coupe au centre
Queue de diametre 3/8 avec meplat weldon
Alternative au fraises HSS
Usinage a sec ou avec l'air
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")

Fresa sub-micrograno metallo duro - taglio al centro
Diametro 3/8" con attacco weldon
Alternativa alle frese tradizionali in HSS
Lavorazione a secco o a umido
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")

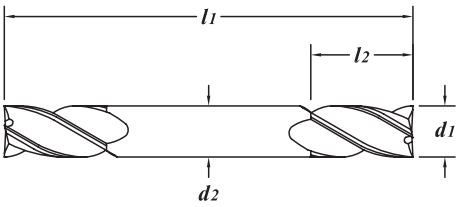
超细晶粒整体硬质合金立铣刀 - 中心切削
具有Weldon平面（驱动平面一译注）的3/8"直径常用刀柄
从高速钢转换时用于增加强度、提高适应性
干式或半干式机加工
半径允差 +0,000 /–0,025 (+.000"-.001")

Series 430M

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6



Standard Length - Square End - Double End
Standard Länge - Ohne Eckenradius - Dopple Ende
Longitud Estándar - Extremo Sin Radio - Doble Punta
Longueur Standart - Extrémité Carré - Double Extrémité
Lunghezza Standard - Piatte - Doppia Fresa
标准长度 - 平头 - 球头



Solid submicron grain carbide end mill - center cutting
Extremely versatile
TiAlN Coated - page 229
Stub Length - page 196

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Extrem Vielseitig
TiAlN-Beschichtet - Seite 229
Kurze Länge - Seite 196

Fresa de submicrograno sólido carburo - corte centrado
Extremadamente versátil
Recubrimiento de TiAlN - Página 229
Longitud Corta - Página 196

Fraises carbure submicrograin - coupe au centre
Utilisations variables
Revêtement TiAlN - Page 229
Longueur Courte - Page 196

Fresa sub-micrograno metallo duro - taglio al centro
Estremamente varsatile
Rivestimento in TiAlN - Pagina 229
Serie Corta - Pagina 196

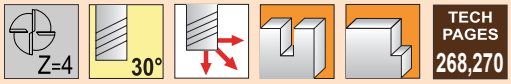
超细晶粒整体硬质合金立铣刀 - 中心切削
功能极多
TiAlN 涂层 - 229页
短柱长度 - 196页

(430M/450M) EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
30030	.0625	1/16"	1.588	1/8"	2"	3/16"
30040	.0938	3/32"	2.383	1/8"	2"	1/4"
30050	.1250	1/8"	3.175	1/8"	2"	3/8"
30060	.1562	5/32"	3.967	3/16"	2-1/2"	7/16"
30070	.1875	3/16"	4.763	3/16"	2-1/2"	1/2"
30090	.2500	1/4"	6.350	1/4"	2-1/2"	5/8"
30100	.3125	5/16"	7.938	5/16"	3-1/2"	3/4"
30110	.3750	3/8"	9.525	3/8"	3-1/2"	3/4"
30130	.5000	1/2"	12.700	1/2"	4"	1"

MATERIAL HARDNESS (Rc)
70
35
0

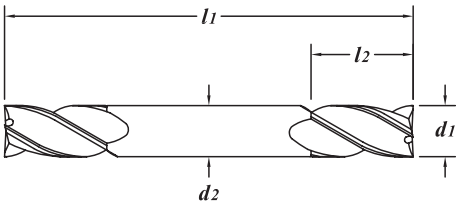
† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6



TECH PAGES 268,270

Standard Length - Square End - Double End - TiALN Coated
Standard Länge - Ohne Eckenradius - Dopple Ende - TiALN-Beschichtet
Longitud Estándar - Extremo Sin Radio - Doble Punta - Recubrimiento de TiALN
Longueur Standart - Extrémité Carré - Double Extrémité - Revêtement TiALN
Lunghezza Standard - Piatte - Doppia Fresa - Rivestimento in TiALN
标准长度 - 平头 - 球头 - TiALN 涂层



Solid submicron grain carbide end mill - center cutting
Dry or semi-dry machining
Extremely versatile
Uncoated - page 228
Stub Length - page 197

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Trocken oder Halbtrockene Bearbeitung
Extrem Vielseitig
Unbeschichtet - Seite 228
Kurze Länge - Seite 197

Fresa de submicrograno sólido carburo - corte centrado
Mecanizado seco o semiseco
Extremadamente versátil
Sin recubrimiento - Página 228
Longitud Corta - Página 197

Fraises carbure submicrograin - coupe au centre
Usinage a sec ou avec l'air
Utilisations variables
Sans revêtement - Page 228
Longueur Courte - Page 197

Fresa sub-micrograno metallo duro - taglio al centro
Lavorazione a secco o a umido
Estremamente varsatile
Non Rivestito - Pagina 228
Serie Corta - Pagina 197

超细晶粒整体硬质合金立铣刀 - 中心切削
干式或半干式机加工
功能极多
未涂层 - 228页
短柱长度 - 197页

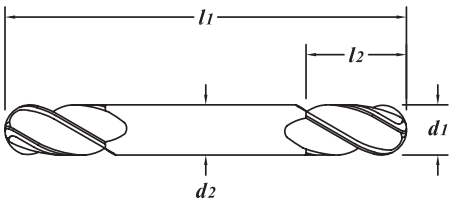
(430MA/450MA) EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
30017	.0312	1/32"	0.792	1/8"	2"	3/32"
30517	.0394		1.000	3.0	50	4
30027	.0469	3/64"	1.191	1/8"	2"	1/8"
30037	.0625	1/16"	1.588	1/8"	2"	3/16"
30537	.0787		2.000	3.0	50	6
30047	.0938	3/32"	2.383	1/8"	2"	1/4"
30057	.1250	1/8"	3.175	1/8"	2"	3/8"
30567	.1378		3.500	4.0	65	9.5
30067	.1562	5/32"	3.967	3/16"	2-1/2"	7/16"
30077	.1875	3/16"	4.763	3/16"	2-1/2"	1/2"
30597	.1969		5.000	5.0	65	12
30087	.2188	7/32"	5.558	1/4"	2-1/2"	9/16"
30607	.2362		6.000	6.0	65	16
30097	.2500	1/4"	6.350	1/4"	2-1/2"	5/8"
30107	.3125	5/16"	7.938	5/16"	3-1/2"	3/4"
30117	.3750	3/8"	9.525	3/8"	3-1/2"	3/4"
30647	.3937		10.000	10.0	88	19
30127	.4375	7/16"	11.113	7/16"	4"	7/8"
30137	.5000	1/2"	12.700	1/2"	4"	1"

Series 530M

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

Z=4 | 30° | TECH PAGES 268,270

Standard Length - Double End - Ball End
Standard Länge - Dopple Ende - Vollradius
Longitud Estándar - Doble Punta - Cabeza Esférica
Longueur Standart - Double Extrémité - Hemispherique
Lunghezza Standard - Doppia Fresa - Sferica
标准长度 - 球头 - 双头



Solid submicron grain carbide end mill - center cutting
Extremely versatile
TiAlN Coated - page 231
Stub Length - page 198

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
TiAlN-Beschichtet - Seite 231
Kurze Länge - Seite 198

Fresa de submicrograno sólido carburo - corte centrado
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Recubrimiento de TiAlN - Página 231
Longitud Corta - Página 198

Fraises carbure submicrograin - coupe au centre
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Revêtement TiAlN - Page 231
Longueur Courte - Page 198

Fresa sub-micrograno metallo duro - taglio al centro
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Rivestimento in TiAlN - Pagina 231
Serie Corta - Pagina 198

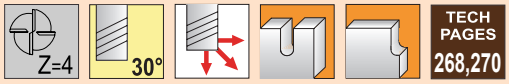
超细晶粒整体硬质合金立铣刀 - 中心切削
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
TiAlN 涂层 - 231页
短柱长度 - 198页

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
32050	.1250	1/8"	3.175	1/8"	2"	3/8"
32070	.1875	3/16"	4.763	3/16"	2-1/2"	1/2"
32090	.2500	1/4"	6.350	1/4"	2-1/2"	5/8"
32110	.3750	3/8"	9.525	3/8"	3-1/2"	3/4"
32130	.5000	1/2"	12.700	1/2"	4"	1"

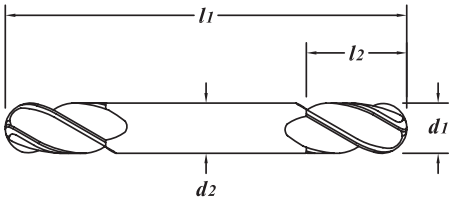
MATERIAL HARDNESS (Rc)
70
35
0

† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")



Standard Length - Double End - Ball End - TiALN Coated
Standard Länge - Dopple Ende - Vollradius - TiALN-Beschichtet
Longitud Estándar - Doble Punta - Cabeza Esférica - Recubrimiento de TiALN
Longueur Standart - Double Extrémité - Hemispherique - Revêtement TiALN
Lunghezza Standard - Doppia Fresa - Sferica - Rivestimento in TiALN
标准长度 - 球头 - 双头 - TiALN 涂层



Solid submicron grain carbide end mill - center cutting
Dry or semi-dry machining
Extremely versatile
Uncoated - page 230
Stub Length - page 199

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Trocken oder Halbtrockene Bearbeitung
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
Unbeschichtet - Seite 230
Kurze Länge - Seite 199

Fresa de submicrograno sólido carburo - corte centrado
Mecanizado seco o semiseco
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Sin recubrimiento - Página 230
Longitud Corta - Página 199

Fraises carbure submicrograin - coupe au centre
Usinage a sec ou avec l'air
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Sans revêtement - Page 230
Longueur Courte - Page 199

Fresa sub-micrograno metallo duro - taglio al centro
Lavorazione a secco o a umido
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Non Rivestito - Pagina 230
Serie Corta - Pagina 199

超细晶粒整体硬质合金立铣刀 - 中心切削
干式或半干式机加工
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
未涂层 - 230页
短柱长度 - 199页

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
32017	.0312	1/32"	0.792	1/8"	2"	3/32"
32027	.0469	3/64"	1.191	1/8"	2"	1/8"
32037	.0625	1/16"	1.588	1/8"	2"	3/16"
32047	.0938	3/32"	2.383	1/8"	2"	1/4"
32057	.1250	1/8"	3.175	1/8"	2"	3/8"
32067	.1562	5/32"	3.967	3/16"	2-1/2"	7/16"
32077	.1875	3/16"	4.763	3/16"	2-1/2"	1/2"
32097	.2500	1/4"	6.350	1/4"	2-1/2"	5/8"
32107	.3125	5/16"	7.938	5/16"	3-1/2"	3/4"
32117	.3750	3/8"	9.525	3/8"	3-1/2"	3/4"
32137	.5000	1/2"	12.700	1/2"	4"	1"

Series 620M, 623M, 630M, 640M, 643M, 650M

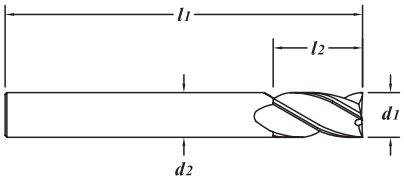
3,000mm - 8,000mm
(.1181" - .3150")

Z=2 Z=3 Z=4 30°

TECH PAGES 268,270

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Extra Length - Square End
Extra Länge - Ohne Eckenradius
Longitud Extra - Extremo Sin Radio
Extra Longue - Extrémité Carré
Lunghezza Extra - Piatte
超长 - 平头



MATERIAL HARDNESS (Rc)
70
35
0

Solid submicron grain carbide end mill - center cutting
Extended reach
Can be modified with a neck within 48 hours
Extremely versatile
TiCN Coated - page 234
TiAlN Coated - page 235
Stub Length - page 191
Standard Length - page 200

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Erweiterte Reichweite
Kann innerhalb 48 Stunden am Schaft verjüngt werden
Extrem Vielseitig
TiCN-Beschichtet - Seite 234
TiAlN-Beschichtet - Seite 235
Kurze Länge - Seite 191
Standard Länge - Seite 200

Fresa de submicrograno sólido carburo - corte centrado
Mayor alcance
Puede ser modificado con un cuello en 48 horas
Extremadamente versátil
Recubrimiento de TiCN - Página 234
Recubrimiento de TiAlN - Página 235
Longitud Corta - Página 191
Longitud Estándar - Página 200

Fraises carbure submicrograin - coupe au centre
Extension supplémentaire
Peut etre modifier avec un col degage sous un delai de 48 heures
Utilisations variables
Revêtement TiCN - Page 234
Revêtement TiAlN - Page 235
Longueur Courte - Page 191
Longueur Standart - Page 200

Fresa sub-micrograno metallo duro - taglio al centro
Estensione più grande
Può essere modificata in 48 ore
Estremamente varsatile
Rivestimento in TiCN - Pagina 234
Rivestimento in TiAlN - Pagina 235
Serie Corta - Pagina 191
Lunghezza Standard - Pagina 200

超细晶粒整体硬质合金立铣刀 - 中心切削
加长
可以在48小时内用轴颈进行修正
功能极多
TiCN 涂层 - 234页
TiAlN 涂层 - 235页
短柱长度 - 191页
标准长度 - 200页

(620M/640M) 2 Flute EDP#	(623M/643M) 3 Flute EDP#	(630M/650M) 4 Flute EDP#	d_1 † Diameter Decimal		d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
92010	93010	94010	.1181		3.000	3.0	50	16
92020	93020	94020	.1181		3.000	3.0	75	20
92030	93030	94030	.1181		3.000	3.0	75	25
41010	54510	42010	.1250	1/8"	3.175	1/8"	2"	5/8"
41020	54520	42020	.1250	1/8"	3.175	1/8"	3"	3/4"
41030	54530	42030	.1250	1/8"	3.175	1/8"	3"	1"
92040	93040	94040	.1575		4.000	4.0	50	16
92050	93050	94050	.1575		4.000	4.0	75	20
92060	93060	94060	.1575		4.000	4.0	75	25
41040	54540	42040	.1875	3/16"	4.763	3/16"	3"	1"
41050	54550	42050	.1875	3/16"	4.763	3/16"	3"	1-1/8"
41060	54560	42060	.1875	3/16"	4.763	3/16"	4"	1"
92070	93070	94070	.1969		5.000	5.0	50	16
92080	93080	94080	.1969		5.000	5.0	75	20
92090	93090	94090	.1969		5.000	5.0	75	25
92100	93100	94100	.2362		6.000	6.0	75	25
92110	93110	94110	.2362		6.000	6.0	100	25
92120	93120	94120	.2362		6.000	6.0	100	32
92130	93130	94130	.2362		6.000	6.0	150	38
41070	54570	42070	.2500	1/4"	6.350	1/4"	3"	1"
41080	54580	42080	.2500	1/4"	6.350	1/4"	4"	1"
41090	54590	42090	.2500	1/4"	6.350	1/4"	4"	1-1/2"
41100	54600	42100	.2500	1/4"	6.350	1/4"	6"	1-1/2"
41110	54610	42110	.3125	5/16"	7.938	5/16"	3"	1"
41120	54620	42120	.3125	5/16"	7.938	5/16"	4"	1"
41130	54630	42130	.3125	5/16"	7.938	5/16"	4"	1-5/8"
41140	54640	42140	.3125	5/16"	7.938	5/16"	6"	1-1/2"
92140	93140	94140	.3150		8.000	8.0	75	25
92150	93150	94150	.3150		8.000	8.0	100	25
92160	93160	94160	.3150		8.000	8.0	100	41
92170	93170	94170	.3150		8.000	8.0	150	50

† *Metric equivalents are for reference only*

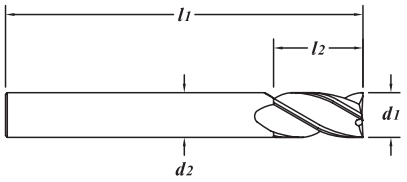
(620M/640M) 2 Flute EDP#	(623M/643M) 3 Flute EDP#	(630M/650M) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
41150	54650	42150	.3750	3/8"	9.525	3/8"	3"	1"
41160	54660	42160	.3750	3/8"	9.525	3/8"	4"	1"
41170	54670	42170	.3750	3/8"	9.525	3/8"	4"	2"
41180	54680	42180	.3750	3/8"	9.525	3/8"	6"	1-1/2"
41190	54690	42190	.3750	3/8"	9.525	3/8"	6"	3"
92180	93180	94180	.3937		10.000	10.0	75	25
92190	93190	94190	.3937		10.000	10.0	100	25
92200	93200	94200	.3937		10.000	10.0	100	50
92210	93210	94210	.3937		10.000	10.0	150	38
92220	93220	94220	.3937		10.000	10.0	150	75
41200	54700	42200	.4375	7/16"	11.113	7/16"	4"	1"
41210	54710	42210	.4375	7/16"	11.113	7/16"	4"	2"
41220	54720	42220	.4375	7/16"	11.113	7/16"	6"	1-1/2"
41230	54730	42230	.4375	7/16"	11.113	7/16"	6"	3"
92230	93230	94230	.4724		12.000	12.0	100	25
92240	93240	94240	.4724		12.000	12.0	100	50
92250	93250	94250	.4724		12.000	12.0	150	50
92260	93260	94260	.4724		12.000	12.0	150	75
41240	54740	42240	.5000	1/2"	12.700	1/2"	4"	1"
41250	54750	42250	.5000	1/2"	12.700	1/2"	4"	2"
41260	54760	42260	.5000	1/2"	12.700	1/2"	6"	1-1/2"
41270	54770	42270	.5000	1/2"	12.700	1/2"	6"	3"
92270	93270	94270	.5512		14.000	14.0	100	25
92280	93280	94280	.5512		14.000	14.0	100	50
92290	93290	94290	.5512		14.000	14.0	150	50
92300	93300	94300	.5512		14.000	14.0	150	75
41280	54780	42280	.5625	9/16"	14.288	9/16"	6"	2"
41290	54790	42290	.5625	9/16"	14.288	9/16"	6"	3"
41300	54800	42300	.6250	5/8"	15.875	5/8"	6"	2"
41310	54810	42310	.6250	5/8"	15.875	5/8"	6"	3"
92310	93310	94310	.6299		16.000	16.0	150	50
92320	93320	94320	.6299		16.000	16.0	150	75
92330	93330	94330	.7087		18.000	18.0	150	50
92340	93340	94340	.7087		18.000	18.0	150	75
41320	54820	42320	.7500	3/4"	19.050	3/4"	6"	2"
41330	54830	42330	.7500	3/4"	19.050	3/4"	6"	3"
92350	93350	94350	.7874		20.000	20.0	150	50
92360	93360	94360	.7874		20.000	20.0	150	75
92370	93370	94370	.9843		25.000	25.0	150	50
-	93380	94380	.9843		25.000	25.0	150	75
41340	54840	42340	1.000	1"	25.400	1"	6"	2"
41350	54850	42350	1.000	1"	25.400	1"	6"	3"
-	-	42360	1.000	1"	25.400	1"	6"	4"
-	-	42390	1.250	1-1/4"	31.750	1-1/4"	6"	3"

Series 620MC, 623MC, 630MC

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Z=2 | Z=3 | Z=4 | 30° | TECH PAGES 268,270

Extra Length - Square End - TiCN Coated
Extra Länge - Ohne Eckenradius - TiCN-Beschichtet
Longitud Extra - Extremo Sin Radio - Recubrimiento de TiCN
Extra Longue - Extrémité Carré - Revêtement TiCN
Lunghezza Extra - Piatte - Rivestimento in TiCN
超长 - 平头 - TiCN 涂层



MATERIAL HARDNESS (Rc)
70
35
0

Solid submicron grain carbide end mill - center cutting
Extended reach
Improved abrasion resistance and lubricity
Can be modified with a neck within 48 hours
Extremely versatile
Uncoated - page 232
TiAlN Coated - page 235
Standard Length - page 203

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Erweiterte Reichweite
Verbesserte Verschleissbeständigkeit und Schmiereienschaft
Kann innerhalb 48 Stunden am Schaft verjüngt werden
Extrem Vielseitig
Unbeschichtet - Seite 232
TiAlN-Beschichtet - Seite 235
Standard Länge - Seite 203

Fresa de submicrograno sólido carburo - corte centrado
Mayor alcance
Mejoradas la resistencia a la abrasión y la lubricación
Puede ser modificado con un cuello en 48 horas
Extremadamente versátil
Sin recubrimiento - Página 232
Recubrimiento de TiAlN - Página 235
Longitud Estándar - Página 203

Fraises carbure submicrograin - coupe au centre
Extension supplémentaire
Amelioration de la resistance a l'abrasion et au glissement
Peut etre modifier avec un col degage sous un delai de 48 heures
Utilisations variables
Sans revêtement - Page 232
Revêtement TiAlN - Page 235
Longueur Standart - Page 203

Fresa sub-micrograno metallo duro - taglio al centro
Estensione più grande
Maggiore resistenza all'abrasione
Può essere modificata in 48 ore
Estremamente versatile
Non Rivestito - Pagina 232
Rivestimento in TiAlN - Pagina 235
Lunghezza Standard - Pagina 203

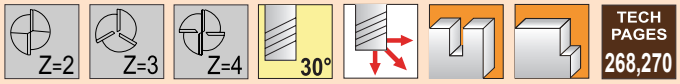
超细晶粒整体硬质合金立铣刀 - 中心切削
加长
改善耐磨性和润滑性
可以在48小时内用轴颈进行修正
功能极多
未涂层 - 232页
TiAlN 涂层 - 235页
标准长度 - 203页

(620MC) 2 Flute EDP#	(623MC) 3 Flute EDP#	(630MC) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
41014	54514	42014	.1250	1/8"	3.175	1/8"	2"	5/8"
41024	54524	42024	.1250	1/8"	3.175	1/8"	3"	3/4"
41034	54534	42034	.1250	1/8"	3.175	1/8"	3"	1"
41044	54544	42044	.1875	3/16"	4.763	3/16"	3"	1"
41054	54554	42054	.1875	3/16"	4.763	3/16"	3"	1-1/8"
41064	54564	42064	.1875	3/16"	4.763	3/16"	4"	1"
41074	54574	42074	.2500	1/4"	6.350	1/4"	3"	1"
41084	54584	42084	.2500	1/4"	6.350	1/4"	4"	1"
41094	54594	42094	.2500	1/4"	6.350	1/4"	4"	1-1/2"
41104	54604	42104	.2500	1/4"	6.350	1/4"	6"	1-1/2"
41114	54614	42114	.3125	5/16"	7.938	5/16"	3"	1"
41124	54624	42124	.3125	5/16"	7.938	5/16"	4"	1"
41134	54634	42134	.3125	5/16"	7.938	5/16"	4"	1-5/8"
41144	54644	42144	.3125	5/16"	7.938	5/16"	6"	1-1/2"
41154	54654	42154	.3750	3/8"	9.525	3/8"	3"	1"
41164	54664	42164	.3750	3/8"	9.525	3/8"	4"	1"
41174	54674	42174	.3750	3/8"	9.525	3/8"	4"	2"
41184	54684	42184	.3750	3/8"	9.525	3/8"	6"	1-1/2"
41194	54694	42194	.3750	3/8"	9.523	3/8"	6"	3"
41204	54704	42204	.4375	7/16"	11.113	7/16"	4"	1"
41214	54714	42214	.4375	7/16"	11.113	7/16"	4"	2"
41224	54724	42224	.4375	7/16"	11.113	7/16"	6"	1-1/2"
-	54734	42234	.4375	7/16"	11.113	7/16"	6"	3"
41244	54744	42244	.5000	1/2"	12.700	1/2"	4"	1"
41254	54754	42254	.5000	1/2"	12.700	1/2"	4"	2"
41264	54764	42264	.5000	1/2"	12.700	1/2"	6"	1-1/2"
41274	54774	42274	.5000	1/2"	12.700	1/2"	6"	3"
41284	54784	42284	.5625	9/16"	14.288	9/16"	6"	2"
41294	-	42294	.5625	9/16"	14.288	9/16"	6"	3"
41304	54804	42304	.6250	5/8"	15.875	5/8"	6"	2"
41314	54814	42314	.6250	5/8"	15.875	5/8"	6"	3"
41324	54824	42324	.7500	3/4"	19.050	3/4"	6"	2"
41334	54834	42334	.7500	3/4"	19.050	3/4"	6"	3"
41344	54844	42344	1.000	1"	25.400	1"	6"	2"
41354	54854	42354	1.000	1"	25.400	1"	6"	3"
-	-	42364	1.000	1"	25.400	1"	6"	4"
-	-	42394	1.250	1-1/4"	31.750	1-1/4"	6"	3"

† *Metric equivalents are for reference only*

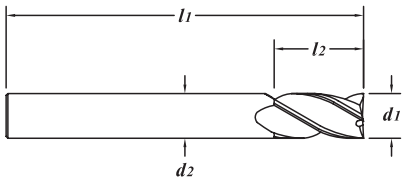
TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6

Series 620MA, 623MA, 630MA, 640MA, 643MA, 650MA



3,000mm - 8,000mm
(.1181" - .3150")

Extra Length - Square End - TiALN Coated
Extra Länge - Ohne Eckenradius - TiALN-Beschichtet
Longitud Extra - Extremo Sin Radio - Recubrimiento de TiALN
Extra Longue - Extrémité Carré - Revêtement TiALN
Lunghezza Extra - Piatte - Rivestimento in TiALN
超长 - 平头 - TiALN 涂层



Solid submicron grain carbide end mill - center cutting
Extended reach
Dry or semi-dry machining
Can be modified with a neck within 48 hours
Extremely versatile
Uncoated - page 232
TiCN Coated - page 234
Stub Length - Page 193
Standard Length - Page 204

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Erweiterte Reichweite
Trocken oder Halbtrockene Bearbeitung
Kann innerhalb 48 Stunden am Schaft verjüngt werden
Extrem Vielseitig
Unbeschichtet - Seite 232
TiCN-Beschichtet - Seite 234
Kurze Länge - Seite 193
Standard Länge - Seite 204

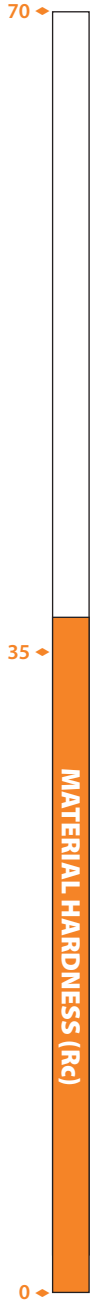
Fresa de submicrograno sólido carburo - corte centrado
Mayor alcance
Mecanizado seco o semiseco
Puede ser modificado con un cuello en 48 horas
Extremadamente versátil
Sin recubrimiento - Página 232
Recubrimiento de TiCN - Página 234
Longitud Corta - Página 193
Longitud Estándar - Página 204

Fraises carbure submicrograin - coupe au centre
Extension supplémentaire
Usinage a sec ou avec l'air
Peut etre modifier avec un col degage sous un delai de 48 heures
Utilisations variables
Sans revêtement - Page 232
Revêtement TiCN - Page 234
Longueur Courte - Page 193
Longueur Standart - Page 204

Fresa sub-micrograno metallo duro - taglio al centro
Estensione più grande
Lavorazione a secco o a umido
Può essere modificata in 48 ore
Estremamente varsatile
Non Rivestito - Pagina 232
Rivestimento in TiCN - Pagina 234
Serie Corta - Pagina 193
Lunghezza Standard - Pagina 204

超细晶粒整体硬质合金立铣刀 - 中心切削
加长
干式或半干式机加工
可以在48小时内用轴颈进行修正
功能极多
未涂层 - 232页
TiCN 涂层 - 234页
短柱长度 - 193页
标准长度 - 204页

(620MA/640MA) 2 Flute EDP#	(623MA/643MA) 3 Flute EDP#	(630MA/650MA) 4 Flute EDP#	d_1 † Diameter Decimal		Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
92017	93017	94017	.1181		3.000	3.0	50	16
92027	93027	94027	.1181		3.000	3.0	75	20
92037	93037	94037	.1181		3.000	3.0	75	25
41017	54517	42017	.1250	1/8"	3.175	1/8"	2"	5/8"
41027	54527	42027	.1250	1/8"	3.175	1/8"	3"	3/4"
41037	54537	42037	.1250	1/8"	3.175	1/8"	3"	1"
92047	93047	94047	.1575		4.000	4.0	50	16
92057	93057	94057	.1575		4.000	4.0	75	20
92067	93067	94067	.1575		4.000	4.0	75	25
41047	54547	42047	.1875	3/16"	4.763	3/16"	3"	1"
41057	54557	42057	.1875	3/16"	4.763	3/16"	3"	1-1/8"
41067	54567	42067	.1875	3/16"	4.763	3/16"	4"	1"
92077	93077	94077	.1969		5.000	5.0	50	16
92087	93087	94087	.1969		5.000	5.0	75	20
92097	93097	94097	.1969		5.000	5.0	75	25
92107	93107	94107	.2362		6.000	6.0	75	25
92117	93117	94117	.2362		6.000	6.0	100	25
92127	93127	94127	.2362		6.000	6.0	100	32
92137	93137	94137	.2362		6.000	6.0	150	38
41077	54577	42077	.2500	1/4"	6.350	1/4"	3"	1"
41087	54587	42087	.2500	1/4"	6.350	1/4"	4"	1"
41097	54597	42097	.2500	1/4"	6.350	1/4"	4"	1-1/2"
41107	54607	42107	.2500	1/4"	6.350	1/4"	6"	1-1/2"
41117	54617	42117	.3125	5/16"	7.938	5/16"	3"	1"
41127	54627	42127	.3125	5/16"	7.938	5/16"	4"	1"
41137	54637	42137	.3125	5/16"	7.938	5/16"	4"	1-5/8"
41147	54647	42147	.3125	5/16"	7.938	5/16"	6"	1-1/2"
92147	93147	94147	.3150		8.000	8.0	75	25
92157	93157	94157	.3150		8.000	8.0	100	25
92167	93167	94167	.3150		8.000	8.0	100	41
92177	93177	94177	.3150		8.000	8.0	150	50



continued →

Series 620MA, 623MA, 630MA, 640MA, 643MA, 650MA *(continued)*

9,525mm - 31,750mm
(.3750" - 1.250")

(620MA/640MA) 2 Flute EDP#	(623MA/643MA) 3 Flute EDP#	(630MA/650MA) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
41157	54657	42157	.3750	3/8"	9.525	3/8"	3"	1"
41167	54667	42167	.3750	3/8"	9.525	3/8"	4"	1"
41177	54677	42177	.3750	3/8"	9.525	3/8"	4"	2"
41187	54687	42187	.3750	3/8"	9.525	3/8"	6"	1-1/2"
41197	54697	42197	.3750	3/8"	9.525	3/8"	6"	3"
92187	93187	94187	.3937		10.000	10.0	75	25
92197	93197	94197	.3937		10.000	10.0	100	25
92207	93207	94207	.3937		10.000	10.0	100	50
92217	93217	94217	.3937		10.000	10.0	150	38
92227	93227	94227	.3937		10.000	10.0	150	75
41207	54707	42207	.4375	7/16"	11.113	7/16"	4"	1"
41217	54717	42217	.4375	7/16"	11.113	7/16"	4"	2"
41227	54727	42227	.4375	7/16"	11.113	7/16"	6"	1-1/2"
41237	54737	42237	.4375	7/16"	11.113	7/16"	6"	3"
92237	93237	94237	.4724		12.000	12.0	100	25
92247	93247	94247	.4724		12.000	12.0	100	50
92257	93257	94257	.4724		12.000	12.0	150	50
92267	93267	94267	.4724		12.000	12.0	150	75
41247	54747	42247	.5000	1/2"	12.700	1/2"	4"	1"
41257	54757	42257	.5000	1/2"	12.700	1/2"	4"	2"
41267	54767	42267	.5000	1/2"	12.700	1/2"	6"	1-1/2"
41277	54777	42277	.5000	1/2"	12.700	1/2"	6"	3"
92277	93277	94277	.5512		14.000	14.0	100	25
92287	93287	94287	.5512		14.000	14.0	100	50
-	93297	94297	.5512		14.000	14.0	150	50
92307	93307	94307	.5512		14.000	14.0	150	75
41287	54787	42287	.5625	9/16"	14.288	9/16"	6"	2"
-	54797	42297	.5625	9/16"	14.288	9/16"	6"	3"
41307	54807	42307	.6250	5/8"	15.875	5/8"	6"	2"
41317	54817	42317	.6250	5/8"	15.875	5/8"	6"	3"
92317	93317	94317	.6299		16.000	16.0	150	50
92327	93327	94327	.6299		16.000	16.0	150	75
-	-	94337	.7087		18.000	18.0	150	50
-	93347	94347	.7087		18.000	18.0	150	75
41327	54827	42327	.7500	3/4"	19.050	3/4"	6"	2"
41337	54837	42337	.7500	3/4"	19.050	3/4"	6"	3"
92357	93357	94357	.7874		20.000	20.0	150	50
92367	93367	94367	.7874		20.000	20.0	150	75
-	93377	94377	.9843		25.000	25.0	150	50
92387	93387	94387	.9843		25.000	25.0	150	75
41347	54847	42347	1.000	1"	25.400	1"	6"	2"
41357	54857	42357	1.000	1"	25.400	1"	6"	3"
-	-	42367	1.000	1"	25.400	1"	6"	4"
-	-	42397	1.250	1-1/4"	31.750	1-1/4"	6"	3"

† *Metric equivalents are for reference only*

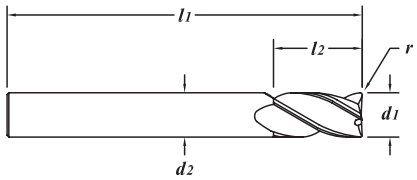
TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
r	+0,025 –0,025mm (+.001" –.001")

Z=4 | 30° | TECH PAGES 268,270

Series 630R

3,175mm - 7,938mm
(.1250" - .3125")

Extra Length - Corner Radius
Extra Länge - Eckenradius
Longitud Extra - Ángulo Redondeado
Extra Longue - Rayon de Coin
Lunghezza Extra - Torico
超长 - 圆角半径



Solid submicron grain carbide end mill - center cutting
Extended reach
For stronger corners and part radius
Can be modified with a neck within 48 hours
Extremely versatile
TiAlN Coated - page 240
Standard Length - page 206

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Erweiterte Reichweite
Für stärkere Schneidecken und Radiusteile
Kann innerhalb 48 Stunden am Schaft verjüngt werden
Extrem Vielseitig
TiAlN-Beschichtet - Seite 240
Standard Länge - Seite 206

Fresa de submicrograno sólido carburo - corte centrado
Mayor alcance
Para un mejor refuerzo de esquinas y zonas curvas
Puede ser modificado con un cuello en 48 horas
Extremadamente versátil
Recubrimiento de TiAlN - Página 240
Longitud Estándar - Página 206

Fraises carbure submicrograin - coupe au centre
Extension supplémentaire
Rayon de coin renforces
Peut etre modifier avec un col degage sous un delai de 48 heures
Utilisations variables
Revêtement TiAlN - Page 240
Longueur Standart - Page 206

Fresa sub-micrograno metallo duro - taglio al centro
Estensione più grande
Raggi rinforzati
Può essere modificata in 48 ore
Estremamente varsatile
Rivestimento in TiAlN - Pagina 240
Lunghezza Standard - Pagina 206

超细晶粒整体硬质合金立铣刀 - 中心切削
加长
用于强化圆角和零件半径
可以在48小时内用轴颈进行修正
功能极多
TiAlN 涂层 - 240页
标准长度 - 206页

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
20100	.1250	1/8"	3.175	1/8"	3"	1"	.010"
20110	.1250	1/8"	3.175	1/8"	3"	1"	.015"
20120	.1250	1/8"	3.175	1/8"	3"	1"	.020"
20130	.1250	1/8"	3.175	1/8"	3"	1"	.030"
20140	.1250	1/8"	3.175	1/8"	3"	1"	.045"
20150	.1875	3/16"	4.763	3/16"	3"	1"	.010"
20160	.1875	3/16"	4.763	3/16"	3"	1"	.015"
20170	.1875	3/16"	4.763	3/16"	3"	1"	.020"
20180	.1875	3/16"	4.763	3/16"	3"	1"	.030"
20190	.1875	3/16"	4.763	3/16"	3"	1"	.045"
20200	.1875	3/16"	4.763	3/16"	3"	1"	.060"
20210	.1875	3/16"	4.763	3/16"	4"	1"	.010"
20220	.1875	3/16"	4.763	3/16"	4"	1"	.015"
20230	.1875	3/16"	4.763	3/16"	4"	1"	.020"
20240	.1875	3/16"	4.763	3/16"	4"	1"	.030"
20250	.1875	3/16"	4.763	3/16"	4"	1"	.045"
20260	.1875	3/16"	4.763	3/16"	4"	1"	.060"
20270	.2500	1/4"	6.350	1/4"	3"	1"	.010"
20280	.2500	1/4"	6.350	1/4"	3"	1"	.020"
20290	.2500	1/4"	6.350	1/4"	3"	1"	.030"
20300	.2500	1/4"	6.350	1/4"	3"	1"	.045"
20310	.2500	1/4"	6.350	1/4"	3"	1"	.060"
20320	.2500	1/4"	6.350	1/4"	4"	1"	.010"
20330	.2500	1/4"	6.350	1/4"	4"	1"	.020"
20340	.2500	1/4"	6.350	1/4"	4"	1"	.030"
20350	.2500	1/4"	6.350	1/4"	4"	1"	.045"
20360	.2500	1/4"	6.350	1/4"	4"	1"	.060"
20370	.2500	1/4"	6.350	1/4"	6"	1-1/2"	.010"
20380	.2500	1/4"	6.350	1/4"	6"	1-1/2"	.020"
20390	.2500	1/4"	6.350	1/4"	6"	1-1/2"	.030"
20400	.2500	1/4"	6.350	1/4"	6"	1-1/2"	.045"
20410	.2500	1/4"	6.350	1/4"	6"	1-1/2"	.060"
20420	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.010"
20430	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.020"
20440	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.030"
20450	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.045"
20460	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.060"
20470	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.090"
20480	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.125"

70
35
0
MATERIAL HARDNESS (Rc)

continued →

Series 630R *(continued)*

9,525mm - 15,875mm
(.3750" - .6250")

