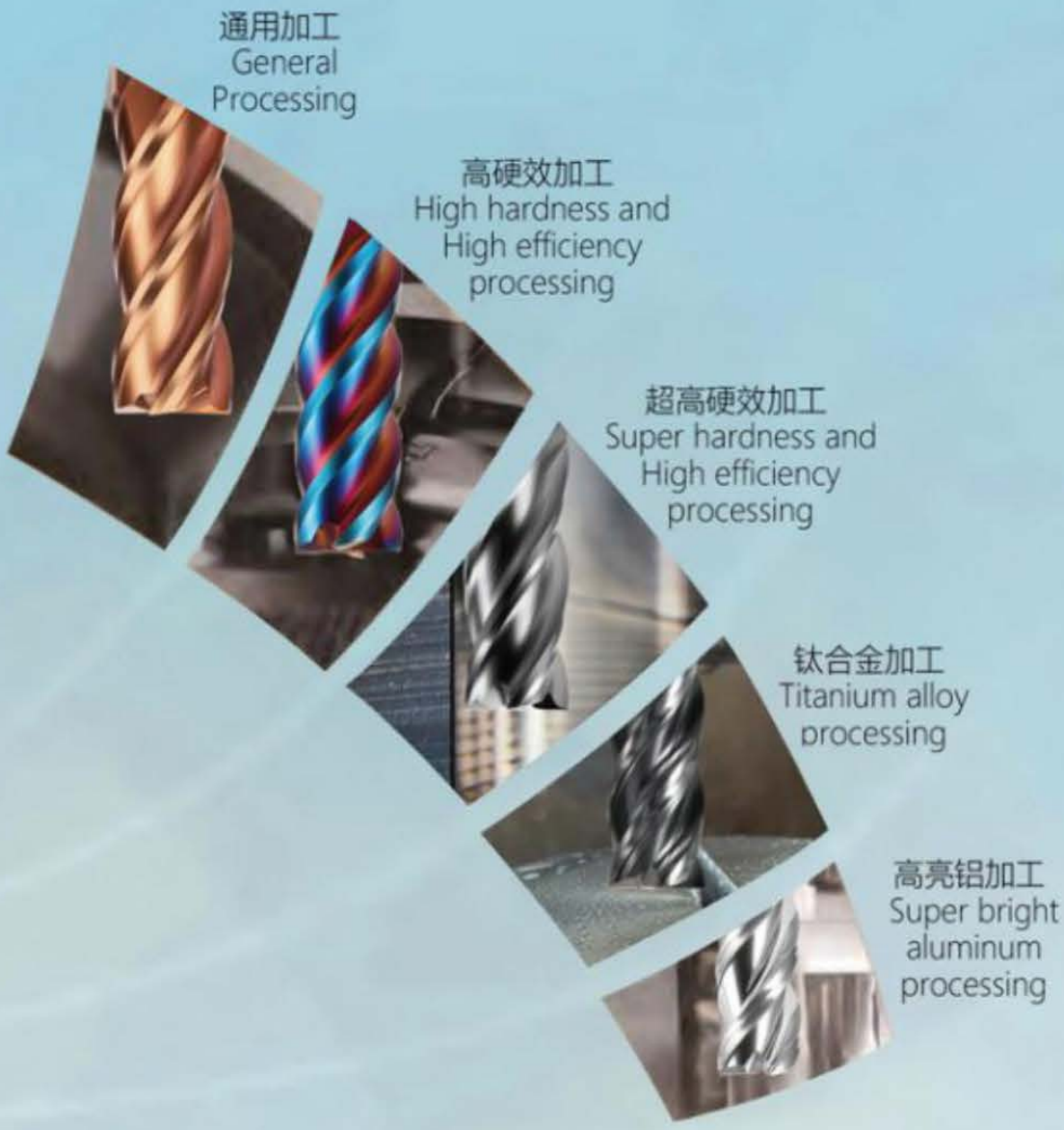
BENZSON
INTERNATIONAL

Cutting Tools

PRODUCT

Tel : 038-386-954



各种各样的整体立铣刀
ALL KINDS OF SOLID CARBIDE END MILLS

- **通用系列 General Series**
  兼具高灵活性和高经济且品种规格齐全的高性能产品。
  High performance products with high flexibility，high economy and complete specifications.
- **专用系列 Special Series**
  满足特定需要并且具有高效，可靠和耐用特性的独特的优质刀具。
  A unique quality tool that meets specific needs and has high efficiency, reliability, and durability.
- **定制解决方案 Customizad Solutions**
  特别设计以满足高性能需求的定制产品和高级非标产品。
  Specially designed to meet high performance requirements of custom products and advanced non-standard products.

HRC45-普通钢，铸铁材料的加工系列

Suitable for ordinary steel,cast iron material processing series

非常适合普通钢，铸铁材料的加工
The special tool design is very suitable for ordinary steel, cast iron material processing

切削参数
Cutting Parameters: P9-16

HRC55-各种钢材的通用加工系列

Suitable for various steels universal processing series

大的螺旋角和特殊刃型设计，非常适合各种钢材的通用加工
The design of large helix angle and special edge,
very suitable for all kinds of steel general processing

切削参数
Cutting Parameters: P20-27

HRC65-不锈钢，铸铁材料的高硬效加工系列

Suitable for stainless steel,cast iron high-efficiency processing series

非常适合不锈钢，铸铁材料的加工
The special tool design is very suitable for stainless steel，cast iron material processing

切削参数
Cutting Parameters: P30-35

ST-H系列-硬钢，模具钢，热处理钢材料的高速高效加工

Suitable for hard steel, mold steel, and heat-treated steel material high-speed and efficient processing

特殊的刀具设计，非常适合硬钢，模具钢，热处理材料的高效高速加工
The special tool design is very suitable for high-efficiency and high-speed cutting of hard steel, mold steel, and heat-treated material processing

切削参数
Cutting Parameters: P38-41

ST-U系列-不锈钢，钛合金，模具钢材料的高速高效加工

Suitable for stainless steel, titanium alloy, and mold steel material high-speed and efficient processing

非常适合不锈钢, 钛合金, 模具钢材料的加工
The special tool design is very suitable for processing stainless steel, titanium alloy, and mold steel materials

切削参数
Cutting Parameters: P44-45

AL-超亮铝通用加工系列

Super bright aluminum processing series

适用于铝合金材料的高效超亮加工
Applicable to aluminum alloy material efficient ultra-bright processing

切削参数
Cutting Parameters: P48-55

CPD-钢，铸铁材料的粗加工系列

Rough processing for steel and cast iron material series

非常适合硬钢，铸铁材料的粗加工
Suitable for roughing of hard steel and cast iron

切削参数
Cutting Parameters：P59-61

SGXJ-高精度深沟加工系列

Suitable for High-precision micro diameter pocket machining series

XJ
微小径平头 Micropath flat head

SG
深沟平头 Deep groove flat head

XJ
微小径球头 Micropath ball head

SG
深沟球刀头 Deep groove ball head

切削参数
Cutting Parameters：P64-67

DJD-钢，铸铁材料的加工系列

Suitable for steel and cast iron material processing series

非常适合钢，铸铁材料的加工 Suitable for steel and cast iron

切削参数
Cutting Parameters：P69-71

DXZ-钢，铸铁材料的加工系列

Suitable for steel and cast iron material processing seriestt

非常适合钢，铸铁材料的加工 Suitable for steel and cast iron

切削参数
Cutting Parameters：P73-75

NRD-钢，铸铁材料的加工系列

Suitable for steel and cast iron material processing series

非常适合钢，铸铁材料的加工 Suitable for steel and cast iron

切削参数
Cutting Parameters：P77-78

TXD-各种钢材的通用加工系列

Suitable for various steels universal processing series

非常适合各种钢材的通用加工
The special tool design is very suitable for various steels universal processing

切削参数
Cutting Parameters: P80-81

YWXD-各种钢材的通用加工系列

Suitable for various steels universal processing series

非常适合各种钢材的通用加工
The special tool design is very suitable for various steels universal processing

切削参数
Cutting Parameters: P82-83

LWXD-各种钢材的通用加工系列

Suitable for various steels universal processing series

非常适合各种钢材的通用加工
The special tool design is very suitable for various steels universal processing

切削参数
Cutting Parameters: P85-86

ZT-各种钢材的通用加工系列

Suitable for various steels universal processing series

非常适合各种钢材的通用加工
The special tool design is very suitable for various steels universal processing

切削参数
Cutting Parameters: P88-93

图标类型和标识
Icon Type And Identification

被加工材料 Processed Material

P	钢和高合金钢	Steel, high-alloyed	P
M	不锈钢	Stainless steel	M
K	灰铸铁,可锻铸铁和球墨铸铁	Grey cast iron, spheroidal graphite iron/malleable cast iron	K
N	铝合金及其它有色金属	Aluminium and other non-ferrous metals	N
S	特殊合金,镍基合金以及钛合金	Special, super and titanium alloys	S
H	硬化钢及硬化铸铁	Hardened steel and chilled cast iron	H

图标 Icons

切削方式 Cutting Wethod

侧铣 Side Milling　槽铣 Slot Milling　仿形 Profiling　台阶 Step Milling　粗加工 Roughing　螺旋 Helix　钻铣 Drilling

涂层 Coating

AlTiN　TiSiN　NACO　AlCrSiN　AL

系列 Series

HRC45　HRC55　HRC65　700　750　AL　CPD　SGXJ　DJXD　DXZ　NRD　TXD　YWXD　LWXD　YMXD　ZT

柄部 Shank

ISO 标准柄部 ISO Standard Shank

刃长 Blade Length

短 Short　标准 Standard　长 Long

刃数 No. of Flutes

2刃 2Flute　3刃 3Flute　4刃 4Flute

类型 Type

2刃平头 2Flute，Square　3刃球头 3Flute，Square　4刃球头 4Flute，Square

2刃球头 2Flute，Ballnose

2刃圆弧 2Flute，Corner-Radius　4刃圆弧 4Flute，Corner-Radius

螺旋角 Helix

底刃形状 Endteeth Type

平头 Square　圆角头 Corner-R　球头 Ballnose　刀尖倒角 Chamfer

新型涂层
NEW COATING

新开发的NACO4涂层具有更高的耐磨性。
涂层的平滑处理降低了切削阻力并显著改善了排屑。
这种下一代涂层在加工难切削材料时提供了更长的刀具寿命和更高的效率。
Newly-developed NACO4 coating with improved wear resistance.
The smoothing treatment of the coating layer reduces the cutting resistance and improves chip discharge significantly. This next-generation coating offers longer tool life and higher efficiency in machining difficult-to-cut materials.

平滑表面
Smoothed Surface

新开发的NACO4涂层
Newly Developed NACO4 Coating

超精细基材
Ultrafine Substrates

独创的表面处理技术
光滑的表面和锋利的边缘得到了很好的平衡，可以顺畅地排屑并降低切削阻力，从而提高加工效率和刀具寿命。
Unique surface treatment technology
A good balance of smooth surfaces and sharp edges enables smooth chip evacuation and reduced cutting resistance, increasing machining efficiency and tool life.

彩色涂层
DLC COATING

硬度与 CVD 金刚石涂层相似，具有高附着强度。
Hardness similar to that of CVD diamond coating achieved with high adhesion strength.

古铜纳米涂层
ALTIN+TISIN COATING

该涂层耐高温性能良好，具有低磨擦系数等特点，在高速钢或硬质合金钻头上涂层，适用于深孔钻铣加工
The coating has good high temperature resistance and low friction coefficient. It is suitable for coating on high-speed steel or carbide drill bits, and is suitable for deep hole drilling and milling.

蓝纳米涂层
TIALSIN COATING

该涂层在钻铣铸铁或普通钢性能良好，减少粘刀现象。在高速钢或硬质合金钻头上涂层，适用于深孔钻铣加工
The coating has good performance in drilling and milling cast iron or ordinary steel, reducing the phenomenon of sticking. Suitable for coating on HSS or carbide drills; also suitable for deep hole drilling and milling

黑色涂层
ALTIN COATING

该涂层在切削硬度介于45HRC与50HRC等难加工材料上能发挥出优秀的性能；特别适用于高速切削加工
The coating can exert excellent performance on difficult-to-machine materials such as cutting hardness between 45HRC and 50HRC; especially suitable for high-speed cutting

PRODUCT 产品应用

APPLICATIONS

		材料分组 Material Grouping	通用加工 General Machining	粗加工 Roughing	高效加工 Efficient Machining	微加工 Micro Machining
P	1 2 3 4	碳钢，合金钢（<45HRC） Carbon Steel，Alloy Steel（<45HRC）	HRC55 HRC65 ST-H ST-U	CPD	ST-H ST-U	SGXJ
	5	合金钢（HRC50） Alloy Steel（HRC50）				
	6	PH马铁素体/马氏体钢（<45HRC） PH Feritic, Martensitic Steel（<45HRC）				
M	1 2 3	不锈钢 Stainless Steel	HRC65		ST-H ST-U	
K	1 2	灰铸铁，球墨铸铁（<32HRC） Grey Cast Iron（<32HRC）	HRC45 HRC55 HRC65 ST-H ST-U	CPD	ST-H ST-U	SGXJ
	3	高合金铸铁（35~45HRC） High-Alloy Cast Iron（35~45HRC）				
N	1 2	变形铝合金，锻造铝合金（Si≤12%） Wrought Aluminium Alloys/Cast Aluminium Allopys（Si≤12%）	AL		AL	AL
	3	铸造铝合金（Si>12%） Cast Aluminium Allopys（Si>12%）				
	4	铜合金（<200HB） Copper Allopys（<200HB）				
S	1 2 3	高温合金（<450HB） Heat-Resistant Alloys（<450HB）			ST-H ST-U	
	4	钛合金（<400HB） Titanium Alloys（<400HB）				
H	1	高硬钢（63HRC） High hardness steel（63HRC）			ST-H	
	2	超高硬（65HRC） Superhard Material（65HRC）			ST-U	

HRC45加工立铣刀

普通钢，铸铁材料的加工
Suitable for processing ordinary steel and cast iron materials

P K

适用于低合金钢，45号钢等材料的加工
特殊的刃口的断屑槽处理
采用高性能AITIN涂层，耐高温，耐磨损

Suitable for processing low alloy steel, No. 45 steel, ect.
Chipbreaker treatment for special cutting edge
High-performance AITIN coating, high temperature resistance, wear resistance

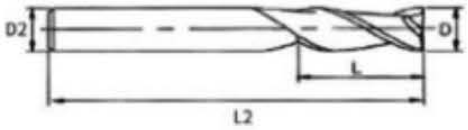
刃口耐磨性和刀具刚性提升
Improved edge wear resistance and tool rigidity

Carbide 2Flutes Square End Mill（Standard）

PD450 AlTiN HRC 45 S

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

P ● M K ● N S H



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
1	3	4	50	PD450-2F-01030450
1.5	5	4	50	PD450-2F-015050450
2	6	4	50	PD450-2F-02060450
2.5	8	4	50	PD450-2F-025080450
3	9	3	50	PD450-2F-03090350
3	9	4	50	PD450-2F-03090450
3.5	11	4	50	PD450-2F-035110450
4	10	4	50	PD450-2F-04120450
5	13	5	50	PD450-2F-05130450
5	13	6	50	PD450-2F-05130650
6	15	6	50	PD450-2F-06150650
7	20	8	60	PD450-2F-07200860
8	20	8	60	PD450-2F-08200860
9	25	10	75	PD450-2F-09251075
10	25	10	75	PD450-2F-10251075
11	25	12	75	PD450-2F-11251275
12	30	12	75	PD450-2F-12301275
14	45	14	100	PD450-2F-144514100
15	45	16	100	PD450-2F-154516100
16	45	16	100	PD450-2F-164516100
18	45	18	100	PD450-2F-184518100
20	45	20	100	PD450-2F-204520100

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀径 Tool Diameter (mm) 3	4	6	8	10	12	16	20
P	碳钢合金（<45HRC） Carbon steel alloy steel	ap≤1.5D ap≤0.15D	180	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	19110 1070	14330 1030	9550 920	7170 930	5730 920	4780 860	3580 860	2870 860
	合金钢（50HRC） Alloy Steel	ap≤1D ap≤0.12D	130	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	13800 610	10350 580	6900 550	5180 620	4140 560	3450 500	2590 410	2070 370
K	灰铸铁，球墨铸铁（<32HRC） Gry cast iron，nodular cast iron	ap≤1.5D ap≤0.15D	160	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	16990 850	12740 820	8490 820	6370 750	5100 700	4250 680	3190 610	2550 560
	高合金铸铁（35-45HRC） High alloy cast iron	ap≤1D ap≤0.12D	140	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	14860 650	11150 670	7430 670	5570 620	4460 580	3720 560	2790 500	2230 460

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

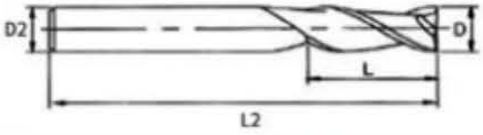
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide 2Flutes Square End Mill（Extra Long）

PD450 | AlTiN | HRC 45 | S

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

P ●
M
K ●
N
S
H



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
3	12	3	75	PD450-2F-03120375
4	15	4	75	PD450-2F-04160475
5	18	5	75	PD450-2F-05180575
6	25	6	75	PD450-2F-06240675
8	25	8	75	PD450-2F-08250875
3	12	3	100	PD450-2F-031203100
4	20	4	100	PD450-2F-042004100
5	30	5	100	PD450-2F-053005100
6	30	6	100	PD450-2F-063006100
8	35	8	100	PD450-2F-083508100
10	40	10	100	PD450-2F-104010100
12	45	12	100	PD450-2F-124512100
6	45	6	150	PD450-2F-064506150
8	50	8	150	PD450-2F-085008150
10	55	10	150	PD450-2F-105510150
12	55	12	150	PD450-2F-125512150
14	60	14	150	PD450-2F-147014150
16	70	16	150	PD450-2F-168016150
18	70	18	150	PD450-2F-188018150
20	70	20	150	PD450-2F-208020150

ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刃径 Tool Diameter（mm） 3	4	6	8	10	12	16	20
P	碳钢合金（<45HRC） Carbon steel alloy steel	ap≤1.5D ap≤0.15D	180	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	19110 1070	14330 1030	9550 920	7170 930	5730 920	4780 860	3580 860	2870 860
	合金钢（50HRC） Alloy Steel	ap≤1D ap≤0.12D	130	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	13800 610	10350 580	6900 550	5180 620	4140 560	3450 500	2590 410	2070 370
K	灰铸铁，球墨铸铁（<32HRC） Gry cast iron，nodular cast iron	ap≤1.5D ap≤0.15D	160	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	16990 850	12740 820	8490 820	6370 750	5100 700	4250 680	3190 610	2550 560
	高合金铸铁（35-45HRC） High alloy cast iron	ap≤1D ap≤0.12D	140	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	14860 650	11150 670	7430 670	5570 620	4460 580	3720 560	2790 500	2230 460

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

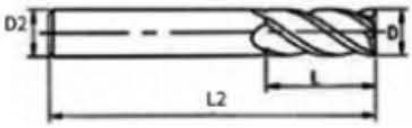
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide 4Flutes Square End Mill（Standard）

PD450 AlTiN HRC 45 S

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

P ● M K ● N S H



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
1	3	4	50	PD450-4F-01030450
1.5	5	4	50	PD450-4F-015050450
2	6	4	50	PD450-4F-02060450
2.5	8	4	50	PD450-4F-025080450
3	9	3	50	PD450-4F-03090350
3	9	4	50	PD450-4F-03090450
3.5	11	4	50	PD450-4F-035110450
4	12	4	50	PD450-4F-04120450
5	13	5	50	PD450-4F-05130550
5	13	6	50	PD450-4F-05130650
6	15	6	50	PD450-4F-06150650
7	20	8	60	PD450-4F-07200860
8	20	8	60	PD450-4F-08200860
8	24	8	60	PD450-4F-08240860
9	25	10	75	PD450-4F-09251075
10	25	10	75	PD450-4F-10251075
10	30	10	75	PD450-4F-10301075
11	30	12	75	PD450-4F-11301275
12	30	12	75	PD450-4F-12301275
12	35	12	75	PD450-4F-12351275
13	45	14	100	PD450-4F-134514100
14	45	14	100	PD450-4F-144514100
15	45	16	100	PD450-4F-154516100
16	45	16	100	PD450-4F-164516100
18	45	18	100	PD450-4F-184518100
20	45	20	100	PD450-4F-204520100

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀径 Tool Diameter (mm) 3	4	6	8	10	12	16	20
P	碳钢合金（<45HRC） Carbon steel alloy steel	ap≤1.5D ap≤0.15D	180	转速 rote speed (min-1)	19110	14330	9550	7170	5730	4780	3580	2870
				进给转速 feed velocity (mm/min)	1070	1030	920	930	920	860	860	860
	合金钢（50HRC） Alloy Steel	ap≤1D ap≤0.12D	130	转速 rote speed (min-1)	13800	10350	6900	5180	4140	3450	2590	2070
				进给转速 feed velocity (mm/min)	610	580	550	620	560	500	410	370
K	灰铸铁，球墨铸铁（<32HRC） Gry cast iron，nodular cast iron	ap≤1.5D ap≤0.15D	160	转速 rote speed (min-1)	16990	12740	8490	6370	5100	4250	3190	2550
				进给转速 feed velocity (mm/min)	850	820	820	750	700	680	610	560
	高合金铸铁（35-45HRC） High alloy cast iron	ap≤1D ap≤0.12D	140	转速 rote speed (min-1)	14860	11150	7430	5570	4460	3720	2790	2230
				进给转速 feed velocity (mm/min)	650	670	670	620	580	560	500	460

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

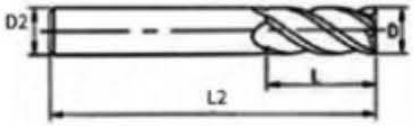
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide 4Flutes Square End Mill（Extra Long）

PD450 | AlTiN | HRC 45 | S

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

P ●
M
K ●
N
S
H



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
3	12	3	75	PD450-4F-03120375
3.5	11	4	75	PD450-4F-035110475
4	16	4	75	PD450-4F-04160475
5	18	5	75	PD450-4F-05180575
6	24	6	75	PD450-4F-06240675
8	25	8	75	PD450-4F-08250875
3	12	3	100	PD450-4F-031203100
4	20	4	100	PD450-4F-042004100
5	30	5	100	PD450-4F-053005100
6	30	6	100	PD450-4F-063006100
8	35	8	100	PD450-4F-083508100
10	40	10	100	PD450-4F-104010100
10	50	10	100	PD450-4F-105010100
12	45	12	100	PD450-4F-124512100
12	50	12	100	PD450-4F-125012100
6	45	6	150	PD450-4F-064506150
8	50	8	150	PD450-4F-085008150
10	55	10	150	PD450-4F-105510150
12	55	12	150	PD450-4F-125512150
14	70	14	150	PD450-4F-147014150
16	80	16	150	PD450-4F-168016150
18	80	18	150	PD450-4F-188018150
20	80	20	150	PD450-4F-208020150
6	50	6	200	PD450-4F-065006200
8	60	8	200	PD450-4F-086008200
10	65	10	200	PD450-4F-106510200
12	70	12	200	PD450-4F-127012200
14	80	14	200	PD450-4F-148014200
16	85	16	200	PD450-4F-168516200
20	90	20	200	PD450-4F-209020200

ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刀径 Tool Diameter（mm） 3	4	6	8	10	12	16	20
P	碳钢合金（<45HRC） Carbon steel alloy steel 合金钢（50HRC） Alloy Steel	ap≤1.5D ap≤0.15D	180	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	19110 1070	14330 1030	9550 920	7170 930	5730 920	4780 860	3580 860	2870 860
		ap≤1D ap≤0.12D	130	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	13800 610	10350 580	6900 550	5180 620	4140 560	3450 500	2590 410	2070 370
K	灰铸铜，球墨铸铁（<32HRC） Gry cast iron，nodular cast iron 高合金铸铁（35-45HRC） High alloy cast iron	ap≤1.5D ap≤0.15D	160	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	16990 850	12740 820	8490 820	6370 750	5100 700	4250 680	3190 610	2550 560
		ap≤1D ap≤0.12D	140	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	14860 650	11150 670	7430 670	5570 620	4460 580	3720 560	2790 500	2230 460

上表是侧铣加工的标准值。刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

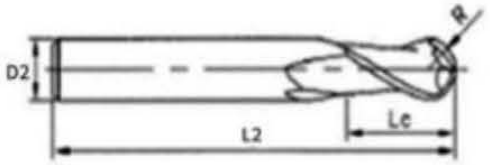
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide Ball Nose End Mill (Standard)

QD450 | AlTiN | HRC 45 | B

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

P ●
M
K ●
N
S
H



Cutting Length L	Radius R	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
2	0.5	4	50	QD450-2F-01020450
3	0.75	4	50	QD450-2F-015030450
4	1	4	50	QD450-2F-02040450
5	1.25	4	50	QD450-2F-025050450
6	1.5	3	50	QD450-2F-03060350
6	1.5	4	50	QD450-2F-03060450
7	1.75	4	50	QD450-2F-035070450
8	2	4	50	QD450-2F-04080450
10	2.5	5	50	QD450-2F-05100550
10	2.5	6	50	QD450-2F-05100650
12	3	6	50	QD450-2F-06120650
14	3.5	8	60	QD450-2F-07120860
16	4	8	60	QD450-2F-08160860
20	5	10	75	QD450-2F-10201075
24	6	12	75	QD450-2F-12241275
28	7	14	100	QD450-2F-142814100
32	8	16	100	QD450-2F-163216100
36	9	18	100	QD450-2F-183618100
40	10	20	100	QD450-2F-204020100

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 4	5	6	7	8	9	10	11	12
P	碳钢合金 (<45HRC) Carbon steel alloy steel 合金钢 (50HRC) Alloy Steel	ap≤0.2D ap≤0.3D	160	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	12740 1020	10190 1020	8490 1020	7280 1020	6370 1020	5660 1020	5100 1020	4630 1020	4250 1020
		ap≤0.15D ap≤0.15D	120	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	9550 610	7640 640	6370 660	5460 630	4780 620	4250 610	3820 610	3470 610	3190 610
K	灰铸铁，球墨铸铁 (<32HRC) Gry cast iron，nodular cast iron 高合金铸铁 (35-45HRC) High alloy cast iron	ap≤0.2D ap≤0.2D	140	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	11150 780	8920 800	7430 820	6370 800	5570 800	4950 790	4460 800	4050 810	3720 820
		ap≤0.1D ap≤0.1D	120	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	9550 610	7640 640	6370 660	5460 660	4780 670	4250 650	3820 650	3470 660	3190 670

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

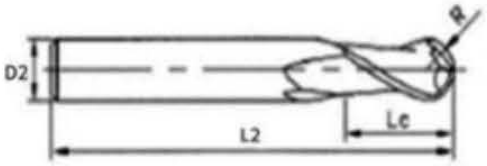
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide Ball Nose End Mill (Extra Long)

QD450 | AlTiN | HRC 45 | B

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

P ●
M
K ●
N
S
H



Cutting Length L	Radius R	Shank D2	Overall Length L2
mm	mm	mm	mm
6	1.5	3	75
8	2	4	75
10	2.5	5	75
12	3	6	75
16	4	8	75
6	1.5	3	100
4	2	4	100
10	2.5	5	100
12	3	6	100
16	4	8	100
20	5	10	100
24	6	12	100
12	3	6	150
16	4	8	150
20	5	10	150
24	6	12	150
28	7	14	150
32	8	16	150
36	9	18	150
40	10	20	150
12	3	6	200
16	4	8	200
20	5	10	200
24	6	12	200
32	8	16	200

Ordering Code
QD450-2F-03060375
QD450-2F-04080475
QD450-2F-05100575
QD450-2F-06120675
QD450-2F-08160875
QD450-2F-030603100
QD450-2F-040804100
QD450-2F-051005100
QD450-2F-061206100
QD450-2F-081608100
QD450-2F-102010100
QD450-2F-122412100
QD450-2F-061206150
QD450-2F-081608150
QD450-2F-102010150
QD450-2F-122412150
QD450-2F-142814150
QD450-2F-163216150
QD450-2F-183618150
QD450-2F-204020150
QD450-2F-061206200
QD450-2F-081608200
QD450-2F-102010200
QD450-2F-122412200
QD450-2F-163216200

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀径 Tool Diameter (mm) 4	5	6	7	8	9	10	11	12
P	碳钢合金 (<45HRC) Carbon steel alloy steel 合金钢 (50HRC) Alloy Steel	ap≤0.2D ap≤0.3D	160	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	12740 1020	10190 1020	8490 1020	7280 1020	6370 1020	5660 1020	5100 1020	4630 1020	4250 1020
		ap≤0.15D ap≤0.15D	120	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	9550 610	7640 640	6370 660	5460 630	4780 620	4250 610	3820 610	3470 610	3190 610
K	灰铸铁，球墨铸铁 (<32HRC) Gry cast iron，nodular cast iron 高合金铸铁 (35-45HRC) High alloy cast iron	ap≤0.2D ap≤0.2D	140	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	11150 780	8920 800	7430 820	6370 800	5570 800	4950 790	4460 800	4050 810	3720 820
		ap≤0.1D ap≤0.1D	120	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	9550 610	7640 640	6370 660	5460 660	4780 670	4250 650	3820 650	3470 660	3190 670

上表是侧铣加工的标准值。刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

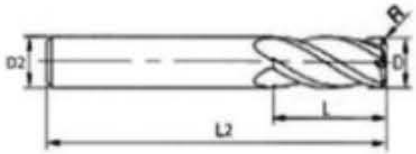
Above table is the standard cutting data for side milling maching, if for groove cutting, the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide Corner Radius End Mill（Standard）

YB450 | AlTiN | HRC 45 | S

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

P ●
M
K ●
N
S
H



Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	mm	
1	0.2	3	4	50	YB450-4F-0102030450
1.5	0.2	5	4	50	YB450-4F-01502050450
2	0.2	6	4	50	YB450-4F-0202060450
2	0.5	6	4	50	YB450-4F-0205060450
2.5	0.2	8	4	50	YB450-4F-02502080450
2.5	0.5	8	4	50	YB450-4F-02505080450
3	0.2	8	3	50	YB450-4F-0302090350
3	0.2	9	4	50	YB450-4F-0302090450
3	0.5	8	3	50	YB450-4F-0305090350
3	0.5	9	4	50	YB450-4F-0305090450
3.5	0.5	11	4	50	YB450-4F-03505110450
4	0.2	10	4	50	YB450-4F-0402120450
4	0.5	10	4	50	YB450-4F-0405120450
5	0.5	13	5	50	YB450-4F-0505130550
5	0.5	13	6	50	YB450-4F-0505130650
5	1	13	5	50	YB450-4F-051130550
5	1	13	6	50	YB450-4F-051130650
6	0.2	15	6	50	YB450-4F-0602150650
6	0.3	15	6	50	YB450-4F-0603150650
6	0.5	15	6	50	YB450-4F-0605150650
6	1	15	6	50	YB450-4F-061150650
8	0.5	20	8	60	YB450-4F-0805200860
8	1	20	8	60	YB450-4F-081200860
8	2	20	8	60	YB450-4F-082200860
10	0.5	25	10	75	YB450-4F-1005251075
10	1	25	10	75	YB450-4F-101251075
10	2	25	10	75	YB450-4F-102251075
10	3	25	10	75	YB450-4F-103251075
12	0.5	30	12	75	YB450-4F-1205301275
12	1	30	12	75	YB450-4F-121301275
12	2	30	12	75	YB450-4F-122301275
12	3	30	12	75	YB450-4F-123301275

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀具 Tool Diameter (mm) 3	4	6	8	10	12	16	20
P	碳钢合金（<45HRC） Carbon steel alloy steel 合金钢（50HRC） Alloy Steel	ap≤1.5D ap≤0.15D ap≤1D ap≤0.12D	180 130	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	19110 1070 13800 610	14330 1030 10350 580	9550 920 6900 550	7170 930 5180 620	5730 920 4140 560	4780 860 3450 500	3580 860 2590 410	2870 860 2070 370
K	灰铸铁、球墨铸铁（<52HRC） Grey cast iron、nodular cast iron 高合金钢铁（35-45HRC） High alloy cast iron	ap≤1.5D ap≤0.15D ap≤1D ap≤0.12D	160 140	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	16990 850 14860 650	12740 820 11150 670	8490 820 7430 670	6370 750 5570 620	5100 700 4460 580	4250 680 3720 560	3190 610 2790 500	2550 560 2230 460

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

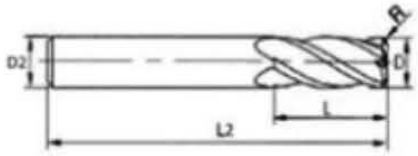
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide Corner Radius End Mill（Extra Long）

YB450 | AlTiN | HRC 45 | S

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

P ●
M
K ●
N
S
H



Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	mm	
3	0.5	12	3	75	YB450-4F-0305120375
4	0.5	15	4	75	YB450-4F-0405160475
5	0.5	25	5	75	YB450-4F-0505180575
6	0.5	25	6	75	YB450-4F-0605240675
8	0.5	25	8	75	YB450-4F-0805250875
4	0.5	20	4	100	YB450-4F-04052004100
4	1	20	4	100	YB450-4F-0412004100
5	0.5	30	5	100	YB450-4F-05053005100
5	1	30	5	100	YB450-4F-0513005100
6	0.5	30	6	100	YB450-4F-06053006100
6	1	30	6	100	YB450-4F-0613006100
8	0.5	35	8	100	YB450-4F-08053508100
8	1	35	8	100	YB450-4F-0813508100
10	0.5	40	10	100	YB450-4F-10054010100
10	1	40	10	100	YB450-4F-1014010100
12	0.5	45	12	100	YB450-4F-12054512100
12	1	45	12	100	YB450-4F-1214512100
8	0.5	50	8	150	YB450-4F-08055008150
8	1	50	8	150	YB450-4F-0815008150
10	0.5	55	10	150	YB450-4F-10055510150
10	1	55	10	150	YB450-4F-1015510150
12	0.5	60	12	150	YB450-4F-12055512150
12	1	60	12	150	YB450-4F-1215512150

ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刀径 Tool Diameter（mm） 3	4	6	8	10	12	16	20
P	碳钢合金（<45HRC） Carbon steel alloy steel 合金钢（50HRC） Alloy Steel	ap≤1.5D ap≤0.15D	180	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	19110 1070	14330 1030	9550 920	7170 930	5730 920	4780 860	3580 860	2870 860
		ap≤1D ap≤0.12D	130	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	13800 610	10350 580	6900 550	5180 620	4140 560	3450 500	2590 410	2070 370
K	灰铸铁，球墨铸铁（<32HRC） Gry cast iron，nodular cast iron 高合金铸铁（35-45HRC） High alloy cast iron	ap≤1.5D ap≤0.15D	160	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	16990 850	12740 820	8490 820	6370 750	5100 700	4250 680	3190 610	2550 560
		ap≤1D ap≤0.12D	140	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	14860 650	11150 670	7430 670	5570 620	4460 580	3720 560	2790 500	2230 460

上表是侧铣加工的标准值。刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

550古铜系列
通用加工立铣刀
GENERAL MACHINING END MILLS

New TiSiN

P K

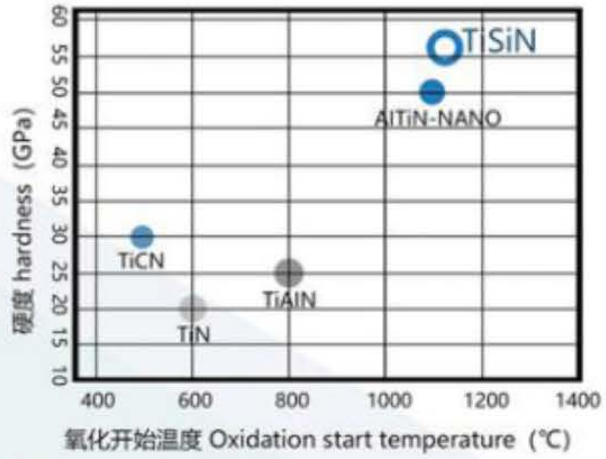
- 适用于普通钢、P20、铸铁材料的加工
- 采用高性能TiSiN涂层，耐高温、耐磨损
- 采用细晶粒硬质合金基材
- Suitable for ordinary steel, P20, cast iron materials processing.
- High-performance TiSiN coating, high temperature and wear resistance.
- Ultra-fine grained carbide material.

刃口耐磨性和刀具刚性提升

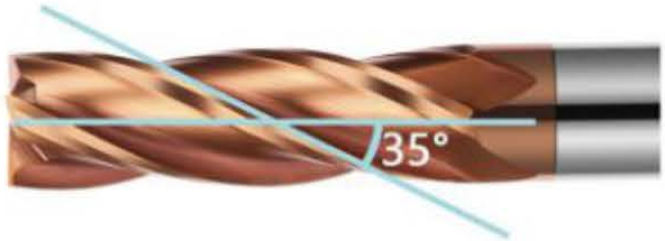
Improved edge wear resistance and tool rigidity

各种钢材的通用加工: 抗沾刀能力强，提高刀具寿命，
35°螺旋角设计，切削顺滑，不积屑
General processing of various steels
Strong anti-sticking ability，improve tool life,
35° helix angle design，Smooth cutting without chip accumulation

● 产品特点 Features



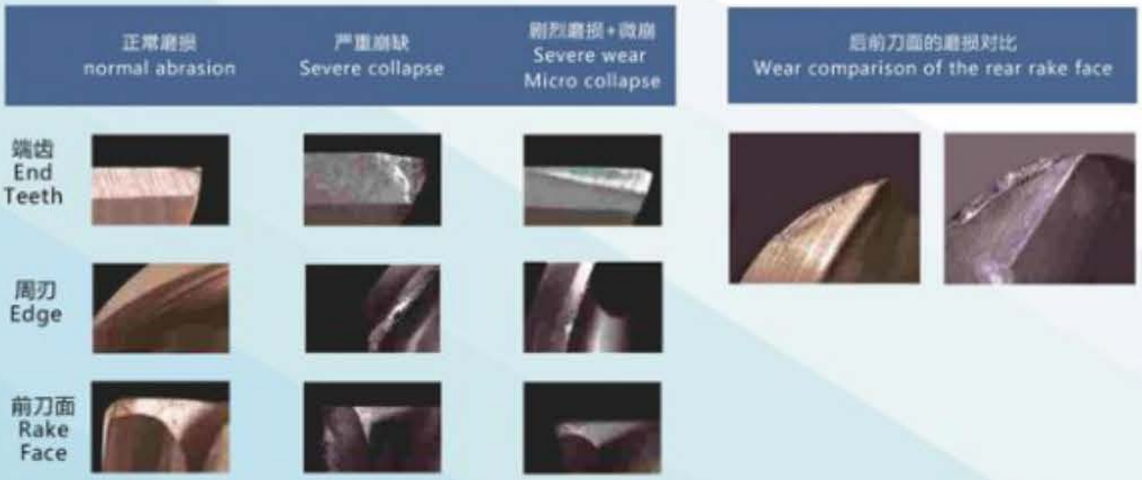
● 大螺旋角Irregular helix angle



[震动小，有效加工，提高生产效率]

[Improved productivty with effective machining due to less vibration]

● 加工后磨损状况 Wear condition after processing



采用超细硬质合金基材
特殊切刃和高性能TISIN涂层，从而实现高精度，长寿命加工
Ultra-fine cemented carbide substrate
Special cutting edge and high performance TISIN coating to achieve high precision, long life processing

特殊顶端形状实现良好的切削效果
Special end shape achieves good cutting results

弓形R刃角分散切削阻力抑制切刃的磨损
The arcuate R edge disperses the cutting resistance to reduce the wear of the cutting edge

大容量槽 Large chip groove

即使大切深加工也可以稳定排屑
Stable chip removal even in deep cutting

刃口钝化
Edge Precision passivation

刃口钝化提高道具使用寿命和工件表面洁度。特殊角度设计，刃口强度极高，通用性强。
Improve tool life and workpiece surface finish. Special angle design and high edge strength ensure stronger versatility.

高质量刃面 High quality blade surface

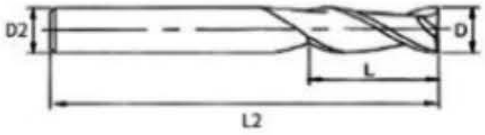
平滑锋利的切刃
优异的耐磨损性和耐熔着性
Smooth and sharp cutting edge
Excellent wear resistance and Fusion resistance

Carbide 2Flutes Square End Mill（Standard）

PD550 | TISIN | HRC 55 | S

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

P ●
M
K ●
N
S
H



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
1	3	4	50	PD550-2F-01030450
1.5	5	4	50	PD550-2F-015050450
2	6	4	50	PD550-2F-02060450
2.5	8	4	50	PD550-2F-025080450
3	9	3	50	PD550-2F-03090350
3	9	4	50	PD550-2F-03090450
3.5	11	4	50	PD550-2F-035110450
4	12	4	50	PD550-2F-04120450
5	13	5	50	PD550-2F-05130450
5	13	6	50	PD550-2F-05130650
6	15	6	50	PD550-2F-06150650
7	20	8	60	PD550-2F-07200860
8	20	8	60	PD550-2F-08200860
9	25	10	75	PD550-2F-09251075
10	25	10	75	PD550-2F-10251075
11	25	12	75	PD550-2F-11251275
12	30	12	75	PD550-2F-12301275
14	45	14	100	PD550-2F-144514100
15	45	16	100	PD550-2F-154516100
16	45	16	100	PD550-2F-164516100
18	45	18	100	PD550-2F-184518100
20	45	20	100	PD550-2F-204520100

ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刃径 Tool Diameter（mm） 3	4	6	8	10	12	16	20
P	碳钢合金（<45HRC） Carbon steel alloy steel 合金钢（50HRC） Alloy Steel	ap≤1.5D ap≤0.15D	180	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	19110 1070	14330 1030	9550 920	7170 930	5730 920	4780 860	3580 860	2870 860
		ap≤1D ap≤0.12D	130	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	13800 610	10350 580	6900 550	5180 620	4140 560	3450 500	2590 410	2070 370
K	灰铸铁，球墨铸铁（<32HRC） Gry cast iron，nodular cast iron 高合金铸铁（35-45HRC） High alloy cast iron	ap≤1.5D ap≤0.15D	160	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	16990 850	12740 820	8490 820	6370 750	5100 700	4250 680	3190 610	2550 560
		ap≤1D ap≤0.12D	140	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	14860 650	11150 670	7430 670	5570 620	4460 580	3720 560	2790 500	2230 460

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

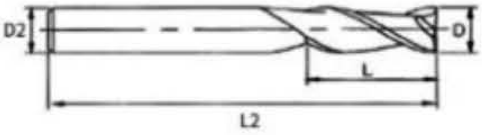
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide 2Flutes Square End Mill（Extra Long）

PD550 | TiSiN | HRC 55 | S

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

P ●
M
K ●
N
S
H



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
3	12	3	75	PD550-2F-03120375
4	16	4	75	PD550-2F-04160475
5	18	5	75	PD550-2F-05180575
6	24	6	75	PD550-2F-06240675
8	25	8	75	PD550-2F-08250875
3	12	3	100	PD550-2F-031203100
4	20	4	100	PD550-2F-042004100
5	30	5	100	PD550-2F-053005100
6	30	6	100	PD550-2F-063006100
8	35	8	100	PD550-2F-083508100
10	40	10	100	PD550-2F-104010100
12	45	12	100	PD550-2F-124512100
6	45	6	150	PD550-2F-064506150
8	50	8	150	PD550-2F-085008150
10	55	10	150	PD550-2F-105510150
12	55	12	150	PD550-2F-125512150
14	70	14	150	PD550-2F-147014150
16	80	16	150	PD550-2F-168016150
18	80	18	150	PD550-2F-188018150
20	80	20	150	PD550-2F-208020150

ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刃径 Tool Diameter（mm） 3	4	6	8	10	12	16	20
P	碳钢合金（<45HRC） Carbon steel alloy steel 合金钢（50HRC） Alloy Steel	ap≤1.5D ap≤0.15D	180	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	19110 1070	14330 1030	9550 920	7170 930	5730 920	4780 860	3580 860	2870 860
		ap≤1D ap≤0.12D	130	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	13800 610	10350 580	6900 550	5180 620	4140 560	3450 500	2590 410	2070 370
K	灰铸铁，球墨铸铁（<32HRC） Gry cast iron，nodular cast iron 高合金钢铁（35-45HRC） High alloy cast iron	ap≤1.5D ap≤0.15D	160	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	16990 850	12740 820	8490 820	6370 750	5100 700	4250 680	3190 610	2550 560
		ap≤1D ap≤0.12D	140	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	14860 650	11150 670	7430 670	5570 620	4460 580	3720 560	2790 500	2230 460

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

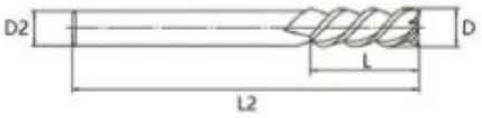
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide 4Flutes Square End Mill（Standard）

PD550 | TiSiN | HRC 55 | S

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

P ●
M
K ●
N
S
H



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
1	3	4	50	PD550-4F-01030450
1.5	5	4	50	PD550-4F-015050450
2	6	4	50	PD550-4F-02060450
2.5	8	4	50	PD550-4F-025080450
3	9	3	50	PD550-4F-03090350
3	9	4	50	PD550-4F-03090450
3.5	11	4	50	PD550-4F-035110450
4	12	4	50	PD550-4F-04120450
5	13	5	50	PD550-4F-05130550
5	13	6	50	PD550-4F-05130650
6	15	6	50	PD550-4F-06150650
7	20	8	60	PD550-4F-07200860
8	20	8	60	PD550-4F-08200860
8	24	8	60	PD550-4F-08240860
9	25	10	75	PD550-4F-09251075
10	25	10	75	PD550-4F-10251075
10	30	10	75	PD550-4F-10301075
11	30	12	75	PD550-4F-11301275
12	30	12	75	PD550-4F-12301275
12	35	12	75	PD550-4F-12351275
13	45	14	100	PD550-4F-134514100
14	45	14	100	PD550-4F-144514100
15	45	16	100	PD550-4F-154516100
16	45	16	100	PD550-4F-164516100
18	45	18	100	PD550-4F-184518100
20	45	20	100	PD550-4F-204520100

ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刀径 Tool Diameter（mm） 3	4	6	8	10	12	16	20
P	碳钢合金（<45HRC） Carbon steel alloy steel	ap≤1.5D ap≤0.15D	180	转速 rote speed（min-1）	19110	14330	9550	7170	5730	4780	3580	2870
				进给转速 feed velocity（mm/min）	1070	1030	920	930	920	860	860	860
	合金钢（50HRC） Alloy Steel	ap≤1D ap≤0.12D	130	转速 rote speed（min-1）	13800	10350	6900	5180	4140	3450	2590	2070
				进给转速 feed velocity（mm/min）	610	580	550	620	560	500	410	370
K	灰铸铁，球墨铸铁（<32HRC） Gry cast iron，nodular cast iron	ap≤1.5D ap≤0.15D	160	转速 rote speed（min-1）	16990	12740	8490	6370	5100	4250	3190	2550
				进给转速 feed velocity（mm/min）	850	820	820	750	700	680	610	560
	高合金铸铁（35-45HRC） High alloy cast iron	ap≤1D ap≤0.12D	140	转速 rote speed（min-1）	14860	11150	7430	5570	4460	3720	2790	2230
				进给转速 feed velocity（mm/min）	650	670	670	620	580	560	500	460

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

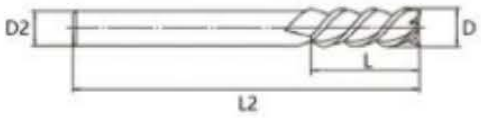
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide 4Flutes Square End Mill（Extra Long）

PD550 | TiSiN | HRC 55 | S

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

P	●
M	
K	●
N	
S	
H	



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
3	12	3	75	PD550-4F-03120375
3.5	11	4	75	PD550-4F-035110475
4	16	4	75	PD550-4F-04160475
5	18	5	75	PD550-4F-05180575
6	24	6	75	PD550-4F-06240675
8	25	8	75	PD550-4F-08250875
3	12	3	100	PD550-4F-031203100
4	20	4	100	PD550-4F-042004100
5	30	5	100	PD550-4F-053005100
6	30	6	100	PD550-4F-063006100
8	35	8	100	PD550-4F-083508100
10	40	10	100	PD550-4F-104010100
10	50	10	100	PD550-4F-105010100
12	45	12	100	PD550-4F-124512100
12	50	12	100	PD550-4F-125012100
6	45	6	150	PD550-4F-064506150
8	50	8	150	PD550-4F-085008150
10	55	10	150	PD550-4F-105510150
12	55	12	150	PD550-4F-125512150
14	70	14	150	PD550-4F-147014150
16	80	16	150	PD550-4F-168016150
18	80	18	150	PD550-4F-188018150
20	80	20	150	PD550-4F-208020150
6	50	6	200	PD550-4F-065006200
8	60	8	200	PD550-4F-086008200
10	65	10	200	PD550-4F-106510200
12	70	12	200	PD550-4F-127012200
14	80	14	200	PD550-4F-148014200
16	85	16	200	PD550-4F-168516200
20	90	20	200	PD550-4F-209020200

ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刀径 Tool Diameter（mm） 3	4	6	8	10	12	16	20
P	碳钢合金（<45HRC） Carbon steel alloy steel	ap≤1.5D ap≤0.15D	180	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	19110 1070	14330 1030	9550 920	7170 930	5730 920	4780 860	3580 860	2870 860
	合金钢（50HRC） Alloy Steel	ap≤1D ap≤0.12D	130	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	13800 610	10350 580	6900 550	5180 620	4140 560	3450 500	2590 410	2070 370
K	灰铸铁、球墨铸铁（<32HRC） Gry cast iron、nodular cast iron	ap≤1.5D ap≤0.15D	160	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	16990 850	12740 820	8490 820	6370 750	5100 700	4250 680	3190 610	2550 560
	高合金铸铁（35-45HRC） High alloy cast iron	ap≤1D ap≤0.12D	140	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	14860 650	11150 670	7430 670	5570 620	4460 580	3720 560	2790 500	2230 460

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

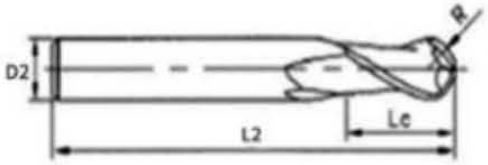
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide Ball Nose End Mill (Standard)

QD550 | TISIN | HRC 55 | B

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

P ●
M
K ●
N
S
H



Cutting Length L	Radius R	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
2	0.5	4	50	QD550-2F-01020450
3	0.75	4	50	QD550-2F-015030450
4	1	4	50	QD550-2F-02040450
5	1.25	4	50	QD550-2F-025050450
6	1.5	3	50	QD550-2F-03060350
6	1.5	4	50	QD550-2F-03060450
7	1.75	4	50	QD550-2F-035070450
8	2	4	50	QD550-2F-04080450
10	2.5	5	50	QD550-2F-05100550
10	2.5	6	50	QD550-2F-05100650
12	3	6	50	QD550-2F-06120650
14	3.5	8	60	QD550-2F-07140860
16	4	8	60	QD550-2F-08160860
20	5	10	75	QD550-2F-10201075
24	6	12	75	QD550-2F-12241275
28	7	14	100	QD550-2F-142814100
32	8	16	100	QD550-2F-163216100
36	9	18	100	QD550-2F-183618100
40	10	20	100	QD550-2F-204020100

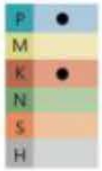
ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 4	5	6	7	8	9	10	11	12
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤0.2D ap≤0.3D	160	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	12740 1020	10190 1020	8490 1020	7280 1020	6370 1020	5660 1020	5100 1020	4630 1020	4250 1020
	合金钢 (50HRC) Alloy Steel	ap≤0.15D ap≤0.15D	120	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	9550 610	7640 640	6370 660	5460 630	4780 620	4250 610	3820 610	3470 610	3190 610
K	灰铸铁，球墨铸铁 (<32HRC) Gry cast iron，nodular cast iron	ap≤0.2D ap≤0.2D	140	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	11150 780	8920 800	7430 820	6370 800	5570 800	4950 790	4460 800	4050 810	3720 820
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤0.1D ap≤0.1D	120	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	9550 610	7640 640	6370 660	5460 660	4780 670	4250 650	3820 650	3470 660	3190 670

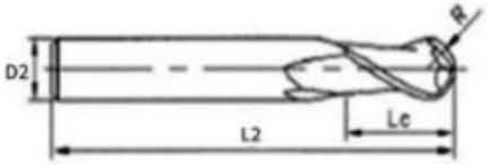
上表是侧铣加工的标准值。刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide Ball Nose End Mill（Extra Long）

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





Cutting Length L	Radius R	Shank D2	Overall Length L2
mm	mm	mm	mm
6	1.5	3	75
8	2	4	75
10	2.5	5	75
12	3	6	75
16	4	8	75
6	1.5	3	100
8	2	4	100
10	2.5	5	100
12	3	6	100
16	4	8	100
20	5	10	100
24	6	12	100
12	3	6	150
16	4	8	150
20	5	10	150
24	6	12	150
28	7	14	150
32	8	16	150
36	9	18	150
40	10	20	150
12	3	6	200
16	4	8	200
20	5	10	200
24	6	12	200
32	8	16	200

Ordering Code
QD550-2F-03060375
QD550-2F-04080475
QD550-2F-05100575
QD550-2F-06120675
QD550-2F-08160875
QD550-2F-030603100
QD550-2F-040804100
QD550-2F-051005100
QD550-2F-061206100
QD550-2F-081608100
QD550-2F-102010100
QD550-2F-122412100
QD550-2F-061206150
QD550-2F-081608150
QD550-2F-102010150
QD550-2F-122412150
QD550-2F-142814150
QD550-2F-163216150
QD550-2F-183618150
QD550-2F-204020150
QD550-2F-061206200
QD550-2F-081608200
QD550-2F-102010200
QD550-2F-122412200
QD550-2F-163216200

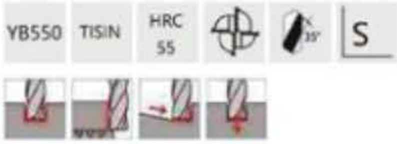
ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刀径 Tool Diameter（mm） 4	5	6	7	8	9	10	11	12
P	碳钢合金（<45HRC） Carbon steel alloy steel	ap≤0.2D	160	转速 rote speed（min-1）	12740	10190	8490	7280	6370	5660	5100	4630	4250
		ap≤0.3D		进给转速 feed velocity（mm/min）	1020	1020	1020	1020	1020	1020	1020	1020	1020
	合金钢（50HRC） Alloy Steel	ap≤0.15D	120	转速 rote speed（min-1）	9550	7640	6370	5460	4780	4250	3820	3470	3190
		ap≤0.15D		进给转速 feed velocity（mm/min）	610	640	660	630	620	610	610	610	610
K	灰铸铁，球墨铸铁（<32HRC） Gry cast iron，nodular cast iron	ap≤0.2D	140	转速 rote speed（min-1）	11150	8920	7430	6370	5570	4950	4460	4050	3720
		ap≤0.2D		进给转速 feed velocity（mm/min）	780	800	820	800	800	790	800	810	820
	高合金铸铁（35-45HRC） High alloy cast iron	ap≤0.1D	120	转速 rote speed（min-1）	9550	7640	6370	5460	4780	4250	3820	3470	3190
		ap≤0.1D		进给转速 feed velocity（mm/min）	610	640	660	660	670	650	650	660	670

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

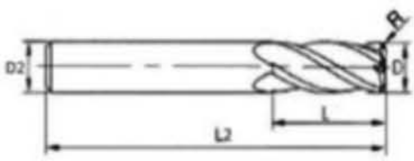
Carbide Corner Radius End Mill（Standard）

YB550 TISIN HRC 55 S



P	●
M	
K	●
N	
S	
H	

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



Diameter D mm	Radius R mm	Cutting Length L mm	Shank D2 mm	Overall Length L2 mm	Ordering Code
1	0.2	3	4	50	YB550-4F-0102030450
1.5	0.2	5	4	50	YB550-4F-01502050450
2	0.2	6	4	50	YB550-4F-0202060450
2	0.5	6	4	50	YB550-4F-0205060450
2.5	0.2	8	4	50	YB550-4F-02502080450
2.5	0.5	8	4	50	YB550-4F-02505080450
3	0.2	8	3	50	YB550-4F-0302090350
3	0.2	9	4	50	YB550-4F-0302090450
3	0.5	8	3	50	YB550-4F-0305090350
3	0.5	9	4	50	YB550-4F-0305090450
3.5	0.5	11	4	50	YB550-4F-03505110450
4	0.2	10	4	50	YB550-4F-0402120450
4	0.5	10	4	50	YB550-4F-0405120450
5	0.5	13	5	50	YB550-4F-0505130550
5	0.5	13	6	50	YB550-4F-0505130650
5	1	13	5	50	YB550-4F-051130550
5	1	13	6	50	YB550-4F-051130650
6	0.2	15	6	50	YB550-4F-0602150650
6	0.3	15	6	50	YB550-4F-0603150650
6	0.5	15	6	50	YB550-4F-0605150650
6	1	15	6	50	YB550-4F-061150650
8	0.5	20	8	60	YB550-4F-0805200860
8	1	20	8	60	YB550-4F-081200860
8	2	20	8	60	YB550-4F-082200860
10	0.5	25	10	75	YB550-4F-1005251075
10	1	25	10	75	YB550-4F-101251075
10	2	25	10	75	YB550-4F-102251075
10	3	25	10	75	YB550-4F-103251075
12	0.5	30	12	75	YB550-4F-1205301275
12	1	30	12	75	YB550-4F-121301275
12	2	30	12	75	YB550-4F-122301275
12	3	30	12	75	YB550-4F-123301275

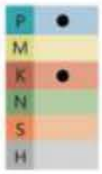
ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀具 Tool Diameter (mm) 3	4	6	8	10	12	16	20
P	[illegible] (≤45HRC) Carbon steel alloy steel	ap≤1.5D ap≤0.15D	180	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	19110 1070	14330 1030	9550 920	7170 930	5730 920	4780 860	3580 860	2870 860
	[illegible] (50HRC) Alloy Steel	ap≤1D ap≤0.12D	130	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	13800 610	10350 580	6900 550	5180 620	4140 560	3450 500	2590 410	2070 370
K	[illegible] Gry cast iron、nodular cast iron	ap≤1.5D ap≤0.15D	160	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	16990 850	12740 820	8490 820	6370 750	5100 700	4250 680	3190 610	2550 560
	[illegible] High alloy cast iron	ap≤1D ap≤0.12D	140	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	14860 650	11150 670	7430 670	5570 620	4460 580	3720 560	2790 500	2230 460

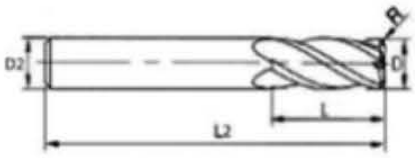
上表是侧铣加工的标准值，刀具切槽时，转速要以上表的50%-70%，进给速度要以40%-60%为标准值。

Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%-70% and the feed should reach 40%-60% based on the table.

Carbide Corner Radius End Mill（Extra Long）

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





Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2
mm	mm	mm	mm	mm
3	0.5	12	3	75
4	0.5	15	4	75
5	0.5	25	5	75
6	0.5	25	6	75
8	0.5	25	8	75
4	0.5	20	4	100
4	1	20	4	100
5	0.5	30	5	100
5	1	30	5	100
6	0.5	30	6	100
6	1	30	6	100
8	0.5	35	8	100
8	1	35	8	100
10	0.5	40	10	100
10	1	40	10	100
12	0.5	45	12	100
12	1	45	12	100
8	0.5	50	8	100
8	1	50	8	150
10	0.5	55	10	150
10	1	55	10	150
12	0.5	60	12	150
12	1	60	12	150

MÃ ĐẶT HÀNG
YB550-4F-0305120375
YB550-4F-0405160475
YB550-4F-0505180575
YB550-4F-0605240675
YB550-4F-0805250875
YB550-4F-04052004100
YB550-4F-0412004100
YB550-4F-05053005100
YB550-4F-0513005100
YB550-4F-06053006100
YB550-4F-0613006100
YB550-4F-08053508100
YB550-4F-0813508100
YB550-4F-10054010100
YB550-4F-1014010100
YB550-4F-12054512100
YB550-4F-1214512100
YB550-4F-08055008150
YB550-4F-0815008150
YB550-4F-10055510150
YB550-4F-1015510150
YB550-4F-12055512150
YB550-4F-1215512150

ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刀径 Tool Diameter（mm） 3	4	6	8	10	12	16	20
P	碳钢合金（<45HRC） Carbon steel alloy steel 合金钢（50HRC） Alloy Steel	ap≤1.5D ap≤0.15D	180	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	19110 1070	14330 1030	9550 920	7170 930	5730 920	4780 860	3580 860	2870 860
		ap≤1D ap≤0.12D	130	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	13800 610	10350 580	6900 550	5180 620	4140 560	3450 500	2590 410	2070 370
K	灰铸铁、球墨铸铁（<32HRC） Gry cast iron，nodular cast iron 高合金铸铁（35-45HRC） High alloy cast iron	ap≤1.5D ap≤0.15D	160	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	16990 850	12740 820	8490 820	6370 750	5100 700	4250 680	3190 610	2550 560
		ap≤1D ap≤0.12D	140	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	14860 650	11150 670	7430 670	5570 620	4460 580	3720 560	2790 500	2230 460

上表是侧铣加工的标准值。刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

HRC65系列
HIGH PERFORMANCE

P K M H

HRC65高硬度高效加工立铣刀
HRC65 High hardness and high efficiency machining end milling cutter

END

- 适用于高硬度钢件的高效加工
- 可加工不锈钢，调质钢和一般经过热处理的钢材
- 适用于精加工
- Suitable for efficient processing of high-hardness steel parts
- Can process stainless steel, quenched and tempered steel and generally heat-treated steel.
- Suitable for finishing

卓越的抗震能力
Excellent vibration resistance

全球合作伙伴-WORLDWIDE RELIABLE PARTNERS

0.4μm微晶粒尺寸，可加工不锈钢，
大多数钢和经过热处理的钢材。
0.4μm micro grain size, can process stainless steel,
most modulated steel and general steel after heat treatment.

●产品特点 Features

采用高性能复合涂层
HIGH-PERFORMANCE COMPOSITE COATING

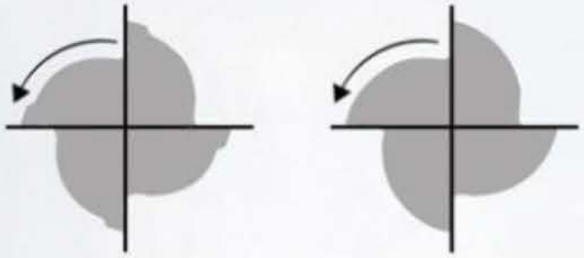
●大螺旋角Lang Helix Angle

大螺旋角：抑制振动，完全面良好
Lage Helix Angle: vibration suppresion,
good finfish surface

[振动小，有效加工，提高生产效率]
[Improved productivty with effective machining due to less vibration]

●槽型经过特殊设计，能够更好的改善切削流动和卷曲，以及降低切屑力。

The groove is specially designed to better improve chip flow and curl, and reduce cutting force.



本产品槽型
This Product Type

传统槽型
Traditional Type

●加工效果 Machining Effect

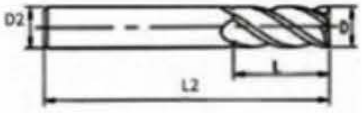
加工时间 processing time	50min			
刀具磨损 Tool wear				
刀具型号 Tool type	HRC65-S4-D6.0	A公司同类产品 Similar products of company A	B公司同类产品 Similar products of company B	HRC65-S4-D6.0

Carbide 4Flutes Square End Mill（Standard）

PD650 | NACO | HRC 65 | S

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

P	●
M	●
K	●
N	
S	
H	●



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
1	3	4	50	PD650-4F-01030450
1.5	4	4	50	PD650-4F-015040450
2	6	4	50	PD650-4F-02060450
2.5	8	4	50	PD650-4F-025080450
3	8	3	50	PD650-4F-03080350
3	8	4	50	PD650-4F-03080450
3.5	10	4	50	PD650-4F-035100450
4	12	4	50	PD650-4F-04120450
5	13	5	50	PD650-4F-05130550
5	13	6	50	PD650-4F-05130650
6	15	6	50	PD650-4F-06150650
7	20	8	60	PD650-4F-07200860
8	20	8	60	PD650-4F-08200860
9	25	10	75	PD650-4F-09251075
10	25	10	75	PD650-4F-10251075
11	30	12	75	PD650-4F-11301275
12	30	12	75	PD650-4F-12301275
14	45	14	100	PD650-4F-144514100
16	45	16	100	PD650-4F-164516100
18	45	18	100	PD650-4F-184518100
20	45	20	100	PD650-4F-204520100

ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刀径 Tool Diameter（mm） 2	4	6	8	10	12
H	合金钢，淬硬钢(<60HAC) Alloy steel,hardened steel	ap≤1D ap≤0.05D	120	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	19110 380	9550 380	6370 380	7170 930	4780 380	3490 360
	合金钢，淬硬钢(65HRC) Alloy steel, hardened stee	ap≤0.7D ap≤0.03D	90	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	15920 260	11940 360	7960 370	5180 620	4780 370	3980 340

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

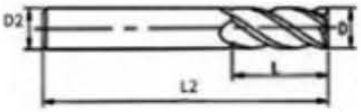
Above table is the standard cutting data for side milling machine, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide 4Flutes Square End Mill（Extra Long）

PD650 NACO HRC 65 S

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

P	●
M	●
K	●
N	
S	
H	●



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
3	12	3	75	PD650-4F-03120375
4	16	4	75	PD650-4F-04160475
5	18	5	75	PD650-4F-05180575
6	24	6	75	PD650-4F-06240675
8	25	8	75	PD650-4F-08250875
3	12	3	100	PD650-4F-031203100
4	20	4	100	PD650-4F-042004100
5	30	5	100	PD650-4F-053005100
6	30	6	100	PD650-4F-063006100
8	35	8	100	PD650-4F-083508100
10	40	10	100	PD650-4F-104010100
12	45	12	100	PD650-4F-124512100
6	45	6	150	PD650-4F-064506150
8	50	8	150	PD650-4F-085008150
10	55	10	150	PD650-4F-105510150
12	55	12	150	PD650-4F-125512150
14	70	14	150	PD650-4F-147014150
16	70	16	150	PD650-4F-167016150
20	70	20	150	PD650-4F-207020150

ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刀径 Tool Diameter（mm） 2	4	6	8	10	12
H	合金钢，淬硬钢(<60HAC) Alloy steel,hardened steel	ap≤1D ap≤0.05D	120	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	19110 380	9550 380	6370 380	7170 930	4780 380	3490 360
	合金钢，淬硬钢(65HRC) Alloy steel, hardened stee	ap≤0.7D ap≤0.03D	90	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	15920 260	11940 360	7960 370	5180 620	4780 370	3980 340

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

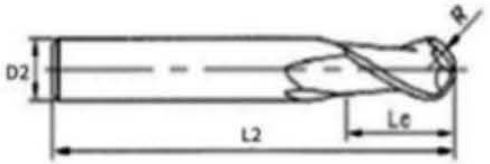
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.t

Carbide Ball Nose End Mill（Standard）

QD650 | NACO | HRC 65 | 2 | 45° | B

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

P	●
M	●
K	●
N	
S	
H	●



Cutting Length L	Radius R	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
2	0.5	4	50	QD650-2F-01020450
3	0.75	4	50	QD650-2F-015030450
4	1	4	50	QD650-2F-02040450
5	1.25	4	50	QD650-2F-025050450
6	1.5	3	50	QD650-2F-03060350
6	1.5	4	50	QD650-2F-03060450
7	1.75	4	50	QD650-2F-035070450
12	2	4	50	QD650-2F-04080450
12	2.5	5	50	QD650-2F-05100550
12	2.5	6	50	QD650-2F-05100650
12	3	6	50	QD650-2F-06120650
16	4	8	60	QD650-2F-08160860
20	5	10	75	QD650-2F-10201075
24	6	12	75	QD650-2F-12241275
28	7	14	100	QD650-2F-142814100
32	8	16	100	QD650-2F-163216100
36	9	18	100	QD650-2F-183618100
40	10	20	100	QD650-2F-204020100

ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刀径 Tool Diameter（mm） 2	4	6	8	10	12
H	合金钢，淬硬钢(<60HAC) Alloy steel,hardened steel	ap≤1D ap≤0.05D	120	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	19110 380	9550 380	6370 380	7170 930	4780 380	3490 360
	合金钢，淬硬钢(65HRC) Alloy steel, hardened stee	ap≤0.7D ap≤0.03D	90	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	15920 260	11940 360	7960 370	5180 620	4780 370	3980 340

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

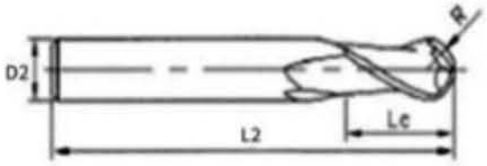
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide Ball Nose End Mill（Extra Long）

QD650 | NACO | HRC 65 | 2F | 45° | B

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

P	●
M	●
K	●
N	
S	
H	●



Cutting Length L	Radius R	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
6	1.5	3	75	QD650-2F-03060375
8	2	4	75	QD650-2F-04080475
10	2.5	5	75	QD650-2F-05100575
12	3	6	75	QD650-2F-06120675
16	4	8	75	QD650-2F-08160875
8	2	4	100	QD650-2F-040804100
12	2.5	5	100	QD650-2F-051005100
12	3	6	100	QD650-2F-061206100
16	4	8	100	QD650-2F-081608100
20	5	10	100	QD650-2F-102010100
24	6	12	100	QD650-2F-122412100
12	3	6	150	QD650-2F-061206150
16	4	8	150	QD650-2F-081608150
20	5	10	150	QD650-2F-102010150
24	6	12	150	QD650-2F-122412150
28	7	14	150	QD650-2F-142814150
32	8	16	150	QD650-2F-163216150
40	10	20	150	QD650-2F-204020150

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 2	4	6	8	10	12
H	合金钢、淬硬钢(<60HAC) Alloy steel,hardened steel	ap≤1D ap≤0.05D	120	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	19110 380	9550 380	6370 380	7170 930	4780 380	3490 360
	合金钢、淬硬钢(65HRC) Alloy steel, hardened stee	ap≤0.7D ap≤0.03D	90	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	15920 260	11940 360	7960 370	5180 620	4780 370	3980 340

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

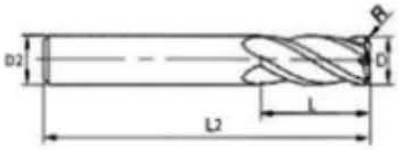
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide Corner Radius End Mill (Standard)

YB650 | NACO | HRC 65 | S

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

P	●
M	●
K	●
N	
S	
H	●



Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	mm	
1	0.2	3	4	50	YB650-4F-0102030450
1.5	0.2	5	4	50	YB650-4F-01502050450
2	0.2	6	4	50	YB650-4F-0202060450
2	0.5	6	4	50	YB650-4F-0205060450
2.5	0.2	8	4	50	YB650-4F-02502080450
2.5	0.5	8	3	50	YB650-4F-02505080350
3	0.5	8	3	50	YB650-4F-0305090350
3	0.2	9	4	50	YB650-4F-0302090450
3	0.5	9	4	50	YB650-4F-0305090450
4	0.2	10	4	50	YB650-4F-0402120450
4	0.5	10	4	50	YB650-4F-0405120450
4	1	10	4	50	YB650-4F-041120450
5	0.5	13	5	50	YB650-4F-0505130550
5	1	13	5	50	YB650-4F-051130550
5	0.5	13	6	50	YB650-4F-0505130650
5	1	13	6	50	YB650-4F-051130650
6	0.2	15	6	50	YB650-4F-0602150650
6	0.5	15	6	50	YB650-4F-0605150650
6	1	15	6	50	YB650-4F-061150650
8	0.5	20	8	60	YB650-4F-0805200860
8	1	20	8	60	YB650-4F-081200860
10	0.5	25	10	75	YB650-4F-1005251075
10	1	25	10	75	YB650-4F-101251075
12	0.5	30	12	75	YB650-4F-1205301275
12	1	30	12	75	YB650-4F-121301275

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀径 Tool Diameter (mm) 2	4	6	8	10	12
H	合金钢，淬硬钢(<60HAC) Alloy steel,hardened steel	ap≤1D ap≤0.05D	120	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	19110 380	9550 380	6370 380	7170 930	4780 380	3490 360
	合金钢，淬硬钢(65HRC) Alloy steel, hardened stee	ap≤0.7D ap≤0.03D	90	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	15920 260	11940 360	7960 370	5180 620	4780 370	3980 340

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

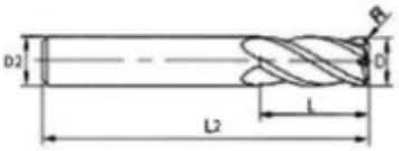
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Carbide Corner Radius End Mill（Extra Long）

YB650 | NACO | HRC 65 | S

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

P ●
M ●
K ●
N
S
H ●



Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	mm	
4	0.5	15	4	75	YB650-4F-0405160475
6	0.5	25	6	75	YB650-4F-0605240675
6	1	25	6	75	YB650-4F-061240675
8	0.5	30	8	75	YB650-4F-0805250875
8	1	30	8	75	YB650-4F-081250875
4	0.5	20	4	100	YB650-4F-04052004100
4	1	20	4	100	YB650-4F-0412004100
6	0.5	30	6	100	YB650-4F-06053006100
6	1	30	6	100	YB650-4F-0613006100
8	0.5	35	8	100	YB650-4F-08053508100
8	1	35	8	100	YB650-4F-0813508100
10	0.5	40	10	100	YB650-4F-10054010100
10	1	40	10	100	YB650-4F-1014010100
12	0.5	45	12	100	YB650-4F-12054512100
12	1	45	12	100	YB650-4F-1214512100

ISO	被加工材料 Workpiece Material	切削量（mm） Depth of cut	Vc m/min		刃径 Tool Diameter（mm） 2	4	6	8	10	12
H	合金钢，淬硬钢(<60HAC) Alloy steel,hardened steel	ap≤1D ap≤0.05D	120	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	19110 380	9550 380	6370 380	7170 930	4780 380	3490 360
	合金钢，淬硬钢(65HRC) Alloy steel, hardened stee	ap≤0.7D ap≤0.03D	90	转速 rote speed（min-1） 进给转速 feed velocity（mm/min）	15920 260	11940 360	7960 370	5180 620	4780 370	3980 340

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

ST-H系列铣刀
ST-H SERIES ENDMILL

通用加工立铣刀 · GENERAL MACHINING END MILLS

P M H K

多功能刀具，适用材料最广泛，工况适应性最优性价比之王，高速加工，精粗两用，高效率加工

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

高硬度 高韧性基材

High hardness and high toughness base material

全球合作伙伴-WORLDWIDE RELIABLE PARTNERS

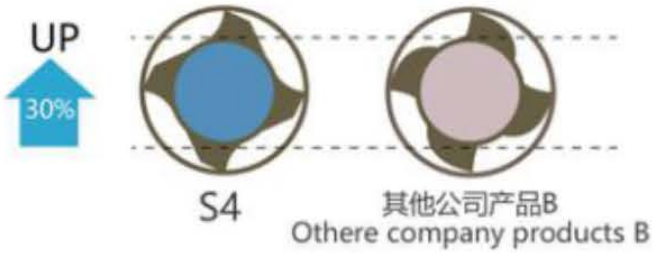
通用加工·抗粘刀能力强，提升刀具寿命
General machining, strong anti-sticking ability, extended tool life

稳定的排屑量。芯厚大，高刚性
Stable chip evacuation. Large core thickness, high rigidity.

