QUALITY TECH TOOL

For Quality Performance Cutting Tools, Contact Quality Tech Tool!

Quality Tech Tool has been making quality performance cutting tools for years to many well known industries such as aircraft, automotive, medical and defense.

QTT has the equipment, the knowledge and expertise to provide you with equal or better industrial carbide tooling as our competitors. Every tool designed at QTT uses the combined skills of our technicians and cutting edge equipment to create superior high performance cutting tools.

We are well versed in the exacting requirements that are placed on providing a full line of carbide tooling.

When your company needs the finest high performance cutting tools, contact Quality Tech Tool!

Premium Class Drills

TOOL SPECIFICATIONS									MATERIAL GROUP													
									Non Ferrous		Iron	Steel								Specialty Alloy		Non Metal
Series	Page	Shank Style	Helix	Point Angle	Length	Coolant Fed	Coating	Speeds & Feeds Page	Aluminum	Copper	Cast Iron	Low and Medium Carbon Steel	High Carbon Steel	Alloys Steel	Die Steel	Austenitic Stainless Steel	Precipitation Hardened	Hardened Steel	High Nickel Alloy	Titanium Alloy	Glass, Plastics, Composite Materials
PC243	9-10	Common	26°-30°	140°	3 x D	None	TiAlN	80-81	x		x	x	x	x	x	x	x	x	x	x	
PC245	11-12	Common	26°-30°	140°	5 x D	None	TiAlN	82-83	x		x	x	x	x	x	x	x	x	x	x	
PC253	13-14	Common	26°-30°	140°	3 x D	Thru	TiAlN	84-85	x		x	x	x	x	x	x	x	x	x	x	
PC255	15-16	Common	26°-30°	140°	5 x D	Thru	TiAlN	86-87	x		x	x	x	x	x	x	x	x	x	x	
PC258	17	Common	26°-30°	140°	8 x D	Thru	TiAlN	88-89	x		x	x	x	x	x	x	x	x	x	x	

General Purpose Drills, NC Spotting Drills, Center Drills and Reamers

TOOL SPECIFICATIONS							MATERIAL GROUP														
							Non Ferrous		Iron	Steel									Specialty Alloy		Non Metal
Series	Page	Tool Type	Helix	Point Angle	Length	Speeds & Feeds Page	Aluminum	Copper	Cast Iron	Low and Medium Carbon Steel	High Carbon Steel	Alloys Steel	Die Steel	Austenitic Stainless Steel	Precipitation Hardened	Hardened Steel	High Nickel Alloy	Titanium Alloy	Glass, Plastics, Composite Materials
MD135	42	Miniature Drill	35°	130°	Standard	90-91	x	x	x	x	x	x	x	x	x	x	x	x	x
MD136	43	Extended MD	35°	130°	Standard	90-91	x	x	x	x	x	x	x	x	x	x	x	x	x
MD137	43	Miniature Drill	35°	130°	Standard	90-91	x	x	x	x	x	x	x	x	x	x	x	x	x
DR200	44	Str. Fl	0°	140°	Screw Machine	92-93	x	x	x	x	x	x	x	x	x	x	x	x	
DR215	45	Slow Sp	15°	135°	Screw Machine	94-95	x	x	x	x	x	x	x	x	x	x	x	x	
DR220	46	Jobbers	20°	118°	Jobber	96	x	x	x	x	x	x						x	x
SD221-90	47	NC Spot	20°	90°	Short	97	x	x	x	x	x	x	x	x	x	x	x	x	x
SD221-120	47	NC Spot	20°	120°	Short	97	x	x	x	x	x	x	x	x	x	x	x	x	x
DR235	47	Center Drill	0°	118°	Short	97	x	x	x	x	x	x	x	x	x	x	x	x	x
RM300	48-49	Reamer	0°	Chamfer	Standard	98	x	x	x	x	x	x	x	x	x	x	x	x	

Premium Class End Mills

TOOL SPECIFICATIONS									MATERIAL GROUP													
									Non Ferrous		Iron	Steel								Specialty Alloy		Non Metal
Series	Page	Number of Flutes	Helix	End Style	Length	Neck Reach	Coating	Speeds & Feeds Page	Aluminum	Copper	Cast Iron	Low and Medium Carbon Steel	High Carbon Steel	Alloys Steel	Die Steel	Austenitic Stainless Steel	Precipitation Hardened	Hardened Steel	High Nickel Alloy	Titanium Alloy	Glass, Plastics, Composite Materials
PC400	19	4	30°	Square	Std	-	AlCrN	99-101	x		x	x		x	x	x	x	x			
PC401	19	3-6	45°	Square	Std	-	AlCrN	99-101	x		x	x		x	x	x	x	x			
PC410	20	2	30°	Square	Short	Neck	TiAlN	102		x		x		x	x	x	x	x			
PC410L	20	2	30°	Square	Short	Lg. Neck	TiAlN	102				x		x	x	x	x	x			
PC411	21	4	30°	Square	Short	Lg. Neck	TiAlN	102				x		x	x	x	x	x			
PC412	22-23	2	30°	Radius	Short	Lg. Neck	TiAlN	103		x		x		x	x	x	x	x			
PC413	23	2	30°	Ball	Short	Neck	TiAlN	104-105			x	x	x	x	x			x			
PC416	24	2	30°	Ball	Std	-	TiAlN	106-107			x	x	x	x					x	x	
PC418	25	2	30°	Ball	Short	Taper	TiAlN	108			x	x	x	x	x			x			
PC419	26	2	30°	Ball	Short	Neck	TiAlN	104-105			x	x	x	x	x			x			
PC419L	27	2	30°	Ball	Short	Lg. Neck	TiAlN	104-105			x	x	x	x	x			x			
PC420	28	2	30°	Ball	Std	-	Diamond	109	x	x											x
PC420BN	28	2	30°	Ball	Std	-	Diamond	109	x	x											x
PC421	29	2	35°	Square	Std	-	TiAlN	110-111			x	x	x	x		x	x	x	x	x	
PC421BN	29	2	35°	Ball	Std	-	TiAlN	112-113			x	x	x	x		x	x	x	x	x	
PC432	30	2	30°	Radius	Std	-	TiAlN	114			x	x	x	x	x			x			
PC433	31	2	30°	Radius	Std	Neck	TiAlN	114			x	x	x	x	x			x			
PC434	30	4	30°	Radius	Std	-	TiAlN	114-115			x	x	x	x	x			x			
PC435	32	4	30°	Radius	Std	Neck	TiAlN	114-115			x	x	x	x	x			x			
VH439	33	4	Variable	Square	Std	-	AlCrN	116-118			x	x	x	x	x	x	x	x	x	x	
VHR439	33	4	Variable	Square	Std	-	AlCrN	116-118			x	x	x	x	x	x	x	x	x	x	
PC440	33	2	40°	Square	Std	Neck	TiCN	115	x	x											
PC441	34	4	35°	Square	Std	-	TiAlN	111, 119			x	x	x	x		x	x	x	x	x	
PC441BN	34	4	35°	Ball	Std	-	TiAlN	112-113			x	x	x	x		x	x	x	x	x	
PC450	35	4-8	50°	Square	Std	-	AlCrN	120			x	x	x	x	x	x	x	x	x	x	
PC450L	35	4-8	50°	Square	Long	-	AlCrN	120			x	x	x	x	x	x	x	x	x	x	
PC451	36	4	50°	Square	Long	-	AlCrN	121			x	x	x	x	x	x	x	x			
PC453	36	4	50°	Square	Std	Neck	AlCrN	121			x	x	x	x	x	x	x	x			
PC455	37	5	45°	Square	Std	-	AlCrN	122			x	x	x	x	x	x	x	x	x	x	
PC456	37	4	50°	Square	Std	Neck	AlCrN	121			x	x	x	x	x	x	x	x			
PC460	38	3	60°	Square	Std	-	TiAlN	123			x	x	x	x		x	x	x	x		
PC470	38	2	30°	Square	Std	-	ZrN	124-125	x	x											
PC471	39	2	30°	Square	Long	-	ZrN	124-125	x	x											
PC475	39	3	45°	Square	Std	-	ZrN	126-127	x	x											
PC476	40	3	45°	Square	Long	-	ZrN	126-127	x	x											
PC497	40	2	15°	Ball	Short	-	TiAlN	128			x	x	x	x	x	x	x	x	x	x	

General Purpose End Mills

TOOL SPECIFICATIONS									MATERIAL GROUP													
									Non Ferrous		Iron	Steel								Specialty Alloy		Non Metal
Series	Page	Number of Flutes	Helix	End Style	Length	Neck Reach	Coating	Speeds & Feeds Page	Aluminum	Copper	Cast Iron	Low and Medium Carbon Steel	High Carbon Steel	Alloys Steel	Die Steel	Austenitic Stainless Steel	Precipitation Hardened	Hardened Steel	High Nickel Alloy	Titanium Alloy	Glass, Plastics, Composite Materials
EM400	51	4	30°	Square	Std	-	-	129	x	x	x	x	x	x	x	x	x	x	x		
EM401	51	3-6	45°	Square	Std	-	-	129	x	x	x	x	x	x	x	x	x	x	x		
EM402	52	2	30°	Square	Std	-	-	130-131	x	x	x	x	x	x	x	x	x	x			
EM402BN	53	2	30°	Ball	Std	-	-	132	x	x	x	x	x	x	x	x	x	x			
EM403	52	3	30°	Square	Std	-	-	130-131	x	x	x	x	x	x	x	x	x	x			
EM403BN	53	3	30°	Ball	Std	-	-	132	x	x	x	x	x	x	x	x	x	x			
EM404	52	4	30°	Radius	Std	-	-	133-134	x	x	x	x	x	x	x	x	x	x			
EM404BN	53	4	30°	Ball	Std	-	-	132	x	x	x	x	x	x	x	x	x	x			
EM440	54	2	40°	Square	Std	-	-	134	x	x											
EM460	55	3	60°	Square	Std	-	-	135								x	x	x		x	
EM461	55	6	30°	Square	Std	-	-	133-134					x	x		x	x	x	x		
EM462	56	2	30°	Square	Long	-	-	130-131	x	x	x	x	x	x	x	x	x	x			
EM462BN	56	2	30°	Ball	Long	-	-	132	x	x	x	x	x	x	x	x	x	x			
EM464	57	4	30°	Square	Long	-	-	133-134	x	x	x	x	x	x	x	x	x	x			
EM464BN	57	4	30°	Ball	Long	-	-	132	x	x	x	x	x	x	x	x	x	x			
EM470	58	2	30°	Square	Std	-	-	124-125	x	x											
EM471	58	2	30°	Square	Std	-	-	124-125	x	x											
EM475	59	3	45°	Square	Std	-	-	126-127	x	x											
EM476	59	3	45°	Square	Std	-	-	126-127	x	x											
EM482	60	2	30°	Square	X-Long	-	-	130-131	x	x	x	x	x	x	x	x	x	x			
EM482BN	60	2	30°	Ball	X-Long	-	-	132	x	x	x	x	x	x	x	x	x	x			
EM484	61	4	30°	Square	X-Long	-	-	133-134	x	x	x	x	x	x	x	x	x	x			
EM484BN	61	4	30°	Ball	X-Long	-	-	132	x	x	x	x	x	x	x	x	x	x			
EM497	62	2	15°	Ball	Short	-	-	135	x	x	x	x	x	x	x	x	x	x			

Burs

Double Cut, Medium Right Hand Spiral, Aluminum Cut

Series BR801 - BR920 Pages 64-75

Aircraft

Countersinks, Reamers, Routers and Drills

Pages 77-78

AlCrN, TiAlN, TiCN

Alcrona AlCrN (Aluminium Chromium Nitride)

Alcrona (AlCrN),produced in the INNOVA, is a Titanium free coating for broad application in machining and forming operations. Alcrona has remarkable wear resistance at lower speeds and feeds and under high mechanical loads. At higher speeds, where hot hardness and oxidation resistance are important, Alcrona excels, compared to Titanium based coatings, with an operating temperature up to 1,100°C. Alcrona is applicable to HSS and carbide tooling and for forming and forging operations, as well as cutting operations.

Alcrona has shown great results in machining a wide variety of hardened steels up to 54 HRC both with and without coolant as well as low alloy steels and high tensile steels.

Applications and Benefits
- Low alloy steels and high tensile steels
- Hardened steels up to 54 HRC
- Forming/punching/blanking and hot forging

Improved Performance with
- High speed machining
- Dry or MQL machining
- Higher productivity

- Colour Blue - Grey
- Coating Thickness 4 µm
- Microhardness 3200 HV
- Coeff. Friction vs Steel 0.35
- Thermal Stability up to 1,100ºC

Futura Nano TiAlN (Titanium Aluminium Nitride)

Futura Nano (TiAlN), produced in the INNOVA, is a great all round coating for both HSS and carbide tools, especially in applications where there is a high thermal load. TiAlN has a nanolayered structure which was engineered to give an optimum balance between hardness and internal stress. High internal compressive stresses help to reduce the propagation of cracks through a coating therefore delaying the onset of failure. TiAlN also has improved sliding properties.

Applications and Benefits
- Abrasive materials - cast iron and heat treated steel
- Difficult to machine materials, such as stainless steel
- Higher speeds and feeds
- Reduces or eliminates use of coolants

Improved Performance with
- Higher speed and feed machining
- Dry or MQL machining
- Machining of harder materials

- Colour Violet - Grey
- Coating Thickness 4 µm
- Microhardness 3300HV
- Thermal Stability up to 900ºC
- Coefficient of Friction vs Steel 0.3 - 0.35

TiCN (Titanium Carbonitride)

TiCN has a fine grain dense structure that provides excellent toughness and high hardness. TiCN is harder and tougher than TiN, consequently it exhibits a high resistance to edge chipping.

This coating is a good choice for milling, forming and punching tools that encounter high mechanical stresses. TiCN is also recommended for applications cutting highly abrasive and/or gummy materials such as cast iron, brass and some cast aluminium alloys. LVEB TiCN is extremely smooth.

Applications and Benefits
- High performance applications
- Difficult to machine materials
- Abrasive materials - cast iron and aluminium alloys
- Adhesive materials - copper and copper based alloys
- Higher speeds and feeds possible for enhanced machine productivity compared to TiN
- Wear resistance and toughness superior to TiN

Improved performance with
- Higher speed conventional milling
- Gear cutting tools
- Heavy duty stamping
- Plastic moulds and extrusion tools for plastics containing >30% glass fillers (abrasion resistance)
- Deep drawing tools

- Colour Blue - Grey
- Coating Thickness 2 - 4 µm
- Microhardness 3000 HV
- Coefficient of Friction vs Steel 0.4
- Thermal Stability up to 400ºC

AlTiN, TiN, ZrN

TiN (Titanium Nitride)
TiN was the first PVD wear resistant film coating introduced at Surface Technology Coatings, using the world's leading low voltage electron beam technology by Balzers of Switzerland. TiN is the standard general purpose coating for protecting a wide variety of tools and parts from wear. TiN is a good choice for the machining of iron based materials, die casting and plastic mould tooling.

TiN is also a good coating for wear part applications demanding resistance to abrasive and adhesive wear. TiN is also an attractive gold colour. LVEB TiN is extremely smooth.

Applications and Benefits
- General purpose use
- 3 to 8 times longer tool life
- Wide range of materials
- Higher tool speeds and feeds than uncoated tools

Improved performance with
- Wide range of cutting tools in both HSS and Carbide
- Plastic moulds and moulding machine parts
- Slitting knives for the plastic and paper industries
- Wear parts
- Medical and dental instruments
- Forming tools

- Colour Gold - Yellow
- Coating Thickness 1- 3 µm
- Microhardness 2300 HV
- Coefficient of Friction vs Steel 0.4
- Thermal Stability up to 600ºC

AlTiN (Aluminum Titanium Nitride)

AlTiN has very similar features to TiAlN. It is ideal for high temperature cutting operations in the same materials as TiAlN and has the same oxidation effect. AlTiN has a higher aluminum content which makes it much harder and smoother than TiAlN. It is ideal for smaller depths of cut and excels in high speed and dry machining applications and when machining hardened steel.

Applications and Benefits
- Used for nickel based alloys, stainless steel, hardened steels, and titanium.
- Extremely heat resistant

- Maximum Working Temperature = 800° C/1470° F
- Coating Thickness (microns) = 1-2
- Coefficient of Friction Against Steel (Dry) = 0.4
- Microhardness (HV 0.05) = 3500

ZrN

Zirconium Nitride (ZrN): The next generation of coating developed specifically for machining aluminum yet excellent when machining all non-ferrous materials. ZrN is also, highly recommended for machining fiberglass, nylon and most polymer materials.

Applications and Benefits
- Used for aluminum alloys, cast iron, high temperature alloys, stainless steels, and non-ferrous metals
- Very effective in glass filled plastics and wood

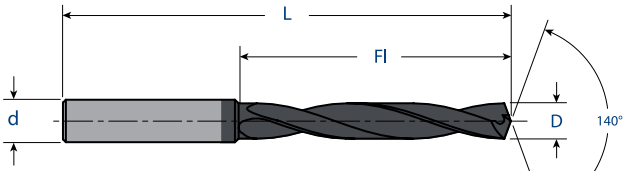
Improved performance with
- Maximum Working Temperature = 600° C/1110° F
- Coating Thickness (microns) = 1-2
- Coefficient of Friction Against Steel (Dry) = 0.55
- Microhardness (HV 0.05) = 3000

MADE TO ORDER TOOLS

PREMIUM CLASS DRILLS

PC243 WITH TiAlN COATING

2 Flute - 3 x D Drilling Capability - 25°-30° Helix



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

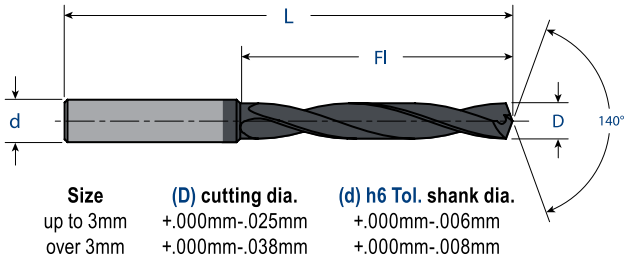
PC243	D cutting dia.	Fl flute length	d shank dia.	L overall Length
PC243-1181	3.0	20	6	62
PC243-1220	3.1	20	6	62
PC243-1260	3.2	20	6	62
PC243-1299	3.3	20	6	62
PC243-1339	3.4	20	6	62
PC243-1378	3.5	20	6	62
PC243-1417	3.6	20	6	62
PC243-1457	3.7	24	6	62
PC243-1496	3.8	24	6	66
PC243-1535	3.9	24	6	66
PC243-1575	4.0	24	6	66
PC243-1614	4.1	24	6	66
PC243-1654	4.2	24	6	66
PC243-1693	4.3	24	6	66
PC243-1732	4.4	24	6	66
PC243-1772	4.5	24	6	66
PC243-1811	4.6	24	6	66
PC243-1850	4.7	24	6	66
PC243-1890	4.8	28	6	66
PC243-1929	4.9	28	6	66
PC243-1969	5.0	28	6	66
PC243-2008	5.1	28	6	66
PC243-2047	5.2	28	6	66
PC243-2087	5.3	28	6	66
PC243-2126	5.4	28	6	66
PC243-2165	5.5	28	6	66
PC243-2205	5.6	28	6	66
PC243-2244	5.7	28	6	66
PC243-2283	5.8	28	6	66
PC243-2323	5.9	28	6	66
PC243-2362	6.0	28	6	66
PC243-2402	6.1	34	8	79

PC243	D cutting dia.	Fl flute length	d shank dia.	L overall Length
PC243-2441	6.2	34	8	79
PC243-2480	6.3	34	8	79
PC243-2520	6.4	34	8	79
PC243-2559	6.5	34	8	79
PC243-2598	6.6	34	8	79
PC243-2638	6.7	34	8	79
PC243-2677	6.8	34	8	79
PC243-2717	6.9	34	8	79
PC243-2756	7.0	34	8	79
PC243-2795	7.1	41	8	79
PC243-2835	7.2	41	8	79
PC243-2874	7.3	41	8	79
PC243-2913	7.4	41	8	79
PC243-2953	7.5	41	8	79
PC243-2992	7.6	41	8	79
PC243-3031	7.7	41	8	79
PC243-3071	7.8	41	8	79
PC243-3110	7.9	41	8	79
PC243-3150	8.0	41	8	79
PC243-3189	8.1	47	10	89
PC243-3228	8.2	47	10	89
PC243-3268	8.3	47	10	89
PC243-3307	8.4	47	10	89
PC243-3346	8.5	47	10	89
PC243-3386	8.6	47	10	89
PC243-3425	8.7	47	10	89
PC243-3465	8.8	47	10	89
PC243-3504	8.9	47	10	89
PC243-3543	9.0	47	10	89
PC243-3583	9.1	47	10	89
PC243-3622	9.2	47	10	89
PC243-3661	9.3	47	10	89

For speeds and feeds, refer to pages 80-81.

PC243 WITH TiAlN COATING

2 Flute - 3 x D Drilling Capability - 25°-30° Helix



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

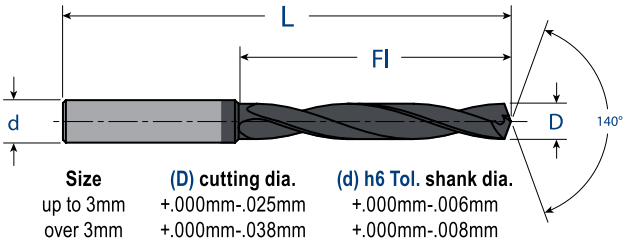
PC243	D cutting dia.	Fl flute length	d shank dia.	L overall length
PC243-3701	9.4	47	10	89
PC243-3740	9.5	47	10	89
PC243-3780	9.6	47	10	89
PC243-3819	9.7	47	10	89
PC243-3858	9.8	47	10	89
PC243-3898	9.9	47	10	89
PC243-3937	10.0	47	10	89
PC243-3976	10.1	55	12	102
PC243-4016	10.2	55	12	102
PC243-4055	10.3	55	12	102
PC243-4094	10.4	55	12	102
PC243-4134	10.5	55	12	102
PC243-4173	10.6	55	12	102
PC243-4213	10.7	55	12	102
PC243-4252	10.8	55	12	102
PC243-4291	10.9	55	12	102
PC243-4331	11.0	55	12	102
PC243-4370	11.1	55	12	102
PC243-4409	11.2	55	12	102
PC243-4449	11.3	55	12	102
PC243-4488	11.4	55	12	102
PC243-4528	11.5	55	12	102
PC243-4567	11.6	55	12	102
PC243-4606	11.7	55	12	102
PC243-4646	11.8	55	12	102
PC243-4685	11.9	55	12	102
PC243-4724	12.0	55	12	102
PC243-4764	12.1	60	14	107
PC243-4803	12.2	60	14	107
PC243-4843	12.3	60	14	107
PC243-4882	12.4	60	14	107
PC243-4921	12.5	60	14	107

PC243	D cutting dia.	Fl flute length	d shank dia.	L overall length
PC243-4961	12.6	60	14	107
PC243-5000	12.7	60	14	107
PC243-5039	12.8	60	14	107
PC243-5079	12.9	60	14	107
PC243-5118	13.0	60	14	107
PC243-5157	13.1	60	14	107
PC243-5197	13.2	60	14	107
PC243-5236	13.3	60	14	107
PC243-5276	13.4	60	14	107
PC243-5315	13.5	60	14	107
PC243-5512	14.0	60	14	107
PC243-5709	14.5	65	16	115
PC243-5906	15.0	65	16	115
PC243-6102	15.5	65	16	115
PC243-6299	16.0	65	16	115
PC243-6496	16.5	73	18	123
PC243-6693	17.0	73	18	123
PC243-6890	17.5	73	18	123
PC243-7087	18.0	73	18	123
PC243-7283	18.5	79	20	131
PC243-7480	19.0	79	20	131
PC243-7677	19.5	79	20	131
PC243-7874	20.0	79	20	131

For speeds and feeds, refer to pages 80-81.

PC245 WITH TiAlN COATING

2 Flute - 5 x D Drilling Capability - 25°-30° Helix



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

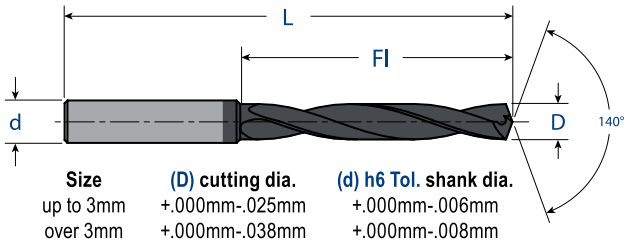
PC245	D cutting dia.	Fl flute length	d shank dia.	L overall Length
PC245-1181	3.0	28	6	66
PC245-1220	3.1	28	6	66
PC245-1260	3.2	28	6	66
PC245-1299	3.3	28	6	66
PC245-1339	3.4	28	6	66
PC245-1378	3.5	28	6	66
PC245-1417	3.6	28	6	66
PC245-1457	3.7	28	6	66
PC245-1496	3.8	36	6	74
PC245-1535	3.9	36	6	74
PC245-1575	4.0	36	6	74
PC245-1614	4.1	36	6	74
PC245-1654	4.2	36	6	74
PC245-1693	4.3	36	6	74
PC245-1732	4.4	36	6	74
PC245-1772	4.5	36	6	74
PC245-1811	4.6	36	6	74
PC245-1850	4.7	44	6	82
PC245-1890	4.8	44	6	82
PC245-1929	4.9	44	6	82
PC245-1969	5.0	44	6	82
PC245-2008	5.1	44	6	82
PC245-2047	5.2	44	6	82
PC245-2087	5.3	44	6	82
PC245-2126	5.4	44	6	82
PC245-2165	5.5	44	6	82
PC245-2205	5.6	44	6	82
PC245-2244	5.7	44	6	82
PC245-2283	5.8	44	6	82
PC245-2323	5.9	44	6	82
PC245-2362	6.0	44	6	82
PC245-2402	6.1	53	8	91

PC245	D cutting dia.	Fl flute length	d shank dia.	L overall Length
PC245-2441	6.2	53	8	91
PC245-2480	6.3	53	8	91
PC245-2520	6.4	53	8	91
PC245-2559	6.5	53	8	91
PC245-2598	6.6	53	8	91
PC245-2638	6.7	53	8	91
PC245-2677	6.8	53	8	91
PC245-2717	6.9	53	8	91
PC245-2756	7.0	53	8	91
PC245-2795	7.1	53	8	91
PC245-2835	7.2	53	8	91
PC245-2874	7.3	53	8	91
PC245-2913	7.4	53	8	91
PC245-2953	7.5	53	8	91
PC245-2992	7.6	53	8	91
PC245-3031	7.7	53	8	91
PC245-3071	7.8	53	8	91
PC245-3110	7.9	53	8	91
PC245-3150	8.0	53	8	91
PC245-3189	8.1	61	10	103
PC245-3228	8.2	61	10	103
PC245-3268	8.3	61	10	103
PC245-3307	8.4	61	10	103
PC245-3346	8.5	61	10	103
PC245-3386	8.6	61	10	103
PC245-3425	8.7	61	10	103
PC245-3465	8.8	61	10	103
PC245-3504	8.9	61	10	103
PC245-3543	9.0	61	10	103
PC245-3583	9.1	61	10	103
PC245-3622	9.2	61	10	103
PC245-3661	9.3	61	10	103

For speeds and feeds, refer to pages 82-83.

PC245 WITH TiAlN COATING

2 Flute - 5 x D Drilling Capability - 25°-30° Helix



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

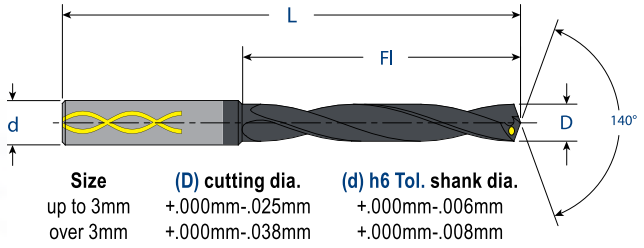
PC245	D cutting dia.	Fl flute length	d shank dia.	L overall Length
PC245-3701	9.4	61	10	103
PC245-3740	9.5	61	10	103
PC245-3780	9.6	61	10	103
PC245-3819	9.7	61	10	103
PC245-3858	9.8	61	10	103
PC245-3898	9.9	61	10	103
PC245-3937	10.0	61	10	103
PC245-3976	10.1	71	12	118
PC245-4016	10.2	71	12	118
PC245-4055	10.3	71	12	118
PC245-4094	10.4	71	12	118
PC245-4134	10.5	71	12	118
PC245-4173	10.6	71	12	118
PC245-4213	10.7	71	12	118
PC245-4252	10.8	71	12	118
PC245-4291	10.9	71	12	118
PC245-4331	11.0	71	12	118
PC245-4370	11.1	71	12	118
PC245-4409	11.2	71	12	118
PC245-4449	11.3	71	12	118
PC245-4488	11.4	71	12	118
PC245-4528	11.5	71	12	118
PC245-4567	11.6	71	12	118
PC245-4606	11.7	71	12	118
PC245-4646	11.8	71	12	118
PC245-4685	11.9	71	12	118
PC245-4724	12.0	71	12	118
PC245-4764	12.1	77	14	124
PC245-4803	12.2	77	14	124
PC245-4843	12.3	77	14	124
PC245-4882	12.4	77	14	124
PC245-4921	12.5	77	14	124

PC245	D cutting dia.	Fl flute length	d shank dia.	L overall Length
PC245-4961	12.6	77	14	124
PC245-5000	12.7	77	14	124
PC245-5039	12.8	77	14	124
PC245-5079	12.9	77	14	124
PC245-5118	13.0	77	14	124
PC245-5157	13.1	77	14	124
PC245-5197	13.2	77	14	124
PC245-5236	13.3	77	14	124
PC245-5276	13.4	77	14	124
PC245-5315	13.5	77	14	124
PC245-5512	14.0	77	14	124
PC245-5709	14.5	83	16	133
PC245-5906	15.0	83	16	133
PC245-6102	15.5	83	16	133
PC245-6299	16.0	83	16	133
PC245-6496	16.5	93	18	143
PC245-6693	17.0	93	18	143
PC245-6890	17.5	93	18	143
PC245-7087	18.0	93	18	143
PC245-7283	18.5	101	20	153
PC245-7480	19.0	101	20	153
PC245-7677	19.5	101	20	153
PC245-7874	20.0	101	20	153

For speeds and feeds, refer to pages 82-83.

PC253 WITH TiAlN COATING

2 Flute - 3 x D Drilling Capability - 25°-30° Helix - Coolant Fed



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

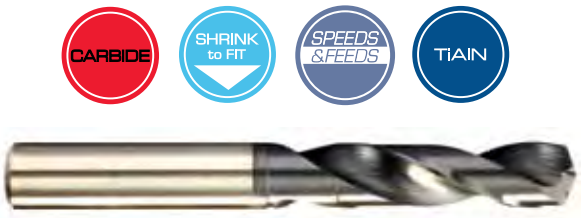
PC253	D cutting dia.	fl flute length	d shank dia.	L overall Length
PC253-1181	3.0	20	6	62
PC253-1220	3.1	20	6	62
PC253-1260	3.2	20	6	62
PC253-1299	3.3	20	6	62
PC253-1339	3.4	20	6	62
PC253-1378	3.5	20	6	62
PC253-1417	3.6	20	6	62
PC253-1457	3.7	24	6	62
PC253-1496	3.8	24	6	66
PC253-1535	3.9	24	6	66
PC253-1575	4.0	24	6	66
PC253-1614	4.1	24	6	66
PC253-1654	4.2	24	6	66
PC253-1693	4.3	24	6	66
PC253-1732	4.4	24	6	66
PC253-1772	4.5	24	6	66
PC253-1811	4.6	24	6	66
PC253-1850	4.7	24	6	66
PC253-1890	4.8	28	6	66
PC253-1929	4.9	28	6	66
PC253-1969	5.0	28	6	66
PC253-2008	5.1	28	6	66
PC253-2047	5.2	28	6	66
PC253-2087	5.3	28	6	66
PC253-2126	5.4	28	6	66
PC253-2165	5.5	28	6	66
PC253-2205	5.6	28	6	66
PC253-2244	5.7	28	6	66
PC253-2283	5.8	28	6	66
PC253-2323	5.9	28	6	66
PC253-2362	6.0	28	6	66
PC253-2402	6.1	34	8	79

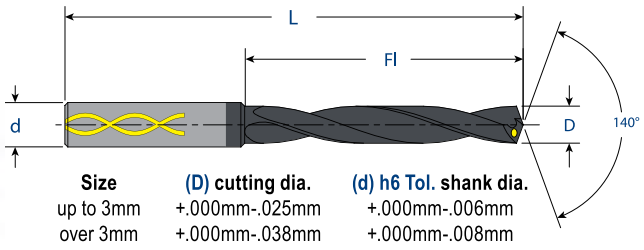
PC253	D cutting dia.	fl flute length	d shank dia.	L overall Length
PC253-2441	6.2	34	8	79
PC253-2480	6.3	34	8	79
PC253-2520	6.4	34	8	79
PC253-2559	6.5	34	8	79
PC253-2598	6.6	34	8	79
PC253-2638	6.7	34	8	79
PC253-2677	6.8	34	8	79
PC253-2717	6.9	34	8	79
PC253-2756	7.0	34	8	79
PC253-2795	7.1	41	8	79
PC253-2835	7.2	41	8	79
PC253-2874	7.3	41	8	79
PC253-2913	7.4	41	8	79
PC253-2953	7.5	41	8	79
PC253-2992	7.6	41	8	79
PC253-3031	7.7	41	8	79
PC253-3071	7.8	41	8	79
PC253-3110	7.9	41	8	79
PC253-3150	8.0	41	8	79
PC253-3189	8.1	47	10	89
PC253-3228	8.2	47	10	89
PC253-3268	8.3	47	10	89
PC253-3307	8.4	47	10	89
PC253-3346	8.5	47	10	89
PC253-3386	8.6	47	10	89
PC253-3425	8.7	47	10	89
PC253-3465	8.8	47	10	89
PC253-3504	8.9	47	10	89
PC253-3543	9.0	47	10	89
PC253-3583	9.1	47	10	89
PC253-3622	9.2	47	10	89
PC253-3661	9.3	47	10	89

For speeds and feeds, refer to pages 84-85.

PC253 WITH TiAlN COATING

2 Flute - 3 x D Drilling Capability - 25°-30° Helix - Coolant Fed





Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

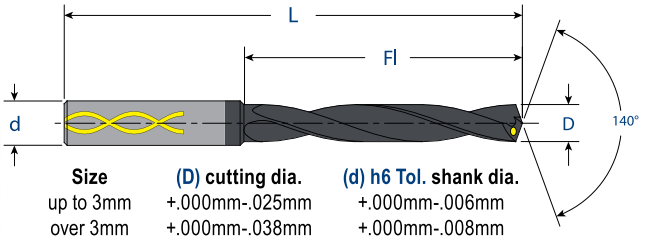
PC253	D cutting dia.	Fl flute length	d shank dia.	L overall length
PC253-3701	9.4	47	10	89
PC253-3740	9.5	47	10	89
PC253-3780	9.6	47	10	89
PC253-3819	9.7	47	10	89
PC253-3858	9.8	47	10	89
PC253-3898	9.9	47	10	89
PC253-3937	10.0	47	10	89
PC253-3976	10.1	55	12	102
PC253-4016	10.2	55	12	102
PC253-4055	10.3	55	12	102
PC253-4094	10.4	55	12	102
PC253-4134	10.5	55	12	102
PC253-4173	10.6	55	12	102
PC253-4213	10.7	55	12	102
PC253-4252	10.8	55	12	102
PC253-4291	10.9	55	12	102
PC253-4331	11.0	55	12	102
PC253-4370	11.1	55	12	102
PC253-4409	11.2	55	12	102
PC253-4449	11.3	55	12	102
PC253-4488	11.4	55	12	102
PC253-4528	11.5	55	12	102
PC253-4567	11.6	55	12	102
PC253-4606	11.7	55	12	102
PC253-4646	11.8	55	12	102
PC253-4685	11.9	55	12	102
PC253-4724	12.0	55	12	102
PC253-4764	12.1	60	14	107
PC253-4803	12.2	60	14	107
PC253-4843	12.3	60	14	107
PC253-4882	12.4	60	14	107
PC253-4921	12.5	60	14	107

PC253	D cutting dia.	Fl flute length	d shank dia.	L overall length
PC253-4961	12.6	60	14	107
PC253-5000	12.7	60	14	107
PC253-5039	12.8	60	14	107
PC253-5079	12.9	60	14	107
PC253-5118	13.0	60	14	107
PC253-5157	13.1	60	14	107
PC253-5197	13.2	60	14	107
PC253-5236	13.3	60	14	107
PC253-5276	13.4	60	14	107
PC253-5315	13.5	60	14	107
PC253-5512	14.0	60	14	107
PC253-5709	14.5	65	16	115
PC253-5906	15.0	65	16	115
PC253-6102	15.5	65	16	115
PC253-6299	16.0	65	16	115
PC253-6496	16.5	73	18	123
PC253-6693	17.0	73	18	123
PC253-6890	17.5	73	18	123
PC253-7087	18.0	73	18	123
PC253-7283	18.5	79	20	131
PC253-7480	19.0	79	20	131
PC253-7677	19.5	79	20	131
PC253-7874	20.0	79	20	131

For speeds and feeds, refer to pages 84-85.

PC255 WITH TiAlN COATING

2 Flute - 5 x D Drilling Capability - 25°-30° Helix - Coolant Fed



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

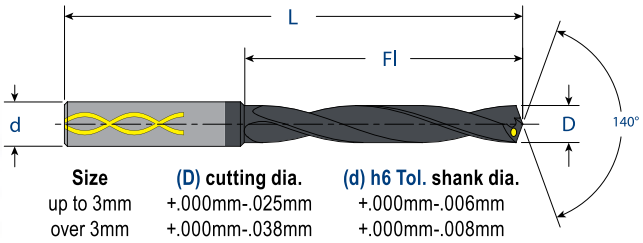
PC255	D cutting dia.	Fl flute length	d shank dia.	L overall Length
PC255-1181	3.0	28	6	66
PC255-1220	3.1	28	6	66
PC255-1260	3.2	28	6	66
PC255-1299	3.3	28	6	66
PC255-1339	3.4	28	6	66
PC255-1378	3.5	28	6	66
PC255-1417	3.6	28	6	66
PC255-1457	3.7	28	6	66
PC255-1496	3.8	36	6	74
PC255-1535	3.9	36	6	74
PC255-1575	4.0	36	6	74
PC255-1614	4.1	36	6	74
PC255-1654	4.2	36	6	74
PC255-1693	4.3	36	6	74
PC255-1732	4.4	36	6	74
PC255-1772	4.5	36	6	74
PC255-1811	4.6	44	6	82
PC255-1850	4.7	44	6	82
PC255-1890	4.8	44	6	82
PC255-1929	4.9	44	6	82
PC255-1969	5.0	44	6	82
PC255-2008	5.1	44	6	82
PC255-2047	5.2	44	6	82
PC255-2087	5.3	44	6	82
PC255-2126	5.4	44	6	82
PC255-2165	5.5	44	6	82
PC255-2205	5.6	44	6	82
PC255-2244	5.7	44	6	82
PC255-2283	5.8	44	6	82
PC255-2323	5.9	44	6	82
PC255-2362	6.0	44	6	82
PC255-2402	6.1	53	8	91

PC255	D cutting dia.	Fl flute length	d shank dia.	L overall Length
PC255-2441	6.2	53	8	91
PC255-2480	6.3	53	8	91
PC255-2520	6.4	53	8	91
PC255-2559	6.5	53	8	91
PC255-2598	6.6	53	8	91
PC255-2638	6.7	53	8	91
PC255-2677	6.8	53	8	91
PC255-2717	6.9	53	8	91
PC255-2756	7.0	53	8	91
PC255-2795	7.1	53	8	91
PC255-2835	7.2	53	8	91
PC255-2874	7.3	53	8	91
PC255-2913	7.4	53	8	91
PC255-2953	7.5	53	8	91
PC255-2992	7.6	53	8	91
PC255-3031	7.7	53	8	91
PC255-3071	7.8	53	8	91
PC255-3110	7.9	53	8	91
PC255-3150	8.0	53	8	91
PC255-3189	8.1	61	10	103
PC255-3228	8.2	61	10	103
PC255-3268	8.3	61	10	103
PC255-3307	8.4	61	10	103
PC255-3346	8.5	61	10	103
PC255-3386	8.6	61	10	103
PC255-3425	8.7	61	10	103
PC255-3465	8.8	61	10	103
PC255-3504	8.9	61	10	103
PC255-3543	9.0	61	10	103
PC255-3583	9.1	61	10	103
PC255-3622	9.2	61	10	103
PC255-3661	9.3	61	10	103

For speeds and feeds, refer to pages 86-87.

PC255 WITH TiAlN COATING

2 Flute - 5 x D Drilling Capability - 25°-30° Helix - Coolant Fed



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC255	D cutting dia.	Fl flute length	d shank dia.	L overall Length
PC255-3701	9.4	61	10	103
PC255-3740	9.5	61	10	103
PC255-3780	9.6	61	10	103
PC255-3819	9.7	61	10	103
PC255-3858	9.8	61	10	103
PC255-3898	9.9	61	10	103
PC255-3937	10.0	61	10	103
PC255-3976	10.1	71	12	118
PC255-4016	10.2	71	12	118
PC255-4055	10.3	71	12	118
PC255-4094	10.4	71	12	118
PC255-4134	10.5	71	12	118
PC255-4173	10.6	71	12	118
PC255-4213	10.7	71	12	118
PC255-4252	10.8	71	12	118
PC255-4291	10.9	71	12	118
PC255-4331	11.0	71	12	118
PC255-4370	11.1	71	12	118
PC255-4409	11.2	71	12	118
PC255-4449	11.3	71	12	118
PC255-4488	11.4	71	12	118
PC255-4528	11.5	71	12	118
PC255-4567	11.6	71	12	118
PC255-4606	11.7	71	12	118
PC255-4646	11.8	71	12	118
PC255-4685	11.9	71	12	118
PC255-4724	12.0	71	12	118
PC255-4764	12.1	77	14	124
PC255-4803	12.2	77	14	124
PC255-4843	12.3	77	14	124
PC255-4882	12.4	77	14	124
PC255-4921	12.5	77	14	124

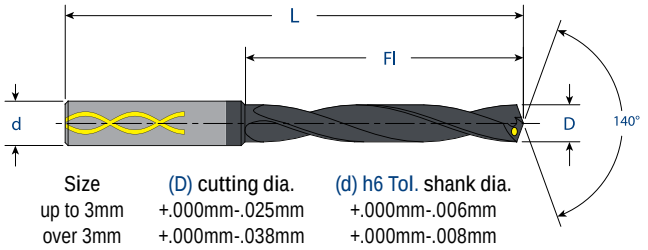
PC255	D cutting dia.	Fl flute length	d shank dia.	L overall Length
PC255-4961	12.6	77	14	124
PC255-5000	12.7	77	14	124
PC255-5039	12.8	77	14	124
PC255-5079	12.9	77	14	124
PC255-5118	13.0	77	14	124
PC255-5157	13.1	77	14	124
PC255-5197	13.2	77	14	124
PC255-5236	13.3	77	14	124
PC255-5276	13.4	77	14	124
PC255-5315	13.5	77	14	124
PC255-5512	14.0	77	14	124
PC255-5709	14.5	83	16	133
PC255-5906	15.0	83	16	133
PC255-6102	15.5	83	16	133
PC255-6299	16.0	83	16	133
PC255-6496	16.5	93	18	143
PC255-6693	17.0	93	18	143
PC255-6890	17.5	93	18	143
PC255-7087	18.0	93	18	143
PC255-7283	18.5	101	20	153
PC255-7480	19.0	101	20	153
PC255-7677	19.5	101	20	153
PC255-7874	20.0	101	20	153

For speeds and feeds, refer to pages 86-87.

