

procarb

CUTTING TOOLS

prosolid



The complete Range of SOLID TOOLS



Prosoild Standard Series

High Performance products with high flexibility, high economy and complete specifications.

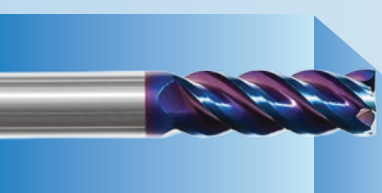
Prosoild Special End Mill Series

A unique quality tool that meets specific needs and has high efficiency, reliability and durability.

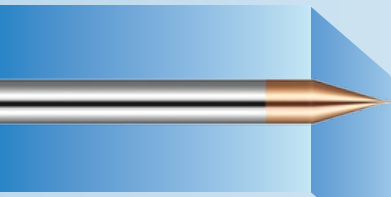
Prosoild Tailor Made Solution

Specially designed to meet high performance requirements of custom products and advanced non-standard products.

Index

	P4050 Series Suitable for Alloy steel, P20, Cast Iron material processing series	01-08
	P5055 Series Suitable for Hardened steels universal processing series	10-17
	P5065 Series Suitable for Hardened steel, Stainless steel , high-efficiency processing series	19-24
	UHE Series Suitable for Stainless steel and heat- treated steel material high-speed and efficiency processing	26-28
	SM604 Series Suitable for hardened steel and stainless steel and super alloys work materials high speed and efficiency processing	30-33
	STU Series The Special tool design with variable helix suitable for processing stainless steel and titanium alloys and heat treated steels	35-36
	ALU Series Super Polished aluminum and Copper processing series	38-45

Index



PMD Series

Suitable for high precision micro end mills and rib type end mills for alloys steels and hardened steel

47-52



PR55 Series

Universal series for P, M, K work materials processing rough milling operations

54



PCT Series

General purpose Wide range of Chamfering operations suitable for P, M, K work materials

55



CD50 Series

General purpose for wide range of center drilling operations suitable for P, M, K work materials

56



CRE Series

General purpose for wide range of Corner rounding operations suitable for P, M, K work materials

57



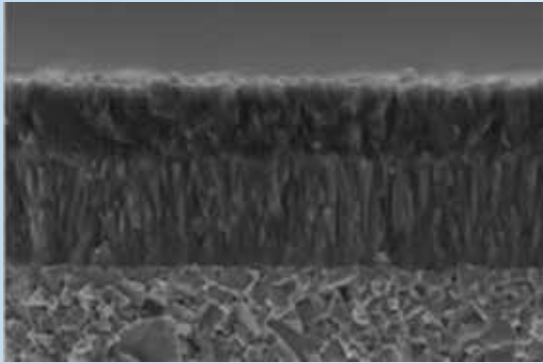
DT5 Series

Special series for back chamfering, corner rounding operations suitable for P, M, K work materials

58

SOLID END MILLS

ABOUT COATING



Smooth Surface Finile

Unquie coating Treatment Technology

Ultrafine Substrates

Improved Wear Resistance



DLC COATING

Hardness similar to that of CVD diamond coating with high adhesion strength

ALTIN +TISIN COATING

The coating has good high temperature resistance and low friction coefficient .it is suitable for coating on high-speed steel or carbide deill bits and is suitable for deep hole drilling and milling

TIALSIN COATING

The coating has good performance in drilling and milling cast iron or ordinary steel , reducing the phenomenon of sticking of sticking . Suitable for coating on HSS or carbide drills, also suitable for deep hole drilling and milling

ALTIN COATING

The coating can exert excellent performance on difficult-to-machine materials such as cutting hardness between 45HRC especially suitable for high-speed cutting

Guide Line To ICONS

Carbide

Perfect
MG

Micro grain

Ultra
UMG

Ultramicro grain

Corner R



Corner Radius

Grain Size

0.2
µm

Grain size is 0.2 µm

0.4
µm

Grain size is 0.4 µm

0.6
µm

Grain size is 0.6 µm

Flute



2 Flutes



2 Flutes



3 Flutes



4 Flutes



4 Flutes



5 Flutes



6 Flutes

Coating

AlCrN

AlCrSiN

TiAlN

AlTiN
nano

AlCrN/
TiSiN

AlTiN/
TiSiN

TiAlCrSiN

TiAlSiN

Workpiece

P

M

K

N

S

H

Helix

28°

Helix

30°

Helix

35°

Helix

38°

Helix

40°

Helix

15°/40°

Helix

35°/38°

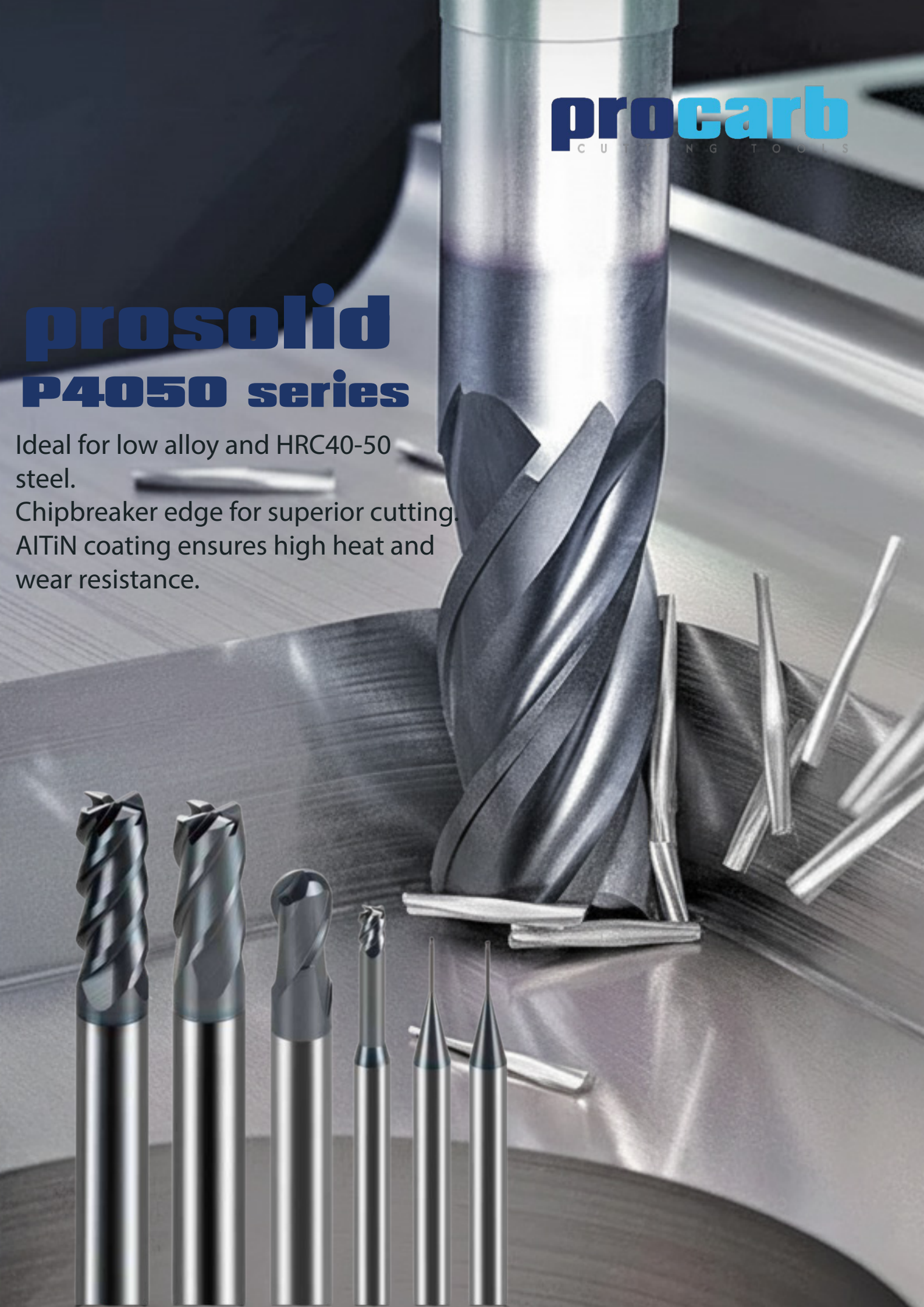
Helix

38°/40°

Helix

47°/45°/43°

Helix



procarb
CUTTING TOOLS

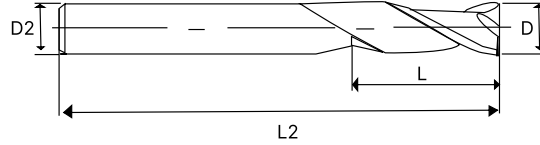
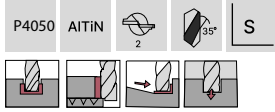
prosolid

P4050 series

Ideal for low alloy and HRC40-50 steel.

Chipbreaker edge for superior cutting.
AlTiN coating ensures high heat and wear resistance.

Carbide 2 Flutes Square End Mill (Standard)

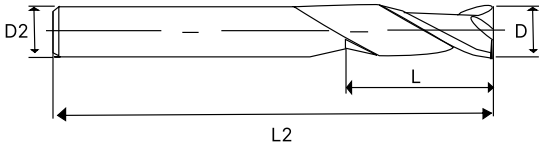
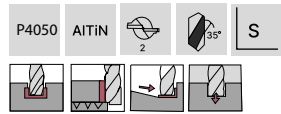


Unit	(mm)	
D	D < 12	D > 12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
P40502E-0100	1	3	4	50
P40502E-0150	1.5	5	4	50
P40502E-0200	2	6	4	50
P40502E-0250	2.5	8	4	50
P40502E-0300S3	3	9	3	50
P40502E-0300	3	9	4	50
P40502E-0350	3.5	11	4	50
P40502E-0400	4	10	4	50
P40502E-0500S5	5	13	5	50
P40502E-0500	5	13	6	50
P40502E-0600	6	15	6	50
P40502E-0700	7	20	8	60
P40502E-0800	8	20	8	60
P40502E-0900	9	25	10	75
P40502E-1000	10	25	10	75
P40502E-1100	11	25	12	75
P40502E-1200	12	30	12	75
P40502E-1400	14	45	14	100
P40502E-1500	15	45	16	100
P40502E-1600	16	45	16	100
P40502E-1800	18	45	18	100
P40502E-2000	20	45	20	100

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) / Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-

Carbide 2 Flutes Square End Mill (Extra Long)

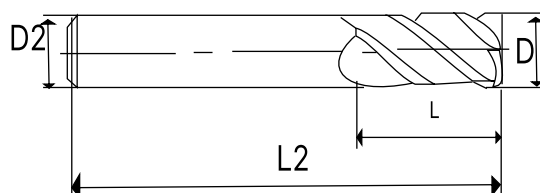


Unit	(mm)	
D	D< 12	D>12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm
P40502E-0301275	3	12	3	75
P40502E-0401575	4	15	4	75
P40502E-0501875	5	18	5	75
P40502E-0602575	6	25	6	75
P40502E-0802575	8	25	8	75
P40502E-03012100	3	12	3	100
P40502E-04020100	4	20	4	100
P40502E-05030100	5	30	5	100
P40502E-06030100	6	30	6	100
P40502E-08035100	8	35	8	100
P40502E-10040100	10	40	10	100
P40502E-12045100	12	45	12	100
P40502E-06045150	6	45	6	150
P40502E-08050150	8	50	8	150
P40502E-10055150	10	55	10	150
P40502E-12055150	12	55	12	150
P40502E-14060150	14	60	14	150
P40502E-16070150	16	70	16	150
P40502E-18070150	18	70	18	150
P40502E-20070150	20	70	20	150

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 4Flutes Square End Mill (Standard)

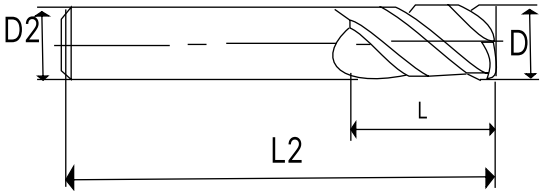
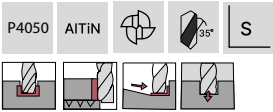


Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
P40504E-0100	1	3	4	50
P40504E-0150	1.5	5	4	50
P40504E-0200	2	6	4	50
P40504E-0250	2.5	8	4	50
P40504E-0300S3	3	9	3	50
P40504E-0300	3	9	4	50
P40504E-0350	3.5	11	4	50
P40504E-0400	4	12	4	50
P40504E-0500S5	5	13	5	50
P40504E-0500	5	13	6	50
P40504E-0600	6	15	6	50
P40504E-0700	7	20	8	50
P40504E-0800	8	20	8	60
P40504E-0900	9	25	10	60
P40504E-1000	10	25	10	75
P40504E-100030	10	30	10	75
P40504E-1100	11	30	12	75
P40504E-1200	12	30	12	75
P40504E-120035	12	35	12	75
P40504E-1300	13	45	14	75
P40504E-1400	14	45	14	100
P40504E-1500	15	45	16	100
P40504E-1600	16	45	16	100
P40504E-1800	18	45	18	100
P40504E-2000	20	45	20	100

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed (mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 4Flutes Square End Mill (Extra Long)

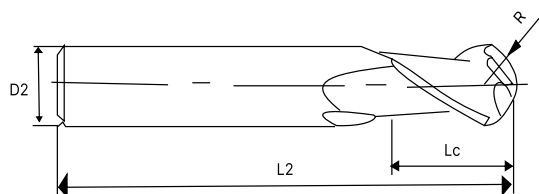
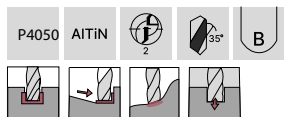


Unit	(mm)	
D	D≤ 12	D>12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm
P40504E-0301275	3	12	3	75
P40504E-0351175	3.5	11	4	75
P40504E-0401675	4	16	4	75
P40504E-0501875	5	18	5	75
P40504E-0602475	6	24	6	75
P40504E-0802575	8	25	8	75
P40504E-03012100	3	12	3	100
P40504E-04020100	4	20	4	100
P40504E-05030100	5	30	5	100
P40504E-06030100	6	30	6	100
P40504E-08035100	8	35	8	100
P40504E-10040100	10	40	10	100
P40504E-10050100	10	50	10	100
P40504E-12045100	12	45	12	100
P40504E-12050100	12	50	12	100
P40504E-06045150	6	45	6	150
P40504E-08050150	8	50	8	150
P40504E-10055150	10	55	10	150
P40504E-12055150	12	55	12	150
P40504E-14070150	14	70	14	150
P40504E-16080150	16	80	16	150
P40504E-18080150	18	80	18	150
P40504E-20080150	20	80	20	150
P40504E-06050200	6	50	6	200
P40504E-08060200	8	60	8	200
P40504E-10065200	10	65	10	200
P40504E-12070200	12	70	12	200
P40504E-14080200	14	80	14	200
P40504E-16085200	16	85	16	200
P40504E-20090200	20	90	20	200

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 2 Flutes Ball Nose End Mill (Standard)

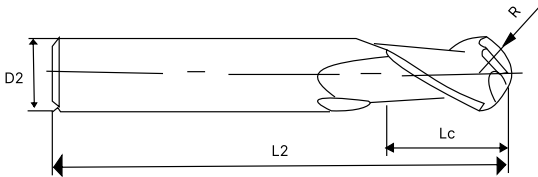
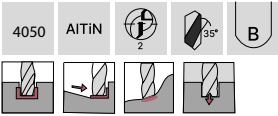


Unit	(mm)		
R	R ≤ 1.5	1.5 < R < 3	R ≥ 3
Tol	0	0	0
	-0.015	-0.015	-0.02

Ordering Code	Cutting Length L	Radius R	Shank D2	Overall Length L2
	mm	mm	mm	mm
P40502B-0100	2	0.5	4	50
P40502B-0150	3	0.75	4	50
P40502B-0200	4	1	4	50
P40502B-0250	5	1.25	4	50
P40502B-0300S3	6	1.5	3	50
P40502B-0300	6	1.5	4	50
P40502B-0350	7	1.75	4	50
P40502B-0400	8	2	4	50
P40502B-0500S5	10	2.5	5	50
P40502B-0500	10	2.5	6	50
P40502B-0600	12	3	6	50
P40502B-0700	14	3.5	8	60
P40502B-0800	16	4	8	60
P40502B-1000	20	5	10	75
P40502B-1200	24	6	12	75
P40502B-1400	28	7	14	100
P40502B-1600	32	8	16	100
P40502B-1800	36	9	18	100
P40502B-2000	40	10	20	100

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed (mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 2 Flutes Ball Nose End Mill (Extra Long)

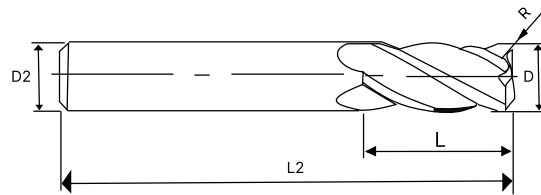
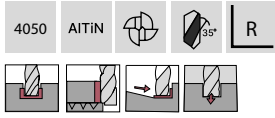


Unit	(mm)		
R	R ≤ 1.5	1.5 < R < 3	R ≥ 3
Tol	0	0	0
	-0.015	-0.015	-0.02

Ordering Code	Radius R	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm
P40502B-0300675	1.5	6	3	75
P40502B-0400875	2	8	4	75
P40502B-0501075	2.5	10	5	75
P40502B-0601275	3	12	6	75
P40502B-0801675	4	16	8	75
P40502B-03006100	1.5	6	3	100
P40502B-04004100	2	4	4	100
P40502B-05010100	2.5	10	5	100
P40502B-06012100	3	12	6	100
P40502B-08016100	4	16	8	100
P40502B-100020100	5	20	10	100
P40502B-120024100	6	24	12	100
P40502B-060012150	3	12	6	150
P40502B-080016150	4	16	8	150
P40502B-100020150	5	20	10	150
P40502B-120024150	6	24	12	150
P40502B-140028150	7	28	14	150
P40502B-160032150	8	32	16	150
P40502B-180036150	9	36	18	150
P40502B-200040150	10	40	20	150
P40502B-060012200	3	12	6	200
P40502B-080016200	4	16	8	200
P40502B-100020200	5	20	10	200
P40502B-120024200	6	24	12	200
P40502B-160032200	8	32	16	200