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
20490	.3750	3/8"	9.525	3/8"	4"	1"	.010"
20500	.3750	3/8"	9.525	3/8"	4"	1"	.020"
20510	.3750	3/8"	9.525	3/8"	4"	1"	.030"
20520	.3750	3/8"	9.525	3/8"	4"	1"	.045"
20530	.3750	3/8"	9.525	3/8"	4"	1"	.060"
20540	.3750	3/8"	9.525	3/8"	4"	1"	.090"
20550	.3750	3/8"	9.525	3/8"	4"	1"	.125"
20560	.3750	3/8"	9.525	3/8"	4"	2"	.010"
20570	.3750	3/8"	9.525	3/8"	4"	2"	.020"
20580	.3750	3/8"	9.525	3/8"	4"	2"	.030"
20590	.3750	3/8"	9.525	3/8"	4"	2"	.045"
20600	.3750	3/8"	9.525	3/8"	4"	2"	.060"
20610	.3750	3/8"	9.525	3/8"	4"	2"	.090"
20620	.3750	3/8"	9.525	3/8"	4"	2"	.125"
20630	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.010"
20640	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.020"
20650	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.030"
20660	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.045"
20670	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.060"
20680	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.090"
20690	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.125"
20700	.5000	1/2"	12.700	1/2"	4"	1"	.015"
20710	.5000	1/2"	12.700	1/2"	4"	1"	.020"
20720	.5000	1/2"	12.700	1/2"	4"	1"	.030"
20730	.5000	1/2"	12.700	1/2"	4"	1"	.045"
20740	.5000	1/2"	12.700	1/2"	4"	1"	.060"
20750	.5000	1/2"	12.700	1/2"	4"	1"	.090"
20760	.5000	1/2"	12.700	1/2"	4"	1"	.125"
20770	.5000	1/2"	12.700	1/2"	4"	2"	.015"
20780	.5000	1/2"	12.700	1/2"	4"	2"	.020"
20790	.5000	1/2"	12.700	1/2"	4"	2"	.030"
20800	.5000	1/2"	12.700	1/2"	4"	2"	.045"
20810	.5000	1/2"	12.700	1/2"	4"	2"	.060"
20820	.5000	1/2"	12.700	1/2"	4"	2"	.090"
20830	.5000	1/2"	12.700	1/2"	4"	2"	.125"
20840	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.015"
20850	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.020"
20860	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.030"
20870	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.045"
20880	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.060"
20890	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.090"
20900	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.125"
20910	.6250	5/8"	15.875	5/8"	6"	2"	.010"
20920	.6250	5/8"	15.875	5/8"	6"	2"	.015"
20930	.6250	5/8"	15.875	5/8"	6"	2"	.020"
20940	.6250	5/8"	15.875	5/8"	6"	2"	.030"
20950	.6250	5/8"	15.875	5/8"	6"	2"	.045"
20960	.6250	5/8"	15.875	5/8"	6"	2"	.060"
20970	.6250	5/8"	15.875	5/8"	6"	2"	.090"
20980	.6250	5/8"	15.875	5/8"	6"	2"	.125"

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
20990	.7500	3/4"	19.050	3/4"	6"	3"	.015"
21000	.7500	3/4"	19.050	3/4"	6"	3"	.020"
21010	.7500	3/4"	19.050	3/4"	6"	3"	.030"
21020	.7500	3/4"	19.050	3/4"	6"	3"	.045"
21030	.7500	3/4"	19.050	3/4"	6"	3"	.060"
21040	.7500	3/4"	19.050	3/4"	6"	3"	.090"
21050	.7500	3/4"	19.050	3/4"	6"	3"	.125"
21140	.7500	3/4"	19.050	3/4"	6"	3"	.250"
21060	1.000	1"	25.400	1"	6"	3"	.015"
21070	1.000	1"	25.400	1"	6"	3"	.020"
21080	1.000	1"	25.400	1"	6"	3"	.030"
21090	1.000	1"	25.400	1"	6"	3"	.045"
21100	1.000	1"	25.400	1"	6"	3"	.060"
21110	1.000	1"	25.400	1"	6"	3"	.090"
21120	1.000	1"	25.400	1"	6"	3"	.125"
21130	1.000	1"	25.400	1"	6"	3"	.250"

End Mill Reconditioning

Series 630RA

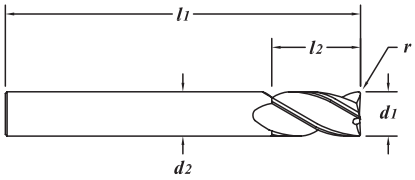
3,175mm - 7,938mm
(.1250" - .3125")

Z=4 | 30° | TECH PAGES 268,270

TOLERANCES

d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
r	+0,025 –0,025mm (+.001" –.001")

Extra Length - Corner Radius - TiALN Coated
Extra Länge - Eckenradius - TiALN-Beschichtet
Longitud Extra - Ángulo Redondeado - Recubrimiento de TiALN
Extra Longue - Rayon de Coin - Revêtement TiALN
Lunghezza Extra - Torico - Rivestimento in TiALN
超长 - 圆角半径 - TiALN 涂层



Solid submicron grain carbide end mill - center cutting
Extended reach
For stronger corners and part radius
Dry or semi-dry machining
Can be modified with a neck within 48 hours
Extremely versatile
Uncoated - page 237
Standard Length - page 208

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Erweiterte Reichweite
Für stärkere Schneidecken und Radiusteile
Trocken oder Halbtrockene Bearbeitung
Kann innerhalb 48 Stunden am Schaft verjüngt werden
Extrem Vielseitig
Unbeschichtet - Seite 237
Standard Länge - Seite 208

Fresa de submicrograno sólido carburo - corte centrado
Mayor alcance
Para un mejor refuerzo de esquinas y zonas curvas
Mecanizado seco o semiseco
Puede ser modificado con un cuello en 48 horas
Extremadamente versátil
Sin recubrimiento - Página 237
Longitud Estándar - Página 208

Fraises carbure submicrograin - coupe au centre
Extension supplémentaire
Rayon de coin renforces
Usinage a sec ou avec l'air
Peut etre modifier avec un col degage sous un delai de 48 heures
Utilisations variables
Sans revêtement - Page 237
Longueur Standart - Page 208

Fresa sub-micrograno metallo duro - taglio al centro
Estensione più grande
Raggi rinforzati
Lavorazione a secco o a umido
Può essere modificata in 48 ore
Estremamente varsatile
Non Rivestito - Pagina 237
Lunghezza Standard - Pagina 208

超细晶粒整体硬质合金立铣刀 - 中心切削
加长
用于强化圆角和零件半径
干式或半干式机加工
可以在48小时内用轴颈进行修正
功能极多
未涂层 - 237页
标准长度 - 208页

MATERIAL HARDNESS (Rc)
70
35
0

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
20107	.1250	1/8"	3.175	1/8"	3"	1"	.010"
20117	.1250	1/8"	3.175	1/8"	3"	1"	.015"
20127	.1250	1/8"	3.175	1/8"	3"	1"	.020"
20137	.1250	1/8"	3.175	1/8"	3"	1"	.030"
20147	.1250	1/8"	3.175	1/8"	3"	1"	.045"
20157	.1875	3/16"	4.763	3/16"	3"	1"	.010"
20167	.1875	3/16"	4.763	3/16"	3"	1"	.015"
20177	.1875	3/16"	4.763	3/16"	3"	1"	.020"
20187	.1875	3/16"	4.763	3/16"	3"	1"	.030"
20197	.1875	3/16"	4.763	3/16"	3"	1"	.045"
20207	.1875	3/16"	4.763	3/16"	3"	1"	.060"
20217	.1875	3/16"	4.763	3/16"	4"	1"	.010"
20227	.1875	3/16"	4.763	3/16"	4"	1"	.015"
20237	.1875	3/16"	4.763	3/16"	4"	1"	.020"
20247	.1875	3/16"	4.763	3/16"	4"	1"	.030"
20257	.1875	3/16"	4.763	3/16"	4"	1"	.045"
20267	.1875	3/16"	4.763	3/16"	4"	1"	.060"
20277	.2500	1/4"	6.350	1/4"	3"	1"	.010"
20287	.2500	1/4"	6.350	1/4"	3"	1"	.020"
20297	.2500	1/4"	6.350	1/4"	3"	1"	.030"
20307	.2500	1/4"	6.350	1/4"	3"	1"	.045"
20317	.2500	1/4"	6.350	1/4"	3"	1"	.060"
20327	.2500	1/4"	6.350	1/4"	4"	1"	.010"
20337	.2500	1/4"	6.350	1/4"	4"	1"	.020"
20347	.2500	1/4"	6.350	1/4"	4"	1"	.030"
20357	.2500	1/4"	6.350	1/4"	4"	1"	.045"
20367	.2500	1/4"	6.350	1/4"	4"	1"	.060"
20377	.2500	1/4"	6.350	1/4"	6"	1-1/2"	.010"
20387	.2500	1/4"	6.350	1/4"	6"	1-1/2"	.020"
20397	.2500	1/4"	6.350	1/4"	6"	1-1/2"	.030"
20407	.2500	1/4"	6.350	1/4"	6"	1-1/2"	.045"
20417	.2500	1/4"	6.350	1/4"	6"	1-1/2"	.060"
20427	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.010"
20437	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.020"
20447	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.030"
20457	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.045"
20467	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.060"
20477	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.090"
20487	.3125	5/16"	7.938	5/16"	4"	1-5/8"	.125"

† *Metric equivalents are for reference only*

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
20497	.3750	3/8"	9.525	3/8"	4"	1"	.010"
20507	.3750	3/8"	9.525	3/8"	4"	1"	.020"
20517	.3750	3/8"	9.525	3/8"	4"	1"	.030"
20527	.3750	3/8"	9.525	3/8"	4"	1"	.045"
20537	.3750	3/8"	9.525	3/8"	4"	1"	.060"
20547	.3750	3/8"	9.525	3/8"	4"	1"	.090"
20557	.3750	3/8"	9.525	3/8"	4"	1"	.125"
20567	.3750	3/8"	9.525	3/8"	4"	2"	.010"
20577	.3750	3/8"	9.525	3/8"	4"	2"	.020"
20587	.3750	3/8"	9.525	3/8"	4"	2"	.030"
20597	.3750	3/8"	9.525	3/8"	4"	2"	.045"
20607	.3750	3/8"	9.525	3/8"	4"	2"	.060"
20617	.3750	3/8"	9.525	3/8"	4"	2"	.090"
20627	.3750	3/8"	9.525	3/8"	4"	2"	.125"
20637	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.010"
20647	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.020"
20657	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.030"
20667	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.045"
20677	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.060"
20687	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.090"
20697	.3750	3/8"	9.525	3/8"	6"	1-1/2"	.125"
21157	.4375	7/16"	11.113	7/16"	4"	1"	.010"
21167	.4375	7/16"	11.113	7/16"	4"	1"	.015"
21177	.4375	7/16"	11.113	7/16"	4"	1"	.020"
21187	.4375	7/16"	11.113	7/16"	4"	1"	.030"
21227	.4375	7/16"	11.113	7/16"	4"	1"	.125"
20707	.5000	1/2"	12.700	1/2"	4"	1"	.015"
20717	.5000	1/2"	12.700	1/2"	4"	1"	.020"
20727	.5000	1/2"	12.700	1/2"	4"	1"	.030"
20737	.5000	1/2"	12.700	1/2"	4"	1"	.045"
20747	.5000	1/2"	12.700	1/2"	4"	1"	.060"
20757	.5000	1/2"	12.700	1/2"	4"	1"	.090"
20767	.5000	1/2"	12.700	1/2"	4"	1"	.125"
20777	.5000	1/2"	12.700	1/2"	4"	2"	.015"
20787	.5000	1/2"	12.700	1/2"	4"	2"	.020"
20797	.5000	1/2"	12.700	1/2"	4"	2"	.030"
20807	.5000	1/2"	12.700	1/2"	4"	2"	.045"
20817	.5000	1/2"	12.700	1/2"	4"	2"	.060"
20827	.5000	1/2"	12.700	1/2"	4"	2"	.090"
20837	.5000	1/2"	12.700	1/2"	4"	2"	.125"
20847	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.015"
20857	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.020"
20867	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.030"
20877	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.045"
20887	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.060"
20897	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.090"
20907	.5000	1/2"	12.700	1/2"	6"	1-1/2"	.125"
20917	.6250	5/8"	15.875	5/8"	6"	2"	.010"
20927	.6250	5/8"	15.875	5/8"	6"	2"	.015"
20937	.6250	5/8"	15.875	5/8"	6"	2"	.020"
20947	.6250	5/8"	15.875	5/8"	6"	2"	.030"
20957	.6250	5/8"	15.875	5/8"	6"	2"	.045"
20967	.6250	5/8"	15.875	5/8"	6"	2"	.060"
20977	.6250	5/8"	15.875	5/8"	6"	2"	.090"
20987	.6250	5/8"	15.875	5/8"	6"	2"	.125"

continued →

Series 630RA *(continued)*

19,050mm - 25,400mm
(.7500" - 1.000")

EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length	r Corner Radius
20997	.7500	3/4"	19.050	3/4"	6"	3"	.015"
21007	.7500	3/4"	19.050	3/4"	6"	3"	.020"
21017	.7500	3/4"	19.050	3/4"	6"	3"	.030"
21027	.7500	3/4"	19.050	3/4"	6"	3"	.045"
21037	.7500	3/4"	19.050	3/4"	6"	3"	.060"
21047	.7500	3/4"	19.050	3/4"	6"	3"	.090"
21057	.7500	3/4"	19.050	3/4"	6"	3"	.125"
21147	.7500	3/4"	19.050	3/4"	6"	3"	.250"
21067	1.000	1"	25.400	1"	6"	3"	.015"
21077	1.000	1"	25.400	1"	6"	3"	.020"
21087	1.000	1"	25.400	1"	6"	3"	.030"
21097	1.000	1"	25.400	1"	6"	3"	.045"
21107	1.000	1"	25.400	1"	6"	3"	.060"
21117	1.000	1"	25.400	1"	6"	3"	.090"
21127	1.000	1"	25.400	1"	6"	3"	.125"
21137	1.000	1"	25.400	1"	6"	3"	.250"

† *Metric equivalents are for reference only*

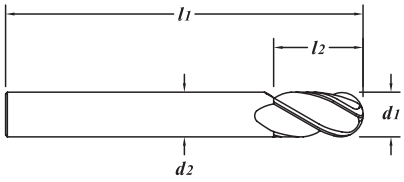
TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

Series 720M, 723M, 730M, 740M, 743M, 750M

TECH PAGES 268,270

3,000mm - 8,000mm
(.1181" - .3150")

Extra Length - Ball End
Extra Länge - Vollradius
Longitud Extra - Cabeza Esférica
Extra Longue - Hemispherique
Lunghezza Extra - Sferica
超长 - 球头



Solid submicron grain carbide end mill - center cutting
Extended reach
Can be modified with a neck within 48 hours
Extremely versatile
TiCN Coated - page 245
TiAlN Coated - page 246
Stub Length - page 194
Standard Length - page 211

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Erweiterte Reichweite
Kann innerhalb 48 Stunden am Schaft verjüngt werden
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
TiCN-Beschichtet - Seite 245
TiAlN-Beschichtet - Seite 246
Kurze Länge - Seite 194
Standard Länge - Seite 211

Fresa de submicrograno sólido carburo - corte centrado
Mayor alcance
Puede ser modificado con un cuello en 48 horas
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Recubrimiento de TiCN - Página 245
Recubrimiento de TiAlN - Página 246
Longitud Corta - Página 194
Longitud Estándar - Página 211

Fraises carbure submicrograin - coupe au centre
Extension supplémentaire
Peut etre modifier avec un col degage sous un delai de 48 heures
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Revêtement TiCN - Page 245
Revêtement TiAlN - Page 246
Longueur Courte - Page 194
Longueur Standart - Page 211

Fresa sub-micrograno metallo duro - taglio al centro
Estensione più grande
Può essere modificata in 48 ore
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Rivestimento in TiCN - Pagina 245
Rivestimento in TiAlN - Pagina 246
Serie Corta - Pagina 194
Lunghezza Standard - Pagina 211

超细晶粒整体硬质合金立铣刀 - 中心切削
加长
可以在48小时内用轴颈进行修正
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
TiCN 涂层 - 245页
TiAlN 涂层 - 246页
短柱长度 - 194页
标准长度 - 211页

(720M/740M) 2 Flute EDP#	(723M/743M) 3 Flute EDP#	(730M/750M) 4 Flute EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
97010	98010	99010	.1181		3.000	3.0	50	16
97020	98020	99020	.1181		3.000	3.0	75	20
97030	98030	99030	.1181		3.000	3.0	75	25
43010	55510	44010	.1250	1/8"	3.175	1/8"	2"	5/8"
43020	55520	44020	.1250	1/8"	3.175	1/8"	3"	3/4"
43030	55530	44030	.1250	1/8"	3.175	1/8"	3"	1"
97040	98040	99040	.1575		4.000	4.0	50	16
97050	98050	99050	.1575		4.000	4.0	75	20
97060	98060	99060	.1575		4.000	4.0	75	25
43040	55540	44040	.1875	3/16"	4.763	3/16"	3"	1"
43050	55550	44050	.1875	3/16"	4.763	3/16"	3"	1-1/8"
43060	55560	44060	.1875	3/16"	4.763	3/16"	4"	1"
97070	98070	99070	.1969		5.000	5.0	50	16
97080	98080	99080	.1969		5.000	5.0	75	20
97090	98090	99090	.1969		5.000	5.0	75	25
97100	98100	99100	.2362		6.000	6.0	75	25
97110	98110	99110	.2362		6.000	6.0	100	25
97120	98120	99120	.2362		6.000	6.0	100	32
97130	98130	99130	.2362		6.000	6.0	150	38
43070	55570	44070	.2500	1/4"	6.350	1/4"	3"	1"
43080	55580	44080	.2500	1/4"	6.350	1/4"	4"	1"
43090	55590	44090	.2500	1/4"	6.350	1/4"	4"	1-1/2"
43100	55600	44100	.2500	1/4"	6.350	1/4"	6"	1-1/2"
43110	55610	44110	.3125	5/16"	7.938	5/16"	3"	1"
43120	55620	44120	.3125	5/16"	7.938	5/16"	4"	1"
43130	55630	44130	.3125	5/16"	7.938	5/16"	4"	1-5/8"
43140	55640	44140	.3125	5/16"	7.938	5/16"	6"	1-1/2"
97140	98140	99140	.3150		8.000	8.0	75	25
97150	98150	99150	.3150		8.000	8.0	100	25
97160	98160	99160	.3150		8.000	8.0	100	41
97170	98170	99170	.3150		8.000	8.0	150	50

continued →

Series 720M, 723M, 730M, 740M, 743M, 750M *(continued)*

9,525mm - 25,400mm
(.3750" - 1.000")

(720M/740M) 2 Flute EDP#	(723M/743M) 3 Flute EDP#	(730M/750M) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
43150	55650	44150	.3750	3/8"	9.525	3/8"	3"	1"
43160	55660	44160	.3750	3/8"	9.525	3/8"	4"	1"
43170	55670	44170	.3750	3/8"	9.525	3/8"	4"	2"
43180	55680	44180	.3750	3/8"	9.525	3/8"	6"	1-1/2"
43190	55690	44190	.3750	3/8"	9.525	3/8"	6"	3"
97180	98180	99180	.3937		10.000	10.0	75	25
97190	98190	99190	.3937		10.000	10.0	100	25
97200	98200	99200	.3937		10.000	10.0	100	50
97210	98210	99210	.3937		10.000	10.0	150	38
97220	98220	99220	.3937		10.000	10.0	150	75
43200	55700	44200	.4375	7/16"	11.113	7/16"	4"	1"
43210	55710	44210	.4375	7/16"	11.113	7/16"	4"	2"
43220	-	44220	.4375	7/16"	11.113	7/16"	6"	1-1/2"
43230	-	44230	.4375	7/16"	11.113	7/16"	6"	3"
97230	98230	99230	.4724		12.000	12.0	100	25
97240	98240	99240	.4724		12.000	12.0	100	50
97250	98250	99250	.4724		12.000	12.0	150	50
97260	98260	99260	.4724		12.000	12.0	150	75
43240	55740	44240	.5000	1/2"	12.700	1/2"	4"	1"
43250	55750	44250	.5000	1/2"	12.700	1/2"	4"	2"
43260	55760	44260	.5000	1/2"	12.700	1/2"	6"	1-1/2"
43270	55770	44270	.5000	1/2"	12.700	1/2"	6"	3"
97270	-	99270	.5512		14.000	14.0	100	25
97280	-	-	.5512		14.000	14.0	100	50
97290	-	99290	.5512		14.000	14.0	150	50
97300	98300	-	.5512		14.000	14.0	150	75
43280	55780	44280	.5625	9/16"	14.288	9/16"	6"	2"
-	55790	44290	.5625	9/16"	14.288	9/16"	6"	3"
43300	55800	44300	.6250	5/8"	15.875	5/8"	6"	2"
43310	55810	44310	.6250	5/8"	15.875	5/8"	6"	3"
97310	98310	99310	.6299		16.000	16.0	150	50
97320	98320	99320	.6299		16.000	16.0	150	75
97340	98340	99340	.7087		18.000	18.0	150	75
43320	55820	44320	.7500	3/4"	19.050	3/4"	6"	2"
43330	55830	44330	.7500	3/4"	19.050	3/4"	6"	3"
97350	98350	99350	.7874		20.000	20.0	150	50
97360	98360	99360	.7874		20.000	20.0	150	75
-	98370	-	.9843		25.000	25.0	150	50
97380	98380	-	.9843		25.000	25.0	150	75
43340	55840	44340	1.000	1"	25.400	1"	6"	2"
43350	55850	44350	1.000	1"	25.400	1"	6"	3"

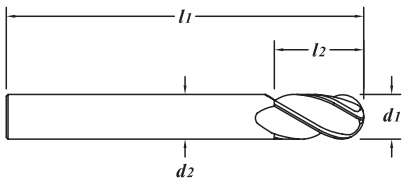
† *Metric equivalents are for reference only*

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

Z=2 Z=3 Z=4 30°

TECH PAGES 268,270

Extra Length - Ball End - TiCN Coated
Extra Länge - Vollradius - TiCN-Beschichtet
Longitud Extra - Cabeza Esférica - Recubrimiento de TiCN
Extra Longue - Hemispherique - Revêtement TiCN
Lunghezza Extra - Sferica - Rivestimento in TiCN
超长 - 球头 - TiCN 涂层



Solid submicron grain carbide end mill - center cutting
Extended reach
Improved abrasion resistance and lubricity
Can be modified with a neck within 48 hours
Extremely versatile
Uncoated - page 243
TiAlN Coated - page 246
Standard Length - page 214

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Erweiterte Reichweite
Verbesserte Verschleissbeständigkeit und Schmiereienschaft
Kann innerhalb 48 Stunden am Schaft verjüngt werden
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
Unbeschichtet - Seite 243
TiAlN-Beschichtet - Seite 246
Standard Länge - Seite 214

Fresa de submicrograno sólido carburo - corte centrado
Mayor alcance
Mejoradas la resistencia a la abrasión y la lubricación
Puede ser modificado con un cuello en 48 horas
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Sin recubrimiento - Página 243
Recubrimiento de TiAlN - Página 246
Longitud Estándar - Página 214

Fraises carbure submicrograin - coupe au centre
Extension supplémentaire
Amelioration de la resistance a l'abrasion et au glissement
Peut etre modifier avec un col degage sous un delai de 48 heures
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Sans revêtement - Page 243
Revêtement TiAlN - Page 246
Longueur Standart - Page 214

Fresa sub-micrograno metallo duro - taglio al centro
Estensione più grande
Maggiore resistenza all'abrasione
Può essere modificata in 48 ore
Estremamente varsatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Non Rivestito - Pagina 243
Rivestimento in TiAlN - Pagina 246
Lunghezza Standard - Pagina 214

超细晶粒整体硬质合金立铣刀 - 中心切削
加长
改善耐磨性和润滑性
可以在48小时内用轴颈进行修正
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
未涂层 - 243页
TiAlN 涂层 - 246页
标准长度 - 214页

(720MC) 2 Flute EDP#	(723MC) 3 Flute EDP#	(730MC) 4 Flute EDP#	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
43014	55514	44014	.1250	1/8"	3.175	1/8"	2"	5/8"
43024	55524	44024	.1250	1/8"	3.175	1/8"	3"	3/4"
43034	55534	44034	.1250	1/8"	3.175	1/8"	3"	1"
43044	55544	44044	.1875	3/16"	4.763	3/16"	3"	1"
43054	55554	44054	.1875	3/16"	4.763	3/16"	3"	1-1/8"
43064	55564	44064	.1875	3/16"	4.763	3/16"	4"	1"
43074	55574	44074	.2500	1/4"	6.350	1/4"	3"	1"
43084	55584	44084	.2500	1/4"	6.350	1/4"	4"	1"
43094	55594	44094	.2500	1/4"	6.350	1/4"	4"	1-1/2"
43104	55604	44104	.2500	1/4"	6.350	1/4"	6"	1-1/2"
43114	55614	44114	.3125	5/16"	7.938	5/16"	3"	1"
43124	55624	44124	.3125	5/16"	7.938	5/16"	4"	1"
43134	-	44134	.3125	5/16"	7.938	5/16"	4"	1-5/8"
43144	55644	44144	.3125	5/16"	7.938	5/16"	6"	1-1/2"
43154	55654	44154	.3750	3/8"	9.525	3/8"	3"	1"
43164	55664	44164	.3750	3/8"	9.525	3/8"	4"	1"
43174	55674	44174	.3750	3/8"	9.525	3/8"	4"	2"
43184	55684	44184	.3750	3/8"	9.525	3/8"	6"	1-1/2"
-	55694	44194	.3750	3/8"	9.525	3/8"	6"	3"
-	-	44204	.4375	7/16"	11.113	7/16"	4"	1"
-	-	44214	.4375	7/16"	11.113	7/16"	4"	2"
43224	55724	44224	.4375	7/16"	11.113	7/16"	6"	1-1/2"
-	-	44234	.4375	7/16"	11.113	7/16"	6"	3"
43244	55744	44244	.5000	1/2"	12.700	1/2"	4"	1"
43254	55754	44254	.5000	1/2"	12.700	1/2"	4"	2"
43264	55764	44264	.5000	1/2"	12.700	1/2"	6"	1-1/2"
43274	55774	44274	.5000	1/2"	12.700	1/2"	6"	3"
-	-	44284	.5625	9/16"	14.288	9/16"	6"	2"
-	-	44294	.5625	9/16"	14.288	9/16"	6"	3"
43304	55804	44304	.6250	5/8"	15.875	5/8"	6"	2"
-	-	44314	.6250	5/8"	15.875	5/8"	6"	3"
43324	55824	44324	.7500	3/4"	19.050	3/4"	6"	2"
43334	55834	44334	.7500	3/4"	19.050	3/4"	6"	3"
-	55844	44344	1.000	1"	25.400	1"	6"	2"
43354	55854	44354	1.000	1"	25.400	1"	6"	3"

Series 720MA, 723MA, 730MA, 740MA, 743MA, 750MA

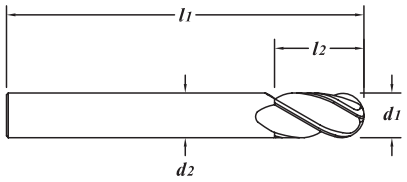
3,000mm - 8,000mm
(.1181" - .3150")

Z=2 Z=3 Z=4 30°

TECH PAGES 268,270

TOLERANCES	
d_1	+0,000 –0,050mm (+.000" –.002")
d_2	h6
ball radius	+0,000 –0,025mm (+.000" –.001")

Extra Length - Ball End - TiALN Coated
Extra Länge - Vollradius - TiALN-Beschichtet
Longitud Extra - Cabeza Esférica - Recubrimiento de TiALN
Extra Longue - Hemispherique - Revêtement TiALN
Lunghezza Extra - Sferica - Rivestimento in TiALN
超长 - 球头 - TiALN 涂层



70
35
0

MATERIAL HARDNESS (Rc)

Solid submicron grain carbide end mill - center cutting
Extended reach
Dry or semi-dry machining
Can be modified with a neck within 48 hours
Extremely versatile
Uncoated - page 243
TiCN Coated - page 245
Stub Length - page 195
Standard Length - page 215

Vollhartmetallfräser aus Feinkornhartmetall - Zentrumsschnitt
Erweiterte Reichweite
Trocken oder Halbtrockene Bearbeitung
Kann innerhalb 48 Stunden am Schaft verjüngt werden
Extrem Vielseitig
Vollradius Toleranz: +0,000 / –0,025 (+.000" –.001")
Unbeschichtet - Seite 243
TiCN-Beschichtet - Seite 245
Kurze Länge - Seite 195
Standard Länge - Seite 215

Fresa de submicrograno sólido carburo - corte centrado
Mayor alcance
Mecanizado seco o semiseco
Puede ser modificado con un cuello en 48 horas
Extremadamente versátil
Tolerancia de la cabeza esférica +0,000 / –0,025 (+.000" –.001")
Sin recubrimiento - Página 243
Recubrimiento de TiCN - Página 245
Longitud Corta - Página 195
Longitud Estándar - Página 215

Fraises carbure submicrograin - coupe au centre
Extension supplémentaire
Usinage a sec ou avec l'air
Peut etre modifier avec un col degage sous un delai de 48 heures
Utilisations variables
Tolerance du rayon de hemispherique +0,000 / –0,025 (+.000" –.001")
Sans revêtement - Page 243
Revêtement TiCN - Page 245
Longueur Courte - Page 195
Longueur Standart - Page 215

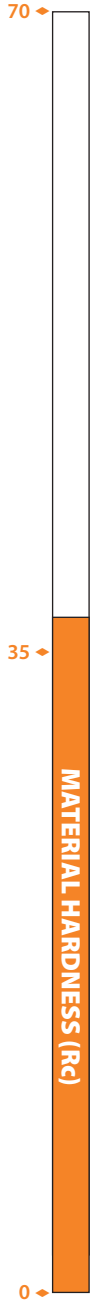
Fresa sub-micrograno metallo duro - taglio al centro
Estensione più grande
Lavorazione a secco o a umido
Può essere modificata in 48 ore
Estremamente versatile
Tolleranza del raggio +0,000 / –0,025 (+.000" –.001")
Non Rivestito - Pagina 243
Rivestimento in TiCN - Pagina 245
Serie Corta - Pagina 195
Lunghezza Standard - Pagina 215

超细晶粒整体硬质合金立铣刀 - 中心切削
加长
干式或半干式机加工
可以在48小时内用轴颈进行修正
功能极多
半径允差 +0,000 /–0,025 (+.000"–.001")
未涂层 - 243页
TiCN 涂层 - 245页
短柱长度 - 195页
标准长度 - 215页

(720MA/740MA) 2 Flute EDP#	(723MA/743MA) 3 Flute EDP#	(730MA/750MA) 4 Flute EDP#	d_1 † Diameter Decimal		Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
97017	98017	99017	.1181		3.000	3.0	50	16
97027	98027	99027	.1181		3.000	3.0	75	20
97037	98037	99037	.1181		3.000	3.0	75	25
43017	55517	44017	.1250	1/8"	3.175	1/8"	2"	5/8"
43027	55527	44027	.1250	1/8"	3.175	1/8"	3"	3/4"
43037	55537	44037	.1250	1/8"	3.175	1/8"	3"	1"
97047	98047	99047	.1575		4.000	4.0	50	16
97057	98057	99057	.1575		4.000	4.0	75	20
97067	98067	99067	.1575		4.000	4.0	75	25
43047	55547	44047	.1875	3/16"	4.763	3/16"	3"	1"
43057	55557	44057	.1875	3/16"	4.763	3/16"	3"	1-1/8"
43067	55567	44067	.1875	3/16"	4.763	3/16"	4"	1"
97077	98077	99077	.1969		5.000	5.0	50	16
97087	98087	99087	.1969		5.000	5.0	75	20
97097	98097	99097	.1969		5.000	5.0	75	25
97107	98107	99107	.2362		6.000	6.0	75	25
97117	98117	99117	.2362		6.000	6.0	100	25
97127	98127	99127	.2362		6.000	6.0	100	32
97137	98137	99137	.2362		6.000	6.0	150	38
43077	55577	44077	.2500	1/4"	6.350	1/4"	3"	1"
43087	55587	44087	.2500	1/4"	6.350	1/4"	4"	1"
43097	55597	44097	.2500	1/4"	6.350	1/4"	4"	1-1/2"
43107	55607	44107	.2500	1/4"	6.350	1/4"	6"	1-1/2"
43117	-	44117	.3125	5/16"	7.938	5/16"	3"	1"
43127	55627	44127	.3125	5/16"	7.938	5/16"	4"	1"
43137	55637	44137	.3125	5/16"	7.938	5/16"	4"	1-5/8"
43147	55647	44147	.3125	5/16"	7.938	5/16"	6"	1-1/2"
97147	98147	99147	.3150		8.000	8.0	75	25
97157	98157	99157	.3150		8.000	8.0	100	25
97167	98167	99167	.3150		8.000	8.0	100	41
97177	98177	99177	.3150		8.000	8.0	150	50

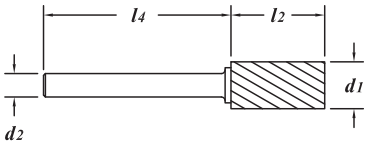
† Metric equivalents are for reference only

(720MA/740MA) 2 Flute EDP#	(723MA/743MA) 3 Flute EDP#	(730MA/750MA) 4 Flute EDP#	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_1 Overall Length	l_2 Flute Length
43157	55657	44157	.3750	3/8"	9.525	3/8"	3"	1"
43167	55667	44167	.3750	3/8"	9.525	3/8"	4"	1"
43177	55677	44177	.3750	3/8"	9.525	3/8"	4"	2"
43187	55687	44187	.3750	3/8"	9.525	3/8"	6"	1-1/2"
43197	55697	44197	.3750	3/8"	9.525	3/8"	6"	3"
97187	98187	99187	.3937		10.000	10.0	76	25
97197	98197	99197	.3937		10.000	10.0	100	25
97207	98207	99207	.3937		10.000	10.0	100	50
97217	98217	99217	.3937		10.000	10.0	150	38
97227	98227	99227	.3937		10.000	10.0	150	75
43207	-	44207	.4375	7/16"	11.113	7/16"	4"	1"
-	55717	44217	.4375	7/16"	11.113	7/16"	4"	2"
43227	-	44227	.4375	7/16"	11.113	7/16"	6"	1-1/2"
43237	55737	44237	.4375	7/16"	11.113	7/16"	6"	3"
97237	-	99237	.4724		12.000	12.0	100	25
97247	98247	99247	.4724		12.000	12.0	100	50
97257	98257	99257	.4724		12.000	12.0	150	50
97267	98267	99267	.4724		12.000	12.0	150	75
43247	55747	44247	.5000	1/2"	12.700	1/2"	4"	1"
43257	55757	44257	.5000	1/2"	12.700	1/2"	4"	2"
43267	55767	44267	.5000	1/2"	12.700	1/2"	6"	1-1/2"
43277	55777	44277	.5000	1/2"	12.700	1/2"	6"	3"
97277	-	99277	.5512		14.000	14.0	100	25
-	-	99287	.5512		14.000	14.0	100	50
97297	-	99297	.5512		14.000	14.0	150	50
-	-	99307	.5512		14.000	14.0	150	75
43287	-	44287	.5625	9/16"	14.288	9/16"	6"	2"
43297	-	44297	.5625	9/16"	14.288	9/16"	6"	3"
43307	55807	44307	.6250	5/8"	15.875	5/8"	6"	2"
43317	55817	44317	.6250	5/8"	15.875	5/8"	6"	3"
97317	98317	99317	.6299		16.000	16.0	150	50
97327	98327	99327	.6299		16.000	16.0	150	75
-	98337	99337	.7087		18.000	18.0	150	50
-	-	99347	.7087		18.000	18.0	150	75
43327	55827	44327	.7500	3/4"	19.050	3/4"	6"	2"
43337	55837	44337	.7500	3/4"	19.050	3/4"	6"	3"
97357	98357	99357	.7874		20.000	20.0	150	50
97367	98367	99367	.7874		20.000	20.0	150	75
-	-	99377	.9843		25.000	25.0	150	50
-	-	99387	.9843		25.000	25.0	150	75
-	55847	44347	1.000	1"	25.400	1"	6"	2"
43357	55857	44357	1.000	1"	25.400	1"	6"	3"



SA

Carbide Rotary Files - Cylindrical Shape
Rotierende Hartmetallwerkzeuge - Zylindrische Form
Limas Rotativas de Carburo - Forma Cilíndrica
Fraises Limes Rotatives Carbure - Forme Cylindrique
Lime Rotative in Metallo Duro - Geometria Cilindrica
硬质合金回转锉刀 - 圆柱形



Submicron Grain Carbide
1/4" (6,35mm) steel shank
A - Aluminum Cut
D - Double Cut
* - Solid Carbide

Feinkornhartmetall
1/4" (6,35mm) Stahlschaft
A - Aluminiumbearbeitung
D - Doppelte Bearbeitung
* - Vollhartmetall

Submicrograno carburo
Espigas de acero de 1/4" (6,35mm)
A - Corte de aluminio
D - Corte doble
* - Carburo sólido

Carbure submicrograin
Queue acier 1/4" (6,35mm)
A - Coupe Aluminium
D - Double Coupe
* - Carbure Plein

Sub-micrograno metallo duro
Stelo in acciaio da 1/4" (6,35mm)
A - Taglio per alluminio
D - Doppio tagliente
* - Metallo duro

超细晶粒硬质合金
1/4" (6,35mm) 钢质刀柄
A - 铝材切削
D - 双切削
* - 整体硬质合金

EDP#	TOOL #	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_2 Flute Length	l_4 Shank Length
60010	* SA-14	.1875	3/16"	4.763	1/4"	5/8"	1-3/8"
60012	* SA-14D	.1875	3/16"	4.763	1/4"	5/8"	1-3/8"
60020	* SA-1	.2500	1/4"	6.350	1/4"	5/8"	1-3/8"
60021	* SA-1A	.2500	1/4"	6.350	1/4"	5/8"	1-3/8"
60022	* SA-1D	.2500	1/4"	6.350	1/4"	5/8"	1-3/8"
60030	SA-2	.3125	5/16"	7.938	1/4"	3/4"	1-3/4"
60032	SA-2D	.3125	5/16"	7.938	1/4"	3/4"	1-3/4"
60040	SA-3	.3750	3/8"	9.525	1/4"	3/4"	1-3/4"
60041	SA-3A	.3750	3/8"	9.525	1/4"	3/4"	1-3/4"
60042	SA-3D	.3750	3/8"	9.525	1/4"	3/4"	1-3/4"
60050	SA-4	.4375	7/16"	11.113	1/4"	1"	1-3/4"
60052	SA-4D	.4375	7/16"	11.113	1/4"	1"	1-3/4"
60060	SA-5	.5000	1/2"	12.700	1/4"	1"	1-3/4"
60061	SA-5A	.5000	1/2"	12.700	1/4"	1"	1-3/4"
60062	SA-5D	.5000	1/2"	12.700	1/4"	1"	1-3/4"
60070	SA-6	.6250	5/8"	15.875	1/4"	1"	1-3/4"
60071	SA-6A	.6250	5/8"	15.875	1/4"	1"	1-3/4"
60072	SA-6D	.6250	5/8"	15.875	1/4"	1"	1-3/4"
60080	SA-7	.7500	3/4"	19.050	1/4"	1"	1-3/4"
60081	SA-7A	.7500	3/4"	19.050	1/4"	1"	1-3/4"
60082	SA-7D	.7500	3/4"	19.050	1/4"	1"	1-3/4"
60090	SA-9	1.000	1"	25.400	1/4"	1"	1-3/4"
60091	SA-9A	1.000	1"	25.400	1/4"	1"	1-3/4"
60092	SA-9D	1.000	1"	25.400	1/4"	1"	1-3/4"

Basic Rotary File Cut Styles Available

Standard Cut | Chipbreaker Cut | Double Cut (D) | Diamond Cut (add 20%) | Aluminum Cut (A) | End Cut (add 10%)

Double Cut and Aluminum Cut rotary files are in stock where indicated by (D) and (A) in the catalog tables.

