BELZ

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BELZ

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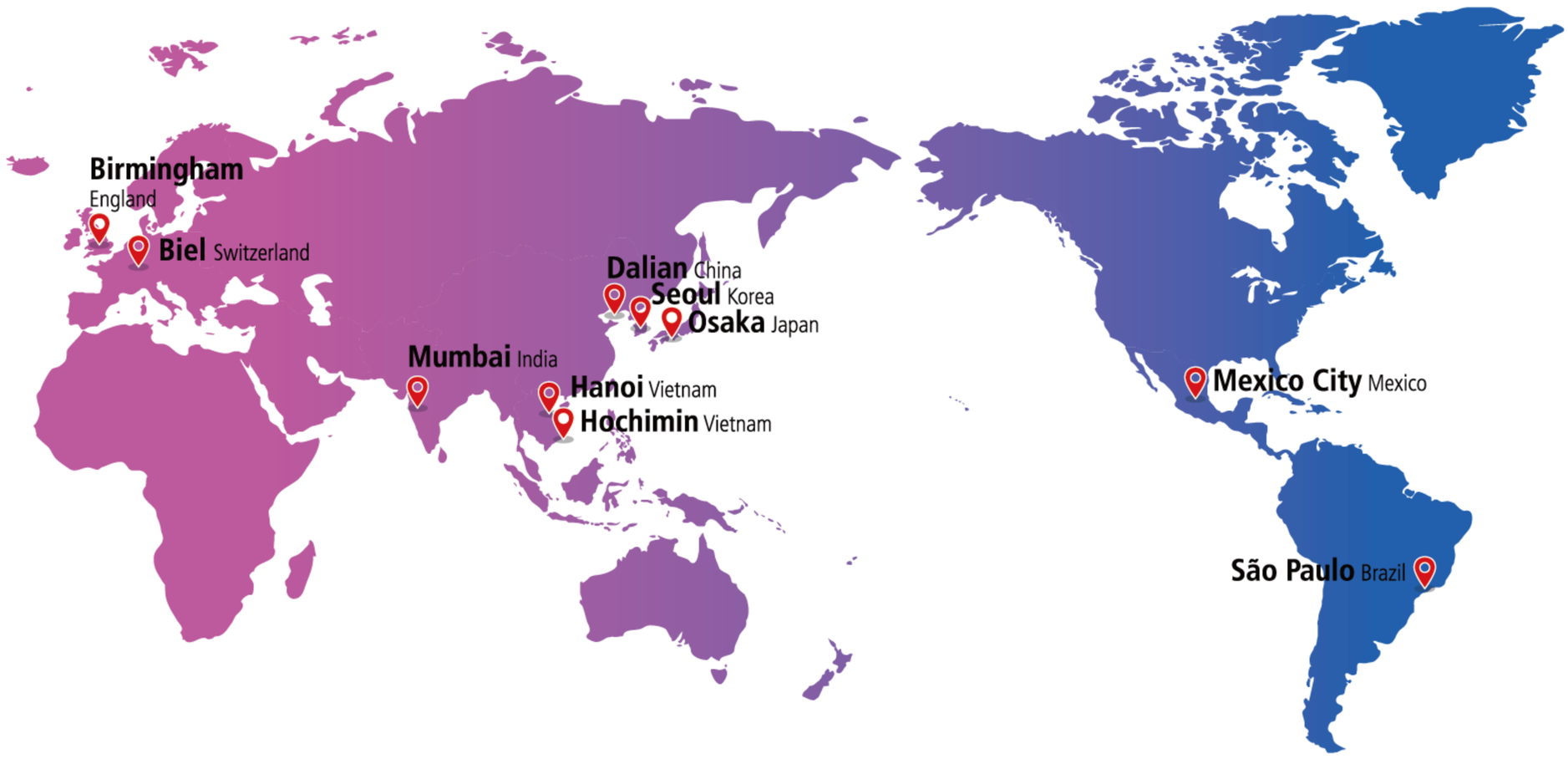
COMPANY PROFILE

Founded in 1918 in Sutz, Switzerland, Belz has evolved nearly a century to become a leading powerhouse in manufacturing first-class taps and drill bits.

In 2014, the company was integrated into YunDa International and relocated to Dalian, China. With YunDa's continuous investment in R&D and equipments, Belz entered a new stage of development. It now offers increasingly optimized round tool solutions with enhanced product and service capabilities for global users.

GLOBAL LAYOUT




ANCA


WALTER


HARDCOAT

END MILL CODING RULES

1	2	3	4	5	6	7	8
E	P	S	E	2	030	04	050

1 End mill

E	

2 Product series

	Remark
P	General Purpose
RP	General Purpose ; Roughing
XR	General Purpose ; High Performance ; Roughing
XP	General Purpose ; High Efficiency
XW	High Wear Resistance ; <55HRC
XH	High Hardness ; <65HRC
EH	High Hardness ; <65HRC ; High Efficiency
M	Stainless Steel ; <380HB
S	Stainless Steel ; Titanium Alloy ; High-temperature Alloy
N	Aluminum
XN	Aluminum (DLC)

3 Bottom cutting edge shape

S	Square
B	Ball nose
R	Corner Radius
C	Chamfer

4 Flute Angle

Q	0°
D	30°
E	35°
O	42°
F	45°
G	52°
H	35°/38°
I	34°/36°
J	39°/40°/41°
K	43°/45°/47°
P	30° Power
X	-9°Straight power

5 Number of flutes

2
3
4
5
6

6 Cutting Diam

0001	0.1mm
030	3mm
100	10mm

7 Shank Diam.

04	4mm
10	10mm

8 Overall length

050	50mm
100	100mm

Description of Icon

Coating

General Purpose | High Wear Resistance | High Hardness | Stainless Steel | High Hardness & High Efficiency | Non-ferrous Alloys | Difficult-to-machine Materials

Number of Flute

2 Flutes | 3 Flutes | 4 Flutes | 5 Flutes | 6 Flutes

Helix Angle

Q | X | D/P | E | O | F | G | H | I | J | K

Corner Shape

Protection Edge | Ball Nose | Corner Radius | Chamfer Corner | Sharp Edge

Front Corner Angle

OD Relief Angle Type

Arc Angle Relief Type / Arc Back Angle

Straight Line Relief Angle / Straight Back Angle

Shank Tolerance

Shank Dia. tolerance H5

Shank Dia. tolerance H6

Machining Hardness

Table of Contents

EXH SERIES for High Hardness Material Machining 064

EEH SERIES for High Effciency & High Hardness Machining 133

EM SERIES for Stainless steel Machining 136

ES SERIES For Tianium, high-temperature alloy and stainless steel Machining 142

EP SERIES

First choice for General Purpose Machining
⩽ 48HRC

- 45°helix angle and double-edged design. The sharp cutting edge ensure the strength of the tool edge.

- The AlCrSiN coating offers high oxidation resistance and strong adhesion, ensuring the exceptional lifespan of the tool.

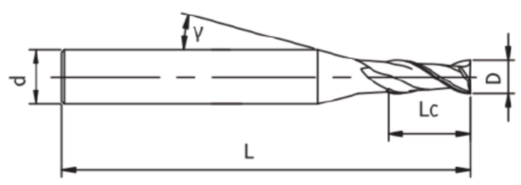
- For rough and precision machining of ordinary steel and cast iron (⩽48 HRC) ; Side milling, Shallow groove milling.

EPSE-2

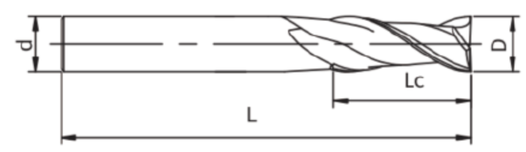
2 Flute Square End Mill

AlCrSiN | 2 | 35° Spiral Angle | -4° | S | Shank Dia. tolerance H5 | ≤48 HRC

Type A



Type B



ΦD	D Tolerance
≤12	0~-0.02
> 12	0~-0.03

(mm)

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	Lc	L	Φd		
EPSE-2010 04050	1	3	50	4	A	●
EPSE-2015 04050	1.5	4	50	4	A	●
EPSE-2020 04050	2	6	50	4	A	●
EPSE-2025 04050	2.5	8	50	4	A	●
EPSE-2030 04050	3	9	50	4	A	●
EPSE-2030 06050	3	9	50	6	A	○
EPSE-2035 04050	3.5	9	50	4	A	●
EPSE-2035 06050	3.5	9	50	6	A	○
EPSE-2040 04050	4	11	50	4	B	●
EPSE-2040 06050	4	11	50	6	A	○
EPSE-2050 06050	5	13	50	6	A	●
EPSE-2060 06050	6	16	50	6	B	●
EPSE-2080 08060	8	20	60	8	B	●
EPSE-2100 10075	10	25	75	10	B	●
EPSE-2120 12075	12	30	75	12	B	●
EPSE-2140 14100	14	34	100	14	B	○
EPSE-2160 16100	16	36	100	16	B	○
EPSE-2180 18100	18	40	100	18	B	○
EPSE-2200 20100	20	45	100	20	B	○

RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	CAST IRON DUCTILE CAST IRON	COPPER ALLOYS
~38HRC	~45HRC	~50HRC	~35HRC		
○	○	○	○	○	○

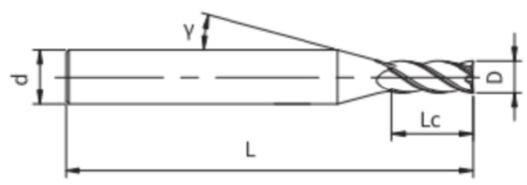
○ Very suitable ○ Suitable

EPSF-4

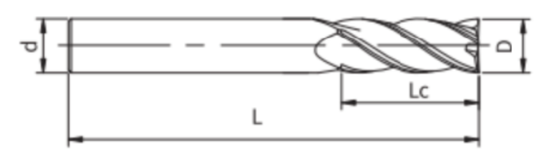
4 Flute Square End Mill

AlCrSiN | 4 | 45° Spiral Angle | 2° | S | Shank Dia. tolerance H5 | ≤48 HRC

Type A



Type B



ΦD	D Tolerance
≤12	0~-0.02
>12	0~-0.03

(mm)

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	Lc	L	Φd		
EPSF-4010 04050	1	3	50	4	A	●
EPSF-4015 04050	1.5	5	50	4	A	●
EPSF-4020 04050	2	6	50	4	A	●
EPSF-4025 04050	2.5	8	50	4	A	●
EPSF-4030 04050	3	9	50	4	A	●
EPSF-4030 06050	3	9	50	6	A	●
EPSF-4030 04075	3	12	75	4	A	●
EPSF-4035 04050	3.5	9	50	4	A	●
EPSF-4040 04050	4	11	50	4	B	●
EPSF-4040 06050	4	11	50	6	A	●
EPSF-4040 04075	4	15	75	4	B	●
EPSF-4050 06050	5	13	50	6	A	●
EPSF-4060 06050	6	16	50	6	B	●
EPSF-4060 06075	6	20	75	6	B	●
EPSF-4060 06100	6	20	100	6	B	●
EPSF-4070 08060	7	20	60	8	A	●
EPSF-4080 08060	8	20	60	8	B	●
EPSF-4080 08075	8	20	75	8	B	●
EPSF-4080 08100	8	25	100	8	B	●
EPSF-4090 10075	9	23	75	10	A	●
EPSF-4100 10075	10	25	75	10	B	●
EPSF-4100 10100	10	30	100	10	B	●
EPSF-4120 12075	12	30	75	12	B	●
EPSF-4120 12100	12	35	100	12	B	○
EPSF-4140 14100	14	34	100	14	B	●
EPSF-4160 16100	16	36	100	16	B	●
EPSF-4160 16150	16	50	150	16	B	○
EPSF-4180 18100	18	45	100	18	B	●
EPSF-4200 20100	20	45	100	20	B	●
EPSF-4200 20150	20	55	150	20	B	○

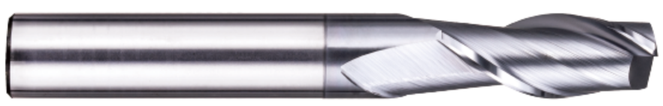
RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	CAST IRON DUCTILE CAST IRON	COPPER ALLOYS
~38HRC	~45HRC	~50HRC	~35HRC		
◎	◎	○	○	○	○

◎ Very suitable ○ Suitable

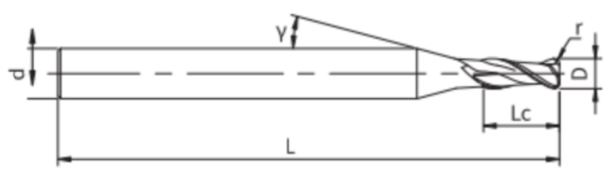
EPRE-2

2 Flute Corner Radius End Mill

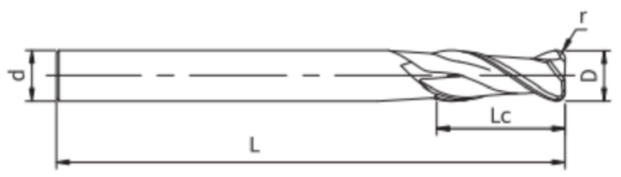


AlCrSiN | 2 | 35° Spiral Angle | -4° | R | Shank Dia. tolerance H5 | ≤48 HRC

Type A



Type B



ΦD	D Tolerance
≤12	0~-0.02
>12	0~-0.03

(mm)