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 4 Flutes Corner Radius End Mill (Standard)

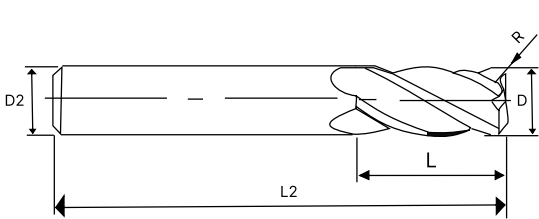
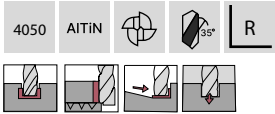


Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D mm	Radius R mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
P40504R-010002	1	0.2	3	4	50
P40504R-015002	1.5	0.2	5	4	50
P40504R-020002	2	0.2	6	4	50
P40504R-020005	2	0.5	6	4	50
P40504R-025002	2.5	0.2	8	4	50
P40504R-025005	2.5	0.5	8	4	50
P40504R-030002S3	3	0.2	8	3	50
P40504R-030002	3	0.2	9	4	50
P40504R-030005S3	3	0.5	8	3	50
P40504R-030005	3	0.5	9	4	50
P40504R-035005	3.5	0.5	11	4	50
P40504R-040002	4	0.2	10	4	50
P40504R-040005	4	0.5	10	4	50
P40504R-050005S5	5	0.5	13	5	50
P40504R-050005	5	0.5	13	6	50
P40504R-050010S5	5	1	13	5	50
P40504R-050010	5	1	13	6	50
P40504R-060002	6	0.2	15	6	50
P40504R-060003	6	0.3	15	6	50
P40504R-060005	6	0.5	15	6	50
P40504R-060010	6	1	15	6	50
P40504R-080005	8	0.5	20	8	60
P40504R-080010	8	1	20	8	60
P40504R-080020	8	2	20	8	60
P40504R-100005	10	0.5	25	10	75
P40504R-100010	10	1	25	10	75
P40504R-100020	10	2	25	10	75
P40504R-100030	10	3	25	10	75
P40504R-120005	12	0.5	30	12	75
P40504R-120010	12	1	30	12	75
P40504R-120020	12	2	30	12	75
P40504R-120030	12	3	30	12	75

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 4 Flutes Corner Radius End Mill (Extra Long)



Unit	(mm)	
D	D< 12	D>12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm	mm
P40504R-030051275	3	0.5	12	3	75
P40504R-040051575	4	0.5	15	4	75
P40504R-050052575	5	0.5	25	5	75
P40504R-060052575	6	0.5	25	6	75
P40504R-080052575	8	0.5	25	8	75
P40504R-0400520100	4	0.5	20	4	100
P40504R-0401020100	4	1	20	4	100
P40504R-0500530100	5	0.5	30	5	100
P40504R-0501030100	5	1	30	5	100
P40504R-0600530100	6	0.5	30	6	100
P40504R-0601030100	6	1	30	6	100
P40504R-0800535100	8	0.5	35	8	100
P40504R-0801035100	8	1	35	8	100
P40504R-1000540100	10	0.5	40	10	100
P40504R-1001040100	10	1	40	10	100
P40504R-1200545100	12	0.5	45	12	100
P40504R-1200145100	12	1	45	12	100
P40504R-0800550150	8	0.5	50	8	150
P40504R-0801050150	8	1	50	8	150
P40504R-1000555150	10	0.5	55	10	150
P40504R-1001055150	10	1	55	10	150
P40504R-1200506150	12	0.5	60	12	150
P40504R-1201060150	12	1	60	12	150

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) /Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-



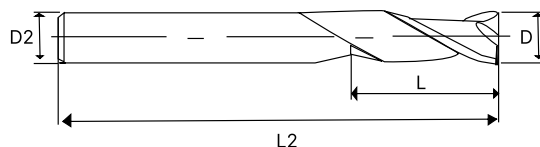
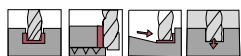
procarb
CUTTING TOOLS

prosolid P5055 Series

- Ideal for hardened steel, stainless steel and cast iron machining.
- TiSiN coating ensures high heat and wear resistance.
- Ultra-fine carbide for superior performance.



Carbide 2 Flutes Square End Mill (Standard)

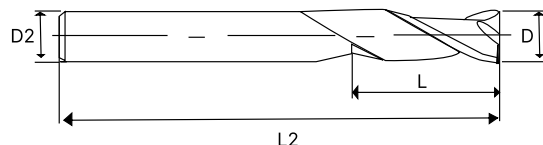
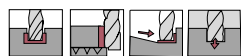


Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
P50552E-0100	1	3	4	50
P50552E-0150	1.5	5	4	50
P50552E-0200	2	6	4	50
P50552E-0250	2.5	8	4	50
P50552E-0300S3	3	9	3	50
P50552E-0300	3	9	4	50
P50552E-0350	3.5	11	4	50
P50552E-0400	4	12	4	50
P50552E-0500S5	5	13	5	50
P50552E-0500	5	13	6	50
P50552E-0600	6	15	6	50
P50552E-0700	7	20	8	60
P50552E-0800	8	20	8	60
P50552E-0900	9	25	10	75
P50552E-1000	10	25	10	75
P50552E-1100	11	25	12	75
P50552E-1200	12	30	12	75
P50552E-1400	14	45	14	100
P50552E-1500	15	45	16	100
P50552E-1600	16	45	16	100
P50552E-1800	18	45	18	100
P50552E-2000	20	45	20	100

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed (mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
			0.10 - 0.20-0.30	0.10 - 0.20-0.30	0.10 - 0.20-0.30	0.10 - 0.20-0.30	0.10 - 0.20-0.30	0.10 - 0.20-0.30	0.10 - 0.20-0.30	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 2 Flutes Square End Mill (Extra Long)

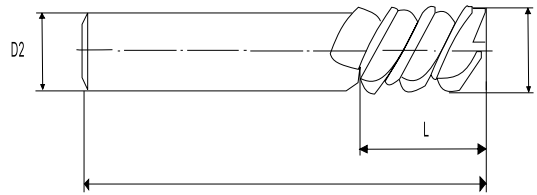
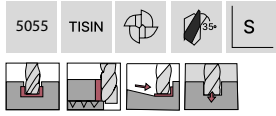


Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
P50552E-0301275	3	12	3	75
P50552E-0401675	4	16	4	75
P50552E-0501875	5	18	5	75
P50552E-0602475	6	24	6	75
P50552E-0802575	8	25	8	75
P50552E-03012100	3	12	3	100
P50552E-04020100	4	20	4	100
P50552E-05030100	5	30	5	100
P50552E-06030100	6	30	6	100
P50552E-08035100	8	35	8	100
P50552E-10040100	10	40	10	100
P50552E-12045100	12	45	12	100
P50552E-06045150	6	45	6	150
P50552E-08050150	8	50	8	150
P50552E-10055150	10	55	10	150
P50552E-12055150	12	55	12	150
P50552E-14070150	14	70	14	150
P50552E-16080150	16	80	16	150
P50552E-18080150	18	80	18	150
P50552E-20080150	20	80	20	150

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
			0.10 - 0.20-0.30	0.10 - 0.20-0.30	0.10 - 0.20-0.30	0.10 - 0.20-0.30	0.10 - 0.20-0.30	0.10 - 0.20-0.30	0.10 - 0.20-0.30	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
P	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
P	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
M	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
K	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
S	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 4Flutes Square End Mill (Standard)

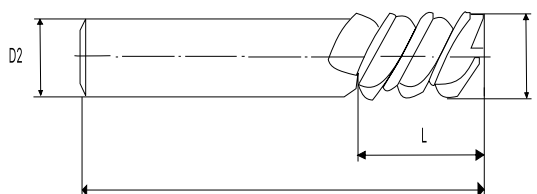
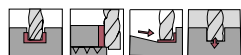


Unit	(mm)	
D	D < 12	D > 12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
P50554E-0100	1	3	4	50
P50554E-0150	1.5	5	4	50
P50554E-0200	2	6	4	50
P50554E-0250	2.5	8	4	50
P50554E-0300S3	3	9	3	50
P50554E-0300	3	9	4	50
P50554E-0350	3.5	11	4	50
P50554E-0400	4	12	4	50
P50554E-0500S5	5	13	5	50
P50554E-0500	5	13	6	50
P50554E-0600	6	15	6	50
P50554E-0700	7	20	8	60
P50554E-0800	8	20	8	60
P50554E-0900	9	25	10	75
P50554E-1000	10	25	10	75
P50554E-100030	10	30	10	75
P50554E-1100	11	30	12	75
P50554E-1200	12	30	12	75
P50554E-120035	12	35	12	75
P50554E-1300	13	45	14	100
P50554E-1400	14	45	14	100
P50554E-1500	15	45	16	100
P50554E-1600	16	45	16	100
P50554E-1800	18	45	18	100
P50554E-2000	20	45	20	100

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 4Flutes Square End Mill (Extra Long)

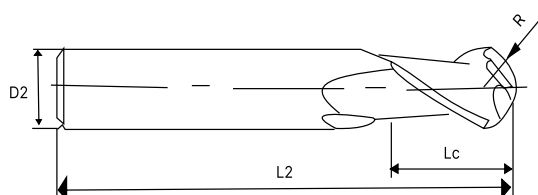
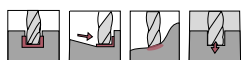


Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm
P50554E-0301275	3	12	3	75
P50554E-0351175	3.5	11	4	75
P50554E-0401675	4	16	4	75
P50554E-0501875	5	18	5	75
P50554E-0602475	6	24	6	75
P50554E-0802575	8	25	8	75
P50554E-03012100	3	12	3	100
P50554E-04020100	4	20	4	100
P50554E-05030100	5	30	5	100
P50554E-06030100	6	30	6	100
P50554E-08035100	8	35	8	100
P50554E-10040100	10	40	10	100
P50554E-10050100	10	50	10	100
P50554E-12045100	12	45	12	100
P50554E-12050100	12	50	12	100
P50554E-06045150	6	45	6	150
P50554E-08050150	8	50	8	150
P50554E-10055150	10	55	10	150
P50554E-12055150	12	55	12	150
P50554E-14070150	14	70	14	150
P50554E-16080150	16	80	16	150
P50554E-18080150	18	80	18	150
P50554E-20080150	20	80	20	150
P50554E-06050200	6	50	6	200
P50554E-08060200	8	60	8	200
P50554E-10065200	10	65	10	200
P50554E-12070200	12	70	12	200
P50554E-14080200	14	80	14	200
P50554E-16085200	16	85	16	200
P50554E-20090200	20	90	20	200

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 2 Flutes Ball Nose End Mill (Standard)

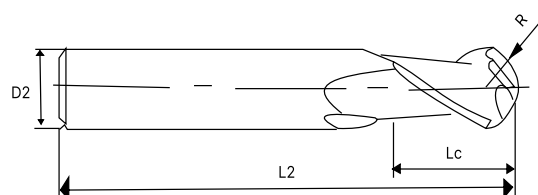
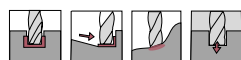


Unit	(mm)		
R	R ≤ 1.5	1.5 < R < 3	R ≥ 3
Tol	0	0	0
	-0.015	-0.015	-0.02

Ordering Code	Radius R	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm
P50552B-0100	0.5	2	4	50
P50552B-0150	0.75	3	4	50
P50552B-0200	1	4	4	50
P50552B-0250	1.25	5	4	50
P50552B-0300S3	1.5	6	3	50
P50552B-0300	1.5	6	4	50
P50552B-0350	1.75	7	4	50
P50552B-0400	2	8	4	50
P50552B-0500S5	2.5	10	5	50
P50552B-0500	2.5	10	6	50
P50552B-0600	3	12	6	50
P50552B-0700	3.5	14	8	60
P50552B-0800	4	16	8	60
P50552B-1000	5	20	10	75
P50552B-1200	6	24	12	75
P50552B-1400	7	28	14	100
P50552B-1600	8	32	16	100
P50552B-1800	9	36	18	100
P50552B-2000	10	40	20	100

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) / Feed (mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-

Carbide 2 Flutes Ball Nose End Mill (Extra Long)

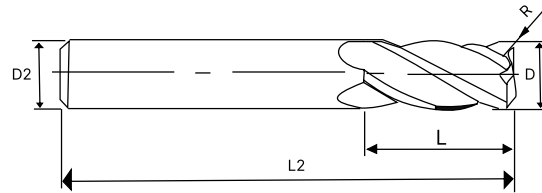
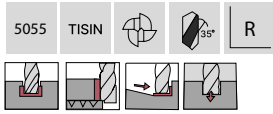


Unit	(mm)			
R	R ≤ 1.5	1.5 < R < 3	R ≥ 3	
Tol	0	0	0	
	-0.015	-0.015	-0.02	

Ordering Code	Radius R	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm
P50552B-0300675	1.5	6	3	75
P50552B-0400875	2	8	4	75
P50552B-0501075	2.5	10	5	75
P50552B-0601275	3	12	6	75
P50552B-0801675	4	16	8	75
P50552B-03006100	1.5	6	3	100
P50552B-04008100	2	8	4	100
P50552B-05010100	2.5	10	5	100
P50552B-06012100	3	12	6	100
P50552B-08016100	4	16	8	100
P50552B-100020100	5	20	10	100
P50552B-120024100	6	24	12	100
P50552B-06012150	3	12	6	150
P50552B-08016150	4	16	8	150
P50552B-100020150	5	20	10	150
P50552B-120024150	6	24	12	150
P50552B-140028150	7	28	14	150
P50552B-160032150	8	32	16	150
P50552B-180036150	9	36	18	150
P50552B-200040150	10	40	20	150
P50552B-060012200	3	12	6	200
P50552B-080016200	4	16	8	200
P50552B-100020200	5	20	10	200
P50552B-120024200	6	24	12	200
P50552B-080032200	8	32	16	200

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 4 Flutes Corner Radius End Mill (Standard)

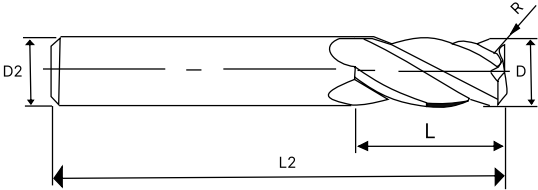
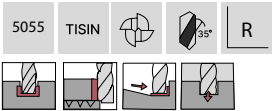


Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D mm	Radius R mm	Cutting Length l mm	Shank D2 mm	Overall Length L2 mm
P50554R-010002	1	0.2	3	4	50
P50554R-015002	1.5	0.2	5	4	50
P50554R-020002	2	0.2	6	4	50
P50554R-020005	2	0.5	6	4	50
P50554R-025002	2.5	0.2	8	4	50
P50554R-025005	2.5	0.5	8	4	50
P50554R-030002S3	3	0.2	8	3	50
P50554R-030002	3	0.2	9	4	50
P50554R-030005S3	3	0.5	8	3	50
P50554R-030005	3	0.5	9	4	50
P50554R-035005	3.5	0.5	11	4	50
P50554R-040002	4	0.2	10	4	50
P50554R-040005	4	0.5	10	4	50
P50554R-050005S5	5	0.5	13	5	50
P50554R-050005	5	0.5	13	6	50
P50554R-050010S5	5	1	13	5	50
P50554R-050010	5	1	13	6	50
P50554R-060002	6	0.2	15	6	50
P50554R-060003	6	0.3	15	6	50
P50554R-060005	6	0.5	15	6	50
P50554R-060010	6	1	15	6	50
P50554R-080005	8	0.5	20	8	60
P50554R-080010	8	1	20	8	60
P50554R-080020	8	2	20	8	60
P50554R-100005	10	0.5	25	10	75
P50554R-100010	10	1	25	10	75
P50554R-100020	10	2	25	10	75
P50554R-100030	10	3	25	10	75
P50554R-120005	12	0.5	30	12	75
P50554R-120010	12	1	30	12	75
P50554R-120020	12	2	30	12	75
P50554R-120030	12	3	30	12	75

CUTTING PARAMETERS												
Cutting Speed			Vc (m/min) /Feed(mm/rev)									
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55	
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30	
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250	
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200	
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150	
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90	
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80	
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220	
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200	
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-	
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-	
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-	
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-	

Carbide 4 Flutes Corner Radius End Mill (Extra Long)



Unit	(mm)	
D	D≤ 12	D>12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm	mm
P50554R-030051275	3	0.5	12	3	75
P50554R-040051575	4	0.5	15	4	75
P50554R-050052575	5	0.5	25	5	75
P50554R-060052575	6	0.5	25	6	75
P50554R-080052575	8	0.5	25	8	75
P50554R-0400520100	4	0.5	20	4	100
P50554R-0401020100	4	1	20	4	100
P50554R-0500530100	5	0.5	30	5	100
P50554R-0501030100	5	1	30	5	100
P50554R-0600530100	6	0.5	30	6	100
P50554R-0601030100	6	1	30	6	100
P50554R-0800535100	8	0.5	35	8	100
P50554R-0801035100	8	1	35	8	100
P50554R-1000540100	10	0.5	40	10	100
P50554R-1001040100	10	1	40	10	100
P50554R-1200545100	12	0.5	45	12	100
P50554R-1201045100	12	1	45	12	100
P50554R-0800550100	8	0.5	50	8	100
P50554R-0801050150	8	1	50	8	150
P50554R-1000555150	10	0.5	55	10	150
P50554R-1001055150	10	1	55	10	150
P50554R-1200560150	12	0.5	60	12	150
P50554R-1201060150	12	1	60	12	150

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) /Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-



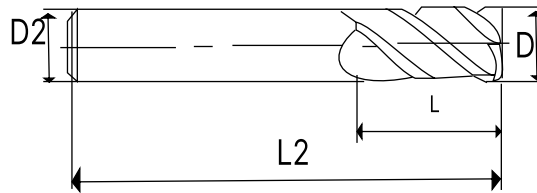
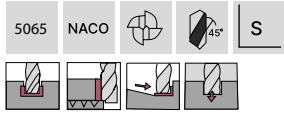
procarb
CUTTING TOOLS

prosolid

P5065 Series

- Ideal for efficient machining of high-hardness steels.
- Stainless steel, quenched, and heat-treated steels.
- Suitable for finishing operations.