PC258 WITH TiAlN COATING

2 Flute - 8 x D Drilling Capability - 25°-30° Helix - Coolant Fed

CARBIDE | SHRINK to FIT | SPEEDS & FEEDS | TiAlN



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC258	D cutting dia.	fl flute length	d shank dia.	L overall length
PC258-1181	3.0	34	6	72
PC258-1220	3.1	34	6	72
PC258-1260	3.2	34	6	72
PC258-1299	3.3	34	6	72
PC258-1339	3.4	34	6	72
PC258-1378	3.5	34	6	72
PC258-1417	3.6	34	6	72
PC258-1457	3.7	34	6	72
PC258-1496	3.8	42	6	80
PC258-1535	3.9	42	6	80
PC258-1575	4.0	42	6	80
PC258-1614	4.1	42	6	80
PC258-1654	4.2	42	6	80
PC258-1693	4.3	42	6	80
PC258-1732	4.4	42	6	80
PC258-1772	4.5	42	6	80
PC258-1811	4.6	42	6	80
PC258-1850	4.7	42	6	80
PC258-1890	4.8	57	6	95
PC258-1929	4.9	57	6	95

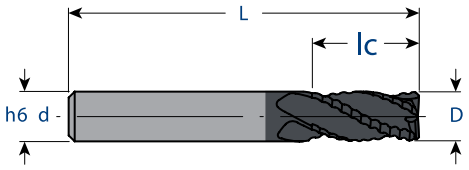
PC258	D cutting dia.	Fl flute length	d shank dia.	L overall length
PC258-1969	5.0	57	6	95
PC258-2165	5.5	57	6	95
PC258-2362	6.0	57	6	95
PC258-2559	6.5	76	8	116
PC258-2756	7.0	76	8	116
PC258-2953	7.5	76	8	116
PC258-3150	8.0	76	8	116
PC258-3346	8.5	87	10	131
PC258-3543	9.0	87	10	131
PC258-3740	9.5	95	10	139
PC258-3937	10.0	95	10	139
PC258-4134	10.5	106	12	155
PC258-4331	11.0	106	12	155
PC258-4528	11.5	114	12	163
PC258-4724	12.0	114	12	163
PC258-4921	12.5	133	14	182
PC258-5118	13.0	133	14	182
PC258-5315	13.5	133	14	182
PC258-5512	14.0	133	14	182
PC258-5709	14.5	152	16	204
PC258-5906	15.0	152	16	204
PC258-6102	15.5	152	16	204
PC258-6299	16.0	152	16	204
PC258-6496	16.5	171	18	223
PC258-6693	17.0	171	18	223
PC258-6890	17.5	171	18	223
PC258-7087	18.0	171	18	223
PC258-7283	18.5	190	20	244
PC258-7480	19.0	190	20	244
PC258-7677	19.5	190	20	244
PC258-7874	20.0	190	20	244

For speeds and feeds, refer to pages 88-89.

PREMIUM CLASS END MILLS

PC400 WITH AlCrN COATING

4 Flute - Rough Style - 30° Helix

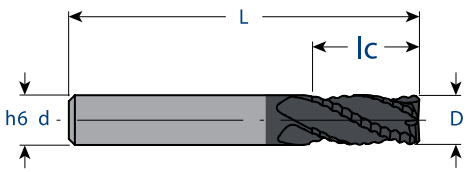


Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC400 4 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC400-1181	3.0	10	4	64
PC400-1575	4.0	14	6	64
PC400-1969	5.0	15	6	64
PC400-2362	6.0	19	6	64
PC400-3150	8.0	21	8	64
PC400-3937	10.0	25	10	70
PC400-4724	12.0	25	12	76
PC400-6299	16.0	32	16	89
PC400-7874	20.0	38	20	102
PC400-9843	25.0	38	25	102

PC401 WITH AlCrN COATING

4 Flute - Rough Style - 45° Helix



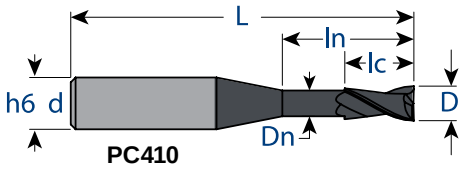
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC401 3-6 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC401-1181	3.0	10	4	64
PC401-1575	4.0	14	6	64
PC401-1969	5.0	15	6	64
PC401-2362	6.0	19	6	64
PC401-3150	8.0	21	8	64
PC401-3937	10.0	25	10	70
PC401-4724	12.0	25	12	76
PC401-6299	16.0	32	16	89
PC401-7874	20.0	38	20	102
PC401-9843	25.0	38	25	102

For speeds and feeds, refer to pages 99-101.

PC410 WITH TiAlN COATING

2 Flute - Square End - Necked Design - Standard Length

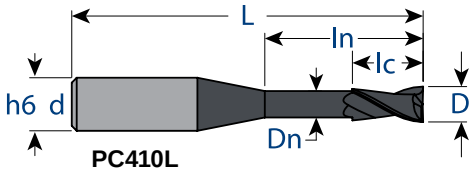


Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC410 2 flute	D mill dia.	lc length of cut	ln neck length	Dn neck dia.	d shank dia.	L overall length
PC410-0197	0.5	0.7	2.5	0.45	6	60
PC410-0236	0.6	0.9	3.0	0.55	6	60
PC410-0315	0.8	1.2	4.0	0.75	6	60
PC410-0394	1.0	1.5	5.0	0.95	6	60
PC410-0472	1.2	1.8	6.0	1.15	6	60
PC410-0551	1.4	2.1	7.0	1.35	6	60
PC410-0591	1.5	2.3	7.5	1.45	6	60
PC410-0630	1.6	2.4	8.0	1.55	6	60
PC410-0709	1.8	2.7	9.0	1.75	6	60
PC410-0787	2.0	3.0	10	1.95	6	60
PC410-0984	2.5	3.7	12.5	2.40	6	60

PC410L WITH TiAlN COATING

2 Flute - Square End - Necked Design - Long Neck



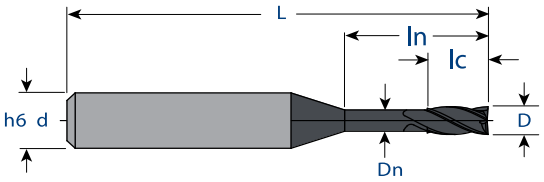
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC410L 2 flute	D mill dia.	lc length of cut	ln neck length	Dn neck dia.	d shank dia.	L overall length
PC410L-0197	0.5	0.7	4.0	0.45	6	60
PC410L-0198	0.5	0.7	6.0	0.45	6	60
PC410L-0236	0.6	0.9	6.0	0.55	6	60
PC410L-0315	0.8	1.2	6.0	0.75	6	60
PC410L-0394	1.0	1.5	8.0	0.95	6	60
PC410L-0395	1.0	1.5	12.0	0.95	6	60
PC410L-0472	1.2	1.8	10.0	1.15	6	60
PC410L-0551	1.4	2.1	12.0	1.35	6	60
PC410L-0552	1.4	2.1	16.0	1.35	6	60
PC410L-0591	1.5	2.3	10.0	1.45	6	60
PC410L-0592	1.5	2.3	20.0	1.45	6	60
PC410L-0630	1.6	2.4	12.0	1.55	6	60
PC410L-0631	1.6	2.4	20.0	1.55	6	60
PC410L-0709	1.8	2.7	6.0	1.75	6	60
PC410L-0710	1.8	2.7	12.0	1.75	6	60
PC410L-0711	1.8	2.7	20.0	1.75	6	60
PC410L-0787	2.0	3.0	6.0	1.95	6	60
PC410L-0788	2.0	3.0	16.0	1.95	6	60
PC410L-0789	2.0	3.0	20.0	1.95	6	60

For speeds and feeds, refer to page 102.

PC411 WITH TiAlN COATING

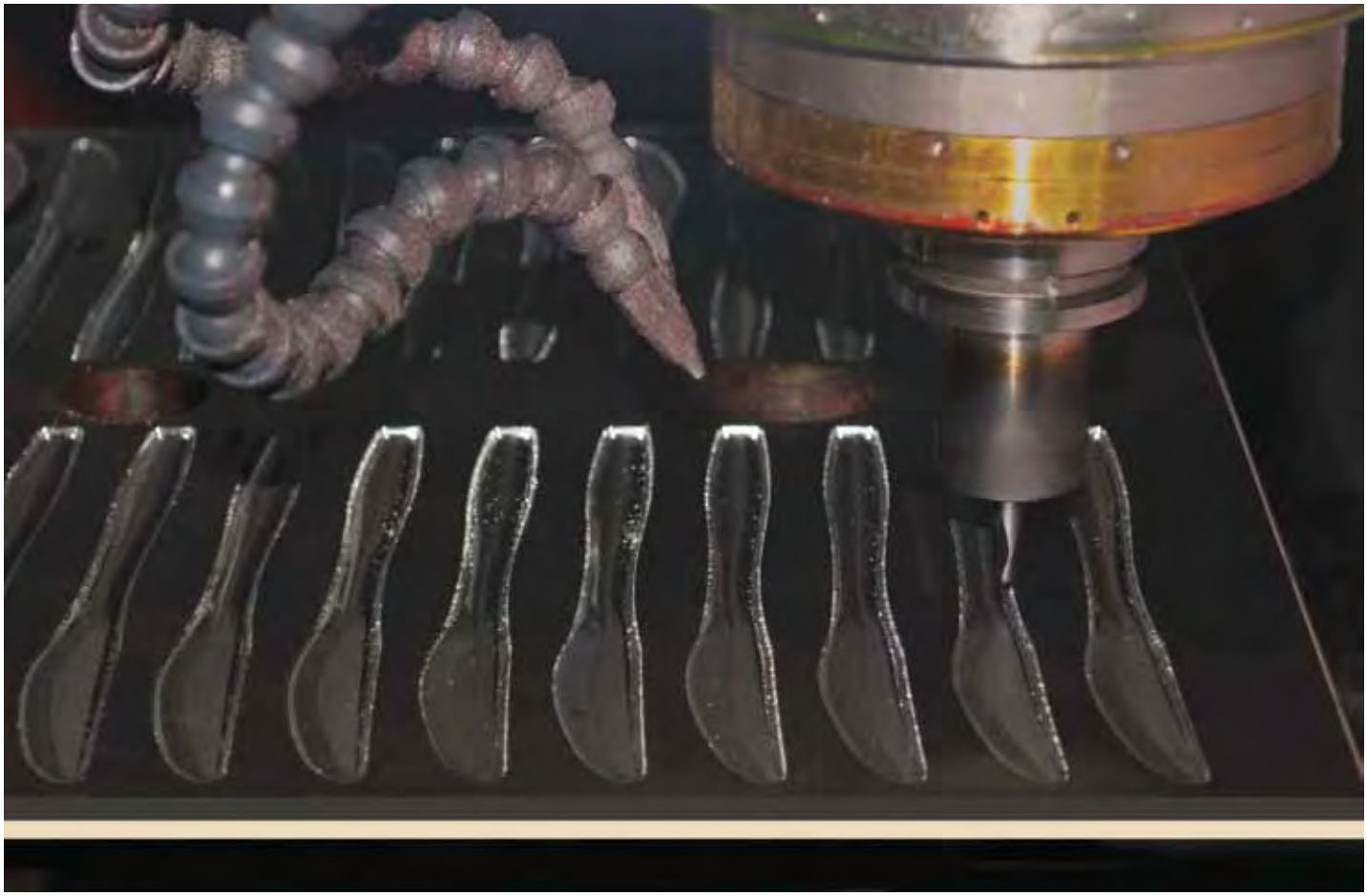
4 Flute - Square End - Short Length - Long Reach



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

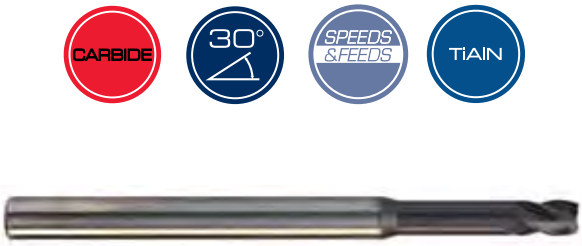
PC411 4 flute	D mill dia.	lc length of cut	ln neck length	Dn neck dia.	d shank dia.	L overall length
PC411-1181	3.0	4.5	15	2.85	6	70
PC411-1378	3.5	5.3	17.5	3.35	6	70
PC411-1575	4.0	6.0	20	3.85	6	70
PC411-1969	5.0	7.5	25	4.85	6	80
PC411-2362	6.0	9.0	30	5.85	6	90

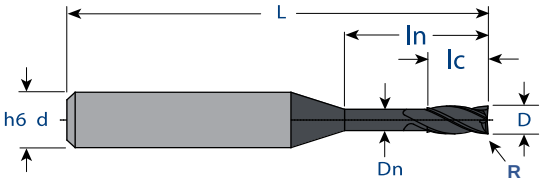
For speeds and feeds, refer to page 102.



PC412 WITH TiAlN COATING

2 Flute - Square End - Short Length - Long Reach





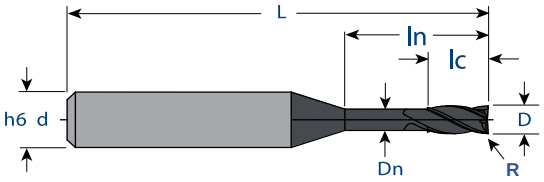
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC412 2 flute	D mill dia.	R corner radius	lc length of cut	ln neck length	Dn neck dia.	d shank dia.	L overall length
PC412-0197-2	0.5	0.05	0.7	2.0	0.46	6	50
PC412-0197-4	0.5	0.05	0.7	4.0	0.46	6	50
PC412-0394-4	1.0	0.1	1.5	4.0	0.95	6	50
PC412-0394-8	I.0	0.1	1.5	8.0	0,95	6	50
PC412-0394-12	1.0	0.1	1.5	12	0.95	6	50
PC412-0395-4	1.0	0.2	1.5	4.0	0.95	6	50
PC412-0395-8	1.0	0.2	1.5	8.0	0.95	6	50
PC412-0395-12	1.0	0.2	1.5	12	0.95	6	50
PC412-0396-4	1.0	0.3	1.5	4.0	0.95	6	50
PC412-0396-8	1.0	0.3	1.5	8.0	0.95	6	50
PC412-0396-12	1.0	0.3	1.5	12	0.95	6	50
PC412-0591-6	1.5	0.3	2.3	6.0	1.45	6	50
PC412-0591-12	1.5	0.3	2.3	12	1.45	6	50
PC412-0591-18	1.5	0.3	2.3	18	1.45	6	50
PC412-0591-24	1.5	0.3	2.3	24	1.45	6	60
PC412-0592-6	1.5	0.5	2.3	6.0	1.45	6	60
PC412-0592-12	1.5	0.5	2.3	1.2	1.45	6	60
PC412-0592-18	1.5	0.5	2.3	18	1.45	6	60
PC412-0787-10	2.0	0.3	3.0	10	1.94	6	60
PC412-0787-16	2.0	0.3	3.0	16	1.94	6	60
PC412-0787-24	2.0	0.3	3.0	24	1.94	6	70
PC412-0787-30	2.0	0.3	3.0	30	1.94	6	70

For speeds and feeds, refer to page 103.

PC412 WITH TiAlN COATING

2 Flute - Square End - Short Length - Long Reach



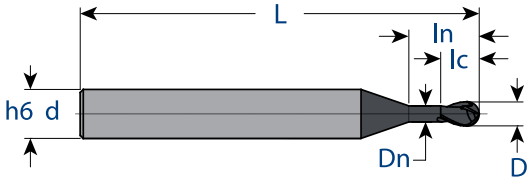
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC412 2 flute	D mill dia.	R corner radius	lc length of cut	ln neck length	Dn neck dia.	d shank dia.	L overall length
PC412-0788-10	2.0	0.5	3.0	10	1.94	6	60
PC412-0788-16	2.0	0.5	3.0	16	1.94	6	60
PC412-0788-24	2.0	0.5	3.0	24	1.94	6	70
PC412-0788-30	2.0	0.5	3.0	30	1.94	6	70
PC412-0984-15	2.5	0.5	3.7	15	2.4	6	70
PC412-0984-30	2.5	0.5	3.7	30	2.4	6	70
PC412-1181-12	3.0	0.5	4.5	12	2.85	6	70
PC412-1181-24	3.0	0.5	4.5	24	2.85	6	80
PC412-1181-36	3.0	0.5	4.5	36	2.85	6	80
PC412-1182-12	3.0	1.0	4.5	12	2.85	6	80
PC412-1182-24	3.0	1.0	4.5	24	2.85	6	80
PC412-1182-36	3.0	1.0	4.5	36	2.85	6	80
PC412-1378-16	3.5	0.5	5.0	16	3.35	6	80
PC412-1378-32	3.5	0.5	5.0	32	3.35	6	80
PC412-1379-16	3.5	1.0	5.0	16	3.35	6	80
PC412-1575-16	4.0	0.5	6.0	16	3.8	6	80
PC412-1575-24	4.0	0.5	6.0	24	3.8	6	80
PC412-1575-32	4.0	0.5	6.0	32	3.8	6	80
PC412-1576-16	4.0	1.0	6.0	16	3.8	6	80
PC412-1576-24	4.0	1.0	6.0	24	3.8	6	80
PC412-1576-32	4.0	1.0	6.0	32	3.8	6	80
PC412-1772-16	4.5	0.5	8.0	16	4.3	6	80
PC412-1772-32	4.5	0.5	8.0	3.2	4.3	6	80

For speeds and feeds, refer to page 103.

PC413 WITH TiAlN COATING

2 Flute - Ball Nose - Necked Design
Short Length



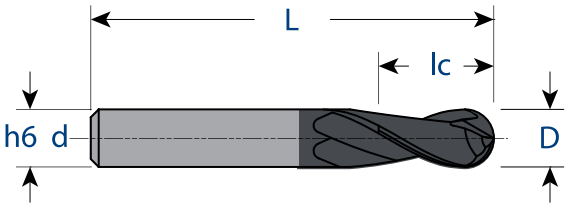
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC413 2 flute	D mill dia	lc length of cut	ln neck length	Dn neck dia.	d shank dia.	L overall length
PC413-0394	1.0	1.0	2.5	0.95	6	50
PC413-0472	1.2	1.2	3.0	1.15	6	50
PC413-0551	1.4	1.4	7.0	1.35	6	50
PC413-0591	1.5	1.5	3.8	1.45	6	50
PC413-0630	1.6	1.6	4.0	1.55	6	50
PC413-0709	1.8	1.8	4.5	1.75	6	50
PC413-0787	2.0	2.0	5.0	1.95	6	50
PC413-0984	2.5	2.5	5.0	2.40	6	50
PC413-1181	3.0	3.0	6.0	2.85	6	50
PC413-1378	3.5	3.5	6.0	3.35	6	50
PC413-1575	4.0	4.0	6.0	3.85	6	50
PC413-1969	5.0	5.0	7.5	4.85	6	50
PC413-2362	6.0	6.0	9.0	5.85	6	50

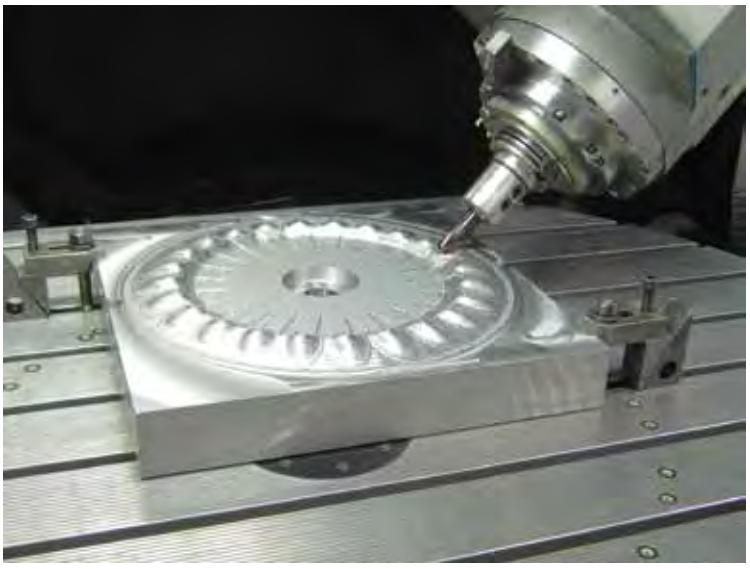
For speeds and feeds, refer to pages 103 - 105.

PC416 WITH TiAlN COATING

2 Flute - Ball Nose - Standard Length



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

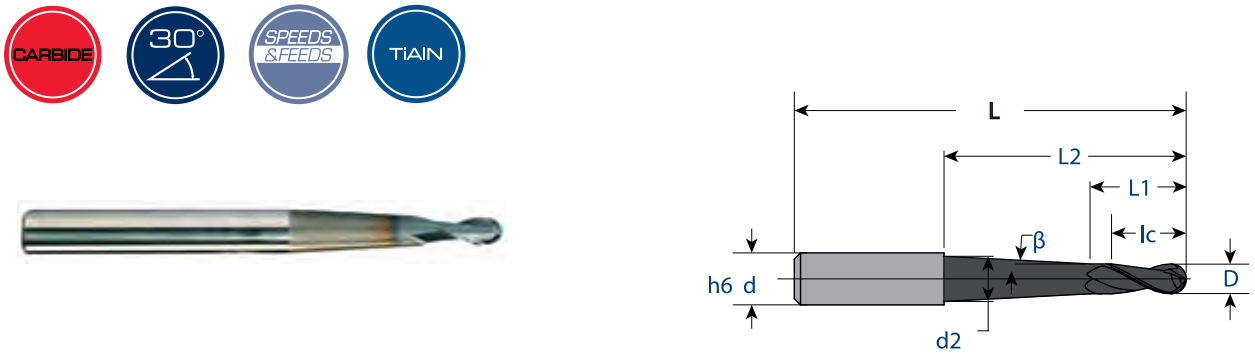


PC416 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC416-0394	1.0	2.5	4	50
PC416-0472	1.2	3.0	4	50
PC416-0551	1.4	3.5	4	50
PC416-0591	1.5	4.0	4	50
PC416-0630	1.6	4.0	4	50
PC416-0709	1.8	4.5	4	50
PC416-0787	2.0	5.0	6	50
PC416-0984	2.5	6.0	6	60
PC416-1181	3.0	8.0	6	60
PC416-1378	3.5	8.0	6	70
PC416-1575	4.0	8.0	6	70
PC416-1576	4.0	8.0	6	60
PC416-1772	4.5	10.0	6	80
PC416-1969	5.0	10.0	6	80
PC416-2165	5.5	12.0	6	90
PC416-2362	6.0	12.0	6	90
PC416-2559	6.5	14.0	6	90
PC416-2756	7.0	14.0	6	90
PC416-2953	7.5	14.0	6	90
PC416-3150	8.0	14.0	8	100
PC416-3346	8.5	18.0	8	100
PC416-3543	9.0	18.0	8	100
PC416-3740	9.5	18.0	8	100
PC416-3937	10	18.0	10	100
PC416-4331	11	22.0	10	100
PC416-4724	12	22.0	12	110
PC416-5118	13	26.0	12	110
PC416-5512	14	26.0	12	110
PC416-5906	15	30.0	12	110
PC416-6299	16	30.0	16	140
PC416-7087	18	34.0	16	140
PC416-7874	20	38.0	20	160
PC416-9843	25	50.0	25	180

For speeds and feeds, refer to pages 106 and 107.

PC418 WITH TiAlN COATING

2 Flute - Ball Nose - Tapered Pencil Neck



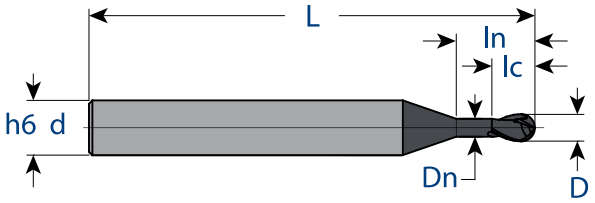
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC418 2 flute	D mill dia.	lc length of cut	L2 non-taper neck length	L1 neck length	d2 max. neck dia.	ß neck incline	d shank dia.	L overall length
PC418-0390	1.0	2.5	4.0	20	3.8	5°	6	60
PC418-0391	1.0	2.5	4.0	40	4.8	3°	6	80
PC418-0392	1.0	2.5	4.0	20	1.8	1.5°	6	70
PC418-0780	2.0	5.0	7.0	20	4.3	5°	6	60
PC418-0781	2.0	5.0	7.0	40	5.5	3°	6	80
PC418-0782	2.0	5.0	7.0	20	2.7	1.5°	6	70
PC418-1180	3.0	8.0	10.5	30	5.0	3°	6	70
PC418-1181	3.0	8.0	10.5	50	5.1	1.5°	6	90
PC418-1574	4.0	8.0	10.5	28	6.0	3°	6	70
PC418-1575	4.0	8.0	10.5	48	6.0	1.5°	6	90
PC418-1968	5.0	10	12.5	40	8.0	3°	8	90
PC418-1969	5.0	10	12.5	60	7.5	1.5°	8	110
PC418-2361	6.0	12	14.5	33.5	8.0	3°	8	90
PC418-2362	6.0	12	14.5	52	8.0	1.5°	8	110
PC418-3150	8.0	14	16.5	35.5	10	3°	10	100
PC418-3151	8.0	14	16.5	54.5	10	1.5°	10	120
PC418-3930	10	18	20.5	39.5	12	3°	12	110
PC418-3931	10	18	20.5	58.5	12	1.5°	12	130
PC418-4720	12	22	25	60	16	3°	16	140
PC418-4721	12	22	25	80	14.9	1.5°	16	160

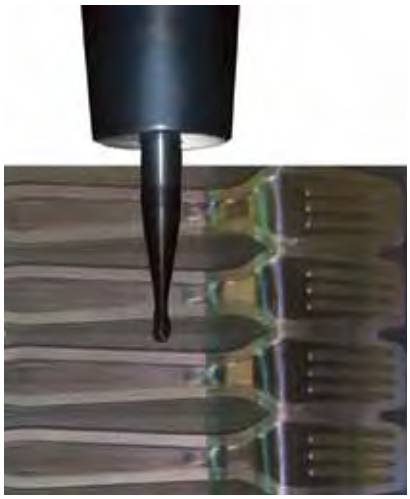
For speeds and feeds, refer to page 108.

PC419 WITH TiAlN COATING

2 Flute - Ball Nose - Necked Design - Standard Reach



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

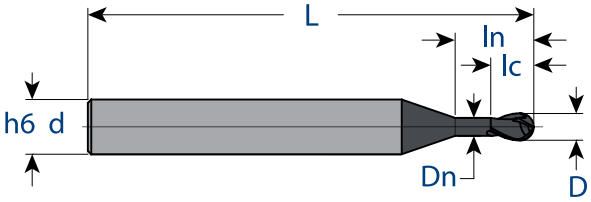


PC419 2 flute	tool series	D mill dia.	lc length of cut	ln reach length	Dn neck dia.	d shank dia.	L overall length
PC419-0197	PC419	0.5	0.5	2.5	0.45	6	60
PC419-0236	PC419	0.6	0.6	3.0	0.55	6	60
PC419-0315	PC419	0.8	0.8	4.0	0.75	6	60
PC419-0394	PC419	1.0	1.0	5.0	0.95	6	60
PC419-0395	PC419	1.0	1.0	8.0	0.95	6	60
PC419-0472	PC419	1.2	1.2	6.0	1.15	6	60
PC419-0551	PC419	1.4	1.4	7.0	1.35	6	60
PC419-0590	PC419	1.5	1.5	6.0	1.45	6	60
PC419-0591	PC419	1.5	1.5	7.5	1.45	6	60
PC419-0592	PC419	1.5	1.5	10	1.45	6	60
PC419-0630	PC419	1.6	1.6	8.0	1.55	6	60
PC419-0709	PC419	1.8	1.8	9.0	1.75	6	60
PC419-0786	PC410	2.0	2.0	8.0	1.95	6	60
PC419-0787	PC419	2.0	2.0	10	1.95	6	60
PC419-0788	PC419	2.0	2.0	12	1.95	6	60
PC419-0984	PC419	2.5	2.5	12.5	2.40	6	60
PC419-1179	PC419	3.0	3.0	10	2.85	6	70
PC419-1180	PC419	3.0	3.0	12	2.85	6	70
PC419-1181	PC419	3.0	3.0	15	2.85	6	70
PC419-1378	PC419	3.5	3.5	17.5	3.35	6	70
PC419-1572	PC419	4.0	4.0	8.0	3.85	6	70
PC419-1573	PC419	4.0	4.0	12	3.85	6	70
PC419-1574	PC419	4.0	4.0	16	3.85	6	70
PC419-1575	PC419	4.0	4.0	20	3.85	6	70
PC419-1969	PC419	5.0	5.0	25	4.85	6	80
PC419-2362	PC419	6.0	6.0	30	5.85	6	90

For speeds and feeds, refer to pages 104 and 105.

PC419L WITH TiAlN COATING

2 Flute - Ball Nose - Necked Design - Extended Reach



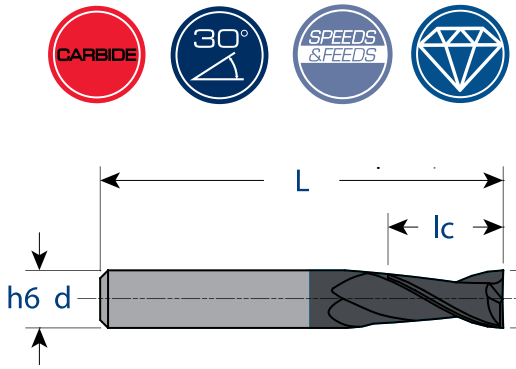
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC419L 2 flute	tool series	D mill dia.	lc length of cut	ln reach length	Dn neck dia.	d shank dia.	L overall length
PC419L-0197	PC419L	0.5	0.7	2.5	0.45	6	60
PC419L-0236	PC419L	0.6	0.6	6.0	0.55	6	60
PC419L-0315	PC419L	0.8	0.8	8.0	0.75	6	60
PC419L-0394	PC419L	1.0	1.0	10	0.95	6	60
PC419L-0395	PC419L	1.0	1.0	12	0.95	6	60
PC419L-0396	PC419L	1.0	1.0	16	0.95	6	60
PC419L-0397	PC419L	1.0	1.0	20	0.95	6	60
PC419L-0472	PC419L	1.2	1.2	12	1.15	6	60
PC419L-0551	PC419L	1.4	1.4	12	1.35	6	60
PC419L-0591	PC419L	1.5	1.5	12	1.45	6	60
PC419L-0593	PC419L	1.5	1.5	20	1.45	6	60
PC419L-0630	PC419L	1.6	1.6	16	1.55	6	60
PC419L-0709	PC419L	1.8	1.8	16	1.75	6	60
PC419L-0787	PC419L	2.0	2.0	16	1.95	6	60
PC419L-0788	PC419L	2.0	2.0	20	1.95	6	60
PC419L-0789	PC419L	2.0	2.0	25	2.40	6	60
PC419L-0984	PC419L	2.5	2.5	16	2.40	6	60
PC419L-0985	PC419L	2.5	2.5	20	2.40	6	60
PC419L-1179	PC419L	3.0	3.0	20	2.85	6	70
PC419L-1180	PC419L	3.0	3.0	25	2.85	6	70
PC419L-1181	PC419L	3.0	3.0	30	2.85	6	70
PC419L-1182	PC419L	3.0	3.0	35	2.85	6	70
PC419L-1575	PC419L	4.0	4.0	25	3.85	6	70
PC419L-1576	PC419L	4.0	4.0	30	3.85	6	70

For speeds and feeds, refer to pages 104 and 105.

PC420 WITH DIAMOND COATING

2 Flute - Square End - Stub Length

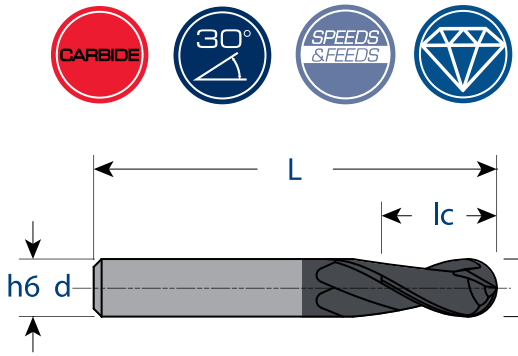


Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC420 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC420-0197	0.5	1.5	3	38
PC420-0315	0.8	2.0	3	38
PC420-0394	1.0	3.0	3	38
PC420-0591	1.5	5.0	3	38
PC420-0787	2.0	7.0	3	38
PC420-0984	2.5	7.0	3	38
PC420-1181	3.0	9.0	3	38
PC420-1575	4.0	14	4	50
PC420-1969	5.0	16	5	50
PC420-2362	6.0	19	6	64
PC420-3150	8.0	21	8	64
PC420-3937	10	22	10	70
PC420-4724	12	25	12	76

PC420BN WITH DIAMOND COATING

2 Flute - Ball Nose - Stub Length



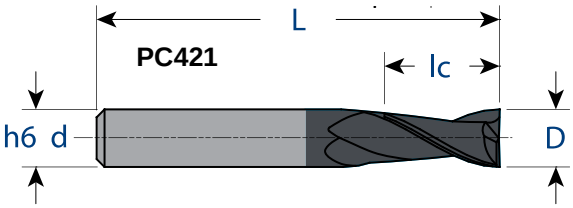
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC420BN 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC420-0197-BN	0.5	1.5	3	38
PC420-0315-BN	0.8	2.0	3	38
PC420-0394-BN	1.0	3.0	3	38
PC420-0591-BN	1.5	5.0	3	38
PC420-0787-BN	2.0	7.0	3	38
PC420-0984-BN	2.5	7.0	3	38
PC420-1181-BN	3.0	9.0	3	38
PC420-1575-BN	4.0	14	4	50
PC420-1969-BN	5.0	16	5	50
PC420-2362-BN	6.0	19	6	64
PC420-3150-BN	8.0	21	8	64
PC420-3937-BN	10	22	10	70
PC420-4724-BN	12	25	12	76

For speeds and feeds, refer to page 109.

PC421 WITH TiAlN COATING

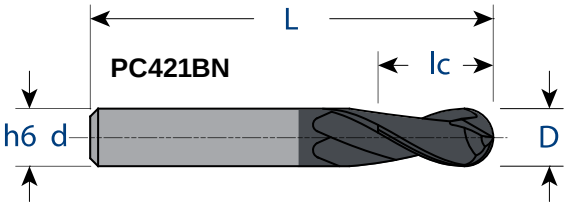
2 Flute - Single End - Square End



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

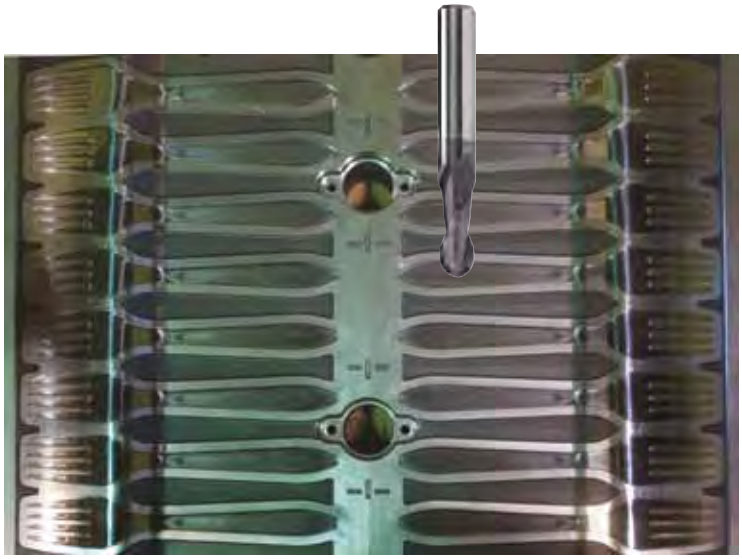
PC421BN WITH TiAlN COATING

2 Flute - Ball Nose



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

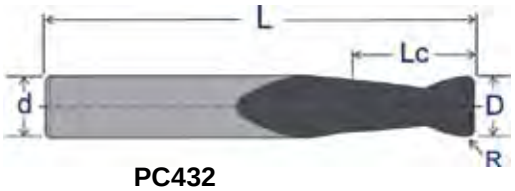
PC421 2 flute	PC421BN 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC421-0394	PC421-0394 -BN	1.0	3.0	3	39
PC421-0591	PC421-0591 -BN	1.5	5.0	3	39
PC421-0787	PC421-0787 -BN	2.0	7.0	3	39
PC421-0984	PC421-0984 -BN	2.5	8.0	3	39
PC421-1181	PC421-1181 -BN	3.0	10	3	39
PC421-1378	PC421-1378 -BN	3.5	12	4	51
PC421-1575	PC421-1575 -BN	4.0	14	4	51
PC421-1772	PC421-1772 -BN	4.5	14	5	51
PC421-1969	PC421-1969 -BN	5.0	16	5	51
PC421-2362	PC421-2362 -BN	6.0	19	6	64
PC421-2756	PC421-2756 -BN	7.0	19	8	64
PC421-3150	PC421-3150 -BN	8.0	21	8	64
PC421-3543	PC421-3543 -BN	9.0	22	10	70
PC421-3937	PC421-3937 -BN	10	25	10	70
PC421-4331	PC421-4331 -BN	11	25	11	70
PC421-4724	PC421-4724 -BN	12	25	12	76
PC421-5512	PC421-5512 -BN	14	30	14	89
PC421-6299	PC421-6299 -BN	16	32	16	89
PC421-7087	PC421-7087 -BN	18	35	18	102
PC421-7874	PC421-7874 -BN	20	38	20	102
PC421-8661	PC421-8661 -BN	22	38	22	102
PC421-9843	PC421-9843 -BN	25	38	25	102



For speeds and feeds, refer to pages 110 and 111.

PC432 WITH TiAlN COATING

2 Flute - Corner Radius

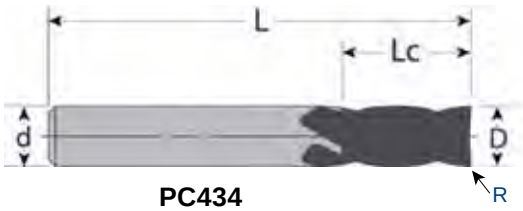


PC432

Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC434 WITH TiAlN COATING

4 Flute - Corner Radius



PC434

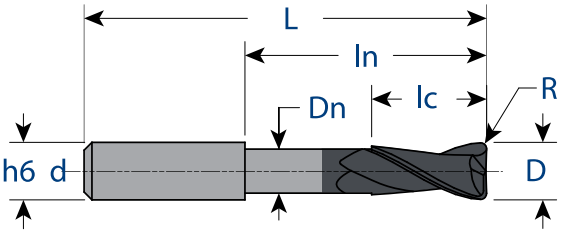
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC432 2 flute	PC434 4 flute	D mill dia.	R corner radius	lc length of cut	d shank dia.	L overall length
PC432-1181	PC434-1181	3.0	0.2	8	6	60
PC432-1182	PC434-1182	3.0	0.5	8	6	60
PC432-1575	PC434-1575	4.0	0.2	11	6	70
PC432-1576	PC434-1576	4.0	0.5	11	6	70
PC432-1577	PC434-1577	4.0	1.0	11	6	70
PC432-1967	PC434-1967	5.0	0.2	13	6	80
PC432-1968	PC434-1968	5.0	0.5	13	6	80
PC432-1969	PC434-1969	5.0	1.0	13	6	80
PC432-2360	PC434-2360	6.0	0.2	13	6	80
PC432-2361	PC434-2361	6.0	0.5	13	6	80
PC432-2362	PC434-2362	6.0	1.0	13	6	80
PC432-2363	PC434-2363	6.0	1.5	13	6	80
PC432-2364	PC434-2364	6.0	2.0	13	6	80
PC432-3150	PC434-3150	8.0	0.5	19	8	100
PC432-3151	PC434-3151	8.0	1.0	19	8	100
PC432-3152	PC434-3152	8.0	1.5	19	8	100
PC432-3153	PC434-3153	8.0	2.0	19	8	100
PC432-3930	PC434-3930	10	0.5	22	10	100
PC432-3931	PC434-3931	10	1.0	22	10	100
PC432-3932	PC434-3932	10	1.5	22	10	100
PC432-3933	PC434-3933	10	2.0	22	22	100
PC432-3934	PC434-3934	10	3.0	22	10	100
PC432-4720	PC434-4720	12	0.5	26	12	110
PC432-4721	PC434-4721	12	1.0	26	12	110
PC432-4722	PC434-4722	12	1.5	26	12	110
PC432-4723	PC434-4723	12	2.0	26	12	110
PC432-4724	PC434-4724	12	3.0	26	12	110

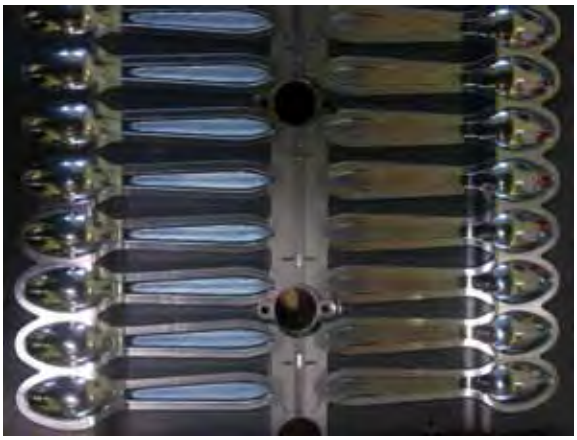
For speeds and feeds, refer to pages 114 and 115.