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	r	Lc	L	Φd		
EPRE-2020R0.2 04050	2	0.2	6	50	4	A	●
EPRE-2030R0.5 04050	3	0.5	9	50	4	A	●
EPRE-2040R0.5 04050	4	0.5	11	50	4	B	●
EPRE-2050R0.5 06050	5	0.5	13	50	6	A	●
EPRE-2060R0.5 06050	6	0.5	16	50	6	B	●
EPRE-2060R1 06050	6	1.0	16	50	6	B	●
EPRE-2080R0.5 08060	8	0.5	20	60	8	B	●
EPRE-2080R1 08060	8	1.0	20	60	8	B	●
EPRE-2100R0.5 10075	10	0.5	25	75	10	B	●
EPRE-2100R1 10075	10	1.0	25	75	10	B	●
EPRE-2100R2 10075	10	2.0	25	75	10	B	●

RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	CAST IRON DUCTILE CAST IRON	COPPER ALLOYS
~38HRC	~45HRC	~50HRC	~35HRC		
○	○	○	○	○	○

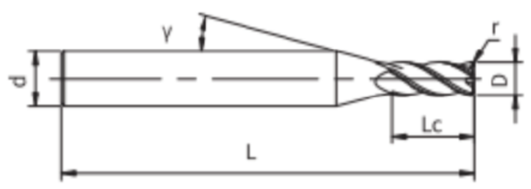
○ Very suitable ○ Suitable

EPRF-4

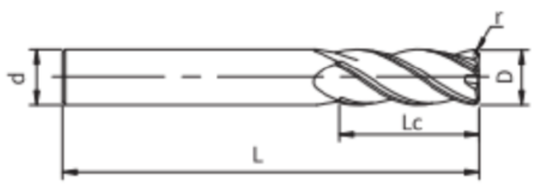
4 Flute Corner Radius End Mill

AlCrSiN | 4 | 45° Spiral Angle | 2° | R | Shank Dia. tolerance H5 | ≤48 HRC

Type A



Type B



ΦD	D Tolerance
≤12	0~-0.02
> 12	0~-0.03

(mm)

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	r	Lc	L	Φd		
EPRF-4010R0.2 04050	1	0.2	3	50	4	A	●
EPRF-4015R0.2 04050	1.5	0.2	5	50	4	A	●
EPRF-4020R0.2 04050	2	0.2	6	50	4	A	●
EPRF-4030R0.2 04050	3	0.2	9	50	4	A	●
EPRF-4030R0.5 04050	3	0.5	9	50	4	A	●
EPRF-4040R0.2 04050	4	0.2	11	50	4	B	●
EPRF-4040R0.2 04075	4	0.2	11	75	4	B	●
EPRF-4040R0.3 04050	4	0.3	11	50	4	B	●
EPRF-4040R0.5 04050	4	0.5	11	50	4	B	●
EPRF-4040R0.5 04075	4	0.5	11	75	4	B	●
EPRF-4040R1 04050	4	1.0	11	50	4	B	●
EPRF-4050R0.5 06050	5	0.5	13	50	6	A	●
EPRF-4050R1 06050	5	1.0	13	50	6	A	●
EPRF-4060R0.2 06050	6	0.2	16	50	6	B	●
EPRF-4060R0.3 06050	6	0.3	16	50	6	B	●
EPRF-4060R0.5 06050	6	0.5	16	50	6	B	●
EPRF-4060R0.5 06075	6	0.5	16	75	6	B	●
EPRF-4060R0.5 06100	6	0.5	16	100	6	B	●
EPRF-4060R1 06050	6	1.0	16	50	6	B	●
EPRF-4060R1 06075	6	1.0	16	75	6	B	●
EPRF-4060R1 06100	6	1.0	16	100	6	B	●
EPRF-4080R0.5 08060	8	0.5	20	60	8	B	●
EPRF-4080R0.5 08075	8	0.5	20	75	8	B	●
EPRF-4080R0.5 08100	8	0.5	20	100	8	B	●
EPRF-4080R1 08060	8	1.0	20	60	8	B	●
EPRF-4080R1 08075	8	1.0	20	75	8	B	●
EPRF-4080R1 08100	8	1.0	20	100	8	B	●
EPRF-4100R0.5 10075	10	0.5	25	75	10	B	●
EPRF-4100R0.5 10100	10	0.5	25	100	10	B	●
EPRF-4100R1 10075	10	1.0	25	75	10	B	●
EPRF-4100R1 10100	10	1.0	25	100	10	B	●
EPRF-4100R2 10075	10	2.0	25	75	10	B	●
EPRF-4100R2 10100	10	2.0	25	100	10	B	●
EPRF-4100R3 10075	10	3.0	25	75	10	B	●

EPRF-4

4 Flute Corner Radius End Mill

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	r	Lc	L	Φd		
EPRF-4120R0.5 12075	12	0.5	30	75	12	B	●
EPRF-4120R0.5 12100	12	0.5	30	100	12	B	
EPRF-4120R1 12075	12	1.0	30	75	12	B	●
EPRF-4120R1 12100	12	1.0	30	100	12	B	●
EPRF-4120R2 12075	12	2.0	30	75	12	B	
EPRF-4120R2 12100	12	2.0	30	100	12	B	●
EPRF-4120R3 12075	12	3.0	30	75	12	B	
EPRF-4160R1 16100	16	1.0	45	100	16	B	●
EPRF-4160R2 16100	16	2.0	45	100	16	B	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	CAST IRON DUCTILE CAST IRON	COPPER ALLOYS
~38HRC	~45HRC	~50HRC	~35HRC		
○	○	○	○	○	○

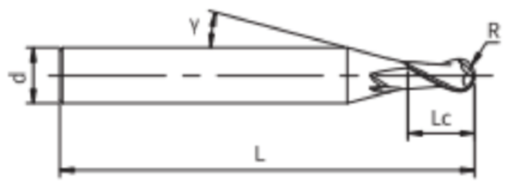
○ Very suitable ○ Suitable

EPBD-2

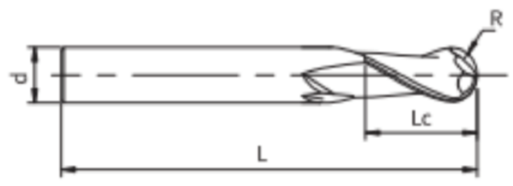
2 Flute Ball Nose End Mill

AlCrSiN | 2 | 30° Spiral Angle | 1° | B | Shank Dia. tolerance H5 | ≤48 HRC

Type A



Type B



ΦR	D Tolerance
R≤1.5	0~-0.01
1.5 < R < 3	0~-0.015
R≥3	0~-0.02

(mm)

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	R	Lc	L	Φd		
EPBD-2010 04050	1	0.5	2	50	4	A	●
EPBD-2015 04050	1.5	0.75	3	50	4	A	●
EPBD-2020 04050	2	1.0	4	50	4	A	●
EPBD-2025 04050	2.5	1.25	5	50	4	A	●
EPBD-2030 04050	3	1.5	6	50	4	A	●
EPBD-2035 04050	3.5	1.75	7	50	4	A	●
EPBD-2040 04050	4	2.0	8	50	4	B	●
EPBD-2040 04075	4	2.0	8	75	4	B	●
EPBD-2040 04100	4	2.0	8	100	4	B	●
EPBD-2050 06050	5	2.5	10	50	6	A	●
EPBD-2060 06050	6	3.0	12	50	6	B	●
EPBD-2060 06075	6	3.0	12	75	6	B	●
EPBD-2060 06100	6	3.0	12	100	6	B	●
EPBD-2070 08060	7	3.5	14	60	8	A	●
EPBD-2080 08060	8	4.0	14	60	8	B	●
EPBD-2080 08075	8	4.0	14	75	8	B	●
EPBD-2080 08100	8	4.0	14	100	8	B	●
EPBD-2090 10075	9	4.5	16	75	10	A	●
EPBD-2100 10075	10	5.0	18	75	10	B	●
EPBD-2100 10100	10	5.0	18	100	10	B	●
EPBD-2120 12100	12	6.0	22	100	12	B	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	CAST IRON DUCTILE CAST IRON	COPPER ALLOYS
~38HRC	~45HRC	~50HRC	~35HRC		
○	○	○	○	○	○

○ Very suitable ○ Suitable

EPSE-2 / EPRE-2 Cutting Parameter

Side Milling

Workpiece Materials	(180-250HB) Carbon Steels, Alloy Steels, Cast Iron		(25-35HRC) Stainless Steels, Tool Steels		(35-48HRC) Pre-Hardened Steels	
Depth of cut (mm)	ap≤1.5D		ap≤1.5D		ap≤1D	
	ae≤0.15D		ae≤0.15D		ae≤0.12D	
Mill Dia (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	20060	900	14490	570	14490	510
4	15040	860	10860	550	10860	480
6	10020	760	7240	500	7240	450
8	7520	770	5430	540	5430	520
10	6010	760	4340	510	4340	460

Slotting

Workpiece Materials	(180-250HB) Carbon Steels, Alloy Steels, Cast Iron		(25-35HRC) Stainless Steels, Tool Steels		(35-48HRC) Pre-Hardened Steels	
Depth of cut (mm)	ap≤0.8D		ap≤0.3D		ap≤0.3D	
Mill Dia (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	8910	360	6130	110	6680	220
4	6680	450	4590	120	5010	250
6	4460	360	3060	160	3340	220
8	3340	330	2290	160	2500	190
10	2670	300	1830	160	2000	180

NOTE

▲Prefer to use the high-rigidity and high accuracy machine.

▲Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.

▲Please adjust the parameters when chatter or abnormal vibration occurs.

EPSF-4 / EPRF-4 Cutting Parameter

Side Milling

Workpiece Materials	(180-250HB) Carbon Steels, Alloy Steels, Cast Iron		(25-35HRC) Stainless Steels, Tool Steels		(35-48HRC) Pre-Hardened Steels	
Depth of cut (mm)	ap≤1.5D		ap≤1.5D		ap≤1D	
	ae≤0.15D		ae≤0.15D		ae≤0.12D	
Mill Dia (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	20060	1790	14490	1150	14490	1020
4	15040	1730	10860	1110	10860	970
6	10020	1530	7240	990	7240	920
8	7520	1560	5430	1090	5430	1040
10	6010	1530	4340	1030	4340	940

EPBD-2 Cutting Parameter

Profiling

Workpiece Materials	(180-250HB) Carbon Steels, Alloy Steels, Cast Iron		(25-35HRC) Stainless Steels, Tool Steels		(35-48HRC) Pre-Hardened Steels	
Depth of cut (mm)	ap≤0.2D		ap≤0.2D		ap≤0.15D	
	ae≤0.3D		ae≤0.2D		ae≤0.15D	
Mill Dia (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
4	13370	850	9190	510	10020	510
5	10690	850	7360	530	8020	530
6	8910	850	6130	530	6680	550
7	7640	850	5260	530	5730	530
8	6680	850	4590	530	5010	520
9	5940	850	4080	520	4460	510
10	5350	850	3670	530	4010	510

NOTE

▲Prefer to use the high-rigidity and high accuracy machine.

▲Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.

▲Please adjust the parameters when chatter or abnormal vibration occurs.

ERP SERIES

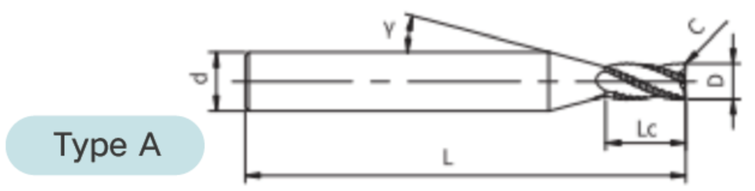
First Choice for General Purpose Roughing Machining
⩽ 48HRC

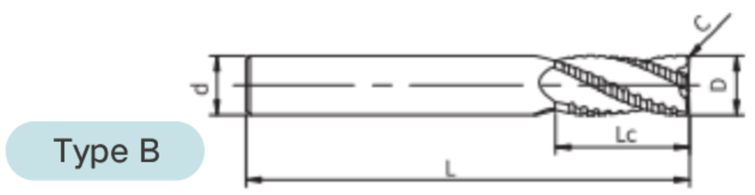
- Speical wave flute design make small chip and smooth chip exhausting.
- Large helix angle + U groove design enhances the machining stability.
- High performance ultra fine substrate together with high performance AlCrSiN coating, good heat resistance and wear resistance.
- Heavy roughing for steel and cast iron.