Carbide 4Flutes Square End Mill (Standard)

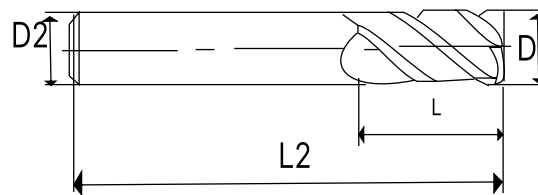
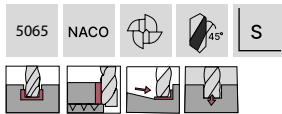


Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
P50654E-0100	1	3	4	50
P50654E-0150	1.5	4	4	50
P50654E-0200	2	6	4	50
P50654E-0250	2.5	8	4	50
P50654E-0300S3	3	8	3	50
P50654E-0300	3	8	4	50
P50654E-0350	3.5	10	4	50
P50654E-0400	4	12	4	50
P50654E-0500S5	5	13	5	50
P50654E-0500	5	13	6	50
P50654E-0600	6	15	6	50
P50654E-0700	7	20	8	60
P50654E-0800	8	20	8	60
P50654E-0900	9	25	10	75
P50654E-1000	10	25	10	75
P50654E-1100	11	30	12	75
P50654E-1200	12	30	12	75
P50654E-1400	14	45	14	100
P50654E-1500	15	45	16	100
P50654E-1600	16	45	16	100
P50654E-1800	18	45	18	100
P50654E-2000	20	45	20	100

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) /Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-

Carbide 4Flutes Square End Mill (Extra Long)

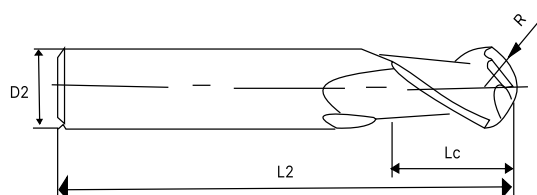
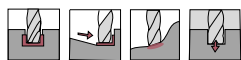


Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
P50654E-0301275	3	12	3	75
P50654E-0401675	4	16	4	75
P50654E-0501875	5	18	5	75
P50654E-0602475	6	24	6	75
P50654E-0802575	8	25	8	75
P50654E-03012100	3	12	3	100
P50654E-04020100	4	20	4	100
P50654E-05030100	5	30	5	100
P50654E-06030100	6	30	6	100
P50654E-08035100	8	35	8	100
P50654E-10040100	10	40	10	100
P50654E-12045100	12	45	12	100
P50654E-06045150	6	45	6	150
P50654E-08050150	8	50	8	150
P50654E-10055150	10	55	10	150
P50654E-12055150	12	55	12	150
P50654E-14070150	14	70	14	150
P50654E-16070150	16	70	16	150
P50654E-20070150	20	70	20	150

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) /Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
P	P1 - P3	Low Carbon Steel	0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
	P4 - P7	Medium - Alloyed Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-

Carbide 2 Flutes Ball Nose End Mill (Standard)

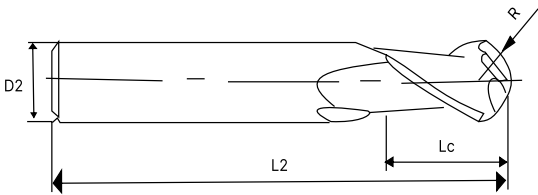
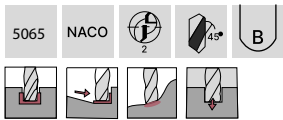


Unit	(mm)		
R	R ≤ 1.5	1.5 < R < 3	R ≥ 3
Tol	0	0	0
	-0.015	-0.015	-0.02

Ordering Code	Radius R mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
P50652B-0100	0.5	2	4	50
P50652B-0150	0.75	3	4	50
P50652B-0200	1	4	4	50
P50652B-0250	1.25	5	4	50
P50652B-0300S3	1.5	6	3	50
P50652B-0300	1.5	6	4	50
P50652B-0350	1.75	7	4	50
P50652B-0400	2	12	4	50
P50652B-0500S5	2.5	12	5	50
P50652B-0500	2.5	12	6	50
P50652B-0600	3	12	6	50
P50652B-0800	4	16	8	60
P50652B-1000	5	20	10	75
P50652B-1200	6	24	12	75
P50652B-1400	7	28	14	100
P50652B-1600	8	32	16	100
P50652B-1800	9	36	18	100
P50652B-2000	10	40	20	100

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed (mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 2 Flutes Ball Nose End Mill (Extra Long)

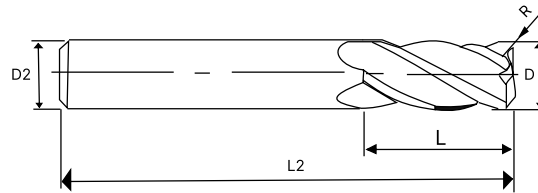
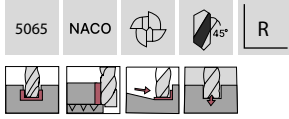


Unit	(mm)		
R	R < 1.5	1.5 < R < 3	R ≥ 3
Tol	0	0	0
	-0.015	-0.015	-0.02

Ordering Code	Radius R mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
P50652B-0300675	1.5	6	3	75
P50652B-0400875	2	8	4	75
P50652B-0501075	2.5	10	5	75
P50652B-0601275	3	12	6	75
P50652B-0801675	4	16	8	75
P50652B-04008100	2	8	4	100
P50652B-05012100	2.5	12	5	100
P50652B-06012100	3	12	6	100
P50652B-08016100	4	16	8	100
P50652B-10020100	5	20	10	100
P50652B-12024100	6	24	12	100
P50652B-06012150	3	12	6	150
P50652B-08016150	4	16	8	150
P50652B-10020150	5	20	10	150
P50652B-12024150	6	24	12	150
P50652B-14028150	7	28	14	150
P50652B-16032150	8	32	16	150
P50652B-20040150	10	40	20	150

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) /Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
P	P1 - P3	Low Carbon Steel	0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
	P4 - P7	Medium -Alloyed Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P8 - P12	High-Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
M	M1 - M3	Ferritic & Martensitic Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
	M4 - M5	Austenitic Stainless Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
K	K1 - K4	Grey Cast Iron	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
	K5 - K7	Ductile Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
N	N1 - N11	Non-Ferrous Metals	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
S	S1 - S3	Titanium Alloys	-	-	-	-	-	-	200-250-350	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
H	H5 - H21	Hard Materials	-	-	25-30-40	30-40-50	30-40-50	30-40-50	-	-	-
			-	-	50-60-80	-	60-70-80	60-70-80	-	-	-

Carbide 4 Flutes Corner Radius End Mill (Standard)

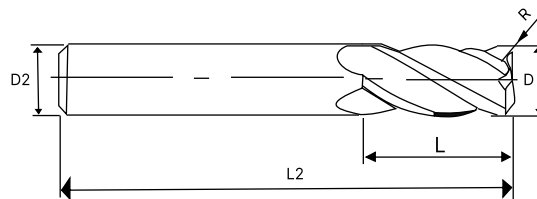
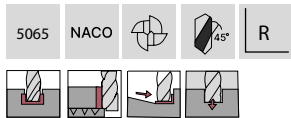


Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D mm	Radius R mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
P50654R-010002	1	0.2	3	4	50
P50654R-015002	1.5	0.2	5	4	50
P50654R-020002	2	0.2	6	4	50
P50654R-020005	2	0.5	6	4	50
P50654R-025002	2.5	0.2	8	4	50
P50654R-025005	2.5	0.5	8	3	50
P50654R-030005S3	3	0.5	8	3	50
P50654R-030002	3	0.2	9	4	50
P50654R-030005	3	0.5	9	4	50
P50654R-040002	4	0.2	10	4	50
P50654R-040005	4	0.5	10	4	50
P50654R-040010	4	1	10	4	50
P50654R-050001S5	5	0.5	13	5	50
P50654R-050010	5	1	13	5	50
P50654R-050005	5	0.5	13	6	50
P50654R-050010	5	1	13	6	50
P50654R-060002	6	0.2	15	6	50
P50654R-060005	6	0.5	15	6	50
P50654R-060010	6	1	15	6	50
P50654R-080005	8	0.5	20	8	60
P50654R-080010	8	1	20	8	60
P50654R-100005	10	0.5	25	10	75
P50654R-100010	10	1	25	10	75
P50654R-120005	12	0.5	30	12	75
P50654R-120010	12	1	30	12	75

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
P	P1 - P3	Low Carbon Steel	0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
	P4 - P7	Medium - Alloyed Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P8 - P12	High-Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
M	M1 - M3	Ferritic & Martensitic Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
	M4 - M5	Austenitic Stainless Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
K	K1 - K4	Grey Cast Iron	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
	K5 - K7	Ductile Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
N	N1 - N11	Non-Ferrous Metals	130-150-200	130-150-200	-	-	-	-	-	130-150-200
	S1 - S3	Titanium Alloys	-	-	-	-	-	200-250-350	-	-
S	S11 - S13	Heat-Resistant Alloy	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	H5 - H21	Hard Materials	-	-	50-60-80	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 4 Flutes Corner Radius End Mill (Extra Long)



Unit	(mm)	
D	D<12	D>12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D mm	Radius R mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
P50654R-040051575	4	0.5	15	4	75
P50654R-060052575	6	0.5	25	6	75
P50654R-060102575	6	1	25	6	75
P50654R-080053075	8	0.5	30	8	75
P50654R-080103075	8	1	30	8	75
P50654R-0400520100	4	0.5	20	4	100
P50654R-0401020100	4	1	20	4	100
P50654R-0600530100	6	0.5	30	6	100
P50654R-0601030100	6	1	30	6	100
P50654R-0800535100	8	0.5	35	8	100
P50654R-0801035100	8	1	35	8	100
P50654R-1000540100	10	0.5	40	10	100
P50654R-1001040100	10	1	40	10	100
P50654R-1200545100	12	0.5	45	12	100
P50654R-1201045100	12	1	45	12	100

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) /Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-



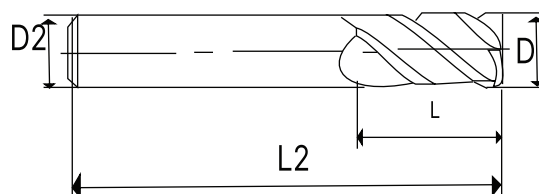
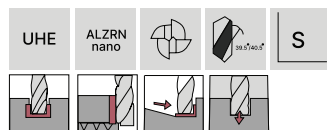
procarb
CUTTING TOOLS

prosolid

UHE Series

Multifunctional tool, applicable to the widest range of materials, the best adaptability to working conditions, the king of cost performance, high-speed machining, both fine and rough, high-efficiency machining in M and S class materials

Carbide 4Flutes Square End Mill (Standard)

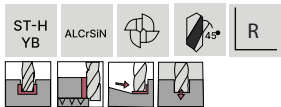


Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0 -0.015	0 -0.02

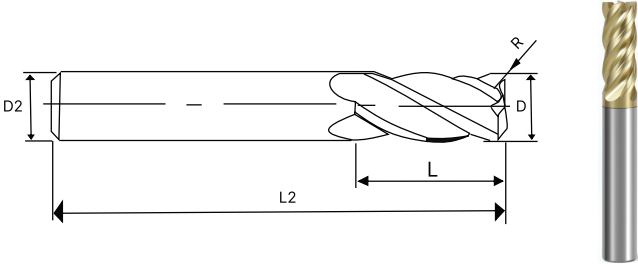
Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
UHE504010	1	3	4	50
UHE504015	1.5	5	4	50
UHE504020	2	6	4	50
UHE504025	2.5	8	4	50
UHE504030	3	9	4	50
UHE504040	4	12	4	50
UHE5040401675	4	16	4	75
UHE504050	5	13	6	50
UHE5040602575	6	25	6	75
UHE504060	6	18	6	50
UHE504080	8	20	8	60
UHE50400803275	8	32	8	75
UHE504100	10	30	10	75
UHE50410030100	10	30	10	100
UHE504120	12	36	12	75
UHE50412036100	12	36	12	100
UHE504140	14	40	14	100
UHE504160	16	45	16	100
UHE504180	18	50	18	100
UHE504200	20	50	20	100

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed (mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80 0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250 180-220-250
	P4 - P7	Medium-Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200 150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150 100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90 70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80 60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250 150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200 100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	- -
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	- -
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	- -
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	- -

Carbide 4 Flutes Corner Radius End Mill (Standard)



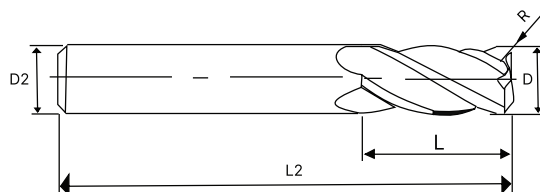
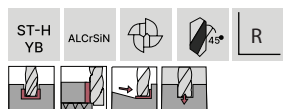
Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0 -0.015	0 -0.02



Ordering Code	Diameter D mm	Radius R mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
UHR50401002	1	R0.2	3	4	50
UHR50401502	1.5	R0.2	4	4	50
UHR50402002	2	R0.2	5	4	50
UHR50402502	2.5	R0.2	7	4	50
UHR50403005	3	R0.5	8	4	50
UHR50403505	3.5	R0.5	8	4	50
UHR50404005	4	R0.5	10	4	50
UHR50405005	5	R0.5	13	6	50
UHR50406005	6	R0.5	15	6	50
UHR50408005	8	R0.5	20	8	60
UHR50401005	10	R0.5	25	10	75
UHR50401205	12	R0.5	30	12	75

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 4 Flutes Corner Radius End Mill (Extra Long)



Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0 -0.015	0 -0.02

Ordering Code	Diameter D mm	Radius R mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
UHR504040051075	4	R0.5	10	4	75
UHR504050051375	5	R0.5	13	5	75
UHR504060051575	6	R0.5	15	6	75
UHR504080055075	8	R0.5	50	8	75
UHR5040400510100	4	R0.5	10	4	100
UHR5040600515100	6	R0.5	15	6	100
UHR5040800520100	8	R0.5	20	8	100
UHR5041000525100	10	R0.5	25	10	100
UHR5041200535100	12	R0.5	30	12	100

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed (mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80 0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-



procarb
CUTTING TOOLS

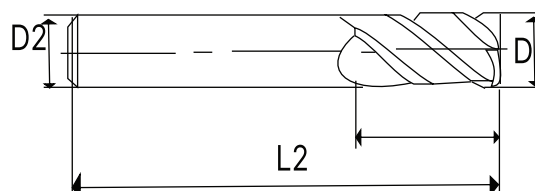
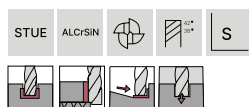
prosolid **STU Series**

Variable bottom edges and large helix angle to reduce vibration and improve surface finish

The tool design is especially suitable for machining high hardness steel



Carbide 4Flutes Square End Mill (Standard)



Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02

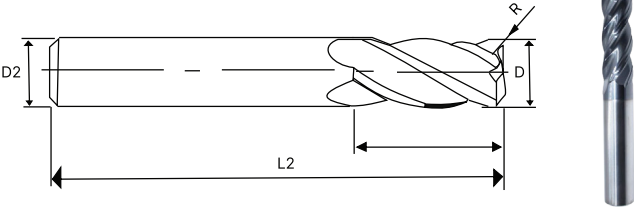
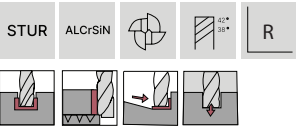
Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
STUE604010	1	3	4	50
STUE604015	1.5	5	4	50
STUE604020	2	6	4	50
STUE604025	2.5	8	4	50
STUE604030	3	9	4	50
STUE604040	4	11	4	50
STUE604050	5	13	6	50
STUE604060	6	15	6	50
STUE604080	8	20	8	60
STUE604100	10	25	10	75
STUE604120	12	30	12	75
STUE604160	16	45	16	100

Carbide 4Flutes Square End Mill (Extra Long)

Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
STUE6040401275	4	12	4	75
STUE6040601875	6	18	6	75
STUE6040802475	8	24	8	75
STUE60406018100	6	18	6	100
STUE60408024100	8	24	8	100
STUE60410030100	10	30	10	100
STUE60412036100	12	36	12	100

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80 0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250 180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200 150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	80-100-120	100-120-150	-	100-120-150 100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90 70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80 60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250 150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200 100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	- -
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	- -
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	- -
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	- -

Carbide 4 Flutes Corner Radius End Mill (Standard)



Unit	(mm)	
D	D< 12	D>12
Tol	0	0
	-0.015	-0.02

Ordering Code	Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm	mm
STUR60401002	1	R0.2	3	4	50
STUR60401502	1.5	R0.2	4	4	50
STUR60402002	2	R0.2	5	4	50
STUR60403002	3	R0.2	9	4	50
STUR60403005	3	R0.5	9	4	50
STUR60404002	4	R0.2	11	4	50
STUR60404005	4	R0.5	11	4	50
STUR60405005	5	R0.5	13	6	50
STUR60405010	5	R1	13	6	50
STUR60405002	5	R0.2	13	6	50
STUR60406002	6	R0.2	15	15	50
STUR60406005	6	R0.5	15	15	50
STUR60406010	6	R1	15	15	50
STUR60408005	8	R0.5	20	20	60
STUR60408010	8	R1	20	20	60
STUR60410005	10	R0.5	25	25	75
STUR60410010	10	R1	25	25	75
STUR60412005	12	R0.5	30	30	75
STUR60412010	12	R1	30	30	75