GARR TOOL®

† *Metric equivalents are for reference only*

Carbide Rotary Files - Cylindrical-Radius Shape

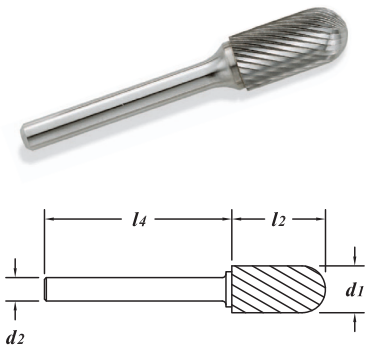
Rotierende Hartmetallwerkzeuge - Zylindrische Radius Form

Limas Rotativas de Carburo - Forma Cilíndrica-Redondeada

Fraises Limes Rotatives Carbure - Forme Cylindrique - Hemispherique

Lime Rotative in Metallo Duro - Geometria Cilindrica-Torica

硬质合金回转锉刀 - 圆柱—半径形状



Submicron Grain Carbide
1/4" (6,35mm) steel shank
A - Aluminum Cut
D - Double Cut
* - Solid Carbide

Feinkornhartmetall
1/4" (6,35mm) Stahlschaft
A - Aluminiumbearbeitung
D - Doppelte Bearbeitung
* - Vollhartmetall

Submicrograno carburo
Espigas de acero de 1/4" (6,35mm)
A - Corte de aluminio
D - Corte doble
* - Carburo sólido

Carbure submicrograin
Queue acier 1/4" (6,35mm)
A - Coupe Aluminium
D - Double Coupe
* - Carbure Plein

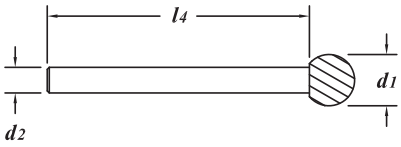
Sub-micrograno metallo duro
Stelo in acciaio da 1/4" (6,35mm)
A - Taglio per alluminio
D - Doppio tagliente
* - Metallo duro

超细晶粒硬质合金
1/4" (6,35mm) 钢质刀柄
A - 铝材切削
D - 双切削
* - 整体硬质合金

EDP#	TOOL #	*d1* † Diameter Decimal	Diameter Metric	*d2* Shank Diameter	*l2* Flute Length	*l4* Shank Length
61010	* SC-14	.1875	3/16" 4.763	1/4"	5/8"	1-3/8"
61012	* SC-14D	.1875	3/16" 4.763	1/4"	5/8"	1-3/8"
61020	* SC-1	.2500	1/4" 6.350	1/4"	5/8"	1-3/8"
61021	* SC-1A	.2500	1/4" 6.350	1/4"	5/8"	1-3/8"
61022	* SC-1D	.2500	1/4" 6.350	1/4"	5/8"	1-3/8"
61030	SC-2	.3125	5/16" 7.938	1/4"	3/4"	1-3/4"
61032	SC-2D	.3125	5/16" 7.938	1/4"	3/4"	1-3/4"
61040	SC-3	.3750	3/8" 9.525	1/4"	3/4"	1-3/4"
61041	SC-3A	.3750	3/8" 9.525	1/4"	3/4"	1-3/4"
61042	SC-3D	.3750	3/8" 9.525	1/4"	3/4"	1-3/4"
61050	SC-4	.4375	7/16" 11.113	1/4"	1"	1-3/4"
61052	SC-4D	.4375	7/16" 11.113	1/4"	1"	1-3/4"
61060	SC-5	.5000	1/2" 12.700	1/4"	1"	1-3/4"
61061	SC-5A	.5000	1/2" 12.700	1/4"	1"	1-3/4"
61062	SC-5D	.5000	1/2" 12.700	1/4"	1"	1-3/4"
61070	SC-6	.6250	5/8" 15.875	1/4"	1"	1-3/4"
61071	SC-6A	.6250	5/8" 15.875	1/4"	1"	1-3/4"
61072	SC-6D	.6250	5/8" 15.875	1/4"	1"	1-3/4"
61080	SC-7	.7500	3/4" 19.050	1/4"	1"	1-3/4"
61081	SC-7A	.7500	3/4" 19.050	1/4"	1"	1-3/4"
61082	SC-7D	.7500	3/4" 19.050	1/4"	1"	1-3/4"

SD

Carbide Rotary Files - Ball Shape
Rotierende Hartmetallwerkzeuge - Vollradiusform
Limas Rotativas de Carburo - Forma Esférica
Fraises Limes Rotatives Carbure - Forme Cylindrique a Bout Hemispherique
Lime Rotative in Metallo Duro - Geometria Sferica
硬质合金回转锉刀 - 球型



Submicron Grain Carbide
1/4" (6,35mm) steel shank
A - Aluminum Cut
D - Double Cut
* - Solid Carbide

Feinkornhartmetall
1/4" (6,35mm) Stahlschaft
A - Aluminiumbearbeitung
D - Doppelte Bearbeitung
* - Vollhartmetall

Submicrograno carburo
Espigas de acero de 1/4" (6,35mm)
A - Corte de aluminio
D - Corte doble
* - Carburo sólido

Carbure submicrograin
Queue acier 1/4" (6,35mm)
A - Coupe Aluminium
D - Double Coupe
* - Carbure Plein

Sub-micrograno metallo duro
Stelo in acciaio da 1/4" (6,35mm)
A - Taglio per alluminio
D - Doppio tagliente
* - Metallo duro

超细晶粒硬质合金
1/4" (6,35mm) 钢质刀柄
A - 铝材切削
D - 双切削
* - 整体硬质合金

EDP#	TOOL #	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_2 Flute Length	l_4 Shank Length
62010	*SD-14	.1875	3/16"	4.763	1/4"	-	2"
62012	*SD-14D	.1875	3/16"	4.763	1/4"	-	2"
62020	*SD-1	.2500	1/4"	6.350	1/4"	-	2"
62021	*SD-1A	.2500	1/4"	6.350	1/4"	-	2"
62022	*SD-1D	.2500	1/4"	6.350	1/4"	-	2"
62030	SD-2	.3125	5/16"	7.938	1/4"	-	1-3/4"
62032	SD-2D	.3125	5/16"	7.938	1/4"	-	1-3/4"
62040	SD-3	.3750	3/8"	9.525	1/4"	-	1-3/4"
62041	SD-3A	.3750	3/8"	9.525	1/4"	-	1-3/4"
62042	SD-3D	.3750	3/8"	9.525	1/4"	-	1-3/4"
62050	SD-4	.4375	7/16"	11.113	1/4"	-	1-3/4"
62052	SD-4D	.4375	7/16"	11.113	1/4"	-	1-3/4"
62060	SD-5	.5000	1/2"	12.700	1/4"	-	1-3/4"
62061	SD-5A	.5000	1/2"	12.700	1/4"	-	1-3/4"
62062	SD-5D	.5000	1/2"	12.700	1/4"	-	1-3/4"
62070	SD-6	.6250	5/8"	15.875	1/4"	-	1-3/4"
62071	SD-6A	.6250	5/8"	15.875	1/4"	-	1-3/4"
62072	SD-6D	.6250	5/8"	15.875	1/4"	-	1-3/4"
62080	SD-7	.7500	3/4"	19.050	1/4"	-	1-3/4"
62082	SD-7D	.7500	3/4"	19.050	1/4"	-	1-3/4"
62090	SD-9	1.000	1"	25.400	1/4"	-	1-3/4"
62092	SD-9D	1.000	1"	25.400	1/4"	-	1-3/4"

† *Metric equivalents are for reference only*

Carbide Rotary Files - Egg Shape

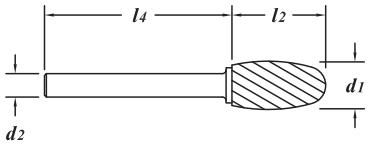
Rotierende Hartmetallwerkzeuge - Eiform

Limas Rotativas de Carburo - Forma Ovalada

Fraises Limes Rotatives Carbure - Forme Ovale

Lime Rotative in Metallo Duro - Geometria Ovale

硬质合金回转锉刀 - 蛋型



Submicron Grain Carbide
1/4" (6,35mm) steel shank
A - Aluminum Cut
D - Double Cut
* - Solid Carbide

Feinkornhartmetall
1/4" (6,35mm) Stahlschaft
A - Aluminiumbearbeitung
D - Doppelte Bearbeitung
* - Vollhartmetall

Submicrograno carburo
Espigas de acero de 1/4" (6,35mm)
A - Corte de aluminio
D - Corte doble
* - Carburo sólido

Carbure submicrograin
Queue acier 1/4" (6,35mm)
A - Coupe Aluminium
D - Double Coupe
* - Carbure Plein

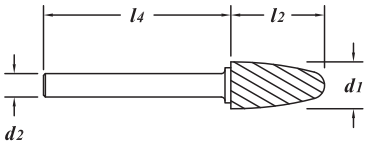
Sub-micrograno metallo duro
Stelo in acciaio da 1/4" (6,35mm)
A - Taglio per alluminio
D - Doppio tagliente
* - Metallo duro

超细晶粒硬质合金
1/4" (6,35mm) 钢质刀柄
A - 铝材切削
D - 双切削
* - 整体硬质合金

EDP#	TOOL #	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_2 Flute Length	l_4 Shank Length
63010	* SE-1	.2500	1/4"	6.350	1/4"	3/8"	2"
63012	* SE-1D	.2500	1/4"	6.350	1/4"	3/8"	2"
63020	SE-3	.3750	3/8"	9.525	1/4"	5/8"	1-3/4"
63021	SE-3A	.3750	3/8"	9.525	1/4"	5/8"	1-3/4"
63022	SE-3D	.3750	3/8"	9.525	1/4"	5/8"	1-3/4"
63030	SE-5	.5000	1/2"	12.700	1/4"	7/8"	1-3/4"
63031	SE-5A	.5000	1/2"	12.700	1/4"	7/8"	1-3/4"
63032	SE-5D	.5000	1/2"	12.700	1/4"	7/8"	1-3/4"
63040	SE-6	.6250	5/8"	15.875	1/4"	1"	1-3/4"
63041	SE-6A	.6250	5/8"	15.875	1/4"	1"	1-3/4"
63042	SE-6D	.6250	5/8"	15.875	1/4"	1"	1-3/4"
63050	SE-7	.7500	3/4"	19.050	1/4"	1"	1-3/4"
63052	SE-7D	.7500	3/4"	19.050	1/4"	1"	1-3/4"

SF

Carbide Rotary Files - Tree-Radius Shape
Rotierende Hartmetallwerkzeuge - Baumradiusform
Limas Rotativas de Carburo - Forma de Árbol-Redondeada
Fraises Limes Rotatives Carbure - Forme Ogive a Bout Hemispherique
Lime Rotative in Metallo Duro - Geometria a Tre Raggi
硬质合金回转锉刀 - 树—半径型



Submicron Grain Carbide
1/4" (6,35mm) steel shank
A - Aluminum Cut
D - Double Cut
* - Solid Carbide

Feinkornhartmetall
1/4" (6,35mm) Stahlschaft
A - Aluminiumbearbeitung
D - Doppelte Bearbeitung
* - Vollhartmetall

Submicrograno carburo
Espigas de acero de 1/4" (6,35mm)
A - Corte de aluminio
D - Corte doble
* - Carburo sólido

Carbure submicrograin
Queue acier 1/4" (6,35mm)
A - Coupe Aluminium
D - Double Coupe
* - Carbure Plein

Sub-micrograno metallo duro
Stelo in acciaio da 1/4" (6,35mm)
A - Taglio per alluminio
D - Doppio tagliente
* - Metallo duro

超细晶粒硬质合金
1/4" (6,35mm) 钢质刀柄
A - 铝材切削
D - 双切削
* - 整体硬质合金

EDP#	TOOL #	d_1 † Diameter Decimal	Diameter	Metric	d_2 Shank Diameter	l_2 Flute Length	l_4 Shank Length
64010	*SF-1	.2500	1/4"	6.350	1/4"	5/8"	2"
64011	*SF-1A	.2500	1/4"	6.350	1/4"	5/8"	2"
64012	*SF-1D	.2500	1/4"	6.350	1/4"	5/8"	2"
64020	SF-3	.3750	3/8"	9.525	1/4"	3/4"	1-3/4"
64021	SF-3A	.3750	3/8"	9.525	1/4"	3/4"	1-3/4"
64022	SF-3D	.3750	3/8"	9.525	1/4"	3/4"	1-3/4"
64030	SF-5	.5000	1/2"	12.700	1/4"	1"	1-3/4"
64031	SF-5A	.5000	1/2"	12.700	1/4"	1"	1-3/4"
64032	SF-5D	.5000	1/2"	12.700	1/4"	1"	1-3/4"
64040	SF-6	.6250	5/8"	15.875	1/4"	1"	1-3/4"
64041	SF-6A	.6250	5/8"	15.875	1/4"	1"	1-3/4"
64042	SF-6D	.6250	5/8"	15.875	1/4"	1"	1-3/4"
64050	SF-14	.7500	3/4"	19.050	1/4"	1-1/4"	1-3/4"
64052	SF-14D	.7500	3/4"	19.050	1/4"	1-1/4"	1-3/4"

† *Metric equivalents are for reference only*

Carbide Rotary Files - Tree-Pointed Shape

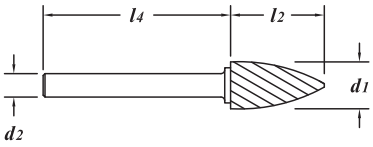
Rotierende Hartmetallwerkzeuge - Baumpunktform

Limas Rotativas de Carburo - Forma de Árbol con Punta

Fraises Limes Rotatives Carbure - Forme Ogive a Bout Pointu

Lime Rotative in Metallo Duro - Geometria a Punta

硬质合金回转锉刀 - 树—尖端型



Submicron Grain Carbide
1/4" (6,35mm) steel shank
D - Double Cut
* - Solid Carbide

Feinkornhartmetall
1/4" (6,35mm) Stahlschaft
D - Doppelte Bearbeitung
* - Vollhartmetall

Submicrograno carburo
Espigas de acero de 1/4" (6,35mm)
D - Corte doble
* - Carburo sólido

Carbure submicrograin
Queue acier 1/4" (6,35mm)
D - Double Coupe
* - Carbure Plein

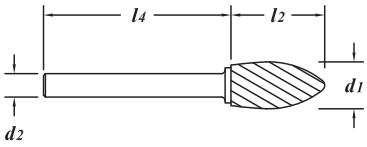
Sub-micrograno metallo duro
Stelo in acciaio da 1/4" (6,35mm)
D - Doppio tagliente
* - Metallo duro

超细晶粒硬质合金
1/4" (6,35mm) 钢质刀柄
D - 双切削
* - 整体硬质合金

EDP#	TOOL #	*d1* † Diameter Decimal	Diameter	Metric	*d2* Shank Diameter	*l2* Flute Length	*l4* Shank Length
65010	* SG-1	.2500	1/4"	6.350	1/4"	5/8"	2"
65012	* SG-1D	.2500	1/4"	6.350	1/4"	5/8"	2"
65020	SG-3	.3750	3/8"	9.525	1/4"	3/4"	1-3/4"
65022	SG-3D	.3750	3/8"	9.525	1/4"	3/4"	1-3/4"
65030	SG-13	.5000	1/2"	12.700	1/4"	3/4"	1-3/4"
65032	SG-13D	.5000	1/2"	12.700	1/4"	3/4"	1-3/4"
65040	SG-5	.5000	1/2"	12.700	1/4"	1"	1-3/4"
65042	SG-5D	.5000	1/2"	12.700	1/4"	1"	1-3/4"
65050	SG-6	.6250	5/8"	15.875	1/4"	1"	1-3/4"
65052	SG-6D	.6250	5/8"	15.875	1/4"	1"	1-3/4"
65060	SG-7	.7500	3/4"	19.050	1/4"	1"	1-3/4"
65062	SG-7D	.7500	3/4"	19.050	1/4"	1"	1-3/4"

SH

Carbide Rotary Files - Flame Shape
Rotierende Hartmetallwerkzeuge - Flammenform
Limas Rotativas de Carburo - Forma de Flama
Fraises Limes Rotatives Carbure - Forme Flamme
Lime Rotative in Metallo Duro - Geometria a Fiamma
硬质合金回转锉刀 - 火焰型



Submicron Grain Carbide
1/4" (6,35mm) steel shank
D - Double Cut

Feinkornhartmetall
1/4" (6,35mm) Stahlschaft
D - Doppelte Bearbeitung

Submicrograno carburo
Espigas de acero de 1/4" (6,35mm)
D - Corte doble

Carbure submicrograin
Queue acier 1/4" (6,35mm)
D - Double Coupe

Sub-micrograno metallo duro
Stelo in acciaio da 1/4" (6,35mm)
D - Doppio tagliente

超细晶粒硬质合金
1/4" (6,35mm) 钢质刀柄
D - 双切削

EDP#	TOOL #	*d1* † Diameter Decimal	Diameter	Metric	*d2* Shank Diameter	*l2* Flute Length	*l4* Shank Length
66010	SH-2	.3125	5/16"	7.938	1/4"	3/4"	1-3/4"
66012	SH-2D	.3125	5/16"	7.938	1/4"	3/4"	1-3/4"
66020	SH-5	.5000	1/2"	12.700	1/4"	1-1/4"	1-3/4"
66022	SH-5D	.5000	1/2"	12.700	1/4"	1-1/4"	1-3/4"
66030	SH-6	.6250	5/8"	15.875	1/4"	1-7/16"	1-3/4"
66032	SH-6D	.6250	5/8"	15.875	1/4"	1-7/16"	1-3/4"
66040	SH-7	.7500	3/4"	19.050	1/4"	1-5/8"	1-3/4"
66042	SH-7D	.7500	3/4"	19.050	1/4"	1-5/8"	1-3/4"

† *Metric equivalents are for reference only*

Carbide Rotary Files - Taper Shape *(60° Included Angle)*

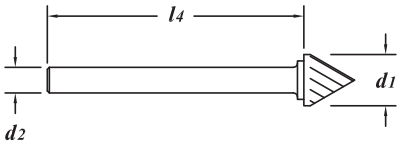
Rotierende Hartmetallwerkzeuge - Kegelzapfenform *(60° inclusive Winkel)*

Limas Rotativas de Carburo - Forma Cónica *(Ángulo de cara de 60°)*

Fraises Limes Rotatives Carbure - Forme Conique *(Forme conique a 60°)*

Lime Rotative in Metallo Duro - Geometria Conica *(Angolo a 60°)*

硬质合金回转锉刀 - 退拔型 *(60° 夹角)*



Submicron Grain Carbide
1/4" (6,35mm) steel shank
D - Double Cut
** - Solid Carbide/Double End

Feinkornhartmetall
1/4" (6,35mm) Stahlschaft
D - Doppelte Bearbeitung
** - Vollhartmetall / Doppel ende

Submicrograno carburo
Espigas de acero de 1/4" (6,35mm)
D - Corte doble
** - Carburo sólido / Doble punta

Carbure submicrograin
Queue acier 1/4" (6,35mm)
D - Double Coupe
** - Carbure Plein / Double Extremite

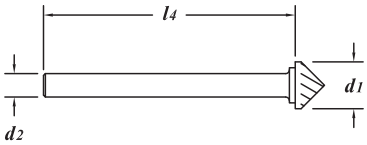
Sub-micrograno metallo duro
Stelo in acciaio da 1/4" (6,35mm)
D - Doppio tagliente
** - Metallo duro / Doppia fresa

超细晶粒硬质合金
1/4" (6,35mm) 钢质刀柄
D - 双切削
** - 整体硬质合金 / 双头

EDP#	TOOL #	d_1 † Diameter Decimal	d_1 † Diameter	d_1 † Diameter Metric	d_2 Shank Diameter	l_4 Shank Length
67010	** SJ-1	.2500	1/4"	6.350	1/4"	1-11/16"
67012	** SJ-1D	.2500	1/4"	6.350	1/4"	1-11/16"
67020	SJ-3	.3750	3/8"	9.525	1/4"	1-3/4"
67022	SJ-3D	.3750	3/8"	9.525	1/4"	1-3/4"
67030	SJ-5	.5000	1/2"	12.700	1/4"	1-3/4"
67032	SJ-5D	.5000	1/2"	12.700	1/4"	1-3/4"
67040	SJ-6	.6250	5/8"	15.875	1/4"	1-3/4"
67042	SJ-6D	.6250	5/8"	15.875	1/4"	1-3/4"
67050	SJ-7	.7500	3/4"	19.050	1/4"	1-3/4"
67052	SJ-7D	.7500	3/4"	19.050	1/4"	1-3/4"
67070	SJ-9	1.000	1"	25.400	1/4"	1-3/4"
67072	SJ-9D	1.000	1"	25.400	1/4"	1-3/4"

SK

Carbide Rotary Files - Taper Shape *(90° Included Angle)*
Rotierende Hartmetallwerkzeuge - Kegelzapfenform *(90° inclusive Winkel)*
Limas Rotativas de Carburo - Forma Cónica *(Ángulo de cara de 90°)*
Fraises Limes Rotatives Carbure - Forme Conique *(Forme conique a 90°)*
Lime Rotative in Metallo Duro - Geometria Conica *(Angolo a 90°)*
硬质合金回转锉刀 - 退拔型 *(90° 夹角)*



Submicron Grain Carbide
1/4" (6,35mm) steel shank
D - Double Cut
** - Solid Carbide/Double End

Feinkornhartmetall
1/4" (6,35mm) Stahlschaft
D - Doppelte Bearbeitung
** - Vollhartmetall / Doppel ende

Submicrograno carburo
Espigas de acero de 1/4" (6,35mm)
D - Corte doble
** - Carburo sólido / Doble punta

Carbure submicrograin
Queue acier 1/4" (6,35mm)
D - Double Coupe
** - Carbure Plein / Double Extremite

Sub-micrograno metallo duro
Stelo in acciaio da 1/4" (6,35mm)
D - Doppio tagliente
** - Metallo duro / Doppia fresa

超细晶粒硬质合金
1/4" (6,35mm) 钢质刀柄
D - 双切削
** - 整体硬质合金 / 双头

EDP#	TOOL #	*d1* † Diameter Decimal	*d1* † Diameter	*d1* † Diameter Metric	*d2* Shank Diameter	*l4* Shank Length
68010	** SK-1	.2500	1/4"	6.350	1/4"	1-11/16"
68012	** SK-1D	.2500	1/4"	6.350	1/4"	1-11/16"
68020	SK-3	.3750	3/8"	9.525	1/4"	1-3/4"
68022	SK-3D	.3750	3/8"	9.525	1/4"	1-3/4"
68030	SK-5	.5000	1/2"	12.700	1/4"	1-3/4"
68032	SK-5D	.5000	1/2"	12.700	1/4"	1-3/4"
68040	SK-6	.6250	5/8"	15.875	1/4"	1-3/4"
68042	SK-6D	.6250	5/8"	15.875	1/4"	1-3/4"
68050	SK-7	.7500	3/4"	19.050	1/4"	1-3/4"
68052	SK-7D	.7500	3/4"	19.050	1/4"	1-3/4"
68070	SK-9	1.000	1"	25.400	1/4"	1-3/4"
68072	SK-9D	1.000	1"	25.400	1/4"	1-3/4"

† *Metric equivalents are for reference only*

Carbide Rotary Files - Cone-Radius Shape *(14° included angle)*

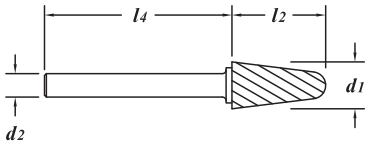
Rotierende Hartmetallwerkzeuge - Kegel-Radiusform *(14° inclusive Winkel)*

Limas Rotativas de Carburo - Forma Cónica-Redondeada *(Ángulo de cara de 14°)*

Fraises Limes Rotatives Carbure - Forme Conique a Bout Hemispherique *(forme conique a 14°)*

Lime Rotative in Metallo Duro - Geometria torica conica *(Angolo a 14°)*

硬质合金回转锉刀 - 圆锥—半径型 *(14° 夹角)*



Submicron Grain Carbide
1/4" (6,35mm) steel shank
A - Aluminum Cut
D - Double Cut
* - Solid Carbide

Feinkornhartmetall
1/4" (6,35mm) Stahlschaft
A - Aluminiumbearbeitung
D - Doppelte Bearbeitung
* - Vollhartmetall

Submicrograno carburo
Espigas de acero de 1/4" (6,35mm)
A - Corte de aluminio
D - Corte doble
* - Carburo sólido

Carbure submicrograin
Queue acier 1/4" (6,35mm)
A - Coupe Aluminium
D - Double Coupe
* - Carbure Plein

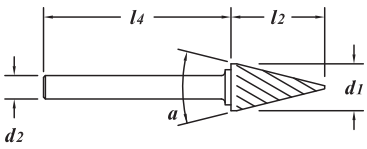
Sub-micrograno metallo duro
Stelo in acciaio da 1/4" (6,35mm)
A - Taglio per alluminio
D - Doppio tagliente
* - Metallo duro

超细晶粒硬质合金
1/4" (6,35mm) 钢质刀柄
A - 铝材切削
D - 双切削
* - 整体硬质合金

EDP#	TOOL #	*d1* † Diameter Decimal	Diameter	Metric	*d2* Shank Diameter	*l2* Flute Length	*l4* Shank Length
69010	* SL-1	.2500	1/4"	6.350	1/4"	5/8"	2"
69012	* SL-1D	.2500	1/4"	6.350	1/4"	5/8"	2"
69020	SL-2	.3125	5/16"	7.938	1/4"	7/8"	1-3/4"
69022	SL-2D	.3125	5/16"	7.938	1/4"	7/8"	1-3/4"
69030	SL-3	.3750	3/8"	9.525	1/4"	1-1/16"	1-3/4"
69031	SL-3A	.3750	3/8"	9.525	1/4"	1-1/16"	1-3/4"
69032	SL-3D	.3750	3/8"	9.525	1/4"	1-1/16"	1-3/4"
69040	SL-4	.5000	1/2"	12.700	1/4"	1-1/8"	1-3/4"
69041	SL-4A	.5000	1/2"	12.700	1/4"	1-1/8"	1-3/4"
69042	SL-4D	.5000	1/2"	12.700	1/4"	1-1/8"	1-3/4"
69050	SL-5	.6250	5/8"	15.875	1/4"	1-3/16"	1-3/4"
69051	SL-5A	.6250	5/8"	15.875	1/4"	1-3/16"	1-3/4"
69052	SL-5D	.6250	5/8"	15.875	1/4"	1-3/16"	1-3/4"
69060	SL-7	.7500	3/4"	19.050	1/4"	1-1/2"	1-3/4"
69062	SL-7D	.7500	3/4"	19.050	1/4"	1-1/2"	1-3/4"

SM

Carbide Rotary Files - Cone Flat Shape *(no radius)*
Rotierende Hartmetallwerkzeuge - Kegel-Flache Form *(Ohne Radius)*
Limas Rotativas de Carburo - Forma Cónica-Plana *(no redondeada)*
Fraises Limes Rotatives Carbure - Forme Conique a Bout Plat *(Pas de rayon)*
Lime Rotative in Metallo Duro - Geometria piatta conica *(piatta)*
硬质合金回转锉刀 - 圆锥—平面型 *(无圆角半径)*



Submicron Grain Carbide
1/4" (6,35mm) steel shank
D - Double Cut
* - Solid Carbide

Feinkornhartmetall
1/4" (6,35mm) Stahlschaft
D - Doppelte Bearbeitung
* - Vollhartmetall

Submicrograno carburo
Espigas de acero de 1/4" (6,35mm)
D - Corte doble
* - Carburo sólido

Carbure submicrograin
Queue acier 1/4" (6,35mm)
D - Double Coupe
* - Carbure Plein

Sub-micrograno metallo duro
Stelo in acciaio da 1/4" (6,35mm)
D - Doppio tagliente
* - Metallo duro

超细晶粒硬质合金
1/4" (6,35mm) 钢质刀柄
D - 双切削
* - 整体硬质合金

EDP#	TOOL #	*d1* † Diameter Decimal	*d1* † Diameter Metric	*d2* Shank Diameter	*a* Included Angle	*l2* Flute Length	*l4* Shank Length
70010	* SM-1	.2500	6.350	1/4"	22°	1/2"	2"
70012	* SM-1D	.2500	6.350	1/4"	22°	1/2"	2"
70020	SM-4	.3750	9.525	1/4"	28°	5/8"	1-3/4"
70022	SM-4D	.3750	9.525	1/4"	28°	5/8"	1-3/4"
70030	SM-5	.5000	12.700	1/4"	28°	7/8"	1-3/4"
70032	SM-5D	.5000	12.700	1/4"	28°	7/8"	1-3/4"
70040	SM-6	.6250	15.875	1/4"	31°	1"	1-3/4"
70042	SM-6D	.6250	15.875	1/4"	31°	1"	1-3/4"

† *Metric equivalents are for reference only*

Carbide Rotary Files - Inverted Cone Shape

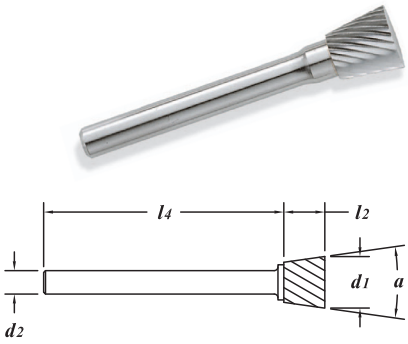
Rotierende Hartmetallwerkzeuge - Umgekehrte Kegelform

Limas Rotativas de Carburo - Forma Cónica Invertida

Fraises Limes Rotatives Carbure - Forme Conique Inversee

Lime Rotative in Metallo Duro - Geometria conica invertita

硬质合金回转锉刀 - 倒圆锥型



Submicron Grain Carbide
1/4" (6,35mm) steel shank
D - Double Cut
* - Solid Carbide

EDP#	TOOL #	$d1$ † Diameter Decimal	$d1$ † Diameter	$d1$ † Diameter Metric	$d2$ Shank Diameter	a Included Angle	$l2$ Flute Length	$l4$ Shank Length
71010	* SN-1	.2500	1/4"	6.350	1/4"	10°	5/16"	2"
71012	* SN-1D	.2500	1/4"	6.350	1/4"	10°	5/16"	2"
71020	SN-2	.3750	3/8"	9.525	1/4"	13°	3/8"	1-3/4"
71022	SN-2D	.3750	3/8"	9.525	1/4"	13°	3/8"	1-3/4"
71030	SN-3	.5000	1/2"	12.700	1/4"	16°	1/2"	1-3/4"
71032	SN-3D	.5000	1/2"	12.700	1/4"	16°	1/2"	1-3/4"

Feinkornhartmetall
1/4" (6,35mm) Stahlschaft
D - Doppelte Bearbeitung
* - Vollhartmetall

Submicrograno carburo
Espigas de acero de 1/4" (6,35mm)
D - Corte doble
* - Carburo sólido

Carbure submicrograin
Queue acier 1/4" (6,35mm)
D - Double Coupe
* - Carbure Plein

Sub-micrograno metallo duro
Stelo in acciaio da 1/4" (6,35mm)
D - Doppio tagliente
* - Metallo duro

超细晶粒硬质合金
1/4" (6,35mm) 钢质刀柄
D - 双切削
* - 整体硬质合金

3/16" Diameter

Solid Carbide Rotary Files
Rotierende Vollhartmetallwerkzeuge
Limas Rotativas de Carburo Sólido
Fraises Limes Rotatives Plein Carbure
Lime Rotative in Metallo Duro Solido
整体硬质合金回转锉刀

Solid Submicron Grain Carbide
3/16" (4,762mm) shank
D - Double Cut

Vollhartmetall aus Feinkornhartmetall
3/16" (4,762mm) Schaft
D - Doppelte Bearbeitung

Carburo sólido de grano submicrónico
Espigas de 3/16" (4,762mm)
D - Corte doble

Carbure plein submicrograin
Queue 3/16" (4,762mm)
D - Double Coupe

Super sub-micrograno metallo duro
Stelo da 3/16" (4,762mm)
D - Doppio tagliente

优质超细晶粒
3/16" (4,762mm) 刀柄
D - 双切削

EDP#	TOOL #	d_1 † Diameter Decimal	Diameter	Metric	l_1 Overall Length	a Included Angle	l_2 Flute Length
72010	SA-81	.1875	3/16"	4.763	2"	-	5/8"
72012	SA-81D	.1875	3/16"	4.763	2"	-	5/8"
72020	SC-81	.1875	3/16"	4.763	2"	-	5/8"
72030	SD-81	.1875	3/16"	4.763	2"	-	-
72032	SD-81D	.1875	3/16"	4.763	2"	-	-
72040	SE-81	.1875	3/16"	4.763	2"	-	9/32"
72042	SE-81D	.1875	3/16"	4.763	2"	-	9/32"
72050	SF-81	.1875	3/16"	4.763	2"	-	1/2"
72052	SF-81D	.1875	3/16"	4.763	2"	-	1/2"
72060	SG-81	.1875	3/16"	4.763	2"	-	1/2"
72062	SG-81D	.1875	3/16"	4.763	2"	-	1/2"
72070	SJ-81	.1875	3/16"	4.763	2"	60°	-
72072	SJ-81D	.1875	3/16"	4.763	2"	60°	-
72080	SK-81	.1875	3/16"	4.763	2"	90°	-
72082	SK-81D	.1875	3/16"	4.763	2"	90°	-
72090	SL-81	.1875	3/16"	4.763	2"	14°	1/2"
72092	SL-81D	.1875	3/16"	4.763	2"	14°	1/2"
72100	SM-81	.1875	3/16"	4.763	2"	12°	5/8"
72110	SN-81	.1875	3/16"	4.763	2"	10°	1/4"
72112	SN-81D	.1875	3/16"	4.763	2"	10°	1/4"

† *Metric equivalents are for reference only*

Carbide Rotary Files
Rotierende Hartmetallwerkzeuge
Limas Rotativas de Carburo
Fraises Limes Rotatives Carbure
Lime Rotative in Metallo Duro
硬质合金回转锉刀

SA-51
SB-51
SC-51
SD-51
SE-51

SF-51
SG-51
SM-51
SN-51

Submicron Grain Carbide
1/8" (3,175mm) steel shank
D - Double Cut

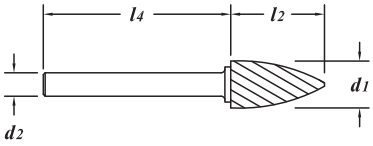
Feinkornhartmetall
1/8" (3,175mm) Stahlschaft
D - Doppelte Bearbeitung

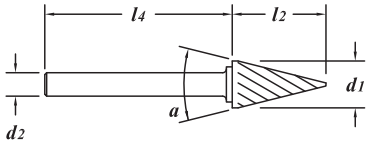
Submicrograno carburo
Espigas de acero de 1/8" (3,175mm)
D - Corte doble

Carbure submicrograin
Queue acier 1/8" (3,175mm)
D - Double Coupe

Sub-micrograno metallo duro
Stelo in acciaio da 1/8" (3,175mm)
D - Doppio tagliente

超细晶粒硬质合金
1/8" (3,175mm) 钢质刀柄
D - 双切削



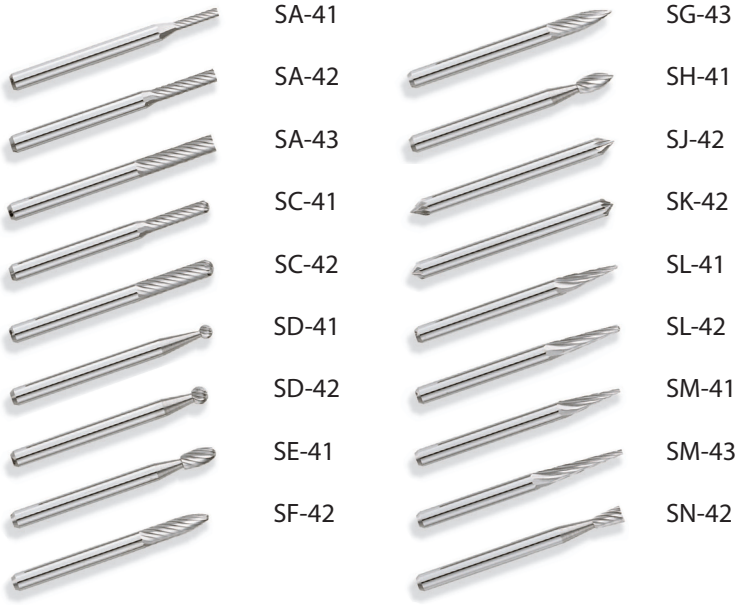


EDP#	TOOL #	d_1 † Diameter Decimal	d_1 † Diameter	Metric	d_2 Shank Diameter	a Included Angle	l_2 Flute Length	l_4 Shank Length
73010	SA-51	.2500	1/4"	6.350	1/8"	-	1/2"	1-1/2"
73012	SA-51D	.2500	1/4"	6.350	1/8"	-	1/2"	1-1/2"
73020	SB-51	.2500	1/4"	6.350	1/8"	-	3/16"	1-1/2"
73022	SB-51D	.2500	1/4"	6.350	1/8"	-	3/16"	1-1/2"
73030	SC-51	.2500	1/4"	6.350	1/8"	-	1/2"	1-1/2"
73032	SC-51D	.2500	1/4"	6.350	1/8"	-	1/2"	1-1/2"
73040	SD-51	.2500	1/4"	6.350	1/8"	-	-	1-1/2"
73042	SD-51D	.2500	1/4"	6.350	1/8"	-	-	1-1/2"
73050	SE-51	.2500	1/4"	6.350	1/8"	-	3/8"	1-1/2"
73052	SE-51D	.2500	1/4"	6.350	1/8"	-	3/8"	1-1/2"
73060	SF-51	.2500	1/4"	6.350	1/8"	-	1/2"	1-1/2"
73062	SF-51D	.2500	1/4"	6.350	1/8"	-	1/2"	1-1/2"
73070	SG-51	.2500	1/4"	6.350	1/8"	-	1/2"	1-1/2"
73072	SG-51D	.2500	1/4"	6.350	1/8"	-	1/2"	1-1/2"
73080	SM-51	.2500	1/4"	6.350	1/8"	22°	1/2"	1-1/2"
73082	SM-51D	.2500	1/4"	6.350	1/8"	22°	1/2"	1-1/2"
73090	SN-51	.2500	1/4"	6.350	1/8"	10°	1/4"	1-1/2"
73092	SN-51D	.2500	1/4"	6.350	1/8"	10°	1/4"	1-1/2"