在切槽·高进给加工中发挥威力
Play a powerful role in slotting and high feed processing

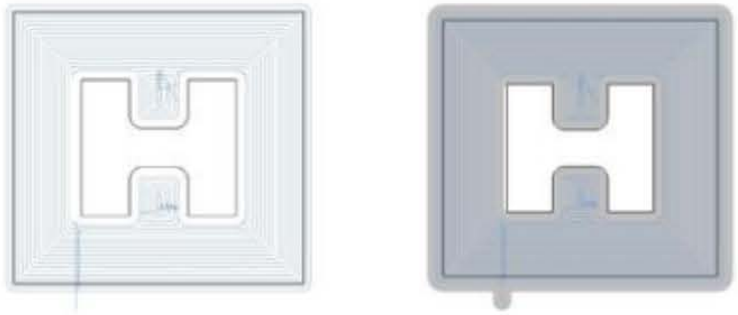
抗振刀性·抗弯能力强
Vibration resistance strong bending resistance

芯厚对比 The core thickness contrast



ST-H系列案例 ST-H SERIES CASE

侧面铣削 Side milling

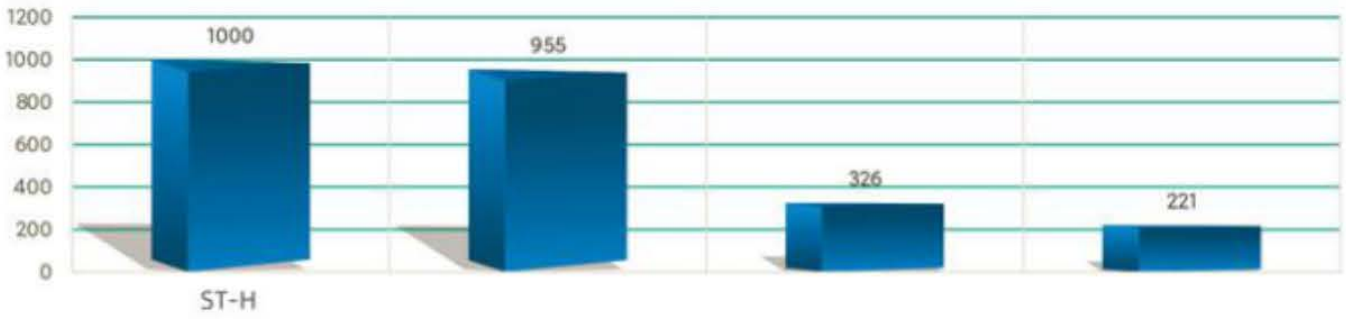


压铸热处理后: H13钢 HRC55-60　应用规格: 8R0.5x60mm
转速:7700 进给:2500 切深:10μm

After die casting heat treatment: H13 steel HRC55-60
Application specifications: 8R0.5x60mm
Rotation speed: 7700 Feed: 2500 Depth of cut: 10μm

(加工效果Processing effect)

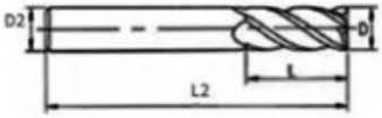
刀具寿命对比（件数）
Tool life comparison (number of pieces)



Carbide 4Flutes Square End Mill (Standard)

单位Unit	(mm)	
D	D≤12	D>12
公差Tol	0	0
	-0.005	-0.005

P	●
M	●
K	●
N	
S	●
H	●



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
1	3	4	50	ST-H-4F-01030450
1.5	5	4	50	ST-H-4F-015050450
2	6	4	50	ST-H-4F-02060450
2.5	8	4	50	ST-H-4F-025080450
3	9	4	50	ST-H-4F-03090450
4	12	4	50	ST-H-4F-04120450
5	13	6	50	ST-H-4F-05130650
6	18	6	50	ST-H-4F-06180650
8	20	8	60	ST-H-4F-08200860
10	30	10	75	ST-H-4F-10301075
12	36	12	75	ST-H-4F-12361275
14	40	14	100	ST-H-4F-144014100
16	45	16	100	ST-H-4F-164516100
18	50	18	100	ST-H-4F-185018100
20	50	20	100	ST-H-4F-205020100

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀径 Tool Diameter (mm) 3	4	6	8	10	12	16	20
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤1.5D	200	转速 rote speed (min-1)	21230	15920	10620	7960	6370	5310	3980	3190
		ap≤0.15D		进给转速 feed velocity (mm/min)	2040	1960	1690	1670	1620	1590	1490	1480
	合金钢 (50HRC) Alloy Steel	ap≤1D	150	转速 rote speed (min-1)	15920	10350	7960	5970	4780	3980	2990	2390
		ap≤0.12D		进给转速 feed velocity (mm/min)	1290	1180	1080	1160	1050	930	760	680
M	不锈钢 stainless steel	ap≤1.5D	150	转速 rote speed (min-1)	15920	11940	49600	5970	4780	3980	2900	2390
		ap≤0.15D		进给转速 feed velocity (mm/min)	1580	1330	1150	1220	1130	1080	900	820
K	灰铸铁，球墨铸铁 (<32HRC) Gry cast iron，nodular cast iron	ap≤1.5D	170	转速 rote speed (min-1)	18050	13540	9020	6770	5410	4510	3380	2710
		ap≤0.15D		进给转速 feed velocity (mm/min)	1620	1500	1440	1330	1200	1150	1020	930
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤1D	150	转速 rote speed (min-1)	15920	11940	7960	5970	4780	3980	2990	2390
		ap≤0.12D		进给转速 feed velocity (mm/min)	1290	1250	1190	1090	1000	960	850	770
H	合金钢，淬硬钢(<60HRC) Alloy steel, hardened steel	ap≤1D	120	转速 rote speed (min-1)	16710	9550	6370	4780	3820	3190	2390	1910
		ap≤0.05D		进给转速 feed velocity (mm/min)	380	380	380	380	370	360	310	290

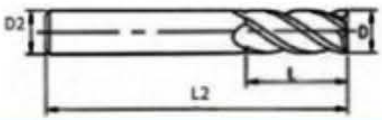
上表是侧铣加工的标准值，刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。

Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

Carbide 4Flutes Square End Mill (Extra Long)

单位Unit	(mm)	
D	D≤12	D>12
公差Tol	0	0
	-0.005	-0.005

P	●
M	●
K	●
N	
S	●
H	●



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
3	12	4	75	ST-H-4F-03120475
4	16	4	75	ST-H-4F-04160475
5	20	6	75	ST-H-4F-05200675
6	25	6	75	ST-H-4F-06250675
8	32	8	75	ST-H-4F-08320875
3	12	4	100	ST-H-4F-031204100
4	16	4	100	ST-H-4F-041604100
6	25	6	100	ST-H-4F-062506100
8	32	8	100	ST-H-4F-083208100
10	40	10	100	ST-H-4F-104010100
12	50	12	100	ST-H-4F-125012100
6	45	6	150	ST-H-4F-064506150
8	50	8	150	ST-H-4F-085008150
10	55	10	150	ST-H-4F-105510150
12	60	12	150	ST-H-4F-126012150
16	65	16	150	ST-H-4F-166516150
20	80	20	150	ST-H-4F-208020150

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀径 Tool Diameter (mm) 3	4	6	8	10	12	16	20
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤1.5D ap≤0.15D	200	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	21230 2040	15920 1960	10620 1690	7960 1670	6370 1620	5310 1590	3980 1490	3190 1480
	合金钢 (50HRC) Alloy Steel	ap≤1D ap≤0.12D	150	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	15920 1290	10350 1180	7960 1080	5970 1160	4780 1050	3980 930	2990 760	2390 680
M	不锈钢 stainless steel	ap≤1.5D ap≤0.15D	150	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	15920 1580	11940 1330	49600 1150	5970 1220	4780 1130	3980 1080	2900 900	2390 820
K	灰铸铁、球墨铸铁 (<32HRC) Gry cast iron, nodular cast iron	ap≤1.5D ap≤0.15D	170	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	18050 1620	13540 1500	9020 1440	6770 1330	5410 1200	4510 1150	3380 1020	2710 930
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤1D ap≤0.12D	150	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	15920 1290	11940 1250	7960 1190	5970 1090	4780 1000	3980 960	2990 850	2390 770
H	合金钢、淬硬钢(<60HRC) Alloy steel, hardened steel	ap≤1D ap≤0.05D	120	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	16710 380	9550 380	6370 380	4780 380	3820 370	3190 360	2390 310	1910 290

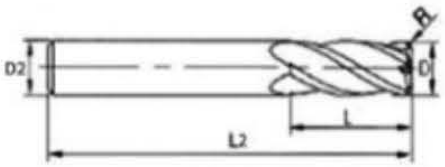
上表是侧铣加工的标准值，刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。

Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

Carbide Corner Radius End Mill (Standard)

单位Unit	(mm)	
D	D≤12	D>12
公差Tol	0	0
	-0.005	-0.005

P	●
M	●
K	●
N	
S	●
H	●



Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	mm	
1	R0.2	3	4	50	ST-H-4F-YB01002030450
1.5	R0.2	4	4	50	ST-H-4F-YB015002040450
2	R0.2	5	4	50	ST-H-4F-YB02002050450
2.5	R0.2	7	4	50	ST-H-4F-YB025002074050
2.5	R0.5	7	4	50	ST-H-4F-YB025005070450
3	R0.2	8	4	50	ST-H-4F-YB03002080450
3	R0.5	8	4	50	ST-H-4F-YB03005080450
3	R1	8	4	50	ST-H-4F-YB0301080450
3.5	R0.5	8	4	50	ST-H-4F-YB035005080450
4	R0.2	10	4	50	ST-H-4F-YB04002100450
4	R1	10	4	50	ST-H-4F-YB0401100450
5	R0.2	13	6	50	ST-H-4F-YB05002130650
5	R0.5	13	5	50	ST-H-4F-YB05005130550
5	R0.5	13	6	50	ST-H-4F-YB05005130650
5	R1	13	6	50	ST-H-4F-YB0501130650
6	R0.2	15	6	50	ST-H-4F-YB06002150650
6	R0.5	15	6	50	ST-H-4F-YB06005150650
6	R1	15	6	50	ST-H-4F-YB0601150650
8	R0.5	20	8	60	ST-H-4F-YB08005200860
8	R1	20	8	60	ST-H-4F-YB0801200860
10	R0.5	25	10	75	ST-H-4F-YB10005251075
10	R1	25	10	75	ST-H-4F-YB1001251075
12	R0.5	30	12	75	ST-H-4F-YB12005301275
12	R1	30	12	75	ST-H-4F-YB1201301275

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀径 Tool Diameter (mm) 3	4	6	8	10	12	16	20
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤1.5D	200	转速 rote speed (min-1)	21230	15920	10620	7960	6370	5310	3980	3190
		ap≤0.15D		进给转速 feed velocity (mm/min)	2040	1960	1690	1670	1620	1590	1490	1480
	合金钢 (50HRC) Alloy Steel	ap≤1D	150	转速 rote speed (min-1)	15920	10350	7960	5970	4780	3980	2990	2390
		ap≤0.12D		进给转速 feed velocity (mm/min)	1290	1180	1080	1160	1050	930	760	680
M	不锈钢 stainless steel	ap≤1.5D	150	转速 rote speed (min-1)	15920	11940	49600	5970	4780	3980	2900	2390
		ap≤0.15D		进给转速 feed velocity (mm/min)	1580	1330	1150	1220	1130	1080	900	820
K	灰铸铁、球墨铸铁 (<32HRC) Gry cast iron, nodular cast iron	ap≤1.5D	170	转速 rote speed (min-1)	18050	13540	9020	6770	5410	4510	3380	2710
		ap≤0.15D		进给转速 feed velocity (mm/min)	1620	1500	1440	1330	1200	1150	1020	930
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤1D	150	转速 rote speed (min-1)	15920	11940	7960	5970	4780	3980	2990	2390
		ap≤0.12D		进给转速 feed velocity (mm/min)	1290	1250	1190	1090	1000	960	850	770
H	合金钢、冷硬钢 (<60HRC) Alloy steel, hardened steel	ap≤1D	120	转速 rote speed (min-1)	16710	9550	6370	4780	3820	3190	2390	1910
		ap≤0.05D		进给转速 feed velocity (mm/min)	380	380	380	380	370	360	310	290

上表是侧铣加工的标准值。刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。

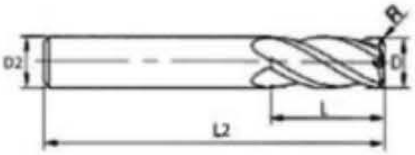
Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

Carbide Corner Radius End Mill (Extra Long)

ST-H YB | AlCrSiN | HRC 68 | S

单位Unit	(mm)	
D	D≤12	D>12
公差Tol	0	0
	-0.005	-0.005

P	●
M	●
K	●
N	
S	●
H	●



Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	mm	
4	R0.5	10	4	75	ST-H-4F-YB04005100475
4	R1	10	4	75	ST-H-4F-YB0401100475
5	R0.5	13	5	75	ST-H-4F-YB05005130575
6	R0.5	15	6	75	ST-H-4F-YB06005150675
6	R1	15	6	75	ST-H-4F-YB0601150675
8	R0.5	50	8	75	ST-H-4F-YB08005500875
8	R1	20	8	75	ST-H-4F-YB0801200875
4	R0.5	10	4	100	ST-H-4F-YB040051004100
4	R1	10	4	100	ST-H-4F-YB04011004100
6	R0.5	15	6	100	ST-H-4F-YB060051506100
6	R1	15	6	100	ST-H-4F-YB06011506100
8	R0.5	20	8	100	ST-H-4F-YB080052008100
8	R1	20	8	100	ST-H-4F-YB08012008100
10	R0.5	25	10	100	ST-H-4F-YB100052510100
10	R1	25	10	100	ST-H-4F-YB10012510100
12	R0.5	30	12	100	ST-H-4F-YB120053012100
12	R1	30	12	100	ST-H-4F-YB12013012100
10	R0.5	40	10	150	ST-H-4F-YB100054010150
10	R1	40	10	150	ST-H-4F-YB10014010150
12	R0.5	48	12	150	ST-H-4F-YB120054812150

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 3	4	6	8	10	12	16	20
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤1.5D ap≤0.15D	200	转速 rote speed (min-1)	21230	15920	10620	7960	6370	5310	3980	3190
				进给转速 feed velocity (mm/min)	2040	1960	1690	1670	1620	1590	1490	1480
	合金钢 (50HRC) Alloy Steel	ap≤1D ap≤0.12D	150	转速 rote speed (min-1)	15920	10350	7960	5970	4780	3980	2990	2390
				进给转速 feed velocity (mm/min)	1290	1180	1080	1160	1050	930	760	680
M	不锈钢 stainless steel	ap≤1.5D ap≤0.15D	150	转速 rote speed (min-1)	15920	11940	49600	5970	4780	3980	2900	2390
				进给转速 feed velocity (mm/min)	1580	1330	1150	1220	1130	1080	900	820
K	灰铸铁、球墨铸铁 (<32HRC) Gry cast iron、nodular cast iron	ap≤1.5D ap≤0.15D	170	转速 rote speed (min-1)	18050	13540	9020	6770	5410	4510	3380	2710
				进给转速 feed velocity (mm/min)	1620	1500	1440	1330	1200	1150	1020	930
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤1D ap≤0.12D	150	转速 rote speed (min-1)	15920	11940	7960	5970	4780	3980	2990	2390
				进给转速 feed velocity (mm/min)	1290	1250	1190	1090	1000	960	850	770
H	合金钢、淬硬钢(<60HRC) Alloy steel, hardened steel	ap≤1D ap≤0.05D	120	转速 rote speed (min-1)	16710	9550	6370	4780	3820	3190	2390	1910
				进给转速 feed velocity (mm/min)	380	380	380	380	370	360	310	290

上表是侧铣加工的标准值。刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。

Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

高性能ST-U系列铣刀

HIGH PERFORMANCE ST-U SERIES ENDMILL

超高硬高效立铣刀

EXTREMELY HIGH HARDNESS AND HIGH PERFORMANCE END MILL

- 底刃不等分，大螺旋角设计，减少震动，加工表面光洁度高
- 特殊的刀具设计，非常适合加工各种难加工硬钢
- 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.

P M K H S

不等分特殊刃形，减少震动，表面光洁度高

Specially uneven blade shape, reduced vibration, high surface gloss

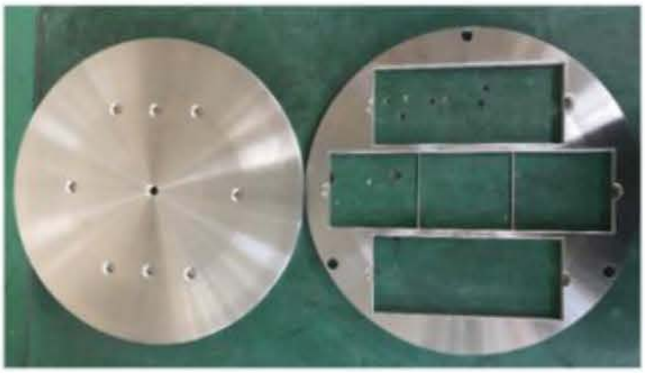
全球合作伙伴-WORLDWIDE RELIABLE PARTNERS

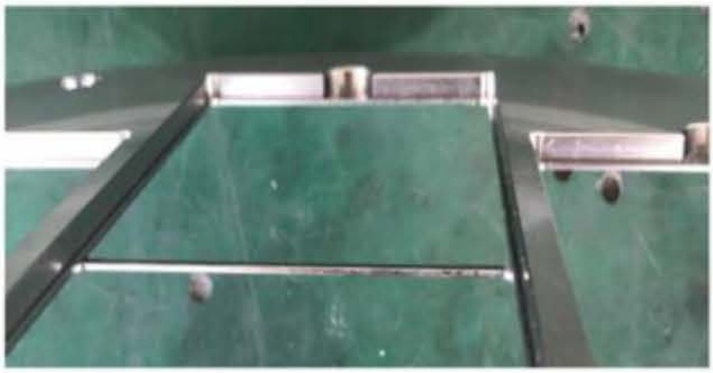
底刃不等分，大幅度抑制振动，减少震动，可实现稳定加工
The bottom edge is not equally divided, greatly inhibit vibration, reduce vibration, can realize stable processing

特殊的容屑槽形状，即使在沟槽及型腔加工中
也能表现出优异的性能
Special chip groove shape, even in the groove and cavity machining can also show excellent performance.

加工材料: TC18 钛合金
刀具规格: MS4CD10四刃平刀
加工参数: S=2000 F=1000 动态铣削
切削量: Ap: 20.0mm Ae: 02~0.3mm

Processing material: TC18 titanium alloy
Tool specifications: MS4CD10 four-edged flat knife
Processing parameters: S=2000 F=1000 dynamic milling
Cutting amount: Ap: 20.0mm Ae: 02~0.3mm

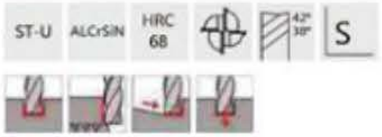




T2 纯钛 加工案例
使用机械:常准(TMV-11H)
加工材料:T2纯钛
工件尺寸:
直径350mm，厚度7mm
刀具规格:
MS4C D6 四刃平刀
切削速度:
VC=85
加工参数:
S=4500 F=1800开槽切槽
切削量:Ap:0.25mm Ae:6.0mm

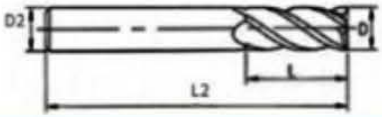
T2 pure titanium processing case
Machine used: Changsha (TMV-11H)
Processing material: T2 pure titanium
Work piece size:
Diameter 350mm, thickness 7mm
Tool specifications:
MS4C D6 four-edged flat knife
Cutting speed:
VC=85
Processing parameters:
S=4500 F=1800 grooving and grooving
Cutting amount: Ap: 0.25mm Ae: 6.0mm

Carbide 4Flutes Square End Mill (Standard)



单位Unit	(mm)	
D	D≤12	D>12
公差Tol	0	0
	-0.005	-0.005

P	●
M	●
K	●
N	
S	●
H	●



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
1	3	4	50	ST-U-4F-01030450
1.5	5	4	50	ST-U-4F-015050450
2	6	4	50	ST-U-4F-02060450
2.5	8	4	50	ST-U-4F-025080450
3	9	4	50	ST-U-4F-03090450
4	11	4	50	ST-U-4F-04110450
5	13	6	50	ST-U-4F-051360550
6	15	6	50	ST-U-4F-06150650
8	20	8	60	ST-U-4F-08200860
10	25	10	75	ST-U-4F-10251075
12	30	12	75	ST-U-4F-12301275
16	45	16	100	ST-U-4F-164516100

Carbide 4Flutes Square End Mill (Extra Long)

Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
4	12	4	75	ST-U-4F-04120475
6	18	6	75	ST-U-4F-06180675
8	24	8	75	ST-U-4F-08240875
6	18	6	100	ST-U-4F-061806100
8	24	8	100	ST-U-4F-082408100
10	30	10	100	ST-U-4F-103010100
12	36	12	100	ST-U-4F-123612100

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 3	4	6	8	10	12	16	20
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤1.5D ap≤0.15D	200	转速 rote speed (min-1)	21230	15920	10620	7960	6370	5310	3980	3190
				进给转速 feed velocity (mm/min)	2040	1960	1690	1670	1620	1590	1490	1480
	合金钢 (50HRC) Alloy Steel	ap≤1D ap≤0.12D	150	转速 rote speed (min-1)	15920	10350	7960	5970	4780	3980	2990	2390
				进给转速 feed velocity (mm/min)	1290	1180	1080	1160	1050	930	760	680
M	不锈钢 stainless steel	ap≤1.5D ap≤0.15D	150	转速 rote speed (min-1)	15920	11940	49600	5970	4780	3980	2900	2390
				进给转速 feed velocity (mm/min)	1580	1330	1150	1220	1130	1080	900	820
K	灰铸铁、球墨铸铁 (<32HRC) Gry cast iron、nodular cast iron	ap≤1.5D ap≤0.15D	170	转速 rote speed (min-1)	18050	13540	9020	6770	5410	4510	3380	2710
				进给转速 feed velocity (mm/min)	1620	1500	1440	1330	1200	1150	1020	930
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤1D ap≤0.12D	150	转速 rote speed (min-1)	15920	11940	7960	5970	4780	3980	2990	2390
				进给转速 feed velocity (mm/min)	1290	1250	1190	1090	1000	960	850	770
H	合金钢、淬硬钢(<60HRC) Alloy steel, hardened steel	ap≤1D ap≤0.05D	120	转速 rote speed (min-1)	16710	9550	6370	4780	3820	3190	2390	1910
				进给转速 feed velocity (mm/min)	380	380	380	380	370	360	310	290

上表是侧铣加工的标准值。刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。

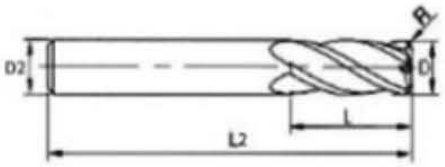
Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

Carbide Corner Radius End Mill (Standard)

ST-U YB | ALCrSiN | HRC 68 | S

单位Unit	(mm)	
D	D≤12	D>12
公差Tol	0	0
	-0.005	-0.005

P ●
M ●
K ●
N
S ●
H ●



Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	mm	
1	R0.2	3	4	50	ST-U-4F-YB0100200450
1.5	R0.2	4	4	50	ST-U-4F-YB015002040450
2	R0.2	5	4	50	ST-U-4F-YB02002050450
3	R0.2	9	4	50	ST-U-4F-YB03002090450
3	R0.5	9	4	50	ST-U-4F-YB03005090450
4	R0.2	11	4	50	ST-U-4F-YB04002110450
4	R0.5	11	4	50	ST-U-4F-YB04005110450
5	R0.5	13	6	50	ST-U-4F-YB05005130650
5	R1	13	6	50	ST-U-4F-YB0501130650
5	R0.2	13	6	50	ST-U-4F-YB05002130650
6	R0.2	15	15	50	ST-U-4F-YB06002150650
6	R0.5	15	15	50	ST-U-4F-YB06005150650
6	R1	15	15	50	ST-U-4F-YB0601150650
8	R0.5	20	20	60	ST-U-4F-YB08005200860
8	R1	20	20	60	ST-U-4F-YB0801200860
10	R0.5	25	25	75	ST-U-4F-YB1000521075
10	R1	25	25	75	ST-U-4F-YB1001251075
12	R0.5	30	30	75	ST-U-4F-YB12005301275
12	R1	30	30	75	ST-U-4F-YB120131275

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀径 Tool Diameter (mm) 3	4	6	8	10	12	16	20
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤1.5D	200	转速 rote speed (min-1)	21230	15920	10620	7960	6370	5310	3980	3190
		ap≤0.15D		进给转速 feed velocity (mm/min)	2040	1960	1690	1670	1620	1590	1490	1480
	合金钢 (50HRC) Alloy Steel	ap≤1D	150	转速 rote speed (min-1)	15920	10350	7960	5970	4780	3980	2990	2390
		ap≤0.12D		进给转速 feed velocity (mm/min)	1290	1180	1080	1160	1050	930	760	680
M	不锈钢 stainless steel	ap≤1.5D	150	转速 rote speed (min-1)	15920	11940	49600	5970	4780	3980	2900	2390
		ap≤0.15D		进给转速 feed velocity (mm/min)	1580	1330	1150	1220	1130	1080	900	820
K	灰铸铁，球墨铸铁 (<32HRC) Gry cast iron，nodular cast iron	ap≤1.5D	170	转速 rote speed (min-1)	18050	13540	9020	6770	5410	4510	3380	2710
		ap≤0.15D		进给转速 feed velocity (mm/min)	1620	1500	1440	1330	1200	1150	1020	930
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤1D	150	转速 rote speed (min-1)	15920	11940	7960	5970	4780	3980	2990	2390
		ap≤0.12D		进给转速 feed velocity (mm/min)	1290	1250	1190	1090	1000	960	850	770
H	合金钢，淬硬钢(<60HRC) Alloy steel, hardened steel	ap≤1D	120	转速 rote speed (min-1)	16710	9550	6370	4780	3820	3190	2390	1910
		ap≤0.05D		进给转速 feed velocity (mm/min)	380	380	380	380	370	360	310	290

上表是侧铣加工的标准值。刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。

Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

AL系列

超亮铝加工立铣刀

Super Bright Aluminum Processing Series

N

高光·HIGHLIGHT

- 适用于铝合金材料的高效超亮加工
- 底刃变分度，独特螺旋角设计，拥有卓越的抗震性能，加工表面精度高
- 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.

特殊的刃口设计，有效解决刀具刃口沾屑问题

Special edge design, effectively solve the problem of sticky

全球合作伙伴-WORLDWIDE RELIABLE PARTNERS

铝合金材料的高效超亮加工
Aluminum alloy material efficient ultra-bright processing

抑制毛刺 Inhibition of burr

大前角和小棱边实现优秀的切削效果。
Large front angle and small edge achieve excellent cutting effect.

大容屑槽 Large Chip flute

在高进给加工中，刀具的切削与排屑更加流畅。
The cutting and chip removal are more smooth and stable in the high feed processing.

锋利切削刃 Sharp cutting edge

锋利的切削刃及大螺旋角设计有效防止机屑瘤的产生
Sharp cutting edge and large spiral angle design can effectively prevent the generation of built-up edge.

N

特殊的刃口设计
有效解决刀具刃口粘屑问题
Special edge design
Effectively solve the sticking

高光·HIGHLIGHT

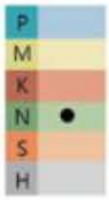
特殊的容屑槽形状，即使在沟槽及型腔加工中也能表现出优异的性能
Special chip flute shape,can show excellent performance even in groove and cavity machining.

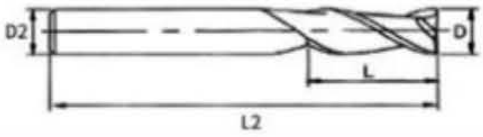
1. 大排屑空间,不易积屑
Large chip removal space, not easy to accumulate chips
2. 抗震工艺,锋利月牙刃口
Anti-seismic technology, sharp crescent edge

全刃口抗震设计，能抑制加工过程中的颤振，提高加工表面质量。
Full-edge anti-vibration design can supp ress vibration during processing and improve the quality of the processed surface.

2Flutes Square End Mill For Aluminum (Standard)

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





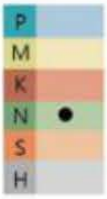
Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
1	3	4	50	LYJCD-2F-01030450
1.5	5	4	50	LYJCD-2F-015050450
2	6	4	50	LYJCD-2F-02060450
2.5	8	4	50	LYJCD-2F-025080450
3	9	3	50	LYJCD-2F-03090350
3	9	4	50	LYJCD-2F-03090450
3.5	11	4	50	LYJCD-2F-035110450
4	12	4	50	LYJCD-2F-04120450
5	15	5	50	LYJCD-2F-05150550
5	15	6	50	LYJCD-2F-05150650
6	18	6	50	LYJCD-2F-06180650
7	24	8	60	LYJCD-2F-07240860
8	24	8	60	LYJCD-2F-08240860
10	30	10	75	LYJCD-2F-10301075
11	35	12	75	LYJCD-2F-11351275
12	35	12	75	LYJCD-2F-12351275
14	45	14	100	LYJCD-2F-144514100
16	45	16	100	LYJCD-2F-164516100
18	45	18	100	LYJCD-2F-184518100
20	45	20	100	LYJCD-2F-204520100

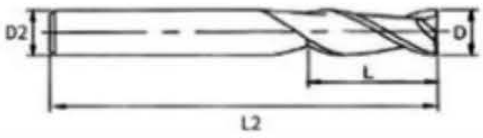
ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	12700	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	580	710	1200	1280	1390	1720	2400	2500	2450
	铜合金(<200HB) Copper alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	12700	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	520	650	1070	1150	1250	1550	2170	2250	2200

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy	ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤1D		进给转速 feed velocity (mm/min)	400	500	810	920	1100	1280	1300	1310	1200
	铜合金(<200HB) Copper alloy	ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤1D		进给转速 feed velocity (mm/min)	380	450	800	830	1000	1150	1130	1000	1080

2Flutes Square End Mill For Aluminum (Extra Long)

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





Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
3	12	3	75	LYJCD-2F-03120375
4	16	4	75	LYJCD-2F-04160475
5	18	5	75	LYJCD-2F-05180575
6	25	6	75	YJCD-2F-06250675
8	25	8	75	LYJCD-2F-08250875
3	12	3	100	LYJCD-2F-031203100
4	20	4	100	YJCD-2F-042004100
5	30	5	100	LYJCD-2F-053005100
6	30	6	100	LYJCD-2F-063006100
8	35	8	100	LYJCD-2F-083508100
10	40	10	100	YJCD-2F-104010100
12	45	12	100	LYJCD-2F-124512100
6	45	6	150	LYJCD-2F-064506150
8	50	8	150	LYJCD-2F-085008150
10	55	10	150	LYJCD-2F-105510150
12	55	12	150	LYJCD-2F-125512150
14	70	14	150	LYJCD-2F-147014150
16	80	16	150	LYJCD-2F-168016150
18	80	18	150	LYJCD-2F-188018150
20	80	20	150	LYJCD-2F-208020150

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金(<200HB) Copper alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	12700	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	580	710	1200	1280	1390	1720	2400	2500	2450
		ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	12700	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	520	650	1070	1150	1250	1550	2170	2250	2200

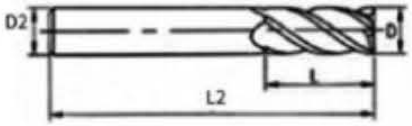
ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金(<200HB) Copper alloy	ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤1D		进给转速 feed velocity (mm/min)	400	500	810	920	1100	1280	1300	1310	1200
		ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤1D		进给转速 feed velocity (mm/min)	380	450	800	830	1000	1150	1130	1000	1080

3Flutes Square End Mill For Aluminum (Standard)

LYD | DLC | HRC 55 | S

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

P
M
K
N ●
S
H



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
1	3	4	50	LYD-3F-01030450
1.5	5	4	50	LYD-3F-015050450
2	6	4	50	LYD-3F-02060450
2.5	8	4	50	LYD-3F-025080450
3	9	3	50	LYD-3F-03090350
3	9	4	50	LYD-3F-03090450
3.5	11	4	50	LYD-3F-035110450
4	12	4	50	LYD-3F-04120450
5	15	5	50	LYD-3F-05150550
5	15	6	50	LYD-3F-05150650
6	18	6	50	LYD-3F-06180650
7	24	8	60	LYD-3F-07240860
8	24	8	60	LYD-3F-08240860
9	30	10	75	LYD-3F-09301075
10	30	10	75	LYD-3F-10301075
11	35	12	75	LYD-3F-11351275
12	35	12	75	LYD-3F-12351275
14	45	14	100	LYD-3F-144514100
16	45	16	100	LYD-3F-164516100
18	45	18	100	LYD-3F-184518100
20	45	20	100	LYD-3F-204520100

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	12700	12000	10600	10000	9500	9280	7000	5600
	铜合金(<200HB) Copper alloy	ap≤0.2D		进给转速 feed velocity (mm/min)	580	710	1200	1280	1390	1720	2400	2500	2450
		ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	12700	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	520	650	1070	1150	1250	1550	2170	2250	2200

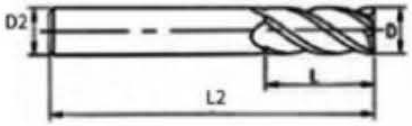
ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy	ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
	铜合金(<200HB) Copper alloy	ap≤1D		进给转速 feed velocity (mm/min)	400	500	810	920	1100	1280	1300	1310	1200
		ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤1D		进给转速 feed velocity (mm/min)	380	450	800	830	1000	1150	1130	1000	1080

3Flutes Square End Mill For Aluminum（Extra Long）

LYD | DLC | HRC 55 | S

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

P
M
K
N ●
S
H

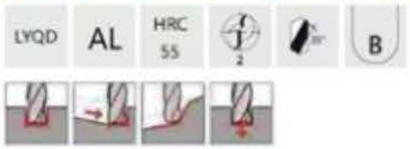


Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
2	6	4	75	LYD-3F-02060475
3	9	4	75	LYD-3F-03090475
3	12	3	75	LYD-3F-03120375
3.5	11	4	75	LYD-3F-035110475
4	16	4	75	LYD-3F-04160475
5	18	5	75	LYD-3F-05180575
6	25	6	75	LYD-3F-06250675
8	30	8	75	LYD-3F-08300875
3	12	3	100	LYD-3F-031203100
4	20	4	100	LYD-3F-042004100
5	30	5	100	LYD-3F-053005100
6	30	6	100	LYD-3F-063006100
8	35	8	100	LYD-3F-083508100
10	40	10	100	LYD-3F-104010100
12	45	12	100	LYD-3F-124512100
6	45	6	150	LYD-3F-064506150
8	50	8	150	LYD-3F-085008150
10	55	10	150	LYD-3F-105510150
12	55	12	150	LYD-3F-125512150
14	70	14	150	LYD-3F-147014150
16	80	16	150	LYD-3F-168016150
18	80	18	150	LYD-3F-188018150
20	80	20	150	LYD-3F-208020150
6	50	6	200	LYD-3F-065006200
8	60	8	200	LYD-3F-08608200
10	65	10	200	LYD-3F-106510200
12	70	12	200	LYD-3F-127012200
14	80	14	200	LYD-3F-148014200
16	85	16	200	LYD-3F-168516200
20	90	20	200	LYD-3F-209020200

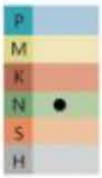
ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) forging and casting aluminum alloy 铝合金(<200HB) Copper alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	650	850	1430	1530	1670	2050	2800	3000	3150
		ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	720	900	1200	1200	1500	1800	2225	2500	3000

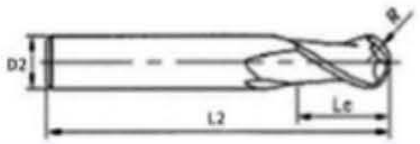
ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) forging and casting aluminum alloy 铝合金(<200HB) Copper alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤0.2D		进给转速 feed velocity (mm/min)	450	570	960	1050	1300	1500	1620	1680	1800
		ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤0.2D		进给转速 feed velocity (mm/min)	450	520	860	830	9600	1240	1500	1500	1510

Ball Nose End Mill For Aluminum (Standard)



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





Cutting Length L	Radius R	Shank D2	Overall Length L2
mm	mm	mm	mm
2	0.5	4	50
3	0.75	4	50
4	1	4	50
5	1.25	4	50
6	1.5	3	50
6	1.5	4	50
7	1.75	4	50
12	2	4	50
12	2.5	5	50
12	2.5	6	50
12	3	6	50
16	4	8	60
20	5	10	75
24	6	12	75
28	7	14	100
32	8	16	100
36	9	18	100
40	10	20	100

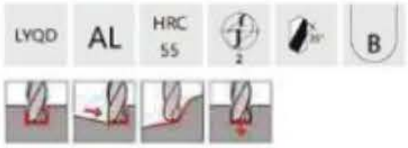
Ordering Code
LYQD-2F-01020450
LYQD-2F-015030450
LYQD-2F-02040450
LYQD-2F-025050450
LYQD-2F-03060350
LYQD-2F-03060450
LYQD-2F-035070450
LYQD-2F-04080450
LYQD-2F-05100550
LYQD-2F-05100650
LYQD-2F-06120650
LYQD-2F-08160860
LYQD-2F-10201075
LYQD-2F-12241275
LYQD-2F-142814100
LYQD-2F-163216100
LYQD-2F-183618100
LYQD-2F-204020100

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀径 tool Diameter (mm) 1	2	4	6	8	10	12	16
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金(<200HB) Copper alloy	ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	19000	15900	11900	10600	8000	7950	7950	7000
		ap≤1D		进给转速 feed velocity (mm/min)	950	1600	1900	2500	2250	3800	3800	4450
		ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	19000	15900	11900	10600	8000	7950	7950	7000
		ap≤1D		进给转速 feed velocity (mm/min)	860	1430	1720	2300	2300	2850	3450	4010

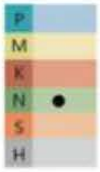
1.请使用高精度的机床和刀柄。
2.请使用油冷冷却的切削液。
3.机床与工件安装刚性较差的情况下，会产生振动和异常声音，此时应将上表的转速与进给速度同比降低。
4.在不干涉的条件下尽可能使刀具悬长最短。

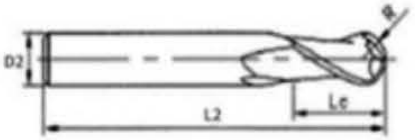
1.Please use high-precision machine tools and tool holder.
2.Pls use oil cooled cutting liquid.
3.When the riaidity of the machine tool and the workpiece is poorly installed, vibration and abnormal sound will occur. At this time, the rotation speed and feed rate of the above table should be reduced.
4. Keep the tool overhang as short as possible without interference.

Ball Nose End Mill For Aluminum (Extra Long)



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





Cutting Length L	Radius R	Shank D2	Overall Length L2
mm	mm	mm	mm
6	1.5	3	75
8	2	4	75
10	2.5	5	75
12	3	6	75
16	4	8	75
6	1.5	3	100
8	2	4	100
10	2.5	5	100
12	3	6	100
16	4	8	100
20	5	10	100
24	6	12	100
12	3	6	150
16	4	8	150
20	5	10	150
24	6	12	150

Ordering Code
LYQD-2F-03060375
LYQD-2F-04080475
LYQD-2F-05100575
LYQD-2F-06120675
LYQD-2F-08160875
LYQD-2F-030603100
LYQD-2F-040804100
LYQD-2F-051005100
LYQD-2F-061206100
LYQD-2F-081608100
LYQD-2F-102010100
LYQD-2F-122412100
LYQD-2F-061206150
LYQD-2F-081608150
LYQD-2F-102010150
LYQD-2F-122412150

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金(<200HB) Copper alloy	ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	19000	15900	11900	10600	8000	7950	7950	7000
		ap≤1D		进给转速 feed velocity (mm/min)	950	1600	1900	2500	2250	3800	3800	4450
		ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	19000	15900	11900	10600	8000	7950	7950	7000
		ap≤1D		进给转速 feed velocity (mm/min)	860	1430	1720	2300	2300	2850	3450	4010

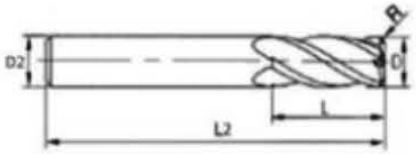
1.请使用高精度的机床和刀柄。
2.请使用油冷冷却的切削液。
3.机床与工件安装刚性较差的情况下，会产生振动和异常声音，此时应将上表的转速与进给速度同比降低。
4.在不干涉的条件下尽可能使刀具悬长最短。
1.Please use high-precision machine tools and tool holder.
2.Pls use oil cooled cutting liquid.
3.When the riaidity of the machine tool and the workpiece is poorly installed, vibration and abnormal sound will occur.
At this time, the rotation speed and feed rate of the above table should be reduced.
4. Keep the tool overhang as short as possible without interference.

Carbide Corner Radius End Mill (Standard)

LYYB | AL | HRC 55 | 3 | 30° | S

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

P
M
K
N ●
S
H



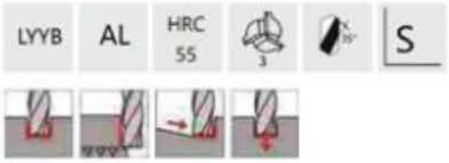
Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2
mm	mm	mm	mm	mm
1	0.2	3	4	50
1.5	0.2	4.5	4	50
2	0.2	6	4	50
2	0.5	6	4	50
3	0.2	9	4	50
3	0.5	9	4	50
3	1	9	4	50
4	0.5	12	4	50
4	1	12	4	50
5	0.5	18	6	50
5	0.5	18	5	50
5	1	18	5	50
5	1	18	6	50
6	0.5	18	6	50
6	1	18	6	50
8	0.5	24	8	60
8	1	24	8	60
8	2	24	8	60
10	0.5	30	10	75
10	1	30	10	75
12	0.5	35	12	75
12	1	35	12	75

Ordering Code
LYYB-3F-0102030450
LYYB-3F-01502050450
LYYB-3F-0202060450
LYYB-3F-0205060450
LYYB-3F-0302090450
LYYB-3F-0305090450
LYYB-3F-031090450
LYYB-3F-0405120450
LYYB-3F-041120450
LYYB-3F-0505130650
LYYB-3F-0505130550
LYYB-3F-051130550
LYYB-3F-051130650
LYYB-3F-0605150650
LYYB-3F-061150650
LYYB-3F-0805200860
LYYB-3F-081200860
LYYB-3F-082200860
LYYB-3F-1005251075
LYYB-3F-101251075
LYYB-3F-1205301275
LYYB-3F-121301275

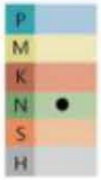
ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金(<200HB) Copper alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	650	850	1200	1530	1670	2050	2800	3000	3150
		ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	720	900	1200	1200	1500	1800	2225	2500	3000

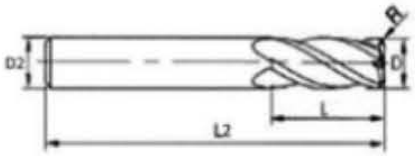
ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金(<200HB) Copper alloy	ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤1D		进给转速 feed velocity (mm/min)	450	570	960	1050	1300	1500	1620	1680	1800
		ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤1D		进给转速 feed velocity (mm/min)	450	520	860	830	960	1240	1500	1550	1510

Carbide Corner Radius End Mill (Extra Long)



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





Diameter D	Radius R	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	mm	
4	0.5	20	4	75	LYYB-3F-0405160475
4	1	20	4	75	LYYB-3F-041160475
6	0.5	25	6	75	LYYB-3F-0605240675
6	1	25	6	75	LYYB-3F-061240675
8	0.5	30	8	75	LYYB-3F-0805250875
8	1	30	8	75	LYYB-3F-081250875
4	0.5	25	4	100	LYYB-3F-04052004100
4	1	25	4	100	LYYB-3F-0412004100
6	0.5	30	6	100	LYYB-3F-06053006100
6	1	30	6	100	LYYB-3F-061300610
8	0.5	35	8	100	LYYB-3F-08053508100
8	1	35	8	100	LYYB-3F-0813508100
10	0.5	40	10	100	LYYB-3F-10054010100
10	1	40	10	100	LYYB-3F-1014010100
12	0.5	45	12	100	LYYB-3F-12054512100
12	1	45	12	100	LYYB-3F-1214512100

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金(<200HB) Copper alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	650	850	1200	1530	1670	2050	2800	3000	3150
		ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	720	900	1200	1200	1500	1800	2225	2500	3000

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金(<200HB) Copper alloy	ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤1D		进给转速 feed velocity (mm/min)	450	570	960	1050	1300	1500	1620	1680	1800
		ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤1D		进给转速 feed velocity (mm/min)	450	520	860	830	960	1240	1500	1550	1510

粗加工立铣刀系列
Endmills for roughing application series

- 适用于普通钢，铸铁材料的粗加工
- 特殊的刃口断屑槽处理，适用于工件的沟槽和侧壁粗加工
- 采用TiSiN涂层
- 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.

刃口耐磨性和刀具刚性提升

Improved edge wear resistance and tool rigidity

全球合作伙伴-WORLDWIDE RELIABL PARTNERS

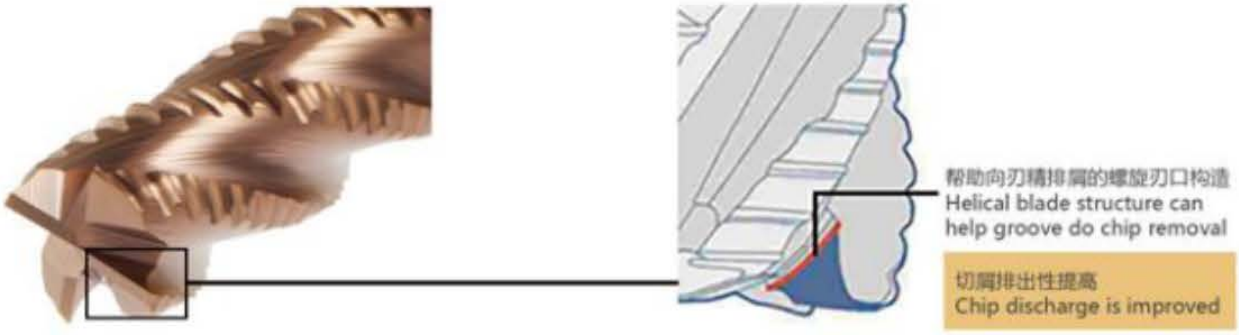
多刃规格实现高效率，稳定加工，可应对钢，铸铁的粗加工
Multi-blade specification to achieve high efficiency, stable processing, can be corresponding to steel, cast iron rough processing.

1 多刃规格实现高效率加工
Multi-blade specification to achieve high efficiency processing

多刃规格：独特的刃口形状提高排屑性能

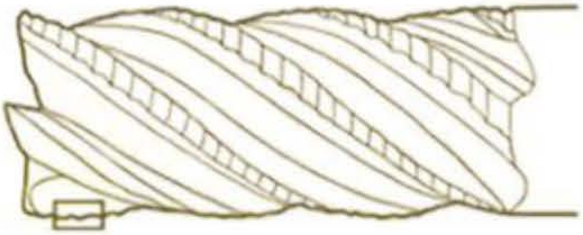
Multi-edge specification: Unique edge shape improves chip evacuation performance

多刃规格（Φ16-6枚刀）Multi-blade specification (Φ16-6T)　独特的刃口形状 Unique edge shape

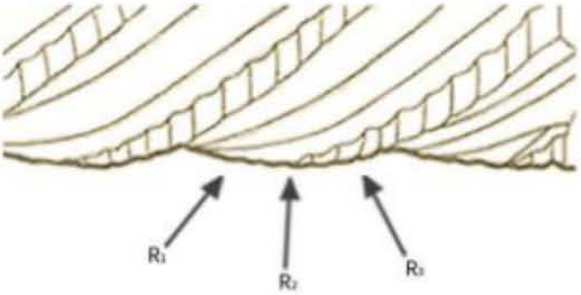


2 耐崩损 Resistance to collapse

特殊R角波形切刃，应力集中，抑制崩损。实现稳定加工。
Special R-angle wave cutting edge, stress concentration, suppression of chipping. and achieve stable processing.



特殊R角波形切刃
Special R-angle wave cutting edge



不同的R角组合构成波形切刃（复合R角形状）
缓和应力集中，提高抗崩损性
Different R angles forms wavy cutting edges (composite R angle shape) to relieve concentration and improve the collapse resistance

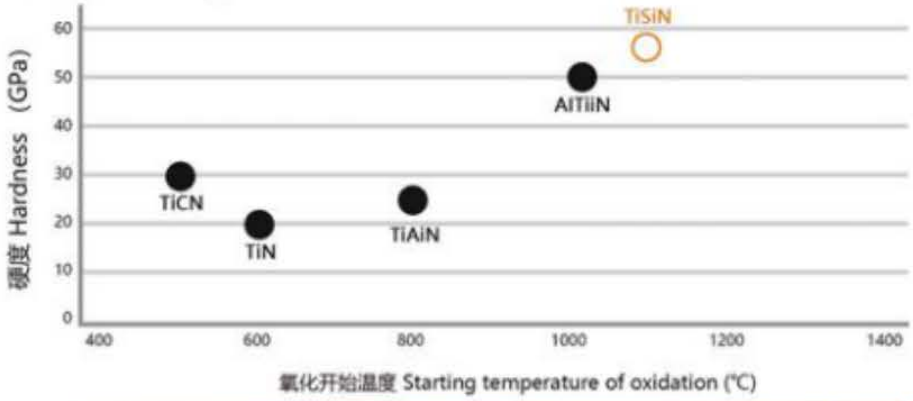
加工12m后的刀尖状态
The tip state after procesng 12m
(本公司对比) (Comparison of our company)

切削参数 Cutting paramter：n=2900min^{-1}
Vf=712mm/min, ap*ae=5*3mm
加工径 Processing diameter θ10, Wet
台阶加工 Processing steps
被削材 By cutting material：Ti-6Al-4V

3 实现长寿命，稳定加工
Achieve long life,stable processiing

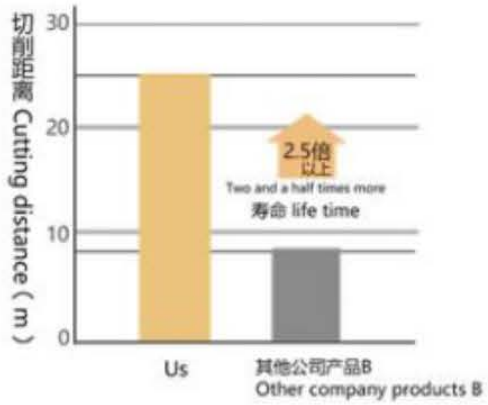
采用耐磨性、抗氧化性优异的(TiSiN)PVD涂层
(TiSiN) PVD coating with excellent wear resistance and oxidation resistance

涂层特性 Coating Characteristics



低 Low 抗氧化性 Oxidation resistance 高 High

寿命对比 compared with life
(本公司对比) (Comparison of our company)



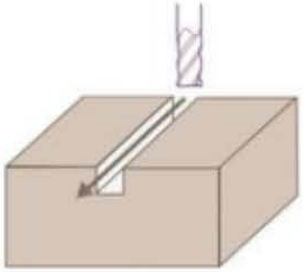
加工8.4m后的刀尖状态
The tip state after 8.4m processing

切削参数 Cutting paramter: n=3500min^{-1}, Vf=840mm/min, ap*ae=5*4mm
加工径 Processing diameter: θ16，台阶加工 Processing steps，Wet
被削材 By cutting material: SU304

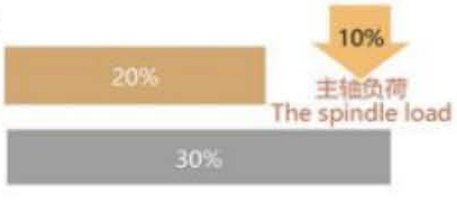
加工实例 Processing Example

加测试件 Testware SUS304

n=1.800min^{-1}
(Vc=56m/min)
Vf=250 mm/min
(fz=0.027 mm/t)
apxae=3x10mm(切槽加工
Grooving processing)
3走刀 3 Feed
Wet(内部给油Internal to the oil)



主轴负载
The spindie load



该产品降低主轴负载10%切削音安静、设备振动减少、完成面良好
This product reduces spindle load by 10%. The cutting sound is quiet. the vibration of equipment is reduced. and the finished surface is good.

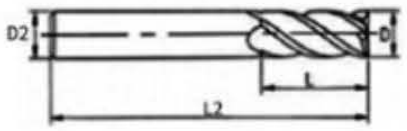
来自用户评价)
(From user reviews)

Rough End Mill (Standard)

CPD550 | TiSiN | HRC 55 | S

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

P	●
M	
K	●
N	
S	
H	



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
4	12	4	50	CPD550-4F-04120450
5	13	5	50	CPD550-4F-05130550
5	13	6	50	CPD550-4F-05130650
6	15	6	50	CPD550-4F-06150650
8	20	8	60	CPD550-4F-08200860
10	25	10	75	CPD550-4F-10251075
12	30	12	75	CPD550-4F-12301275
14	45	14	100	CPD550-4F-144514100
16	45	16	100	CPD550-4F-164516100
18	45	18	100	CPD550-4F-184518100
20	45	20	100	CPD550-4F-204520100

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 6	8	10	12	16	20
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤1D	80	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	4250 760	3190 700	2550 660	2120 640	1590 640	1270 710
	合金钢 (50HRC) Alloy Steel	ap≤0.5D	60	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	3190 380	2390 380	1910 380	1590 380	1190 330	960 310
K	灰铸铁, 球墨铸铁 (<32HRC) Gry cast iron, nodular cast iron	ap≤1D	55	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	2920 370	2190 370	1750 360	1460 350	1100 310	880 280
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤0.8D	55	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	2920 350	2190 350	1750 350	1460 320	1133 290	880 260

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

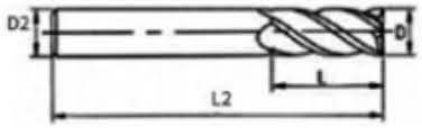
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Rough End Mill (Extra Long)

CPD550 | TiSiN | HRC 55 | S

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

P	●
M	
K	●
N	
S	
H	



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
6	24	6	75	CPD550-4F-06240675
8	25	8	75	CPD550-4F-08250875
6	30	6	100	CPD550-4F-063006100
8	35	8	100	CPD550-4F-083508100
10	40	10	100	CPD550-4F-104010100
12	45	12	100	CPD550-4F-124512100
16	70	16	150	CPD550-4F-167016150
20	70	20	150	CPD550-4F-207020150

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 6	8	10	12	16	20
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤1D	80	转速 rote speed (min-1)	4250	3190	2550	2120	1590	1270
				进给转速 feed velocity (mm/min)	760	700	660	640	640	710
	合金钢 (50HRC) Alloy Steel	ap≤0.5D	60	转速 rote speed (min-1)	3190	2390	1910	1590	1190	960
				进给转速 feed velocity (mm/min)	380	380	380	380	330	310
K	灰铸铁、球墨铸铁 (<32HRC) Gry cast iron, nodular cast iron	ap≤1D	55	转速 rote speed (min-1)	2920	2190	1750	1460	1100	880
				进给转速 feed velocity (mm/min)	370	370	360	350	310	280
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤0.8D	55	转速 rote speed (min-1)	2920	2190	1750	1460	1133	880
				进给转速 feed velocity (mm/min)	350	350	350	320	290	260

上表是侧铣加工的标准值，刀具切槽时，转速要以上表格的50%~70%，进给速度要以40%~60%为标准值。

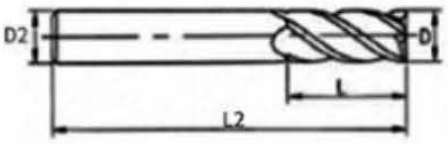
Above table is the standard cutting data for side milling maching, if for groove cutting , the VC should reach 50%~70% and the feed should reach 40%~60% based on the table.

Rough End Mill (Standard)

LYCPD | AL | HRC 55 | S

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

P
M
K
N ●
S
H



Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
4	12	4	50	LYCPD-3F-04120450
5	15	5	50	LYCPD-3F-05150550
5	15	6	50	LYCPD-3F-05150650
6	18	6	50	LYCPD-3F-06180650
8	24	8	60	LYCPD-3F-08240860
10	30	10	75	LYCPD-3F-10301075
12	35	12	75	LYCPD-3F-12351275
14	45	14	100	LYCPD-3F-144514100
16	45	16	100	LYCPD-3F-164516100
18	45	18	100	LYCPD-3F-184518100
20	45	20	100	LYCPD-3F-204520100

Rough End Mill (Extra Long)

Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
6	24	6	75	LYCPD-3F-06240675
8	25	8	75	LYCPD-3F-08250875
6	30	6	100	LYCPD-3F-063006100
8	35	8	100	LYCPD-3F-083508100
10	40	10	100	LYCPD-3F-104010100
12	45	12	100	LYCPD-3F-124512100
14	70	14	150	LYCPD-3F-147014100
16	70	16	150	LYCPD-3F-167016150
20	70	20	150	LYCPD-3F-207020150

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金 Copper alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	650	850	1430	1530	1670	2050	2800	3000	3150
		ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	720	900	1200	1200	1500	1800	2225	2500	3000

P K M

微小径系列

SUITABLE FOR MICRO DIAMETER POCKET MILLING SERIES

- 适用于各种钢件，铸铁的深槽加工
- 采用高性能TiSiN涂层，耐高温，耐磨损
- 长颈避免深腔加工干涉，适用于模具肋槽的深腔加工

- Suitable for deep groove processing various steel and cast iron.
- High-performance TiSiN coating for high temperature and wear resistance.
- Long neck desgin avoids collision with workpiece, Suitable for deep pocket milling of mold rib.

TiSiN
耐高温，耐磨损
TiSiN coating
High temperature and wear resistance

精细研磨，尺寸精准

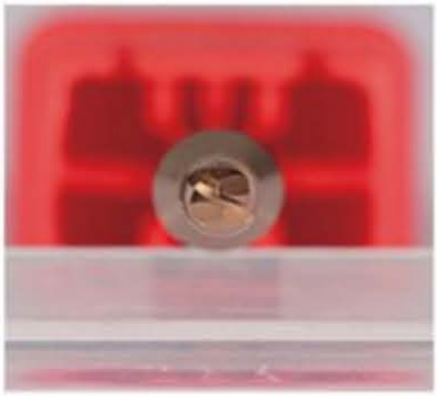
Fine grinding，high precise sizes

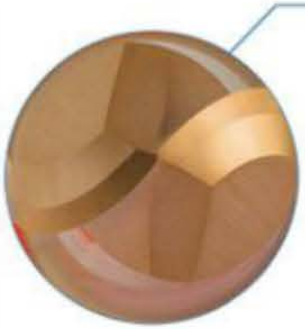
全球合作伙伴-WORLDWIDE RELIABL PARTNERS

模具肋槽的深腔加工; 精细研磨, 尺寸精准
Suitable for deep pocket milling of mold rib areas; Fine grinding, High precise sizes.

切边刀刃形状 Cutting edge shape

- 刀口精准钝化，提高刀具使用寿命
- 可抑制加工表面的不均匀性，确保优异的光洁度
- Accurate passivation of cutting edge, improve tool life.
- Can Suppresses the unevenness of the surface and ensures perfect finish.



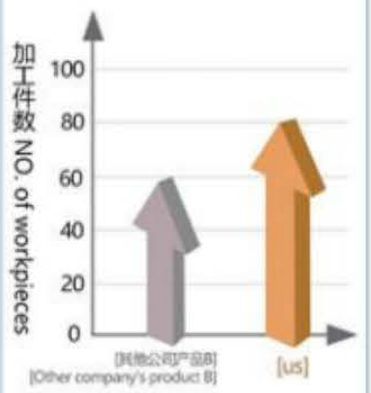


球头端齿 The ball head end teeth

- 刀具刃型优化，精细研磨，尺寸精准
- 球点形状的切削提供优良的耐磨性和切削性能
- Cutting edge optimization, fine grinding, precise size.
- Cutting edge of the ball point shape provide excellent wear resistance and cutting performance.

加工案例-对比 Processing Case-Comparison

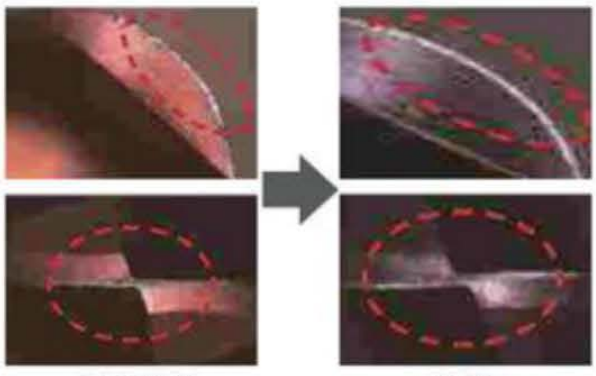
[切削性能 Cutting Performance]



新型涂层TiSiN具有优异的韧性和耐磨性
New TISIN coating has excellent toughness and wear resistance

磨损对比图 Picture of abrasion comparison

- 工件 Workpiece: Co-Cr
- 切削条件 Cutting conditions: vc(m/min)=150, fz(mm/t)=0.08, ap(mm)=0.13, ae(mm)=0.7, wet
- 刀具 Tool: SGQD



[其他公司产品B]
[PRODUCTS OF OTHER COMPANIESB

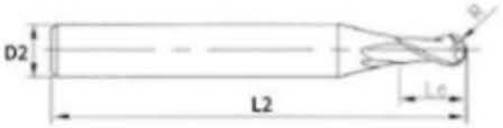
[SGQD]

Micro Diameter Ball Nose End Mill (Standard)

WXJQD | TISIN | HRC 60 | 2 | 45° | B

单位Unit	(mm)
R	R
公差Tol	±0.015

P	●
M	
K	●
N	●
S	
H	



Diameter D	Radius R	Shank D2	Overall Length L2
mm	mm	mm	mm
0.3	0.15	4	50
0.4	0.2	4	50
0.5	0.25	4	50
0.7	0.35	4	50
0.8	0.4	4	50
0.9	0.45	4	50

Ordering Code
WXJQD-2F-0030060450
WXJQD-2F-0040080450
WXJQD-2F-005010450
WXJQD-2F-0070140450
WXJQD-2F-0080160450
WXJQD-2F-0090180450

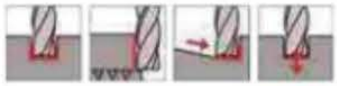
ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 0.6	0.8	1.0	1.2	1.6	2.0
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤0.02D	80	转速 rote speed (min-1)	42460	15920	25480	21230	6370	12740
		ap≤0.02D		进给转速 feed velocity (mm/min)	1400	1960	1430	1490	1620	1400
	合金钢 (50HRC) Alloy Steel	ap≤0.01D	70	转速 rote speed (min-1)	37150	10350	22290	5970	4780	11150
		ap≤0.01D		进给转速 feed velocity (mm/min)	1190	1180	1160	1160	1050	1160
K	灰铸铁，球墨铸铁 (<32HRC) Gry cast iron，nodular cast iron	ap≤0.02D	80	转速 rote speed (min-1)	42460	31850	25480	17520	11680	12740
		ap≤0.02D		进给转速 feed velocity (mm/min)	1440	1460	1430	2630	2570	1400
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤0.02D	70	转速 rote speed (min-1)	37150	27870	22290	17520	11680	11150
		ap≤0.02D		进给转速 feed velocity (mm/min)	1190	1170	1160	2450	2450	1160

上表是侧铣加工的标准值，刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。
Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16
N	锻造及铸造铝合金(SI<12%) Forging and casting aluminum alloy	ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	19000	15900	11900	10600	8000	7950	7950	7000
		ap≤1D		进给转速 feed velocity (mm/min)	950	1600	1900	2500	2250	3800	3800	4450
	铜合金(<200HB) Copper alloy	ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	19000	15900	11900	10600	8000	7950	7950	7000
		ap≤1D		进给转速 feed velocity (mm/min)	860	1430	1720	2300	2300	2850	3450	4010

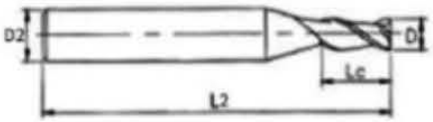
Micro Diameter Square End Mill (Standard)

WXJPD | TISIN | HRC 60 | 2 | 45° | S



单位Unit	(mm)
D	D
公差Tol	0
	-0.015

P	●
M	
K	●
N	●
S	
H	



Diameter D	Cutting Length L	Shank D2	Overall Length L2
mm	mm	mm	mm
0.2	0.4	4	50
0.3	0.6	4	50
0.4	0.8	4	50
0.5	1	4	50
0.6	1.2	4	50
0.7	1.4	4	50
0.8	1.6	4	50
0.9	1.8	4	50

Ordering Code
WXJPD-2F-0020040450
WXJPD-2F-0030060450
WXJPD-2F-0040080450
WXJPD-2F-005010450
WXJPD-2F-0060120450
WXJPD-2F-00740140450
WXJPD-2F-0080160450
WXJPD-2F-0090180450

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤0.5D ap≤0.05D	90	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	35830 1150	31850 1150	28600 1150	23890 1100	20470 1110	17910 1070	15920 1110	5840 2800
	合金钢 (50HRC) Alloy Steel	ap≤0.5D ap≤0.05D	70	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	27870 840	24770 840	22290 850	18580 820	15920 800	13930 780	12380 820	4780 2000
K	灰铸铁，球墨铸铁 (<32HRC) Gry cast iron，nodular cast iron	ap≤0.5D ap≤0.05D	90	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	35830 1150	31850 1150	28660 1150	23890 1100	20470 1100	17910 1070	15920 1110	5840 2530
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤0.5D ap≤0.05D	80	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	31850 830	28310 850	25480 820	21230 760	18200 800	15920 860	14150 910	5840 2440

上表是侧铣加工的标准值。刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。

Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

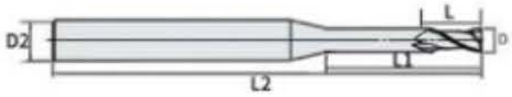
ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy	ap≤1.5D ap≤0.2D	150 (60~350)	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	16000 580	12700 710	12000 1200	10600 1280	10000 1390	9500 1720	9280 2400	7000 2500	5600 2450
	铜合金(<200HB) Copper alloy	ap≤1.5D ap≤0.2D	150 (60~350)	转速 rote speed (min-1) 进给转速 feed velocity (mm/min)	16000 520	12700 650	12000 1070	10600 1150	10000 1250	9500 1550	9280 2170	7000 2250	5600 2200

Long Neck Square End Mill (Standard)

SGPD	TISIN	HRC 55	2/4	35°	S

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

P	●
M	
K	●
N	●
S	
H	



Diameter D	Cutting Length L	Shank D2	Effective cutting Length L1	Overall Length L2	Ordering Code
mm	mm	mm	mm	mm	
0.3	0.6	4	2/3	50	SGPD-2F-00302040250
0.4	0.8	4	3/4/5/6	50	SGPD-2F-00402040350
0.5	1	4	2/3/4/6/8	50	SGPD-2F-00502040250
0.6	1.2	4	2/3/4/6/8	50	SGPD-2F-00602040250
0.7	1.4	4	3/4/6/8/10	50	SGPD-2F-00703040350
0.8	1.6	4	3/4/6/8/10	50	SGPD-2F-00803040350
0.9	1.8	4	3/4/6/8/10	50	SGPD-2F-00903040350
1	3	4	6/8/10/12/16/20	50	SGPD-4F-0103040650
1.5	4.5	4	6/8/10/12/16/20	50	SGPD-4F-01506040650
2	6	4	8/10/12/16/20	50	SGPD-4F-0206040850
2.5	8	4	10/12/16/20	50	SGPD-4F-025080410450
3	9	4	12/16/20	50	SGPD-4F-0309041250

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤0.5D	90	转速 rote speed (min-1)	19900	31850	28600	23890	13270	9950	8850	7960
		ap≤0.05D		进给转速 feed velocity (mm/min)	400	1150	1150	1100	370	400	410	400
	合金钢 (50HRC) Alloy Steel	ap≤0.5D	70	转速 rote speed (min-1)	15920	24770	22290	18580	10620	7960	7080	6370
		ap≤0.05D		进给转速 feed velocity (mm/min)	250	840	850	820	250	290	300	290
K	灰铸铁，球墨铸铁 (<32HRC) Gry cast iron，nodular cast iron	ap≤0.5D	90	转速 rote speed (min-1)	15920	31850	28660	23890	10620	9100	7960	6370
		ap≤0.05D		进给转速 feed velocity (mm/min)	320	1150	1150	1100	300	310	320	320
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤0.5D	80	转速 rote speed (min-1)	11940	28310	25480	21230	7960	6800	5970	4780
		ap≤0.05D		进给转速 feed velocity (mm/min)	210	650	820	760	210	220	230	230

上表是侧铣加工的标准值，刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。

Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

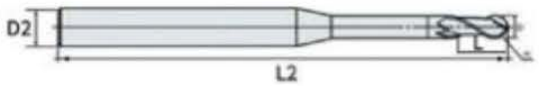
ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	12700	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	580	710	1200	1280	1390	1720	2400	2500	2450
	铜合金(<200HB) Copper alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	12700	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	520	650	1070	1150	1250	1550	2170	2250	2200

Long Neck Ball Nose End Mill (Standard)

SGQD	TISIN	HRC 55	2	35°	B

单位Unit	(mm)
R	R
公差Tol	±0.015

P	●
M	
K	●
N	●
S	
H	



Radius R	Shank D2	Cutting Length L	Effective cutting Length L1	Overall Length L2
mm	mm	mm	mm	mm
0.15	4	0.6	2/3/4	50
0.2	4	0.8	2/3/4/5/6	50
0.25	4	1	2/3/4/6/8	50
0.3	4	1.2	2/3/4/6/8	50
0.35	4	1.4	3/4/6/8/10	50
0.4	4	1.6	3/4/6/8/10	50
0.5	4	2	6/8/10/12/16/20	50
0.75	4	3	6/8/10/12/16/20	50
1	4	4	6/8/10/12/16/20	50

Ordering Code
SGQD-2F-001504020250
SGOD-2F-00204020250
SGOD-2F-002504020250
SGQD-2F-00304020250
SGQD-2F-003504030350
SGOD-2F-00404030350
SGQD-2F-00504060650
SGQD-2F-007504060650
SGQD-4F-0104060650

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 0.6	0.8	1.0	1.2	1.6	2.0
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤0.02D	80	转速 rote speed (min-1)	42460	15920	25480	21230	6370	12740
		ap≤0.02D		进给转速 feed velocity (mm/min)	1400	1960	1430	1490	1620	1400
	合金钢 (50HRC) Alloy Steel	ap≤0.01D	70	转速 rote speed (min-1)	37150	10350	22290	5970	4780	11150
		ap≤0.01D		进给转速 feed velocity (mm/min)	1190	1180	1160	1160	1050	1160
K	灰铸铁、球墨铸铁 (<32HRC) Gry cast iron、nodular cast iron	ap≤0.02D	80	转速 rote speed (min-1)	42460	31850	25480	17520	11680	12740
		ap≤0.02D		进给转速 feed velocity (mm/min)	1440	1460	1430	2630	2570	1400
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤0.02D	70	转速 rote speed (min-1)	37150	27870	22290	17520	11680	11150
		ap≤0.02D		进给转速 feed velocity (mm/min)	1190	1170	1160	2450	2450	1160

上表是侧铣加工的标准值，刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。
Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金(<200HB) Copper alloy	ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	19000	15900	11900	10600	8000	7950	7950	7000
		ap≤1D		进给转速 feed velocity (mm/min)	950	1600	1900	2500	2250	3800	3800	4450
		ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	19000	15900	11900	10600	8000	7950	7950	7000
		ap≤1D		进给转速 feed velocity (mm/min)	860	1430	1720	2300	2300	2850	3450	4010

整体硬质合金内径立铣刀
Solid Carbide Inner R EndMill

- 适用于铜、不锈钢、合金钢、碳钢、铸铁等材料
- 适用于圆弧加工，具有光洁度高、不起毛边等特点
- 内R铣刀使用最新的超细碳化钨，具有最高的耐磨性和强度
- Suitable for copper, stainless steel, alloy steel, carbon steel, cast iron and other materials.
- It is suitable for arc processing and has the characteristics of high smoothness and no burrs.
- The inner R end mill uses the latest ultra-fine tungsten carbide, which has the highest wear resistance and strength.

刃口耐磨性和刀具刚性提升

Improved edge wear resistance and tool steel

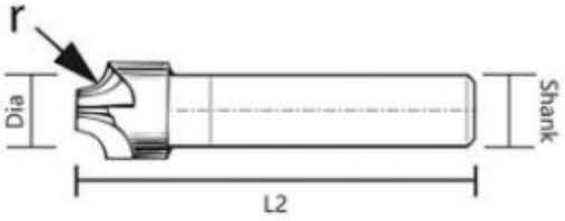
全球合作伙伴-WORLDWIDE RELIABL PARTNERS

Internal R End Mill (Standard)

NRD | TiAlN | HRC 55 | S

单位Unit	(mm)
D	D
公差Tol	0
	-0.015

P	●
M	
K	●
N	
S	
H	



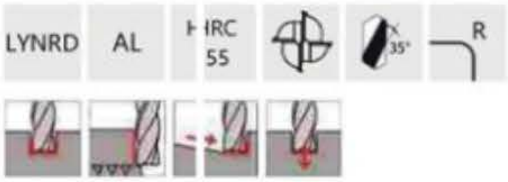
Diameter D	Radius R	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
4	0.5	4	50	NRD-4F-040050450
4	0.75	4	50	NRD-4F-0400750450
4	1	4	50	NRD-4F-04010450
6	1.5	6	50	NRD-4F-060150650
6	2	6	50	NRD-4F-06020650
6	2.5	6	50	NRD-4F-060250650
8	3	8	60	NRD-4F-0803060
10	4	10	60	NRD-4F-10041060
12	5	12	60	NRD-4F-12051260
14	6	14	75	NRD-4F-14061475
16	7	16	75	NRD-4F-16071675

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刀径 Tool Diameter (mm) 3	4	6	8	10	12	16	20
P	碳钢合金（<45HRC） Carbon steel alloy steel	ap≤1.5D	200	转速 rote speed (min-1)	21230	15920	10620	7960	6370	5310	3980	3190
		ap≤0.15D		进给转速 feed velocity (mm/min)	2040	1960	1690	1670	1620	1590	1490	1480
	合金钢（50HRC） Alloy Steel	ap≤1D	150	转速 rote speed (min-1)	15920	10350	7960	5970	4780	3980	2990	2390
		ap≤0.12D		进给转速 feed velocity (mm/min)	1290	1180	1080	1160	1050	930	760	680
K	灰铸铁，球墨铸铁（<32HRC） Gry cast iron、nodular cast iron	ap≤1.5D	170	转速 rote speed (min-1)	18050	13540	9020	6770	5410	4510	3380	2710
		ap≤0.15D		进给转速 feed velocity (mm/min)	1620	1500	1440	1330	1200	1150	1020	930
	高合金铸铁（35-45HRC） High alloy cast iron	ap≤1D	150	转速 rote speed (min-1)	15920	11940	7960	5970	4780	3980	2990	2390
		ap≤0.12D		进给转速 feed velocity (mm/min)	1290	1250	1190	1090	1000	960	850	770

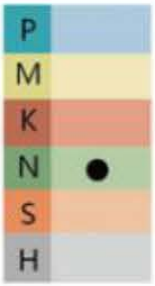
上表是侧铣加工的标准值。刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。

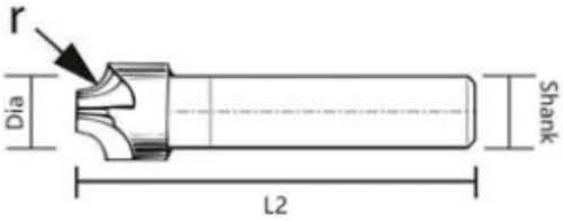
Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

Internal R End Mill (Standard)



单位Unit	(mm)
D	D
公差Tol	0
	-0.015





Diameter D	Radius R	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
4	0.5	4	50	NRD-LY-4F-040050450
4	0.75	4	50	NRD-LY-4F-0400750450
4	1	4	50	NRD-LY-4F-04010450
6	1.5	6	50	NRD-LY-4F-060150650
6	2	6	50	NRD-LY-4F-06020650
6	2.5	6	50	NRD-LY-4F-060250650
8	3	8	60	NRD-LY-4F-08030860
10	4	10	60	NRD-LY-4F-10041060
12	5	12	60	NRD-LY-4F-12051260
14	6	14	75	NRD-LY-4F-14601475
16	7	16	75	NRD-LY-4F-16071675

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铝合金(<200HB) Copper alloy	ap≤1.5D	150 (60–350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	650	850	1430	1530	1670	2050	2800	3000	3150
		ap≤1.5D	150 (60–350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	720	900	1200	1200	1500	1800	2225	2500	3000

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铝合金(<200HB) Copper alloy	ap≤1.5D	150 (60–350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤0.2D		进给转速 feed velocity (mm/min)	450	570	960	1050	1300	1500	1620	1680	1800
		ap≤1.5D	150 (60–350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤0.2D		进给转速 feed velocity (mm/min)	450	520	860	830	9600	1240	1500	1500	1510

T型/燕尾立铣刀
T-Shaped/Dovetail End Mill

- 具有缩短的颈部，适用于长距离加工操作
- 圆角半径轮廓可提高强度
- 整体硬质合金，经久耐用
- Features shortened neck for long distance machining operations
- Rounded corner radius profile increases strength
- Solid carbide for durability

特殊的刃口设计，有效解决刀具刃口沾屑问题

Special edge design, effectively solve the problem of sticky

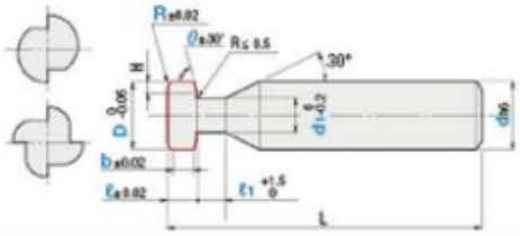
全球合作伙伴-WORLDWIDE RELIABL PARTNERS

T-Slot End Mill (Standard)

TXD	AlTiN	HRC 55			S

单位Unit	(mm)
D	D
公差Tol	±0.01

P	●
M	
K	●
N	
S	
H	



Diameter D	Blade Thickness L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
3	0.5/1/1.5/2	4	50	TXD-4F-030050450
4	0.5/1/1.5/2	4	50	TXD-4F-040050450
6	0.5/1/1.5/2/2.5/3	6	50	TXD-4F-060050650
8	0.5/1/1.5/2/2.5/3	8	50	TXD-4F-080050850
10	1/1.5/2/2.5/3/4/5	10	60	TXD-4F-10011060
12	1/1.5/2/2.5/3/4/5	12	60	TXD-4F-12041260
14	1/1.5/2/2.5/3/4/5	14	75	TXD-4F-14011475
16	1/1.5/2/2.5/3/4/5	16	75	TXD-4F-16011675

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤0.5D	90	转速 rote speed (min-1)	35830	31850	28600	23890	20470	17910	15920	5840
		ap≤0.05D		进给转速 feed velocity (mm/min)	1150	1150	1150	1100	1110	1070	1110	2800
	合金钢 (50HRC) Alloy Steel	ap≤0.5D	70	转速 rote speed (min-1)	27870	24770	22290	18580	15920	13930	12380	4780
		ap≤0.05D		进给转速 feed velocity (mm/min)	840	840	850	820	800	780	820	2000
K	灰铸铁，球墨铸铁 (<32HRC) Gry cast iron，nodular cast iron	ap≤0.5D	90	转速 rote speed (min-1)	35830	31850	28660	23890	20470	17910	15920	5840
		ap≤0.05D		进给转速 feed velocity (mm/min)	1150	1150	1150	1100	1100	1070	1110	2530
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤0.5D	80	转速 rote speed (min-1)	31850	28310	25480	21230	18200	15920	14150	5840
		ap≤0.05D		进给转速 feed velocity (mm/min)	830	850	820	760	800	860	910	2440

上表是侧铣加工的标准值，刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。

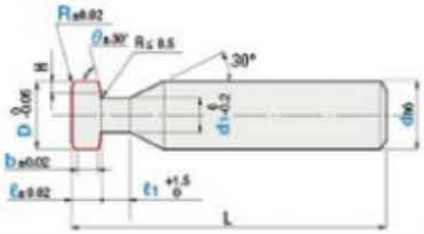
Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

T-Slot End Mill（Standard）

LYTXD	AL	HRC 55			S

单位Unit	(mm)
D	D
公差Tol	±0.01

P	
M	
K	
N	●
S	
H	



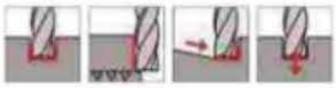
Diameter D	Blade Thickness L	Shank D2	Overall Length L2	Ordering Code
mm	mm	mm	mm	
3	0.5/1/1.5/2	4	50	TXD-LY-4F-030050450
4	0.5/1/1.5/2	4	50	TXD-LY-4F-040050450
6	0.5/1/1.5/2/2.5/3	6	50	TXD-LY-4F-060050650
8	0.5/1/1.5/2/2.5/3	8	50	TXD-LY-4F-080050850
10	1/1.5/2/2.5/3/4/5	10	60	TXD-LY-4F-10011060
12	1/1.5/2/2.5/3/4/5	12	60	TXD-LY-4F-12041260
14	1/1.5/2/2.5/3/4/5	14	75	TXD-LY-4F-14011475
16	1/1.5/2/2.5/3/4/5	16	75	TXD-LY-4F-16011675

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金(<200HB) Copper alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	650	850	1430	1530	1670	2050	2800	3000	3150
		ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	720	900	1200	1200	1500	1800	2225	2500	3000

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金(<200HB) Copper alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤0.2D		进给转速 feed velocity (mm/min)	450	570	960	1050	1300	1500	1620	1680	1800
		ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤0.2D		进给转速 feed velocity (mm/min)	450	520	860	830	9600	1240	1500	1500	1510

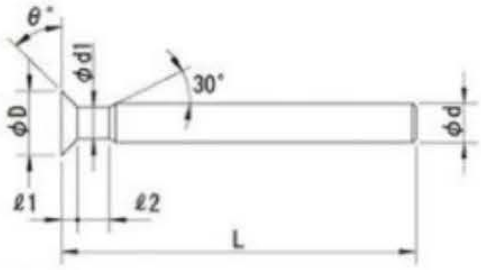
Dovetail End Mill (Standard)

YWXD | TiAlN | HRC 55 | S



单位Unit	(mm)
D	D
公差Tol	0
	-0.015

P	●
M	
K	●
N	
S	
H	



Diameter D	Angle	Shank D2	Overall Length L2	Ordering Code
mm		mm	mm	
1	30°	4	50	YWXD-4F-01300450
1.5	30°	4	50	YWXD-4F-015300450
2	30°	4	50	YWXD-4F-02300450
2.5	30°	4	50	YWXD-4F-025302450
3	30°	4	50	YWXD-4F-03300450
4	30°	4	50	YWXD-4F-04300450
6	30°	6	50	YWXD-4F-06300350
8	30°	8	60	YWXD-4F-08300860
10	30°	10	75	YWXD-4F-10301075
1	45°	4	50	YWXD-4F-01450450
1.5	45°	4	50	YWXD-4F-015450450
2	45°	4	50	YWXD-4F-02450450
2.5	45°	4	50	YWXD-4F-025450450
3	45°	4	50	YWXD-4F-03450450
4	45°	4	50	YWXD-4F-04450450
6	45°	6	50	YWXD-4F-06450650
8	45°	8	60	YWXD-4F-08450860
10	45°	10	75	YWXD-4F-10451075

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 3	4	6	8	10	12	16	20
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤1.5D ap≤0.15D	200	转速 rote speed (min-1)	21230	15920	10620	7960	6370	5310	3980	3190
				进给转速 feed velocity (mm/min)	2040	1960	1690	1670	1620	1590	1490	1480
	合金钢 (50HRC) Alloy Steel	ap≤1D ap≤0.12D	150	转速 rote speed (min-1)	15920	10350	7960	5970	4780	3980	2990	2390
				进给转速 feed velocity (mm/min)	1290	1180	1080	1160	1050	930	760	680
K	灰铸铁，球墨铸铁 (<32HRC) Gry cast iron、nodular cast iron	ap≤1.5D ap≤0.15D	170	转速 rote speed (min-1)	18050	13540	9020	6770	5410	4510	3380	2710
				进给转速 feed velocity (mm/min)	1620	1500	1440	1330	1200	1150	1020	930
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤1D ap≤0.12D	150	转速 rote speed (min-1)	15920	11940	7960	5970	4780	3980	2990	2390
				进给转速 feed velocity (mm/min)	1290	1250	1190	1090	1000	960	850	770

上表是侧铣加工的标准值，刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。

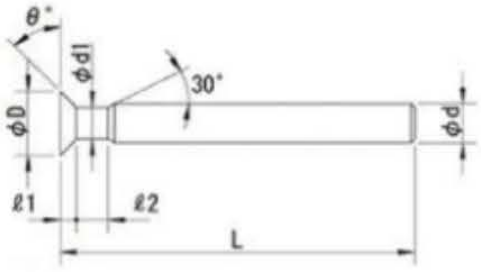
Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

Dovetail End Mill (Standard)

YWXD | AL | HRC 55 | S

单位Unit	(mm)
D	D
公差Tol	0
	-0.015

P
M
K
N ●
S
H



Diameter D	Angle	Shank D2	Overall Length L2	Ordering Code
mm		mm	mm	
1	30°	4	50	YWXD-LY-4F-01300450
1.5	30°	4	50	YWXD-LY-4F-015300450
2	30°	4	50	YWXD-LY-4F-02300450
2.5	30°	4	50	YWXD-LY-4F-025302450
3	30°	4	50	YWXD-LY-4F-03300450
4	30°	4	50	YWXD-LY-4F-04300450
6	30°	6	50	YWXD-LY-4F-06300350
8	30°	8	60	YWXD-LY-4F-08300860
10	30°	10	75	YWXD-LY-4F-10301075
1	45°	4	50	YWXD-LY-4F-01450450
1.5	45°	4	50	YWXD-LY-4F-015450450
2	45°	4	50	YWXD-LY-4F-02450450
2.5	45°	4	50	YWXD-LY-4F-025450450
3	45°	4	50	YWXD-LY-4F-03450450
4	45°	4	50	YWXD-LY-4F-04450450
6	45°	6	50	YWXD-LY-4F-06450650
8	45°	8	60	YWXD-LY-4F-08450860
10	45°	10	75	YWXD-LY-4F-10451075

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铸铜合金(<200HB) Copper alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	650	850	1430	1530	1670	2050	2800	3000	3150
		ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	13000	12000	10600	10000	9500	9280	7000	5600
		ap≤0.2D		进给转速 feed velocity (mm/min)	720	900	1200	1200	1500	1800	2225	2500	3000

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铸铜合金(<200HB) Copper alloy	ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤0.2D		进给转速 feed velocity (mm/min)	450	570	960	1050	1300	1500	1620	1680	1800
		ap≤1.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤0.2D		进给转速 feed velocity (mm/min)	450	520	860	830	9600	1240	1500	1500	1510

螺纹铣刀 - 硬质合金
Thread End Mills - Carbide

- 适用于不锈钢、热处理模具钢等各种高硬钢件材料
- 结合全磨圆弧刃锋利刃口，高耐磨专业铣削设计
- Suitable for stainless steel, heat-treated mold steel and other high-hardness steel materials
- Combined with fully ground arc sharp edges, high wear-resistant professional milling design

刃口耐磨性和刀具刚性提升

Improved edge wear resistance and tool rigidity

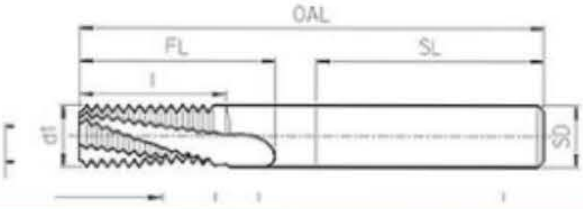
全球合作伙伴-WORLDWIDE RELIABL PARTNERS

Thread End Mill (standard)

LWXD | TiAlN | HRC 55 | 3 | 35° | S

单位Unit	(mm)
D	D
公差Tol	0
	-0.015

P	●
M	
K	●
N	
S	
H	



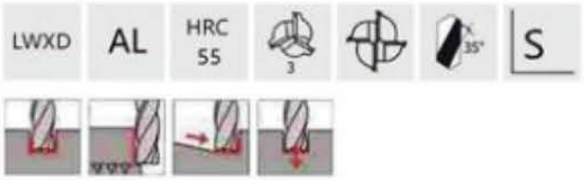
Model (pitch P)	Diameter D	Cutting Length L	Shank D2	Overall Length L2	Ordering Code
	mm	mm	mm	mm	
M3*P0.5	2.3	6	4	50	LWXD-3F-023060450
M6*P0.5	4	10	4	50	LWXD-3F-04100450
M8-M12*P0.5	6	13	6	60	LWXD-3F-06130660
M3.5*P0.6	2.7	7	4	50	LWXD-3F-027070450
M4*P0.7	3	8	4	50	LWXD-3F-03080450
M4.5*P0.75	3.4	9	4	50	LWXD-3F-034090450
M6*P0.75	4.8	12	6	60	LWXD-3F-048120660
M8*P0.75	6	16	6	60	LWXD-3F-06160660
M10-M12*P0.75	8	20	8	60	LWXD-3F-08200860
M5*P0.8	4	10	4	50	LWXD-3F-04100450
M6*P1	4.8	12	6	60	LWXD-3F-048120660
M8*P1	6	16	6	60	LWXD-3F-06160660
M10*P1	8	20	8	60	LWXD-3F-08200860
M12-M14*P1	10	22	10	75	LWXD-4F-10221075
M16*P1	12	30	12	75	LWXD-4F-12301275
M20-M48*P1	16	30	16	90	LWXD-4F-16301690
M8*P1.25	6	16	6	60	LWXD-3F-06160660
M10*P1.25	8	20	8	60	LWXD-3F-08200860
M12-M14*P1.25	10	25	10	75	LWXD-4F-10251075
M10*P1.5	8	20	8	60	LWXD-3F-08200860
M12-M20*P1.5	10	28	10	75	LWXD-4F-10281075
M14-M24*P1.5	12	28	12	75	LWXD-4F-12281275
M20-M48*P1.5	16	30	16	90	LWXD-4F-16301690
M12*P1.75	9.8	30	10	75	LWXD-4F-098301075
M14*P2.0	10	30	10	75	LWXD-4F-10301075
M16*P2.0	12	30	12	75	LWXD-4F-12301275
M20-M80*P2.0	16	40	16	100	LWXD-4F-164016100
M18-M20*P2.5	14	36	14	100	LWXD-4F-143614100
M20-M80*P2.5	16	40	16	100	LWXD-4F-164016100
M24*P3.0	16	42	16	100	LWXD-4F-164216100

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 Tool Diameter (mm) 0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0
P	碳钢合金 (<45HRC) Carbon steel alloy steel	ap≤0.5D	90	转速 rote speed (min-1)	35830	31850	28600	23890	20470	17910	15920	5840
		ap≤0.05D		进给转速 feed velocity (mm/min)	1150	1150	1150	1100	1110	1070	1110	2800
	合金钢 (50HRC) Alloy Steel	ap≤0.5D	70	转速 rote speed (min-1)	27870	24770	22290	18580	15920	13930	12380	4780
		ap≤0.05D		进给转速 feed velocity (mm/min)	840	840	850	820	800	780	820	2000
K	灰铸铁，球墨铸铁 (<32HRC) Gry cast iron、nodular cast iron	ap≤0.5D	90	转速 rote speed (min-1)	35830	31850	28660	23890	20470	17910	15920	5840
		ap≤0.05D		进给转速 feed velocity (mm/min)	1150	1150	1150	1100	1100	1070	1110	2530
	高合金铸铁 (35-45HRC) High alloy cast iron	ap≤0.5D	80	转速 rote speed (min-1)	31850	28310	25480	21230	18200	15920	14150	5840
		ap≤0.05D		进给转速 feed velocity (mm/min)	830	850	820	760	800	860	910	2440

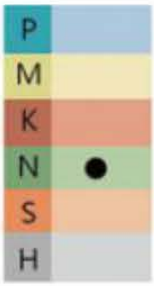
上表是侧铣加工的标准值，刀具切槽时，转速要以上表的50%~70%，进给速度要以40%~60%为标准值。

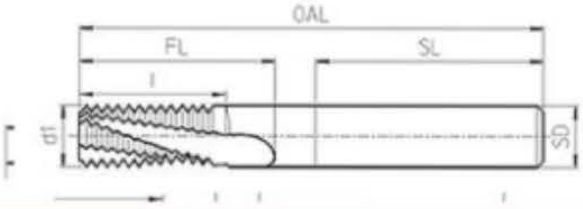
Above table is the standard cutting data for side milling maching, if for groove cuttingtheVC should reach 50%-70%and the feed should reach 40%-60% based on the table.