ERPCF-4

4 Flute Square Roughing End Mill (Chamfer)

AlCrSiN | 4 | 45° Spiral Angle | 3° | C | Shank Dia. tolerance H5 | ≤48 HRC





ΦD	D Tolerance
D≤6	0~-0.03
6<D≤10	0~-0.04
D>10	0~-0.05

(mm)

Order Code	Dia.	Chamfer	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	C	Lc	L	Φd		
ERPCF-4060C0.2 06050	6	0.2	16	50	6	B	●
ERPCF-4080C0.2 08060	8	0.2	20	60	8	B	●
ERPCF-4100C0.3 10075	10	0.3	25	75	10	B	●
ERPCF-4120C0.3 12075	12	0.3	30	75	12	B	●
ERPCF-4160C0.4 16100	16	0.4	36	100	16	B	●
ERPCF-4200C0.5 20100	20	0.5	45	100	20	B	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~38HRC	~45HRC	~50HRC	~35HRC	
○	○	○	○	○

○ Very suitable ○ Suitable

ERPCF-4 Cutting Parameter

Side Milling

Workpiece Materials	(180-250HB) Carbon Steels, Alloy Steels, Cast Iron		(25-35HRC) Stainless Steels, Tool Steels		(35-48HRC) Pre-Hardened Steels		(45-55HRC) Hardneed Steel	
Depth of cut (mm)	ap≤1.5D		ap≤1.5D		ap≤1D		ap≤1D	
	ae≤0.15D		ae≤0.15D		ae≤0.12D		ae≤0.125D	
Mill Dia (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
6	7800	1120	6130	600	6680	660	5560	550
8	5840	1120	4590	640	5010	690	4170	500
10	4680	1120	3670	660	4010	720	3340	470
12	3900	1120	3060	670	3340	730	2780	440
16	2920	1050	2290	550	2500	590	2080	420
20	2340	940	1830	510	2000	560	1660	390

Slotting

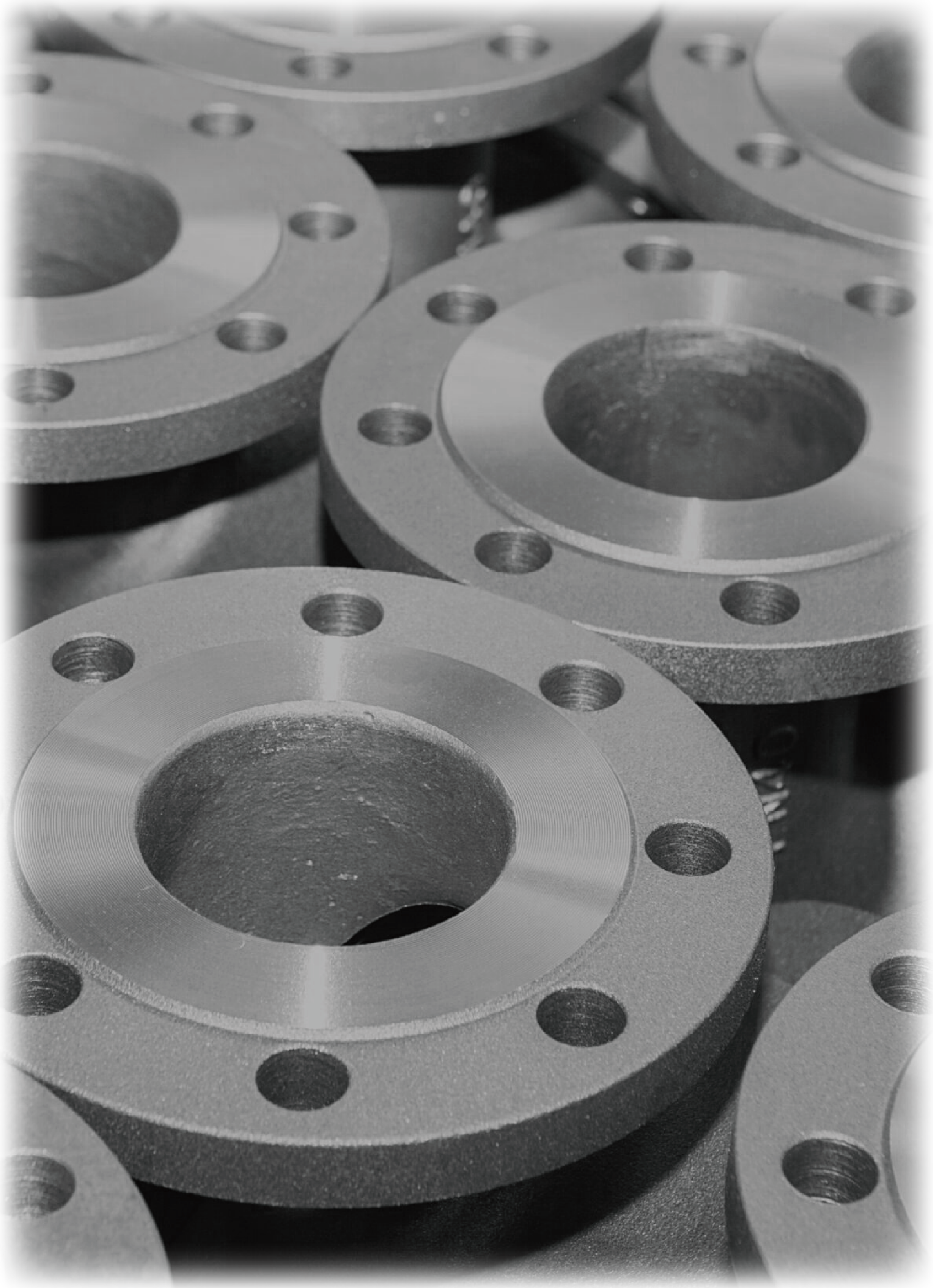
Workpiece Materials	(180-250HB) Carbon Steels, Alloy Steels, Cast Iron		(25-35HRC) Stainless Steels, Tool Steels		(35-48HRC) Pre-Hardened Steels	
Depth of cut (mm)	ap≤1D		ap≤0.75D		ap≤0.75D	
Mill Dia (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
36	6680	670	5000	390	5570	450
8	5010	660	3750	370	4200	420
10	4010	640	3000	420	3340	470
12	3340	670	2500	390	2780	440
16	2500	590	1870	330	2080	370
20	2000	560	1500	290	1660	330

NOTE

▲Prefer to use the high-rigidity and high accuracy machine.

▲Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.

▲Please adjust the parameters when chatter or abnormal vibration occurs.



EXP SERIES

Top Solution for General Purpose High Efficient Machining ⩽ 48HRC

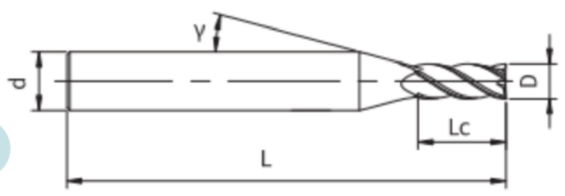
- The variable flute depth design balances tool rigidity and chip pocket space, good for high-efficiency machining with large cutting depths and widths.
- The variable pitch and helix design ensures exceptional vibration reduction for stable machining.
- The AlCrSiN coating offers high oxidation resistance and strong adhesion, ensuring the exceptional lifespan of the tool.
- Optimized for: Low-depth/wide-width face milling ; High-depth/narrow-width side milling ; Shallow slots (<0.5D).
- High efficient maching for steel and cast Iron.

EXPSK-3

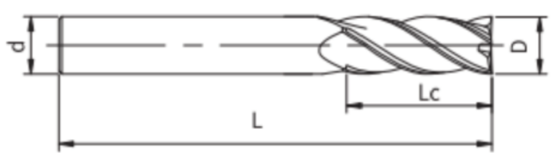
3 Flute Square Variable Helix End Mill

AlCrSiN | 3 | 43° 45° 47° | 3° | S | Shank Dia. tolerance H5 | ≤48 HRC

Type A



Type B



ΦD	D Tolerance
≤12	0~-0.02
>12	0~-0.03

(mm)

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	Lc	L	Φd		
EXPSK-3030 04050	3	9	50	4	A	●
EXPSK-3040 04050	4	11	50	4	B	●
EXPSK-3050 06050	5	13	50	6	B	●
EXPSK-3060 06050	6	16	50	6	B	●
EXPSK-3080 08060	8	20	60	8	B	●
EXPSK-3100 10075	10	25	75	10	B	●
EXPSK-3120 12075	12	30	75	12	B	●
EXPSK-3160 16100	16	36	100	16	B	●
EXPSK-3200 20100	20	45	100	20	B	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~38HRC	~45HRC	~50HRC	~35HRC	
○	○	○	○	○

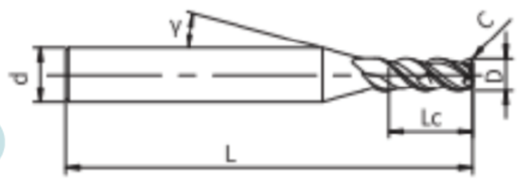
○ Very suitable ○ Suitable

EXPCK-3

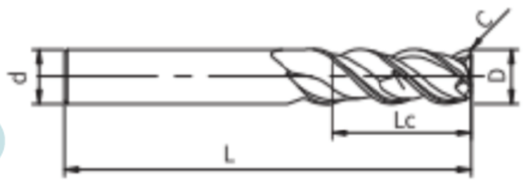
3 Flute Square Variable Helix End Mill (Chamfer)

AlCrSiN | 3 | 43° 45° 47° | 3° | C | Shank Dia. tolerance H5 | ≤48 HRC

Type A



Type B



ΦD	D Tolerance
≤12	0~-0.02
>12	0~-0.03

(mm)

Order Code	Dia.	Chamfer	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	C	Lc	L	Φd		
EXPCK-3060C0.2 06050	6	0.2	16	50	6	B	●
EXPCK-3080C0.2 08060	8	0.2	20	60	8	B	●
EXPCK-3100C0.3 10075	10	0.3	25	75	10	B	●
EXPCK-3120C0.3 12075	12	0.3	30	75	12	B	●
EXPCK-3160C0.3 16100	16	0.3	36	100	16	B	○

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~38HRC	~45HRC	~50HRC	~35HRC	
○	○	○	○	○

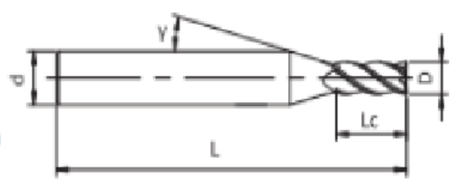
○ Very suitable ○ Suitable

EXPSH-4

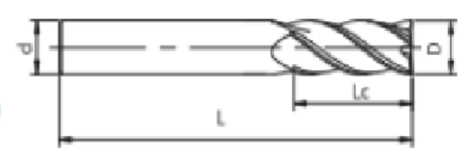
4 Flute Square Variable Helix End Mill

AlCrSiN | 4 | 35° 38° | 5° | S | Shank Dia. tolerance H5 | ≤48 HRC

Type A



Type B



ΦD	D Tolerance
≤12	0~-0.02
>12	0~-0.03

(mm)

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	Lc	L	Φd		
EXPSH-4020 04050	2	6	50	4	A	●
EXPSH-4030 04050	3	9	50	4	A	●
EXPSH-4040 04050	4	11	50	4	B	●
EXPSH-4050 06050	5	13	50	6	A	●
EXPSH-4060 06050	6	16	50	6	B	●
EXPSH-4080 08060	8	20	60	8	B	●
EXPSH-4100 10075	10	25	75	10	B	●
EXPSH-4120 12075	12	30	75	12	B	●
EXPSH-4160 16100	16	36	100	16	B	○
EXPSH-4200 20100	20	45	100	20	B	○

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~38HRC	~45HRC	~50HRC	~35HRC	
○	○	○	○	○

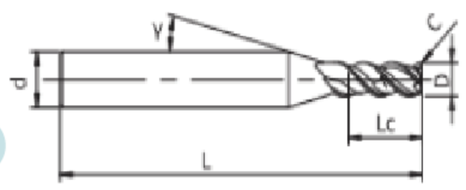
○ Very suitable ○ Suitable

EXPCH-4

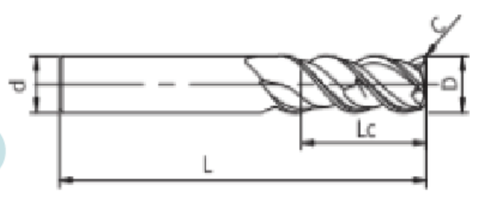
4 Flute Square Variable Helix End Mill (Chamfer)

AlCrSiN | 4 | 35° 38° | 5° | C | Shank Dia. tolerance H5 | ≤48 HRC

Type A



Type B



ΦD	D Tolerance
≤12	0~-0.02
>12	0~-0.03

(mm)