CAD drawings representative for dimension placement

1/8" Diameter

Solid Carbide Rotary Files
Rotierende Vollhartmetallwerkzeuge
Limas Rotativas de Carburo Sólido
Fraises Limes Rotatives Plein Carbure
Lime Rotative in Metallo Duro Solido
整体硬质合金回转锉刀



Solid Submicron Grain Carbide
1/8" (3,175mm) shank
D - Double Cut

Vollhartmetall aus Feinkornhartmetall
1/8" (3,175mm) Schaft
D - Doppelte Bearbeitung

Carburo sólido de grano submicrónico
Espigas de 1/8" (3,175mm)
D - Corte doble

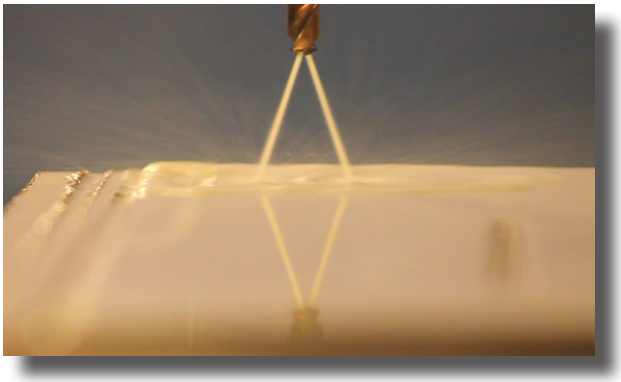
Carbure plein submicrograin
Queue 1/8" (3,175mm)
D - Double Coupe

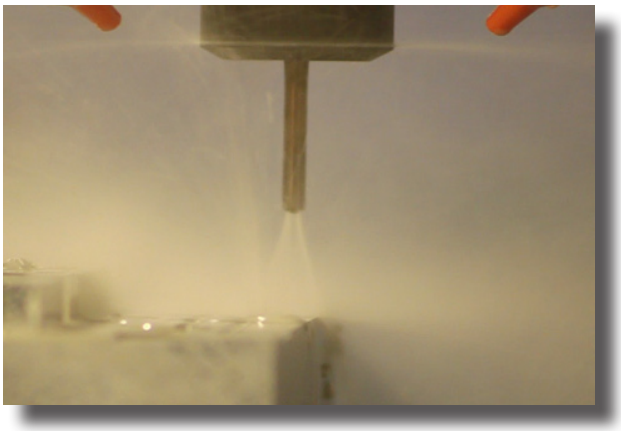
Super sub-micrograno metallo duro
Stelo da 1/8" (3,175mm)
D - Doppio tagliente

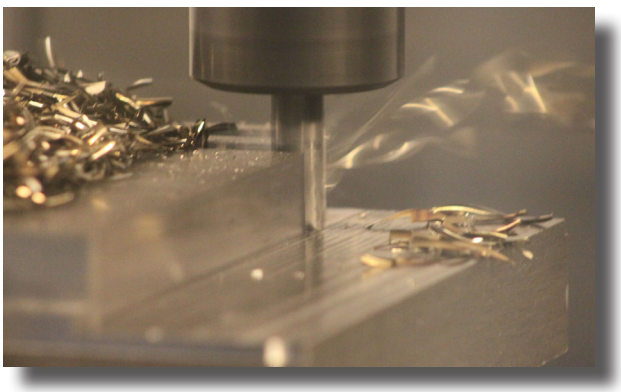
优质超细晶粒
1/8" (3,175mm) 刀柄
D - 双切削

EDP#	TOOL #	d_1 † Diameter Decimal	Diameter	Metric	l_1 Overall Length	a Included Angle	l_2 Flute Length
74010	SA-41	.0625	1/16"	1.588	1-1/2"	-	1/4"
74012	SA-41D	.0625	1/16"	1.588	1-1/2"	-	1/4"
74020	SA-42	.0938	3/32"	2.383	1-1/2"	-	7/16"
74022	SA-42D	.0938	3/32"	2.383	1-1/2"	-	7/16"
74030	SA-43	.1250	1/8"	3.175	1-1/2"	-	9/16"
74032	SA-43D	.1250	1/8"	3.175	1-1/2"	-	9/16"
74040	SC-41	.0938	3/32"	2.383	1-1/2"	-	7/16"
74042	SC-41D	.0938	3/32"	2.383	1-1/2"	-	7/16"
74050	SC-42	.1250	1/8"	3.175	1-1/2"	-	9/16"
74052	SC-42D	.1250	1/8"	3.175	1-1/2"	-	9/16"
74060	SD-41	.0938	3/32"	2.383	1-1/2"	-	-
74062	SD-41D	.0938	3/32"	2.383	1-1/2"	-	-
74070	SD-42	.1250	1/8"	3.175	1-1/2"	-	-
74072	SD-42D	.1250	1/8"	3.175	1-1/2"	-	-
74080	SE-41	.1250	1/8"	3.175	1-1/2"	-	7/32"
74082	SE-41D	.1250	1/8"	3.175	1-1/2"	-	7/32"
74090	SF-42	.1250	1/8"	3.175	1-1/2"	-	1/2"
74092	SF-42D	.1250	1/8"	3.175	1-1/2"	-	1/2"
74100	SG-43	.1250	1/8"	3.175	1-1/2"	-	3/8"
74102	SG-43D	.1250	1/8"	3.175	1-1/2"	-	3/8"
74110	SH-41	.1250	1/8"	3.175	1-1/2"	-	1/4"
74112	SH-41D	.1250	1/8"	3.175	1-1/2"	-	1/4"
74120	SJ-42	.1250	1/8"	3.175	1-1/2"	60°	-
74122	SJ-42D	.1250	1/8"	3.175	1-1/2"	60°	-
74130	SK-42	.1250	1/8"	3.175	1-1/2"	90°	-
74132	SK-42D	.1250	1/8"	3.175	1-1/2"	90°	-
74140	SL-41	.1250	1/8"	3.175	1-1/2"	8°	3/8"
74142	SL-41D	.1250	1/8"	3.175	1-1/2"	8°	3/8"
74150	SL-42	.1250	1/8"	3.175	1-1/2"	8°	1/2"
74152	SL-42D	.1250	1/8"	3.175	1-1/2"	8°	1/2"
74160	SM-41	.1250	1/8"	3.175	1-1/2"	12°	3/8"
74162	SM-41D	.1250	1/8"	3.175	1-1/2"	12°	3/8"
74170	SM-43	.1250	1/8"	3.175	1-1/2"	7°	5/8"
74172	SM-43D	.1250	1/8"	3.175	1-1/2"	7°	5/8"
74180	SN-42	.1250	1/8"	3.175	1-1/2"	10°	3/16"
74182	SN-42D	.1250	1/8"	3.175	1-1/2"	10°	3/16"

† *Metric equivalents are for reference only*







Troubleshooting Guide - End Mills	262
Troubleshooting Guide - Drills	263
Troubleshooting Guide - Reamers	264
Formulas	265
Tool Coating Types	266
SFM/RPM Conversion Charts	267
General Milling Guide - *fractional*	268
High Performance Milling Guide - *fractional*	269
General Milling Guide - *metric*	270
High Performance Milling Guide - *metric*	271
Alumastar Coated Milling Guide	272
VRX Milling Guide	273
VRX-6 Milling Guide	274
ARC Milling Guide	276
VHM Milling Guide	277
TMS/TMR Milling Guide - *fractional*	278
TMS/TMR Milling Guide - *metric*	279
TMS/TMR Chip Thinning Calculations - *fractional*	280
TMS/TMR Chip Thinning Calculations - *metric*	281
V4 High Speed Milling Guide - *fractional*	282
V4 High Speed Milling Guide - *metric*	283
V5 High Speed Milling Guide - *fractional*	284
V5 High Speed Milling Guide - *metric*	285
High Rc Finisher Milling Guide - *fractional*	286
High Rc Finisher Milling Guide - *metric*	287
Die Mold Cutter Milling Guide - *fractional*	288
Die Mold Cutter Milling Guide - *metric*	289
High Feed Milling Guide	290
Diamond Coated Milling Guide	291
Reaming Guide - *fractional*	292
Reaming Guide - *metric*	293
Drill Mills, Chamfering - *fractional*	294
Drill Mills, Chamfering - *metric*	295
Drill Mills, Through Hole - *fractional*	296
Drill Mills, Through Hole - *metric*	297
Drill Mills, Solids - *fractional*	298
Drill Mills, Solids - *metric*	299
General Drilling Guide - *fractional*	300
General Drilling Guide - *metric*	302
High Performance Mini Drills Guide - *fractional*	304
High Performance Mini Drills Guide - *metric*	305
High Performance Drilling Guide - *fractional*	306
High Performance Drilling Guide - *metric*	307
3-Flute for Aluminum Drilling Guide	308
Length Deviation Chart for Spotting Drills	309
Hardness Conversion Chart	310

Troubleshooting for End Mills

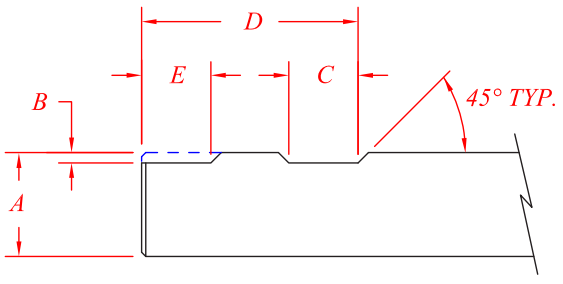
PROBLEM	SUGGESTIONS
Chipping	Check part rigidity
	Verify speeds and feeds
	Confirm concentricity of end mill in holder
	Decrease ramp angle or slow down approach
	Check coolant flow and location
Breakage	Decrease feed rate
	Decrease axial depth
	Use shorter tool or stub holder
	Resharpen earlier
Chattering	Too light of a cut
	Leave more stock for finish pass
	Decrease axial depth
	Adjust speeds and feeds
Part finish	Confirm concentricity of end mill in holder
	Decrease feed rate
	Use different style of end mill
	Check coolant flow and location
	Check part rigidity
Burr	Change end mill sooner / too much wear
	Verify speeds and feeds
	Increase spindle speed
	Decrease feed rate
	Use different style of end mill
Excessive noise	Check part rigidity
	Verify speeds and feeds
	Too light of a cut
	Confirm concentricity of end mill in holder
Tool life	Work material harder than expected
	Verify speeds and feeds
	Recutting chips
	Too light of a cut
	Use different style of end mill
Wear	Speed too fast
	Too light of a feed
	Confirm concentricity of end mill in holder
	Verify speeds and feeds
Chip welding	Verify speeds and feeds
	Check coolant flow and location
	Use different style of end mill
Chip packing	Check coolant flow and location
	Decrease axial depth
	Adjust speeds and feeds
	Use different style of end mill
Wall not straight	Decrease feed rate
	Decrease axial depth
	Use shorter tool or stub holder
	Use different style of end mill

PROBLEM	SUGGESTIONS
Chipping on point	Reduce feed rate
	Check part rigidity
	Constant feed rate
	Verify speeds and feeds
	Minimum drill overhang
	Reduce number of peck cycles
Chipping on O.D.	Reduce feed rate
	Confirm concentricity of drill in holder
	Check coolant flow and location
	Check part rigidity
Breakage	Reduce feed rate
	Check your program - is 'R' clearing the part
	Check coolant flow and location
	Check part rigiditiy
Heavy wear on corners	Increase feed rate
	Check coolant flow and location
	Confirm concentricity of drill in holder
	Check part rigidity
Long, stringy chips	Increase feed rate
	Increase hone relief
	Constant feed rate
	Increase number of peck cycles
Excessive noise	Check drill
	Check part rigidity
	Check for proper speeds and feeds
Tool life	Lower speeds and feeds
	Check coolant flow and location
	Confirm concentricity of drill in holder
	Confirm coolant concentration
Hole too small	Increase feed rate
	Confirm coolant concentration
	Confirm drill diameter
Hole too large	Reduce feed rate
	Slow feed rate to start hole
	Increase RPMs
	Spot hole
Chip welding	Increase RPMs by 20%
	Confirm coolant concentration
	Check coolant flow and location
Chip packing	Add a peck cycle to clear chips
	Increase RPMs
	Reduce feed rate
	Check coolant flow and location

Troubleshooting for Reamers

PROBLEM	SUGGESTIONS
Hole diameter too large	Check part rigidity
	Verify speeds and feeds
	Confirm concentricity of reamer in holder
	Confirm diameter of reamer
	Check coolant flow and location
Hole diameter too small	Leave more stock before reaming
	Reamer worn
	Check coolant flow and concentration
	Resharpen earlier
Hole not straight	Hole was not drilled properly
	Leave more stock before reaming
	Confirm concentricity of reamer in holder
	Check part rigidity
Part finish	Reamer worn
	Verify speeds and feeds
	Confirm concentricity of reamer in holder
	Check coolant flow and location
	Check part rigidity
Tool life	Work material harder than expected
	Verify speeds and feeds
	Not evacuating chips properly
	Too light of a cut
Wear	Speed too fast
	Too light of a feed
	Confirm concentricity of reamer in holder
	Check coolant flow, location, and concentration
Not evacuating	Verify speeds and feeds
	Check coolant flow, location, and concentration
	Reamer worn

STANDARD WELDON SHANK DIMENSIONS					
Diameter (A)		B	C	D	E
3/8"	.3750"	.050" - .065"	.280" - .282"	.921"	-
7/16"	.4375"	.050" - .065"	.312" - .314"	.991"	-
1/2"	.5000"	.060" - .075"	.330" - .332"	1.055"	-
9/16"	.5625"	.065" - .080"	.400" - .402"	1.154"	-
5/8"	.6250"	.065" - .080"	.400" - .402"	1.154"	-
3/4"	.7500"	.075" - .090"	.455" - .457"	1.242"	-
7/8"	.8750"	.065" - .080"	.455" - .457"	1.242"	.500"
1"	1.0000"	.075" - .090"	.515" - .517"	1.398"	.500"
1-1/4"	1.2500"	.094" - .109"	.515" - .517"	1.398"	.500"



$$\text{SMM (Vc)} = \frac{\pi \times \text{Diameter} \times \text{RPM}}{1000} \qquad \text{CPT (Fz)} = \frac{\text{Feed Rate}}{\text{RPM} \times \text{Number of Teeth}}$$

$$\text{RPM} = \frac{\text{Vc} \times 1000}{\pi \times \text{Diameter}} \qquad \text{Feed Rate} = \text{RPM} \times \text{Number of Teeth} \times \text{Fz}$$

Chip Thinning Calculation:

$$\frac{.50\left(\frac{\text{Diameter}}{\text{Radial Stepover}}\right)}{\sqrt{\left(\frac{\text{Diameter}}{\text{Radial Stepover}}\right)-1}} \times \text{CPT}_{\text{(Actual)}} = \text{CPT}_{\text{(Programmed)}}$$

Example below:

$$\frac{.50\left(\frac{0.50}{.015}\right)}{\sqrt{\left(\frac{0.50}{.015}\right)-1}} = \frac{16.667}{5.6} = 2.93 \times .0015 = .0045$$

(Chip Thinning reference charts on pages 280-281)

For additional help:
Check out our web site, the MC-20 machinist calculator or, if you have a smartphone, search for the feedrate calculator from the App Store.

h6 TOLERANCE FOR SHRINK FIT HOLDERS *(as taken from the Machinery's Handbook)*		
SHANK DIAMETER		TOLERANCE
Decimal	Nominal	
≤ .1181"	≤ 3,0mm	-.00000" / -.00024"
> .1181" - .2362"	> 3,0mm - 6,0mm	-.00000" / -.00032"
> .2362" - .3937"	> 6,0mm - 10,0mm	-.00000" / -.00035"
> .3937" - .7087"	> 10,0mm - 18,0mm	-.00000" / -.00043"
> .7087" - 1.1811"	> 18,0mm - 30,0mm	-.00000" / -.00050"
> 1.1811"	> 30,0mm	-.00000" / -.00050"

Tool Coatings for Standard Products

TiN
(Titanium Nitride)

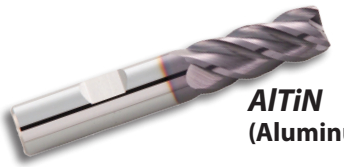
General purpose coating - low heat resistance. Good lubricity.

TiCN
(Titanium Carbonitride)

Good abrasion resistance. Recommended for aluminum, brass and bronze applications. Low heat resistance - good lubricity.

TiAlN
(Titanium Aluminum Nitride)

Multi-layer coating with good thermal stability for increased speeds and feeds. For semi-dry to dry cutting of most steels, high-nickel alloys, stainless steel and cast iron. Excellent heat resistance, good lubricity. For materials that are 40Rc and under.



AlTiN
(Aluminum Titanium)

A single-layer coating whose hardness, oxidation resistance and thermal stability were optimized for material hardness above 38Rc and high-speed machining of materials that are difficult to work (titanium alloys, Inconel).

ALUMASTAR®
(Titanium Diboride - TiB_2)

A thin film coating with a low affinity for aluminum, ideal for machining aluminum alloys. The resistance to adhesion of aluminum allows higher speeds or feeds. Coating thickness is intentionally kept lower in order to maintain a sharp edge.

CRYSTALLINE DIAMOND
(CVD)

Improved productivity in composites. Excellent choice for cutting graphite and fiberglass. Can be added to a special for milling or drilling applications.

AlCrN
(Aluminum Chromium)

Aluminum Chromium-based coatings have excellent wear resistance, thermal shock stability, and hot hardness. Well suited for Titanium, Inconel, and carbon fiber.

HARDLUBE

Multi-layer coating with thermal stability and lubricating properties needed for the drilling of steels, high-nickel alloys, stainless steel, cast iron, aluminum, brass, and bronze. Excellent heat resistance, great lubricity.

AlTiN-based

Greater abrasion resistance, extra shear strength, lower adhesion tendency, maximum toughness and a very smooth surface achieve a quantum leap in drilling performance. This coating is particularly advantageous for carbide drills. With its unique nanostructure, AlTiN plus AlCrN, it boosts productivitiy in various materials.

Fractional

	DIAMETER														
	(.0625)	(.0938)	(.1250)	(.1562)	(.1875)	(.2188)	(.2500)	(.3125)	(.3750)	(.4375)	(.5000)	(.6250)	(.7500)	(.8750)	(1.000)
	1/16"	3/32"	1/8"	5/32"	3/16"	7/32"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1"
SFM	**RPM**														
50	3050	2040	1530	1220	1020	875	765	610	510	440	380	310	250	220	190
75	4580	3060	2290	1830	1530	1310	1150	920	760	570	570	460	380	330	285
100	6100	4080	3050	2450	2040	1750	1530	1220	1020	760	760	610	510	440	385
125	7630	5100	3820	3050	2550	2180	1920	1530	1270	950	950	770	630	550	475
150	9150	6120	4570	3670	3060	2620	2290	1830	1530	1140	1140	920	760	660	575
175	10,680	7140	5350	4270	3570	3060	2680	2140	1780	1330	1330	1080	880	770	665
200	12,200	8150	6100	4900	4070	3500	3100	2450	2000	1500	1500	1200	1000	875	750
300	18,500	12,200	9200	7300	6100	5250	4600	3700	3100	2300	2300	1800	1500	1300	1100
400	24,500	16,300	12,200	9800	8150	7000	6100	4900	4100	3050	3050	2450	2050	1750	1525
500	30,500	20,400	15,300	12,200	10,200	8700	7600	6100	5100	3800	3800	3100	2500	2200	1900
750	45,800	36,700	22,900	18,300	15,300	13,100	11,500	9200	7600	5700	5700	4600	3800	3770	2850
1000	-	40,800	30,600	24,500	20,400	17,500	15,300	12,200	10,200	7650	7650	6100	5100	4400	3800
1500	-	-	40,800	36,700	30,600	26,200	22,900	18,300	15,300	11,300	11,300	9200	7600	6500	5700
2000	-	-	-	49,000	40,800	35,000	30,600	24,400	20,400	15,300	15,300	12,200	10,200	8700	7600
3000	-	-	-	-	-	52,500	45,900	36,600	30,600	22,900	22,900	18,300	15,300	13,100	11,400
4000	-	-	-	-	-	-	-	48,800	40,800	30,600	30,600	24,400	20,400	17,500	15,200
5000	-	-	-	-	-	-	-	-	51,000	38,200	38,200	30,600	25,500	21,800	19,000

Metric

	DIAMETER														
	(.0394")	(.0787")	(.1181")	(.1575")	(.1969")	(.2362")	(.3150")	(.3937")	(.4724")	(.5512")	(.6299")	(.7087")	(.7874")	(.8661")	(.9843")
	1,0	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0	22,0	25,0
M/Min.	**RPM**														
15	4800	2400	1600	1200	960	800	600	480	400	340	300	265	240	220	190
22	7000	3500	2300	1750	1400	1170	875	700	585	500	440	390	350	320	280
30	10,000	4800	3200	2400	1900	1590	1200	955	800	685	600	530	480	440	380
38	12,100	6000	4000	3025	2420	2020	1515	1210	1000	870	760	670	600	550	485
45	14,300	7200	4800	3600	2870	2390	1790	1430	1200	1020	900	800	710	650	575
53	16,880	8440	5630	4220	3375	2815	2110	1690	1400	1200	1055	940	845	770	675
60	19,110	9550	6370	4780	3825	3185	2390	1910	1590	1365	1200	1060	955	870	765
90	28,770	14,350	9550	7165	5735	4780	3585	2870	2390	2050	1790	1590	1430	1300	1150
120	38,220	19,100	12,750	9550	7645	6370	4780	3820	3185	2730	2490	2120	1910	1740	1530
150	47,770	23,885	15,925	11,950	9550	7965	5970	4780	3980	3410	2990	2650	2390	2170	1900
230	-	36,625	24,400	18,315	14,650	12,210	9150	7325	6100	5230	4580	4070	3660	3330	2930
300	-	47,770	31,850	23,885	19,110	15,925	11,950	9550	7960	6825	5970	5300	4780	4340	3820
450	-	-	47,770	35,830	28,660	23,885	17,915	14,330	11,950	10,240	8960	7960	7170	6510	5730
600	-	-	-	47,770	38,220	31,850	23,885	19,100	15,920	13,650	12,000	10,600	9550	8685	7600
900	-	-	-	-	-	47,770	35,830	28,660	23,885	20,475	17,900	15,900	14,330	13,030	11,500
1200	-	-	-	-	-	-	47,770	38,210	31,850	27,300	23,885	21,230	19,100	17,370	15,300
1500	-	-	-	-	-	-	-	47,770	39,810	34,210	29,860	26,540	23,885	21,710	19,100

General Solid Carbide Milling Guide
Fractional

Type	Rc Hardness	MILLING SFM (Vc)					CHIPLOAD PER FLUTE (Fz)				
		2 flute stub / std.	2 flute extra length	3 & 4 flute stub / std.	3 & 4 flute extra length	Diamond Coated	1/32" - 1/8" (.0938" - .1250")	1/8" - 1/4" (.1250" - .2500")	1/4" - 1/2" (.2500" - .5000")	1/2" - 1" (.5000" - 1.000")	1" - 1-1/4" (1.000" - 1.250")
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	< 35	-	-	175 - 225	150 - 200	-	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"	.0030" - .0050"
	> 35	-	-	125 - 175	100 - 150	-	.0003" - .0005"	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"	.0020" - .0040"
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金											
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	-	-	125 - 175	100 - 150	-	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"	.0030" - .0050"
	> 35	-	-	70 - 115	70 - 100	-	.0003" - .0005"	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"	.0020" - .0040"
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	< 35	-	-	175 - 225	150 - 200	-	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"	.0030" - .0050"
	> 35	-	-	125 - 175	100 - 150	-	.0003" - .0005"	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"	.0020" - .0040"
MONEL / 铜-镍合金											
Monel - 65% Nickel		175 - 300	125 - 175	175 - 300	125 - 175	-	.0007" - .0015"	.0010" - .0025"	.0015" - .0040"	.0030" - .0050"	.0040" - .0060"
TITANIUM ALLOYS / Titanlegierungen / Aleaciones de Titanio / Alliage de Titane / Leghe di Titanio / 钛合金											
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-2SN-4Zr-2Mo-Si		200 - 300	125 - 250	200 - 300	125 - 250	-	.0007" - .0015"	.0010" - .0025"	.0015" - .0040"	.0030" - .0050"	.0040" - .0060"
5553 / Beta Titanium		-	-	125 - 225	100 - 200	-	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"	.0030" - .0050"
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金											
13/8, 15/5, 17-4, pH Types	< 35	-	-	150 - 250	100 - 150	-	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"	.0030" - .0050"
	> 35	-	-	125 - 175	80 - 150	-	.0003" - .0005"	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"	.0020" - .0040"
Inox, 200 Series, 300 Series	< 35	-	-	200 - 250	125 - 175	-	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"	.0030" - .0050"
	> 35	-	-	150 - 200	100 - 150	-	.0003" - .0005"	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"	.0020" - .0040"
304L, 316L, Nitronic 50, Inox	< 35	-	-	90 - 125	80 - 120	-	.0005" - .0008"	.0008" - .0015"	.0010" - .0020"	.0020" - .0040"	.0030" - .0050"
	> 35	-	-	75 - 110	60 - 90	-	.0003" - .0005"	.0005" - .0010"	.0010" - .0015"	.0010" - .0030"	.0020" - .0040"
400 Series	< 35	-	-	150 - 250	100 - 150	-	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"	.0030" - .0050"
	> 35	-	-	125 - 175	80 - 150	-	.0003" - .0005"	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"	.0020" - .0040"
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢											
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30	-	-	150 - 225	125 - 175	-	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"	.0030" - .0050"
	30 - 38	-	-	90 - 125	80 - 120	-	.0003" - .0005"	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"	.0020" - .0040"
	> 38	-	-	60 - 90	50 - 80	-	.0002" - .0004"	.0003" - .0007"	.0008" - .0015"	.0010" - .0025"	.0015" - .0035"
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											
200, 250, 300, 8620	< 35	-	-	175 - 250	150 - 200	-	.0007" - .0015"	.0010" - .0025"	.0015" - .0040"	.0030" - .0050"	.0040" - .0060"
	> 35	-	-	100 - 175	100 - 150	-	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"	.0030" - .0050"
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢											
A36, 12L14, 1000's, 1100's, 1300's	< 35	-	-	175 - 250	150 - 200	-	.0007" - .0015"	.0010" - .0025"	.0015" - .0040"	.0030" - .0050"	.0040" - .0060"
	> 35	-	-	100 - 175	100 - 150	-	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"	.0030" - .0050"
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件											
Steel		225 - 325	175 - 250	250 - 350	175 - 250	-	.0010" - .0020"	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"	.0050" - .0100"
Ductile Iron		200 - 300	125 - 200	200 - 300	125 - 200	-	.0005" - .0015"	.0010" - .0030"	.0015" - .0040"	.0020" - .0060"	.0030" - .0080"
Gray Iron		225 - 325	175 - 250	250 - 350	175 - 250	-	.0010" - .0020"	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"	.0050" - .0100"
Aluminum		250 - 350	250 - 350	250 - 350	250 - 350	-	.0010" - .0020"	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"	.0050" - .0100"
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝											
Aircraft Grade (6061, 7075)	Standard Speed	300 - 500	300 - 500	300 - 500	300 - 500	-	.0010" - .0020"	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"	.0050" - .0150"
	High Speed	*(SEE HIGH SPEED ALUMINUM CHART - PAGE 272)*									
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁											
		300 - 500	300 - 500	300 - 500	300 - 500	-	.0010" - .0020"	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"	.0050" - .0100"
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜											
Copper Alloys		300 - 400	250 - 350	300 - 450	250 - 350	-	.0007" - .0015"	.0010" - .0025"	.0015" - .0035"	.0020" - .0080"	.0040" - .0100"
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜											
Brass, Aluminum/Bronze, Low Silicon Bronze		300 - 400	200 - 300	275 - 375	200 - 300	-	.0007" - .0015"	.0010" - .0025"	.0015" - .0035"	.0020" - .0080"	.0040" - .0100"
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料											
Glass Epoxy, Fiberglass, Plastics		200 - 400	200 - 400	200 - 400	200 - 400	200 - 500	.0010" - .0020"	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"	.0050" - .0100"
Graphite, G10		*(SEE GRAPHITE CHART - PAGE 291)*				300 - 1000	.0010" - .0020"	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"	.0050" - .0100"

When plunging into a solid, drop feed by approximately 50%.
20% of diameter for basic engagement parameters.

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

High Performance Solid Carbide Milling Guide
Fractional

Type	Rc Hardness	MILLING SFM (Vc)				CHIPLOAD PER FLUTE (Fz)		
		Aluminum Series		All Other High Performance Series		1/8" - 1/4" (.1250 - .2500)	1/4" - 1/2" (.2500 - .5000)	1/2" - 1" (.5000 - 1.000)
		Uncoated	Coated	Uncoated	AlTiN Coating			
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	< 35	-	-	200 - 275	275 - 400	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"
	> 35	-	-	125 - 175	175 - 250	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金								
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	-	-	150 - 200	200 - 300	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"
	> 35	-	-	90 - 125	125 - 200	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"
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	< 35	-	-	200 - 300	250 - 350	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"
	> 35	-	-	150 - 200	200 - 250	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"
MONEL / 铜-镍合金								
Monel - 65% Nickel		-	-	200 - 300	275 - 400	.0010" - .0025"	.0015" - .0040"	.0030" - .0050"
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		125 - 300	250 - 400	150 - 300	250 - 400	.0005" - .0012"	.0010" - .0025"	.0015" - .0040"
5553 / Beta Titanium		-	-	100 - 200	150 - 250	.0004" - .0010"	.0008" - .0020"	.0010" - .0030"
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金								
13/8, 15/5, 17-4, pH Types	< 35	-	-	200 - 300	250 - 350	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"
	> 35	-	-	150 - 200	200 - 250	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"
Inox, 200 Series, 300 Series	< 35	-	-	250 - 350	300 - 400	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"
	> 35	-	-	175 - 275	225 - 300	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"
304L, 316L, Nitronic 50, Inox	< 35	-	-	125 - 200	250 - 300	.0008" - .0015"	.0010" - .0020"	.0020" - .0040"
	> 35	-	-	90 - 125	200 - 250	.0005" - .0010"	.0010" - .0015"	.0010" - .0030"
400 Series	< 35	-	-	200 - 300	250 - 350	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"
	> 35	-	-	150 - 200	200 - 250	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢								
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30	-	-	225 - 300	250 - 350	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"
	30 - 38	-	-	125 - 200	150 - 250	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"
	> 38	*(SEE HIGH ROCKWELL CHART - PAGES 286-287)*						
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								
200, 250, 300, 8620	< 35	-	-	250 - 350	250 - 400	.0010" - .0025"	.0015" - .0040"	.0030" - .0050"
	> 35	-	-	150 - 200	150 - 300	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢								
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35	-	-	250 - 350	300 - 500	.0010" - .0025"	.0015" - .0040"	.0030" - .0050"
	> 35	-	-	150 - 200	250 - 400	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件								
Steel		-	-	175 - 250	250 - 350	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"
Ductile Iron		-	-	200 - 300	250 - 400	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"
Gray Iron		-	-	175 - 250	200 - 400	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"
Aluminum		300 - 400	350 - 500	300 - 400	-	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝								
Aircraft Grade (6061, 7075)	Standard Speed	300 - 400	300 - 600	200 - 400	300 - 500	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"
	High Speed	*(SEE HIGH SPEED ALUMINUM CHART - PAGE 272)*						
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁								
		200 - 300	200 - 500	200 - 300	300 - 500	.0015" - .0040"	.0020" - .0060"	.0030" - .0100"
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜								
Copper Alloys		200 - 300	300 - 500	200 - 300	300 - 500	.0010" - .0025"	.0015" - .0035"	.0020" - .0080"
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜								
Brass, Aluminum/Bronze, Low Silicon Bronze		200 - 300	300 - 500	200 - 300	200 - 400	.0010" - .0025"	.0015" - .0035"	.0020" - .0080"

Beryllium added to any material adds hardness and some nickel content. If tool displays chatter, increase feed (IPM) up to 30% and reduce speed (RPM) by 10%.
More detailed information is available on succeeding pages regarding the following materials: Aluminum, High Rockwell Steels, Graphite, and VRX end mills

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

General Solid Carbide Milling Guide

Metric

Type	Rc Hardness	MILLING M/Min. (Vc)					CHIPLOAD PER FLUTE (Fz)				
		2 flute stub / std.	2 flute extra length	3 & 4 flute stub / std.	3 & 4 flute extra length	DIAMOND COATED	1,0 - 3,0 (.0394" - .1181")	3,0 - 6,0 (.1181" - .2362")	6,0 - 12,0 (.2362" - .4724")	12,0 - 25,0 (.4724" - .9843")	25,0 - 32,0 (.9843" - 1.2598")
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	< 35	-	-	50 - 70	45 - 60	-	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100	0,075 - 0,125
	> 35	-	-	35 - 50	30 - 45	-	0,005 - 0,015	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075	0,050 - 0,100
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金											
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	-	-	35 - 50	30 - 45	-	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100	0,075 - 0,125
	> 35	-	-	20 - 35	15 - 25	-	0,005 - 0,015	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075	0,050 - 0,100
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	< 35	-	-	50 - 70	45 - 60	-	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100	0,075 - 0,125
	> 35	-	-	35 - 50	30 - 45	-	0,005 - 0,015	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075	0,050 - 0,100
MONEL / 铜-镍合金											
Monel - 65% Nickel		50 - 90	35 - 50	50 - 90	35 - 50	-	0,015 - 0,035	0,025 - 0,065	0,035 - 0,100	0,075 - 0,125	0,100 - 0,150
TITANIUM ALLOYS / Titanlegierungen / Aleaciones de Titanio / Alliage de Titane / Leghe di Titanio / 钛合金											
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-2SN-4Zr-2Mo-Si		60 - 90	35 - 75	60 - 90	35 - 75	-	0,015 - 0,035	0,025 - 0,065	0,035 - 0,100	0,075 - 0,125	0,100 - 0,150
5553 / Beta Titanium		-	-	35 - 65	30 - 60	-	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100	0,075 - 0,125
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金											
13/8, 15/5, 17-4, pH Types	< 35	-	-	45 - 75	30 - 45	-	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100	0,075 - 0,125
	> 35	-	-	35 - 50	25 - 45	-	0,005 - 0,015	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075	0,050 - 0,100
Inox, 200 Series, 300 Series	< 35	-	-	60 - 80	40 - 55	-	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100	0,075 - 0,125
	> 35	-	-	45 - 60	30 - 45	-	0,005 - 0,015	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075	0,050 - 0,100
304L, 316L, Nitronic 50, Inox	< 35	-	-	25 - 40	25 - 35	-	0,010 - 0,020	0,020 - 0,035	0,025 - 0,050	0,035 - 0,075	0,050 - 0,100
	> 35	-	-	20 - 35	15 - 25	-	0,005 - 0,015	0,010 - 0,025	0,025 - 0,035	0,025 - 0,050	0,035 - 0,075
400 Series	< 35	-	-	45 - 75	30 - 45	-	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100	0,075 - 0,125
	> 35	-	-	35 - 50	25 - 40	-	0,005 - 0,015	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075	0,050 - 0,100
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢											
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30	-	-	45 - 60	35 - 50	-	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100	0,075 - 0,125
	30 - 38	-	-	30 - 45	25 - 35	-	0,005 - 0,015	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075	0,050 - 0,100
	> 38	-	-	15 - 30	10 - 25	-	0,003 - 0,008	0,005 - 0,020	0,015 - 0,040	0,020 - 0,065	0,035 - 0,090
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											
200, 250, 300, 8620	< 35	-	-	55 - 75	45 - 60	-	0,015 - 0,035	0,025 - 0,065	0,035 - 0,100	0,075 - 0,125	0,100 - 0,150
	> 35	-	-	35 - 55	30 - 45	-	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100	0,075 - 0,125
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢											
A36, 12L14, 1000's, 1100's, 1300's	< 35	-	-	55 - 75	45 - 60	-	0,015 - 0,035	0,025 - 0,065	0,035 - 0,100	0,075 - 0,125	0,100 - 0,150
	> 35	-	-	35 - 55	30 - 45	-	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100	0,075 - 0,125
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件											
Steel		70 - 100	50 - 75	75 - 105	50 - 75	-	0,025 - 0,050	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250	0,125 - 0,250
Ductile Iron		60 - 90	35 - 60	60 - 90	35 - 60	-	0,015 - 0,035	0,025 - 0,075	0,035 - 0,100	0,050 - 0,150	0,075 - 0,200
Gray Iron		70 - 100	50 - 75	75 - 105	50 - 75	-	0,025 - 0,050	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250	0,125 - 0,250
Aluminum		75 - 105	75 - 105	75 - 105	75 - 105	-	0,025 - 0,050	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250	0,125 - 0,250
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝											
Aircraft Grade (6061, 7075)	Standard Speed	90 - 150	90 - 150	90 - 150	90 - 150	-	0,025 - 0,050	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250	0,125 - 0,300
	High Speed	*(SEE HIGH SPEED ALUMINUM CHART - PAGE 272)*									
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁											
		90 - 150	90 - 150	90 - 150	90 - 150	-	0,025 - 0,050	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250	0,125 - 0,250
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜											
Copper Alloys		120 - 150	75 - 105	90 - 135	75 - 105	-	0,020 - 0,040	0,025 - 0,065	0,040 - 0,090	0,050 - 0,200	0,075 - 0,250
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜											
Brass, Aluminum/Bronze, Low Silicon Bronze		90 - 120	60 - 90	75 - 115	60 - 90	-	0,020 - 0,040	0,025 - 0,065	0,040 - 0,090	0,050 - 0,200	0,075 - 0,250
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料											
Glass Epoxy, Fiberglass, Plastics		60 - 120	60 - 120	60 - 120	60 - 120	60 - 150	0,025 - 0,050	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250	0,125 - 0,250
Graphite, G10		*(SEE GRAPHITE CHART - PAGE 291)*				90 - 300	0,025 - 0,050	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250	0,125 - 0,250

When plunging into a solid, drop feed by approximately 50%.
20% of diameter for basic engagement parameters.