Thread End Mill（standard）



单位Unit	(mm)
D	D
公差Tol	0
	-0.015





Model (pitch P)	Diameter D	Cutting Length L	Shank D2	Overall Length L2
	mm	mm	mm	mm
M3*P0.5	2.3	6	4	50
M6*P0.5	4	10	4	50
M8-M12*P0.5	6	13	6	60
M3.5*P0.6	2.7	7	4	50
M4*P0.7	3	8	4	50
M4.5*P0.75	3.4	9	4	50
M6*P0.75	4.8	12	6	60
M8*P0.75	6	16	6	60
M10-M12*P0.75	8	20	8	60
M5*P0.8	4	10	4	50
M6*P1	4.8	12	6	60
M8*P1	6	16	6	60
M10*P1	8	20	8	60
M12-M14*P1	10	22	10	75
M16*P1	12	30	12	75
M20-M48*P1	16	30	16	90
M8*P1.25	6	16	6	60
M10*P1.25	8	20	8	60
M12-M14*P1.25	10	25	10	75
M10*P1.5	8	20	8	60
M12-M20*P1.5	10	28	10	75
M14-M24*P1.5	12	28	12	75
M20-M48*P1.5	16	30	16	90
M12*P1.75	9.8	30	10	75
M14*P2.0	10	30	10	75
M16*P2.0	12	30	12	75
M20-M80*P2.0	16	40	16	100
M18-M20*P2.5	14	36	14	100
M20-M80*P2.5	16	40	16	100
M24*P3.0	16	42	16	100

Ordering Code
LWXD-3F-YL023060450
LWXD-3F-YL04100450
LWXD-3F-YL06130660
LWXD-3F-YL027070450
LWXD-3F-YL03080450
LWXD-3F-YL034090450
LWXD-3F-YL048120660
LWXD-3F-YL06160660
LWXD-3F-YL08200860
LWXD-3F-YL04100450
LWXD-3F-YL048120660
LWXD-3F-YL06160660
LWXD-3F-YL08200860
LWXD-4F-YL10221075
LWXD-4F-YL12301275
LWXD-4F-YL16301690
LWXD-3F-YL06160660
LWXD-3F-YL08200860
LWXD-4F-YL10251075
LWXD-3F-YL08200860
LWXD-4F-YL10281075
LWXD-4F-YL12281275
LWXD-4F-YL16301690
LWXD-4F-YL098301075
LWXD-4F-YL10301075
LWXD-4F-YL12301275
LWXD-4F-YL164016100
LWXD-4F-YL143614100
LWXD-4F-YL164016100
LWXD-4F-YL164216100

ISO	被加工材料 Workpiece Material	切削量 (mm) Depth of cut	Vc m/min		刃径 tool Diameter (mm) 1	2	4	6	8	10	12	16	20
N	锻造及铸造铝合金(Si<12%) Forging and casting aluminum alloy 铜合金(<200HB) Copper alloy	ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤1D		进给转速 feed velocity (mm/min)	400	500	810	920	1100	1280	1300	1310	1200
		ap≤0.5D	150 (60~350)	转速 rote speed (min-1)	16000	10000	9000	8000	7800	8000	6800	5000	4000
		ap≤1D		进给转速 feed velocity (mm/min)	380	450	800	830	1000	1150	1130	1000	1080

TUNGSTEIN CARBID END MILL

One end mill

ALL the processes

Overall • Optimal base material

Tungsten steel, sturdy and durable

Blade • Fine craftsmanship

Special grinding machine used

End Mill

Strip • Enhanced toughness

sharp, and long-lasting coating

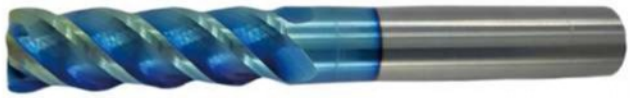
Mold killer

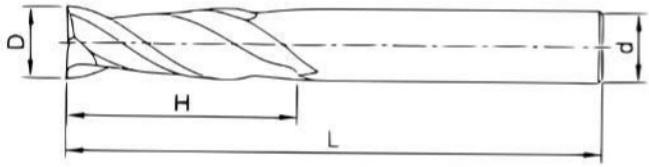
Adaptable

TUNGSTEIN CARBIDE ROUND SLOT END MILL

Green Devil Series

P K HRC ►48





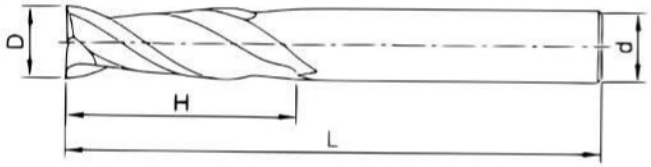
Specifications

- Composite dual-layer coating enhances cutting tool lifespan by improving high-temperature resistance and anti-slip properties in machining.
- Cutting material hardness: ⩽48° .
- The applicable machine tools are CNC milling machines, machining centers,engraving machines, high-speed precision engravers, and similar high-speed machines.
- Applicable materials: copper, carbon steel, cast iron, mold steel, alloy steel, tool steel.
- Using micro-grain tungsten steel as the base material, the cutting tools are designed with a large core diameter to enhance rigidity and chip evacuation performance. This results in more stable cutting improved chip removal.

■Inventory products

訂購編號 Order No.	外徑 D	刃數 S	刃長 H	總長 L	柄徑 D	庫存 Stock	牌價 P	備註2 Remark2
D4AG0010	1	4	3	50	4	■	240	
D4AG0015	1.5	4	5	50	4	■	240	
D4AG0020	2	4	6	50	4	■	240	
D4AG0025	2.5	4	8	50	4	■	240	
D4AG0030	3	4	8	50	3	■	240	
D4AG0031	3	4	9	50	4	■	240	
D4AG0040	4	4	12	50	4	■	240	
D4AG0050	5	4	15	50	6	■	340	
D4AG0060	6	4	18	50	6	■	340	
D4AG0080	8	4	24	60	8	■	660	
D4AG0100	10	4	30	75	10	■	900	
D4AG0120	12	4	36	75	12	■	1160	

TUNGSTEN CARBIDE UNEQUAL END MILL P K HRC ►50



Specifications

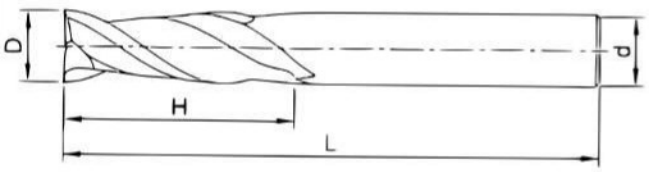
- Composite Titanium Tungsten Coating
- Cutting material hardness ⩽ 50
- The applicable machine tools are CNC milling machines, machining centers,engraving machines, high-speed precision engravers, and similar high-speed machines.
- The applicable materials are iron, steel, cast iron, and similar materials.
- Main features: Unequal pitch with high feed design for efficient and stable cutting performance.

訂購編號 Order NO.	外徑 D	刃數 S	刃長 H	總長 L	柄徑 D	庫存 StOck	牌價 P	備註2 Remark2
D4AC0040	4	4	10	50	4	■	260	
D4AC0050	5	4	13	50	6	■	380	
D4AC0060	6	4	18	50	6	■	380	
D4AC0070	7	4	15	60	8	■	760	
D4AC0080	8	4	24	60	8	■	760	
D4AC0090	9	4	25	75	10	■	960	
D4AC0100	10	4	25	75	10	■	960	
D4AC0110	11	4	30	75	12	■	1240	
D4AC0120	12	4	30	75	12	■	1240	

■Inventory products

TUNGSTEN CARBIDE UNEQUAL END MILL (MEDIUM TO HEAVY CUTTING)

P K HRC ►50



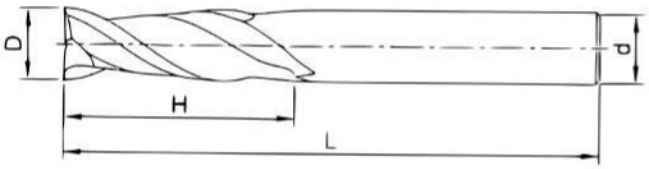
Specifications

- Composite Titanium Tungsten Coating
- Cutting material hardness ⩽ 50
- The applicable machine tools are CNC milling machines, machining centers,engraving machines, high-speed precision engravers, and similar high-speed machines.
- The applicable materials are iron, steel, cast iron, and similar materials.
- Main features: Unequal pitch with high feed design for efficient and stable cutting performance.

訂購編號 Order N0.	外徑 D	刃數 S	刃長 H	總長 L	柄徑 D	庫存 St0ck	牌價 P	備註2 Remark2
D4ACC0040	4	4	10	50	4	■	360	C Angel
D4ACC0050	5	4	13	50	6	■	460	C Angel
D4ACC0060	6	4	18	50	6	■	460	C Angel
D4ACC0070	7	4	15	60	8	■	880	C Angel
D4ACC0080	8	4	24	60	8	■	880	C Angel
D4ACC0090	9	4	25	75	10	■	1300	C Angel
D4ACC0100	10	4	25	75	10	■	1300	C Angel
D4ACC0110	11	4	30	75	12	■	1600	C Angel
D4ACC0120	12	4	30	75	12	■	1600	C Angel
D4ACC0130	13	4	35	75	16		3000	C Angel
D4ACC0140	14	4	35	75	16		3000	C Angel
D4ACC0150	15	4	35	75	16		3000	C Angel
D4ACC0160	16	4	35	75	16		3000	C Angel
D4ACC0161	16	4	60	100	16	■	3800	C Angel
D4ACC0180	18	4	60	100	20	■	5000	C Angel
D4ACC0190	19	4	60	100	20	■	5000	C Angel
D4ACC0200	20	4	60	100	20	■	5000	C Angel

■ Inventory products

TUNGSTEN CARBIDE END MILL FOR ALUMINUM N



Specifications

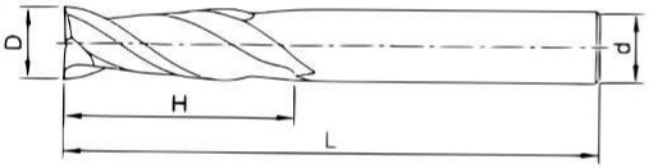
- The applicable machine tools are CNC milling machines, machining centers,engraving machines, high-speed precision engravers, and similar high-speed machines.
- The applicable materials are aluminum alloys, plastics, wood, copper and other soft materials.
- Main features: High feed series, polished cutting edges for stable cutting and improved chip evacuation.

訂購編號 Order No.	外徑 D	刃數 S	刃長 H	總長 L	柄徑 D	庫存 Stock	牌價 P	備註2 Remark2
D3BE0010	1	3	3	50	4	■	280	
D3BE0020	2	3	6	50	4	■	280	
D3BE0030	3	3	9	50	4	■	280	
D3BE0040	4	3	12	50	4	■	280	
D3BE0050	5	3	15	50	6	■	340	
D3BE0060	6	3	18	50	6	■	340	
D3BE0080	8	3	24	60	8	■	680	
D3BE0100	10	3	30	75	10	■	1000	
D3BE0120	12	3	36	75	12	■	1300	

■Inventory products

TUNGSTEN CARBIDE END MILL FOR ALUMINUM VIOLET COATING

N



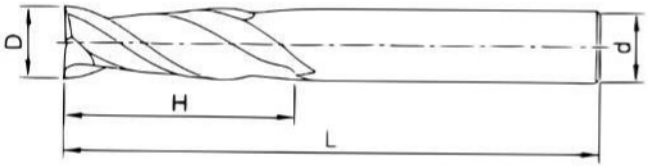
Specifications

- Composite Violet Coating
- Suitable for dry cutting without coolant or lubrication.
- The applicable machine tools are CNC milling machines, machining centers,engraving machines, high-speed precision engravers, and similar high-speed machines.
- The applicable materials are aluminum alloys, plastics, wood, copper and and soft metals such as bronze and brass.
- Main features: Enhanced with a composite violet coating for faster chip evacuation during cutting,significantly extending the tool's lifespan.

訂購編號 Order No.	外徑 D	刃數 S	刃長 H	總長 L	柄徑 D	庫存 Stock	牌價 P	備註2 Remark2
D3BEA0010	1	3	3	50	4	■	360	
D3BEA0020	2	3	6	50	4	■	360	
D3BEA0030	3	3	9	50	4	■	360	
D3BEA0040	4	3	12	50	4	■	360	
D3BEA0050	5	3	15	50	6	■	440	
D3BEA0060	6	3	18	50	6	■	440	
D3BEA0080	8	3	24	60	8	■	880	
D3BEA0100	10	3	30	75	10	■	1320	
D3BEA0120	12	3	36	75	12	■	1700	

■Inventory products

STAINLESS STEEL END MILL M



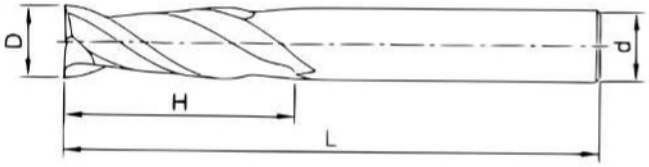
Specifications

- Zirconium Nitride (ZrN) coating
- The applicable machine tools are CNC milling machines, machining centers,engraving machines, high-speed precision engravers, and similar high-speed machines.
- Applicable materials: SUS303/304/316 stainless steel series.
- Main features: This stainless steel end mill features a composite stainless steel coating that reduces chip adhesion and significantly extends tool life.

訂購編號 Order No.	外徑 D	刃數 S	刃長 H	總長 L	柄徑 D	庫存 StOck	牌價 P	備註2 Remark2
D4AV0010	1	4	3	50	4	■	600	
D4AV0015	1.5	4	4	50	4	■	600	
D4AV0020	2	4	5	50	4	■	600	
D4AV0030	3	4	8	50	4	■	600	
D4AV0040	4	4	10	50	4	■	600	
D4AV0050	5	4	13	50	6	■	680	
D4AV0060	6	4	15	50	6	■	680	
D4AV0080	8	4	20	60	8	■	1140	
D4AV0100	10	4	30	75	10	■	1800	
D4AV0120	12	4	30	75	12	■	2250	
D4AV0160	16	4	45	100	16	■	5300	

■Inventory products

TUNGSTEN CARBIDE EFFECT END MILL FOR ALUMINUM N



Specifications

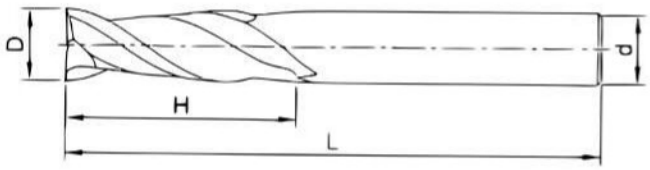
- The applicable machine tools are CNC milling machines, machining centers,engraving machines, high-speed precision engravers, and similar high-speed machines.
- Applicable materials: Aluminum alloy series, plastics, wood, copper, and other soft materials.
- This tungsten carbide end mill is designed for aluminum machining, offering high-speed cutting and improved chip evacuation for enhanced productivity.

訂購編號 Order No.	外徑 D	刃數 S	刃長 H	總長 L	柄徑 D	庫存 Stock	牌價 P	備註2 Remark2
D3BS0020	2	2	6	50	4	■	400	
D3BS0030	3	3	8	50	4	■	400	
D3BS0040	4	3	12	50	4	■	400	
D3BS0050	5	3	13	50	6	■	460	
D3BS0060	6	3	18	50	6	■	460	
D3BS0080	8	3	24	60	8	■	780	
D3BS0100	10	3	30	75	10	■	1360	
D3BS0120	12	3	36	75	12	■	1700	

■Inventory products

TUNGSTEN CARBIDE EFFECT END MILL FOR ALUMINUM VIOLET COATING

N



Specifications

End mill series

- Composite Diamond-Like Carbon (DLC) coating.
- It can be used for dry cutting applications.
- The applicable machine tools are CNC milling machines, machining centers,engraving machines, high-speed precision engravers, and similar high-speed machines.
- Applicable materials: Aluminum alloy, plastics, wood, copper, bronze, and red brass, as well as other soft materials.
- This end mill features a composite diamond-like carbon (DLC) coating for fast chip evacuation, resulting in a significantly extended tool lifespan.

訂購編號 Order No.	外徑 D	刃數 S	刃長 H	總長 L	柄徑 D	庫存 Stock	牌價 P	備註2 Remark2
D3BSA0030	3	3	8	50	4	■	520	
D3BSA0040	4	3	12	50	4	■	520	
D3BSA0050	5	3	13	50	6	■	680	
D3BSA0060	6	3	18	50	6	■	680	
D3BSA0080	8	3	24	60	8	■	1100	
D3BSA0100	10	3	30	75	10	■	1700	
D3BSA0120	12	3	36	75	12	■	2200	

■Inventory products

BRAZED CARBIDE CUTTER

SLOTTING

ROGUGHING

- Precisely welded fabrication
- Used for groove machining
- Effective chip control

PROFESSIONAL CRAFTSMANSHIP AND IMPECCABLE QUALITY

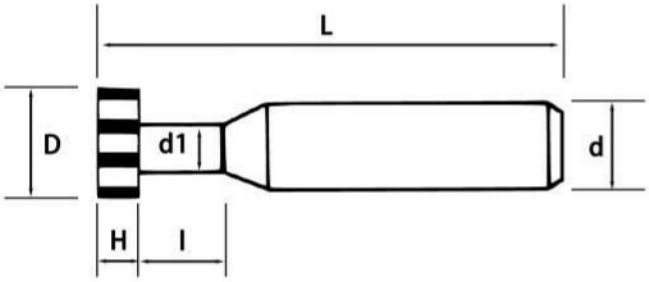
Premium materials

Durable

Exquisite quality

Efficient operation

BRAZED CARBIDE T-SLOT CUTTER (STRAIGHT FLUTE)



Specifications

- Applicable machine tools include CNC milling machines, machining centers, engraving machines, and other high-speed machines.
- The applicable materials include stainless steel, carbon steel, alloy steel, aluminum alloys, aluminum castings, and copper alloys.
- It is ideal for groove machining, specifically T-shaped or side grooves, with a straight blade design. Meticulous welding processes ensure and greatly enhance its lifespan.

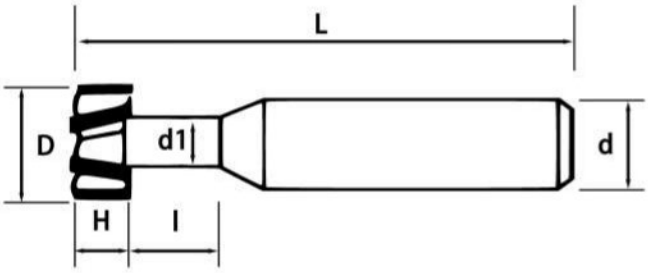
訂購編號 Order NO.	外徑 D	刃數 S	刃長 H	頸徑 d1	頸長 l1	總長 L	柄徑 D	庫存 Stock	牌價① P	牌價② P
	16	4	3/4/5/6/8/10/12	7	15	100	12		900	1000
	20	4	3/4/5/6/8/10/12	10	15	100	12		1000	1120
	25	6	3/4/5/6/8/10/12	13	15	120	16		1200	1300
	30	6	3/4/5/6/8/10/12	15	15	120	16		1360	1480
	32	6	3/4/5/6/8/10/12	15	15	120	16		1500	1640
	35	6	3/4/5/6/8/10/12	15	15	120	16		1680	1800
	40	6	3/4/5/6/8/10/12	21	15	140	25		1900	2080
	45	6	3/4/5/6/8/10/12	23	15	140	25		2200	2480
	5o	8	3/4/5/6/8/10/12	24.5	15	140	25		2700	2900
	60	10	3/4/5/6/8/10/12	30	20	140	32		3400	3720

■Inventory products

① represents prices for blade lengths of 3, 4, and 5

② represents the prices for blade lengths of 6, 8, 10, and 12.

BRAZED CARBIDE T-SLOT CUTTER (STAGGERED FLUTE)



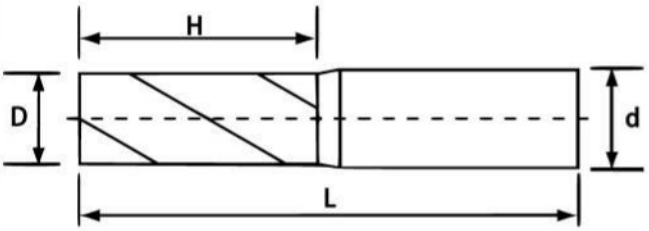
Specifications

- Applicable machine tools include CNC milling machines, machining centers, engraving machines, and other high-speed machines.
- The applicable materials include stainless steel, carbon steel, alloy steel, aluminum alloys, aluminum castings, and copper alloys.
- Main features: a suitability for T-shaped or side groove machining, along with left and right helical flutes for efficient chip breaking. It is constructed with a durable welding process, ensuring precision and extended tool life.

訂購編號 Order NO.	外徑 D	刃數 S	刃長 H	頸徑 d1	頸長 l	總長 L	柄徑 D	庫存 Stock	牌價 P	備註2 Remark2
	16	4	6/8/10/12	7	15	100	12		1180	
	20	4	6/8/10/12	10	15	100	12		1360	
	25	6	6/8/10/12	13	15	120	16		1680	
	30	6	6/8/10/12	15	15	120	16		1960	
	32	6	6/8/10/12	15	15	120	16		2120	
	35	6	6/8/10/12	15	15	120	16		2400	
	40	6	6/8/10/12	21	15	140	25		2680	
	45	6	6/8/10/12	23	15	140	25		3120	
	50	8	8/10/12	24.5	15	140	25		3800	
	60	10	8/10/12	30	20	140	32		4600	

■Inventory products

BRAZED CARBIDE HELICAL FLUTE CUTTER-STANDARD



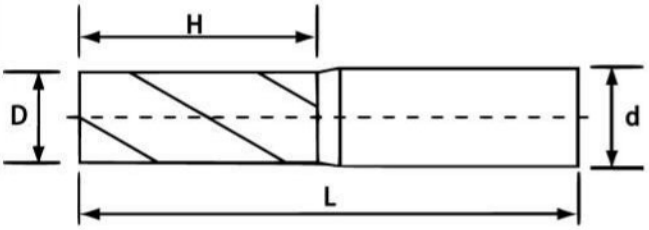
Specifications

- Applicable machine tools include CNC milling machines, machining centers, engraving machines, and other high-speed machines.
- The applicable materials include stainless steel, carbon steel, alloy steel, aluminum alloys, aluminum castings, and copper alloys.
- It is manufactured through various rigorous welding processes, ensuring precision quality and significantly extending the tool's lifespan.

訂購編號 Order NO.	外徑 D	刃數 S	刃長 H	總長 L	柄徑 D	庫存 Stock	牌價 P	備註2 Remark2
	12	4	30	80	12		900	
	14	4	35	90	16		1080	
	16	4	40	95	16		1200	
	18	4	40	100	20		1360	
	20	4	45	110	20		1500	
	25	4	50	120	25		1900	
	30	4	55	125	25		2480	
	32	4	60	145	32		2760	
	35	4	65	150	32		3360	
	40	4	65	150	32		3800	
	45	4	70	160	32		4600	
	50	4	70	160	32		5700	

■Inventory products

BRAZED CARBIDE HELICAL FLUTE CUTTER-LONG FLUTE



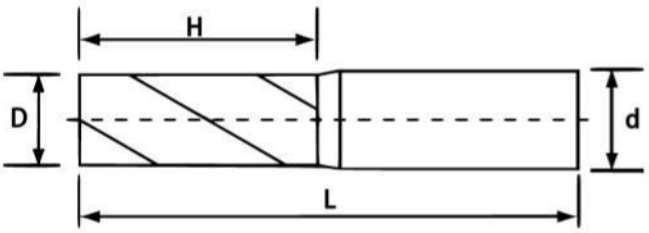
Specifications

- Applicable machine tools include CNC milling machines, machining centers, engraving machines, and other high-speed machines.
- The applicable materials include stainless steel, carbon steel, alloy steel, aluminum alloys, aluminum castings, and copper alloys.
- It is manufactured through various rigorous welding processes, ensuring precision quality and significantly extending the tool's lifespan.

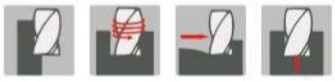
訂購編號 Order NO.	外徑 D	刃數 S	刃長 H	總長 L	柄徑 D	庫存 Stock	牌價 P	備註2 Remark2
	12	4	40	90	12		1100	
	14	4	45	105	16		1280	
	16	4	50	120	16		1400	
	18	4	60	120	20		1840	
	20	4	75	135	20		2320	
	25	4	85	175	25		3080	
	30	4	100	195	25		4200	
	32	4	105	205	32		5200	
	35	4	105	205	32		5480	
	40	4	105	205	32		6400	
	45	4	105	205	32		6600	
	50	4	125	240	32		10400	

■Inventory products

BRAZED CARBIDE HELICAL FLUTE CUTTER- EXTRA LONG FLUTE



Specifications

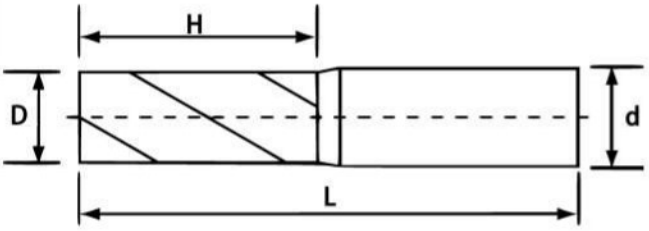


- Applicable machine tools include CNC milling machines, machining centers, engraving machines, and other high-speed machines.
- The applicable materials include stainless steel, carbon steel, alloy steel, aluminum alloys, aluminum castings, and copper alloys.
- It is manufactured through various rigorous welding processes, ensuring precision quality and significantly extending the tool's lifespan.

訂購編號 Order NO.	外徑 D	刃數 S	刃長 H	總長 L	柄徑 D	庫存 Stock	牌價 P	備註2 Remark2
	20	4	100	180	20		3000	
	25	4	120	210	25		4200	
	30	4	120	210	25		5000	
	32	4	120	210	32		5800	
	35	4	150	250	32		7600	
	40	4	150	250	32		8400	
	40	4	200	305	32		11400	
	45	4	150	250	32		9200	
	45	4	200	305	32		12400	
	50	4	150	250	32		11800	
	50	4	200	305	32		13600	

■Inventory products

BRAZED CARBIDE HELICAL FLUTE RIPPER CUTTER



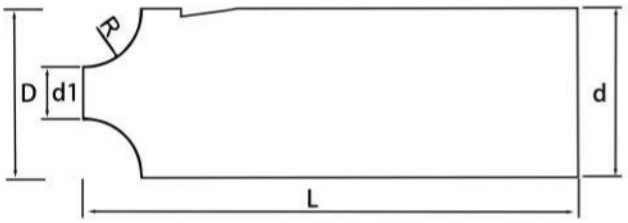
Specifications

- Applicable machine tools include CNC milling machines, machining centers, engraving machines, and other high-speed machines.
- It is versatile, suitable for processing stainless steel, carbon steel, alloy steel, aluminum alloys, aluminum castings, copper alloys. as well as other non-ferrous metals and plastics.
- It is manufactured through various rigorous welding processes, ensuring precision quality and significantly extending the tool's lifespan.

訂購編號 Order NO.	外徑 D	刃數 S	刃長 H	總長 L	柄徑 D	庫存 Stock	牌價 P	備註2 Remark2
	30	4	60	140	32		3400	
	30	4	80	160	32		4200	
	30	4	105	205	32		5720	
	32	4	60	140	32		3600	
	32	4	80	160	32		4520	
	32	4	105	205	32		5920	
	35	4	60	140	32		3800	
	35	4	80	160	32		4800	
	35	4	105	205	32		6200	
	40	4	60	140	32		4000	
	40	4	80	160	32		5200	
	40	4	105	205	32		6720	
	50	5	105	205	42		11200	
	50	5	125	225	42		13000	
	50	5	150	250	42		15200	
	50	5	205	305	42		20000	

■Inventory products

BRAZED CARBIDE CORNER ROUNDING CUTTER



Specifications

- Applicable machine tools include CNC milling machines, machining centers, engraving machines, and other high-speed machines.
- It is versatile, suitable for processing stainless steel, carbon steel, alloy steel, aluminum alloys, aluminum castings, copper alloys. as well as other non-ferrous metals and plastics.
- It provides excellent wear resistance for milling workpiece edges with rounded chamfers. And it is manufactured through various rigorous welding processes, ensuring precision quality and significantly extending the tool's lifespan.

訂購編號 Order NO.	外徑 D	刃數 S	小徑 d1	R角 R	總長 L	柄徑 D	庫存 Stock	牌價 P	備註2 Remark2
	18	4	10	3	100	16			
	20	4	11	3.5	100	16			
	22	4	12	4	100	20			
	24	4	12	4.5	120	20			
	25	4	13	5	120	25			
	28	4	14	6	120	25			
	31	4	15	7	120	25			
	33	4	15	8	130	32			
	37	4	17	9	130	32			
	42	4	20	10	130	32			
	44	4	20	11	130	32			
	48	4	22	12	150	32			
	5o	4	22	13	150	32			
	52	4	22	14	150	42			
	54	4	22	15	150	42			
	56	4	22	16	170	42			
	60	4	22	18	170	42			
	64	4	22	20	170	42			

■Inventory products

宏茂深沟刀
HONGMAOSHENGOUDAO

东莞盛弘数控科技有限公司

Dongguan Shenghong numerical control Technology Co., LTD

地址：广东省东莞市长安镇新安社区松林西路4号
公司电话：0769-81887005
技术咨询：136 8606 0599
邮箱：waynen@126.com

Add: No.4 Songlin West Road, Xin 'an Community, Chang 'an Town, Dongguan City, Guangdong Province
Company telephone: 0769-81887005
Technical Consultation: 136 8606 0599
Email: waynen@126.com

宏茂深沟刀 HONGMAOSHENGOUDAO Vol.05 2023.6.6

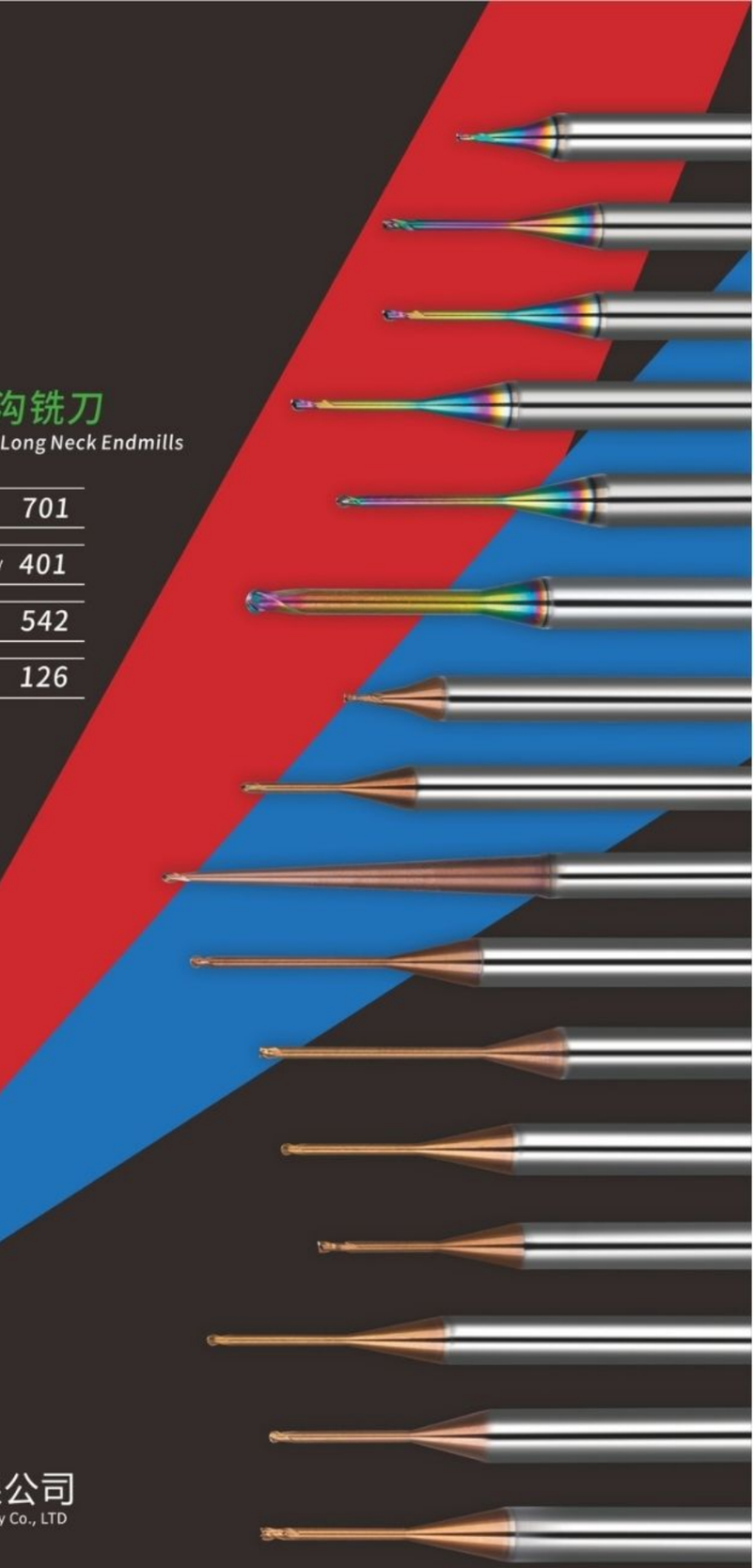
东莞盛弘数控科技有限公司 Dongguan Shenghong numerical control Technology Co., LTD

宏茂深沟刀
HONGMAOSHENGOUDAO

专注高品质微小径深沟铣刀

Focus On High Quality Micro Diameter Long Neck Endmills

Total 1770 items



东莞盛弘数控科技有限公司

Dongguan Shenghong numerical control Technology Co., LTD

Vol.05 2023.6.6

宏茂深沟刀
HONGMAOSHENGOUDAO

关于我们
Regarding our ours

东莞盛弘数控科技有限公司（宏茂深沟刀）:成立于2009年，是一间集研发生产、销售和服务为一体的专业刀具供应商，是科技创新型企业、国家高新技术企业。我们专业为客户提供精密切削工具全寿命周期解决方案及配套服务。

我司拥有世界先进的六轴联动"日本 makino、瑞士TTB"等高精密数控刀具磨床;德国Zoller g3m全自动刀具检测仪；公司自有刀具试切实验室。与世界一流涂层厂、国内外高质量硬质合金（钨钢）材料厂长期合作。以便确保品质和加工寿命。

我司专业提供：高品质微小径、深沟铣刀、高精高硬模具铣刀。广泛应用于：航空、汽车、医疗器械、军工、眼镜、钟表、黄金等领域。

一直以来，我们始终以"技术创新、市场领先、产品品质、人员配置、客户服务"为工作导向 ，为品质稳定、永续经营提供有利的保障。

Dongguan Shenghong numerical control Technology Co., LTD(HONGMAOSHENGOUDAO): Founded in 2009,Is a set of research and development, production, sales and service as one of the professional tool supplier, Is a scientific and technological innovation-oriented enterprise, a national high-tech enterprise. We specialize in providing customers with precision cutting tools full life cycle solutions and supporting services.

Our company has the world advanced six-axis linkage "Japan makino, Switzerland TTB" and other high precision CNC tool grinder; German Zoller g3m automatic tool detector; our own tool test cutting laboratory. Long-term cooperation with world-class coating factory, domestic and foreign high quality cemented carbide (tungsten steel) material factory. To ensure the quality and processing life.

Our professional provides: high quality small diameter, deep ditch milling cutter, high precision high hard mold milling cutter. Widely used in: aviation, automobile, medical equipment, military industry, glasses, watches, gold, and other fields.

All along, we have always been to "technology innovation, market leadership, product quality, personnel allocation, Customer service" for the work orientation, for the stable quality, sustainable operation to provide a favorable guarantee.

企业使命：
推动切削细分领域的技术进步与升级，为切削更加高效、精准而奋斗。

Enterprise mission:
To promote the technological progress and upgrading of the cutting segmentation field, and strive for more efficient and accurate cutting.

企业愿景：
做全球精度最高的微小径、深沟铣刀，成为"细分领域的领航者"。

Enterprise vision:
To do the world's highest precision of small diameter, deep ditch milling cutter, to become the "leader in the field of segmentation".

技术能力
Technical capability

瑞士TTB 5轴联动高精密磨床
Swiss TTB 5 axis linkage high precision grinding machine

- 重复定位精度可达0.001mm
- FANUC机器手自动化生产
- 最小可生产刃径0.03mm铣刀
- 世界先进NUM系统适用于钻头、铣刀、铰刀等钨钢刀具生产
- The repeated positioning accuracy can reach 0.001mm
- Automatic production of FANUC robotic hand
- Milling cutters with a minimum diameter of 0.03mm can be produced
- The world advanced NUM system is suitable for the production of tungsten steel tools such as drills、milling cutters and reamers

日本makino 6轴联动SS7高精密磨床
Japan makino 6-axis linkage SS7 high precision grinding machine

- 重复定位精度可达0.001mm
- 行架式机械手自动化生产
- 最小可生产R0.03球头铣刀
- 适用于微小径类的钻头、铣刀、铰刀等钨钢刀具生产
- The repeated positioning accuracy can reach 0.001mm
- Automatic production of manipulator
- Minimum R0.03 ball end milling cutter can be produced
- It is suitable for tungsten steel cutter production of drill、milling cutter、reamer and so on

日本makino 6轴联动SG10高精密磨床
Japan makino 6-axis linkage SG10 high precision grinding machine

- 重复定位精度可达0.001mm
- 行架式机械手自动化生产
- 稳定批量生产3~10mm刀具
- 适用于中直径的钻头、铣刀、铰刀等钨钢刀具生产
- The repeated positioning accuracy can reach 0.001mm
- Automatic production of manipulator
- Stable mass production of 3~10mm tools
- Suitable for tungsten steel tool production of medium diameter drill、milling cutter、reamer and so on

日本makino 6轴联动MG30高精密磨床
Japan makino 6-axis linkage MG30 high precision grinding machine

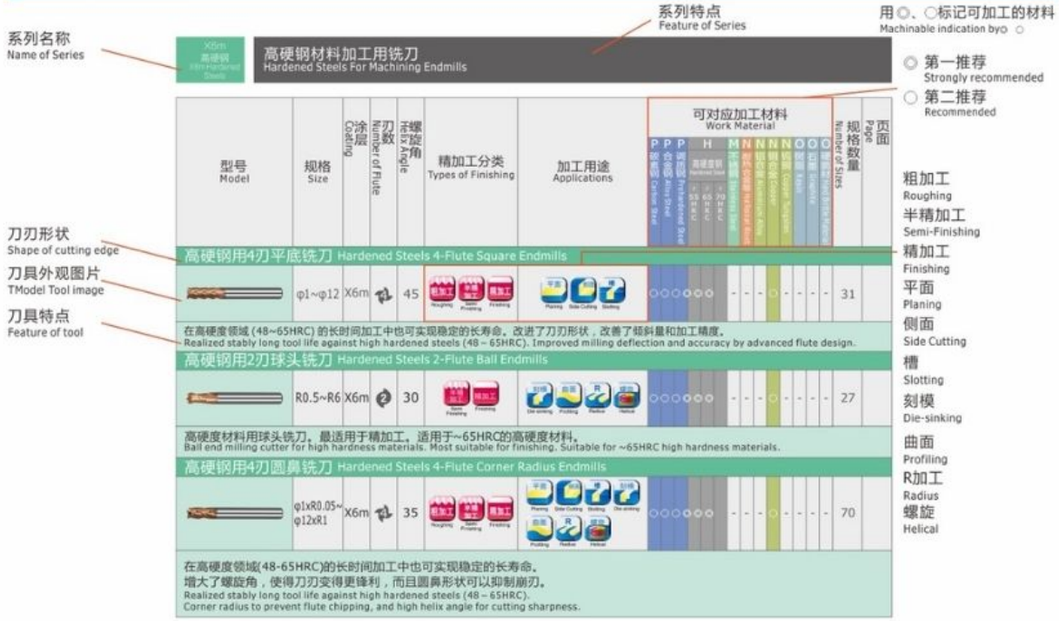
- 重复定位精度可达0.001mm
- 转臂式机械手自动化生产
- 稳定批量生产6~30mm刀具
- 适用于中大直径的钻头、铣刀、铰刀等钨钢刀具生产
- The repeated positioning accuracy can reach 0.001mm
- Automatic production of rotary manipulator
- Stable mass production of 6~30mm cutting tools
- It is suitable for the production of tungsten steel cutting tools such as drill、milling cutter and reamer with large diameter

德国ZOLLER-g3m高倍率全自动刀具量测仪
Germany ZOLLER-g3m high rate automatic tool measuring instrument

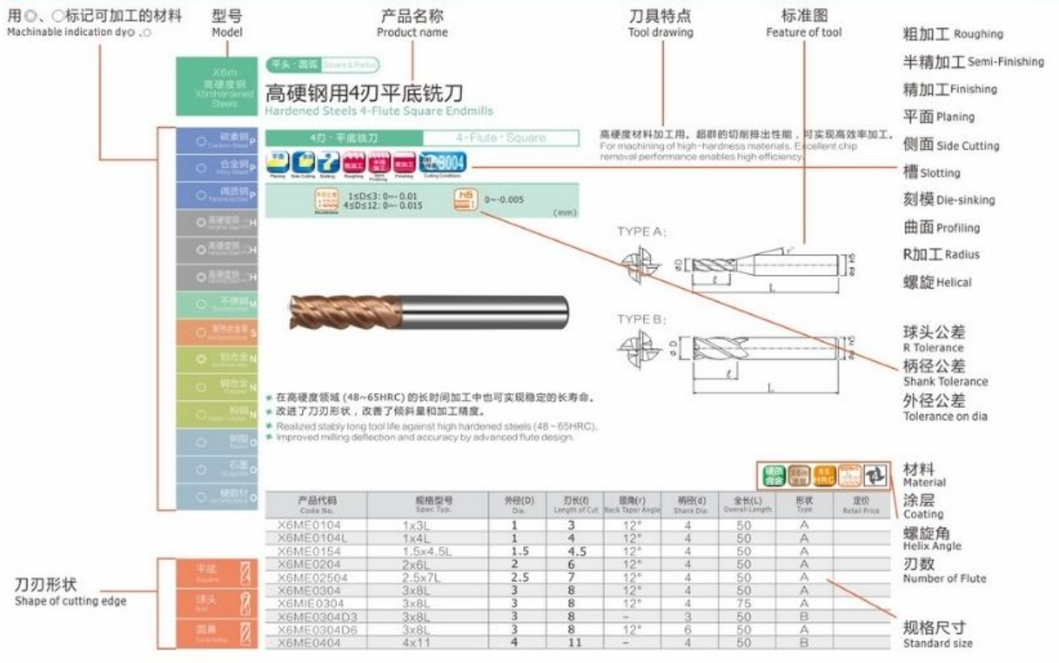
- 尺寸量测精度可达0.0001mm
- 可量测刀具全部几何特征
- 可与生产设备联机，共享数据
- 行业公认的检测基准
- The measurement accuracy can reach 0.0001mm
- All geometric features of the tool can be measured
- Can be connected to production equipment, sharing data
- Industry-recognized testing benchmarks

综合目录使用方法
How to use catalog

跨页 Spread page



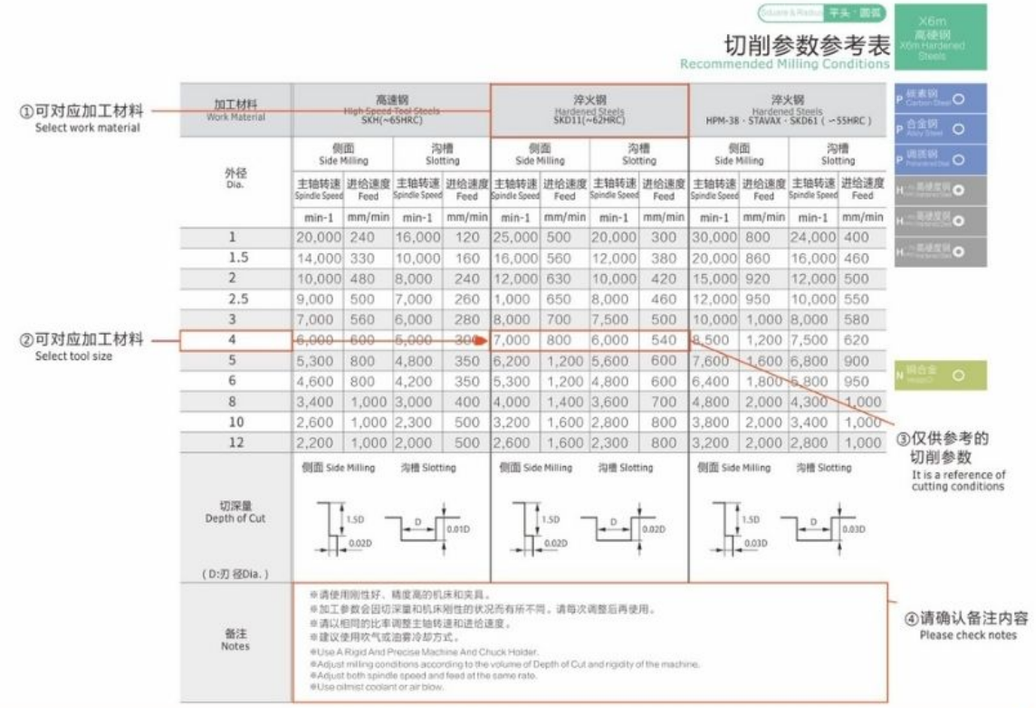
产品页 Product page



产品代码 Code No.	规格型号 Spec. Typ.	外径(D) Dia.	刃长(l) Length of Cut	锥角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X6ME0104	1x3L	1	3	12°	4	50	A	
X6ME0104L	1x4L	1	4	12°	4	50	A	
X6ME0154	1.5x4.5L	1.5	4.5	12°	4	50	A	
X6ME0204	2x6L	2	6	12°	4	50	A	
X6ME02504	2.5x7L	2.5	7	12°	4	50	A	
X6ME0304	3x8L	3	8	12°	4	50	A	
X6MIE0304	3x8L	3	8	12°	4	75	A	
X6ME0304D3	3x8L	3	8	–	3	50	B	
X6ME0304D6	3x8L	3	8	12°	6	50	A	
X6ME0404	4x11	4	11	–	4	50	B	

切削参数参考表页
Recommended milling condition page

跨页 Spread page



加工材料 Work Material	高速钢 SKH(~65HRC) 侧面 Side Milling 主轴转速	高速钢 SKH(~65HRC) 侧面 Side Milling 进给速度	高速钢 SKH(~65HRC) 沟槽 Slotting 主轴转速	高速钢 SKH(~65HRC) 沟槽 Slotting 进给速度	淬火钢 SKD11(~62HRC) 侧面 Side Milling 主轴转速	淬火钢 SKD11(~62HRC) 侧面 Side Milling 进给速度	淬火钢 SKD11(~62HRC) 沟槽 Slotting 主轴转速	淬火钢 SKD11(~62HRC) 沟槽 Slotting 进给速度	淬火钢 HPM-38 · STAVAX · SKD61 (~55HRC) 侧面 Side Milling 主轴转速	淬火钢 HPM-38 · STAVAX · SKD61 (~55HRC) 侧面 Side Milling 进给速度	淬火钢 HPM-38 · STAVAX · SKD61 (~55HRC) 沟槽 Slotting 主轴转速	淬火钢 HPM-38 · STAVAX · SKD61 (~55HRC) 沟槽 Slotting 进给速度
外径 Dia.	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
1	20,000	240	16,000	120	25,000	500	20,000	300	30,000	800	24,000	400
1.5	14,000	330	10,000	160	16,000	560	12,000	380	20,000	860	16,000	460
2	10,000	480	8,000	240	12,000	630	10,000	420	15,000	920	12,000	500
2.5	9,000	500	7,000	260	1,000	650	8,000	460	12,000	950	10,000	550
3	7,000	560	6,000	280	8,000	700	7,500	500	10,000	1,000	8,000	580
4	6,000	600	5,000	300	7,000	800	6,000	540	8,500	1,200	7,500	620
5	5,300	800	4,800	350	6,200	1,200	5,600	600	7,600	1,600	6,800	900
6	4,600	800	4,200	350	5,300	1,200	4,800	600	6,400	1,800	5,800	950
8	3,400	1,000	3,000	400	4,000	1,400	3,600	700	4,800	2,000	4,300	1,000
10	2,600	1,000	2,300	500	3,200	1,600	2,800	800	3,800	2,000	3,400	1,000
12	2,200	1,000	2,000	500	2,600	1,600	2,300	800	3,200	2,000	2,800	1,000

切深量 Depth of Cut：侧面 Side Milling 1.5D / 0.02D；沟槽 Slotting D / 0.01D；侧面 Side Milling 1.5D / 0.02D；沟槽 Slotting D / 0.02D；侧面 Side Milling 1.5D / 0.03D；沟槽 Slotting D / 0.03D

备注栏的共同内容 Common notes for all products

说明 Explanation	本切削参数仅供参考。请根据实际的加工形状和所使用的机床等调整切削参数。 Recommended cutting conditions indicate just for reference. It should be adjusted according to milling shape and machine tool.
事前准备 Preparation	如果担心加工材料和铣刀会干涉时，请务必实际测量进行确认。 Tool measurement required. In order to avoid interference to the work material. 建议加工前充分考虑主轴的伸缩量和机床的特性。 Recommend to assess the machine characters, such as expansion of the spindle and others before using the tool. 建议采用顺铣加工方式。 Down-cut is recommended. 请尽量抑制刀具的偏摆量。(可能的话，请确认所用主轴转速下的动态偏摆精度。) Minimize chucking runout. (Recommend to measure actual runout at activated spindle speed.) 请使用刚性较大的铣刀刀柄和机床。 Use a rigid machine and holder. 拆装刀具或者测量刀具长度时请务必小心。 Extra care of handling when tool setting and measuring. 请根据需要控制刀具的伸出量在最短状态(不干涉的前提下)。 Minimize a possible tool overhang length. 请在考虑加工材料及加工形状等的基础上，选用合适的切削油。 Select a cutting fluid appropriate to work material, m lling shape and machining content.
调整参数 Milling condition adjustment	加工R角等负载大的部位或复杂的形状时，请特别注意参数设定和刀路轨迹等。 When cutting high load sections or complex shapes, it requires attention to condition setting and tool path. 如果刀具发生崩刃，或者需要高精度加工时，请降低进给速度。 Reduce the feed for high accurate machining to avoid breakage of work piece. 发生振刀或加工声音较吵等问题时，请以相同的比率降低主轴转速和进给速度。此外，机床主轴转速不足时，也请以相同的比率降低。 Reduce both spindle speed and feed at same rate for chattering. and also for insuficientspindle speed of a machine. 请根据机床刚性和工件的夹持状态等调整切削参数。实际加工时请根据加工形状、目的以及所用的机床等调整切削参数。 Adjust milling condition conforming with machine rigidity and dlamping condition.Final milling Conditions are subject fo machining profile, purpose and machine status. 主轴转速和进给速度会根据刀具伸出量和切深量的不同时,会有大幅度变更的可能。 Spindle speed andfeed are hanged according to overhang length and depth of cut. 精加工时，请根据要求精度等调整切削参数。 For finishing process, please adjust to the optimized condition to meet the requirement of machining accuracy. 加工过程中切屑卡入、缠绕可能会有损加工面品质，因此请注意排屑。 Care for chip removal toavoid being stuck or caught during process for better surface quality.

HONGMAOSHENGOUDAO

目录索引
Index

主要系列Main Series

高硬钢材料加工用铣刀
Hardened Steels For Machining Endmills

X6m 高硬钢 X6m Hardened Steels

型号 Model	规格 Size	涂层 Coating	刃数 Number of Flute	螺旋角 Helix Angle	精加工分类 Types of Finishing	加工用途 Applications	可对应加工材料 Work Material	规格数量 Number of Sizes	页面 Page
高硬钢用4刃平底铣刀 Hardened Steels 4-Flute Square Endmills									
	φ1~φ12	X6m	4	45	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting	○○○ ○○○ - - - ○ - - - - -	31	B003
在高硬度领域 (48~65HRC) 的长时间加工中也可实现稳定的长寿命。改进了刀刃形状，改善了倾斜量和加工精度。 Realized stably long tool life against high hardened steels (48 ~ 65HRC). Improved milling deflection and accuracy by advanced flute design.									
高硬钢用2刃球头铣刀 Hardened Steels 2-Flute Ball Endmills									
	R0.5~R6	X6m	2	30	半精加工 Semi Finishing; 精加工 Finishing	刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○○○ ○○○ - - - ○ - - - - -	27	B005
高硬度材料用球头铣刀。最适用于精加工。适用于~65HRC的高硬度材料。 Ball end milling cutter for high hardness materials. Most suitable for finishing. Suitable for ~65HRC high hardness materials.									
高硬钢用4刃圆鼻铣刀 Hardened Steels 4-Flute Corner Radius Endmills									
	φ1xR0.05~ φ12xR1	X6m	4	35	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○○○ ○○○ - - - ○ - - - - -	70	B007
在高硬度领域(48-65HRC)的长时间加工中也可实现稳定的长寿命。 增大了螺旋角，使得刀刃变得更锋利，而且圆鼻形状可以抑制崩刃。 Realized stably long tool life against high hardened steels (48 ~ 65HRC). Corner radius to prevent flute chipping, and high helix angle for cutting sharpness.									
高硬钢用2刃微小径平底铣刀 Hardened Steels 2-Flute Micro Diameter Square Endmills									
	φ0.03~φ0.9	X6m	2	35	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting	○○○ ○○○ - - - ○ - - - - -	20	B011
在高硬度领域 (48~65HRC) 的长时间加工中也可实现稳定的长寿命。改进了刀刃形状，改善了倾斜量和加工精度。 Realized stably long tool life against high hardened steels (48 ~ 65HRC). Improved milling deflection and accuracy by advanced flute design.									
高硬钢用2刃微小径球头铣刀 Hardened Steels 2-Flute Micro Diameter Ball Endmills									
	R0.03~R0.45	X6m	2	30	半精加工 Semi Finishing; 精加工 Finishing	刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○○○ ○○○ - - - ○ - - - - -	17	B013
高硬度材料用球头铣刀。最适用于精加工。适用于~65HRC的高硬度材料。 Ball end milling cutter for high hardness materials. Most suitable for finishing. Suitable for ~65HRC high hardness materials.									
高硬钢用2刃微小径圆鼻铣刀 Hardened Steels 2-Flute Micro Diameter Corner Radius Endmills									
	φ0.1xR0.01~ φ0.9xR0.1	X6m	2	35	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○○○ ○○○ - - - ○ - - - - -	21	B015
在高硬度领域(48-65HRC)的长时间加工中也可实现稳定的长寿命。 增大了螺旋角，使得刀刃变得更锋利，而且圆鼻形状可以抑制崩刃。 Realized stably long tool life against high hardened steels (48 ~ 65HRC). Corner radius to prevent flute chipping, and high helix angle for cutting sharpness.									

型号 Model	规格 Size	涂层 Coating	刃数 Number of Flute	螺旋角 Helix Angle	精加工分类 Types of Finishing	加工用途 Applications	可对应加工材料 Work Material	规格数量 Number of Sizes	页面 Page
高硬钢用2刃长颈平底铣刀 Hardened Steels 2-Flute Long Neck Square Endmills									
	φ0.1~φ2	X6m	2	35	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting	○○○ ○○○ - - - ○ - - - - -	66	B017
在高硬度领域 (48~65HRC) 的长时间加工中也可实现稳定的长寿命。改进了刀刃形状，改善了倾斜量和加工精度。 Realized stably long tool life against high hardened steels (48 ~ 65HRC). Improved milling deflection and accuracy by advanced flute design.									
高硬钢用4刃长颈平底铣刀 Hardened Steels 4-Flute Long Neck Square Endmills									
	φ1~φ4	X6m	4	35	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting	○○○ ○○○ - - - ○ - - - - -	32	B021
在高硬度领域 (48~65HRC) 的长时间加工中也可实现稳定的长寿命。改进了刀刃形状，改善了倾斜量和加工精度。 Realized stably long tool life against high hardened steels (48 ~ 65HRC). Improved milling deflection and accuracy by advanced flute design.									
高硬钢用2刃长颈球头铣刀 Hardened Steel 2-Flute Long Neck Ball Endmills									
	R0.04~R2	X6m	2	30	半精加工 Semi Finishing; 精加工 Finishing	刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○○○ ○○○ - - - ○ - - - - -	136	B023
高硬度材料用球头铣刀。最适用于精加工。适用于~65HRC的高硬度材料。 Ball end milling cutter for high hardness materials. Most suitable for finishing. Suitable for ~65HRC high hardness materials.									
高硬钢用2刃长颈圆鼻铣刀 Hardened Steels 2-Flute Long Neck Corner Radius Endmills									
	φ0.1xR0.01~ φ0.8xR0.2	X6m	2	35	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○○○ ○○○ - - - ○ - - - - -	85	B029
在高硬度领域(48-65HRC)的长时间加工中也可实现稳定的长寿命。增大了螺旋角，使得刀刃变得更锋利，而且圆鼻形状可以抑制崩刃。 Realized stably long tool life against high hardened steels (48 ~ 65HRC). Corner radius to prevent flute chipping, and high helix angle for cutting sharpness.									
高硬钢用4刃长颈圆鼻铣刀 Hardened Steels 4-Flute Long Neck Corner Radius Endmills									
	φ1xR0.05~ φ4xR1	X6m	4	35	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○○○ ○○○ - - - ○ - - - - -	161	B033
在高硬度领域(48-65HRC)的长时间加工中也可实现稳定的长寿命。增大了螺旋角，使得刀刃变得更锋利，而且圆鼻形状可以抑制崩刃。 Realized stably long tool life against high hardened steels (48 ~ 65HRC). Corner radius to prevent flute chipping, and high helix angle for cutting sharpness.									
高硬钢用4刃直柄长颈圆鼻铣刀 Hardened Steels 4-Flute Straight Shank Long Neck Corner Radius Endmills									
	φ4xR0.1~ φ12xR1	X6m	4	35	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○○○ ○○○ - - - ○ - - - - -	35	B039
在高硬度领域(48-65HRC)的长时间加工中也可实现稳定的长寿命。增大了螺旋角，使得刀刃变得更锋利，而且圆鼻形状可以抑制崩刃。 Realized stably long tool life against high hardened steels (48 ~ 65HRC). Corner radius to prevent flute chipping, and high helix angle for cutting sharpness.									

平头・圆弧 Sduare & Radius

高硬钢用4刃平底铣刀
Hardened Steels 4-Flute Square Endmills

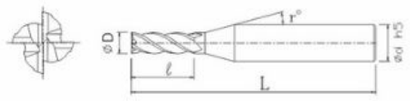
4刃・平底铣刀 | 4-Flute・Square

平面 Planing | 侧面 Side Cutting | 槽 Slotting | 粗加工 Roughing | 半精加工 Semi Finishing | 精加工 Finishing | 切削条件 B004 Cutting Conditions

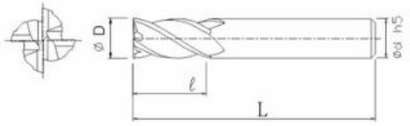
外径公差 Dia.Tolerance: 1≤D≤3: 0~-0.01; 4≤D≤12: 0~-0.015 | h5: 0~-0.005 (mm)

高硬度材料加工用。超群的切削排出性能，可实现高效率加工。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

TYPE A:



TYPE B:



- 在高硬度领域 (48~65HRC) 的长时间加工中也可实现稳定的长寿命。
- 改进了刀刃形状，改善了倾斜量和加工精度。
- Realized stably long tool life against high hardened steels (48 ~ 65HRC).
- Improved milling deflection and accuracy by advanced flute design.

硬质合金 | X6m涂层 | 65 HRC | 降低角45

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X6ME0104	1x3L	1	3	12°	4	50	A	
X6ME0104L	1x4L	1	4	12°	4	50	A	
X6ME0154	1.5x4.5L	1.5	4.5	12°	4	50	A	
X6ME0204	2x6L	2	6	12°	4	50	A	
X6ME02504	2.5x7L	2.5	7	12°	4	50	A	
X6ME0304	3x8L	3	8	12°	4	50	A	
X6MIE0304	3x8L	3	8	12°	4	75	A	
X6ME0304D3	3x8L	3	8	–	3	50	B	
X6ME0304D6	3x8L	3	8	12°	6	50	A	
X6ME0404	4x11	4	11	–	4	50	B	
X6MIE0404	4x11L	4	11	–	4	75	B	
X6MJE0404	4x11L	4	11	–	4	100	B	
X6ME040D6	4x11L	4	11	12°	6	50	A	
X6MIE040D6	4x11L	4	11	12°	6	75	A	
X6MJE040D6	4x11L	4	11	12°	6	100	A	
X6ME0504	5x13L	5	13	12°	6	50	A	
X6MIE0504	5x13L	5	13	12°	6	75	A	
X6MJE0504	5x13L	5	13	12°	6	100	A	
X6ME0604	6x16L	6	16	–	6	50	B	
X6ME0604L	6x16L	6	16	–	6	60	B	
X6MIE0604	6x16L	6	16	–	6	75	B	
X6MJE0604	6x16L	6	16	–	6	100	B	
X6ME0804	8x20L	8	20	–	8	60	B	
X6MIE0804	8x20L	8	20	–	8	75	B	
X6MJE0804	8x20L	8	20	–	8	100	B	
X6ME1004	10x25L	10	25	–	10	75	B	
X6MJE1004	10x25L	10	25	–	10	100	B	
X6MXE1004	10x25L	10	25	–	10	150	B	
X6ME1204	12x30L	12	30	–	12	75	B	
X6MJE1204	12x30L	12	30	–	12	100	B	
X6MXE1204	12x30L	12	30	–	12	150	B	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material	高速钢 High Speed Tool Steels SKH(~65HRC)				淬火钢 Hardened Steels SKD11(~62HRC)				淬火钢 Hardened Steels HPM-38・STAVAX・SKD61 (~55HRC)			
外径 Dia.	侧面 Side Milling		沟槽 Slotting		侧面 Side Milling		沟槽 Slotting		侧面 Side Milling		沟槽 Slotting	
	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed
	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
1	20,000	240	16,000	120	25,000	500	20,000	300	30,000	800	24,000	400
1.5	14,000	330	10,000	160	16,000	560	12,000	380	20,000	860	16,000	460
2	10,000	480	8,000	240	12,000	630	10,000	420	15,000	920	12,000	500
2.5	9,000	500	7,000	260	1,000	650	8,000	460	12,000	950	10,000	550
3	7,000	560	6,000	280	8,000	700	7,500	500	10,000	1,000	8,000	580
4	6,000	600	5,000	300	7,000	800	6,000	540	8,500	1,200	7,500	620
5	5,300	800	4,800	350	6,200	1,200	5,600	600	7,600	1,600	6,800	900
6	4,600	800	4,200	350	5,300	1,200	4,800	600	6,400	1,800	5,800	950
8	3,400	1,000	3,000	400	4,000	1,400	3,600	700	4,800	2,000	4,300	1,000
10	2,600	1,000	2,300	500	3,200	1,600	2,800	800	3,800	2,000	3,400	1,000
12	2,200	1,000	2,000	500	2,600	1,600	2,300	800	3,200	2,000	2,800	1,000
切深量 Depth of Cut (D:刃 径Dia.)	侧面 Side Milling: 1.5D, 0.02D		沟槽 Slotting: D, 0.01D		侧面 Side Milling: 1.5D, 0.02D		沟槽 Slotting: D, 0.02D		侧面 Side Milling: 1.5D, 0.03D		沟槽 Slotting: D, 0.03D	
备注 Notes	※请使用刚性好、精度高的机床和夹具。 ※加工参数会因切深量和机床刚性的状况而有所不同。请每次调整后再使用。 ※请以相同的比率调整主轴转速和进给速度。 ※建议使用吹气或油雾冷却方式。 ※Use A Rigid And Precise Machine And Chuck Holder. ※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine. ※Adjust both spindle speed and feed at the same rate. ※Use oilmist coolant or air blow.											

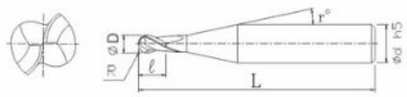
高硬钢用2刃球头铣刀
Hardened Steels 2-Flute Ball Endmills

2刃 · 球头 | 2-Flute · Ball

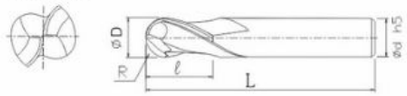
高硬度材料加工用。超群的切削排出性能，可实现高效率加工。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

1≤D≤3: 0~-0.01
4≤D≤12: 0~-0.015
±0.005
0~-0.005
(mm)

TYPE A :



TYPE B :



- 高硬度材料用球头铣刀。最适用于精加工。
- 适用于~65HRC的高硬度材料。
- Ball End Milling Cutter For High Hardness Materials. Most Suitable For Finishing.
- Suitable For ~65HRC High Hardness Materials.

产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Radius	刃长(ℓ) Length of Cut	外径(D) Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X6MB0102	R0.5x2L	**R0.5**	**2**	1	12°	4	50	A	
X6MB0152	R0.75x3L	**R0.75**	**3**	1.5	12°	4	50	A	
X6MB0202	R1x4L	**R1**	**4**	2	12°	4	50	A	
X6MB02502	R1.25x5L	**R1.25**	**5**	2.5	12°	4	50	A	
X6MB0302D3	R1.5x6L	**R1.5**	**6**	3	-	3	50	B	
X6MB0302	R1.5x6L	**R1.5**	**6**	3	12°	4	50	A	
X6MIB0302	R1.5x6L	**R1.5**	**6**	3	12°	4	75	A	
X6MB0302D6	R1.5x6L	**R1.5**	**6**	3	12°	6	60	A	
X6MB03502	R1.75x7L	**R1.75**	**7**	3.5	12°	4	50	A	
X6MB0402	R2x6L	**R2**	**6**	4	-	4	50	B	
X6MIB0402	R2x6L	**R2**	**6**	4	-	4	75	B	
X6MJB0402	R2x6L	**R2**	**6**	4	-	4	100	B	
X6MB0402D6	R2x6L	**R2**	**6**	4	12°	6	60	A	
X6MB0502	R2.5x9L	**R2.5**	**9**	5	12°	6	50	A	
X6MB0602	R3x9L	**R3**	**9**	6	-	6	50	B	
X6MB0602L	R3x9L	**R3**	**9**	6	-	6	60	B	
X6MIB0602	R3x9L	**R3**	**9**	6	-	6	75	B	
X6MJB0602	R3x9L	**R3**	**9**	6	-	6	100	B	
X6MB0802	R4x12L	**R4**	**12**	8	-	8	60	B	
X6MIB0802	R4x12L	**R4**	**12**	8	-	8	75	B	
X6MJB0802	R4x12L	**R4**	**12**	8	-	8	100	B	
X6MB1002	R5x15L	**R5**	**15**	10	-	10	75	B	
X6MJB1002	R5x15L	**R5**	**15**	10	-	10	100	B	
X6MXB1002	R5x15L	**R5**	**15**	10	-	10	150	B	
X6MB1202	R6x18L	**R6**	**18**	12	-	12	75	B	
X6MJB1202	R6x18L	**R6**	**18**	12	-	12	100	B	
X6MXB1202	R6x18L	**R6**	**18**	12	-	12	150	B	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material	高速钢 High Speed Tool Steels SKH(~65HRC)				淬火钢 Hardened Steels SKD11 (~62HRC)				淬火钢 Hardened Steels SKD61 · STAVAX · HPM-38 (~52HRC)			
球头半径(R) Radius	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.5	25,000	1,400	0.08	0.1	30,000	2,000	0.1	0.2	40,000	2,500	0.1	0.3
0.75	25,000	2,000	0.1	0.2	30,000	2,500	0.1	0.3	30,000	3,000	0.15	0.3
1	20,000	2,000	0.15	0.3	25,000	2,500	0.2	0.5	25,000	3,000	0.2	0.5
1.25	16,000	2,000	0.15	0.3	20,000	2,500	0.2	0.5	25,000	3,000	0.2	0.6
1.5	14,000	2,000	0.2	0.5	18,000	2,500	0.2	0.6	20,000	3,000	0.2	0.8
1.75	13,000	2,000	0.2	0.55	17,000	2,500	0.2	0.7	20,000	3,000	0.25	1.15
2	12,000	2,000	0.2	0.6	16,000	2,500	0.2	0.8	20,000	3,000	0.3	1.5
2.5	9,200	2,000	0.2	0.7	12,000	2,500	0.2	1.2	18,000	3,000	0.3	1.5
3	7,000	2,000	0.2	1	8,000	2,500	0.3	1.2	16,000	3,000	0.3	2
4	5,000	1,200	0.3	1	7,000	1,800	0.4	1.2	10,000	2,500	0.5	2
5	4,000	1,000	0.4	1.2	5,000	1,500	0.5	1.5	7,000	2,000	0.7	2.5
6	3,000	800	0.5	1.5	4,000	1,200	0.6	2	5,000	1,500	1	3

备注 Notes

※切深量的ap表示轴向切入量,ae表示步距量。
※建议使用油雾冷却方式。
※请以相同的比率调整主轴转速和进给速度。
※加工参数会因切深量和机床刚性的状况而有所不同。请每次调整后再使用。
※请根据需要控制刀具的伸出量。

※ Depth of Cut: ap=Axial Depth of Cut / ae=Radial Depth of Cut.
※ We recommend using oil mist coolant.
※ Adjust both spindle speed and feed at the same rate.
※ Adjust milling conditions according to the volume of depth of cut and rigidity of machine.
※ Length of tool overhang must be as short as possible.

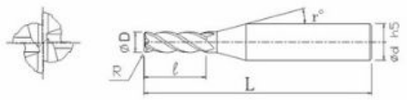
高硬钢用4刃圆鼻铣刀
Hardened Steels 4-Flute Corner Radius Endmills

4刃 · 带R角 | 4-Flute·Corner Radius

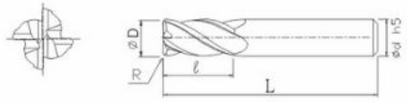
外径公差 Dia.tolerance: 1≤D≤3: 0~-0.01; 4≤D≤12: 0~-0.015
R公差 R tolerance: ±0.005
h5: 0~-0.005
(mm)

高硬度材料加工用。超群的切削排出性能，可实现高效率加工。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

TYPE A:



TYPE B:



- 在高硬度领域(48-65HRC)的长时间加工中也可实现稳定的长寿命。
- 增大了螺旋角，使得刀刃变得更锋利，而且圆鼻形状可以抑制崩刃。
- Realized stably long tool life against high hardened steels (48 ~ 65HRC).
- Corner radius to prevent flute chipping, and high helix angle for cutting sharpness.