Order Code	Dia.	Chamfer	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	C	Lc	L	Φd		
EXPCH-4030C0.03 04050	3	0.03	9	50	4	A	○
EXPCH-4030C0.13 04050	3	0.13	9	50	4	A	●
EXPCH-4040C0.04 04050	4	0.04	11	50	4	B	○
EXPCH-4040C0.18 04050	4	0.18	11	50	4	B	●
EXPCH-4050C0.05 06050	5	0.05	13	50	6	A	○
EXPCH-4050C0.13 06050	5	0.13	13	50	6	A	●
EXPCH-4050C0.2 06050	5	0.2	13	50	6	A	●
EXPCH-4060C0.06 06050	6	0.06	16	50	6	B	○
EXPCH-4060C0.13 06050	6	0.13	16	50	6	B	●
EXPCH-4060C0.2 06050	6	0.2	16	50	6	B	●
EXPCH-4080C0.08 08060	8	0.08	20	60	8	B	●
EXPCH-4080C0.2 08060	8	0.2	20	60	8	B	●
EXPCH-4100C0.1 10075	10	0.1	25	75	10	B	●
EXPCH-4100C0.3 10075	10	0.3	25	75	10	B	●
EXPCH-4120C0.12 12075	12	0.12	30	75	12	B	○
EXPCH-4120C0.3 12075	12	0.3	30	75	12	B	●
EXPCH-4160C0.15 16100	16	0.15	36	100	16	B	○
EXPCH-4160C0.4 16100	16	0.4	36	100	16	B	○
EXPCH-4200C0.15 20100	20	0.15	45	100	20	B	○
EXPCH-4200C0.5 20100	20	0.5	45	100	20	B	○

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~38HRC	~45HRC	~50HRC	~35HRC	
○	○	○	○	○

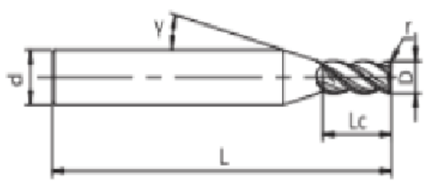
○ Very suitable ○ Suitable

EXPRH-4

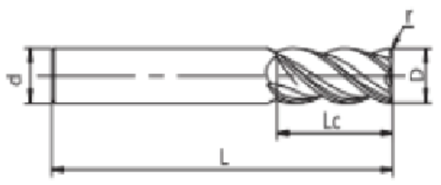
4 Flute Corner Radius Variable Helix End Mill

AlCrSiN | 4 | 35° 38° | 5° | R | Shank Dia. tolerance H5 | ≤48 HRC

Type A



Type B



ΦD	D Tolerance
≤12	0~-0.02
>12	0~-0.03

(mm)

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	r	Lc	L	Φd		
EXPRH-4030R0.3 04050	3	0.3	9	50	4	A	○
EXPRH-4030R0.5 04050	3	0.5	9	50	4	A	●
EXPRH-4040R0.3 04050	4	0.3	11	50	4	B	●
EXPRH-4040R0.5 04050	4	0.5	11	50	4	B	●
EXPRH-4050R0.3 06050	5	0.3	13	50	6	A	○
EXPRH-4050R0.5 06050	5	0.5	13	50	6	A	●
EXPRH-4060R0.5 06050	6	0.5	16	50	6	B	●
EXPRH-4060R1 06050	6	1.0	16	50	6	B	●
EXPRH-4080R0.5 08060	8	0.5	20	60	8	B	●
EXPRH-4080R1 08060	8	1.0	20	60	8	B	●
EXPRH-4100R0.5 10075	10	0.5	25	75	10	B	●
EXPRH-4100R1 10075	10	1.0	25	75	10	B	●
EXPRH-4100R2 10075	10	2.0	25	75	10	B	●
EXPRH-4120R0.5 12075	12	0.5	30	75	12	B	○
EXPRH-4120R1 12075	12	1.0	30	75	12	B	●
EXPRH-4120R2 12075	12	2.0	30	75	12	B	○
EXPRH-4140R2 14075	14	2.0	32	75	14	B	○
EXPRH-4160R2 16100	16	2.0	36	100	16	B	○

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~38HRC	~45HRC	~50HRC	~35HRC	
◎	◎	○	○	○

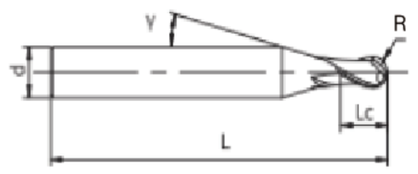
◎ Very suitable ○ Suitable

EXPBD-2

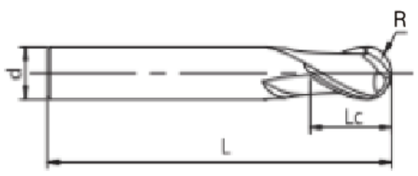
2 Flute Ball Nose End Mill

AlCrSiN | 2 | 30° | -6° | B | Shank Dia. tolerance H5 | ≤48 HRC

Type A



Type B



ΦR	D Tolerance
R≤1.5	0~-0.01
1.5 < R < 3	0~-0.015
R≥3	0~-0.02

(mm)

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	R	Lc	L	Φd		
EXPBD-2010 04050	1	0.5	2	50	4	A	●
EXPBD-2015 04050	1.5	0.75	3	50	4	A	●
EXPBD-2020 04050	2	1.0	4	50	4	A	●
EXPBD-2030 04050	3	1.5	6	50	4	A	●
EXPBD-2040 04050	4	2.0	8	50	4	B	●
EXPBD-2040 04075	4	2.0	8	75	4	B	●
EXPBD-2060 06050	6	3.0	12	50	6	B	●
EXPBD-2060 06060	6	3.0	12	60	6	B	●
EXPBD-2060 06075	6	3.0	12	75	6	B	●
EXPBD-2080 08060	8	4.0	14	60	8	B	●
EXPBD-2080 08075	8	4.0	14	75	8	B	●
EXPBD-2100 10075	10	5.0	18	75	10	B	●
EXPBD-2100 10100	10	5.0	18	100	10	B	●
EXPBD-2110 12075	11	5.5	20	75	12	B	●
EXPBD-2120 12075	12	6.0	22	75	12	B	●
EXPBD-2120 12100	12	6.0	22	100	12	B	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~38HRC	~45HRC	~50HRC	~35HRC	
○	○	○	○	○

○ Very suitable ○ Suitable

EXPSK-3 / EXPCK-3 Cutting Parameter

Side Milling

Workpiece Materials	(180-250HB) Carbon Steels, Alloy Steels, Cast Iron		(25-35HRC) Stainless Steels, Tool Steels		(35-48HRC) Pre-Hardened Steels	
Depth of cut (mm)	ap≤1.5D		ap≤1.5D		ap≤1D	
	ae≤0.15D		ae≤0.15D		ae≤0.12D	
Mill Dia (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	22290	2140	16710	1650	16710	1350
4	16710	2050	12530	1390	12530	1230
6	11150	1770	8350	1200	8350	1130
8	8350	1750	6260	1280	6260	1210
10	6680	1700	5010	1180	5010	1100
12	5570	1660	4170	1130	4170	970
16	4170	1560	3130	940	3130	790
20	3340	1550	2500	860	2500	710

Slotting

Workpiece Materials	(180-250HB) Carbon Steels, Alloy Steels, Cast Iron		(25-35HRC) Stainless Steels, Tool Steels		(35-48HRC) Pre-Hardened Steels	
Depth of cut (mm)	ap≤1D		ap≤0.3D		ap≤0.5D	
Mill Dia (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	8910	820	6130	330	6680	520
4	6680	960	4590	330	5010	570
6	4460	760	3060	360	3340	470
8	3340	670	2290	350	2500	380
10	2670	610	1830	330	2000	370
12	2220	590	1530	330	1660	370
16	1660	670	1150	290	1240	380
20	1330	680	920	270	1000	380

NOTE

▲Prefer to use the high-rigidity and high accuracy machine.

▲Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.

▲Please adjust the parameters when chatter or abnormal vibration occurs.

EXPSH-4 / EXPCH-4 / EXPRH-4 Cutting Parameter

Side Milling

Workpiece Materials	(180-250HB) Carbon Steels, Alloy Steels, Cast Iron		(25-35HRC) Stainless Steels, Tool Steels		(35-48HRC) Pre-Hardened Steels	
Depth of cut (mm)	ap≤1.5D		ap≤1.5D		ap≤1D	
	ae≤0.15D		ae≤0.15D		ae≤0.12D	
Mill Dia (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	22290	2850	16710	2200	16710	1800
4	16710	2740	12530	1850	12530	1650
6	11150	2360	8350	1600	8350	1500
8	8350	2340	6260	1700	6260	1620
10	6680	2270	5010	1580	5010	1470
12	5570	2220	4170	1500	4170	1300
16	4170	2080	3130	1240	3130	1070
20	3340	2070	2500	1150	2500	950

Slotting

Workpiece Materials	(180-250HB) Carbon Steels, Alloy Steels, Cast Iron		(25-35HRC) Stainless Steels, Tool Steels		(35-48HRC) Pre-Hardened Steels	
Depth of cut (mm)	ap≤1D		ap≤0.3D		ap≤0.5D	
Mill Dia (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	8910	1100	6130	440	6680	690
4	6680	1280	4590	440	5010	760
6	4460	1010	3060	490	3340	630
8	3340	890	2290	470	2500	520
10	2670	820	1830	450	2000	490
12	2220	790	1530	450	1660	500
16	1660	890	1150	390	1240	510
20	1330	910	920	360	1000	520

NOTE

▲Prefer to use the high-rigidity and high accuracy machine.

▲Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.

▲Please adjust the parameters when chatter or abnormal vibration occurs.

EXPBD-2 Cutting Parameter

Side Milling

Workpiece Materials	(180-250HB) Carbon Steels, Alloy Steels, Cast Iron		(25-35HRC) Stainless Steels, Tool Steels		(35-48HRC) Pre-Hardened Steels	
Depth of cut (mm)	ap≤0.04D		ap≤0.04D		ap≤0.02D	
	ae≤0.04D		ae≤0.04D		ae≤0.02D	
Mill Dia (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
1	52500	2940	52500	2640	52500	2040
2	36780	2940	36780	2570	30090	2110
3	24520	2940	24520	2690	20060	2080
4	18390	2940	18390	2760	15040	2110
6	12260	2940	12260	2690	10020	2110
8	9190	2940	9190	2660	7520	2110
10	7360	2940	7360	2640	6010	2100
12	6130	2940	6130	2650	5010	2100

NOTE

▲Prefer to use the high-rigidity and high accuracy machine.

▲Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.

▲Please adjust the parameters when chatter or abnormal vibration occurs.

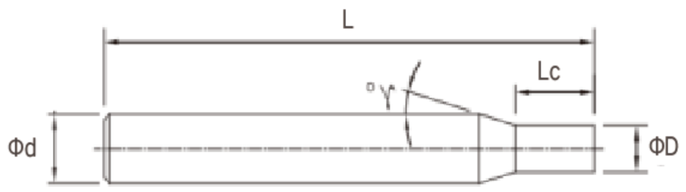
EXW SERIES

Top Solution for Precision Mold Machining
⩽55HRC

- We use 0.3 um ultra fine carbide substrates to ensure high wear resistance.
- The super lubrication of AlCrSi coating surface makes the surface friction coefficient lower.Thus during the process of machining,the cutting resistance and cutting temperature will be greatly reduced.
- AlCrSi coating is very suitable for cutting the materials of ⩽55HRC, The coating is widely used for the processing of high-precision moulds such as car lamp moulds, mobile phone moulds and hardware moulds,etc.