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

Type	Rc Hardness	MILLING M/Min. (Vc)				CHIPLOAD PER FLUTE (Fz)		
		Aluminum Series		All Other High Performance Series		3,0 - 6,0 (.1181" - .2362")	6,0 - 12,0 (.2362" - .4724")	12,0 - 25,0 (.4724" - .9843")
		Uncoated	Coated	Uncoated	AlTiN Coating			
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-4. L-605	< 35	-	-	60 - 80	80 - 120	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100
	> 35	-	-	40 - 50	50 - 75	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金								
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	-	-	45 - 60	60 - 90	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100
	> 35	-	-	25 - 40	40 - 60	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075
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	< 35	-	-	60 - 90	75 - 105	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100
	> 35	-	-	45 - 60	60 - 75	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075
MONEL / 铜-镍合金								
Monel - 65% Nickel		-	-	60 - 90	80 - 120	0,025 - 0,065	0,035 - 0,100	0,075 - 0,125
TITANIUM ALLOYS / Titanlegierungen / Aleaciones de Titanio / Alliage de Titane / Leghe di Titanio / 钛合金								
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-2SN-4Zr-2Mo-Si		40 - 90	75 - 120	45 - 90	75 - 120	0,010 - 0,025	0,025 - 0,065	0,035 - 0,100
5553 / Beta Titanium		-	-	30 - 60	45 - 75	0,008 - 0,020	0,020 - 0,050	0,025 - 0,075
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金								
13/8, 15/5, 17-4, pH Types	< 35	-	-	60 - 105	75 - 90	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100
	> 35	-	-	45 - 75	60 - 75	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075
Inox, 200 Series, 300 Series	< 35	-	-	75 - 105	90 - 120	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100
	> 35	-	-	50 - 80	65 - 90	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075
304L, 316L, Nitronic 50, Inox	< 35	-	-	40 - 60	75 - 90	0,020 - 0,035	0,025 - 0,050	0,035 - 0,075
	> 35	-	-	25 - 40	60 - 75	0,010 - 0,025	0,025 - 0,035	0,025 - 0,050
400 Series	< 35	-	-	60 - 105	75 - 90	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100
	> 35	-	-	45 - 75	60 - 75	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢								
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30	-	-	65 - 90	75 - 105	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100
	30 - 38	-	-	40 - 60	45 - 75	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075
	> 38	*(SEE HIGH ROCKWELL CHART - PAGES 286-287)*						
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								
200, 250, 300, 8620	< 35	-	-	75 - 105	75 - 120	0,025 - 0,065	0,035 - 0,100	0,075 - 0,125
	> 35	-	-	45 - 60	45 - 90	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢								
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35	-	-	75 - 105	90 - 150	0,025 - 0,065	0,035 - 0,100	0,075 - 0,125
	> 35	-	-	45 - 60	75 - 120	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件								
Steel		-	-	50 - 75	75 - 120	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250
Ductile Iron		-	-	60 - 90	90 - 125	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250
Gray Iron		-	-	50 - 75	75 - 125	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250
Aluminum		90 - 120	90 - 150	90 - 120	-	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝								
Aircraft Grade (6061, 7075)	Standard Speed	90 - 120	90 - 180	60 - 120	90 - 150	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250
	High Speed	*(SEE HIGH SPEED ALUMINUM CHART - PAGE 272)*						
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁								
		60 - 90	60 - 150	60 - 90	90 - 150	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜								
Copper Alloys		60 - 90	90 - 150	60 - 90	90 - 150	0,025 - 0,065	0,040 - 0,090	0,050 - 0,200
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜								
Brass, Aluminum/Bronze, Low Silicon Bronze		60 - 90	90 - 150	60 - 90	60 - 120	0,025 - 0,065	0,040 - 0,090	0,050 - 0,200

Beryllium added to any material adds hardness and some nickel content. If tool displays chatter, increase feed (M/Min.) up to 30% and reduce speed (RPM) by 10%.
More detailed information is available on succeeding pages regarding the following materials: Aluminum, High Rockwell Steels, Graphite, and VRX end mills

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

GARR TOOL Application Guide for Alumastar Coated End Mills in Aircraft Grade Aluminum

Fractional

	SLOTTING		SIDE MILLING
	Axial = .5xD	Axial = 1xD	Axial ≤ 1xD Radial ≤ .5xD
	SFM = 1500 - 2000	SFM = 750 - 1500	SFM = 1500 - 2000
Diameter	CPT = 1.5% - 3% of diameter	CPT = 1% - 2% of diameter	CPT = 2% - 3% of diameter
1/8"	.0019" - .0038"	.0013" - .0025"	.0025" - .0038"
3/16"	.0028" - .0056"	.0018" - .0037"	.0037" - .0056"
1/4"	.0037" - .0074"	.0025" - .0050"	.0050" - .0075"
5/16"	.0052" - .0104"	.0031" - .0062"	.0062" - .0094"
3/8"	.0055" - .0110"	.0037" - .0074"	.0075" - .0112"
1/2"	.0075" - .0150"	.0050" - .0100"	.0100" - .0150"
5/8"	.0093" - .0186"	.0062" - .0125"	.0125" - .0187"
3/4"	.0112" - .0224"	.0075" - .0150"	.0150" - .0225"
1"	.0150" - .0300"	.0100" - .0200"	.0200" - .0300"

Metric

	SLOTTING		SIDE MILLING
	Axial = .5xD	Axial = 1xD	Axial ≤ 1xD Radial ≤ 0.5xD
	M/Min. = 450 - 760	M/Min. = 225 - 450	M/Min. = 450 - 760
Diameter	CPT = 1.5% - 3% of diameter	CPT = 1% - 2% of diameter	CPT = 2% - 3% of diameter
3,0	0,045 - 0,090	0,030 - 0,060	0,060 - 0,090
4,0	0,060 - 0,120	0,040 - 0,080	0,080 - 0,120
6,0	0,090 - 0,180	0,060 - 0,120	0,120 - 0,180
8,0	0,120 - 0,240	0,080 - 0,160	0,160 - 0,240
10,0	0,150 - 0,300	0,100 - 0,200	0,200 - 0,300
12,0	0,180 - 0,360	0,120 - 0,240	0,240 - 0,360
16,0	0,240 - 0,480	0,160 - 0,320	0,320 - 0,480
20,0	0,300 - 0,600	0,200 - 0,400	0,400 - 0,600
25,0	0,375 - 0,750	0,250 - 0,500	0,500 - 0,750

CPT = Chipload per flute (Fz)

For CAT 40 machines using tools over 5/8" diameter, speeds and feeds may need to be reduced by as much as 50%

END MILL NOTES:

- Climb milling recommended for best finish
- Figures shown are based on 6061 / 7075
- CAT 50 Taper holders are recommended for 3/4" and 1" diameter end mills
- In controlled slotting tests, 4000 SFM, 1% diameter Chipload Per Flute, and 50% of Dia. axial depth were obtained
- In cases for tools with slower SFM (M/Min.), reference Series 242M/842M, page 62

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

Fractional

Material	Rc	SFM (Vc)	CHIPLOAD PER FLUTE Recommendations (Fz)										*Profiling	Slotting
			1/16" (.0625)	1/8" (.1250)	3/16" (.1875)	1/4" (.2500)	5/16" (.3125)	3/8" (.3750)	1/2" (.5000)	5/8" (.6250)	3/4" (.7500)	1" (1.000)	Radial	Axial
Stainless Steel: 303		290-375	.0003"-.0005"	.0004"-.0008"	.0008"-.0010"	.0010"-.0015"	.0013"-.0020"	.0015"-.0020"	.0020"-.0030"	.0025"-.0035"	.0030"-.0040"	.0035"-.0045"	1 x D	1 x D
Stainless Steel: 304, 316, 400 Series, Kovar, Invar		250-300	.0003"-.0005"	.0003"-.0006"	.0006"-.0010"	.0008"-.0015"	.0010"-.0020"	.0012"-.0020"	.0015"-.0020"	.0020"-.0025"	.0025"-.0030"	.0025"-.0035"	1 x D	1 x D
Stainless Steel: 304L, 316L, 8620, 17/4, 15/5, 13/8, PH Mat'l	<35 >35	250-300 200-250	.0003"-.0005" .0003"-.0005"	.0003"-.0006" .0003"-.0006"	.0006"-.0008" .0006"-.0008"	.0007"-.0010" .0007"-.0010"	.0010"-.0015" .0008"-.0010"	.0015"-.0020" .0010"-.0015"	.0015"-.0025" .0010"-.0020"	.0020"-.0030" .0015"-.0025"	.0025"-.0035" .0020"-.0030"	.0030"-.0040" .0020"-.0030"	1 x D 0.5 x D	1 x D 0.5 x D
High Temperature Alloys: Inconel 625/718, A286	<35 >35	125-175 80-100	.0003"-.0005" .0002"-.0004"	.0004"-.0008" .0003"-.0006"	.0008"-.0010" .0007"-.0010"	.0010"-.0015" .0008"-.0010"	.0012"-.0020" .0010"-.0015"	.0020"-.0025" .0010"-.0015"	.0025"-.0030" .0010"-.0015"	.0030"-.0035" .0012"-.0020"	.0030"-.0035" .0015"-.0025"	.0030"-.0040" .0015"-.0025"	0.5 x D 0.2 x D	0.3 x D 0.2 x D
Titanium: 6AL4V, CP		150-200	.0003"-.0005"	.0004"-.0008"	.0008"-.0010"	.0010"-.0015"	.0010"-.0020"	.0015"-.0020"	.0020"-.0030"	.0025"-.0030"	.0030"-.0035"	.0030"-.0040"	1 x D	1 x D
Carbon Steels: 1000 Series	<35 >35	400-600 275-425	.0003"-.0005" .0002"-.0004"	.0004"-.0008" .0003"-.0006"	.0008"-.0010" .0006"-.0008"	.0010"-.0015" .0008"-.0012"	.0010"-.0020" .0010"-.0015"	.0015"-.0020" .0010"-.0020"	.0020"-.0030" .0015"-.0025"	.0025"-.0035" .0020"-.0025"	.0030"-.0040" .0020"-.0030"	.0035"-.0045" .0025"-.0035"	0.3 x D 0.3 x D	0.5 x D 0.5 x D
High Strength Tool Steel: 4130, 4140, A2, D2, P20, H13	<30	250-400	.0003"-.0005"	.0003"-.0006"	.0006"-.0010"	.0008"-.0015"	.0010"-.0020"	.0012"-.0020"	.0015"-.0022"	.0020"-.0025"	.0025"-.0030"	.0025"-.0035"	0.5 x D	0.5 x D
	30-38	250-400	.0003"-.0005"	.0003"-.0006"	.0006"-.0008"	.0007"-.0010"	.0008"-.0010"	.0010"-.0015"	.0010"-.0020"	.0015"-.0025"	.0020"-.0030"	.0020"-.0030"	0.3 x D	0.5 x D
	>38	*(SEE HIGH ROCKWELL CHART - PAGE 286)*												
Gray Cast Iron		400-500	.0003"-.0005"	.0005"-.0010"	.0010"-.0020"	.0010"-.0020"	.0015"-.0020"	.0015"-.0025"	.0020"-.0035"	.0025"-.0035"	.0030"-.0040"	.0040"-.0050"	1 x D	1 x D

Metric

Material	Rc	M/Min. (Vc)	CHIPLOAD PER FLUTE - Metric Recommendations (Fz)										*Profiling	Slotting
			1,5 (.0591")	3,0 (.1181")	5,0 (.1969")	6,0 (.2362")	8,0 (.3150")	10,0 (.3937")	12,0 (.4724")	16,0 (.6299")	20,0 (.7874")	25,0 (.9843")	Radial	Axial
Stainless Steel: 303		90-115	0,008 - 0,012	0,010 - 0,020	0,020 - 0,025	0,025 - 0,038	0,033 - 0,050	0,038 - 0,050	0,050 - 0,076	0,063 - 0,089	0,076 - 0,102	0,089 - 0,114	1 x D	1 x D
Stainless Steel: 304, 316, 400 Series, Kovar, Invar		75-90	0,005 - 0,010	0,008 - 0,015	0,015 - 0,025	0,020 - 0,038	0,025 - 0,050	0,030 - 0,050	0,038 - 0,050	0,050 - 0,063	0,063 - 0,076	0,063 - 0,089	1 x D	1 x D
Stainless Steel: 304L, 316L, 17/4, 15/5, 13/8, PH Materials	<35 >35	75-85 60-75	0,005 - 0,010 0,005 - 0,010	0,008 - 0,015 0,008 - 0,015	0,015 - 0,020 0,015 - 0,020	0,018 - 0,025 0,018 - 0,025	0,025 - 0,038 0,020 - 0,025	0,038 - 0,050 0,025 - 0,038	0,038 - 0,063 0,025 - 0,050	0,050 - 0,076 0,038 - 0,063	0,063 - 0,089 0,050 - 0,076	0,076 - 0,102 0,050 - 0,076	1 x D 0.5 x D	1 x D 0.5 x D
High Temperature Alloys: Inconel 625/718, A286	<35 >35	40-55 25-30	0,008 - 0,012 0,005 - 0,010	0,010 - 0,020 0,008 - 0,015	0,020 - 0,025 0,018 - 0,025	0,025 - 0,038 0,020 - 0,025	0,030 - 0,050 0,025 - 0,038	0,050 - 0,063 0,025 - 0,038	0,063 - 0,076 0,025 - 0,038	0,076 - 0,089 0,030 - 0,050	0,076 - 0,089 0,038 - 0,063	0,076 - 0,102 0,038 - 0,063	0.5 x D 0.2 x D	0.3 x D 0.2 x D
Titanium: 6AL4V, CP		45-60	0,008 - 0,012	0,010 - 0,020	0,020 - 0,025	0,025 - 0,038	0,025 - 0,050	0,038 - 0,050	0,050 - 0,076	0,063 - 0,076	0,076 - 0,089	0,076 - 0,102	1 x D	1 x D
Carbon Steels: 1000 Series	<35 >35	125-185 85-130	0,008 - 0,012 0,006 - 0,010	0,010 - 0,020 0,008 - 0,015	0,020 - 0,025 0,015 - 0,020	0,025 - 0,038 0,020 - 0,030	0,025 - 0,050 0,025 - 0,038	0,038 - 0,050 0,025 - 0,050	0,050 - 0,076 0,038 - 0,063	0,063 - 0,089 0,050 - 0,063	0,076 - 0,102 0,050 - 0,076	0,089 - 0,114 0,063 - 0,089	0.3 x D 0.3 x D	0.5 x D 0.5 x D
High Strength Tool Steel: 4130, 4140, A2, D2, P20, H13	<30	75-125	0,005 - 0,010	0,008 - 0,015	0,015 - 0,025	0,020 - 0,038	0,025 - 0,050	0,030 - 0,050	0,038 - 0,056	0,050 - 0,063	0,063 - 0,076	0,063 - 0,089	0.5 x D	0.5 x D
	30-38	75-125	0,004 - 0,008	0,006 - 0,015	0,015 - 0,020	0,018 - 0,025	0,020 - 0,025	0,025 - 0,038	0,025 - 0,050	0,038 - 0,063	0,050 - 0,076	0,050 - 0,076	0.3 x D	0.5 x D
	>38	*(SEE HIGH ROCKWELL CHART - PAGE 287)*												
Gray Cast Iron		125-150	0,010 - 0,015	0,013 - 0,025	0,025 - 0,050	0,025 - 0,050	0,038 - 0,050	0,038 - 0,063	0,050 - 0,089	0,063 - 0,089	0,076 - 0,102	0,102 - 0,127	1 x D	1 x D

*** For profiling, axial = 1xD**

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

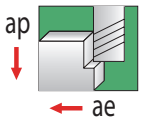
GARR TOOL Milling Guide for VRX-6 Series End Mills

Fractional

	Material Group S	Material Group M	Material Group S	Material Group P	Material Group K
	Nickel or Cobalt-based	Stainless	Titanium Alloys	Carbon Steels	Grey Cast Iron
	Inconel, Cobalt Chrome, Ductile Iron	Invar, 400, 316, pH Series	6Al4V	1000 Series	
	SFM = 150 - 225	SFM = 250 - 400	SFM = 250 - 450	SFM = 400 - 600	SFM = 400 - 500
DIA	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)
1/4"	.0006" - .0012"	.0010" - .0015"	.0010" - .0015"	.0015" - .0020"	.0015" - .0020"
3/8"	.0008" - .0016"	.0015" - .0025"	.0015" - .0025"	.0020" - .0030"	.0020" - .0030"
1/2"	.0012" - .0023"	.0020" - .0030"	.0020" - .0030"	.0025" - .0035"	.0025" - .0035"
5/8"	.0015" - .0025"	.0025" - .0035"	.0025" - .0035"	.0030" - .0040"	.0030" - .0040"
3/4"	.0018" - .0025"	.0030" - .0040"	.0030" - .0040"	.0035" - .0045"	.0035" - .0045"
1"	.0020" - .0030"	.0035" - .0050"	.0035" - .0050"	.0040" - .0055"	.0040" - .0055"

Profile/Trochoidal Milling

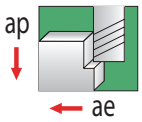
Axial (ap)	up to 2xD
Radial (ae)	15% of Dia.



	Nickel or Cobalt-based	Stainless	Titanium Alloys	Carbon Steels	Grey Cast Iron
	Inconel, Cobalt Chrome, Ductile Iron	Invar, 400, 316, pH Series	6Al4V	1000 Series	
	SFM = 200 - 250	SFM = 300 - 500	SFM = 300 - 600	SFM = 450 - 650	SFM = 450 - 550
DIA	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)
1/4"	.0010" - .0015"	.0015" - .0020"	.0015" - .0020"	.0020" - .0025"	.0020" - .0025"
3/8"	.0012" - .0020"	.0020" - .0030"	.0020" - .0030"	.0025" - .0035"	.0025" - .0035"
1/2"	.0015" - .0025"	.0025" - .0035"	.0025" - .0035"	.0030" - .0040"	.0030" - .0040"
5/8"	.0018" - .0028"	.0030" - .0040"	.0030" - .0040"	.0035" - .0045"	.0035" - .0045"
3/4"	.0020" - .0030"	.0035" - .0045"	.0035" - .0045"	.0040" - .0050"	.0040" - .0050"
1"	.0025" - .0035"	.0040" - .0055"	.0040" - .0055"	.0050" - .0065"	.0050" - .0065"

Profile/Trochoidal Milling

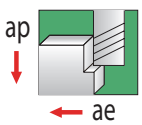
Axial (ap)	up to 3xD
Radial (ae)	10% of Dia.



	Nickel or Cobalt-based	Stainless	Titanium Alloys	Carbon Steels	Grey Cast Iron
	Inconel, Cobalt Chrome, Ductile Iron	Invar, 400, 316, pH Series	6Al4V	1000 Series	
	SFM = 225 - 300	SFM = 400 - 600	SFM = 400 - 700	SFM = 500 - 700	SFM = 450 - 600
DIA	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)
1/4"	.0015" - .0025"	.0020" - .0030"	.0020" - .0030"	.0025" - .0035"	.0025" - .0035"
3/8"	.0017" - .0030"	.0025" - .0040"	.0025" - .0040"	.0030" - .0045"	.0030" - .0045"
1/2"	.0020" - .0035"	.0030" - .0045"	.0030" - .0045"	.0035" - .0050"	.0035" - .0050"
5/8"	.0025" - .0040"	.0035" - .0050"	.0035" - .0050"	.0040" - .0055"	.0040" - .0055"
3/4"	.0030" - .0045"	.0040" - .0055"	.0040" - .0055"	.0045" - .0060"	.0045" - .0060"
1"	.0035" - .0050"	.0050" - .0070"	.0050" - .0070"	.0055" - .0070"	.0055" - .0070"

Profile/Trochoidal Milling

Axial (ap)	up to 4xD
Radial (ae)	5% of Dia.



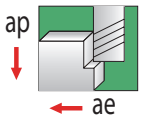
NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

Metric

	Material Group S	Material Group M	Material Group S	Material Group P	Material Group K
	Nickel or Cobalt-based	Stainless	Titanium Alloys	Carbon Steels	Grey Cast Iron
	Inconel, Cobalt Chrome, Ductile Iron	Invar, 400, 316, pH Series	6Al4V	1000 Series	
	SMM = 45 - 70	SMM = 75 - 120	SMM = 75 - 140	SMM = 120 - 180	SMM = 120 - 150
DIA	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)
6,0	0,015 - 0,030	0,025 - 0,035	0,025 - 0,035	0,035 - 0,050	0,035 - 0,050
8,0	0,020 - 0,040	0,030 - 0,050	0,030 - 0,050	0,040 - 0,060	0,040 - 0,060
10,0	0,025 - 0,055	0,035 - 0,065	0,035 - 0,065	0,050 - 0,075	0,050 - 0,075
12,0	0,030 - 0,060	0,050 - 0,075	0,050 - 0,075	0,060 - 0,090	0,060 - 0,090
16,0	0,035 - 0,065	0,065 - 0,090	0,065 - 0,090	0,075 - 0,100	0,075 - 0,100
20,0	0,045 - 0,065	0,075 - 0,100	0,075 - 0,100	0,090 - 0,115	0,090 - 0,115
25,0	0,050 - 0,075	0,085 - 0,125	0,090 - 0,125	0,100 - 0,140	0,100 - 0,140

Profile/Trochoidal Milling

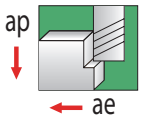
Axial (ap)	up to 2xD
Radial (ae)	11%-16% x D



	Nickel or Cobalt-based	Stainless	Titanium Alloys	Carbon Steels	Grey Cast Iron
	Inconel, Cobalt Chrome, Ductile Iron	Invar, 400, 316, pH Series	6Al4V	1000 Series	
	SMM = 60 - 75	SMM = 90 - 150	SMM = 90 - 180	SMM = 140 - 200	SMM = 140 - 160
DIA	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)
6,0	0,025 - 0,035	0,035 - 0,050	0,035 - 0,050	0,050 - 0,065	0,050 - 0,065
8,0	0,025 - 0,045	0,040 - 0,060	0,040 - 0,060	0,060 - 0,080	0,060 - 0,080
10,0	0,030 - 0,050	0,050 - 0,075	0,050 - 0,075	0,065 - 0,090	0,065 - 0,090
12,0	0,035 - 0,060	0,060 - 0,085	0,060 - 0,090	0,075 - 0,100	0,075 - 0,100
16,0	0,040 - 0,065	0,075 - 0,100	0,075 - 0,100	0,090 - 0,115	0,090 - 0,115
20,0	0,050 - 0,075	0,085 - 0,110	0,085 - 0,115	0,100 - 0,125	0,100 - 0,125
25,0	0,060 - 0,085	0,100 - 0,140	0,100 - 0,140	0,125 - 0,165	0,125 - 0,165

Profile/Trochoidal Milling

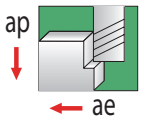
Axial (ap)	up to 3xD
Radial (ae)	6%-10% x D



	Nickel or Cobalt-based	Stainless	Titanium Alloys	Carbon Steels	Grey Cast Iron
	Inconel, Cobalt Chrome, Ductile Iron	Invar, 400, 316, pH Series	6Al4V	1000 Series	
	SMM = 70 - 90	SMM = 120 - 180	SMM = 120 - 210	SMM = 150 - 210	SMM = 140 - 180
DIA	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)
6,0	0,035 - 0,060	0,050 - 0,075	0,050 - 0,075	0,065 - 0,085	0,065 - 0,085
8,0	0,035 - 0,065	0,055 - 0,085	0,055 - 0,085	0,070 - 0,095	0,070 - 0,095
10,0	0,040 - 0,070	0,065 - 0,100	0,065 - 0,100	0,075 - 0,110	0,075 - 0,110
12,0	0,050 - 0,085	0,075 - 0,110	0,075 - 0,110	0,090 - 0,125	0,090 - 0,125
16,0	0,060 - 0,100	0,090 - 0,120	0,090 - 0,120	0,100 - 0,135	0,100 - 0,135
20,0	0,075 - 0,110	0,100 - 0,130	0,100 - 0,130	0,115 - 0,150	0,115 - 0,150
25,0	0,090 - 0,125	0,120 - 0,170	0,120 - 0,170	0,140 - 0,185	0,140 - 0,185

Profile/Trochoidal Milling

Axial (ap)	up to 4xD
Radial (ae)	3%-5% x D



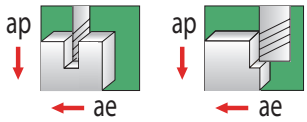
NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

GARR TOOL Application Guide for ARC Series 3-Flute Roughers

Fractional

	Aluminum	Non-Ferrous (Copper, Brass, Bronze)	Titanium Alloys	Carbon Steels
	SFM = 700 - 1000	SFM = 300 - 500	SFM = 150 - 250	SFM = 200 - 300
Diameter	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)
3/16"	.0010" - .0020"	.0008" - .0013"	.0005" - .0008"	.0008" - .0010"
1/4"	.0015" - .0025"	.0012" - .0018"	.0007" - .0010"	.0010" - .0015"
5/16"	.0020" - .0030"	.0015" - .0023"	.0008" - .0013"	.0012" - .0020"
3/8"	.0025" - .0035"	.0018" - .0028"	.0012" - .0018"	.0013" - .0022"
1/2"	.0030" - .0040"	.0020" - .0035"	.0015" - .0023"	.0015" - .0025"
5/8"	.0040" - .0050"	.0025" - .0045"	.0018" - .0028"	.0018" - .0030"
3/4"	.0050" - .0060"	.0030" - .0050"	.0020" - .0035"	.0022" - .0035"
1"	.0060" - .0070"	.0040" - .0060"	.0025" - .0045"	.0025" - .0040"

	SLOTTING	PROFILING
Axial (ap)	1xD	2xD
Radial (ae)	1xD	0.5xD



Metric

	Aluminum	Non-Ferrous (Copper, Brass, Bronze)	Titanium Alloys	Carbon Steels
	SMM = 200 - 350	SMM = 80 - 150	SMM = 40 - 80	SMM = 70 - 90
Diameter	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)
4,0	0,025 - 0,050	0,020 - 0,035	0,010 - 0,020	0,020 - 0,025
6,0	0,040 - 0,065	0,025 - 0,050	0,015 - 0,025	0,025 - 0,040
8,0	0,050 - 0,075	0,035 - 0,055	0,020 - 0,035	0,025 - 0,050
10,0	0,060 - 0,090	0,045 - 0,075	0,025 - 0,050	0,025 - 0,060
12,0	0,075 - 0,100	0,050 - 0,090	0,035 - 0,055	0,035 - 0,060
16,0	0,100 - 0,125	0,060 - 0,115	0,045 - 0,075	0,050 - 0,075
20,0	0,125 - 0,150	0,075 - 0,125	0,050 - 0,090	0,050 - 0,090
25,0	0,150 - 0,180	0,100 - 0,150	0,060 - 0,115	0,060 - 0,100

ARC SERIES TOOLS ARE NOT DESIGNED FOR OVER 28Rc MATERIALS

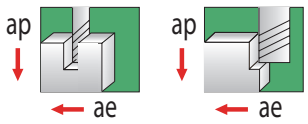
CPT (Fz) = Chipload per flute

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

Fractional

Material	SFM (Vc)	CHIPLOAD PER FLUTE (CPT) - Recommendations (Fz)							
		3/16" (.1875)	1/4" (.2500)	5/16" (.3125)	3/8" (.3750)	1/2" (.5000)	5/8" (.6250)	3/4" (.7500)	1" (1.000)
Stainless Steel: 303	290-375	.0008" - .0010"	.0010" - .0015"	.0013" - .0020"	.0015" - .0020"	.0020" - .0030"	.0025" - .0035"	.0030" - .0040"	.0035" - .0045"
Stainless Steel: 304, 316, 400 Series, Kovar, Invar	250-300	.0006" - .0010"	.0008" - .0015"	.0010" - .0020"	.0012" - .0020"	.0015" - .0020"	.0020" - .0025"	.0025" - .0030"	.0025" - .0035"
Stainless Steel: 304L, 316L, 8620, 17/4, 15/5, 13/8, PH Mat'l	200-250	.0006" - .0008"	.0007" - .0010"	.0008" - .0010"	.0010" - .0015"	.0010" - .0020"	.0015" - .0025"	.0020" - .0030"	.0020" - .0030"
High Temperature Alloys: Inconel 625/718, A286	100-175	.0007" - .0010"	.0008" - .0010"	.0010" - .0015"	.0010" - .0015"	.0010" - .0015"	.0012" - .0020"	.0015" - .0025"	.0015" - .0025"
Titanium: 6AL4V, CP	150-200	.0008" - .0010"	.0010" - .0015"	.0010" - .0020"	.0015" - .0020"	.0020" - .0030"	.0025" - .0030"	.0030" - .0035"	.0030" - .0040"
Carbon Steels: 1000 Series	275-425	.0006" - .0008"	.0008" - .0012"	.0010" - .0015"	.0010" - .0020"	.0015" - .0025"	.0020" - .0025"	.0020" - .0030"	.0025" - .0035"
High Strength Tool Steel: 4130, 4140, A2, D2, P20, H13	250-400	.0006" - .0008"	.0007" - .0010"	.0008" - .0010"	.0010" - .0015"	.0010" - .0020"	.0015" - .0025"	.0020" - .0030"	.0020" - .0030"
Gray Cast Iron	400-500	.0010" - .0020"	.0010" - .0020"	.0015" - .0020"	.0015" - .0025"	.0020" - .0035"	.0025" - .0035"	.0030" - .0040"	.0040" - .0050"

	SLOTTING	PROFILING
Axial (ap)	0.5xD	2xD
Radial (ae)	1xD	0.2xD



Metric

Material	M/Min. (Vc)	CHIPLOAD PER FLUTE (CPT) - Metric Recommendations (Fz)								
		4,0 (.1575")	5,0 (.1969")	6,0 (.2362")	8,0 (.3150")	10,0 (.3937")	12,0 (.4724")	16,0 (.6299")	20,0 (.7874")	25,0 (.9843")
Stainless Steel: 303	90-115	0,010 - 0,020	0,020 - 0,025	0,025 - 0,038	0,033 - 0,050	0,038 - 0,050	0,050 - 0,076	0,063 - 0,089	0,076 - 0,102	0,089 - 0,114
Stainless Steel: 304, 316, 400 Series, Kovar, Invar	75-90	0,008 - 0,015	0,015 - 0,025	0,020 - 0,038	0,025 - 0,050	0,030 - 0,050	0,038 - 0,050	0,050 - 0,063	0,063 - 0,076	0,063 - 0,089
Stainless Steel: 304L, 316L, 17/4, 15/5, 13/8, PH Materials	60-75	0,008 - 0,015	0,015 - 0,020	0,018 - 0,025	0,020 - 0,025	0,025 - 0,038	0,025 - 0,050	0,038 - 0,063	0,050 - 0,076	0,050 - 0,076
High Temperature Alloys: Inconel 625/718, A286	30-55	0,008 - 0,015	0,018 - 0,025	0,020 - 0,025	0,025 - 0,038	025 - 0,038	0,025 - 0,038	0,030 - 0,050	0,038 - 0,063	0,038 - 0,063
Titanium: 6AL4V, CP	45-60	0,010 - 0,020	0,020 - 0,025	0,025 - 0,038	0,025 - 0,050	0,038 - 0,050	0,050 - 0,076	0,063 - 0,076	0,076 - 0,089	0,076 - 0,102
Carbon Steels: 1000 Series	85-130	0,008 - 0,015	0,015 - 0,020	0,020 - 0,030	0,025 - 0,038	0,025 - 0,050	0,038 - 0,063	0,050 - 0,063	0,050 - 0,076	0,063 - 0,089
High Strength Tool Steel: 4130, 4140, A2, D2, P20, H13	75-125	0,006 - 0,015	0,015 - 0,020	0,018 - 0,025	0,020 - 0,025	0,025 - 0,038	0,025 - 0,050	0,038 - 0,063	0,050 - 0,076	0,050 - 0,076
Gray Cast Iron	125-150	0,013 - 0,025	0,025 - 0,050	0,025 - 0,050	0,038 - 0,050	0,038 - 0,063	0,050 - 0,089	0,063 - 0,089	0,076 - 0,102	0,102 - 0,127

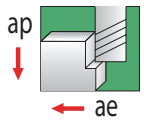
NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

GARR TOOL Speeds and Feeds for TMS and TMR End Mills

Fractional

Material Type	SFM (Vc)	CHIPLOAD PER FLUTE (Fz) at 2% RADIAL ENGAGEMENT (USING PROGRAMMED CALCULATION - PG. 286)						
		1/4" (.2500)	5/16" (.3125)	3/8" (.3750)	1/2" (.5000)	5/8" (.6250)	3/4" (.7500)	1.0" (1.000)
TITANIUM ALLOYS / Titanlegierungen / Aleaciones de Titanio / Alliage de Titane / Leghe di Titanio / 钛合金								
6Al - 4V	250 - 400	.0020" - .0042"	.0030" - .0052"	.0035" - .0065"	.0043" - .0078"	.0052" - .0095"	.0065" - .0115"	.0080" - .0143"
5553	150 - 250	.0015" - .0028"	.0018" - .0035"	.0025" - .0043"	.0030" - .0055"	.0035" - .0065"	.0042" - .0080"	.0052" - .0095"
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金								
Free Machining (303)	300 - 400	.0020" - .0042"	.0027" - .0052"	.0035" - .0065"	.0043" - .0078"	.0052" - .0095"	.0065" - .0115"	.0080" - .0143"
Austenitic (304 / 304L)	225 - 350	.0017" - .0035"	.0025" - .0043"	.0030" - .0052"	.0035" - .0065"	.0043" - .0078"	.0052" - .0095"	.0065" - .0115"
Martensitic (17-4 / 416)	200 - 250	.0015" - .0028"	.0018" - .0035"	.0025" - .0043"	.0030" - .0055"	.0035" - .0065"	.0042" - .0080"	.0052" - .0095"
TOOL STEELS < 40Rc / Werkzeugstähle < 40HRc / Herramienta aceros < 40Rc / Aciers à outils < 40HRC / Acciaio da utensili < 40HRC / **工具钢** < 40HRC								
8620	250 - 400	.0017" - .0035"	.0025" - .0043"	.0030" - .0052"	.0035" - .0065"	.0043" - .0078"	.0052" - .0095"	.0065" - .0115"
4140, D2 & S7	250 - 350	.0015" - .0028"	.0018" - .0035"	.0025" - .0043"	.0030" - .0055"	.0035" - .0065"	.0042" - .0080"	.0052" - .0095"
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢								
1000 Series, A36 & 12L14	300 - 500	.0020" - .0042"	.0027" - .0052"	.0035" - .0065"	.0043" - .0078"	.0052" - .0095"	.0065" - .0115"	.0080" - .0143"
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件								
Steel & Iron	250 - 350	.0020" - .0042"	.0027" - .0052"	.0035" - .0065"	.0043" - .0078"	.0052" - .0095"	.0065" - .0115"	.0080" - .0143"
Aluminum	300 - 400	.0017" - .0035"	.0025" - .0043"	.0030" - .0052"	.0035" - .0065"	.0043" - .0078"	.0052" - .0095"	.0065" - .0115"
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝								
6061 - T6	300 - 500	.0020" - .0042"	.0027" - .0052"	.0035" - .0065"	.0043" - .0078"	.0052" - .0095"	.0065" - .0115"	.0080" - .0143"
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜, BRASS ALLOYS / Messinglegierungen / Aleaciones de latón / Alliage de laiton / Leghe di ottone / 黄铜合金								
Short Chip	250 - 350	.0020" - .0042"	.0027" - .0052"	.0035" - .0065"	.0043" - .0078"	.0052" - .0095"	.0065" - .0115"	.0080" - .0143"
Long Chip	175 - 300	.0017" - .0035"	.0025" - .0043"	.0030" - .0052"	.0035" - .0065"	.0043" - .0078"	.0052" - .0095"	.0065" - .0115"

SFM / RPM Conversion



ap = full flute length
ae = 2%

	DIAMETER (d)						
	(.2500)	(.3125)	(.3750)	(.5000)	(.6250)	(.7500)	(1.000)
	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
SFM (Vc)	RPM (n)						
100	1528	1222	1019	764	611	509	382
125	1910	1528	1273	955	764	637	478
150	2292	1834	1528	1146	917	764	573
175	2674	2139	1783	1337	1070	891	669
200	3056	2445	2037	1528	1222	1019	764
250	3820	3056	2547	1910	1528	1273	955
300	4584	3667	3056	2292	1834	1528	1146
350	5348	4278	3565	2674	2139	1783	1337
400	6112	4890	4075	3056	2445	2037	1528
450	6876	5501	4584	3438	2750	2292	1719
500	7640	6112	5093	3820	3056	2547	1910
550	8404	6723	5603	4202	3362	2801	2101
600	9168	7334	6112	4584	3667	3056	2292

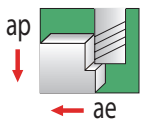
NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

GARR TOOL Speeds and Feeds for TMS and TMR End Mills

Metric

Material Type	SMM (Vc)	CHIPLOAD PER FLUTE (Fz) at 2% RADIAL ENGAGEMENT (USING PROGRAMMED CALCULATION - PG. 287)					
		6,0 (.2362)	8,0 (.3150)	10,0 (.3937)	12,0 (.4724)	16,0 (.6299)	20,0 (.7874)
TITANIUM ALLOYS / Titanlegierungen / Aleaciones de Titanio / Alliage de Titane / Leghe di Titanio / 钛合金							
6Al-4V	75 - 120	0,050 - 0,105	0,075 - 0,130	0,090 - 0,165	0,105 - 0,200	0,130 - 0,240	0,165 - 0,365
5553	45 - 75	0,035 - 0,070	0,045 - 0,090	0,065 - 0,105	0,075 - 0,140	0,090 - 0,165	0,105 - 0,200
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金							
Free Machining (303)	90 - 120	0,050 - 0,105	0,075 - 0,130	0,090 - 0,165	0,105 - 0,200	0,130 - 0,240	0,165 - 0,365
Austenitic (304 / 304L)	70 - 100	0,040 - 0,090	0,065 - 0,110	0,075 - 0,130	0,090 - 0,165	0,110 - 0,200	0,130 - 0,240
Martensitic (17-4 / 416)	60 - 75	0,035 - 0,070	0,045 - 0,090	0,065 - 0,105	0,075 - 0,140	0,090 - 0,165	0,105 - 0,200
TOOL STEELS < 40Rc / Werkzeugstähle < 40HRc / Herramienta aceros < 40Rc / Aciers à outils < 40HRC / Acciaio da utensili < 40HRC / 工具钢 < 40HRC							
8620	80 - 120	0,040 - 0,090	0,065 - 0,110	0,075 - 0,130	0,090 - 0,165	0,110 - 0,200	0,130 - 0,240
4140, D2 & S7	75 - 110	0,035 - 0,070	0,045 - 0,090	0,065 - 0,105	0,075 - 0,140	0,090 - 0,165	0,105 - 0,200
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢							
1000 Series, A36 & 12L14	90 - 150	0,050 - 0,105	0,075 - 0,130	0,090 - 0,165	0,105 - 0,200	0,130 - 0,240	0,165 - 0,365
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件							
Steel & Iron	75 - 110	0,050 - 0,105	0,075 - 0,130	0,090 - 0,165	0,105 - 0,200	0,130 - 0,240	0,165 - 0,365
Aluminum	90 - 120	0,040 - 0,090	0,065 - 0,110	0,075 - 0,130	0,090 - 0,165	0,110 - 0,200	0,130 - 0,240
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝							
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 - 0,365
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜, BRASS ALLOYS / Messinglegierungen / Aleaciones de latón / Alliage de laiton / Leghe di ottone / 黄铜合金							
Short Chip	75 - 110	0,050 - 0,105	0,075 - 0,130	0,090 - 0,165	0,105 - 0,200	0,130 - 0,240	0,165 - 0,365
Long Chip	60 - 90	0,040 - 0,090	0,065 - 0,110	0,075 - 0,130	0,090 - 0,165	0,110 - 0,200	0,130 - 0,240