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-



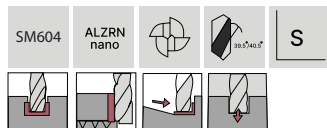
procarb
CUTTING TOOLS

prosolid

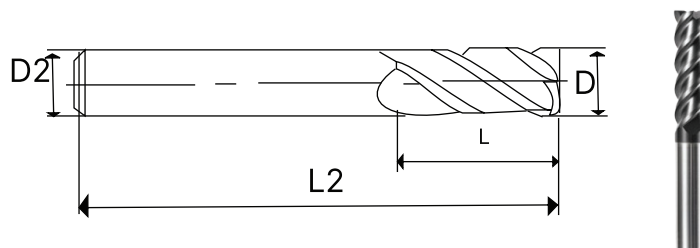
SM604 Series

Multifunctional tool, applicable to the widest range of materials, the best adaptability to working conditions, P, M, S, H, Work materials with high-speed machining, both fine and rough, high-efficiency machining

Carbide 4Flutes Square End Mill (Standard)



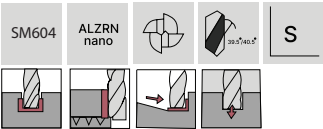
Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0 -0.015	0 -0.02



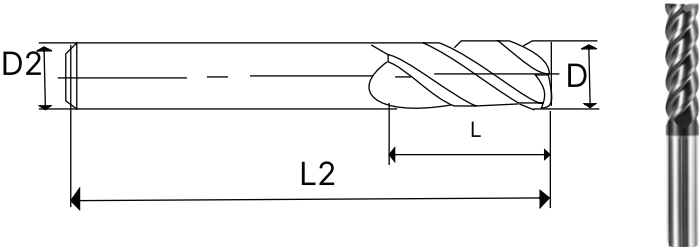
Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
SM604010	1	3	4	50
SM604015	1.5	5	4	50
SM604020	2	6	4	50
SM604250	2.5	8	4	50
SM604030	3	9	4	50
SM604040	4	12	4	50
SM604050	5	13	6	50
SM604060	6	18	6	50
SM604080	8	20	8	60
SM604100	10	30	10	75
SM604120	12	36	12	75
SM604140	14	40	14	100
SM604160	16	45	16	100
SM604180	18	50	18	100
SM604200	20	50	20	100

CUTTING PARAMETERS												
Cutting Speed			Vc (m/min) /Feed(mm/rev)									
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55	
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30	
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250	
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200	
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150	
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90	
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80	
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220	
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200	
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-	
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-	
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-	
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-	

Carbide 4Flutes Square End Mill (Extra Long)



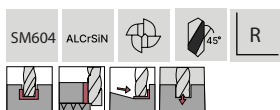
Unit	(mm)	
D	D< 12	D>12
Tol	0	0
	-0.015	-0.02



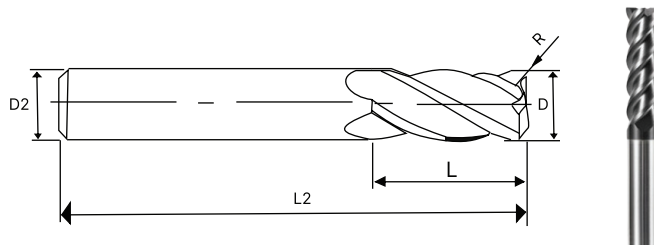
Ordering Code	Diameter D	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm
SM6040301275	3	12	4	75
SM6040401675	4	16	4	75
SM6040502075	5	20	6	75
SM6040602575	6	25	6	75
SM6040803275	8	32	8	75
SM60403012100	3	12	4	100
SM60404016100	4	16	4	100
SM60406025100	6	25	6	100
SM60408032100	8	32	8	100
SM60410040100	10	40	10	100
SM60412050100	12	50	12	100
SM60406045150	6	45	6	150
SM60408050150	8	50	8	150
SM60410055150	10	55	10	150
SM60412060150	12	60	12	150
SM60416065150	16	65	16	150
SM60420080150	20	80	20	150

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) /Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-

Carbide 4 Flutes Corner Radius End Mill (Standard)



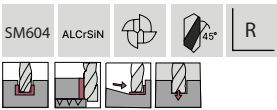
Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02



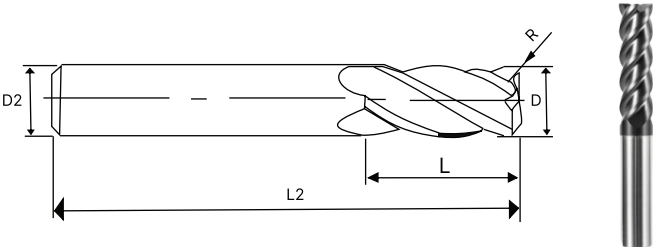
Ordering Code	Diameter D mm	Radius R mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
SMR60401002	1	R0.2	3	4	50
SMR60401502	1.5	R0.2	4	4	50
SMR60402002	2	R0.2	5	4	50
SMR60402502	2.5	R0.2	7	4	50
SMR60403005	3	R0.5	8	4	50
SMR60403505	3.5	R0.5	8	4	50
SMR60404005	4	R0.5	10	4	50
SMR60405005	5	R0.5	13	6	50
SMR60406005	6	R0.5	15	6	50
SMR60408005	8	R0.5	20	8	60
SMR60401005	10	R0.5	25	10	75
SMR60401205	12	R0.5	30	12	75

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) /Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-

Carbide 4 Flutes Corner Radius End Mill (Extra Long)



Unit	(mm)	
D	D≤ 12	D>12
Tol	0	0
	-0.015	-0.02



Ordering Code	Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm	mm
SMR604040051075	4	R0.5	10	4	75
SMR604050051375	5	R0.5	13	5	75
SMR604060051575	6	R0.5	15	6	75
SMR604080055075	8	R0.5	50	8	75
SMR6040400510100	4	R0.5	10	4	100
SMR6040600515100	6	R0.5	15	6	100
SMR6040800520100	8	R0.5	20	8	100
SMR6041000525100	10	R0.5	25	10	100
SMR6041200530100	12	R0.5	30	12	100

CUTTING PARAMETERS												
Cutting Speed			Vc (m/min) /Feed(mm/rev)									
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55	
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30	
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250	
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200	
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150	
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90	
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80	
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220	
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200	
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-	
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-	
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-	
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-	



procarb
C U T T I N G T O O L S

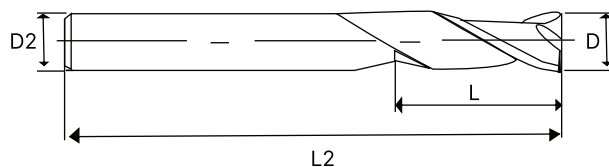
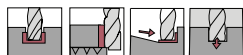
prosolid

UAL Series

It is suitable for high-efficiency super bright processing of aluminum alloy materials

The variable indexing of the bottom edge, the unique design of the helix angle, has excellent anti-seismic performance and high precision of the processed surface

2Flutes Square End Mill For Aluminum (Standard)

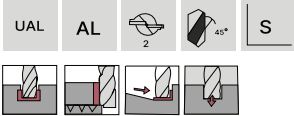


Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02

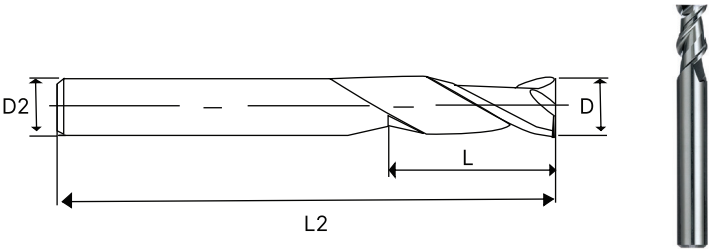
Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
UAL502010	1	3	4	50
UAL502015	1.5	5	4	50
UAL502020	2	6	4	50
UAL502025	2.5	8	4	50
UAL502030S3	3	9	3	50
UAL502030	3	9	4	50
UAL502035	3.5	11	4	50
UAL502040	4	12	4	50
UAL502050S5	5	15	5	50
UAL502050	5	15	6	50
UAL502060	6	18	6	50
UAL502070	7	24	8	60
UAL502080	8	24	8	60
UAL502100	10	30	10	75
UAL502110	11	35	12	75
UAL502120	12	35	12	75
UAL502140	14	45	14	100
UAL502160	16	45	16	100
UAL502180	18	45	18	100
UAL502200	20	45	20	100

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
			0.10 - 0.20-0.30							
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium-Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

2Flutes Square End Mill For Aluminum (Extra Long)



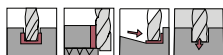
Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02



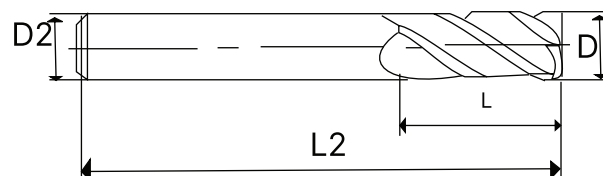
Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
UAL5020301275	3	12	3	75
UAL5020401675	4	16	4	75
UAL5020501875	5	18	5	75
UAL5020602575	6	25	6	75
UAL5020802575	8	25	8	75
UAL50203012100	3	12	3	100
UAL50204020100	4	20	4	100
UAL50205030100	5	30	5	100
UAL50206030100	6	30	6	100
UAL50208035100	8	35	8	100
UAL50210040100	10	40	10	100
UAL50212045150	12	45	12	100
UAL50206045150	6	45	6	150
UAL50208050150	8	50	8	150
UAL50210050150	10	55	10	150
UAL50212055150	12	55	12	150
UAL50214070150	14	70	14	150
UAL50216080150	16	80	16	150
UAL50218080150	18	80	18	150
UAL50220080150	20	80	20	150

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

3Flutes Square End Mill For Aluminum (Standard)



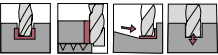
Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02



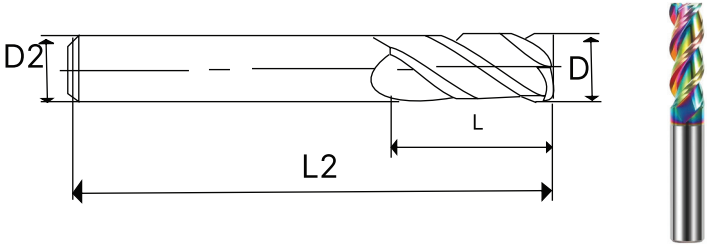
Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
DAL503010	1	3	4	50
DAL503015	1.5	5	4	50
DAL503020	2	6	4	50
DAL503025	2.5	8	4	50
DAL503030S3	3	9	3	50
DAL503030	3	9	4	50
DAL503035	3.5	11	4	50
DAL503040	4	12	4	50
DAL503050S5	5	15	5	50
DAL503050	5	15	6	50
DAL503060	6	18	6	50
DAL503070	7	24	8	60
DAL503080	8	24	8	60
DAL503090	9	30	10	75
DAL503100	10	30	10	75
DAL503110	11	35	12	75
DAL503120	12	35	12	75
DAL503140	14	45	14	100
DAL503160	16	45	16	100
DAL503180	18	45	18	100
DAL503200	20	45	20	100

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
			180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
P	P1 - P3	Low Carbon Steel	180-220-250	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

3Flutes Square End Mill For Aluminum (Extra Long)



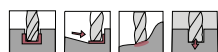
Unit (mm)		
D	D≤ 12	D>12
Tol	0	0
	-0.015	-0.02



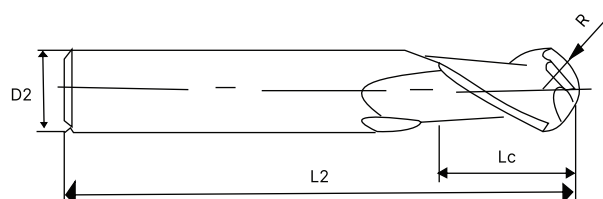
Ordering Code	Diameter D	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm
DAL5030200675	2	6	4	75
DAL5030300975	3	9	4	75
DAL5030301275S3	3	12	3	75
DAL5030351175	3.5	11	4	75
DAL5030401675	4	16	4	75
DAL5030501875	5	18	5	75
DAL5030602575	6	25	6	75
DAL5030803075	8	30	8	75
DAL50303012100	3	12	3	100
DAL50304020100	4	20	4	100
DAL50305030100	5	30	5	100
DAL50306030100	6	30	6	100
DAL50308035100	8	35	8	100
DAL50310040100	10	40	10	100
DAL50312045100	12	45	12	100
DAL50306045150	6	45	6	150
DAL50308050150	8	50	8	150
DAL50310055150	10	55	10	150
DAL50312055150	12	55	12	150
DAL50314070150	14	70	14	150
DAL50316080150	16	80	16	150
DAL50318080150	18	80	18	150
DAL50320080150	20	80	20	150

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Ball Nose 2 Flutes End Mill For Aluminum (Standard)



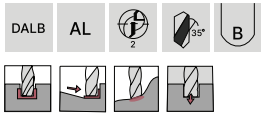
Unit	(mm)		
R	R ≤ 1.5	1.5 < R < 3	R ≥ 3
Tol	0	0	0
	-0.01	-0.015	-0.02



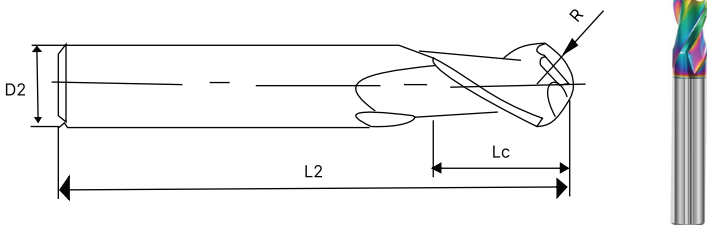
Ordering Code	Radius R	cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm
DALB502010	0.5	2	4	50
DALB502015	0.75	3	4	50
DALB502020	1	4	4	50
DALB502025	1.25	5	4	50
DALB502030S3	1.5	6	3	50
DALB502030	1.5	6	4	50
DALB502035	1.75	7	4	50
DALB502040	2	12	4	50
DALB502050S5	2.5	12	5	50
DALB502050	2.5	12	6	50
DALB502060	3	12	6	50
DALB502080	4	16	8	60
DALB502100	5	20	10	75
DALB502120	6	24	12	75
DALB502140	7	28	14	100
DALB502160	8	32	16	100
DALB502180	9	36	18	100
DALB502200	10	40	20	100

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
			180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	100-150-180	150-170-200	-	150-180-200
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-120-150	100-120-150	-	100-120-150
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Ball Nose2 Flutes End Mill For Aluminum (Extralong)



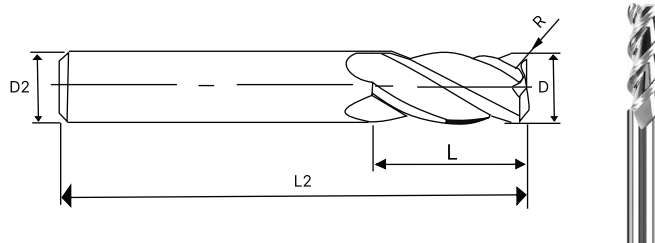
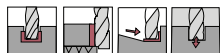
Unit	(mm)		
R	R< 1.5	1.5<R<3	R≥ 3
Tol	0	0	0
	-0.01	-0.015	-0.02



Ordering Code	Radius R	cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm
DALB5020300675	1.5	6	3	75
DALB5020400875	2	8	4	75
DALB5020501075	2.5	10	5	75
DALB5020601275	3	12	6	75
DALB5020801675	4	16	8	75
DALB50203006100	1.5	6	3	100
DALB50204008100	2	8	4	100
DALB50205010100	2.5	10	5	100
DALB50206012100	3	12	6	100
DALB50208020100	4	20	8	100
DALB50210016100	5	16	10	100
DALB50212024100	6	24	12	100
DALB50206012150	3	12	6	150
DALB50208016150	4	16	8	150
DALB50210020150	5	20	10	150
DALB50212024150	6	24	12	150

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 4 Flutes Corner Radius End Mill (Standard)

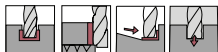


Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02

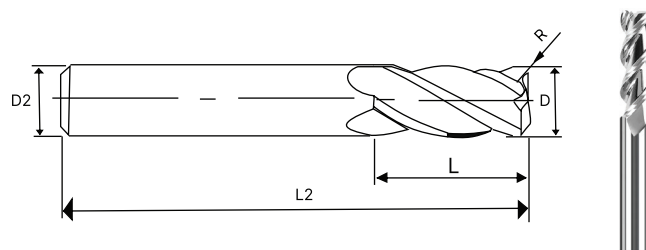
Ordering Code	Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm	mm
UALR50301002	1	0.2	3	4	50
UALR50301502	1.5	0.2	4.5	4	50
UALR50302002	2	0.2	6	4	50
UALR50300205	2	0.5	6	4	50
UALR50303002	3	0.2	9	4	50
UALR50303005	3	0.5	9	4	50
UALR50303010	3	1	9	4	50
UALR50304005	4	0.5	12	4	50
UALR50304010	4	1	12	4	50
UALR50305005	5	0.5	18	6	50
UALR50305005S5	5	0.5	18	5	50
UALR50305010S5	5	1	18	5	50
UALR50305010	5	1	18	6	50
UALR50306005	6	0.5	18	6	50
UALR50306010	6	1	18	6	50
UALR50308005	8	0.5	24	8	60
UALR50308010	8	1	24	8	60
UALR50308020	8	2	24	8	60
UALR50310005	10	0.5	30	10	75
UALR50310010	10	1	30	10	75
UALR50312005	12	0.5	35	12	75
UALR50312010	12	1	35	12	75

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
P	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
P	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
M	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
K	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
S	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Carbide 4 Flutes Corner Radius End Mill (Extra Long)



Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02



Ordering Code	Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm	mm
UALR503040052075	4	0.5	20	4	75
UALR503040102075	4	1	20	4	75
UALR503060052575	6	0.5	25	6	75
UALR503060102575	6	1	25	6	75
UALR503080053075	8	0.5	30	8	75
UALR503080103075	8	1	30	8	75
UALR5030400525100	4	0.5	25	4	100
UALR5030401025100	4	1	25	4	100
UALR5030600530100	6	0.5	30	6	100
UALR5030601030100	6	1	30	6	100
UALR5030800535100	8	0.5	35	8	100
UALR5030801035100	8	1	35	8	100
UALR5031000540100	10	0.5	40	10	100
UALR5031001040100	10	1	40	10	100
UALR5031200545100	12	0.5	45	12	100
UALR5031201045100	12	1	45	12	100

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
			0.10 - 0.20-0.30							
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
P	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
P	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
M	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
K	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
S	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-



procarb
CUTTING TOOLS

prosolid

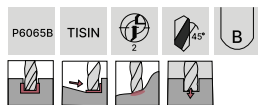
P6065 Series

Suitable for deep groove processing various steel and Hardened steel

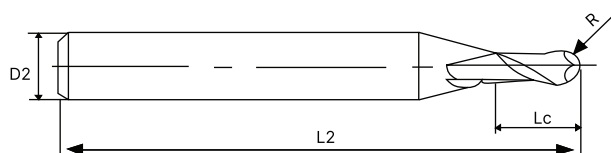
High-performance TiSiN coating for high temperature and wear resistance

Long neck design avoids collision with workpiece, suitable for deep pocket milling of mold rib

2 Flutes Micro Diameter Ball Nose End Mill (Standard)



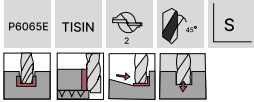
Unit	(mm)
R	R
Tol	± 0.015



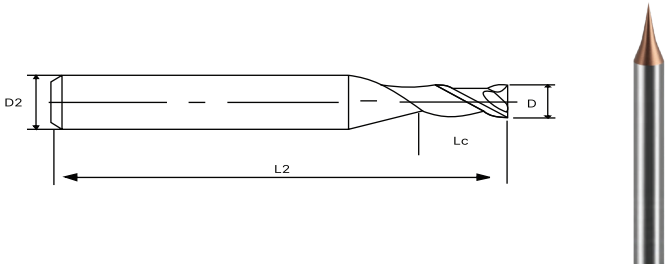
Ordering Code	Diameter D	Radius R	Shank D2	Overall Length L2
	mm	mm	mm	mm
P60652B003	0.3	0.15	4	50
P60652B004	0.4	0.2	4	50
P60652B005	0.5	0.25	4	50
P60652B007	0.7	0.35	4	50
P60652B008	0.8	0.4	4	50
P60652B009	0.9	0.45	4	50

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) /Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-

2 Flutes Micro Diameter Square End Mill (Standard)



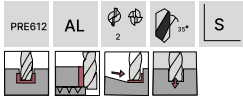
Unit	(mm)
D	D
Tol	0
	-0.015



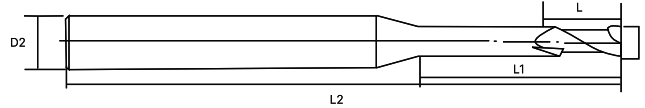
Ordering Code	Diameter D	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm
P60652E002	0.2	0.4	4	50
P60652E003	0.3	0.6	4	50
P60652E004	0.4	0.8	4	50
P60652E005	0.5	1	4	50
P60652E006	0.6	1.2	4	50
P60652E007	0.7	1.4	4	50
P60652E008	0.8	1.6	4	50
P60652E009	0.9	1.8	4	50

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) /Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P4 - P7	Medium - Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-

2 Flutes Long Neck Square Rib Type End Mill (Standard)



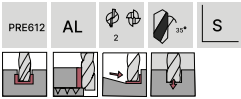
Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02



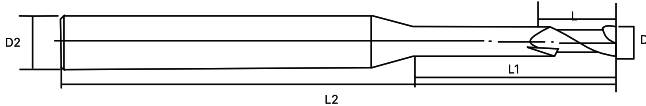
Ordering Code	Diameter D	Cutting Length L	Shank D2	Effective Cutting Length L1	Overall Length L2
	mm	mm	mm	mm	mm
PRE612 00302	0.3	0.6	4	2	50
PRE612 00303	0.3	0.6	4	3	50
PRE612 00403	0.4	0.8	4	3	50
PRE612 00404	0.4	0.8	4	4	50
PRE612 00405	0.4	0.8	4	5	50
PRE612 00406	0.4	0.8	4	6	50
PRE612 00502	0.5	1	4	2	50
PRE612 00503	0.5	1	4	3	50
PRE612 00504	0.5	1	4	4	50
PRE612 00506	0.5	1	4	6	50
PRE612 00508	0.5	1	4	8	50
PRE612 00602	0.6	1.2	4	2	50
PRE612 00603	0.6	1.2	4	3	50
PRE612 00604	0.6	1.2	4	4	50
PRE612 00606	0.6	1.2	4	6	50
PRE612 00608	0.6	1.2	4	8	50
PRE612 00703	0.7	1.4	4	3	50
PRE612 00704	0.7	1.4	4	4	50
PRE612 00706	0.7	1.4	4	6	50
PRE612 00708	0.7	1.4	4	8	50
PRE612 007010	0.7	1.4	4	10	50
PRE612 00803	0.8	1.6	4	3	50
PRE612 00804	0.8	1.6	4	4	50
PRE612 00806	0.8	1.6	4	6	50
PRE612 00808	0.8	1.6	4	8	50
PRE612 008010	0.8	1.6	4	10	50
PRE612 00903	0.9	1.8	4	3	50
PRE612 00904	0.9	1.8	4	4	50
PRE612 00906	0.9	1.8	4	6	50
PRE612 00908	0.9	1.8	4	8	50
PRE612 009010	0.9	1.8	4	10	50

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) / Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
			0.10 - 0.20-0.30							
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

4 Flutes Long Neck Square Rib Type End Mill (Standard)



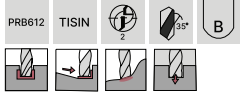
Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02



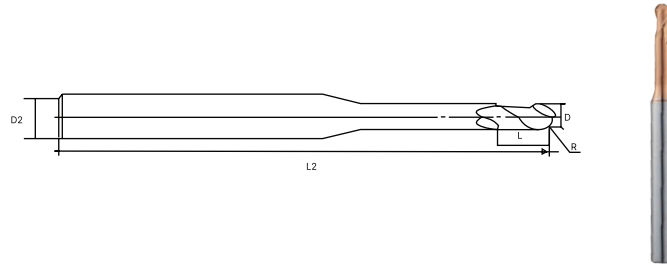
Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Effective Cutting Length L1 mm	Overall Length L2 mm
PRE614 01006	1	3	4	6	50
PRE614 01008	1	3	4	8	50
PRE614 01010	1	3	4	10	50
PRE614 01012	1	3	4	12	50
PRE614 01016	1	3	4	16	50
PRE614 01020	1	3	4	20	50
PRE614 01506	1.5	4.5	4	6	50
PRE614 01508	1.5	4.5	4	8	50
PRE614 01510	1.5	4.5	4	10	50
PRE614 01512	1.5	4.5	4	12	50
PRE614 01516	1.5	4.5	4	16	50
PRE614 01520	1.5	4.5	4	20	50
PRE614 02008	2	6	4	8	50
PRE614 02010	2	6	4	10	50
PRE614 02012	2	6	4	12	50
PRE614 02016	2	6	4	16	50
PRE614 02020	2	6	4	20	50
PRE614 02510	2.5	8	4	10	50
PRE614 02512	2.5	8	4	12	50
PRE614 02516	2.5	8	4	16	50
PRE614 02520	2.5	8	4	20	50
PRE614 03012	3	9	4	12	50
PRE614 03016	3	9	4	16	50
PRE614 03020	3	9	4	20	50

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

2 Flutes Long Neck Ball Nose Rib Type End Mill (Standard)



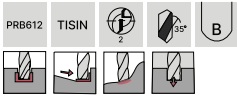
Unit	(mm)
R	R
Tol	± 0.015



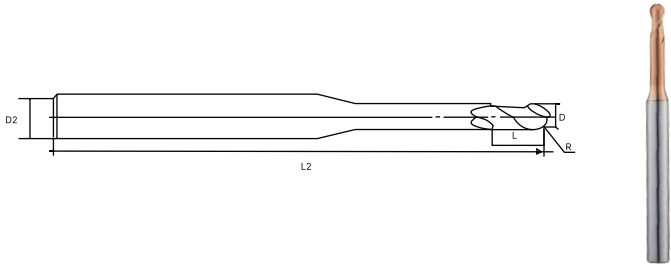
Ordering Code	Radius R	Shank D2	Cutting Length L	Effective Cutting Length L1	Overall Length L2
	mm	mm	mm	mm	mm
PRB612 00302	0.15	4	0.6	2	50
PRB612 00303	0.15	4	0.6	3	50
PRB612 00304	0.15	4	0.6	4	50
PRB612 00402	0.2	4	0.8	2	50
PRB612 00403	0.2	4	0.8	3	50
PRB612 00404	0.2	4	0.8	4	50
PRB612 00405	0.2	4	0.8	5	50
PRB612 00406	0.2	4	0.8	6	50
PRB612 00502	0.25	4	1	2	50
PRB612 00503	0.25	4	1	3	50
PRB612 00504	0.25	4	1	4	50
PRB612 00506	0.25	4	1	6	50
PRB612 00508	0.25	4	1	8	50
PRB612 00602	0.3	4	1.2	2	50
PRB612 00603	0.3	4	1.2	3	50
PRB612 00604	0.3	4	1.2	4	50
PRB612 00606	0.3	4	1.2	6	50
PRB612 00608	0.3	4	1.2	8	50
PRB612 00703	0.35	4	1.4	3	50
PRB612 00704	0.35	4	1.4	4	50
PRB612 00706	0.35	4	1.4	6	50
PRB612 00708	0.35	4	1.4	8	50
PRB612 007010	0.35	4	1.4	10	50

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

2 Flutes Long Neck Ball Nose Rib Type End Mill (Standard)



Unit (mm)	
R	R
Tol ± 0.015	



Ordering Code	Radius R	Shank D2	Cutting Length L	Effective Cutting Length L1	Overall Length L2
	mm	mm	mm	mm	mm
PRB612 00803	0.4	4	1.6	3	50
PRB612 00804	0.4	4	1.6	4	50
PRB612 00806	0.4	4	1.6	6	50
PRB612 00808	0.4	4	1.6	8	50
PRB612 008010	0.4	4	1.6	10	50
PRB612 01006	0.5	4	2	6	50
PRB612 01008	0.5	4	2	8	50
PRB612 01010	0.5	4	2	10	50
PRB612 01012	0.5	4	2	12	50
PRB612 01016	0.5	4	2	16	50
PRB612 01020	0.5	4	2	20	50
PRB612 01506	0.75	4	3	6	50
PRB612 01508	0.75	4	3	8	50
PRB612 01510	0.75	4	3	10	50
PRB612 01512	0.75	4	3	12	50
PRB612 01516	0.75	4	3	16	50
PRB612 01520	0.75	4	3	20	50
PRB612 02006	1	4	4	6	50
PRB612 02008	1	4	4	8	50
PRB612 02010	1	4	4	10	50
PRB612 02012	1	4	4	12	50
PRB612 02016	1	4	4	16	50
PRB612 02020	1	4	4	20	50

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-



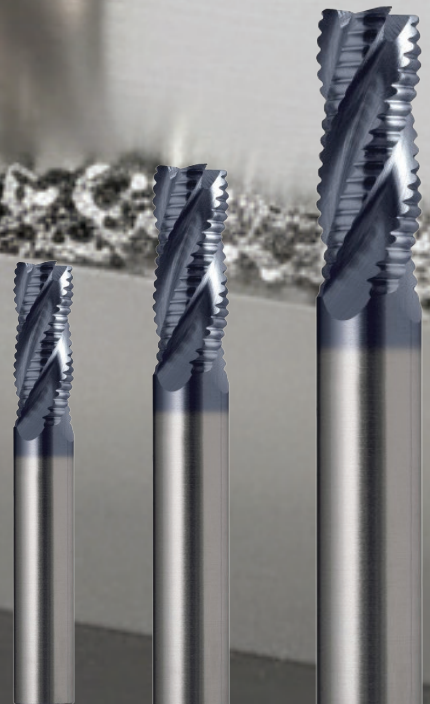
procarb
CUTTING TOOLS

prosolid

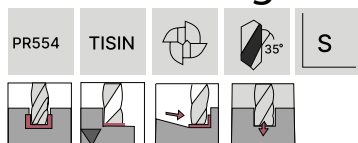
PR554 Series

Endmill for roughing application series
Suitable for rough machining of steel&cast iron
Special cutting edge chipbreaker treatment,
suitable for rough machining of groove
and side wall of workpieces

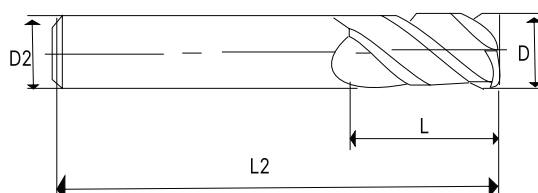
TiSiN Coating



4 Flutes Rough End Mill (Standard)



Unit	(mm)	
D	D ≤ 12	D > 12
Tol	0	0
	-0.015	-0.02



Ordering Code	Diameter D mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm
PR554040	4	12	4	50
PR554050S5	5	13	5	50
PR554050	5	13	6	50
PR554060	6	15	6	50
PR554080	8	20	8	60
PR554100	10	25	10	75
PR554120	12	30	12	75
PR554140	14	45	14	100
PR554160	16	45	16	100
PR554180	18	45	18	100
PR554200	20	45	20	100

CUTTING PARAMETERS												
Cutting Speed			Vc (m/min) /Feed(mm/rev)									
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55	
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30	
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250	
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200	
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150	
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90	
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80	
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220	
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200	
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-	
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-	
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-	
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-	



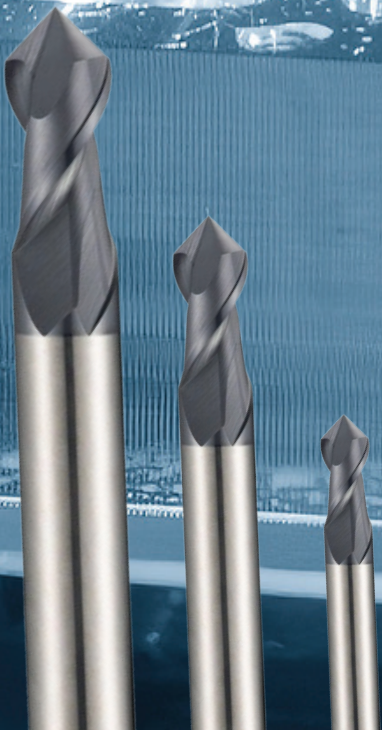
procarb
CUTTING TOOLS

prosolid

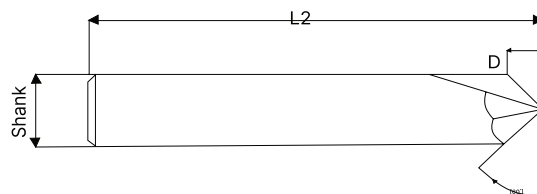
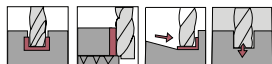
Ideal for chamfering and deburring small, narrow areas and flat surfaces

optimized for contours and chamfers on larger features.

End cut, ideal for mixing floors and chamfering walls in one go



2 Flutes Chamfer End Mill (Standard)

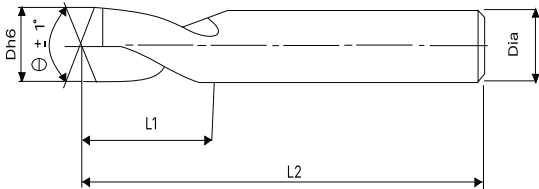
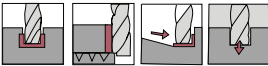


Unit	(mm)
D	D
Tol	0
	-0.015

Ordering Code	Diameter D mm	Angle mm	Shank D2 mm	Overall Length L2 mm
PCT02060	2	60°	4	50
PCT020120	2	120°	4	50
PCT020120S3	3	120°	3	50
PCT03060	3	60°	4	50
PCT030120	3	120°	4	50
PCT03090	3	90°	3	50
PCT04090	4	90°	4	50
PCT05090	5	90°	5	50
PCT06090	6	90°	6	50
PCT08090	8	90°	8	60
PCT10090	10	90°	10	75
PCT12090	12	90°	12	75
PCT04060	4	60°	4	50
PCT040120	4	120°	4	50
PCT050120	5	120°	5	50
PCT06060	6	60°	6	50
PCT08060	8	60°	8	50
PCT10060	10	60°	10	75

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

2 Flutes Center Drill (Standard)

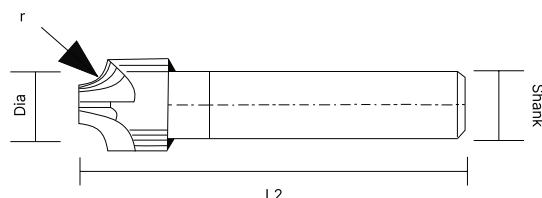
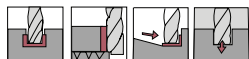


Unit	(mm)
D	D
Tol	0
	-0.015

Ordering Code	Diameter D	Angle	Shank D2	Overall Length L2
	mm	mm	mm	mm
CD50201090	1	90°	4	50
CD50202590	2.5	90°	4	50
CD50203090S3	3	90°	3	50
CD50203090	3	90°	4	50
CD50204090	4	90°	4	50
CD50205090	5	90°	5	50
CD50206090	6	90°	6	50
CD50208090	8	90°	8	60
CD50210090	10	90°	10	75
CD50212090	12	90°	12	75
CD50204090100	4	90°	4	100
CD50206090100	6	90°	6	100
CD50208090100	8	90°	8	100
CD50210090100	10	90°	10	100
CD50212090100	12	90°	12	100
CD50216090100	16	90°	16	100

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) /Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-