EXWSD-2

2 Flute Square End Mill



AlCrSiN | 2 | 30° Spiral Angle | Straight Back Angle | S | Shank Dia. tolerance H5 | < 55 HRC

ΦD	D Tolerance
D≤3	0~-0.010
3 < D≤6	0~-0.012
6 < D≤10	0~-0.015
10 < D≤18	0~-0.018
D > 18	0~-0.020

(mm)

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	Lc	L	Φd	
EXWSD-2001 04050	0.1	0.2	50	4	●
EXWSD-20015 04050	0.15	0.3	50	4	●
EXWSD-2002 04050	0.2	0.4	50	4	●
EXWSD-2003 04050	0.3	0.6	50	4	●
EXWSD-2004 04050	0.4	1.2	50	4	●
EXWSD-2005 04050	0.5	1.5	50	4	●
EXWSD-2006 04050	0.6	1.8	50	4	●
EXWSD-2007 04050	0.7	2.1	50	4	●
EXWSD-2008 04050	0.8	2.4	50	4	●
EXWSD-2010 04050	1	3	50	4	●
EXWSD-2010 06050	1	3	50	6	●
EXWSD-2012 04050	1.2	3.5	50	4	●
EXWSD-2014 04050	1.4	4	50	4	●
EXWSD-2015 04050	1.5	4	50	4	●
EXWSD-2015 06050	1.5	4	50	6	●
EXWSD-2016 04050	1.6	4.5	50	4	●
EXWSD-2020 04050	2	6	50	4	●
EXWSD-2020 06050	2	6	50	6	●
EXWSD-2025 04050	2.5	8	50	4	●
EXWSD-2025 06050	2.5	8	50	6	●
EXWSD-2030 04050	3	8	50	4	●
EXWSD-2030 06050	3	8	50	6	●
EXWSD-2030 06075	3	12	75	6	●
EXWSD-2040 04050	4	11	50	4	●
EXWSD-2040 06050	4	11	50	6	●
EXWSD-2040 06075	4	15	75	6	●
EXWSD-2050 06050	5	13	50	6	●
EXWSD-2050 06075	5	18	75	6	●
EXWSD-2060 06050	6	16	50	6	●
EXWSD-2060 06060	6	16	60	6	●
EXWSD-2060 06075	6	20	75	6	●
EXWSD-2080 08060	8	20	60	8	●
EXWSD-2080 08075	8	20	75	8	●
EXWSD-2080 08100	8	25	100	8	●

EXWSD-2

2 Flute Square End Mill

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	Lc	L	Φd	
EXWSD-2100 10075	10	25	75	10	●
EXWSD-2100 10100	10	30	100	10	●
EXWSD-2120 12075	12	30	75	12	●
EXWSD-2120 12100	12	35	100	12	●
EXWSD-2160 16100	16	45	100	16	●
EXWSD-2200 20100	20	45	100	20	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	○			○	○

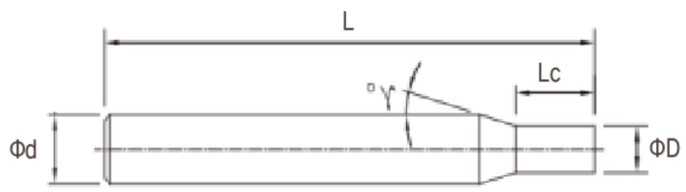
COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○	○		○	○	

○ Very suitable ○ Suitable

EXWSD-4

4 Flute Square End Mill

AlCrSiN | 4 | 30° Spiral Angle | Arc Back Angle | S | Shank Dia. tolerance H5 | < 55 HRC



ΦD	D Tolerance
D≤3	0~-0.010
3<D≤6	0~-0.012
6<D≤10	0~-0.015
10<D≤18	0~-0.018
D>18	0~-0.020

(mm)

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	Lc	L	Φd	
EXWSD-4008 04050	0.8	2.4	50	4	○
EXWSD-4010 04050	1	3	50	4	●
EXWSD-4010 06050	1	3	50	6	○
EXWSD-4012 04050	1.2	3.5	50	4	○
EXWSD-4014 04050	1.4	4	50	4	○
EXWSD-4015 04050	1.5	4	50	4	●
EXWSD-4015 06050	1.5	4	50	6	○
EXWSD-4016 04050	1.6	5	50	4	○
EXWSD-4020 04050	2	6	50	4	●
EXWSD-4020 06050	2	6	50	6	○
EXWSD-4025 04050	2.5	8	50	4	●
EXWSD-4025 06050	2.5	8	50	6	○
EXWSD-4030 04050	3	8	50	4	●
EXWSD-4030 06050	3	8	50	6	●
EXWSD-4030 06075	3	12	75	6	●
EXWSD-4040 04050	4	11	50	4	●
EXWSD-4040 04075	4	15	75	4	●
EXWSD-4040 06050	4	11	50	6	●
EXWSD-4040 06075	4	15	75	6	●
EXWSD-4050 06050	5	13	50	6	●
EXWSD-4050 06075	5	18	75	6	●
EXWSD-4060 06050	6	16	50	6	●
EXWSD-4060 06060	6	16	60	6	●
EXWSD-4060 06075	6	20	75	6	●
EXWSD-4060 06100	6	20	100	6	●
EXWSD-4080 08060	8	20	60	8	●
EXWSD-4080 08075	8	20	75	8	●
EXWSD-4080 08100	8	25	100	8	●
EXWSD-4100 10075	10	25	75	10	●
EXWSD-4100 10100	10	30	100	10	●
EXWSD-4120 12075	12	30	75	12	●
EXWSD-4120 12100	12	35	100	12	●
EXWSD-4160 16100	16	45	100	16	●
EXWSD-4160 16125	16	50	125	16	●

EXWSD-4

4 Flute Square End Mill

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	Lc	L	Φd	
EXWSD-4200 20100	20	45	100	20	●
EXWSD-4200 20125	20	55	125	20	●

TABLE OF RECOMMENDED MILLING MATERIALS

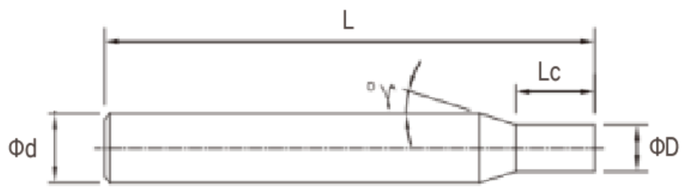
CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
O	O	O			O	O

COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
O	O		O	O	

O Very suitable O Suitable

EXWSF-4

4 Flute Square End Mill



AlCrSiN | 4 | 45° Spiral Angle | Arc Back Angle | S | Shank Dia. tolerance H5 | < 55 HRC

ΦD	D Tolerance
D≤3	0~-0.010
3 < D≤6	0~-0.012
6 < D≤10	0~-0.015
10 < D≤20	0~-0.018

(mm)

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	Lc	L	Φd	
EXWSF-4010 04050	1	3	50	4	●
EXWSF-4010 06050	1	3	50	6	○
EXWSF-4012 04050	1.2	3.5	50	4	○
EXWSF-4014 04050	1.4	4	50	4	○
EXWSF-4015 04050	1.5	4	50	4	●
EXWSF-4015 06050	1.5	4	50	6	○
EXWSF-4016 04050	1.6	5	50	4	○
EXWSF-4020 04050	2	6	50	4	●
EXWSF-4020 06050	2	6	50	6	○
EXWSF-4025 04050	2.5	8	50	4	●
EXWSF-4025 06050	2.5	8	50	6	○
EXWSF-4030 04050	3	8	50	4	●
EXWSF-4030 06050	3	8	50	6	●
EXWSF-4030 06060	3	8	60	6	●
EXWSF-4030 06075	3	12	75	6	●
EXWSF-4040 04050	4	11	50	4	●
EXWSF-4040 04075	4	15	75	4	●
EXWSF-4040 06050	4	11	50	6	●
EXWSF-4040 06060	4	11	60	6	○
EXWSF-4040 06075	4	15	75	6	●
EXWSF-4050 06050	5	13	50	6	●
EXWSF-4050 06060	5	13	60	6	●
EXWSF-4050 06075	5	18	75	6	●
EXWSF-4060 06050	6	16	50	6	●
EXWSF-4060 06060	6	16	60	6	●
EXWSF-4060 06075	6	20	75	6	●
EXWSF-4060 06100	6	20	100	6	●
EXWSF-4080 08060	8	20	60	8	●
EXWSF-4080 08075	8	20	75	8	●
EXWSF-4080 08100	8	25	100	8	●
EXWSF-4100 10075	10	25	75	10	●
EXWSF-4100 10100	10	30	100	10	●
EXWSF-4100 10125	10	35	125	10	●
EXWSF-4120 12075	12	30	75	12	●

EXWSF-4

4 Flute Square End Mill

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	Lc	L	Φd	
EXWSF-4120 12100	12	35	100	12	●
EXWSF-4120 12125	12	42	125	12	●
EXWSF-4160 16100	16	45	100	16	●
EXWSF-4160 16150	16	50	150	16	●
EXWSF-4200 20100	20	45	100	20	●
EXWSF-4200 20150	20	55	150	20	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	○			○	○

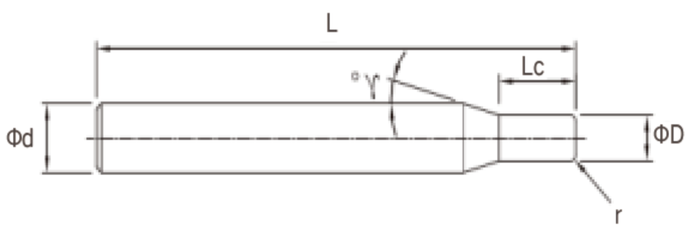
COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○	○		○	○	

○ Very suitable ○ Suitable

EXWRD-2

2 Flute Corner Radius End Mill

AlCrSiN | 2 | 30° Spiral Angle | Straight Back Angle | R | Shank Dia. tolerance H5 | <55 HRC



ΦD	D Tolerance
D≤3	0~-0.010
3<D≤6	0~-0.012
6<D≤10	0~-0.015
10<D≤18	0~-0.018

(mm)

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	L	Φd	
EXWRD-2002R0.05 04050	0.2	0.05	0.4	50	4	●
EXWRD-2003R0.05 04050	0.3	0.05	0.6	50	4	●
EXWRD-2004R0.05 04050	0.4	0.05	0.8	50	4	●
EXWRD-2004R0.1 04050	0.4	0.1	0.8	50	4	●
EXWRD-2005R0.05 04050	0.5	0.05	1	50	4	●
EXWRD-2005R0.1 04050	0.5	0.1	1	50	4	●
EXWRD-2006R0.05 04050	0.6	0.05	1.2	50	4	●
EXWRD-2006R0.1 04050	0.6	0.1	1.2	50	4	●
EXWRD-2007R0.05 04050	0.7	0.05	1.4	50	4	●
EXWRD-2007R0.1 04050	0.7	0.1	1.4	50	4	●
EXWRD-2008R0.05 04050	0.8	0.05	1.6	50	4	●
EXWRD-2008R0.1 04050	0.8	0.1	1.6	50	4	●
EXWRD-2009R0.1 04050	0.9	0.1	1.8	50	4	●
EXWRD-2010R0.05 04050	1	0.05	2	50	4	●
EXWRD-2010R0.1 04050	1	0.1	2	50	4	●
EXWRD-2010R0.2 04050	1	0.2	2	50	4	●
EXWRD-2010R0.3 04050	1	0.3	2	50	4	●
EXWRD-2015R0.05 04050	1.5	0.05	3	50	4	●
EXWRD-2015R0.1 04050	1.5	0.1	3	50	4	●
EXWRD-2015R0.2 04050	1.5	0.2	3	50	4	●
EXWRD-2015R0.3 04050	1.5	0.3	3	50	4	●
EXWRD-2020R0.05 04050	2	0.05	4	50	4	●
EXWRD-2020R0.1 04050	2	0.1	4	50	4	●
EXWRD-2020R0.2 04050	2	0.2	4	50	4	●
EXWRD-2020R0.3 04050	2	0.3	4	50	4	●
EXWRD-2020R0.5 04050	2	0.5	4	50	4	●
EXWRD-2030R0.2 04050	3	0.2	6	50	4	●
EXWRD-2030R0.2 06060	3	0.2	6	60	6	●
EXWRD-2030R0.5 04050	3	0.5	6	50	4	●
EXWRD-2030R0.5 06060	3	0.5	6	60	6	●
EXWRD-2040R0.2 04050	4	0.2	8	50	4	●
EXWRD-2040R0.2 06060	4	0.2	8	60	6	●
EXWRD-2040R0.5 04050	4	0.5	8	50	4	●
EXWRD-2040R0.5 06060	4	0.5	8	60	6	●

EXWRD-2

2 Flute Corner Radius End Mill

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	L	Φd	
EXWRD-2040R1.0 04050	4	1.0	8	50	4	●
EXWRD-2040R1.0 06060	4	1.0	8	60	6	●
EXWRD-2060R0.5 06050	6	0.5	12	50	6	●
EXWRD-2060R0.5 06060	6	0.5	12	60	6	●
EXWRD-2060R0.5 06075	6	0.5	12	75	6	●
EXWRD-2060R0.5 06100	6	0.5	12	100	6	●
EXWRD-2060R1.0 06050	6	1.0	12	50	6	●
EXWRD-2060R1.0 06060	6	1.0	12	60	6	●
EXWRD-2060R1.0 06075	6	1.0	12	75	6	●
EXWRD-2060R1.0 06100	6	1.0	12	100	6	●
EXWRD-2080R0.5 08060	8	0.5	16	60	8	●
EXWRD-2080R0.5 08075	8	0.5	16	75	8	●
EXWRD-2080R0.5 08100	8	0.5	16	100	8	●
EXWRD-2080R1.0 08060	8	1.0	16	60	8	●
EXWRD-2080R1.0 08075	8	1.0	16	75	8	●
EXWRD-2080R1.0 08100	8	1.0	16	100	8	●
EXWRD-2100R0.5 10075	10	0.5	20	75	10	●
EXWRD-2100R0.5 10100	10	0.5	20	100	10	●
EXWRD-2100R1.0 10075	10	1.0	20	75	10	●
EXWRD-2100R1.0 10100	10	1.0	20	100	10	●
EXWRD-2120R0.5 12075	12	0.5	24	75	12	●
EXWRD-2120R0.5 12100	12	0.5	24	100	12	●
EXWRD-2120R1.0 12075	12	1.0	24	75	12	●
EXWRD-2120R1.0 12100	12	1.0	24	100	12	●
EXWRD-2120R2.0 12075	12	2.0	24	75	12	●
EXWRD-2120R2.0 12100	12	2.0	24	100	12	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	○			○	○