PC433 WITH TiAlN COATING

2 Flute - Corner Radius - Necked Design



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

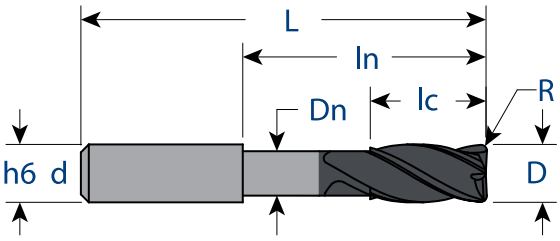


PC433 2 flute	D mill dia.	R corner radius	lc length of cut	ln reach length	Dn neck dia.	d shank dia.	L overall length
PC433-1181	3.0	0.2	4.5	14	2.8	6	60
PC433-1182	3.0	0.5	4.5	14	2.8	6	60
PC433-1575	4.0	0.2	6.0	25	3.7	6	70
PC433-1576	4.0	0.5	6.0	25	3.7	6	70
PC433-1577	4.0	1.0	6.0	25	3.7	6	70
PC433-1967	5.0	0.2	7.5	30	4.6	6	80
PC433-1968	5.0	0.5	7.5	30	4.6	6	80
PC433-1969	5.0	1.0	7.5	30	4.6	6	80
PC433-2360	6.0	0.2	9.0	35	5.5	6	80
PC433-2361	6.0	0.5	9.0	35	5.5	6	80
PC433-2362	6.0	1.0	9.0	35	5.5	6	80
PC433-2363	6.0	1.5	9.0	35	5.5	6	80
PC433-2364	6.0	2.0	9.0	35	5.5	6	80
PC433-3150	8.0	0.5	12	40	7.4	8	100
PC433-3151	8.0	1.0	12	40	7.4	8	100
PC433-3152	8.0	1.5	12	40	7.4	8	100
PC433-3153	8.0	2.0	12	40	7.4	8	100
PC433-3930	10	0.5	15	45	9.2	10	100
PC433-3931	10	1.0	15	45	9.2	10	100
PC433-3932	10	1.5	15	45	9.2	10	100
PC433-3933	10	2.0	15	45	9.2	10	100
PC433-3934	10	3.0	15	45	9.2	10	100
PC433-4720	12	0.5	18	50	11	12	110
PC433-4721	12	1.0	18	50	11	12	110
PC433-4722	12	1.5	18	50	11	12	110
PC433-4723	12	2.0	18	50	11	12	110
PC433-4724	12	3.0	18	50	11	12	110

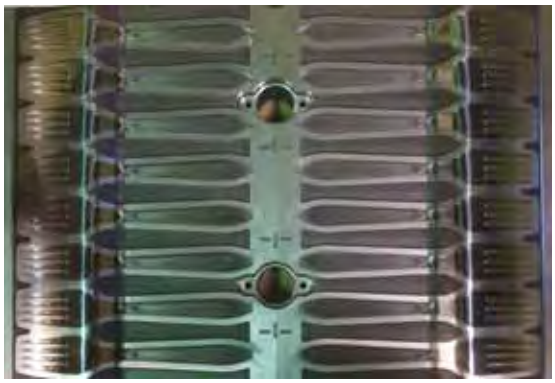
For speeds and feeds, refer to page 114.

PC435 WITH TiAlN COATING

4 Flute - Corner Radius - Necked Design



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm



PC435 4 flute	D mill dia.	R corner radius	lc length of cut	ln reach length	Dn neck dia.	d shank dia.	L overall length
PC435-1181	3.0	0.2	4.5	14	2.8	6	60
PC435-1182	3.0	0.5	4.5	14	2.8	6	60
PC435-1575	4.0	0.2	6.0	25	3.7	6	70
PC435-1576	4.0	0.5	6.0	25	3.7	6	70
PC435-1577	4.0	1.0	6.0	25	3.7	6	70
PC435-1967	5.0	0.2	7.5	30	4.6	6	80
PC435-1968	5.0	0.5	7.5	30	4.6	6	80
PC435-1969	5.0	1.0	7.5	30	4.6	6	80
PC435-2360	6.0	0.2	9.0	35	5.5	6	80
PC435-2361	6.0	0.5	9.0	35	5.5	6	80
PC435-2362	6.0	1.0	9.0	35	5.5	6	80
PC435-2363	6.0	1.5	9.0	35	5.5	6	80
PC435-2364	6.0	2.0	9.0	35	5.5	6	80
PC435-3150	8.0	0.5	12	40	7.4	8	100
PC435-3151	8.0	1.0	12	40	7.4	8	100
PC435-3152	8.0	1.5	12	40	7.4	8	100
PC435-3153	8.0	2.0	12	40	7.4	8	100
PC435-3930	10	0.5	15	45	9.2	10	100
PC435-3931	10	1.0	15	45	9.2	10	100
PC435-3932	10	1.5	15	45	9.2	10	100
PC435-3933	10	2.0	15	45	9.2	10	100
PC435-3934	10	3.0	15	45	9.2	10	100
PC435-4720	12	0.5	18	50	11	12	110
PC435-4721	12	1.0	18	50	11	12	110
PC435-4722	12	1.5	18	50	11	12	110
PC435-4723	12	2.0	18	50	11	12	110
PC435-4724	12	3.0	18	50	11	12	110

For speeds and feeds, refer to pages 114 and 115.

VH439 WITH AlCrN COATING

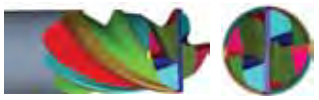
4 Flute - Variable Helix

Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

VH439 4 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
VH439-1181	3.0	10	3	38
VH439-1575	4.0	14	4	50
VH439-1969	5.0	16	5	50
VH439-2362	6.0	19	6	64
VH439-3150	8.0	21	8	64
VH439-3937	10	25	10	70
VH439-4724	12	30	12	76
VH439-6299	16	32	16	89
VH439-7087	18	35	18	100
VH439-7874	20	38	20	100

VHR439 WITH AlCrN COATING

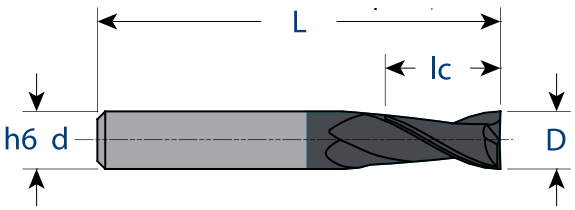
4 Flute - Variable Helix



VHR439 4 flute	D mill dia.	R corner radius	lc length of cut	d shank dia.	L overall length
VHR439-1181	3.0	.3	10	3	38
VHR439-1575	4.0	.4	14	4	50
VHR439-1969	5.0	.5	16	5	50
VHR439-2362	6.0	.6	19	6	64
VHR439-3150	8.0	.8	21	8	64
VHR439-3937	10	1.0	25	10	70
VHR439-4724	12	1.2	30	12	76
VHR439-6299	16	1.6	32	16	89
VHR439-7087	18	1.8	35	18	100
VHR439-7874	20	2.0	38	20	100

PC440 WITH TiCN COATING

2 Flute - Fast Cut - Standard and Long Length for Aluminum



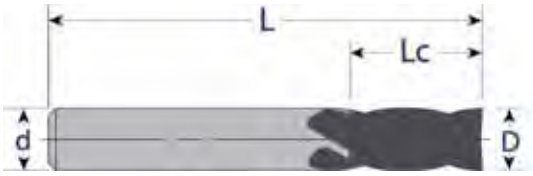
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC440 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC440-2362	6.0	19	6	63
PC440-2363	6.0	38	6	102
PC440-3150	8.0	21	8	63
PC440-3151	8.0	41	8	102
PC440-3937	10	25	10	70
PC440-3938	10	51	10	102
PC440-4724	12	26	12	76
PC440-4725	12	51	12	102
PC440-6299	16	32	16	89
PC440-6300	16	57	16	127
PC440-7874	20	38	20	102
PC440-7875	20	57	20	127
PC440-9843	25	57	25	127
PC440-9844	25	76	25	152

For speeds and feeds, refer to pages 116 - 118.

PC441 WITH TiAlN COATING

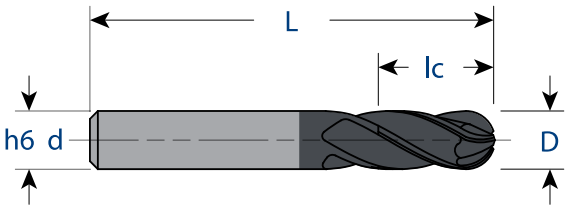
4 Flute - Single End - Standard Length



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

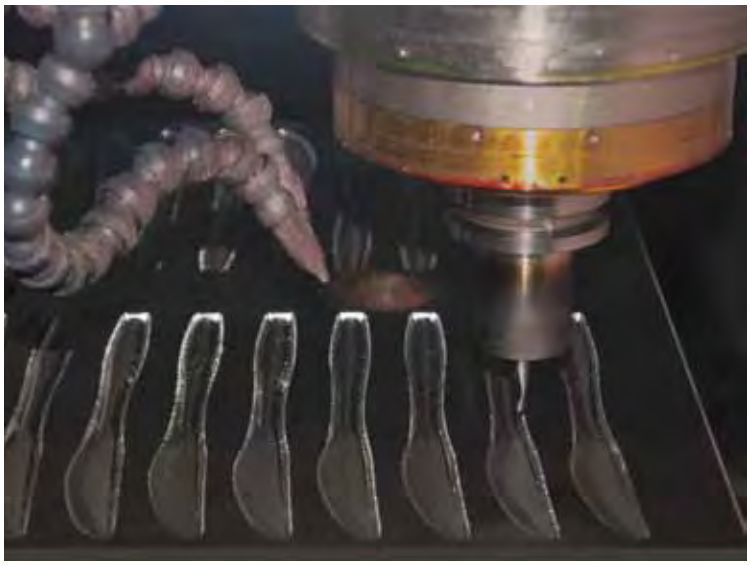
PC441BN WITH TiAlN COATING

4 Flute - Ball Nose



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

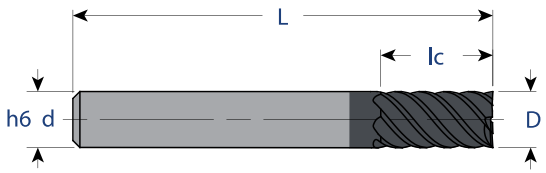
PC441 4 flute	PC441BN 4 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC441-0394	PC441-0394-BN	1.0	3.0	3	39
PC441-0591	PC441-0591-BN	1.5	5.0	3	39
PC441-0787	PC441-0787-BN	2.0	7.0	3	39
PC441-0984	PC441-0984-BN	2.5	8.0	3	39
PC441-1181	PC441-1181-BN	3.0	10	3	39
PC441-1378	PC441-1378-BN	3.5	12	4	51
PC441-1575	PC441-1575-BN	4.0	14	4	51
PC441-1772	PC441-1772-BN	4.5	14	5	51
PC441-1969	PC441-1969-BN	5.0	16	5	51
PC441-2362	PC441-2362-BN	6.0	19	6	64
PC441-2756	PC441-2756-BN	7.0	19	8	64
PC441-3150	PC441-3150-BN	8.0	21	8	64
PC441-3543	PC441-3543-BN	9.0	22	10	70
PC441-3937	PC441-3937-BN	10	25	10	70
PC441-4331	PC441-4331-BN	11	25	11	70
PC441-4724	PC441-4724-BN	12	25	12	76
PC441-5512	PC441-5512-BN	14	30	14	89
PC441-6299	PC441-6299-BN	16	32	16	89
PC441-7087	PC441-7087-BN	18	35	18	102
PC441-7874	PC441-7874-BN	20	38	20	102
PC441-8661	PC441-8661-BN	22	38	22	102
PC441-9843	PC441-9843-BN	25	38	25	102



For speeds and feeds, refer to pages 112, 113 and 119.

PC450 WITH AlCrN COATING

Multiple Flute - Standard Length

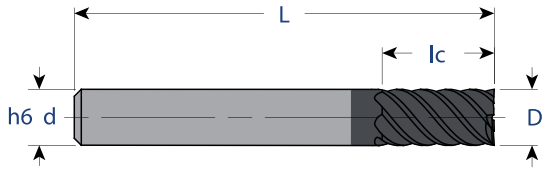


Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC450 Multi Flute	D mill dia.	lc length of cut	no. of flutes	d shank dia.	L overall length
PC450-1181	3.0	10	4	6	51
PC450-1575	4.0	14	4	6	51
PC450-1969	5.0	16	4	6	51
PC450-2362	6.0	19	6	6	64
PC450-3150	8.0	21	6	8	64
PC450-3937	10	25	6	10	64
PC450-4724	12	25	6	12	76
PC450-5512	14	30	6	14	89
PC450-6299	16	35	6	16	89
PC450-7087	18	35	6	18	102
PC450-7874	20	38	6	20	102
PC450-8661	22	38	6	22	102

PC450L WITH AlCrN COATING

Multiple Flute - Extended Length



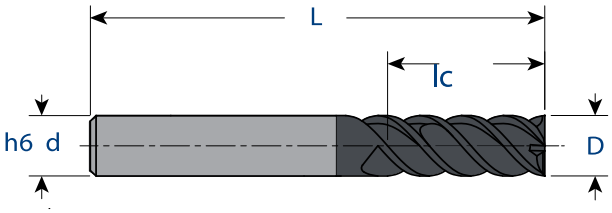
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC450L Multi Flute	D mill dia.	lc length of cut	no. of flutes	d shank dia.	L overall length
PC450L-2362	6.0	26	6	6	100
PC450L-3150	8.0	36	6	8	100
PC450L-3937	10	46	6	10	100
PC450L-4724	12	56	6	12	110
PC450L-6299	16	66	6	16	130
PC450L-7874	20	76	6	20	140
PC450L-9843	25	92	8	25	180

For speeds and feeds, refer to page 120.

PC451 WITH AlCrN COATING

4 Flute - Standard Length

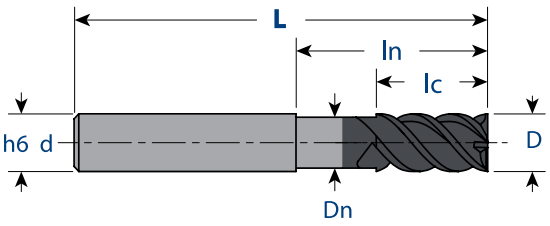


Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC451 4 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC451-1575	4.0	12	6	60
PC451-1969	5.0	14	6	60
PC451-2362	6.0	15	6	60
PC451-3150	8.0	20	8	75
PC451-3937	10	25	10	80
PC451-4724	12	30	12	102
PC451-6299	16	40	16	110
PC451-7874	20	45	20	125

PC453 WITH AlCrN COATING

4 Flute - Super Tough End Mill



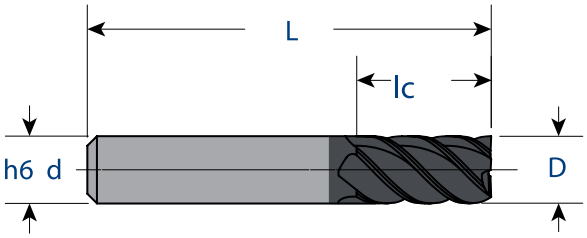
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC453 4 flute	D mill dia	ln neck length	Dn neck dia.	lc length of cut	d shank dia.	L overall length
PC453-1575	4.0	3.9	12	6	6	60
PC453-1969	5.0	4.9	15	8	6	60
PC453-2362	6.0	5.9	18	9	6	60
PC453-3150	8.0	7.9	24	12	8	75
PC453-3937	10	9.9	30	15	10	80
PC453-4724	12	11.9	36	18	12	102
PC453-6299	16	15.9	48	24	16	110
PC453-7874	20	19.9	60	30	20	125

For speeds and feeds, refer to page 121.

PC455 WITH AlCrN COATING

5 Flute - Standard Length

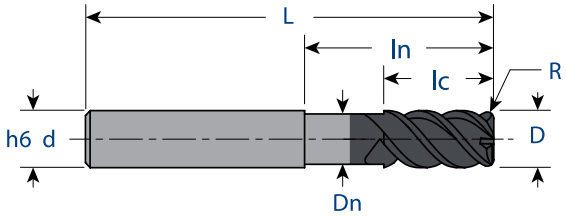


Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC455 5 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC455-1181	3.0	9.0	3	39
PC455-1575	4.0	14	4	51
PC455-1969	5.0	16	5	51
PC455-2362	6.0	19	6	64
PC455-2756	7.0	19	7	64
PC455-3150	8.0	21	8	64
PC455-3937	10	22	10	70
PC455-4331	11	25	11	70
PC455-4724	12	25	12	76
PC455-5512	14	30	14	89
PC455-6299	16	32	16	89
PC455-7874	20	38	20	102
PC455-9843	25	38	25	102

PC456 WITH AlCrN COATING

4 Flute - Radius - Super Tough End Mill



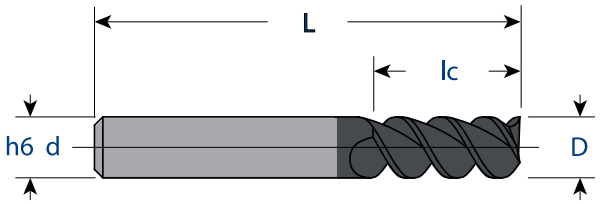
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC456 4 flute	D mill dia.	R corner radius	Dn neck dia.	ln neck length	lc length of cut	d shank dia.	L overall length
PC456-2363	6.0	0.5	5.9	18	9	6	60
PC456-2364	6.0	1.0	5.9	18	9	6	60
PC456-3151	8.0	0.5	7.9	24	12	8	75
PC456-3152	8.0	1.0	7.9	24	12	8	75
PC456-3938	10	0.5	9.9	30	15	10	80
PC456-3939	10	1.0	9.9	30	15	10	80
PC456-4725	12	0.5	11.9	36	18	12	102
PC456-4726	12	1.0	11.9	36	18	12	102
PC456-4727	12	1.5	11.9	36	18	12	102

For speeds and feeds, refer to pages 121 and 122.

PC460 WITH TiAlN COATING

3 Flute - High Helix

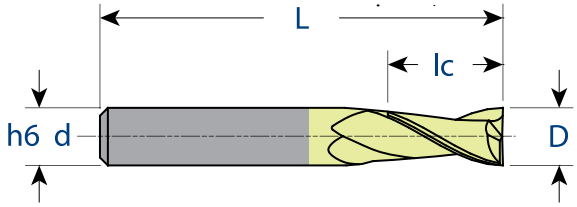


Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC460 3 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC460-1181	3.0	12	6	64
PC460-1575	4.0	14	6	64
PC460-1969	5.0	16	6	64
PC460-2362	6.0	19	6	64
PC460-3150	8.0	21	8	64
PC460-3937	10	25	10	70
PC460-4724	12	25	12	76
PC460-5512	14	29	14	89
PC460-6299	16	32	16	89
PC460-7087	18	38	18	102
PC460-7874	20	38	20	102
PC460-9843	25	38	25	102

PC470 WITH ZrN COATING

2 Flute - Standard Length for Cutting Aluminum



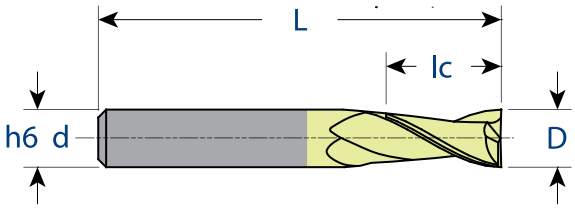
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC470 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC470-1181	3.0	4.5	6	38
PC470-1575	4.0	6.0	6	51
PC470-1969	5.0	7.0	6	51
PC470-2362	6.0	9.0	6	64
PC470-3150	8.0	12	8	64
PC470-3937	10	15	10	64
PC470-4724	12	18	12	76
PC470-6299	16	24	16	89
PC470-7874	20	30	20	102
PC470-9843	25	37.5	25	102

For speeds and feeds, refer to pages 123 - 125.

PC471 WITH ZrN COATING

2 Flute - Long Length for Cutting Aluminum

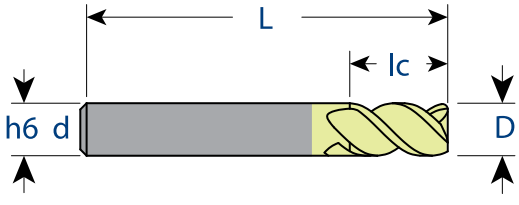


Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC471 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC471-1181	3.0	7.5	6	38
PC471-1575	4.0	10	6	51
PC471-1969	5.0	12	6	51
PC471-2362	6.0	15	6	64
PC471-3150	8.0	20	8	64
PC471-3937	10	25	10	64
PC471-4724	12	30	12	76
PC471-6299	16	40	16	89
PC471-7874	20	50	20	102
PC471-9843	25	62.5	25	127

PC475 WITH ZrN COATING

3 Flute - Standard Length for Cutting Aluminum



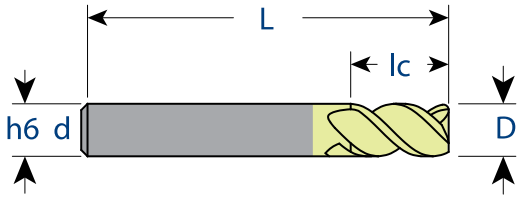
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC475 3 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC475-1181	3.0	4.5	6	38
PC475-1575	4.0	6	6	51
PC475-1969	5.0	8	6	51
PC475-2362	6.0	9	6	64
PC475-3150	8.0	12	8	64
PC475-3937	10	15	10	64
PC475-4724	12	18	12	76
PC475-6299	16	24	16	89
PC475-7874	20	30	20	102
PC475-9843	25	37.5	25	127

For speeds and feeds, refer to pages 124 - 127.

PC476 WITH ZrN COATING

3 Flute - Long Length for Cutting Aluminum

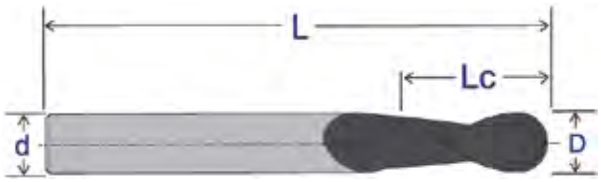


Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC476 3 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC476-1181	3.0	7.5	6	38
PC476-1575	4.0	10	6	51
PC476-1969	5.0	12	6	51
PC476-2362	6.0	15	6	64
PC476-3150	8.0	20	8	64
PC476-3937	10	25	10	64
PC476-4724	12	30	12	76
PC476-6299	16	40	16	89
PC476-7874	20	50	20	102
PC476-9843	25	62.5	25	127

PC497 WITH TiAlN COATING

2 Flute - Ball Nose - Long Length



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

PC497 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
PC497-1181	3.0	4.5	6	63
PC497-1575	4.0	6.0	4	63
PC497-1969	5.0	7.5	5	63
PC497-2362	6.0	9.0	6	100
PC497-3150	8.0	12	8	100
PC497-3937	10	15	10	100
PC497-4331	11	16.5	11	127
PC497-4724	12	18	12	127
PC497-5512	14	21	14	127
PC497-6299	16	24	16	152
PC497-7087	18	27	18	152
PC497-7874	20	30	20	152
PC497-8661	22	33	22	152
PC497-9843	25	37.5	25	152

For speeds and feeds, refer to pages 126 - 128.

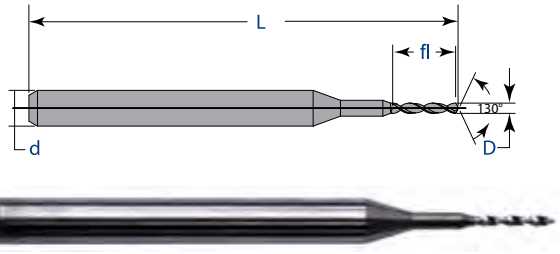
GENERAL PURPOSE DRILLS

MD135 PREMIUM FINE GRAIN CARBIDE

130° 4 Facet Drill Point

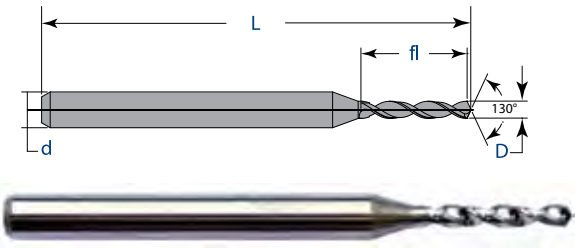
CARBIDE | 35° | SPEEDS &FEEDS | BRIGHT

Coating and special designs available.



MD135 - Style 1 - Step Design
0.35mm DIA to 0.40mm DIA

MD135 2 flute	D size	fl flute length	d shank dia.	L overall length
MD135-0138	0.35	5.60	3.0	38
MD135-0158	0.40	5.60	3.0	38
MD135-0177	0.45	6.40	3.0	38
MD135-0197	0.50	6.40	3.0	38
MD135-0217	0.55	6.40	3.0	38
MD135-0236	0.60	8.00	3.0	38
MD135-0256	0.65	8.00	3.0	38
MD135-0276	0.70	10.70	3.0	38
MD135-0295	0.75	10.70	3.0	38
MD135-0315	0.80	10.70	3.0	38
MD135-0335	0.85	10.70	3.0	38
MD135-0354	0.90	10.70	3.0	38
MD135-0374	0.95	10.70	3.0	38
MD135-0394	1.00	10.70	3.0	38
MD135-0413	1.05	10.70	3.0	38
MD135-0433	1.10	10.70	3.0	38
MD135-0443	1.125	10.70	3.0	38
MD135-0453	1.15	10.70	3.0	38
MD135-0472	1.20	10.70	3.0	38
MD135-0492	1.25	10.70	3.0	38
MD135-0512	1.30	10.70	3.0	38
MD135-0531	1.35	10.70	3.0	38
MD135-0551	1.40	10.70	3.0	38
MD135-0571	1.45	10.70	3.0	38
MD135-0591	1.50	10.70	3.0	38
MD135-0610	1.55	10.70	3.0	38
MD135-0630	1.60	12.20	3.0	38
MD135-0650	1.65	12.20	3.0	38
MD135-0669	1.70	12.20	3.0	38
MD135-0689	1.75	12.20	3.0	38
MD135-0709	1.80	12.20	3.0	38
MD135-0728	1.85	12.20	3.0	38



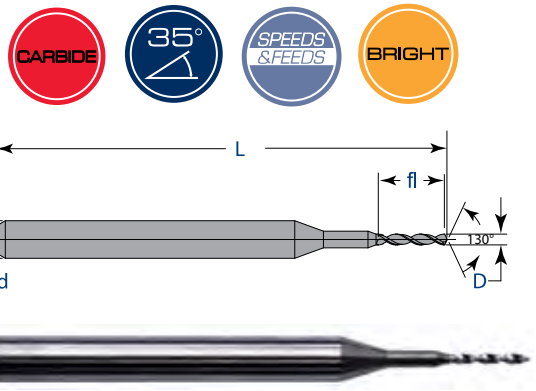
MD135 - Style 2
0.45mm DIA to 3.00mm DIA

MD135 2 flute	D size	fl flute length	d shank dia.	L overall length
MD135-0748	1.90	12.20	3.0	38
MD135-0768	1.95	12.20	3.0	38
MD135-0787	2.00	12.20	3.0	38
MD135-0807	2.05	12.20	3.0	38
MD135-0846	2.10	12.20	3.0	38
MD135-0866	2.20	12.20	3.0	38
MD135-0886	2.25	12.20	3.0	38
MD135-0906	2.30	12.20	3.0	38
MD135-0925	2.35	12.20	3.0	38
MD135-0945	2.40	12.20	3.0	38
MD135-0965	2.45	12.20	3.0	38
MD135-0984	2.50	12.20	3.0	38
MD135-1004	2.55	12.20	3.0	38
MD135-1024	2.60	12.20	3.0	38
MD135-1043	2.65	12.20	3.0	38
MD135-1063	2.70	12.20	3.0	38
MD135-1083	2.75	12.20	3.0	38
MD135-1102	2.80	12.20	3.0	38
MD135-1122	2.85	12.20	3.0	38
MD135-1142	2.90	12.20	3.0	38
MD135-1161	2.95	12.20	3.0	38
MD135-1181	3.00	12.20	3.0	38

For speeds and feeds, refer to pages 90 and 91.

MD136 PREMIUM FINE GRAIN CARBIDE

30° 4 Facet Drill Point

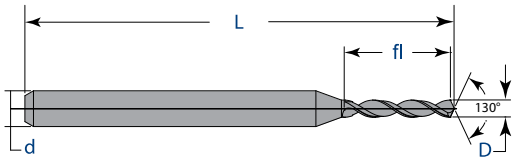


MD136 - Style 1 - Step Design
0.35mm DIA to 0.40mm DIA

MD136 - Style 2
0.45mm DIA to 0.65mm DIA

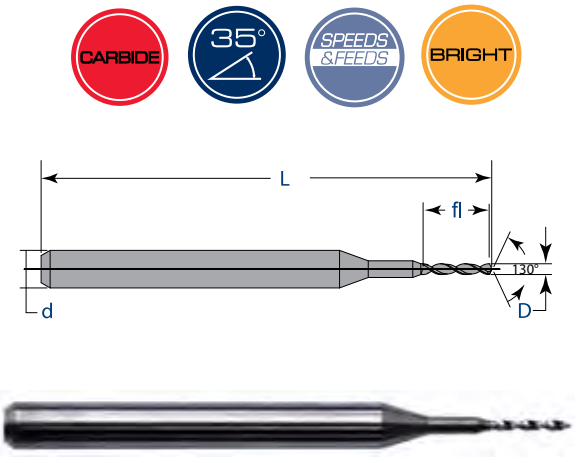
MD136 2 flute	D size	fl flute length	d shank dia.	L overall length
MD136-0138	0.35	7.0	3.0	38
MD136-0158	0.40	7.0	3.0	38
MD136-0177	0.45	8.0	3.0	38
MD136-0197	0.50	8.0	3.0	38
MD136-0217	0.55	8.0	3.0	38
MD136-0236	0.60	9.0	3.0	38
MD136-0256	0.65	9.0	3.0	38

Coating and special designs available.



MD137 PREMIUM FINE GRAIN CARBIDE

30° 4 Facet Drill Point



Sizes 0.10mm to 0.30mm

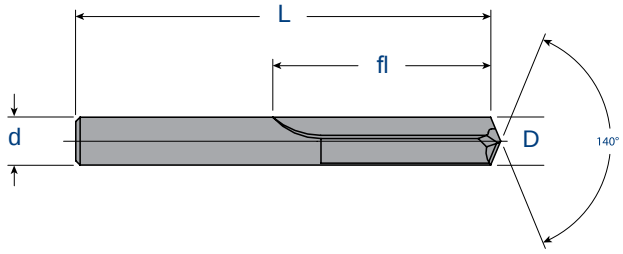
MD137 2 flute	D size	fl flute length	d shank dia.	L overall length
MD137-0040	0.10	1.50	3.0	38
MD137-0050	0.13	1.80	3.0	38
MD137-0059	0.15	2.50	3.0	38
MD137-0079	0.20	3.18	3.0	38
MD137-0098	0.25	3.80	3.0	38
MD137-0118	0.30	5.60	3.0	38

Coating and special designs available.

For speeds and feeds, refer to pages 90 and 91.

DR200 HEAVY DUTY CONSTRUCTION

2 Straight Flute - 140° 4 Facet Drill Point - Screw Machine Length



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

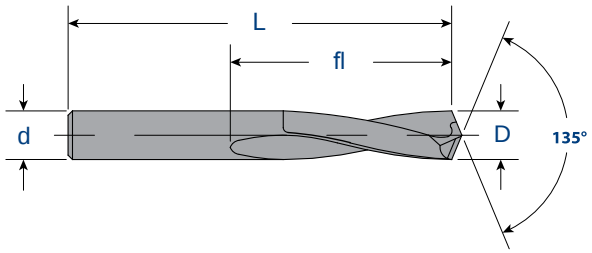
DR200 2 flute	D cutting dia.	fl flute length	d shank dia.	L overall length
DR200-0591	1.5	13	1.5	38
DR200-0787	2.0	19	2.0	44
DR200-0984	2.5	21	2.5	46
DR200-1181	3.0	22	3.0	48
DR200-1378	3.5	24	3.5	49
DR200-1575	4.0	27	4.0	54
DR200-1772	4.5	29	4.5	56
DR200-1969	5.0	30	5.0	57
DR200-2165	5.5	32	5.5	60
DR200-2362	6.0	33	6.0	62
DR200-2559	6.5	35	6.5	64
DR200-2756	7.0	38	7.0	68
DR200-2953	7.5	40	7.5	70
DR200-3150	8.0	41	8.0	71
DR200-3346	8.5	43	8.5	76
DR200-3543	9.0	44	9.0	78
DR200-3740	9.5	46	9.5	79
DR200-3937	10.0	48	10.0	83
DR200-4134	10.5	51	10.5	86
DR200-4331	11.0	52	11.0	87
DR200-4528	11.5	54	11.5	90
DR200-4724	12.0	54	12.0	92

Additional sizes available upon request.
Coating available upon request.

For speeds and feeds, refer to pages 92 and 93.

DR215 WITH 15° RIGHT HAND HELIX

2 Flute - 135° Modified Split Point - Screw Machine Length



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

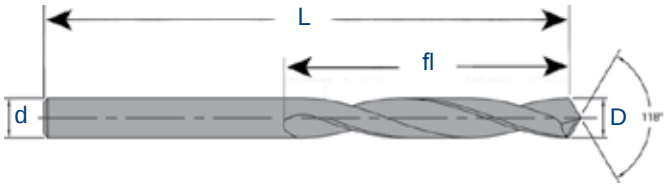
DR215 2 flute	D cutting dia.	fl flute length	d shank dia.	L overall length
DR215-0591	1.5	13	1.5	38
DR215-0787	2.0	19	2.0	44
DR215-0984	2.5	21	2.5	46
DR215-1181	3.0	22	3.0	48
DR215-1378	3.5	24	3.5	49
DR215-1575	4.0	27	4.0	54
DR215-1772	4.5	29	4.5	56
DR215-1969	5.0	30	5.0	57
DR215-2165	5.5	32	5.5	60
DR215-2362	6.0	33	6.0	62
DR215-2559	6.5	35	6.5	64
DR215-2756	7.0	38	7.0	68
DR215-2953	7.5	40	7.5	70
DR215-3150	8.0	41	8.0	71
DR215-3346	8.5	43	8.5	76
DR215-3543	9.0	44	9.0	78
DR215-3740	9.5	46	9.5	79
DR215-3937	10.0	48	10.0	83
DR215-4134	10.5	51	10.5	86
DR215-4331	11.0	52	11.0	87
DR215-4528	11.5	54	11.5	90
DR215-4724	12.0	54	12.0	92

Additional sizes available upon request.
Coating available upon request.

For speeds and feeds, refer to pages 94 and 95.

DR220 WITH 20° RIGHT HAND HELIX

2 Flute - 118° 4 Facet Point - Jobber Length



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

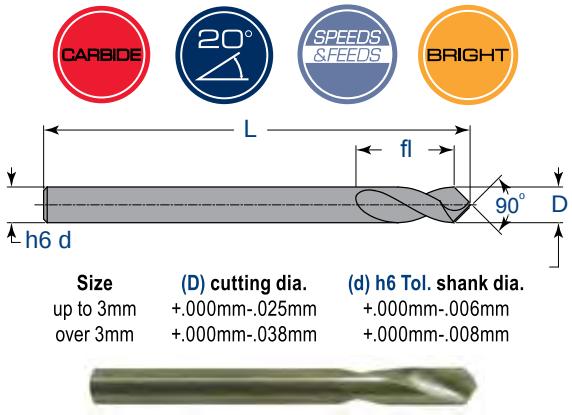
DR220 2 flute	D cutting dia.	fl flute length	d shank dia.	L overall length
DR220-0591	1.5	19	1.5	38
DR220-0787	2.0	22	2.0	44
DR220-0984	2.5	25	2.5	51
DR220-1181	3.0	32	3.0	57
DR220-1378	3.5	35	3.5	64
DR220-1575	4.0	35	4.0	64
DR220-1772	4.5	41	4.5	70
DR220-1969	5.0	44	5.0	76
DR220-2165	5.5	44	5.5	76
DR220-2362	6.0	51	6.0	83
DR220-2559	6.5	51	6.5	83
DR220-2756	7.0	54	7.0	89
DR220-2953	7.5	60	7.5	92
DR220-3150	8.0	60	8.0	92
DR220-3346	8.5	64	8.5	102
DR220-3543	9.0	64	9.0	102
DR220-3740	9.5	70	9.5	108
DR220-3937	10.0	73	10.0	114
DR220-4134	10.5	73	10.5	114
DR220-4331	11.0	73	11.0	114
DR220-4528	11.5	76	11.5	121
DR220-4724	12.0	76	12.0	121

Additional sizes available upon request.
Coating available upon request.

For speeds and feeds, refer to page 96.

SD221 NC DRILL MICRO GRAIN CARBIDE

2 Flute - 90° Point

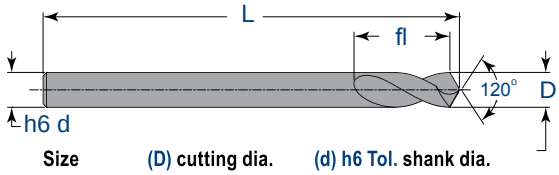


Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

SD221 90°	D cutting dia.	fl flute length	d shank dia.	L overall length
SD221-1575-90	4.0	10	4	51
SD221-2362-90	6.0	16	6	51
SD221-3150-90	8.0	23	8	64
SD221-3937-90	10	24	10	70
SD221-4724-90	12	25	12	70

SD221 NC DRILL MICRO GRAIN CARBIDE

2 Flute - 120° Point

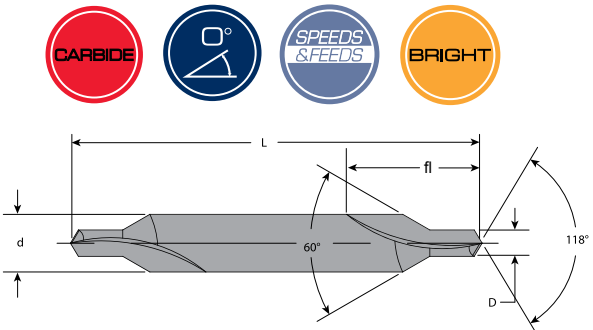


Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

SD221 120°	D cutting dia.	fl flute length	d shank dia.	L overall length
SD221-1575-120	4.0	10	4	51
SD221-2362-120	6.0	16	6	51
SD221-3150-120	8.0	23	8	64
SD221-3937-120	10	24	10	70
SD221-4724-120	12	25	12	70

DR235 COMBINATION DRILL COUNTERSINK

Straight Flute - 118° 4 Facet Point - 60° C'Sink Angle



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

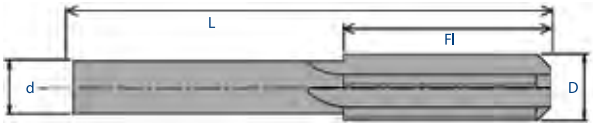
DR235 2 flute	D cutting dia.	fl flute length	d shank dia.	L overall length
DR235-0100	1.00	25	3.0	38
DR235-0125	1.25	32	3.0	38
DR235-0160	1.60	35	4.0	50
DR235-0200	2.00	35	5.0	50
DR235-0250	2.50	41	6.0	64
DR235-0315	3.15	44	8.0	64
DR235-0400	4.00	50	10.0	64
DR235-0500	5.00	60	12.0	64
DR235-0630	6.30	45	16.0	76
DR235-0800	8.00	50	20.0	100
DR235-1000	10.00	55	25.0	100

Additional sizes available upon request. Coating available upon request.

For speeds and feeds, refer to page 97.

RM300 STRAIGHT FLUTE

4 and 6 Flute - Right Hand Cutting



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

RM300 4 & 6 flute	D cutting dia.	Fl flute length	d shank dia.	L overall length
RM300-0630	1.6	10	1.32	38
RM300-0669	1.7	12	1.59	44
RM300-0709	1.8	12	1.59	44
RM300-0748	1.9	12	1.59	44
RM300-0787	2.0	12	1.59	44
RM300-0827	2.1	12	1.98	50
RM300-0866	2.2	12	1.98	50
RM300-0906	2.3	12	1.98	50
RM300-0945	2.4	12	1.98	50
RM300-1063	2.7	16	2.38	57
RM300-1181	3.0	16	2.78	57
RM300-1260	3.2	16	2.78	57
RM300-1417	3.6	19	3.57	64
RM300-1535	3.9	19	3.57	64
RM300-1614	4.1	22	3.97	70
RM300-1732	4.4	22	3.97	70
RM300-1929	4.9	22	4.76	70
RM300-2008	5.1	25	4.76	76
RM300-2047	5.2	25	4.76	76
RM300-2087	5.3	25	4.76	76
RM300-2126	5.4	25	4.76	76
RM300-2165	5.5	25	4.76	76
RM300-2205	5.6	25	4.76	76
RM300-2244	5.7	25	5.56	76
RM300-2283	5.8	25	5.56	76
RM300-2323	5.9	25	5.56	76
RM300-2362	6.0	25	5.56	76

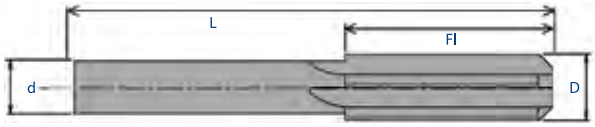
RM300 4 & 6 flute	D cutting dia.	Fl flute length	d shank dia.	L overall length
RM300-2402	6.1	25	5.56	76
RM300-2441	6.2	25	5.56	76
RM300-2480	6.3	25	5.56	76
RM300-2520	6.4	29	6.35	83
RM300-2559	6.5	29	6.35	83
RM300-2598	6.6	29	6.35	83
RM300-2638	6.7	29	6.35	83
RM300-2677	6.8	29	6.35	83
RM300-2717	6.9	29	6.35	83
RM300-2756	7.0	29	6.35	83
RM300-2795	7.1	29	6.35	83
RM300-2835	7.2	29	6.35	83
RM300-2874	7.3	29	7.14	83
RM300-2913	7.4	29	7.14	83
RM300-2953	7.5	29	7.14	83
RM300-2992	7.6	29	7.14	83
RM300-3031	7.7	29	7.14	83
RM300-3071	7.8	29	7.14	83
RM300-3110	7.9	29	7.14	83
RM300-3150	8.0	29	7.14	83
RM300-3189	8.1	32	7.94	89
RM300-3228	8.2	32	7.94	89
RM300-3268	8.3	32	7.94	89
RM300-3307	8.4	32	7.94	89
RM300-3346	8.5	32	7.94	89
RM300-3386	8.6	32	7.94	89
RM300-3425	8.7	32	7.94	89

Right hand spiral and left hand spiral, available upon request. Dia. 1.6 mm up to 6.3 mm - 4 flutes. 6.4 mm and over - 6 flutes.

For speeds and feeds, refer to page 98.