SMM / RPM Conversion



ap = full flute length
ae = 2%

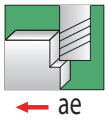
	DIAMETER (d)					
	(.2362")	(.3150")	(.3937")	(.4724")	(.6299")	(.7874")
	6,0	8,0	10,0	12,0	16,0	20,0
SMM (Vc)	RPM (n)					
30	1592	1194	955	796	597	477
35	1857	1393	1114	928	696	557
40	2122	1592	1273	1061	796	637
45	2387	1790	1432	1194	895	716
50	2653	1989	1592	1326	995	796
55	2918	2188	1751	1459	1094	875
60	3183	2387	1910	1592	1194	955
65	3448	2586	2069	1724	1293	1035
70	3714	2785	2228	1857	1393	1114
75	3979	2984	2387	1989	1492	1194
80	4244	3183	2546	2122	1592	1273
85	4509	3382	2706	2255	1691	1353
90	4775	3581	2865	2387	1790	1432
95	5040	3780	3024	2520	1890	1512
100	5305	3979	3183	2653	1989	1592
120	6366	4775	3820	3183	2387	1910
150	7958	5968	4775	3979	2984	2387
175	9284	6963	5570	4642	3482	2785
200	10610	7958	6366	5305	3979	3183

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

Chip Thinning Calculations for TMS / TMR End Mills

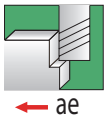
Fractional

ae = 3%



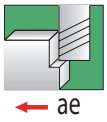
3% Radial Engagement (.03 x d)	
Actual (CPT)	Programmed (CPT)
.0002″	.0005″
.0003″	.0010″
.0005″	.0015″
.0007″	.0020″
.0009″	.0025″
.0010″	.0030″
.0012″	.0035″
.0014″	.0040″
.0015″	.0045″
.0017″	.0050″
.0019″	.0055″
.0020″	.0060″
.0022″	.0065″
.0024″	.0070″
.0026″	.0075″
.0027″	.0080″
.0029″	.0085″
.0031″	.0090″
.0032″	.0095″
.0034″	.0100″
.0036″	.0105″
.0037″	.0110″
.0039″	.0115″
.0041″	.0120″
.0043″	.0125″
.0044″	.0130″
.0046″	.0135″
.0048″	.0140″
.0049″	.0145″
.0051″	.0150″
.0053″	.0155″
.0054″	.0160″
.0056″	.0165″
.0058″	.0170″
.0060″	.0175″
.0061″	.0180″
.0063″	.0185″
.0065″	.0190″
.0066″	.0195″
.0068″	.0200″

ae = 2%



2% Radial Engagement (.02 x d)	
Actual (CPT)	Programmed (CPT)
.0001″	.0005″
.0003″	.0010″
.0004″	.0015″
.0006″	.0020″
.0007″	.0025″
.0008″	.0030″
.0010″	.0035″
.0011″	.0040″
.0013″	.0045″
.0014″	.0050″
.0015″	.0055″
.0017″	.0060″
.0018″	.0065″
.0020″	.0070″
.0021″	.0075″
.0022″	.0080″
.0024″	.0085″
.0025″	.0090″
.0027″	.0095″
.0028″	.0100″
.0029″	.0105″
.0031″	.0110″
.0032″	.0115″
.0034″	.0120″
.0035″	.0125″
.0036″	.0130″
.0038″	.0135″
.0039″	.0140″
.0041″	.0145″
.0042″	.0150″
.0043″	.0155″
.0045″	.0160″
.0046″	.0165″
.0048″	.0170″
.0049″	.0175″
.0050″	.0180″
.0052″	.0185″
.0053″	.0190″
.0055″	.0195″
.0056″	.0200″

ae = 1%



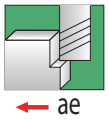
1% Radial Engagement (.01 x d)	
Actual (CPT)	Programmed (CPT)
.0001″	.0005″
.0002″	.0010″
.0003″	.0015″
.0004″	.0020″
.0005″	.0025″
.0006″	.0030″
.0007″	.0035″
.0008″	.0040″
.0009″	.0045″
.0010″	.0050″
.0011″	.0055″
.0012″	.0060″
.0013″	.0065″
.0014″	.0070″
.0015″	.0075″
.0016″	.0080″
.0017″	.0085″
.0018″	.0090″
.0019″	.0095″
.0020″	.0100″
.0021″	.0105″
.0022″	.0110″
.0023″	.0115″
.0024″	.0120″
.0025″	.0125″
.0026″	.0130″
.0027″	.0135″
.0028″	.0140″
.0029″	.0145″
.0030″	.0150″
.0031″	.0155″
.0032″	.0160″
.0033″	.0165″
.0034″	.0170″
.0035″	.0175″
.0036″	.0180″
.0037″	.0185″
.0038″	.0190″
.0039″	.0195″
.0040″	.0200″

CPT = CHIPLOAD PER TOOTH (Fz)

Chip Thinning Calculations for TMS / TMR End Mills

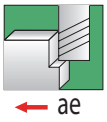
Metric

ae = 3%



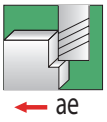
3% Radial Engagement (.03 x d)	
Actual (CPT)	Programmed (CPT)
0,0043	0,0127
0,0086	0,0254
0,0130	0,0381
0,0173	0,0508
0,0216	0,0635
0,0259	0,0762
0,0302	0,0889
0,0345	0,1016
0,0389	0,1143
0,0432	0,1270
0,0475	0,1397
0,0518	0,1524
0,0561	0,1651
0,0605	0,1778
0,0648	0,1905
0,0691	0,2032
0,0734	0,2159
0,0777	0,2286
0,0820	0,2413
0,0864	0,2540
0,0907	0,2667
0,0950	0,2794
0,0993	0,2921
0,1036	0,3048
0,1080	0,3175
0,1123	0,3302
0,1166	0,3429
0,1209	0,3556
0,1252	0,3683
0,1295	0,3810
0,1339	0,3937
0,1382	0,4064
0,1425	0,4191
0,1468	0,4318
0,1511	0,4445
0,1554	0,4572
0,1598	0,4699
0,1641	0,4826
0,1684	0,4953
0,1727	0,5080

ae = 2%



2% Radial Engagement (.02 x d)	
Actual (CPT)	Programmed (CPT)
0,0036	0,0127
0,0071	0,0254
0,0107	0,0381
0,0142	0,0508
0,0178	0,0635
0,0213	0,0762
0,0249	0,0889
0,0284	0,1016
0,0320	0,1143
0,0356	0,1270
0,0391	0,1397
0,0427	0,1524
0,0462	0,1651
0,0498	0,1778
0,0533	0,1905
0,0569	0,2032
0,0605	0,2159
0,0640	0,2286
0,0676	0,2413
0,0711	0,2540
0,0747	0,2667
0,0782	0,2794
0,0818	0,2921
0,0853	0,3048
0,0889	0,3175
0,0925	0,3302
0,0960	0,3429
0,0996	0,3556
0,1031	0,3683
0,1067	0,3810
0,1102	0,3937
0,1138	0,4064
0,1173	0,4191
0,1209	0,4318
0,1245	0,4445
0,1280	0,4572
0,1316	0,4699
0,1351	0,4826
0,1387	0,4953
0,1422	0,5080

ae = 1%



1% Radial Engagement (.01 x d)	
Actual (CPT)	Programmed (CPT)
0,0025	0,0127
0,0051	0,0254
0,0076	0,0381
0,0102	0,0508
0,0127	0,0635
0,0152	0,0762
0,0178	0,0889
0,0203	0,1016
0,0229	0,1143
0,0254	0,1270
0,0279	0,1397
0,0305	0,1524
0,0330	0,1651
0,0356	0,1778
0,0381	0,1905
0,0406	0,2032
0,0432	0,2159
0,0457	0,2286
0,0483	0,2413
0,0508	0,2540
0,0533	0,2667
0,0559	0,2794
0,0584	0,2921
0,0610	0,3048
0,0635	0,3175
0,0660	0,3302
0,0686	0,3429
0,0711	0,3556
0,0737	0,3683
0,0762	0,3810
0,0787	0,3937
0,0813	0,4064
0,0838	0,4191
0,0864	0,4318
0,0889	0,4445
0,0914	0,4572
0,0940	0,4699
0,0965	0,4826
0,0991	0,4953
0,1016	0,5080

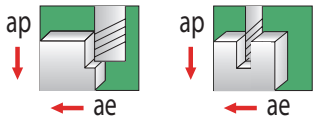
CPT = CHIPLOAD PER TOOTH (Fz)

GARR TOOL Milling Guide for V4 End Mills in Titanium, Inconel, and Stainless

Fractional

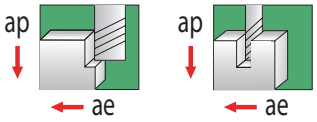
	Titanium Alloys	Nickel or Cobalt-based Material	Stainless (400 Series, pH Series)	Carbon Steel
	SFM = 100 - 200	SFM = 50 - 100	SFM = 100 - 225	SFM = 250 - 400
DIAMETER	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)
.1575" - .2755"	.0004" - .0008"	.0003" - .0006"	.0005" - .0010"	.0008" - .0020"
.2756" - .3124"	.0005" - .0010"	.0004" - .0008"	.0007" - .0012"	.0010" - .0020"
.3125" - .3749"	.0007" - .0012"	.0005" - .0010"	.0008" - .0015"	.0015" - .0025"
.3750" - .4999"	.0008" - .0015"	.0007" - .0012"	.0010" - .0018"	.0020" - .0030"
.5000" - .6249"	.0010" - .0018"	.0008" - .0015"	.0012" - .0020"	.0020" - .0025"
.6250" - .7499"	.0012" - .0020"	.0010" - .0018"	.0015" - .0022"	.0025" - .0030"
.7500" - .8749"	.0015" - .0022"	.0012" - .0020"	.0018" - .0025"	.0030" - .0035"
.8750" - 1.000"	.0018" - .0025"	.0015" - .0022"	.0022" - .0030"	.0035" - .0040"

	Profiling Side Cutting	Slotting Pocket Milling
Axial (ap)	1xD	100% of Dia.
Radial (ae)	100% of Dia.	1xD



	Titanium Alloys	Nickel or Cobalt-based Material	Stainless (400 Series, pH Series)	Carbon Steel
	SFM = 150 - 250	SFM = 60 - 125	SFM = 150 - 300	SFM = 300 - 500
DIAMETER	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)
.1575" - .2755"	.0008" - .0011"	.0004" - .0008"	.0008" - .0012"	.0010" - .0025"
.2756" - .3124"	.0010" - .0015"	.0005" - .0010"	.0010" - .0018"	.0015" - .0030"
.3125" - .3749"	.0012" - .0018"	.0007" - .0012"	.0012" - .0020"	.0020" - .0035"
.3750" - .4999"	.0012" - .0021"	.0008" - .0015"	.0015" - .0022"	.0025" - .0040"
.5000" - .6249"	.0015" - .0025"	.0010" - .0018"	.0018" - .0030"	.0030" - .0035"
.6250" - .7499"	.0018" - .0030"	.0012" - .0020"	.0020" - .0033"	.0035" - .0040"
.7500" - .8749"	.0020" - .0032"	.0015" - .0022"	.0023" - .0037"	.0040" - .0045"
.8750" - 1.000"	.0025" - .0035"	.0018" - .0025"	.0027" - .0040"	.0045" - .0050"

	Profiling Side Cutting	Slotting Pocket Milling
Axial (ap)	1xD	50% of Dia.
Radial (ae)	50% of Dia.	1xD

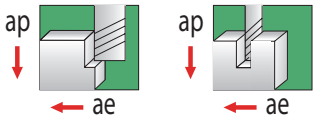


NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

Metric

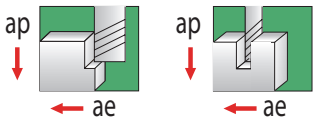
	Titanium Alloys	Nickel or Cobalt-based Material	Stainless (400 Series, pH Series)	Carbon Steel
	SMM = 30 - 60	SMM = 15 - 30	SMM = 30 - 70	SMM = 75 - 120
DIAMETER	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)
4,0 - 7,0	0,010 - 0,020	0,005 - 0,008	0,010 - 0,025	0,020 - 0,050
7,0 - 8,0	0,012 - 0,025	0,010 - 0,020	0,015 - 0,030	0,025 - 0,055
8,0 - 10,0	0,015 - 0,030	0,012 - 0,025	0,020 - 0,040	0,030 - 0,065
10,0 - 13,0	0,020 - 0,040	0,015 - 0,030	0,025 - 0,045	0,050 - 0,080
13,0 - 16,0	0,025 - 0,045	0,020 - 0,040	0,030 - 0,050	0,055 - 0,085
16,0 - 19,0	0,030 - 0,050	0,025 - 0,045	0,035 - 0,055	0,060 - 0,090
19,0 - 22,0	0,035 - 0,055	0,030 - 0,050	0,045 - 0,065	0,065 - 0,095
22,0 - 25,0	0,045 - 0,065	0,035 - 0,055	0,055 - 0,075	0,070 - 0,100

	Profiling Side Cutting	Slotting Pocket Milling
Axial (ap)	1xD	100% of Dia.
Radial (ae)	100% of Dia.	1xD



	Titanium Alloys	Nickel or Cobalt-based Material	Stainless (400 Series, pH Series)	Carbon Steel
	SMM = 45 - 75	SMM = 20 - 40	SMM = 45 - 90	SMM = 90 - 150
DIAMETER	CPT (Fz)	CPT (Fz)	CPT (Fz)	CPT (Fz)
4,0 - 7,0	0,020 - 0,030	0,010 - 0,020	0,020 - 0,030	0,025 - 0,065
7,0 - 8,0	0,025 - 0,040	0,013 - 0,025	0,025 - 0,045	0,035 - 0,080
8,0 - 10,0	0,030 - 0,045	0,018 - 0,030	0,030 - 0,050	0,045 - 0,090
10,0 - 13,0	0,030 - 0,050	0,020 - 0,040	0,035 - 0,055	0,055 - 0,100
13,0 - 16,0	0,035 - 0,060	0,025 - 0,045	0,045 - 0,075	0,075 - 0,095
16,0 - 19,0	0,045 - 0,075	0,030 - 0,050	0,050 - 0,080	0,085 - 0,105
19,0 - 22,0	0,050 - 0,080	0,035 - 0,055	0,055 - 0,095	0,095 - 0,115
22,0 - 25,0	0,060 - 0,090	0,045 - 0,065	0,065 - 0,105	0,105 - 0,125

	Profiling Side Cutting	Slotting Pocket Milling
Axial (ap)	1xD	50% of Dia.
Radial (ae)	50% of Dia.	1xD



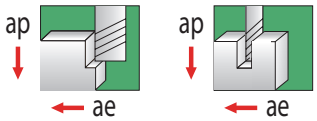
NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

GARR TOOL Milling Guide for V5 End Mills in Titanium, Inconel, and Stainless

Fractional

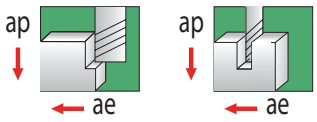
	Titanium Alloys	Nickel or Cobalt-based Material	Stainless (400 Series, pH Series)
	SFM = 150 - 250	SFM = 60 - 125	SFM = 150 - 300
DIAMETER	CPT (Fz)	CPT (Fz)	CPT (Fz)
.2362" - .2755"	.0008" - .0011"	.0004" - .0008"	.0008" - .0012"
.2756" - .3124"	.0010" - .0015"	.0005" - .0010"	.0010" - .0018"
.3125" - .3749"	.0012" - .0018"	.0007" - .0012"	.0012" - .0020"
.3750" - .4999"	.0012" - .0021"	.0008" - .0015"	.0015" - .0022"
.5000" - .6249"	.0015" - .0025"	.0010" - .0018"	.0018" - .0030"
.6250" - .7499"	.0018" - .0030"	.0012" - .0020"	.0020" - .0033"
.7500" - .8749"	.0020" - .0032"	.0015" - .0022"	.0025" - .0037"
.8750" - 1.000"	.0025" - .0035"	.0018" - .0025"	.0030" - .0042"

	Profiling Side Cutting	Slotting Pocket Milling
Axial (ap)	1xD	50% of Dia.
Radial (ae)	50% of Dia.	1xD



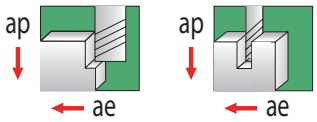
	Titanium Alloys	Nickel or Cobalt-based Material	Stainless (400 Series, pH Series)
	SFM = 300 - 500	SFM = 100 - 200	SFM = 250 - 400
DIAMETER	CPT (Fz)	CPT (Fz)	CPT (Fz)
.2362" - .2755"	.0011" - .0015"	.0007" - .0011"	.0011" - .0015"
.2756" - .3124"	.0013" - .0021"	.0008" - .0013"	.0015" - .0021"
.3125" - .3749"	.0015" - .0023"	.0010" - .0015"	.0018" - .0025"
.3750" - .4999"	.0018" - .0025"	.0011" - .0018"	.0021" - .0028"
.5000" - .6249"	.0021" - .0033"	.0013" - .0021"	.0023" - .0033"
.6250" - .7499"	.0023" - .0036"	.0015" - .0023"	.0028" - .0038"
.7500" - .8749"	.0028" - .0040"	.0018" - .0025"	.0033" - .0043"
.8750" - 1.000"	.0033" - .0045"	.0021" - .0028"	.0038" - .0048"

	Profiling Side Cutting	Slotting Pocket Milling
Axial (ap)	1xD	20% of Dia.
Radial (ae)	20% of Dia.	1xD



	Titanium Alloys	Nickel or Cobalt-based Material	Stainless (400 Series, pH Series)
	SFM = 400 - 700	SFM = 150 - 250	SFM = 300 - 500
DIAMETER	CPT (Fz)	CPT (Fz)	CPT (Fz)
.2362" - .2755"	.0018" - .0022"	.0015" - .0020"	.0020" - .0025"
.2756" - .3124"	.0022" - .0028"	.0017" - .0022"	.0022" - .0030"
.3125" - .3749"	.0025" - .0032"	.0018" - .0025"	.0025" - .0035"
.3750" - .4999"	.0028" - .0035"	.0020" - .0028"	.0028" - .0040"
.5000" - .6249"	.0030" - .0040"	.0022" - .0030"	.0030" - .0045"
.6250" - .7499"	.0035" - .0045"	.0025" - .0032"	.0032" - .0050"
.7500" - .8749"	.0040" - .0050"	.0028" - .0035"	.0035" - .0055"
.8750" - 1.000"	.0045" - .0055"	.0032" - .0040"	.0040" - .0060"

	Profiling Side Cutting	Slotting Pocket Milling
Axial (ap)	1xD	5% of Dia.
Radial (ae)	5% of Dia.	1xD

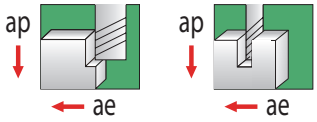


NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

Metric

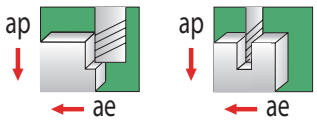
	Titanium Alloys	Nickel or Cobalt-based Material	Stainless (400 Series, pH Series)
	SMM = 45 - 75	SMM = 20 - 40	SMM = 45 - 90
DIAMETER	CPT (Fz)	CPT (Fz)	CPT (Fz)
6,0 - 8,0	0,020 - 0,030	0,010 - 0,020	0,020 - 0,030
8,0 - 10,0	0,025 - 0,040	0,013 - 0,025	0,025 - 0,045
10,0 - 12,0	0,030 - 0,045	0,018 - 0,030	0,030 - 0,050
12,0 - 14,0	0,030 - 0,050	0,020 - 0,040	0,035 - 0,055
14,0 - 16,0	0,035 - 0,060	0,025 - 0,045	0,045 - 0,075
16,0 - 18,0	0,045 - 0,075	0,030 - 0,050	0,050 - 0,080
18,0 - 20,0	0,050 - 0,080	0,035 - 0,055	0,055 - 0,095
22,0 - 25,0	0,060 - 0,090	0,045 - 0,065	0,065 - 0,105

	Profiling Side Cutting	Slotting Pocket Milling
Axial (ap)	1xD	50% of Dia.
Radial (ae)	50% of Dia.	1xD



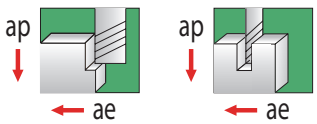
	Titanium Alloys	Nickel or Cobalt-based Material	Stainless (400 Series, pH Series)
	SMM = 90 - 150	SMM = 30 - 60	SMM = 75 - 120
DIAMETER	CPT (Fz)	CPT (Fz)	CPT (Fz)
6,0 - 8,0	0,027 - 0,037	0,017 - 0,027	0,027 - 0,037
8,0 - 10,0	0,032 - 0,052	0,020 - 0,032	0,037 - 0,052
10,0 - 12,0	0,042 - 0,062	0,027 - 0,042	0,052 - 0,067
12,0 - 14,0	0,052 - 0,067	0,032 - 0,047	0,057 - 0,077
14,0 - 16,0	0,057 - 0,082	0,037 - 0,052	0,062 - 0,082
16,0 - 18,0	0,062 - 0,087	0,042 - 0,062	0,072 - 0,092
18,0 - 20,0	0,067 - 0,092	0,047 - 0,072	0,077 - 0,097
22,0 - 25,0	0,072 - 0,097	0,052 - 0,082	0,087 - 0,107

	Profiling Side Cutting	Slotting Pocket Milling
Axial (ap)	1xD	20% of Dia.
Radial (ae)	20% of Dia.	1xD



	Titanium Alloys	Nickel or Cobalt-based Material	Stainless (400 Series, pH Series)
	SMM = 120 - 210	SMM = 45 - 75	SMM = 90 - 150
DIAMETER	CPT (Fz)	CPT (Fz)	CPT (Fz)
6,0 - 8,0	0,045 - 0,065	0,035 - 0,045	0,050 - 0,070
8,0 - 10,0	0,065 - 0,080	0,038 - 0,050	0,065 - 0,085
10,0 - 12,0	0,075 - 0,085	0,045 - 0,065	0,075 - 0,095
12,0 - 14,0	0,080 - 0,090	0,050 - 0,070	0,080 - 0,100
14,0 - 16,0	0,085 - 0,100	0,055 - 0,075	0,090 - 0,110
16,0 - 18,0	0,095 - 0,115	0,060 - 0,085	0,105 - 0,125
18,0 - 20,0	0,110 - 0,125	0,065 - 0,095	0,115 - 0,135
22,0 - 25,0	0,115 - 0,135	0,070 - 0,105	0,120 - 0,145

	Profiling Side Cutting	Slotting Pocket Milling
Axial (ap)	1xD	5% of Dia.
Radial (ae)	5% of Dia.	1xD



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

GARR TOOL Milling Guide for High Rc Finishers in Hardened Steel

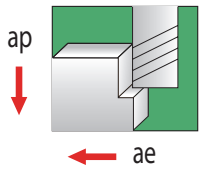
Fractional

(Reference series: 545MA, 545BA, 545RA, VRX)

	38 - 45 HRc		45 - 50 HRc		50 - 55 HRc		55 - 60 HRc		60 - 65 HRc		65 - 70 HRc	
	SFM = 450		SFM = 250		SFM = 175		SFM = 125		SFM = 75		SFM = 60	
DIAMETER	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)
1/8"	13750	.0009"	7650	.0008"	5350	.0006"	3820	.0005"	2300	.0004"	1850	.0003"
3/16"	9200	.0012"	5100	.0010"	3570	.0008"	2550	.0007"	1530	.0006"	1225	.0004"
1/4"	6900	.0015"	3850	.0012"	2675	.0010"	1910	.0008"	1150	.0007"	925	.0006"
3/8"	4600	.0018"	2550	.0015"	1800	.0012"	1275	.0010"	765	.0009"	615	.0008"
1/2"	3450	.0022"	1950	.0018"	1350	.0014"	955	.0012"	575	.0012"	460	.0010"
5/8"	2750	.0027"	1550	.0022"	1100	.0020"	765	.0018"	460	.0015"	370	.0013"
3/4"	2300	.0030"	1275	.0027"	900	.0025"	640	.0022"	390	.0017"	310	.0017"
1"	1720	.0033"	960	.0030"	675	.0027"	480	.0025"	290	.0023"	230	.0019"

	Profiling / Side Cutting
Axial (ap)	1xD
Radial (ae)	5% of Dia.

	Slotting / Pocket Milling
Axial (ap)	5% of Dia.
Radial (ae)	1xD



High Speed Machining

	38 - 45 HRc		45 - 50 HRc		50 - 55 HRc		55 - 60 HRc		60 - 65 HRc		65 - 70 HRc	
	SFM = 1200		SFM = 1000		SFM = 800		SFM = 600		SFM = 450		SFM = 375	
DIAMETER	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)
1/8"	36670	.0006"	30600	.0005"	24500	.0004"	18340	.0004"	13750	.0003"	11460	.0002"
3/16"	24450	.0009"	20400	.0008"	16300	.0006"	12230	.0005"	9200	.0004"	7650	.0003"
1/4"	18340	.0012"	15300	.0010"	12230	.0008"	9200	.0007"	6900	.0005"	5750	.0004"
3/8"	12225	.0015"	10200	.0012"	8150	.0010"	6100	.0008"	4600	.0007"	3850	.0006"
1/2"	9170	.0018"	7650	.0015"	6100	.0012"	4600	.0010"	3450	.0009"	2870	.0008"
5/8"	7335	.0022"	6100	.0018"	4900	.0014"	3700	.0012"	2750	.0011"	2300	.0010"
3/4"	6115	.0027"	5100	.0022"	4100	.0020"	3100	.0018"	2300	.0014"	1900	.0013"
1"	4585	.0030"	3820	.0027"	3100	.0025"	2300	.0022"	1720	.0019"	1450	.0017"

	Profiling / Side Cutting
Axial (ap)	1xD
Radial (ae)	2% of Dia.

	Slotting / Pocket Milling
Axial (ap)	2% of Dia.
Radial (ae)	1xD

D = Tool Diameter

Example: 2% of Dia., when D = 1/2" (.02 x .500") = .010" per pass

Preferable method is to run tools with air blast to keep chips away from the cutting edge.
If air is not available, either coolant spray or dry machining is acceptable.

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

GARR TOOL Milling Guide for High Rc Finishers in Hardened Steel

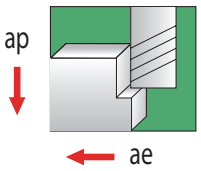
Metric

(Reference series: 545MA, 545BA, 545RA, VRX)

	38 - 45 HRc		45 - 50 HRc		50 - 55 HRc		55 - 60 HRc		60 - 65 HRc		65 - 70 HRc	
	M/Min. = 135		M/Min. = 75		M/Min. = 50		M/Min. = 40		M/Min. = 25		M/Min. = 20	
DIAMETER	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)
3,0	14500	0,025	8100	0,020	5650	0,015	4050	0,010	2400	0,008	1950	0,007
4,0	10900	0,030	6100	0,025	4200	0,020	3000	0,015	1800	0,010	1450	0,008
6,0	7300	0,035	4050	0,030	2800	0,025	2000	0,020	1200	0,015	970	0,010
8,0	5450	0,040	3000	0,035	2100	0,030	1500	0,025	900	0,020	725	0,015
12,0	3650	0,055	2000	0,045	1400	0,035	1000	0,030	600	0,025	480	0,020
16,0	2700	0,065	1500	0,055	1050	0,050	750	0,045	450	0,030	360	0,025
18,0	2400	0,075	1350	0,065	950	0,060	675	0,055	400	0,045	320	0,030
20,0	2150	0,078	1200	0,070	850	0,065	600	0,058	360	0,050	290	0,040
25,0	1750	0,080	1000	0,075	700	0,070	500	0,060	300	0,055	250	0,045

	Profiling / Side Cutting
Axial (ap)	1xD
Radial (ae)	5% of Dia.

	Slotting / Pocket Milling
Axial (ap)	5% of Dia.
Radial (ae)	1xD



High Speed Machining

	38 - 45 HRc		45 - 50 HRc		50 - 55 HRc		55 - 60 HRc		60 - 65 HRc		65 - 70 HRc	
	M/Min. = 365		M/Min. = 305		M/Min. = 240		M/Min. = 180		M/Min. = 135		M/Min. = 115	
DIAMETER	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)	RPM	CPT (Fz)
3,0	38800	0,020	32300	0,015	25800	0,008	19400	0,008	14500	0,007	12100	0,005
4,0	29100	0,025	24200	0,020	19400	0,015	14500	0,010	10900	0,008	9100	0,007
6,0	19400	0,030	16100	0,025	12900	0,020	9700	0,015	7300	0,010	6050	0,008
8,0	14500	0,035	12100	0,030	9700	0,025	7250	0,020	5450	0,015	4500	0,010
12,0	9700	0,045	8075	0,035	6450	0,030	4850	0,025	3650	0,020	3000	0,015
16,0	7250	0,055	6050	0,045	4850	0,035	3600	0,030	2700	0,025	2300	0,020
18,0	6450	0,065	5400	0,055	4300	0,050	3200	0,045	2400	0,030	2000	0,025
20,0	5800	0,070	4850	0,060	3850	0,055	2900	0,050	2150	0,040	1800	0,028
25,0	4650	0,075	3870	0,065	3100	0,060	2300	0,055	1750	0,045	1450	0,030

	Profiling / Side Cutting
Axial (ap)	1xD
Radial (ae)	2% of Dia.

	Slotting / Pocket Milling
Axial (ap)	2% of Dia.
Radial (ae)	1xD

D = Tool Diameter

Example: 2% of Dia., when D = 12mm (.02 x 12mm) = .24mm per pass

Preferable method is to run tools with air blast to keep chips away from the cutting edge.
If air is not available, either coolant spray or dry machining is acceptable.

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

Speed and Feed Recommendations for Cutting Die Molds

Fractional

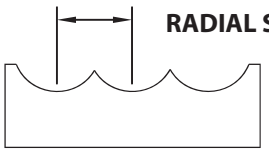
Roughing

(Reference series: 350MX)

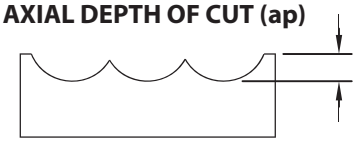
	RPM		CHIPLOAD PER FLUTE (Fz)	
DIAMETER	40 - 50 HRc	50 - 60 HRc	40 - 50 HRc	50 - 60 HRc
1/32"	20,000 - 40,000	20,000 - 40,000	.0005" - .0007"	.0004" - .0005"
1/16"	20,000 - 40,000	20,000 - 40,000	.0010" - .0015"	.0008" - .0010"
3/32"	20,000 - 32,000	20,000 - 30,000	.0015" - .0020"	.0010" - .0015"
1/8"	18,000 - 24,000	15,000 - 20,000	.0020" - .0025"	.0015" - .0020"
3/16"	12,000 - 16,000	10,000 - 14,000	.0030" - .0040"	.0020" - .0030"
1/4"	9,000 - 12,000	7,500 - 10,000	.0040" - .0050"	.0025" - .0040"
5/16"	7,000 - 10,000	6,000 - 8,500	.0050" - .0065"	.0035" - .0050"
3/8"	6,000 - 8,000	5,000 - 7,000	.0060" - .0075"	.0045" - .0060"
1/2"	4,500 - 6,000	4,000 - 5,500	.0080" - .0100"	.0055" - .0080"
5/8"	3,500 - 5,000	3,000 - 4,500	.0090" - .0110"	.0065" - .0090"
3/4"	3,000 - 4,000	2,500 - 3,500	.0100" - .0120"	.0075" - .0100"
1"	2,300 - 3,000	2,000 - 2,500	.0110" - .0130"	.0085" - .0110"

Semi-Finishing and Finishing

	RPM		CHIPLOAD PER FLUTE (Fz)	
DIAMETER	40 - 50 HRc	50 - 60 HRc	40 - 50 HRc	50 - 60 HRc
1/32"	20,000 - 40,000	20,000 - 40,000	.0004" - .0005"	.0003" - .0004"
1/16"	20,000 - 40,000	20,000 - 40,000	.0008" - .0010"	.0005" - .0008"
3/32"	20,000 - 40,000	20,000 - 40,000	.0010" - .0015"	.0008" - .0012"
1/8"	20,000 - 40,000	20,000 - 36,000	.0015" - .0020"	.0010" - .0015"
3/16"	20,000 - 32,000	20,000 - 25,000	.0020" - .0030"	.0015" - .0020"
1/4"	18,000 - 25,000	15,000 - 18,000	.0025" - .0040"	.0020" - .0030"
5/16"	14,000 - 19,000	12,000 - 14,000	.0035" - .0050"	.0025" - .0040"
3/8"	12,000 - 16,000	10,000 - 12,000	.0045" - .0060"	.0030" - .0045"
1/2"	9,000 - 12,000	7,500 - 9,000	.0055" - .0080"	.0040" - .0060"
5/8"	6,500 - 9,000	5,000 - 7,000	.0065" - .0090"	.0050" - .0070"
3/4"	5,500 - 7,500	4,000 - 6,000	.0075" - .0100"	.0060" - .0080"
1"	4,000 - 6,000	3,500 - 5,500	.0085" - .0110"	.0070" - .0090"



RADIAL STEP OVER (ae)



AXIAL DEPTH OF CUT (ap)

Roughing	
Axial (ap)	15% - 25% of Dia.
Radial (ae)	20% - 30% of Dia.

Semi-Finishing	
Axial (ap)	5% - 8% of Dia.
Radial (ae)	2% - 5% of Dia.

Finishing	
Axial (ap)	1% - 3% of Dia.
Radial (ae)	0.5% - 1% of Dia.

High pressure air is recommended for clearing chips away from the cut.

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

Speed and Feed Recommendations for Cutting Die Molds

Metric

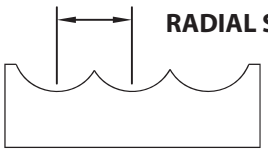
Roughing

(Reference series: 950MX)

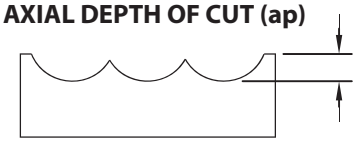
	RPM		CHIPLOAD PER FLUTE (Fz)	
DIAMETER	40 - 50 HRc	50 - 60 HRc	40 - 50 HRc	50 - 60 HRc
1,0	20,000 - 40,000	20,000 - 40,000	0,013 - 0,018	0,010 - 0,013
1,5	20,000 - 40,000	20,000 - 40,000	0,025 - 0,038	0,020 - 0,025
2,0	20,000 - 32,000	20,000 - 30,000	0,038 - 0,050	0,025 - 0,038
3,0	18,000 - 24,000	15,000 - 20,000	0,050 - 0,065	0,038 - 0,050
4,0	12,000 - 16,000	10,000 - 14,000	0,075 - 0,100	0,050 - 0,075
6,0	9,000 - 12,000	7,500 - 10,000	0,100 - 0,125	0,065 - 0,100
8,0	7,000 - 10,000	6,000 - 8,500	0,125 - 0,165	0,088 - 0,125
10,0	6,000 - 8,000	5,000 - 7,000	0,150 - 0,190	0,110 - 0,150
12,0	4,500 - 6,000	4,000 - 5,500	0,200 - 0,250	0,140 - 0,200
16,0	3,500 - 5,000	3,000 - 4,500	0,225 - 0,275	0,165 - 0,225
20,0	3,000 - 4,000	2,500 - 3,500	0,250 - 0,300	0,190 - 0,250
25,0	2,300 - 3,000	2,000 - 2,500	0,275 - 0,325	0,215 - 0,275

Semi-Finishing and Finishing

	RPM		CHIPLOAD PER FLUTE (Fz)	
DIAMETER	40 - 50 HRc	50 - 60 HRc	40 - 50 HRc	50 - 60 HRc
1,0	20,000 - 40,000	20,000 - 40,000	0,010 - 0,013	0,008 - 0,010
1,5	20,000 - 40,000	20,000 - 40,000	0,020 - 0,025	0,013 - 0,020
2,0	20,000 - 40,000	20,000 - 40,000	0,025 - 0,038	0,020 - 0,030
3,0	20,000 - 40,000	20,000 - 36,000	0,038 - 0,050	0,025 - 0,038
4,0	20,000 - 32,000	20,000 - 25,000	0,050 - 0,075	0,038 - 0,050
6,0	18,000 - 25,000	15,000 - 18,000	0,065 - 0,100	0,050 - 0,075
8,0	14,000 - 19,000	12,000 - 14,000	0,088 - 0,125	0,065 - 0,100
10,0	12,000 - 16,000	10,000 - 12,000	0,110 - 0,150	0,075 - 0,110
12,0	9,000 - 12,000	7,500 - 9,000	0,140 - 0,200	0,100 - 0,150
16,0	6,500 - 9,000	5,000 - 7,000	0,165 - 0,225	0,125 - 0,175
20,0	5,500 - 7,500	4,000 - 6,000	0,190 - 0,250	0,150 - 0,200
25,0	4,000 - 6,000	3,500 - 5,500	0,215 - 0,275	0,175 - 0,225



RADIAL STEP OVER (ae)



AXIAL DEPTH OF CUT (ap)

Roughing	
Axial (ap)	15% - 25% of Dia.
Radial (ae)	20% - 30% of Dia.

Semi-Finishing	
Axial (ap)	5% - 8% of Dia.
Radial (ae)	2% - 5% of Dia.

Finishing	
Axial (ap)	1% - 3% of Dia.
Radial (ae)	.5% - 1% of Dia.

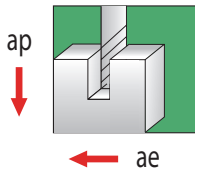
High pressure air is recommended for clearing chips away from the cut.