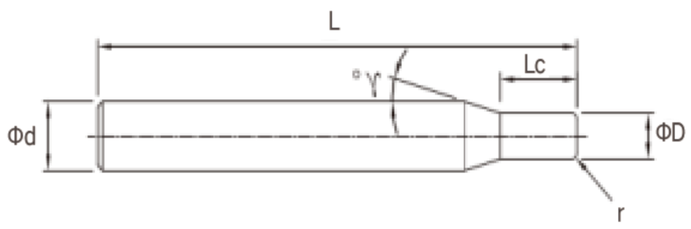
COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○	○		○	○	

○ Very suitable ○ Suitable

EXWRD-4

4 Flute Corner Radius End Mill

AlCrSiN | 4 | 30° Spiral Angle | Straight Back Angle | R | Shank Dia. tolerance H5 | <55 HRC



ΦD	D Tolerance
D≤3	0~-0.010
3<D≤6	0~-0.012
6<D≤10	0~-0.015
10<D≤18	0~-0.018

(mm)

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	L	Φd	
EXWRD-4008R0.05 04050	0.8	0.05	1.6	50	4	○
EXWRD-4008R0.1 04050	0.8	0.1	1.6	50	4	○
EXWRD-4010R0.05 04050	1	0.05	2	50	4	●
EXWRD-4010R0.1 04050	1	0.1	2	50	4	●
EXWRD-4010R0.2 04050	1	0.2	2	50	4	●
EXWRD-4010R0.3 04050	1	0.3	2	50	4	●
EXWRD-4015R0.05 04050	1.5	0.05	3	50	4	●
EXWRD-4015R0.1 04050	1.5	0.1	3	50	4	●
EXWRD-4015R0.2 04050	1.5	0.2	3	50	4	●
EXWRD-4015R0.3 04050	1.5	0.3	3	50	4	●
EXWRD-4020R0.05 04050	2	0.05	4	50	4	●
EXWRD-4020R0.1 04050	2	0.1	4	50	4	●
EXWRD-4020R0.2 04050	2	0.2	4	50	4	●
EXWRD-4020R0.3 04050	2	0.3	4	50	4	●
EXWRD-4020R0.5 04050	2	0.5	4	50	4	●
EXWRD-4025R0.1 04050	2.5	0.1	5	50	4	○
EXWRD-4025R0.2 04050	2.5	0.2	5	50	4	○
EXWRD-4025R0.3 04050	2.5	0.3	5	50	4	○
EXWRD-4025R0.5 04050	2.5	0.5	5	50	4	○
EXWRD-4030R0.1 04050	3	0.1	6	50	4	●
EXWRD-4030R0.1 06060	3	0.1	6	60	6	●
EXWRD-4030R0.1 06075	3	0.1	6	75	6	●
EXWRD-4030R0.2 04050	3	0.2	6	50	4	●
EXWRD-4030R0.2 06060	3	0.2	6	60	6	●
EXWRD-4030R0.2 06075	3	0.2	6	75	6	●
EXWRD-4030R0.3 04050	3	0.3	6	50	4	●
EXWRD-4030R0.3 06060	3	0.3	6	60	6	●
EXWRD-4030R0.3 06075	3	0.3	6	75	6	●
EXWRD-4030R0.5 04050	3	0.5	6	50	4	●
EXWRD-4030R0.5 06060	3	0.5	6	60	6	●
EXWRD-4030R0.5 06075	3	0.5	6	75	6	●
EXWRD-4040R0.1 04050	4	0.1	8	50	4	●
EXWRD-4040R0.1 04075	4	0.1	8	75	4	●
EXWRD-4040R0.1 06060	4	0.1	8	60	6	●

EXWRD-4

4 Flute Corner Radius End Mill

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	L	Φd	
EXWRD-4040R0.1 06075	4	0.1	8	75	6	●
EXWRD-4040R0.2 04050	4	0.2	8	50	4	●
EXWRD-4040R0.2 04075	4	0.2	8	75	4	●
EXWRD-4040R0.2 06050	4	0.2	8	50	6	●
EXWRD-4040R0.2 06060	4	0.2	8	60	6	●
EXWRD-4040R0.2 06075	4	0.2	8	75	6	●
EXWRD-4040R0.3 04050	4	0.3	8	50	4	●
EXWRD-4040R0.3 04075	4	0.3	8	75	4	●
EXWRD-4040R0.3 06060	4	0.3	8	60	6	●
EXWRD-4040R0.3 06075	4	0.3	8	75	6	●
EXWRD-4040R0.5 04050	4	0.5	8	50	4	●
EXWRD-4040R0.5 04075	4	0.5	8	75	4	●
EXWRD-4040R0.5 06050	4	0.5	8	50	6	●
EXWRD-4040R0.5 06060	4	0.5	8	60	6	●
EXWRD-4040R0.5 06075	4	0.5	8	75	6	●
EXWRD-4040R1.0 04050	4	1.0	8	50	4	●
EXWRD-4040R1.0 04075	4	1.0	8	75	4	●
EXWRD-4040R1.0 06060	4	1.0	8	60	6	●
EXWRD-4040R1.0 06075	4	1.0	8	75	6	●
EXWRD-4060R0.1 06050	6	0.1	12	50	6	●
EXWRD-4060R0.1 06060	6	0.1	12	60	6	●
EXWRD-4060R0.1 06075	6	0.1	12	75	6	●
EXWRD-4060R0.1 06100	6	0.1	12	100	6	●
EXWRD-4060R0.2 06050	6	0.2	12	50	6	●
EXWRD-4060R0.2 06060	6	0.2	12	60	6	●
EXWRD-4060R0.2 06075	6	0.2	12	75	6	●
EXWRD-4060R0.2 06100	6	0.2	12	100	6	●
EXWRD-4060R0.3 06050	6	0.3	12	50	6	●
EXWRD-4060R0.3 06060	6	0.3	12	60	6	●
EXWRD-4060R0.3 06075	6	0.3	12	75	6	●
EXWRD-4060R0.3 06100	6	0.3	12	100	6	●
EXWRD-4060R0.5 06050	6	0.5	12	50	6	●
EXWRD-4060R0.5 06060	6	0.5	12	60	6	●
EXWRD-4060R0.5 06075	6	0.5	12	75	6	●
EXWRD-4060R0.5 06100	6	0.5	12	100	6	●
EXWRD-4060R1.0 06050	6	1.0	12	50	6	●
EXWRD-4060R1.0 06060	6	1.0	12	60	6	●
EXWRD-4060R1.0 06075	6	1.0	12	75	6	●
EXWRD-4060R1.0 06100	6	1.0	12	100	6	●
EXWRD-4080R0.1 08060	8	0.1	16	60	8	●
EXWRD-4080R0.1 08075	8	0.1	16	75	8	●
EXWRD-4080R0.1 08100	8	0.1	16	100	8	●

EXWRD-4

4 Flute Corner Radius End Mill

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	L	Φd	
EXWRD-4080R0.2 08060	8	0.2	16	60	8	●
EXWRD-4080R0.2 08075	8	0.2	16	75	8	●
EXWRD-4080R0.2 08100	8	0.2	16	100	8	●
EXWRD-4080R0.3 08060	8	0.3	16	60	8	●
EXWRD-4080R0.3 08075	8	0.3	16	75	8	●
EXWRD-4080R0.3 08100	8	0.3	16	100	8	●
EXWRD-4080R0.5 08060	8	0.5	16	60	8	●
EXWRD-4080R0.5 08075	8	0.5	16	75	8	●
EXWRD-4080R0.5 08100	8	0.5	16	100	8	●
EXWRD-4080R1.0 08060	8	1.0	16	60	8	●
EXWRD-4080R1.0 08075	8	1.0	16	75	8	●
EXWRD-4080R1.0 08100	8	1.0	16	100	8	●
EXWRD-4100R0.2 10075	10	0.2	20	75	10	●
EXWRD-4100R0.2 10100	10	0.2	20	100	10	●
EXWRD-4100R0.5 10075	10	0.5	20	75	10	●
EXWRD-4100R0.5 10100	10	0.5	20	100	10	●
EXWRD-4100R1.0 10075	10	1.0	20	75	10	●
EXWRD-4100R1.0 10100	10	1.0	20	100	10	●
EXWRD-4120R0.5 12075	12	0.5	24	75	12	●
EXWRD-4120R0.5 12100	12	0.5	24	100	12	●
EXWRD-4120R1.0 12075	12	1.0	24	75	12	●
EXWRD-4120R1.0 12100	12	1.0	24	100	12	●
EXWRD-4120R2.0 12075	12	2.0	24	75	12	●
EXWRD-4120R2.0 12100	12	2.0	24	100	12	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	○			○	○

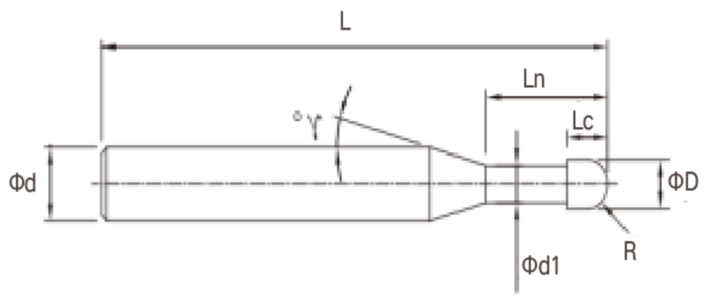
COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○	○		○	○	

○ Very suitable ○ Suitable

EXWBD-2

2 Flute Ball Nose End Mill

AlCrSiN | 2 | 30° Spiral Angle | Straight Back Angle | B | Shank Dia. tolerance H5 | <55 HRC



ΦD	D Tolerance
D≤3	0~-0.010
3<D≤6	0~-0.012
6<D≤10	0~-0.015
10<D≤18	0~-0.018

ΦD	R Tolerance
D<1	±0.003
1≤D≤8	±0.005
D>8	±0.008

(mm)

Order Code	Dia.	Radius	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXWBD-2001 04050	0.1	0.05	0.1	-	-	50	4	●
EXWBD-20015 04050	0.15	0.075	0.15	-	-	50	4	●
EXWBD-2002 04050	0.2	0.1	0.2	-	-	50	4	●
EXWBD-2003 04050	0.3	0.15	0.3	-	-	50	4	●
EXWBD-2004 04050	0.4	0.2	0.6	-	-	50	4	●
EXWBD-2005 04050	0.5	0.25	0.8	-	-	50	4	●
EXWBD-2006 04050	0.6	0.3	0.9	-	-	50	4	●
EXWBD-2008 04050	0.8	0.4	1.2	-	-	50	4	●
EXWBD-2010 04050	1	0.5	0.75	2	0.95	50	4	●
EXWBD-2010 06050	1	0.5	0.75	2.5	0.95	50	6	●
EXWBD-2010 06060	1	0.5	0.75	2.5	0.95	60	6	●
EXWBD-2010 06075	1	0.5	0.75	2.5	0.95	75	6	●
EXWBD-2012 04050	1.2	0.6	0.9	2.4	1.14	50	4	●
EXWBD-2015 04050	1.5	0.75	1.2	3	1.42	50	4	●
EXWBD-2015 06050	1.5	0.75	1.2	4	1.42	50	6	●
EXWBD-2015 06060	1.5	0.75	1.2	4	1.42	60	6	●
EXWBD-2015 06075	1.5	0.75	1.2	4	1.42	75	6	●
EXWBD-2020 04050	2	1.0	1.6	4	1.9	50	4	●
EXWBD-2020 06050	2	1.0	1.6	6	1.9	50	6	●
EXWBD-2020 06060	2	1.0	1.6	6	1.9	60	6	●
EXWBD-2020 06075	2	1.0	1.6	6	1.9	75	6	●
EXWBD-2025 04050	2.5	1.25	2	5	2.4	50	4	●
EXWBD-2025 06050	2.5	1.25	2	7	2.4	50	6	●
EXWBD-2025 06060	2.5	1.25	2	7	2.4	60	6	●
EXWBD-2025 06075	2.5	1.25	2	7	2.4	75	6	●
EXWBD-2030 04050	3	1.5	2.4	6	2.9	50	4	●
EXWBD-2030 06050	3	1.5	2.4	8	2.9	50	6	●
EXWBD-2030 06060	3	1.5	2.4	8	2.9	60	6	●
EXWBD-2030 06075	3	1.5	2.4	8	2.9	75	6	●
EXWBD-2040 04050	4	2.0	6	-	-	50	4	●
EXWBD-2040 04075	4	2.0	6	-	-	75	4	●
EXWBD-2040 06050	4	2.0	3.2	10	3.9	50	6	●
EXWBD-2040 06060	4	2.0	3.2	10	3.9	60	6	●
EXWBD-2040 06075	4	2.0	3.2	10	3.9	75	6	●