硬质合金 | X6m涂层 | 65 HRC

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X6MR01005	1R0.05x3L	1	R0.05	3	12°	4	50	A	
X6MR01005L	1R0.05x4L	1	R0.05	4	12°	4	50	A	
X6MR0101	1R0.1x3L	1	R0.1	3	12°	4	50	A	
X6MR0101L	1R0.1x4L	1	R0.1	4	12°	4	50	A	
X6MR0102	1R0.2x3L	1	R0.2	3	12°	4	50	A	
X6MR0102L	1R0.2x4L	1	R0.2	4	12°	4	50	A	
X6MR01501	1.5R0.1x4.5L	1.5	R0.1	4.5	12°	4	50	A	
X6MR01502	1.5R0.2x4.5L	1.5	R0.2	4.5	12°	4	50	A	
X6MR01503	1.5R0.3x4.5L	1.5	R0.3	4.5	12°	4	50	A	
X6MR01505	1.5R0.5x4.5L	1.5	R0.5	4.5	12°	4	50	A	
X6MR02005	2R0.05x6L	2	R0.05	6	12°	4	50	A	
X6MR0201	2R0.1x6L	2	R0.1	6	12°	4	50	A	
X6MR0202	2R0.2x6L	2	R0.2	6	12°	4	50	A	
X6MR0203	2R0.3x6L	2	R0.3	6	12°	4	50	A	
X6MR0205	2R0.5x6L	2	R0.5	6	12°	4	50	A	
X6MR0301	3R0.1x8L	3	R0.1	8	12°	4	50	A	
X6MR0301D3	3R0.1x6L	3	R0.1	6	–	3	50	B	
X6MR0302	3R0.2x8L	3	R0.2	8	12°	4	50	A	
X6MR0302D3	3R0.2x6L	3	R0.2	6	–	3	50	B	
X6MR0303	3R0.3x8L	3	R0.3	8	12°	4	50	A	
X6MR0303D3	3R0.3x6L	3	R0.3	6	–	3	50	B	
X6MR0305	3R0.5x8L	3	R0.5	8	12°	4	50	A	
X6MR0305D3	3R0.5x6L	3	R0.5	6	–	3	50	B	
X6MR0402	4R0.2x10L	4	R0.2	10	–	4	50	B	
X6MIR0402	4R0.2x10L	4	R0.2	10	–	4	75	B	
X6MR0403	4R0.3x10L	4	R0.3	10	–	4	50	B	
X6MIR0403	4R0.3x10L	4	R0.3	10	–	4	75	B	
X6MR0405	4R0.5x10L	4	R0.5	10	–	4	50	B	
X6MIR0405	4R0.5x10L	4	R0.5	10	–	4	75	B	

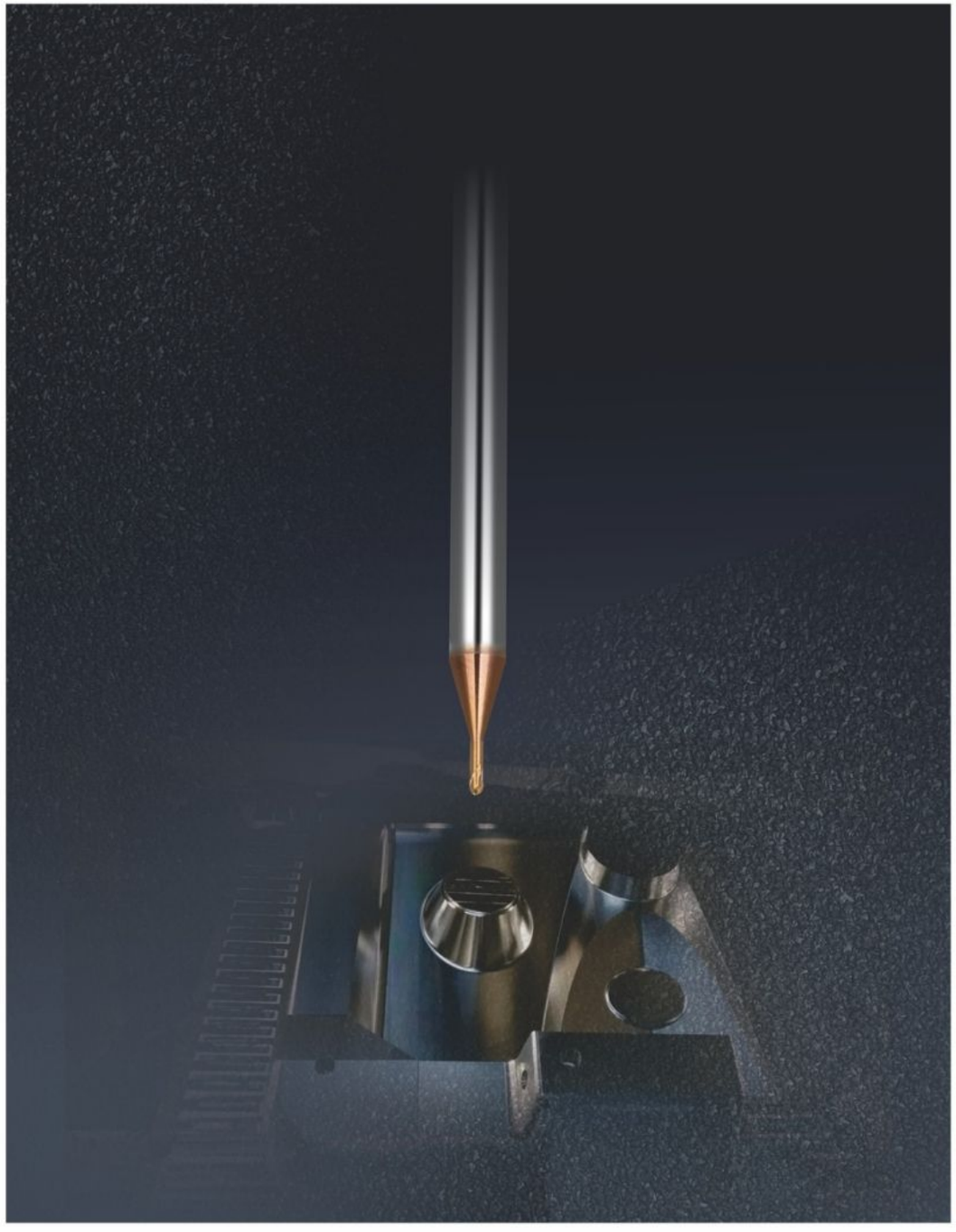
切削参数参考表
Recommended Milling Conditions

硬质合金 | X6m涂层 | 65 HRC

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X6MR0410	4R1x10L	4	R1	10	–	4	50	B	
X6MIR4010	4R1x10L	4	R1	10	–	4	75	B	
X6MR0502	5R0.2x10L	5	R0.2	10	12°	6	50	A	
X6MR0505	5R0.5x10L	5	R0.5	10	12°	6	50	A	
X6MR0601	6R0.1x12L	6	R0.1	12	–	6	50	B	
X6MR0601L	6R0.1x12L	6	R0.1	12	–	6	60	B	
X6MIR0601	6R0.1x12L	6	R0.1	12	–	6	75	B	
X6MJR0601	6R0.1x12L	6	R0.1	12	–	6	100	B	
X6MR0602	6R0.2x12L	6	R0.2	12	–	6	50	B	
X6MR0602L	6R0.2x12L	6	R0.2	12	–	6	60	B	
X6MIR0602	6R0.2x12L	6	R0.2	12	–	6	75	B	
X6MJR0602	6R0.2x12L	6	R0.2	12	–	6	100	B	
X6MR0605	6R0.5x12L	6	R0.5	12	–	6	50	B	
X6MR0605L	6R0.5x12L	6	R0.5	12	–	6	60	B	
X6MIR0605	6R0.5x12L	6	R0.5	12	–	6	75	B	
X6MJR0605	6R0.5x12L	6	R0.5	12	–	6	100	B	
X6MR0610	6R1x12L	6	R1	12	–	6	50	B	
X6MR0610L	6R1x12L	6	R1	12	–	6	60	B	
X6MIR0610	6R1x12L	6	R1	12	–	6	75	B	
X6MJR0610	6R1x12L	6	R1	12	–	6	100	B	
X6MR0802	8R0.2x16L	8	R0.2	16	–	8	60	B	
X6MIR0802	8R0.2x16L	8	R0.2	16	–	8	75	B	
X6MJR0802	8R0.2x16L	8	R0.2	16	–	8	100	B	
X6MR0805	8R0.5x16L	8	R0.5	16	–	8	60	B	
X6MIR0805	8R0.5x16L	8	R0.5	16	–	8	75	B	
X6MJR0805	8R0.5x16L	8	R0.5	16	–	8	100	B	
X6MR0810	8R1x16L	8	R1	16	–	8	60	B	
X6MIR0810	8R1x16L	8	R1	16	–	8	75	B	
X6MJR0810	8R1x16L	8	R1	16	–	8	100	B	
X6MR1005	10R0.5x20L	10	R0.5	20	–	10	75	B	
X6MJR1005	10R0.5x20L	10	R0.5	20	–	10	100	B	
X6MXR1005	10R0.5x20L	10	R0.5	20	–	10	150	B	
X6MR1010	10R1x20L	10	R1	20	–	10	75	B	
X6MJR1010	10R1x20L	10	R1	20	–	10	100	B	
X6MXR1010	10R1x20L	10	R1	20	–	10	150	B	
X6MR1205	12R0.5x24L	12	R0.5	24	–	12	75	B	
X6MJR1205	12R0.5x24L	12	R0.5	24	–	12	100	B	
X6MXR1205	12R0.5x24L	12	R0.5	24	–	12	150	B	
X6MR1210	12R1x24L	12	R1	24	–	12	75	B	
X6MJR1210	12R1x24L	12	R1	24	–	12	100	B	
X6MXR1210	12R1x24L	12	R1	24	–	12	150	B	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material	高速钢 High Speed Tool Steels SKH (~65HRC)				淬火钢 Hardened Steels SKD11 (~62HRC)				淬火钢 Hardened Steels HPM-38 · STAVAX · SKD61(~ 55HRC)			
	侧面 Side Milling		沟槽 Slotting		侧面 Side Milling		沟槽 Slotting		侧面 Side Milling		沟槽 Slotting	
外径 Dia.	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed
	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
1	20000	240	16000	120	25000	500	20000	300	30000	800	24000	400
1.5	14000	330	10000	160	16000	560	12000	380	20000	860	16000	460
2	10000	480	8000	240	12000	630	10000	420	15000	920	12000	500
3	7,000	560	6,000	280	8,000	700	7,500	500	10,000	1,000	8,000	580
4	6,000	600	5,000	300	7,000	800	6,000	540	8,500	1,200	7,500	620
5	5,300	800	4,800	350	6,200	1,200	5,600	600	7,600	1,600	6,800	900
6	4,600	800	4,200	350	5,300	1,200	4,800	600	6,400	1,800	5,800	950
8	3,400	1,000	3,000	400	4,000	1,400	3,600	700	4,800	2,000	4,300	1,000
10	2,600	1,000	2,300	500	3,200	1,600	2,800	800	3,800	2,000	3,400	1,000
12	2,200	1,000	2,000	500	2,600	1,600	2,300	800	3,200	2,000	2,800	1,000
切深量 Depth of Cut (D:刃 径Dia.)	侧面 Side Milling 1.5D 0.02D		沟槽 Slotting D 0.01D		侧面 Side Milling 1.5D 0.02D		沟槽 Slotting D 0.01D		侧面 Side Milling 1.5D 0.03D		沟槽 Slotting D 0.02D	
备注 Notes	※请使用刚性好、精度高的机床和夹具。 ※加工参数会因切深量和机床刚性的状况而有所不同。请每次调整后再使用。 ※请以相同的比率调整主轴转速和进给速度。 ※建议使用吹气或油雾冷却方式。 ※Use A Rigid And Precise Machine And Chuck Holder. ※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine. ※Adjust both spindle speed and feed at the same rate. ※Use oilmist coolant or air blow.											



高硬钢用2刃微小径平底铣刀
Hardened Steels 2-Flute Micro Diameter Square Endmills

2刃 · 平底铣刀 | 2-Flute · Square

平面 Planing | 侧面 Side Cutting | 槽 Slotting | 粗加工 Roughing | 半精加工 Semi Finishing | 精加工 Finishing | 切削条件 B012 Cutting Conditions

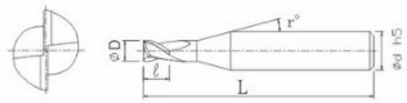
外径公差 Dia.tolerance: D≤0.1 : 0~- 0.005; 0.15≤D≤0.9 : 0~- 0.007

h5 : 0~-0.005

(mm)

高硬度材料加工用。超群的切削排出性能，可实现高效率加工。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

TYPE A :



- 在高硬度领域 (48~65HRC) 的长时间加工中也可实现稳定的长寿命。
- 改进了刀刃形状，改善了倾斜量和加工精度。
- Realized stably long tool life against high hardened steels (48 ~ 65HRC).
- Improved milling deflection and accuracy by advanced flute design.

硬质合金 | X6m涂层 | 65 HRC | 排屑角35 | 2

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X6MSE00032	0.03x0.045L	**0.03**	**0.045**	11°	4	45	A	
X6MSE00042	0.04x0.06L	**0.04**	**0.06**	11°	4	45	A	
X6MSE00052	0.05x0.075L	**0.05**	**0.075**	11°	4	45	A	
X6MSE00062	0.06x0.09L	**0.06**	**0.09**	11°	4	45	A	
X6MSE00072	0.07x0.105L	**0.07**	**0.105**	11°	4	45	A	
X6MSE00082	0.08x0.12L	**0.08**	**0.12**	11°	4	45	A	
X6MSE00092	0.09x0.135L	**0.09**	**0.135**	11°	4	45	A	
X6MSE0012	0.1x0.15L	**0.1**	**0.15**	15°	4	45	A	
X6MSE00152	0.15x0.2L	**0.15**	**0.2**	15°	4	45	A	
X6MSE0022	0.2x0.4L	**0.2**	**0.4**	15°	4	45	A	
X6MSE00252	0.25x0.5L	**0.25**	**0.5**	15°	4	45	A	
X6MSE0032	0.3x0.6L	**0.3**	**0.6**	15°	4	45	A	
X6MSE00352	0.35x0.7L	**0.35**	**0.7**	15°	4	45	A	
X6MSE0042	0.4x0.8L	**0.4**	**0.8**	15°	4	45	A	
X6MSE00452	0.45x0.9L	**0.45**	**0.9**	15°	4	45	A	
X6MSE0052	0.5x1L	**0.5**	**1**	15°	4	45	A	
X6MSE0062	0.6x1.2L	**0.6**	**1.2**	15°	4	45	A	
X6MSE0072	0.7x1.4L	**0.7**	**1.4**	15°	4	45	A	
X6MSE0082	0.8x1.6L	**0.8**	**1.6**	15°	4	45	A	
X6MSE0092	0.9x1.8L	**0.9**	**1.8**	15°	4	45	A	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material	高速钢 High Speed Tool Steels SKH (~65HRC)				淬火钢 Hardened Steels SKD11 · PD613 (~62HRC)				淬火钢 Hardened Steels SKD61 · STAVAX · HPM-38 (~52HRC)				碳素钢 · 调质钢 Carbon Steels · Prehardened Steels S50C · NAK55 · NAK80 · HPM-1 (~43HRC)			
外径 Dia.	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.03	40,000	10	0.001	0.005	40,000	10	0.001	0.01	40,000	20	0.001	0.01	40,000	10	0.001	0.01
0.04	40,000	20	0.001	0.008	40,000	20	0.001	0.01	40,000	30	0.001	0.01	40,000	10	0.001	0.01
0.05	40,000	30	0.001	0.008	40,000	20	0.001	0.01	40,000	40	0.001	0.02	40,000	10	0.002	0.02
0.06	40,000	40	0.001	0.01	40,000	30	0.001	0.02	40,000	50	0.002	0.03	40,000	20	0.002	0.03
0.07	40,000	50	0.001	0.01	40,000	40	0.001	0.02	40,000	60	0.002	0.03	40,000	30	0.003	0.03
0.08	40,000	50	0.002	0.02	40,000	60	0.001	0.03	40,000	80	0.002	0.04	40,000	50	0.003	0.04
0.09	40,000	60	0.002	0.02	40,000	80	0.002	0.03	40,000	100	0.003	0.04	40,000	100	0.004	0.05
0.1	40,000	70	0.002	0.03	40,000	100	0.002	0.04	40,000	120	0.003	0.05	40,000	150	0.005	0.06
0.15	40,000	80	0.002	0.04	40,000	100	0.002	0.06	40,000	120	0.003	0.07	40,000	150	0.005	0.09
0.2	30,000	120	0.003	0.06	30,000	160	0.003	0.08	30,000	200	0.003	0.1	30,000	240	0.005	0.12
0.25	30,000	160	0.003	0.07	30,000	200	0.003	0.1	30,000	200	0.003	0.13	30,000	300	0.006	0.14
0.3	30,000	200	0.003	0.09	30,000	250	0.003	0.12	30,000	300	0.003	0.15	30,000	350	0.007	0.18
0.35	28,000	250	0.004	0.1	30,000	300	0.04	0.14	30,000	350	0.004	0.18	30,000	400	0.08	0.2
0.4	25,000	300	0.005	0.12	30,000	350	0.005	0.16	30,000	400	0.005	0.2	30,000	450	0.01	0.24
0.45	23,000	350	0.005	0.14	26,000	400	0.006	0.18	28,000	450	0.008	0.23	30,000	500	0.015	0.28
0.5	20,000	400	0.005	0.15	23,000	450	0.007	0.2	25,000	500	0.01	0.25	30,000	550	0.02	0.3
0.6	20,000	350	0.005	0.18	23,000	400	0.007	0.25	25,000	500	0.01	0.3	30,000	550	0.02	0.35
0.7	20,000	320	0.007	0.21	23,000	400	0.015	0.28	25,000	560	0.02	0.35	25,000	690	0.03	0.4
0.8	20,000	550	0.012	0.24	23,000	650	0.03	0.32	25,000	780	0.04	0.4	25,000	850	0.05	0.45
0.9	20,000	600	0.014	0.28	23,000	700	0.04	0.4	25,000	850	0.05	0.5	23,000	900	0.06	0.5

备注 Notes

※本切削参数仅供参考。请根据实际的加工形状及使用机床等调整切削参数。
※切深量的ap表示轴向切入量，ae表示步距量。
※加工淬火钢时，建议使用油雾冷却方式。
※轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※沟槽切削时建议参考切削参数表，切深量ap及进给速度设定为50%以下，采用来回切削加工方式。
※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率调。

※These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape and machine type.
※ap:Axial Depth of Cut, ae:Radial Depth of Cut.
※Recommend to apply herical or ramping for approaching into axial direction.
※recommend To Apply Herical Or Ramping For Approaching Into Axial Direction.
※For slotting, recommend reciprocating milling by adjusting feed & ap in below 50% of recommended milling condition.
※Reduce both spindle speed and feed at same rate for chattering and also for insucient spindle speed of a machine.

高硬钢用2刃微小径球头铣刀

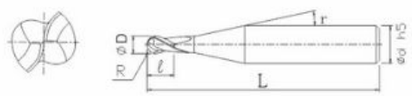
Hardened Steels 2-Flute Micro Diameter Ball Endmills

2刃 · 球头 | 2-Flute · Ball

外径公差 Dia.tolerance
D≤0.1：0~-0.005
0.15≤D≤0.9：0~-0.007
R公差 R tolerance
R≤0.2：±0.003
0.25≤R≤0.45：±0.005
h5
0~-0.005
(mm)

高硬度材料加工用。超群的切削排出性能，可实现高效率加工。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

TYPE A：



- 高硬度材料用球头铣刀。最适用于精加工。
- 适用于~65HRC的高硬度材料。
- Ball End Milling Cutter For High Hardness Materials. Most Suitable For Finishing.
- Suitable For ~65HRC High Hardness Materials.

硬质合金 | X6m涂层 | 65HRC | 排屑角10 | 2

产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Radius	刃长(ℓ) Length of Cut	外径(D) Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X6MSB00062	R0.03x0.06L	**R0.03**	**0.06**	0.06	11°	4	45	A	
X6MSB00072	R0.035x0.07L	**R0.035**	**0.07**	0.07	11°	4	45	A	
X6MSB00082	R0.04x0.08L	**R0.04**	**0.08**	0.08	11°	4	45	A	
X6MSB00092	R0.045x0.09L	**R0.045**	**0.09**	0.09	11°	4	45	A	
X6MSB0012	R0.05x0.1L	**R0.05**	**0.1**	0.1	11°	4	45	A	
X6MSB00122	R0.06x0.12L	**R0.06**	**0.12**	0.12	11°	4	45	A	
X6MSB00142	R0.07x0.14L	**R0.07**	**0.14**	0.14	11°	4	45	A	
X6MSB00152	R0.075x0.15L	**R0.075**	**0.15**	0.15	11°	4	45	A	
X6MSB00162	R0.08x0.16L	**R0.08**	**0.16**	0.16	11°	4	45	A	
X6MSB00182	R0.09x0.18L	**R0.09**	**0.18**	0.18	11°	4	45	A	
X6MSB0022	R0.1x0.2L	**R0.1**	**0.2**	0.2	15°	4	45	A	
X6MSB0032	R0.15x0.3L	**R0.15**	**0.3**	0.3	15°	4	45	A	
X6MSB0042	R0.2x0.6L	**R0.2**	**0.6**	0.4	15°	4	45	A	
X6MSB0052	R0.25x0.8L	**R0.25**	**0.8**	0.5	15°	4	45	A	
X6MSB0062	R0.3x0.9L	**R0.3**	**0.9**	0.6	15°	4	45	A	
X6MSB0082	R0.4x1.2L	**R0.4**	**1.2**	0.8	15°	4	45	A	
X6MSB0092	R0.45x1.4L	**R0.45**	**1.4**	0.9	15°	4	45	A	

切削参数参考表

Recommended Milling Conditions

加工材料 Work Material	高速钢 Hardened Steels SKH（~65HRC）				淬火钢 Hardened Steels SKD11（~62HRC）				淬火钢 Hardened Steels SKD61・STAVAX・HPM-38（~52HRC）			
球头半径(R) Radius	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.03	40,000	80	0.001	0.001	40,000	120	0.001	0.001	40,000	100	0.004	0.008
0.035	40,000	100	0.001	0.002	40,000	140	0.002	0.002	40,000	150	0.004	0.008
0.04	40,000	120	0.001	0.002	40,000	160	0.004	0.004	40,000	200	0.004	0.008
0.045	40,000	140	0.001	0.003	40,000	180	0.004	0.004	40,000	220	0.006	0.01
0.05	40,000	140	0.001	0.003	40,000	200	0.006	0.006	40,000	240	0.006	0.01
0.06	40,000	160	0.002	0.004	40,000	220	0.006	0.006	40,000	260	0.008	0.015
0.07	40,000	160	0.002	0.004	40,000	240	0.008	0.008	40,000	280	0.008	0.015
0.075	40,000	180	0.002	0.004	40,000	260	0.008	0.008	40,000	300	0.01	0.02
0.08	40,000	200	0.003	0.005	40,000	280	0.01	0.01	40,000	320	0.01	0.02
0.09	40,000	220	0.003	0.005	40,000	300	0.01	0.01	40,000	340	0.01	0.02
0.1	40,000	240	0.003	0.005	40,000	320	0.01	0.01	40,000	360	0.01	0.02
0.15	40,000	300	0.005	0.01	40,000	360	0.01	0.02	40,000	420	0.01	0.03
0.2	40,000	480	0.01	0.02	40,000	820	0.02	0.05	40,000	1,000	0.02	0.06
0.25	40,000	600	0.015	0.03	40,000	1,000	0.025	0.05	40,000	1,200	0.03	0.07
0.3	30,000	720	0.02	0.05	40,000	1,200	0.03	0.06	40,000	1,600	0.05	0.1
0.4	30,000	1,200	0.05	0.1	40,000	1,800	0.07	0.1	40,000	2,200	0.1	0.15
0.45	27,500	1,300	0.06	0.1	35,000	1,900	0.08	0.15	40,000	2,350	0.1	0.2

备注 Notes

※切深量的ap表示轴向切入量,ae表示步距量。
※建议使用油雾冷却方式。
※请以相同的比率调整主轴转速和进给速度。
※加工参数会因切深量和机床刚性的状况而有所不同。请每次调整后再使用。
※请根据需要控制刀具的伸出量。
※ Depth of Cut: ap=Axial Depth of Cut / ae=Radial Depth of Cut.
※ We recommend using oil mist coolant.
※ Adjust both spindle speed and feed at the same rate.
※ Adjust milling conditions according to the volume of depth of cut and rigidity of machine.
※ Length of tool overhang must be as short as possible.

高硬钢用2刃微小径圆鼻铣刀
Hardened Steels 2-Flute Micro Diameter Corner Radius Endmills

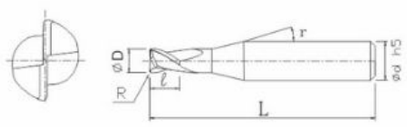
2刃 · 带R角 | 2-Flute · Corner Radius

外径公差 Dia.Tolerance		r公差 r Tolerance		h5	
D≤0.1	0~- 0.005		±0.005		0~-0.005
0.15≤D≤0.9	0~- 0.007				

(mm)

高硬度材料加工用。超群的切削排出性能，可实现高效率加工。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

TYPE A:



- 在高硬度领域(48-65HRC)的长时间加工中也可实现稳定的长寿命。
- 增大了螺旋角，使得刀刃变得更锋利，而且圆鼻形状可以抑制崩刃。
- Realized stably long tool life against high hardened steels (48 ~ 65HRC).
- Corner radius to prevent flute chipping, and high helix angle for cutting sharpness.

硬质合金 | X6m涂层 | 65 HRC | 刃倾 | 螺旋角35° | 2

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X6MSR01001	0.1R0.01x0.2L	0.1	R0.01	0.2	15°	4	45	A	
X6MSR01002	0.1R0.02x0.2L	0.1	R0.02	0.2	15°	4	45	A	
X6MSR015002	0.15R0.02x0.3L	0.15	R0.02	0.3	15°	4	45	A	
X6MSR015003	0.15R0.05x0.3L	0.15	R0.05	0.3	15°	4	45	A	
X6MSR02002	0.2R0.02x0.4L	0.2	R0.02	0.4	15°	4	45	A	
X6MSR02005	0.2R0.05x0.4L	0.2	R0.05	0.4	15°	4	45	A	
X6MSR03005	0.3R0.05x0.6L	0.3	R0.05	0.6	15°	4	45	A	
X6MSR0301	0.3R0.1x0.6L	0.3	R0.1	0.6	15°	4	45	A	
X6MSR04005	0.4R0.05x0.8L	0.4	R0.05	0.8	15°	4	45	A	
X6MSR0401	0.4R0.1x0.8L	0.4	R0.1	0.8	15°	4	45	A	
X6MSR05005	0.5R0.05x1.0L	0.5	R0.05	1	15°	4	45	A	
X6MSR0501	0.5R0.1x1.0L	0.5	R0.1	1	15°	4	45	A	
X6MSR06005	0.6R0.05x1.2L	0.6	R0.05	1.2	15°	4	45	A	
X6MSR0601	0.6R0.1x1.2L	0.6	R0.1	1.2	15°	4	45	A	
X6MSR07005	0.7R0.05x1.4L	0.7	R0.05	1.4	15°	4	45	A	
X6MSR0701	0.7R0.1x1.4L	0.7	R0.1	14	15°	4	45	A	
X6MSR08005	0.8R0.05x1.6L	0.8	R0.05	1.6	15°	4	45	A	
X6MSR0801	0.8R0.1x1.6L	0.8	R0.1	1.6	15°	4	45	A	
X6MSR0802	0.8R0.2x1.6L	0.8	R0.2	1.6	15°	4	45	A	
X6MSR9005	0.9R0.05x1.8L	0.9	R0.05	1.8	15°	4	45	A	
X6MSR00901	0.9R0.1x1.8L	0.9	R0.1	1.8	15°	4	45	A	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		淬火钢 Hardened Steels HPM-38 · STAVAX · SKD61 (~55HRC)				碳素钢 · 调质钢 Carbon Steels · Prehardened Steels S50C · NAK55 · NAK80 · HPM-1 (~43HRC)				铜 · 铝合金 Copper · Aluminum Alloy			
外径 Dia.	角半径(R) Corner Radius	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.1	0.01 0.02	30,000	50	0.001	0.008	30,000	100	0.005	0.008	30,000	150	0.008	0.008
0.15	0.02 0.05	30,000	100	0.002	0.02	30,000	150	0.008	0.02	30,000	200	0.01	0.03
0.2	0.02 0.05	30,000	150	0.003	0.04	30,000	200	0.01	0.05	30,000	250	0.012	0.05
0.3	0.05 0.1	30,000	180	0.003	0.08	30,000	200	0.02	0.1	30,000	300	0.024	0.1
0.4	0.05 0.1	30,000	300	0.005	0.1	30,000	350	0.025	0.12	30,000	450	0.03	0.12
0.5	0.05 0.1	25,000	400	0.01	0.12	30,000	500	0.03	0.14	30,000	650	0.036	0.14
0.6	0.05 0.1	25,000	400	0.02	0.13	30,000	600	0.035	0.16	30,000	800	0.04	0.16
0.7	0.05 0.1	30,000	500	0.03	0.16	30,000	700	0.04	0.2	30,000	1,000	0.05	0.2
0.8	0.1 0.2	25,000	10000	0.035	0.2	30,000	1,400	0.055	0.25	30,000	1,800	0.065	0.25
0.9	0.05 0.1	20,000	700	0.03	0.24	25,000	1,100	0.05	0.3	30,000	1,500	0.06	0.3

备注 Notes

※请根据实际的加工形状及使用机床等调整切削参。
※切深量的ap表示轴向切入量，ae表示步距量。
※加工淬火钢时，建议使用油雾冷却方式。
※轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※沟槽切削时建议参考切削参数表，切深量ap及进给速度设定为50%以下，采用来回切削加工方式。
※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率调。

※Adjust milling conditions according to milling shape and machine type.
※ap : Axial Depth of Cut, ae : Radial Depth of Cut.
※Recommend to use oil mist coolant for machining hardened steels.
※Recommend to apply helical or ramping for approaching into axial direction.
※For slotting, recommend reciprocating milling by adjusting feed & ap in below 50% of recommended milling condition.
※Reduce both spindle speed and feed at same rate for chattering and also for insuicient spindle speed of a machine.

高硬钢用2刃长颈平底铣刀
Hardened Steels 2-Flute Long Neck Square Endmills

2刃 · 平底铣刀 | 2-Flute · Square

平面 Planing | 侧面 Side Cutting | 槽 Slotting | 粗加工 Roughing | 半精加工 Semi Finishing | 精加工 Finishing | 切削条件表 B019 Cutting Conditions

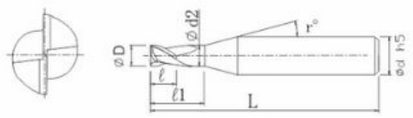
外径公差 Dia.Tolerance
D≤0.1 : 0~-0.005
0.15≤D≤0.9 : 0~-0.007
1≤D≤2 : 0~-0.01

h5 0~-0.005

(mm)

高硬度材料加工用。超群的切削排出性能，可实现高效率加工。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

TYPE A:



- 在高硬度领域 (48~65HRC) 的长时间加工中也可实现稳定的长寿命。
- 改进了刀刃形状，改善了倾斜量和加工精度。
- Realized stably long tool life against high hardened steels (48 ~ 65HRC).
- Improved milling deflection and accuracy by advanced flute design.

硬质合金 | X6m涂层 | 65 HRC | 2

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNE01003	0.1x0.3L	0.1	0.3	0.08	0.085	15°	4	45	
X6MNE01005	0.1x0.5L		0.5	0.08	0.085	15°	4	45	
X6MNE010075	0.1x0.75L		0.75	0.08	0.085	15°	4	45	
X6MNE0101	0.1x1L		1	0.08	0.085	15°	4	45	
X6MNE01015	0.1x1.5L		1.5	0.08	0.085	15°	4	45	
X6MNE015005	0.15x0.5L	0.15	0.5	0.12	0.13	15°	4	45	
X6MNE0150075	0.15x0.75L		0.75	0.12	0.13	15°	4	45	
X6MNE01501	0.15x1L		1	0.12	0.13	15°	4	45	
X6MNE015015	0.15x1.5L		1.5	0.12	0.13	15°	4	45	
X6MNE01502	0.15x2L		2	0.12	0.13	15°	4	45	
X6MNE02005	0.2x0.5L	0.2	0.5	0.16	0.18	15°	4	45	
X6MNE0201	0.2x1L		1	0.16	0.18	15°	4	45	
X6MNE02015	0.2x1.5L		1.5	0.16	0.18	15°	4	45	
X6MNE0202	0.2x2L		2	0.16	0.18	15°	4	45	
X6MNE0203	0.2x3L		3	0.16	0.18	15°	4	45	
X6MNE0204	0.2x4L		4	0.16	0.18	15°	4	45	
X6MNE0301	0.3x1L	0.3	1	0.24	0.27	15°	4	45	
X6MNE03015	0.3x1.5L		1.5	0.24	0.27	15°	4	45	
X6MNE0302	0.3x2L		2	0.24	0.27	15°	4	45	
X6MNE03025	0.3x2.5L		2.5	0.24	0.27	15°	4	45	
X6MNE0303	0.3x3L		3	0.24	0.27	15°	4	45	
X6MNE0304	0.3x4L		4	0.24	0.27	15°	4	45	
X6MNE0306	0.3x6L		6	0.24	0.27	15°	4	45	

高硬钢用2刃长颈平底铣刀
Hardened Steels 2-Flute Long neck Square Endmills

硬质合金 | X6m涂层 | 65 HRC | 2

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNE0401	0.4x1L	0.4	1	0.32	0.37	15°	4	45	
X6MNE04015	0.4x1.5L		1.5	0.32	0.37	15°	4	45	
X6MNE0402	0.4x2L		2	0.32	0.37	15°	4	45	
X6MNE0403	0.4x3L		3	0.32	0.37	15°	4	45	
X6MNE0404	0.4x4L		4	0.32	0.37	15°	4	45	
X6MNE0406	0.4x6L		6	0.32	0.37	15°	4	45	
X6MNE0501	0.5x1L	0.5	1	0.4	0.46	15°	4	45	
X6MNE0502	0.5x2L		2	0.4	0.46	15°	4	45	
X6MNE0503	0.5x3L		3	0.4	0.46	15°	4	45	
X6MNE0504	0.5x4L		4	0.4	0.46	15°	4	45	
X6MNE0506	0.5x6L		6	0.4	0.46	15°	4	45	
X6MNE0508	0.5x8L		8	0.4	0.46	15°	4	45	
X6MNE0602	0.6x2L	0.6	2	0.48	0.56	15°	4	45	
X6MNE0603	0.6x3L		3	0.48	0.56	15°	4	45	
X6MNE0604	0.6x4L		4	0.48	0.56	15°	4	45	
X6MNE0606	0.6x6L		6	0.48	0.56	15°	4	45	
X6MNE0608	0.6x8L		8	0.48	0.56	15°	4	45	
X6MNE0610	0.6x10L		10	0.48	0.56	15°	4	45	
X6MNE0704	0.7x4L	0.7	4	0.56	0.66	15°	4	45	
X6MNE0706	0.7x6L		6	0.56	0.66	15°	4	45	
X6MNE0708	0.7x8L		8	0.56	0.66	15°	4	45	
X6MNE0710	0.7x10L		10	0.56	0.66	15°	4	45	
X6MNE0802	0.8x2L	0.8	2	0.64	0.76	15°	4	45	
X6MNE0803	0.8x3		3	0.64	0.76	15°	4	45	
X6MNE0804	0.8x4L		4	0.64	0.76	15°	4	45	
X6MNE0806	0.8x6L		6	0.64	0.76	15°	4	45	
X6MNE0808	0.8x8L		8	0.64	0.76	15°	4	45	
X6MNE0810	0.8x10L		10	0.64	0.76	15°	4	45	
X6MNE1004A	1x4L	1	4	0.8	0.95	15°	4	50	
X6MNE1006A	1x6L		6	0.8	0.95	15°	4	50	
X6MNE1008A	1x8L		8	0.8	0.95	15°	4	50	
X6MNE1010A	1x10L		10	0.8	0.95	15°	4	50	
X6MNE1012A	1x12L		12	0.8	0.95	15°	4	50	
X6MNE1016A	1x16L		16	0.8	0.95	15°	4	50	
X6MNE1506A	1.5x6L	1.5	6	1.2	1.45	15°	4	50	
X6MNE1508A	1.5x8L		8	1.2	1.45	15°	4	50	
X6MNE1510A	1.5x10L		10	1.2	1.45	15°	4	50	
X6MNE1512A	1.5x12L		12	1.2	1.45	15°	4	50	
X6MNE1516A	1.5x16L		16	1.2	1.45	15°	4	50	
X6MNE2008A	2x8L	2	8	1.6	1.94	15°	4	50	
X6MNE2010A	2x10L		10	1.6	1.94	15°	4	50	
X6MNE2012A	2x12L		12	1.6	1.94	15°	4	50	
X6MNE2016A	2x16L		16	1.6	1.94	15°	4	50	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		高速钢 High Speed Tool Steels SKH（～65HRC）				淬火钢 Hardened Steels SKD11・PD613（～62HRC）				淬火钢 Hardened Steels HPM-38・STAVAX・SKD61（～55HRC）				碳素钢・调质钢 Carbon Steels・Prehardened Steels S50C・NAK55・NAK80・HPM-1（～43HRC）			
外径 Dia.	颈长(t1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.1	0.3	40,000	70	0.002	0.03	40,000	100	0.002	0.04	40,000	120	0.003	0.05	40,000	150	0.005	0.06
	0.5	40,000	50	0.002	0.03	40,000	60	0.002	0.04	40,000	80	0.003	0.05	40,000	100	0.005	0.06
	0.75	40,000	30	0.001	0.03	40,000	50	0.001	0.04	40,000	70	0.002	0.05	40,000	80	0.003	0.06
	1	40,000	20	0.001	0.03	40,000	40	0.001	0.04	40,000	50	0.001	0.05	40,000	60	0.002	0.06
	1.5	40,000	10	0.001	0.03	40,000	30	0.001	0.04	40,000	30	0.001	0.05	40,000	40	0.001	0.06
0.15	0.5	40,000	80	0.002	0.04	40,000	100	0.002	0.06	40,000	120	0.003	0.07	40,000	150	0.005	0.09
	0.75	40,000	60	0.001	0.04	40,000	80	0.001	0.06	40,000	100	0.002	0.07	40,000	120	0.003	0.09
	1	40,000	40	0.001	0.04	40,000	60	0.001	0.06	40,000	80	0.001	0.07	40,000	100	0.002	0.09
	1.5	40,000	20	0.001	0.04	40,000	40	0.001	0.06	40,000	60	0.001	0.07	40,000	80	0.002	0.09
	2	40,000	10	0.001	0.04	40,000	20	0.001	0.06	40,000	40	0.001	0.07	40,000	60	0.001	0.09
0.2	0.5	30,000	120	0.003	0.06	30,000	160	0.003	0.08	30,000	200	0.003	0.1	30,000	240	0.005	0.12
	1	30,000	80	0.003	0.06	30,000	120	0.003	0.08	30,000	150	0.003	0.1	30,000	180	0.005	0.12
	1.5	30,000	60	0.002	0.06	30,000	80	0.002	0.08	30,000	100	0.002	0.1	30,000	120	0.003	0.12
	2	30,000	30	0.002	0.06	30,000	40	0.002	0.08	30,000	50	0.002	0.1	30,000	80	0.003	0.12
	2.5	25,000	30	0.001	0.06	25,000	40	0.001	0.08	30,000	50	0.001	0.1	30,000	60	0.002	0.12
	3	22,000	20	0.001	0.06	25,000	30	0.001	0.08	25,000	40	0.001	0.1	30,000	40	0.002	0.12
	4	22,000	10	0.001	0.06	25,000	20	0.001	0.08	25,000	20	0.001	0.1	30,000	20	0.002	0.12
0.3	1	30,000	200	0.003	0.09	30,000	250	0.003	0.12	30,000	300	0.003	0.15	30,000	350	0.007	0.18
	1.5	30,000	120	0.003	0.09	30,000	160	0.003	0.12	30,000	200	0.003	0.15	30,000	260	0.007	0.18
	2	25,000	100	0.003	0.09	30,000	120	0.003	0.12	30,000	150	0.003	0.15	30,000	180	0.005	0.18
	2.5	20,000	60	0.002	0.09	25,000	80	0.002	0.12	25,000	100	0.002	0.15	30,000	150	0.004	0.18
	3	20,000	30	0.002	0.09	25,000	40	0.002	0.12	25,000	50	0.002	0.15	30,000	70	0.004	0.18
	4	20,000	20	0.001	0.09	25,000	20	0.001	0.12	25,000	30	0.001	0.15	30,000	20	0.003	0.18
	6	20,000	10	0.001	0.09	25,000	10	0.001	0.12	25,000	10	0.001	0.15	30,000	10	0.003	0.18
0.4	1	25,000	300	0.005	0.12	30,000	350	0.005	0.16	30,000	400	0.005	0.2	30,000	450	0.01	0.24
	1.5	25,000	250	0.005	0.12	30,000	330	0.005	0.16	30,000	360	0.005	0.2	30,000	400	0.01	0.24
	2	25,000	220	0.005	0.12	25,000	280	0.005	0.16	30,000	320	0.005	0.2	30,000	360	0.01	0.24
	3	18,000	180	0.003	0.12	20,000	220	0.003	0.16	25,000	260	0.004	0.2	30,000	320	0.008	0.24
	4	18,000	120	0.002	0.12	20,000	160	0.002	0.16	25,000	200	0.003	0.2	30,000	250	0.006	0.24
	6	16,000	70	0.001	0.12	18,000	130	0.002	0.16	22,000	150	0.002	0.2	25,000	200	0.004	0.24
0.5	1	20,000	400	0.005	0.15	23,000	450	0.007	0.2	25,000	500	0.01	0.25	30,000	550	0.02	0.3
	2	20,000	320	0.005	0.15	23,000	380	0.007	0.2	25,000	420	0.01	0.25	30,000	500	0.02	0.3
	3	20,000	280	0.003	0.15	23,000	320	0.005	0.2	25,000	350	0.007	0.25	30,000	420	0.015	0.3
	4	20,000	200	0.002	0.15	23,000	240	0.003	0.2	25,000	280	0.005	0.25	25,000	380	0.01	0.3
	6	16,000	100	0.002	0.15	18,000	150	0.002	0.2	20,000	200	0.003	0.25	25,000	300	0.005	0.3
	8	12,000	60	0.001	0.15	14,000	130	0.002	0.2	16,000	160	0.002	0.25	20,000	200	0.005	0.3
0.6	2	20,000	350	0.005	0.18	23,000	400	0.007	0.25	25,000	500	0.01	0.3	30,000	550	0.02	0.35
	3	20,000	300	0.003	0.18	23,000	350	0.005	0.25	25,000	450	0.007	0.3	30,000	500	0.015	0.35
	4	20,000	250	0.002	0.18	23,000	300	0.003	0.25	25,000	400	0.005	0.3	25,000	450	0.01	0.35
	6	16,000	150	0.001	0.18	18,000	200	0.002	0.25	20,000	300	0.002	0.3	25,000	350	0.001	0.35
	8	16,000	100	0.001	0.18	18,000	150	0.001	0.25	20,000	200	0.002	0.3	25,000	300	0.001	0.35
	10	16,000	80	0.001	0.18	18,000	100	0.001	0.25	20,000	100	0.002	0.3	25,000	200	0.001	0.35
0.7	4	20,000	320	0.007	0.21	23,000	400	0.015	0.28	25,000	560	0.02	0.35	25,000	690	0.03	0.4
	6	16,000	240	0.007	0.21	18,000	300	0.012	0.28	20,000	410	0.015	0.35	25,000	550	0.02	0.4
	8	12,000	180	0.005	0.21	14,000	230	0.007	0.28	16,000	330	0.01	0.35	20,000	430	0.012	0.4
	10	10,000	120	0.002	0.21	12,000	180	0.003	0.28	13,000	200	0.005	0.35	16,000	300	0.008	0.4

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		高速钢 High Speed Tool Steels SKH（～65HRC）				淬火钢 Hardened Steels SKD11・PD613（～62HRC）				淬火钢 Hardened Steels HPM-38・STAVAX・SKD61（～55HRC）				碳素钢・调质钢 Carbon Steels・Prehardened Steels S50C・NAK55・NAK80・HPM-1（～43HRC）			
外径 Dia.	颈长(t1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.8	2	20,000	550	0.012	0.24	23,000	650	0.03	0.32	25,000	780	0.04	0.4	25,000	850	0.05	0.45
	3	20,000	550	0.012	0.24	23,000	650	0.02	0.32	25,000	780	0.03	0.4	25,000	850	0.04	0.45
	4	20,000	500	0.007	0.24	23,000	600	0.015	0.32	25,000	700	0.025	0.4	25,000	800	0.03	0.45
	6	16,000	350	0.005	0.24	18,000	450	0.01	0.32	20,000	550	0.02	0.4	20,000	620	0.025	0.45
	8	12,000	200	0.003	0.24	14,000	300	0.005	0.32	16,000	400	0.007	0.4	16,000	500	0.015	0.45
	10	10,000	150	0.003	0.24	12,000	180	0.005	0.32	16,000	350	0.007	0.4	16,000	400	0.012	0.45
	12	10,000	120	0.002	0.24	12,000	120	0.003	0.32	13,000	220	0.005	0.4	16,000	300	0.007	0.45
1	4	14,000	500	0.02	0.3	18,000	800	0.03	0.4	23,000	700	0.04	0.5	25,000	1,000	0.05	0.6
	6	10,000	400	0.007	0.3	14,000	600	0.01	0.4	18,000	600	0.02	0.5	20,000	900	0.03	0.6
	8	8,000	340	0.005	0.3	12,000	500	0.01	0.4	16,000	500	0.02	0.5	18,000	800	0.03	0.6
	10	6,000	250	0.005	0.3	10,000	400	0.007	0.4	14,000	400	0.01	0.5	16,000	600	0.02	0.6
	12	6,000	180	0.004	0.3	10,000	300	0.005	0.4	13,000	320	0.01	0.5	16,000	500	0.02	0.6
	16	5,500	150	0.003	0.3	9,000	250	0.004	0.4	12,000	320	0.006	0.5	14,000	400	0.012	0.6
1.5	6	14,000	500	0.02	0.45	18,000	700	0.03	0.6	20,000	800	0.04	0.75	23,000	1,000	0.06	0.9
	8	10,000	380	0.01	0.45	14,000	600	0.03	0.6	18,000	600	0.03	0.75	20,000	900	0.06	0.9
	10	10,000	350	0.01	0.45	14,000	500	0.02	0.6	16,000	500	0.03	0.75	20,000	800	0.04	0.9
	12	8,000	310	0.007	0.45	12,000	430	0.02	0.6	14,000	500	0.02	0.75	16,000	700	0.04	0.9
	16	6,800	200	0.005	0.45	9,000	300	0.007	0.6	10,000	360	0.01	0.75	12,000	500	0.02	0.9
2	8	9,500	500	0.02	0.6	12,000	600	0.04	0.8	16,000	800	0.05	1	18,000	900	0.07	1.2
	10	9,500	450	0.02	0.6	12,000	500	0.04	0.8	14,000	700	0.05	1	16,000	800	0.06	1.2
	12	8,200	400	0.01	0.6	10,000	500	0.03	0.8	12,000	600	0.04	1	14,000	700	0.05	1.2
	16	7,500	340	0.007	0.6	9,200	400	0.02	0.8	10,000	500	0.03	1	12,000	600	0.04	1.2

备注 Notes

※本切削参数仅供参考。请根据实际的加工形状及使用机床等调整切削参数。
※切深量的ap表示轴向切入量，ae表示步距量。
※加工淬火钢时，建议使用油雾冷却方式。
※轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※ t1(颈长)／D(刃径)超过8倍时，立面附近的进给速度须调整至50%以下，切深量：ae调整至30%以下。
※沟槽切削时建议参考切削参数表，切深量ap及进给速度设定为50%以下，采用来回切削加工方式。
※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率调。

※These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape and machine type
※ap:Axial Depth of Cut, ae:Radial Depth of Cut.
※Recommend to use oil mist coolant for machining hardened steel.
※Recommend to apply herical or ramping for approaching into axial direction.
※ Adjust feed rate 50% lower and cutting depth(ae) 30% lower for milling deep wall area. Under Neck Length t1/D exceeds 8 for stable milling.
※For slotting, recommend reciprocating milling by adjusting feed & ap in below 50% of recommended milling condition.
※Reduce both spindle speed and feed at same rate for chattering and also for insu cient spindle speed of a machine.

高硬钢用4刃长颈平底铣刀
Hardened Steels 4-Flute Long Neck Square Endmills

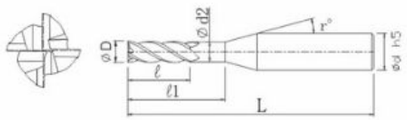
4刃 · 平底铣刀 | 4-Flute · Square

平面 Planing | 侧面 Side Cutting | 槽 Slotting | 粗加工 Roughing | 半精加工 Semi Finishing | 精加工 Finishing | 切削条件 B022 Cutting Conditions

外径公差 Dia.tolerance: 1≤D≤3: 0~-0.01; 4≤D: 0~-0.015 | h5: 0~-0.005 (mm)

高硬度材料加工用。超群的切削排出性能，可实现高效率加工。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

TYPE A:



- 在高硬度领域 (48~65HRC) 的长时间加工中也可实现稳定的长寿命。
- 改进了刀刃形状，改善了倾斜量和加工精度。
- Realized stably long tool life against high hardened steels (48 ~ 65HRC).
- Improved milling deflection and accuracy by advanced flute design.

硬质合金 | X6m涂层 | 65 HRC | 螺旋角35°

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNE1004	1x4L	1	4	0.8	0.95	15°	4	50	
X6MNE1006	1x6L		6	0.8	0.95	15°	4	50	
X6MNE1008	1x8L		8	0.8	0.95	15°	4	50	
X6MNE1010	1x10L		10	0.8	0.95	15°	4	50	
X6MNE1012	1x12L		12	0.8	0.95	15°	4	50	
X6MNE1016	1x16L		16	0.8	0.95	15°	4	50	
X6MNE1506	1.5x6L	1.5	6	1.2	1.45	15°	4	50	
X6MNE1508	1.5x8L		8	1.2	1.45	15°	4	50	
X6MNE1510	1.5x10L		10	1.2	1.45	15°	4	50	
X6MNE1512	1.5x12L		12	1.2	1.45	15°	4	50	
X6MNE1516	1.5x16L		16	1.2	1.45	15°	4	50	
X6MNE2008	2x8L	2	8	1.6	1.94	15°	4	50	
X6MNE2010	2x10L		10	1.6	1.94	15°	4	50	
X6MNE2012	2x12L		12	1.6	1.94	15°	4	50	
X6MNE2016	2x16L		16	1.6	1.94	15°	4	50	
X6MNE2018	2x18L		18	1.6	1.94	15°	4	50	
X6MNE2020	2x20L		20	1.6	1.94	15°	4	50	
X6MNE3010	3x10L	3	10	4.5	2.85	15°	4	50	
X6MNE3012	3x12L		12	4.5	2.85	15°	4	50	
X6MNE3016	3x16L		16	4.5	2.85	15°	4	50	
X6MNE3020	3x20L		20	4.5	2.85	15°	4	50	
X6MNE3010L	3x10L		8	4.5	2.85	15°	6	60	
X6MNE3012L	3x12L		12	4.5	2.85	15°	6	60	
X6MNE3016L	3x16L		16	4.5	2.85	15°	6	60	
X6MNE3020L	3x20L		20	4.5	2.85	15°	6	60	
X6MNE3025L	3x25L		25	4.5	2.85	15°	6	75	
X6MNE3030L	3x30L		30	4.5	2.85	15°	6	75	
X6MNE4012L	4x12L	4	12	6	3.8	15°	6	60	
X6MNE4016L	4x16L		16	6	3.8	15°	6	60	
X6MNE4020L	4x20L		20	6	3.8	15°	6	60	
X6MNE4025L	4x25L		25	6	3.8	15°	6	75	
X6MNE4030L	4x30L		30	6	3.8	15°	6	75	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		碳素钢 · 合金钢₁ · 不锈钢₁ Carbon Steels · Alloy Steels₁ · Stainless Steels₁ S50C · SCM₁ · SKD₁ · SUS₁				调质钢 Prehardened Steels NAK55 · NAK88 · HPM-1 (~43HRC)			
外径 Dia.	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
1	4	25,000	1,700	0.055	0.6	22,000	1,100	0.045	0.6
	6	20,000	1,200	0.045	0.6	18,000	750	0.035	0.6
	8	18,000	1,050	0.035	0.6	15,000	600	0.025	0.6
	10	16,000	900	0.025	0.6	14,000	520	0.018	0.6
	12	14,000	750	0.02	0.6	12,000	450	0.014	0.6
	16	12,000	450	0.01	0.6	10,000	300	0.007	0.6
1.5	6	20,000	1,800	0.08	0.9	16,000	1,100	0.07	0.9
	8	18,000	1,500	0.07	0.9	14,000	900	0.06	0.9
	10	16,000	1,300	0.06	0.9	13,000	780	0.05	0.9
	12	14,000	1,050	0.05	0.9	12,000	670	0.04	0.9
	16	12,000	750	0.035	0.9	10,000	480	0.025	0.9
2	8	16,000	2,000	0.11	1.2	13,000	1,200	0.09	1.2
	10	16,000	1,800	0.1	1.2	13,000	1,100	0.08	1.2
	12	14,000	1,500	0.09	1.2	12,000	1,000	0.07	1.2
	16	12,000	1,200	0.07	1.2	10,000	750	0.05	1.2
	18	11,000	1,000	0.06	1.2	9,000	650	0.04	1.2
	20	10,000	900	0.05	1.2	8,000	550	0.035	1.2
3	8	11,000	2,300	0.2	1.8	9,000	1,500	0.16	1.8
	10	11,000	2,200	0.18	1.8	9,000	1,300	0.14	1.8
	12	11,000	2,000	0.16	1.8	9,000	1,200	0.12	1.8
	16	10,000	1,500	0.12	1.8	8,000	900	0.09	1.8
	20	9,000	1,200	0.1	1.8	7,000	680	0.07	1.8
	25	8,000	1,050	0.08	1.8	6,000	570	0.06	1.8
	30	7,000	900	0.06	1.8	5,000	450	0.045	1.8
4	12	8,000	2,200	0.3	2.4	6,000	1,300	0.25	2.4
	16	8,000	2,100	0.25	2.4	6,000	1,200	0.2	2.4
	20	8,000	2,000	0.2	2.4	6,000	1,100	0.15	2.4
	25	7,000	1,700	0.15	2.4	5,000	900	0.1	2.4
	30	7,000	1,500	0.12	2.4	5,000	800	0.08	2.4

备注 Notes

※ 1切削合金钢、不锈钢时，请将主轴转速及进给速度降低至80%时的值作为参考值。
※ 1 Reference value for Alloy and Stainless Steels are 80% of recommended cutting conditions.

※本切削参数仅供参考。请根据实际的加工形状及使用机床等调整切削参数。
※切深量的ap表示轴向切入量。ae表示距量
※请在考虑加工材料及加工形状等的基础上，选用合适的切削油。
※加工深沟时，请充分注意切削油的供油及排屑是否顺畅。
※轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※由于立面附近的刀具负荷会增大，必须降低进给速度和切深量。
※沟槽切削时建议将切削参数表的切深量降低至80%时的值作为参考值，并采用来回切削加工方式。ℓ1(颈长)/D(刃径)为5以上时，建议先使用有效长较短的刀具切削初期定位槽。
※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率调整。
※刀具的伸出量超过柄径的5倍时，受铣刀刀柄跳动精度等的影响，有时必须对加工参数进行大幅调整。此时请按相同的比率降低主轴转速和进给速度等，调整切削参数。

※ These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape and machine type.
※ ap:Axial Depth of Cut, ae:Radial Depth of Cut.
※ Select a cutting fluid appropriate to work material, milling shape and machining content.
※ Coolant supply and chip disposal in the deep portion are very important.
※ Recommend to apply herical or ramping for approaching into axial direction.
※ Reduction of feed and Depth of Cut to reduce machining load around side wall.
※ When grooving cutting, it is recommended to reduce the cutting depth of the cutting parameter table to 80% as a reference value, and use the back and forth cutting mode. When ℓ1(Under Neck Length)/D(blade diameter) is more than 5, it is recommended to use a tool with a shorter effective length to cut the initial positioning slot.
※ Reduce both spindle speed and feed at same rate for chattering and also for insu cient spindle speed of a machine.
※ Major adjustment of milling conditions, e.g. adjust spindle and feed speed at same rate, required on condition of a tool overhang length exceeding a shank diameter 5 times due to possible accuracy impact by chuck runout etc.

高硬钢用2刃长颈球头铣刀
Hardened Steel 2-Flute Long Neck Ball Endmills

2刃 · 球头 | 2-Flute · Ball

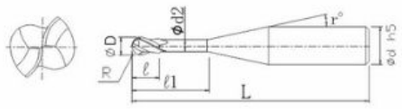
外径公差 Dia.tolerance: D≤0.1: 0~-0.005; 0.15≤D≤0.9: 0~-0.007; 1≤D≤3: 0~-0.01; D≤4: 0~-0.015

R 公差 R tolerance: R≤0.2: ±0.003; 0.25≤R≤2: ±0.005

h5: 0~-0.005 (mm)

高硬度材料加工用。超群的切削排出性能，可实现高效率加工。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

TYPE A:



- 高硬度材料用球头铣刀。最适用于精加工。
- 适用于~65HRC的高硬度材料。
- Ball End Milling Cutter For High Hardness Materials. Most Suitable For Finishing.
- Suitable For ~65HRC High Hardness Materials.

硬质合金 | X6m涂层 | 65 HRC | 螺旋角30° | ②

产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	外径(D) Dia	颈径(d2) Neck Dia	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNB008002	R0.04x0.2L	R0.04	0.2	0.07	0.08	0.065	11°	4	45	
X6MNB008003	R0.04x0.3L		0.3	0.07	0.08	0.065	11°	4	45	
X6MNB008005	R0.04x0.5L		0.5	0.07	0.08	0.065	11°	4	45	
X6MNB01002	R0.05x0.2L	R0.05	0.2	0.08	0.1	0.085	11°	4	45	
X6MNB01003	R0.05x0.3L		0.3	0.08	0.1	0.085	11°	4	45	
X6MNB01005	R0.05x0.5L		0.5	0.08	0.1	0.085	11°	4	45	
X6MNB015003	R0.075x0.3L	R0.075	0.3	0.12	0.15	0.13	11°	4	45	
X6MNB015005	R0.075x0.5L		0.5	0.12	0.15	0.13	11°	4	45	
X6MNB0150075	R0.075x0.75L		0.75	0.12	0.15	0.13	11°	4	45	
X6MNB01501	R0.075x1L		1	0.12	0.15	0.13	11°	4	45	
X6MNB02004	R0.1x0.4L	R0.1	0.4	0.16	0.2	0.18	15°	4	45	
X6MNB020075	R0.1x0.75		0.75	0.16	0.2	0.18	15°	4	45	
X6MNB0201	R0.1x1L		1	0.16	0.2	0.18	15°	4	45	
X6MNB02015	R0.1x1.5L		1.5	0.16	0.2	0.18	15°	4	45	
X6MNB0202	R0.1x2L		2	0.16	0.2	0.18	15°	4	45	
X6MNB03005	R0.15x0.5L	R0.15	0.5	0.24	0.3	0.27	15°	4	45	
X6MNB0301	R0.15x1L		1	0.24	0.3	0.27	15°	4	45	
X6MNB03015	R0.15x1.5L		1.5	0.24	0.3	0.27	15°	4	45	
X6MNB0302	R0.15x2L		2	0.24	0.3	0.27	15°	4	45	
X6MNB03025	R0.15x2.5L		2.5	0.24	0.3	0.27	15°	4	45	
X6MNB0303	R0.15x3L		3	0.24	0.3	0.27	15°	4	45	
X6MNB0304	R0.15x4L		4	0.24	0.3	0.27	15°	4	45	
X6MNB0305	R0.15x5L		5	0.24	0.3	0.27	15°	4	45	
X6MNB04005	R0.2x0.5L	R0.2	0.5	0.32	0.4	0.37	15°	4	45	
X6MNB0401	R0.2x1L		1	0.32	0.4	0.37	15°	4	45	
X6MNB04015	R0.2x1.5L		1.5	0.32	0.4	0.37	15°	4	45	
X6MNB0402	R0.2x2L		2	0.32	0.4	0.37	15°	4	45	
X6MNB0403	R0.2x3L		3	0.32	0.4	0.37	15°	4	45	
X6MNB0404	R0.2x4L		4	0.32	0.4	0.37	15°	4	45	
X6MNB0406	R0.2x6L		6	0.32	0.4	0.37	15°	4	45	

长颈球刀 Long Neck Ball

高硬钢用2刃长颈球头铣刀
Hardened Steel 2-Flute long neck Ball Endmills

硬质合金 | X6m涂层 | 65 HRC | 螺旋角30° | ②

产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	外径(D) Dia	颈径(d2) Neck Dia	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNB0501	R0.25x1L	R0.25	1	0.4	0.5	0.46	15°	4	45	
X6MNB05015	R0.25x1.5L		1.5	0.4	0.5	0.46	15°	4	45	
X6MNB0502	R0.25x2L		2	0.4	0.5	0.46	15°	4	45	
X6MNB05025	R0.25x2.5L		2.5	0.4	0.5	0.46	15°	4	45	
X6MNB0503	R0.25x3L		3	0.4	0.5	0.46	15°	4	45	
X6MNB05035	R0.25x3.5L		3.5	0.4	0.5	0.46	15°	4	45	
X6MNB0504	R0.25x4L		4	0.4	0.5	0.46	15°	4	45	
X6MNB0505	R0.25x5L		5	0.4	0.5	0.46	15°	4	45	
X6MNB0506	R0.25x6L		6	0.4	0.5	0.46	15°	4	45	
X6MNB0507	R0.25x7L		7	0.4	0.5	0.46	15°	4	45	
X6MNB0508	R0.25x8L		8	0.4	0.5	0.46	15°	4	45	
X6MNB0509	R0.25x9L		9	0.4	0.5	0.46	15°	4	45	
X6MNB0510	R0.25x10L		10	0.4	0.5	0.46	15°	4	45	
X6MNB0601	R0.3x1L	R0.3	1	0.48	0.6	0.56	15°	4	45	
X6MNB06015	R0.3x1.5L		1.5	0.48	0.6	0.56	15°	4	45	
X6MNB0602	R0.3x2L		2	0.48	0.6	0.56	15°	4	45	
X6MNB0603	R0.3x3L		3	0.48	0.6	0.56	15°	4	45	
X6MNB0604	R0.3x4L		4	0.48	0.6	0.56	15°	4	45	
X6MNB0605	R0.3x5L		5	0.48	0.6	0.56	15°	4	45	
X6MNB0606	R0.3x6L		6	0.48	0.6	0.56	15°	4	45	
X6MNB0607	R0.3x7L		7	0.48	0.6	0.56	15°	4	45	
X6MNB0608	R0.3x8L		8	0.48	0.6	0.56	15°	4	45	
X6MNB0609	R0.3x9L		9	0.48	0.6	0.56	15°	4	45	
X6MNB0610	R0.3x10L		10	0.48	0.6	0.56	15°	4	45	
X6MNB0702	R0.35x2L	R0.35	2	0.56	0.7	0.66	15°	4	45	
X6MNB0704	R0.35x4L		4	0.56	0.7	0.66	15°	4	45	
X6MNB0706	R0.35x6L		6	0.56	0.7	0.66	15°	4	45	
X6MNB0708	R0.35x8L		8	0.56	0.7	0.66	15°	4	45	
X6MNB0802	R0.4x2L	R0.4	2	0.64	0.8	0.76	15°	4	45	
X6MNB0803	R0.4x3L		3	0.64	0.8	0.76	15°	4	45	
X6MNB0804	R0.4x4L		4	0.64	0.8	0.76	15°	4	45	
X6MNB0806	R0.4x6L		6	0.64	0.8	0.76	15°	4	45	
X6MNB0808	R0.4x8L		8	0.64	0.8	0.76	15°	4	45	
X6MNB0810	R0.4x10L		10	0.64	0.8	0.76	15°	4	45	
X6MNB0902	R0.45x2L	R0.45	2	0.72	0.9	0.86	15°	4	45	
X6MNB0904	R0.45x4L		4	0.72	0.9	0.86	15°	4	45	
X6MNB0906	R0.45x6L		6	0.72	0.9	0.86	15°	4	45	
X6MNB0908	R0.45x8L		8	0.72	0.9	0.86	15°	4	45	
X6MNB1002	R0.5x2L	R0.5	2	0.8	1	0.95	15°	4	50	
X6MNB1003	R0.5x3L		3	0.8	1	0.95	15°	4	50	
X6MNB1004	R0.5x4L		4	0.8	1	0.95	15°	4	50	
X6MNB1005	R0.5x5L		5	0.8	1	0.95	15°	4	50	
X6MNB1006	R0.5x6L		6	0.8	1	0.95	15°	4	50	
X6MNB1008	R0.5x8L		8	0.8	1	0.95	15°	4	50	
X6MNB1010	R0.5x10L		10	0.8	1	0.95	15°	4	50	
X6MNB1012	R0.5x12L		12	0.8	1	0.95	15°	4	50	
X6MNB1016	R0.5x16L		16	0.8	1	0.95	15°	4	50	
X6MNB1204	R0.6x4L	R0.6	4	0.96	1.2	1.15	15°	4	50	
X6MNB1206	R0.6x6L		6	0.96	1.2	1.15	15°	4	50	
X6MNB1208	R0.6x8L		8	0.96	1.2	1.15	15°	4	50	
X6MNB1210	R0.6x10L		10	0.96	1.2	1.15	15°	4	50	
X6MNB1212	R0.6x12L		12	0.96	1.2	1.15	15°	4	50	
X6MNB1216	R0.6x16L		16	0.96	1.2	1.15	15°	4	50	

长颈球刀 Long Neck Ball

高硬钢用2刃长颈球头铣刀
Hardened Steel 2-Flute Long Neck Ball Endmills

产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	外径(D) Dia	颈径(d2) Neck Dia	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNB1504	R0.75x4L	R0.75	4	1.2	1.5	1.45	15°	4	50	
X6MNB1506	R0.75x6L		6	1.2	1.5	1.45	15°	4	50	
X6MNB1508	R0.75x8L		8	1.2	1.5	1.45	15°	4	50	
X6MNB1510	R0.75x10L		10	1.2	1.5	1.45	15°	4	50	
X6MNB1512	R0.75x12L		12	1.2	1.5	1.45	15°	4	50	
X6MNB1516	R0.75x16L		16	1.2	1.5	1.45	15°	4	50	
X6MNB1604	R0.8x4L	R0.8	4	1.28	1.6	1.55	15°	4	50	
X6MNB1608	R0.8x8L		8	1.28	1.6	1.55	15°	4	50	
X6MNB1612	R0.8x12L		12	1.28	1.6	1.55	15°	4	50	
X6MNB1616	R0.8x16L		16	1.28	1.6	1.55	15°	4	50	
X6MNB1620	R0.8x20L		20	1.28	1.6	1.55	15°	4	50	
X6MNB1804	R0.9x4L	R0.9	4	1.44	1.8	1.75	15°	4	50	
X6MNB1808	R0.9x8L		8	1.44	1.8	1.75	15°	4	50	
X6MNB1812	R0.9x12L		12	1.44	1.8	1.75	15°	4	50	
X6MNB1816	R0.9x16L		16	1.44	1.8	1.75	15°	4	50	
X6MNB1820	R0.9x20L		20	1.44	1.8	1.75	15°	4	50	
X6MNB2004	R1x4L	R1	4	1.6	2	1.94	15°	4	50	
X6MNB2006	R1x6L		6	1.6	2	1.94	15°	4	50	
X6MNB2008	R1x8L		8	1.6	2	1.94	15°	4	50	
X6MNB2010	R1x10L		10	1.6	2	1.94	15°	4	50	
X6MNB2012	R1x12L		12	1.6	2	1.94	15°	4	50	
X6MNB2016	R1x16L		16	1.6	2	1.94	15°	4	50	
X6MNB2020	R1x20L		20	1.6	2	1.94	15°	4	65	
X6MNB2025	R1x25L		25	1.6	2	1.94	15°	4	65	
X6MNB2030	R1x30L		30	1.6	2	1.94	15°	4	65	
X6MNB2506	R1.25x6L	R1.25	6	2	2.5	2.4	15°	4	50	
X6MNB2508	R1.25x8L		8	2	2.5	2.4	15°	4	50	
X6MNB2512	R1.25x12L		12	2	2.5	2.4	15°	4	50	
X6MNB2516	R1.25x16L		16	2	2.5	2.4	15°	4	50	
X6MNB2520	R1.25x20L		20	2	2.5	2.4	15°	4	50	
X6MNB3006	R1.5x6L	R1.5	6	2.4	3	2.85	15°	4	50	
X6MNB3008	R1.5x8L		8	2.4	3	2.85	15°	4	50	
X6MNB3010	R1.5x10L		10	2.4	3	2.85	15°	4	50	
X6MNB3012	R1.5x12L		12	2.4	3	2.85	15°	4	50	
X6MNB3016	R1.5x16L		16	2.4	3	2.85	15°	4	50	
X6MNB3020	R1.5x20L		20	2.4	3	2.85	15°	4	50	
X6MNB3008L	R1.5x8L		8	2.4	3	2.85	15°	6	60	
X6MNB3010L	R1.5x10L		10	2.4	3	2.85	15°	6	60	
X6MNB3012L	R1.5x12L		12	2.4	3	2.85	15°	6	60	
X6MNB3016L	R1.5x16L		16	2.4	3	2.85	15°	6	60	
X6MNB3020L	R1.5x20L		20	2.4	3	2.85	15°	6	60	
X6MNB3025L	R1.5x25L		25	2.4	3	2.85	15°	6	75	
X6MNB3030L	R1.5x30L		30	2.4	3	2.85	15°	6	75	
X6MNB3510L	R1.75x10L	R1.75	10	2.8	3.5	3.35	15°	6	60	
X6MNB3515L	R1.75x15L		15	2.8	3.5	3.35	15°	6	60	
X6MNB3520L	R1.75x20L		20	2.8	3.5	3.35	15°	6	60	
X6MNB3525L	R1.75x25L		25	2.8	3.5	3.35	15°	6	75	
X6MNB3530L	R1.75x30L		30	2.8	3.5	3.35	15°	6	75	
X6MNB4012L	R2x12L	R2	12	3.2	4	3.8	15°	6	60	
X6MNB4016L	R2x16L		16	3.2	4	3.8	15°	6	60	
X6MNB4020L	R2x20L		20	3.2	4	3.8	15°	6	60	
X6MNB4025L	R2x25L		25	3.2	4	3.8	15°	6	75	
X6MNB4030L	R2x30L		30	3.2	4	3.8	15°	6	75	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		高速钢 High Speed Tool Steels SKH (∽65HRC)				淬火钢 Hardened Steels SKD11 (∽62HRC)				淬火钢 Hardened Steels SKD61 · STAVAX · HPM-38 (∽52HRC)			
球头半径(R) Radius	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.04	0.2	40,000	50	0.001	0.002	40,000	80	0.001	0.004	40,000	100	0.002	0.004
	0.3	40,000	30	0.001	0.002	40,000	60	0.001	0.004	40,000	80	0.001	0.004
	0.5	40,000	10	0.001	0.002	40,000	40	0.001	0.003	40,000	60	0.001	0.003
0.05	0.2	40,000	70	0.002	0.001	40,000	100	0.002	0.005	40,000	120	0.003	0.005
	0.3	40,000	50	0.002	0.003	40,000	70	0.002	0.005	40,000	100	0.003	0.005
	0.5	40,000	30	0.001	0.002	40,000	50	0.001	0.003	40,000	70	0.002	0.003
0.075	0.3	40,000	100	0.002	0.003	40,000	150	0.002	0.005	40,000	180	0.003	0.005
	0.5	40,000	70	0.002	0.003	40,000	120	0.002	0.005	40,000	150	0.003	0.005
	0.75	40,000	50	0.001	0.002	40,000	80	0.002	0.004	40,000	11	0.003	0.004
	1	40,000	30	0.001	0.002	40,000	50	0.001	0.003	40,000	70	0.002	0.003
0.1	0.4	40,000	190	0.003	0.003	40,000	290	0.005	0.005	40,000	330	0.009	0.01
	0.75	40,000	150	0.002	0.003	40,000	200	0.003	0.005	40,000	280	0.005	0.01
	1	40,000	120	0.001	0.002	40,000	160	0.002	0.003	40,000	250	0.003	0.005
	1.5	40,000	80	0.001	0.002	40,000	120	0.002	0.003	40,000	150	0.003	0.005
	2	40,000	50	0.001	0.001	40,000	80	0.001	0.002	40,000	100	0.002	0.003
0.15	0.5	40,000	280	0.003	0.005	40,000	300	0.007	0.01	40,000	350	0.01	0.015
	1	40,000	200	0.003	0.005	40,000	250	0.005	0.007	40,000	320	0.007	0.01
	1.5	40,000	120	0.002	0.003	40,000	180	0.003	0.005	40,000	230	0.005	0.007
	2	40,000	90	0.002	0.002	40,000	120	0.002	0.003	40,000	150	0.003	0.005
	2.5	40,000	70	0.001	0.001	40,000	80	0.001	0.002	40,000	100	0.002	0.003
	3	40,000	60	0.001	0.001	40,000	70	0.001	0.002	40,000	80	0.001	0.003
	4	40,000	40	0.001	0.001	40,000	50	0.001	0.001	40,000	60	0.001	0.002
	5	40,000	20	0.001	0.001	40,000	30	0.001	0.001	40,000	40	0.001	0.001
0.2	0.5	40,000	580	0.009	0.02	40,000	720	0.03	0.03	40,000	800	0.03	0.05
	1	40,000	580	0.008	0.02	40,000	720	0.02	0.03	40,000	800	0.02	0.05
	1.5	40,000	400	0.005	0.01	40,000	500	0.01	0.02	40,000	620	0.01	0.03
	2	40,000	300	0.005	0.007	40,000	380	0.01	0.01	40,000	500	0.01	0.02
	3	40,000	200	0.003	0.005	40,000	240	0.005	0.007	40,000	300	0.007	0.01
	4	30,000	90	0.002	0.003	30,000	120	0.003	0.003	30,000	160	0.005	0.005
	6	30,000	30	0.001	0.001	30,000	40	0.001	0.001	30,000	50	0.001	0.002
0.25	1	40,000	650	0.01	0.02	40,000	860	0.02	0.03	40,000	1,000	0.03	0.05
	1.5	40,000	520	0.007	0.02	40,000	720	0.01	0.03	40,000	850	0.02	0.05
	2	40,000	400	0.007	0.01	40,000	650	0.01	0.02	40,000	720	0.02	0.03
	2.5	40,000	360	0.005	0.007	40,000	530	0.007	0.01	40,000	600	0.01	0.02
	3	40,000	320	0.005	0.007	40,000	420	0.007	0.01	40,000	500	0.01	0.02
	3.5	40,000	280	0.003	0.005	40,000	360	0.005	0.007	40,000	420	0.007	0.01
	4	40,000	260	0.003	0.005	40,000	300	0.005	0.007	40,000	350	0.007	0.01
	5	33,000	180	0.002	0.003	33,000	200	0.003	0.003	33,000	240	0.005	0.005
	6	30,000	70	0.001	0.002	30,000	80	0.001	0.002	30,000	120	0.002	0.003
	7	30,000	60	0.001	0.002	30,000	70	0.001	0.002	30,000	90	0.002	0.002
	8	30,000	50	0.001	0.002	30,000	60	0.001	0.002	30,000	75	0.002	0.002
	9	20,000	35	0.001	0.001	25,000	50	0.001	0.002	25,000	60	0.001	0.002
	10	20,000	20	0.001	0.001	20,000	30	0.001	0.002	20,000	40	0.001	0.002
0.3	1	30,000	720	0.02	0.05	40,000	1,000	0.03	0.06	40,000	1,400	0.05	0.1
	1.5	30,000	720	0.02	0.05	40,000	1,000	0.03	0.06	40,000	1,400	0.05	0.1
	2	30,000	720	0.02	0.05	40,000	1,000	0.03	0.06	40,000	1,400	0.05	0.1
	3	30,000	640	0.02	0.03	40,000	840	0.02	0.04	40,000	1,200	0.03	0.05
	4	30,000	480	0.01	0.02	40,000	620	0.01	0.03	40,000	1,000	0.02	0.03
	5	30,000	400	0.007	0.01	30,000	500	0.007	0.015	30,000	720	0.01	0.02
	6	30,000	320	0.004	0.006	30,000	380	0.005	0.007	30,000	500	0.007	0.01
	7	20,000	260	0.003	0.003	25,000	300	0.003	0.005	25,000	400	0.005	0.007
	8	20,000	220	0.002	0.003	25,000	260	0.003	0.003	25,000	320	0.003	0.005
	9	20,000	160	0.001	0.002	25,000	220	0.003	0.002	25,000	280	0.003	0.003
	10	18,000	100	0.001	0.002	20,000	120	0.002	0.002	20,000	150	0.002	0.003
0.35	2	30,000	1,000	0.03	0.07	40,000	1,300	0.05	0.08	40,000	1,600	0.07	0.1
	4	30,000	600	0.015	0.02	40,000	820	0.03	0.04	40,000	1,300	0.04	0.06
	6	25,000	420	0.006	0.01	30,000	500	0.01	0.015	30,000	800	0.01	0.03
	8	20,000	250	0.004	0.006	20,000	380	0.005	0.006	25,000	520	0.006	0.01

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		高速钢 High Speed Tool Steels SKH (∽65HRC)				淬火钢 Hardened Steels SKD11 (∽62HRC)				淬火钢 Hardened Steels SKD61 · STAVAX · HPM-38 (∽52HRC)			
球头半径(R) Radius	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.4	2	30,000	1,200	0.05	0.1	40,000	1,600	0.07	0.1	40,000	2,000	0.1	0.15
	3	30,000	1,200	0.05	0.05	40,000	1,600	0.07	0.1	40,000	2,000	0.1	0.15
	4	30,000	860	0.03	0.05	40,000	1,200	0.05	0.05	40,000	1,600	0.05	0.1
	6	25,000	560	0.01	0.02	30,000	760	0.02	0.03	30,000	1,200	0.03	0.05
	8	25,000	480	0.005	0.01	30,000	600	0.007	0.01	30,000	820	0.01	0.02
	10	20,000	320	0.002	0.003	25,000	380	0.003	0.003	25,000	450	0.005	0.005
0.45	2	30,000	1,300	0.06	0.1	30,000	1,800	0.08	0.15	40,000	2,200	0.1	0.2
	4	25,000	900	0.03	0.05	30,000	1,400	0.04	0.08	40,000	1,800	0.05	0.12
	6	20,000	600	0.015	0.025	25,000	800	0.025	0.035	30,000	1,200	0.035	0.05
	8	20,000	500	0.008	0.015	23,000	700	0.015	0.025	30,000	1,000	0.025	0.04
0.5	2	25,000	1,400	0.08	0.1	30,000	2,000	0.1	0.2	40,000	2,500	0.1	0.3
	3	25,000	1,400	0.08	0.1	30,000	2,000	0.1	0.2	40,000	2,500	0.1	0.3
	4	25,000	1,200	0.05	0.1	30,000	1,800	0.05	0.15	40,000	2,500	0.1	0.2
	5	20,000	920	0.03	0.05	25,000	1,600	0.04	0.1	30,000	2,000	0.05	0.15
	6	20,000	740	0.02	0.05	25,000	1,200	0.04	0.05	30,000	1,800	0.05	0.1
	8	20,000	560	0.02	0.03	25,000	860	0.03	0.04	30,000	1,000	0.04	0.06
	10	18,000	450	0.01	0.02	20,000	620	0.02	0.03	25,000	750	0.03	0.05
	12	16,000	400	0.005	0.01	18,000	520	0.007	0.02	20,000	600	0.01	0.03
	16	14,000	200	0.002	0.003	16,000	250	0.003	0.005	18,000	300	0.005	0.005
0.6	4	25,000	1,600	0.05	0.1	30,000	2,000	0.07	0.2	30,000	2,500	0.1	0.2
	6	20,000	1,200	0.03	0.07	25,000	1,600	0.05	0.1	30,000	2,000	0.07	0.1
	8	20,000	920	0.02	0.05	25,000	1,200	0.03	0.07	30,000	1,600	0.05	0.1
	10	18,000	680	0.01	0.03	20,000	860	0.02	0.05	20,000	1,200	0.03	0.07
	12	18,000	480	0.007	0.02	20,000	620	0.01	0.03	20,000	860	0.02	0.05
	16	14,000	130	0.003	0.007	16,000	250	0.005	0.01	16,000	350	0.01	0.02
0.75	4	25,000	2,000	0.1	0.2	30,000	2,500	0.1	0.3	30,000	3,000	0.15	0.3
	6	25,000	1,600	0.1	0.1	30,000	2,000	0.1	0.2	30,000	3,000	0.15	0.2
	8	20,000	1,200	0.05	0.1	25,000	1,600	0.05	0.2	25,000	2,500	0.1	0.2
	10	20,000	860	0.05	0.05	25,000	1,200	0.05	0.1	25,000	2,500	0.1	0.1
	12	18,000	780	0.02	0.05	20,000	920	0.03	0.1	20,000	1,800	0.05	0.1
	16	16,000	580	0.01	0.02	18,000	650	0.02	0.03	18,000	720	0.03	0.05
0.8	4	18,000	1800	0.08	0.15	20,000	2500	0.1	0.2	25,000	2800	0.15	0.3
	8	18,000	1,600	0.05	0.1	20,000	2,000	0.07	0.15	25,000	2,500	0.1	0.2
	12	14,000	1,200	0.03	0.05	16,000	1,500	0.05	0.07	20,000	1,800	0.07	0.1
	16	12,000	480	0.015	0.02	14,000	600	0.02	0.03	16,000	720	0.03	0.05
	20	10,000	300	0.01	0.01	12,000	380	0.01	0.02	14,000	500	0.01	0.03
0.9	4	18,000	1800	0.08	0.15	20,000	2500	0.1	0.2	25,000	3000	0.15	0.3
	8	18,000	1600	0.05	0.1	20,000	2000	0.07	0.15	25,000	2500	0.1	0.2
	12	14,000	1200	0.03	0.05	16,000	1000	0.05	0.07	20,000	1800	0.07	0.1
	16	12,000	500	0.015	0.02	14,000	800	0.02	0.03	16,000	720	0.03	0.05
	20	10,000	300	0.01	0.01	12,000	400	0.01	0.02	14,000	500	0.01	0.03
1	4	20,000	2,000	0.15	0.3	25,000	2,500	0.2	0.5	25,000	3,000	0.2	0.5
	6	20,000	1,600	0.15	0.3	25,000	2,000	0.2	0.3	25,000	2,500	0.2	0.5
	8	16,000	1,200	0.1	0.2	18,000	1,600	0.1	0.2	20,000	2,000	0.2	0.3
	10	14,000	1,200	0.1	0.1	16,000	1,600	0.1	0.2	18,000	2,000	0.1	0.3
	12	12,000	940	0.05	0.1	14,000	1,200	0.1	0.1	16,000	1,600	0.1	0.2
	16	12,000	940	0.03	0.07	14,000	1,200	0.05	0.08	16,000	1,600	0.07	0.15
	20	10,000	720	0.02	0.03	12,000	820	0.03	0.05	14,000	1,000	0.05	0.1
	25	8,500	420	0.01	0.02	10,000	560	0.02	0.03	12,000	680	0.03	0.05
	30	8,500	240	0.008	0.01	10,000	300	0.01	0.02	12,000	360	0.02	0.03
1.25	6	18,000	2,000	0.15	0.4	20,000	2,300	0.2	0.5	20,000	2,800	0.3	0.4
	8	18,000	1,800	0.12	0.25	20,000	2,100	0.15	0.3	20,000	2,600	0.25	0.3
	12	16,000	1,400	0.08	0.13	18,000	1,800	0.13	0.18	19,000	2,300	0.15	0.25
	16	12,000	1,100	0.04	0.08	15,000	14,000	0.06	0.13	1,700	1,750	0.1	0.2
	20	10,000	1,000	0.03	0.05	14,000	1,200	0.05	0.1	16,000	1,500	0.07	0.15

切削参数参考表
Recommended Milling Conditions

碳素钢 Carbon Steel P
合金钢 Alloy Steel P
调质钢 Prehardened Steel P
高硬度钢 ~55 Hardened Steel ~55HRC H
高硬度钢 ~62 Hardened Steel ~62HRC H
高硬度钢 ~70 Hardened Steel ~70HRC H
铜合金 Copper N
长颈球刀 Long Neck Ball

加工材料 Work Material		高速钢 High Speed Tool Steels SKH (∽65HRC)				淬火钢 Hardened Steels SKD11 (∽62HRC)				淬火钢 Hardened Steels SKD61 · STAVAX · HPM-38 (∽52HRC)			
球头半径(R) Radius	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
1.5	6	14,000	2,000	0.2	0.5	18,000	2,500	0.2	0.6	20,000	3,000	0.2	0.8
	8	14,000	2,000	0.2	0.5	18,000	2,500	0.2	0.6	20,000	3,000	0.2	0.8
	10	14,000	1,500	0.1	0.3	18,000	2,000	0.2	0.4	20,000	2,500	0.2	0.6
	12	14,000	1,500	0.1	0.3	18,000	2,000	0.2	0.4	20,000	2,500	0.2	0.6
	16	12,000	1,200	0.1	0.2	16,000	1,600	0.1	0.3	18,000	2,000	0.1	0.4
	20	12,000	960	0.1	0.1	16,000	1,200	0.1	0.2	18,000	1,600	0.1	0.3
	25	10,000	800	0.05	0.07	14,000	920	0.07	0.15	16,000	1,200	0.1	0.2
	30	8,600	600	0.03	0.05	12,000	640	0.05	0.07	14,000	750	0.07	0.1
1.75	10	14,000	1500	0.15	0.5	16,000	2300	0.2	0.6	20,000	3000	0.3	1.2
	15	14,000	1,500	0.13	0.4	16,000	2,300	0.15	0.5	20,000	3,000	0.25	1
	20	12,000	1,200	0.1	0.2	15,000	1,800	0.1	0.3	18,000	2,500	0.18	0.6
	25	10,000	1,000	0.06	0.12	14,000	1,600	0.1	0.2	16,000	1,800	0.12	0.35
	30	9,000	800	0.05	0.08	11,000	950	0.07	0.15	14,000	1,500	0.1	0.25
2	12	12,000	2,000	0.2	0.6	16,000	2,500	0.2	0.8	20,000	3,000	0.3	1.5
	16	11,000	1,500	0.15	0.5	15,000	19,000	0.15	0.7	1,800	2,600	0.25	1.2
	20	10,000	1,400	0.1	0.4	14,000	1,800	0.1	0.6	16,000	2,400	0.2	1
	25	10,000	1,000	0.1	0.2	14,000	1,200	0.1	0.4	16,000	1,600	0.2	0.8
	30	8,200	1,000	0.05	0.15	10,000	1,200	0.07	0.2	14,000	1,600	0.1	0.3
备注 Notes		※切深量的ap表示轴向切入量，ae表示步距量。 ※建议使用油雾冷却方式。 ※请以相同的比率调整主轴转速和进给速度。 ※加工参数会因切深量和机床刚性的状况而有所不同。请每次调整后再使用。 ※请根据需要控制刀具的伸出量。 ※ Depth of Cut: ap=Axial Depth of Cut / ae=Radial Depth of Cut. ※ We recommend using oil mist coolant. ※Adjust both spindle speed and feed at the same rate. ※Adjust milling conditions according to the volume of depth of cut and rigidity of machine. ※Length of tool overhang must be as short as possible.											