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

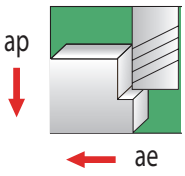
Speed and Feed Recommendations for H-45 High Feed End Mills

	UP TO 40 HRC			40 to 45 HRC			45 TO 55 HRC			55 TO 60 HRC		
DIAMETER	SPEED RPM	FEED IN/MIN	FEED MM/MIN	SPEED RPM	FEED IN/MIN	FEED MM/MIN	SPEED RPM	FEED IN/MIN	FEED MM/MIN	SPEED RPM	FEED IN/MIN	FEED MM/MIN
3,0	16000	120	3100	13000	80	2032	11300	70	1778	9700	35	889
1/8"	15200	120	3100	12000	80	2000	10700	70	1800	9200	35	900
4,0	12100	145	3700	9700	100	2540	8500	85	2159	7300	40	1016
3/16"	10200	160	4100	8200	110	2800	7100	90	2300	6100	45	1200
5,0	9700	155	4000	7700	105	2667	6800	90	2286	5800	45	1143
6,0	8100	180	4600	6500	120	3048	5700	100	2540	4900	50	1270
1/4"	7650	180	4600	6100	120	3100	5400	100	2600	4600	50	1300
5/16"	6100	195	4950	4900	130	3300	4300	110	2800	3700	55	1400
8,0	6050	195	4950	4850	130	3302	4300	110	2794	3650	55	1397
3/8"	5100	200	5200	4100	135	3400	3600	115	3000	3100	60	1550
10,0	4850	200	5100	3900	135	3429	3400	115	2921	2900	60	1524
12,0	4050	250	6400	3200	160	4064	2800	135	3429	2400	65	1651
1/2"	3800	240	6100	3100	160	4100	2700	135	3500	2300	65	1700

	Slotting Pocket Milling
Axial (ap)	0.3 x Radius
Radial (ae)	1.0 x D



	Profiling Side Cutting
Axial (ap)	1.0 x D
Radial (ae)	0.3 x Radius



D = Tool Diameter

Example: 0.3 x Radius, when D = 12mm with 3.0mm corner radius (.3 x 3) = 0.9mm per pass

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

Speed and Feed Recommendations for Diamond Coated End Mills in Graphite

Fractional

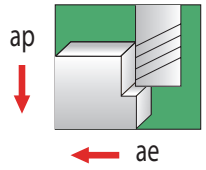
DIAMETER	RPM	CHIPLOAD PER FLUTE (Fz)
1/32" - 1/16"	15,000 - 35,000	.0005" - .0010"
1/16" - 1/8"	8,000 - 31,000	.0008" - .0015"
1/8" - 3/16"	8,000 - 31,000	.0010" - .0020"
3/16" - 1/4"	8,000 - 25,000	.0010" - .0020"
1/4" - 5/16"	6,000 - 23,000	.0020" - .0040"
5/16" - 3/8"	6,000 - 20,000	.0020" - .0040"
3/8" - 1/2"	6,000 - 20,000	.0030" - .0050"
1/2" - 5/8"	4,500 - 15,000	.0050" - .0060"
5/8" - 3/4"	4,500 - 12,000	.0060" - .0070"
3/4" - 1"	4,500 - 12,000	.0070" - .0080"

Metric

DIAMETER	RPM	CHIPLOAD PER FLUTE (Fz)
1,0 - 3,0	15,000 - 35,000	0,015 - 0,030
3,0 - 6,0	8,000 - 31,000	0,030 - 0,050
6,0 - 10,0	6,000 - 31,000	0,050 - 0,100
10,0 - 12,0	6,000 - 25,000	0,080 - 0,130
16,0 - 20,0	4,500 - 15,000	0,130 - 0,150
20,0 - 25,0	4,500 - 12,000	0,150 - 0,200

Generally, tools will run at maximum RPM in relation to the corresponding parameters below:

	SLOTTING	PROFILING
Axial (ap)	5% of Dia.	1xD
Radial (ae)	1xD	10% of Dia.



These recommendations are suggested for use primarily in graphite cutting applications. Rigid work holding, machine stability and part integrity are critical!

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

GARR TOOL Reaming Guide
Fractional

Type	Rc Hardness	Recommended SFM	Chipload Per Flute (Fz)			
		Series 4100	.0590" - .1250" (1,499 - 3,175mm)	.1251" - .2500" (3,178 - 6,350mm)	.2501" - .3750" (6,353 - 9,525mm)	.3751" - .5020" (9,528 - 12,750mm)
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	< 35 > 35	80-120 60-80	.0003"-.0008"	.0005"-.0010"	.0008"-.0012"	.0010"-.0015"
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金						
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35 > 35	100-125 80-110	.0003"-.0008"	.0005"-.0010"	.0008"-.0012"	.0010"-.0015"
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	< 35 > 35	150-175 120-150	.0004"-.0009"	.0006"-.0012"	.0009"-.0013"	.0010"-.0017"
MONEL / 铜-镍合金						
Monel - 65% Nickel		75-110	.0003"-.0008"	.0005"-.0010"	.0008"-.0012"	.0010"-.0015"
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		120-150	.0004"-.0009"	.0006"-.0012"	.0009"-.0013"	.0010"-.0017"
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金						
(Precipitation) 13/8, 15/5, 17-4, pH Types	< 35 > 35	100-125 80-110	.0004"-.0009"	.0006"-.0012"	.0009"-.0013"	.0010"-.0017"
(Austentic) Inox, 200 Series, 300 Series	< 35 > 35	100-125 80-110	.0004"-.0009"	.0006"-.0012"	.0009"-.0013"	.0010"-.0017"
(Austentic) 304L, 316L, Nitronic 50, Inox	< 35 > 35	80-100 60-80	.0003"-.0008"	.0005"-.0010"	.0008"-.0012"	.0010"-.0015"
(Martensitic) 400 Series	< 35 > 35	100-125 80-110	.0004"-.0009"	.0006"-.0012"	.0009"-.0013"	.0010"-.0017"
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢						
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 35 > 35	100-125 80-110	.0003"-.0008"	.0005"-.0010"	.0008"-.0012"	.0010"-.0015"
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						
200, 250, 300, 8620	< 35 > 35	100-125 80-110	.0004"-.0009"	.0006"-.0012"	.0009"-.0013"	.0010"-.0017"
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢						
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35 > 35	100-125 80-110	.0004"-.0009"	.0006"-.0012"	.0009"-.0013"	.0010"-.0017"
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件						
Steel		125-150	.0003"-.0008"	.0005"-.0010"	.0008"-.0012"	.0010"-.0015"
Ductile Iron		150-225	.0005"-.0010"	.0007"-.0012"	.0010"-.0015"	.0010"-.0018"
Gray Iron		125-200	.0005"-.0010"	.0007"-.0012"	.0010"-.0015"	.0010"-.0018"
Aluminum		150-225	.0005"-.0010"	.0007"-.0012"	.0010"-.0015"	.0010"-.0018"
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝						
Aircraft Grade (6061, 7075)		225	.0005"-.0010"	.0007"-.0012"	.0010"-.0015"	.0010"-.0018"
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁						
		225	.0005"-.0010"	.0007"-.0012"	.0010"-.0015"	.0010"-.0018"
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜						
Copper Alloys		225	.0005"-.0010"	.0007"-.0012"	.0010"-.0015"	.0010"-.0018"
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜						
Brass, Aluminum/Bronze, Low Silicon Bronze		125-200	.0005"-.0010"	.0007"-.0012"	.0010"-.0015"	.0010"-.0018"
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料						
Glass Epoxy, Fiberglass, Plastics, Graphite, G10		150	.0003"-.0008"	.0005"-.0010"	.0008"-.0012"	.0010"-.0015"

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

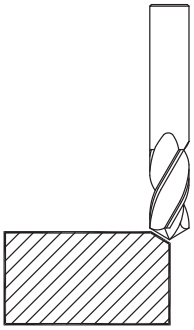
Type	Rc Hardness	Recommended SMM	Chipload Per Flute (Fz)			
		Series 4100	1,50 - 3,00mm (.0591" - .1181")	3,01 - 6,00mm (.1185" - .2362")	6,01 - 9,00mm (.2366" - .3543")	9,01 - 13,00mm (.3547" - .5118")
COBALT BASE ALLOYS / Kobaltlegierungen / Aleaciones del cobalto / Alliages de cobalt / Leghe del cobalto / 钴基合金						
Powdered Metal, Stellite, Hs - 21, Haynes 25/188, X - 40, L - 605	< 35 > 35	25 - 40 15 - 25	0,008 - 0,020	0,013 - 0,025	0,020 - 0,030	0,025 - 0,040
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金						
Invar, Kovar, Inconel - 625/718, Waspalloy, Rene, Hastalloy, A286	< 35 > 35	30 - 40 25 - 35	0,008 - 0,020	0,013 - 0,025	0,020 - 0,030	0,025 - 0,040
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	< 35 > 35	45 - 50 35 - 45	0,010 - 0,023	0,015 - 0,030	0,023 - 0,035	0,025 - 0,045
MONEL / 铜–镍合金						
Monel - 65% Nickel		20 - 35	0,008 - 0,020	0,013 - 0,025	0,020 - 0,030	0,025 - 0,040
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		40 - 45	0,010 - 0,023	0,015 - 0,030	0,023 - 0,035	0,025 - 0,045
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金						
(Precipitation) 13/8, 15/5, 17 - 4, pH Types	< 35 > 35	30 - 40 25 - 35	0,010 - 0,023	0,015 - 0,030	0,023 - 0,035	0,025 - 0,045
(Austentic) Inox, 200 Series, 300 Series	< 35 > 35	30 - 40 25 - 35	0,010 - 0,023	0,015 - 0,030	0,023 - 0,035	0,025 - 0,045
(Austentic) 304L, 316L, Nitronic 50, Inox	< 35 > 35	25 - 30 15 - 25	0,008 - 0,020	0,013 - 0,025	0,020 - 0,030	0,025 - 0,040
(Martensitic) 400 Series	< 35 > 35	30 - 35 25 - 30	0,010 - 0,023	0,015 - 0,030	0,023 - 0,035	0,025 - 0,045
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢						
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 35 > 35	30 - 40 25 - 35	0,008 - 0,020	0,013 - 0,025	0,020 - 0,030	0,025 - 0,040
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						
200, 250, 300, 8620	< 35 > 35	30 - 40 25 - 35	0,010 - 0,023	0,015 - 0,030	0,023 - 0,035	0,025 - 0,045
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢						
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35 > 35	30 - 40 25 - 35	0,010 - 0,023	0,015 - 0,030	0,023 - 0,035	0,025 - 0,045
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件						
Steel		40 - 45	0,008 - 0,020	0,013 - 0,025	0,020 - 0,030	0,025 - 0,040
Ductile Iron		45 - 70	0,013 - 0,025	0,018 - 0,025	0,025 - 0,040	0,025 - 0,050
Gray Iron		35 - 70	0,013 - 0,025	0,018 - 0,025	0,025 - 0,040	0,025 - 0,050
Aluminum		40 - 70	0,013 - 0,025	0,018 - 0,025	0,025 - 0,040	0,025 - 0,050
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝						
Aircraft Grade (6061, 7075)		70	0,013 - 0,025	0,018 - 0,025	0,025 - 0,040	0,025 - 0,050
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁						
		70	0,013 - 0,025	0,018 - 0,025	0,025 - 0,040	0,025 - 0,050
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜						
Copper Alloys		70	0,013 - 0,025	0,018 - 0,025	0,025 - 0,040	0,025 - 0,050
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜						
Brass, Aluminum/Bronze, Low Silicon Bronze		40 - 60	0,013 - 0,025	0,018 - 0,025	0,025 - 0,040	0,025 - 0,050
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料						
Glass Epoxy, Fiberglass, Plastics, Graphite, G10		40 - 45	0,008 - 0,020	0,010 - 0,025	0,020 - 0,030	0,025 - 0,040

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

Speeds and Feeds for Drill Mills

Fractional * ***Chamfering*** *

Type	Rc Hardness	SFM (Vc)		CHIPLOAD PER FLUTE (Fz)				
		154M, 154MA 152M, 152MA	1600 152D, 152DA	3/32" - 1/8" (.0938 - .1250)	1/8" - 1/4" (.1250 - .2500)	1/4" - 3/8" (.2500 - .3750)	3/8" - 1/2" (.3750 - .5000)	1/2" - 3/4" (.5000 - .7500)
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	< 35 > 35	175 - 225 125 - 175	150 - 200 100 - 150	.0003" - .0008" .0002" - .0004"	.0005" - .0010" .0003" - .0005"	.0008" - .0020" .0005" - .0015"	.0010" - .0030" .0010" - .0020"	.0020" - .0040" .0010" - .0030"
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金								
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35 > 35	125 - 175 70 - 115	100 - 150 70 - 100	.0003" - .0008" .0002" - .0004"	.0005" - .0010" .0003" - .0005"	.0008" - .0020" .0005" - .0015"	.0010" - .0030" .0010" - .0020"	.0020" - .0040" .0010" - .0030"
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		200 - 300	125 - 250	.0005" - .0010"	.0007" - .0015"	.0010" - .0025"	.0015" - .0040"	.0030" - .0050"
5553 / Beta Titanium		175 - 225	150 - 200	.0003" - .0008"	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金								
13/8, 15/5, 17-4, pH Types	< 35 > 35	150 - 250 125 - 175	100 - 150 80 - 150	.0003" - .0008" .0002" - .0004"	.0005" - .0010" .0003" - .0005"	.0008" - .0020" .0005" - .0015"	.0010" - .0030" .0010" - .0020"	.0020" - .0040" .0010" - .0030"
Inox, 200 Series, 300 Series	< 35 > 35	200 - 250 150 - 200	125 - 175 100 - 150	.0003" - .0008" .0002" - .0004"	.0005" - .0010" .0003" - .0005"	.0008" - .0020" .0005" - .0015"	.0010" - .0030" .0010" - .0020"	.0020" - .0040" .0010" - .0030"
304L, 316L, Nitronic 50, Inox	< 35 > 35	90 - 125 75 - 110	80 - 120 60 - 90	.0003" - .0006" .0002" - .0004"	.0005" - .0008" .0003" - .0005"	.0008" - .0015" .0005" - .0010"	.0010" - .0020" .0010" - .0015"	.0020" - .0040" .0010" - .0030"
400 Series	< 35 > 35	150 - 250 125 - 175	100 - 150 80 - 150	.0003" - .0008" .0002" - .0004"	.0005" - .0010" .0003" - .0005"	.0008" - .0020" .0005" - .0015"	.0010" - .0030" .0010" - .0020"	.0020" - .0040" .0010" - .0030"
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢								
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30	150 - 225	125 - 175	.0003" - .0008"	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"	.0020" - .0040"
	30 - 38	90 - 125	80 - 120	.0002" - .0004"	.0003" - .0005"	.0005" - .0015"	.0010" - .0020"	.0010" - .0030"
	> 38	60 - 90	40 - 70	.0002" - .0003"	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"	.0006" - .0020"
TOOL STEELS / Werkzeugstähle / Herramienta aceros / Aciers à outils / Acciaio da utensili / 工具钢								
200, 250, 300, 8620, A36, 12L14, 1018, 1020	< 35 > 35	175 - 250 100 - 175	150 - 200 100 - 150	.0005" - .0010" .0003" - .0008"	.0007" - .0015" .0005" - .0010"	.0010" - .0025" .0008" - .0020"	.0015" - .0040" .0010" - .0030"	.0030" - .0050" .0020" - .0040"
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件								
Steel, Iron		250 - 350	175 - 250	.0007" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"
Aluminum		250 - 350	250 - 350	.0007" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝								
Aircraft Grade (6061, 7075)		350 - 500	300 - 400	.0007" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜								
Copper Alloys		250 - 350	150 - 300	.0005" - .0010"	.0007" - .0015"	.0010" - .0025"	.0015" - .0035"	.0020" - .0050"
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜								
Brass, Aluminum/Bronze, Low Silicon Bronze		250 - 350	150 - 300	.0005" - .0010"	.0007" - .0015"	.0010" - .0025"	.0015" - .0035"	.0020" - .0050"
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料								
Glass Epoxy, Fiberglass, Plastics		250 - 450	200 - 400	.0007" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"
Graphite, G10, Carbon Fiber		300 - 500	250 - 450	.0007" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"



Chamfering a corner

DRILL MILL USES:

Chamfering - for all metals, use general milling speeds and feeds. Depending on depth, use diameter at top of part to determine chipload. For example, if using 1/4" diameter, 90° point and depth is 1/8", calculate the chipload based on 1/8" diameter.

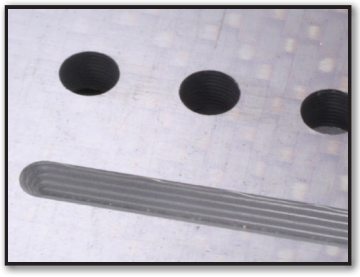
NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

Speeds and Feeds for Drill Mills

* Chamfering *

Metric

Type	Rc Hardness	SFM (Vc)		CHIPLOAD PER FLUTE (Fz)				
		154M, 154MA 152M, 152MA	1600 152D, 152DA	2,0 - 3,0 (.0787" - .1181")	3,0 - 6,0 (.1181" - .2362")	6,0 - 10,0 (.2362" - .3937")	10,0 - 14,0 (.3937" - .5512")	14,0 - 20,0 (.5512" - .7874")
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-4. L-605	< 35 > 35	50 - 70 35 - 50	45 - 60 30 - 45	0,008 - 0,020 0,003 - 0,010	0,010 - 0,025 0,005 - 0,015	0,020 - 0,050 0,010 - 0,035	0,025 - 0,075 0,025 - 0,050	0,050 - 0,100 0,025 - 0,075
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金								
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35 > 35	35 - 50 20 - 35	30 - 45 15 - 25	0,006 - 0,020 0,003 - 0,010	0,010 - 0,025 0,005 - 0,015	0,020 - 0,050 0,010 - 0,035	0,025 - 0,075 0,025 - 0,050	0,050 - 0,100 0,025 - 0,075
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		60 - 90	35 - 75	0,008 - 0,025	0,015 - 0,035	0,025 - 0,065	0,035 - 0,100	0,075 - 0,125
5553 / Beta Titanium		50 - 65	45 - 60	0,006 - 0,020	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金								
13/8, 15/5, 17-4, pH Types	< 35 > 35	45 - 75 35 - 50	30 - 45 25 - 45	0,006 - 0,020 0,003 - 0,010	0,010 - 0,025 0,005 - 0,015	0,020 - 0,050 0,010 - 0,035	0,025 - 0,075 0,025 - 0,050	0,050 - 0,100 0,025 - 0,075
Inox, 200 Series, 300 Series	< 35 > 35	60 - 80 45 - 60	40 - 55 30 - 45	0,008 - 0,020 0,003 - 0,010	0,010 - 0,025 0,005 - 0,015	0,020 - 0,050 0,010 - 0,035	0,025 - 0,075 0,025 - 0,050	0,050 - 0,100 0,025 - 0,075
304L, 316L, Nitronic 50, Inox	< 35 > 35	25 - 40 20 - 35	25 - 35 15 - 25	0,006 - 0,015 0,003 - 0,010	0,010 - 0,020 0,005 - 0,015	0,020 - 0,035 0,010 - 0,025	0,025 - 0,050 0,025 - 0,035	0,035 - 0,075 0,025 - 0,050
400 Series	< 35 > 35	45 - 70 35 - 50	30 - 45 25 - 40	0,006 - 0,020 0,003 - 0,010	0,010 - 0,025 0,005 - 0,015	0,020 - 0,050 0,010 - 0,035	0,025 - 0,075 0,025 - 0,050	0,050 - 0,100 0,025 - 0,075
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢								
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30	45 - 60	35 - 50	0,006 - 0,020	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075	0,050 - 0,100
	30 - 38	30 - 45	25 - 35	0,003 - 0,010	0,005 - 0,015	0,010 - 0,035	0,025 - 0,050	0,025 - 0,075
	> 38	15 - 30	10 - 25	0,002 - 0,006	0,003 - 0,008	0,005 - 0,020	0,015 - 0,040	0,020 - 0,065
TOOL STEELS / Werkzeugstähle / Herramienta aceros / Aciers à outils / Acciaio da utensili / **工具钢**								
200, 250, 300, 8620, A36, 12L14, 1018, 1020	< 35 > 35	55 - 75 35 - 55	45 - 60 30 - 45	0,008 - 0,025 0,006 - 0,020	0,015 - 0,035 0,010 - 0,025	0,025 - 0,065 0,020 - 0,050	0,035 - 0,100 0,025 - 0,075	0,075 - 0,125 0,050 - 0,100
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件								
Steel, Iron		75 - 105	50 - 75	0,010 - 0,035	0,025 - 0,050	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250
Aluminum		75 - 105	75 - 105	0,010 - 0,035	0,025 - 0,050	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝								
Aircraft Grade (6061, 7075)		90 - 150	90 - 150	0,010 - 0,035	0,025 - 0,050	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜								
Copper Alloys		75 - 115	60 - 90	0,008 - 0,025	0,020 - 0,040	0,025 - 0,065	0,040 - 0,090	0,050 - 0,200
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜								
Brass, Aluminum/Bronze, Low Silicon Bronze		75 - 115	60 - 90	0,008 - 0,025	0,020 - 0,040	0,025 - 0,065	0,040 - 0,090	0,050 - 0,200
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料								
Glass Epoxy, Fiberglass, Plastics		60 - 120	60 - 120	0,010 - 0,035	0,025 - 0,050	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250
Graphite, G10, Carbon Fiber		90 - 150	75 - 135	0,010 - 0,035	0,025 - 0,050	0,035 - 0,100	0,050 - 0,150	0,075 - 0,250



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

Speeds and Feeds for Drill Mills

Fractional * Through Hole *

Type	Rc Hardness	SFM (Vc)		CHIPLOAD PER FLUTE (Fz)			
		152M, 152MA 154M, 154MA	152D, 152DA	1/8" - 1/4" (.1250 - .2500)	1/4" - 3/8" (.2500 - .3750)	3/8" - 1/2" (.3750 - .5000)	1/2" - 3/4" (.5000 - .7500)
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		-	125 - 250	.0007" - .0015"	.0010" - .0025"	.0015" - .0040"	.0030" - .0050"
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金							
13/8, 15/5, 17-4, pH Types	< 35 > 35	- -	100 - 150 80 - 150	.0005" - .0010" .0003" - .0005"	.0008" - .0020" .0005" - .0015"	.0010" - .0030" .0010" - .0020"	.0020" - .0040" .0010" - .0030"
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢							
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30 30 - 38	-	125 - 175 80 - 120	.0005" - .0010" .0003" - .0005"	.0008" - .0020" .0005" - .0015"	.0010" - .0030" .0010" - .0020"	.0020" - .0040" .0010" - .0030"
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							
200, 250, 300, 8620	< 35 > 35	- -	150 - 200 100 - 150	.0007" - .0015" .0005" - .0010"	.0010" - .0025" .0008" - .0020"	.0015" - .0040" .0010" - .0030"	.0030" - .0050" .0020" - .0040"
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢							
A36, 12L14, 1000's, 1100's, 1300's	< 35 > 35	175 - 250 -	150 - 200 100 - 150	.0007" - .0015" .0005" - .0010"	.0010" - .0025" .0008" - .0020"	.0015" - .0040" .0010" - .0030"	.0030" - .0050" .0020" - .0040"
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件							
Steel		-	175 - 250	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"
Ductile Iron		-	175 - 250	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"
Gray Iron		-	175 - 250	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"
Aluminum		250 - 350	250 - 350	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝							
Aircraft Grade (6061, 7075)		350 - 500	300 - 400	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁							
		250 - 400	250 - 350	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜							
Copper Alloys		250 - 350	150 - 300	.0007" - .0015"	.0010" - .0025"	.0015" - .0035"	.0020" - .0050"
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜							
Brass, Aluminum/Bronze, Low Silicon Bronze		250 - 350	150 - 300	.0007" - .0015"	.0010" - .0025"	.0015" - .0035"	.0020" - .0050"
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料							
Glass Epoxy, Fiberglass, Plastics		250 - 450	200 - 400	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"
Graphite, G10, Carbon Fiber		300 - 500	250 - 450	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0030" - .0060"

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

Speeds and Feeds for Drill Mills

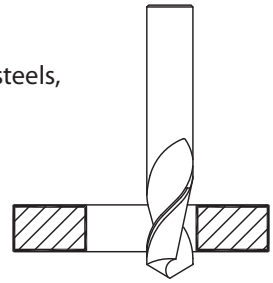
* Through Hole *

Metric

Type	Rc Hardness	SFM (Vc)		CHIPLOAD PER FLUTE (Fz)			
		152M, 152MA 154M, 154MA	152D, 152DA	3,0 - 6,0 (.1181" - .2362")	6,0 - 10,0 (.2362" - .3937")	10,0 - 14,0 (.3937" - .5512")	14,0 - 20,0 (.5512" - .7874")
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		-	35 - 75	0,015 - 0,035	0,025 - 0,065	0,035 - 0,100	0,075 - 0,125
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金							
13/8, 15/5, 17-4, pH Types	< 35 > 35	- -	30 - 45 25 - 45	0,010 - 0,025 0,005 - 0,015	0,020 - 0,050 0,010 - 0,035	0,025 - 0,075 0,025 - 0,050	0,050 - 0,100 0,025 - 0,075
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢							
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30 30 - 38	- -	35 - 50 25 - 35	0,010 - 0,025 0,005 - 0,015	0,020 - 0,050 0,010 - 0,035	0,025 - 0,075 0,025 - 0,050	0,050 - 0,100 0,025 - 0,075
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							
200, 250, 300, 8620	< 35 > 35	- -	45 - 60 30 - 45	0,015 - 0,035 0,010 - 0,025	0,025 - 0,065 0,020 - 0,050	0,035 - 0,100 0,025 - 0,075	0,075 - 0,125 0,050 - 0,100
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢							
A36, 12L14, 1000's, 1100's, 1300's	< 35 > 35	55 - 75 -	45 - 60 30 - 45	0,015 - 0,035 0,010 - 0,025	0,025 - 0,065 0,020 - 0,050	0,035 - 0,100 0,025 - 0,075	0,075 - 0,125 0,050 - 0,100
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件							
Steel		-	50 - 75	0,025 - 0,050	0,035 - 0,075	0,050 - 0,100	0,075 - 0,150
Ductile Iron		-	60 - 90	0,025 - 0,050	0,035 - 0,075	0,050 - 0,100	0,075 - 0,150
Gray Iron		-	50 - 75	0,025 - 0,050	0,035 - 0,075	0,050 - 0,100	0,075 - 0,150
Aluminum		75 - 105	75 - 105	0,025 - 0,050	0,035 - 0,075	0,050 - 0,100	0,075 - 0,150
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝							
Aircraft Grade (6061, 7075)		90 - 150	90 - 150	0,025 - 0,050	0,035 - 0,075	0,050 - 0,100	0,075 - 0,150
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁							
		90 - 135	75 - 105	0,020 - 0,040	0,025 - 0,065	0,040 - 0,090	0,050 - 0,125
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜							
Copper Alloys		75 - 115	60 - 90	0,020 - 0,040	0,025 - 0,065	0,040 - 0,090	0,050 - 0,125
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜							
Brass, Aluminum/Bronze, Low Silicon Bronze		75 - 115	60 - 90	0,020 - 0,040	0,025 - 0,065	0,040 - 0,090	0,050 - 0,125
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料							
Glass Epoxy, Fiberglass, Plastics		60 - 120	60 - 120	0,025 - 0,050	0,035 - 0,075	0,050 - 0,100	0,075 - 0,150
Graphite, G10, Carbon Fiber		90 - 150	75 - 135	0,025 - 0,050	0,035 - 0,075	0,050 - 0,100	0,075 - 0,150

DRILL MILL USES:

Through Hole - mostly for composites, plastics, softer steels, copper, aluminum and similar metals.



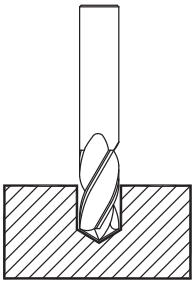
Drilling through, then side milling

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

Speeds and Feeds for Drill Mills

Fractional * Solids *

Type	Rc Hardness	SFM (Vc)	CHIPLOAD PER FLUTE (Fz)			
		152M, 152MA 154M, 154MA	1/8" - 1/4" (.1250 - .2500)	1/4" - 3/8" (.2500 - .3750)	3/8" - 1/2" (.3750 - .5000)	1/2" - 3/4" (.5000 - .7500)
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金						
13/8, 15/5, 17-4, pH Types	< 35	125 - 175	.0003" - .0008"	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"
400 Series	< 35	125 - 175	.0003" - .0008"	.0005" - .0010"	.0008" - .0020"	.0010" - .0030"
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢						
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30 30 - 38	125 - 200 90 - 125	.0003" - .0008" .0002" - .0004"	.0005" - .0010" .0003" - .0005"	.0008" - .0020" .0005" - .0015"	.0010" - .0030" .0010" - .0020"
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						
200, 250, 300	< 35	150 - 225	.0005" - .0010"	.0007" - .0015"	.0010" - .0025"	.0015" - .0040"
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢						
A36, 1000's, 1100's, 1300's	< 35	150 - 250	.0005" - .0010"	.0007" - .0015"	.0010" - .0025"	.0015" - .0040"
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件						
Steel		150 - 250	.0007" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"
Aluminum		200 - 350	.0007" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝						
Aircraft Grade (6061, 7075)		250 - 400	.0007" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁						
		250 - 400	.0007" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜						
Copper Alloys		250 - 350	.0005" - .0010"	.0007" - .0015"	.0010" - .0025"	.0015" - .0035"
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜						
Brass, Aluminum/Bronze, Low Silicon Bronze		250 - 350	.0005" - .0010"	.0007" - .0015"	.0010" - .0025"	.0015" - .0035"
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料						
Glass Epoxy, Fiberglass, Plastics		250 - 450	.0007" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"
Graphite, G10, Carbon Fiber		300 - 500	.0007" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"



Slotting

DRILL MILL USES:

Solids - primarily for use in composites and plastics.

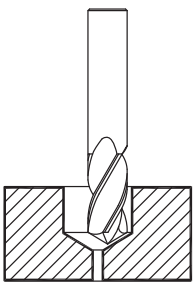
NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

Speeds and Feeds for Drill Mills

* Solids *

Metric

Type	Rc Hardness	SFM (Vc)	CHIPLOAD PER FLUTE (Fz)			
		152M, 152MA 154M, 154MA	3,0 - 6,0 (.1181" - .2362")	6,0 - 10,0 (.2362" - .3937")	10,0 - 14,0 (.3937" - .5512")	14,0 - 20,0 (.5512" - .7874")
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金						
13/8, 15/5, 17-4, pH Types	< 35	45 - 75	0,006 - 0,020	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075
400 Series	< 35	45 - 75	0,006 - 0,020	0,010 - 0,025	0,020 - 0,050	0,025 - 0,075
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢						
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 30 30 - 38	45 - 60 30 - 45	0,006 - 0,020 0,003 - 0,010	0,010 - 0,025 0,005 - 0,015	0,020 - 0,050 0,010 - 0,035	0,025 - 0,075 0,025 - 0,050
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						
200, 250, 300	< 35	55 - 75	0,008 - 0,025	0,015 - 0,035	0,025 - 0,065	0,035 - 0,100
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢						
A36, 1000's, 1100's, 1300's	< 35	55 - 75	0,008 - 0,025	0,015 - 0,035	0,025 - 0,065	0,035 - 0,100
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件						
Steel		75 - 105	0,010 - 0,035	0,025 - 0,050	0,035 - 0,075	0,050 - 0,100
Aluminum		75 - 105	0,010 - 0,035	0,020 - 0,050	0,035 - 0,075	0,050 - 0,100
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝						
Aircraft Grade (6061, 7075)		90 - 150	0,010 - 0,035	0,025 - 0,050	0,035 - 0,075	0,050 - 0,100
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁						
		90 - 135	0,008 - 0,025	0,020 - 0,040	0,025 - 0,065	0,040 - 0,090
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜						
Copper Alloys		75 - 115	0,008 - 0,025	0,020 - 0,040	0,025 - 0,065	0,040 - 0,090
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜						
Brass, Aluminum/Bronze, Low Silicon Bronze		75 - 115	0,008 - 0,025	0,020 - 0,040	0,025 - 0,065	0,040 - 0,090
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料						
Glass Epoxy, Fiberglass, Plastics		60 - 120	0,010 - 0,035	0,025 - 0,050	0,035 - 0,075	0,050 - 0,100
Graphite, G10, Carbon Fiber		90 - 150	0,010 - 0,035	0,025 - 0,050	0,035 - 0,075	0,050 - 0,100



Milling pre-drilled through hole to size

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

GARR TOOL Drilling Guide

Fractional

Type	Rc Hardness	RECOMMENDED SFM BY SERIES			
		1100, 1120	1200, 1205, 1520, 1600, 1400	1500, 1510, 1300	1800H
COBALT BASE ALLOYS / Kobaltlegierungen / Aleaciones del cobalto / Alliages de cobalt / Leghe del cobalto / 钴基合金					
Powdered Metal, Stellite, Hs-21, Haynes	< 35	80 - 120	100 - 150	100 - 150	-
25/188, X-40, L-605	> 35	–	80 - 110	80 - 110	-
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金					
Invar, Kovar, Inconel-625/718, Waspalloy,	< 35	100 - 125	100 - 150	125 - 175	-
Rene, Hastalloy, A286	> 35	–	90 - 125	90 - 125	-
IRON BASE ALLOYS / Eisenlegierungen / Aleaciones ferrosas / Alliages ferreux / Leghe ferrose / 铁基合金					
Incoloy 800-802, Multimet N-155,	< 35	100 - 125	100 - 150	125 - 175	-
Timkin 16-25-6, Carpenter 22-b3	> 35	–	90 - 125	90 - 150	-
MONEL / 铜-镍合金					
Monel - 65% Nickel		-	100 - 150	100 - 150	-
TITANIUM ALLOYS / Titanlegierungen / Aleaciones de Titanio / Alliage de Titane / Leghe di Titanio / 钛合金					
Commercially Pure, 6Al-4V,		125 - 175	150 - 200	150 - 200	-
Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si					
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金					
(Precipitation)	< 35	-	125 - 175	150 - 200	-
13/8, 15/5, 17-4, pH Types	> 35	-	80 - 125	100 - 150	-
(Austentic)	< 35	-	100 - 175	150 - 200	-
Inox, 200 Series, 300 Series	> 35	-	100 - 125	125 - 150	-
(Austentic)	< 35	-	80 - 100	90 - 125	-
304L, 316L, Nitronic 50, Inox	> 35	-	60 - 90	80 - 100	-
(Martensitic)	< 35	-	100 - 150	125 - 175	-
400 Series	> 35	-	80 - 125	100 - 140	-
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢					
4140, 4340, 6150, 5210, A2, D2,	< 35	-	100 - 175	125 - 175	-
P20, H11, H13, S2, O1	35 - 50	-	80 - 130	80 - 130	-
Thompson Shaft,	> 50	-	-	70 - 90	-
Armor Plate (Class 1)					-
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					
200, 250, 300, 8620	< 35	-	125 - 175	125 - 175	-
	> 35	-	100 - 150	100 - 150	-
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢					
Platinum, A36, 12L14,	< 35	-	125 - 175	150 - 200	-
1000's, 1100's, 1300's	> 35	-	100 - 125	100 - 175	-
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件					
Steel		150 - 200	125 - 175	–	–
Ductile Iron		200 - 400	125 - 200	150 - 250	–
Gray Iron		175 - 300	100 - 200	150 - 250	–
Aluminum		200 - 400	150 - 250	–	250 - 400
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝					
Aircraft Grade (6061, 7075)		-	250 - 350	-	250 - 400
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁					
		-	200 - 300	-	200 - 400
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜					
Copper Alloys		-	150 - 250	-	-
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜					
Brass, Aluminum/Bronze,		-	150 - 300	-	200 - 400
Low Silicon Bronze		-	125 - 200	-	200 - 400
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料					
Glass Epoxy, Fiberglass, Plastics,		200	150 - 300	150 - 300	-
Graphite, G10					

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

Type	Rc Hardness	CHIPLOAD PER FLUTE (Fz)				
		1/16" - 1/8" (.0625 - .1250)	1/8" - 1/4" (.1250 - .2500)	1/4" - 3/8" (.2500 - .3750)	3/8" - 1/2" (.3750 - .5000)	1/2" - 5/8" (.5000 - .6250)
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	< 35	.0004" - .0010"	.0008" - .0020"	.0015" - .0025"	.0020" - .0040"	.0025" - .0050"
	> 35	.0004" - .0010"	.0005" - .0010"	.0010" - .0015"	.0010" - .0020"	.0015" - .0030"
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金						
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	.0005" - .0015"	.0010" - .0015"	.0015" - .0025"	.0020" - .0040"	.0025" - .0050"
	> 35	.0004" - .0010"	.0008" - .0015"	.0010" - .0015"	.0015" - .0030"	.0020" - .0040"
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	< 35	.0010" - .0015"	.0010" - .0020"	.0015" - .0035"	.0020" - .0050"	.0030" - .0060"
	> 35	.0008" - .0015"	.0010" - .0020"	.0015" - .0025"	.0020" - .0040"	.0025" - .0050"
MONEL / 铜-镍合金						
Monel - 65% Nickel		.0004" - .0010"	.0008" - .0015"	.0010" - .0015"	.0015" - .0030"	.0020" - .0040"
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		.0008" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0025" - .0050"
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金						
(Precipitation) 13/8, 15/5, 17-4, pH Types	< 35	.0005" - .0015"	.0010" - .0020"	.0015" - .0035"	.0020" - .0040"	.0025" - .0050"
	> 35	.0004" - .0010"	.0008" - .0015"	.0010" - .0015"	.0015" - .0030"	.0020" - .0040"
(Austentic) Inox, 200 Series, 300 Series	< 35	.0005" - .0015"	.0010" - .0020"	.0015" - .0035"	.0020" - .0040"	.0025" - .0050"
	> 35	.0004" - .0010"	.0008" - .0015"	.0010" - .0015"	.0015" - .0030"	.0020" - .0040"
(Austentic) 304L, 316L, Nitronic 50, Inox	< 35	.0004" - .0010"	.0008" - .0015"	.0010" - .0015"	.0015" - .0030"	.0020" - .0040"
	> 35	.0003" - .0008"	.0005" - .0010"	.0010" - .0015"	.0010" - .0020"	.0015" - .0030"
(Martensitic) 400 Series	< 35	.0005" - .0015"	.0010" - .0020"	.0015" - .0035"	.0020" - .0040"	.0025" - .0050"
	> 35	.0004" - .0010"	.0008" - .0015"	.0010" - .0015"	.0015" - .0030"	.0020" - .0040"
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢						
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 35	.0005" - .0015"	.0010" - .0020"	.0015" - .0025"	.0015" - .0030"	.0020" - .0040"
	35 - 50	.0004" - .0010"	.0008" - .0020"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"
Thompson Shaft, Armor Plate (Class 1)	> 50	.0003" - .0006"	.0005" - .0010"	.0008" - .0015"	.0010" - .0020"	.0015" - .0030"
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						
200, 250, 300, 8620	< 35	.0010" - .0015"	.0015" - .0025"	.0020" - .0030"	.0020" - .0040"	.0025" - .0050"
	> 35	.0005" - .0010"	.0010" - .0020"	.0010" - .0025"	.0015" - .0030"	.0020" - .0040"
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢						
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35	.0010" - .0015"	.0015" - .0025"	.0020" - .0030"	.0020" - .0040"	.0025" - .0050"
	> 35	.0005" - .0010"	.0010" - .0020"	.0010" - .0025"	.0015" - .0035"	.0020" - .0040"
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件						
Steel		.0008" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0025" - .0050"
Ductile Iron		.0010" - .0020"	.0010" - .0030"	.0015" - .0035"	.0025" - .0040"	.0030" - .0050"
Gray Iron		.0010" - .0020"	.0010" - .0030"	.0015" - .0035"	.0025" - .0040"	.0030" - .0050"
Aluminum		.0010" - .0020"	.0015" - .0040"	.0020" - .0050"	.0030" - .0060"	.0035" - .0070"
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝						
Aircraft Grade (6061, 7075)		.0010" - .0020"	.0015" - .0040"	.0020" - .0050"	.0030" - .0060"	.0035" - .0070"
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁						
		.0010" - .0020"	.0010" - .0030"	.0015" - .0035"	.0025" - .0040"	.0030" - .0050"
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜						
Copper Alloys		.0010" - .0020"	.0010" - .0030"	.0015" - .0035"	.0025" - .0040"	.0030" - .0050"
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜						
Brass, Aluminum/Bronze, Low Silicon Bronze		.0010" - .0020"	.0010" - .0030"	.0015" - .0035"	.0025" - .0040"	.0030" - .0050"
		.0008" - .0015"	.0010" - .0020"	.0015" - .0030"	.0020" - .0040"	.0025" - .0050"
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料						
Glass Epoxy, Fiberglass, Plastics, Graphite, G10		.0006" - .0015"	.0008" - .0020"	.0010" - .0025"	.0015" - .0030"	.0020" - .0040"