EXWBD-2

2 Flute Ball Nose End Mill

Order Code	Dia.	Radius	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXWBD-2050 06050	5	2.5	4	12	4.85	50	6	●
EXWBD-2050 06060	5	2.5	4	12	4.85	60	6	●
EXWBD-2050 06075	5	2.5	4	12	4.85	75	6	●
EXWBD-2060 06050	6	3.0	9	-	-	50	6	●
EXWBD-2060 06060	6	3.0	9	-	-	60	6	●
EXWBD-2060 06075	6	3.0	9	-	-	75	6	●
EXWBD-2060 06100	6	3.0	9	-	-	100	6	●
EXWBD-2080 08060	8	4.0	12	-	-	60	8	●
EXWBD-2080 08075	8	4.0	12	-	-	75	8	●
EXWBD-2080 08100	8	4.0	12	-	-	100	8	●
EXWBD-2100 10075	10	5.0	15	-	-	75	10	●
EXWBD-2100 10100	10	5.0	15	-	-	100	10	●
EXWBD-2100 10125	10	5.0	15	-	-	125	10	●
EXWBD-2120 12075	12	6.0	18	-	-	75	12	●
EXWBD-2120 12100	12	6.0	18	-	-	100	12	●
EXWBD-2120 12125	12	6.0	18	-	-	125	12	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	○			○	○

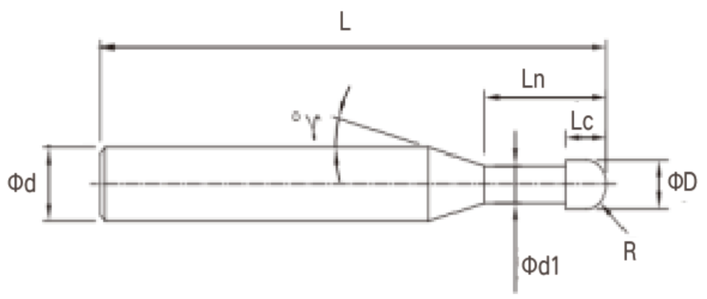
COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○	○		○	○	

○ Very suitable ○ Suitable

EXWBD-2L

2 Flute Ball Nose End Mill (Long Neck)

AlCrSiN | 2 | 30° Spiral Angle | Straight Back Angle | B | Shank Dia. tolerance H5 | <55 HRC



ΦD	D Tolerance
D≤3	0~-0.010
3<D≤6	0~-0.012
6<D≤10	0~-0.015
10<D≤18	0~-0.018

ΦD	R Tolerance
D<1	±0.003
1≤D≤8	±0.005
D>8	±0.008

(mm)

Order Code	Dia.	Corner	Length of cut	Neck length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXWBD-2001L0.2 04050	0.1	0.05	0.07	0.2	0.085	50	4	●
EXWBD-2001L0.3 04050	0.1	0.05	0.07	0.3	0.085	50	4	●
EXWBD-2001L0.5 04050	0.1	0.05	0.07	0.5	0.085	50	4	●
EXWBD-2001L0.75 04050	0.1	0.05	0.07	0.75	0.085	50	4	●
EXWBD-2001L1 04050	0.1	0.05	0.07	1	0.085	50	4	●
EXWBD-20015L0.3 04050	0.15	0.075	0.1	0.3	0.13	50	4	●
EXWBD-20015L0.5 04050	0.15	0.075	0.1	0.5	0.13	50	4	●
EXWBD-20015L0.75 04050	0.15	0.075	0.1	0.75	0.13	50	4	●
EXWBD-20015L1 04050	0.15	0.075	0.1	1	0.13	50	4	●
EXWBD-20015L1.5 04050	0.15	0.075	0.1	1.5	0.13	50	4	●
EXWBD-2002L0.3 04050	0.2	0.1	0.15	0.3	0.18	50	4	●
EXWBD-2002L0.5 04050	0.2	0.1	0.15	0.5	0.18	50	4	●
EXWBD-2002L0.75 04050	0.2	0.1	0.15	0.75	0.18	50	4	●
EXWBD-2002L1 04050	0.2	0.1	0.15	1	0.18	50	4	●
EXWBD-2002L1.25 04050	0.2	0.1	0.15	1.25	0.18	50	4	●
EXWBD-2002L1.5 04050	0.2	0.1	0.15	1.5	0.18	50	4	●
EXWBD-2002L1.75 04050	0.2	0.1	0.15	1.75	0.18	50	4	●
EXWBD-2002L2 04050	0.2	0.1	0.15	2	0.18	50	4	●
EXWBD-2003L0.5 04050	0.3	0.15	0.2	0.5	0.28	50	4	●
EXWBD-2003L0.6 04050	0.3	0.15	0.2	0.6	0.28	50	4	●
EXWBD-2003L0.75 04050	0.3	0.15	0.2	0.75	0.28	50	4	●
EXWBD-2003L1 04050	0.3	0.15	0.2	1	0.28	50	4	●
EXWBD-2003L1.25 04050	0.3	0.15	0.2	1.25	0.28	50	4	●
EXWBD-2003L1.5 04050	0.3	0.15	0.2	1.5	0.28	50	4	●
EXWBD-2003L1.75 04050	0.3	0.15	0.2	1.75	0.28	50	4	●
EXWBD-2003L2 04050	0.3	0.15	0.2	2	0.28	50	4	●
EXWBD-2003L2.25 04050	0.3	0.15	0.2	2.25	0.28	50	4	●
EXWBD-2003L2.5 04050	0.3	0.15	0.2	2.5	0.28	50	4	●
EXWBD-2003L3 04050	0.3	0.15	0.2	3	0.28	50	4	●
EXWBD-2004L0.5 04050	0.4	0.2	0.3	0.5	0.37	50	4	●
EXWBD-2004L0.8 04050	0.4	0.2	0.3	0.8	0.37	50	4	●
EXWBD-2004L1 04050	0.4	0.2	0.3	1	0.37	50	4	●
EXWBD-2004L1.5 04050	0.4	0.2	0.3	1.5	0.37	50	4	●
EXWBD-2004L2 04050	0.4	0.2	0.3	2	0.37	50	4	●

EXWBD-2L

2 Flute Ball Nose End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Neck length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXWBD-2004L2.5 04050	0.4	0.2	0.3	2.5	0.37	50	4	●
EXWBD-2004L3 04050	0.4	0.2	0.3	3	0.37	50	4	●
EXWBD-2004L3.5 04050	0.4	0.2	0.3	3.5	0.37	50	4	●
EXWBD-2004L4 04050	0.4	0.2	0.3	4	0.37	50	4	●
EXWBD-2004L4.5 04050	0.4	0.2	0.3	4.5	0.37	50	4	●
EXWBD-2005L1 04050	0.5	0.25	0.35	1	0.46	50	4	●
EXWBD-2005L1.5 04050	0.5	0.25	0.35	1.5	0.46	50	4	●
EXWBD-2005L2 04050	0.5	0.25	0.35	2	0.46	50	4	●
EXWBD-2005L2.5 04050	0.5	0.25	0.35	2.5	0.46	50	4	●
EXWBD-2005L3 04050	0.5	0.25	0.35	3	0.46	50	4	●
EXWBD-2005L3.5 04050	0.5	0.25	0.35	3.5	0.46	50	4	●
EXWBD-2005L4 04050	0.5	0.25	0.35	4	0.46	50	4	●
EXWBD-2005L4.5 04050	0.5	0.25	0.35	4.5	0.46	50	4	●
EXWBD-2005L5 04050	0.5	0.25	0.35	5	0.46	50	4	●
EXWBD-2005L5.5 04050	0.5	0.25	0.35	5.5	0.46	50	4	●
EXWBD-2005L6 04050	0.5	0.25	0.35	6	0.46	50	4	●
EXWBD-2006L1 04050	0.6	0.3	0.45	1	0.56	50	4	●
EXWBD-2006L1.5 04050	0.6	0.3	0.45	1.5	0.56	50	4	●
EXWBD-2006L2 04050	0.6	0.3	0.45	2	0.56	50	4	●
EXWBD-2006L3 04050	0.6	0.3	0.45	3	0.56	50	4	●
EXWBD-2006L4 04050	0.6	0.3	0.45	4	0.56	50	4	●
EXWBD-2006L5 04050	0.6	0.3	0.45	5	0.56	50	4	●
EXWBD-2006L6 04050	0.6	0.3	0.45	6	0.56	50	4	●
EXWBD-2006L7 04050	0.6	0.3	0.45	7	0.56	50	4	●
EXWBD-2006L8 04050	0.6	0.3	0.45	8	0.56	50	4	●
EXWBD-2007L2 04050	0.7	0.35	0.5	2	0.66	50	4	●
EXWBD-2007L3 04050	0.7	0.35	0.5	3	0.66	50	4	●
EXWBD-2007L4 04050	0.7	0.35	0.5	4	0.66	50	4	●
EXWBD-2007L6 04050	0.7	0.35	0.5	6	0.66	50	4	●
EXWBD-2007L8 04050	0.7	0.35	0.5	8	0.66	50	4	●
EXWBD-2008L2 04050	0.8	0.4	0.6	2	0.76	50	4	●
EXWBD-2008L2.5 04050	0.8	0.4	0.6	2.5	0.76	50	4	●
EXWBD-2008L3 04050	0.8	0.4	0.6	3	0.76	50	4	●
EXWBD-2008L4 04050	0.8	0.4	0.6	4	0.76	50	4	●
EXWBD-2008L5 04050	0.8	0.4	0.6	5	0.76	50	4	●
EXWBD-2008L6 04050	0.8	0.4	0.6	6	0.76	50	4	●
EXWBD-2008L7 04050	0.8	0.4	0.6	7	0.76	50	4	●
EXWBD-2008L8 04050	0.8	0.4	0.6	8	0.76	50	4	●
EXWBD-2008L10 04050	0.8	0.4	0.6	10	0.76	50	4	●
EXWBD-2008L12 04050	0.8	0.4	0.6	12	0.76	50	4	●
EXWBD-2008L16 04050	0.8	0.4	0.6	16	0.76	50	4	●
EXWBD-2009L2 04050	0.9	0.45	0.65	2	0.86	50	4	○

EXWBD-2L

2 Flute Ball Nose End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Neck length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXWBD-2009L4 04050	0.9	0.45	0.65	4	0.86	50	4	○
EXWBD-2009L6 04050	0.9	0.45	0.65	6	0.86	50	4	○
EXWBD-2009L8 04050	0.9	0.45	0.65	8	0.86	50	4	○
EXWBD-2010L2.5 04050	1	0.5	0.75	2.5	0.95	50	4	●
EXWBD-2010L3 04050	1	0.5	0.75	3	0.95	50	4	●
EXWBD-2010L4 04050	1	0.5	0.75	4	0.95	50	4	●
EXWBD-2010L4 06060	1	0.5	0.75	4	0.95	60	6	●
EXWBD-2010L5 04050	1	0.5	0.75	5	0.95	50	4	●
EXWBD-2010L6 04050	1	0.5	0.75	6	0.95	50	4	●
EXWBD-2010L6 06060	1	0.5	0.75	6	0.95	60	6	●
EXWBD-2010L7 04050	1	0.5	0.75	7	0.95	50	4	●
EXWBD-2010L8 04050	1	0.5	0.75	8	0.95	50	4	●
EXWBD-2010L8 06060	1	0.5	0.75	8	0.95	60	6	●
EXWBD-2010L9 04050	1	0.5	0.75	9	0.95	50	4	●
EXWBD-2010L10 04050	1	0.5	0.75	10	0.95	50	4	●
EXWBD-2010L10 06060	1	0.5	0.75	10	0.95	60	6	●
EXWBD-2010L12 04050	1	0.5	0.75	12	0.95	50	4	●
EXWBD-2010L13 04050	1	0.5	0.75	13	0.95	50	4	●
EXWBD-2010L14 04050	1	0.5	0.75	14	0.95	50	4	●
EXWBD-2010L16 04050	1	0.5	0.75	16	0.95	50	4	●
EXWBD-2010L18 04060	1	0.5	0.75	18	0.95	60	4	●
EXWBD-2010L20 04060	1	0.5	0.75	20	0.95	60	4	●
EXWBD-2010L22 04060	1	0.5	0.75	22	0.95	60	4	●
EXWBD-2012L4 04050	1.2	0.6	1	4	1.14	50	4	○
EXWBD-2012L6 04050	1.2	0.6	1	6	1.14	50	4	○
EXWBD-2012L8 04050	1.2	0.6	1	8	1.14	50	4	○
EXWBD-2012L10 04050	1.2	0.6	1	10	1.14	50	4	○
EXWBD-2012L12 04050	1.2	0.6	1	12	1.14	50	4	○
EXWBD-2012L14 04050	1.2	0.6	1	14	1.14	50	4	○
EXWBD-2014L8 04050	1.4	0.7	1.1	8	1.34	50	4	○
EXWBD-2014L12 04050	1.4	0.7	1.1	12	1.34	50	4	○
EXWBD-2014L16 04050	1.4	0.7	1.1	16	1.34	50	4	○
EXWBD-2015L4 04050	1.5	0.75	1.2	4	1.42	50	4	●
EXWBD-2015L6 04050	1.5	0.75	1.2	6	1.42	50	4	●
EXWBD-2015L6 06060	1.5	0.75	1.2	6	1.42	60	6	●
EXWBD-2015L8 04050	1.5	0.75	1.2	8	1.42	50	4	●
EXWBD-2015L8 06060	1.5	0.75	1.2	8	1.42	60	6	●
EXWBD-2015L10 04050	1.5	0.75	1.2	10	1.42	50	4	●
EXWBD-2015L10 06060	1.5	0.75	1.2	10	1.42	60	6	●
EXWBD-2015L12 04050	1.5	0.75	1.2	12	1.42	50	4	●
EXWBD-2015L12 06060	1.5	0.75	1.2	12	1.42	60	6	●
EXWBD-2015L14 04050	1.5	0.75	1.2	14	1.42	50	4	●