RM300 STRAIGHT FLUTE

4 and 6 Flute - Right Hand Cutting



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

RM300 4 & 6 flute	D cutting dia.	Fl flute length	d shank dia.	L overall length
RM300-3465	8.8	32	7.94	89
RM300-3504	8.9	32	7.94	89
RM300-3543	9.0	32	7.94	89
RM300-3583	9.1	32	7.94	89
RM300-3622	9.2	32	9.13	89
RM300-3661	9.3	32	9.13	89
RM300-3701	9.4	32	9.13	89
RM300-3740	9.5	32	9.13	89
RM300-3780	9.6	32	9.13	89
RM300-3819	9.7	32	9.13	89
RM300-3858	9.8	32	9.13	89
RM300-3898	9.9	32	9.53	89
RM300-3937	10.0	32	9.53	89
RM300-3976	10.1	32	9.53	89
RM300-4016	10.2	32	9.53	89
RM300-4055	10.3	32	9.53	89
RM300-4094	10.4	32	9.53	89
RM300-4134	10.5	32	9.53	89
RM300-4173	10.6	35	9.53	95
RM300-4213	10.7	35	9.53	95
RM300-4252	10.8	35	9.53	95
RM300-4291	10.9	35	9.53	95
RM300-4331	11.0	35	9.53	95
RM300-4370	11.1	35	9.53	95
RM300-4409	11.2	35	9.53	95
RM300-4449	11.3	35	9.53	95
RM300-4488	11.4	35	9.53	95

RM300 4 & 6 flute	D cutting dia.	Fl flute length	d shank dia.	L overall length
RM300-4528	11.5	35	9.53	95
RM300-4567	11.6	35	11.11	95
RM300-4606	11.7	35	11.11	95
RM300-4646	11.8	35	11.11	95
RM300-4685	11.9	35	11.11	95
RM300-4724	12.0	38	11.11	102
RM300-4764	12.1	38	11.11	102
RM300-4803	12.2	38	11.11	102
RM300-4843	12.3	38	11.11	102
RM300-4882	12.4	38	11.11	102
RM300-4921	12.5	38	11.11	102
RM300-4961	12.6	38	11.11	102
RM300-5039	12.8	38	11.11	102
RM300-5079	12.9	38	11.11	102
RM300-5118	13.0	38	11.11	102

Right hand spiral and left hand spiral, available upon request.

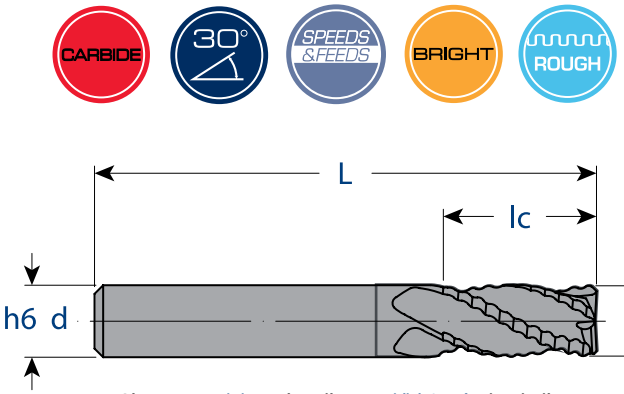
Dia. 1.6 mm up to 6.3 mm - 4 flutes. 6.4 mm and over - 6 flutes.

For speeds and feeds, refer to page 98.

GENERAL PURPOSE END MILLS

EM400

4 Flute - Rough Style - 30° Helix



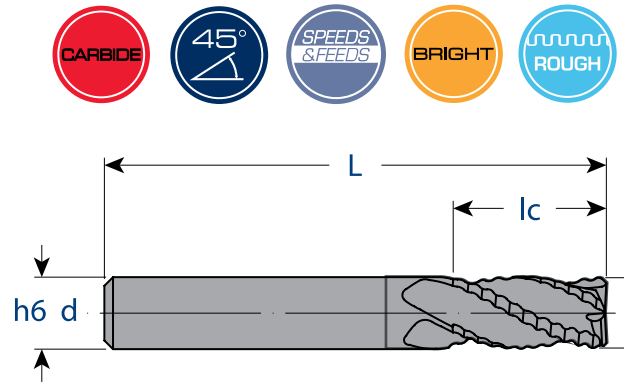
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

EM400 4 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM400-1181	3.0	10	4	64
EM400-1575	4.0	14	6	64
EM400-1969	5.0	15	6	64
EM400-2362	6.0	19	6	64
EM400-3150	8.0	21	8	64
EM400-3937	10.0	25	10	70
EM400-4724	12.0	25	12	76
EM400-6299	16.0	32	16	89
EM400-7874	20.0	38	20	102
EM400-9843	25.0	38	25	102

Coatings and shank flats available upon request.

EM401

3 - 6 Flute - Rough Style - 45° Helix



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

EM401 3-6 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM401-1181	3.0	10	4	64
EM401-1575	4.0	14	6	64
EM401-1969	5.0	15	6	64
EM401-2362	6.0	19	6	64
EM401-3150	8.0	21	8	64
EM401-3937	10.0	25	10	70
EM401-4724	12.0	25	12	76
EM401-6299	16.0	32	16	89
EM401-7874	20.0	38	20	102
EM401-9843	25.0	38	25	102

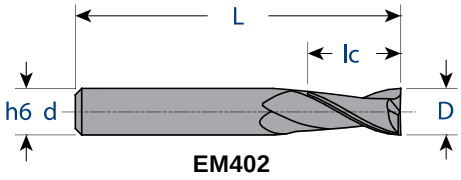
Coatings and shank flats available upon request.

For speeds and feeds, refer to page 129.

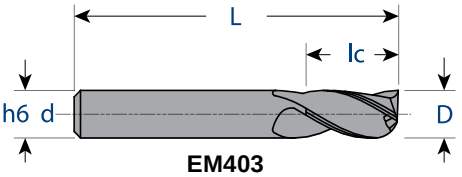
STANDARD LENGTH · SINGLE END · SQUARE END

2, 3, and 4 Flute

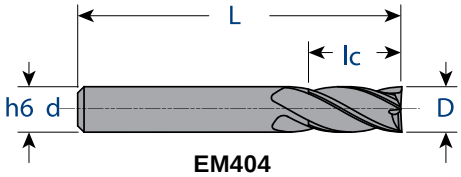
CARBIDE | 30° | SPEEDS &FEEDS | BRIGHT



EM402



EM403



EM404

Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

Coatings and shank flats available upon request.

EM402 2 flute	EM403 3 flute	EM404 4 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM402-0197	EM403-0197	EM404-0197	0.5	1.5	3	39
EM402-0394	EM403-0394	EM404-0394	1.0	3.0	3	39
EM402-0591	EM403-0591	EM404-0591	1.5	5.0	3	39
EM402-0787	EM403-0787	EM404-0787	2.0	7.0	3	39
EM402-0984	EM403-0984	EM404-0984	2.5	7.0	3	39
EM402-1181	EM403-1181	EM404-1181	3.0	9.0	3	39
EM402-1378	EM403-1378	EM404-1378	3.5	12	4	51
EM402-1575	EM403-1575	EM404-1575	4.0	14	4	51
EM402-1772	EM403-1772	EM404-1772	4.5	14	5	51
EM402-1969	EM403-1969	EM404-1969	5.0	16	5	51
EM402-2362	EM403-2362	EM404-2362	6.0	19	6	64
EM402-2756	EM403-2756	EM404-2756	7.0	19	8	64
EM402-3150	EM403-3150	EM404-3150	8.0	21	8	64
EM402-3543	EM403-3543	EM404-3543	9.0	22	10	70
EM402-3937	EM403-3937	EM404-3937	10	22	10	70
EM402-4331	EM403-4331	EM404-4331	11	25	11	70
EM402-4724	EM403-4724	EM404-4724	12	25	12	76
EM402-5512	EM403-5512	EM404-5512	14	30	14	89
EM402-6299	EM403-6299	EM404-6299	16	32	16	89
EM402-7087	EM403-7087	EM404-7087	18	35	18	102
EM402-7874	EM403-7874	EM404-7874	20	38	20	102
EM402-8661	EM403-8661	EM404-8661	22	38	22	102
EM402-9843	EM403-9843	EM404-9843	25	38	25	102

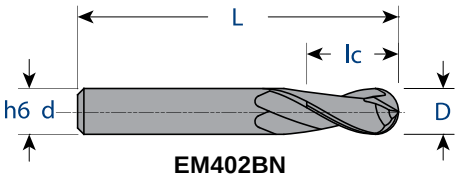
For speeds and feeds, refer to pages 130, 131, 133 and 134.

QUALITY TECH TOOL

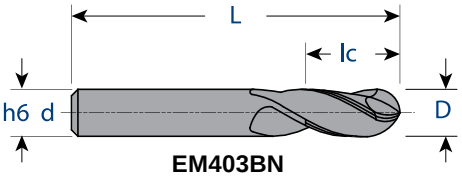
STANDARD LENGTH · SINGLE END · BALL NOSE

2, 3, and 4 Flute

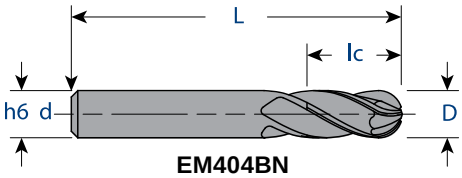
CARBIDE | 30° | SPEEDS &FEEDS | BRIGHT



EM402BN



EM403BN



EM404BN

EM402BN 2 flute	EM403BN 3 flute	EM404BN 4 flute	D mill dia.	lc length of cut	d shank length	L overall length
EM402-0197-BN	EM403-0197-BN	EM404-0197-BN	0.5	1.5	3	39
EM402-0394-BN	EM403-0394-BN	EM404-0394-BN	1.0	3.0	3	39
EM402-0591-BN	EM403-0591-BN	EM404-0591-BN	1.5	5.0	3	39
EM402-0787-BN	EM403-0787-BN	EM404-0787-BN	2.0	7.0	3	39
EM402-0984-BN	EM403-0984-BN	EM404-0984-BN	2.5	7.0	3	39
EM402-1181-BN	EM403-1181-BN	EM404-1181-BN	3.0	9.0	3	39
EM402-1378-BN	EM403-1378-BN	EM404-1378-BN	3.5	12	4	51
EM402-1575-BN	EM403-1575-BN	EM404-1575-BN	4.0	14	4	51
EM402-1772-BN	EM403-1772-BN	EM404-1772-BN	4.5	14	5	51
EM402-1969-BN	EM403-1969-BN	EM404-1969-BN	5.0	16	5	51
EM402-2362-BN	EM403-2362-BN	EM404-2362-BN	6.0	19	6	64
EM402-2756-BN	EM403-2756-BN	EM404-2756-BN	7.0	19	8	64
EM402-3150-BN	EM403-3150-BN	EM404-3150-BN	8.0	21	8	64
EM402-3543-BN	EM403-3543-BN	EM404-3543-BN	9.0	22	10	70
EM402-3937-BN	EM403-3937-BN	EM404-3937-BN	10	22	10	70
EM402-4331-BN	EM403-4331-BN	EM404-4331-BN	11	25	11	70
EM402-4724-BN	EM403-4724-BN	EM404-4724-BN	12	25	12	76
EM402-5512-BN	EM403-5512-BN	EM404-5512-BN	14	30	14	89
EM402-6299-BN	EM403-6299-BN	EM404-6299-BN	16	32	16	89
EM402-7087-BN	EM403-7087-BN	EM404-7087-BN	18	35	18	102
EM402-7874-BN	EM403-7874-BN	EM404-7874-BN	20	38	20	102
EM402-8661-BN	EM403-8661-BN	EM404-8661-BN	22	38	22	102
EM402-9843-BN	EM403-9843-BN	EM404-9843-BN	25	38	25	102

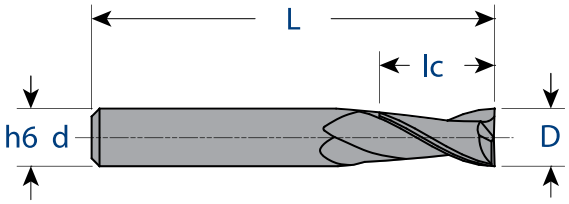
Coatings and shank flats available upon request.

Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

For speeds and feeds, refer to page 132.

EM440 FAST CUT

2 Flute - Standard and Long Length



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.006mm
over 3mm	+.000mm-.038mm	+.000mm-.008mm

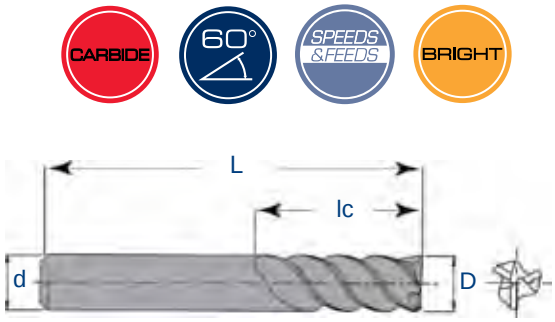
EM440 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM440-2362	6.0	19	6	63
EM440-2363	6.0	38	6	102
EM440-3150	8.0	21	8	63
EM440-3151	8.0	41	8	102
EM440-3937	10	25	10	70
EM440-3938	10	51	10	102
EM440-4724	12	26	12	76
EM440-4725	12	51	12	102
EM440-6299	16	32	16	89
EM440-6300	16	57	16	127
EM440-7874	20	38	20	102
EM440-7875	20	57	20	127
EM440-9843	25	57	25	127
EM440-9844	25	76	25	152

For speeds and feeds, refer to page 134.

Coatings and shank flats available upon request.

EM460

3 Flute - High Helix



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

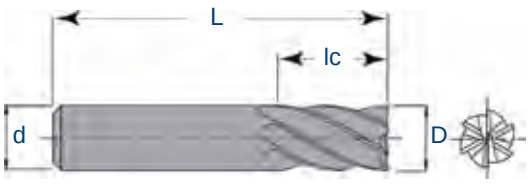
Coatings and shank flats available upon request.

EM460 3 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM460-1181	3.0	12	6	64
EM460-1575	4.0	14	6	64
EM460-1969	5.0	16	6	64
EM460-2362	6.0	19	6	64
EM460-3150	8.0	21	8	64
EM460-3937	10	25	10	70
EM460-4724	12	25	12	76
EM460-5512	14	29	14	89
EM460-6299	16	32	16	89
EM460-7087	18	38	18	102
EM460-7874	20	38	20	102
EM460-9843	25	38	25	102

For speeds and feeds, refer to page 135.

EM461 - RHS/RHC

6 Flute



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

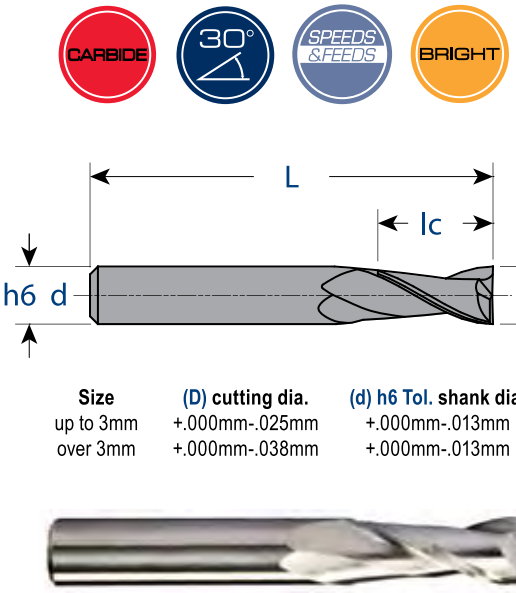
Coatings and shank flats available upon request.

EM461 6 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM461-1181	3.0	10	3	39
EM461-1575	4.0	14	4	51
EM461-1969	5.0	16	5	51
EM461-2362	6.0	19	6	64
EM461-2756	7.0	19	8	64
EM461-3150	8.0	21	8	64
EM461-3543	9.0	22	10	70
EM461-3937	10	25	10	70
EM461-4331	11	25	11	70
EM461-4724	12	25	12	76
EM461-5512	14	30	14	89
EM461-6299	16	32	16	89
EM461-7087	18	35	18	102
EM461-7874	20	38	20	102
EM461-8661	22	38	22	102
EM461-9843	25	38	25	102

For speeds and feeds, refer to pages 133 - 135.

EM462 LONG LENGTH

2 Flute - Single End - Square End



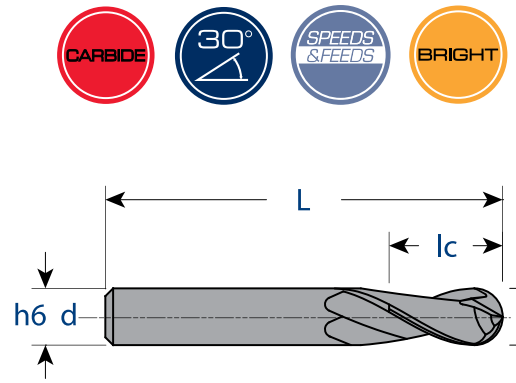
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

EM462 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM462-1181	3.0	19	3	57
EM462-1575	4.0	19	4	57
EM462-1969	5.0	25	5	64
EM462-2362	6.0	28	6	76
EM462-3150	8.0	29	8	76
EM462-3937	10	32	10	76
EM462-4724	12	51	12	102
EM462-5512	14	57	14	127
EM462-6299	16	57	16	127
EM462-7087	18	57	18	127
EM462-7874	20	57	20	127
EM462-9843	25	57	25	127

Coatings and shank flats available upon request.

EM462BN LONG LENGTH

2 Flute - Single End - Ball Nose



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

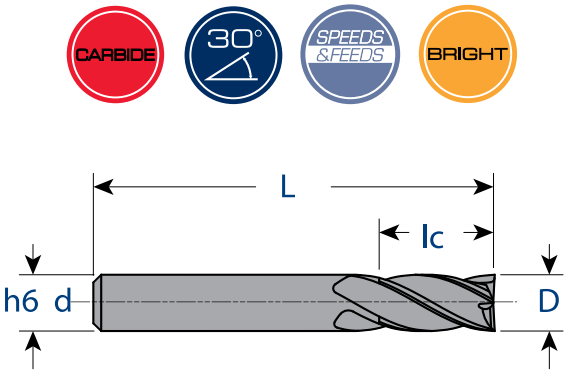
EM462BN 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM462-1181-BN	3.0	19	3	57
EM462-1575-BN	4.0	19	4	57
EM462-1969-BN	5.0	25	5	64
EM462-2362-BN	6.0	28	6	76
EM462-3150-BN	8.0	28	8	76
EM462-3937-BN	10	32	10	76
EM462-4724-BN	12	51	12	102
EM462-5512-BN	14	57	14	127
EM462-6299-BN	16	57	16	127
EM462-7087-BN	18	57	18	127
EM462-7874-BN	20	57	20	127
EM462-9843-BN	25	57	25	127

Coatings and shank flats available upon request.

For speeds and feeds, refer to pages 130 - 132.

EM464 LONG LENGTH

4 Flute - Single End - Square End



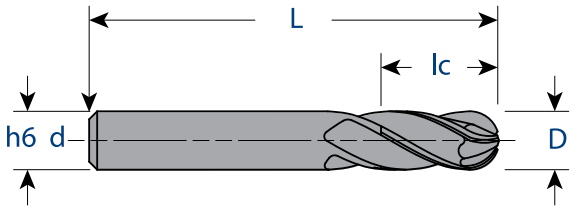
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

EM464 4 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM464-1181	3.0	19	3	57
EM464-1575	4.0	19	4	57
EM464-1969	5.0	25	5	64
EM464-2362	6.0	28	6	76
EM464-3150	8.0	29	8	76
EM464-3937	10	32	10	76
EM464-4724	12	51	12	102
EM464-5512	14	57	14	127
EM464-6299	16	57	16	127
EM464-7087	18	57	18	127
EM464-7874	20	57	20	127
EM464-9843	25	57	25	127

Coatings and shank flats available upon request.

EM464BN LONG LENGTH

4 Flute - Single End - Ball Nose



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

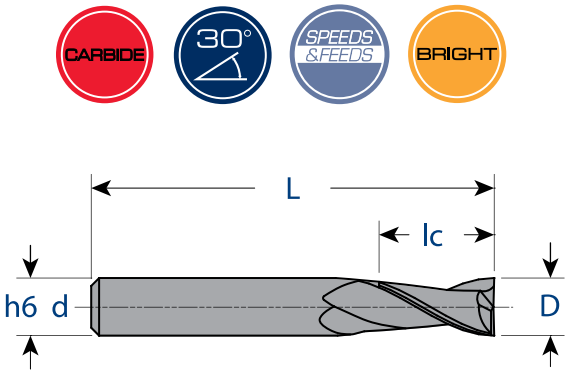
EM464BN 4 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM464-1181-BN	3.0	19	3	57
EM464-1575-BN	4.0	19	4	57
EM464-1969-BN	5.0	25	5	64
EM464-2362-BN	6.0	28	6	76
EM464-3150-BN	8.0	28	8	76
EM464-3937-BN	10	32	10	76
EM464-4724-BN	12	51	12	102
EM464-5512-BN	14	57	14	127
EM464-6299-BN	16	57	16	127
EM464-7087-BN	18	57	18	127
EM464-7874-BN	20	57	20	127
EM464-9843-BN	25	57	25	127

Coatings and shank flats available upon request.

For speeds and feeds, refer to pages 132 - 134.

EM470

2 Flute - Standard Length for Cutting Aluminum



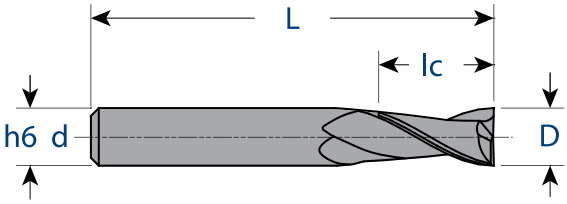
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

EM470 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM470-1181	3.0	4.5	6	38
EM470-1575	4.0	6.0	6	51
EM470-1969	5.0	8.0	6	51
EM470-2362	6.0	9.0	6	64
EM470-3150	8.0	12	8	64
EM470-3937	10	15	10	64
EM470-4724	12	18	12	76
EM470-6299	16	24	16	89
EM470-7874	20	30	20	102
EM470-9843	25	37.5	25	102

Coatings and shank flats available upon request.

EM471

2 Flute - Long Length for Cutting Aluminum



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

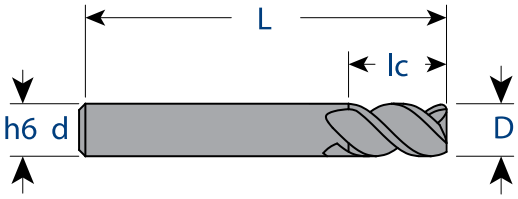
EM471 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM471-1181	3.0	7.5	6	38
EM471-1575	4.0	10	6	51
EM471-1969	5.0	12	6	51
EM471-2362	6.0	15	6	64
EM471-3150	8.0	20	8	64
EM471-3937	10	25	10	64
EM471-4724	12	30	12	76
EM471-6299	16	40	16	89
EM471-7874	20	50	20	102
EM471-9843	25	62.5	25	127

Coatings and shank flats available upon request.

For speeds and feeds, refer to pages 124 and 125.

EM475

3 Flute - Standard Length for Cutting Aluminum



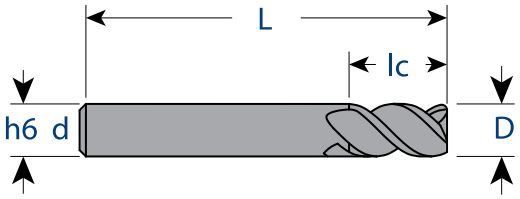
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

EM475 3 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM475-1181	3.0	4.5	6	38
EM475-1575	4.0	6.0	6	51
EM475-1969	5.0	8.0	6	51
EM475-2362	6.0	9.0	6	64
EM475-3150	8.0	12	8	64
EM475-3937	10	15	10	64
EM475-4724	12	18	12	76
EM475-6299	16	24	16	89
EM475-7874	20	30	20	102
EM475-9843	25	37.5	25	102

Coatings and shank flats available upon request.

EM476

3 Flute - Long Length for Cutting Aluminum



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

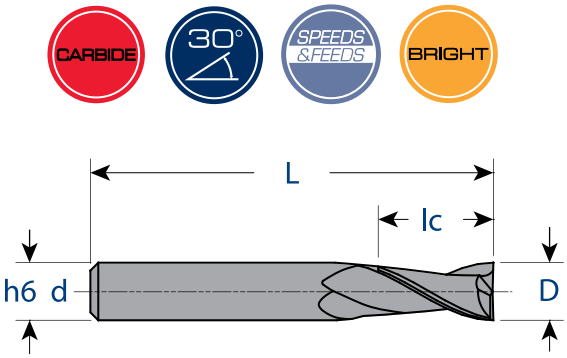
EM476 3 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM476-1181	3.0	7.5	6	38
EM476-1575	4.0	10	6	51
EM476-1969	5.0	12	6	51
EM476-2362	6.0	15	6	64
EM476-3150	8.0	20	8	64
EM476-3937	10	25	10	64
EM476-4724	12	30	12	76
EM476-6299	16	40	16	89
EM476-7874	20	50	20	102
EM476-9843	25	62.5	25	127

Coatings and shank flats available upon request.

For speeds and feeds, refer to pages 126 and 127.

EM482 EXTRA LONG LENGTH

2 Flute - Single End - Square End



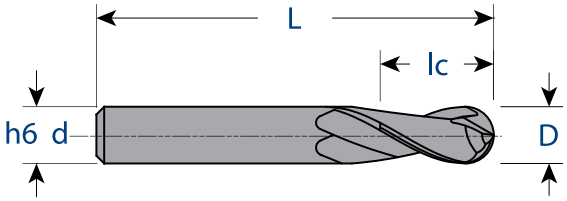
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

EM482 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM482-1181	3.0	25	3	76
EM482-1575	4.0	28	4	76
EM482-1969	5.0	32	5	76
EM482-2362	6.0	38	6	102
EM482-3150	8.0	42	8	102
EM482-3937	10	45	10	102
EM482-4724	12	76	12	153
EM482-5512	14	76	14	153
EM482-6299	16	76	16	153
EM482-7087	18	76	18	153
EM482-7874	20	76	20	153
EM482-9843	25	76	25	153

Coatings and shank flats available upon request.

EM482BN EXTRA LONG LENGTH

2 Flute - Ball Nose



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

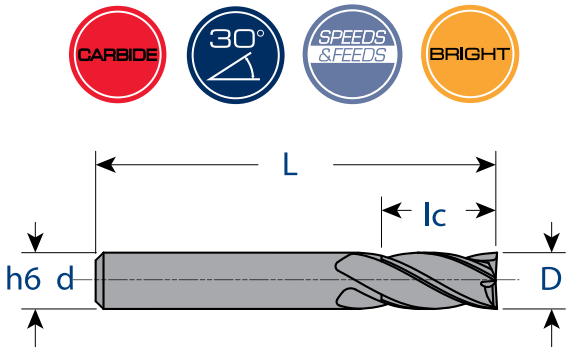
EM482BN 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM482-1181-BN	3.0	25	3	76
EM482-1575-BN	4.0	28	4	76
EM482-1969-BN	5.0	32	5	76
EM482-2362-BN	6.0	38	6	102
EM482-3150-BN	8.0	42	8	102
EM482-3937-BN	10	45	10	102
EM482-4724-BN	12	76	12	153
EM482-5512-BN	14	76	14	153
EM482-6299-BN	16	76	16	153
EM482-7087-BN	18	76	18	153
EM482-7874-BN	20	76	20	153
EM482-9843-BN	25	76	25	153

Coatings and shank flats available upon request.

For speeds and feeds, refer to pages 130 - 132.

EM484 EXTRA LONG LENGTH

4 Flute - Single End - Square End



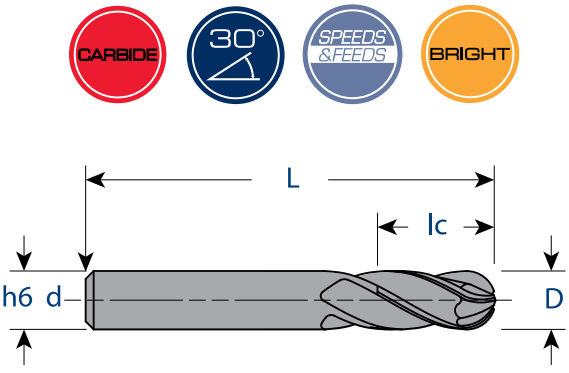
Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

EM484 4 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM484-1181	3.0	25	3	76
EM484-1575	4.0	28	4	76
EM484-1969	5.0	32	5	76
EM484-2362	6.0	38	6	102
EM484-3150	8.0	42	8	102
EM484-3937	10	45	10	102
EM484-4724	12	76	12	153
EM484-5512	14	76	14	153
EM484-6299	16	76	16	153
EM484-7087	18	76	18	153
EM484-7874	20	76	20	153
EM484-9843	25	76	25	153

Coatings and shank flats available upon request.

EM484BN EXTRA LONG LENGTH

4 Flute - Ball Nose



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

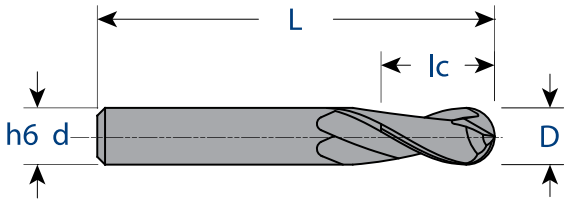
EM484BN 4 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM484-1181-BN	3.0	25	3	76
EM484-1575-BN	4.0	28	4	76
EM484-1969-BN	5.0	32	5	76
EM484-2362-BN	6.0	38	6	102
EM484-3150-BN	8.0	42	8	102
EM484-3937-BN	10	45	10	102
EM484-4724-BN	12	76	12	153
EM484-5512-BN	14	76	14	153
EM484-6299-BN	16	76	16	153
EM484-7087-BN	18	76	18	153
EM484-7874-BN	20	76	20	153
EM484-9843-BN	25	76	25	153

Coatings and shank flats available upon request.

For speeds and feeds, refer to pages 132 - 134.

EM497 EXTRA LONG LENGTH

2 Flute - Single End - Ball Nose



Size	(D) cutting dia.	(d) h6 Tol. shank dia.
up to 3mm	+.000mm-.025mm	+.000mm-.013mm
over 3mm	+.000mm-.038mm	+.000mm-.013mm

Coatings and shank flats available upon request.

EM497 2 flute	D mill dia.	lc length of cut	d shank dia.	L overall length
EM497-1181	3.0	4.5	3	63
EM497-1575	4.0	6.0	4	63
EM497-1969	5.0	8.0	5	63
EM497-2362	6.0	9.0	6	100
EM497-3150	8.0	12	8	100
EM497-3937	10	15	10	100
EM497-4331	11	17	12	127
EM497-4724	12	18	12	127
EM497-5512	14	21	14	127
EM497-6299	16	24	16	152
EM497-7087	18	27	18	152
EM497-7874	20	30	20	152
EM497-8661*	22	33	22	152
EM497-9843*	25	38	25	152

*Available upon request.

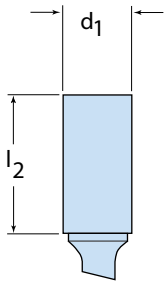
For speeds and feeds, refer to page 135.

QTT BURS

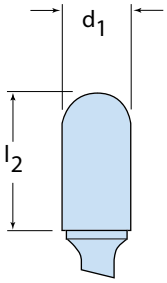
SOLID MICROGRAIN CARBIDE BURS

METRIC SIZES

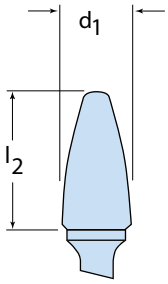
SHAPES & SCTI IDENTIFICATION



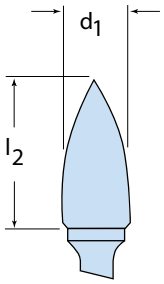
Series SA
Cylindrical



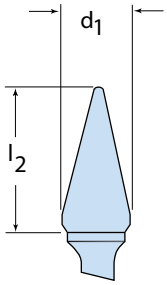
Series SC
Cylindrical Ball Nose



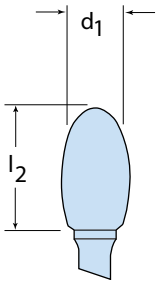
Series SF
Round Nose Tree



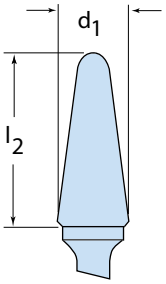
Series SG
Pointed Tree



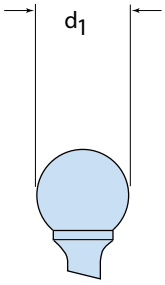
Series SM
Pointed Cone



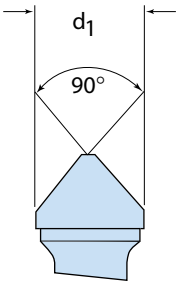
Series SE
Egg Shape



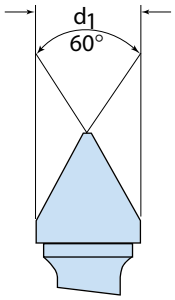
Series SL
14 Degree Included Angle



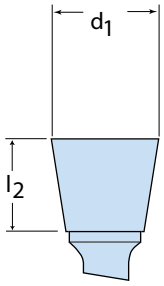
Series SD
Ball Shape



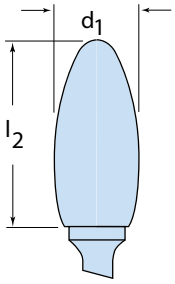
Series SK
90 Degree Included Angle



Series SJ
60 Degree Included Angle



Series SN
Inverted Taper



Series SH
Flame Shape

Styles of Cut

Double Cut

Engineered specifically for tough applications. Tough cut insures faster, splinter-free cutting in weld and alloy castings with increased tool life.

Medium Right Hand Spiral

General purpose, recommended where fair stock removal and smooth finish are required.

Aluminum Cut

Designed for use on aluminum, non-ferrous metals, soft steel, reinforced plastics, and other soft materials.

Coarse and Fine Cuts are available on request.

Recommended Cutting Speeds for Carbide Burs

Diameter	R.P.M.	MAXIMUM R.P.M.
1.5	55,000 - 85,000	90,000
2	50,000 - 60,000	85,000
3	35,000 - 65,000	80,000
5	30,000 - 55,000	75,000
6	25,000 - 50,000	70,000
8	18,000 - 38,000	65,000
9	17,000 - 38,000	63,000
11	13,000 - 37,000	55,000
12	14,000 - 36,000	50,000
16	11,000 - 23,000	40,000
19	8,000 - 19,000	30,000
25	7,000 - 18,000	25,000

NOTE: Use Lower Speeds when cutting harder ferrous materials and Higher Speeds for softer non-ferrous materials.

METRIC SIZES - 6MM SHANK

BR801 Series

Cylindrical

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR801-1250-60	3	SA-11M*	12
	BR801-1875-60	4	SA-14M*	16
	BR801-2362	6	SA-1M*	16
	BR801-3125-60	8	SA-2M	19
	BR801-3750-60	9	SA-3M	19
	BR801-4375-60	11	SA-4M	25
	BR801-5001-60**	12	SA-5FM	12
	BR801-5000-60	12	SA-5M	25
	BR801-6250-60	16	SA-6M	25
	BR801-7500-60**	19	SA-16M	19
	BR801-7501-60	19	SA-7M	25
	BR801-1000-60	25	SA-9M	25

BR901 Series

Cylindrical

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR901-1250-60	3	SA-11M*	12
	BR901-1875-60	5	SA-14M*	16
	BR901-2362	6	SA-1M*	16
	BR901-3125-60	8	SA-2M	19
	BR901-3750-60	9	SA-3M	19
	BR901-4375-60	11	SA-4M	25
	BR901-5001-60**	12	SA-5FM	12
	BR901-5000-60	12	SA-5M	25
	BR901-6250-60	16	SA-6M	25
	BR901-7500-60**	19	SA-16M	19
	BR901-7501-60	19	SA-7M	25
	BR901-1000-60	25	SA-9M	25

BR802 Series

Cylindrical Ball Nose

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR802-1250-60	3	SC-11M*	12
	BR802-1875-60	4	SC-14M*	16
	BR802-2362	6	SC-1M*	16
	BR802-3125-60	8	SC-2M	19
	BR802-3750-60	9	SC-3M	19
	BR802-4375-60	11	SC-4M	25
	BR802-5000-60	12	SC-5M	25
	BR802-6250-60	16	SC-6M	25
	BR802-7500-60	19	SC-7M	25

BR902 Series

Cylindrical Ball Nose

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR902-1250-60	3	SC-11M*	12
	BR902-1875-60	5	SC-14M*	16
	BR902-2362	6	SC-1M*	16
	BR902-3125-60	8	SC-2M	19
	BR902-3750-60	9	SC-3M	19
	BR902-4375-60	11	SC-4M	25
	BR902-5000-60	12	SC-5M	25
	BR902-6250-60	16	SC-6M	25
	BR902-7500-60	19	SC-7M	25

BR803 Series

Round Nose Tree

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR803-2362	6	SF-1M*	16
	BR803-3750-60	9	SF-3M	19
	BR803-5001-60	12	SF-13M	19
	BR803-5000-60	12	SF-5M	25
	BR803-6250-60	16	SF-6M	25
	BR803-7500-60	16	SF-7M	25
	BR803-7501-60	19	SF-14M	31
	BR803-7502-60	19	SF-15M	38

BR903 Series

Round Nose Tree

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR903-2362	6	SF-1M*	16
	BR903-3750-60	9	SF-3M	19
	BR903-5001-60	12	SF-13M	19
	BR903-5000-60	12	SF-5M	25
	BR903-6250-60	16	SF-6M	25
	BR903-7500-60	19	SF-7M	25
	BR903-7501-60	19	SF-14M	32
	BR903-7502-60	19	SF-15M	38

*Indicates solid 6mm carbide 50mm O.A.L., all others have 6mm diameter hardened steel shank. (8mm diameter shanks available).
** Indicates non-stocking item. Available upon request.

METRIC SIZES - 6MM SHANK

BR804 Series

Pointed Tree

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR804-2362	6	SG-1M*	16
	BR804-3125-60	8	SG-2M	19
	BR804-3750-60	9	SG-3M	19
	BR804-5001-60	12	SG-13M	19
	BR804-5000-60	12	SG-5M	25
	BR804-6250-60	16	SG-6M	25
	BR804-7500-60	19	SG-7M	25
	BR804-7501-60	19	SG-15M	38

BR904 Series

Pointed Tree

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR904-2362	6	SG-1M*	16
	BR904-3125-60	8	SG-2M	19
	BR904-3750-60	9	SG-3M	19
	BR904-5001-60	12	SG-13M	19
	BR904-5000-60	12	SG-5M	25
	BR904-6250-60	16	SG-6M	25
	BR904-7500-60	19	SG-7M	25
	BR904-7501-60	19	SG-15M	38

BR805 Series

Pointed Cone

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)	Incl. Ang. Deg.
	BR805-2362	6	SM-1M*	12	22
	BR805-2363	6	SM-2M*	19	14
	BR805-2364	6	SM-3M*	25	10
	BR805-3750-60	9	SM-4M*	16	28
	BR805-5000-60	12	SM-5M	22	28
	BR805-6250-60	16	SM-6M	25	31

BR905 Series

Pointed Cone

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)	Incl. Ang. Deg.
	BR905-2362	6	SM-1M*	12	22
	BR905-2363	6	SM-2M*	19	14
	BR905-2364	6	SM-3M*	25	10
	BR905-3750-60	9	SM-4M	16	28
	BR905-5000-60	12	SM-5M	22	28
	BR905-6250-60	16	SM-6M	25	31

BR806 Series

Egg Shape

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR806-2362	6	SE-1M*	9
	BR806-3750-60	9	SE-3M	16
	BR806-5000-60	12	SE-5M	22
	BR806-6250-60	16	SE-6M	25
	BR806-7500-60	19	SE-7M	25

BR906 Series

Egg Shape

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR906-2362	6	SE-1M*	9
	BR906-3750-60	16	SE-3M	16
	BR906-5000-60	22	SE-5M	22
	BR906-6250-60	25	SE-6M	25
	BR906-7500-60	25	SE-7M	25

*Indicates solid 6mm carbide 50mm O.A.L., all others have 6mm diameter hardened steel shank. (8mm diameter shanks available).

METRIC SIZES - 6MM SHANK

BR807 Series

14° Included Angle

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)	Incl. Ang. Deg.
	BR807-2362	6	SL-1M*	16	14
	BR807-3125-60	8	SL-2M	22	14
	BR807-3750-60	9	SL-3M	26	14
	BR807-5000-60	12	SL-4M	28	14
	BR807-6250-60	16	SL-5M	33	14
	BR807-7500-60	19	SL-7M	38	14

BR907 Series

14° Included Angle

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)	Incl. Ang. Deg.
	BR907-2362	6	SL-1M*	16	14
	BR907-3125-60	8	SL-2M	22	14
	BR907-3750-60	9	SL-3M	26	14
	BR907-5000-60	12	SL-4M	28	14
	BR907-6250-60	16	SL-5M	33	14
	BR907-7500-60	19	SL-7M	38	14

BR808 Series

Ball Shape

Double Cut	Catalog Number	Dia. (d_1)	SCTI
	BR808-1250-60	3	SD-11M*
	BR808-1875-60	4	SD-14M*
	BR808-2362	6	SD-1M*
	BR808-3125-60	8	SD-2M
	BR808-3750-60	9	SD-3M
	BR808-5000-60	12	SD-5M
	BR808-6250-60	16	SD-6M
	BR808-7500-60	19	SD-7M
	BR808-1000-60	25	SD-9M

BR908 Series

Ball Shape

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI
	BR908-1250-60	3	SD-11M*
	BR908-1875-60	4	SD-14M*
	BR908-2362	6	SD-1M*
	BR908-3125-60	8	SD-2M
	BR908-3750-60	9	SD-3M
	BR908-5000-60	12	SD-5M
	BR908-6250-60	16	SD-6M
	BR908-7500-60	19	SD-7M
	908-1000-60	25	SD-9M

BR849 Series

90° Cone

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Incl. Ang. Deg.
	BR849-2362	6	SK-1M*	90
	BR849-3750-60	9	SK-3M	90
	BR849-5000-60	12	SK-5M	90
	BR849-6250-60	16	SK-6M	90
	BR849-7500-60	19	SK-7M	90
	BR849-1000-60	25	SK-9M	90

BR949 Series

90° Cone

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Incl. Ang. Deg.
	BR949-2362	6	SK-1M*	90
	BR949-3750-60	9	SK-3M	90
	BR949-5000-60	12	SK-5M	90
	BR949-6250-60	16	SK-6M	90
	BR949-7500-60	19	SK-7M	90
	BR949-1000-60	25	SK-9M	90

*Indicates solid 6mm carbide 50mm O.A.L., all others have 6mm diameter hardened steel shank. (8mm diameter shanks available).

METRIC SIZES - 6MM SHANK

BR850 Series

60° Cone

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Incl. Ang. Deg.
	BR850-2362	6	SJ-1M*	60
	BR850-3750-60	9	SJ-3M	60
	BR850-5000-60	12	SJ-5M	60
	BR850-6250-60	16	SJ-6M	60
	BR850-7500-60	19	SL-7M	60
	BR850-1000-60	25	SJ-9M	60

BR950 Series

60° Cone

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Incl. Ang. Deg.
	BR950-2362	6	SJ-1M*	60
	BR950-3750-60	9	SJ-3M	60
	BR950-5000-60	12	SJ-5M	60
	BR950-6250-60	16	SJ-6M	60
	BR950-7500-60	19	SJ-7M	60
	BR950-1000-60	25	SJ-9M	60

BR851 Series

Flame Shape

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR851-3125-60	8	SH-2M	19
	BR851-5000-60	12	SH-5M	31
	BR851-6250-60	16	SH-6M	36
	BR851-7500-60	19	SH-7M	41

BR951 Series

Flame Shape

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR951-3125-60	8	SH-2M	19
	BR951-5000-60	12	SH-5M	31
	BR951-6250-60	16	SH-6M	36
	BR951-7500-60	19	SH-7M	41

BR852 Series

Inverted Taper

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)	Incl. Ang. Deg.
	BR852-2362	6	SN-1M*	8	10
	BR852-3750-60	9	SN-2M	9	13
	BR852-5000-60	12	SN-4M	12	28
	BR852-6250-60	16	SN-6M	19	18
	BR852-7500-60	19	SN-7M	16	30

BR952 Series

Inverted Taper

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)	Incl. Ang. Deg.
	BR952-2362	6	SN-1M*	8	10
	BR952-3750-60	9	SN-2M	9	13
	BR952-5000-60	12	SN-4M	12	28
	BR952-6250-60	16	SN-6M	19	18
	BR952-7500-60	19	SN-7M	16	30

*Indicates solid 6mm carbide 50mm O.A.L., all others have 6mm diameter hardened steel shank. (8mm diameter shanks available).