4 Flutes Corner Round End mill (Standard)

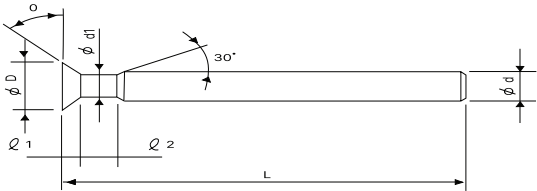
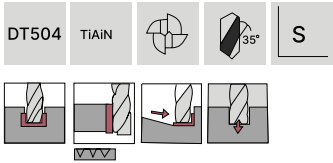


Unit	(mm)
D	D
Tol	0
	-0.015

Ordering Code	Diameter D mm	Radius R mm	Shank D2 mm	Overall Length L2 mm
CRE04005	4	0.5	4	50
CRE04075	4	0.75	4	50
CRE04010	4	1	4	50
CRE06015	6	1.5	6	50
CRE06020	6	2	6	50
CRE06025	6	2.5	6	50
CRE08030	8	3	8	60
CRE010040	10	4	10	60
CRE012050	12	5	12	60
CRE014060	14	6	14	75
CRE016070	16	7	16	75

CUTTING PARAMETERS											
Cutting Speed			Vc (m/min) /Feed(mm/rev)								
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD	PR55
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06 - 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80	0.10 - 0.20-0.30
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90	70-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80	60-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250	150-200-220
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200	100-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-	-

4 Flutes Dovetail End mill (Standard)



Unit	(mm)
D	D
Tol	0
	-0.015

Ordering Code	Diameter D	Angle	Shank D2	Overall Length L2
	mm	mm	mm	mm
DT50401030	1	30°	4	50
DT50401530	1.5	30°	4	50
DT50402030	2	30°	4	50
DT50402530	2.5	30°	4	50
DT50403030	3	30°	4	50
DT50404030	4	30°	4	50
DT50406030	6	30°	6	50
DT50408030	8	30°	8	60
DT50410030	10	30°	10	75
DT50401045	1	45°	4	50
DT50401545	1.5	45°	4	50
DT50402045	2	45°	4	50
DT50402545	2.5	45°	4	50
DT50403045	3	45°	4	50
DT50404045	4	45°	4	50
DT50406045	6	45°	6	50
DT50408045	8	45°	8	60
DT50410045	10	45°	10	75

CUTTING PARAMETERS										
Cutting Speed			Vc (m/min) /Feed(mm/rev)							
ISO	MG	Sub-Group	P4050	P5055	P5065	UHE	SM604	STU	ALU	PMD
			Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
			0.05 - 0.08-0.12	0.04 - 0.06-0.10	0.05 - 0.08-0.10	0.05 - 0.10-0.15	0.08 - 0.10-0.15	0.06- 0.09-0.13	0.08 - 0.15-0.03	0.30 - 0.50-0.80
P	P1 - P3	Low Carbon Steel	180-220-250	180-220-250	-	-	-	150-170-200	-	180-220-250
	P4 - P7	Medium -Alloyed Steel	150-180-200	150-180-200	-	-	100-150-180	150-170-200	-	150-180-200
	P8 - P12	High-Alloyed Steel	100-120-150	100-120-150	120-150-170	80-120-160	100-120-150	100-120-150	-	100-120-150
M	M1 - M3	Ferritic & Martensitic Steel	-	60-80-90	70-80-90	60-80-100	80-100-120	70-90-100	-	60-80-90
	M4 - M5	Austenitic Stainless Steel	-	50-70-80	60-70-80	70-90-110	70-90-110	60-70-80	-	50-70-80
K	K1 - K4	Grey Cast Iron	150-200-250	150-200-250	-	-	-	-	-	150-200-250
	K5 - K7	Ductile Iron	130-150-200	130-150-200	-	-	-	-	-	130-150-200
N	N1 - N11	Non-Ferrous Metals	-	-	-	-	-	-	200-250-350	-
S	S1 - S3	Titanium Alloys	-	-	-	30-35-40	40-50-60	40-50-60	-	-
	S11 - S13	Heat-Resistant Alloy	-	-	-	25-30-40	30-40-50	30-40-50	-	-
H	H5 - H21	Hard Materials	-	-	50-60-80	-	60-70-80	60-70-80	-	-

Trouble Shooting for End Milling

Problem	Cause	Solution
(1) Rupture	• High feed • High slotting volume • High protrusion volume • Worn out of flute • Longer cutting length	• Reduce feed • Reduce slotting volume • Reduce protrusion volume • Regrind at the beginning • Reduce cutting length
(2) Wear / Burning	• High speed • Small rake angle • High Hardness of material	• Reduce speed, Supply enough oil • Correct to proper rake angle • Supply Dry > soluble > Non-water soluble oil and do surface treatment"
(3) Chattering	• Improper cutting condition • Lack of Strength in machinery and chuck • Poorly fixed material • High protrusion volume • Large clearance of rake angle	• Adjust cutting and feed speed • Replace machinery and chuck • Contain a material firmly • Reduce protrusion volume • Reduce clearance of rake angle
(4) Defective of cutting edge	• Hige feed • Small rake angle • Chattering occurs • Poorly sealed material • High slotting volume • High protrusion volume • Lack of Strength in machinery	• Reduce feed • Adjust angle properly • Reduce Chattering by lowing the number of turning • Contain a material firmly • Reduce slotting volume • Reduce protrusion volume • Replace machinery
(5) Bad Cutability	• Worn out of cutting edge • Improper endmill • Small rake angle	• Regrind at the beginning • Replace proper endmill • Correct to proper rake angle
(6) Poor chip emission	• Low injection pressure of the oil • Small chip pocket • Worn out of cutting edge • High slotting volume	• Increase oil volume and pressure • Use fewer flute endmill or Reduce feed • Regrind at the beginning • Reduce slotting volume
(7) Burr on surface	• High feed • Low speed • Worn out of cutting edge • High slotting volume	• Reduce feed • Speed up • Regrind at the beginning • Reduce slotting volume
(8) Incorrect dimension	• Incorrect machinery or chuck • Incorrect rigidity of machinery or chuck • longer cutting length • Fewer number of flutes	• Correct machinery or chuck • Replace machinery or chuck • Reduce cutting length • Replace to larger number of flutes endmill
(9) Fusion	• Lack of oil or affination between tool and material	• Supply Dry > soluble > Non-water soluble oil • For Alloy Steels, use active type non-water soluble oil

Workpiece materials

Classification, MG

MG - Introduction

Cutting speed v_c (m/min)

The foundation for MG is a classification of workpiece materials based on their type rather than their relative machinability and consequently it contains workpiece materials like composites. It is comprehensive enough, but still easy to identify which MG a particular material belongs to.

Each MG has a specific material standard in a specific condition assigned as reference to allow easy adjustment of cutting data for any actual material compared to any Seco reference material see page(s) FoI

As example the reference materials EN C45E for MG P4 and EN 42 CrMo 4 for both MG P5 and MG H5 see further details in the following tables.

Steels, ferritic and martensitic stainless steels

MG	Description	Properties	Reference	$k_{cl,1}$	m_c
P1	Free-cutting steels	$360 < R_m < 880$	11 SMn30 $R_m = 385 \text{ N/mm}^2$	1500	0,14
P2	Low-alloy ferritic steels, $C < 0.25\% \text{wt}$ Low-alloy weldable general structural steels	$320 < R_m < 600$	S235JRG2 $R_m = 420 \text{ N/mm}^2$	1600	0,23
P3	Ferritic & ferritic/pearlitic steels, $C < 0.25\% \text{wt}$ Weldable general structural steels Case-hardening steels	$430 < R_m < 610$	16MnCr5 $R_m = 550 \text{ N/mm}^2$	1800	0,14
P4	Low-alloy general structural steels, $0.25\% < C < 0.67\% \text{wt}$ Low-alloy Quench & Temper steels	$520 < R_m < 1200$	C45E $R_m = 660 \text{ N/mm}^2$	2000	0,15
P5	Structural steels, $0.25\% < C < 0.67\% \text{wt}$ Quench & Temper steels	$550 < R_m < 1200$	42 CrMo 4 $R_m = 700 \text{ N/mm}^2$	2020	0,18
P6	Low-alloy through-hardening steels, $C > 0.67\% \text{wt}$ Low-alloy spring and bearing steels	$520 < R_m < 1200$	C100S $R_m = 600 \text{ N/mm}^2$	2100	0,17
P7	Through-hardening steels, $C > 0.67\% \text{wt}$ Spring and bearing steels	$600 < R_m < 1200$	100 Cr 6 $R_m = 650 \text{ N/mm}^2$	2160	0,17
P8	Tool steels High Speed Steels (HSS)	$600 < R_m < 1200$	X40 CrMoV51 $R_m = 700 \text{ N/mm}^2$	2400	0,20
P11	Ferritic & martensitic stainless steels	$415 < R_m < 1200$	X20 Cr 13 $R_m = 675 \text{ N/mm}^2$	2000	0,15
P12	Maraging and precipitation-hardening stainless steels	$500 < R_m < 1200$	X 5 CrNiCuNb 16,4 $R_m = 1100 \text{ N/mm}^2$	2100	0,17

Free-cutting, austenitic and duplex stainless steels

MG	Description	Properties	Reference	$k_{cl,1}$	m_c
M1	Free-cutting austenitic stainless steels		X 10 CrNiS 18 9	1700	0,14
M2	Low-alloy austenitic stainless steels		X 5 CrNi 18 10	1920	0,18
M3	Medium-alloy austenitic stainless steels		X 2 CrNiMo 18 14 3	2070	0,17
M4	High-alloy austenitic and duplex stainless steels		X2CrNiMoN 22 5 3	2230	0,16
M5	Difficult high-alloy austenitic and duplex stainless steels		X 2 CrNiMoN 25 7 4	2510	0,13

Workpiece materials
Classification, MG

Cast irons

MG	Description	Properties	Reference	$k_{cl,1}$	m_{ϵ}
K1	Grey cast irons (GCI)		EN-GJL-250	930	0,32
K2	Compacted graphite irons (CGI)		EN-GJV-400	1000	0,35
K3	Malleable cast irons (MCI)		EN-GJMB-550-4	1050	0,37
K4	Nodular cast irons (SGI)		EN-GJS-500-7	1160	0,37
K5	Austempered ductile irons (ADI)		EN-GJS-1000-5		
K6	Austenitic lamellar cast irons		EN-GJLA-XNiCuCr15-6-2		
K7	Austenitic nodular cast irons		EN-GJSA-XNiMn23-4		

Non-ferrous metals

MG	Description	Properties	Reference	$k_{cl,1}$	m_{ϵ}
N1	Aluminium alloys, Si < 9%		AW-7075		
N2	Aluminium alloys, 9% < Si < 16%		AC-44200 Si = 12%		
N3	Aluminium alloys, Si > 16%		AlSi17Cu5		
N11	Copper alloys		CW614N	740	0,26

Superalloys and titanium

MG	Description	Properties	Reference	$k_{cl,1}$	m_{ϵ}
S1	Iron-based superalloys		Discalloy		
S2	Cobalt-based superalloys		Stellite 21		
S3	Nickel-based superalloys		Inconel 718	2530	0,21
S11	Titanium, low alloyed, (a)		Ti		
S12	Titanium, medium alloyed, (a+2)		TiAl6V4		
S13	Titanium, high alloyed, (near 2 and 2)		Ti10V2Fe3Al	1500	0,24

Workpiece materials

Classification, MG

Hard materials

MG	Description	Properties	Reference	$k_{c1,1}$	m_c
H3	Case-hardened steels	58 < HRC < 62	16MnCr5 60 HRC	2070	0,14
H5	Quenched & Tempered steels	38 < HRC < 56	42 CrMo4 50 HRC	2320	0,18
H7	Quenched & Tempered steels Bearing steels	56 < HRC < 64	100 Cr6 60 HRC	2480	0,17
H8	Tool steels High Speed Steels (HSS)	38 < HRC < 64	X40 CrMoV51 50 HRC	2750	0,20
H11	Martensitic stainless steels	38 < HRC < 50	X20 Cr 13 45 HRC	2300	0,15
H12	Maraged and precipitation-hardened stainless steels	1200 < R _m < 1650	X 5 CrNiCuNb 16 4 R _m = 1450 N/mm ²	2410	0,17
H21	Manganese steels	23 < HRC < 64	X120 Mn 12 50 HRC		
H31	White cast irons	50 < HRC < 64	EN-GJN-HV600(XCr11) 55 HRC		

Other difficult materials

MG	Description	Properties	Reference	$k_{c1,1}$	m_c
PM1	Low-alloy PM-materials		F-0008 Fe-0.7C		
PM2	Medium-alloy PM-materials		FLC-4608 Fe2Cu1.8Ni 0.5Mo0.2Mn0.8C		
PM3	High-alloy PM-materials Exhaust valve seat materials, etc.				
HF1	Hardfacing alloys Welded or plasma-deposited iron-based alloys				
HF2	Hardfacing alloys Welded or plasma-deposited cobalt- and nickel-based alloys				
CC1	Sintered tungsten carbide		G50		

Workpiece materials
Classification, MG

Plastics and Composites

MG	Description	Properties	Reference	$k_{s1.1}$	m_c
TS1	Thermosetting carbon-fibre composites		Urea formaldehyde (UF)		
TS2	Thermosetting glass-fibre composites		T300 T700T800 HTA-S IMA-Epoxy (M21)...		
TS3	Thermosetting aramide-fibre composites		Epoxy - HX..(42..)/E glass (7781 ...)...		
TS4	Thermoplastic polymers		Kevlar 49		
TP1	Thermoplastic carbon-fibre composites		Polycarbonate (PC)		
TP2	Thermoplastic glass-fibre composites		PPS/PEEK-T300.,		
TP3	Thermoplastic aramide-fibre composites		PPS/PEEK-E-glass or A-glass...		
TP4	Thermosetting polymers				

Graphite

MG	Description	Properties	Reference	$k_{s1.1}$	m_c
GR1	Graphite		R8500		

Workpiece materials

Classification, MG

MG

MG	EN	EN-Nr	W.-Nr	DIN	AFNOR	BS	UNI	JIS	SS	UNS
P1	11 SMn 30	1.0715	1.0715	9 SMn 28	S250	230 M 07	CF 9 SMn 28	SUM 22	1912	G12130
	11 SMnPb 30	1.0718	1.0718	9 SMnPb 28	S 250 Pb		CF 9 SMnPb 28	SUM 22 L	1914	G12134
	10S20	1.0721	1.0721	10S20	10 F1	210 M 15	CF10S20			
			1.0722	10SPb 20	10 PbF 2		CF10SPb 20			
	15 SMn 13	1.0725	1.0723	15S20		210A15		SUM 32	1922	
	35 S20	1.0726	1.0726	35S20	35 MF 4	212 M 36			1957	G11400
	46 S20	1.0727	1.0727	46S20	45 MF 4	212 M 44			1973	G11460
P2	11 SMn 37	1.0736	1.0736	9 SMn 36	S300	240 M 07	CF 9 SMn 36			G12150
	11 SMn 37	1.0736	1.0736	9 SMn 36	S300	240 M 07	CF 9 SMn 36			G12150
	S235JR	1.0037	1.0037	St 37-2	E24-2		Fe 360 B	STKM12C	1311	
	S235JRG2	1.0038	1.0116	St 37-3	E 24-3, E 24-4	4360-40 C	Fe 360 D FF		1312,1313	
	S275J2G3	1.0144	1.0144	St 44-3 N	E 28-3, E 28-4	4360-43 C	Fe430DFF	SM 41 C	1412,1414	
	C10	1.0301	1.0301	C10	34C10, XC10	045 M 10	C10	S10C		G10100
			1.0401	C15	37C12, XC18	080 M 15	C 15, C 16		1350	G10170
P3	C22	1.0402	1.0402	C22	C20	050 A 20	C 20, C 21		1450	G10200
	S355JR	1.0570	1.0570	St 52-3	E 36-3, E 36-4	4360-50 C	Fe 510 B	SM 50 YA	2172,2132	
	C15R	1.1141	1.1141	Ck 15	XC15, XC18	080 M 15	C 15, C 16	S15C, S15CK	1370	G10170
			1.1158	Ck25	XC25	060 A 25	C25	S25C		G10250
			1.2162	21 MnCr5	20 NC5			SCR 420 H		
	16 Mo 3	1.5415	1.5415	15 Mo 3	15D3	1501-240	16 Mo 3		2912	
			1.5423	16 Mo 5		1503-245-420	16 Mo 5	SB 450 M		G45200
P4	14 NiCr 14	1.5752	1.5752	14 NiCr 14	12 NC 15	655 M 13		SNC 815(H)		G33106
			1.5919	15 CrNi 6	16NC6	S107	16 CrNi 4			
	18 NiCrMo 7 6	1.6587	1.6587	18 CrNiMo 7 6	18NCD6	820 A16	18 NiCrMo 7			
	16MnCr5	1.7131	1.7131	16MnCr5	16MC5	527 M 17	16MnCr5	SCR 415	2511	G51170
	16 MnCr5 5	1.7139	1.7139	16 MnCr5 5						
	20MnCr5	1.7147	1.7147	20 MnCr5	20 MC5		20 MnCr5	SMnC420 (H)		G51200
	20 MnCr5 5	1.7149	1.7149	20 MnCr5 5	20 MnCr5 5			SMnC 21 H		
P5	13CrMo4 5	1.7335	1.7335	13CrMo44	15 CD 3.5	1501-620 Gr. 27	14CrMo4 5		2216	
			1.7337	16CrMo4 4	15 CD 4.5	1501-620 Gr. 27	14CrMo4 5		2216	
	10CrMo910	1.7380	1.7380	10CrMo910	10 CD 9.10	1501-622 Gr. 31	12CrMo910		2218	J21890
	C35		1.0501	C35	55C35	060 A 35	C35		1550	G10350
	E335	1.0503	1.0503	C45	65C45	80M46	C45	S45C	1650	G10430
	C40		1.0511	C40	60C40	080 M 40	C40	S40C		
	E360	1.0070	1.0535	St 70-2	A 70-2		Fe 690		1655	
P6	C60	1.0601	1.0601	C60	CC 55	080 A 62	C60			G10600
			1.1157	40 Mn4	35 M 5	150 M 36				G10390
	G 28 Mn6	1.1165	1.1165	30 Mn5		120 M 36		SMn 1 H, SCMn 2		G13300
	C35E	1.1181	1.1181	Ck 35	XC 38 H1	080 M 36	C35	S35C	1572	G10340
	C45E	1.1191	1.1191	Ck45	XC42	080 M 46	C45	S45C	1672	G10420
	C60E	1.1221	1.1221	Ck 60	XC60	080 A 62	C60	S58C	1665,1678	G10640
			1.1740	C60W	Y3 55			SK7		
P7	55 SiCr7	1.7100	1.0904	55 Si 7	55 S 7	250 A 53	55 Si 8		2085,2090	
			1.2330	35 CrMo4	34 CD 4	708 A 37	35 CrMo4		2234	T51620
			1.2542	45WCrV7		BS1	45 WCrV 8 KU		2710	T41901
		1.2714	1.2714	56NiCrMoV7		BH 224-5	56 NiCrMoV7-KU	SKT4		T61206
			1.5121	46 MnSi 4						
			1.5710	36 NiCr 6	35 NC6	640 A 35		SNC 236		
			1.5736	36 NiCr 10	35 NC 11		35 NiCr 9	SNC 631 (H)		
P8	36 CrNiMo 4		1.6511	36 CrNiMo 4	40 NCD 3	816 M 40	38 NiCrMo 4 (KB)			G98400
	34 CrNiMo 6	1.6582	1.6582	34 CrNiMo 6	35 NCD 6	817 M 40	35 NiCrMo 6 (KW)	SNCM 447	2541	G43400
	34 Or 4	1.7033	1.7033	34Cr4	32C4	530 A 32	34 Cr4(KB)	SCR 430 (H)		G51320
	41 Or 4	1.7035	1.7035	41 Cr4	42 C4	530 M 40	41 Cr4	SCR 440 (H)		G51400
	25 CrMo4	1.7218	1.7218	25 CrMo4	25 CD 4 S	708 M 25	25 CrMo4(KB)	SCM 425	2225	G41300
	42 CrMo4	1.7225	1.7225	42CrMo4	42 CD 4	708 M 40	42 CrMo4	SCM 440 (H)	2244	G41400
	42 CrMo4	1.7225	1.7225	42CrMo4	42 CD 4	708 M 40	42 CrMo4	SCM 440 (H)	2244	G41400
P9			1.7361	32CrMo12	30 CD 12	722 M 24	32 CrMo12		2240	
	50 CrV4	1.8159	1.8159	50 CrV4	50 CV4	735 A 50	51 CrV4	SUP 10	2230	H61500
	41 CrAlMo 7 10	1.8509	1.8509	41 CrAlMo 7	40 CAD 6.12	905 M 39	41 CrAlMo 7	SACM 645	2940	K24065
	C67S	1.1231	1.1231	Ck67	XC68	060 A 67	C70		1770	G10700
	C100S	1.1274	1.1274	Ck 101		060 A 96		SUP 4	1870	G10950
	C105U	1.1545	1.1545	C105W1	Y1 105		C 100 KU		1880	
			1.1645	C105W2	Y1 105		C 100 KU	SK3		
P10			1.1663	C125W	Y2120		C 120 KU	SK2		