高硬钢用2刃长颈圆鼻铣刀
Hardened Steels 2-Flute Long Neck Corner Radius Endmills

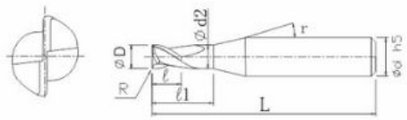
2刃 · 带R角 | 2-Flute · Corner Radius

平面 Planing | 侧铣 Side Cutting | 槽 Slotting | 刻模 Die-sinking | 仿形 Profiling | R Radius | 螺旋 Helical | 粗加工 Roughing | 半精加工 Semi-Finishing | 精加工 Finishing | 切削条件 B031 Cutting Conditions

外径公差 Dia.tolerance: D≤0.1: 0~-0.005; 0.15≤D≤0.9: 0~-0.007
r公差 r tolerance: ±0.005
h5: 0~-0.005
(mm)

高硬度材料加工用。超群的切削排出性能，可实现高效率加工。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

TYPE A:



- 在高硬度领域(48-65HRC)的长时间加工中也可实现稳定的长寿命。
- 增大了螺旋角，使得刀刃变得更锋利，而且圆鼻形状可以抑制崩刃。

- Realized stably long tool life against high hardened steels (48~65HRC).
- Corner radius to prevent flute chipping, and high helix angle for cutting sharpness.

硬质合金 | X6m涂层 | 65 HRC | 共颈 | 颈部角35

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia	角半径(R) Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNR01003001	0.1R0.01x0.3L	0.1	R0.01	0.3	0.08	0.085	15°	4	45	
X6MNR01005001	0.1R0.01x0.5L			0.5	0.08	0.085	15°	4	45	
X6MNR01003002	0.1R0.02x0.3L		R0.02	0.3	0.08	0.085	15°	4	45	
X6MNR01005002	0.1R0.02x0.5L			0.5	0.08	0.085	15°	4	45	
X6MNR015005002	0.15R0.02x0.5L	0.15	R0.02	0.5	0.12	0.13	15°	4	45	
X6MNR01501002	0.15R0.02x1L			1	0.12	0.13	15°	4	45	
X6MNR01505005	0.15R0.05x0.5L		R0.05	0.5	0.12	0.13	15°	4	45	
X6MNR015001005	0.15R0.05x1L			1	0.12	0.13	15°	4	45	
X6MNR02005002	0.2R0.02x0.5L	0.2	R0.02	0.5	0.16	0.18	15°	4	45	
X6MNR0201002	0.2R0.02x1L			1	0.16	0.18	15°	4	45	
X6MNR02015002	0.2R0.02x1.5L			1.5	0.16	0.18	15°	4	45	
X6MNR0202002	0.2R0.02x2L			2	0.16	0.18	15°	4	45	
X6MNR02005005	0.2R0.05x0.5L		R0.05	0.5	0.16	0.18	15°	4	45	
X6MNR0201005	0.2R0.05x1L			1	0.16	0.18	15°	4	45	
X6MNR02015005	0.2R0.05x1.5L			1.5	0.16	0.18	15°	4	45	
X6MNR0202005	0.2R0.05x2L			2	0.16	0.18	15°	4	45	
X6MNR0301002	0.3R0.02x1L	0.3	R0.02	1	0.24	0.27	15°	4	45	
X6MNR03015002	0.3R0.02x1.5L			1.5	0.24	0.27	15°	4	45	
X6MNR0302002	0.3R0.02x2L			2	0.24	0.27	15°	4	45	
X6MNR03025002	0.3R0.02x2.5L			2.5	0.24	0.27	15°	4	45	
X6MNR0303002	0.3R0.02x3L			3	0.24	0.27	15°	4	45	
X6MNR0301005	0.3R0.05x1L		R0.05	1	0.24	0.27	15°	4	45	
X6MNR03015005	0.3R0.05x1.5L			1.5	0.24	0.27	15°	4	45	
X6MNR0302005	0.3R0.05x2L			2	0.24	0.27	15°	4	45	
X6MNR03025005	0.3R0.05x2.5L			2.5	0.24	0.27	15°	4	45	
X6MNR0303005	0.3R0.05x3L			3	0.24	0.27	15°	4	45	
X6MNR0401005	0.4R0.05x1L	0.4	R0.05	1	0.32	0.37	15°	4	45	
X6MNR0402005	0.4R0.05x2L			2	0.32	0.37	15°	4	45	
X6MNR0403005	0.4R0.05x3L			3	0.32	0.37	15°	4	45	
X6MNR0404005	0.4R0.05x4L			4	0.32	0.37	15°	4	45	
X6MNR040101	0.4R0.1x1L		R0.1	1	0.32	0.37	15°	4	45	
X6MNR040201	0.4R0.1x2L			2	0.32	0.37	15°	4	45	
X6MNR040301	0.4R0.1x3L			3	0.32	0.37	15°	4	45	
X6MNR040401	0.4R0.1x4L			4	0.32	0.37	15°	4	45	

高硬钢用2刃长颈圆鼻铣刀
Hardened Steels 2-Flute Long Neck Corner Radius Endmills

硬质合金 | X6m涂层 | 65 HRC | 共颈 | 颈部角35

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNR0501005	0.5R0.05x1L	0.5	R0.05	1	0.4	0.46	15°	4	45	
X6MNR0502005	0.5R0.05x2L			2	0.4	0.46	15°	4	45	
X6MNR0503005	0.5R0.05x3L			3	0.4	0.46	15°	4	45	
X6MNR0504005	0.5R0.05x4L			4	0.4	0.46	15°	4	45	
X6MNR0505005	0.5R0.05x5L			5	0.4	0.46	15°	4	45	
X6MNR0506005	0.5R0.05x6L			6	0.4	0.46	15°	4	45	
X6MNR050101	0.5R0.1x1L		R0.1	1	0.4	0.46	15°	4	45	
X6MNR050201	0.5R0.1x2L			2	0.4	0.46	15°	4	45	
X6MNR050301	0.5R0.1x3L			3	0.4	0.46	15°	4	45	
X6MNR050401	0.5R0.1x4L			4	0.4	0.46	15°	4	45	
X6MNR050501	0.5R0.1x5L			5	0.4	0.46	15°	4	45	
X6MNR050601	0.5R0.1x6L			6	0.4	0.46	15°	4	45	
X6MNR0602005	0.6R0.05x2L	0.6	R0.05	2	0.48	0.56	15°	4	45	
X6MNR0603005	0.6R0.05x3L			3	0.48	0.56	15°	4	45	
X6MNR0604005	0.6R0.05x4L			4	0.48	0.56	15°	4	45	
X6MNR0606005	0.6R0.05x6L			6	0.48	0.56	15°	4	45	
X6MNR0608005	0.6R0.05x8L			8	0.48	0.56	15°	4	45	
X6MNR0610005	0.6R0.05x10L			10	0.48	0.56	15°	4	45	
X6MNR060201	0.6R0.1x2L		R0.1	2	0.48	0.56	15°	4	45	
X6MNR060301	0.6R0.1x3L			3	0.48	0.56	15°	4	45	
X6MNR060401	0.6R0.1x4L			4	0.48	0.56	15°	4	45	
X6MNR060601	0.6R0.1x6L			6	0.48	0.56	15°	4	45	
X6MNR060801	0.6R0.1x8L			8	0.48	0.56	15°	4	45	
X6MNR061001	0.6R0.1x10L			10	0.48	0.56	15°	4	45	
X6MNR0702005	0.7R0.05x2L	0.7	R0.05	2	0.56	0.66	15°	4	45	
X6MNR0704005	0.7R0.05x4L			4	0.56	0.66	15°	4	45	
X6MNR0706005	0.7R0.05x6L			6	0.56	0.66	15°	4	45	
X6MNR070201	0.7R0.1x2L		R0.1	2	0.56	0.66	15°	4	45	
X6MNR070401	0.7R0.1x4L			4	0.56	0.66	15°	4	45	
X6MNR070601	0.7R0.1x6L			6	0.56	0.66	15°	4	45	
X6MNR0802005	0.8R0.05x2L	0.8	R0.05	2	0.56	0.66	15°	4	45	
X6MNR0803005	0.8R0.05x3L			3	0.56	0.66	15°	4	45	
X6MNR0804005	0.8R0.05x4L			4	0.56	0.66	15°	4	45	
X6MNR0806005	0.8R0.05x6L			6	0.56	0.66	15°	4	45	
X6MNR0808005	0.8R0.05x8L			8	0.56	0.66	15°	4	45	
X6MNR0810005	0.8R0.05x10L			10	0.56	0.66	15°	4	45	
X6MNR0812005	0.8R0.05x12L			12	0.56	0.66	15°	4	45	
X6MNR080201	0.8R0.1x2L		R0.1	2	0.56	0.66	15°	4	45	
X6MNR080301	0.8R0.1x3L			3	0.56	0.66	15°	4	45	
X6MNR080401	0.8R0.1x4L			4	0.56	0.66	15°	4	45	
X6MNR080601	0.8R0.1x6L			6	0.56	0.66	15°	4	45	
X6MNR080801	0.8R0.1x8L			8	0.56	0.66	15°	4	45	
X6MNR081001	0.8R0.1x10L			10	0.56	0.66	15°	4	45	
X6MNR081201	0.8R0.1x12L			12	0.56	0.66	15°	4	45	
X6MNR080202	0.8R0.2x2L		R0.2	2	0.56	0.66	15°	4	45	
X6MNR080302	0.8R0.2x3L			3	0.56	0.66	15°	4	45	
X6MNR080402	0.8R0.2x4L			4	0.56	0.66	15°	4	45	
X6MNR080602	0.8R0.2x6L			6	0.56	0.66	15°	4	45	
X6MNR080802	0.8R0.2x8L			8	0.56	0.66	15°	4	45	
X6MNR081002	0.8R0.2x10L			10	0.56	0.66	15°	4	45	
X6MNR081202	0.8R0.2x12L			12	0.56	0.66	15°	4	45	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material			碳素钢・调质钢 Carbon Steels・Prehardened Steels S50C・NAK55・NAK80・HPM-1（~43HRC）				淬火钢 Hardened Steels HPM-38・STAVAX・SKD61（~55HRC）				铜・铝合金 Copper・Aluminum Alloy			
外径 Dia	角半径(R) Corner Radius	颈长(ℓ1) under Neck length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
			min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.1	0.01	0.3	30,000	200	0.003	0.01	30,000	100	0.001	0.02	30,000	150	0.008	0.01
	0.02	0.5	30,000	150	0.005	0.01	30,000	80	0.001	0.02	30,000	100	0.005	0.01
0.15	0.02	0.5	30,000	200	0.005	0.03	30,000	150	0.002	0.03	30,000	200	0.012	0.03
	0.05	1	30,000	150	0.008	0.03	30,000	100	0.002	0.03	30,000	150	0.01	0.03
0.2	0.02	0.5	30,000	200	0.01	0.05	30,000	150	0.003	0.04	30,000	250	0.012	0.05
		1	30,000	150	0.007	0.05	30,000	100	0.003	0.04	30,000	200	0.008	0.05
	0.05	1.5	30,000	100	0.005	0.05	30,000	80	0.002	0.04	30,000	135	0.006	0.05
		2	30,000	50	0.003	0.05	30,000	50	0.002	0.04	30,000	75	0.004	0.05
0.3	0.02	1	30,000	200	0.02	0.1	30,000	180	0.003	0.08	30,000	300	0.024	0.1
		1.5	30,000	180	0.015	0.1	30,000	130	0.003	0.08	30,000	260	0.018	0.1
	0.05	2	30,000	150	0.01	0.1	30,000	100	0.003	0.08	30,000	250	0.012	0.1
		2.5	30,000	120	0.007	0.1	25,000	80	0.002	0.08	30,000	240	0.008	0.1
		3	30,000	100	0.005	0.1	25,000	50	0.002	0.08	30,000	220	0.006	0.1
0.4	0.05	1	30,000	350	0.025	0.12	30,000	300	0.005	0.1	30,000	450	0.03	0.12
		2	30,000	250	0.02	0.12	25,000	180	0.005	0.1	30,000	360	0.024	0.12
	0.1	3	30,000	220	0.015	0.12	25,000	150	0.004	0.1	30,000	300	0.018	0.12
		4	25,000	160	0.01	0.12	20,000	100	0.003	0.1	30,000	240	0.012	0.12
0.5	0.05	1	30,000	500	0.03	0.14	25,000	400	0.01	0.12	30,000	650	0.036	0.14
		2	30,000	400	0.025	0.14	25,000	300	0.01	0.12	30,000	600	0.03	0.14
		3	30,000	340	0.02	0.14	25,000	250	0.008	0.12	30,000	480	0.024	0.14
	0.1	4	25,000	280	0.015	0.14	20,000	180	0.005	0.12	30,000	430	0.018	0.14
		5	25,000	230	0.01	0.14	20,000	150	0.004	0.12	30,000	360	0.012	0.14
		6	20,000	180	0.008	0.14	16,000	100	0.003	0.12	25,000	270	0.01	0.14
0.6	0.05	2	30,000	600	0.035	0.16	25,000	400	0.02	0.13	30,000	800	0.04	0.16
		3	30,000	500	0.03	0.16	25,000	350	0.015	0.13	30,000	750	0.035	0.16
		4	25,000	400	0.025	0.16	20,000	250	0.015	0.13	30,000	650	0.03	0.16
	0.1	6	20,000	250	0.015	0.16	16,000	150	0.008	0.13	25,000	400	0.018	0.16
		8	18,000	180	0.01	0.16	14,000	100	0.005	0.13	20,000	300	0.012	0.16
		10	16,000	160	0.01	0.16	1,200	80	0.005	0.13	15,000	200	0.012	0.16
0.7	0.05	2	30,000	700	0.04	0.2	30,000	500	0.03	0.16	30,000	1,000	0.05	0.2
		4	25,000	600	0.03	0.2	20,000	400	0.02	0.16	30,000	1,000	0.04	0.2
	0.1	6	20,000	450	0.02	0.2	16,000	250	0.01	0.16	25,000	700	0.025	0.2
0.8	0.05	2	30,000	1,400	0.055	0.25	25,000	10000	0.035	0.2	30,000	1,800	0.065	0.25
		3	30,000	1,200	0.05	0.25	25,000	800	0.03	0.2	30,000	1,600	0.06	0.25
		4	25,000	1,000	0.045	0.25	20,000	600	0.025	0.2	30,000	1,400	0.055	0.25
	0.1	6	20,000	700	0.03	0.25	16,000	400	0.02	0.2	25,000	1,000	0.04	0.25
		8	18,000	400	0.02	0.25	14,000	250	0.01	0.2	22,000	600	0.025	0.25
	0.2	10	16,000	200	0.01	0.25	12,000	200	0.01	0.2	20,000	400	0.02	0.25
		12	14,000	100	0.01	0.25	10,000	150	0.01	0.2	180,000	200	0.01	0.25

长颈圆鼻 Long Neck Corner Radius

备注 Notes

※请根据实际的加工形状及使用机床等调整切削参数。
※切深量的ap表示轴向切入量，ae表示步距量。
※加工淬火钢时，建议使用油雾冷却方式。
※轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※ℓ1(颈长)/D(刃径)超过8倍时，立面附近的进给速度须调整至50%以下，切深量: ae调整至30%以下。
※沟槽切削时建议参考切削参数表，切深量ap及进给速度设定为50%以下，采用来回切削加工方式。
※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率调。

※Adjust milling conditions according to milling shape and machine type.
※ap : Axial Depth Of Cut, ae : Radial Depth Of Cut.
※Recommend to use oil mist coolant for machining hardened steels.
※Recommend to apply helical or ramping for approaching into axial direction.
※ Adjust feed rate 50% lower and cutting depth (ae) 30% lower for milling deep wall area Under Neck Length ℓ1/D exceeds 8 for table milling.
※For slotting, recommend reciprocating milling by adjusting feed & ap in below 50% of recommended milling condition.
※Reduce both spindle speed and feed at same rate for chattering and also for insuicient spindle speed of a machine.

高硬钢用4刃长颈圆鼻铣刀
Hardened Steels 4-Flute Long Neck Corner Radius Endmills

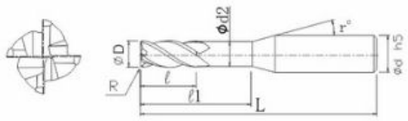
4刃 · 带R角 | 4-Flute · Corner Radius

平面 Planing | 侧铣 Side Cutting | 槽 Slotting | 刻模 Die-sinking | 仿形 Profiling | R Radius | 螺旋 Helical | 粗加工 Roughing | 半精加工 Semi-Finishing | 精加工 Finishing | 切削条件 B037 Cutting Conditions

外径公差 Dia.tolerance: 1≤D≤3: 0~-0.01; D≤4: 0~-0.015
r公差 r tolerance: ±0.005
h5: 0~-0.005
(mm)

高硬度材料加工用。超群的切削排出性能，可实现高效率加工。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

TYPE A:



- 在高硬度领域(48-65HRC)的长时间加工中也可实现稳定的长寿命。
- 增大了螺旋角，使得刀刃变得更锋利，而且圆鼻形状可以抑制崩刃。
- Realized stably long tool life against high hardened steels (48 ~ 65HRC).
- Corner radius to prevent flute chipping, and high helix angle for cutting sharpness.

硬质合金 | X6m涂层 | 65 HRC | 柄面 | 螺旋角35°

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNR1004005	1R0.05x4L	1	R0.05	4	0.8	0.95	15°	4	50	
X6MNR1006005	1R0.05x6L			6	0.8	0.95	15°	4	50	
X6MNR1008005	1R0.05x8L			8	0.8	0.95	15°	4	50	
X6MNR1010005	1R0.05x10L			10	0.8	0.95	15°	4	50	
X6MNR1012005	1R0.05x12L			12	0.8	0.95	15°	4	50	
X6MNR1016005	1R0.05x16L			16	0.8	0.95	15°	4	50	
X6MNR100401	1R0.1x4L		R0.1	4	0.8	0.95	15°	4	50	
X6MNR100601	1R0.1x6L			6	0.8	0.95	15°	4	50	
X6MNR100801	1R0.1x8L			8	0.8	0.95	15°	4	50	
X6MNR101001	1R0.1x10L			10	0.8	0.95	15°	4	50	
X6MNR101201	1R0.1x12L			12	0.8	0.95	15°	4	50	
X6MNR101601	1R0.1x16L			16	0.8	0.95	15°	4	50	
X6MNR100402	1R0.2x4L		R0.2	4	0.8	0.95	15°	4	50	
X6MNR100602	1R0.2x6L			6	0.8	0.95	15°	4	50	
X6MNR100802	1R0.2x8L			8	0.8	0.95	15°	4	50	
X6MNR101002	1R0.2x10L			10	0.8	0.95	15°	4	50	
X6MNR101202	1R0.2x12L			12	0.8	0.95	15°	4	50	
X6MNR101602	1R0.2x16L			16	0.8	0.95	15°	4	50	
X6MNR100403	1R0.3x4L		R0.3	4	0.8	0.95	15°	4	50	
X6MNR100603	1R0.3x6L			6	0.8	0.95	15°	4	50	
X6MNR100803	1R0.3x8L			8	0.8	0.95	15°	4	50	
X6MNR101003	1R0.3x10L			10	0.8	0.95	15°	4	50	
X6MNR101203	1R0.3x12L			12	0.8	0.95	15°	4	50	
X6MNR101603	1R0.3x16L			16	0.8	0.95	15°	4	50	
X6MNR120501	1.2R0.1x5L	1.2	R0.1	5	0.96	1.15	15°	4	50	
X6MNR121001	1.2R0.1x10L			10	0.96	1.15	15°	4	50	
X6MNR121501	1.2R0.1x15L			15	0.96	1.15	15°	4	50	
X6MNR120502	1.2R0.2x5L		R0.2	5	0.96	1.15	15°	4	50	
X6MNR121002	1.2R0.2x10L			10	0.96	1.15	15°	4	50	
X6MNR121502	1.2R0.2x15L			15	0.96	1.15	15°	4	50	

小直径深腔 Small Deep Rib
X6m 高硬钢 X6m Hardened Steels
高硬钢用4刃长颈圆鼻铣刀
Hardened Steels 4-Flute Long Neck Corner Radius Endmills

硬质合金 | X6m涂层 | 65 HRC | 柄面 | 螺旋角35°

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNR1506005	1.5R0.05x6L	1.5	R0.05	6	1.2	1.45	15°	4	50	
X6MNR1508005	1.5R0.05x8L			8	1.2	1.45	15°	4	50	
X6MNR1510005	1.5R0.05x10L			10	1.2	1.45	15°	4	50	
X6MNR1512005	1.5R0.05x12L			12	1.2	1.45	15°	4	50	
X6MNR1516005	1.5R0.05x16L			16	1.2	1.45	15°	4	50	
X6MNR150601	1.5R0.1x6L		R0.1	6	1.2	1.45	15°	4	50	
X6MNR150801	1.5R0.1x8L			8	1.2	1.45	15°	4	50	
X6MNR151001	1.5R0.1x10L			10	1.2	1.45	15°	4	50	
X6MNR151201	1.5R0.1x12L			12	1.2	1.45	15°	4	50	
X6MNR151601	1.5R0.1x16L			16	1.2	1.45	15°	4	50	
X6MNR150602	1.5R0.2x6L		R0.2	6	1.2	1.45	15°	4	50	
X6MNR150802	1.5R0.2x8L			8	1.2	1.45	15°	4	50	
X6MNR151002	1.5R0.2x10L			10	1.2	1.45	15°	4	50	
X6MNR151202	1.5R0.2x12L			12	1.2	1.45	15°	4	50	
X6MNR151602	1.5R0.2x16L			16	1.2	1.45	15°	4	50	
X6MNR200601	2R0.1x6L	2	R0.1	6	1.6	1.94	15°	4	50	
X6MNR200801	2R0.1x8L			8	1.6	1.94	15°	4	50	
X6MNR201001	2R0.1x10L			10	1.6	1.94	15°	4	50	
X6MNR201201	2R0.1x12L			12	1.6	1.94	15°	4	50	
X6MNR201601	2R0.1x16L			16	1.6	1.94	15°	4	50	
X6MNR202001	2R0.1x20L			20	1.6	1.94	15°	4	50	
X6MNR200602	2R0.2x6L		R0.2	6	1.6	1.94	15°	4	50	
X6MNR200802	2R0.2x8L			8	1.6	1.94	15°	4	50	
X6MNR201002	2R0.2x10L			10	1.6	1.94	15°	4	50	
X6MNR201202	2R0.2x12L			12	1.6	1.94	15°	4	50	
X6MNR201602	2R0.2x16L			16	1.6	1.94	15°	4	50	
X6MNR202002	2R0.2x20L			20	1.6	1.94	15°	4	50	
X6MNR200603	2R0.3x6L		R0.3	6	1.6	1.94	15°	4	50	
X6MNR200803	2R0.3x8L			8	1.6	1.94	15°	4	50	
X6MNR201003	2R0.3x10L			10	1.6	1.94	15°	4	50	
X6MNR201203	2R0.3x12L			12	1.6	1.94	15°	4	50	
X6MNR201603	2R0.3x16L			16	1.6	1.94	15°	4	50	
X6MNR203003	2R0.3x20L			20	1.6	1.94	15°	4	50	
X6MNR200605	2R0.5x6L		R0.5	6	1.6	1.94	15°	4	50	
X6MNR200805	2R0.5x8L			8	1.6	1.94	15°	4	50	
X6MNR201005	2R0.5x10L			10	1.6	1.94	15°	4	50	
X6MNR201205	2R0.5x12L			12	1.6	1.94	15°	4	50	
X6MNR201605	2R0.5x16L			16	1.6	1.94	15°	4	50	
X6MNR202005	2R0.5x20L			20	1.6	1.94	15°	4	50	
X6MNR251001	2.5R0.1x10L	2.5	R0.1	10	2	2.4	15°	4	50	
X6MNR252001	2.5R0.1x20L			20	2	2.4	15°	4	60	
X6MNR253001	2.5R0.1x30L			30	2	2.4	15°	4	75	
X6MNR251002	2.5R0.2x10L		R0.2	10	2	2.4	15°	4	50	
X6MNR252002	2.5R0.2x20L			20	2	2.4	15°	4	60	
X6MNR253002	2.5R0.2x30L			30	2	2.4	15°	4	75	
X6MNR251003	2.5R0.3x10L		R0.3	10	2	2.4	15°	4	50	
X6MNR252003	2.5R0.3x20L			20	2	2.4	15°	4	60	
X6MNR253003	2.5R0.3x30L			30	2	2.4	15°	4	75	
X6MNR251005	2.5R0.5x10L		R0.5	10	2	2.4	15°	4	50	
X6MNR252005	2.5R0.5x20L			20	2	2.4	15°	4	60	
X6MNR253005	2.5R0.5x30L			30	2	2.4	15°	4	75	

高硬钢用4刃长颈圆鼻铣刀
Hardened Steels 4-Flute Long Neck Corner Radius Endmills

硬质合金 | X6m涂层 | 65 HRC | 4

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNR300801	3R0.1x8L	3	R0.1	8	2.4	2.85	15°	4	50	
X6MNR301001	3R0.1x10L			10	2.4	2.85	15°	4	50	
X6MNR301201	3R0.1x12L			12	2.4	2.85	15°	4	50	
X6MNR301601	3R0.1x16L			16	2.4	2.85	15°	4	50	
X6MNR300801L	3R0.1x8L			8	2.4	2.85	15°	6	60	
X6MNR301201L	3R0.1x12L			12	2.4	2.85	15°	6	60	
X6MNR301601L	3R0.1x16L			16	2.4	2.85	15°	6	60	
X6MNR302001L	3R0.1x20L			20	2.4	2.85	15°	6	60	
X6MNR302501L	3R0.1x25L			25	2.4	2.85	15°	6	75	
X6MNR303001L	3R0.1x30L			30	2.4	2.85	15°	6	75	
X6MNR300802	3R0.2x8L		R0.2	8	2.4	2.85	15°	4	50	
X6MNR301002	3R0.2x10L			10	2.4	2.85	15°	4	50	
X6MNR301202	3R0.2x12L			12	2.4	2.85	15°	4	50	
X6MNR301602	3R0.2x16L			16	2.4	2.85	15°	4	50	
X6MNR300802L	3R0.2x8L			8	2.4	2.85	15°	6	60	
X6MNR301202L	3R0.2x12L			12	2.4	2.85	15°	6	60	
X6MNR301602L	3R0.2x16L			16	2.4	2.85	15°	6	60	
X6MNR302002L	3R0.2x20L			20	2.4	2.85	15°	6	60	
X6MNR302502L	3R0.2x25L			25	2.4	2.85	15°	6	75	
X6MNR303002L	3R0.2x30L			30	2.4	2.85	15°	6	75	
X6MNR300803	3R0.3x8L		R0.3	8	2.4	2.85	15°	4	50	
X6MNR301003	3R0.3x10L			10	2.4	2.85	15°	4	50	
X6MNR301203	3R0.3x12L			12	2.4	2.85	15°	4	50	
X6MNR301603	3R0.3x16L			16	2.4	2.85	15°	4	50	
X6MNR300803L	3R0.3x8L			8	2.4	2.85	15°	6	60	
X6MNR301203L	3R0.3x12L			12	2.4	2.85	15°	6	60	
X6MNR301603L	3R0.3x16L			16	2.4	2.85	15°	6	60	
X6MNR302003L	3R0.3x20L			20	2.4	2.85	15°	6	60	
X6MNR302503L	3R0.3x25L			25	2.4	2.85	15°	6	75	
X6MNR303003L	3R0.3x30L			30	2.4	2.85	15°	6	75	
X6MNR300805	3R0.5x8L		R0.5	8	2.4	2.85	15°	4	50	
X6MNR301005	3R0.5x10L			10	2.4	2.85	15°	4	50	
X6MNR301205	3R0.5x12L			12	2.4	2.85	15°	4	50	
X6MNR301605	3R0.5x16L			16	2.4	2.85	15°	4	50	
X6MNR300805L	3R0.5x8L			8	2.4	2.85	15°	6	60	
X6MNR301205L	3R0.5x12L			12	2.4	2.85	15°	6	60	
X6MNR301605L	3R0.5x16L			16	2.4	2.85	15°	6	60	
X6MNR302005L	3R0.5x20L			20	2.4	2.85	15°	6	60	
X6MNR302505L	3R0.5x25L			25	2.4	2.85	15°	6	75	
X6MNR303005L	3R0.5x30L			30	2.4	2.85	15°	6	75	
X6MNR300810	3R1x8L		R1	8	2.4	2.85	15°	4	50	
X6MNR301010	3R1x10L			10	2.4	2.85	15°	4	50	
X6MNR301210	3R1x12L			12	2.4	2.85	15°	4	50	
X6MNR301610	3R1x16L			16	2.4	2.85	15°	4	50	
X6MNR300810L	3R1x8L			8	2.4	2.85	15°	6	60	
X6MNR301210L	3R1x12L			12	2.4	2.85	15°	6	60	
X6MNR301610L	3R1x16L			16	2.4	2.85	15°	6	60	
X6MNR302010L	3R1x20L			20	2.4	2.85	15°	6	60	
X6MNR302510L	3R1x25L			25	2.4	2.85	15°	6	75	
X6MNR303010L	3R1x30L			30	2.4	2.85	15°	6	75	

小直径深腔 Small Deep Rib
高硬钢用4刃长颈圆鼻铣刀
Hardened Steels 4-Flute Long Neck Corner Radius Endmills
X6m 高硬钢 X6m Hardened Steels
碳素钢 Carbon Steel P
合金钢 Alloy Steel P
调质钢 Prehardened Steel P
高硬度钢 ~55 Hardened Steel ~55HRC H
高硬度钢 ~60 Hardened Steel ~60HRC H
高硬度钢 ~70 Hardened Steel ~70HRC H
铜合金 Copper N
长颈圆鼻 Long neck and round nose
硬质合金 | X6m涂层 | 65 HRC | 4

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNR400801L	4R0.1x8L	4	R0.1	8	3.2	3.8	15°	6	60	
X6MNR401201L	4R0.1x12L			12	3.2	3.8	15°	6	60	
X6MNR401601L	4R0.1x16L			16	3.2	3.8	15°	6	60	
X6MNR402001L	4R0.1x20L			20	3.2	3.8	15°	6	60	
X6MNR402401L	4R0.1x24L			24	3.2	3.8	15°	6	75	
X6MNR403201L	4R0.1x32L			32	3.2	3.8	15°	6	75	
X6MNR400802L	4R0.2x8L		R0.2	8	3.2	3.8	15°	6	60	
X6MNR401202L	4R0.2x12L			12	3.2	3.8	15°	6	60	
X6MNR401602L	4R0.2x16L			16	3.2	3.8	15°	6	60	
X6MNR402002L	4R0.2x20L			20	3.2	3.8	15°	6	60	
X6MNR402402L	4R0.2x24L			24	3.2	3.8	15°	6	75	
X6MNR403202L	4R0.2x32L			32	3.2	3.8	15°	6	75	
X6MNR400803L	4R0.3x8L		R0.3	8	3.2	3.8	15°	6	60	
X6MNR401203L	4R0.3x12L			12	3.2	3.8	15°	6	60	
X6MNR401603L	4R0.3x16L			16	3.2	3.8	15°	6	60	
X6MNR402003L	4R0.3x20L			20	3.2	3.8	15°	6	60	
X6MNR402403L	4R0.3x24L			24	3.2	3.8	15°	6	75	
X6MNR403203L	4R0.3x32L			32	3.2	3.8	15°	6	75	
X6MNR400805L	4R0.5x8L		R0.5	8	3.2	3.8	15°	6	60	
X6MNR401205L	4R0.5x12L			12	3.2	3.8	15°	6	60	
X6MNR401605L	4R0.5x16L			16	3.2	3.8	15°	6	60	
X6MNR402005L	4R0.5x20L			20	3.2	3.8	15°	6	60	
X6MNR402405L	4R0.5x24L			24	3.2	3.8	15°	6	75	
X6MNR403205L	4R0.5x32L			32	3.2	3.8	15°	6	75	
X6MNR400810L	4R1x8L		R1	8	3.2	3.8	15°	6	60	
X6MNR401210L	4R1x12L			12	3.2	3.8	15°	6	60	
X6MNR401610L	4R1x16L			16	3.2	3.8	15°	6	60	
X6MNR402010L	4R1x20L			20	3.2	3.8	15°	6	60	
X6MNR402410L	4R1x24L			24	3.2	3.8	15°	6	75	
X6MNR403210L	4R1x32L			32	3.2	3.8	15°	6	75	

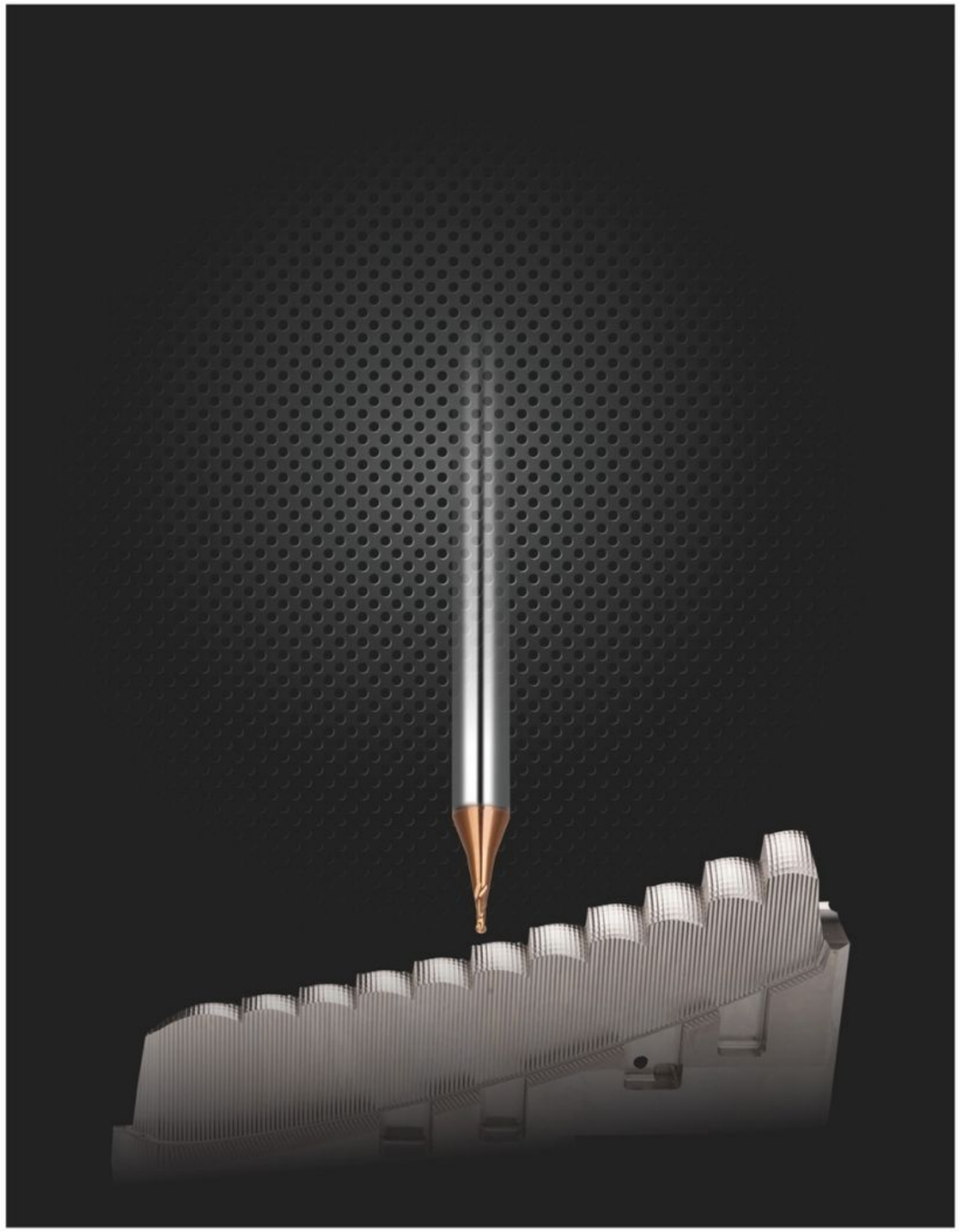
切削参数参考表
Recommended Milling Conditions

加工材料 Work Material			淬火钢 Hardened Steels SKD11 (∽62HRC)				淬火钢 Hardened Steels HPM-38 · STAVAX · SKD61 (∽55HRC)				碳素钢 · 调质钢 Carbon Steels · Prehardened Steels S50C · NAK55 · NAK80 · HPM-1 (∽43HRC)				铜 · 铝合金 Copper · Aluminum Alloy			
外径 Dia.	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	
			min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
1	0.05 0.1 0.2 0.3	4	10,800	840	0.03	0.25	12,800	1,050	0.04	0.3	16,000	1,500	0.05	0.05	16,000	1,500	0.15	0.23
		6	8,900	680	0.015	0.2	11,600	840	0.03	0.25	14,500	1,200	0.04	0.04	14,500	1,200	0.12	0.2
		8	8,900	500	0.012	0.16	11,600	620	0.02	0.2	14,500	870	0.03	0.03	14,500	870	0.09	0.2
		10	7,100	370	0.01	0.1	8,900	470	0.015	0.1	11,100	660	0.025	0.025	11,100	660	0.075	0.15
		12	7,100	160	0.005	0.06	8,900	210	0.01	0.08	11,100	300	0.02	0.02	11,100	300	0.06	0.15
		16	7,100	80	0.003	0.05	8,900	100	0.01	0.06	11,100	100	0.01	0.01	11,100	100	0.05	0.1
1.2	0.1 0.2	5	10,000	970	0.025	0.25	12,400	1,220	0.045	0.35	15,500	1,740	0.06	0.06	15,500	1,740	0.18	0.28
		10	8,000	720	0.01	0.15	9,600	900	0.03	0.25	12,000	1,290	0.04	0.04	12,000	1,290	0.12	0.28
		15	6,600	270	0.005	0.08	8,500	330	0.01	0.1	10,600	480	0.02	0.02	10,600	480	0.07	0.23
1.5	0.05 0.1 0.2	6	8,500	1,070	0.03	0.3	11,200	1,340	0.05	0.4	14,000	1,910	0.08	0.08	14,000	1,910	0.24	0.35
		8	7,800	950	0.025	0.3	10,500	1,190	0.05	0.4	13,000	1,960	0.07	0.07	13,000	1,700	0.22	0.34
		10	7,000	800	0.02	0.3	9,800	10,000	0.045	0.35	12,000	1,470	0.07	0.07	12,000	1,450	0.2	0.33
		12	6,400	700	0.01	0.2	9,000	870	0.04	0.3	11,500	1,250	0.06	0.06	11,500	1,250	0.18	0.3
		16	5,000	500	0.008	0.1	7,000	500	0.03	0.2	10,000	800	0.04	0.04	10,000	600	0.1	0.28
2	0.1 0.2 0.3 0.5	6	8,000	1300	0.04	0.4	1,000	1600	0.06	0.6	12,000	2200	0.09	0.09	12,000	2200	0.3	0.45
		8	7,000	1,200	0.03	0.4	8,800	1,500	0.05	0.5	11,100	2,150	0.08	0.08	11,100	2,150	0.24	0.45
		10	6,000	1,000	0.027	0.4	8,800	1,300	0.045	0.5	11,100	2,000	0.07	0.07	11,100	2,000	0.2	0.43
		12	5,600	1,000	0.027	0.4	8,800	1,260	0.045	0.5	11,100	1,800	0.065	0.065	11,100	1,800	0.2	0.43
		16	4,800	840	0.01	0.2	7,700	1,050	0.04	0.35	9,600	1,500	0.05	0.05	9,600	1,500	0.15	0.39
		20	4,500	500	0.01	0.1	7,700	630	0.015	0.25	9,600	900	0.03	0.03	9,600	900	0.12	0.35
2.5	0.1 0.2 0.3 0.5	10	6,000	1,280	0.04	0.5	7,400	1,590	0.07	0.7	9,200	2,280	0.1	0.1	9,200	2,280	0.3	0.5
		20	4,000	900	0.01	0.2	6,600	1,110	0.05	0.4	8,300	1,580	0.08	0.08	8,300	1,580	0.24	0.43
		30	3,200	400	0.005	0.1	4,300	500	0.01	0.2	5,400	710	0.025	0.025	5,400	710	0.1	0.33
3	0.1 0.2 0.3 0.5 1	8	6,000	1,500	0.05	0.75	8,000	2,000	0.08	0.9	9,000	3,000	0.12	0.12	10,000	2,600	0.4	0.65
		10	5,500	1,450	0.05	0.7	7,000	1,800	0.08	0.85	8,500	2,800	0.12	0.12	9,000	2,500	0.38	0.56
		12	5,200	1,350	0.05	0.65	6,400	1,680	0.08	0.8	8,000	2,400	0.12	0.12	8,000	2,400	0.36	0.55
		16	3,700	1,100	0.03	0.4	6,200	1,410	0.07	0.7	7,800	2,000	0.11	0.11	7,800	2,010	0.33	0.5
		20	3,600	1,000	0.03	0.3	6,200	1,250	0.06	0.6	7,700	1,850	0.1	0.1	7,700	1,850	0.3	0.5
		25	3,400	900	0.02	0.2	6,000	1,140	0.06	0.5	7,500	1,620	0.1	0.1	7,500	1,620	0.3	0.45
		30	3,000	600	0.005	0.1	4,800	740	0.03	0.4	6,000	1,050	0.05	0.05	6,000	1,050	0.15	0.4
4	0.1 0.2 0.3 0.5 1	8	6,000	1600	0.06	0.9	6,000	200	0.1	1	8,000	2,800	0.18	0.18	8,000	3,500	0.55	0.8
		12	5,000	1500	0.06	0.85	5,000	1800	0.1	1	7,000	2,600	0.16	0.16	7,000	3,000	0.5	0.78
		16	4,000	1,400	0.06	0.8	4,800	1,770	0.1	1	6,000	2,520	0.15	0.15	6,000	2,520	0.45	0.75
		20	3,500	1,200	0.05	0.7	1,500	1,500	0.09	0.9	5,600	2,300	0.14	0.14	5,700	2,200	0.4	0.73
		24	2,800	1,140	0.05	0.65	4,300	1,430	0.085	0.8	5,400	2,030	0.12	0.12	5,400	2,030	0.39	0.7
		32	2,300	750	0.01	0.1	3,800	950	0.04	0.7	4,800	1,350	0.08	0.08	4,800	1,350	0.25	0.6

备注 Notes

※请根据实际的加工形状及使用机床等调整切削参数。
※切深量的ap表示轴向切入量，ae表示步距量。
※加工淬火钢时，建议使用油雾冷却方式。
※轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※ℓ1(颈长)/D(刃径)超过8倍时，立面附近的进给速度须调整至50%以下，切深量: ae调整至30%以。
※沟槽切削时建议参考切削参数表，切深量ap及进给速度设定为50%以下，采用来回切削加工方式。
※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率调。

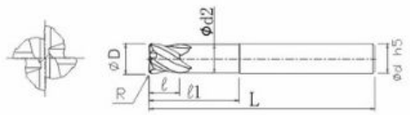
※Adjust milling conditions according to milling shape and machine type.
※ap : Axial Depth of Cut, ae : Radial Depth of Cut.
※Recommend to use oil mist coolant for machining hardened steels.
※Recommend to apply herical or ramping for approaching into axial direction.
※ Adjust feed rate 50% lower and cutting depth (ae) 30% lower for milling deep wall area Under Neck Length ℓ1/D exceeds 8 for table milling.
※For slotting, recommend reciprocating milling by adjusting feed & ap in below 50% of recommended milling condition.
※Reduce both spindle speed and feed at same rate for chattering and also for insuicient spindle speed of a machine.



高硬钢用4刃直柄长颈圆鼻铣刀

Hardened Steels 4-Flute Straight Shank Long Neck Corner Radius Endmills

4刃 · 带R角 | 4-Flute · Corner Radius



高硬度材料加工用。超群的切削排出性能，可实现高效率加工。
For machining of high-hardness materials. Excellent chip removal performance enables high efficiency.

4≤D≤12: 0~-0.015 ±0.005 h5 0~-0.005 (mm)

- 在高硬度领域(48-65HRC)的长时间加工中也可实现稳定的长寿命。
- 增大了螺旋角，使得刀刃变得更锋利，而且圆鼻形状可以抑制崩刃。

- Realized stably long tool life against high hardened steels (48~65HRC).
- Corner radius to prevent flute chipping, and high helix angle for cutting sharpness.

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X6MNR401201	4R0.1x12L	4	0.1	12	5	3.8	15°	4	50	
X6MNR401202	4R0.2x12L		0.2	12	5	3.8	15°	4	50	
X6MNR401203	4R0.3x12L		0.3	12	5	3.8	15°	4	50	
X6MNR401205	4R0.5x12L		0.5	12	5	3.8	15°	4	50	
X6MNR401210L	4R1x12L		1	12	5	3.8	15°	4	50	
X6MNR601802	6R0.2x18L	6	0.2	18	7	5.8	15°	6	50	
X6MNR601802L	6R0.2x18L			18	7	5.8	15°	6	60	
X6MINR601802	6R0.2x18L			18	7	5.8	15°	6	75	
X6MJNR601802	6R0.2x18L			18	7	5.8	15°	6	100	
X6MNR601803	6R0.3x18L		0.3	18	7	5.8	15°	6	50	
X6MNR601803L	6R0.3x18L			18	7	5.8	15°	6	60	
X6MINR601803	6R0.3x18L			18	7	5.8	15°	6	75	
X6MJNR601803	6R0.3x18L			18	7	5.8	15°	6	100	
X6MNR601805	6R0.5x18L		0.5	18	7	5.8	15°	6	50	
X6MNR601805L	6R0.5x18L			18	7	5.8	15°	6	60	
X6MINR601805	6R0.5x18L			18	7	5.8	15°	6	75	
X6MJNR601805	6R0.5x18L			18	7	5.8	15°	6	100	
X6MNR601810	6R1x18L		1	18	7	5.8	15°	6	50	
X6MNR601810L	6R1x18L			18	7	5.8	15°	6	60	
X6MINR601810	6R1x18L			18	7	5.8	15°	6	75	
X6MJNR601810	6R1x18L			18	7	5.8	15°	6	100	
X6MNR802405	8R0.5x24L	8	0.5	24	9	7.8	15°	8	60	
X6MINR802405	8R0.5x24L			24	9	7.8	15°	8	75	
X6MJNR802405	8R0.5x24L			24	9	7.8	15°	8	100	
X6MNR802410	8R1x24L		1	24	9	7.8	15°	8	60	
X6MINR802410	8R1x24L			24	9	7.8	15°	8	75	
X6MJNR802410	8R1x24L			24	9	7.8	15°	8	100	
X6MNR103005	10R0.5x30L	10	0.5	30	11	9.8	15°	10	75	
X6MJNR103005	10R0.5x30L			30	11	9.8	15°	10	100	
X6MNR103010	10R1x30L		1	30	11	9.8	15°	10	75	
X6MJNR103010	10R1x30L			30	11	9.8	15°	10	100	
X6MNR123605	12R0.5x36L	12	0.5	36	13	11.7	15°	12	75	
X6MJNR123605	12R0.5x36L			36	13	11.7	15°	12	100	
X6MNR123610	12R1x36L		1	36	13	11.7	15°	12	75	
X6MJNR123610	12R1x36L			36	13	11.7	15°	12	100	

切削参数参考表

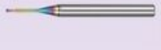
Recommended Milling Conditions

加工材料 Work Material	高速钢 High Speed Tool Steels SKH (~65HRC)				淬火钢 Hardened Steels SKD11 (~62HRC)				淬火钢 Hardened Steels HPM-38 · STAVAX · SKD61 (~55HRC)			
	侧面 Side Milling		沟槽 Slotting		侧面 Side Milling		沟槽 Slotting		侧面 Side Milling		沟槽 Slotting	
外径 Dia.	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed
	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
4	6,000	600	5,000	300	7,000	800	6,000	540	8,500	1,200	7,500	620
6	4,600	800	4,200	350	5,300	1,200	4,800	600	6,400	1,800	5,800	950
8	3,400	1,000	3,000	400	4,000	1,400	3,600	700	4,800	2,000	4,300	1,000
10	2,600	1,000	2,300	500	3,200	1,600	2,800	800	3,800	2,000	3,400	1,000
12	2,200	1,000	2,000	500	2,600	1,600	2,300	800	3,200	2,000	2,800	1,000
切深量 Depth of Cut (D:刃 径Dia.)	侧面 Side Milling 1.5D 0.02D; 沟槽 Slotting D 0.01D				侧面 Side Milling 1.5D 0.02D; 沟槽 Slotting D 0.01D				侧面 Side Milling 1.5D 0.03D; 沟槽 Slotting D 0.02D			
备注 Notes	※请使用刚性好、精度高的机床和夹具。 ※加工参数会因切深量和机床刚性的状况而有所不同。请每次调整后再使用。 ※请以相同的比率调整主轴转速和进给速度。 ※建议使用吹气或油雾冷却方式。 ※Use a rigid and precise machine and chuck holder. ※Adjust miling conditions according to the volume of Depth of Cut and rigidity of the machine. ※Adjust both spindle speed and feed at the same rate. ※Use oilmist coolant orair blow.											

铜・铝合金加工用铣刀
Copper・Aluminum Alloy For Machining Endmills

铜・铝合金加工用铣刀
Copper・Aluminum Alloy For Machining Endmills
X3
铜·铝合金
X3 Copper·
Aluminum Alloy

型号 Model	规格 Size	涂层 Coating	刃数 Number of Flute	螺旋角 Helix Angle	精加工分类 Types of Finishing	加工用途 Applications	可对应加工材料 Work Material	规格数量 Number of Sizes	页面 Page
铜・铝合金用4刃平底铣刀 Copper・Aluminum Alloy 4-Flute Square Endmills									
	φ1~φ12	tac	4	35	精加工 Finishing; 筋加工 细部 Rib Miniature	侧面 Side Cutting; 槽 Slotting; 细部 Miniature	○ ○ - ○ - -	24	B043
针对铜电极加工用的平底铣刀。采用锋利度和精加工表面品质兼具的高螺旋角，可抑制加工面产生水平条纹。 Flat end milling cutter for copper electrode machining. The high spiral Angle with both edge sharpness and finishing surface quality can restrain the horizontal fringe.									
铜・铝合金用2刃球头铣刀 Copper・Aluminum Alloy 2-Flute Ball Endmills									
	R0.5~R5	tac	2	30	半精加工 Semi Finishing; 精加工 Finishing; 筋加工 细部 Rib Miniature	槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 细部 Miniature	○ ○ - ○ - -	17	B045
针对铜电极加工用的球头铣刀。采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。 Ball end milling cutter for copper electrode machining. With optimized blade shape and tac coating, continuous and stable high quality processing is ensured over long periods of time.									
铜・铝合金用4刃圆鼻铣刀 Copper・Aluminum Alloy 4-Flute Corner Radius Endmills									
	φ1xR0.05 ~φ10xR1	tac	4	35	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○ ○ - ○ - -	37	B047
针对铜电极加工用的圆鼻铣刀。采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。 Ball end milling cutter for copper electrode machining. With optimized blade shape and tac coating, continuous and stable high quality processing is ensured over long periods of time.									
铜・铝合金用2刃微小径平底铣刀 Copper・Aluminum Alloy 2-Flute Micro Diameter Square Endmills									
	φ0.03~φ0.9	tac	2	30	精加工 Finishing; 筋加工 细部 Rib Miniature	侧面 Side Cutting; 槽 Slotting; 细部 Miniature	○ ○ - ○ - -	20	B049
针对铜电极加工用的平底铣刀。采用锋利度和精加工表面品质兼具的高螺旋角，可抑制加工面产生水平条纹。 Flat end milling cutter for copper electrode machining. The high spiral Angle with both edge sharpness and finishing surface quality can restrain the horizontal fringe.									
铜・铝合金用2刃微小径球头铣刀 Copper・Aluminum Alloy2-Flute Micro Diameter Ball Endmills									
	R0.03-R0.45	tac	2	30	半精加工 Semi Finishing; 精加工 Finishing; 筋加工 细部 Rib Miniature	槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 细部 Miniature	○ ○ - ○ - -	15	B051
针对铜电极加工用的球头铣刀。采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。 Ball end milling cutter for copper electrode machining. With optimized blade shape and tac coating, continuous and stable high quality processing is ensured over long periods of time.									
铜・铝合金用2刃微小径圆鼻铣刀 Copper・Aluminum Alloy 2-Flute Micro Diameter Corner Radius Endmills									
	φ0.1xR0.01~ φ0.8xR0.2	tac	2	30	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○ ○ - ○ - -	19	B053
针对铜电极加工用的圆鼻铣刀。采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。 Ball end milling cutter for copper electrode machining. With optimized blade shape and tac coating, continuous and stable high quality processing is ensured over long periods of time.									

型号 Model	规格 Size	涂层 Coating	刃数 Number of Flute	螺旋角 Helix Angle	精加工分类 Types of Finishing	加工用途 Applications	可对应加工材料 Work Material	规格数量 Number of Sizes	页面 Page
铜・铝合金用2刃长颈平底铣刀 Copper・Aluminum Alloy 2-Flute Long Neck Square Endmills									
	φ0.1~φ2	tac	2	30	精加工 Finishing; 筋加工 细部 Rib Miniature	侧面 Side Cutting; 槽 Slotting; 细部 Miniature	○ ○ - ○ - -	71	B055
针对铜电极加工用的平底铣刀。采用锋利度和精加工表面品质兼具的高螺旋角，可抑制加工面产生水平条纹。 Flat end milling cutter for copper electrode machining. The high spiral Angle with both edge sharpness and finishing surface quality can restrain the horizontal fringe.									
铜・铝合金用4刃长颈平底铣刀 Copper・Aluminum Alloy 4-Flute Long Neck Square Endmills									
	φ1~φ4	tac	4	30	精加工 Finishing; 筋加工 细部 Rib Miniature	侧面 Side Cutting; 槽 Slotting; 细部 Miniature	○ ○ - ○ - -	30	B059
针对铜电极加工用的平底铣刀。采用锋利度和精加工表面品质兼具的高螺旋角，可抑制加工面产生水平条纹。 Flat end milling cutter for copper electrode machining. The high spiral Angle with both edge sharpness and finishing surface quality can restrain the horizontal fringe.									
铜・铝合金用2刃长颈球头铣刀 Copper・Aluminum Alloy 2-Flute Long Neck Ball Endmills									
	R0.1~R2	tac	2	30	半精加工 Semi Finishing; 精加工 Finishing; 筋加工 细部 Rib Miniature	槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 细部 Miniature	○ ○ - ○ - -	70	B061
针对铜电极加工用的球头铣刀。采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。 Ball end milling cutter for copper electrode machining. With optimized blade shape and tac coating, continuous and stable high quality processing is ensured over long periods of time.									
铜・铝合金用2刃长颈圆鼻铣刀 Copper・Aluminum Alloy 2-Flute Long Neck Corner Radius Endmills									
	φ0.2xR0.02~ φ0.8xR0.2	tac	2	30	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○ ○ - ○ - -	41	B065
针对铜电极加工用的圆鼻铣刀。采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。 Ball end milling cutter for copper electrode machining. With optimized blade shape and tac coating, continuous and stable high quality processing is ensured over long periods of time.									
铜・铝合金用4刃长颈圆鼻铣刀 Copper・Aluminum Alloy 4-Flute Long Neck Corner Radius Endmills									
	φ1xR0.05~ φ4xR0.5	tac	4	30	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○ ○ - ○ - -	57	B067
针对铜电极加工用的圆鼻铣刀。采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。 Ball end milling cutter for copper electrode machining. With optimized blade shape and tac coating, continuous and stable high quality processing is ensured over long periods of time.									

铜·铝合金用4刃平底铣刀
Copper · Aluminum Alloy 4-Flute Square Endmills

4刃·平底铣刀 | 4-Flute · Square

Side Cutting | Slotting | Miniature | Finishing | Rib Miniature | Cutting Conditions B044

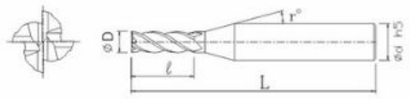
外径公差 Dia.tolerance: 1≤D≤3: 0~-0.01; 4≤D≤12: 0~-0.015

h5: 0~-0.005

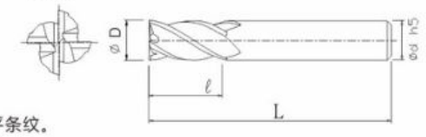
(mm)

高耐溶着性能。最适合铝合金·铜的加工。tac涂层。
High welding resistance makes it ideal for machining aluminum alloys and copper.tac coating.

TYPE A:



TYPE B:



- 针对铜电极加工用的平底铣刀。
- 采用锋利度和精加工表面品质兼具的高螺旋角，可抑制加工面产生水平条纹。
- 采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。
- Flat end milling cutter for copper electrode machining.
- The high spiral Angle with both edge sharpness and finishing surface quality can restrain the horizontal fringe.
- High quality and stable milling performance with long tool life by optimized design and tac COATING.

硬质合金 | tac涂层 | 螺旋角加大 | 4

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	价格 Retail Price
X3E0103	1x3L	1	3	12°	4	50	A	
X3E0104	1x4L	1	4	12°	4	50	A	
X3E0154	1.5x4.5L	1.5	4.5	12°	4	50	A	
X3E0204	2x6L	2	6	12°	4	50	A	
X3E0254	2.5x7.5L	2.5	7.5	12°	4	50	A	
X3E0304	3x9L	3	9	12°	4	50	A	
X3IE0304	3x9L	3	9	12°	4	75	A	
X3E0304D3	3x9L	3	9	–	3	50	B	
X3E0304D6	3x9L	3	9	12°	6	50	A	
X3E0404	4x12L	4	12	–	4	50	B	
X3IE0404	4x12L	4	12	–	4	75	B	
X3E0404D6	4x12L	4	12	12°	6	50	A	
X3E0504	5x14L	5	14	12°	6	50	A	
X3E0604	6x16L	6	16	–	6	50	B	
X3E0604L	6x16L	6	16	–	6	60	B	
X3IE0604	6x18L	6	18	–	6	75	B	
X3JE0604	6x24L	6	24	–	6	100	B	
X3E0804	8x22L	8	22	–	8	60	B	
X3IE0804	8x24L	8	24	–	8	75	B	
X3JE0804	8x32L	8	32	–	8	100	B	
X3E1004	10x30L	10	30	–	10	75	B	
X3JE1004	10x35L	10	35	–	10	100	B	
X3E1204	12x36L	12	36	–	12	75	B	
X3JE1204	12x40L	12	40	–	12	100	B	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material	铜合金 Copper		铝合金 Aluminum Alloy	
切削速度 Cutting Speed	60m/min		80~150m/min	
外径 Dia.	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed
	min-1	mm/min	min-1	mm/min
1	19,000	150	48,000	800
1.5	13,000	150	32,000	1,000
2	9,600	150	24,000	1,000
2.5	7,700	200	19,000	1,000
3	6,400	200	16,000	1,000
4	4,800	200	12,000	1,000
5	3,800	200	9,600	1,000
6	3,200	200	8,000	1,000
8	2,400	200	6,000	1,000
10	1,900	200	4,800	1,000
12	1,600	200	4,000	1,000
切深量 Depth of Cut (D:刃径Dia.)	侧面 Side Milling: 2D; 0.3D			
备注 Notes	※ 建议使用油冷冷却方式。 ※ 请以相同的比率调整主轴转速和进给速度。 ※ 严禁用于钢。 ※ Use cutting fluid. ※ Adjust both spindle speed and feed at the same rate. ※ Don't use for cutting steels.			

铜・铝合金用2刃球头铣刀
Copper・Aluminum Alloy 2-Flute Ball Endmills

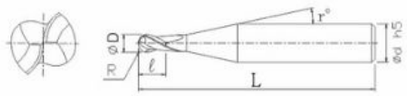
2刃・球头 | 2-Flute・Ball

槽 Slotting | 斜模 Die-sinking | 曲面 Profiling | R Radius | 细部 Miniature | 半精加工 Semi Finishing | 精加工 Finishing | 凸槽细部 Rib Miniature | 切削条件 B046 Cutting Conditions

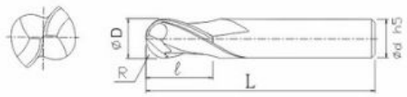
外径公差 Dia.Tolerance: 1≤D≤3: 0~-0.01; 4≤D≤10: 0~-0.015
R公差 R Tolerance: ±0.005
h5: 0~-0.005
(mm)

高耐溶着性能。最适合铝合金·铜的加工。tac涂层。
High welding resistance makes it ideal for machining aluminum alloys and copper.tac coating.

TYPE A:



TYPE B:



- 针对铜电极加工用的球头铣刀。
- 采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。
- Ball end milling cutter for copper electrode machining.
- High quality and stable milling performance with long tool life by optimized design and tac COATING.

硬质合金 | tac涂层 | 螺旋角60°

产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Radius	刃长(ℓ) Length of Cut	外径(D) Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X3B0102	R0.5x2L	**R0.5**	**2**	1	12°	4	50	A	
X3B0152	R0.75x3L	**R0.75**	**3**	1.5	12°	4	50	A	
X3B0202	R1x4L	**R1**	**4**	2	12°	4	50	A	
X3B0302	R1.5x6L	**R1.5**	**6**	3	12°	4	50	A	
X3B0302D3	R1.5x6L	**R1.5**	**6**	3	-	3	50	B	
X3B0402	R2x6L	**R2**	**6**	4	-	4	50	B	
X3IB0402	R2x6L	**R2**	**6**	4	-	4	75	B	
X3B0502	R2.5x9L	**R2.5**	**9**	5	12°	6	50	A	
X3B0602	R3x9L	**R3**	**9**	6	-	6	50	B	
X3B0602L	R3x9L	**R3**	**9**	6	-	6	60	B	
X3IB0602	R3x9L	**R3**	**9**	6	-	6	75	B	
X3JB0602	R3x9L	**R3**	**9**	6	-	6	100	B	
X3B0802	R4x12L	**R4**	**12**	8	-	8	60	B	
X3IB0802	R4x12L	**R4**	**12**	8	-	8	75	B	
X3JB0802	R4x12L	**R4**	**12**	8	-	8	100	B	
X3B1002	R5x15L	**R5**	**15**	10	-	10	75	B	
X3JB1002	R5x15L	**R5**	**15**	10	-	10	100	B	

切削参数参考表
Recommended Milling Conditions

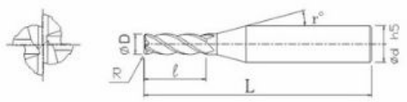
加工材料 Work Material	铜合金 Copper			铝合金 Aluminum Alloy		
切削速度 Cutting Speed	70～100m/min			100～200m/min		
球头半径(R) Radius	主轴转速 Spindle Speed	进给速度 Feed		主轴转速 Spindle Speed	进给速度 Feed	
	min-1	mm/min		min-1	mm/min	
		粗加工 Roughing	精加工 Finishing		粗加工 Roughing	精加工 Finishing
0.5	32,000	200	550	47,000	320	860
0.75	21,000	200	550	47,000	320	860
1	16,000	200	550	23,800	600	860
1.5	11,000	250	700	16,000	750	1,650
2	8,000	250	700	12,000	750	1,650
2.5	6,400	250	700	9,600	750	1,650
3	5,300	250	700	8,000	750	1,650
4	4,000	250	700	6,000	750	1,650
5	3,200	250	700	4,800	750	1,650
切深量 Depth of Cut (R：球头半径 Radius)	粗加工 Roughing 1×R; 精加工 Finishing 0.1×R, 0.1×R					
备注 Notes	※ 建议使用油冷冷却方式。 ※ 请以相同的比率调整主轴转速和进给速度。 ※ 严禁用于钢。 ※ Use cutting fluid. ※ Adjust both spindle speed and feed at the same rate. ※ Don't use for cutting steels.					

铜·铝合金用4刃圆鼻铣刀
Copper · Aluminum Alloy 4-Flute Corner Radius Endmills

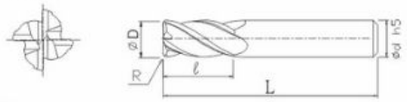
4刃·带R角 | 4-Flute·Corner Radius

高耐溶着性能。最适合铝合金·铜的加工。tac涂层。
High welding resistance makes it ideal for machining aluminum alloys and copper.tac coating.

TYPE A:



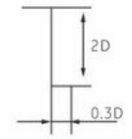
TYPE B:



- 针对铜电极加工用的球头铣刀。
- 采用优化的刃刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。
- Ball end milling cutter for copper electrode machining.
- High quality and stable milling performance with long tool life by optimized design and tac COATING.

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X3R01005	1R0.05x3L	1	R0.05	3	12°	4	50	A	
X3R01005L	1R0.05x4L	1	R0.05	4	12°	4	50	A	
X3R0101	1R0.1x3L	1	R0.1	3	12°	4	50	A	
X3R0101L	1R0.1x4L	1	R0.1	4	12°	4	50	A	
X3R0102	1R0.2x3L	1	R0.2	3	12°	4	50	A	
X3R0102L	1R0.2x4L	1	R0.2	4	12°	4	50	A	
X3R0151	1.5R0.1x4.5L	1.5	R0.1	4.5	12°	4	50	A	
X3R0152	1.5R0.2x4.5L	1.5	R0.2	4.5	12°	4	50	A	
X3R0201	2R0.1x6L	2	R0.1	6	12°	4	50	A	
X3R0202	2R0.2x6L	2	R0.2	6	12°	4	50	A	
X3R0205	2R0.5x6L	2	R0.5	6	12°	4	50	A	
X3R0302	3R0.2x9L	3	R0.2	9	12°	4	50	A	
X3R0302D3	3R0.2x9L	3	R0.2	9	-	3	50	B	
X3R0303	3R0.3x9L	3	R0.3	9	12°	4	50	A	
X3R0303D3	3R0.3x9L	3	R0.3	9	-	3	50	B	
X3R0305	3R0.5x9L	3	R0.5	9	12°	4	50	A	
X3R0305D3	3R0.5x9L	3	R0.5	9	-	3	50	B	
X3R0401	4R0.1x12L	4	R0.1	12	-	4	50	B	
X3R0402	4R0.2x12L	4	R0.2	12	-	4	50	B	
X3IR0402	4R0.2x12L	4	R0.2	12	-	4	75	B	
X3R0403	4R0.3x12L	4	R0.3	12	-	4	50	B	
X3R0405	4R0.5x12L	4	R0.5	12	-	4	50	B	
X3IR0405	4R0.5x12L	4	R0.5	12	-	4	75	B	
X3R0602	6R0.2x16L	6	R0.2	16	-	6	50	B	
X3IR0602	6R0.2x18L	6	R0.2	18	-	6	75	B	
X3JR0602	6R0.2x18L	6	R0.2	18	-	6	100	B	
X3R0605	6R0.5x16L	6	R0.5	16	-	6	50	B	
X3R0605L	6R0.5x16L	6	R0.5	16	-	6	60	B	
X3IR0605	6R0.5x18L	6	R0.5	18	-	6	75	B	
X3JR0605	6R0.5x18L	6	R0.5	18	-	6	100	B	
X3R0805	8R0.5x22L	8	R0.5	22	-	8	60	B	
X3IR0805	8R0.5x24L	8	R0.5	24	-	8	75	B	
X3JR0805	8R0.5x24L	8	R0.5	24	-	8	100	B	
X3R1005	10R0.5x30L	10	R0.5	30	-	10	75	B	
X3JR1005	10R0.5x30L	10	R0.5	30	-	10	100	B	
X3R1010	10R1x30L	10	R1	30	-	10	75	B	
X3JR1010	10R1x30L	10	R1	30	-	10	100	B	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material	铜合金 Copper		铝合金 Aluminum Alloy	
切削速度 Cutting Speed	60m/min		80～150m/min	
外径 Dia.	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed
	min-1	mm/min	min-1	mm/min
1	19,000	150	48,000	800
1.5	13,000	150	32,000	1,000
2	9,600	150	24,000	1,000
3	6,400	200	16,000	1,000
4	4,800	200	12,000	1,000
6	3,200	200	8,000	1,000
8	2,400	200	6,000	1,000
10	1,900	200	4,800	1,000
切深量 Depth of Cut (D:刃 径Dia.)	侧面 Side Milling 			
备注 Notes	※ 建议使用油冷冷却方式。 ※ 请以相同的比率调整主轴转速和进给速度。 ※ 严禁用于钢。 ※ Use cutting fluid. ※ Adjust both spindle speed and feed at the same rate. ※ Don't use for cutting steels.			

微小径 Micro Diameter

铜・铝合金用2刃微小径平底铣刀

Copper・Aluminum Alloy 2-Flute Micro Diameter Square Endmills

2刃・平底铣刀 | 2-Flute・Square

Side Cutting · Slotting · Miniature · Finishing · Rib Miniature · Cutting Conditions B050

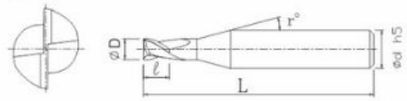
外径公差 Dia.tolerance
D≤0.1: 0~- 0.005
0.15≤D≤0.9: 0~- 0.007

h5 0~-0.005

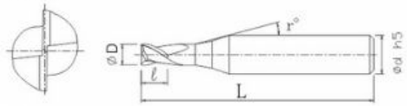
(mm)

高耐溶着性能。最适合铝合金·铜的加工。tac涂层。
High welding resistance makes it ideal for machining aluminum alloys and copper.tac coating.

TYPE A:



TYPE B:



- 针对铜电极加工用的平底铣刀。
- 采用锋利度和精加工表面品质兼具的高螺旋角，可抑制加工面产生水平条纹。
- 采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。
- Flat end milling cutter for copper electrode machining.
- The high spiral Angle with both edge sharpness and finishing surface quality can restrain the horizontal fringe.
- High quality and stable milling performance with long tool life by optimized design and tac COATING.

硬质合金 · tac涂层

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	价格 Retail Price
X3SE00032	0.03x0.006L	0.03	0.06	11°	4	45	A	
X3SE00042	0.04x0.008L	0.04	0.08	11°	4	45	A	
X3SE00052	0.05x0.1L	0.05	0.1	11°	4	45	A	
X3SE00062	0.06x0.12L	0.06	0.12	11°	4	45	A	
X3SE00072	0.07x0.14L	0.07	0.14	11°	4	45	A	
X3SE00082	0.08x0.16L	0.08	0.16	11°	4	45	A	
X3SE00092	0.09x0.18L	0.09	0.18	11°	4	45	A	
X3SE0013	0.1x0.3L	0.1	0.3	10+20°	4	50	B	
X3SE00152	0.15x0.3L	0.15	0.3	10+20°	4	50	B	
X3SE0022	0.2x0.4L	0.2	0.4	10+20°	4	50	B	
X3SE0025	0.25x0.5L	0.25	0.5	10+20°	4	50	B	
X3SE0032	0.3x0.6L	0.3	0.6	10+20°	4	50	B	
X3SE0035	0.35x0.7L	0.35	0.7	10+20°	4	50	B	
X3SE0042	0.4x0.8L	0.4	0.8	10+20°	4	50	B	
X3SE0045	0.45x0.9L	0.45	0.9	10+20°	4	50	B	
X3SE0052	0.5x1.0L	0.5	1	10+20°	4	50	B	
X3SE0062	0.6x1.2L	0.6	1.2	10+20°	4	50	B	
X3SE0072	0.7x1.4L	0.7	1.4	10+20°	4	50	B	
X3SE0082	0.8x1.6L	0.8	1.6	10+20°	4	50	B	
X3SE0092	0.9x1.8L	0.9	1.8	10+20°	4	50	B	

切削参数参考表

Recommended Milling Conditions

加工材料 Work Material	铜合金 Copper			铝合金 Aluminum Alloy		
切削速度 Cutting Speed	60 ~ 80m/min			100 ~ 200m/min		
外径 Dia.	主轴转速 Spindle Speed	进给速度 Feed mm/min		主轴转速 Spindle Speed	进给速度 Feed mm/min	
	min-1	侧面 Side Milling	沟槽 Slotting	min-1	侧面 Side Milling	沟槽 Slotting
0.03	50,000	15	5	50000	15	5
0.04	50,000	20	5	50000	20	5
0.05	50,000	25	5	50000	25	5
0.06	50,000	30	5	50000	30	5
0.07	50,000	35	10	50000	35	10
0.08	50,000	40	15	50000	40	15
0.09	50,000	45	20	50000	45	20
0.1	50,000	60	25	50,000	60	25
0.15	50,000	75	20	50,000	75	20
0.2	50,000	90	35	50,000	90	35
0.25	50,000	120	47	50,000	120	47
0.3	50,000	150	60	50,000	150	60
0.35	50,000	175	70	50,000	175	70
0.4	50,000	200	80	50,000	200	80
0.45	48,000	210	85	50,000	225	90
0.5	44,600	220	90	50,000	250	100
0.6	40,000	230	92	50,000	320	130
0.7	30,000	240	94	50,000	390	150
0.8	27,900	250	95	50,000	450	180
0.9	24000	280	100	50,000	500	200

切深量 Depth of Cut

(D:刃 径Dia.)

备注 Notes

※请使用发烟性低的油冷冷却方式。
※请以相同的比率调整主轴转速和进给速度。
※加工参数会因切深量和机床刚性的状况而有所不同。请每次调整后再使用。
※ Use cutting fluid with smoke retardant.
※Adjust both spindle speed and feed atthe same rate.
※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.

微小径 Micro Diameter

铜・铝合金用2刃微小径球头铣刀

Copper・Aluminum Alloy 2-Flute Micro Diameter Ball Endmills

2刃・球头 2-Flute・Ball

槽 Slotting | 型模 Die-sinking | 曲面 Profiling | R Radius | 细部 Miniature | 半精加工 Semi Finishing | 精加工 Finishing | 细槽加工 Rib Miniature | 切削条件 B052 Cutting Conditions

半径公差 Dia.tolerance: D≤0.1: 0~-0.005; 0.15≤D≤0.9: 0~-0.007

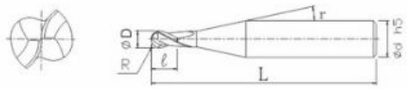
R公差 R tolerance: R≤0.2: ±0.003; 0.25≤R≤0.45: ±0.005

h5: 0~-0.005 (mm)

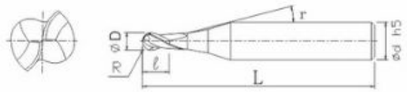
高耐溶着性能。最适合铝合金·铜的加工。tac涂层。

High welding resistance makes it ideal for machining aluminum alloys and copper.tac coating.

TYPE A:



TYPE B:



- 针对铜电极加工用的球头铣刀。
- 采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。
- Ball end milling cutter for copper electrode machining.
- High quality and stable milling performance with long tool life by optimized design and tac COATING.

硬质合金 | tac涂层 | 螺旋角35° | 2

产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Radius	刃长(ℓ) Length of Cut	外径(D) Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X3B000602	R0.03x0.12L	**R0.03**	**0.12**	0.06	11°	4	45	A	
X3B000702	R0.035x0.14L	**R0.035**	**0.14**	0.07	11°	4	45	A	
X3B000802	R0.04x0.16L	**R0.04**	**0.16**	0.08	11°	4	45	A	
X3SB000102	R0.05x0.15L	**R0.05**	**0.15**	0.1	11°	4	45	A	
X3SB000102L	R0.05x0.2L	**R0.05**	**0.2**	0.1	11°	4	45	A	
X3SB000152	R0.075x0.2L	**R0.075**	**0.2**	0.15	11°	4	45	A	
X3SB000152L	R0.075x0.28L	**R0.075**	**0.28**	0.15	11°	4	45	A	
X3SB0022	R0.1x0.4L	**R0.1**	**0.4**	0.2	10+20°	4	50	B	
X3SB0032	R0.15x0.6L	**R0.15**	**0.6**	0.3	10+20°	4	50	B	
X3SB0042	R0.2x0.8L	**R0.2**	**0.8**	0.4	10+20°	4	50	B	
X3SB0052	R0.25x1.0L	**R0.25**	**1**	0.5	10+20°	4	50	B	
X3SB0062	R0.3x1.2L	**R0.3**	**1.2**	0.6	10+20°	4	50	B	
X3SB0072	R0.35x1.4L	**R0.35**	**1.4**	0.7	10+20°	4	50	B	
X3SB0082	R0.4x1.6L	**R0.4**	**1.6**	0.8	10+20°	4	50	B	
X3SB0092	R0.45x1.6L	**R0.45**	**1.8**	0.9	10+20°	4	50	B	

铝合金 Aluminum Alloy N

铜合金 Copper N

树脂 Resin O

球头 Ball

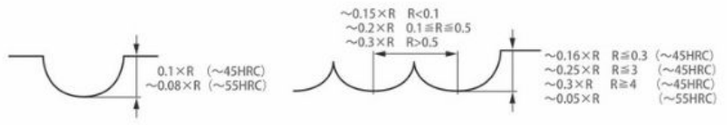
切削参数参考表

Recommended Milling Conditions

加工材料 Work Material	铜合金 Copper		铝合金 Aluminum Alloy	
切削速度 Cutting Speed	100～150m/min		150m/min～	
球头半径(R) Radius	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed
	min-1	mm/min	min-1	mm/min
0.03	50,000	100	50,000	100
0.035	50,000	150	50,000	150
0.04	50,000	200	50,000	200
0.05	50,000	250	50,000	250
0.075	50,000	380	50,000	380
0.1	50,000	500	50,000	500
0.15	50,000	550	50,000	550
0.2	50,000	600	50,000	600
0.25	50,000	630	50,000	630
0.3	50,000	750	50,000	750
0.35	50,000	880	50,000	880
0.4	50,000	1,000	50,000	1,000
0.45	50,000	1,200	50,000	1,200

切深量 Depth of Cut

（R：球头半径 Radius）



备注 Notes

※沟槽加工时，请将进给速度调为上述参数的60%。
※刀具伸出量请以4D为标准，伸出量超出该标准时请调整切削参数。
※建议使用吹气或油雾冷却方式。
※请以相同的比率调整主轴转速和进给速度。
※ When slotting, reduce the feed by 60% from the above values.
※Length of overhang is 4 times Dia. as standard.When it is longer than 4 times Dia., adjust the conditions listed above.
※Recommended airblow or oil mist.
※Adjust both spindle speed and feed at the same rate.