6MM SHANK — 152MM LONG STEEL SHANK

BR861 Series

Cylindrical

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR861-3750-60 BR861-5000-60	9 12	SA-3ML6 SA-5ML6	19 25

BR961 Series

Cylindrical

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR961-3750-60 BR961-5000-60	9 12	SA-3ML6 SA-5ML6	19 25

BR862 Series

Cylindrical Ball Nose

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR862-3750-60 BR862-5000-60	9 12	SC-3ML6 SC-5ML6	19 25

BR962 Series

Cylindrical Ball Nose

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR962-3750-60 BR962-5000-60	9 12	SC-3ML6 SC-5ML6	

BR863 Series

Round Nose Tree

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR863-3750-60 BR863-5000-60	9 12	SF-3ML6 SF-5ML6	19 25

BR963 Series

Round Nose Tree

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR963-3750-60 BR963-5000-60	9 12	SF-3ML6 SF-5ML6	19 25

QTT 86 & 96 Series Burs feature 152mm long, 6mm diameter shanks.

6MM SHANK — 152MM LONG STEEL SHANK

BR867 Series

14° Included Angle

Double Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR867-3750-60 BR867-5000-60	9 12	SL-3ML6 SL-4ML6	26 28

BR967 Series

14° Included Angle

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR967-3750-60 BR967-5000-60	9 12	SL-3ML6 SL-4ML6	26 28

BR868 Series

Ball Shape

Double Cut	Catalog Number	Dia. (d_1)	SCTI
	BR868-3750-60 BR868-5000-60	9 12	SD-3ML6 SD-5ML6

BR968 Series

Ball Shape

Medium Right Hand Spiral	Catalog Number	Dia. (d_1)	SCTI
	BR968-3750-60 BR968-5000-60	9 12	SD-3ML6 SD-5ML6

QTT 86 & 96 Series Burs feature 152mm long, 6mm diameter shanks.

6MM SHANK — ALUMINUM CUT

BR881 Series

Cylindrical

Alum. Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR881-2362	6	SA-1MNF	16
	BR881-3125-60**	8	SA-2MNF	19
	BR881-3750-60	9	SA-3MNF	19
	BR881-5000-60	12	SA-5MNF	25
	BR881-6250-60	16	SA-6MNF	25
	BR881-7500-60	19	SA-7MNF	25

BR882 Series

Cylindrical Ball Nose

Alum. Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR882-2362	6	SC-1MNF	19
	BR882-3750-60	9	SC-3MNF	19
	BR882-5000-60	12	SC-5MNF	25
	BR882-6250-60	16	SC-6MNF	25
	BR882-7500-60	19	SC-7MNF	25

BR883 Series

Round Nose Tree

Alum. Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR883-2362	6	SF-1MNF	16
	BR883-3750-60	9	SF-3MNF	19
	BR883-5000-60	12	SF-5MNF	25
	BR883-6250-60	16	SF-6MNF	25
	BR883-7500-60	19	SF-14MNF	32

Aluminum Cut Burs are designed for use on:

- Aluminum
- Non-ferrous metals
- Soft Steel
- Reinforced plastics
- Other soft materials

Also provides excellent work finish with minimum loading when cutting soft, sticky materials.

*Indicates solid 6mm carbide 50mm O.A.L., all others have 6mm diameter hardened steel shank. (8mm diameter shanks available).

** Indicates non-stocking item. Available upon request.

6MM SHANK — ALUMINUM CUT

BR885 Series

Flame Shape

Alum. Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR885-5000-60**	12	SH-5MNF	32
	BR885-6250-60**	16	SH-6MNF	67
	BR885-7500-60**	19	SH-7MNF	41

BR886 Series

Egg Shape

Alum. Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR886-3750-60	9	SE-3MNF	16
	BR886-5000-60	12	SE-5MNF	22
	BR886-6250-60	16	SE-6MNF	25
	BR886-7500-60	19	SE-7MNF	25

BR887 Series

14° Included Angle

Alum. Cut	Catalog Number	Dia. (d_1)	SCTI	Flute Length (l_2)
	BR887-3750-60	9	SL-3MNF	27
	BR887-5000-60	12	SL-4MNF	29
	BR887-6250-60	16	SL-5MNF	33
	BR887-7500-60	19	SL-7MNF	38

BR888 Series

Ball Shape

Alum. Cut	Catalog Number	Dia. (d_1)	SCTI
	BR888-2362	6	SD-3MNF
	BR888-3125-60**	8	SD-3MNF
	BR888-3750-60	9	SD-3MNF
	BR888-5000-60	12	SD-5MNF
	BR888-6250-60	16	SD-6MNF

*Indicates solid 6mm carbide 50mm O.A.L., all others have 6mm diameter hardened steel shank. (8mm diameter shanks available).

** Indicates non-stocking item. Available upon request.

3MM SHANK — 38MM OVERALL LENGTH

BR800 Series - Double Cut

Style:	SA-42M	SA-43M	SB-43M	SC-42M	SG-44M	SF-42M	SC-41M	SA-41M	SB-ECOM	SE-41M
Size:	2.5 x 11	3 x 14	3 x 14	3 x 14	3 x 12	3 x 12	2.5 x 14	1.5 x 6	3	3 x 5.5
Catalog Number:	BR800-8001-30	BR800-8002-30	BR800-8003-30	BR800-8004-30	BR800-8005-30	BR800-8006-30	BR800-8007-30	BR800-8008-30	BR800-8009-30	BR800-8010-30

Style:	SM-41M	SM-42M	SM-43M	SN-42M	SJ-42M	SK-42M	SL-42M	SD-41M	SD-42M	SH-41M
Size:	3 x 8	3 x 11	3 x 16	3 x 5	3 x 2.5	3 x 1.5	3 x 12	2.5	3	3 x 6
Taper Degrees	12	14	7	10 INVERTED	60	90	8			
Catalog Number:	BR800-8011-30	BR800-8012-30	BR800-8013-30	BR800-8014-30	BR800-8015-30	BR800-8016-30	BR800-8017-30	BR800-8018-30	BR800-8019-30	BR800-8020-30

BR900 Series - Medium Right Hand Spiral

Style:	SA-42M	SA-43M	SB-43M	SC-42M	SG-44M	SF-42M	SC-41M	SA-41M	SB-ECOM	SE-41M
Size:	2.5 x 11	3 x 14	3 x 14	3 x 14	3 x 12	3 x 12	2.5 x 14	1.5 x 6	3	3 x 5.5
Catalog Number:	BR900-9001-30	BR900-9002-30	BR900-9003-30	BR900-9004-30	BR900-9005-30	BR900-9006-30	BR900-9007-30	BR900-9008-30	BR900-9009-30	BR900-9010-30

Style:	SM-41M	SM-42M	SM-43M	SN-42M	SJ-42M	SK-42M	SL-42M	SD-41M	SD-42M	SH-41M
Size:	3 x 8	3 x 11	3 x 16	3 x 5	3 x 2.5	3 x 1.5	3 x 12	2.5	3	3 x 6
Taper Degrees	12	14	7	10 INVERTED	60	90	8			
Catalog Number:	BR900-9011-30	BR900-9012-30	BR900-9013-30	BR900-9014-30	BR900-9015-30	BR900-9016-30	BR900-9017-30	BR900-9018-30	BR900-9019-30	BR900-9020-30

6MM DIAMETER - 3MM HARDENED STEEL SHANK

BR815 Series - Double Cut

	Cylindrical	Cylindrical Ball Nose	Round Nose Tree	Pointed Tree	Pointed Cone	End Cut	Ball Shape	Egg Shape	Inverted Taper
									
Style:	SA-51M	SC-51M	SF-51M	SG-51M	SM-51M	SB-51M	SD-51M	SE-51M	SN-51M
Size:	6 x 12	6 x 12	6 x 12	6 x 12	6 x 12	6 x 5	6	6 x 9	6 x 6
Taper Degrees					22				10 INVERTED
Catalog Number:	BR815-0001-30	BR815-0002-30	BR815-0003-30	BR815-0004-30	BR815-0005-30	BR815-0006-30	BR815-0007-30	BR815-0008-30	BR815-0009-30

BR915 Series - Medium Right Hand Spiral

	Cylindrical	Cylindrical Ball Nose	Round Nose Tree	Pointed Tree	Pointed Cone	End Cut	Ball Shape	Egg Shape	Inverted Taper
									
Style:	SA-51M	SC-51M	SF-51M	SG-51M	SM-51M	SB-51M	SD-51M	SE-51M	SN-51M
Size:	6 x 12	6 x 12	6 x 12	6 x 12	6 x 12	6 x 5	6	6 x 9	6 x 6
Taper Degrees					22				10 INVERTED
Catalog Number:	BR915-0001-30	BR915-0002-30	BR915-0003-30	BR915-0004-30	BR915-0005-30	BR915-0006-30	BR915-0007-30	BR915-0008-30	BR915-0009-30

3MM SHANK — 38MM OVERALL LENGTH

BR820 Series - Double Cut, Solid Micrograin Carbide






Style:	**SA-52M**	**SA-53M**	**SC-52M**	**SC-53M**	**SF-53M**	**SG-53M**
Size:	4 x 12	5 x 12	4 x 12	5 x 12	5 x 12	5 x 12
Catalog Number:	**BR820-0001-30**	**BR820-0011-30**	**BR820-0002-30**	**BR820-0012-30**	**BR820-0003-30**	**BR820-0004-30**






Style:	**SM-53M**	**SE-53M**	**SL-53M**	**SD-53M**	**SH-53M**	**SN-53M**
Size:	4 x 12	5 x 12	4 x 12	5	5 x 9	5 x 6
Taper Degrees	16		14			10 INVERTED
Catalog Number:	**BR820-0005-30**	**BR820-0006-30**	**BR820-0007-30**	**BR820-0008-30**	**BR820-0009-30**	**BR820-0010-30**

BR920 Series - Medium Right Hand Spiral, Solid Micrograin Carbide






Style:	**SA-52M**	**SA-53M**	**SC-52M**	**SC-53M**	**SF-53M**	**SG-53M**
Size:	4 x 12	5 x 12	4 x 12	5 x 12	5 x 12	5 x 12
Catalog Number:	**BR920-0001-30**	**BR920-0011-30**	**BR920-0002-30**	**BR920-0012-30**	**BR920-0003-30**	**BR920-0004-30**






Style:	**SM-53M**	**SE-53M**	**SL-53M**	**SD-53M**	**SH-53M**	**SN-53M**
Size:	4 x 12	5 x 12	4 x 12	5	5 x 9	5 x 6
Taper Degrees	16		14			10 INVERTED
Catalog Number:	**BR920-0005-30**	**BR920-0006-30**	**BR920-0007-30**	**BR920-0008-30**	**BR920-0009-30**	**BR920-0010-30**

AEROSPACE SPECIALS

MICROGRAIN CARBIDE TOOLS

AIRCRAFT TOOLS MADE TO ORDER

Nutplate Drill/Countersink
Carbide drill and countersink with 135 degree split point. External thread and 60 degree cone seat straight shank style with pin spanner wrench holes. Application: Nutplate and motors with nutplate pressure foot attachments.

2 & 3 Flute Piloted Countersink
Designed with a safe, integral piloted construction. The threaded shank style is an excellent choice for portable drill motors and its precision ground fluting geomertry generates a clean, bur free accurate seat for aircraft fasteners.

Integral Piloted PCD Countersink
The Integral Piloted PCD Countersink is designed for customer specific applications of machining as well as assembly. They are made with a controlled fillet radius.

Carbide Tapered Reamer
Our carbide tapered reamers are designed for finishing hole sizes in composite materials. The geometries incorporated into the design of these tools produce excellent results; flaking, tearing, and cracking in laminate materials are minimized.

Compression Router
This carbide router is designed primarily for use with composite and honeycomb materials. This design with opposing flutes compresses the material to produce an excellent finish on both sides of material being routed.

Diamond Cut Router
The carbide diamond cut router is used in a variety of materials including graphite composite materials. Available in a four styles of end cut, depending on the specific application.

Dagger Drill
This carbide drill is designed to produce holes in composite materials without delamination around the hole or fraying the composite material.

Threaded Shank Coolant Fed Straight Flute Drill
This coolant fed straight flute drill was used to drill through a combination of aluminum and composite materials. This stye of drill can also be adapted to take a PCD tip for extended tool life.

VT58
The VT58 offers fast feed and speed rates. This 1.5hp has an improved diameter tolerence with superior hole finish. No erosion of liquid shim or delamination in composite material.

VT68
The 2.5hp VT68 has a positive feed drill motor with interrupted cut feature. Our VT68 offers fast feed and speed rates and improved diameter tolerence with superior hole finish. No erosion of liquid shim or delamination in composite material.

AIRCRAFT TOOLS MADE TO ORDER

NAS 937 Jobbers Length Double Margin Step Drill
Carbide drill with 135 degree split point. Used for drilling close tolerance holes in low tensile strength materials. Can also be supplied in taper and screw machine lengths, or special lengths.

Threaded Hex Shank Adapter Drill
Carbide adapter drill manufactured to NAS 907 construction with 135 degree split points. Used for general to medium duty drilling in low tensile strength materials in confined areas.

Threaded Square Shank Adapter Drill
Carbide step adapter drills are manufactured similar to NAS 907 construction with 135 degree split points. Used for drilling hard, tough, high tensile strength materials in confined areas.

Kevlar Drill
Kevlar, and similar woven materials pose many problems with quality of exit hole quality. The unique brad and spur inspired point cuts a clean hole with elimination of fraying experienced with conventional drill points.

Threaded Shank PCD Reamer
This straight flute PCD “polycrystalline diamond” reamer is available with or without threaded shank and with or without a pilot diameter.

Spacematic Drill/Countersink
Carbide drill and countersink with internal thread and 60 degree cone seat straight shank style with pin spanner wrench holes or optional wrench flats for slotted type drill wrenches. Application: Spacematic Drill motors with 1” stroke.

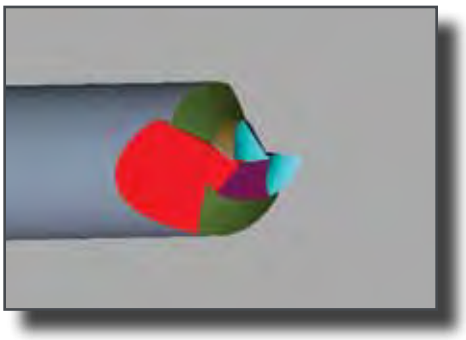
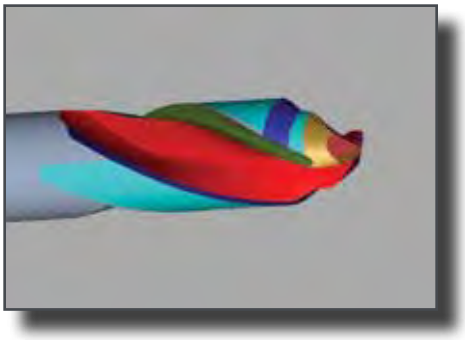
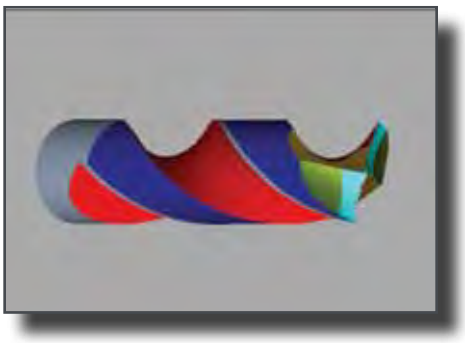
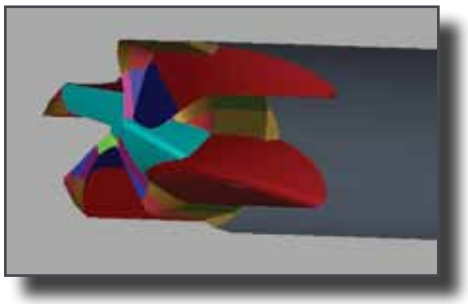
Drivematic Drill/Countersink
Carbide drill and countersink with solid shank used in aerospace drivematic drill riveting machines.

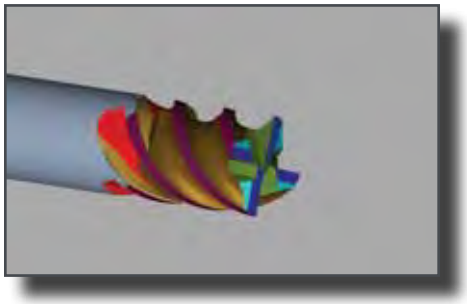
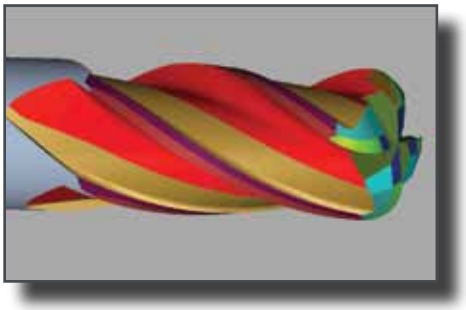
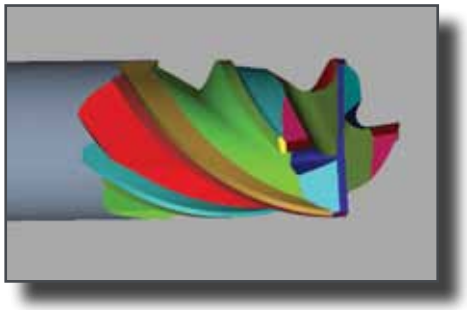
PCD Straight Flute Router
This polycrystalline diamond straight flute router is used for machining as well as assembly operations. Available in a various number of flutes.

Herringbone Router
This carbide router is designed primarily for use with composite and honeycomb materials. This design with opposing flutes compresses the material to produce an excellent finish on both sides of material being routed.

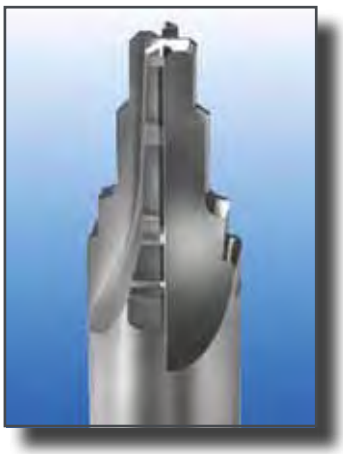
QUALITY TECH TOOL

TOOLS MADE TO ORDER






SERIES PC243 - 3 x D

Non-Coolant Fed

Work Material	Cast Irons				Steels					
	Gray Cast Iron A48 Class 20/G4000		Ductile Cast Iron A536/60-40-18		Low Carbon Steel		Alloy Steel (up to 35 Rc) 4140		Alloy Steel (36-45 Rc) 4140	
Cutting Speed	145 M/min		115 M/min		110 M/min		110 M/min		95 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	45,864	.093	37,265	.075	34,398	.046	30,101	.060	15,768	.024
1.5	30,578	.136	24,845	.110	22,932	.067	20,066	.088	10,512	.035
2.0	22,932	.179	18,635	.144	17,199	.088	15,048	.116	7,884	.046
2.5	18,347	.222	14,904	.179	13,761	.109	12,038	.144	6,305	.057
3.0	15,287	.265	12,420	.213	11,466	.130	10,035	.172	5,256	.068
3.5	13,104	.297	10,647	.238	9,828	.147	8,600	.192	4,505	.075
4.0	11,466	.323	9,315	.258	8,600	.160	7,524	.207	3,942	.082
4.5	10,193	.349	8,280	.278	7,646	.174	6,687	.223	3,506	.088
5.0	9,171	.375	7,452	.298	6,881	.188	6,021	.238	3,155	.094
5.5	8,339	.401	6,777	.318	6,255	.202	5,472	.254	2,867	.100
6.0	7,646	.427	6,210	.338	5,733	.216	5,018	.270	2,628	.106
6.5	7,056	.451	5,733	.356	5,292	.228	4,631	.284	2,426	.111
7.0	6,552	.469	5,324	.371	4,914	.237	4,302	.295	2,255	.116
7.5	6,116	.487	4,968	.386	4,586	.245	4,014	.306	2,102	.120
8.0	5,733	.506	4,658	.401	4,302	.254	3,762	.318	1,971	.124
8.5	5,396	.524	4,383	.415	4,046	.263	3,542	.329	1,854	.129
9.0	5,094	.542	4,140	.430	3,821	.271	3,344	.340	1,751	.133
9.5	4,829	.560	3,924	.445	3,623	.280	3,168	.351	1,661	.137
10.0	4,586	.579	3,726	.463	3,438	.291	3,011	.366	1,575	.144
10.5	4,370	.598	3,551	.481	3,276	.302	2,867	.381	1,503	.151
11.0	4,172	.617	3,389	.499	3,128	.314	2,736	.395	1,436	.158
11.5	3,987	.636	3,240	.517	2,993	.325	2,619	.410	1,373	.165

SERIES PC243 - 3 x D

Non-Coolant Fed

Work Material	Austenitic Stainless		Precipitation Hardened Stainless Steel		Special Alloys				Hardened Steel		Aluminum	
	304/316		17-4 PH		Titanium 6AL-4V		High Temp Alloys Inconel,Hastelloy Waspelloy		>45Rc A2/52100		Aircraft Grade (6061, 7075)	
Cutting Speed	50 M/min		45 M/min		40 M/min		30 M/min		30 M/min		280 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	15,768	.037	14,333	.037	12,902	.024	10,035	.022	10,035	.018	88,862	.075
1.5	10,512	.053	9,554	.053	8,600	.035	6,687	.032	6,687	.027	59,243	.110
2.0	7,884	.070	7,169	.070	6,449	.046	5,018	.042	5,018	.035	44,433	.144
2.5	6,305	.087	5,733	.087	5,162	.057	4,014	.052	4,014	.044	35,546	.179
3.0	5,256	.104	4,779	.104	4,302	.068	3,344	.062	3,344	.052	29,619	.213
3.5	4,505	.117	4,095	.117	3,686	.075	2,867	.071	2,867	.058	25,389	.238
4.0	3,942	.129	3,582	.129	3,227	.082	2,507	.077	2,507	.062	22,217	.258
4.5	3,506	.140	3,186	.140	2,867	.088	2,228	.084	2,228	.066	19,746	.278
5.0	3,155	.151	2,867	.151	2,579	.094	2,007	.091	2,007	.071	17,771	.298
5.5	2,867	.162	2,606	.162	2,345	.100	1,823	.098	1,823	.075	16,155	.318
6.0	2,628	.174	2,390	.174	2,151	.106	1,674	.105	1,674	.079	14,810	.338
6.5	2,426	.184	2,205	.184	1,985	.111	1,544	.112	1,544	.084	13,671	.356
7.0	2,255	.191	2,048	.191	1,845	.116	1,436	.118	1,436	.088	12,695	.371
7.5	2,102	.197	1,913	.197	1,719	.120	1,337	.124	1,337	.092	11,849	.386
8.0	1,971	.204	1,791	.204	1,611	.124	1,256	.130	1,256	.097	11,106	.401
8.5	1,854	.211	1,688	.211	1,517	.129	1,179	.136	1,179	.101	10,454	.415
9.0	1,751	.218	1,593	.218	1,436	.133	1,116	.142	1,116	.105	9,873	.430
9.5	1,661	.225	1,508	.225	1,359	.137	1,058	.148	1,058	.110	9,356	.445
10.0	1,575	.234	1,436	.234	1,292	.144	1,004	.157	1,004	.114	8,888	.463
10.5	1,503	.242	1,364	.242	1,229	.151	954	.165	954	.118	8,465	.481
11.0	1,436	.251	1,305	.251	1,175	.158	914	.174	914	.123	8,078	.499
11.5	1,373	.260	1,247	.260	1,121	.165	873	.183	873	.127	7,727	.517
12.0	1,314	.268	1,193	.268	1,076	.172	837	.191	837	.131	7,407	.536

SERIES PC245 - 5 x D

Non-Coolant Fed

Work Material	Cast Irons				Steels					
	Gray Cast Iron A48 Class 20/G4000		Ductile Cast Iron A536/60-40-18		Low Carbon Steel		Alloy Steel (up to 35 Rc) 4140		Alloy Steel (36-45 Rc) 4140	
Cutting Speed	120 M/min		100 M/min		90 M/min		80 M/min		40 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	38,220	.085	31,054	.068	28,665	.042	25,084	.055	13,140	.022
1.5	25,481	.124	20,704	.100	19,110	.061	16,721	.080	8,760	.032
2.0	19,110	.163	15,529	.131	14,333	.080	12,540	.106	6,570	.042
2.5	15,289	.202	12,420	.163	11,468	.099	10,031	.131	5,254	.052
3.0	12,739	.241	10,350	.194	9,555	.118	8,363	.156	4,380	.062
3.5	10,920	.270	8,873	.217	8,190	.133	7,166	.174	3,754	.069
4.0	9,555	.294	7,763	.235	7,166	.146	6,270	.188	3,285	.074
4.5	8,494	.318	6,900	.253	6,371	.158	5,573	.203	2,921	.080
5.0	7,643	.341	6,210	.271	5,734	.171	5,018	.217	2,629	.085
5.5	6,949	.365	5,648	.289	5,213	.184	4,560	.231	2,389	.091
6.0	6,371	.388	5,175	.307	4,778	.196	4,181	.245	2,190	.096
6.5	5,880	.410	4,778	.324	4,410	.207	3,859	.258	2,021	.101
7.0	5,460	.426	4,436	.337	4,095	.215	3,585	.268	1,879	.105
7.5	5,096	.443	4,140	.351	3,821	.223	3,345	.279	1,751	.109
8.0	4,778	.460	3,881	.364	3,585	.231	3,135	.289	1,643	.113
8.5	4,496	.476	3,653	.378	3,371	.239	2,951	.299	1,545	.117
9.0	4,245	.493	3,450	.391	3,184	.247	2,786	.309	1,459	.121
9.5	4,024	.509	3,270	.404	3,019	.255	2,640	.319	1,384	.125
10.0	3,821	.526	3,105	.421	2,865	.265	2,509	.333	1,313	.131
10.5	3,641	.544	2,959	.437	2,730	.275	2,389	.346	1,253	.137
11.0	3,476	.561	2,824	.454	2,606	.285	2,280	.359	1,196	.144
11.5	3,323	.578	2,700	.470	2,494	.295	2,183	.373	1,144	.150
12.0	3,184	.596	2,588	.487	2,389	.306	2,089	.386	1,095	.156

QUALITY TECH TOOL

SERIES PC245 - 5 x D

Non-Coolant Fed

Work Material	Austenitic Stainless		Precipitation Hardened Stainless Steel		Special Alloys				Hardened Steel		Aluminum	
	304/316		17-4 PH		Titanium 6AL-4V		High Temp Alloys Inconel,Hastelloy Waspelloy		>45Rc A2/52100		Aircraft Grade (6061, 7075)	
Cutting Speed	40 M/min		40 M/min		35 M/min		25 M/min		25 M/min		235 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	13,140	.033	11,944	.033	10,751	.022	8,363	.020	8,363	.017	74,051	.068
1.5	8,760	.049	7,961	.049	7,166	.032	5,573	.029	5,573	.024	49,369	.100
2.0	6,570	.064	5,974	.064	5,374	.042	4,181	.038	4,181	.032	37,028	.131
2.5	5,254	.079	4,778	.079	4,301	.052	3,345	.048	3,345	.040	29,621	.163
3.0	4,380	.095	3,983	.095	3,585	.062	2,786	.057	2,786	.047	24,683	.194
3.5	3,754	.107	3,413	.107	3,071	.069	2,389	.064	2,389	.053	21,158	.217
4.0	3,285	.117	2,985	.117	2,689	.074	2,089	.070	2,089	.056	18,514	.235
4.5	2,921	.127	2,655	.127	2,389	.080	1,856	.077	1,856	.060	16,455	.253
5.0	2,629	.137	2,389	.137	2,149	.085	1,673	.083	1,673	.064	14,809	.271
5.5	2,389	.148	2,171	.148	1,954	.091	1,519	.089	1,519	.068	13,463	.289
6.0	2,190	.158	1,991	.158	1,793	.096	1,395	.096	1,395	.072	12,341	.307
6.5	2,021	.167	1,838	.167	1,654	.101	1,286	.102	1,286	.076	11,393	.324
7.0	1,879	.173	1,706	.173	1,538	.105	1,196	.107	1,196	.080	10,579	.337
7.5	1,751	.179	1,594	.179	1,433	.109	1,114	.113	1,114	.084	9,874	.351
8.0	1,643	.186	1,493	.186	1,343	.113	1,046	.118	1,046	.088	9,255	.364
8.5	1,545	.192	1,406	.192	1,264	.117	983	.124	983	.092	8,711	.378
9.0	1,459	.198	1,328	.198	1,196	.121	930	.129	930	.096	8,228	.391
9.5	1,384	.205	1,256	.205	1,133	.125	881	.135	881	.100	7,796	.404
10.0	1,313	.212	1,196	.212	1,076	.131	836	.142	836	.104	7,406	.421
10.5	1,253	.220	1,136	.220	1,024	.137	795	.150	795	.108	7,054	.437
11.0	1,196	.228	1,088	.228	979	.144	761	.158	761	.112	6,731	.454
11.5	1,144	.236	1,039	.236	934	.150	728	.166	728	.116	6,439	.470
12.0	1,095	.244	994	.244	896	.156	698	.174	698	.119	6,173	.487

SERIES PC253 - 3 x D

Coolant Fed

Work Material	Cast Irons				Steels					
	Gray Cast Iron A48 Class 20/G4000		Ductile Cast Iron A536/60-40-18		Low Carbon Steel		Alloy Steel (up to 35 Rc) 4140		Alloy Steel (36-45 Rc) 4140	
Cutting Speed	190 M/min		155 M/min		145 M/min		125 M/min		65 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	61,152	.093	49,686	.075	45,864	.046	40,134	.060	21,024	.024
1.5	40,770	.136	33,126	.110	30,576	.067	26,754	.088	14,016	.035
2.0	30,576	.179	24,846	.144	22,932	.088	20,064	.116	10,512	.046
2.5	24,462	.222	19,872	.179	18,348	.109	16,050	.144	8,406	.057
3.0	20,382	.265	16,560	.213	15,288	.130	13,380	.172	7,008	.068
3.5	17,472	.297	14,196	.238	13,104	.147	11,466	.192	6,006	.075
4.0	15,288	.323	12,420	.258	11,466	.160	10,032	.207	5,256	.082
4.5	13,590	.349	11,040	.278	10,194	.174	8,916	.223	4,674	.088
5.0	12,228	.375	9,936	.298	9,174	.188	8,028	.238	4,206	.094
5.5	11,118	.401	9,036	.318	8,340	.202	7,296	.254	3,822	.100
6.0	10,194	.427	8,280	.338	7,644	.216	6,690	.270	3,504	.106
6.5	9,408	.451	7,644	.356	7,056	.228	6,174	.284	3,234	.111
7.0	8,736	.469	7,098	.371	6,552	.237	5,736	.295	3,006	.116
7.5	8,154	.487	6,624	.386	6,114	.245	5,352	.306	2,802	.120
8.0	7,644	.506	6,210	.401	5,736	.254	5,016	.318	2,628	.124
8.5	7,194	.524	5,844	.415	5,394	.263	4,722	.329	2,472	.129
9.0	6,792	.542	5,520	.430	5,094	.271	4,458	.340	2,334	.133
9.5	6,438	.560	5,232	.445	4,830	.280	4,224	.351	2,214	.137
10.0	6,114	.579	4,968	.463	4,584	.291	4,014	.366	2,100	.144
10.5	5,826	.598	4,734	.481	4,368	.302	3,822	.381	2,004	.151
11.0	5,562	.617	4,518	.499	4,170	.314	3,648	.395	1,914	.158
11.5	5,316	.636	4,320	.517	3,990	.325	3,492	.410	1,830	.165
12.0	5,094	.655	4,140	.536	3,822	.336	3,342	.425	1,752	.172

SERIES PC253 - 3 x D

Coolant Fed

Work Material	Austenitic Stainless		Precipitation Hardened Stainless Steel		Special Alloys				Hardened Steel		Aluminum	
	304/316		17-4 PH		Titanium 6AL-4V		High Temp Alloys Inconel,Hastelloy Waspelloy		>45Rc A2/52100		Aircraft Grade (6061, 7075)	
Cutting Speed	65 M/min		60 M/min		55 M/min		40 M/min		40 M/min		370 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	21,024	.037	19,110	.037	17,202	.024	13,380	.022	13,380	.018	118,482	.075
1.5	14,016	.053	12,738	.053	11,466	.035	8,916	.032	8,916	.027	78,990	.110
2.0	10,512	.070	9,558	.070	8,598	.046	6,690	.042	6,690	.035	59,244	.144
2.5	8,406	.087	7,644	.087	6,882	.057	5,352	.052	5,352	.044	47,394	.179
3.0	7,008	.104	6,372	.104	5,736	.068	4,458	.062	4,458	.052	39,492	.213
3.5	6,006	.117	5,460	.117	4,914	.075	3,822	.071	3,822	.058	33,852	.238
4.0	5,256	.129	4,776	.129	4,302	.082	3,342	.077	3,342	.062	29,622	.258
4.5	4,674	.140	4,248	.140	3,822	.088	2,970	.084	2,970	.066	26,328	.278
5.0	4,206	.151	3,822	.151	3,438	.094	2,676	.091	2,676	.071	23,694	.298
5.5	3,822	.162	3,474	.162	3,126	.100	2,430	.098	2,430	.075	21,540	.318
6.0	3,504	.174	3,186	.174	2,868	.106	2,232	.105	2,232	.079	19,746	.338
6.5	3,234	.184	2,940	.184	2,646	.111	2,058	.112	2,058	.084	18,228	.356
7.0	3,006	.191	2,730	.191	2,460	.116	1,914	.118	1,914	.088	16,926	.371
7.5	2,802	.197	2,550	.197	2,292	.120	1,782	.124	1,782	.092	15,798	.386
8.0	2,628	.204	2,388	.204	2,148	.124	1,674	.130	1,674	.097	14,808	.401
8.5	2,472	.211	2,250	.211	2,022	.129	1,572	.136	1,572	.101	13,938	.415
9.0	2,334	.218	2,124	.218	1,914	.133	1,488	.142	1,488	.105	13,164	.430
9.5	2,214	.225	2,010	.225	1,812	.137	1,410	.148	1,410	.110	12,474	.445
10.0	2,100	.234	1,914	.234	1,722	.144	1,338	.157	1,338	.114	11,850	.463
10.5	2,004	.242	1,818	.242	1,638	.151	1,272	.165	1,272	.118	11,286	.481
11.0	1,914	.251	1,740	.251	1,566	.158	1,218	.174	1,218	.123	10,770	.499
11.5	1,830	.260	1,662	.260	1,494	.165	1,164	.183	1,164	.127	10,302	.517
12.0	1,752	.268	1,590	.268	1,434	.172	1,116	.191	1,116	.131	9,876	.536

SERIES PC255 - 5 x D

Coolant Fed

Work Material	Cast Irons				Steels					
	Gray Cast Iron A48 Class 20/G4000		Ductile Cast Iron A536/60-40-18		Low Carbon Steel		Alloy Steel (up to 35 Rc) 4140		Alloy Steel (36-45 Rc) 4140	
Cutting Speed	160 M/min		130 M/min		120 M/min		105 M/min		55 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	50,960	.085	41,405	.068	38,220	.042	33,445	.055	17,520	.022
1.5	33,975	.124	27,605	.100	25,480	.061	22,295	.080	11,680	.032
2.0	25,480	.163	20,705	.131	19,110	.080	16,720	.106	8,760	.042
2.5	20,385	.202	16,560	.163	15,290	.099	13,375	.131	7,005	.052
3.0	16,985	.241	13,800	.194	12,740	.118	11,150	.156	5,840	.062
3.5	14,560	.270	11,830	.217	10,920	.133	9,555	.174	5,005	.069
4.0	12,740	.294	10,350	.235	9,555	.146	8,360	.188	4,380	.074
4.5	11,325	.318	9,200	.253	8,495	.158	7,430	.203	3,895	.080
5.0	10,190	.341	8,280	.271	7,645	.171	6,690	.217	3,505	.085
5.5	9,265	.365	7,530	.289	6,950	.184	6,080	.231	3,185	.091
6.0	8,495	.388	6,900	.307	6,370	.196	5,575	.245	2,920	.096
6.5	7,840	.410	6,370	.324	5,880	.207	5,145	.258	2,695	.101
7.0	7,280	.426	5,915	.337	5,460	.215	4,780	.268	2,505	.105
7.5	6,795	.443	5,520	.351	5,095	.223	4,460	.279	2,335	.109
8.0	6,370	.460	5,175	.364	4,780	.231	4,180	.289	2,190	.113
8.5	5,995	.476	4,870	.378	4,495	.239	3,935	.299	2,060	.117
9.0	5,660	.493	4,600	.391	4,245	.247	3,715	.309	1,945	.121
9.5	5,365	.509	4,360	.404	4,025	.255	3,520	.319	1,845	.125
10.0	5,095	.526	4,140	.421	3,820	.265	3,345	.333	1,750	.131
10.5	4,855	.544	3,945	.437	3,640	.275	3,185	.346	1,670	.137
11.0	4,635	.561	3,765	.454	3,475	.285	3,040	.359	1,595	.144
11.5	4,430	.578	3,600	.470	3,325	.295	2,910	.373	1,525	.150
12.0	4,245	.596	3,450	.487	3,185	.306	2,785	.386	1,460	.156

SERIES PC255 - 5 x D

Coolant Fed

Work Material	Austenitic Stainless		Precipitation Hardened Stainless Steel		Special Alloys				Hardened Steel		Aluminum	
	304/316		17-4 PH		Titanium 6AL-4V		High Temp Alloys Inconel,Hastelloy Waspelloy		>45Rc A2/52100		Aircraft Grade (6061, 7075)	
Cutting Speed	55 M/min		50 M/min		45 M/min		35 M/min		35 M/min		310 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	17,520	.033	15,925	.033	14,335	.022	11,150	.020	11,150	.017	98,735	.068
1.5	11,680	.049	10,615	.049	9,555	.032	7,430	.029	7,430	.024	65,825	.100
2.0	8,760	.064	7,965	.064	7,165	.042	5,575	.038	5,575	.032	49,370	.131
2.5	7,005	.079	6,370	.079	5,735	.052	4,460	.048	4,460	.040	39,495	.163
3.0	5,840	.095	5,310	.095	4,780	.062	3,715	.057	3,715	.047	32,910	.194
3.5	5,005	.107	4,550	.107	4,095	.069	3,185	.064	3,185	.053	28,210	.217
4.0	4,380	.117	3,980	.117	3,585	.074	2,785	.070	2,785	.056	24,685	.235
4.5	3,895	.127	3,540	.127	3,185	.080	2,475	.077	2,475	.060	21,940	.253
5.0	3,505	.137	3,185	.137	2,865	.085	2,230	.083	2,230	.064	19,745	.271
5.5	3,185	.148	2,895	.148	2,605	.091	2,025	.089	2,025	.068	17,950	.289
6.0	2,920	.158	2,655	.158	2,390	.096	1,860	.096	1,860	.072	16,455	.307
6.5	2,695	.167	2,450	.167	2,205	.101	1,715	.102	1,715	.076	15,190	.324
7.0	2,505	.173	2,275	.173	2,050	.105	1,595	.107	1,595	.080	14,105	.337
7.5	2,335	.179	2,125	.179	1,910	.109	1,485	.113	1,485	.084	13,165	.351
8.0	2,190	.186	1,990	.186	1,790	.113	1,395	.118	1,395	.088	12,340	.364
8.5	2,060	.192	1,875	.192	1,685	.117	1,310	.124	1,310	.092	11,615	.378
9.0	1,945	.198	1,770	.198	1,595	.121	1,240	.129	1,240	.096	10,970	.391
9.5	1,845	.205	1,675	.205	1,510	.125	1,175	.135	1,175	.100	10,395	.404
10.0	1,750	.212	1,595	.212	1,435	.131	1,115	.142	1,115	.104	9,875	.421
10.5	1,670	.220	1,515	.220	1,365	.137	1,060	.150	1,060	.108	9,405	.437
11.0	1,595	.228	1,450	.228	1,305	.144	1,015	.158	1,015	.112	8,975	.454
11.5	1,525	.236	1,385	.236	1,245	.150	970	.166	970	.116	8,585	.470
12.0	1,460	.244	1,325	.244	1,195	.156	930	.174	930	.119	8,230	.487

SERIES PC258 - 8 x D

Coolant Fed

Work Material	Cast Irons				Steels					
	Gray Cast Iron A48 Class 20/G4000		Ductile Cast Iron A536/60-40-18		Low Carbon Steel		Alloy Steel (up to 35 Rc) 4140		Alloy Steel (36-45 Rc) 4140	
Cutting Speed	145 M/min		115 M/min		110 M/min		95 M/min		50 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	45,864	.085	37,265	.068	34,398	.042	30,101	.055	15,768	.022
1.5	30,578	.124	24,845	.100	22,932	.061	20,066	.080	10,512	.032
2.0	22,932	.163	18,635	.131	17,199	.080	15,048	.106	7,884	.042
2.5	18,347	.202	14,904	.163	13,761	.099	12,038	.131	6,305	.052
3.0	15,287	.241	12,420	.194	11,466	.118	10,035	.156	5,256	.062
3.5	13,104	.270	10,647	.217	9,828	.133	8,600	.174	4,505	.069
4.0	11,466	.294	9,315	.235	8,600	.146	7,524	.188	3,942	.074
4.5	10,193	.318	8,280	.253	7,646	.158	6,687	.203	3,506	.080
5.0	9,171	.341	7,452	.271	6,881	.171	6,021	.217	3,155	.085
5.5	8,339	.365	6,777	.289	6,255	.184	5,472	.231	2,867	.091
6.0	7,646	.388	6,210	.307	5,733	.196	5,018	.245	2,628	.096
6.5	7,056	.410	5,733	.324	5,292	.207	4,631	.258	2,426	.101
7.0	6,552	.426	5,324	.337	4,914	.215	4,302	.268	2,255	.105
7.5	6,116	.443	4,968	.351	4,586	.223	4,014	.279	2,102	.109
8.0	5,733	.460	4,658	.364	4,302	.231	3,762	.289	1,971	.113
8.5	5,396	.476	4,383	.378	4,046	.239	3,542	.299	1,854	.117
9.0	5,094	.493	4,140	.391	3,821	.247	3,344	.309	1,751	.121
9.5	4,829	.509	3,924	.404	3,623	.255	3,168	.319	1,661	.125
10.0	4,586	.526	3,726	.421	3,438	.265	3,011	.333	1,575	.131
10.5	4,370	.544	3,551	.437	3,276	.275	2,867	.346	1,503	.137
11.0	4,172	.561	3,389	.454	3,128	.285	2,736	.359	1,436	.144
11.5	3,987	.578	3,240	.470	2,993	.295	2,619	.373	1,373	.150
12.0	3,821	.596	3,105	.487	2,867	.306	2,507	.386	1,314	.156