Workpiece materials
Classification, MG

MG

U.N.E./I.H.A.	AISI/ASTM	GOST	CSN	Misc. Brands	Condition	Structure
	1213				Annealed	
	12 L13				Annealed	
	1108				Annealed	
	11 L08				Annealed	
					Annealed	
	1140	40			Annealed	
	1146				Annealed	
	1215				Annealed	
	12 L14				Annealed	
		16D			Annealed	
	A573 Grade 58	18kp	11378		Annealed	
	A573 Grade 70	St14kP	11 448		Annealed	
	1010	10			Annealed	
F.1110	1015	15			Annealed	
	1020,1023	20	12 024		Annealed	
		17G1S	11 523		Annealed	
F.1511	1015	15			Annealed	
F.1120	1025	25			Annealed	
					Annealed	
	A204 Grade A		15 020		Annealed	
	4520				Annealed	
	3310,9314	20X2H4A	16420		Annealed	
	4320		16220		Annealed	
					Annealed	
F.1516	5115	12KHN2	14220		Annealed	
		18HG			Annealed	
	5120	20KH	14 221		Annealed	
	5120 H	20KH			Annealed	
	A182-F11, A182-F12	12KHM	15121		Annealed	
	A387 Grade 12 Cl. 2				Annealed	
F.155	A182-F22	12KH8	15313		Annealed	
F.1130	1035	35	12 040		Annealed	
F.5110	1045	45	12 050		Annealed	
	1040	40	12 041		Annealed	
F.1150	1055	55			Annealed	
	1060	60	12 061		Annealed	
	1039	40G			Annealed	
	1330	30G2			Annealed	
F.1135	1035	35			Annealed	
F.1140	1045	45	12 050		Annealed	
F.1150	1064	60			Annealed	
	1060	60			Annealed	
F.144	9255	55S2			Annealed	
F.1250	4135	35KHM			Annealed	
F.5241	S1	5KHV2S			Annealed	
	L6	5KHNV			Annealed	
	5045				Annealed	
	3135				Quenched & Tempered	
	3435				Annealed	
	9840				Quenched & Tempered	
F.1280	4340	38H2N2MA	16 343		Annealed	
	5132	35KH			Quenched & Tempered	
	5140	40H	14140		Quenched & Tempered	
F.1251	4130	20KHM	15130		Quenched & Tempered	
F.1252	4142,4140	38HM	15142		Annealed	
F.1252	4142,4140	38HM	15142		Quenched & Tempered	
					Quenched & Tempered	
F.143	6150	50KHFA	15 260		Quenched & Tempered	
F.1740	A355 Cl. A				Annealed	
F.5103	1070	70			Annealed	
F.5117	1095				Annealed	
F.5118	W1	U10A			Annealed	
		U10			Annealed	
	W1	U13			Annealed	

Workpiece materials

Classification, MG

MG

MG	EN	EN-Nr	W.-Nr	DIN	AFNOR	BS	UNI	JIS	SS	UNS
P7	107 CrV3	1.2210	1.2210	115 CrV 3	100 C 3	Y	107 CrV 3 KU	Y	Y	T61202
			1.2510	100MnCrW4	90 MWCV 5	BO1	95 MnWCr5KU	SKS3	SKS3	T31501
	90 MnCrV8	1.2842	1.2842	90 MnCrV 8	90 MV 8	BO 2	90 MnVCr8KU			T31502
	100 Cr6	1.3505	1.3505	100 Cr6	100 C 6	534 A 99	100 Cr6	SUJ2	SUJ2	G51986
P8	X210CM2	1.2080	1.2080	X 210 CM2	Z200C12	BD3	X 210 CM3 KU	SKD1	SKD1	T30403
			1.2343	X 38 CrMoV 5 1	Z38 CDV5	BH 11	X 37 CrMoV 5 1 KU	SKD6	SKD6	T20811
	X40 CrMoV 5 1	1.2344	1.2344	X40 CrMoV 51	Z40 CDV5	BH13	X40 CrMo 51 1 KU	SKD61	SKD61	T20813
	X100 CrMoV 5	1.2363	1.2363	X100 CrMoV 51	Z100 CDV5	BA 2	X100 CrMoV 51 KU	SKD12	SKD12	T30102
			1.2365	X 32 CrMoV 3 3	32 DCV28	BH10	30 CrMoV 12 27 KU	SKD7	SKD7	T20810
			1.2436	X210CrW12			X215CrW121 KU	SKD2	SKD2	
			1.2601	X165 CrMoV 12			X165 CrMoW12KU			
			1.2713	55NiCrMoV6	55 NCDV 7			SKT4	SKT4	T61206
	H5 6-5-2-5	1.3243	1.3243	S 6-5-2-5	Z85 WDKCV 06-05-04-02		H5 6-5-2-5	SKH 55	SKH 55	
	H5 2-10-1-8	1.3247	1.3247	S 2-10-1-8	Z 110 DKCWV 09-08-04	BM 42	H5 2-9-1-8	SKH 51	SKH 51	T11342
	H5 18-1-2-5	1.3255	1.3255	S 18-1-2-5	Z80 WDKCV 18-05-04-01	BT4	H5 18-1-1-5	SKH 3	SKH 3	T12004
	H5 6-5-2	1.3343	1.3343	S 6-5-2	Z 85 WDCV 06-05-04-02	BM2	H5 6-5-2	SKH 9, SKH 51	SKH 9, SKH 51	T11302
	H5 2-9-2	1.3348	1.3348	S 2-9-2	Z 100 DCWV 09-04-02-02		H5 2-9-2	SKH 58	SKH 58	T11307
	H5 18-0-1	1.3355	1.3355	S 18-0-1	Z80 WCV 18-04-01	BT1	H5 18-0-1	SKH 2	SKH 2	T12001
P11	X 6 Cr 13	1.4000	1.4000	X 6 Cr 13	Z6C12	403 S 17	X 6 Cr 13	SUS 403	SUS 403	S41008
	X12 CM3	1.4006	1.4006	X10 CM3	Z 10 C 13	410 S 21	X12 CM3	SUS 410	SUS 410	S41000
	X6Cr17	1.4016	1.4016	X6CM7	Z8C17	430 S 15	X8Cr17	SUS 430	SUS 430	S43000
	X20 Cr 13	1.4021	1.4021	X20 Cr 13	Z20C13	420 S 37	X20 Cr 13	SUS 420 J 1	SUS 420 J 1	S42000
	X39 Cr 13	1.4031	1.4031	X40 Cr 13	Z40C14	420 S 45	X40 Cr 14	SUS 420	SUS 420	S40280
	X70 CrMo 15	1.4109	1.4109	X65 CrMo 14	Z70D14			SUS 440 A	SUS 440 A	S44002
	X90 CrMoV 18	1.4112	1.4112	X90 CrMoV 18	Z2CND1805	409 S 19	X CrTi 12	SUS 440 B	SUS 440 B	S44003
	X105 CrMo 17	1.4125	1.4125	X105 CrMo 17	Z100 CD 17		X105 CrMo 17	SUS 440 C	SUS 440 C	S44004
	X 3 CrNiMo 13 3	1.4313	1.4313	X 5 CrNi 134	Z5CN13.4	425 C 11	X 6 CrNi 13 04	SCS5	SCS5	S41500
	X18CrN28	1.4749	1.4749	X18CrN 28	Z18C25					S44600
P12	X 6 NiCrTiMoV25 15	1.4534	1.4534	X 3 CrNiMoAl 13 8 2						S13800
	X 4 CrNiCuNb 164	1.4540	1.4540	X 4 CrNiCuNb 16 4						S15500
		1.4540	1.4540	X 4 CrNiCuNb 16 4	Z4CNUNb16.4M					S15500
	X4 CrNiCuNb 164	1.4540	1.4540	X 4 CrNiCuNb 16 4						S15500
	X 5 CrNiCuNb 16 4	1.4542	1.4542	X 5 CrNiCuNb 16 4				SUS 630	SUS 630	S17400
	X 5 CrNiCuNb 17 4	1.4548	1.4542	X 5 CrNiCuNb 17 4	Z6CNU17.4			SCS 24, SUS 630	SCS 24, SUS 630	S17400
	X 7 CrNiAl 17 7	1.4564	1.4564	X 7 CrNiAl 17 7	Z 9 CAN 17.7	301 S 81	X 7 CrNiAl 17 7	SUS 631	SUS 631	S17700
	X 2 NiCoMoTi 18 12 4	1.6356	1.6356	X 2 NiCoMoTi 18 12 4						K93160
	X 2 NiCoMoTi 189 5	1.6358	1.6358	X 2 NiCoMoTi 18 9 5	Z2NKD 19-09					K93120
	X2NiCoMo18 9 5	1.6358	1.6358	X 2 NiCoMoTi 18 9 5	Z2NKD 19-09					K93120
	X2NiCoMo18 8 5	1.6359	1.6359	X2NiCoMo18 8 5		5162				K92890
	X2NiCoMo18 8 5	1.6359	1.6359	X2NiCoMo18 8 5		5162				K92890
	X 10 CrNiS 18 9	1.4305	1.4305	X 10 CrNiS 18 9	Z 10 CNF 18.09	303 S 31	X 10 CrNi 18 09	SUS 303	SUS 303	S30300
	X 2 CrNi 19 11	1.4306	1.4306	X 2 CrNi 19 11	Z2CN18.10	304 S 12	X 3 Cr Ni 18 11	SUS 304 L	SUS 304 L	S30403
M1	X5 CrNi 18 10	1.4301	1.4301	X 5 CrNi 18 10	Z6CN18.09	304 S 31	X 5 CrNi 18 11	SUS 304	SUS 304	S30400
	X5CrNiMo 17 12 2	1.4401	1.4401	X 5 CrNiMo 17 12 2	Z3CND 17.11.1	316 S 31	X 5 CrNiMo 17 12	SUS 316	SUS 316	S31600
	X 6 CrNiNb 18 10	1.4550	1.4550	X 6 CrNiNb 18 10	Z6CNNb18.10	347 S 31	X 6 CrNiNb 18 11	SUS 347	SUS 347	S34700
	X 9 CrNi 18 8	1.4310	1.4310	X 12 CrNi 17 7	Z 12 CN 17.07	301 S 21	X 12 CrNi 17 07	SUS 301	SUS 301	S30100
M2	X12 CrNi 18 8	1.4300	1.4300	X 12 CrNi 18 8	Z 12 CN 18	302 S 25		SUS 302	SUS 302	S30200
	X2CrNiMo 18 14 3	1.4435	1.4435	X 2 CrNiMo 18 14 3	Z2CND 17.13	316 S 12	X 2 CrNiMo 17 13 2	SCS 16, SUS 316 L	SCS 16, SUS 316 L	S31603
	X2CrNiMoN 17 13 3	1.4429	1.4429	X 2 CrNiMoN 17 13 3	Z2CND17.13AZ	316 S 62	X 2 CrNiMoN 17 13 3	SUS 316 LN	SUS 316 LN	S31653
	X2 CrNiN 1810	1.4311	1.4311	X 2 CrNiN 19 11	Z2CN18.10AZ	304 S 62	X 2 CrNiN 18 11	SUS 304 LN	SUS 304 LN	S30453
M3	X 3 CrNiMo 1812 3	1.4466	1.4466	X 5 CrNi 1815		317 S 16	X 5 CrNi 18 15	SUS 317	SUS 317	S31700
	X 9 CrNiSiN 21 112	1.4835	1.4893	X 9 CrNiSiN 2111 2		310 S 31				S30815
	X12 CrNi 25 21	1.4335	1.4335	X12 CrNi 25 21	Z12CN 25.20	310 S 24	X 6 CrNi 26 20	SUH 310, SUS 310 S	SUH 310, SUH 310 S	S31008
	X 2 CrNiMoN 22 5 3	1.4462	1.4462	X 2 CrNiMoN 22 5	Z 2 CND 22.05 Az	332 S 15	X 2 CrNiMoN 22 5			S31803
M4	X2 CrNiMoSi 19 5	1.4424	1.4417	X 2 CrNiMoSi 19 5	Z 2 CND 18.05.03					S31500
	X2NiCrMoCu 25 20 5	1.4539	1.4539	X2NiCrMoCu 2520 5	Z2NCDU 2520	904 S 13				N08904
	X 3 CrNiMo 27 5 2	1.4460	1.4460	X 4 CrNiMo 27 5 2	Z 3 CND 25.7 Az		X 3 CrNiMo 27 5 2	SUS 329 J 1	SUS 329 J 1	S32900
	X 5 CrNiCuNb 16 4	1.4980	1.4943	X4 NiCrTi 2515	Z6NCTDV25.15	HR 51		SUH 660	SUH 660	S66286
M5	X1 CrNiMoN 20 18 7	1.4547	1.4529	X1 CrNiMoN 2018 7	Z1 CNDU 20.18.05 Az		X1 CrNiMoN 2018 7			S31254
	X 1 CrNiMoN 25 22 8	1.4652	1.4652	X 2 CrNiMoN 2522 7						S32654
	X 10 NiCrAlTi 32 20	1.4876	1.4876	X 10 NiCrAlTi 32 20	Z 10 NC 32.21			NCF 800	NCF 800	N08800
	X 2 CrNiMoN 25 7 4	1.4410	1.4410	X 2 CrNiMoN 25 7 4	Z 3 CND 25.07 Az		X 2 CrNiMoN 25 7 4			S32750