N 铝合金 Aluminum Alloy

N 铜合金 Copper

O 树脂 Resin

球头 Ball

铜・铝合金用2刃微小径圆鼻铣刀

Copper・Aluminum Alloy 2-Flute Micro Diameter Corner Radius Endmills

2刃・带R角 | 2-Flute・Corner Radius

平面 Planing | 侧面 Side Cutting | 槽 Slotting | 刻模 Die-sinking | 曲面 Profiling | R Radius | 螺旋 Helical | 粗加工 Roughing | 半精加工 Semi Finishing | 精加工 Finishing | 切削条件 B054 Cutting Conditions

外径公差 Dia.tolerance: D≤0.1：0~- 0.005；0.15≤D≤0.8：0~- 0.007

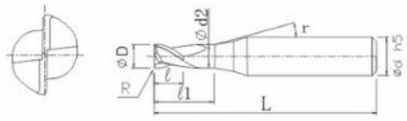
R公差 R tolerance: ±0.005

h5: 0~-0.005 (mm)

高耐溶着性能。最适合铝合金·铜的加工。tac涂层。

High welding resistance makes it ideal for machining aluminum alloys and copper.tac coating.

TYPE A:



- 针对铜电极加工用的球头铣刀。
- 采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。
- Ball end milling cutter for copper electrode machining.
- High quality and stable milling performance with long tool life by optimized design and tac COATING.

硬质合金 | tac涂层 | 内冷 | 螺旋角 | 2

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X3SR01001	0.1R0.01x0.2L	0.1	R0.01	0.2	10+20°	4	50	A	
X3SR01002	0.1R0.02x0.2L	0.1	R0.02	0.2	10+20°	4	50	A	
X3SR015002	0.15R0.02x0.3L	0.15	R0.02	0.3	10+20°	4	50	A	
X3SR015003	0.15R0.05x0.3L	0.15	R0.05	0.3	10+20°	4	50	A	
X3SR02002	0.2R0.02x0.4L	0.2	R0.02	0.4	10+20°	4	50	A	
X3SR02005	0.2R0.05x0.4L	0.2	R0.05	0.4	10+20°	4	50	A	
X3SR03005	0.3R0.05x0.6L	0.3	R0.05	0.6	10+20°	4	50	A	
X3SR0301	0.3R0.1x0.6L	0.3	R0.1	0.6	10+20°	4	50	A	
X3SR04005	0.4R0.05x0.8L	0.4	R0.05	0.8	10+20°	4	50	A	
X3SR0401	0.4R0.1x0.8L	0.4	R0.1	0.8	10+20°	4	50	A	
X3SR05005	0.5R0.05x1.0L	0.5	R0.05	1	10+20°	4	50	A	
X3SR0501	0.5R0.1x1.0L	0.5	R0.1	1	10+20°	4	50	A	
X3SR06005	0.6R0.05x1.2L	0.6	R0.05	1.2	10+20°	4	50	A	
X3SR0601	0.6R0.1x1.2L	0.6	R0.1	1.2	10+20°	4	50	A	
X3SR07005	0.7R0.05x1.4L	0.7	R0.05	1.4	10+20°	4	50	A	
X3SR0701	0.7R0.1x1.4L	0.7	R0.1	1.4	10+20°	4	50	A	
X3SR08005	0.8R0.05x1.6L	0.8	R0.05	1.6	10+20°	4	50	A	
X3SR0801	0.8R0.1x1.6L	0.8	R0.1	1.6	10+20°	4	50	A	
X3SR0802	0.8R0.2x1.6L	0.8	R0.2	1.6	10+20°	4	50	A	

切削参数参考表

Recommended Milling Conditions

加工材料 Work Material		铜合金 Copper			
外径 Dia.	角半径(R) Corner Radius	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm
0.1	0.01	40,000	200	0.005	0.005
	0.02	40,000	200	0.005	0.005
0.15	0.02	40,000	300	0.008	0.008
	0.05	40,000	300	0.008	0.008
0.2	0.02	40,000	400	0.01	0.1
	0.05	40,000	400	0.03	0.1
0.3	0.05	40,000	480	0.03	0.15
	0.1	40,000	480	0.06	0.15
0.4	0.05	40,000	640	0.03	0.2
	0.1	40,000	640	0.06	0.2
0.5	0.05	40,000	800	0.03	0.25
	0.1	40,000	800	0.06	0.25
0.6	0.05	30,000	1,000	0.03	0.3
	0.1	30,000	1,000	0.06	0.3
0.7	0.05	30,000	1,500	0.03	0.35
	0.1	30,000	1,500	0.06	0.35
0.8	0.05	30,000	1,600	0.03	0.4
	0.1	30,000	1,600	0.06	0.4
	0.2	30,000	1,600	0.06	0.4

备注 Notes

※本切削参数仅供参考。请根据实际的加工形状和所使用的机床等调整切削参数。
※切深量的ap表示轴向切深量，ae表示径向切深量。
※轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※沟槽切削时建议参考切削参数表，进给速度设定为60%以下，并采用来回切削加工方式。
※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率降低。
※建议使用油冷冷却方式。

※ The cutting parameters are for reference only. Please adjust the cutting parameters according to the actual machining shape and the machine tool used.
※ The ap of the cutting depth indicates the axial cutting depth, and the ae indicates the radial cutting depth.
※ Screw feed and inclined feed are recommended for axial feed.
※ It is recommended to refer to the cutting parameter table when grooving cutting, the feed speed is set to less than 60%, and the cutting mode is adopted.
※ When vibrating knife occurs, please reduce the spindle speed and feed speed in the same ratio. In addition, when the spindle speed is too low, it is also reduced at the same rate.
※ Oil cooling is recommended.

铜·铝合金用2刃长颈平底铣刀
Copper · Aluminum Alloy 2-Flute Long Neck Square Endmills

2刃·平底铣刀 | 2-Flute · Square

高耐溶着性能。最适合铝合金·铜的加工。tac涂层。
High welding resistance makes it ideal for machining aluminum alloys and copper.tac coating.

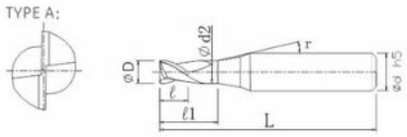
Side Cutting · Slotting · Miniature · Finishing · Rib Miniature · Cutting Conditions B057

外径公差 Dia.Tolerance
D≤0.1：0~-0.005
0.15≤D≤0.9：0~-0.007
1≤D≤2：0~-0.01

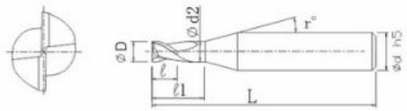
h5 0~-0.005

(mm)

TYPE A:



TYPE B:



- 针对铜电极加工用的平底铣刀。
- 采用锋利度和精加工表面品质兼具的高螺旋角，可抑制加工面产生水平条纹。
- 采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。
- Flat end milling cutter for copper electrode machining.
- The high spiral Angle with both edge sharpness and finishing surface quality can restrain the horizontal fringe.
- High quality and stable milling performance with long tool life by optimized design and tac COATING.

硬质合金 | tac涂层 | 螺旋角60°

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	价格 Retail Price
X3NE01005	0.1x0.5L	0.1	0.5	0.2	0.085	10+20°	4	50	
X3NE0101	0.1x1L		1	0.2	0.085	10+20°	4	50	
X3NE01015	0.1x1.5L		1.5	0.2	0.085	10+20°	4	50	
X3NE0102	0.1x2L		2	0.2	0.085	10+20°	4	50	
X3NE01505	0.15x0.5L	0.15	0.5	0.23	0.13	10+20°	4	50	
X3NE01506	0.15x0.6L		0.6	0.23	0.13	10+20°	4	50	
X3NE01501	0.15x1L		1	0.23	0.13	10+20°	4	50	
X3NE015015	0.15x1.5L		1.5	0.23	0.13	10+20°	4	50	
X3NE01502	0.15x2L		2	0.23	0.13	10+20°	4	50	
X3NE015025	0.15x2.5L		2.5	0.23	0.13	10+20°	4	50	
X3NE0201	0.2x1L	0.2	1	0.3	0.18	10+20°	4	50	
X3NE02015	0.2x1.5L		1.5	0.3	0.18	10+20°	4	50	
X3NE0202	0.2x2L		2	0.3	0.18	10+20°	4	50	
X3NE0203	0.2x3L		3	0.3	0.18	10+20°	4	50	
X3NE0204	0.2x4L		4	0.3	0.18	10+20°	4	50	
X3NE02501	0.25x1L	0.25	1	0.4	0.23	10+20°	4	50	
X3NE025015	0.25x1.5L		1.5	0.4	0.23	10+20°	4	50	
X3NE02502	0.25x2L		2	0.4	0.23	10+20°	4	50	
X3NE02503	0.25x3L		3	0.4	0.23	10+20°	4	50	
X3NE02504	0.25x4L		4	0.4	0.23	10+20°	4	50	
X3NE0301	0.3x1L	0.3	1	0.5	0.27	10+20°	4	50	
X3NE03015	0.3x1.5L		1.5	0.5	0.27	10+20°	4	50	
X3NE0302	0.3x2L		2	0.5	0.27	10+20°	4	50	
X3NE03025	0.3x2.5L		2.5	0.5	0.27	10+20°	4	50	
X3NE0303	0.3x3L		3	0.5	0.27	10+20°	4	50	
X3NE0304	0.3x4L		4	0.5	0.27	10+20°	4	50	
X3NE0306	0.3x6L		6	0.5	0.27	10+20°	4	50	

铜·铝合金用2刃长颈平底铣刀
Copper · Aluminum Alloy 2-Flute Long neck Square Endmills

硬质合金 | tac涂层 | 螺旋角60°

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	价格 Retail Price
X3NE0402	0.4x2L	0.4	2	0.6	0.37	10+20°	4	50	
X3NE0403	0.4x3L		3	0.6	0.37	10+20°	4	50	
X3NE0404	0.4x4L		4	0.6	0.37	10+20°	4	50	
X3NE0406	0.4x6L		6	0.6	0.37	10+20°	4	50	
X3NE0502	0.5x2L	0.5	2	0.7	0.46	10+20°	4	50	
X3NE0503	0.5x3L		3	0.7	0.46	10+20°	4	50	
X3NE0504	0.5x4L		4	0.7	0.46	10+20°	4	50	
X3NE0505	0.5x5L		5	0.7	0.46	10+20°	4	50	
X3NE0506	0.5x6L		6	0.7	0.46	10+20°	4	50	
X3NE0508	0.5x8L		8	0.7	0.46	10+20°	4	50	
X3NE0510	0.5x10L		10	0.7	0.46	10+20°	4	50	
X3NE0512	0.5x12L		12	0.7	0.46	10+20°	4	50	
X3NE0602	0.6x2L	0.6	2	0.9	0.56	10+20°	4	50	
X3NE0603	0.6x3L		3	0.9	0.56	10+20°	4	50	
X3NE0604	0.6x4L		4	0.9	0.56	10+20°	4	50	
X3NE0606	0.6x6L		6	0.9	0.56	10+20°	4	50	
X3NE0608	0.6x8L		8	0.9	0.56	10+20°	4	50	
X3NE0702	0.7x2L	0.7	2	1	0.66	10+20°	4	50	
X3NE0704	0.7x4L		4	1	0.66	10+20°	4	50	
X3NE0706	0.7x6L		6	1	0.66	10+20°	4	50	
X3NE0708	0.7x8L		8	1	0.66	10+20°	4	50	
X3NE0802	0.8x2L	0.8	2	1.2	0.76	10+20°	4	50	
X3NE0803	0.8x3L		3	1.2	0.76	10+20°	4	50	
X3NE0804	0.8x4L		4	1.2	0.76	10+20°	4	50	
X3NE0806	0.8x6L		6	1.2	0.76	10+20°	4	50	
X3NE0808	0.8x8L		8	1.2	0.76	10+20°	4	50	
X3NE0810A	0.8x10L		10	1.2	0.76	10+20°	4	50	
X3NE1004A	1x4L	1	4	1.5	0.95	12°	4	50	
X3NE1006A	1x6L		6	1.5	0.95	12°	4	50	
X3NE1008A	1x8L		8	1.5	0.95	12°	4	50	
X3NE1010A	1x10L		10	1.5	0.95	12°	4	50	
X3NE1012A	1x12L		12	1.5	0.95	12°	4	50	
X3NE1016A	1x16L		16	1.5	0.95	12°	4	50	
X3NE1506A	1.5x6L	1.5	6	2.3	1.45	12°	4	50	
X3NE1508A	1.5x8L		8	2.3	1.45	12°	4	50	
X3NE1510A	1.5x10L		10	2.3	1.45	12°	4	50	
X3NE1512A	1.5x12L		12	2.3	1.45	12°	4	50	
X3NE1516A	1.5x16L		16	2.3	1.45	12°	4	50	
X3NE1520A	1.5x20L		20	2.3	1.45	12°	4	50	
X3NE2008A	2x8L	2	8	3	1.94	12°	4	50	
X3NE2010A	2x10L		10	3	1.94	12°	4	50	
X3NE2012A	2x12L		12	3	1.94	12°	4	50	
X3NE2016A	2x16L		16	3	1.94	12°	4	50	
X3NE2020A	2x20L		20	3	1.94	12°	4	50	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		铜合金 Copper						
外径 Dia.	颈长(ℓ1) Under Neck Length	侧面 Side Milling				沟槽 Slotting		
		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm
0.1	0.5	40,000	140	0.1	0.004	40,000	130	0.007
	1	40,000	140	0.1	0.003	40,000	130	0.006
	1.5	40,000	140	0.1	0.002	40,000	130	0.005
	2	40,000	140	0.1	0.001	40,000	130	0.004
0.15	0.5	40,000	180	0.1	0.007	40,000	170	0.012
	0.6	40,000	180	0.1	0.006	40,000	170	0.01
	1	40,000	140	0.1	0.005	40,000	130	0.08
	1.5	40,000	140	0.1	0.004	40,000	130	0.07
	2	40,000	140	0.1	0.003	40,000	130	0.06
	2.5	40,000	140	0.1	0.002	40,000	130	0.05
0.2	1	40,000	350	0.2	0.006	40,000	320	0.015
	1.5	40,000	300	0.2	0.004	40,000	250	0.01
	2	40,000	300	0.2	0.003	40,000	250	0.08
	3	40,000	300	0.2	0.002	40,000	250	0.06
	4	40,000	300	0.2	0.001	40,000	250	0.05
0.25	1	40,000	400	0.2	0.01	40,000	380	0.03
	1.5	40,000	350	0.2	0.008	40,000	320	0.02
	2	40,000	300	0.2	0.006	40,000	250	0.015
	3	40,000	300	0.2	0.004	40,000	250	0.01
	4	40,000	300	0.2	0.003	40,000	250	0.008
0.3	1	40,000	500	0.3	0.01	40,000	450	0.035
	1.5	40,000	450	0.3	0.008	40,000	400	0.025
	2	40,000	380	0.3	0.006	40,000	350	0.017
	2.5	40,000	350	0.3	0.005	40,000	300	0.015
	3	40,000	350	0.3	0.004	40,000	300	0.013
	4	40,000	300	0.3	0.003	40,000	300	0.01
	6	40,000	300	0.3	0.002	40,000	300	0.008
0.4	2	40,000	600	0.4	0.015	40,000	550	0.03
	3	35,000	500	0.4	0.01	35,000	450	0.02
	4	28,000	350	0.4	0.006	28,000	300	0.015
	6	28,000	350	0.4	0.005	28,000	300	0.01
0.5	2	38,000	800	0.5	0.02	35,000	700	0.055
	3	35,000	700	0.5	0.015	32,000	600	0.04
	4	28,000	550	0.5	0.008	26,000	500	0.03
	5	18,000	500	0.5	0.007	18,000	300	0.02
	6	18,000	350	0.5	0.005	18,000	300	0.015
	8	18,000	350	0.5	0.004	18,000	300	0.01
	10	18,000	350	0.5	0.002	18,000	300	0.008
	12	18,000	350	0.5	0.001	18,000	300	0.006

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		铜合金 Copper						
外径 Dia.	颈长(ℓ1) Under Neck Length	侧面 Side Milling				沟槽 Slotting		
		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm
0.6	2	38,000	1,000	0.6	0.025	35,000	850	0.1
	3	32,000	800	0.6	0.02	30,000	700	0.08
	4	28,000	700	0.6	0.015	26,000	600	0.06
	6	20,000	450	0.6	0.01	20,000	400	0.03
	8	20,000	450	0.6	0.008	20,000	400	0.02
0.7	2	30,000	1300	0.7	0.05	28,000	1200	0.2
	4	26,000	1100	0.7	0.04	24,000	1000	0.15
	6	22,000	900	0.7	0.03	18,000	650	0.012
	8	16,000	600	0.7	0.02	16,000	500	0.01
0.8	2	30,000	1,500	0.8	0.05	28,000	1,400	0.15
	3	30,000	1,300	0.8	0.04	28,000	1,200	0.15
	4	26,000	1,100	0.8	0.03	24,000	1,000	0.12
	6	22,000	900	0.8	0.02	18,000	650	0.08
	8	16,000	600	0.8	0.01	16,000	500	0.05
	10	16,000	600	0.8	0.008	16,000	500	0.05
1	4	24,000	2,000	1	0.05	22,000	1,800	0.2
	6	20,000	1,500	1	0.03	18,000	1,200	0.14
	8	16,000	1,200	1	0.025	15,000	1,000	0.1
	10	14,000	1,000	1	0.02	12,000	800	0.07
	12	10,000	700	1	0.01	10,000	650	0.05
	16	10,000	700	1	0.008	10,000	650	0.03
1.5	6	18,000	2,200	1.5	0.08	16,000	1,800	0.3
	8	16,000	1,700	1.5	0.06	14,000	1,400	0.25
	10	16,000	1,500	1.5	0.05	14,000	1,400	0.2
	12	12,000	1,200	1.5	0.04	11,000	1,000	0.15
	16	10,000	900	1.5	0.02	10,000	800	0.08
	20	10,000	900	1.5	0.01	10,000	800	0.06
2	8	16,000	2,200	2	0.09	14,000	1,900	0.4
	10	14,000	1,900	2	0.08	12,000	1,600	0.35
	12	12,000	1,600	2	0.07	11,000	1,400	0.28
	16	10,000	1,200	2	0.045	9,000	1,000	0.18
	20	9,000	1,000	2	0.03	8,000	850	0.12

备注 Notes

※ 本切削参数仅供参考。请根据实际的加工形状和所使用的机床等调整切削参数。
※ 切深量的ap表示轴向切入量，ae表示半径方向的切入量。
※ 发生振刀时，请以相同的比率降低主轴转速和进给速度。
此外，主轴转速过低时，也以相同的比率调整。
※ 建议使用油冷冷却方式进行冷却。
※ Recommend to use the milling condition as just reference. Adjust milling conditions according to machining shape and machine status.
※ Depth of Cut : ap=Axial Depth of Cut / ae=Radial Depth of Cut.
※ Reduce both spindle speed and feed at same rate for chattering and also for insu cient spindle speed of a machine.
※ Water-insoluble cutting fluid is recommended.

铜・铝合金用4刃长颈平底铣刀

Copper・Aluminum Alloy 4-Flute Long Neck Square Endmills

4刃・平底铣刀 | 4-Flute・Square

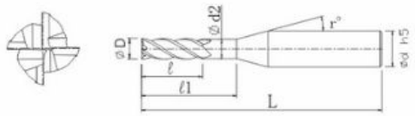
侧面 Side Cutting　槽 Slotting　细部 Miniature　精加工 Finishing　肋槽细部 Rib Miniature　切削条件表 B060 Cutting Conditions

外径公差 Dia.tolerance　1≤D≤3：0~-0.01　4≤D：0~-0.015　h5　0~-0.005　(mm)

高耐溶着性能。最适合铝合金·铜的加工。tac涂层。

High welding resistance makes it ideal for machining aluminum alloys and copper.tac coating.

TYPE A:



- 针对铜电极加工用的平底铣刀。
- 采用锋利度和精加工表面品质兼具的高螺旋角，可抑制加工面产生水平条纹。
- 采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。
- Flat end milling cutter for copper electrode machining.
- The high spiral Angle with both edge sharpness and finishing surface quality can restrain the horizontal fringe.
- High quality and stable milling performance with long tool life by optimized design and tac COATING.

硬质合金　tac涂层

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	价格 Retail Price
X3NE1004	1x4L	1	4	1.5	0.95	12°	4	50	
X3NE1006	1x6L		6	1.5	0.95	12°	4	50	
X3NE1008	1x8L		8	1.5	0.95	12°	4	50	
X3NE1010	1x10L		10	1.5	0.95	12°	4	50	
X3NE1012	1x12L		12	1.5	0.95	12°	4	50	
X3NE1016	1x16L		16	1.5	0.95	12°	4	50	
X3NE1506	1.5x6L	1.5	6	2.3	1.45	12°	4	50	
X3NE1508	1.5x8L		8	2.3	1.45	12°	4	50	
X3NE1510	1.5x10L		10	2.3	1.45	12°	4	50	
X3NE1512	1.5x12L		12	2.3	1.45	12°	4	50	
X3NE1516	1.5x16L		16	2.3	1.45	12°	4	50	
X3NE2008	2x8L	2	8	3	1.94	12°	4	50	
X3NE2010	2x10L		10	3	1.94	12°	4	50	
X3NE2012	2x12L		12	3	1.94	12°	4	50	
X3NE2016	2x16L		16	3	1.94	12°	4	50	
X3NE2018	2x18L		18	3	1.94	12°	4	50	
X3NE2020	2x20L		20	3	1.94	12°	4	50	
X3NE2512	2.5x12L	2.5	12	3.8	2.4	12°	4	50	
X3NE2516	2.5x16L		16	3.8	2.4	12°	4	50	
X3NE2520	2.5x20L		20	3.8	2.4	12°	4	50	
X3NE3010	3x10L	3	10	4.5	2.85	12°	4	50	
X3NE3012	3x12L		12	4.5	2.85	12°	4	50	
X3NE3016	3x16L		16	4.5	2.85	12°	4	50	
X3NE3010L	3x10L	3	10	4.5	2.85	12°	6	60	
X3NE3012L	3x12L		12	4.5	2.85	12°	6	60	
X3NE3016L	3x16L		16	4.5	2.85	12°	6	60	
X3NE3020L	3x20L		20	4.5	2.85	12°	6	60	
X3NE4012L	4x12L	4	12	6	3.8	12°	6	60	
X3NE4016L	4x16L		16	6	3.8	12°	6	60	
X3NE4020L	4x20L		20	6	3.8	12°	6	60	

切削参数参考表

Recommended Milling Conditions

加工材料 Work Material		铜合金 Copper						
外径 Dia.	颈长(ℓ1) Under Neck Length	侧面 Side Milling				沟槽 Slotting		
		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm
1	4	24,000	2,000	1	0.05	22,000	1,800	0.2
	6	20,000	1,500	1	0.03	18,000	1,200	0.14
	8	16,000	1,200	1	0.025	15,000	1,000	0.1
	10	14,000	1,000	1	0.02	12,000	800	0.07
	12	10,000	700	1	0.01	10,000	650	0.05
	16	10,000	700	1	0.008	10,000	650	0.03
1.5	6	18,000	2,200	1.5	0.08	16,000	1,800	0.3
	8	16,000	1,700	1.5	0.06	14,000	1,400	0.25
	10	16,000	1,500	1.5	0.05	14,000	1,400	0.2
	12	12,000	1,200	1.5	0.04	11,000	1,000	0.15
	16	10,000	900	1.5	0.02	10,000	800	0.08
2	8	16,000	2,200	2	0.09	14,000	1,900	0.4
	10	14,000	1,900	2	0.08	12,000	1,600	0.35
	12	12,000	1,600	2	0.07	11,000	1,400	0.28
	16	10,000	1,200	2	0.045	9,000	1,000	0.18
	18	9,500	1,100	2	0.04	8,500	900	0.16
	20	9,000	1,000	2	0.03	8,000	850	0.12
2.5	12	12,000	1,600	2.5	0.08	11,000	1400	0.3
	16	10,000	1,200	2.5	0.06	9,000	1000	0.2
	20	9,000	1,000	2.5	0.04	8,000	850	0.15
3	10	16,000	2,400	3	0.12	14,000	2,000	0.7
	12	15,000	2,300	3	0.11	13,000	15,000	0.65
	16	14,000	2,100	3	0.1	12,000	1,600	0.6
	20	11,000	1,500	3	0.07	10,000	1,200	0.4
4	12	15,000	2,300	4	0.3	13,000	2,000	0.8
	16	1,400	22,000	4	0.2	10,000	1,800	0.75
	20	10,000	2,000	4	0.15	8,000	1,600	0.7

备注 Notes

※ 本切削参数仅供参考。请根据实际的加工形状和所使用的机床等调整切削参数。
※ 切深量的ap表示轴向切入量，ae表示半径方向的切入量。
※ 发生振刀时，请以相同的比率降低主轴转速和进给速度。
此外，主轴转速过低时，也以相同的比率调整。
※ 建议使用油冷冷却方式进行冷却。
※ Recommend to use the milling condition as just reference. Adjust milling conditions according to machining shape and machine status.
※ Depth of Cut : ap=Axial Depth of Cut / ae=Radial Depth of Cut.
※ Reduce both spindle speed and feed at same rate for chattering and also for insu cient spindle speed of a machine.
※ Water-insoluble cutting fluid is recommended.

铜·铝合金用2刃长颈球头铣刀
Copper · Aluminum Alloy 2-Flute Long Neck Ball Endmills

2刃·球头 | 2-Flute · Ball

槽 Slotting | 斜模 Die-sinking | 曲面 Profiling | R Radius | 细部 Miniature | 半精加工 Semi Finishing | 精加工 Finishing | 肋槽细部 Rib Miniature | 切削条件 B063 Cutting Conditions

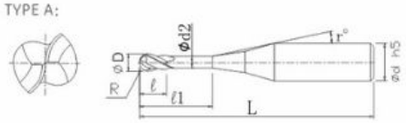
直径公差 Dia.tolerance: D≤0.9：0~-0.007；1≤D≤3：0~-0.01；D≤4：0~-0.015

R公差 R tolerance: R≤0.2：±0.003；0.25≤R≤2：±0.005

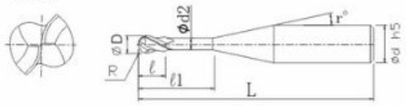
h5: 0~-0.005 (mm)

高耐溶着性能。最适合铝合金·铜的加工。tac涂层。
High welding resistance makes it ideal for machining aluminum alloys and copper.tac coating.

TYPE A:



TYPE B:



- 针对铜电极加工用的球头铣刀。
- 采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。
- Ball end milling cutter for copper electrode machining.
- High quality and stable milling performance with long tool life by optimized design and tac COATING.

硬质合金 | tac涂层 | 螺旋角

产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	外径(D) Dia.	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X3NB02006	R0.1x0.6L	R0.1	0.6	0.2	0.2	0.18	10+20°	4	50	
X3NB0201	R0.1x1L		1	0.2	0.2	0.18	10+20°	4	50	
X3NB02015	R0.1x1.5L		1.5	0.2	0.2	0.18	10+20°	4	50	
X3NB0202	R0.1x2L		2	0.2	0.2	0.18	10+20°	4	50	
X3NB0203	R0.1x3L		3	0.2	0.2	0.18	10+20°	4	50	
X3NB0301	R0.15x1L	R0.15	1	0.3	0.3	0.27	10+20°	4	50	
X3NB03015	R0.15x1.5L		1.5	0.3	0.3	0.27	10+20°	4	50	
X3NB0302	R0.15x2L		2	0.3	0.3	0.27	10+20°	4	50	
X3NB0303	R0.15x3L		3	0.3	0.3	0.27	10+20°	4	50	
X3NB0304	R0.15x4L		4	0.3	0.3	0.27	10+20°	4	50	
X3NB0305	R0.15x5L		5	0.3	0.3	0.27	10+20°	4	50	
X3NB0401	R0.2x1Lx0.4L	R0.2	1	0.4	0.4	0.37	10+20°	4	50	
X3NB04015	R0.2x1.5L		1.5	0.4	0.4	0.37	10+20°	4	50	
X3NB0402	R0.2x2L		2	0.4	0.4	0.37	10+20°	4	50	
X3NB0403	R0.2x3L		3	0.4	0.4	0.37	10+20°	4	50	
X3NB0404	R0.2x4L		4	0.4	0.4	0.37	10+20°	4	50	
X3NB0405	R0.2x5L		5	0.4	0.4	0.37	10+20°	4	50	
X3NB0406	R0.2x6L		6	0.4	0.4	0.37	10+20°	4	50	
X3NB0502	R0.25x2L	R0.25	2	0.5	0.5	0.46	10+20°	4	50	
X3NB0503	R0.25x3L		3	0.5	0.5	0.46	10+20°	4	50	
X3NB0504	R0.25x4L		4	0.5	0.5	0.46	10+20°	4	50	
X3NB0505	R0.25x5L		5	0.5	0.5	0.46	10+20°	4	50	
X3NB0506	R0.25x6L		6	0.5	0.5	0.46	10+20°	4	50	
X3NB0508	R0.25x8L		8	0.5	0.5	0.46	10+20°	4	50	
X3NB0602	R0.3x2L	R0.3	2	0.6	0.6	0.56	10+20°	4	50	
X3NB0603	R0.3x3L		3	0.6	0.6	0.56	10+20°	4	50	
X3NB0604	R0.3x4L		4	0.6	0.6	0.56	10+20°	4	50	
X3NB0606	R0.3x6L		6	0.6	0.6	0.56	10+20°	4	50	
X3NB0608	R0.3x8L		8	0.6	0.6	0.56	10+20°	4	50	
X3NB0610	R0.3x10L		10	0.6	0.6	0.56	10+20°	4	50	

铜·铝合金用2刃长颈球头铣刀
Copper · Aluminum Alloy 2-Flute Long Neck Ball Endmills

硬质合金 | tac涂层 | 螺旋角

产品代码 Code No.	规格型号 Spec Typ.	球半径(R) Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	刃径(D) Dia.	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X3NB0704	R0.35x4L	R0.35	4	0.7	0.7	0.66	10+20°	4	50	
X3NB0705	R0.35x5L		5	0.7	0.7	0.66	10+20°	4	50	
X3NB0802	R0.4x2L	R0.4	2	0.8	0.8	0.76	10+20°	4	50	
X3NB0803	R0.4x3L		3	0.8	0.8	0.76	10+20°	4	50	
X3NB0804	R0.4x4L		4	0.8	0.8	0.76	10+20°	4	50	
X3NB0806	R0.4x6L		6	0.8	0.8	0.76	10+20°	4	50	
X3NB0808	R0.4x8L		8	0.8	0.8	0.76	10+20°	4	50	
X3NB0810	R0.4x10L		10	0.8	0.8	0.76	10+20°	4	50	
X3NB1003	R0.5x3L	R0.5	3	1	1	0.95	12°	4	50	
X3NB1004	R0.5x4L		4	1	1	0.95	12°	4	50	
X3NB1006	R0.5x6L		6	1	1	0.95	12°	4	50	
X3NB1008	R0.5x8L		8	1	1	0.95	12°	4	50	
X3NB1010	R0.5x10L		10	1	1	0.95	12°	4	50	
X3NB1012	R0.5x12L		12	1	1	0.95	12°	4	50	
X3NB1016	R0.5x16L		16	1	1	0.95	12°	4	50	
X3NB1504	R0.75x4L	R0.75	4	1.5	1.5	1.45	12°	4	50	
X3NB1506	R0.75x6L		6	1.5	1.5	1.45	12°	4	50	
X3NB1508	R0.75x8L		8	1.5	1.5	1.45	12°	4	50	
X3NB1510	R0.75x10L		10	1.5	1.5	1.45	12°	4	50	
X3NB1512	R0.75x12L		12	1.5	1.5	1.45	12°	4	50	
X3NB1516	R0.75x16L		16	1.5	1.5	1.45	12°	4	50	
X3NB2006	R1x6L	R1	6	2	2	1.94	12°	4	50	
X3NB2008	R1x8L		8	2	2	1.94	12°	4	50	
X3NB2010	R1x10L		10	2	2	1.94	12°	4	50	
X3NB2012	R1x12L		12	2	2	1.94	12°	4	50	
X3NB2016	R1x16L		16	2	2	1.94	12°	4	50	
X3NB2018	R1x18L		18	2	2	1.94	12°	4	50	
X3NB2020	R1x20L		20	2	2	1.94	12°	4	50	
X3NB3008	R1.5x8L	R1.5	8	3	3	2.85	12°	4	50	
X3NB3010	R1.5x10L		10	3	3	2.85	12°	4	50	
X3NB3012	R1.5x12L		12	3	3	2.85	12°	4	50	
X3NB3016	R1.5x16L		16	3	3	2.85	12°	4	50	
X3NB3008L	R1.5x8L		8	3	3	2.85	12°	6	60	
X3NB3010L	R1.5x10L		10	3	3	2.85	12°	6	60	
X3NB3012L	R1.5x12L		12	3	3	2.85	12°	6	60	
X3NB3016L	R1.5x16L		16	3	3	2.85	12°	6	60	
X3NB3020L	R1.5x20L		20	3	3	2.85	12°	6	60	
X3NB4012L	R2x12L	R2	12	4	4	3.8	12°	6	60	
X3NB4016L	R2x16L		16	4	4	3.8	12°	6	60	
X3NB4020L	R2x20L		20	4	4	3.8	12°	6	60	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		铜合金 Copper			
球头半径(R) Radius	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm
0.1	0.6	40,000	500	0.025	0.05
	1	40,000	400	0.02	0.04
	1.5	40,000	300	0.015	0.03
	2	40,000	300	0.01	0.03
	3	40,000	300	0.008	0.03
0.15	1	40,000	700	0.03	0.07
	1.5	40,000	500	0.025	0.05
	2	40,000	400	0.015	0.03
	3	40,000	300	0.013	0.03
	4	40,000	300	0.01	0.03
	5	40,000	300	0.008	0.03
0.2	1	40,000	1,000	0.05	0.1
	1.5	40,000	800	0.04	0.1
	2	40,000	600	0.035	0.06
	3	30,000	400	0.02	0.04
	4	25,000	250	0.008	0.015
	5	25,000	250	0.008	0.01
	6	25,000	250	0.008	0.008
0.25	2	40,000	800	0.08	0.15
	3	35,000	600	0.06	0.1
	4	30,000	400	0.04	0.08
	5	25,000	300	0.02	0.04
	6	25,000	300	0.015	0.03
	8	25,000	300	0.01	0.02
0.3	2	40,000	1,600	0.12	0.2
	3	40,000	1,000	0.1	0.14
	4	30,000	700	0.07	0.1
	6	25,000	500	0.04	0.06
	8	25,000	400	0.02	0.05
	10	25,000	300	0.01	0.04
0.35	4	30,000	700	0.06	0.15
	5	30,000	600	0.05	0.1

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		铜合金 Copper			
球头半径(R) Radius	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm
0.4	2	40,000	2000	0.2	0.3
	3	40,000	2,000	0.15	0.3
	4	35,000	1,600	0.12	0.2
	6	30,000	1,000	0.08	0.15
	8	22,000	700	0.05	0.06
	10	22,000	700	0.04	0.06
0.5	3	40,000	2,800	0.25	0.4
	4	40,000	2,400	0.2	0.4
	6	30,000	1,600	0.14	0.3
	8	25,000	1,000	0.12	0.2
	10	20,000	800	0.08	0.15
	12	16,000	600	0.06	0.1
	16	16,000	600	0.05	0.08
0.75	4	30,000	2400	0.4	0.6
	6	30,000	2,400	0.3	0.6
	8	25,000	1,600	0.25	0.5
	10	25,000	1,600	0.2	0.4
	12	16,000	1,000	0.15	0.3
	16	10,000	700	0.08	0.12
1	6	27,000	3,000	0.45	0.8
	8	25,000	2,400	0.4	0.8
	10	22,000	2,000	0.3	0.6
	12	16,000	1,400	0.3	0.6
	16	12,000	1,000	0.25	0.5
	18	12,000	1,000	0.2	0.4
	20	10,000	800	0.15	0.3
1.5	8	20,000	3400	0.8	1.5
	10	20,000	3,400	0.7	1.5
	12	20,000	3,000	0.65	1.4
	16	18,000	3,000	0.6	1.2
	20	16,000	2,400	0.5	0.8
2	12	16,000	4,000	1	1.6
	16	16,000	3,400	0.8	1.6
	20	14,000	3,000	0.8	1.6

备注 Notes

※本切削参数仅供参考。请根据实际的加工形状和所使用的机床等调整切削参数。
※切深量的ap表示轴向切入量，ae表示步距量。
※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴主轴转速过低时，也以相同的比率调整。
※建议使用油冷冷却方式。

※These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape andmachine type.
※ Depth of Cut : ap=Axial Depth of Cut / ae=Radial Depth of Cut.
※Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.
※Water-insoluble cutting fluid is recommended.

铜・铝合金用2刃长颈圆鼻铣刀

Copper・Aluminum Alloy 2-Flute Long Neck Corner Radius Endmills

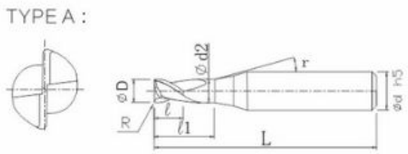
2刃・带R角 | 2-Flute・Corner Radius

外径公差 Dia.tolerance 0~-0.007　R公差 R tolerance ±0.005　h5 0~-0.005　(mm)

高耐溶着性能。最适合铝合金·铜的加工。tac涂层。

High welding resistance makes it ideal for machining aluminum alloys and copper.tac coating.

TYPE A :



- 针对铜电极加工用的球头铣刀。
- 采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。
- Ball end milling cutter for copper electrode machining.
- High quality and stable milling performance with long tool life by optimized design and tac COATING.

硬质合金 tac涂层

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	半径角(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X3R02005002	0.2R0.02x0.5L	0.2	R0.02	0.5	0.3	0.18	10+20°	4	50	
X3R0201002	0.2R0.02x1L			1	0.3	0.18	10+20°	4	50	
X3R02015002	0.2R0.02x1.5L			1.5	0.3	0.18	10+20°	4	50	
X3R02005005	0.2R0.05x0.5L		R0.05	0.5	0.3	0.18	10+20°	4	50	
X3R0201005	0.2R0.05x1L			1	0.3	0.18	10+20°	4	50	
X3R02015005	0.2R0.05x1.5L			1.5	0.3	0.18	10+20°	4	50	
X3R0202005	0.2R0.05x2L			2	0.3	0.18	10+20°	4	50	
X3NR0301005	0.3R0.05x1L	0.3	R0.05	1	0.5	0.27	10+20°	4	50	
X3NR03015005	0.3R0.05x1.5L			1.5	0.5	0.27	10+20°	4	50	
X3NR0302005	0.3R0.05x2L			2	0.5	0.27	10+20°	4	50	
X3NR0303005	0.3R0.05x3L			3	0.5	0.27	10+20°	4	50	
X3NR0401005	0.4R0.05x1L	0.4	R0.05	1	0.6	0.37	10+20°	4	50	
X3NR0402005	0.4R0.05x2L			2	0.6	0.37	10+20°	4	50	
X3NR0403005	0.4R0.05x3L			3	0.6	0.37	10+20°	4	50	
X3NR040101	0.4R0.1x1L		R0.1	1	0.6	0.37	10+20°	4	50	
X3NR040201	0.4R0.1x2L			2	0.6	0.37	10+20°	4	50	
X3NR040301	0.4R0.1x3L			3	0.6	0.37	10+20°	4	50	
X3NR0502005	0.5R0.05x2L	0.5	R0.05	2	0.7	0.46	10+20°	4	50	
X3NR0503005	0.5R0.05x3L			3	0.7	0.46	10+20°	4	50	
X3NR0504005	0.5R0.05x4L			4	0.7	0.46	10+20°	4	50	
X3NR0506005	0.5R0.05x6L			6	0.7	0.46	10+20°	4	50	
X3NR050201	0.5R0.1x2L		R0.1	2	0.7	0.46	10+20°	4	50	
X3NR050301	0.5R0.1x3L			3	0.7	0.46	10+20°	4	50	
X3NR0602005	0.6R0.05x2L	0.6	R0.05	2	0.9	0.56	10+20°	4	50	
X3NR0603005	0.6R0.05x3L			3	0.9	0.56	10+20°	4	50	
X3NR0604005	0.6R0.05x4L			4	0.9	0.56	10+20°	4	50	
X3NR060201	0.6R0.1x2L		R0.1	2	0.9	0.56	10+20°	4	50	
X3NR060301	0.6R0.1x3L			3	0.9	0.56	10+20°	4	50	
X3NR060401	0.6R0.1x4L			4	0.9	0.56	10+20°	4	50	
X3NR0802005	0.8R0.05x2L	0.8	R0.05	2	1.2	0.76	10+20°	4	50	
X3NR0803005	0.8R0.05x3L			3	1.2	0.76	10+20°	4	50	
X3NR0804005	0.8R0.05x4L			4	1.2	0.76	10+20°	4	50	
X3NR080301	0.8R0.1x3L		R0.1	3	1.2	0.76	10+20°	4	50	
X3NR080401	0.8R0.1x4L			4	1.2	0.76	10+20°	4	50	
X3NR080501	0.8R0.1x5L			5	1.2	0.76	10+20°	4	50	
X3NR080601	0.8R0.1x6L			6	1.2	0.76	10+20°	4	50	
X3NR080202	0.8R0.2x2L		R0.2	2	1.2	0.76	10+20°	4	50	
X3NR080302	0.8R0.2x3L			3	1.2	0.76	10+20°	4	50	
X3NR080402	0.8R0.2x4L			4	1.2	0.76	10+20°	4	50	
X3NR080602	0.8R0.2x6L			6	1.2	0.76	10+20°	4	50	

切削参数参考表

Recommended Milling Conditions

加工材料 Work Material			铜合金 Copper			
外径 Dia.	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
			min-1	mm/min	ap mm	ae mm
0.2	0.02	0.5	40,000	300	0.024	0.13
		1	40,000	250	0.02	0.13
		1.5	30,000	200	0.018	0.13
		2	30,000	150	0.015	0.13
	0.05	0.5	40,000	350	0.026	0.14
		1	40,000	300	0.024	0.14
		1.5	30,000	250	0.02	0.14
		2	30,000	200	0.018	0.14
0.3	0.05	1	40,000	480	0.03	0.15
		1.5	40,000	360	0.024	0.15
		2	30,000	240	0.018	0.15
		3	30,000	200	0.015	0.15
0.4	0.05	1	40,000	640	0.03	0.2
		2	40,000	560	0.024	0.2
		3	30,000	420	0.018	0.2
	0.1	1	40,000	640	0.06	0.2
		2	40,000	560	0.05	0.2
		3	30,000	420	0.036	0.2
0.5	0.05	2	40,000	800	0.03	0.25
		3	35,000	640	0.024	0.25
		4	30,000	480	0.018	0.25
		6	25,000	400	0.012	0.25
	0.1	2	40,000	800	0.06	0.25
		3	35,000	640	0.05	0.25
0.6	0.05	2	30,000	1,000	0.03	0.3
		3	25,000	1,000	0.03	0.3
		4	25,000	800	0.02	0.3
	0.1	2	30,000	1,000	0.06	0.3
		3	30,000	1,000	0.06	0.3
		4	25,000	800	0.05	0.3
0.8	0.05	2	30,000	1,600	0.03	0.4
		3	30,000	1,600	0.03	0.4
		4	25,000	1,600	0.03	0.4
	0.1	3	30,000	1,600	0.06	0.4
		4	25,000	1,600	0.06	0.4
		5	20,000	1,200	0.05	0.4
		6	20,000	1,200	0.05	0.4
	0.2	2	30,000	1,600	0.06	0.4
		3	30,000	1,600	0.06	0.4
		4	25,000	1,600	0.06	0.4
		6	20,000	1,200	0.05	0.4

备注 Notes

※本切削参数仅供参考。请根据实际的加工形状和所使用的机床等调整切削参数。
※切深量的ap表示轴向切深量，ae表示径向切深量。
※轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※沟槽切削时建议参考切削参数表，进给速度设定为60%以下，并采用来回切削加工方式。
※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率降低。
※建议使用油冷冷却方式。

※ The cutting parameters are for reference only. Please adjust the cutting parameters according to the actual machining shape and the machine tool used.
※ The ap of the cutting depth indicates the axial cutting depth, and the ae indicates the radial cutting depth.
※ Screw feed and inclined feed are recommended for axial feed.
※ It is recommended to refer to the cutting parameter table when grooving cutting, the feed speed is set to less than 60%, and the cutting mode is adopted.
※ When vibrating knife occurs, please reduce the spindle speed and feed speed in the same ratio. In addition, when the spindle speed is too low, it is also reduced at the same rate.
※ Oil cooling is recommended.

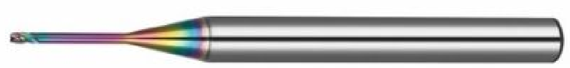
铜·铝合金用4刃长颈圆鼻铣刀
Copper · Aluminum Alloy 4-Flute Long Neck Corner Radius Endmills

4刃·带R角 4-Flute · Corner Radius

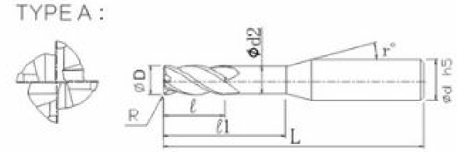
平面 Planing | 侧面 Side Cuting | 槽 Slotting | 刻模 Die-sinking | 曲面 Profiling | R Radius | 螺旋 Helical | 粗加工 Roughing | 半精加工 Semi Finishing | 精加工 Finishing | 切削条件表 B069 Cutting Conditions

外径公差 Dia.tolerance 1≤D≤3 : 0~-0.01 D≤4 : 0~-0.015 | r公差 r tolerance ±0.005 | h5 0~-0.005 (mm)

高耐溶着性能。最适合铝合金·铜的加工。tac涂层。
High welding resistance makes it ideal for machining aluminum alloys and copper.tac coating.



TYPE A :



- 针对铜电极加工用的球头铣刀。
- 采用优化的刀刃形状和tac涂层，可确保长时间进行持续稳定的高品质加工。
- Ball end milling cutter for copper electrode machining.
- High quality and stable milling performance with long tool life by optimized design and tac COATING.

硬质合金 | tac涂层 | R角 | 颈锥角12°

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	半径角(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X3NR1004005	1R0.05x4L	1	R0.05	4	1.5	0.95	12°	50	4	
X3NR1006005	1R0.05x6L			6	1.5	0.95	12°	50	4	
X3NR1008005	1R0.05x8L			8	1.5	0.95	12°	50	4	
X3NR1010005	1R0.05x10L			10	1.5	0.95	12°	50	4	
X3NR100401	1R0.1x4L		R0.1	4	1.5	0.95	12°	50	4	
X3NR100601	1R0.1x6L			6	1.5	0.95	12°	50	4	
X3NR100801	1R0.1x8L			8	1.5	0.95	12°	50	4	
X3NR101001	1R0.1x10L			10	1.5	0.95	12°	50	4	
X3NR100402	1R0.2x4L		R0.2	4	1.5	0.95	12°	50	4	
X3NR100502	1R0.2x5L			5	1.5	0.95	12°	50	4	
X3NR100602	1R0.2x6L			6	1.5	0.95	12°	50	4	
X3NR100802	1R0.2x8L			8	1.5	0.95	12°	50	4	
X3NR101002	1R0.2x10L			10	1.5	0.95	12°	50	4	
X3NR101202	1R0.2x12L			12	1.5	0.95	12°	50	4	
X3NR150602	1.5R0.2x6L	1.5	R0.2	6	2.3	1.45	12°	50	4	
X3NR150802	1.5R0.2x8L			8	2.3	1.45	12°	50	4	
X3NR151002	1.5R0.2x10L			10	2.3	1.45	12°	50	4	
X3NR151202	1.5R0.2x12L			12	2.3	1.45	12°	50	4	
X3NR151602	1.5R0.2x16L			16	2.3	1.45	12°	50	4	
X3NR200801	2R0.1x8L	2	R0.1	8	3	1.94	12°	50	4	
X3NR201001	2R0.1x10L			10	3	1.94	12°	50	4	
X3NR201201	2R0.1x12L			12	3	1.94	12°	50	4	

铜·铝合金用4刃长颈圆鼻铣刀
Copper · Aluminum Alloy 4-Flute Long Neck Corner Radius Endmills

硬质合金 | tac涂层 | R角 | 颈锥角12°

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	半径角(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
X3NR200802	2R0.2x8L	2	R0.2	8	3	1.94	12°	50	4	
X3NR201002	2R0.2x10L			10	3	1.94	12°	50	4	
X3NR201202	2R0.2x12L			12	3	1.94	12°	50	4	
X3NR201602	2R0.2x16L			16	3	1.94	12°	50	4	
X3NR200805	2R0.5x8L		R0.5	8	3	1.94	12°	50	4	
X3NR201005	2R0.5x10L			10	3	1.94	12°	50	4	
X3NR201205	2R0.5x12L			12	3	1.94	12°	50	4	
X3NR201605	2R0.5x16L			16	3	1.94	12°	50	4	
X3NR202005	2R0.5x20L			20	3	1.94	12°	50	4	
X3NR031002	3R0.2x10L	3	R0.2	10	4.5	2.85	12°	50	4	
X3NR301202	3R0.2x12L			12	4.5	2.85	12°	50	4	
X3NR301402	3R0.2x14L			14	4.5	2.85	12°	50	4	
X3NR301602	3R0.2x16L			16	4.5	2.85	12°	50	4	
X3NR301202L	3R0.2x12L			12	4.5	2.85	12°	60	6	
X3NR301602L	3R0.2x16L			16	4.5	2.85	12°	60	6	
X3NR302002L	3R0.2x20L			20	4.5	2.85	12°	60	6	
X3NR301203	3R0.3x12L		R0.3	12	4.5	2.85	12°	50	4	
X3NR301603	3R0.3x16L			16	4.5	2.85	12°	50	4	
X3NR301203L	3R0.3x12L			12	4.5	2.85	12°	60	6	
X3NR301603L	3R0.3x16L			16	4.5	2.85	12°	60	6	
X3NR302003L	3R0.3x20L			20	4.5	2.85	12°	60	6	
X3NR301005	3R0.5x10L		R0.5	10	4.5	2.85	12°	50	4	
X3NR301205	3R0.5x12L			12	4.5	2.85	12°	50	4	
X3NR301605	3R0.5x16L			16	4.5	2.85	12°	50	4	
X3NR301205L	3R0.5x12L			12	4.5	2.85	12°	60	6	
X3NR301605L	3R0.5x16L			16	4.5	2.85	12°	60	6	
X3NR302005L	3R0.5x20L			20	4.5	2.85	12°	60	6	
X3NR401202L	4R0.2x12L	4	R0.2	12	6	3.8	12°	60	6	
X3NR401602L	4R0.2x16L			16	6	3.8	12°	60	6	
X3NR402002L	4R0.2x20L			20	6	3.8	12°	60	6	
X3NR401603L	4R0.3x16L		R0.3	16	6	3.8	12°	60	6	
X3NR402003L	4R0.3x20L			20	6	3.8	12°	60	6	
X3NR401205L	4R0.5x12L		R0.5	12	6	3.8	12°	60	6	
X3NR401605L	4R0.5x16L			16	6	3.8	12°	60	6	
X3NR402005L	4R0.5x20L			20	6	3.8	12°	60	6	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material			铜合金 Copper			
外径 Dia.	角半径(R) Corner Radius	颈长(*l*1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
			min-1	mm/min	ap mm	ae mm
1	0.05	4	25,000	2,200	0.03	0.6
		6	20,000	1,800	0.024	0.6
		8	16,000	1,400	0.02	0.6
		10	12,000	1,000	0.02	0.6
	0.4	4	25,000	2,200	0.055	0.6
		6	20,000	1,800	0.045	0.6
		8	16,000	1,400	0.04	0.6
		10	12,000	1,000	0.03	0.6
	0.2	4	25,000	2,200	0.11	0.6
		5	22,000	2,000	0.1	0.6
		6	20,000	1,800	0.09	0.6
		8	16,000	1,400	0.08	0.6
		10	12,000	1,000	0.06	0.6
		12	12,000	1,000	0.06	0.6
1.5	0.2	6	20,000	2,400	0.12	0.9
		8	20,000	1,600	0.1	0.9
		10	16,000	1,600	0.1	0.9
		12	16,000	1,000	0.07	0.9
		16	12,000	1,000	0.08	0.9
2	0.1	8	14,000	2,600	0.06	1.2
		10	12,000	2,000	0.06	1.2
		12	12,000	2,000	0.05	1.2
	0.2	8	14,000	2,600	0.12	1.2
		10	12,000	2,000	0.12	1.2
		12	12,000	2,000	0.1	1.2
		16	10,000	1,600	0.08	1.2
	0.5	8	14,000	2,600	0.3	1.2
		10	12,000	2,000	0.3	1.2
		12	12,000	2,000	0.25	1.2
		16	10,000	1,600	0.2	1.2
		20	8,000	1,200	0.15	1.2
3	0.2	10	14,000	3,000	0.15	1.8
		12	14,000	3,000	0.12	1.8
		14	13,000	2,600	0.1	1.8
		16	12,000	2,400	0.08	1.8
		20	10,000	1,800	0.08	1.8
	0.3	12	14,000	3,000	0.18	1.8
		16	12,000	2,400	0.15	1.8
		20	10,000	1,800	0.12	1.8
	0.5	10	14,000	3,000	0.3	1.8
		12	14,000	3,000	0.3	1.8
		16	12,000	2,400	0.25	1.8
		20	10,000	1,800	0.2	1.8

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material			铜合金 Copper			
外径 Dia.	角半径(R) Corner Radius	颈长(*l*1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
			min-1	mm/min	ap mm	ae mm
4	0.2	12	10,000	2,800	0.14	2.8
		16	10,000	2,800	0.14	2.8
		20	8,000	2,200	0.12	2.8
	0.3	12	10,000	2,800	0.18	2.8
		16	10,000	2,800	0.18	2.8
		20	8,000	2,200	0.15	2.8
	0.5	12	10,000	2,800	0.3	2.4
		16	10,000	2,800	0.3	2.4
		20	8,000	2,200	0.24	2.4
备注 Notes			※本切削参数仅供参考。请根据实际的加工形状和所使用的机床等调整切削参数。 ※切深量的ap表示轴向切深量，ae表示径向切深量。 ※轴向进刀建议采用螺旋进刀及倾斜进刀方式。 ※沟槽切削时建议参考切削参数表，进给速度设定为60%以下，并采用来回切削加工方式。 ※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率降低。 ※建议使用油冷冷却方式。 ※ The cutting parameters are for reference only. Please adjust the cutting parameters according to the actual machining shape and the machine tool used. ※ The ap of the cutting depth indicates the axial cutting depth, and the ae indicates the radial cutting depth. ※ Screw feed and inclined feed are recommended for axial feed. ※ It is recommended to refer to the cutting parameter table when grooving cutting, the feed speed is set to less than 60%, and the cutting mode is adopted. ※ When vibrating knife occurs, please reduce the spindle speed and feed speed in the same ratio. In addition, when the spindle speed is too low, it is also reduced at the same rate. ※ Oil cooling is recommended.			

通用合金材料加工用铣刀
Universal ALoy For Machining Endmills

AP
通用合金
AP
Universal Aloy

型号 Model	规格 Size	涂层 Coating	刃数 Number of Flute	螺旋角 Helix Angle	精加工分类 Types of Finishing	加工用途 Applications	可对应加工材料 Work Material	规格数量 Number of Sizes	页面 Page
通用合金用2刃微小径平底铣刀 Universal Alloy 2-Flute Micro Diameter Square Endmills									
	φ0.03~φ0.9	AP	2	30	精加工 Finishing; 助槽细部 Rib Miniature	侧面 Side Cutting; 槽 Slotting; 细部 Miniature	○○○○----○-○-----	20	B073
刃长为外径的2倍，适用于侧面、沟槽切削的全能型。 可以对应小于HRC50°的合金和有色金属。 The blade length is 2 times the outside diameter, suitable for side and groove cutting all-purpose. Alloys and Non-ferrous metal > HRC50.									
通用合金用2刃微小径球头铣刀 Universal Alloy 2-Flute Micro Diameter Ball Endmills									
	R0.03~R0.45	AP	2	30	半精加工 Semi Finishing; 精加工 Finishing; 助槽细部 Rib Miniature	槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 细部 Miniature	○○○○----○-○-----	18	B075
适用于从低速到高速的深沟精密3D形状加工 可以对应各种加工材料。可以对应小于HRC50°的合金和有色金属。 It is possible to have deep and precision three-dimensional cutting in the low to high speed range.Alloys and Non-ferrous metal > HRC50.									
通用合金用2刃微小径圆鼻铣刀 Universal Alloy 2-Flute Micro Diameter Corner Radius Endmills									
	φ0.1xR0.01~φ0.9xR0.1	AP	2	30	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○○○○----○-○-----	21	B077
与球头铣刀相比，步距设定值可取较大值，实现高效加工。 Compared with ball-end milling cutter, the step setting value should be larger to achieve efficient machining.									
通用合金用2刃长颈平底铣刀 Universal Alloy 2-Flute Long Neck Square Endmills									
	φ0.1~φ2	AP	2	30	精加工 Finishing; 助槽细部 Rib Miniature	侧面 Side Cutting; 槽 Slotting; 细部 Miniature	○○○○----○-○-----	87	B079
适用于深沟加工的长颈避空型。可以对应小于HRC50°的合金和有色金属。 Long neck design is suited for the machining of narrow and deep area.Alloys and Non-ferrous metal > HRC50.									
通用合金用4刃长颈平底铣刀 Universal Alloy 4-Flute Long Neck Square Endmills									
	φ1~φ4	AP	4	30	精加工 Finishing; 助槽细部 Rib Miniature	侧面 Side Cutting; 槽 Slotting; 细部 Miniature	○○○○----○-○-----	38	B083
适用于深沟加工的长颈避空型。可以对应小于HRC50°的合金和有色金属。 Long neck design is suited for the machining of narrow and deep area.Alloys and Non-ferrous metal > HRC50.									
通用合金用2刃长颈球头铣刀 Universal Alloy 2-Flute Long Neck Ball Endmills									
	R0.04~R2	AP	2	30	半精加工 Semi Finishing; 精加工 Finishing; 助槽细部 Rib Miniature	槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 细部 Miniature	○○○○----○-○-----	132	B085
适用于深沟加工的长颈避空型。适用于从低速到高速的深沟精密3D形状加工，可以对应小于HRC50°的合金和有色金属。 Long neck design is suited for the machining of narrow and deep area.It is possible to have deep and precision three-dimensional cutting in the low to high speed range.Alloys and Non-ferrous metal > HRC50.									

型号 Model	规格 Size	涂层 Coating	刃数 Number of Flute	螺旋角 Helix Angle	精加工分类 Types of Finishing	加工用途 Applications	可对应加工材料 Work Material	规格数量 Number of Sizes	页面 Page
通用合金用2刃长颈圆鼻铣刀 Universal Alloy 2-Flute Long Neck Corner Radius Endmills									
	φ0.2xR0.02~φ0.8xR0.2	AP	2	30	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○○○○----○-○-----	79	B091
与球头铣刀相比，步距设定值可取较大值，实现高效加工。 Compared with ball-end milling cutter, the step setting value should be larger to achieve efficient machining.									
通用合金用4刃长颈圆鼻铣刀 Universal Alloy 4-Flute Long Neck Corner Radius Endmills									
	φ1xR0.05~φ4xR1	AP	4	30	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刻模 Die-sinking; 曲面 Profiling; R Radius; 螺旋 Helical	○○○○----○-○-----	147	B095
与球头铣刀相比，步距设定值可取较大值，实现高效加工。 Compared with ball-end milling cutter, the step setting value should be larger to achieve efficient machining.									

通用合金用2刃微小径平底铣刀
Universal Alloy 2-Flute Micro Diameter Square Endmills

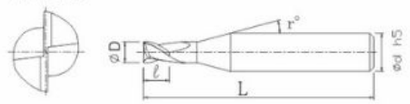
2刃・平底铣刀 | 2-Flute・Square

小直径精密加工用平头立铣刀。
Square Endmills for small-diameter high-precision machining.

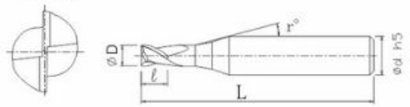
Side Cutting 侧面 | Slotting 槽 | Miniature 细部 | Finishing 精加工 | Rib Miniature 肋槽细部 | Cutting Conditions 切削条件表 B074

外径公差 Dia.Tolerance: D≤0.1 : 0~- 0.005
0.15≤D≤0.9 : 0~- 0.007
h5 : 0~-0.005
(mm)

TYPE A:



TYPE B:



- 刃长为外径的2倍，适用于侧面、沟槽切削的全能型。
- 可以对应小于HRC50°的合金和有色金属。
- The blade length is 2 times the outside diameter, suitable for side and groove cutting all-purpose.
- Alloys and Non-ferrous metal > HRC50.

硬质合金 | AP涂层

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
HSE00032	0.03x0.006L	0.03	0.06	11°	4	45	A	
HSE00042	0.04x0.008L	0.04	0.08	11°	4	45	A	
HSE00052	0.05x0.1L	0.05	0.1	11°	4	45	A	
HSE00062	0.06x0.12L	0.06	0.12	11°	4	45	A	
HSE00072	0.07x0.14L	0.07	0.14	11°	4	45	A	
HSE00082	0.08x0.16L	0.08	0.16	11°	4	45	A	
HSE00092	0.09x0.18L	0.09	0.18	11°	4	45	A	
HSE0013	0.1x0.3L	0.1	0.3	10+20°	4	50	B	
HSE00152	0.15x0.3L	0.15	0.3	10+20°	4	50	B	
HSE0022	0.2x0.4L	0.2	0.4	10+20°	4	50	B	
HSE0025	0.25x0.5L	0.25	0.5	10+20°	4	50	B	
HSE0032	0.3x0.6L	0.3	0.6	10+20°	4	50	B	
HSE0035	0.35x0.7L	0.35	0.7	10+20°	4	50	B	
HSE0042	0.4x0.8L	0.4	0.8	10+20°	4	50	B	
HSE0045	0.45x0.9L	0.45	0.9	10+20°	4	50	B	
HSE0052	0.5x1.0L	0.5	1	10+20°	4	50	B	
HSE0062	0.6x1.2L	0.6	1.2	10+20°	4	50	B	
HSE0072	0.7x1.4L	0.7	1.4	10+20°	4	50	B	
HSE0082	0.8x1.6L	0.8	1.6	10+20°	4	50	B	
HSE0092	0.9x1.8L	0.9	1.8	10+20°	4	50	B	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material	碳素钢 Carbon Steels S50C			合金钢 Alloy Steels SCM・SKD・SUS			调质钢 Prehardened Steels HPM・NAK		
切削速度 Cutting Speed	50~80m/min			50~70m/min			40~60m/min		
外径 Dia.	主轴转速 Spindle Speed	进给速度 Feed mm/min		主轴转速 Spindle Speed	进给速度 Feed mm/min		主轴转速 Spindle Speed	进给速度 Feed mm/min	
	min-1	侧面 Side Milling	沟槽 Slotting	min-1	侧面 Side Milling	沟槽 Slotting	min-1	侧面 Side Milling	沟槽 Slotting
0.03	50,000	-	5	50,000	-	5	50,000	-	5
0.04	50,000	-	5	50,000	-	5	50,000	-	5
0.05	50,000	-	5	50,000	-	5	50,000	-	5
0.06	50,000	-	5	50,000	-	5	50,000	-	5
0.07	50,000	-	10	50,000	-	5	50,000	-	5
0.08	50,000	-	15	50,000	-	5	50,000	-	5
0.09	50,000	-	20	50,000	-	10	50,000	-	10
0.1	50,000	-	25	50,000	-	15	50,000	-	20
0.15	50,000	-	30	50,000	-	20	50,000	-	25
0.2	50,000	-	40	50,000	-	25	50,000	-	30
0.25	50,000	80	45	50,000	70	30	50,000	70	35
0.3	50,000	100	50	50,000	90	35	50,000	85	40
0.35	50,000	130	60	50,000	110	40	50,000	90	45
0.4	50,000	150	75	47,700	130	50	39,800	110	55
0.45	45,000	160	80	42,000	130	50	40,000	110	55
0.5	41,400	170	85	38,200	130	50	31,800	110	55
0.6	36,000	180	90	33,000	130	50	28,000	115	60
0.7	30,000	190	95	28,000	140	55	23,000	120	60
0.8	25,900	210	100	23,900	150	55	19,900	130	65
0.9	20,000	250	150	20,000	200	60	17,000	150	70

切深量 Depth of Cut (D:刃径Dia.)

侧面 Side Milling: 1.5D, ae φ0.3~0.95=0.05D
沟槽 Slotting: D, ap φ0.1~0.45=0.05D φ0.5~1.45=0.1D

备注 Notes

※请使用发烟性低的油冷冷却方式。
※请以相同的比率调整主轴转速和进给速度。
※加工参数会因切深量和机床刚性的状况而有所不同。请每次调整后再使用。
※ Use cutting fluid with smoke retardant.
※Adjust both spindle speed and feed atthe same rate.
※Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.

通用合金用2刃微小径球头铣刀
Universal Alloy 2-Flute Micro Diameter Ball Endmills

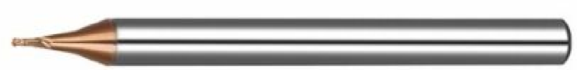
2刃 · 球头 2-Flute · Ball

Slotting / Die-sinking / Profiling / Radius / Miniature / Semi Finishing / Finishing / Rib Miniature / 切削条件表 B076 Cutting Conditions

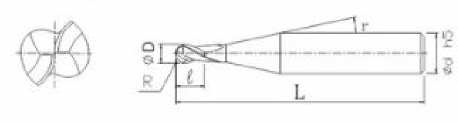
Dia.tolerance	R tolerance	h5
D≤0.1：0~-0.005 0.15≤D≤0.8：0~-0.007	R≤0.2：±0.003 0.25≤R≤0.45：±0.005	0~-0.005

（mm）

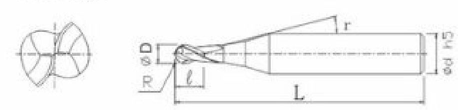
小直径精密加工用球头立铣刀。
Ball end mill for small-diameter high-precision machining.



TYPE A：



TYPE B：



- 适用于从低速到高速的深沟精密3D形状加工。
- 可以对应小于HRC50°的合金和有色金属。
- It is possible to have deep and precision three-dimensional cutting in the low to high speed range.
- Alloys and Non-ferrous metal > HRC50.

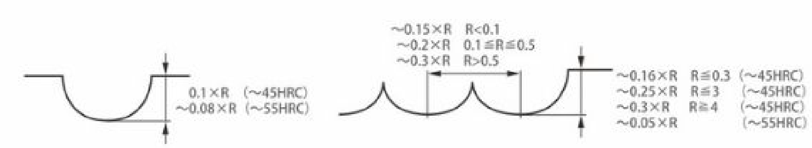
产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Radius	刃长(ℓ) Length of Cut	外径(D) Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
HSB000602	R0.03x0.12L	R0.03	0.12	0.06	11°	4	45	A	
HSB000702	R0.035x0.14L	R0.035	0.14	0.07	11°	4	45	A	
HSB000802	R0.04x0.16L	R0.04	0.16	0.08	11°	4	45	A	
HSB000102	R0.05x0.15L	R0.05	0.15	0.1	11°	4	45	A	
HSB000102L	R0.05x0.2L	R0.05	0.2	0.1	11°	4	45	A	
HSB000122	R0.06x0.24L	R0.06	0.24	0.12	11°	4	45	A	
HSB000152	R0.075x0.2L	R0.075	0.2	0.15	11°	4	45	A	
HSB000152L	R0.075x0.28L	R0.075	0.28	0.15	11°	4	45	A	
HSB000162	R0.08x0.32L	R0.08	0.32	0.16	11°	4	45	A	
HSB000182	R0.09x0.36L	R0.09	0.36	0.18	11°	4	45	A	
HSB0022	R0.1x0.4L	R0.1	0.4	0.2	10+20°	4	50	B	
HSB0032	R0.15x0.6L	R0.15	0.6	0.3	10+20°	4	50	B	
HSB0042	R0.2x0.8L	R0.2	0.8	0.4	10+20°	4	50	B	
HSB0052	R0.25x1.0L	R0.25	1	0.5	10+20°	4	50	B	
HSB0062	R0.3x1.2L	R0.3	1.2	0.6	10+20°	4	50	B	
HSB0072	R0.35x1.4L	R0.35	1.4	0.7	10+20°	4	50	B	
HSB0082	R0.4x1.6L	R0.4	1.6	0.8	10+20°	4	50	B	
HSB0092	R0.45x1.6L	R0.45	1.8	0.9	10+20°	4	50	B	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material	碳素钢 Carbon Steels S50C		合金钢 · 调质钢 Alloy Steels Prehardened Steels SCM · SKD · SUS · HPM快 NAK		淬火钢 Hardened Steels SKD61（v 52HRC）		铝合金 Aluminum Alloy		铜合金 Copper	
切削速度 Cutting Speed	150m/min		120~150m/min		80~100m/min		150m/min		100~150m/min	
球头半径(R) Radius	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed
	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
0.03	50,000	100	50,000	80	50,000	40	50,000	100	50,000	100
0.035	50,000	150	50,000	100	50,000	60	50,000	150	50,000	150
0.04	50,000	180	50,000	130	50,000	80	50,000	200	50,000	200
0.05	50,000	200	50,000	150	50,000	100	50,000	250	50,000	250
0.06	50,000	250	50,000	100	50,000	120	50,000	280	50,000	300
0.075	50,000	300	50,000	250	50,000	140	50,000	320	50,000	350
0.08	50,000	350	50,000	280	50,000	160	50,000	390	50,000	400
0.09	50,000	380	50,000	300	50,000	180	50,000	460	50,000	450
0.1	50,000	400	50,000	340	50,000	200	50,000	530	50,000	500
0.15	50,000	500	50,000	500	50,000	300	50,000	580	50,000	550
0.2	50,000	630	50,000	600	50,000	630	50,000	600	50,000	600
0.25	50,000	800	50,000	750	49,000	750	50,000	680	50,000	680
0.3	50,000	930	50,000	940	48,000	900	50,000	750	50,000	750
0.35	50,000	1000	50,000	1100	40,000	900	50,000	850	50,000	850
0.4	50,000	1,200	48,000	1,200	36,000	900	50,000	1,000	50,000	1,000
0.45	49,000	1,300	45,000	1,200	32,000	900	50,000	1,100	49,000	1,000

切深量 Depth of Cut

（R：球头半径 Radius）



备注 Notes

※沟槽加工时，请将进给速度调为上述参数的60%。
※刀具伸出量请以4D为标准，伸出量超出该标准时请调整切削参数。
※建议使用吹气或油雾冷却方式。
※请以相同的比率调整主轴转速和进给速度。
※ When slotting, reduce the feed by 60% from the above values.
※Length of overhang is 4 times Dia. as standard.When it is longer than 4 times Dia., adjust the conditions listed above.
※Recommended airblow or oil mist.
※Adjust both spindle speed and feed at the same rate.

通用合金用2刃微小径圆鼻铣刀
Universal Alloy 2-Flute Micro Diameter Corner Radius Endmills

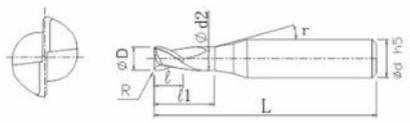
2刃 · 带R角 | 2-Flute · Corner Radius

小直径精密加工用圆鼻铣刀。
Radius Endmills for small-diameter high-precision machining.

平面 Planing | 侧面 Side Cutting | 槽 Slotting | 刻模 Die-sinking | 轮廓 Profiling | R Radius | 螺旋 Helical | 粗加工 Roughing | 半精加工 Semi Finishing | 精加工 Finishing | 切削条件 B078 Cutting Conditions

外径公差 Dia.tolerance: D≤0.1: 0~- 0.005; 0.15≤D≤0.9: 0~- 0.007
r公差 r.tolerance: ±0.005
h5: 0~-0.005
(mm)

TYPE A:



- 与球头铣刀相比，步距设定值可取较大值，实现高效加工。
- 可以对应小于HRC50°的合金和有色金属。
- Realized high eiciency milling by obtaining larger radial depth of cutting comparing with Ball End Mill.
- Alloys and Non-ferrous metal > HRC50

硬质合金 | AP 涂层 | 内冷 | 螺旋角

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
HSR01001	0.1R0.01x0.2L	0.1	R0.01	0.2	10+20°	4	50	A	
HSR01002	0.1R0.02x0.2L	0.1	R0.02	0.2	10+20°	4	50	A	
HSR015002	0.15R0.02x0.3L	0.15	R0.02	0.3	10+20°	4	50	A	
HSR015003	0.15R0.05x0.3L	0.15	R0.05	0.3	10+20°	4	50	A	
HSR02002	0.2R0.02x0.4L	0.2	R0.02	0.4	10+20°	4	50	A	
HSR02005	0.2R0.05x0.4L	0.2	R0.05	0.4	10+20°	4	50	A	
HSR03005	0.3R0.05x0.6L	0.3	R0.05	0.6	10+20°	4	50	A	
HSR0301	0.3R0.1x0.6L	0.3	R0.1	0.6	10+20°	4	50	A	
HSR04005	0.4R0.05x0.8L	0.4	R0.05	0.8	10+20°	4	50	A	
HSR0401	0.4R0.1x0.8L	0.4	R0.1	0.8	10+20°	4	50	A	
HSR05005	0.5R0.05x1.0L	0.5	R0.05	1	10+20°	4	50	A	
HSR0501	0.5R0.1x1.0L	0.5	R0.1	1	10+20°	4	50	A	
HSR06005	0.6R0.05x1.2L	0.6	R0.05	1.2	10+20°	4	50	A	
HSR0601	0.6R0.1x1.2L	0.6	R0.1	1.2	10+20°	4	50	A	
HSR07005	0.7R0.05x1.4L	0.7	R0.05	1.4	10+20°	4	50	A	
HSR0701	0.7R0.1x1.4L	0.7	R0.1	14	10+20°	4	50	A	
HSR08005	0.8R0.05x1.6L	0.8	R0.05	1.6	10+20°	4	50	A	
HSR0801	0.8R0.1x1.6L	0.8	R0.1	1.6	10+20°	4	50	A	
HSR0802	0.8R0.2x1.6L	0.8	R0.2	1.6	10+20°	4	50	A	
HSR9005	0.9R0.05x1.8L	0.9	R0.05	1.8	10+20°	4	50	A	
HSR00901	0.9R0.1x1.8L	0.9	R0.1	1.8	10+20°	4	50	A	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		碳素钢 · 调质钢 Carbon Steels · Prehardened Steels S50C · NAK55 · NAK80 · HPM-1 (~43HRC)				淬火钢 Hardened Steels HPM-38 · STAVAX · SKD61 (~55HRC)				铜 · 铝合金 Copper · Aluminum Alloy			
外径 Dia.	(R)角半径 Corner Radius	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.1	0.01 0.02	30,000	100	0.005	0.03	30,000	50	0.001	0.008	30,000	150	0.008	0.01
0.15	0.02 0.05	30,000	150	0.008	0.04	30,000	100	0.002	0.01	30,000	200	0.01	0.03
0.2	0.02 0.05	30,000	200	0.01	0.05	30,000	150	0.003	0.04	30,000	250	0.012	0.05
0.3	0.05 0.1	30,000	200	0.02	0.1	30,000	180	0.003	0.08	30,000	300	0.024	0.1
0.4	0.05 0.1	30,000	350	0.025	0.12	30,000	300	0.005	0.1	30,000	450	0.03	0.12
0.5	0.05 0.1	30,000	500	0.03	0.14	25,000	400	0.01	0.12	30,000	650	0.036	0.14
0.6	0.05 0.1	30,000	600	0.035	0.16	25,000	400	0.02	0.13	30,000	800	0.04	0.16
0.7	0.05 0.1	30,000	800	0.04	0.2	30,000	600	0.02	0.16	30,000	1,500	0.04	0.2
0.8	0.05 0.1 0.2	30,000	1,500	0.05	0.25	25,000	800	0.03	0.2	30,000	1,800	0.06	0.25
0.9	0.05 0.1	30,000	1700	0.06	0.3	25,000	1000	0.04	0.3	30,000	2000	0.08	0.3

备注 Notes

※请根据实际的加工形状及使用机床等调整切削参数。
※切深量的ap表示轴向切入量，ae表示步距量。
※加工淬火钢时，建议使用油雾冷却方式。
※轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※沟槽切削时建议参考切削参数表，切深量ap及进给速度设定为50%以下，采用来回切削加工方式。
※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率调。

※adjust Milling Conditions According To Milling Shape And Machine Type.
※ap : Axial Depth Of Cut, Ae : Radial Depth Of Cut.
※recommend To Use Oil Mist Coolant For Machining Hardened Steels.
※recommend To Apply Helical Or Ramping For Approaching Into Axial Direction.
※for Slotting, Recommend Reciprocating Milling By Adjusting Feed & Ap In Below 50% Of Recommended Millingcondition.
※reduce Both Spindle Speed And Feed At Same Rate For Chattering And Also For Insufficient Spindle Speed Of A Machine.

通用合金用2刃长颈平底铣刀
Universal Alloy 2-Flute Long Neck Square Endmills

2刃 · 平底铣刀 | 2-Flute · Square

Side Cutting | Slotting | Miniature | Finishing | Rib Miniature | Cutting Conditions B081

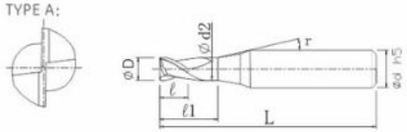
外径公差 Dia.Tolerance
D≤0.1: 0~-0.005
0.15≤D≤0.9: 0~-0.007
1≤D≤3: 0~-0.01

h5 0~-0.005

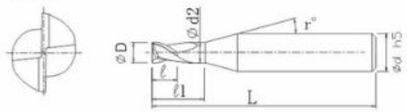
(mm)

精密加工用长颈平头立铣刀。
Long neck flat end mill for precision machining.

TYPE A:



TYPE B:



- 适用于深沟加工的长颈避空型。
- 可以对应小于HRC50°的合金和有色金属。
- Long neck design is suited for the machining of narrow and deep area.
- Alloys and Non-ferrous metal > HRC50.