SERIES PC258 - 8 x D

Coolant Fed

Work Material	Austenitic Stainless		Precipitation Hardened Stainless Steel		Special Alloys				Hardened Steel		Aluminum	
	304/316		17-4 PH		Titanium 6AL-4V		High Temp Alloys Inconel,Hastelloy Waspelloy		>45Rc A2/52100		Aircraft Grade (6061, 7075)	
Cutting Speed	50 M/min		45 M/min		40 M/min		30 M/min		30 M/min		280 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	15,768	.033	14,333	.033	12,902	.022	10,035	.020	10,035	.017	88,862	.068
1.5	10,512	.049	9,554	.049	8,600	.032	6,687	.029	6,687	.024	59,243	.100
2.0	7,884	.064	7,169	.064	6,449	.042	5,018	.038	5,018	.032	44,433	.131
2.5	6,305	.079	5,733	.079	5,162	.052	4,014	.048	4,014	.040	35,546	.163
3.0	5,256	.095	4,779	.095	4,302	.062	3,344	.057	3,344	.047	29,619	.194
3.5	4,505	.107	4,095	.107	3,686	.069	2,867	.064	2,867	.053	25,389	.217
4.0	3,942	.117	3,582	.117	3,227	.074	2,507	.070	2,507	.056	22,217	.235
4.5	3,506	.127	3,186	.127	2,867	.080	2,228	.077	2,228	.060	19,746	.253
5.0	3,155	.137	2,867	.137	2,579	.085	2,007	.083	2,007	.064	17,771	.271
5.5	2,867	.148	2,606	.148	2,345	.091	1,823	.089	1,823	.068	16,155	.289
6.0	2,628	.158	2,390	.158	2,151	.096	1,674	.096	1,674	.072	14,810	.307
6.5	2,426	.167	2,205	.167	1,985	.101	1,544	.102	1,544	.076	13,671	.324
7.0	2,255	.173	2,048	.173	1,845	.105	1,436	.107	1,436	.080	12,695	.337
7.5	2,102	.179	1,913	.179	1,719	.109	1,337	.113	1,337	.084	11,849	.351
8.0	1,971	.186	1,791	.186	1,611	.113	1,256	.118	1,256	.088	11,106	.364
8.5	1,854	.192	1,688	.192	1,517	.117	1,179	.124	1,179	.092	10,454	.378
9.0	1,751	.198	1,593	.198	1,436	.121	1,116	.129	1,116	.096	9,873	.391
9.5	1,661	.205	1,508	.205	1,359	.125	1,058	.135	1,058	.100	9,356	.404
10.0	1,575	.212	1,436	.212	1,292	.131	1,004	.142	1,004	.104	8,888	.421
10.5	1,503	.220	1,364	.220	1,229	.137	954	.150	954	.108	8,465	.437
11.0	1,436	.228	1,305	.228	1,175	.144	914	.158	914	.112	8,078	.454
11.5	1,373	.236	1,247	.236	1,121	.150	873	.166	873	.116	7,727	.470
12.0	1,314	.244	1,193	.244	1,076	.156	837	.174	837	.119	7,407	.487

QUALITY TECH TOOL

SERIES MD135, MD136, MD137

Micro/Miniature Twist Drills for Small Hole Drilling of both Ferrous and Non-Ferrous and Non-Metallic Materials

Material Group	Steel						Austenitic		Stainless Steel			
Work Material	Low Carbon Steel 1018		Alloy Steel (up to 35 Rc) 4140		Alloy Steel (36-45 Rc) 4140		304/316		Free Machining		Ferritic Martensitic	
Speed	90 M/mm		70 M/min		60 M/min		60 M/min		55 M/min		30 M/min	
Drill Diameter	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev
.20	80,000	.005	80,000	.005	80,000	.005	80,000	.004	80,000	.004	47,710	.005
.25	80,000	.010	80,000	.010	76,330	.010	76,330	.008	69,970	.008	38,170	.010
.50	57,250	.010	44,530	.010	38,170	.010	38,170	.008	34,990	.008	19,080	.010
.80	35,780	.020	27,830	.020	23,850	.020	23,850	.015	21,870	.015	11,930	.020
1.00	28,630	.025	22,260	.025	19,080	.025	19,080	.020	17,490	.020	9,540	.025
1.25	22,900	.036	17,810	.036	15,270	.036	15,270	.025	13,990	.025	7,630	.036
1.50	19,080	.038	14,840	.038	12,720	.038	12,720	.030	11,660	.030	6,360	.038
1.75	16,360	.038	12,720	.038	10,900	.038	10,900	.030	10,000	.030	5,450	.038
2.00	14,310	.038	11,130	.038	9,540	.038	9,540	.030	8,750	.030	4,770	.038
2.25	12,720	.038	9,900	.038	8,480	.038	8,480	.030	7,770	.030	4,240	.038
2.50	11,450	.038	8,910	.038	7,630	.038	7,630	.030	7,000	.030	3,820	.038
2.75	10,410	.038	8,100	.038	6,940	.038	6,940	.030	6,360	.030	3,470	.038
3.00	9,540	.038	7,420	.038	6,360	.038	6,360	.030	5,830	.030	3,180	.038

QUALITY TECH TOOL

SERIES MD135, MD136, MD137

Micro/Miniature Twist Drills for Small Hole Drilling of both Ferrous and Non-Ferrous and Non-Metallic Materials

Work Group	Participation Hardened Steel		Cast Irons				Special Alloy			
Work Piece Material	17-4 PH		Gray Cast Irons A48 Class 20/G4000		Ductile Cast Irons A536/60-40-18		Titanium 6AL-4V		High Temp Alloys Inconel/Hastelloy Waspelloy Nickel Based	
Speed	25 M/mm		120 M/mm		110 M/mm		20 M/mm		15 M/mm	
Drill Diameter	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev
.20	39,760	.005	80,000	.005	80,000	.005	31,810	.004	23,850	.004
.25	31,810	.010	80,000	.010	80,000	.010	25,440	.008	19,080	.008
.50	15,900	.010	76,330	.010	69,970	.010	12,720	.008	9,540	.008
.80	9,940	.020	47,710	.020	43,730	.020	7,950	.015	5,960	.015
1.00	7,950	.025	38,170	.025	34,990	.025	6,360	.020	4,770	.020
1.25	6,360	.036	30,530	.036	27,990	.036	5,090	.025	3,820	.025
1.50	5,300	.038	25,440	.038	23,320	.038	4,240	.030	3,180	.030
1.75	4,540	.038	21,810	.038	19,990	.038	3,630	.030	2,730	.030
2.00	3,980	.038	19,080	.038	17,490	.038	3,180	.030	2,390	.030
2.25	3,530	.038	16,960	.038	15,550	.038	2,830	.030	2,120	.030
2.50	3,180	.038	15,270	.038	13,990	.038	2,540	.030	1,910	.030
2.75	2,890	.038	13,880	.038	12,720	.038	2,310	.030	1,730	.030
3.00	2,650	.038	12,720	.038	11,660	.038	2,120	.030	1,590	.030

Work Group	Hardened Steels		Non-Ferrous							
Work Piece Material	45 Rc A2/52100		Aluminum (<10% Si)		Aluminum (<10% Si)		Plastics		Composites/Fiber Reinforced Materials Circuit Boards	
Speed	55 M/mm		140 M/mm		100 M/mm		170 M/mm		200 M/mm	
Drill Diameter	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev
.20	80,000	.005	80,000	.005	80,000	.005	80,000	.005	80,000	.013
.25	69,970	.010	80,000	.010	80,000	.010	80,000	.010	80,000	.025
.50	34,990	.010	80,000	.010	63,610	.010	80,000	.010	80,000	.025
.80	21,870	.020	55,660	.020	39,760	.020	67,590	.020	79,520	.051
1.00	17,490	.025	44,530	.025	31,810	.025	54,070	.025	63,610	.076
1.25	13,990	.036	35,620	.036	25,440	.036	43,260	.036	50,890	.102
1.50	11,660	.038	29,690	.038	21,200	.038	36,050	.038	42,410	.127
1.75	10,000	.038	25,440	.038	18,170	.038	30,900	.038	36,350	.127
2.00	8,750	.038	22,260	.038	15,900	.038	27,040	.038	31,810	.127
2.25	7,770	.038	19,790	.038	14,140	.038	24,030	.038	28,270	.127
2.50	7,000	.038	17,810	.038	12,720	.038	21,630	.038	25,440	.127
2.75	6,360	.038	16,190	.038	11,570	.038	19,660	.038	23,130	.127
3.00	5,830	.038	14,840	.038	10,600	.038	18,020	.038	21,200	.127

SERIES DR200

Straight Flute Drills

Work Material	Aluminum		Steels						Austenitic Stainless		Precipitation Hardened Stainless Steel	
	Aircraft Grade (6061, 7075)		Low Carbon Steel		Alloy Steel (up to 35 Rc) 4140		Alloy Steel (36-45 Rc) 4140		304/316		17-4 PH	
Cutting Speed	85 M/min		55 M/min		45 M/min		30 M/min		40 M/min		20 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	27,075	.012	17,520	.006	14,335	.006	9,555	.006	12,740	.006	6,370	.006
1.5	18,050	.018	11,680	.013	9,555	.013	6,370	.013	8,495	.013	4,245	.013
2.0	13,535	.025	8,760	.029	9,558	.029	6,370	.028	8,493	.028	4,248	.028
2.5	10,830	.037	7,005	.040	7,169	.040	4,778	.039	6,369	.039	3,186	.039
3.0	9,025	.050	5,840	.051	4,780	.051	3,185	.050	4,245	.050	2,125	.050
3.5	7,735	.058	5,005	.058	4,095	.058	2,730	.051	3,640	.051	1,820	.051
4.0	6,770	.067	4,380	.065	3,585	.065	2,390	.052	3,185	.052	1,595	.052
4.5	6,015	.078	3,895	.077	3,185	.077	2,125	.063	2,830	.063	1,415	.063
5.0	5,415	.085	3,505	.084	2,865	.084	1,910	.064	2,550	.064	1,275	.064
5.5	4,920	.092	3,185	.093	2,605	.093	1,735	.070	2,315	.070	1,160	.070
6.0	4,510	.100	2,920	.102	2,390	.102	1,595	.076	2,125	.076	1,060	.076
6.5	4,165	.103	2,695	.105	2,205	.105	1,470	.079	1,960	.079	980	.079
7.0	3,870	.106	2,505	.108	2,050	.108	1,365	.082	1,820	.082	910	.082
7.5	3,610	.110	2,335	.111	1,910	.111	1,275	.085	1,700	.085	850	.085
8.0	3,385	.112	2,190	.115	1,790	.115	1,195	.089	1,595	.089	795	.089
8.5	3,185	.115	2,060	.118	1,685	.118	1,125	.092	1,500	.092	750	.092
9.0	3,010	.119	1,945	.121	1,595	.121	1,060	.095	1,415	.095	710	.095
9.5	2,850	.123	1,845	.124	1,510	.124	1,005	.098	1,340	.098	670	.098
10.0	2,705	.125	1,750	.127	1,435	.127	955	.101	1,275	.101	635	.101
10.5	2,580	.128	1,670	.133	1,365	.133	910	.114	1,215	.114	605	.114
11.0	2,460	.133	1,595	.140	1,305	.140	870	.127	1,160	.127	580	.127
11.5	2,355	.137	1,525	.146	1,245	.146	830	.139	1,110	.139	555	.139
12.0	2,255	.140	1,460	.152	1,195	.152	795	.152	1,060	.152	530	.152

SERIES DR200

Straight Flute Drills

Work Material	Special Alloys				Hardened Steels		Non-Ferrous					
	Titanium 6AL-4V		High Temp Alloys Inconel, Hastelloy Waspelloy		>45Rc A2/52100		Plastic		Kevlar/Graphite		Glass/Ceramic	
Cutting Speed	25 M/min		25 M/min		20 M/min		90 M/min		115 M/min		25 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	7,965	.006	7,965	.006	6,370	.013	28,665	.006	36,630	.006	7,965	.013
1.5	5,310	.013	5,310	.013	4,245	.025	19,110	.013	24,420	.013	5,310	.025
2.0	5,310	.028	5,310	.028	4,248	.019	19,110	.028	24,420	.028	5,310	.019
2.5	3,983	.039	3,983	.039	3,186	.022	14,333	.039	18,315	.039	3,983	.022
3.0	2,655	.050	2,655	.050	2,125	.025	9,555	.050	12,210	.050	2,655	.025
3.5	2,275	.051	2,275	.051	1,820	.024	8,190	.051	10,465	.051	2,275	.024
4.0	1,990	.052	1,990	.052	1,595	.022	7,165	.052	9,155	.052	1,990	.022
4.5	1,770	.063	1,770	.063	1,415	.025	6,370	.063	8,140	.063	1,770	.025
5.0	1,595	.064	1,595	.064	1,275	.024	5,735	.064	7,325	.064	1,595	.024
5.5	1,450	.070	1,450	.070	1,160	.024	5,210	.070	6,660	.070	1,450	.024
6.0	1,325	.076	1,325	.076	1,060	.025	4,780	.076	6,105	.076	1,325	.025
6.5	1,225	.079	1,225	.079	980	.028	4,410	.079	5,635	.079	1,225	.028
7.0	1,140	.082	1,140	.082	910	.031	4,095	.082	5,235	.082	1,140	.031
7.5	1,060	.085	1,060	.085	850	.034	3,820	.085	4,885	.085	1,060	.034
8.0	995	.089	995	.089	795	.038	3,585	.089	4,580	.089	995	.038
8.5	935	.092	935	.092	750	.041	3,370	.092	4,310	.092	935	.041
9.0	885	.095	885	.095	710	.044	3,185	.095	4,070	.095	885	.044
9.5	840	.098	840	.098	670	.047	3,015	.098	3,855	.098	840	.047
10.0	795	.101	795	.101	635	.050	2,865	.101	3,665	.101	795	.050
10.5	760	.114	760	.114	605	.050	2,730	.114	3,490	.114	760	.050
11.0	725	.127	725	.127	580	.050	2,605	.127	3,330	.127	725	.050
11.5	690	.139	690	.139	555	.050	2,495	.139	3,185	.139	690	.050
12.0	665	.152	665	.152	530	.050	2,390	.152	3,050	.152	665	.050

SERIES DR215

Slow Spiral Drills

Work Material	Aluminum		Steels						Austenitic Stainless		Precipitation Hardened Stainless Steel	
	Aircraft Grade (6061, 7075)		Low Carbon Steel		Alloy Steel (up to 35 Rc) 4140		Alloy Steel (36-45 Rc) 4140		304/316		17-4 PH	
Cutting Speed	85 M/min		55 M/min		45 M/min		35 M/min		45 M/min		20 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	27,075	.012	17,520	.025	14,335	.025	11,150	.025	14,335	.025	6,370	.006
1.5	18,050	.018	11,680	.050	9,555	.050	7,430	.050	9,555	.050	4,245	.013
2.0	13,535	.025	8,760	.051	9,558	.051	7,433	.051	9,558	.051	4,248	.028
2.5	10,830	.037	7,005	.063	7,169	.063	5,574	.063	7,169	.063	3,186	.039
3.0	9,025	.050	5,840	.076	4,780	.076	3,715	.076	4,780	.076	2,125	.050
3.5	7,735	.058	5,005	.089	4,095	.089	3,185	.089	4,095	.089	1,820	.051
4.0	6,770	.067	4,380	.101	3,585	.101	2,785	.101	3,585	.101	1,595	.052
4.5	6,015	.078	3,895	.114	3,185	.114	2,475	.114	3,185	.114	1,415	.063
5.0	5,415	.085	3,505	.127	2,865	.127	2,230	.127	2,865	.127	1,275	.064
5.5	4,920	.092	3,185	.139	2,605	.139	2,025	.139	2,605	.139	1,160	.070
6.0	4,510	.100	2,920	.152	2,390	.152	1,860	.152	2,390	.152	1,060	.076
6.5	4,165	.103	2,695	.158	2,205	.158	1,715	.158	2,205	.158	980	.079
7.0	3,870	.106	2,505	.165	2,050	.165	1,595	.165	2,050	.165	910	.082
7.5	3,610	.110	2,335	.171	1,910	.171	1,485	.171	1,910	.171	850	.085
8.0	3,385	.112	2,190	.178	1,790	.178	1,395	.178	1,790	.178	795	.089
8.5	3,185	.115	2,060	.184	1,685	.184	1,310	.184	1,685	.184	750	.092
9.0	3,010	.119	1,945	.190	1,595	.190	1,240	.190	1,595	.190	710	.095
9.5	2,850	.123	1,845	.197	1,510	.197	1,175	.197	1,510	.197	670	.098
10.0	2,705	.125	1,750	.203	1,435	.203	1,115	.203	1,435	.203	635	.101
10.5	2,580	.128	1,670	.216	1,365	.216	1,060	.216	1,365	.216	605	.114
11.0	2,460	.133	1,595	.229	1,305	.229	1,015	.229	1,305	.229	580	.127
11.5	2,355	.137	1,525	.241	1,245	.241	970	.241	1,245	.241	555	.139
12.0	2,255	.140	1,460	.254	1,195	.254	930	.254	1,195	.254	530	.152

SERIES DR215

Slow Spiral Drills

Work Material	Cast Irons				Special Alloys				Hardened Steels		Non-Ferrous	
	Gray Cast Iron A48 Class 20/G4000		Ductile Cast Iron A536/60-40-18		Titanium 6AL-4V		High Temp Alloys Inconel, Hastelloy Waspelloy		>45Rc A2/52100		Plastic	
Cutting Speed	55 M/min		55 M/min		25 M/min		20 M/min		15 M/min		90 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	17,520	.025	17,520	.025	7,965	.006	6,370	.006	4,780	.006	28,665	.006
1.5	11,680	.050	11,680	.050	5,310	.013	4,245	.013	3,185	.013	19,110	.013
2.0	8,760	.051	8,760	.051	5,310	.028	4,248	.028	3,188	.028	19,110	.028
2.5	7,005	.063	7,005	.063	3,983	.039	3,186	.039	2,391	.039	14,333	.039
3.0	5,840	.076	5,840	.076	2,655	.050	2,125	.050	1,595	.050	9,555	.050
3.5	5,005	.089	5,005	.089	2,275	.051	1,820	.051	1,365	.051	8,190	.051
4.0	4,380	.101	4,380	.101	1,990	.052	1,595	.052	1,195	.052	7,165	.052
4.5	3,895	.114	3,895	.114	1,770	.063	1,415	.063	1,060	.063	6,370	.063
5.0	3,505	.127	3,505	.127	1,595	.064	1,275	.064	955	.064	5,735	.064
5.5	3,185	.139	3,185	.139	1,450	.070	1,160	.070	870	.070	5,210	.070
6.0	2,920	.152	2,920	.152	1,325	.076	1,060	.076	795	.076	4,780	.076
6.5	2,695	.158	2,695	.158	1,225	.079	980	.079	735	.079	4,410	.079
7.0	2,505	.165	2,505	.165	1,140	.082	910	.082	685	.082	4,095	.082
7.5	2,335	.171	2,335	.171	1,060	.085	850	.085	635	.085	3,820	.085
8.0	2,190	.178	2,190	.178	995	.089	795	.089	595	.089	3,585	.089
8.5	2,060	.184	2,060	.184	935	.092	750	.092	560	.092	3,370	.092
9.0	1,945	.190	1,945	.190	885	.095	710	.095	530	.095	3,185	.095
9.5	1,845	.197	1,845	.197	840	.098	670	.098	505	.098	3,015	.098
10.0	1,750	.203	1,750	.203	795	.101	635	.101	480	.101	2,865	.101
10.5	1,670	.216	1,670	.216	760	.114	605	.114	455	.114	2,730	.114
11.0	1,595	.229	1,595	.229	725	.127	580	.127	435	.127	2,605	.127
11.5	1,525	.241	1,525	.241	690	.139	555	.139	415	.139	2,495	.139
12.0	1,460	.254	1,460	.254	665	.152	530	.152	400	.152	2,390	.152

When drilling deep holes, the recommended speeds and feeds should be reduced proportionately based on the hole depth. To the right are guidelines for reducing the speeds and feeds.

Hole Depth Diameter	Reduce Spindle Speed	Reduce Infeed Rate
3 x Dia.	10%	10%
4 x Dia.	20%	10%
5 x Dia.	30%	20%
6 x Dia.	35%	20%
8 x Dia.	40%	20%

SERIES DR220

Twist Drills

Work Material	Steels				Austenitic Stainless		Cast Iron				Non-Ferrous					
	Low Carbon Steels		Alloy Steels (up to 35 Rc) 4140		304/316		Gray Cast Iron A48 Class 20/G4000		Ductile Cast Iron A536/60-40-18		Plastic		Kevlar Graphite		Aluminum	
Cutting Speed	55 M/min		50 M/min		40 M/min		85 M/min		55 M/min		120 M/min		120 M/min		80 M/min	
Drill Diameter	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev	Speed min-1	Feed mm/rev
1.0	17,520	.025	15,925	.025	12,740	.025	27,075	.025	17,520	.025	38,220	.006	38,220	.006	25,480	.012
1.5	11,680	.050	10,615	.050	8,495	.050	18,050	.050	11,680	.050	25,480	.013	25,480	.013	16,985	.018
2.0	8,760	.051	10,618	.051	8,493	.051	13,535	.051	8,760	.051	25,480	.028	25,480	.028	12,740	.025
2.5	7,005	.063	7,964	.063	6,369	.063	10,830	.063	7,005	.063	19,110	.039	19,110	.039	10,190	.037
3.0	5,840	.076	5,310	.076	4,245	.076	9,025	.076	5,840	.076	12,740	.050	12,740	.050	8,495	.050
3.5	5,005	.089	4,550	.089	3,640	.089	7,735	.089	5,005	.089	10,920	.051	10,920	.051	7,280	.058
4.0	4,380	.101	3,980	.101	3,185	.101	6,770	.101	4,380	.101	9,555	.052	9,555	.052	6,370	.067
4.5	3,895	.114	3,540	.114	2,830	.114	6,015	.114	3,895	.114	8,495	.063	8,495	.063	5,660	.078
5.0	3,505	.127	3,185	.127	2,550	.127	5,415	.127	3,505	.127	7,645	.064	7,645	.064	5,095	.085
5.5	3,185	.139	2,895	.139	2,315	.139	4,920	.139	3,185	.139	6,950	.070	6,950	.070	4,635	.092
6.0	2,920	.152	2,655	.152	2,125	.152	4,510	.152	2,920	.152	6,370	.076	6,370	.076	4,245	.100
6.5	2,695	.158	2,450	.158	1,960	.158	4,165	.158	2,695	.158	5,880	.079	5,880	.079	3,920	.103
7.0	2,505	.165	2,275	.165	1,820	.165	3,870	.165	2,505	.165	5,460	.082	5,460	.082	3,640	.106
7.5	2,335	.171	2,125	.171	1,700	.171	3,610	.171	2,335	.171	5,095	.085	5,095	.085	3,395	.110
8.0	2,190	.178	1,990	.178	1,595	.178	3,385	.178	2,190	.178	4,780	.089	4,780	.089	3,185	.112
8.5	2,060	.184	1,875	.184	1,500	.184	3,185	.184	2,060	.184	4,495	.092	4,495	.092	3,000	.115
9.0	1,945	.190	1,770	.190	1,415	.190	3,010	.190	1,945	.190	4,245	.095	4,245	.095	2,830	.119
9.5	1,845	.197	1,675	.197	1,340	.197	2,850	.197	1,845	.197	4,025	.098	4,025	.098	2,680	.123
10.0	1,750	.203	1,595	.203	1,275	.203	2,705	.203	1,750	.203	3,820	.101	3,820	.101	2,550	.125
10.5	1,670	.216	1,515	.216	1,215	.216	2,580	.216	1,670	.216	3,640	.114	3,640	.114	2,425	.128
11.0	1,595	.229	1,450	.229	1,160	.229	2,460	.229	1,595	.229	3,475	.127	3,475	.127	2,315	.133
11.5	1,525	.241	1,385	.241	1,110	.241	2,355	.241	1,525	.241	3,325	.139	3,325	.139	2,215	.137
12.0	1,460	.254	1,325	.254	1,060	.254	2,255	.254	1,460	.254	3,185	.152	3,185	.152	2,125	.140

QUALITY TECH TOOL

SERIES SD221-90, SD221-120

90° and 120° SD Spotting Drills

Material Group	Steels						Stainless Steels			
Work Piece Material	Low Carbon Steels 1018		Alloy Steels (up to 35 Rc) 4140		Alloy Steels (36-45 Rc) 4140		Austenitic 304/316		Ph Stainless 17-4 PH	
Speed	55 M/mm		50 M/mm		45 M/mm		40 M/mm		20 M/mm	
Drill Diameter	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev
.50	34,990	.006	31,810	.006	28,630	.006	25,440	.006	12,720	.006
.80	21,870	.010	19,880	.010	17,890	.010	15,900	.010	7,950	.010
1.00	17,490	.013	15,900	.013	14,310	.013	12,720	.013	6,360	.013
1.25	13,990	.019	12,720	.019	11,450	.019	10,180	.019	5,090	.019
1.60	10,930	.025	9,940	.025	8,950	.025	7,950	.025	3,980	.025
2.00	8,750	.025	7,950	.025	7,160	.025	6,360	.025	3,180	.025
2.50	7,000	.032	6,360	.032	5,730	.032	5,090	.032	2,540	.032
3.15	5,550	.038	5,050	.038	4,540	.038	4,040	.038	2,020	.038
4.00	4,370	.051	3,980	.051	3,580	.051	3,180	.051	1,590	.051
5.00	3,500	.063	3,180	.063	2,860	.063	2,540	.063	1,270	.063
6.00	2,920	.076	2,650	.076	2,390	.076	2,120	.076	1,060	.076
6.30	2,780	.078	2,520	.078	2,270	.078	2,020	.078	1,010	.078
8.00	2,190	.089	1,990	.089	1,790	.089	1,590	.089	800	.089
10.00	1,750	.102	1,590	.102	1,430	.102	1,270	.102	640	.102

SERIES DR235

Material Group	Cast Iron				Special Alloys				Hardened Steel	
Work Piece Material	Gray Cast Irons A48 Class 20/G4000		Ductile Cast Iron A536/60-40-18		Titanium 6AL-4V		High Temp Alloys Inconel/Hastelloy Waspelloy Nickel Based		45 Rc A2/52100	
Speed	85 M/mm		55 M/mm		25 M/mm		10 M/mm		15 M/mm	
Drill Diameter	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev
.50	54,070	.006	34,990	.006	15,900	.006	6,360	.006	9,540	.006
.80	33,790	.010	21,870	.010	9,940	.010	3,980	.010	5,960	.010
1.00	27,040	.013	17,490	.013	7,950	.013	3,180	.013	4,770	.013
1.25	21,630	.019	13,990	.019	6,360	.019	2,540	.019	3,820	.019
1.60	16,900	.025	10,930	.025	4,970	.025	1,990	.025	2,980	.025
2.00	13,520	.025	8,750	.025	3,980	.025	1,590	.025	2,390	.025
2.50	10,810	.032	7,000	.032	3,180	.032	1,270	.032	1,910	.032
3.15	8,580	.038	5,550	.038	2,520	.038	1,010	.038	1,510	.038
4.00	6,760	.051	4,370	.051	1,990	.051	800	.051	1,190	.051
5.00	5,410	.063	3,500	.063	1,590	.063	640	.063	950	.063
6.00	4,510	.076	2,920	.076	1,330	.076	530	.076	800	.076
6.30	4,290	.078	2,780	.078	1,260	.078	500	.078	760	.078
8.00	3,380	.089	2,190	.089	990	.089	400	.089	600	.089
10.00	2,700	.102	1,750	.102	800	.102	320	.102	480	.102
10.00	1,750	.102	1,590	.102	1,430	.102	1,270	.102	640	.102

Note: When determining proper speed and feed for Series DR235, base the diameter on the cutting diameter “D”, not the shank diameter.

SERIES RM300

4-6 Flute, Straight Flute Reamers

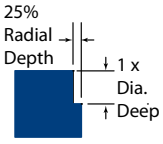
Hardness			Up to 30 HRC		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC							
Work Material	Cast Iron		Mild Steel Carbon Steel		Alloy Tool Steel Tool Steel		Hardened Steel Prehardened Steel		Hardened Steel Prehardened Steel		Titanium Alloy *Annealed*		Inconel, Titanium Alloy *Solution Treated and Aged*		Aluminum	
Cutting Speed	61 M/min		65 M/min		53 M/min		44 M/min		34 M/min		25 M/min		15 M/min		128 M/min	
Mill Diameter	RPM	Feed mm/rev	RPM	Feed mm/rev	RPM	Feed mm/rev	RPM	Feed mm/rev	RPM	Feed mm/rev	RPM	Feed mm/rev	RPM	Feed mm/rev	RPM	Feed mm/rev
1.0	17,520	.025	15,925	.025	12,740	.025	27,075	.025	17,520	.025	38,220	.006	38,220	.006	25,480	.012
1.5	11,680	.050	10,615	.050	8,495	.050	18,050	.050	11,680	.050	25,480	.013	25,480	.013	16,985	.018
2.0	8,760	.051	10,618	.051	8,493	.051	13,535	.051	8,760	.051	25,480	.028	25,480	.028	12,740	.025
2.5	7,005	.063	7,964	.063	6,369	.063	10,830	.063	7,005	.063	19,110	.039	19,110	.039	10,190	.037
3.0	5,840	.076	5,310	.076	4,245	.076	9,025	.076	5,840	.076	12,740	.050	12,740	.050	8,495	.050
3.5	5,005	.089	4,550	.089	3,640	.089	7,735	.089	5,005	.089	10,920	.051	10,920	.051	7,280	.058
4.0	4,380	.101	3,980	.101	3,185	.101	6,770	.101	4,380	.101	9,555	.052	9,555	.052	6,370	.067
4.5	3,895	.114	3,540	.114	2,830	.114	6,015	.114	3,895	.114	8,495	.063	8,495	.063	5,660	.078
5.0	3,505	.127	3,185	.127	2,550	.127	5,415	.127	3,505	.127	7,645	.064	7,645	.064	5,095	.085
5.5	3,185	.139	2,895	.139	2,315	.139	4,920	.139	3,185	.139	6,950	.070	6,950	.070	4,635	.092
6.0	2,920	.152	2,655	.152	2,125	.152	4,510	.152	2,920	.152	6,370	.076	6,370	.076	4,245	.100
6.5	2,695	.158	2,450	.158	1,960	.158	4,165	.158	2,695	.158	5,880	.079	5,880	.079	3,920	.103
7.0	2,505	.165	2,275	.165	1,820	.165	3,870	.165	2,505	.165	5,460	.082	5,460	.082	3,640	.106
7.5	2,335	.171	2,125	.171	1,700	.171	3,610	.171	2,335	.171	5,095	.085	5,095	.085	3,395	.110
8.0	2,190	.178	1,990	.178	1,595	.178	3,385	.178	2,190	.178	4,780	.089	4,780	.089	3,185	.112
8.5	2,060	.184	1,875	.184	1,500	.184	3,185	.184	2,060	.184	4,495	.092	4,495	.092	3,000	.115
9.0	1,945	.190	1,770	.190	1,415	.190	3,010	.190	1,945	.190	4,245	.095	4,245	.095	2,830	.119
9.5	1,845	.197	1,675	.197	1,340	.197	2,850	.197	1,845	.197	4,025	.098	4,025	.098	2,680	.123
10.0	1,750	.203	1,595	.203	1,275	.203	2,705	.203	1,750	.203	3,820	.101	3,820	.101	2,550	.125
10.5	1,670	.216	1,515	.216	1,215	.216	2,580	.216	1,670	.216	3,640	.114	3,640	.114	2,425	.128
11.0	1,595	.229	1,450	.229	1,160	.229	2,460	.229	1,595	.229	3,475	.127	3,475	.127	2,315	.133
11.5	1,525	.241	1,385	.241	1,110	.241	2,355	.241	1,525	.241	3,325	.139	3,325	.139	2,215	.137
12.0	1,460	.254	1,325	.254	1,060	.254	2,255	.254	1,460	.254	3,185	.152	3,185	.152	2,125	.140

SERIES PC400, PC401

3-6 Flute - Rough End Mills - Medium Profile Milling

Hardness	≤88 HRB		>88 HRB, ≤26 HRC		≤26 HRC		≤26 HRC		≤91 HRB		≤32 HRC		≤32 HRC	
Work Material	Steels								Cast Iron					
	Carbon Steel				Alloy Steel		Tool Steel		Gray		Ductile		Malleable	
Cutting Speed	168 m/mm		139 m/min		122 m/min		116 m/min		165 m/min		37 m/min		70 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	17,810	855	14,740	555	12,930	485	12,300	460	17,490	995	3,920	145	7,420	280
4	13,360	855	11,050	555	9,700	485	9,220	460	13,120	995	2,940	145	5,570	280
5	10,690	855	8,840	555	7,760	485	7,380	460	10,500	995	2,350	145	4,450	280
6	8,910	855	7,370	555	6,470	485	6,150	460	8,750	1,000	1,960	145	3,710	280
8	6,680	800	5,530	525	4,850	460	4,610	435	6,560	935	1,470	140	2,780	265
10	5,340	770	4,420	505	3,880	440	3,690	420	5,250	900	1,180	135	2,230	255
12	4,450	1,140	3,680	750	3,230	660	3,070	625	4,370	1,330	980	200	1,860	380
14	3,820	1,095	3,160	725	2,770	635	2,640	605	3,750	1,285	840	190	1,590	365
16	3,340	1,060	2,760	700	2,430	615	2,310	585	3,280	1,245	740	190	1,390	355
18	2,970	1,035	2,460	685	2,160	605	2,050	570	2,920	1,220	650	180	1,240	345
20	2,670	1,015	2,210	670	1,940	590	1,840	560	2,620	1,195	590	180	1,110	335
25	2,140	1,630	1,770	1,085	1,550	950	1,480	905	2,100	1,915	470	290	890	545

Hardness	≤88 HRB		>88 HRB, ≤26 HRC		≤26 HRC		≤26 HRC		≤91 HRB		≤32 HRC	
Work Material	Stainless Steels						Special Alloys				Aluminum	
	300 Series		400 Series		PH Steels		Titanium Alloys		Hi Temp Alloys		6061, 7075	
Cutting Speed	94 m/mm		143 m/min		45 m/min		66 m/min		23 m/min		457 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	9,970	375	15,160	570	9,010	340	7,000	335	2,440	90	48,450	4,650
4	7,470	375	11,370	570	6,760	340	5,250	335	1,830	90	36,340	4,650
5	5,980	375	9,100	570	5,410	340	4,200	335	1,460	90	29,070	4,650
6	4,980	375	7,580	570	4,510	340	3,500	335	1,220	90	24,230	4,650
8	3,740	355	5,690	540	3,380	320	2,620	315	910	85	18,170	4,335
10	2,990	340	4,550	520	2,700	310	2,100	300	730	85	14,540	4,145
12	2,490	510	3,790	775	2,250	460	1,750	450	610	125	12,110	6,150
14	2,140	490	3,250	745	1,930	440	1,500	430	520	120	10,380	5,935
16	1,870	475	2,840	720	1,690	430	1,310	415	460	115	9,080	5,775
18	1,660	465	2,530	705	1,500	420	1,170	410	410	115	8,080	5,655
20	1,490	455	2,270	690	1,350	410	1,050	400	370	110	7,270	5,555
25	1,200	735	1,820	1,115	1,080	660	840	640	290	175	5,810	8,855



Depth of Cut

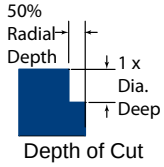
QUALITY TECH TOOL

SERIES PC400, PC401

3-6 Flute - Rough End Mills - Heavy Profile Milling

Hardness	≤88 HRB		>88 HRB, ≤26 HRC		≤26 HRC		≤26 HRC		≤91 HRB		≤32 HRC		≤32 HRC	
Work Material	Steels								Cast Iron					
	Carbon Steel				Alloy Steel		Tool Steel		Gray		Ductile		Malleable	
Cutting Speed	152 m/mm		126 m/min		111 m/min		105 m/min		149 m/min		34 m/min		64 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	16,120	580	13,360	380	11,770	335	11,130	315	15,800	685	3,600	105	6,790	195
4	12,090	580	10,020	380	8,830	335	8,350	315	11,850	685	2,700	105	5,090	195
5	9,670	580	8,020	380	7,060	335	6,680	315	9,480	685	2,160	105	4,070	195
6	8,060	580	6,680	380	5,880	335	5,570	315	7,900	685	1,800	105	3,390	195
8	6,040	545	5,010	360	4,410	320	4,170	300	5,920	640	1,350	95	2,540	185
10	4,830	520	4,010	350	3,530	305	3,340	290	4,740	610	1,080	95	2,040	175
12	4,030	775	3,340	510	2,940	445	2,780	425	3,950	900	900	135	1,700	260
14	3,450	740	2,860	490	2,520	430	2,390	410	3,390	870	770	130	1,450	250
16	3,020	720	2,500	475	2,210	420	2,090	395	2,960	845	680	130	1,270	240
18	2,690	700	2,230	465	1,960	410	1,860	390	2,630	830	600	125	1,130	235
20	2,420	685	2,000	455	1,770	405	1,670	380	2,370	815	540	125	1,020	235
25	1,930	1,100	1,600	740	1,410	650	1,340	620	1,900	1,300	430	200	810	375

Hardness	≤88 HRB		>88 HRB, ≤26 HRC		≤26 HRC		≤26 HRC		≤91 HRB		≤32 HRC	
Work Material	Stainless Steels						Special Alloys				Aluminum	
	300 Series		400 Series		PH Steels		Titanium Alloys		Hi Temp Alloys		6061, 7075	
Cutting Speed	85 m/mm		131 m/min		79 m/min		59 m/min		22 m/min		411 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	9,010	255	13,890	395	8,380	240	6,260	225	2,330	65	43,570	3,135
4	6,760	255	10,420	395	6,280	240	4,690	225	1,750	65	32,680	3,135
5	5,410	255	8,330	395	5,030	240	3,750	225	1,400	65	26,140	3,135
6	4,510	255	6,940	395	4,190	240	3,130	225	1,170	65	21,790	3,140
8	3,380	245	5,210	375	3,140	225	2,350	210	870	65	16,340	2,915
10	2,700	235	4,170	365	2,510	220	1,880	205	700	60	13,070	2,785
12	2,250	340	3,470	525	2,090	320	1,560	300	580	90	10,890	4,140
14	1,930	330	2,980	510	1,790	305	1,340	290	500	85	9,340	4,000
16	1,690	320	2,600	495	1,570	300	1,170	280	440	85	8,170	3,890
18	1,500	315	2,310	485	1,400	295	1,040	270	390	80	7,260	3,805
20	1,350	310	2,080	475	1,260	285	940	265	350	80	6,540	3,740
25	1,080	500	1,670	770	1,010	465	750	430	280	130	5,230	5,995



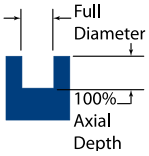
Depth of Cut

SERIES PC400, PC401

3-6 Flute - Rough End Mills - Slot Milling

Hardness	≤88 HRB		>88 HRB, ≤26 HRC		≤26 HRC		≤26 HRC		≤91 HRB		≤32 HRC		≤32 HRC	
Work Material	Steels								Cast Iron					
	Carbon Steel				Alloy Steel		Tool Steel		Gray		Ductile		Malleable	
Cutting Speed	122 m/mm		101 m/min		90 m/min		84 m/min		120 m/min		61 m/min		52 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	12,930	310	10,710	210	9,540	185	8,910	175	12,720	365	6,470	125	5,510	105
4	9,700	310	8,030	210	7,160	185	6,680	175	9,540	365	4,850	125	4,130	105
5	7,760	310	6,420	210	5,730	185	5,340	175	7,630	360	3,880	125	3,310	110
6	6,470	310	5,350	210	4,770	185	4,450	175	6,360	365	3,230	125	2,760	110
8	4,850	255	4,020	195	3,580	170	3,340	160	4,770	345	2,430	115	2,070	100
10	3,880	220	3,210	185	2,860	165	2,670	150	3,820	330	1,940	110	1,650	95
12	3,230	325	2,680	270	2,390	240	2,230	225	3,180	485	1,620	160	1,380	140
14	2,770	315	2,290	260	2,040	230	1,910	215	2,730	465	1,390	155	1,180	135
16	2,430	305	2,010	255	1,790	225	1,670	210	2,390	455	1,210	150	1,030	130
18	2,160	300	1,780	245	1,590	220	1,480	205	2,120	445	1,080	150	920	130
20	1,940	295	1,610	245	1,430	215	1,340	205	1,910	435	970	145	830	125
25	1,550	475	1,280	390	1,150	350	1,070	325	1,530	700	780	240	660	200

Hardness	≤88 HRB		>88 HRB, ≤26 HRC		≤26 HRC		≤26 HRC		≤91 HRB		≤32 HRC	
Work Material	Stainless Steels						Special Alloys				Aluminum	
	300 Series		400 Series		PH Steels		Titanium Alloys		Hi Temp Alloys		6061, 7075	
Cutting Speed	69 m/mm		105 m/min		62 m/min		47 m/min		17 m/min		335 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	7,320	145	11,130	215	6,570	130	4,980	120	1,800	35	35,520	1,705
4	5,490	145	8,350	215	4,930	130	3,740	120	1,350	35	26,640	1,705
5	4,390	145	6,680	215	3,940	130	2,990	120	1,080	35	21,310	1,705
6	3,660	145	5,570	215	3,290	130	2,490	120	900	35	17,760	1,705
8	2,740	130	4,170	200	2,460	120	1,870	110	680	35	13,320	1,600
10	2,190	125	3,340	190	1,970	110	1,490	105	540	30	10,660	1,535
12	1,830	185	2,780	280	1,640	165	1,250	160	450	45	8,880	2,275
14	1,570	175	2,390	270	1,410	160	1,070	155	390	45	7,610	2,185
16	1,370	175	2,090	265	1,230	155	930	150	340	45	6,660	2,120
18	1,220	170	1,860	260	1,100	155	830	145	300	40	5,920	2,065
20	1,100	165	1,670	255	990	150	750	145	270	40	5,330	2,025
25	880	270	1,340	410	790	240	600	230	220	65	4,260	3,245