Workpiece materials

Classification, MG

MG

MG	EN	EN-Nr	W.-Nr	DIN	AFNOR	BS	UNI	JIS	SS	UNS
K1	EN-GJL-150	0.6150	0.6150	GG-15	Ft 15 D	Grade 150	G15	FC 150	01 15-00	F11601
	EN-GJL-200	0.6200	0.6200	GG-20	Ft20 D	Grade 220	G20	FC 200	01 20-00	F12101
	EN-GJL-250	0.6250	0.6250	GG-25	Ft25D	Grade 260	G25	FC 250	01 25-00	F12401
	EN-GJL-350	0.6350	0.6350	GG-35	Ft 35 D	Grade 350	G35	FC 350	01 35-00	F13502
K2	EN-GJL-215			GG-220 HB					0219	
	EN-GJV-300			GJV-300						
	EN-GJV-350			GJV-350						
	EN-GJV-400			GJV-400						
K3	EN-GJV-450			GJV-450						
	EN-GJV-500			GJV-500						
	EN-GJMB-550-4	0.8155		GTS-55-04	P 540/5	P 540/5	P 55-04	PCMP55-04	08 54-00	F24130
	EN-GJS-350-22	0.7033	0.7033	GGG-35.3	FGS 370-17	Grade 350/22		FCD 350-22L	07 17-15	
K4	EN-GJS-400-15	0.7040	0.7040	GGG-40	FGS 400-12	Grade 420/12	GS 400-12	FCD 400-18L	07 17-02	F32800
	EN-GJS-400-18	0.7043	0.7043	GGG-40.3	FGS 370-17	Grade 370/17	GSO42/17		07 17-12	F32800
	EN-GJS-500-7	0.7050	0.7050	GGG-50	FGS 500-7	Grade 500/7	GS 500-7	FCD 500-7	0727-02	F33800
	EN-GJS-600-3	0.7060	0.7060	GGG-60	FGS 600-3	Grade 600/3	GS 600-3	FCD 600-3	07 32-03	F34100
K5	EN-GJS-700-2	0.7070	0.7070	GGG-70	FGS 700-2	Grade 700/2	GS 700-2	FCD 700-2	07 37-01	F34800
	EN-GJS-1000-5			GJS-1000-5						ADI grade 5
	EN-GJS-1200-2			GJS-1200-2						ADI grade 2
	EN-GJS-1400-1			GJS-1400-1						ADI grade 3
K6	EN-GJS-800-8			GJS-800-8						ADI grade 4
	EN-GJLA-XNiCr 20-2	0.6660	0.6660	GGL-NiCr20 2	FGL Ni20 Cr2	Grade F2			0523-00	F41002
	EN-GJLA-XNiCr 30-3	0.6676	0.6676	GGL-NiCr30 3	FGL Ni30 Cr3	Grade F3				F41004
	EN-GJLA-XNiCuCr 15-6-2	0.6655	0.6655	GGL-NiCuCr 15 6 2	FGLNi15Cu6 Cr2	Grade F1				F41000
K7	EN-GJSA-XNiMn 13-7	0.7652	0.7652	GGG-NiMn13 7	FGS Ni13 Mn7	Grade S6			07 72-00	
	EN-GJSA-XNiCr 20-2	0.7660	0.7660	GGG-NiCr20 2	FGS Ni20 Cr2	Grade S2				F43000
	EN-GJSA-XNiMn 23-4	0.7673	0.7673	GGG-NiMn 234	FGS Ni23 Mn4	Grade S2M				F43010
	EN-GJSA-XNiCr 30-3	0.7676	0.7676	GGG-NiCr30 3	FGS Ni30 Cr3	Grade S3				F43003
N1	EN-GJSA-XNi 35	0.7683	0.7683	GGG-Ni 35	FGS Ni35					F43006
	AW-1050A	AI99.5	3.0255	AI99.5	A-5/1050A	1B		(A1050)	4007	AA1050A
	AW-2011	AlCuBiPb	3.1655	AlCuBiPb	A-U5PbBi/2011	FC1		A2011	4355	AA2011
	AW-2014	AlCuSiMn	3.1255	AlCuSiMn	A-U4SG/2014	H15			4338	AA2014
N2	AW-5005	AlMgI	3.3315	AlMgI	A-G0.6	N41			4106	AA5005
	AW-6060	AlMgSi0.5	3.3206	AlMgSi0.5	A-G5/6060	(H0)			4103	AA6060
	AW-6063	AlMgSi0.7	3.3210	AlMgSi0.7	A-GSUC/6061	(H10)		(A6063)	4104,4107	AA6005
	AW-3103	AlMnI	3.0515	AlMnI		N3			4054	AA3103
N3	AW-3003	AlMnICu	3.0517	AlMnICu	A-M1/3003			A3003		AA3003
	AW-7020	AlZn4.5Mg1	3.4335	AlZn4.5Mg1	A-Z5G/7020	H17			4425	AA7020
	AW-7075		3.4365	AlZnMgCu1.5	A-Z5GU/7075	2L95/2L96		A7075		AA7075
	AC-42000		3.2341	G-AlSi5Mg	A-S7G	LM25	3599	AC4C	4244	
N11	AC-46200	AlSi8Cu3(Si)	3.2161	G-AlSi8Cu3					4251	A13800
	MG-P-63	MgAl6Zn	3.5612	G-MgAl6Zn	G-A6-Z1	MAG-E-121				M11600
	MG-P-61	MgAl8Zn	3.5812	G-MgAl8Zn	(G-A7-Z1)					
	MN65120	MgSe3Zn2Zr1	3.5103	G-MgSe3Zn2Zr1	ZRE1	MAG6-TE				M12330
N2	AC-43400	AlSi10Mg(Fe)	3.2381	G-AlSi10Mg	A-S10G	LM9			4253	A13600
	AC-44200	AlSi12	3.2382	GD-AlSi12						
	AW-6082	AlMgSiI	3.2315	AlMgSiI	A-SGM0.7/6082	H30			4212	AA6082
		AlSi17Cu5						ADC14		
N11	CC331G		2.0940.01	CuAHOFe	CuAHOFe	AB1			5710	C95200
	CC333G		2.0975.01	CuAHONI	CuAl10Ni5Fe5	AB2			5716	C95500
		CuNi10Fe1Mn	2.0872	CuNi10Fe1Mn	CuNi10Fe1Mn	CN102			5667	C70600
				CuNi10Zn45						
N11		CW408J	2.0790	CuNi18Zn19Pb	CuNi18Zn19Pb1					C76300
	CW352H		2.1176	CuPbIOSn	CuSn10Pb10	LB2			5640	C93700
	CC480K		2.1050.01	CuSnIO	CuSnIO	CT1			5443	C90700
			2.1087	CuSnIOZn					5458	C90500
N11	CW452K	CuSn6	2.1020	CuSn6	CuSn6	PB103		C5191	5428	C51900
	CW502L	CuZn15	2.0240	CuZn15	CuZn15	CZ102		C2300	5112	C23000
	CW706R	CuZn28Sn1	2.0470	CuZn28Sn1	CuZn29Sn1				5220	C44300
	CW508L	CuZn37	2.0321	CuZn37	CuZn37	CZ108			5150	C27200
N11	CW717R	CuZn38Sn1	2.0530	CuZn38Sn1						C46400
	CW614N	CuZn39Pb3	2.0401	CuZn39Pb3	CuZn39Pb3	CZ121			5170	C38500
	CW612N	CuZn40Pb2	2.0402	CuZn40Pb2	CuZn39Pb2	CZ120			5168	C37800
	CW622N	CuZn44Pb2	2.0410	CuZn44Pb2		CZ104			5272	C68700

MG

U.N.E./I.H.A.	AISI/ASTM	GOST	CSN	Misc. Brands	Condition	Structure
	A48 25 B	Sc 15	422 415			Grey cast iron (GCI)
	A48 30 B	Sc 20	422 420			Grey cast iron (GCI)
	A48 35 B	Sc 25	422 425			Grey cast iron (GCI)
	A48 50 B	Sc 35				Grey cast iron (GCI)
	G3500					Grey cast iron (GCI)
	Grade 350					Compacted graphite iron (CGI)
	Grade 400					Compacted graphite iron (CGI)
	Grade 400-15					Compacted graphite iron (CGI)
	Grade 450					Compacted graphite iron (CGI)
	Grade 500					Compacted graphite iron (CGI)
	A220 60004				Tempered	Malleable cast iron (MCI)
						Nodular cast iron (SGI)
FGE 38-17	60-40-18	Vc 42-12	422 304			Nodular cast iron (SGI)
	60-40-18	Vc 42-12				Nodular cast iron (SGI)
FGE 50-7	A536,80-55-06	Vc50-2	422 305			Nodular cast iron (SGI)
FGE 60-2	A476,80-60-03	Vc60-2	422 306			Nodular cast iron (SGI)
FGE 70-2	A536,100-70-03	Vc70-2				Nodular cast iron (SGI)
	1600/1300/-					Austempered ductile iron (ADI)
	1050/700/7					Austempered ductile iron (ADI)
	1200/850/4					Austempered ductile iron (ADI)
	1400/1100/1					Austempered ductile iron (ADI)
	850/550/10					Austempered ductile iron (ADI)
	A436 Type 2			Ni-Resist 2		Austenitic lamellar cast iron
	A436 Type 3			Ni-Resist 3		Austenitic lamellar cast iron
	A436 Type 1			Ni-Resist 1		Austenitic lamellar cast iron
				Nodumag		Austenitic nodular cast iron
	A436Type D-2			Ni-Resist D-2		Austenitic nodular cast iron
	A439Type D-2M			Ni-Resist D-2M		Austenitic nodular cast iron
	A436Type D-3			Ni-Resist D-3		Austenitic nodular cast iron
	A439Type D-5			Ni-Resist D-5		Austenitic nodular cast iron
	B26					
	A380					
	AZ61A					
	AZ80A					
	AMS 4442					
	B85					
	A413.2					
	B390.0					
	CA952	BrW9ZH3L				
	CA955	BrW10ZH4N4L				
	CA937					
		BrOF6.5-0.15				
		L90				
		LGMsh70-1-0.05				
		LO60-1				
		LWMsh77-2-0.05				

Workpiece materials

Classification, MG

MG

MG	EN	EN-Nr	W.-Nr	DIN	AFNOR	BS	UNI	JIS	SS	UNS
S1										
S2										
S3	NiMo30	2.4810	2.4810							N10002
	NiMo16Cr15W	2.4819	2.4819							N10276
	NiCr19Fe19Nb5Mo3	2.4668	2.4668							N07718
		2.4669	2.4669							N07750
	NiCr20TiAl	2.4631	2.4631							N07080
S11										
		3.7024	3.7024							
S12										
S13										
H3	16MnCr5	1.7131	1.7131	16MnCr5	16MC5	527 M 17	16MnCr5	SCR 415	2511	G51170
H5	C67S	1.1231	1.1231	Ck67	XC68	060 A 67	C70		1770	G10700
	C75S	1.1248	1.1248	Ck75	XC75	060 A 78	C75		1774,1778	G10780
	C100S	1.1274	1.1274	Ck 101		060 A 96		SUP 4	1870	G10950
	C105U	1.1545	1.1545	C105W1	Y1 105		C 100 KU		1880	
		1.2550	1.2550	60WCrV7	55 WC 20		55WCrV8KU			
	55 Cr3	1.7176	1.7176	55 Cr3	55C3	527 A 60	55 Cr3	SUP 9 (A)	2253	G51550
H7	42 CrMo 4	1.7225	1.7225	42 CrMo 4	42 CD 4	708 M 40	42 CrMo 4	SCM 440 (H)	2244	G41400
	107 CrV3	1.2210	1.2210	115 CrV 3	100C 3		107 CrV 3 KU			T61202
		1.2510	1.2510	100 MnCrW4	90 MWCV 5	BO1	95 MnWCr5KU	SKS3	2140	T31501
	90 MnCrV8	1.2842	1.2842	90 MnCrV8	90 MV 8	BO 2	90 MnVCr8KU			T31502
	100 Cr6	1.3505	1.3505	100 Cr6	100 C 6	534 A 99	100 Cr6	SUJ2	2258	G51986
	X40 CrMoV 51	1.2344	1.2344	X40 CrMoV 51	Z40 CDV5	BH13	X 40 CrMo 51 1 KU	SKD61	2242	T20813
H8	X100 CrMoV 5	1.2363	1.2363	X100 CrMoV 51	Z100 CDV5	BA 2	X100 CrMoV 51 KU	SKD12	2260	T30102
	X155 CrVMo 121	1.2379	1.2379	X155 CrVMo 12 1	Z160 CDV12	BD2	X155 CrVMo 121 KU	SKD11		T30402
		1.2436	1.2436	X210CrW12			X215CrW121 KU	SKD2	2312	
		1.2601	1.2601	X165 CrMoV 12			X165 CrMoW12KU		2310	
		1.2713	1.2713	55 NiCrMoV6	55 NCDV 7			SKT4		T61206
	HS 6-5-2-5	1.3243	1.3243	S 6-5-2-5	ZB5 WDKCV 06-05-05-04-02		HS 6-5-2-5	SKH 55	2723	
H11	HS 2-10-1-8	1.3247	1.3247	S 2-10-1-8	Z 110 DKCWV 09-08-	BM 42	HS 2-9-1-8	SKH 51		T11342
	HS 18-0-1	1.3355	1.3355	S 18-0-1	Z80 WCV 18-04-01	BT1	HS 18-0-1	SKH 2		T12001
	X20 Cr 13	1.4021	1.4021	X20 Cr 13	Z20C13	420 S 37	X20 Cr 13	SUS 420 J 1	2303	S42000
	X70 CrMo 15	1.4109	1.4109	X 65 CrMo 14	Z70D14			SUS 440 A		S44002
	X90 CrMoV 18	1.4112	1.4112	X90 CrMoV 18	Z2CND18 05	409 S 19	XCrti 12	SUS 440 B	2327	S44003
	X105 CrMo 17	1.4125	1.4125	X105 CrMo 17	Z100 CD 17		X105 CrMo 17	SUS 440 C		S44004
H12	X4 CrNiCuNb 16 4	1.4540	1.4540	X 4 CrNiCuNb 16 4						S15500
	X 5 CrNiCuNb 16 4	1.4542	1.4542	X 5 CrNiCuNb 16 4				SUS 630		S17400
	X 5 CrNiCuNb 16 4	1.4542	1.4542	X 5 CrNiCuNb 16 4				SUS 630		S17400
	X 7 CrNiAl 17 7	1.4568	1.4568	X 7 CrNiAl 17 7	Z 9 CAN 17.7	301 S 81	X 7 CrNiAl 17 7	SUS 631	2388	S17700
	X 8 CrNiMoAl 15 7 5	1.4574	1.4574	X 8 CrNiMoAl 15 7 5						S15700
	X 6 NiCrTiMoV25 15	1.4943	1.4943	X4 NiCrTi 25 15	Z6NCTDV25.15	HR 51		SUH 660	2570	S66286
	X2NiCoMo18 8 5	1.6359	1.6359	X2NiCoMo18 8 5		S162				K92890
	X 2 NiCoMoTi 18 9 5	1.6358	1.6358	X 2 NiCoMoTi 18 9 5	Z2NKD19-09					K93120
	X 2 NiCoMoTi 18 9 5	1.6358	1.6358	X 2 NiCoMoTi 18 9 5	Z2NKD 19-09					K93120
	X 2 NiCoMoTi 18 12 4	1.6356	1.6356	X 2 NiCoMoTi 18 12 4						K93160
H21	X120Mn12	1.3401	1.3401	X120 Mn12	Z120 M 12	BW10		SC MnH 1	2183	
H31	EN-GJN-HV520	0.9620	0.9620	G-X330 NiCr4 2	FB Ni4 Cr2 BC	Grade 2 A			05 12-00	F45001
	EN-GJN-HV550	0.9625	0.9625	G-X260 NiCr4 2	FB Ni4 Cr2 HC	Grade 2 B			05 13-00	F45000
	EN-GJN-HV600(XCr11)	0.9630	0.9630	G-X300 CrNiSi 9 5 2	FB Cr9 Ni5	Grade 2 C, D, E			04 57-00	F45003

Workpiece materials

Classification, MG

MG

U.N.E./I.H.A.	AISI/ASTM	GOST	CSN	Misc. Brands	Condition	Structure
				Discalloy	Precipitation hardened	
				Haynes 25		
				Stellite 21		
				Hastelloy C		
		KHN65MV		Hastelloy C-276		
				IN 100		
				Inconel 718		
				Inconel X-750	Solution annealed	
				Nimonic 80A		
				Rene 41		
				Udimet 500		
				Waspalloy		
				Ti	Commercially pure	Ti(«)
	AMS 4919			Ti 6-2-4-2	Annealed	Ti («)
	AMS 4943			Ti 3Al-2.5V (grd 9)	Annealed	Ti (a+ 2)
	AMS 4920, Grade 5	VT6		Ti 6Al-4V	Annealed	Ti (a+ 2)
	AMS 4986			Ti 10V-2Fe-3Al	Annealed	Ti(2)
F.1516	5115	12KHN2	14 220		Case hardened	
F.5103	1070	70			Quenched & Tempered	
F.5107	1078,1080	75			Quenched & Tempered	
F.5117	1095				Quenched & Tempered	
F.5118	W1	U10A			Quenched & Tempered	
	S1	5KHV25F			Quenched & Tempered	
	5155				Quenched & Tempered	
F.1252	4142,4140	38HM	15142		Quenched & Tempered	
F.520L	L2	11KHF			Quenched & Tempered	
F.5220	01	9KHVG			Quenched & Tempered	
	02	9G2F			Quenched & Tempered	
F.5230	52100	SHKH15	14109		Quenched & Tempered	
F.5318	H13	4KH5MF15			Quenched & Tempered	
F.5227	A2	9KH5VF			Quenched & Tempered	
F.5211	D2	KH12MF			Quenched & Tempered	
F.5213		KH12			Quenched & Tempered	
		KH12MF			Quenched & Tempered	
F.520.S	L6	5KHNM			Quenched & Tempered	
F.5613	M35	R6M5K5			Quenched & Tempered	
	M42	R2AM9K5			Quenched & Tempered	
	T1	R18			Quenched & Tempered	
F.5261	420	20KH13	17 022		Quenched & Tempered	Martensitic
	440 A				Quenched & Tempered	Martensitic
	440 B	95KH18			Quenched & Tempered	Martensitic
	440 C	95KH18			Quenched & Tempered	Martensitic
	XM-12			15-5 PH	H900	Martensitic
	SAE 630			17-4 PH	H1025	Martensitic
	SAE 630			17-4 PH	H900	Martensitic
	AMS 5528	09KH17N7YU1		17-7 PH	TH1050	Martensitic
	632			PH 15-7 Mo	TH1050	Martensitic
	660			A286	Precipitation hardened	Austenitic
	AMS 6512			Marage 250	Precipitation hardened	Martensitic
	AMS 6521			Marage 300	Precipitation hardened	Martensitic
	AMS 6521			Marage 300	Precipitation hardened	Martensitic
	AMS 6515			Marage 350	Precipitation hardened	Martensitic
	A128 Grade A			Hadfield		
	A532 IB (NiCr-LC)			Ni-Hard 2		White cast iron
	A532 IA(NiCr-HC)			Ni-Hard 1		White cast iron
	A532 ID (Ni-HiCr)			Ni-Hard 4		White cast iron

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+91 4479665707



sales@procarbtools.com



Procarb Tools India Private Limited
#409, F1, Sivaprakasam Nagar Main Road,
Ambattur - Puzhal Main Road Surapet,
Chennai - 600066 . Tamilnadu , India.