硬质合金 | AP涂层 | 螺旋角可变

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	颈长(t1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	价格 Retail Price
KNE01003	0.1x0.3L	0.1	0.3	0.2	0.085	10+20°	4	50	
KNE01005	0.1x0.5L		0.5	0.2	0.085	10+20°	4	50	
KNE010075	0.1x0.75L		0.75	0.2	0.085	10+20°	4	50	
KNE0101	0.1x1L		1	0.2	0.085	10+20°	4	50	
KNE01015	0.1x1.5L		1.5	0.2	0.085	10+20°	4	50	
KNE0102	0.1x2L		2	0.2	0.085	10+20°	4	50	
KNE015005	0.15x0.5L	0.15	0.5	0.23	0.13	10+20°	4	50	
KNE015006	0.15x0.6L		0.6	0.23	0.13	10+20°	4	50	
KNE0150075	0.15x0.75L		0.75	0.23	0.13	10+20°	4	50	
KNE01501	0.15x1L		1	0.23	0.13	10+20°	4	50	
KNE015015	0.15x1.5L		1.5	0.23	0.13	10+20°	4	50	
KNE01502	0.15x2L		2	0.23	0.13	10+20°	4	50	
KNE015025	0.15x2.5L		2.5	0.23	0.13	10+20°	4	50	
KNE018005A	0.18x0.5L	0.18	0.5	0.27	0.16	10+20°	4	50	
KNE01801A	0.18x1L		1	0.27	0.16	10+20°	4	50	
KNE02005	0.2x0.5L	0.2	0.5	0.3	0.18	10+20°	4	50	
KNE0201	0.2x1L		1	0.3	0.18	10+20°	4	50	
KNE02015	0.2x1.5L		1.5	0.3	0.18	10+20°	4	50	
KNE0202	0.2x2L		2	0.3	0.18	10+20°	4	50	
KNE0203	0.2x3L		3	0.3	0.18	10+20°	4	50	
KNE0204	0.2x4L		4	0.3	0.18	10+20°	4	50	
KNE02501	0.25x1L	0.25	1	0.4	0.23	10+20°	4	50	
KNE025015	0.25x1.5L		1.5	0.4	0.23	10+20°	4	50	
KNE02502	0.25x2L		2	0.4	0.23	10+20°	4	50	
KNE02503	0.25x3L		3	0.4	0.23	10+20°	4	50	
KNE0254	0.25x4L		4	0.4	0.23	10+20°	4	50	
KNE0301	0.3x1L	0.3	1	0.5	0.27	10+20°	4	50	
KNE03015	0.3x1.5L		1.5	0.5	0.27	10+20°	4	50	
KNE0302	0.3x2L		2	0.5	0.27	10+20°	4	50	
KNE03025	0.3x2.5L		2.5	0.5	0.27	10+20°	4	50	
KNE0303	0.3x3L		3	0.5	0.27	10+20°	4	50	
KNE0304	0.3x4L		4	0.5	0.27	10+20°	4	50	
KNE0306	0.3x6L		6	0.5	0.27	10+20°	4	50	

通用合金用2刃长颈平底铣刀
Universal Alloy 2-Flute Long Neck Square Endmills

硬质合金 | AP涂层 | 螺旋角可变

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	颈长(t1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	价格 Retail Price
KNE0401	0.4x1L	0.4	1	0.6	0.37	10+20°	4	50	
KNE0402	0.4x2L		2	0.6	0.37	10+20°	4	50	
KNE0403	0.4x3L		3	0.6	0.37	10+20°	4	50	
KNE0404	0.4x4L		4	0.6	0.37	10+20°	4	50	
KNE0406	0.4x6L		6	0.6	0.37	10+20°	4	50	
KNE0501	0.5x1L	0.5	1	0.7	0.46	10+20°	4	50	
KNE0502	0.5x2L		2	0.7	0.46	10+20°	4	50	
KNE0503	0.5x3L		3	0.7	0.46	10+20°	4	50	
KNE0504	0.5x4L		4	0.7	0.46	10+20°	4	50	
KNE0505	0.5x5L		5	0.7	0.46	10+20°	4	50	
KNE0506	0.5x6L		6	0.7	0.46	10+20°	4	50	
KNE0508	0.5x8L		8	0.7	0.46	10+20°	4	50	
KNE0510	0.5x10L		10	0.7	0.46	10+20°	4	50	
KNE0512	0.5x12L		12	0.7	0.46	10+20°	4	50	
KNE0602	0.6x2L	0.6	2	0.9	0.56	10+20°	4	50	
KNE0603	0.6x3L		3	0.9	0.56	10+20°	4	50	
KNE0604	0.6x4L		4	0.9	0.56	10+20°	4	50	
KNE0606	0.6x6L		6	0.9	0.56	10+20°	4	50	
KNE0608	0.6x8L		8	0.9	0.56	10+20°	4	50	
KNE0610	0.6x10L		10	0.9	0.56	10+20°	4	50	
KNE0702	0.7x2L	0.7	2	1	0.66	10+20°	4	50	
KNE0704	0.7x4L		4	1	0.66	10+20°	4	50	
KNE0706	0.7x6L		6	1	0.66	10+20°	4	50	
KNE0708	0.7x8L		8	1	0.66	10+20°	4	50	
KNE0710	0.7x10L		10	1	0.66	10+20°	4	50	
KNE0802	0.8x2L	0.8	2	1.2	0.76	10+20°	4	50	
KNE0803	0.8x3L		3	1.2	0.76	10+20°	4	50	
KNE0804	0.8x4L		4	1.2	0.76	10+20°	4	50	
KNE0806	0.8x6L		6	1.2	0.76	10+20°	4	50	
KNE0808	0.8x8L		8	1.2	0.76	10+20°	4	50	
KNE0810	0.8x10L		10	1.2	0.76	10+20°	4	50	
KNE1004A	1.0x4L	1	4	1.5	0.95	12°	4	50	
KNE1006A	1.0x6L		6	1.5	0.95	12°	4	50	
KNE1008A	1.0x8L		8	1.5	0.95	12°	4	50	
KNE1010A	1.0x10L		10	1.5	0.95	12°	4	50	
KNE1012A	1.0x12L		12	1.5	0.95	12°	4	50	
KNE1016A	1.0x16L		16	1.5	0.95	12°	4	50	
KNE1204A	1.2x4L	1.2	4	1.8	1.15	12°	4	50	
KNE1206A	1.2x6L		6	1.8	1.15	12°	4	50	
KNE1208A	1.2x8L		8	1.8	1.15	12°	4	50	
KNE1506A	1.5x6L	1.5	6	2.3	1.45	12°	4	50	
KNE1508A	1.5x8L		8	2.3	1.45	12°	4	50	
KNE1510A	1.5x10L		10	2.3	1.45	12°	4	50	
KNE1512A	1.5x12L		12	2.3	1.45	12°	4	50	
KNE1516A	1.5x16L		16	2.3	1.45	12°	4	50	
KNE1520A	1.5x20L		20	2.3	1.45	12°	4	50	
KNE2008A	2.0x8L	2	8	3	1.94	12°	4	50	
KNE2010A	2.0x10L		10	3	1.94	12°	4	50	
KNE2012A	2.0x12L		12	3	1.94	12°	4	50	
KNE2016A	2.0x16L		16	3	1.94	12°	4	50	
KNE2020A	2.0x20L		20	3	1.94	12°	4	50	
KNE3010A	3.0x10L	3	10	4.5	2.85	12°	4	50	
KNE3012A	3.0x12L		12	4.5	2.85	12°	4	50	
KNE3016A	3.0x16L		16	4.5	2.85	12°	4	50	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		碳素钢・合金钢＊1・不锈钢＊1 Carbon Steels・Alloy Steels＊1・Stainless Steels＊1 S50C・SCM＊1・SKD＊1・SUS＊1			调质钢 Prehardened Steels NAK55・NAK80・HPM-1（～43HRC）			铜・铝合金 Copper・Aluminum Alloy		
外径 Dia.	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut
		min-1	mm/min	ap mm	min-1	mm/min	ap mm	min-1	mm/min	ap mm
0.1	0.3	40,000	150	0.005	40,000	120	0.004	40,000	150	0.006
	0.5	40,000	100	0.004	40,000	75	0.003	40,000	100	0.005
	0.75	40,000	60	0.003	40,000	50	0.002	40,000	60	0.003
	1	40,000	40	0.002	40,000	30	0.002	40,000	40	0.002
	1.5	40,000	20	0.001	40,000	20	0.001	40,000	20	0.001
	2	40,000	10	0.001	40,000	10	0.001	40,000	10	0.001
0.15	0.5	40,000	150	0.005	40,000	120	0.004	40,000	150	0.008
	0.6	40,000	130	0.004	40,000	100	0.003	40,000	130	0.006
	0.75	40,000	100	0.004	40,000	90	0.003	40,000	100	0.006
	1	40,000	80	0.003	40,000	60	0.002	40,000	80	0.004
	1.5	40,000	50	0.002	35,000	40	0.002	40,000	50	0.003
	2	40,000	30	0.001	35,000	30	0.001	40,000	30	0.002
	2.5	40,000	10	0.001	35,000	10	0.001	40,000	10	0.001
0.18	0.5	40,000	300	0.01	40,000	200	0.007	40,000	300	0.012
	1	40,000	200	0.007	40,000	150	0.005	40,000	200	0.008
0.2	0.5	40,000	330	0.01	40,000	250	0.007	40,000	330	0.012
	1	40,000	250	0.007	40,000	180	0.005	40,000	250	0.008
	1.5	40,000	180	0.005	35,000	120	0.004	40,000	180	0.006
	2	40,000	100	0.003	35,000	65	0.002	40,000	100	0.004
	3	30,000	60	0.002	25,000	40	0.002	35,000	70	0.002
	4	23,000	30	0.001	20,000	20	0.001	25,000	35	0.001
0.25	1	40,000	300	0.015	35,000	250	0.015	40,000	350	0.024
	1.5	40,000	280	0.01	35,000	250	0.01	40,000	360	0.018
	2	35,000	250	0.08	30,000	200	0.007	40,000	300	0.012
	3	30,000	200	0.007	25,000	180	0.005	35,000	280	0.008
	4	30,000	150	0.005	25,000	160	0.004	35,000	250	0.006
0.3	1	40,000	400	0.02	35,000	260	0.015	40,000	400	0.024
	1.5	40,000	350	0.015	35,000	230	0.01	40,000	350	0.018
	2	35,000	300	0.01	30,000	180	0.007	40,000	320	0.012
	2.5	30,000	250	0.007	25,000	160	0.005	35,000	280	0.008
	3	30,000	200	0.005	25,000	130	0.004	35,000	250	0.006
	4	25,000	120	0.004	22,000	80	0.003	30,000	150	0.004
	6	20,000	60	0.002	18,000	40	0.002	22,000	65	0.002
0.4	1	35,000	500	0.025	30,000	330	0.018	40,000	600	0.03
	2	35,000	400	0.02	30,000	260	0.014	40,000	450	0.024
	3	30,000	300	0.015	25,000	190	0.01	35,000	350	0.018
	4	25,000	200	0.01	22,000	140	0.007	30,000	240	0.012
	6	20,000	120	0.005	18,000	80	0.003	22,000	130	0.006
0.5	1	30,000	550	0.03	25,000	350	0.022	35,000	650	0.036
	2	30,000	500	0.025	25,000	320	0.018	35,000	600	0.03
	3	30,000	450	0.02	25,000	280	0.014	35,000	550	0.024
	4	25,000	350	0.015	22,000	230	0.01	30,000	420	0.018
	5	25,000	300	0.01	20,000	180	0.007	30,000	350	0.012
	6	20,000	200	0.008	18,000	140	0.005	25,000	250	0.01
	8	18,000	150	0.003	14,000	90	0.002	20,000	160	0.003
	10	16,000	100	0.002	14,000	65	0.002	18,000	110	0.002
	12	16,000	80	0.002	14,000	50	0.002	18,000	90	0.002
0.6	2	30,000	600	0.035	25,000	380	0.025	35,000	700	0.04
	3	30,000	550	0.03	25,000	350	0.02	35,000	650	0.035
	4	25,000	450	0.025	22,000	300	0.018	30,000	550	0.03
	6	20,000	300	0.015	18,000	200	0.01	25,000	380	0.018
	8	18,000	200	0.01	15,000	130	0.007	20,000	230	0.012
	10	16,000	150	0.005	14,000	100	0.003	18,000	170	0.006

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		碳素钢・合金钢＊1・不锈钢＊1 Carbon Steels・Alloy Steels＊1・Stainless Steels＊1 S50C・SCM＊1・SKD＊1・SUS＊1			调质钢 Prehardened Steels NAK55・NAK80・HPM-1（～43HRC）			铜・铝合金 Copper・Aluminum Alloy		
外径 Dia.	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut
		min-1	mm/min	ap mm	min-1	mm/min	ap mm	min-1	mm/min	ap mm
0.7	2	30,000	650	0.04	25,000	400	0.03	35,000	750	0.05
	4	25,000	500	0.03	22,000	330	0.02	30,000	600	0.04
	6	20,000	350	0.02	18,000	240	0.015	25,000	450	0.03
	8	18,000	280	0.015	15,000	180	0.01	22,000	350	0.02
	10	16,000	220	0.008	14,000	150	0.005	20,000	280	0.01
0.8	2	25,000	800	0.055	22,000	600	0.03	35,000	900	0.06
	3	25,000	700	0.05	22,000	500	0.03	35,000	850	0.06
	4	25,000	600	0.045	22,000	400	0.03	30,000	720	0.055
	6	20,000	450	0.03	18,000	300	0.02	25,000	560	0.04
	8	18,000	350	0.02	15,000	240	0.015	22,000	430	0.025
	10	16,000	300	0.01	14,000	200	0.007	20,000	380	0.012
1	4	25,000	1,100	0.055	22,000	700	0.045	30,000	1,300	0.065
	6	20,000	800	0.045	18,000	500	0.035	25,000	1,000	0.055
	8	18,000	700	0.035	15,000	400	0.025	22,000	850	0.045
	10	16,000	600	0.025	14,000	350	0.018	20,000	750	0.03
	12	14,000	500	0.02	12,000	300	0.014	18,000	650	0.025
	16	12,000	300	0.01	10,000	200	0.007	14,000	350	0.012
1.2	4	23,000	1,200	0.06	20,000	800	0.05	27,000	1,400	0.07
	6	20,000	900	0.05	18,000	600	0.04	25,000	1,200	0.06
	8	18,000	800	0.04	15,000	500	0.03	22,000	1,000	0.05
1.5	6	20,000	1,200	0.08	16,000	720	0.07	24,000	1,500	0.09
	8	18,000	1,000	0.07	14,000	580	0.06	22,000	1,300	0.08
	10	16,000	850	0.06	13,000	520	0.05	20,000	1,100	0.07
	12	14,000	700	0.05	12,000	450	0.04	17,000	850	0.06
	16	12,000	500	0.035	10,000	320	0.025	15,000	650	0.04
	20	10,000	400	0.02	8,000	240	0.014	12,000	480	0.025
2	8	16,000	1,300	0.11	13,000	800	0.09	20,000	1,650	0.13
	10	16,000	1,200	0.1	13,000	750	0.08	20,000	1,500	0.12
	12	14,000	1,000	0.09	12,000	650	0.07	17,000	1,200	0.11
	16	12,000	800	0.07	10,000	500	0.05	15,000	1,000	0.085
	20	10,000	600	0.05	8,000	360	0.035	12,000	720	0.06
3	10	11,000	1,400	0.18	9,000	900	0.14	13,000	1,700	0.22
	12	11,000	1,300	0.16	9,000	800	0.12	13,000	1,600	0.2
	16	10,000	1,000	0.12	8,000	600	0.09	12,000	1,200	0.15

备注 Notes

※ 1切削合金钢、不锈钢时，请将主轴转速及进给速度降低至80%时的值作为参考值。
※ 1 Reference value for Alloy and Stainless Steels are 80% of recommended cutting conditions.
※本切削参数仅供参考。请根据实际的加工形状及使用机床等调整切削参数。
※切深量的ap表示轴向切入量。
※请在考虑加工材料及加工形状等的基础上，选用合适的切削油。
※加工深沟时，请充分注意切削油的供油及排屑是否顺畅。
※轴向进刀建议采用倾斜进刀方式。
※建议采用来回切削加工方式。
※ℓ1(颈长)/D(刃径)为5以上时，建议先使用有效长较短的刀具切削初期定位槽。
※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率调整。
※p0.5以下或ℓ1(颈长)/D(刃径)为15以上时，根据加工形状及使用机床等，有时必须对加工参数进行大幅调整。
※刀具的伸出量超过柄径的5倍时，受铣刀刀柄跳动精度等的影响，有时必须对加工参数进行大幅调整。此时请按相同的比率降低主轴转速和进给速度等，调整切削参数。

※ These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape and machine type.
※ ap:Axial Depth of Cut.
※ Select a cutting fluid appropriate to work material, milling shape and machining content.
※ Coolant supply and chip disposal in the deep portion are very important.
※ Recommend to apply ramping for approaching into axial direction.
※ Recommend reciprocating cutting.
※ When ℓ1 (neck length)/D(blade diameter) is more than 5, it is recommended to use a tool with a shorter effective length to cut the initial positioning slot.
※ Reduce both spindle speed and feed at same rate for chattering and also for insu cient spindle speed of a machine.
※ When p0.5 or ℓ1 (neck length)/D(blade diameter) is more than 15, it is sometimes necessary to greatly adjust the machining parameters according to the machining shape and the machine tool used.
※ Major adjustment of milling conditions, e.g. adjust spindle and feed speed at same rate, required on condition of a tool overhang length exceeding a shank diameter 5 times due to possible accuracy impact by chuck runout etc.

通用合金用4刃长颈平底铣刀
Universal Alloy 4-Flute Long Neck Square Endmills

4刃 · 平底铣刀 | 4-Flute · Square

Side Cutting · Slotting · Miniature · Finishing · Rib Miniature · Cutting Conditions B084

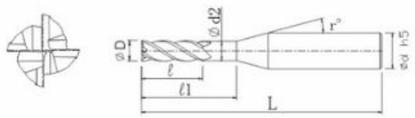
外径公差 Dia.tolerance: 1≤D≤3 : 0~- 0.01; D≤4 : 0~- 0.015

h5: 0~-0.005

(mm)

精密加工用长颈平头立铣刀。
Long neck flat end mill for precision machining.

TYPE A:



- 适用于深沟加工的长颈避空型。
- 可以对应小于HRC50°的合金和有色金属。
- Long neck design is suited for the machining of narrow and deep area.
- Alloys and Non-ferrous metal > HRC50.

硬质合金 · AP涂层 · 螺旋角 45°

产品代码 Code No.	规格型号 Spec Typ.	(D)外径 Dia.	(ℓ1)颈长 Under Neck Length	(ℓ)刃长 Length of Cut	(d2)颈径 Neck Dia.	(r)颈角 Neck Taper Angle	(d)柄径 Shank Dia.	(L)全长 Overall Length	价格 Retail Price
KNE1004	1.0x4L	1	4	1.5	0.95	12°	4	50	
KNE1006	1.0x6L		6	1.5	0.95	12°	4	50	
KNE1008	1.0x8L		8	1.5	0.95	12°	4	50	
KNE1010	1.0x10L		10	1.5	0.95	12°	4	50	
KNE1012	1.0x12L		12	1.5	0.95	12°	4	50	
KNE1016	1.0x16L		16	1.5	0.95	12°	4	50	
KNE1206	1.2x6L	1.2	6	1.8	1.15	12°	4	50	
KNE1208	1.2x8L		8	1.8	1.15	12°	4	50	
KNE1212	1.2x12L		12	1.8	1.15	12°	4	50	
KNE1506	1.5x6L	1.5	6	2.3	1.45	12°	4	50	
KNE1508	1.5x8L		8	2.3	1.45	12°	4	50	
KNE1510	1.5x10L		10	2.3	1.45	12°	4	50	
KNE1512	1.5x12L		12	2.3	1.45	12°	4	50	
KNE1516	1.5x16L		16	2.3	1.45	12°	4	50	
KNE1806	1.8x6L	1.8	6	2.7	1.75	12°	4	50	
KNE1808	1.8x8L		8	2.7	1.75	12°	4	50	
KNE2008	2.0x8L	2	8	3	1.94	12°	4	50	
KNE2010	2.0x10L		10	3	1.94	12°	4	50	
KNE2012	2.0x12L		12	3	1.94	12°	4	50	
KNE2016	2.0x16L		16	3	1.94	12°	4	50	
KNE2018	2.0x18L		18	3	1.94	12°	4	50	
KNE2020	2.0x20L		20	3	1.94	12°	4	50	
KNE2512	2.5x12L	2.5	12	3.8	2.4	12°	4	50	
KNE2516	2.5x16L		16	3.8	2.4	12°	4	50	
KNE2520	2.5x20L		20	3.8	2.4	12°	4	50	
KNE2525	2.5x25L		25	3.8	2.4	12°	4	50	
KNE3010	3.0x10L	3	10	4.5	2.85	12°	4	50	
KNE3012	3.0x12L		12	4.5	2.85	12°	4	50	
KNE3016	3.0x16L		16	4.5	2.85	12°	4	50	
KNE3018	3.0x18L		18	4.5	2.85	12°	4	50	
KNE3010L	3.0x10L		10	4.5	2.85	12°	6	60	
KNE3012L	3.0x12L		12	4.5	2.85	12°	6	60	
KNE3016L	3.0x16L		16	4.5	2.85	12°	6	60	
KNE3020L	3.0x20L		20	4.5	2.85	12°	6	60	
KNE3025L	3.0x25L		25	4.5	2.85	12°	6	60	
KNE4012L	4.0x12L	4	12	6	3.8	12°	6	60	
KNE4016L	4.0x16L		16	6	3.8	12°	6	60	
KNE4020L	4.0x20L		20	6	3.8	12°	6	60	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		碳素钢 · 合金钢 * 1 · 不锈钢 * 1 Carbon Steels · Alloy Steels * 1 · Stainless Steels * 1 S50C · SCM * 1 · SKD * 1 · SUS * 1				调质钢 Prehardened Steels NAK55 · NAK80 · HPM-1 (∽43HRC)			
外径 Dia.	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
1	4	25,000	1,700	0.055	0.6	22,000	1,100	0.045	0.6
	6	20,000	1,200	0.045	0.6	18,000	750	0.035	0.6
	8	18,000	1,050	0.035	0.6	15,000	600	0.025	0.6
	10	16,000	900	0.025	0.6	14,000	520	0.018	0.6
	12	14,000	750	0.02	0.6	12,000	450	0.014	0.6
	16	12,000	450	0.01	0.6	10,000	300	0.007	0.6
1.2	6	20,000	1,400	0.05	0.72	18,000	900	0.04	0.72
	8	18,000	1,200	0.04	0.72	15,000	750	0.03	0.72
	12	14,000	900	0.025	0.72	12,000	530	0.018	0.72
1.5	6	20,000	1,800	0.08	0.9	16,000	1,100	0.07	0.9
	8	18,000	1,500	0.07	0.9	14,000	900	0.06	0.9
	10	16,000	1,300	0.06	0.9	13,000	780	0.05	0.9
	12	14,000	1,050	0.05	0.9	12,000	670	0.04	0.9
	16	12,000	750	0.035	0.9	10,000	480	0.025	0.9
1.8	6	18,000	2,000	0.1	1.08	14,000	1,200	0.09	1.08
	8	18,000	1,700	0.09	1.08	14,000	1,000	0.08	1.08
2	8	16,000	2,000	0.11	1.2	13,000	1,200	0.09	1.2
	10	16,000	1,800	0.1	1.2	13,000	1,100	0.08	1.2
	12	14,000	1,500	0.09	1.2	12,000	1,000	0.07	1.2
	16	12,000	1,200	0.07	1.2	10,000	750	0.05	1.2
	18	11,000	1,000	0.06	1.2	9,000	650	0.04	1.2
	20	10,000	900	0.05	1.2	8,000	550	0.035	1.2
2.5	12	13,000	1,800	0.13	1.5	11,000	1,100	0.1	1.5
	16	11,000	1,400	0.1	1.5	9,000	850	0.07	1.5
	20	9,000	1,100	0.08	1.5	7,000	600	0.05	1.5
	25	8,000	900	0.05	1.5	6,000	500	0.035	1.5
3	10	11,000	2,200	0.18	1.8	9,000	1,300	0.14	1.8
	12	11,000	2,000	0.16	1.8	9,000	1,200	0.12	1.8
	16	10,000	1,500	0.12	1.8	8,000	900	0.09	1.8
	18	9,000	1,300	0.1	1.8	7,000	800	0.08	1.8
	20	9,000	1,200	0.1	1.8	7,000	680	0.07	1.8
	25	8,000	1,050	0.08	1.8	6,000	570	0.06	1.8
4	12	8,000	2,200	0.3	2.4	6,000	1,300	0.25	2.4
	16	8,000	2,100	0.25	2.4	6,000	1,200	0.2	2.4
	20	8,000	2,000	0.2	2.4	6,000	1,100	0.15	2.4

备注 Notes

※ 1切削合金钢、不锈钢时，请将主轴转速及进给速度降低至80%时的值作为参考值。
※ 1 Reference value for Alloy and Stainless Steels are 80% of recommended cutting conditions.

※本切削参数仅供参考。请根据实际的加工形状及使用机床等调整切削参数。
※切深量的ap表示轴向切入量。ae表示距量
※请在考虑加工材料及加工形状等的基础上，选用合适的切削油。
※加工深沟时，请充分注意切削油的供油及排屑是否顺畅。
※轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※由于立面附近的刀具负荷会增大，必须降低进给速度和切深量。
※沟槽切削时建议将切削参数表的切深量降低至80%时的值作为参考值，并采用来回切削加工方式。ℓ1(颈长)/D(刃径) 为5以上时，建议先使用有效长较短的刀具切削初期定位槽。
※发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率调整。
※刀具的伸出量超过柄径的5倍时，受铣刀刀柄跳动精度等的影响，有时必须对加工参数进行大幅调整。此时请按相同的比率降低主轴转速和进给速度等，调整切削参数。
※ These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape and machine type.
※ ap:Axial Depth of Cut, ae:Radial Depth of Cut.
※ Select a cutting fluid appropriate to work material, milling shape and machining content.
※ Coolant supply and chip disposal in the deep portion are very important.
※ Recommend to apply herical or ramping for approaching into axial direction.
※ Reduction of feed and Depth of Cut to reduce machining load around side wall.
※ When grooving cutting, it is recommended to reduce the cutting depth of the cutting parameter table to 80% as a reference value, and use the back and forth cutting mode. When ℓ1(neck length)/D(blade diameter) is more than 5, it is recommended to use a tool with a shorter effective length to cut the initial positioning slot.
※ Reduce both spindle speed and feed at same rate for chattering and also for insu cient spindle speed of a machine.
※ Major adjustment of milling conditions, e.g. adjust spindle and feed speed at same rate, required on condition of a tool overhang length exceeding a shank diameter 5 times due to possible accuracy impact by chuck runout etc.

通用合用2刃长颈球头铣刀
Universal Alloy 2-Flute Long Neck Ball Endmills

2刃 · 球头 | 2-Flute · Ball

槽 Slotting | 型模 Die-sinking | 曲面 Profiling | R Radius | 细部 Miniature | 半精加工 Semi Finishing | 精加工 Finishing | 肋槽细部 Rib Miniature | 切削条件 B088 Cutting Conditions

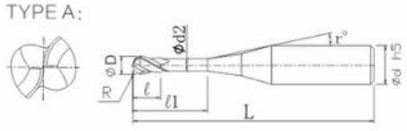
外径公差 Dia.tolerance: D≤0.1 : 0~-0.005; 0.15≤D≤0.9 : 0~-0.007; 1≤D≤3 : 0~-0.01; D≤4 : 0~-0.015

R 公差 R tolerance: R≤0.2 : ±0.003; 0.25≤R≤2 : ±0.005

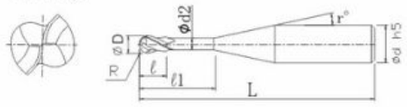
h5: 0~-0.005 (mm)

精密加工用长颈球刀铣刀。
Long neck ball cutter for precision machining.

TYPE A:



TYPE B:



- 适用于深沟加工的长颈避空型。
- 适用于从低速到高速的深沟精密3D形状加工。
- 可以对应小于HRC50°的合金和有色金属。
- Long neck design is suited for the machining of narrow and deep area.
- It is possible to have deep and precision three-dimensional cutting in the low to high speed range.
- Alloys and Non-ferrous metal > HRC50.

硬质合金 | AP 涂层 | 螺旋角(r)

产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	外径(D) Dia.	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
KNB008002	R0.04x0.2L	R0.04	0.2	0.07	0.08	0.065	11°	4	45	
KNB008003	R0.04x0.3L		0.3	0.07	0.08	0.065	11°	4	45	
KNB008005	R0.04x0.5L		0.5	0.07	0.08	0.065	11°	4	45	
KNB001002	R0.05x0.2L	R0.05	0.2	0.08	0.1	0.085	11°	4	45	
KNB001003	R0.05x0.3L		0.3	0.08	0.1	0.085	11°	4	45	
KNB001005	R0.05x0.5L		0.5	0.08	0.1	0.085	11°	4	45	
KNB0010075	R0.05x0.75L		0.75	0.08	0.1	0.085	11°	4	45	
KNB00101	R0.05x1L		1	0.07	0.1	0.085	11°	4	45	
KNB0015003	R0.075x0.3L	R0.075	0.3	0.12	0.15	0.13	11°	4	45	
KNB0015005	R0.075x0.5L		0.5	0.12	0.15	0.13	11°	4	45	
KNB00150075	R0.075x0.75L		0.75	0.12	0.15	0.13	11°	4	45	
KNB0015001	R0.075x1L		1	0.12	0.15	0.13	11°	4	45	
KNB02004	R0.1x0.4L	R0.1	0.4	0.2	0.2	0.18	10+20°	4	50	
KNB02006	R0.1x0.6L		0.6	0.2	0.2	0.18	10+20°	4	50	
KNB020075	R0.1x0.75L		0.75	0.2	0.2	0.18	10+20°	4	50	
KNB0201	R0.1x1L		1	0.2	0.2	0.18	10+20°	4	50	
KNB02015	R0.1x1.5L		1.5	0.2	0.2	0.18	10+20°	4	50	
KNB0202	R0.1x2L		2	0.2	0.2	0.18	10+20°	4	50	
KNB0203	R0.1x3L		3	0.2	0.2	0.18	10+20°	4	50	
KNB03005	R0.15x0.5L	R0.15	0.5	0.3	0.3	0.27	10+20°	4	50	
KNB0301	R0.15x1L		1	0.3	0.3	0.27	10+20°	4	50	
KNB03015	R0.15x1.5L		1.5	0.3	0.3	0.27	10+20°	4	50	
KNB0302	R0.15x2L		2	0.3	0.3	0.27	10+20°	4	50	
KNB03025	R0.15x2.5L		2.5	0.3	0.3	0.27	10+20°	4	50	
KNB0303	R0.15x3L		3	0.3	0.3	0.27	10+20°	4	50	
KNB0304	R0.15x4L		4	0.3	0.3	0.27	10+20°	4	50	
KNB0305	R0.15x5L		5	0.3	0.3	0.27	10+20°	4	50	
KNB04005	R0.2x0.5L	R0.2	0.5	0.4	0.4	0.37	10+20°	4	50	
KNB0401	R0.2x1L		1	0.4	0.4	0.37	10+20°	4	50	
KNB04015	R0.2x1.5L		1.5	0.4	0.4	0.37	10+20°	4	50	
KNB0402	R0.2x2L		2	0.4	0.4	0.37	10+20°	4	50	
KNB0403	R0.2x3L		3	0.4	0.4	0.37	10+20°	4	50	
KNB0404	R0.2x4L		4	0.4	0.4	0.37	10+20°	4	50	
KNB0405	R0.2x5L		5	0.4	0.4	0.37	10+20°	4	50	
KNB0406	R0.2x6L		6	0.4	0.4	0.37	10+20°	4	50	

通用合用2刃长颈球头铣刀
Universal Alloy 2-Flute Long Neck Ball Endmills

硬质合金 | AP 涂层 | 螺旋角(r)

产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	外径(D) Dia.	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
KNB0501	R0.25x1L	R0.25	1	0.5	0.5	0.46	10+20°	4	50	
KNB05015	R0.25x1.5L		1.5	0.5	0.5	0.46	10+20°	4	50	
KNB0502	R0.25x2L		2	0.5	0.5	0.46	10+20°	4	50	
KNB05025	R0.25x2.5L		2.5	0.5	0.5	0.46	10+20°	4	50	
KNB0503	R0.25x3L		3	0.5	0.5	0.46	10+20°	4	50	
KNB05035	R0.25x3.5L		3.5	0.5	0.5	0.46	10+20°	4	50	
KNB0504	R0.25x4L		4	0.5	0.5	0.46	10+20°	4	50	
KNB0505	R0.25x5L		5	0.5	0.5	0.46	10+20°	4	50	
KNB0506	R0.25x6L		6	0.5	0.5	0.46	10+20°	4	50	
KNB0507	R0.25x7L		7	0.5	0.5	0.46	10+20°	4	50	
KNB0508	R0.25x8L		8	0.5	0.5	0.46	10+20°	4	50	
KNB0509	R0.25x9L		9	0.5	0.5	0.46	10+20°	4	50	
KNB0510	R0.25x10L		10	0.5	0.5	0.46	10+20°	4	50	
KNB0601	R0.3x1L	R0.3	1	0.6	0.6	0.56	10+20°	4	50	
KNB06015	R0.3x1.5L		1.5	0.6	0.6	0.56	10+20°	4	50	
KNB0602	R0.3x2L		2	0.6	0.6	0.56	10+20°	4	50	
KNB0603	R0.3x3L		3	0.6	0.6	0.56	10+20°	4	50	
KNB0604	R0.3x4L		4	0.6	0.6	0.56	10+20°	4	50	
KNB0605	R0.3x5L		5	0.6	0.6	0.56	10+20°	4	50	
KNB0606	R0.3x6L		6	0.6	0.6	0.56	10+20°	4	50	
KNB0607	R0.3x7L		7	0.6	0.6	0.56	10+20°	4	50	
KNB0608	R0.3x8L		8	0.6	0.6	0.56	10+20°	4	50	
KNB0609	R0.3x9L		9	0.6	0.6	0.56	10+20°	4	50	
KNB0610	R0.3x10L		10	0.6	0.6	0.56	10+20°	4	50	
KNB0702	R0.35x2L	R0.35	2	0.7	0.7	0.66	10+20°	4	50	
KNB0704	R0.35x4L		4	0.7	0.7	0.66	10+20°	4	50	
KNB0705	R0.35x5L		5	0.7	0.7	0.66	10+20°	4	50	
KNB0706	R0.35x6L		6	0.7	0.7	0.66	10+20°	4	50	
KNB0708	R0.35x8L		8	0.7	0.7	0.66	10+20°	4	50	
KNB0802	R0.4x2L	R0.4	2	0.8	0.8	0.76	10+20°	4	50	
KNB0803	R0.4x3L		3	0.8	0.8	0.76	10+20°	4	50	
KNB0804	R0.4x4L		4	0.8	0.8	0.76	10+20°	4	50	
KNB0806	R0.4x6L		6	0.8	0.8	0.76	10+20°	4	50	
KNB0808	R0.4x8L		8	0.8	0.8	0.76	10+20°	4	50	
KNB0810	R0.4x10L		10	0.8	0.8	0.76	10+20°	4	50	
KNB0902	R0.45x2L	R0.45	2	0.9	0.9	0.86	10+20°	4	50	
KNB0904	R0.45x4L		4	0.9	0.9	0.86	10+20°	4	50	
KNB0906	R0.45x6L		6	0.9	0.9	0.86	10+20°	4	50	
KNB0908	R0.45x8L		8	0.9	0.9	0.86	10+20°	4	50	
KNB1002	R0.5x2L	R0.5	2	1	1	0.95	12°	4	50	
KNB1003	R0.5x3L		3	1	1	0.95	12°	4	50	
KNB1004	R0.5x4L		4	1	1	0.95	12°	4	50	
KNB1006	R0.5x6L		6	1	1	0.95	12°	4	50	
KNB1008	R0.5x8L		8	1	1	0.95	12°	4	50	
KNB1010	R0.5x10L		10	1	1	0.95	12°	4	50	
KNB1012	R0.5x12L		12	1	1	0.95	12°	4	50	
KNB1016	R0.5x16L		16	1	1	0.95	12°	4	50	
KNB1204	R0.6x4L	R0.6	4	1.2	1.2	1.15	12°	4	50	
KNB1206	R0.6x6L		6	1.2	1.2	1.15	12°	4	50	
KNB1208	R0.6x8L		8	1.2	1.2	1.15	12°	4	50	
KNB1210	R0.6x10L		10	1.2	1.2	1.15	12°	4	50	
KNB1212	R0.6x12L		12	1.2	1.2	1.15	12°	4	50	
KNB1216	R0.6x16L		16	1.2	1.2	1.15	12°	4	50	
KNB1504	R0.75x4L	R0.75	4	1.5	1.5	1.45	12°	4	50	
KNB1506	R0.75x6L		6	1.5	1.5	1.45	12°	4	50	
KNB1508	R0.75x8L		8	1.5	1.5	1.45	12°	4	50	
KNB1510	R0.75x10L		10	1.5	1.5	1.45	12°	4	50	
KNB1512	R0.75x12L		12	1.5	1.5	1.45	12°	4	50	
KNB1516	R0.75x16L		16	1.5	1.5	1.45	12°	4	50	

通用合用2刃长颈球头铣刀
Universal Alloy 2-Flute Long Neck Ball Endmills

产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	外径(D) Dia.	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
KNB1604	R0.8x4L	R0.8	4	1.6	1.6	1.55	12°	4	50	
KNB1608	R0.8x8L		8	1.6	1.6	1.55	12°	4	50	
KNB1612	R0.8x12L		12	1.6	1.6	1.55	12°	4	50	
KNB1616	R0.8x16L		16	1.6	1.6	1.55	12°	4	50	
KNB1620	R0.8x20L		20	1.6	1.6	1.55	12°	4	50	
KNB1804	R0.9x4L	R0.9	4	1.8	1.8	1.75	12°	4	50	
KNB1808	R0.9x8L		8	1.8	1.8	1.75	12°	4	50	
KNB1812	R0.9x12L		12	1.8	1.8	1.75	12°	4	50	
KNB1816	R0.9x16L		16	1.8	1.8	1.75	12°	4	50	
KNB1820	R0.9x20L		20	1.8	1.8	1.75	12°	4	50	
KNB2006	R1.0x6L	R1	6	2	2	1.94	12°	4	50	
KNB2008	R1.0x8L		8	2	2	1.94	12°	4	50	
KNB2010	R1.0x10L		10	2	2	1.94	12°	4	50	
KNB2012	R1.0x12L		12	2	2	1.94	12°	4	50	
KNB2016	R1.0x16L		16	2	2	1.94	12°	4	50	
KNB2018	R1.0x18L		18	2	2	1.94	12°	4	50	
KNB2020	R1.0x20L		20	2	2	1.94	12°	4	50	
KNB2506	R1.25x6L	R1.25	6	2.5	2.5	2.44	12°	4	50	
KNB2508	R1.25x8L		8	2.5	2.5	2.44	12°	4	50	
KNB2512	R1.25x12L		12	2.5	2.5	2.44	12°	4	50	
KNB2516	R1.25x16L		16	2.5	2.5	2.44	12°	4	50	
KNB2520	R1.25x20L		20	2.5	2.5	2.44	12°	4	50	
KNB3008	R1.5x8L	R1.5	8	3	3	2.85	12°	4	50	
KNB3010	R1.5x10L		10	3	3	2.85	12°	4	50	
KNB3012	R1.5x12L		12	3	3	2.85	12°	4	50	
KNB3016	R1.5x16L		16	3	3	2.85	12°	4	50	
KNB3020	R1.5x20L		20	3	3	2.85	12°	4	50	
KNB3008L	R1.5x8L		8	3	3	2.85	12°	6	60	
KNB3010L	R1.5x10L		10	3	3	2.85	12°	6	60	
KNB3012L	R1.5x12L		12	3	3	2.85	12°	6	60	
KNB3016L	R1.5x16L		16	3	3	2.85	12°	6	60	
KNB3020L	R1.5x20L		20	3	3	2.85	12°	6	60	
KNB3510L	R1.75x10L	R1.75	10	3.5	3.5	3.35	12°	6	60	
KNB3515L	R1.75x15L		15	3.5	3.5	3.8	12°	6	60	
KNB3520L	R1.75x20L		20	3.5	3.5	3.8	12°	6	60	
KNB4012L	R2.0x12L	R2	12	4	4	3.8	12°	6	60	
KNB4016L	R2.0x16L		16	4	4	3.8	12°	6	60	
KNB4020L	R2.0x20L		20	4	4	3.8	12°	6	60	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		碳素钢 · 调质钢 Carbon Steels · Prehardened Steels S50C · NAK · HPM-1 (~45HRC)				淬火钢 Hardened Steels SKD · STAVAX · HPM-38 (~55HRC)				淬火钢 Hardened Steels SKD11 (~62HRC)				铜合金 Copper			
球头半径(R) Radius	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.04	0.2	20,000~50,000	80	0.006	0.004	20,000~50,000	60	0.004	0.004	20,000~50,000	50	0.004	0.004	20,000~50,000	70	0.006	0.006
	0.3	20,000~50,000	60	0.004	0.004	20,000~50,000	40	0.004	0.004	20,000~50,000	40	0.004	0.004	20,000~50,000	60	0.006	0.006
	0.5	20,000~50,000	40	0.002	0.003	20,000~50,000	20	0.004	0.004	20,000~50,000	30	0.004	0.004	20,000~50,000	50	0.006	0.006
0.05	0.2	20,000~50,000	90	0.007	0.006	20,000~50,000	80	0.003	0.003	20,000~50,000	60	0.003	0.003	20,000~50,000	90	0.005	0.005
	0.3	20,000~50,000	80	0.005	0.005	20,000~50,000	60	0.003	0.003	20,000~50,000	50	0.003	0.003	20,000~50,000	80	0.005	0.005
	0.5	20,000~50,000	70	0.003	0.003	20,000~50,000	40	0.003	0.003	20,000~50,000	40	0.003	0.003	20,000~50,000	70	0.005	0.005
	0.75	20,000~50,000	60	0.002	0.002	20,000~50,000	30	0.003	0.003	20,000~50,000	30	0.003	0.003	20,000~50,000	50	0.005	0.005
	1	20,000~50,000	50	0.001	0.002	20,000~50,000	20	0.003	0.003	20,000~50,000	20	0.003	0.003	20,000~50,000	30	0.005	0.005
0.075	0.3	20,000~50,000	150	0.005	0.015	20,000~50,000	120	0.003	0.005	20,000~50,000	90	0.002	0.005	20,000~50,000	150	0.008	0.01
	0.5	20,000~50,000	150	0.004	0.007	20,000~50,000	120	0.003	0.005	20,000~50,000	90	0.002	0.005	20,000~50,000	150	0.007	0.008
	0.75	20,000~50,000	130	0.003	0.006	20,000~50,000	90	0.002	0.004	20,000~50,000	70	0.001	0.004	20,000~50,000	130	0.006	0.007
	1	20,000~50,000	100	0.003	0.005	20,000~50,000	70	0.002	0.003	20,000~50,000	60	0.001	0.003	20,000~50,000	100	0.005	0.007
0.1	0.4	20,000~50,000	280	0.01	0.02	20,000~50,000	250	0.01	0.01	20,000~50,000	170	0.007	0.007	20,000~50,000	250	0.01	0.02
	0.6	20,000~50,000	250	0.008	0.01	20,000~50,000	210	0.008	0.01	20,000~50,000	170	0.006	0.007	20,000~50,000	250	0.01	0.018
	0.75	20,000~50,000	250	0.007	0.01	20,000~50,000	210	0.005	0.01	20,000~50,000	170	0.004	0.007	20,000~50,000	250	0.01	0.015
	1	20,000~50,000	250	0.005	0.01	20,000~50,000	210	0.003	0.005	20,000~50,000	170	0.002	0.004	20,000~50,000	250	0.008	0.015
	1.5	20,000~50,000	150	0.003	0.01	20,000~50,000	120	0.003	0.005	20,000~50,000	100	0.002	0.004	20,000~50,000	150	0.005	0.015
	2	20,000~50,000	100	0.003	0.005	20,000~50,000	80	0.002	0.003	20,000~50,000	70	0.002	0.003	20,000~50,000	100	0.005	0.007
	3	20,000~50,000	80	0.002	0.003	20,000~50,000	60	0.002	0.002	20,000~50,000	50	0.002	0.002	20,000~50,000	80	0.003	0.004
0.15	0.5	20,000~50,000	250	0.01	0.02	20,000~50,000	210	0.01	0.015	20,000~50,000	170	0.007	0.01	20,000~50,000	250	0.012	0.025
	1	20,000~50,000	250	0.007	0.01	20,000~50,000	210	0.005	0.01	20,000~50,000	170	0.004	0.007	20,000~50,000	250	0.01	0.02
	1.5	20,000~50,000	200	0.005	0.01	20,000~50,000	170	0.005	0.005	20,000~50,000	140	0.004	0.004	20,000~50,000	200	0.008	0.015
	2	20,000~50,000	150	0.003	0.01	20,000~50,000	120	0.003	0.005	20,000~50,000	100	0.002	0.003	20,000~50,000	150	0.005	0.012
	2.5	20,000~50,000	150	0.003	0.007	20,000~50,000	120	0.003	0.003	20,000~50,000	100	0.002	0.002	20,000~50,000	150	0.005	0.01
	3	20,000~50,000	150	0.003	0.005	20,000~50,000	120	0.003	0.003	20,000~50,000	100	0.002	0.002	20,000~50,000	150	0.005	0.007
	4	20,000~50,000	100	0.003	0.005	20,000~50,000	80	0.003	0.003	20,000~50,000	70	0.002	0.002	20,000~50,000	100	0.005	0.007
	5	20,000~50,000	80	0.003	0.003	20,000~50,000	80	0.003	0.003	20,000~50,000	50	0.002	0.002	20,000~50,000	80	0.005	0.005
0.2	0.5	20,000~50,000	800	0.02	0.05	20,000~50,000	650	0.02	0.03	20,000~50,000	560	0.015	0.02	20,000~50,000	800	0.03	0.07
	1	20,000~50,000	800	0.02	0.05	20,000~50,000	650	0.02	0.03	20,000~50,000	560	0.015	0.02	20,000~50,000	800	0.03	0.07
	1.5	20,000~50,000	700	0.02	0.03	20,000~50,000	600	0.01	0.02	20,000~50,000	490	0.007	0.015	20,000~50,000	700	0.03	0.05
	2	20,000~50,000	600	0.015	0.02	20,000~50,000	500	0.01	0.015	20,000~50,000	420	0.007	0.01	20,000~50,000	600	0.02	0.03
	3	20,000~30,000	400	0.01	0.02	20,000~30,000	340	0.01	0.01	20,000~30,000	280	0.007	0.007	20,000~30,000	400	0.015	0.03
	4	20,000~30,000	250	0.005	0.01	20,000~30,000	210	0.005	0.007	20,000~30,000	170	0.004	0.004	20,000~30,000	250	0.008	0.015
	5	20,000~30,000	150	0.003	0.005	20,000~30,000	120	0.003	0.005	20,000~30,000	100	0.002	0.003	20,000~30,000	150	0.005	0.007
	6	20,000~30,000	80	0.003	0.003	20,000~30,000	60	0.003	0.003	20,000~30,000	50	0.002	0.002	20,000~30,000	80	0.005	0.005
0.25	1	20,000~50,000	800	0.03	0.05	20,000~50,000	680	0.02	0.05	20,000~50,000	560	0.015	0.035	20,000~50,000	800	0.045	0.07
	1.5	20,000~50,000	700	0.03	0.05	20,000~50,000	600	0.02	0.04	20,000~50,000	490	0.015	0.03	20,000~50,000	700	0.04	0.07
	2	20,000~50,000	600	0.02	0.04	20,000~50,000	510	0.02	0.03	20,000~50,000	420	0.015	0.02	20,000~50,000	600	0.03	0.06
	2.5	20,000~50,000	600	0.015	0.04	20,000~50,000	510	0.01	0.03	20,000~50,000	420	0.007	0.02	20,000~50,000	600	0.02	0.06
	3	20,000~50,000	500	0.015	0.035	20,000~50,000	420	0.01	0.025	20,000~50,000	350	0.007	0.015	20,000~50,000	500	0.02	0.05
	3.5	20,000~50,000	400	0.015	0.03	20,000~50,000	340	0.01	0.02	20,000~50,000	280	0.007	0.015	20,000~50,000	400	0.02	0.045
	4	20,000~50,000	400	0.012	0.02	20,000~50,000	340	0.005	0.01	20,000~50,000	280	0.004	0.007	20,000~50,000	400	0.018	0.03
	5	20,000~30,000	250	0.005	0.01	20,000~30,000	210	0.005	0.005	20,000~30,000	170	0.003	0.003	20,000~30,000	250	0.008	0.015
	6	20,000~30,000	150	0.005	0.005	20,000~30,000	120	0.003	0.003	20,000~30,000	100	0.002	0.002	20,000~30,000	150	0.008	0.008
	7	20,000~30,000	120	0.003	0.005	20,000~30,000	100	0.003	0.003	20,000~30,000	80	0.002	0.002	20,000~30,000	120	0.005	0.008
	8	20,000~30,000	120	0.003	0.003	20,000~30,000	100	0.002	0.002	20,000~30,000	80	0.002	0.002	20,000~30,000	120	0.005	0.005
	9	18,000~24,000	100	0.002	0.002	18,000~24,000	80	0.002	0.002	18,000~24,000	70	0.002	0.002	18,000~24,000	100	0.003	0.003
	10	18,000~24,000	80	0.002	0.002	18,000~24,000	60	0.002	0.002	18,000~24,000	50	0.002	0.002	18,000~24,000	80	0.003	0.003
0.3	1	20,000~50,000	1,200	0.05	0.1	20,000~50,000	1,000	0.05	0.07	20,000~50,000	840	0.035	0.05	20,000~50,000	1,200	0.07	0.12
	1.5	20,000~50,000	1,200	0.05	0.1	20,000~50,000	1,000	0.05	0.07	20,000~50,000	840	0.035	0.05	20,000~50,000	1,200	0.07	0.12
	2	20,000~50,000	1,200	0.05	0.1	20,000~50,000	1,000	0.04	0.07	20,000~50,000	840	0.028	0.05	20,000~50,000	1,200	0.07	0.12
	3	20,000~50,000	1,000	0.025	0.1	20,000~50,000	850	0.03	0.05	20,000~50,000	700	0.02	0.035	20,000~50,000	1,000	0.04	0.1
	4	20,000~50,000	800	0.025	0.05	20,000~50,000	680	0.02	0.04	20,000~50,000	560	0.015	0.03	20,000~50,000	800	0.035	0.08
	5	20,000~30,000	500	0.02	0.04	20,000~30,000	420	0.01	0.02	20,000~30,000	350	0.007	0.015	20,000~30,000	500	0.03	0.06
	6	20,000~30,000	450	0.01	0.02	20,000~30,000	380	0.005	0.01	20,000~30,000	310	0.004	0.007	20,000~30,000	450	0.015	0.03
	7	20,000~30,000	400	0.008	0.02	20,000~30,000	340	0.005	0.005	20,000~30,000	280	0.004	0.004	20,000~30,000	400	0.012	0.03
	8	18,000~24,000	300	0.005	0.01	18,000~24,000	250	0.003	0.005	18,000~24,000	210	0.002	0.004	18,000~24,000	300	0.008	0.015
	9	18,000~24,000	250	0.005	0.01	18,000~24,000	210	0.003	0.003	18,000~24,000	170	0.002	0.002	18,000~24,000	250	0.007	0.015
	10	18,000~24,000	150	0.003	0.005	18,000~24,000	120	0.002	0.003	18,000~24,000	100	0.002	0.002	18,000~24,000	150	0.005	0.008

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		碳素钢 · 调质钢 Carbon Steels · Prehardened Steels S50C · NAK · HPM-1 (~45HRC)				淬火钢 Hardened Steels SKD · STAVAX · HPM-38 (~55HRC)				淬火钢 Hardened Steels SKD11 (~62HRC)				铜合金 Copper			
球头半径 (R) Radius	颈长 (ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.35	2	20,000~50,000	1,800	0.08	0.12	20,000~50,000	1,300	0.07	0.08	20,000~30,000	1,000	0.04	0.06	20,000~30,000	1,500	0.1	0.15
	4	20,000~50,000	1,300	0.05	0.11	20,000~50,000	1,100	0.03	0.06	20,000~30,000	700	0.02	0.04	20,000~30,000	1,200	0.06	0.12
	5	20,000~30,000	900	0.04	0.08	20,000~30,000	800	0.02	0.04	20,000~30,000	550	0.01	0.02	20,000~30,000	800	0.05	0.1
	6	20,000~30,000	700	0.03	0.05	20,000~30,000	600	0.01	0.02	20,000~30,000	450	0.008	0.015	20,000~30,000	600	0.04	0.07
	8	18,000~24,000	400	0.005	0.01	18,000~24,000	330	0.003	0.005	14,000~21,000	250	0.002	0.003	18,000~24,000	400	0.008	0.01
0.4	2	20,000~50,000	2,000	0.1	0.15	20,000~50,000	1,700	0.1	0.12	14,000~35,000	1,400	0.07	0.085	20,000~50,000	2,000	0.15	0.2
	3	20,000~50,000	1,800	0.07	0.15	20,000~50,000	1,500	0.07	0.1	14,000~35,000	1,200	0.05	0.07	20,000~50,000	1,800	0.12	0.2
	4	20,000~50,000	1,500	0.05	0.12	20,000~50,000	1,300	0.05	0.08	14,000~35,000	1,000	0.035	0.055	20,000~50,000	1,500	0.1	0.2
	6	20,000~30,000	900	0.05	0.08	20,000~30,000	750	0.03	0.05	14,000~21,000	630	0.02	0.035	20,000~30,000	900	0.07	0.12
	8	18,000~24,000	500	0.015	0.03	18,000~24,000	420	0.01	0.01	12,600~16,800	350	0.007	0.007	18,000~24,000	500	0.02	0.05
	10	18,000~24,000	350	0.005	0.01	18,000~24,000	300	0.003	0.005	12,600~16,800	240	0.002	0.003	18,000~24,000	350	0.008	0.008
0.45	2	20,000~50,000	2,500	0.15	0.2	20,000~50,000	2,000	0.1	0.2	14,000~35,000	1,800	0.07	0.15	20,000~50,000	2,800	0.2	0.3
	4	20,000~50,000	2,000	0.1	0.2	20,000~50,000	1,500	0.05	0.12	14,000~35,000	1,100	0.04	0.08	20,000~50,000	2,000	0.15	0.25
	6	20,000~30,000	1,300	0.07	0.15	20,000~30,000	1,000	0.035	0.05	14,000~21,000	650	0.025	0.035	20,000~30,000	1,300	0.1	0.2
	8	20,000~30,000	800	0.035	0.05	20,000~30,000	700	0.025	0.04	12,600~16,800	550	0.015	0.025	18,000~24,000	800	0.055	0.08
0.5	2	20,000~50,000	3,200	0.25	0.35	20,000~50,000	2,500	0.12	0.3	14,000~35,000	2,300	0.085	0.2	20,000~50,000	3,500	0,25	0.4
	3	20,000~50,000	3,000	0.2	0.3	20,000~50,000	2,500	0.12	0.3	14,000~35,000	2,100	0.08	0.2	20,000~50,000	3,000	0.25	0.4
	4	20,000~50,000	2,500	0.15	0.25	20,000~50,000	2,100	0.1	0.2	14,000~35,000	1,700	0.07	0.14	20,000~50,000	2,500	0.2	0.4
	6	20,000~50,000	1,500	0.1	0.2	20,000~50,000	1,200	0.07	0.12	14,000~35,000	1,000	0.05	0.085	20,000~50,000	1,500	0.15	0.3
	8	20,000~30,000	1,200	0.05	0.1	20,000~30,000	1,000	0.05	0.08	14,000~21,000	840	0.035	0.055	20,000~30,000	1,200	0.08	0.15
	9	20,000~30,000	1,000	0.04	0.06	20,000~30,000	850	0.05	0.05	14,000~21,000	700	0.035	0.035	20,000~30,000	1,000	0.06	0.1
	10	20,000~30,000	800	0.03	0.05	20,000~30,000	680	0.03	0.05	14,000~21,000	560	0.02	0.035	20,000~30,000	800	0.05	0.08
	12	16,000~20,000	600	0.015	0.025	16,000~20,000	510	0.01	0.03	11,200~14,000	420	0.007	0.02	16,000~20,000	600	0.02	0.04
	16	12,000~16,000	250	0.005	0.01	12,000~16,000	210	0.005	0.01	8,400~11,200	170	0.004	0.007	12,000~16,000	250	0.01	0.015
0.6	4	20,000~30,000	3,000	0.2	0.3	20,000~30,000	2,500	0.12	0.3	14,000~21,000	2,100	0.085	0.21	20,000~30,000	3,000	0.28	0.45
	6	20,000~30,000	2,000	0.1	0.25	20,000~30,000	1,700	0.08	0.17	14,000~21,000	1,400	0.055	0.12	20,000~30,000	2,000	0.15	0.4
	8	20,000~30,000	1,300	0.08	0.2	20,000~30,000	1,100	0.06	0.15	14,000~21,000	910	0.04	0.1	20,000~30,000	1,300	0.12	0.3
	10	14,000~20,000	1,200	0.05	0.1	14,000~20,000	1,000	0.03	0.08	9,800~14,000	840	0.02	0.055	14,000~20,000	1,200	0.08	0.15
	12	14,000~20,000	800	0.03	0.05	14,000~20,000	680	0.02	0.04	9,800~14,000	560	0.015	0.03	14,000~20,000	800	0.05	0.08
	16	14,000~20,000	400	0.01	0.02	14,000~20,000	340	0.01	0.01	9,800~14,000	280	0.007	0.007	14,000~20,000	400	0.015	0.03
0.75	4	20,000~30,000	4,000	0.2	0.3	20,000~30,000	3,400	0.15	0.25	14,000~21,000	2,800	0.09	0.15	20,000~30,000	4,000	0.3	0.45
	6	20,000~30,000	3,000	0.15	0.3	20,000~30,000	2,500	0.12	0.2	14,000~21,000	2,100	0.07	0.12	20,000~30,000	3,000	0.2	0.45
	8	20,000~30,000	2,400	0.1	0.25	20,000~30,000	2,000	0.08	0.18	14,000~21,000	1,700	0.05	0.11	20,000~30,000	2,400	0.15	0.4
	10	20,000~30,000	1,800	0.08	0.2	20,000~30,000	1,500	0.06	0.12	14,000~21,000	1,200	0.035	0.07	20,000~30,000	1,800	0.12	0.3
	12	18,000~24,000	1,200	0.07	0.13	18,000~24,000	1,000	0.05	0.09	12,600~16,800	840	0.03	0.055	18,000~24,000	1,200	0.1	0.2
	16	12,000~18,000	800	0.05	0.08	12,000~18,000	680	0.035	0.06	8,400~12,600	560	0.02	0.035	12,000~18,000	800	0.07	0.12
0.8	4	18,000~24,000	4,000	0.2	0.3	18,000~24,000	3,400	0.17	0.25	12,600~16,800	2,800	0.1	0.15	18,000~24,000	4,000	0.3	0.45
	8	18,000~24,000	3,000	0.1	0.3	18,000~24,000	2,500	0.09	0.2	12,600~16,800	2,100	0.055	0.12	18,000~24,000	3,000	0.15	0.45
	12	18,000~24,000	1,800	0.07	0.15	18,000~24,000	1,500	0.06	0.12	12,600~16,800	1,300	0.035	0.07	18,000~24,000	1,800	0.1	0.25
	16	12,000~18,000	650	0.05	0.1	12,000~18,000	550	0.035	0.07	8,400~12,600	450	0.02	0.04	12,000~18,000	650	0.08	0.15
	20	12,000~18,000	450	0.03	0.05	12,000~18,000	380	0.02	0.04	8,400~12,600	310	0.01	0.025	12,000~18,000	450	0.05	0.08

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		碳素钢 · 调质钢 Carbon Steels · Prehardened Steels S50C · NAK · HPM-1 (~45HRC)				淬火钢 Hardened Steels SKD · STAVAX · HPM-38 (~55HRC)				淬火钢 Hardened Steels SKD11 (~62HRC)				铜合金 Copper			
球头半径 (R) Radius	颈长 (ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.9	4	18,000~24,000	3,500	0.2	0.4	18,000~24,000	3,400	0.17	0.25	12,600~16,800	2,800	0.1	0.15	18,000~24,000	4,000	0.3	0.45
	8	16,000~20,000	2,500	0.15	0.3	16,000~20,000	2,100	0.12	0.2	11,200~14,000	1,750	0.07	0.12	16,000~20,000	2,500	0.2	0.45
	12	12,000~16,000	1,800	0.1	0.2	12,000~16,000	1,500	0.07	0.15	8,400~11,200	1,300	0.04	0.09	12,000~16,000	1,800	0.15	0.3
	16	10,000~14,000	1,600	0.08	0.13	10,000~14,000	1,400	0.06	0.1	7,000~9,800	1,100	0.035	0.06	10,000~14,000	1,600	0.12	0.2
	20	8,000~12,000	1,000	0.05	0.1	8,000~12,000	850	0.04	0.08	5,600~8,400	700	0.025	0.05	8,000~12,000	1,000	0.08	0.15
1	6	20,000~30,000	3,000	0.25	0.5	20,000~30,000	2,500	0.2	0.4	14,000~21,000	2,100	0.12	0.24	20,000~30,000	3,000	0.38	0.7
	8	16,000~20,000	2,500	0.2	0.3	16,000~20,000	2,100	0.15	0.3	11,200~14,000	1,700	0.09	0.18	16,000~20,000	2,500	0.3	0.45
	10	16,000~20,000	2,500	0.15	0.3	16,000~20,000	2,100	0.1	0.2	11,200~14,000	1,700	0.06	0.12	16,000~20,000	2,500	0.23	0.45
	12	12,000~16,000	1,800	0.13	0.2	12,000~16,000	1,500	0.1	0.15	8,400~11,200	1,300	0.06	0.09	12,000~16,000	1,800	0.2	0.3
	16	10,000~14,000	1,600	0.1	0.15	10,000~14,000	1,400	0.06	0.11	7,000~9,800	1,100	0.035	0.065	10,000~14,000	1,600	0.15	0.25
	18	10,000~14,000	1,600	0.07	0.12	10,000~14,000	1,400	0.05	0.1	7,000~9,800	1,100	0.03	0.06	10,000~14,000	1,600	0.1	0.2
	20	8,000~12,000	1,000	0.06	0.1	8,000~12,000	850	0.05	0.07	5,600~8,400	700	0.03	0.04	8,000~12,000	1,000	0.1	0.15
1.25	6	16,000~20,000	4,000	0.35	0.5	16,000~20,000	3,400	0.3	0.4	11,200~14,000	2,800	0.18	0.24	16,000~20,000	4,000	0.5	0.8
	8	16,000~20,000	2,500	0.15	0.3	16,000~20,000	2,100	0.1	0.2	11,200~14,000	1,700	0.06	0.12	16,000~20,000	2,500	0.25	0.45
	12	16,000~20,000	2,800	0.18	0.4	16,000~20,000	2,300	0.2	0.3	11,200~14,000	1,900	0.1	0.15	16,000~20,000	2,800	0.28	0.6
	16	16,000~20,000	2,500	0.15	0.3	16,000~20,000	2,100	0.1	0.2	11,200~14,000	1,700	0.06	0.12	16,000~20,000	2,500	0.25	0.45
	20	12,000~16,000	1,800	0.1	0.2	12,000~16,000	1,500	0.08	0.15	8,400~11,200	1,300	0.05	0.09	12,000~16,000	1,800	0.15	0.3
1.5	8	16,000~20,000	4,000	0.3	0.5	16,000~20,000	3,400	0.2	0.5	11,200~14,000	2,800	0.12	0.3	16,000~20,000	4,000	0.45	0.8
	10	16,000~20,000	4,000	0.3	0.5	16,000~20,000	3,400	0.2	0.45	11,200~14,000	2,800	0.12	0.27	16,000~20,000	4,000	0.45	0.8
	12	16,000~20,000	3,000	0.2	0.4	16,000~20,000	2,500	0.2	0.4	11,200~14,000	2,100	0.12	0.24	16,000~20,000	3,000	0.3	0.6
	16	16,000~20,000	3,000	0.15	0.35	16,000~20,000	2,500	0.13	0.35	11,200~14,000	2,100	0.07	0.21	16,000~20,000	3,000	0.23	0.5
	20	12,000~16,000	1,800	0.15	0.3	12,000~16,000	1,500	0.1	0.2	8,400~11,200	1,300	0.06	0.12	12,000~16,000	1,800	0.23	0.45
1.75	10	16,000~20,000	4,000	0.35	0.6	16,000~20,000	3,400	0.25	0.5	11,200~14,000	2,800	0.15	0.3	16,000~20,000	4,000	0.5	1
	15	16,000~20,000	4,000	0.3	0.4	16,000~20,000	3,400	0.2	0.45	11,200~14,000	2,800	0.12	0.27	16,000~20,000	4,000	0.45	0.6
	20	14,000~18,000	2,400	0.2	0.3	14,000~18,000	2,000	0.13	0.35	9,800~12,600	1,680	0.08	0.21	14,000~18,000	2,400	0.3	0.45
2	12	16,000~20,000	4,000	0.35	0.7	16,000~20,000	3,400	0.25	0.7	11,200~14,000	2,800	0.15	0.42	16,000~20,000	4,000	0.53	1
	16	16,000~20,000	3,500	0.2	0.5	16,000~20,000	3,000	0.2	0.3	11,200~14,000	2,500	0.12	0.18	16,000~20,000	3,500	0.3	0.8
	20	16,000~20,000	3,300	0.2	0.35	16,000~20,000	2,800	0.15	0.3	11,200~14,000	2,300	0.09	0.18	16,000~20,000	3,300	0.3	0.5

备注 Notes

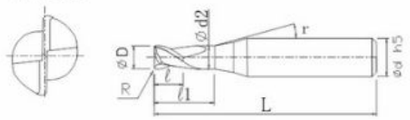
※ 本切削参数仅供参考。请根据实际的加工形状及使用机床等调整切削参数。
※ 切深量的ap表示轴向切入量，ae表示步距量。
※ 发生振刀时，请以相同的比率降低主轴转速和进给速度。
此外，主轴转速过低时，也以相同的比率调整。
※ ℓ1(颈长)/D(刃径)超过15倍时，受加工形状等因素的影响可能会较大，必须进行调整。
※ 加工淬火钢时，建议使用油雾冷却方式。
※ Recommend to use the milling condition as just reference. Adjust milling conditions according to machining shapeand machine status.
※ Depth of Cut : ap=Axial Depth of Cut / ae=Radial Depth of Cut.
※ Reduce both spindle speed and feed at same rate for chattering and also for insucient spindle speed of a machine.
※ When ℓ1 (neck length)/D(blade diameter) exceeds 15 times, it may be greatly affected by machining shape and other factors, and must be adjusted.
※ Oil mist coolant is recommended for the machining of hardened steels.

通用合金用2刃长颈圆鼻铣刀
Universal Alloy 2-Flute Long Neck Corner Radius Endmills

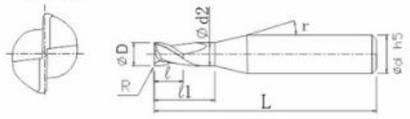
2刃 · 带R角 | 2-Flute · Corner Radius

精密加工用长颈圆鼻铣刀。
Long neck round nose milling cutter for precision machining.

TYPE A:



TYPE B:



- 适用于深沟加工的长颈避空型。
- 与球头铣刀相比，步距设定值可取较大值，实现高效加工。
- 可以对应小于HRC50°的合金和有色金属。
- Long neck design is suited for the machining of narrow and deep area.
- Compared with ball-end milling cutter, the step setting value should be larger to achieve efficient machining.
- Alloys and Non-ferrous metal > HRC50.

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
KNR02005002	0.2R0.02x0.5L	0.2	R0.02	0.5	0.3	0.18	10+20°	4	50	
KNR0201002	0.2R0.02x1L			1	0.3	0.18	10+20°	4	50	
KNR02015002	0.2R0.02x1.5L			1.5	0.3	0.18	10+20°	4	50	
KNR0202002	0.2R0.02x2L			2	0.3	0.18	10+20°	4	50	
KNR02005005	0.2R0.05x0.5L		R0.05	0.5	0.3	0.18	10+20°	4	50	
KNR0201005	0.2R0.05x1L			1	0.3	0.18	10+20°	4	50	
KNR02015005	0.2R0.05x1.5L			1.5	0.3	0.18	10+20°	4	50	
KNR0202005	0.2R0.05x2L			2	0.3	0.18	10+20°	4	50	
KNR0301002	0.3R0.02x1L	0.3	R0.02	1	0.5	0.27	10+20°	4	50	
KNR03015002	0.3R0.02x1.5L			1.5	0.5	0.27	10+20°	4	50	
KNR0302002	0.3R0.02x2L			2	0.5	0.27	10+20°	4	50	
KNR0302502	0.3R0.02x2.5L			2.5	0.5	0.27	10+20°	4	50	
KNR0303002	0.3R0.02x3L			3	0.5	0.27	10+20°	4	50	
KNR0301005	0.3R0.05x1L		R0.05	1	0.5	0.27	10+20°	4	50	
KNR03015005	0.3R0.05x1.5L			1.5	0.5	0.27	10+20°	4	50	
KNR0302005	0.3R0.05x2L			2	0.5	0.27	10+20°	4	50	
KNR0302505	0.3R0.05x2.5L			2.5	0.5	0.27	10+20°	4	50	
KNR0303005	0.3R0.05x3L			3	0.5	0.27	10+20°	4	50	
KNR0401005	0.4R0.05x1L	0.4	R0.05	1	0.6	0.37	10+20°	4	50	
KNR0402005	0.4R0.05x2L			2	0.6	0.37	10+20°	4	50	
KNR0403005	0.4R0.05x3L			3	0.6	0.37	10+20°	4	50	
KNR0404005	0.4R0.05x4L			4	0.6	0.37	10+20°	4	50	
KNR040101	0.4R0.1x1L		R0.1	1	0.6	0.37	10+20°	4	50	
KNR040201	0.4R0.1x2L			2	0.6	0.37	10+20°	4	50	
KNR040301	0.4R0.1x3L			3	0.6	0.37	10+20°	4	50	
KNR040401	0.4R0.1x4L			4	0.6	0.37	10+20°	4	50	

通用合金用2刃长颈圆鼻铣刀
Universal Alloy 2-Flute Long Neck Corner Radius Endmills

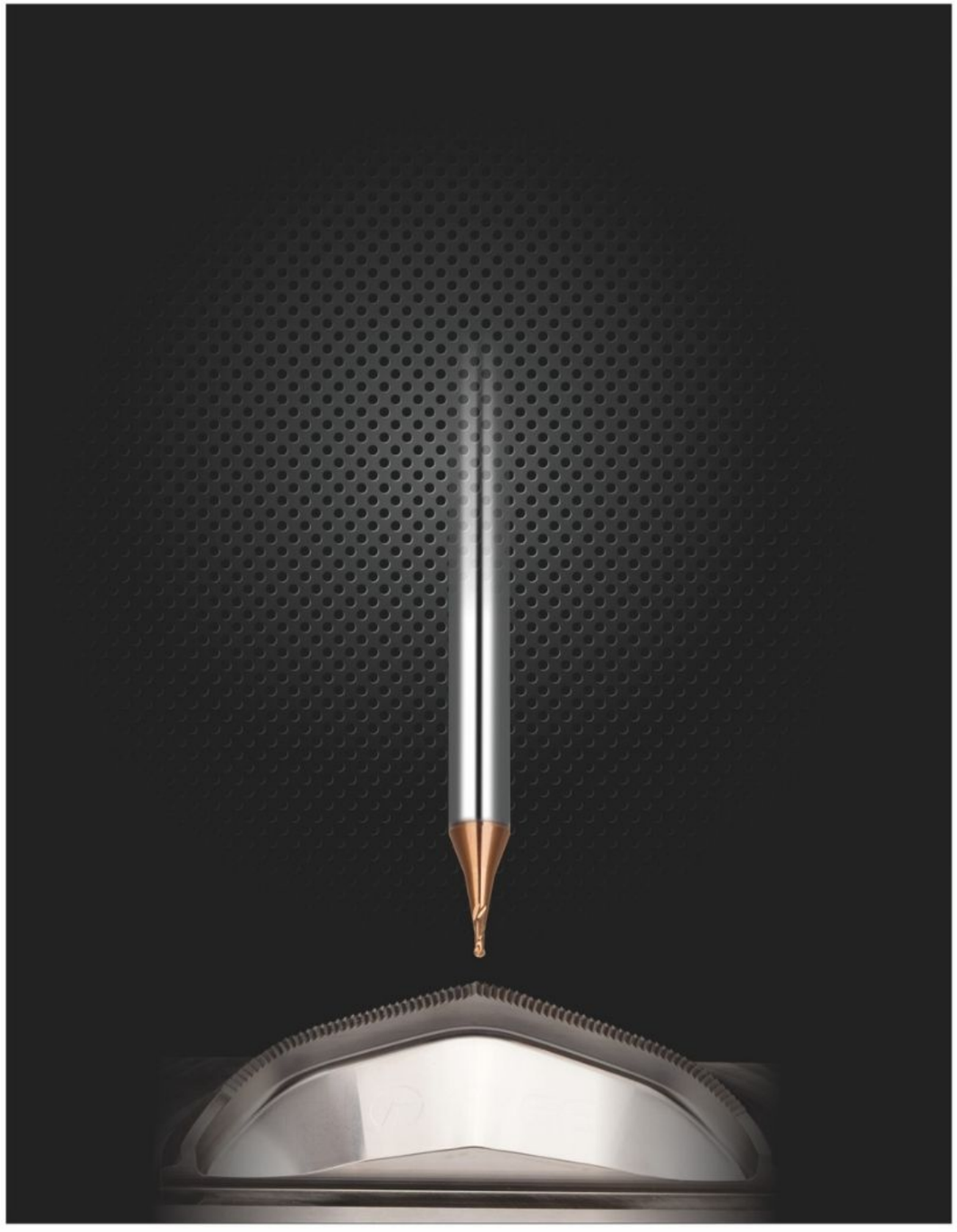
产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
KNR0501005	0.5R0.05x1L	0.5	R0.05	1	0.7	0.46	10+20°	4	50	
KNR0502005	0.5R0.05x2L			2	0.7	0.46	10+20°	4	50	
KNR0503005	0.5R0.05x3L			3	0.7	0.46	10+20°	4	50	
KNR0504005	0.5R0.05x4L			4	0.7	0.46	10+20°	4	50	
KNR0505005	0.5R0.05x5L			5	0.7	0.46	10+20°	4	50	
KNR0506005	0.5R0.05x6L			6	0.7	0.46	10+20°	4	50	
KNR050101	0.5R0.1x1L		R0.1	1	0.7	0.46	10+20°	4	50	
KNR050201	0.5R0.1x2L			2	0.7	0.46	10+20°	4	50	
KNR050301	0.5R0.1x3L			3	0.7	0.46	10+20°	4	50	
KNR050401	0.5R0.1x4L			4	0.7	0.46	10+20°	4	50	
KNR050501	0.5R0.1x5L			5	0.7	0.46	10+20°	4	50	
KNR050601	0.5R0.1x6L			6	0.7	0.46	10+20°	4	50	
KNR0602005	0.6R0.05x2L	0.6	R0.05	2	0.9	0.56	10+20°	4	50	
KNR0603005	0.6R0.05x3L			3	0.9	0.56	10+20°	4	50	
KNR0604005	0.6R0.05x4L			4	0.9	0.56	10+20°	4	50	
KNR0606005	0.6R0.05x6L			6	0.9	0.56	10+20°	4	50	
KNR0608005	0.6R0.05x8L			8	0.9	0.56	10+20°	4	50	
KNR06010005	0.6R0.05x10L			10	0.9	0.56	10+20°	4	50	
KNR060201	0.6R0.1x2L		R0.1	2	0.9	0.56	10+20°	4	50	
KNR060301	0.6R0.1x3L			3	0.9	0.56	10+20°	4	50	
KNR060401	0.6R0.1x4L			4	0.9	0.56	10+20°	4	50	
KNR060601	0.6R0.1x6L			6	0.9	0.56	10+20°	4	50	
KNR060801	0.6R0.1x8L			8	0.9	0.56	10+20°	4	50	
KNR061001	0.6R0.1x10L			10	0.9	0.56	10+20°	4	50	
KNR0702005	0.7R0.05x2L	0.7	R0.05	2	1	0.66	10+20°	4	50	
KNR0703005	0.7R0.05x3L			3	1	0.66	10+20°	4	50	
KNR0704005	0.7R0.05x4L			4	1	0.66	10+20°	4	50	
KNR0706005	0.7R0.05x6L			6	1	0.66	10+20°	4	50	
KNR070201	0.7R0.1x2L		R0.1	2	1	0.66	10+20°	4	50	
KNR070301	0.7R0.1x3L			3	1	0.66	10+20°	4	50	
KNR070401	0.7R0.1x4L			4	1	0.66	10+20°	4	50	
KNR070601	0.7R0.1x6L			6	1	0.66	10+20°	4	50	
KNR0802005	0.8R0.05x2L	0.8	R0.05	2	1.2	0.76	10+20°	4	50	
KNR0803005	0.8R0.05x3L			3	1.2	0.76	10+20°	4	50	
KNR0804005	0.8R0.05x4L			4	1.2	0.76	10+20°	4	50	
KNR0806005	0.8R0.05x6L			6	1.2	0.76	10+20°	4	50	
KNR0808005	0.8R0.05x8L			8	1.2	0.76	10+20°	4	50	
KNR0810005	0.8R0.05x10L			10	1.2	0.76	10+20°	4	50	
KNR0812005	0.8R0.05x12L			12	1.2	0.76	10+20°	4	50	
KNR080201	0.8R0.1x2L		R0.1	2	1.2	0.76	10+20°	4	50	
KNR080301	0.8R0.1x3L			3	1.2	0.76	10+20°	4	50	
KNR080401	0.8R0.1x4L			4	1.2	0.76	10+20°	4	50	
KNR080601	0.8R0.1x6L			6	1.2	0.76	10+20°	4	50	
KNR080801	0.8R0.1x8L			8	1.2	0.76	10+20°	4	50	
KNR081001	0.8R0.1x10L			10	1.2	0.76	10+20°	4	50	
KNR081201	0.8R0.1x12L			12	1.2	0.76	10+20°	4	50	
KNR080202	0.8R0.2x2L		R0.2	2	1.2	0.76	10+20°	4	50	
KNR080302	0.8R0.2x3L			3	1.2	0.76	10+20°	4	50	
KNR080402	0.8R0.2x4L			4	1.2	0.76	10+20°	4	50	
KNR080602	0.8R0.2x6L			6	1.2	0.76	10+20°	4	50	
KNR080802	0.8R0.2x8L			8	1.2	0.76	10+20°	4	50	
KNR081002	0.8R0.2x10L			10	1.2	0.76	10+20°	4	50	
KNR081202	0.8R0.2x12L			12	1.2	0.76	10+20°	4	50	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material			碳素钢 · 调质钢 Carbon Steels · Prehardened Steels S50C · NAK55 · NAK80 · HPM-1 (~43HRC)				淬火钢 Hardened Steels HPM-38 · STAVAX · SKD61 (~55HRC)				铜 · 铝合金 Copper · Aluminum Alloy			
外径 Dia.	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
			min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
0.2	0.02 0.05	0.5	30,000	200	0.01	0.05	30,000	150	0.003	0.04	30,000	250	0.012	0.05
		1	30,000	150	0.007	0.05	30,000	100	0.003	0.04	30,000	200	0.008	0.05
		1.5	30,000	100	0.005	0.05	30,000	80	0.002	0.04	30,000	135	0.006	0.05
		2	30,000	50	0.003	0.05	30,000	50	0.002	0.04	30,000	75	0.004	0.05
0.3	0.02 0.05	1	30,000	200	0.02	0.1	30,000	180	0.003	0.08	30,000	300	0.024	0.1
		1.5	30,000	180	0.015	0.1	30,000	130	0.003	0.08	30,000	260	0.018	0.1
		2	30,000	150	0.01	0.1	30,000	100	0.003	0.08	30,000	250	0.012	0.1
		2.5	30,000	120	0.007	0.1	25,000	80	0.002	0.08	30,000	240	0.008	0.1
		3	30,000	100	0.005	0.1	25,000	50	0.002	0.08	30,000	220	0.006	0.1
0.4	0.05 0.1	1	30,000	350	0.025	0.12	30,000	300	0.005	0.1	30,000	450	0.03	0.12
		2	30,000	250	0.02	0.12	25,000	180	0.005	0.1	30,000	360	0.024	0.12
		3	30,000	220	0.015	0.12	25,000	150	0.004	0.1	30,000	300	0.018	0.12
		4	25,000	160	0.01	0.12	20,000	100	0.003	0.1	30,000	240	0.012	0.12
0.5	0.05 0.1	1	30,000	500	0.03	0.14	25,000	400	0.01	0.12	30,000	650	0.036	0.14
		2	30,000	400	0.025	0.14	25,000	300	0.01	0.12	30,000	600	0.03	0.14
		3	30,000	340	0.02	0.14	25,000	250	0.008	0.12	30,000	480	0.024	0.14
		4	25,000	280	0.015	0.14	20,000	180	0.005	0.12	30,000	430	0.018	0.14
		5	25,000	230	0.01	0.14	20,000	150	0.004	0.12	30,000	360	0.012	0.14
		6	20,000	180	0.008	0.14	16,000	100	0.003	0.12	25,000	270	0.01	0.14
0.6	0.05 0.1	2	30,000	600	0.035	0.16	25,000	400	0.02	0.13	30,000	800	0.04	0.16
		3	30,000	500	0.03	0.16	25,000	350	0.015	0.13	30,000	750	0.035	0.16
		4	25,000	400	0.025	0.16	20,000	250	0.015	0.13	30,000	650	0.03	0.16
		6	20,000	250	0.015	0.16	16,000	150	0.008	0.13	25,000	400	0.018	0.16
		8	18,000	180	0.01	0.16	14,000	100	0.005	0.13	20,000	300	0.012	0.16
		10	18,000	1150	0.01	0.16	14,000	80	0.004	0.13	18,000	200	0.01	0.16
0.7	0.05 0.1	2	30,000	800	0.04	0.2	30,000	600	0.02	0.16	30,000	1,500	0.04	0.2
		3	30,000	700	0.035	0.2	25,000	500	0.02	0.16	30,000	1,300	0.04	0.2
		4	25,000	600	0.03	0.2	20,000	400	0.02	0.16	30,000	1,000	0.04	0.2
		6	20,000	450	0.02	0.2	16,000	250	0.01	0.16	25,000	700	0.025	0.2
0.8	0.05 0.1 0.2	2	30,000	1,500	0.05	0.25	25,000	800	0.03	0.2	30,000	1,800	0.06	0.25
		3	28,000	1,300	0.048	0.25	23,000	700	0.028	0.2	30,000	1,600	0.058	0.25
		4	25,000	1,000	0.045	0.25	20,000	600	0.025	0.2	30,000	1,400	0.055	0.25
		6	20,000	700	0.03	0.25	16,000	400	0.02	0.2	25,000	1,000	0.04	0.25
		8	18,000	400	0.02	0.25	14,000	250	0.01	0.2	22,000	600	0.025	0.25
		10	16,000	300	0.01	0.25	12,000	200	0.01	0.2	20,000	400	0.02	0.25
		12	15,000	200	0.01	0.25	10,000	150	0.01	0.2	18,000	200	0.015	0.25

备注 Notes

※ 请根据实际的加工形状及使用机床等调整切削参数。
※ 切深量的ap表示轴向切入量，ae表示步距量。
※ 加工淬火钢时，建议使用油雾冷却方式。
※ 轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※ ℓ1(颈长) / D(刃径)超过8倍时，立面附近的进给速度须调整至50%以下，切深量：ae调整至30%以下。
※ 沟槽切削时建议参考切削参数表，切深量ap及进给速度设定为50%以下，采用来回切削加工方式。
※ 发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率调整。
※ Adjust milling conditions according to milling shape and machine type.
※ ap : Axial Depth of Cut, ae : Radial Depth of Cut.
※ Recommend to use oil mist coolant for machining hardened steels.
※ Recommend to apply helical or ramping for approaching into axial direction.
※ When ℓ1(neck length)/D (blade diameter) exceeds 8 times, the feed speed near the facade shall be adjusted to less than 50%, and the cutting depth: ae shall be adjusted to less than 30%.
※ For slotting, recommend reciprocating milling by adjusting feed & ap in below 50% of recommended milling condition.
※ Reduce both spindle speed and feed at same rate for chattering and also for insu cient spindle speed of a machine.