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

GARR TOOL Drilling Guide

Metric

Type	Rc Hardness	RECOMMENDED M/Min. BY SERIES			
		1100, 1120	1200, 1205, 1520, 1600, 1400	1500, 1510, 1300	1800H
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	< 35	25 - 40	30 - 45	30 - 45	-
	> 35	-	25 - 35	25 - 35	-
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金					
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	30 - 40	30 - 45	40 - 50	-
	> 35	-	25 - 40	25 - 40	-
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	< 35	30 - 40	40 - 50	40 - 50	-
	> 35	-	30 - 40	30 - 45	-
MONEL / 铜-镍合金					
Monel - 65% Nickel		-	30 - 45	30 - 45	-
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		-	45 - 60	45 - 60	-
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金					
(Precipitation) 13/8, 15/5, 17-4, pH Types	< 35	-	40 - 50	45 - 60	-
	> 35		25 - 40	30 - 45	-
(Austentic) Inox, 200 Series, 300 Series	< 35	-	30 - 50	45 - 60	-
	> 35		30 - 40	40 - 45	-
(Austentic) 304L, 316L, Nitronic 50, Inox	< 35	-	25 - 30	30 - 40	-
	> 35		20 - 30	25 - 30	-
(Martensitic) 400 Series	< 35	-	30 - 45	40 - 55	-
	> 35		25 - 40	30 - 45	-
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢					
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 35	-	30 - 55	40 - 55	-
	35 - 50	-	25 - 40	25 - 40	-
Thompson Shaft, Armor Plate (Class 1)	> 50	-	-	20 - 30	- -
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					
200, 250, 300, 8620	< 35	-	40 - 55	40 - 55	-
	> 35		30 - 45	30 - 45	-
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢					
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35	-	40 - 55	45 - 60	-
	> 35		30 - 40	30 - 55	-
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件					
Steel		45 - 60	40 - 55	-	-
Ductile Iron		60 - 120	40 - 60	45 - 75	-
Gray Iron		50 - 90	30 - 60	45 - 75	-
Aluminum		60 - 120	45 - 70	-	70 - 120
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝					
Aircraft Grade (6061, 7075)		-	75 - 100	-	70 - 120
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁					
		-	60 - 90	-	60 - 120
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜					
Copper Alloys		-	45 - 70	-	-
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜					
Brass, Aluminum/Bronze, Low Silicon Bronze		-	45 - 90	-	60 - 120
		-	40 - 60	-	60 - 120
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料					
Glass Epoxy, Fiberglass, Plastics, Graphite, G10		60	45 - 90	45 - 90	-

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

Type	Rc Hardness	CHIPLOAD PER FLUTE (Fz)				
		2,0 - 3,0 (.0787" - .1181")	3,0 - 6,0 (.1181" - .2362")	6,0 - 10,0 (.2362" - .3937")	10,0 - 13,0 (.3937" - .5118")	13,0 - 16,0 (.5118" - .6299")
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-4. L-605	< 35	0,010 - 0,025	0,020 - 0,050	0,040 - 0,065	0,050 - 0,100	0,065 - 0,125
	> 35	0,010 - 0,025	0,013 - 0,025	0,025 - 0,040	0,025 - 0,050	0,040 - 0,075
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金						
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	0,013 - 0,040	0,025 - 0,040	0,040 - 0,065	0,050 - 0,100	0,065 - 0,125
	> 35	0,010 - 0,025	0,020 - 0,040	0,025 - 0,040	0,040 - 0,075	0,050 - 0,100
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	< 35	0,025 - 0,040	0,025 - 0,050	0,040 - 0,090	0,050 - 0,100	0,075 - 0,150
	> 35	0,020 - 0,040	0,025 - 0,050	0,040 - 0,065	0,040 - 0,075	0,065 - 0,125
MONEL / 铜-镍合金						
Monel - 65% Nickel		0,010 - 0,025	0,020 - 0,040	0,025 - 0,040	0,040 - 0,075	0,050 - 0,100
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		0,020 - 0,040	0,025 - 0,050	0,040 - 0,075	0,050 - 0,100	0,065 - 0,125
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金						
(Precipitation) 13/8, 15/5, 17-4, pH Types	< 35	0,013 - 0,040	0,025 - 0,050	0,040 - 0,090	0,050 - 0,100	0,065 - 0,125
	> 35	0,010 - 0,025	0,020 - 0,040	0,025 - 0,040	0,040 - 0,075	0,050 - 0,100
(Austentic) Inox, 200 Series, 300 Series	< 35	0,013 - 0,040	0,025 - 0,050	0,040 - 0,090	0,050 - 0,100	0,065 - 0,125
	> 35	0,010 - 0,025	0,020 - 0,040	0,025 - 0,040	0,040 - 0,075	0,050 - 0,100
(Austentic) 304L, 316L, Nitronic 50, Inox	< 35	0,010 - 0,025	0,020 - 0,040	0,025 - 0,040	0,040 - 0,075	0,050 - 0,100
	> 35	0,008 - 0,020	0,013 - 0,025	0,025 - 0,040	0,025 - 0,050	0,040 - 0,075
(Martensitic) 400 Series	< 35	0,013 - 0,040	0,025 - 0,050	0,040 - 0,090	0,050 - 0,100	0,065 - 0,125
	> 35	0,010 - 0,025	0,020 - 0,040	0,025 - 0,040	0,040 - 0,075	0,050 - 0,100
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢						
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 35	0,013 - 0,040	0,025 - 0,050	0,040 - 0,065	0,050 - 0,100	0,075 - 0,125
	35 - 50	0,010 - 0,025	0,020 - 0,050	0,025 - 0,050	0,030 - 0,075	0,040 - 0,100
Thompson Shaft, Armor Plate (Class 1)	> 50	0,008 - 0,020	0,010 - 0,030	0,015 - 0,040	0,020 - 0,060	0,030 - 0,080
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						
200, 250, 300, 8620	< 35	0,025 - 0,040	0,040 - 0,065	0,050 - 0,075	0,050 - 0,100	0,065 - 0,125
	> 35	0,013 - 0,040	0,025 - 0,050	0,025 - 0,065	0,040 - 0,075	0,050 - 0,100
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢						
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35	0,025 - 0,040	0,040 - 0,065	0,050 - 0,075	0,050 - 0,100	0,065 - 0,125
	> 35	0,013 - 0,040	0,025 - 0,050	0,025 - 0,065	0,040 - 0,090	0,050 - 0,100
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件						
Steel		0,020 - 0,040	0,025 - 0,050	0,040 - 0,075	0,050 - 0,100	0,065 - 0,125
Ductile Iron		0,025 - 0,050	0,025 - 0,075	0,040 - 0,090	0,065 - 0,100	0,075 - 0,125
Gray Iron		0,025 - 0,050	0,025 - 0,075	0,040 - 0,090	0,065 - 0,100	0,075 - 0,125
Aluminum		0,025 - 0,050	0,025 - 0,100	0,050 - 0,125	0,075 - 0,150	0,090 - 0,180
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝						
Aircraft Grade (6061, 7075)		0,025 - 0,050	0,025 - 0,100	0,050 - 0,125	0,075 - 0,150	0,090 - 0,180
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁						
		0,025 - 0,050	0,025 - 0,075	0,040 - 0,090	0,065 - 0,100	0,075 - 0,125
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜						
Copper Alloys		0,025 - 0,050	0,025 - 0,075	0,040 - 0,090	0,065 - 0,100	0,075 - 0,125
BRASS, BRONZE / Messing, Bronze / Latón, Bronce / Laiton, Bronze / Ottone, Bronzo / 黄铜, 青铜						
Brass, Aluminum/Bronze, Low Silicon Bronze		0,025 - 0,050	0,025 - 0,075	0,040 - 0,090	0,065 - 0,100	0,075 - 0,125
		0,020 - 0,040	0,025 - 0,050	0,040 - 0,075	0,050 - 0,100	0,065 - 0,125
COMPOSITE MATERIAL / Verbundwerkstoffe / Material compuesto / Materiaux composites / Materiale composito / 复合材料						
Glass Epoxy, Fiberglass, Plastics, Graphite, G10		0,015 - 0,040	0,020 - 0,050	0,025 - 0,065	0,040 - 0,075	0,050 - 0,100

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

GARR TOOL High Performance Drilling Guide for Mini Drills

Fractional

Type	Rc Hardness	Recommended SFM	CHIPLOAD PER FLUTE (Fz)		
		Series 1250H 1550H 1850H	1/32" - 0,99mm (.0312" - .0390")	1,00mm - 2,00mm (.0394" - .0787")	2,01mm - 1/8" (.0791" - .1250")
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	< 35	100 - 150	.0002" - .0004"	.0004" - .0008"	.0006" - .0012"
	> 35	80 - 110	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金					
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	125 - 150	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
	> 35	100 - 125	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
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	< 35	125 - 175	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
	> 35	80 - 100	.0003" - .0006"	.0004" - .0008"	.0006" - .0012"
MONEL / 铜-镍合金					
Monel - 65% Nickel		75 - 125	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
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		150 - 200	.0003" - .0006"	.0004" - .0008"	.0006" - .0012"
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金					
(Precipitation) 13/8, 15/5, 17-4, pH Types	< 35	125 - 175	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
	> 35	80 - 125	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
(Austentic) Inox, 200 Series, 300 Series	< 35	100 - 175	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
	> 35	80 - 125	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
(Austentic) 304L, 316L, Nitronic 50, Inox	< 35	80 - 100	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
	> 35	60 - 90	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
(Martensitic) 400 Series	< 35	100 - 150	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
	> 35	80 - 125	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢					
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 35	100 - 175	.0003" - .0006"	.0004" - .0008"	.0006" - .0012"
	35-48	80 - 130	.0002" - .0005"	.0003" - .0008"	.0006" - .0012"
	> 48	60 - 80	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
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					
200, 250, 300, 8620	< 35	125 - 175	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
	> 35	80 - 125	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢					
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35	125 - 175	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
	> 35	80 - 125	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件					
Steel		100 - 175	.0003" - .0006"	.0004" - .0008"	.0006" - .0012"
Ductile Iron		100 - 200	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
Gray Iron		80 - 175	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
Aluminum		100 - 250	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝					
2014, 2024, 6061-(T1-T6), 7075, Extruded		125 - 300	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁					
		125 - 250	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜					
Copper Alloys		125 - 250	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
BRASS / Messing / Latón / Laiton / Ottone / 黄铜					
Short Chips		125 - 250	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
Long Chips		100 - 200	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
BRONZE / Bronze / Bronce / Bronze / Bronzo / 青铜					
Short Chips		100 - 250	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
Long Chips		80 - 175	.0003" - .0006"	.0004" - .0008"	.0006" - .0012"

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

GARR TOOL High Performance Drilling Guide for Mini Drills

Metric

Type	Rc Hardness	Recommended M/Min. Series 1250H 1550H 1850H	CHIPLOAD PER FLUTE (Fz) 1/32" - 0,99mm (.0312" - .0390")	1,00mm - 2,00mm (.0394" - .0787")	2,01mm - 1/8" (.0791" - .1250")
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	< 35	30 - 45	0,005 - 0,010	0,010 - 0,020	0,015 - 0,030
	> 35	25 - 35	0,005 - 0,010	0,008 - 0,015	0,013 - 0,025
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金					
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	40 - 45	0,008 - 0,013	0,010 - 0,020	0,015 - 0,030
	> 35	30 - 40	0,005 - 0,010	0,008 - 0,015	0,013 - 0,025
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	< 35	40 - 50	0,010 - 0,020	0,015 - 0,030	0,020 - 0,038
	> 35	25 - 30	0,008 - 0,015	0,010 - 0,020	0,015 - 0,030
MONEL / 铜-镍合金					
Monel - 65% Nickel		20 - 40	0,005 - 0,010	0,008 - 0,015	0,013 - 0,025
TITANIUM ALLOYS / Titanlegierungen / Aleaciones de Titanio / Alliage de Titane / Leghe di Titanio / 钛合金					
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-2SN-4Zr-2Mo-Si		45 - 60	0,008 - 0,015	0,010 - 0,020	0,015 - 0,030
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金					
(Precipitation) 13/8, 15/5, 17-4, pH Types	< 35	40 - 50	0,008 - 0,013	0,010 - 0,020	0,015 - 0,030
	> 35	25 - 40	0,005 - 0,010	0,008 - 0,015	0,013 - 0,025
(Austentic) Inox, 200 Series, 300 Series	< 35	30 - 50	0,008 - 0,013	0,010 - 0,020	0,015 - 0,030
	> 35	25 - 40	0,005 - 0,010	0,008 - 0,015	0,013 - 0,025
(Austentic) 304L, 316L, Nitronic 50, Inox	< 35	25 - 30	0,008 - 0,013	0,010 - 0,020	0,015 - 0,030
	> 35	20 - 25	0,005 - 0,010	0,008 - 0,015	0,013 - 0,025
(Martensitic) 400 Series	< 35	30 - 45	0,008 - 0,013	0,010 - 0,020	0,015 - 0,030
	> 35	25 - 40	0,005 - 0,010	0,008 - 0,015	0,013 - 0,025
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢					
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 35	30 - 50	0,008 - 0,015	0,010 - 0,020	0,015 - 0,030
	35-48	25 - 40	0,005 - 0,013	0,008 - 0,020	0,015 - 0,030
	> 48	20 - 25	0,005 - 0,010	0,008 - 0,015	0,013 - 0,025
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					
200, 250, 300, 8620	< 35	40 - 50	0,010 - 0,020	0,015 - 0,030	0,020 - 0,038
	> 35	25 - 40	0,008 - 0,013	0,010 - 0,020	0,015 - 0,030
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢					
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35	40 - 50	0,010 - 0,020	0,015 - 0,030	0,020 - 0,038
	> 35	25 - 40	0,008 - 0,013	0,010 - 0,020	0,015 - 0,030
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件					
Steel		30 - 50	0,008 - 0,015	0,010 - 0,020	0,015 - 0,030
Ductile Iron		30 - 60	0,010 - 0,020	0,015 - 0,030	0,020 - 0,038
Gray Iron		25 - 50	0,010 - 0,020	0,015 - 0,030	0,020 - 0,038
Aluminum		30 - 75	0,010 - 0,020	0,015 - 0,030	0,020 - 0,038
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝					
2014, 2024, 6061-(T1-T6), 7075, Extruded		40 - 90	0,010 - 0,020	0,015 - 0,030	0,020 - 0,038
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁					
		40 - 75	0,010 - 0,020	0,015 - 0,030	0,020 - 0,038
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜					
Copper Alloys		40 - 75	0,010 - 0,020	0,015 - 0,030	0,020 - 0,038
BRASS / Messing / Latón / Laiton / Ottone / 黄铜					
Short Chips		40 - 75	0,010 - 0,020	0,015 - 0,030	0,020 - 0,038
Long Chips		30 - 60	0,008 - 0,013	0,010 - 0,020	0,015 - 0,030
BRONZE / Bronze / Bronce / Bronze / Bronzo / 青铜					
Short Chips		30 - 75	0,010 - 0,020	0,015 - 0,030	0,020 - 0,038
Long Chips		25 - 50	0,008 - 0,015	0,010 - 0,020	0,015 - 0,030

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

GARR TOOL High Performance Drilling Guide

Fractional

Type	Rc Hardness	Recommended SFM		CHIPLOAD PER FLUTE (Fz)				
		NON-COOLANT 1580H 1280H 1580HD	*COOLANT FED* 1580KH 1280KH 1880KH 1580KD 1280KD	1/8" - 1/4" (.1250 - .2500)	1/4" - 3/8" (.2500 - .3750)	3/8" - 1/2" (.3750 - .5000)	1/2" - 5/8" (.5000 - .6250)	5/8" - 3/4" (.6250 - .7500)
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	< 35	185	225	.0010" - .0020"	.0020" - .0030"	.0025" - .0035"	.0030" - .0040"	.0035" - .0055"
	> 35	125	180	.0005" - .0015"	.0015" - .0025"	.0020" - .0030"	.0025" - .0035"	.0030" - .0045"
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金								
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	150	225	.0010" - .0020"	.0020" - .0030"	.0025" - .0035"	.0030" - .0040"	.0035" - .0055"
	> 35	125	180	.0005" - .0015"	.0015" - .0025"	.0020" - .0030"	.0025" - .0035"	.0030" - .0045"
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	< 35	200	300	.0015" - .0025"	.0025" - .0030"	.0025" - .0035"	.0035" - .0045"	.0035" - .0055"
	> 35	150	240	.0005" - .0015"	.0015" - .0025"	.0025" - .0030"	.0030" - .0035"	.0030" - .0045"
MONEL / 铜-镍合金								
Monel - 65% Nickel		150	225	.0010" - .0020"	.0015" - .0025"	.0020" - .0030"	.0025" - .0035"	.0035" - .0055"
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		225	300	.0010" - .0020"	.0020" - .0030"	.0025" - .0035"	.0030" - .0040"	.0035" - .0055"
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金								
(Precipitation) 13/8, 15/5, 17-4, pH Types	< 35	225	300	.0015" - .0025"	.0025" - .0030"	.0030" - .0035"	.0035" - .0045"	.0040" - .0055"
	> 35	175	240	.0005" - .0015"	.0015" - .0025"	.0025" - .0030"	.0030" - .0035"	.0035" - .0045"
(Austentic) Inox, 200 Series, 300 Series	< 35	225	300	.0015" - .0025"	.0025" - .0030"	.0030" - .0035"	.0035" - .0045"	.0040" - .0055"
	> 35	175	225	.0010" - .0015"	.0015" - .0020"	.0020" - .0025"	.0025" - .0035"	.0035" - .0045"
(Austentic) 304L, 316L, Nitronic 50, Inox	< 35	125	175	.0010" - .0015"	.0015" - .0020"	.0020" - .0030"	.0030" - .0040"	.0025" - .0040"
	> 35	80	100	.0003" - .0010"	.0010" - .0015"	.0015" - .0025"	.0025" - .0035"	.0020" - .0040"
(Martensitic) 400 Series	< 35	225	300	.0015" - .0025"	.0025" - .0030"	.0030" - .0035"	.0035" - .0045"	.0040" - .0055"
	> 35	175	240	.0005" - .0015"	.0015" - .0025"	.0025" - .0030"	.0030" - .0035"	.0035" - .0045"
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢								
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 35	200	300	.0015" - .0025"	.0025" - .0030"	.0030" - .0035"	.0035" - .0045"	.0045" - .0055"
	> 35	175	240	.0005" - .0015"	.0015" - .0025"	.0025" - .0030"	.0030" - .0035"	.0035" - .0045"
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								
200, 250, 300, 8620	< 35	200	300	.0015" - .0025"	.0025" - .0030"	.0030" - .0035"	.0035" - .0045"	.0045" - .0065"
	> 35	175	240	.0005" - .0015"	.0015" - .0025"	.0025" - .0030"	.0030" - .0035"	.0035" - .0045"
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢								
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35	200	300	.0015" - .0025"	.0025" - .0030"	.0030" - .0035"	.0035" - .0045"	.0045" - .0065"
	> 35	175	240	.0005" - .0015"	.0015" - .0025"	.0025" - .0030"	.0030" - .0035"	.0035" - .0045"
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件								
Steel		200	300	.0025" - .0035"	.0035" - .0045"	.0035" - .0045"	.0045" - .0055"	.0065" - .0075"
Ductile Iron		250	350	.0025" - .0035"	.0035" - .0045"	.0035" - .0045"	.0045" - .0055"	.0065" - .0075"
Gray Iron		250	400	.0025" - .0035"	.0035" - .0045"	.0035" - .0045"	.0045" - .0055"	.0065" - .0075"
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝								
2014, 2024, 6061-(T1-T6), 7075		300 - 400	300 - 500	.0035" - .0045"	.0045" - .0055"	.0065" - .0075"	.0085" - .0095"	.0085" - .0095"
Die Cast, Extruded		250 - 300	300 - 400	.0025" - .0035"	.0035" - .0045"	.0055" - .0065"	.0075" - .0085"	.0075" - .0085"
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁								
		300	400	.0035" - .0045"	.0045" - .0055"	.0065" - .0075"	.0085" - .0095"	.0085" - .0095"
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜								
Copper Alloys		300	400	.0025" - .0035"	.0035" - .0045"	.0035" - .0045"	.0045" - .0055"	.0065" - .0075"
BRASS / Messing / Latón / Laiton / Ottone / 黄铜								
Short Chips		300	400	.0035" - .0045"	.0045" - .0055"	.0065" - .0075"	.0085" - .0095"	.0085" - .0095"
Long Chips		200	300	.0025" - .0035"	.0035" - .0045"	.0055" - .0065"	.0075" - .0085"	.0075" - .0085"
BRONZE / Bronze / Bronce / Bronze / Bronzo / 青铜								
Short Chips		200	300	.0025" - .0035"	.0035" - .0045"	.0035" - .0045"	.0055" - .0065"	.0075" - .0085"
Long Chips		150	250	.0015" - .0025"	.0025" - .0035"	.0025" - .0035"	.0045" - .0055"	.0065" - .0075"

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

Type	Rc Hardness	Recommended M/Min.		CHIPLOAD PER FLUTE (Fz)				
		NON-COOLANT	*COOLANT FED*					
		1580H 1280H 1580HD	1580KH 1280KH 1880KH 1580KD 1280KD	3,0 - 6,0 (.1181" - .2362")	6,0 - 10,0 (.2362" - .3937")	10,0 - 13,0 (.3937" - .5118")	13,0 - 16,0 (.5118" - .6299")	16,0 - 20,0 (.5118" - .7874")
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	< 35	60	70	0,035 - 0,060	0,060 - 0,085	0,075 - 0,100	0,085 - 0,110	0,095 - 0,130
	> 35	40	55	0,025 - 0,050	0,050 - 0,075	0,060 - 0,085	0,075 - 0,100	0,095 - 0,110
NICKEL BASE ALLOYS / Nickellegierungen / Aleaciones de níquel / Alliage de nickel / Leghe di nichel / 高镍基合金								
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	60	70	0,035 - 0,060	0,060 - 0,085	0,075 - 0,100	0,085 - 0,125	0,085 - 0,110
	> 35	40	55	0,025 - 0,050	0,050 - 0,075	0,060 - 0,085	0,075 - 0,100	0,085 - 0,100
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	< 35	60	90	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,100 - 0,125	0,110 - 0,140
	> 35	45	70	0,025 - 0,050	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,095 - 0,110
MONEL / 铜-镍合金								
Monel - 65% Nickel		45	70	0,035 - 0,060	0,050 - 0,075	0,060 - 0,085	0,075 - 0,100	0,085 - 0,120
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		70	90	0,035 - 0,060	0,060 - 0,085	0,075 - 0,100	0,085 - 0,110	0,095 - 0,130
STAINLESS STEELS / Rostfreie Stähle / Acero Inoxidable / Acier Inoxydable / Acciaio Inox / 不锈钢合金								
(Precipitation) 13/8, 15/5, 17-4, pH Types	< 35	70	90	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,100 - 0,125	0,100 - 0,140
	> 35	50	70	0,025 - 0,050	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,085 - 0,110
(Austentic) Inox, 200 Series, 300 Series	< 35	70	90	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,100 - 0,125	0,100 - 0,140
	> 35	50	70	0,035 - 0,050	0,050 - 0,060	0,060 - 0,075	0,075 - 0,100	0,075 - 0,110
(Austentic) 304L, 316L, Nitronic 50, Inox	< 35	40	55	0,035 - 0,050	0,050 - 0,060	0,060 - 0,085	0,085 - 0,110	0,075 - 0,110
	> 35	20	30	0,025 - 0,035	0,035 - 0,050	0,050 - 0,075	0,075 - 0,100	0,075 - 0,110
(Martensitic) 400 Series	< 35	70	90	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,100 - 0,125	0,100 - 0,130
	> 35	50	70	0,025 - 0,050	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,085 - 0,110
HIGH STRENGTH TOOL STEELS / Hochfeste Werkzeugstähle / Herramienta aceros de alto dureza / Aciers à outils a haute résistance / Acciaio da utensili molto duro / 高强度工具钢								
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 35	60	90	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,100 - 0,125	0,100 - 0,130
	> 35	50	70	0,025 - 0,050	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,085 - 0,100
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								
200, 250, 300, 8620	< 35	60	90	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,100 - 0,125	0,100 - 0,140
	> 35	50	70	0,025 - 0,050	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,085 - 0,110
CARBON STEELS / Kohlenstoffstahl / Acero de carbón / Acier du carbone / Acciaio al carbonio / 碳钢								
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35	60	90	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,100 - 0,125	0,100 - 0,140
	> 35	50	70	0,025 - 0,050	0,050 - 0,075	0,075 - 0,085	0,085 - 0,100	0,085 - 0,120
CAST MATERIAL / Gegossenes Material / Material bastidor vertidos / Materiaux fontes / Materiale fuso / 铸造件								
Steel		60	90	0,060 - 0,090	0,100 - 0,125	0,100 - 0,125	0,125 - 0,150	0,175 - 0,200
Ductile Iron		75	100	0,060 - 0,090	0,100 - 0,125	0,100 - 0,125	0,125 - 0,150	0,175 - 0,200
Gray Iron		75	120	0,060 - 0,090	0,100 - 0,125	0,100 - 0,125	0,125 - 0,150	0,175 - 0,200
ALUMINUM / Aluminium / Aluminio / Aluminium / Alluminio / 铝								
2014, 2024, 6061-(T1-T6), 7075		90 - 120	90 - 150	0,090 - 0,120	0,125 - 0,150	0,175 - 0,200	0,225 - 0,250	0,225 - 0,250
Die Cast, Extruded		75 - 90	90 - 120	0,060 - 0,100	0,100 - 0,120	0,150 - 0,175	0,200 - 0,225	0,200 - 0,225
MAGNESIUM / Magnesium / Magnesio / Magnésium / Magnesio / 镁								
		90	120	0,080 - 0,120	0,125 - 0,150	0,175 - 0,200	0,225 - 0,250	0,225 - 0,250
COPPER / Kupfer / Cobre / Cuivre / Rame / 铜								
Copper Alloys		90	120	0,060 - 0,100	0,100 - 0,125	0,100 - 0,125	0,125 - 0,150	0,175 - 0,200
BRASS / Messing / Latón / Laiton / Ottone / 黄铜								
Short Chips		90	120	0,080 - 0,120	0,125 - 0,150	0,175 - 0,200	0,225 - 0,250	0,225 - 0,250
Long Chips		60	90	0,060 - 0,090	0,100 - 0,125	0,150 - 0,175	0,200 - 0,225	0,200 - 0,225
BRONZE / Bronze / Bronce / Bronze / Bronzo / 青铜								
Short Chips		60	90	0,060 - 0,100	0,100 - 0,125	0,100 - 0,125	0,150 - 0,175	0,200 - 0,225
Long Chips		45	70	0,040 - 0,060	0,060 - 0,085	0,075 - 0,100	0,125 - 0,150	0,175 - 0,200

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

GARR TOOL Application Guide for Aluminum Series 3-Flute Drills

Fractional

CHIPLOAD PER FLUTE (Fz)								
Material	Type	SFM	3/16" (.1875)	1/4" (.2500)	5/16" (.3125)	3/8" (.3750)	1/2" (.5000)	5/8" (.6250)
Aluminum Alloy	6061	450 - 650	.0020" - .0040"	.0025" - .0050"	.0035" - .0060"	.0045" - .0070"	.0055" - .0080"	.0065" - .0100"
Cast Aluminum	380	300 - 500	.0015" - .0030"	.0020" - .0040"	.0030" - .0050"	.0030" - .0060"	.0035" - .0070"	.0040" - .0080"
Magnesium		250 - 500	.0015" - .0030"	.0020" - .0040"	.0030" - .0050"	.0030" - .0060"	.0035" - .0070"	.0040" - .0080"
Copper & Brass		250 - 400	.0010" - .0025"	.0020" - .0030"	.0020" - .0030"	.0020" - .0040"	.0030" - .0050"	.0030" - .0060"
Titanium	6Al-4V	100 - 300	.0010" - .0020"	.0020" - .0030"	.0020" - .0030"	.0020" - .0040"	.0030" - .0050"	.0030" - .0060"

Metric

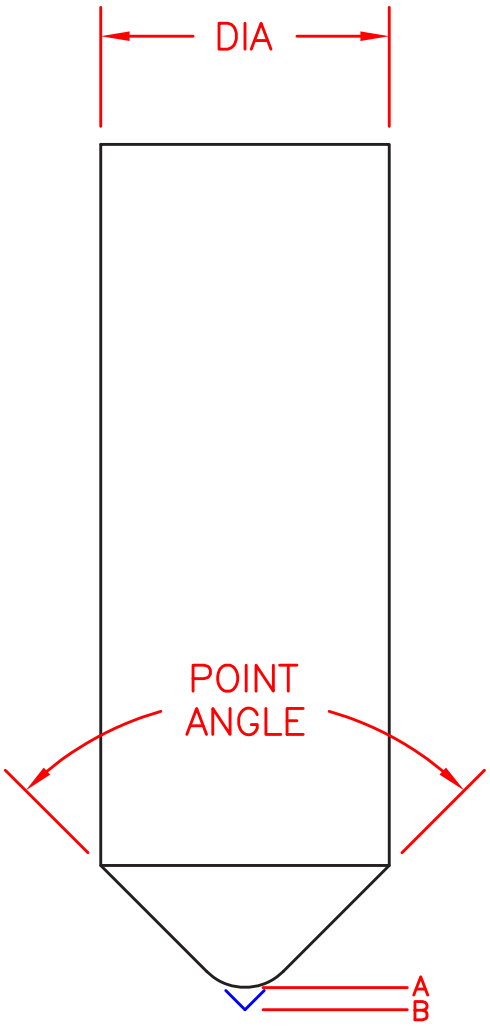
CHIPLOAD PER FLUTE (Fz)								
Material	Type	M/Min.	4,0 (.1575")	6,0 (.2362")	8,0 (.3150")	10,0 (.3937")	12,0 (.4724")	16,0 (.6299")
Aluminum Alloy	6061	140 - 200	0,050 - 0,100	0,065 - 0,125	0,090 - 0,150	0,115 - 0,175	0,150 - 0,200	0,165 - 0,250
Cast Aluminum	380	90 - 150	0,038 - 0,075	0,050 - 0,100	0,075 - 0,125	0,075 - 0,150	0,090 - 0,175	0,100 - 0,200
Magnesium		75 - 150	0,038 - 0,075	0,050 - 0,100	0,075 - 0,125	0,075 - 0,150	0,090 - 0,175	0,100 - 0,200
Copper & Brass		75 - 120	0,025 - 0,060	0,050 - 0,075	0,050 - 0,075	0,050 - 0,100	0,075 - 0,125	0,075 - 0,150
Titanium	6Al-4V	30 - 90	0,025 - 0,050	0,050 - 0,075	0,050 - 0,075	0,050 - 0,100	0,075 - 0,125	0,075 - 0,150

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

Length Deviation Chart for Spotting Drills

DIAMETER		DRILL POINT ANGLE			
		82°	90°	120°	140°
2mm	.0787	.003	.002	.001	.001
3/32"	.0938	.003	.003	.002	.001
3mm	.1181	.004	.004	.002	.001
1/8"	.1250	.004	.004	.002	.001
4mm	.1575	.005	.005	.003	.002
3/16"	.1875	.006	.006	.003	.002
5mm	.1969	.007	.006	.003	.002
6mm	.2362	.008	.007	.004	.003
1/4"	.2500	.009	.008	.004	.003
5/16"	.3125	.011	.009	.005	.003
8mm	.3150	.011	.009	.005	.003
3/8"	.3750	.013	.011	.006	.004
10mm	.3937	.014	.012	.007	.004
7/16"	.4375	.015	.013	.008	.005
12mm	.4724	.016	.014	.008	.005
1/2"	.5000	.017	.015	.009	.005
14mm	.5512	.019	.017	.010	.006
9/16"	.5625	.019	.017	.010	.006
5/8"	.6250	.022	.019	.011	.007
16mm	.6299	.022	.019	.011	.007
18mm	.7087	.024	.021	.012	.008
3/4"	.7500	.026	.023	.013	.008
20mm	.7874	.027	.024	.014	.009

Garr Tool series 1600 spotting drills are not only useful for starting holes, but also for leaving the desired chamfer when programmed to the correct depth. Because spotting drills do not come to a true point, but have a small "flat" as shown in the figure to the right, the length deviation from the chart above must be taken into account to leave the correct chamfer length. This chart gives the distance from the theoretical drill point 'B' to the actual drill point 'A'. These values can be used to compensate for the "flat" on our spotting drills in your calculations.



Hardness Conversion Chart

ROCKWELL HARDNESS (HRb)	ROCKWELL HARDNESS (HRc)	BRINELL HARDNESS (HB)	VICKERS HARDNESS (HV)	TENSILE STRENGTH (N/mm^2)	PSI ($1000\ lb/in^2$)
67	-	116	122	401	58
70	-	121	127	432	63
73	-	126	132	448	65
75	-	131	137	455	66
77	-	137	143	463	67
80	-	143	150	479	69
82	-	149	156	494	72
84	-	156	163	525	76
86	-	163	171	540	78
89	-	170	178	556	81
91	-	179	188	602	88
93	-	187	196	632	92
96	-	197	212	664	97
97	-	207	218	695	101
98	-	212	222	710	103
-	20	217	228	741	107
-	21	223	234	756	110
-	22	229	241	772	112
-	23	235	247	787	114
-	24	241	255	818	118
-	25	248	261	849	123
-	27	255	269	865	125
-	28	262	275	895	130
-	29	269	284	911	132
-	30	277	292	942	136
-	31	285	300	973	141
-	32	293	308	988	143
-	33	302	318	1019	147
-	34	311	327	1050	152
-	35	321	337	1096	159
-	37	331	349	1127	163
-	38	341	359	1158	168
-	39	352	370	1189	172
-	40	363	381	1235	179
-	41	375	395	1266	183
-	42	388	408	1312	190
-	44	401	422	1359	197
-	45	415	437	1420	206
-	46	429	452	1467	212
-	48	444	470	1513	219
-	50	461	497	1559	226
-	51	477	517	1621	235
-	52	495	532	1668	241
-	54	543	572	1729	250
-	56	514	609	1807	262
-	57	555	630	1884	273
-	59	578	670	1961	284
-	60	601	698	2039	295
-	61	-	720	-	-
-	62	-	746	-	-
-	63	-	772	-	-
-	64	-	800	-	-
-	65	-	832	-	-
-	66	-	865	-	-
-	67	-	900	-	-
-	68	-	940	-	-

Conversions from each scale are approximate

Standards
Every GARR carbide cutting tool is manufactured from premium submicron grain carbide, unless otherwise noted.

Each of our styles of end mills is center cutting, unless otherwise noted.

Altered Standards - 48 Hour Delivery
Many special tooling needs can be satisfied by adding a flat, a corner radius, or by making a minor diameter change to one of our standard tools. Garr Tool Company will ship altered standards within 48 hours. Contact us for pricing.

GARR TOOL cannot be responsible for tools altered by other parties.

Solid Carbide Specials - 2 Week Delivery
Blueprint and non-blueprint specials will be quoted within 24 hours. Uncoated tooling made from stock material will be manufactured to your specifications within two weeks.

Solid carbide cutting tools which are 1" or less in diameter and up to 12" in length can be produced from premium submicron grain carbide in the time it takes most manufacturers to quote and order material.

Garr Tool Company can take care of your special round tooling needs. We deliver!

Reconditioning Service
With our state-of-the-art reconditioning department, you can expect quality reground tools at competitive prices. Let us be your 'local' source for regrinding.

Check Us Out
Our web site, *www.garrtool.com*, enhances the level of customer service you have come to expect from us. Increase the speed and accuracy of special pricing requests by e-mailing prints for quote to *sales@garrtool.com*.

A collection of 'fill-in-the-blank' prints is available for download from our website to aid in quoting of specials.

GARR TOOL®

Copyright© 2019 by Garr Tool Company, Alma, Michigan, USA.
All Rights Reserved. No part of this publication may be reproduced
in any form or by any means without prior written permission from Garr Tool Company.
Garr Tool Company makes every effort to ensure accuracy in its publications.
We are not responsible for errors in printing should they occur.
Printed in the United Kingdom.

⚠ **WARNING**: Our products can expose you to chemicals including cobalt, which is known to the State of California, USA, to cause cancer. For more information go to www.P65Warnings.ca.gov
Please see our Safety Data Sheet at sds.garrtool.com

+1 989-463-6171 fax **+1 989-463-3609**

GARR TOOL®

7800 N Alger Road
Alma, Michigan USA 48801
+1 800-248-9003
+1 989-463-6171
Fax +1 989-463-3609

Unit 4 Genoa Way
High Wycombe HP11 1NY
United Kingdom
+44 (0) 1494 418160
Fax +44 (0) 1494 442564

CATALOG 19i

www.garrtool.com

Sold through select industrial distributors

Prices subject to change without notice