Depth of Cut

SERIES PC410, PC410L

Slot Milling

Hardness	Tensile Strength: Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloys *Annealed*		Hardened Steel Prehardened Steel Ti Alloys *Solution Treated & Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloys		Hardened Steel		Hardened Steel	
Cutting Speed	96 m/min		78 m/min		66 m/min		60 m/min		36 m/min		18 m/min	
Depth of Cut							a_a=0.02D					
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
0.5	44,160	350	44,160	280	44,160	280	42,090	210	26,220	110	13,800	40
0.6	44,160	410	44,160	350	40,710	300	34,500	280	21,390	110	11,660	40
0.8	43,470	550	37,260	480	30,360	350	26,220	280	15,870	110	8,760	40
1.0	36,570	690	29,670	620	24,150	480	20,700	350	13,110	110	6,970	40
1.5	24,150	830	19,320	690	15,870	550	13,800	350	8,760	110	4,620	40
2.0	17,940	830	14,490	690	12,280	550	10,490	350	6,550	110	3,450	40
2.5	14,490	830	11,940	690	9,800	550	8,420	350	5,240	110	2,760	40
12.0	1,460	.254	1,460	.254	665	.152	530	.152	400	.152	2,390	.152

SERIES PC411

Slot Milling

Hardness	Tensile Strength: Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloys *Annealed*		Hardened Steel Prehardened Steel Ti Alloys *Solution Treated & Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloys		Hardened Steel		Hardened Steel	
Cutting Speed	100 m/min		80 m/min		68 m/min		56 m/min		36 m/min		25 m/min	
Depth of Cut	a_a=0.1D 						a_a=0.02D					
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
3	12,280	1,380	9,940	970	8,140	690	7,040	550	4,420	210	2,900	70
4	9,250	1,380	7,450	970	6,210	690	5,240	550	3,310	210	2,210	70
5	7,310	1,380	5,930	970	4,970	690	4,280	550	2,620	210	1,790	70
6	6,210	1,380	4,970	970	4,140	690	3,450	550	2,210	210	1,520	70

SERIES PC412

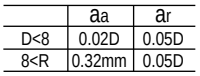
Slot Milling

Hardness	Tensile Strength: Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloys *Annealed*		Hardened Steel Prehardened Steel Ti Alloys *Solution Treated & Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloys		Hardened Steel		Hardened Steel	
Cutting Speed	103 m/min		88 m/min		75 m/min		66 m/min		41 m/min		22 m/min	
Depth of Cut							aa=0.02D					
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
2	17,940	830	14,490	690	12,280	550	10,490	350	6,550	110	3,450	40
2.5	14,490	830	11,940	690	9,800	550	8,420	350	5,240	110	2,760	40
3	10,870	745	9,330	665	7,990	555	6,960	355	4,340	110	2,310	40
3.5	9,210	745	7,900	660	6,770	540	5,900	345	3,680	110	1,960	40
4	8,150	755	7,000	665	5,990	535	5,220	350	3,250	110	1,740	40
4.5	7,250	750	6,220	665	5,330	555	4,640	355	2,890	110	1,540	40

QUALITY TECH TOOL

SERIES PC413, PC419, PC419L

High Speed Light Milling

Hardness	Tensile Strength: Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloys *Annealed*		Hardened Steel Prehardened Steel Ti Alloys *Solution Treated & Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloys		Hardened Steel		Hardened Steel	
Cutting Speed	290 m/min		250 m/min		220 m/min		175 m/min		175 m/min		120 m/min	
Depth of Cut	aa=0.02D ar=0.05D											
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
0.5	57,500	1,670	57,500	1,610	57,500	1,610	57,500	1,380	36,800	850	36,800	850
0.6	57,500	1,900	57,500	1,900	57,500	1,900	57,500	1,610	36,800	1,010	36,800	1,010
0.8	57,500	2,530	57,500	2,530	57,500	2,300	57,500	2,190	36,800	1,320	36,800	1,150
1	57,500	3,220	57,500	3,220	57,500	2,880	54,620	2,590	36,800	1,670	28,750	1,150
2	36,550	4,010	29,190	3,220	28,620	2,880	27,460	2,590	19,810	1,780	14,590	1,150
3	23,550	4,070	18,770	3,340	18,200	2,920	17,420	2,630	12,650	1,850	9,610	1,170
4	20,800	4,250	17,850	3,890	17,280	3,150	15,590	2,810	12,650	2,170	9,150	1,260
5	17,730	4,750	16,970	4,700	15,640	3,310	12,370	2,640	11,400	2,440	8,550	1,370
6	16,540	5,290	14,810	4,720	12,710	3,030	10,440	2,480	10,440	2,480	7,250	1,270
8	13,340	4,240	11,620	3,720	10,380	2,440	8,300	1,970	8,300	1,970	5,750	1,030
10	10,640	3,360	9,230	2,910	7,990	1,900	6,370	1,510	6,370	1,510	4,420	790
12	8,670	2,730	7,490	2,350	6,500	1,530	5,180	1,210	5,180	1,210	3,590	640

	aa	ar
D<8	0.02D	0.05D
8<R	0.32mm	0.05D

QUALITY TECH TOOL

SERIES PC413, PC419, PC419L

Profile Milling

Hardness		Tensile Strength Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Cast Iron	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloy *Annealed*		Hardened Steel Prehardened Steel Ti Alloy *Solution Treated and Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloy		Hardened Steel		Hardened Steel	
Cutting Speed	210 m/mm	168 m/min		138 m/min		108 m/min		96 m/min		84 m/min		60 m/min	
Depth of Cut	aa=0.1D ar=0.2D 									aa=0.05D ar=0.1D			
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
0.5	52,990	1,040	52,990	1,040	52,990	830	52,990	520	52,990	410	63,290	280	46,370	210
0.6	52,990	1,120	52,990	1,120	52,990	910	52,990	550	52,990	440	63,290	300	46,370	210
0.8	52,990	1,240	52,990	1,240	52,990	980	52,990	580	52,990	460	39,580	330	28,980	220
1	52,990	1,260	52,990	1,260	52,160	1,020	41,400	660	36,430	470	31,460	350	23,180	230
2	39,120	1,550	31,800	1,260	26,080	1,020	21,020	660	18,490	480	15,970	350	12,010	230
3	24,510	1,550	19,830	1,260	16,640	1,040	13,370	680	11,720	500	10,050	360	7,510	240
4	19,250	1,550	15,870	1,260	13,290	1,040	10,610	730	9,270	610	7,950	440	5,930	280
5	15,320	1,740	12,250	1,410	10,230	1,060	8,130	740	7,160	610	6,110	470	4,580	290
6	12,590	1,810	10,050	1,470	8,380	1,140	6,640	790	5,840	660	4,980	500	3,710	310
8	9,950	2,140	7,950	1,720	6,600	1,300	5,260	910	4,600	750	3,930	530	2,910	350
10	7,650	1,960	6,110	1,560	5,080	1,210	4,030	860	3,530	710	3,040	550	2,250	340
12	6,210	1,790	4,940	1,420	4,150	1,140	3,300	800	2,880	680	2,440	500	1,810	320

SERIES PC416

High Speed Light Milling

Hardness	Tensile Strength: Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloys *Annealed*		Hardened Steel Prehardened Steel Ti Alloys *Solution Treated & Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloys		Hardened Steel		Hardened Steel	
Cutting Speed	300 m/min		260 m/min		225 m/min		180 m/min		180 m/min		125 m/min	
Depth of Cut	aa=0.02D ar=0.05D								aa / ar D<8: 0.02D / 0.05D 8<R: 0.32mm / 0.05D			
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
1	57,500	3,220	57,500	3,220	57,500	2,880	54,620	2,590	36,800	1,670	28,750	1,150
2	36,550	4,000	29,190	3,220	28,620	2,880	27,460	2,590	19,810	1,770	14,590	1,150
3	23,550	4,060	18,770	3,330	18,200	2,920	17,420	2,620	12,650	1,850	9,610	1,160
4	20,800	4,240	17,850	3,890	17,280	3,150	15,590	2,810	12,650	2,160	9,150	1,250
5	17,730	4,740	16,970	4,690	15,640	3,300	12,370	2,630	11,400	2,440	8,550	1,370
6	16,540	5,280	14,810	4,720	12,710	3,020	10,440	2,470	10,440	2,470	7,250	1,270
8	13,340	4,230	11,620	3,710	10,380	2,440	8,300	1,970	8,300	1,970	5,750	1,020
10	10,640	3,360	9,230	2,900	7,990	1,900	6,370	1,510	6,370	1,510	4,420	790
12	8,670	2,730	7,490	2,350	6,500	1,530	5,180	1,210	5,180	1,210	3,590	630
14	7,820	2,470	6,780	2,130	5,870	1,380	4,660	1,120	4,660	1,120	3,220	580
16	6,900	2,200	5,970	1,850	5,160	1,210	4,110	980	4,110	980	2,830	510
18	6,090	1,900	5,230	1,670	4,540	1,080	3,620	860	3,620	860	2,530	450
20	5,620	1,770	4,850	1,540	4,200	1,000	3,360	800	3,360	800	2,310	410
22	4,890	1,550	4,270	1,350	3,670	870	2,930	700	2,930	700	2,020	360
25	4,300	1,360	3,740	1,180	3,230	770	2,550	610	2,550	610	1,750	310

SERIES PC416

Profile Milling

Hardness			Tensile Strength Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Cast Iron		Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloy *Annealed*		Hardened Steel Prehardened Steel Ti Alloy *Solution Treated and Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloy		Hardened Steel		Hardened Steel	
Cutting Speed	210 m/mm		168 m/min		138 m/min		114 m/min		96 m/min		84 m/min		60 m/min	
Depth of Cut	a_a=0.1D a_r=0.2D 										a_a=0.05D a_r=0.1D			
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
1	52,990	1,260	52,990	1,260	52,160	1,020	41,400	660	36,430	470	31,460	350	23,180	230
2	39,130	1,550	31,800	1,260	26,080	1,020	21,020	660	18,490	480	15,970	350	12,010	230
3	24,510	1,550	19,830	1,260	16,640	1,040	13,380	680	11,720	500	10,050	360	7,510	240
4	19,250	1,550	15,880	1,260	13,290	1,040	10,620	730	9,280	610	7,950	440	5,930	280
5	15,320	1,740	12,250	1,410	10,230	1,060	8,130	740	7,170	610	6,110	470	4,580	290
6	12,590	1,810	10,050	1,470	8,380	1,140	6,640	790	5,840	660	4,980	500	3,710	310
8	9,950	2,140	7,950	1,720	6,600	1,300	5,260	910	4,600	750	3,930	530	2,920	350
10	7,650	1,960	6,110	1,560	5,080	1,210	4,030	860	3,540	710	3,040	550	2,250	340
12	6,220	1,790	4,950	1,420	4,150	1,140	3,300	800	2,880	680	2,450	500	1,810	320
14	5,630	1,740	4,470	1,430	3,730	1,120	2,980	790	2,570	640	2,240	500	1,660	310
16	4,930	1,740	3,920	1,390	3,250	1,070	2,590	790	2,250	630	1,920	450	1,490	300
18	4,390	1,660	3,480	1,310	2,900	1,010	2,320	790	1,990	630	1,740	430	1,310	290
20	4,020	1,580	3,230	1,280	2,650	960	2,130	750	1,860	610	1,620	410	1,210	280
22	3,510	1,470	2,940	1,180	2,450	850	1,880	670	1,640	550	1,410	370	1,060	270
25	3,090	1,280	2,450	1,100	2,040	760	1,630	590	1,450	480	1,240	340	920	230

SERIES PC418

High Speed Light Milling

Hardness		Tensile Strength Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC	
Work Material	Mild Steel Carbon Steel	Alloy Steel Tool Steel Ti Alloys *Annealed*		Hardened Steel Prehardened Steel Ti Alloys *Solution Treated & Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloys		Hardened Steel		Hardened Steel	
Cutting Speed	261 m/min	226 m/min		196 m/min		157 m/min		157 m/min		109 m/min	
Depth of Cut	aa=0.02D ar=0.05D 							D<8: aa 0.02D, ar 0.05D; 8<D: aa 0.32mm, ar 0.05D			
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
1	50,000	2,800	50,000	2,800	50,000	2,500	47,500	2,250	32,000	1,450	25,000	1,000
2	31,780	3,480	25,390	2,800	24,890	2,500	23,880	2,250	17,220	1,540	12,690	1,000
3	20,470	3,530	16,330	2,900	15,830	2,540	15,150	2,280	11,000	1,610	8,350	1,010
4	18,080	3,690	15,520	3,380	15,020	2,740	13,560	2,440	11,000	1,880	7,960	1,090
5	15,410	4,120	14,750	4,080	13,600	2,870	10,750	2,290	9,920	2,120	7,430	1,190
6	14,380	4,590	12,880	4,100	11,050	2,630	9,080	2,150	9,080	2,150	6,310	1,100
8	11,600	3,680	10,100	3,230	9,030	2,120	7,220	1,710	7,220	1,710	5,000	890
10	9,250	2,920	8,020	2,520	6,950	1,650	5,540	1,310	5,540	1,310	3,840	690
12	7,540	2,370	6,510	2,040	5,650	1,330	4,500	1,050	4,500	1,050	3,120	550

SERIES PC418

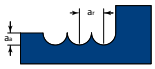
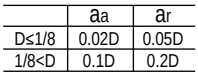
Profile Milling

Hardness		Tensile Strength Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Cast Iron	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloy *Annealed*		Hardened Steel Prehardened Steel Ti Alloy *Solution Treated and Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloy		Hardened Steel		Hardened Steel	
Cutting Speed	183 m/mm	146 m/min		120 m/min		99 m/min		83 m/min		73 m/min		52 m/min	
Depth of Cut	aa=0.1D ar=0.2D 									aa=0.05D ar=0.1D			
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
1	46,080	1,100	46,080	1,100	45,360	890	36,000	580	31,680	410	27,360	300	20,160	200
2	34,030	1,340	27,650	1,100	22,680	890	18,280	580	16,080	410	13,880	300	10,450	200
3	21,310	1,350	17,240	1,100	14,470	910	11,630	590	10,190	430	8,740	310	6,530	210
4	16,740	1,350	13,810	1,100	11,560	910	9,230	640	8,070	530	6,910	380	5,160	250
5	13,320	1,510	10,660	1,230	8,900	920	7,070	640	6,230	530	5,320	410	3,980	250
6	10,940	1,570	8,740	1,280	7,280	990	5,780	690	5,080	580	4,330	430	3,230	270
8	8,650	1,860	6,910	1,500	5,740	1,130	4,580	790	4,000	650	3,420	460	2,540	300
10	6,650	1,700	5,320	1,360	4,420	1,060	3,500	740	3,080	620	2,650	470	1,960	290
12	5,410	1,550	4,300	1,240	3,610	990	2,870	700	2,510	590	2,130	440	1,570	280

QUALITY TECH TOOL

SERIES PC420, PC420BN

Profile Milling

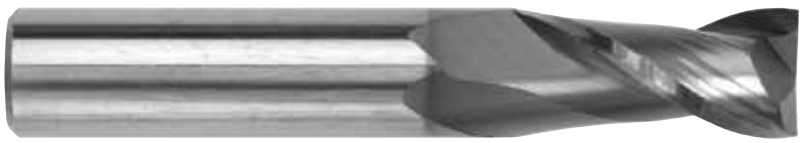
Work Material	Aluminum Alloys		Graphite	
Cutting Speed	50-2,400 m/min		50-900 m/min	
Depth of Cut				
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min
1	46,000	0.010-0.020	46,000	0.012-0.025
1.5	36,800	0.025-0.050	46,000	0.025-0.050
2	31,050	0.025-0.050	46,000	0.025-0.050
2.5	28,750	0.025-0.050	46,000	0.025-0.050
3	27,600	0.025-0.050	46,000	0.025-0.050
4	23,000	0.025-0.050	46,000	0.025-0.050
5	18,400	0.025-0.050	46,000	0.025-0.050
6	13,800	0.038-0.050	41,400	0.050-0.100
8	10,930	0.050-0.100	36,800	0.050-0.100
10	9,200	0.075-0.125	32,200	0.075-0.125
12	6,900	0.075-0.125	27,600	0.075-0.125

QUALITY TECH TOOL

SERIES PC421

Slot Milling

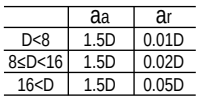
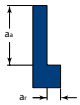
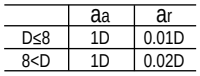
Hardness		Tensile Strength Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Cast Iron	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloy *Annealed*		Hardened Steel Prehardened Steel Ti Alloy *Solution Treated and Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloy		Hardened Steel		Hardened Steel	
Cutting Speed	130 m/mm	120 m/min		95 m/min		80 m/min		65 m/min		40 m/min		30 m/min	
Depth of Cut		Dia / ap: D<1 / 0.1D; 1≤D<3 / 0.3D; D≤3 / 0.5D								Dia / ap: D<1 / 0.02D; 1≤D / 0.05D		Dia / ap: D<1 / 0.01D; 1≤D<3 / 0.02D; 3≤D / 0.05D	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
1	35,520	230	32,290	220	24,010	210	20,700	150	18,220	110	11,590	50	8,360	40
2	20,040	240	18,220	220	13,910	210	11,590	150	10,520	120	6,540	70	4,550	40
3	13,510	370	12,250	330	10,520	250	8,780	160	7,370	130	4,550	80	3,310	50
4	10,840	430	9,850	390	8,110	310	7,050	210	5,800	150	3,640	80	2,570	50
5	9,650	580	8,780	520	7,120	390	5,880	220	5,050	160	3,150	90	2,090	50
6	8,110	560	7,370	510	5,960	390	4,890	220	4,140	160	2,570	90	1,740	40
8	6,010	540	5,460	490	4,470	390	3,640	210	3,150	160	1,900	80	1,320	40
10	4,830	510	4,390	460	3,560	380	2,900	210	2,480	160	1,580	80	1,050	40
12	4,010	510	3,640	460	2,980	380	2,400	210	2,070	160	1,320	80	880	30
14	3,460	510	3,150	460	2,480	360	2,090	180	1,740	160	1,130	70	750	30
16	3,010	440	2,730	430	2,240	330	1,820	160	1,580	140	990	60	650	30
18	2,640	420	2,400	380	1,990	300	1,640	150	1,400	130	880	50	580	30
20	2,370	380	2,150	340	1,740	260	1,470	130	1,260	110	790	50	520	20
22	2,190	350	1,990	320	1,590	240	1,340	120	1,140	100	710	40	470	20
25	1,910	300	1,740	270	1,430	220	1,180	110	1,010	90	630	30	420	20

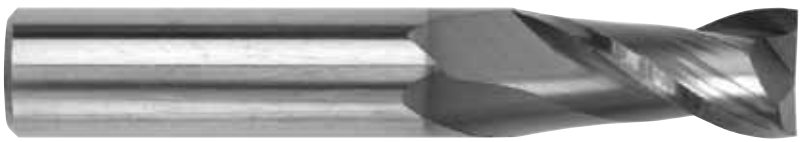


QUALITY TECH TOOL

SERIES PC421, PC441

High Speed Light Milling

Hardness	Tensile Strength: Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC	
Work Material	Mild Carbon Steel Mild Steel		Alloy Steel Tool Steel Ti Alloy *Annealed*		Hardened Steel Prehardened Steel Ti Alloy *Solution Treated and Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel, Ni Based Alloy		Hardened Steel	
Cutting Speed	400 m/mm		350 m/min		250 m/min		150 m/min		80 m/min	
Depth of Cut										
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
1	115,000	1,280	115,000	1,450	91,540	1,150	54,910	620	29,270	380
2	73,200	1,430	64,050	1,610	45,770	1,270	27,430	690	14,600	410
3	48,820	2,320	42,720	2,050	30,470	1,440	18,290	760	9,720	410
4	36,570	2,440	32,030	2,130	22,890	1,550	13,680	790	7,300	480
5	29,270	3,560	25,590	2,450	18,290	1,610	10,980	860	5,810	520
6	24,150	2,820	21,280	2,470	14,950	1,720	9,140	910	4,830	480
8	17,830	2,820	15,520	2,420	11,390	1,670	6,840	910	3,620	490
10	14,370	2,880	12,650	2,420	9,140	1,670	5,460	920	2,880	480
12	12,070	2,820	10,640	2,420	7,590	1,670	4,540	910	2,420	470
14	10,410	2,700	9,140	2,300	6,500	1,550	3,910	850	2,070	450
16	9,140	2,590	7,990	2,240	5,690	1,550	3,390	820	1,780	430
18	8,110	2,590	7,070	2,190	5,060	1,490	3,050	810	1,610	430
20	7,300	2,420	6,380	2,130	4,540	1,490	2,700	760	1,440	410
22	6,610	2,240	5,810	1,950	4,140	1,380	2,470	730	1,320	370
24	6,090	2,070	5,290	1,780	3,790	1,270	2,240	660	1,210	340
25	5,810	1,950	5,120	1,720	3,620	1,210	2,190	640	1,150	320



QUALITY TECH TOOL

SERIES PC421BN, PC441BN

High Speed Light Milling

Hardness	Tensile Strength Up to 750N/mm2		Up to 30 HRC		Up to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloys *Annealed*		Hardened Steel Prehardened Steel Ti Alloys *Solution Treated & Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloys		Hardened Steel		Hardened Steel	
Cutting Speed	300 m/min		260 m/min		225 m/min		180 m/min		180 m/min		120 m/min	
Depth of Cut	ae=0.02D ar=0.05D											
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
1	57,500	3,220	57,500	3,220	57,500	2,880	54,620	2,590	36,800	1,670	28,750	1,150
2	36,550	4,010	29,190	3,220	28,620	2,880	27,460	2,590	19,810	1,780	14,590	1,150
3	23,550	4,070	18,770	3,340	18,200	2,920	17,420	2,630	12,650	1,850	9,610	1,170
4	20,800	4,240	17,850	3,890	17,280	3,150	15,590	2,810	12,650	2,170	9,150	1,260
5	17,730	4,740	16,970	4,700	15,640	3,310	12,370	2,630	11,400	2,440	8,550	1,370
6	16,540	5,280	14,810	4,720	12,710	3,030	10,440	2,470	10,440	2,470	7,250	1,270
8	13,340	4,240	11,620	3,710	10,380	2,440	8,300	1,970	8,300	1,970	5,750	1,030
10	10,640	3,360	9,230	2,900	7,990	1,900	6,370	1,510	6,370	1,510	4,420	790
12	8,670	2,730	7,490	2,350	6,500	1,530	5,180	1,210	5,180	1,210	3,590	640
14	7,820	2,470	6,780	2,130	5,870	1,380	4,660	1,120	4,660	1,120	3,220	580
16	6,900	2,200	5,970	1,860	5,160	1,210	4,110	980	4,110	980	2,830	510
18	6,090	1,900	5,230	1,670	4,540	1,090	3,620	870	3,620	870	2,530	450
20	5,620	1,770	4,850	1,540	4,200	1,010	3,360	800	3,360	800	2,310	410
22	4,890	1,550	4,270	1,350	3,670	880	2,930	700	2,930	700	2,020	360
25	4,300	1,360	3,740	1,190	3,230	770	2,550	610	2,550	610	1,750	310

	ae	ar
D≤8	0.02D	0.05D
8<D	0.32mm	0.05D

SERIES PC421BN, PC441BN

Profile Milling

Hardness		Tensile Strength Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Cast Iron	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloy *Annealed*		Hardened Steel Prehardened Steel Ti Alloy *Solution Treated and Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloy		Hardened Steel		Hardened Steel	
Cutting Speed	210 m/mm	168 m/min		138 m/min		114 m/min		96 m/min		84 m/min		60 m/min	
Depth of Cut	aa=0.1D ar=0.2D									aa=0.05D ar=0.1D			
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
1	52,990	1,260	52,990	1,260	52,160	1,020	41,400	660	36,430	470	31,460	350	23,180	230
2	39,130	1,550	31,800	1,260	26,080	1,020	21,020	660	18,490	480	15,970	350	12,010	230
3	24,510	1,550	19,830	1,260	16,640	1,040	13,380	680	11,720	500	10,050	360	7,510	240
4	19,250	1,550	15,880	1,260	13,290	1,040	10,620	730	9,280	610	7,950	440	5,930	280
5	15,320	1,740	12,250	1,410	10,230	1,060	8,130	740	7,170	610	6,110	470	4,580	290
6	12,590	1,810	10,050	1,470	8,380	1,140	6,640	790	5,840	660	4,980	500	3,710	310
8	9,950	2,140	7,950	1,720	6,600	1,300	5,260	910	4,600	750	3,930	530	2,920	350
10	7,650	1,960	6,110	1,560	5,080	1,210	4,030	860	3,540	710	3,040	550	2,250	340
12	6,220	1,790	4,950	1,420	4,150	1,140	3,300	800	2,880	680	2,450	500	1,810	320
14	5,630	1,740	4,470	1,430	3,730	1,120	2,980	790	2,570	640	2,240	500	1,660	310
16	4,930	1,740	3,920	1,390	3,250	1,070	2,590	790	2,250	630	1,920	450	1,490	300
18	4,390	1,660	3,480	1,310	2,900	1,010	2,320	790	1,990	630	1,740	430	1,310	290
20	4,020	1,580	3,230	1,280	2,650	960	2,130	750	1,860	610	1,620	410	1,210	280
22	3,510	1,470	2,940	1,180	2,450	850	1,880	670	1,640	550	1,410	370	1,060	270
25	3,090	1,280	2,450	1,100	2,040	760	1,630	590	1,450	480	1,240	340	920	230

SERIES PC432, PC433

Slot Milling

Hardness		Tensile Strength Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Cast Iron	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloy *Annealed*		Hardened Steel Prehardened Steel Ti Alloy *Solution Treated and Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloy		Hardened Steel		Hardened Steel	
Cutting Speed	130 m/mm	120 m/min		95 m/min		80 m/min		65 m/min		40 m/min		30 m/min	
Depth of Cut													
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	13,510	370	12,250	330	10,520	250	8,780	160	7,370	130	4,550	80	3,310	50
4	10,840	430	9,850	390	8,110	310	7,050	210	5,800	150	3,640	80	2,570	50
5	9,650	580	8,780	520	7,120	390	5,880	220	5,050	160	3,150	90	2,090	50
6	8,110	560	7,370	510	5,960	390	4,890	220	4,140	160	2,570	90	1,740	40
8	6,010	540	5,460	490	4,470	390	3,640	210	3,150	160	1,900	80	1,320	40
10	4,830	510	4,390	460	3,560	380	2,900	210	2,480	160	1,580	80	1,050	40
12	4,010	510	3,640	460	2,980	380	2,400	210	2,070	160	1,320	80	880	30

	aa
D<1	0.1D
1≤D<3	0.3D
3≤D	0.5D

	aa
D<1	0.02D
1≤D	0.05D

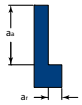
	aa
D<1	0.01D
1≤D<3	0.02D
3≤D	0.05D

SERIES PC432, PC433, PC434, PC435

High Speed Light Milling

Hardness	Tensile Strength: Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC	
Work Material	Mild Carbon Steel Mild Steel		Alloy Steel Tool Steel Ti Alloy *Annealed*		Hardened Steel Prehardened Steel Ti Alloy *Solution Treated and Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel, Ni Based Alloy		Hardened Steel	
Cutting Speed	400 m/mm		350 m/min		250 m/min		150 m/min		80 m/min	
Depth of Cut										
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	48,820	2,320	42,720	2,050	30,470	1,440	18,290	760	9,720	410
4	36,570	2,440	32,030	2,130	22,890	1,550	13,680	790	7,300	480
5	29,270	3,560	25,590	2,450	18,290	1,610	10,980	860	5,810	520
6	24,150	2,820	21,280	2,470	14,950	1,720	9,140	910	4,830	480
8	17,830	2,820	15,520	2,420	11,390	1,670	6,840	910	3,620	490
10	14,370	2,880	12,650	2,420	9,140	1,670	5,460	920	2,880	480
12	12,070	2,820	10,640	2,420	7,590	1,670	4,540	910	2,420	470

	aa	ar
D<8	1.5D	0.01D
8≤D<16	1.5D	0.02D
16<D	1.5D	0.05D



	aa	ar
D<8	1D	0.01D
8<D	1D	0.02D

QUALITY TECH TOOL

SERIES PC434, PC435

Side Milling

Hardness		Tensile Strength Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Cast Iron	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloy *Annealed*		Hardened Steel Prehardened Steel Ti Alloy *Solution Treated and Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloy		Hardened Steel		Hardened Steel	
Cutting Speed	144 m/mm	120 m/min		96 m/min		78 m/min		65 m/min		42 m/min		30 m/min	
Depth of Cut			aa	ar						aa=1D ar=0.02D			
			D<3	1.5D	0.05D								
			3≤R	1.5D	0.1D								
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	16,640	990	14,080	840	12,010	590	9,830	210	7,560	180	4,390	100	3,160	80
4	13,290	1,050	11,120	880	10,890	610	7,130	220	6,180	190	3,660	120	2,500	80
5	10,490	1,220	8,540	1,020	7,170	700	5,710	230	5,080	210	3,040	120	2,010	70
6	9,740	1,210	7,020	1,010	5,840	700	4,660	240	4,180	220	2,450	120	1,660	70
8	6,650	1,180	5,520	980	4,600	690	3,670	240	3,260	220	1,920	110	1,320	60
10	5,080	1,180	4,260	980	3,540	690	2,820	240	2,500	220	1,530	140	1,010	60
12	4,150	1,150	3,460	970	2,880	690	2,280	240	2,040	210	1,240	90	830	50

SERIES PC440

Side and Slot Milling

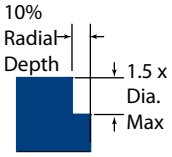
Cutting Type	Side Milling		Slot Milling	
Work Material	Aluminum		Aluminum	
Cutting Speed	270 m/min		270 m/min	
Depth of Cut	aa=1.5D ar=0.1D		aa=0.5D	
Mill Diameter	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min
3	30,360	1,040	30,360	520
4	22,080	1,380	22,080	690
5	17,940	1,720	17,940	860
6	13,800	2,070	13,800	1,040
8	11,040	2,760	11,040	1,380
10	11,040	3,450	11,040	1,720
12	5,520	2,210	5,520	1,100
14	5,520	2,210	5,520	1,100
16	5,390	2,430	5,390	1,215
20	4,310	2,370	4,310	1,185
25	3,450	2,420	3,450	1,210

SERIES VH439, VHR439

4 Flute - Variable Helix End Mills - Light Profile Cut

Hardness	≤88 HRB		≥88 HRB		<26 HRC		<26 HRC		<92 HRB		<30 HRC		<30 HRC	
Work Material	Steel								Cast Iron					
	Low Carbon Steel				Medium Alloy Steel		Mold & Die Steel		Gray		Ductile		Malleable	
Cutting Speed	212 m/mm		174 m/min		140 m/min		70 m/min		183 m/min		93 m/min		58 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	22,480	685	18,450	560	14,840	450	7,420	225	19,400	790	9,860	300	6,150	185
4	17,985	1,005	14,760	823	11,875	568	5,935	283	15,520	1,143	7,890	440	4,920	273
5	13,490	1,325	11,070	1,085	8,910	685	4,450	340	11,640	1,495	5,920	580	3,690	360
6	11,240	1,485	9,220	1,215	7,420	740	3,710	370	9,700	1,670	4,930	650	3,070	405
8	8,430	1,920	6,920	1,580	5,570	1,070	2,780	535	7,280	1,995	3,700	845	2,310	525
10	6,740	2,185	5,530	1,790	4,450	1,265	2,230	635	5,820	2,190	2,960	960	1,840	595
12	5,620	2,405	4,610	1,975	3,710	1,440	1,860	720	4,850	2,310	2,460	1,055	1,540	660
14	4,820	2,185	3,950	1,790	3,180	1,315	1,590	655	4,160	2,095	2,110	955	1,320	600
16	4,210	2,010	3,460	1,655	2,780	1,220	1,390	610	3,640	1,935	1,850	885	1,150	550
18	3,750	1,885	3,070	1,545	2,470	1,145	1,240	575	3,230	1,810	1,640	825	1,020	515
20	3,370	1,780	2,770	1,465	2,230	1,090	1,110	540	2,910	1,710	1,480	780	920	485
25	2,700	1,565	2,210	1,280	1,780	960	890	480	2,330	1,490	1,180	685	740	430

Hardness	<26 HRC		<82 HRB		<35 HRC		<82 HRB		<31 HRC	
Work Material	Stainless Steel						Titanium Alloy		High Temperature Alloy	
	300 Series Stainless		400 Series Stainless		Ph Series Stainless					
Cutting Speed	108 m/mm		166 m/min		90 m/min		104 m/min		30 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	11,450	350	17,600	720	9,540	245	11,030	355	3,180	90
4	9,160	513	14,080	968	7,635	360	8,825	478	2,545	105
5	6,870	675	10,560	1,215	5,730	475	6,620	600	1,910	120
6	5,730	755	8,800	1,340	4,770	535	5,510	660	1,590	125
8	4,290	780	6,600	1,410	3,580	530	4,130	670	1,190	150
10	3,440	800	5,280	1,455	2,860	525	3,310	675	950	165
12	2,860	870	4,400	1,565	2,390	610	2,760	730	800	185
14	2,450	840	3,770	1,485	2,040	555	2,360	675	680	175
16	2,150	815	3,300	1,425	1,790	520	2,070	640	600	175
18	1,910	800	2,930	1,375	1,590	490	1,840	615	530	165
20	1,720	785	2,640	1,340	1,430	465	1,650	585	480	165
25	1,370	670	2,110	1,140	1,150	420	1,320	495	380	130



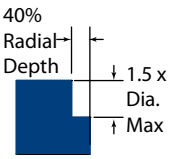
QUALITY TECH TOOL

SERIES VH439, VHR439

4 Flute - Variable Helix End Mills - Heavy Profile Cut

Hardness	≤88 HRB		≥88 HRB		<26 HRC		<26 HRC		<92 HRB		<30 HRC		<30 HRC	
Work Material	Steel								Cast Iron					
	Low Carbon Steel				Medium Alloy Steel		Mold & Die Steel		Gray		Ductile		Malleable	
Cutting Speed	195 m/mm		160 m/min		131 m/min		64 m/min		177 m/min		87 m/min		55 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	20,670	420	16,960	345	13,890	255	6,790	125	18,770	480	9,220	190	5,830	120
4	16,535	583	13,570	478	11,110	320	5,430	158	15,015	663	7,375	263	4,665	165
5	12,400	745	10,180	610	8,330	385	4,070	190	11,260	845	5,530	335	3,500	210
6	10,340	825	8,480	680	6,940	415	3,390	205	9,380	940	4,610	370	2,920	235
8	7,750	1,055	6,360	865	5,210	605	2,540	295	7,040	1,140	3,460	470	2,190	300
10	6,200	1,190	5,090	975	4,170	715	2,040	350	5,630	1,260	2,770	530	1,750	335
12	5,170	1,325	4,240	1,085	3,470	805	1,700	395	4,690	1,330	2,310	590	1,460	375
14	4,430	1,200	3,630	985	2,980	740	1,450	360	4,020	1,215	1,980	535	1,250	340
16	3,880	1,110	3,180	910	2,600	685	1,270	335	3,520	1,125	1,730	495	1,090	310
18	3,450	1,040	2,830	850	2,310	645	1,130	315	3,130	1,060	1,540	465	970	290
20	3,100	980	2,540	805	2,080	615	1,020	300	2,810	1,000	1,380	435	870	275
25	2,480	855	2,040	700	1,670	540	810	260	2,250	875	1,110	380	700	240

Hardness	<26 HRC		<82 HRB		<35 HRC		<82 HRB		<31 HRC	
Work Material	Stainless Steel						Titanium Alloy		High Temperature Alloy	
	300 Series Stainless		400 Series Stainless		Ph Series Stainless					
Cutting Speed	102 m/mm		157 m/min		87 m/min		101 m/min		27 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	10,810	220	16,650	375	9,220	225	10,710	260	2,860	60
4	8,650	305	13,320	530	7,375	283	8,565	328	2,290	70
5	6,490	390	9,990	685	5,530	340	6,420	395	1,720	80
6	5,410	435	8,320	765	4,610	370	5,350	430	1,430	85
8	4,060	455	6,240	800	3,460	400	4,020	465	1,070	95
10	3,240	465	4,990	820	2,770	420	3,210	490	860	105
12	2,700	495	4,160	880	2,310	470	2,680	545	720	120
14	2,320	480	3,570	840	1,980	435	2,290	500	610	110
16	2,030	465	3,120	805	1,730	405	2,010	470	540	110
18	1,800	455	2,770	780	1,540	385	1,780	445	480	110
20	1,620	445	2,500	760	1,380	365	1,610	425	430	105
25	1,300	385	2,000	650	1,110	315	1,280	365	340	90

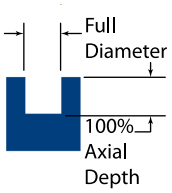


SERIES VH439, VHR439

4 Flute - Variable Helix End Mills - Slot Milling

Hardness	≤88 HRB		≥88 HRB		<26 HRC		<26 HRC		<92 HRB		<30 HRC		<30 HRC	
Work Material	Steel								Cast Iron					
	Low Carbon Steel				Medium Alloy Steel		Mold & Die Steel		Gray		Ductile		Malleable	
Cutting Speed	163 m/mm		134 m/min		113 m/min		58 m/min		152 m/min		78 m/min		49 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	17,280	355	14,210	290	11,980	220	6,150	115	16,120	415	8,270	170	5,190	105
4	13,825	490	11,365	400	9,585	275	4,920	143	12,895	570	6,615	235	4,155	148
5	10,370	625	8,520	510	7,190	330	3,690	170	9,670	725	4,960	300	3,120	190
6	8,640	690	7,100	570	5,990	360	3,070	185	8,060	805	4,130	330	2,600	210
8	6,480	880	5,330	725	4,490	520	2,310	270	6,040	980	3,100	420	1,950	265
10	5,180	995	4,260	820	3,590	615	1,840	315	4,830	1,080	2,480	475	1,560	300
12	4,320	1,105	3,550	910	3,000	695	1,540	355	4,030	1,145	2,070	530	1,300	335
14	3,700	1,005	3,040	825	2,570	635	1,320	325	3,450	1,040	1,770	480	1,110	300
16	3,240	925	2,660	760	2,250	595	1,150	305	3,020	965	1,550	445	970	275
18	2,880	865	2,370	715	2,000	560	1,020	285	2,690	910	1,380	415	870	260
20	2,590	820	2,130	675	1,800	535	920	270	2,420	860	1,240	390	780	245
25	2,070	710	1,700	585	1,440	465	740	240	1,930	750	990	340	620	215

Hardness	<26 HRC		<82 HRB		<35 HRC		<82 HRB		<31 HRC	
Work Material	Stainless Steel						Titanium Alloy		High Temperature Alloy	
	300 Series Stainless		400 Series Stainless		Ph Series Stainless					
Cutting Speed	96 m/mm		134 m/min		81 m/min		91 m/min		24 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	10,180	210	14,210	320	8,590	210	9,650	235	2,540	50
4	8,145	288	11,365	453	6,870	263	7,720	295	2,035	60
5	6,110	365	8,520	585	5,150	315	5,790	355	1,530	70
6	5,090	405	7,100	655	4,290	345	4,820	385	1,270	75
8	3,820	430	5,330	680	3,220	375	3,620	420	950	85
10	3,050	440	4,260	700	2,580	390	2,890	440	760	90
12	2,540	465	3,550	755	2,150	440	2,410	490	640	105
14	2,180	450	3,040	715	1,840	405	2,070	455	550	100
16	1,910	440	2,660	685	1,610	375	1,810	425	480	100
18	1,700	430	2,370	665	1,430	355	1,610	400	420	95
20	1,530	420	2,130	650	1,290	340	1,450	385	380	95
25	1,220	360	1,700	550	1,030	295	1,160	330	310	80



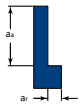
QUALITY TECH TOOL

SERIES PC441

Side Milling

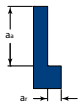
Hardness		Tensile Strength Up to 750N/mm2		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		55 to 60 HRC	
Work Material	Cast Iron	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloy *Annealed*		Hardened Steel Prehardened Steel Ti Alloy *Solution Treated and Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloy		Hardened Steel		Hardened Steel	
Cutting Speed	210 m/mm	168 m/min		138 m/min		108 m/min		96 m/min		84 m/min		60 m/min	
Depth of Cut										a_a=1D a_r=0.02D			
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
1	43,820	610	36,800	510	31,190	460	19,870	180	18,080	160	11,320	100	7,920	60
2	25,780	610	21,650	510	18,340	460	11,720	180	10,630	160	6,640	100	4,660	70
3	16,640	990	14,080	840	12,010	590	9,830	210	7,560	180	4,390	100	3,160	80
4	13,290	1,050	11,120	880	10,890	610	7,130	220	6,180	190	3,660	120	2,500	80
5	10,490	1,220	8,540	1,020	7,170	700	5,710	230	5,080	210	3,040	120	2,010	70
6	9,740	1,210	7,020	1,010	5,840	700	4,660	240	4,180	220	2,450	120	1,660	70
8	6,650	1,180	5,520	980	4,600	690	3,670	240	3,260	220	1,920	110	1,320	60
10	5,080	1,180	4,260	980	3,540	690	2,820	240	2,500	220	1,530	140	1,010	60
12	4,150	1,150	3,460	970	2,880	690	2,280	240	2,040	210	1,240	90	830	50
14	3,730	1,090	3,150	950	2,570	690	2,070	240	1,820	210	1,120	80	750	40
16	3,250	1,100	2,750	910	2,250	690	1,830	220	1,660	190	990	80	650	30
18	2,900	1,080	2,400	900	1,990	670	1,640	190	1,460	170	880	70	580	30
20	2,650	1,040	2,210	870	1,860	550	1,510	180	1,350	160	800	60	520	30
22	2,290	920	1,960	790	1,640	560	1,320	150	1,170	140	700	50	460	30
25	2,050	820	1,710	680	1,450	490	1,160	140	1,040	120	610	50	410	30

	a_a	a_r
D<3	1.5D	0.05D
3≤D	1.5D	0.1D



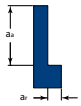
SERIES PC450, PC450L

Side Milling

Hardness	Up to 25 HRC		25 to 45 HRC		45 to 55 HRC		55 to 60 HRC		30 to 40 HRC		25 to 45 HRC	
Work Material	Mild Steel Carbon Steel Cast Iron		Alloy Steel		Hardened Steel		Hardened Steel		Titamium Alloy		Nickel Base	
Cutting Speed	132 m/min		72 m/min		39 m/min		22 m/min		66 m/min		20 m/min	
Depth of Cut	a_a=1.5D a_r=0.1D 				a_a=1.5D a_r=0.05D							
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
3	13,110	2,070	7,310	550	3,730	220	2,620	140	5,800	970	1,930	60
4	9,940	2,070	5,520	550	3,040	280	2,070	140	4,420	1,040	1,450	80
5	7,870	1,790	4,420	550	2,480	300	1,790	140	3,450	1,040	1,130	100
6	7,310	3,590	4,000	1,170	2,210	410	1,520	220	2,900	1,240	970	120
8	5,520	3,310	3,040	1,170	1,660	410	1,150	210	2,210	1,240	720	120
10	4,420	2,900	2,480	1,170	1,320	390	920	210	1,790	1,100	550	120
12	4,000	2,900	2,210	1,060	1,100	390	770	180	1,450	1,040	470	110
16	3,040	2,210	1,660	800	830	300	610	140	1,100	970	360	100
20	2,480	1,790	1,310	630	660	220	480	120	900	830	280	100
25	1,720	1,660	1,040	660	520	250	350	110	830	690	250	80