通用合金用4刃长颈圆鼻铣刀
Universal Alloy 4-Flute Long Neck Corner Radius Endmills

4刃 · 带R角 | 4-Flute · Corner Radius

平面 Planing | 侧面 Side Cutting | 槽 Slotting | 刻模 Die-sinking | 曲面 Profiling | R Radius | 螺旋 Helical | 粗加工 Roughing | 半精加工 Semi Finishing | 精加工 Finishing | 切削条件 B098 Cutting Conditions

外径公差 Dia.tolerance: 1≤D≤3: 0~-0.01; D≤4: 0~-0.015

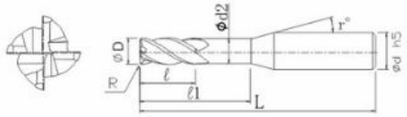
r公差 r tolerance: ±0.005

h5: 0~-0.005

(mm)

精密加工用长颈圆鼻铣刀。
Long neck round nose milling cutter for precision machining.

TYPE A:



- 适用于深沟加工的长颈避空型。
- 与球头铣刀相比，步距设定值可取较大值，实现高效加工。
- 可以对应小于HRC50°的合金和有色金属
- Long neck design is suited for the machining of narrow and deep area.
- Compared with ball-end milling cutter, the step setting value should be larger to achieve efficient machining.
- Alloys and Non-ferrous metal > HRC50.

硬质合金 | AP涂层 | R倒 | 螺旋角 | 4

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
KNR1004005	1R0.05x4L	1	R0.05	4	1.5	0.95	12°	4	50	
KNR1006005	1R0.05x6L			6	1.5	0.95	12°	4	50	
KNR1008005	1R0.05x8L			8	1.5	0.95	12°	4	50	
KNR1010005	1R0.05x10L			10	1.5	0.95	12°	4	50	
KNR1012005	1R0.05x12L			12	1.5	0.95	12°	4	50	
KNR1016005	1R0.05x16L			16	1.5	0.95	12°	4	50	
KNR100401	1R0.1x4L		R0.1	4	1.5	0.95	12°	4	50	
KNR100601	1R0.1x6L			6	1.5	0.95	12°	4	50	
KNR100801	1R0.1x8L			8	1.5	0.95	12°	4	50	
KNR101001	1R0.1x10L			10	1.5	0.95	12°	4	50	
KNR101201	1R0.1x12L			12	1.5	0.95	12°	4	50	
KNR101601	1R0.1x16L			16	1.5	0.95	12°	4	50	
KNR100402	1R0.2x4L		R0.2	4	1.5	0.95	12°	4	50	
KNR100502	1R0.2x5L			5	1.5	0.95	12°	4	50	
KNR100602	1R0.2x6L			6	1.5	0.95	12°	4	50	
KNR100802	1R0.2x8L			8	1.5	0.95	12°	4	50	
KNR101002	1R0.2x10L			10	1.5	0.95	12°	4	50	
KNR101202	1R0.2x12L			12	1.5	0.95	12°	4	50	
KNR101602	1R0.2x16L			16	1.5	0.95	12°	4	50	
KNR100403	1R0.3x4L		R0.3	4	1.5	0.95	12°	4	50	
KNR100503	1R0.3x5L			5	1.5	0.95	12°	4	50	
KNR100603	1R0.3x6L			6	1.5	0.95	12°	4	50	
KNR100803	1R0.3x8L			8	1.5	0.95	12°	4	50	
KNR101003	1R0.3x10L			10	1.5	0.95	12°	4	50	
KNR101203	1R0.3x12L			12	1.5	0.95	12°	4	50	
KNR101603	1R0.3x16L			16	1.5	0.95	12°	4	50	
KNR120501	1.2R0.1x5L	1.2	R0.1	5	1.8	1.15	12°	4	50	
KNR121001	1.2R0.1x10L			10	1.8	1.15	12°	4	50	
KNR121501	1.2R0.1x15L			15	1.8	1.15	12°	4	50	
KNR120502	1.2R0.2x5L		R0.2	5	1.8	1.15	12°	4	50	
KNR121002	1.2R0.2x10L			10	1.8	1.15	12°	4	50	
KNR121502	1.2R0.2x15L			15	1.8	1.15	12°	4	50	
KNR1506005	1.5R0.05x6L	1.5	R0.05	6	2.3	1.45	12°	4	50	
KNR1508005	1.5R0.05x8L			8	2.3	1.45	12°	4	50	
KNR1510005	1.5R0.05x10L			10	2.3	1.45	12°	4	50	
KNR1512005	1.5R0.05x12L			12	2.3	1.45	12°	4	50	
KNR1516005	1.5R0.05x16L			16	2.3	1.45	12°	4	50	
KNR1520005	1.5R0.05x20L			20	2.3	1.45	12°	4	50	

通用合金用4刃长颈圆鼻铣刀
Universal Alloy 4-Flute Long Neck Corner Radius Endmills

硬质合金 | AP涂层 | R倒 | 螺旋角 | 4

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
KNR150601	1.5R0.1x6L	1.5	R0.1	6	2.3	1.45	12°	4	50	
KNR150801	1.5R0.1x8L			8	2.3	1.45	12°	4	50	
KNR151001	1.5R0.1x10L			10	2.3	1.45	12°	4	50	
KNR151201	1.5R0.1x12L			12	2.3	1.45	12°	4	50	
KNR151601	1.5R0.1x16L			16	2.3	1.45	12°	4	50	
KNR152001	1.5R0.1x20L			20	2.3	1.45	12°	4	50	
KNR150602	1.5R0.2x6L		R0.2	6	2.3	1.45	12°	4	50	
KNR150802	1.5R0.2x8L			8	2.3	1.45	12°	4	50	
KNR151002	1.5R0.2x10L			10	2.3	1.45	12°	4	50	
KNR151202	1.5R0.2x12L			12	2.3	1.45	12°	4	50	
KNR151602	1.5R0.2x16L			16	2.3	1.45	12°	4	50	
KNR152002	1.5R0.2x20L			20	2.3	1.45	12°	4	50	
KNR200601	2R0.1x6L	2	R0.1	6	3	1.94	12°	4	50	
KNR200801	2R0.1x8L			8	3	1.94	12°	4	50	
KNR201001	2R0.1x10L			10	3	1.94	12°	4	50	
KNR201201	2R0.1x12L			12	3	1.94	12°	4	50	
KNR201601	2R0.1x16L			16	3	1.94	12°	4	50	
KNR202001	2R0.1x20L			20	3	1.94	12°	4	50	
KNR200602	2R0.2x6L		R0.2	6	3	1.94	12°	4	50	
KNR200802	2R0.2x8L			8	3	1.94	12°	4	50	
KNR201002	2R0.2x10L			10	3	1.94	12°	4	50	
KNR201202	2R0.2x12L			12	3	1.94	12°	4	50	
KNR201602	2R0.2x16L			16	3	1.94	12°	4	50	
KNR202002	2R0.2x20L			20	3	1.94	12°	4	50	
KNR200603	2R0.3x6L		R0.3	6	3	1.94	12°	4	50	
KNR200803	2R0.3x8L			8	3	1.94	12°	4	50	
KNR201003	2R0.3x10L			10	3	1.94	12°	4	50	
KNR201203	2R0.3x12L			12	3	1.94	12°	4	50	
KNR201603	2R0.3x16L			16	3	1.94	12°	4	50	
KNR202003	2R0.3x20L			20	3	1.94	12°	4	50	
KNR200605	2R0.5x6L		R0.5	6	3	1.94	12°	4	50	
KNR200805	2R0.5x8L			8	3	1.94	12°	4	50	
KNR201005	2R0.5x10L			10	3	1.94	12°	4	50	
KNR201205	2R0.5x12L			12	3	1.94	12°	4	50	
KNR201605	2R0.5x16L			16	3	1.94	12°	4	50	
KNR202005	2R0.5x20L			20	3	1.94	12°	4	50	
KNR251001	2.5R0.1x10L	2.5	R0.1	10	3.8	2.39	12°	4	50	
KNR252001	2.5R0.1x20L			20	3.8	2.39	12°	4	50	
KNR251002	2.5R0.2x10L		R0.2	10	3.8	2.39	12°	4	50	
KNR252002	2.5R0.2x20L			20	3.8	2.39	12°	4	50	
KNR251003	2.5R0.3x10L		R0.3	10	3.8	2.39	12°	4	50	
KNR252003	2.5R0.3x20L			20	3.8	2.39	12°	4	50	
KNR251005	2.5R0.5x10L		R0.5	10	3.8	2.39	12°	4	50	
KNR252005	2.5R0.5x20L			20	3.8	2.39	12°	4	50	
KNR030801	3R0.1x8L	3	R0.1	8	4.5	2.85	12°	4	50	
KNR031001	3R0.1x10L			10	4.5	2.85	12°	4	50	
KNR301201	3R0.1x12L			12	4.5	2.85	12°	4	50	
KNR301601	3R0.1x16L			16	4.5	2.85	12°	4	50	
KNR030801L	3R0.1x8L			8	4.5	2.85	12°	6	60	
KNR031001L	3R0.1x10L			10	4.5	2.85	12°	6	60	
KNR301201L	3R0.1x12L			12	4.5	2.85	12°	6	60	
KNR301601L	3R0.1x16L			16	4.5	2.85	12°	6	60	
KNR302001L	3R0.1x20L			20	4.5	2.85	12°	6	60	
KNR030802	3R0.2x8L		R0.2	8	4.5	2.85	12°	4	50	
KNR031002	3R0.2x10L			10	4.5	2.85	12°	4	50	
KNR301202	3R0.2x12L			12	4.5	2.85	12°	4	50	
KNR301602	3R0.2x16L			16	4.5	2.85	12°	4	50	
KNR030802L	3R0.2x8L			8	4.5	2.85	12°	6	60	
KNR031002L	3R0.2x10L			10	4.5	2.85	12°	6	60	
KNR301202L	3R0.2x12L			12	4.5	2.85	12°	6	60	
KNR301602L	3R0.2x16L			16	4.5	2.85	12°	6	60	
KNR302002L	3R0.2x20L			20	4.5	2.85	12°	6	60	

通用合金用4刃长颈圆鼻铣刀
Universal Alloy 4-Flute Long Neck Corner Radius Endmills

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	颈长(ℓ1) Under Neck Length	刃长(ℓ) Length of Cut	颈径(d2) Neck Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	定价 Retail Price
KNR030803	3R0.3x8L	3	R0.3	8	4.5	2.85	12°	4	50	
KNR031003	3R0.3x10L			10	4.5	2.85	12°	4	50	
KNR301203	3R0.3x12L			12	4.5	2.85	12°	4	50	
KNR301603	3R0.3x16L			16	4.5	2.85	12°	4	50	
KNR030803L	3R0.3x8L			8	4.5	2.85	12°	6	60	
KNR031003L	3R0.3x10L			10	4.5	2.85	12°	6	60	
KNR301203L	3R0.3x12L			12	4.5	2.85	12°	6	60	
KNR301603L	3R0.3x16L			16	4.5	2.85	12°	6	60	
KNR302003L	3R0.3x20L			20	4.5	2.85	12°	6	60	
KNR030805	3R0.5x8L		R0.5	8	4.5	2.85	12°	4	50	
KNR031005	3R0.5x10L			10	4.5	2.85	12°	4	50	
KNR301205	3R0.5x12L			12	4.5	2.85	12°	4	50	
KNR301605	3R0.5x16L			16	4.5	2.85	12°	4	50	
KNR030805L	3R0.5x8L			8	4.5	2.85	12°	6	60	
KNR031005L	3R0.5x10L			10	4.5	2.85	12°	6	60	
KNR301205L	3R0.5x12L			12	4.5	2.85	12°	6	60	
KNR301605L	3R0.5x16L			16	4.5	2.85	12°	6	60	
KNR302005L	3R0.5x20L			20	4.5	2.85	12°	6	60	
KNR030810	3R1x8L		R1	8	4.5	2.85	12°	4	50	
KNR031010	3R1x10L			10	4.5	2.85	12°	4	50	
KNR301210	3R1x12L			12	4.5	2.85	12°	4	50	
KNR301610	3R1x16L			16	4.5	2.85	12°	4	50	
KNR030810L	3R1x8L			8	4.5	2.85	12°	6	60	
KNR031010L	3R1x10L			10	4.5	2.85	12°	6	60	
KNR301210L	3R1x12L			12	4.5	2.85	12°	6	60	
KNR301610L	3R1x16L			16	4.5	2.85	12°	6	60	
KNR302010L	3R1x20L			20	4.5	2.85	12°	6	60	
KNR400801L	4R0.1x8L	4	R0.1	8	6	3.8	12°	6	60	
KNR401201L	4R0.1x12L			12	6	3.8	12°	6	60	
KNR401601L	4R0.1x16L			16	6	3.8	12°	6	60	
KNR402001L	4R0.1x20L			20	6	3.8	12°	6	60	
KNR400802L	4R0.2x8L		R0.2	8	6	3.8	12°	6	60	
KNR401202L	4R0.2x12L			12	6	3.8	12°	6	60	
KNR401602L	4R0.2x16L			16	6	3.8	12°	6	60	
KNR402002L	4R0.2x20L			20	6	3.8	12°	6	60	
KNR400803L	4R0.3x8L		R0.3	8	6	3.8	12°	6	60	
KNR401203L	4R0.3x12L			12	6	3.8	12°	6	60	
KNR401603L	4R0.3x16L			16	6	3.8	12°	6	60	
KNR402003L	4R0.3x20L			20	6	3.8	12°	6	60	
KNR400805L	4R0.5x8L		R0.5	8	6	3.8	12°	6	60	
KNR401205L	4R0.5x12L			12	6	3.8	12°	6	60	
KNR401605L	4R0.5x16L			16	6	3.8	12°	6	60	
KNR402005L	4R0.5x20L			20	6	3.8	12°	6	60	
KNR400810L	4R1x8L		R1	8	6	3.8	12°	6	60	
KNR401210L	4R1x12L			12	6	3.8	12°	6	60	
KNR401610L	4R1x16L			16	6	3.8	12°	6	60	
KNR402010L	4R1x20L			20	6	3.8	12°	6	60	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material			碳素钢・调质钢 Carbon Steels・Prehardened Steels S50C・NAK55・NAK80・HPM-1 (~43HRC)				淬火钢 Hardened Steels HPM-38・STAVAX・SKD61 (~55HRC)				淬火钢 Hardened Steels SKD11・PD613 (~62HRC)				铜・铝合金 Copper・Aluminum Alloy			
外径 Dia.	角半径(R) Corner Radius Dia.	颈长(ℓ1) Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
			min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm	min-1	mm/min	ap mm	ae mm
1	0.05 0.1 0.2 0.3	4	16,000	1,500	0.05	0.35	12,800	1,050	0.04	0.3	10,800	840	0.03	0.25	16,000	1,500	0.15	0.23
		5	16,000	1,410	0.045	0.35	12,800	990	0.035	0.25	10,800	800	0.02	0.2	16,000	1,410	0.13	0.23
		6	14,500	1,200	0.04	0.25	11,600	840	0.03	0.25	8,900	680	0.015	0.2	14,500	1,200	0.12	0.2
		8	14,500	870	0.03	0.25	11,600	620	0.02	0.2	8,900	500	0.012	0.16	14,500	870	0.09	0.2
		10	11,100	660	0.025	0.25	8,900	470	0.015	0.1	7,100	370	0.01	0.1	11,100	660	0.075	0.15
		12	11,100	300	0.02	0.2	8,900	210	0.01	0.08	7,100	160	0.005	0.06	11,100	300	0.06	0.15
		16	10,000	200	0.01	0.2	80,000	150	0.01	0.08	6,000	100	0.005	0.05	11,100	200	0.05	0.15
1.2	0.1 0.2	5	15,500	1,740	0.06	0.4	12,400	1,220	0.045	0.35	10,000	970	0.025	0.25	15,500	1,740	0.18	0.28
		10	12,000	1,290	0.04	0.35	9,600	900	0.03	0.25	8,000	720	0.01	0.15	12,000	1,290	0.12	0.28
		15	10,600	480	0.02	0.25	8,500	330	0.01	0.1	6,600	270	0.005	0.08	10,600	480	0.07	0.23
1.5	0.05 0.1 0.2	6	14,000	1,910	0.08	0.53	11,200	1,340	0.05	0.4	8,500	1,070	0.03	0.3	14,000	1,910	0.24	0.35
		8	13,000	1,700	0.07	0.5	11,000	1200	0.045	0.35	7,800	950	0.02	0.25	13,200	1,690	0.18	0.33
		10	12,000	1,500	0.06	0.45	11,500	1000	0.042	0.33	7,000	850	0.015	0.2	12,500	1,470	0.15	0.3
		12	11,500	1,250	0.06	0.42	9,000	870	0.04	0.3	6,400	700	0.01	0.2	11,500	1,250	0.1	0.28
		16	8,500	560	0.02	0.3	6,800	390	0.01	0.15	5,400	320	0.005	0.1	8,500	560	0.08	0.25
		20	7,000	500	0.01	0.2	5,000	300	0.01	0.08	4,000	300	0.003	0.1	6,000	500	0.08	0.2
2	0.1 0.2 0.3 0.5	6	11,100	2,200	0.085	0.6	9,000	1,600	0.05	0.5	8,000	1,300	0.03	0.4	11,100	2,200	0.24	0.45
		8	11,100	2,150	0.08	0.6	8,800	1,500	0.05	0.5	7,000	1,200	0.03	0.4	11,100	2,150	0.24	0.45
		10	11,100	2,000	0.07	0.6	8,800	1,350	0.05	0.5	7,000	1,100	0.03	0.4	11,100	2,000	0.24	0.45
		12	11,100	1,800	0.065	0.6	8,800	1,260	0.045	0.5	5,600	1,000	0.027	0.4	11,100	1,800	0.2	0.43
		16	9,600	1,500	0.05	0.5	7,700	1,050	0.04	0.35	4,800	840	0.01	0.2	9,600	1,500	0.15	0.39
		20	9,600	900	0.03	0.45	7,700	630	0.015	0.25	4,500	500	0.01	0.1	9,600	900	0.12	0.35
2.5	0.1 0.2 0.3 0.5	10	9,200	2,280	0.1	0.85	7,400	1,590	0.07	0.7	6,000	1,280	0.04	0.5	9,200	2,280	0.3	0.5
		20	8,300	1,580	0.08	0.6	6,600	1,110	0.05	0.4	4,000	900	0.01	0.2	8,300	1,580	0.24	0.43
3	0.1 0.2 0.3 0.5 1	8	9,000	3,000	0.18	0.9	7,500	1,800	0.08	0.8	6,000	1,600	0.05	0.65	10,000	2,800	0.36	0.55
		10	8,500	2,600	0.15	0.9	7,000	1,700	0.08	0.8	5,500	1500	0.05	0.65	9,000	2,600	0.36	0.55
		12	8,000	2,400	0.12	0.9	6,400	1,680	0.08	0.8	5,200	1,350	0.05	0.65	8,000	2,400	0.36	0.55
		16	79,000	2,300	0.11	0.8	6,300	1,500	0.07	0.7	4,000	1,200	0.04	0.5	7,900	2,200	0.035	0.5
		18	7,800	2,000	0.11	0.8	6,200	1,410	0.07	0.7	3,700	1,100	0.03	0.4	7,800	2,010	0.33	0.5
		20	7,700	1,850	0.1	0.8	6,200	1,250	0.06	0.6	3,600	1,000	0.03	0.3	7,700	1,850	0.3	0.5
4	0.1 0.2 0.3 0.5 1	8	8,000	3,000	0.18	1.6	6,000	2,000	0.1	1.4	5,000	1,800	0.08	1	8,000	3,000	0.6	0.8
		12	7,000	2,800	0.16	1.4	5,000	1,800	0.1	1.2	4,500	1,600	0.07	0.9	7,000	2,800	0.55	0.78
		16	6,000	2,520	0.15	1.2	4,800	1,770	0.1	1	4,000	1,400	0.06	0.8	6,000	2,520	0.45	0.75
		20	5,000	2,300	0.13	1	4,000	1,600	0.1	0.8	3,500	1,200	0.05	0.7	5,000	2,400	0.4	0.7

备注 Notes

※ 请根据实际的加工形状及使用机床等调整切削参数。
※ 切深量的ap表示轴向切入量，ae表示步距量。
※ 加工淬火钢时，建议使用油雾冷却方式。
※ 轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※ ℓ1(颈长)/D(刃径)超过8倍时，立面附近的进给速度须调整至50%以下，切深量：ae调整至30%以下。
※ 沟槽切削时建议参考切削参数表，切深量ap及进给速度设定为50%以下，采用来回切削加工方式。
※ 发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率调整。
※ Adjust milling conditions according to milling shape and machine type.
※ ap : Axial Depth of Cut, ae : Radial Depth of Cut.
※ Recommend to use oil mist coolant for machining hardened steels.
※ Recommend to apply herical or ramping for approaching into axial direction.
※ When ℓ1 (neck length)/D (blade diameter) exceeds 8 times, the feed speed near the facade shall be adjusted to less than 50%, and the cutting depth: ae shall be adjusted to less than 30%.
※ For slotting, recommend reciprocating milling by adjusting feed & ap in below 50% of recommended milling condition.
※ Reduce both spindle speed and feed at same rate for chattering and also for insu cient spindle speed of a machine.

调质钢材料加工用铣刀
Prehardened Steels For Machining Endmills

型号 Model	规格 Size	涂层 Coating	刃数 Number of Flute	螺旋角 Helix Angle	精加工分类 Types of Finishing	加工用途 Applications	可对应加工材料 Work Material	规格数量 Number of Sizes	页面 Page
调质钢材用4刃平底铣刀 Prehardened Steels 4-Flute Square Endmills									
	φ1~φ12	X5	4	35	半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 侧面 Side Cutting; 槽 Slotting; 刮模 Die-sinking; 螺旋 Helical; 锪孔 Spot Facing	○ ○ ○ ○ – – ○ – ○ ○ ○ – – –	31	B101
适用于从低速到高速的深沟精密3D形状加工 可以对应各种加工材料。 From low speed to high speed deep groove precision 3D shape machining can correspond to a variety of processing materials.									
调质钢材用2刃球头铣刀 Prehardened Steels 2-Flute Ball Endmills									
	R0.5~R5	X5	2	30	粗加工 Roughing; 半精加工 Semi Finishing; 精加工 Finishing	平面 Planing; 曲面 Profiling; R Radius; 清角 Best Material Machining	○ ○ ○ ○ – – ○ – ○ ○ ○ – – –	27	B103
适用于从低速到高速的精密3D形状加工。 Suitable for precision 3D shape machining from low speed to high speed.									
调质钢材用4刃圆鼻铣刀 Prehardened Steels 4-Flute Corner Radius Endmills									
	φ1xR0.05~ φ12xR1	X5	4	35	半精加工 Semi Finishing; 精加工 Finishing	侧面 Side Cutting; 曲面 Profiling; R Radius	○ ○ ○ ○ – – ○ – ○ ○ ○ – – –	68	B105
可同时进行直线与R角加工。 It can process straight line and R Angle at the same time.									

调质钢材用4刃平底铣刀
Prehardened Steels 4-Flute Square Endmills

4刃 · 平底铣刀 | 4-Flute · Square

Planing | Side Cutting | Slotting | Die-sinking | Helical | Spot Facing | Semi Finishing | Finishing | Cutting Conditions B102

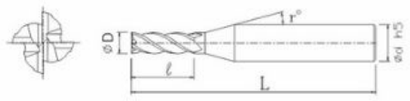
外径公差 Dia.Tolerance: 1≤D≤3：0~-0.01；4≤D≤12：0~-0.015

h5 0~-0.005

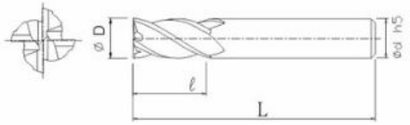
(mm)

超群的切屑排出性能，可实现高效率加工。
Excellent chip removal enables high efficiency.

TYPE A:



TYPE B:

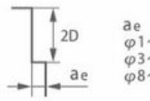
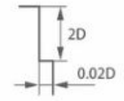
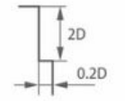


- 可广泛应用于从有色金属到钢材的不同材质。
- 可实现倾斜少的精加工。
- It can be cut from nonferrous to steels due to the sharp edges.
- Minimize tool deflection for accurate finishing.

硬质合金 | X5涂层 | 螺旋角加大

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	价格 Retail Price
X5E0104	1x3L	1	3	12°	4	50	A	
X5E0104L	1x4L	1	4	12°	4	50	A	
X5E0154	1.5x4.5L	1.5	4.5	12°	4	50	A	
X5E0204	2x6L	2	6	12°	4	50	A	
X5E02504	2.5x7L	2.5	7	12°	4	50	A	
X5E0304D3	3x8L	3	8	–	3	50	B	
X5E0304	3x8L	3	8	12°	4	50	A	
X5IE0304	3x8L	3	8	12°	4	75	A	
X5E0304D6	3x8L	3	8	12°	6	50	A	
X5E0404	4x11L	4	11	–	4	50	B	
X5IE0404	4x11L	4	11	–	4	75	B	
X5JE0404	4x11L	4	11	–	4	100	B	
X5E0404D6	4x11L	4	11	12°	6	50	A	
X5IE0404D6	4x11L	4	11	12°	6	75	A	
X5JE0404D6	4x11L	4	11	12°	6	75	A	
X5E0504	5x13L	5	13	12°	6	50	A	
X5IE0504	5x13L	5	13	12°	6	75	A	
X5JE0504	5x13L	5	13	12°	6	100	A	
X5E0604	6x16L	6	16	–	6	50	B	
X5E0604L	6x16L	6	16	–	6	60	B	
X5IE0604	6x16L	6	16	–	6	75	B	
X5JE0604	6x16L	6	16	–	6	100	B	
X5E0804	8x20L	8	20	–	8	60	B	
X5IE0804	8x20L	8	20	–	8	75	B	
X5JE0804	8x20L	8	20	–	8	100	B	
X5E1004	10x30L	10	30	–	10	75	B	
X5JE1004	10x30L	10	30	–	10	100	B	
X5XE1004	10x30L	10	30	–	10	150	B	
X5E1204	12x30L	12	30	–	12	75	B	
X5JE1204	12x30L	12	30	–	12	100	B	
X5XE1204	12x30L	12	30	–	12	150	B	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material	碳素钢 Carbon Steels S50C		合金钢 Alloy Steels SCM · SKD · SUS		调质钢 Prehardened Steels HPM · NAK		淬火钢 Hardened Steels SKD61 (~52HRC)		铜合金 Copper	
切削速度 Cutting Speed	45 ~ 75m/min		45 ~ 65m/min		35 ~ 55m/min		15 ~ 35m/min		55 ~ 75m/min	
外径 Dia.	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed
	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
1	19,100	290	17,500	210	14,300	170	8,000	100	20,700	380
1.5	12,700	290	11,700	210	9,500	170	5,300	100	13,800	420
2	9,500	290	8,800	240	7,200	210	4,000	100	10,300	470
2.5	7,600	350	7,000	260	5,700	210	3,200	110	8,300	500
3	6,400	390	5,800	260	4,800	230	2,700	110	6,900	530
4	4,800	480	4,400	310	3,600	260	2,000	140	5,200	610
5	3,800	510	3,500	360	2,900	320	1,600	140	4,100	630
6	3,200	540	2,900	390	2,400	360	1,300	140	3,400	630
8	2,400	480	2,200	370	1,800	340	1,000	140	2,600	580
10	1,900	440	1,800	360	1,400	310	800	140	2,100	540
12	1,600	440	1,500	360	1,200	290	700	140	1,700	490
切深量 Depth of Cut (D:刃 径Dia.)	侧面 Side Milling  ae φ1～2.5=0.07D φ3～6=0.15D φ8～12=0.2D						侧面 Side Milling 		侧面 Side Milling 	
备注 Notes	※请使用发烟性低的油冷冷却方式。 ※切削淬火钢时，建议使用油雾冷却方式。 ※仅限于侧面切削。 ※请以相同的比率调整主轴转速和进给速度。 ※加工参数会因切深量和机床刚性的状况而有所不同。请每次调整后再使用。 ※ Use cutting fluid with smoke retardant. ※ Recommend to use oil mist coolant for machining hardened steels. ※ Available only for side cutting. ※ Adjust both spindle speed and feed at the same rate. ※ Adjust milling conditions according to the volume of Depth of Cut and rigidity of the machine.									

调质钢材用2刃球头铣刀
Prehardened Steels 2-Flute Ball Endmills

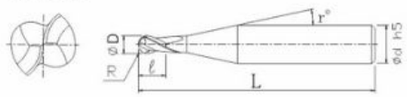
2刃 · 球头 | 2-Flute · Ball

平面 Planing | 曲面 Profiling | R Radius | 残料加工 Rest Material Machining | 粗加工 Roughing | 半精加工 Semi Finishing | 精加工 Finishing | 切削条件 B104 Cutting Conditions

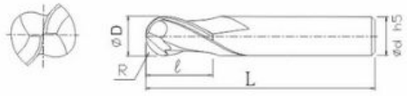
外径公差 Dia.Tolerance: 1≤D≤3: 0~- 0.01; 4≤D≤12: 0~- 0.015
R 公差 R Tolerance: ±0.005
h5: 0~-0.005
(mm)

超群的切屑排出性能，可实现高效率加工。
Excellent chip removal enables high efficiency.

TYPE A:



TYPE B:



- 适用于从低速到高速的精密3D形状加工。
- Suitable for precision three-dimensional cutting in the low to high speed range.

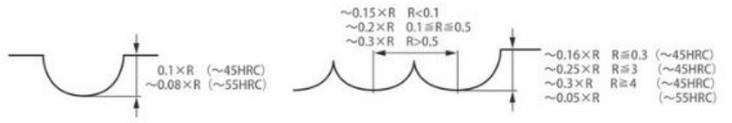
硬质合金 | X5涂层

产品代码 Code No.	规格型号 Spec Typ.	球头半径(R) Radius	刃长(ℓ) Length of Cut	外径(D) Dia.	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X5B0102	R0.5x2L	R0.5	2	1	12°	4	50	A	
X5B0152	R0.75x3L	R0.75	3	1.5	12°	4	50	A	
X5B0202	R1x4L	R1	4	2	12°	4	50	A	
X5B02502	R1.25x5L	R1.25	5	2.5	12°	4	50	A	
X5B0302D3	R1.5x6L	R1.5	6	3	-	3	50	B	
X5B0302	R1.5x6L	R1.5	6	3	12°	4	50	A	
X5IB0302	R1.5x6L	R1.5	6	3	12°	4	75	A	
X5B0302D6	R1.5x6L	R1.5	6	3	12°	6	60	A	
X5B03502	R1.75x7L	R1.75	7	3.5	12°	4	50	A	
X5B0402	R2x6L	R2	6	4	-	4	50	B	
X5IB0402	R2x6L	R2	6	4	-	4	75	B	
X5JB0402	R2x6L	R2	6	4	-	4	100	B	
X5B0402D6	R2x6L	R2	6	4	-	6	60	B	
X5B0502	R2.5x9L	R2.5	9	5	-	6	50	B	
X5B0602	R3x9L	R3	9	6	-	6	50	B	
X5B0602L	R3x9L	R3	9	6	-	6	60	B	
X5IB0602	R3x9L	R3	9	6	-	6	75	B	
X5JB0602	R3x9L	R3	9	6	-	6	100	B	
X5B0802	R4x12L	R4	12	8	-	8	60	B	
X5IB0802	R4x12L	R4	12	8	-	8	75	B	
X5JB0802	R4x12L	R4	12	8	-	8	100	B	
X5B1002	R5x15L	R5	15	10	-	10	75	B	
X5JB1002	R5x15L	R5	15	10	-	10	100	B	
X5XB1002	R5x15L	R5	15	10	-	10	150	B	
X5B1202	R6x18L	R6	18	12	-	12	75	B	
X5JB1202	R6x18L	R6	18	12	-	12	100	B	
X5XB1202	R6x18L	R6	18	12	-	12	150	B	

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material	碳素钢 Carbon Steels S50C		合金钢 · 调质钢 Alloy Steels Prehardened Steels SCM · SKD · SUS · HPM · NAK		淬火钢 Hardened Steels SKD61 (~ 52HRC)		铝合金 Aluminum Alloy		铜合金 Copper	
切削速度 Cutting Speed	150m/min		120 ~ 150m/min		80 ~ 100m/min		150m/min ~		100 ~ 150m/min	
球头半径(R) Radius	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed
	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
0.5	48,000	1,430	38,000	1,200	29,000	900	50,000	1,250	48,000	1,000
0.75	35,000	1,350	34,000	1,100	26,000	830	50,000	1,690	35,000	1,120
1	24,000	1,160	19,000	800	14,300	600	48,000	2,400	24,000	1,200
1.25	20,000	1,000	16,000	700	11,000	500	40,000	2,400	20,000	1,200
1.5	16,000	930	13,000	600	9,600	460	32,000	2,400	16,000	1,200
1.75	14,000	930	12,500	580	8,000	455	28,000	2,400	14,000	1,200
2	12,000	930	10,000	570	7,200	450	24,000	2,400	12,000	1,200
2.5	9,600	930	8,000	560	5,700	450	19,000	2,400	9,600	1,200
3	8,000	930	6,400	540	4,800	450	16,000	2,400	8,000	1,200
4	6,000	900	4,800	540	3,600	450	12,000	2,400	6,000	1,200
5	4,800	900	3,800	540	2,900	450	9,600	2,300	4,800	1,150
6	4,000	900	3,200	540	2,400	450	8,000	2,100	4,000	1,050

切深量 Depth of Cut (R : 球头半径 Radius)



备注 Notes

※沟槽加工时，请将进给速度调为上述参数的60%。
※刀具伸出量请以4D为标准，伸出量超出该标准时请调整切削参数。
※建议使用吹气或油雾冷却方式。
※请以相同的比率调整主轴转速和进给速度。
※ When slotting, reduce the feed by 60% from the above values.
※ Length of overhang is 4 times Dia. as standard. When it is longer than 4 times Dia., adjust the conditions listed above.
※ Recommended airblow or oil mist.
※ Adjust both spindle speed and feed at the same rate.

调质钢材用4刃圆鼻铣刀
Prehardened Steels 4-Flute Corner Radius Endmills

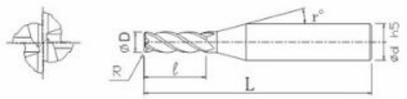
4刃 · 带R角 | 4-Flute·Corner Radius

Side Cutting | Profiling | Radius | Semi Finishing | Finishing | Cutting Conditions B107

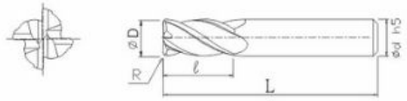
外径公差 Dia.tolerance: 1≤D≤3: 0~- 0.01; 4≤D≤12: 0~- 0.015
r 公差 r tolerance: ±0.005
h5: 0~-0.005
(mm)

超群的切屑排出性能，可实现高效率加工。
Excellent chip removal enables high efficiency.

TYPE A:



TYPE B:



- 可同时进行直线与R角加工。
- It is possible to cut both straight and corner radius simultaneously.

硬质合金 | X5涂层 | R倒角 | 螺旋角可变 | 4

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X5R01005	1R0.05x3L	1	R0.05	3	12°	4	50	A	
X5R01005L	1R0.05x4L	1	R0.05	4	12°	4	50	A	
X5R0101	1R0.1x3L	1	R0.1	3	12°	4	50	A	
X5R0101L	1R0.1x4L	1	R0.1	4	12°	4	50	A	
X5R0102	1R0.2x3L	1	R0.2	3	12°	4	50	A	
X5R0102L	1R0.2x4L	1	R0.2	4	12°	4	50	A	
X5R01501	1.5R0.1x4.5L	1.5	R0.1	4.5	12°	4	50	A	
X5R01502	1.5R0.2x4.5L	1.5	R0.2	4.5	12°	4	50	A	
X5R01503	1.5R0.3x4.5L	1.5	R0.3	4.5	12°	4	50	A	
X5R01505	1.5R0.5x4.5L	1.5	R0.5	4.5	12°	4	50	A	
X5R02005	2R0.05x6L	2	R0.05	6	12°	4	50	A	
X5R0201	2R0.1x6L	2	R0.1	6	12°	4	50	A	
X5R0202	2R0.2x6L	2	R0.2	6	12°	4	50	A	
X5R0205	2R0.5x6L	2	R0.5	6	12°	4	50	A	
X5R0301D3	3R0.1x8L	3	R0.1	8	-	3	50	B	
X5R0301	3R0.1x8L	3	R0.1	8	12°	4	50	A	
X5R0302D3	3R0.2x8L	3	R0.2	8	-	3	50	B	
X5R0302	3R0.2x8L	3	R0.2	8	12°	4	50	A	
X5R0303D3	3R0.3x8L	3	R0.3	8	-	3	50	B	
X5R0303	3R0.3x8L	3	R0.3	8	12°	4	50	A	
X5R0305	3R0.5x8L	3	R0.5	8	12°	4	50	A	
X5R0305D3	3R0.5x8L	3	R0.5	8	-	3	50	B	
X5R0402	4R0.2x10L	4	R0.2	10	-	4	50	B	
X5IR0402	4R0.2x10L	4	R0.2	10	-	4	75	B	
X5R0403	4R0.3x10L	4	R0.3	10	-	4	50	B	
X5IR0403	4R0.3x10L	4	R0.3	10	-	4	75	B	
X5R0405	4R0.5x10L	4	R0.5	10	-	4	50	B	
X5IR0405	4R0.5x10L	4	R0.5	10	-	4	75	B	
X5R0410	4R1x10L	4	R1	10	-	4	50	B	
X5IR0410	4R1x10L	4	R1	10	-	4	75	B	
X5R0502	5R0.2x12L	5	R0.2	12	12°	6	50	A	

Sduare & Radius 平头 · 圆弧
X5 调质钢材 X5 Prehardened Steels
调质钢材用4刃圆鼻铣刀
Prehardened Steels 4-Flute Corner Radius Endmills

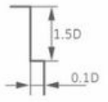
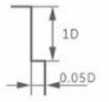
硬质合金 | X5涂层 | R倒角 | 螺旋角可变 | 4

产品代码 Code No.	规格型号 Spec Typ.	外径(D) Dia.	角半径(R) Corner Radius	刃长(ℓ) Length of Cut	颈角(r) Neck Taper Angle	柄径(d) Shank Dia.	全长(L) Overall Length	形状 Type	定价 Retail Price
X5R0601	6R0.1x15L	6	R0.1	15	-	6	50	B	
X5R0601L	6R0.1x15L	6	R0.1	15	-	6	60	B	
X5IR0601	6R0.1x15L	6	R0.1	15	-	6	75	B	
X5JR0601	6R0.1x15L	6	R0.1	15	-	6	100	B	
X5R0602	6R0.2x15L	6	R0.2	15	-	6	50	B	
X5R0602L	6R0.2x15L	6	R0.2	15	-	6	60	B	
X5IR0602	6R0.2x15L	6	R0.2	15	-	6	75	B	
X5JR0602	6R0.2x15L	6	R0.2	15	-	6	100	B	
X5R0605	6R0.5x15L	6	R0.5	15	-	6	50	B	
X5R0605L	6R0.5x15L	6	R0.5	15	-	6	60	B	
X5IR0605	6R0.5x15L	6	R0.5	15	-	6	75	B	
X5JR0605	6R0.5x15L	6	R0.5	15	-	6	100	B	
X5R0610	6R1x15L	6	R1	15	-	6	50	B	
X5R0610L	6R1x15L	6	R1	15	-	6	60	B	
X5IR0610	6R1x15L	6	R1	15	-	6	75	B	
X5JR0610	6R1x15L	6	R1	15	-	6	100	B	
X5R0802	8R0.2x20L	8	R0.2	20	-	8	60	B	
X5IR0802	8R0.2x20L	8	R0.2	20	-	8	75	B	
X5JR0802	8R0.2x20L	8	R0.2	20	-	8	100	B	
X5R0805	8R0.5x20L	8	R0.5	20	-	8	60	B	
X5IR0805	8R0.5x20L	8	R0.5	20	-	8	75	B	
X5JR0805	8R0.5x20L	8	R0.5	20	-	8	100	B	
X5R0810	8R1x20L	8	R1	20	-	8	60	B	
X5IR0810	8R1x20L	8	R1	20	-	8	75	B	
X5JR0810	8R1x20L	8	R1	20	-	8	100	B	
X5R1005	10R0.5x20L	10	R0.5	20	-	10	75	B	
X5JR1005	10R0.5x20L	10	R0.5	20	-	10	100	B	
X5XR1005	10R0.5x20L	10	R0.5	20	-	10	150	B	
X5R1010	10R1x20L	10	R1	20	-	10	75	B	
X5JR1010	10R1x20L	10	R1	20	-	10	100	B	
X5XR1010	10R1x20L	10	R1	20	-	10	150	B	
X5R1205	12R0.5x24L	12	R0.5	24	-	12	75	B	
X5IR1205	12R0.5x24L	12	R0.5	24	-	12	100	B	
X5XR1205	12R0.5x24L	12	R0.5	24	-	12	150	B	
X5R1210	12R1x24L	12	R1	24	-	12	75	B	
X5IR1210	12R1x24L	12	R1	24	-	12	100	B	
X5XR1210	12R1x24L	12	R1	24	-	12	150	B	

平头 · 圆弧 Sduare & Radius

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material	碳素钢 Carbon Steels S50C		合金钢 Alloy Steels SCM · SKD · SUS		调质钢 Prehardened Steels HPM · NAK		淬火钢 Hardened Steels SKD61 (~52HRC)	
切削速度 Cutting Speed	60 ~ 80m/min		50 ~ 70m/min		30 ~ 50m/min		20 ~ 30m/min	
外径 Dia.	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed	主轴转速 Spindle Speed	进给速度 Feed
	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
1	25,000	3000	19,100	220	12,800	120	6,400	60
1.5	17,100	510	12,700	3700	8,500	130	4,300	65
2	12,800	600	9,500	430	6,400	160	3,200	80
3	8,500	670	6,400	500	4,300	180	2,200	90
4	6,400	760	4,800	570	3,200	200	1,600	90
5	5,100	760	3,800	570	2,600	260	1,300	120
6	4,300	780	3,200	580	2,200	380	1,100	160
8	3,200	780	2,400	580	1,600	380	800	160
10	2,600	780	1,900	580	1,300	380	650	160
12	2,100	780	1,600	580	1,100	380	530	160

切深量 Depth of Cut (D:刃 径Dia.)	侧面 Side Milling	侧面 Side Milling
		

备注 Notes
※请根据加工面的倾斜角调整进给速度。 ※在进行R角加工时，进给速度须降低30~50%。 ※转速无法提高时，请以相同的比率调整进给速度与切深量。 ※ Adjust feed according to inclined angle. ※ When corner machining, reduce the feed by approximately 50%~30%。 ※ Adjust spindle speed and feed at the same rate also reduce Depth of Cut, if the mahine spindle speed insufficient.

什么是铣刀?
What is End mill ?

什么是切削刀具? What is Cutting tool?

切削刀具除了使用铣刀进行铣削加工外，还包括使用刀盘和钻头进行铣削加工、使用车刀进行车削加工、使用钻床配合钻头进行钻孔加工、使用滚刀和拉床进行齿轮加工等。
Cutting tools generally indude milling tools, end mills, cutters and drills, turning tools, drilling tools, gear hob cutters and etc.

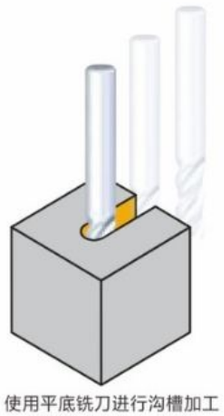


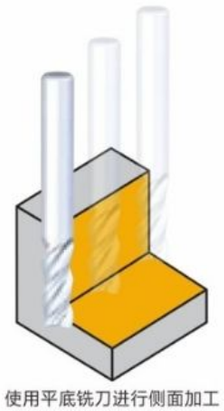
什么是铣刀? What is end mill?

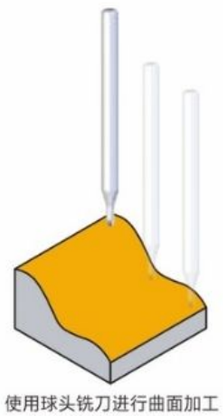
铣刀类似于钻头，支持多种切削加工，广泛应用于各种工业产品的生产。在尺寸上来说直径约可达到30mm左右，但随着工业制品的发展，在6mm以下的微细加工中小径铣刀的利用率不断升高。
此外，铣刀材质丰富多样，从高速钢(SKH)到硬质合金、陶瓷，以及在硬质合金母材上焊接CBN.PCD的材质，具有多种切削性能。

End mill is similar to drill that supports variety of cutting processes, and is used to produce many industrial products. Thebiggest dimension is up to about ϕ 30mm. Recently, with the development of Japanese industrial products, the smalldiameter end mill that under ϕ6mm is becoming popular. Furthermore, the materials of end mill are getting various fromhigh speed steel to cemented carbide, ceramics, and even CBN, PCD brazed on cemented carbide.



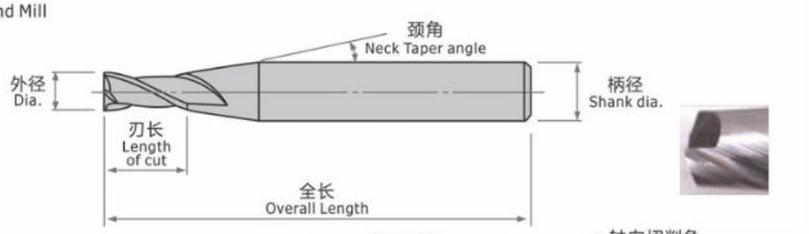

使用平底铣刀进行沟槽加工
Slotting by square end mill

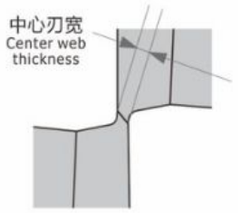

使用平底铣刀进行侧面加工
Side milling by square end mill

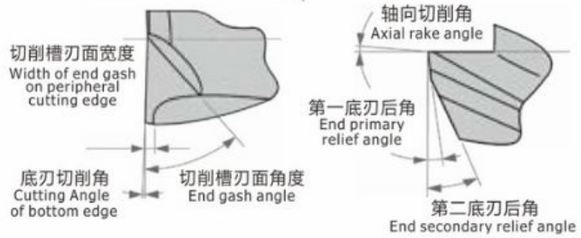

使用球头铣刀进行曲面加工
3D milling by ball end mill

铣刀各部分的名称
Name of parts for End mill

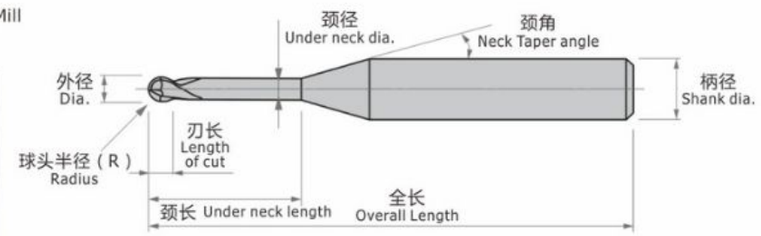
■ 平底铣刀 Square End Mill

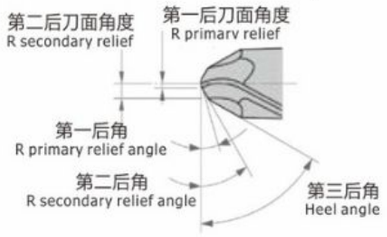




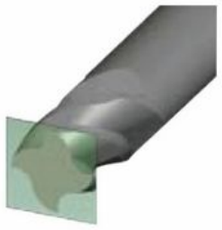


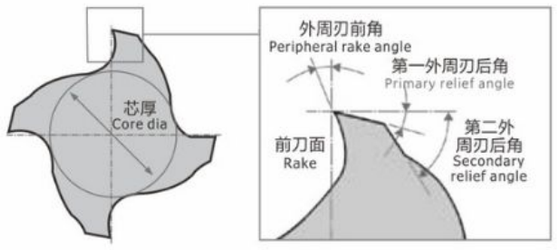
■ 球头铣刀 Ball End Mill





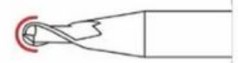
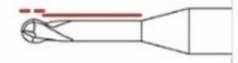
■ 外周刃(4刃铣刀截面) Peripheral cutting edge (Cross section of 4-flute end mill)





铣刀的种类
Type of End mill

■ 铣刀的外周刃和底刃的形状 Type of peripheral and endcuting edge

刀刃的形状 The shape of the bottom edge	平底 Square		方角铣刀 Long Neck
	球头 Ball		带球状底刃的铣刀 Ball end cutting edge
	圆鼻 Corner Radius		圆角铣刀 Square end cutting edge
外周刃的形状 The shape of the peripheral edge	直刃 Straight		圆筒状外周刃 Cylindrical peripheral cutting edge
	长颈 Long Neck		颈径小于外径的形状 Thinner neck diameter than end diameter

■ 盛弘刀具的铣刀形状分类 Shapes of HONGMAOSHENGOUDAO TOOL's end mill

平底铣刀
Square End Mill

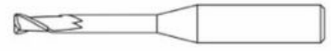
圆鼻铣刀
Corner R adius End Mill

长颈平底铣刀
Long Neck square End Mill

长颈球头铣刀
Long Neck Ball End Mill

球头铣刀
Ball End Mill

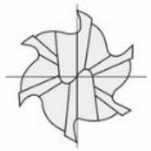
长颈圆鼻铣刀
Long Neck Corner Radius End Mill



铣刀刃数的区别
Differences on number of flute

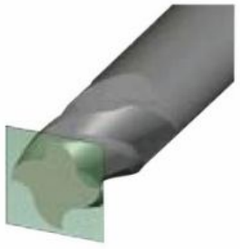
铣刀的刃数 Number Of Flute

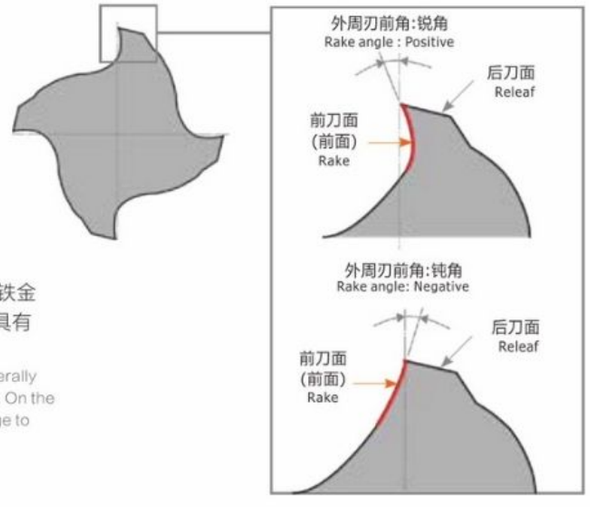
根据铣刀用途选择刃数非常重要。下面对各种刃数的优缺点及其用途进行介绍。
It is important to choose the number of flute of the end mill according to the usage. Introduction of the advantages,disadvantages, and usage of each number of flute are as below.

					
		2刃 2-Flute	3刃 3-Flute	4刃 4-Flute	6刃 6-Flute
特点 Features	优点 Advantage	排屑良好 Well chip removal	排屑良好 Well chip removal	刀具刚性高 High tool rigidity	刀具刚性高 High tool rigidity
	缺点 Disadvantage	刀具刚性低 Low tool rigidity	难以测量外径 Difficult to measure dia.	排屑不畅 Low chip removal	排屑不畅 Low chip removal
用途 Usage		通用 For General use	沟槽和侧面 Slotting & Side milling	侧面 Side milling	侧面 Side milling

铣刀的前角 Rake angle at peripheral cutting edge

铣刀的前角因用途而异，主要取决于加工材料
Variety of rake angles to support different cutting materials.





前角为锐角造型的铣刀注重锋利度,一般适用于非铁金属和低硬度的加工材料。前角为钝角造型的铣刀具有高强度刀刃,适用于高硬度钢等材料。
End mill with positive rake angle has a sharp flute that generally compatible with nonferrous metals and low hard materials. On the other hand, the negative rake angle has strong cutting edge to support high hard materials machining.

铣刀的切削参数(1)
Explanation on Milling Conditions (1)

切削速度、主轴转速、进给速度的计算方法 Calculation for Cutting Speed, Spindle Speed and Feed

切削速度 Cutting Speed	VC (m/min)	=	$\frac{\text{丌（圆周率3.14）} \times \text{D（外径mm）} \times \text{n（主轴转速min}^{-1}\text{）}}{1{,}000}$
主轴转速 Spindle Speed	n (min^{-1})	=	VC÷丌÷D ×1,000
进给速度 Feed	vf (mm/min)	=	n × fz × Z（刃数）
每刃进给量 Feed per Tooth	fz (mm/tooth)	=	$\frac{Vf}{n \times Z\text{（刃数）}}$
切削排出量 Metal Removal Rate	Q (cm^3/min)	=	$\frac{ap \times ae \times vf}{1{,}000}$
理论表明粗糙度 ※平坦部 Theoretical Surface Finish ※Plane	h (μm)	=	ae2 × 1,000 ÷ 8R

ap：轴向深切量（mm）Axial depth of cut
ae：径向深切量（mm）Radial depth of cut
vf：进给速度（mm/min）Feed
ae：径向深切量（mm）Radial depth of cut
R：球头半径（mm）Feed

使用的设备主轴不满足切削参数表的转速时...
利用下述的计算式以相同的比率降低主轴转速和进给速度后使用。
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.

- 根据所使用的主轴转速[n]与切削参数表的主轴转速[n1]计算比率[α]。
  Rate (α)is calculated by chosen Spindle Speed (n) and Recommended Spindle Speed (n1).

$$n(\text{min}^{-1}) \div n1(\text{min}^{-1}) = \alpha$$

比例
Rate

- 将上述比率[α]乘以切削参数表的进给速度[Vf1],求取实际加工时的进给速度[Vf]。
  Obtain Feed (Vf) for actual machining by dividing Recommended Feed (Vf1)from Rate(α).

$$Vf\ 1\ (\text{mm/min}) \times \alpha = Vf\ (\text{mm/min})$$

实际加工时的进给速度
Feed for actual machining

铣刀的切削参数(1)
Explanation on Milling Conditions (1)

切削速度(Vc) Cutting Speed (Vc)

切削速度会因铣刀的材质、刃径、刃长、有效长、加工材料、使用设备、刀柄刚性、加工形状、精度、切削油等不同而存在差异，大致可参考铣刀的材质和加工材料的种类如表1所示。

Appropriate Cutting Speed should be decided by parameters such as tool material, diameter, length of cut, work material,cutting machine, rigidity of tool holder, machining configuration, accuracy, cutting fluid, and etC.Generally tool material and work material are main factors to determine the Cutting Speed.

表 1　切削速度
Table 1. Cutting Speed

加工材料 Work Materials	切削速度[m/min] Cutting Speed (m/min)	
	钨钢铣刀 Solid Carbide Tool	涂层钨钢铣刀 Coated Carbide Tool
碳素钢(S50C等) Carbon Steels	30~60	60~100
合金钢(SCM, SKD等) Alloy Steels	30~40	60~100
调质钢(NAK, HPM等) Prehardened Steels	30~40	60~100
不锈钢(SUS304等) Stainless Steels	20~30	40~80
淬火钢 (SKD61, STAVAX等45~60HRC) Hardened Steels	-	20~100

每刃进给量　fz(mm/Tooth) Feed per Tooth (fz)

进给速度在考虑加工效率时是重要的因素之一，虽然决定其进给速度的每刃进给量因铣刀的刃径、形状、加工材料、使用设备、刀柄刚性、加工形状、精度、切深量不同而存在差异，短刃型铣刀的刃径和刀刃数的大致参考标准如表2所示。

Feed per Tooth is an important element for efficient machining which should be determined by parameters such as tooldiameter, type, work material, cutting machine, rigidity of tool holder, machining configuration, accuracy and cutting depth.Table 2 is a guideline of Feed per Tooth for short flute end mills.

表2每刃进给量
Table 2. Feed per Tooth

刃径[mm] Dia. (mm)	每刃进给量[mm/tooth] Feed per Tooth(mm/tooth)	
	2刃 2-Flutes	4刃 4-Flutes
1	0.001 ~ 0.005	
6	0.02 ~ 0.04	0.01 ~ 0.03
10	0.04 ~ 0.08	0.03 ~ 0.06
20	0.08~0.12	0.06~ 0.1

参考上述的切削速度和每刃进给量，考虑切削相关的所有因素-加工形状、精度、使用设备、刀柄刚性等,来决定主轴转速和进给速度。

Referring above parameters of Cutting Speed and Feed per Tooth, both Spindle Speed and Feed are calculated considering all other related factors as well.

铣刀的切削参数(2)
Explanation on Milling Conditions (2)

切屑排出量　Q (cm^3 /min) Metal RemovalRate

铣床的单位时间（1分钟）内所生成的的切屑排出量按照以下公式进行计算。

Metal removal rate (the volume of metal removed in cubic mm per minute) is calculated by the following formula.

$$Q = \frac{ap \times ae \times Vf}{1{,}000}$$

Q :切屑排出量(cm3/min)
ap :步距量(mm)
Q : Metal removal rate (cm3/min)
ae : Radial depth of cut (mm)

ae :轴向切入量(mm)
vf :进给速度(mm/min)
ap : Axial depth of cut (mm)
Vf : Feed (mm/min)

基于球头铣刀的球头半径(R)和步距(ae)的尖点高度(理论表面粗糙度) all end mill and pick feed (ae) (theoretical surface finish)

球头铣刀加工中，如下图所示，依球头半径和步距而形成的切削剩余部分的高度被称为尖点高度或者残留高度，该高度可以作为理论，上的表面粗糙度进行考量。进行平坦部分的表面加工时,由于步距与步距量ae相同，按照以下的公式进行计算。

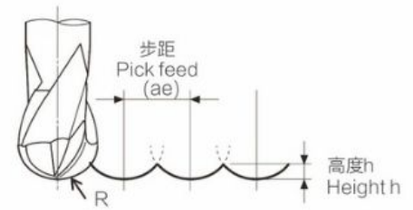
In ball end mill milling, height h of the unmachined part like mountain shape below be formed by ball radius and pick feed,which are called cusp height or scallop height and which is considered theoretical surface finish. Since pick feed is the same ae radial depth of cut at the milling in flat part, it is calculated by the following formula.

$$h = \left(R - \sqrt{R^2 - \left(\frac{ae}{2}\right)}\right) \times 1000 \fallingdotseq ae^2 \times 1000 \div 8R$$

h:尖点高度(μm)
h: Cusp height (μm)

R:球头半径(mm)
R : Radius (mm)

ae :步距量(mm)
ae : Radial depth of cut (mm)



尖点高度-览表　Cusp Height Quick Reference Matrix

单位Unit : μm

球头半径R Radius	步距量ae[mm] Radial depth of cut ae [mm]										
0.005	0.01	0.02	0.03	0.04	0.05	0.08	0.01	0.15	0.2	0.3
0.05	0.06	0.25	1.01	2.30	-	-	-	-	-	-	-
0.1	0.03	0.13	0.50	1.13	2.02	3.18	-	-	-	-	-
0.3	0.01	0.04	0.17	0.38	0.67	1.04	2.68	4.20	-	-	-
0.5	0.01以下	0.03	0.10	0.23	0.40	0.63	1.60	2.51	5.66	-	-
0.75	-	0.02	0.07	0.15	0.27	0.42	1.07	1.67	3.76	6.70	-
1	-	0.01	0.05	0.11	0.20	0.31	0.80	1.25	2.82	5.01	-
1.5	-	0.01以下	0.03	0.08	0.13	0.21	0.53	0.83	1.88	3.34	7.52
2	-	-	0.03	0.06	0.10	0.16	0.40	0.63	1.41	2.50	5.63
2.5	-	-	0.02	0.05	0.08	0.13	0.32	0.50	1.13	2.00	4.50
3	-	-	0.02	0.04	0.07	0.10	0.27	0.42	0.94	1.67	3.75

※上表是使用球头铣刀对平坦部进行精加工时根据步距量ae求得的理论值。

※In finishing in flat part, the above values in the table are theoretical values by the radial depth of cut (ae).

刃数选择标准 Selection of Number of Flute

	2刃 2-Flutes	3刃 3-Flutes	4刃 4-Flutes	6刃 6-Flutes
侧面加工 Side Milling	◎	◎	○	×
沟槽加工 Slotting	○	◎	◎	◎

通常, 2刃及3刃排屑槽比较大适合用于沟槽加工。
侧面加工时，因无需担心切屑的堆积，使用4刃及6刃等多刀刃的刀具效果更佳。

Generally 2-flutes and 3-flutes are selected for slotting because of the larger chip pocket.
4-flutes and 6-flutes are recommended for side milling as no problem of chip disposal.

螺旋角选择标准 Selection of Helix Angle

		30°螺旋角 Helix 30°	35°螺旋角 Helix 35°	45°螺旋角 Helix 45°
锋利度Shearing ability		○	◎	◎
抑制振刀效果Chatter resistance		○	◎	◎
表面粗糙度Surface roughness		○	◎	◎
加工面倾斜量Inclination		◎	◎	○
加工面起伏量Wave		◎	◎	○
用途 Application	沟槽加工Slotting	◎	○	△
	侧面加工Side milling	◎	◎	◎
	淬火材料Hardened stees	△	○	◎

技术资料 Technical Guidance

铣刀的切削参数(2)
Explanation on Milling Conditions (2)

※备注 Remarks

● **30° 螺旋角 Helix 30°**

可支持沟槽和侧面加工的通用型。
Recommendable for both slotting and side milling.

● **35° 螺旋角、40° 螺旋角、45° 螺旋角 Helix 35"°, Helix 40°, Helix 45°**

根据加工表面所需的倾斜程度和起伏量进行选择。
螺旋角越大，锋利度越好，振刀也越少，还能加大刀刃的长度。

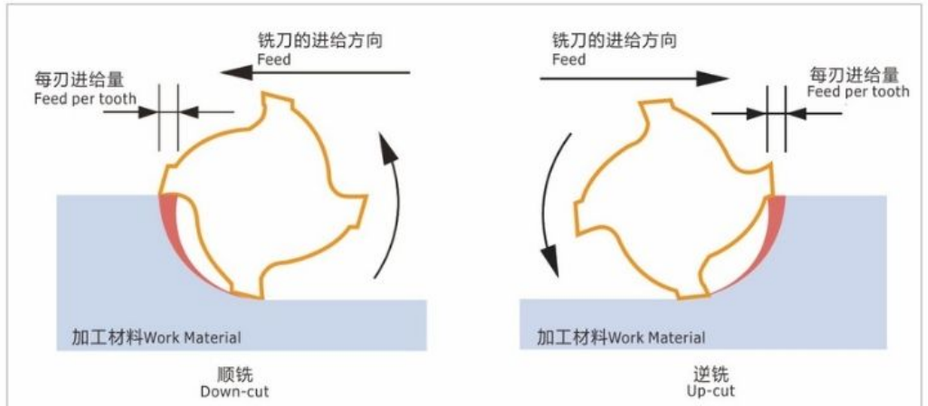
Selectable within the required tolerance.
As larger angle gives higher shearing ability and reduce chattering, it is possible to relatively prolong the length of cut.

● **45° 螺旋角 Helix 45°**

对淬火钢及难削材的加工有效。
Suitable for machining for hardened steels and tough materials.

■ **切削方向(逆铣与顺铣) Cuting Direction (Upcut and Down-cut)**

逆铣与顺铣的切削机构图 Cutting structure of Up-cut and Down-cut



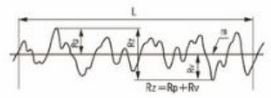
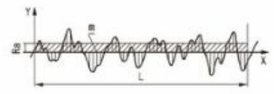
不同切削方向的刀具磨损量比较图片 Diference of edge wear by utting diretions

(对S50C进行50m切削加工后的状态After cutting of 50m, S50C)

顺铣是从厚进刀缓缓切薄,若是逆铣则按照相反的方向进行切削加工。从图片上也可得知，一般情况下，顺铣时刀具的损耗少，使用寿命长。

Down-cut tooth first cuts thicker then progressively thinner, while Up-cut goes the opposite. As shown by above photos, Down-cut is recommended since the wear of cutting edge is comparatively small and tool life is eventually longer.

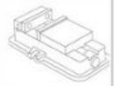
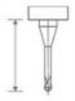
各种表面粗糙度的计算方法(JIS B 0601-2001)
Measurement and Symbol of Surface Roughness (Extrac from JIS B 0601 -2001)

种类 Type	符号 Symbol	计算方法 Description	说明图 Reference chart
最高值 Maximum Height of the Profile Profile	Rz	在粗糙度曲线上，沿着平均线方向截取一段基准长度，然后在所截取的基准长度范围内，沿着粗糙度曲线的纵向倍率方向测量从峰顶到谷底的间隔。该间隔的值就是粗糙度的最高值，单位为μm。截取基准长度时，如果峰顶及谷底的值大得过于极端，则可视为伤痕,不能截取。 The maximum height of the profile is the distancebetween the maximum peak height and the maximum valley depth from the mean line in each sampling length. Rz (SO/JIS) is the mean value of the maximum peak-to-valley heights in the evaluation length.	
平均值 Arithmetic Mean Deviation of the	Ra	在粗糙度曲线上,沿着平均线方向截取一段基准长度，然后将所截取部分的平均线方向定为x轴，将纵向倍率方向定为y轴，当粗糙度曲线以y=f(X)表示时,按照右图中所述的换算公式所求得的值就是平均值，单位为μm。 The arithmetic mean deviation of the profile is the arithmetic mean of the absolute values of distances from the mean line to the profile.	 $Ra=\frac{1}{L}\int_0^L \lvert f(x)\rvert\, dx$ L =基准长度 Evaluation Length

最高值Rz的区分值 Value of Maximum Height of the Profile	平均值Ra的区分值 Value of Arithmetic Mean Deviation of the Profile	传统的三角符号 Finishing Symbol	表面特征的属性(Ra示例时) Indication of surface texture in technical product documentation
0.05S 0.1S 0.2S 0.3S 0.5S	0.012a 0.025a 0.05a 0.1a 0.2a	▼▼▼▼	Ra 0.012 ~ Ra 0.2
1.6S 3.2S 6.3S	0.4a 0.8a 1.6a	▼▼▼	Ra 0.4 ~ Ra 1.6
12.5S 25S	3.2a 6.3a	▼▼	Ra 3.2 ~ Ra 6.2
50S 100S	12.5a 25a	▼	Ra 12.5 ~ Ra 25

※Ra、Rz与三角符号的相互关系，只是为了方便参考，并无严密性。
※Note: Triangle Finishing Symbol Mark presents approximate surface roughness specified by Ra and Rz.

铣刀加工时的要点
Factors for End Mill Operation

要点 Factor	注意事项 Instruction and Advice
机床刚性 Rigidity of Machine 	①尽可能用高刚性的设备进行加工。 Use a rigid machine. ②刚性不足时，调整切深量及切削参数。 Adjust cutting conditions according to the rigidity of machine.
夹具和铣刀的偏摆 Collet Chuck and Runout of End Mill 	①请使用高刚性高精度铣刀刀柄。 Use a rigid and precise collet chuck. ②上刀时，尽量将刀具的偏摆控制到最小。 Minimize the run out of end mill.
工件夹钳 work Clamp 	①工件夹具必须固定牢固。 Work piece must be firmly clamped. ②无法改善夹持状态时，调整切深量等切削参数。 In case work piece cannot be firmly clamped, relieve cutting condition.
切削油和切屑的处理 Cutting Fluid and Chips 	①使用的切削油量须够充足。 Give a sufficient cutting fluid. ②重切削时，推荐使用水溶性切削油。 Recommend water soluble fluid for heavy cutting. ③请注意部分产品为干式切削专用。 Some end mills apply dry cutting only. ④干式切削请使用吹气冷却方式。 Use air blow for dry cutting. ⑤应避免切屑妨碍切削油供应或切削加工。 Remove chips from working area.
铣刀种类的选择 Selection of End Mill 	①请根据不同的加工工件和加工形状，选择适合的铣刀。 Most suitable end mills according to work material and dimension. ②请参照卷头的索引。 Refer to the index table on front page.
切削参数 Cutting Conditions vc vf ap ae	①请参阅切削参数参考表。 Refer to recommended milling condition table. ②请根据设备的刚性和工件的夹持状态，调整切削参数。 It is necessary to adjust conditions according to the machine rigidity and clamping condition of work material.
铣刀的伸出量 Overhang of End Millfrom Tool Holder 	①在不造成干涉的情况下，请尽量减少刀具的伸出量。 Overhang of end mill must be as short as possible from tool holder. ②当刀具伸出量过长时，请调整切深量及进给速度等切削参数。 In case overhang cannot be shorten, relieve cutting condition .

铣刀加工时所遇到问题与解决方案
Hardened Steels For Machining Endmills

问题现象 Symptoms of troubles	原因 Cause	建议措施 Solution
切削时的振刀 Chattering 	主轴转速太快。 进给速度太快。 有效长超出需要，伸出量太长。 加工工件夹持力不足。 切削刀刃磨耗过大。 刀具偏摆精度不足。 Excessive spindle speed. Excessive feed. Excessive long of effective length or overhang of end mill. Work material is not firmly clamped. Wear of cutting edge progressed. Excessive chucking runout.	降低主轴转速。 降低进给速度。 有效长和伸出量请调整到最低限度。 牢固固定加工工件。 使用新的刀具或者进行返修。 调整刀具偏摆精度。 Reduce spindle spee. Reduce feed. Adjust effective length and overhang as short as possible. Clamp work material firmly. Use new end mill or regrind. Adjust chucking runout.
切削时的折损 Breakage of End Mill 	切深量太大。 切屑堵塞。 每刃进给量太大。 切削刀刃磨耗过大。 Excessive depth of cut. Chips clogged Excessive feed per tooth. Wear of cutting edge progressed.	降低切深量。 调整冷却液的对准方向，使切屑排出顺利。 降低每刃进给量。 使用新的刀具或者进行返修。 Reduce depth of cut. Adjust coolant nozzle to right direction to dispose chips. Reduce feed per toot. Use new end mill or regrind.
切削中的崩刃(微小欠角) Chipping of Cutting Edge 	切深量太大。 进给速度太快。 加工工件夹持力不足。 主轴转速太快。 有效长超出需要，伸出量太长。 切削刀刃磨耗过大。 产生积屑瘤。 切削时的急冷所造成的损伤。 Excessive depth of cut. Excessive feed. Work material is not firmly clamped. Excessive spindle speed. Excessive long of effective length or overhang of end mill. Wear of cutting edge progressed. Built up edge. Excessive cooling.	降低切深量。 降低进给速度。 牢固固定加工工件。 降低主轴转速。 有效长和伸出量请调整到最低限度。 使用新的刀具或者进行返修。 使用最合适的涂层刀具。 使用吹气冷却或者油雾冷却方式。 Reduce depth of cut. Reduce feed. Clamp work material firmly. Reduce spindle speed. Adjust effective length and overhang as short as possible. Use new end mill or regrind. Choose appropriate coating. Use air blow or oil mist.
切削刃的异常磨损 Abnormal ear 	主轴转速太快。 Excessive spindle speed 进给速度太慢。 Too low feed	降低主轴转速。 Reduce spindle speed 调高进给速度。 Increase feed
切屑堵塞、熔敷 Clogging and Depositing 	排屑不畅。 进给速度太快。 切深量太大。 刀具刃数过多。 切削刀刃磨耗过大。 Chips are not well disposed Excessive feed Excessive depth of cut Inappropriate number of flute Wear of cutting edge progressed	调整冷却液的对准方向，使切屑排出顺利。 降低进给速度。 降低切深量。 选用刃数较少的刀具。 使用新的刀具或者进行返修。 Adjust coolant nozzle to right direction to dispose chips。 Reduce feed Reduce depth of cut Use fewer flutes end mill Use new end mill or regrind
切削时的倾倒 Deflection of End Mill 	进给速度太快。 切深量太大。 有效长超出需要，伸出量太长。 所使用刀具的螺旋角过大。 Excessive feed Excessive depth of cut Excessive long of effective length or overhang of end mil Large helix angle of flutes	降低进给速度。 降低切深量。 有效长和伸出量请调整到最低限度。 请使用螺旋角小的刀具。 Reduce feed Reduce depth of cut Adjust effective length and overhang as short as possible. Use smaller helix angle
精加工面的毛刺 Burr on Finished Surface 	切削刀刃磨耗过大。 所使用刀具的螺旋角过小。 切深量太大。 Wear of cutting edge progressed. Small helix angle of flutes Excessive depth of cut	使用新的刀具或者进行返修。 请使用螺旋角大的刀具。 降低切深量。 Use new end mill or regrind Use larger helix angle Reduce depth of cut
精加工表面粗糙度不良 Poor Surface Roughness 	切削刀刃磨耗过大。 卡入切屑。 进给速度太快。 有效长超出需要，伸出量太长。 主轴转速太慢。 中加工后的余量不均匀。 刀具偏摆精度不足。 Wear of cutting edge progressed Chips bite Excessive feed Excessive long of effective length or overhang of end mill Too low spindle speed Stock removals vary for finishing Excessive chucking runout	切削刀刃磨耗过大。 卡入切屑。 进给速度太快。 有效长超出需要，伸出量太长。 主轴转速太慢。 中加工后的余量不均匀。 刀具偏摆精度不足。 Wear of cutting edge progressed Chips bite Excessive feed Excessive long of effective length or overhang of end mill Too low spindle speed Stock removals vary for finishing Excessive chucking runout
加工精度不良 Poor Machining Accuracy 	主轴的伸缩量不稳定。 中加工后的余量不均匀。 进给速度太快。 刀具偏摆精度不足。 Inconstant thermal extension of spindle Stock removals vary for finishing Excessive feed Excessive chucking runout	以使用的主轴转速进行暖机，主轴伸缩量稳定后再进行加工。 确认中加工后的余量是否均匀。 降低进给速度。 调整刀具偏摆精度。 Warm up spindle by idling before starting operation Improve semi-finishing process Reduce feed Adjust chucking runout

模具用加工材料品牌对照表
Comparison Table of Die and Mold Materials

分类 Classification	JIS	AISI	硬度 (HRC) Hardness	山阳特殊钢制 SANYO SPECIAL STEEL	大同特殊钢制 DAIDO STEEL	日本高周波钢业 NIHON KOSHUHA STEEL	日立金属 HITACHI METALS	不二越 NACHI FUJIKOSHI	乌德霍尔姆 UDDEHOLM	伯乐 BOHLER
钨钢类 Tungsten type	SKH2	T1	62~			H2	YHX2	SKH2		S200
	SKH3	T4	64~			H3		SKH3		S305
	SKH4	T5	64~			H4		SKH4		
	SKH10	T15	64~			HV5				
钼类 Molybdenum type	SKH51	M2	55-65	QH51	MH51	H51	YXM1	SKH9		S600 S614 S401
	SKH52	M3-1	57-66			H52		HM31		
	SKH53	M3-2	64~			HV1				S607
	SKH54	M4	64~			HV2		HM4		
	SKH55		60-66			HM35	YXM4	HM35		S705
	SKH56	M36	60-66			HM36		HM36		
	SKH57		62-67			HV10	XVC5	HS93R		S700
	SKH58	M7	64~			HM3		HM7NN		S400
	SKH59	M42	52-67			HM42	YXM42	HM42		S500
	其它 Other					S70	YXM27 YXM60	HS53M HS97R HM1 HMT12 HM33 SKH9D DURO-SP		
矩阵类 Matrix type	矩阵类 Matrix type		45-65	QHZ	DRM1 DRM2 DRM3 MH85	KMX1 KMX2 KMX3	YXR3 YXR33 YXR7	DURO-FZ DURO-F1 DURO-F3 DURO-F7 DURO-V2 DURO-V5		W360
粉末类 Powdered type	SKH40		58-70	SPM30	DEX40		HAP40	FAX38	VANADIS30	S590
	其它 Other		58-70	SPM23 SPM60 SPMR8 SPMV6 SPMX4N	DEX20 DEX60 DEX-M1 DEX-M3		HAP10 HAP50 HAP72 HAP5R	FAX31 FAX40 FAX55 FAXG2	VANADIS23 VANADIS60	S290 S390 S690 S790

为了使用安全
Read Following Precautions for Safe Use

安全注意事项Attention on Safety

- 从铣刀盒拿取刀具时，请充分注意避免刀具弹出，不可用手直接触碰刀刃。
  When removing tools from cases, be careful of getting-out of tools and don't touch directly the cutting edges.
- 请注意不可用手直接接触刀刃。
  Never touch the cutting edges directly with bare hand.
- 使用刀具时可能会引起损伤，请务必使用罩盖、防护镜等器具。
  Use safety covers and eye protection, as tools may be broken.
- 刀夹等必须与刀具及加工内容相匹配。
  刀具必须牢固地固定在刀夹上，避免发生振刀。
  Use holders, etc. that match the tools and nature of the processing operations.
  The tool should be firmly attached to the holder to prevent shaking.
- 请牢固地固定工件。
  The work materials clamp firmly.
- 加工前请确认刀具和工件的尺寸。
  Make sure of dimensions of tools and work pieces before starting operation.
- 应根据工件和所使用的机床调整切削条件。
  It is necessary to adjust conditions according to the dimensions of work materials and the machine.
- 请根据用途选用切削油。使用切削油时，可能会因加工时产生的火花或损伤导致起火乃至发生火灾。请务必采取防火措施。
  Select a cutting fluid appropriate to the particular usage. Using a non-water cutting fluid could lead to fires due to sparks generated during processingor heat caused by breakage. Ensure that you take proper fire-prevention measures.
- 使用中若发生异常（切削声响、冒烟），请立即停止机床。
  If abnormal sound, etc. occurs during processing, stop the machine immediately.
- 请勿对刀具进行改造。
  Don't modify tools.

※为了改进和提高产品，本产品目录中刊登的产品规格可能变更.恕不预告。
※Specifications may change without notice for improvement.

技术资料 Technical Guidance