SERIES PC451, PC453, PC456

Side Milling

Hardness		Tensile Strength Up to 750N/mm²		Up to 38 HRC		30 to 38 HRC		38 to 45 HRC			
Work Material	Cast Iron	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloys *Annealed*		Hardened Steel Prehardened Steel Ti Alloy *Solution Treated & Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloys		Aluminum Alloy	
Cutting Speed	102 m/min	120 m/min		96 m/min		72 m/min		48 m/min		132 m/min	
Depth Of Cut	aa=1.5D ar=0.1D 										
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
4	9,380	970	11,040	2,070	8,830	1,790	6,620	550	4,420	330	12,140	1,520
6	6,210	1,100	7,310	2,350	5,800	2,070	4,420	550	2,900	360	8,000	1,790
8	4,690	970	5,520	2,210	4,420	1,930	3,310	860	2,210	570	6,070	1,660
10	3,730	940	4,420	1,930	3,450	1,790	2,620	830	1,790	570	4,830	1,520
12	3,170	910	3,730	1,930	2,900	1,660	2,210	700	1,450	480	4,000	1,380
16	2,350	760	2,760	1,520	2,210	1,310	1,660	540	1,100	460	3,040	1,240
20	1,860	620	2,480	1,240	1,720	1,040	1,310	440	900	360	2,420	1,100

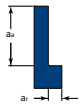
SERIES PC451, PC453, PC456

Slot Milling

Hardness		Tensile Strength Up to 750N/mm²		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC			
Work Material	Cast Iron	Mild Steel Carbon Steel		Alloy Steel Tool Steel Ti Alloys *Annealed*		Hardened Steel Prehardened Steel Ti Alloy *Solution Treated & Aged*		Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloys		Aluminum Alloy	
Cutting Speed	102 m/min	120 m/min		96 m/min		72 m/min		48 m/min		132 m/min	
Depth of Cut	aa=1D 							aa=0.5D			
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
4	4,420	440	9,940	870	8,280	620	5,520	400	3,310	230	9,380	1,240
6	2,900	510	6,620	1,010	5,520	870	3,730	470	2,210	320	8,000	1,380
8	2,210	460	4,970	910	4,140	800	2,760	470	1,660	320	6,070	1,310
10	1,790	410	4,000	830	3,310	650	2,210	430	1,310	290	4,830	1,240
12	1,460	400	3,310	800	2,760	620	1,790	400	1,100	280	4,000	1,100
16	1,100	660	2,480	660	2,070	940	1,380	300	830	250	3,040	970
20	900	580	1,930	580	1,660	440	1,100	250	660	190	2,420	830

SERIES PC455

Side Milling

Hardness	Up to 30 HRC		30 to 38 HRC		38 to 45 HRC	
Work Material	Alloy Steel Tool Steel Ti Alloys (Annealed)		Hardened Steel Prehardened Steel Ti Alloys (Solution Treated and Aged)		Hardened Steel Prehardened Steel Stainless Steel Inconel, Ni Based Alloy	
Cutting Speed	48 m/min		43 m/min		36 m/min	
Depth of Cut	a_a=1.5D a_r=0.1D					
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	5,530	380	4,980	150	3,960	120
4	4,350	380	3,930	150	3,170	120
5	3,370	410	3,040	150	2,420	120
6	2,760	410	2,450	150	1,970	120
7	2,460	410	2,180	150	1,790	120
8	2,170	410	1,920	150	1,590	120
10	1,680	410	1,530	150	1,220	120
11	1,570	410	1,430	150	1,140	120
12	1,370	430	1,240	150	990	120
14	1,210	460	1,100	150	880	120
16	1,090	480	990	150	790	120
20	880	490	800	140	640	120
25	680	380	610	120	500	90

SERIES PC460

Slot Milling

Hardness			Up to 35 HRC		35 to 45 HRC		45 to 55 HRC	
Work Material	Medium Steel Mild Steel		Prehardened Steel Stainless Steel Die and Alloy Steel		Prehardened Steel Stainless Steel Die and Alloy Steel		Hardened Steel	
Cutting Speed	42 m/mm		31 m/min		20 m/min		16 m/min	
Depth of Cut	aa D<1/2 1.5D 1/2≤D 0.1D				aa=0.5D			
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	5,660	140	4,140	80	2,620	30	1,930	10
4	4,280	180	3,170	110	1,930	50	1,520	20
5	3,450	230	2,480	140	1,520	60	1,240	20
6	2,820	280	1,880	170	1,240	70	940	30
8	2,110	280	1,410	170	940	70	700	30
10	1,640	320	1,120	170	750	70	570	30
12	1,410	350	940	180	620	70	470	30
16	1,050	370	700	180	470	70	360	30
20	860	390	570	190	370	70	280	30
25	690	330	440	180	290	70	220	30

SERIES PC460

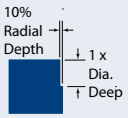
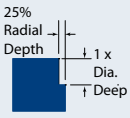
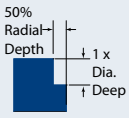
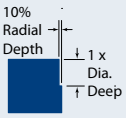
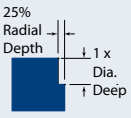
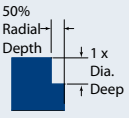
Side Milling

Hardness				Up to 35 HRC		35 to 45 HRC		45 to 55 HRC	
Work Material	Aluminum		Mild Carbon Steel Mild Steel	Prehardened Steel Stainless Steel Die & Alloy Steel		Prehardened Steel Stainless Steel Die & Alloy Steel		H ardened Steel	
Cutting Speed	180 m/mm		62 m/min	42 m/min		21 m/min		21 m/min	
Depth of Cut	aa=1.5D ar=0.1D					aa=1.5D ar=0.1D			
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	18,770	370	6,620	180	4,420	120	3,040	50	2,210	20
4	14,350	510	4,970	250	3,310	170	2,210	70	1,660	30
5	11,450	610	4,000	300	2,760	210	1,790	110	1,380	30
6	9,520	760	3,310	370	2,210	230	1,460	100	1,100	40
8	7,180	760	2,480	370	1,660	230	1,100	100	830	40
10	5,800	830	1,930	470	1,310	230	880	100	660	40
12	4,830	830	1,660	500	1,100	250	730	100	550	40
16	3,590	830	1,240	550	830	250	550	100	410	40
20	2,900	830	990	570	660	280	440	100	330	40
25	2,350	830	800	480	520	250	350	100	260	40

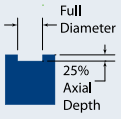
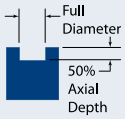
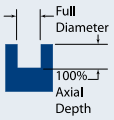
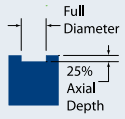
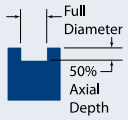
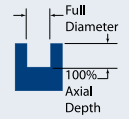
QUALITY TECH TOOL

SERIES PC470, PC471, EM470, EM471

2 Flute End Mills - Profile Milling for Aluminum

Work Material	Aluminum <10% Silicon						Aluminum >10% Silicon					
	Radial Depth of Cut at 1 X Diameter Axial Depth of Cut											
Cutting Speed	610 M/min		495 M/min		305 M/min		460 M/min		375 M/min		245 M/min	
Radial Depth of Cut	10% of Diameter		25% of Diameter		50% of Diameter		10% of Diameter		25% of Diameter		50% of Diameter	
												
Mill Diameter	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min
3	64,670	3,880	52,480	3,621	32,340	3,493	48,770	2,926	39,760	2,743	25,970	2,805
4	48,500	3,686	39,360	3,440	24,250	3,317	36,580	2,780	29,820	2,606	19,480	2,665
6	32,340	4,140	26,240	3,863	16,170	3,726	24,380	3,121	19,880	2,926	12,990	2,993
8	24,250	3,929	19,680	3,666	12,130	3,537	18,290	2,963	14,910	2,778	9,740	2,840
10	19,400	3,647	15,740	3,403	9,700	3,282	14,630	2,750	11,930	2,579	7,790	2,636
12	16,170	3,557	13,120	3,319	8,080	3,200	12,190	2,682	9,940	2,515	6,490	2,570
16	12,130	4,003	9,840	3,734	6,060	3,600	9,140	3,016	7,450	2,827	4,870	2,893
20	9,700	4,074	7,870	3,801	4,850	3,667	7,320	3,074	5,960	2,879	3,900	2,948
25	7,760	3,942	6,300	3,680	3,880	3,548	5,850	2,972	4,770	2,787	3,120	2,853

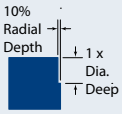
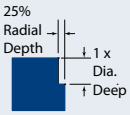
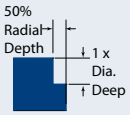
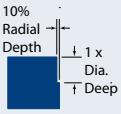
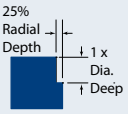
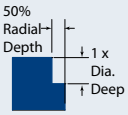
Slot Milling for Aluminum

Work Material	Aluminum <10% Silicon						Aluminum >10% Silicon					
	Radial Depth of Cut at 1 X Diameter Axial Depth of Cut											
Cutting Speed	610 M/min		495 M/min		305 M/min		460 M/min		375 M/min		245 M/min	
Axial Depth of Cut	25% of Diameter		50% of Diameter		100% of Diameter		25% of Diameter		50% of Diameter		100% of Diameter	
												
Mill Diameter	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min
3	64,670	11,253	52,480	9,132	32,340	5,627	48,770	8,486	39,760	6,918	25,970	4,519
4	48,500	10,185	39,360	8,266	24,250	5,093	36,580	7,682	29,820	6,262	19,480	4,091
6	32,340	9,702	26,240	7,872	16,170	4,851zz	24,380	7,314	19,880	5,964	12,990	3,897
8	24,250	9,215	19,680	7,478	12,130	4,609	18,290	6,950	14,910	5,666	9,740	3,701
10	19,400	9,390	15,740	7,618	9,700	4,695	14,630	7,081	11,930	5,774	7,790	3,770
12	16,170	14,553	13,120	11,808	8,080	7,272	12,190	10,971	9,940	8,946	6,490	5,841
16	12,130	18,802	9,840	15,252	6,060	9,393	9,140	14,167	7,450	11,548	4,870	7,549
20	9,700	17,945	7,870	14,560	4,850	8,973	7,320	13,542	5,960	11,026	3,900	7,215
25	7,760	15,520	6,300	12,600	3,880	7,760	5,850	11,700	4,770	9,540	3,120	6,240

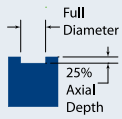
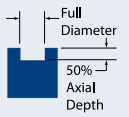
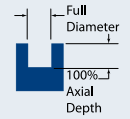
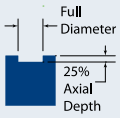
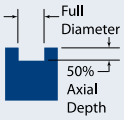
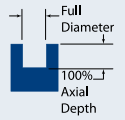
QUALITY TECH TOOL

SERIES PC470, PC471, EM470, EM471

2 Flute End Mills - Profile Milling for Brass and Plastic

Work Material	Brass						Plastic					
	Radial Depth of Cut at 1 X Diameter Axial Depth of Cut											
Cutting Speed	900 M/min		230 M/min		155 M/min		365 M/min		320 M/min		245 M/min	
Radial Depth of Cut	10% of Diameter		25% of Diameter		50% of Diameter		10% of Diameter		25% of Diameter		50% of Diameter	
												
Mill Diameter	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min
3	95,420	5,725	24,380	1,682	16,430	1,774	38,700	2,322	33,930	2,341	25,970	2,805
4	71,560	5,439	18,290	1,599	12,320	1,685	29,020	2,206	25,440	2,223	19,480	2,665
6	47,710	6,107	12,190	1,794	8,220	1,894	19,350	2,477	16,960	2,497	12,990	2,993
8	35,780	5,796	9,140	1,703	6,160	1,796	14,510	2,351	12,720	2,370	9,740	2,840
10	28,630	5,382	7,320	1,583	4,930	1,668	11,610	2,183	10,180	2,201	7,790	2,636
12	23,850	5,247	6,100	1,543	4,110	1,628	9,670	2,127	8,480	2,145	6,490	2,570
16	17,890	5,904	4,570	1,734	3,080	1,830	7,260	2,396	6,360	2,414	4,870	2,893
20	14,310	6,010	3,660	1,768	2,460	1,860	5,800	2,436	5,090	2,458	3,900	2,948
25	11,450	5,817	2,930	1,712	1,970	1,801	4,640	2,357	4,070	2,378	3,120	2,853

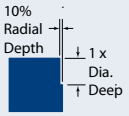
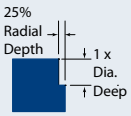
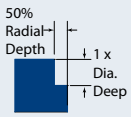
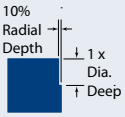
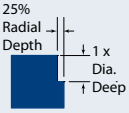
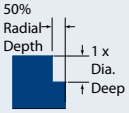
Slot Milling for Brass and Plastic

Work Material	Brass						Plastic					
	Radial Depth of Cut at 1 X Diameter Axial Depth of Cut											
Cutting Speed	610 M/min		495 M/min		305 M/min		460 M/min		375 M/min		245 M/min	
Axial Depth of Cut	25% of Diameter		50% of Diameter		100% of Diameter		25% of Diameter		50% of Diameter		100% of Diameter	
												
Mill Diameter	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min
3	95,420	16,603	24,380	4,242	16,430	2,859	38,700	6,734	33,930	5,904	25,970	4,519
4	71,560	15,028	18,290	3,841	12,320	2,58zz7	29,020	6,094	25,440	5,342	19,480	4,091
6	47,710	14,313	12,190	3,657	8,220	2,466	19,350	5,805	16,960	5,088	12,990	3,897
8	35,780	13,596	9,140	3,473	6,160	2,341	14,510	5,514	12,720	4,834	9,740	3,701
10	28,630	13,857	7,320	3,543	4,930	2,386	11,610	5,619	10,180	4,927	7,790	3,770
12	23,850	21,465	6,100	5,490	4,110	3,699	9,670	8,703	8,480	7,632	6,490	5,841
16	17,890	27,730	4,570	7,084	3,080	4,774	7,260	11,253	6,360	9,858	4,870	7,549
20	14,310	26,474	3,660	6,771	2,460	4,551	5,800	10,730	5,090	9,417	3,900	7,215
25	11,450	22,900	2,930	5,860	1,970	3,940	4,640	9,280	4,070	8,140	3,120	6,240

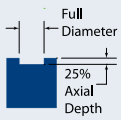
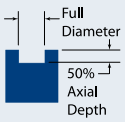
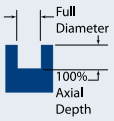
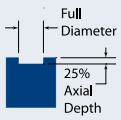
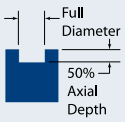
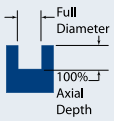
QUALITY TECH TOOL

SERIES PC475, PC476, EM475, EM476

3 Flute End Mills - Profile Milling for Aluminum

Work Material	Aluminum <10% Silicon						Aluminum >10% Silicon					
	Radial Depth of Cut at 1 X Diameter Axial Depth of Cut											
Cutting Speed	610 M/min		495 M/min		305 M/min		460 M/min		375 M/min		245 M/min	
Radial Depth of Cut	10% of Diameter		25% of Diameter		50% of Diameter		10% of Diameter		25% of Diameter		50% of Diameter	
												
Mill Diameter	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min
3	64,670	5,820	52,480	5,432	32,340	5,239	48,770	4,389	39,760	4,115	25,970	4,207
4	48,500	5,529	39,360	5,160	24,250	4,976	36,580	4,170	29,820	3,909	19,480	3,997
6	32,340	6,209	26,240	5,794	16,170	5,588	24,380	4,681	19,880	4,390	12,990	4,489
8	24,250	5,893	19,680	5,500	12,130	5,306	18,290	4,444	14,910	4,167	9,740	4,260
10	19,400	5,471	15,740	5,104	9,700	4,924	14,630	4,126	11,930	3,869	7,790	3,954
12	16,170	5,336	13,120	4,979	8,080	4,800	12,190	4,023	9,940	3,772	6,490	3,855
16	12,130	6,004	9,840	5,601	6,060	5,399	9,140	4,524	7,450	4,241	4,870	4,339
20	9,700	6,111	7,870	5,702	4,850	5,500	7,320	4,612	5,960	4,318	3,900	4,423
25	7,760	5,913	6,300	5,521	3,880	5,322	5,850	4,458	4,770	4,180	3,120	4,279

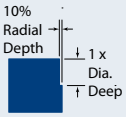
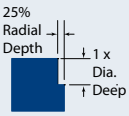
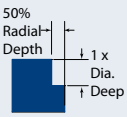
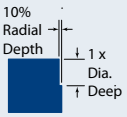
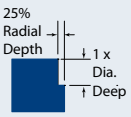
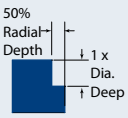
Slot Milling for Aluminum

Work Material	Aluminum <10% Silicon						Aluminum >10% Silicon					
	Radial Depth of Cut at 1 X Diameter Axial Depth of Cut											
Cutting Speed	610 M/min		495 M/min		305 M/min		460 M/min		375 M/min		245 M/min	
Axial Depth of Cut	25% of Diameter		50% of Diameter		100% of Diameter		25% of Diameter		50% of Diameter		100% of Diameter	
												
Mill Diameter	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min
3	64,670	16,879	52,480	13,697	32,340	8,441	48,770	12,729	39,760	10,377	25,970	6,778
4	48,500	15,278	39,360	12,398	24,250	7,639	36,580	11,523	29,820	9,393	19,480	6,136
6	32,340	14,553	26,240	11,808	16,170	7,277	24,380	10,971	19,880	8,946	12,990	5,846
8	24,250	13,823	19,680	11,218	12,130	6,914	18,290	10,425	14,910	8,499	9,740	5,552
10	19,400	14,084	15,740	11,427	9,700	7,042	14,630	10,621	11,930	8,661	7,790	5,656
12	16,170	21,830	13,120	17,712	8,080	10,908	12,190	16,457	9,940	13,419	6,490	8,762
16	12,130	28,202	9,840	22,878	6,060	14,090	9,140	21,251	7,450	17,321	4,870	11,323
20	9,700	26,918	7,870	21,839	4,850	13,459	7,320	20,313	5,960	16,539	3,900	10,823
25	7,760	23,280	6,300	18,900	3,880	11,640	5,850	17,550	4,770	14,310	3,120	9,360

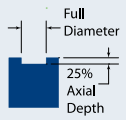
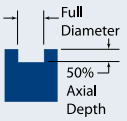
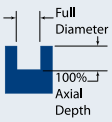
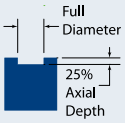
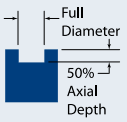
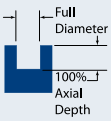
QUALITY TECH TOOL

SERIES PC475, PC476, EM475, EM476

3 Flute End Mills - Profile Milling for Brass and Plastic

Work Material	Brass						Plastic					
	Radial Depth of Cut at 1 X Diameter Axial Depth of Cut											
Cutting Speed	900 M/min		230 M/min		155 M/min		365 M/min		320 M/min		245 M/min	
Radial Depth of Cut	10% of Diameter		25% of Diameter		50% of Diameter		10% of Diameter		25% of Diameter		50% of Diameter	
												
Mill Diameter	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min
3	95,420	8,588	24,380	2,523	16,430	2,662	38,700	3,483	33,930	3,512	25,970	4,207
4	71,560	8,158	18,290	2,398	12,320	2,528	29,020	3,308	25,440	3,335	19,480	3,997
6	47,710	9,160	12,190	2,692	8,220	2,841	19,350	3,715	16,960	3,745	12,990	4,489
8	35,780	8,695	9,140	2,554	6,160	2,694	14,510	3,526	12,720	3,555	9,740	4,260
10	28,630	8,074	7,320	2,374	4,930	2,502	11,610	3,274	10,180	3,301	7,790	3,954
12	23,850	7,871	6,100	2,315	4,110	2,441	9,670	3,191	8,480	3,218	6,490	3,855
16	17,890	8,856	4,570	2,601	3,080	2,744	7,260	3,594	6,360	3,620	4,870	4,339
20	14,310	9,015	3,660	2,652	2,460	2,790	5,800	3,654	5,090	3,688	3,900	4,423
25	11,450	8,725	2,930	2,568	1,970	2,702	4,640	3,536	4,070	3,567	3,120	4,279

Slot Milling for Brass and Plastic

Work Material	Brass						Plastic					
	Radial Depth of Cut at 1 X Diameter Axial Depth of Cut											
Cutting Speed	610 M/min		495 M/min		305 M/min		460 M/min		375 M/min		245 M/min	
Axial Depth of Cut	25% of Diameter		50% of Diameter		100% of Diameter		25% of Diameter		50% of Diameter		100% of Diameter	
												
Mill Diameter	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min
3	95,420	24,905	24,380	6,363	16,430	4,288	38,700	10,101	33,930	8,856	25,970	6,778
4	71,560	22,541	18,290	5,761	12,320	3,881	29,020	9,141	25,440	8,014	19,480	6,136
6	47,710	21,470	12,190	5,486	8,220	3,699	19,350	8,708	16,960	7,632	12,990	5,846
8	35,780	20,395	9,140	5,210	6,160	3,511	14,510	8,271	12,720	7,250	9,740	5,552
10	28,630	20,785	7,320	5,314	4,930	3,579	11,610	8,429	10,180	7,391	7,790	5,656
12	23,850	32,198	6,100	8,235	4,110	5,549	9,670	13,055	8,480	11,448	6,490	8,762
16	17,890	41,594	4,570	10,625	3,080	7,161	7,260	16,880	6,360	14,787	4,870	11,323
20	14,310	39,710	3,660	10,157	2,460	6,827	5,800	16,095	5,090	14,125	3,900	10,823
25	11,450	34,350	2,930	8,790	1,970	5,910	4,640	13,920	4,070	12,210	3,120	9,360

SERIES PC497

Profile Milling

Hardness		Tensile Strength Up to 750N/mm2	Up to 30 HRC	30 to 38 HRC	38 to 45 HRC	45 to 55 HRC	55 to 60 HRC
Work Material	Cast Iron	Mild Steel Carbon Steel	Alloy Steel Tool Steel Ti Alloy *Annealed*	Hardened Steel Prehardened Steel Ti Alloy *Solution Treated and Aged*	Hardened Steel Prehardened Steel Stainless Steel Inconel Ni Based Alloy	Hardened Steel	Hardened Steel
Cutting Speed	198 m/mm	198 m/min	162 m/min	132 m/min	96 m/min	84 m/min	72 m/min
Depth of Cut	a_a=1.5D a_r=1.5D					a_a=1.5D a_r=1.5D	

Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	19,870	1,430	19,870	1,210	17,550	1,010	14,080	670	10,600	500	9,010	370	7,840	320
4	17,880	1,470	17,880	1,210	15,400	1,010	12,340	710	9,270	550	7,880	390	6,860	350
5	15,900	1,510	15,900	1,210	13,250	1,010	10,600	750	7,950	590	6,760	430	5,880	380
6	12,590	1,510	12,590	1,210	10,600	1,010	8,450	790	6,290	590	5,350	430	4,660	380
8	10,600	1,510	10,600	1,260	8,780	1,010	6,960	830	5,300	630	4,500	460	3,920	410
10	7,950	1,130	7,950	970	6,620	790	5,300	630	3,970	460	3,380	330	2,940	300
11	6,290	880	6,290	750	5,300	630	4,140	500	3,150	370	2,670	280	2,330	240
12	5,800	830	5,800	670	4,800	590	3,810	460	2,820	330	2,390	240	2,080	210
14	5,300	750	5,300	630	4,310	550	3,480	410	2,650	330	2,250	240	1,960	210
16	3,970	590	3,970	460	3,310	370	2,650	330	1,990	250	1,690	180	1,470	160
18	3,560	520	3,560	410	2,980	350	2,400	290	1,780	230	1,510	170	1,320	140
20	3,150	460	3,150	370	2,650	330	2,150	250	1,570	210	1,340	150	1,160	130
22	2,820	410	2,820	330	2,400	290	1,900	230	1,420	190	1,200	140	1,050	120
25	2,480	370	2,480	290	2,150	250	1,660	210	1,260	170	1,070	120	930	100

SERIES EM400, EM401

Slot Milling

Hardness	≤175 BHN		>175, ≤275 BHN		≤275 BHN		≤275 BHN		≤200 BHN		≤300 BHN		≤300 BHN	
Work Material	Steels								Cast Iron					
	Carbon Steel				Alloy Steel		Tool Steel		Gray		Ductile		Malleable	
Cutting Speed	92 m/mm		76 m/min		68 m/min		63 m/min		90 m/min		46 m/min		39 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/mi
3	9,750	235	7,950	155	7,100	140	6,680	130	9,540	270	4,880	95	4,130	80
4	7,320	235	5,960	155	5,330	140	5,010	130	7,160	270	3,660	95	3,100	80
5	5,850	235	4,770	155	4,260	140	4,010	130	5,730	270	2,930	95	2,480	80
6	4,880	235	3,980	155	3,550	140	3,340	130	4,770	270	2,440	95	2,070	80
8	3,660	190	2,980	145	2,660	130	2,500	120	3,580	260	1,830	90	1,550	75
10	2,930	165	2,390	135	2,130	120	2,000	115	2,860	250	1,460	85	1,240	70
12	2,440	245	1,990	200	1,780	180	1,670	165	2,390	365	1,220	120	1,030	105
14	2,090	235	1,700	190	1,520	170	1,430	160	2,040	350	1,050	120	890	100
16	1,830	230	1,490	190	1,330	170	1,250	160	1,790	340	910	115	780	100
18	1,630	225	1,330	185	1,180	165	1,110	155	1,590	330	810	115	690	95
20	1,460	220	1,190	180	1,070	165	1,000	150	1,430	325	730	110	620	95
25	1,170	360	950	290	850	260	800	245	1,150	525	590	180	500	155

Hardness	175 BHN		>175, ≤275 BHN		≤275 BHN		≤275 BHN		≤200 BHN		≤300BHN	
Work Material	Stainless Steel						Special Alloy				Aluminum	
	300 Series		400 Series		PH Steels		Titanium Alloys		Hi Temp Alloys		6061, 7075	
Cutting Speed	52 m/mm		79 m/min		46 m/min		35 m/min		13 m/min		251 m/min	
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min
3	5,510	105	8,380	165	4,880	95	3,710	90	1,380	25	26,610	1,275
4	4,130	105	6,280	165	3,660	95	2,780	90	1,030	25	19,960	1,275
5	3,310	110	5,030	165	2,930	95	2,230	90	830	25	15,970	1,280
6	2,760	110	4,190	165	2,440	95	1,860	90	690	25	13,310	1,280
8	2,070	100	3,140	150	1,830	90	1,390	85	520	25	9,980	1,200
10	1,650	95	2,510	145	1,460	85	1,110	80	410	25	7,980	1,150
12	1,380	140	2,090	210	1,220	120	930	120	340	35	6,650	1,700
14	1,180	135	1,790	200	1,050	120	800	115	300	35	5,700	1,635
16	1,030	130	1,570	200	910	115	700	110	260	35	4,990	1,585
18	920	130	1,400	195	810	115	620	110	230	30	4,440	1,550
20	830	125	1,260	190	730	110	560	110	210	30	3,990	1,515
25	660	200	1,010	310	590	180	450	175	170	50	3,190	2,430

QUALITY TECH TOOL

SERIES EM402, EM403, EM462, EM482

Slot Milling

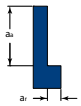
Hardness					Up to 30 HRC		30 to 40 HRC		40 to 45 HRC	
Work Material	Aluminum		Cast Iron		Mid Carbon Steel Mild Steel		Prehardened Steel Die & Alloy Steel		Prehardened Steel Die & Alloy Steel		Hardened Steel	
Cutting Speed	100 m/min		30-45 m/min		30-40 m/min		20-30 m/min		20-25 m/min		15 m/min	
Depth of Cut												
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
0.3	110,000	207	34,650	110	33,000	39	24,640	20	23,320	14	17,600	8
0.5	68,200	230	24,640	138	20,900	44	14,300	22	13,200	17	10,450	9
0.8	44,000	230	17,600	138	15,400	69	8,800	28	8,800	17	6,600	9
1.0	34,650	230	15,400	154	13,750	83	8,250	33	7,700	17	5,280	9
1.5	23,320	230	10,450	154	9,350	99	7,150	39	5,500	22	3,520	12
2.0	17,600	345	7,810	165	6,930	110	5,500	66	4,400	33	2,640	18
3.0	12,320	345	5,230	176	4,680	110	3,520	88	2,860	33	1,760	18
4.0	8,800	345	3,910	176	3,470	110	2,640	88	2,200	33	1,320	18
5.0	6,930	345	3,080	176	2,750	110	2,200	88	1,760	33	1,050	18
6.0	5,830	345	2,600	220	2,330	110	1,760	88	1,430	33	880	18
8.0	4,400	345	1,980	260	1,760	110	1,320	88	1,100	33	660	18
10	3,470	345	1,540	260	1,380	110	1,100	88	880	33	530	18
12	2,920	345	1,300	260	1,170	110	900	88	770	33	440	18
16	2,200	345	990	260	880	110	700	94	550	41	330	13
20	1,760	345	780	260	690	110	550	94	440	41	260	11
25	1,380	345	620	260	550	110	440	94	350	41	210	9

	a_a
D<0.7	0.25D
0.8<D<2	0.5D
2.5<D	1D

QUALITY TECH TOOL

SERIES EM402, EM403, EM462, EM482

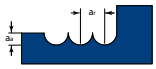
Side Milling

Hardness					Up to 30 HRC		30 to 40 HRC		40 to 45 HRC	
Work Material	Aluminum		Cast Iron		Mid Carbon Steel Mild Steel		Prehardened Steel Die & Alloy Steel		Prehardened Steel Die & Alloy Steel		Hardened Steel	
Cutting Speed	100 m/min		30-45 m/min		30-40 m/min		20-30 m/min		20-25 m/min		15 m/min	
Depth of Cut	a_a=1.5D a_r=0.1D 											
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
0.3	110,000	207	34,650	110	33,000	55	27,500	33	27,500	17	17,600	9
0.5	68,200	208	24,640	138	24,200	66	17,600	39	17,600	20	10,450	11
0.8	44,000	209	17,600	138	15,400	66	11,000	39	11,000	20	6,600	11
1	34,650	210	15,400	193	12,100	94	8,800	66	8,800	39	5,280	15
1.5	23,320	211	10,450	193	8,250	94	5,830	66	5,940	39	3,520	15
2	17,600	212	7,810	275	6,050	94	4,400	66	4,400	39	2,640	15
3	13,750	213	5,230	330	4,950	165	3,910	132	3,470	50	1,760	28
4	10,450	214	3,910	330	3,910	193	2,920	132	2,600	50	1,320	28
5	8,250	215	3,080	330	3,080	220	2,330	138	2,090	50	1,050	28
6	6,930	216	2,600	330	2,600	220	1,870	138	1,760	50	880	28
8	5,230	217	1,980	330	1,980	220	1,450	138	1,300	50	660	28
10	4,130	218	1,540	347	1,540	248	1,170	138	1,050	50	530	28
12	3,470	219	1,300	347	1,300	248	940	138	880	50	440	28
16	2,600	220	990	413	990	275	740	154	660	50	330	28
20	2,090	221	780	413	780	275	580	165	520	50	260	28
25	1,650	222	620	413	620	275	470	154	410	39	210	22

QUALITY TECH TOOL

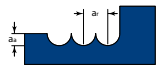
SERIES EM402BN, EM403BN, EM462BN, EM482BN

Profile Milling

Hardness							Up to 30 HRC		30 to 40 HRC		40 to 45 HRC	
Work Material	Aluminum		Cast Iron		Mid Carbon Steel Mild Steel		Prehardened Steel Die & Alloy Steel		Prehardened Steel Die & Alloy Steel		Hardened Steel	
Cutting Speed	100 m/min		30-45 m/min		30-40 m/min		20-30 m/min		20-25 m/min		15 m/min	
Depth of Cut					a_a=0.3D a_r=0.7D							
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
1	32,000	190	11,000	90	11,000	80	8,000	45	6,400	24	8,000	45
2	16,000	190	5,600	90	5,600	80	4,000	45	3,200	24	4,000	45
3	10,000	190	3,700	100	3,700	90	2,600	50	2,100	30	2,600	55
4	8,000	190	2,800	100	2,800	90	2,000	50	1,600	30	2,000	55
5	6,400	190	2,200	100	2,200	90	1,600	50	1,300	30	1,600	55
6	5,300	190	1,900	100	1,900	90	1,320	50	1,000	30	1,320	55
8	4,000	220	1,400	100	1,400	90	1,000	50	800	30	1,000	55
10	3,200	220	1,100	100	1,100	90	800	50	640	30	800	55
12	2,600	220	930	100	930	90	660	50	530	30	660	55
16	2,000	220	700	100	700	90	500	50	400	30	500	55
20	1,600	220	560	100	560	90	400	50	320	30	400	55
25	1,200	220	450	100	450	90	320	50	250	30	320	55

SERIES EM404BN, EM464BN, EM484BN

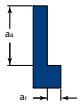
Profile Milling

Hardness							Up to 30 HRC		30 to 40 HRC		40 to 45 HRC	
Work Material	Aluminum		Cast Iron		Mid Carbon Steel Mild Steel		Prehardened Steel Die & Alloy Steel		Prehardened Steel Die & Alloy Steel		Hardened Steel	
Cutting Speed	100 m/min		30-45 m/min		30-40 m/min		20-30 m/min		20-25 m/min		15 m/min	
Depth of Cut					a_a=0.3D a_r=0.7D							
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
1	35,200	209	12,100	99	12,100	88	8,800	50	7,040	26	8,800	50
2	17,600	209	6,160	99	6,160	88	4,400	50	3,520	26	4,400	50
3	11,000	209	4,070	110	4,070	99	2,860	55	2,310	33	2,860	61
4	8,800	209	3,080	110	3,080	99	2,200	55	1,760	33	2,200	61
5	7,040	209	2,420	110	2,420	99	1,760	55	1,430	33	1,760	61
6	5,830	209	2,090	110	2,090	99	1,450	55	1,100	33	1,450	61
8	4,400	242	1,540	110	1,540	99	1,100	55	880	33	1,100	61
10	3,520	242	1,210	110	1,210	99	880	55	700	33	880	61
12	2,860	242	1,020	110	1,020	99	730	55	580	33	730	61
16	2,200	242	770	110	770	99	550	55	440	33	550	61
20	1,760	242	620	110	620	99	440	55	350	33	440	61
25	1,320	242	500	110	500	99	350	55	280	33	350	61

QUALITY TECH TOOL

SERIES EM404, EM461, EM464, EM484

Side Milling

Hardness							Up to 30 HRC		30 to 40 HRC		40 to 45 HRC	
Work Material	Aluminum		Cast Iron		Mid Carbon Steel Mild Steel		Prehardened Steel Die & Alloy Steel		Prehardened Steel Die & Alloy Steel		Hardened Steel	
Cutting Speed	100 m/min		30-45 m/min		30-40 m/min		20-30 m/min		20-25 m/min		15 m/min	
Depth of Cut	a_a=1.5D a_r=0.1D 											
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
0.8	44,000	693	17,600	193	15,400	94	11,000	55	11,000	28	6,600	15
1	34,650	693	15,400	270	12,100	132	8,800	94	8,800	55	5,280	22
1.5	23,320	693	10,450	270	8,250	132	5,830	94	5,940	55	3,520	22
2	17,600	693	7,810	385	6,050	132	4,400	94	4,400	55	2,640	22
3	13,750	693	5,230	462	4,950	231	3,910	187	3,470	69	1,760	39
4	10,450	732	3,910	462	3,910	270	2,920	187	2,600	69	1,320	39
5	8,250	732	3,080	462	3,080	308	2,330	187	2,090	69	1,050	39
6	6,930	732	2,600	462	2,600	308	1,870	187	1,760	69	880	39
8	5,230	770	1,980	462	1,980	308	1,450	187	1,300	69	660	39
10	4,130	770	1,540	484	1,540	341	1,170	187	1,050	69	530	39
12	3,470	858	1,300	484	1,300	341	940	187	880	69	440	39
16	2,600	858	990	578	990	385	740	220	660	69	330	39
20	2,090	858	780	578	780	385	580	231	520	69	260	39
25	1,650	770	620	578	620	385	470	220	410	55	210	31

SERIES EM404, EM461, EM464, EM484

Slot Milling

Hardness					Up to 30 HRC		30 to 40 HRC		40 to 45 HRC	
Work Material	Aluminum		Cast Iron		Mid Carbon Steel Mild Steel		Prehardened Steel Die & Alloy Steel		Prehardened Steel Die & Alloy Steel		Hardened Steel	
Cutting Speed	100 m/min		30-45 m/min		30-40 m/min		20-30 m/min		20-25 m/min		15 m/min	
Depth of Cut					aa D<1/32: 0.2D 1/32≤D≤5/64: 0.3D 5/64<D: 0.5D							
Mill Diameter	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/min	RPM	Feed mm/rev	RPM	Feed mm/min	RPM	Feed mm/min
0.8	44,000	308	17,600	193	15,400	97	8,800	39	8,800	22	6,600	11
1	34,650	308	15,400	220	13,750	116	8,250	46	7,700	22	5,280	11
1.5	23,320	308	10,450	220	9,350	138	7,150	55	5,500	31	3,520	17
2	17,600	462	7,810	231	6,930	154	5,500	94	4,400	46	2,640	24
3	12,320	462	5,230	248	4,680	154	3,520	121	2,860	46	1,760	24
4	8,800	462	3,910	248	3,470	154	2,640	121	2,200	46	1,320	24
5	6,930	462	3,080	248	2,750	154	2,200	121	1,760	46	1,050	24
6	5,830	462	2,600	308	2,330	154	1,760	121	1,430	46	880	24
8	4,400	462	1,980	363	1,760	154	1,320	121	1,100	46	660	24
10	3,470	462	1,540	363	1,380	154	1,100	121	880	46	530	24
12	2,920	462	1,300	363	1,170	154	900	121	770	46	440	24
16	2,200	462	990	363	880	154	700	132	550	55	330	19
20	1,760	462	780	363	690	154	550	132	440	55	260	15
25	1,380	462	620	363	550	154	440	132	350	55	210	12

SERIES EM440

Side Milling

Cutting Type	Side Milling		Slot Milling	
Work Material	Aluminum		Aluminum	
Cutting Speed	185 m/min		185 m/min	
Mill Diameter	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min
3	25,806	884	25,806	442
4	18,768	1,173	18,768	587
5	15,249	1,462	15,249	731
6	11,730	1,760	11,730	884
7	9,384	1,879	9,384	935
8	9,384	2,346	9,384	1,173
10	9,384	2,933	9,384	1,462
11	7,038	2,465	7,038	1,233
12	4,692	1,879	4,692	935
14	4,692	1,879	4,692	935

SERIES EM460

Side Milling

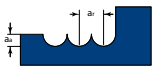
Hardness					Up to 35 HRC		35 to 45 HRC		45 to 55 HRC	
Work Material	Aluminum		Mid Carbon Steel Steels Mild Steel		Prehardened Steel Stainless Steel Die and Alloy Steel		Prehardened Steel Stainless Steel Die and Alloy Steel		Hardened Steel	
Cutting Speed	132 m/min		46 m/min		32 m/min		16 m/min		16 m/min	
Mill Diameter	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/min
3	15,955	315	5,627	153	3,757	102	2,584	43	1,879	17
4	12,198	434	4,225	213	2,814	145	1,879	60	1,411	26
5	9,733	519	3,400	255	2,346	179	1,522	94	1,173	26
6	8,092	646	2,814	315	1,879	196	1,241	85	935	34
8	6,103	646	2,108	315	1,411	196	935	85	706	34
10	4,930	706	1,641	400	1,114	196	748	85	561	34
12	4,106	706	1,411	425	935	213	621	85	468	34
16	3,052	706	1,054	468	706	213	468	85	349	34
20	2,465	706	842	485	561	238	374	85	281	34
25	1,998	706	680	408	442	213	298	85	221	34

SERIES EM497

Profile Milling

Hardness					Up to 30 HRC		30 to 40 HRC		40 to 50 HRC	
Work Material	Cast Iron		Mid Carbon Steel Mild Steel		Prehardened Steel Stainless Steel Die and Alloy Steel		Prehardened Steel Stainless Steel Die and Alloy Steel		Hardened Steel	
Cutting Speed	120 m/min		120 m/min		100 m/min		80 m/min		61 m/min	
Depth of Cut										
Mill Diameter	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/min	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/min
3	12,000	865	12,000	735	10,600	610	8,500	405	6,400	305
5	9,600	915	9,600	735	8,000	610	6,400	455	4,800	355
6	7,600	915	7,600	735	6,400	610	5,100	485	3,800	355
8	6,400	915	6,400	760	5,300	610	4,200	510	3,200	380
10	4,800	685	4,800	585	4,000	485	3,200	380	2,400	280
11	3,800	535	3,800	455	3,200	380	2,500	305	1,900	230
12	3,500	510	3,500	405	2,900	355	2,300	280	1,700	205
14	3,200	455	3,200	380	2,600	330	2,100	255	1,600	205
16	2,400	355	2,400	280	2,000	230	1,600	205	1,200	150
18	1,900	280	1,900	230	1,600	205	1,300	150	950	125
25	1,500	230	1,500	180	1,300	150	1,000	125	760	100

	aa	ar
D≤5/8	0.05D	0.1D
5/8<D	0.03D	0.1D



AIRCRAFT MATERIALS

Drill Depth

Work Material	Graphite Composite		Epoxy Fiber		Acrylic Plastics		Graphite Composite Titanium Stack	
Speed (m/MIN)	64 M/min		64 M/min		49 M/min		5 M/min	
Drill Diameter mm	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev	Speed RPM	Feed mm/rev
2.5	8,550	.038	8,550	.038	6,510	.038	650	.025
3	6,410	.051	6,410	.051	4,890	.051	490	.025
4	4,270	.076	4,270	.076	3,260	.076	330	.051
6	3,210	.102	3,210	.102	2,440	.102	240	.051
8	2,560	.114	2,560	.114	1,950	.114	200	.076
10	2,140	.127	2,140	.127	1,630	.127	160	.102
12	1,600	.152	1,600	.152	1,220	.152	120	.102

The chart below is for materials typically used in aircraft structures. Speeds may be less than optimal because of limitations in the portable machine tools utilized.

Hole Depth Diameter	Reduce Spindle Speed	Reduce Infeed Rate
3 x Dia.	10%	10%
4 x Dia.	20%	10%
5 x Dia.	30%	20%
6 x Dia.	35%	20%
8 x Dia.	40%	20%

When drilling deep holes, the recommended speeds and feeds should be reduced proportionately based on the hole depth. To the right are guidelines for reducing the speeds and feeds.

FORMULAS

Metric
RPM = (SMM x 318.06)/Tool Diameter
mm/min = RPM x mm/rev

Inch
RPM = (SPM x 3.82)/Tool Diameter
IPM = RPM x IPR

Conversions Metric to Inch
SMM to SFM = SMM/.3048
mm/min to IPM = (mm/min)/25.4

Conversions Inch to Metric
SFM to SMM = SFM x .3048
IPM to mm/min = IPM x 25.4