EXWBD-2L

2 Flute Ball Nose End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Neck length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXWBD-2015L16 04050	1.5	0.75	1.2	16	1.42	50	4	●
EXWBD-2015L18 04060	1.5	0.75	1.2	18	1.42	60	4	●
EXWBD-2015L20 04060	1.5	0.75	1.2	20	1.42	60	4	●
EXWBD-2016L8 04050	1.6	0.8	1.3	8	1.52	50	4	●
EXWBD-2016L12 04050	1.6	0.8	1.3	12	1.52	50	4	●
EXWBD-2016L16 04050	1.6	0.8	1.3	16	1.52	50	4	●
EXWBD-2020L6 04050	2	1.0	1.6	6	1.9	50	4	●
EXWBD-2020L8 04050	2	1.0	1.6	8	1.9	50	4	●
EXWBD-2020L8 06060	2	1.0	1.6	8	1.9	60	6	●
EXWBD-2020L10 04050	2	1.0	1.6	10	1.9	50	4	●
EXWBD-2020L10 06060	2	1.0	1.6	10	1.9	60	6	●
EXWBD-2020L12 04050	2	1.0	1.6	12	1.9	50	4	●
EXWBD-2020L12 06060	2	1.0	1.6	12	1.9	60	6	●
EXWBD-2020L14 04050	2	1.0	1.6	14	1.9	50	4	●
EXWBD-2020L16 04050	2	1.0	1.6	16	1.9	50	4	●
EXWBD-2020L16 06060	2	1.0	1.6	16	1.9	60	6	●
EXWBD-2020L18 04060	2	1.0	1.6	18	1.9	60	4	●
EXWBD-2020L20 04060	2	1.0	1.6	20	1.9	60	4	●
EXWBD-2020L22 04060	2	1.0	1.6	22	1.9	60	4	●
EXWBD-2020L25 04060	2	1.0	1.6	25	1.9	60	4	●
EXWBD-2020L30 04075	2	1.0	1.6	30	1.9	75	4	●
EXWBD-2020L35 04075	2	1.0	1.6	35	1.9	75	4	●
EXWBD-2020L40 04075	2	1.0	1.6	40	1.9	75	4	●
EXWBD-2025L6 04050	2.5	1.25	2	6	2.4	50	4	●
EXWBD-2025L8 04050	2.5	1.25	2	8	2.4	50	4	●
EXWBD-2025L10 04050	2.5	1.25	2	10	2.4	50	4	●
EXWBD-2025L12 04050	2.5	1.25	2	12	2.4	50	4	●
EXWBD-2025L16 04050	2.5	1.25	2	16	2.4	50	4	●
EXWBD-2025L20 04060	2.5	1.25	2	20	2.4	60	4	●
EXWBD-2025L25 04060	2.5	1.25	2	25	2.4	60	4	●
EXWBD-2025L30 04075	2.5	1.25	2	30	2.4	75	4	●
EXWBD-2025L35 04075	2.5	1.25	2	35	2.4	75	4	●
EXWBD-2030L8 04050	3	1.5	2.4	8	2.9	50	4	●
EXWBD-2030L10 04050	3	1.5	2.4	10	2.9	50	4	●
EXWBD-2030L10 06060	3	1.5	2.4	10	2.9	60	6	●
EXWBD-2030L12 04050	3	1.5	2.4	12	2.9	50	4	●
EXWBD-2030L12 06060	3	1.5	2.4	12	2.9	60	6	●
EXWBD-2030L14 04050	3	1.5	2.4	14	2.9	50	4	●
EXWBD-2030L14 06060	3	1.5	2.4	14	2.9	60	6	●
EXWBD-2030L16 04050	3	1.5	2.4	16	2.9	50	4	●
EXWBD-2030L16 06060	3	1.5	2.4	16	2.9	60	6	●
EXWBD-2030L20 06060	3	1.5	2.4	20	2.9	60	6	●

EXWBD-2L

2 Flute Ball Nose End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Neck length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXWBD-2030L25 06075	3	1.5	2.4	25	2.9	75	6	●
EXWBD-2030L30 06075	3	1.5	2.4	30	2.9	75	6	●
EXWBD-2030L35 06075	3	1.5	2.4	35	2.9	75	6	●
EXWBD-2030L40 06100	3	1.5	2.4	40	2.9	100	6	●
EXWBD-2035L16 06060	3.5	1.75	2.8	16	3.4	60	6	○
EXWBD-2035L20 06060	3.5	1.75	2.8	20	3.4	60	6	○
EXWBD-2035L25 06075	3.5	1.75	2.8	25	3.4	75	6	○
EXWBD-2035L30 06075	3.5	1.75	2.8	30	3.4	75	6	○
EXWBD-2035L35 06075	3.5	1.75	2.8	35	3.4	75	6	○
EXWBD-2040L12 06060	4	2.0	3.2	12	3.9	60	6	●
EXWBD-2040L14 06060	4	2.0	3.2	14	3.9	60	6	●
EXWBD-2040L16 06060	4	2.0	3.2	16	3.9	60	6	●
EXWBD-2040L20 06060	4	2.0	3.2	20	3.9	60	6	●
EXWBD-2040L20 06075	4	2.0	3.2	20	3.9	75	6	●
EXWBD-2040L25 06075	4	2.0	3.2	25	3.9	75	6	●
EXWBD-2040L30 06075	4	2.0	3.2	30	3.9	75	6	●
EXWBD-2040L35 06075	4	2.0	3.2	35	3.9	75	6	●
EXWBD-2040L40 06100	4	2.0	3.2	40	3.9	100	6	●
EXWBD-2040L45 06100	4	2.0	3.2	45	3.9	100	6	●
EXWBD-2040L50 06100	4	2.0	3.2	50	3.9	100	6	●
EXWBD-2050L16 06060	5	2.5	4	16	4.85	60	6	○
EXWBD-2050L20 06060	5	2.5	4	20	4.85	60	6	○
EXWBD-2050L25 06075	5	2.5	4	25	4.85	75	6	○
EXWBD-2050L30 06075	5	2.5	4	30	4.85	75	6	○
EXWBD-2050L35 06075	5	2.5	4	35	4.85	75	6	○
EXWBD-2050L40 06100	5	2.5	4	40	4.85	100	6	●
EXWBD-2050L45 06100	5	2.5	4	45	4.85	100	6	●
EXWBD-2050L50 06100	5	2.5	4	50	4.85	100	6	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	○			○	○

COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○	○		○	○	

○ Very suitable ○ Suitable

EXWSD-2 Cutting Parameter

Workpiece	Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXWSD-2001 04050	48000	150	0.006	0.06	40000	150	0.005	0.06	32000	120	0.003	0.05
EXWSD-20015 04050	48000	150	0.006	0.09	40000	180	0.005	0.09	32000	80	0.003	0.05
EXWSD-2002 04050	36000	240	0.006	0.12	30000	240	0.005	0.12	24000	200	0.003	0.1
EXWSD-2003 04050	36000	300	0.01	0.2	30000	300	0.01	0.2	24000	300	0.01	0.2
EXWSD-2004 04050	33880	325	0.03	0.28	30800	300	0.03	0.28	28000	300	0.03	0.28
EXWSD-2005 04050	30250	363	0.03	0.3	27500	330	0.03	0.3	25000	300	0.03	0.3
EXWSD-2006 04050	26620	425	0.04	0.42	24200	385	0.04	0.42	22000	350	0.04	0.42
EXWSD-2007 04050	25000	450	0.04	0.49	23200	420	0.04	0.49	21000	380	0.04	0.49
EXWSD-2008 04050	24200	484	0.04	0.56	22000	440	0.04	0.56	20000	400	0.04	0.56
EXWSD-2010 04050	21780	605	0.05	0.7	19800	550	0.05	0.7	18000	500	0.05	0.7
EXWSD-2012 04050	21080	650	0.05	0.84	11900	550	0.05	0.84	17000	500	0.05	0.84
EXWSD-2014 04050	19580	695	0.05	0.91	17500	600	0.05	0.91	16000	550	0.05	0.91
EXWSD-2015 04050	18150	726	0.05	1.05	16500	660	0.05	1.05	15000	600	0.05	1.05
EXWSD-2016 04050	16620	800	0.05	1.12	14500	750	0.05	1.12	13500	650	0.05	1.12
EXWSD-2020 04050	15125	900	0.1	1.5	13750	825	0.1	1.5	12500	750	0.05	1.5
EXWSD-2025 04050	12100	1210	0.1	1.75	11000	1100	0.1	1.75	10000	1000	0.05	1.75
EXWSD-2030 04050	9680	1210	0.1	2.1	8800	1100	0.1	2.1	8000	1000	0.05	2.1
EXWSD-2040 04050	7865	1210	0.1	2.8	7150	1100	0.1	2.8	6500	1000	0.05	2.8
EXWSD-2050 06050	7260	1210	0.1	3.5	6600	1100	0.1	3.5	6000	1000	0.1	3.5
EXWSD-2060 06050	6050	726	0.1	4.2	5500	660	0.1	4.2	5000	600	0.1	4.2
EXWSD-2080 08060	5445	726	0.2	5.6	4950	660	0.1	5.6	4500	600	0.1	5.6
EXWSD-2100 10075	4840	605	0.2	7	4400	550	0.2	7	4000	500	0.1	7
EXWSD-2120 12075	4235	605	0.2	8.4	3850	550	0.2	8.4	3500	500	0.1	8.4
EXWSD-2120 12075	3630	605	0.2	9.6	3300	550	0.2	9.6	3000	500	0.1	9.6
EXWSD-2140 14075	3388	605	0.2	11.2	3080	550	0.2	11.2	2800	500	0.1	11.2
EXWSD-2200 20100	3025	605	0.2	14	2750	550	0.2	14	2500	500	0.1	14

EXWSD-4 Cutting Parameter

Workpiece	Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXWSD-4008 04050	22000	1200	0.03	0.56	21600	1160	0.03	0.56	19800	720	0.03	0.56
EXWSD-4010 04050	21780	1400	0.05	0.7	19800	1240	0.05	0.7	18000	800	0.05	0.7
EXWSD-4012 04050	20000	1500	0.05	0.8	18000	1280	0.05	0.8	17000	850	0.05	0.8
EXWSD-4014 04050	18800	1680	0.05	1	17200	1320	0.05	1	16000	900	0.05	1
EXWSD-4015 04050	18150	1680	0.05	1.05	16500	1488	0.05	1.05	15000	960	0.05	1.05
EXWSD-4016 04050	18150	1680	0.05	1.1	16500	1488	0.05	1.1	15000	960	0.05	1.1
EXWSD-4020 04050	15125	2100	0.1	1.5	13750	1860	0.1	1.5	12500	1200	0.05	1.5
EXWSD-4025 04050	12100	2800	0.1	1.75	11000	2480	0.1	1.75	1100	1600	0.05	1.75
EXWSD-4030 04050	9680	2800	0.1	2.1	8800	2480	0.1	2.1	8000	1600	0.05	2.1
EXWSD-4040 04050	7865	2800	0.1	2.8	7150	2480	0.1	2.8	6500	1600	0.05	2.8
EXWSD-4050 06050	7260	2100	0.1	3.5	6600	1860	0.1	3.5	6000	1200	0.1	3.5
EXWSD-4060 06050	6050	1680	0.1	4.2	5500	1488	0.1	4.2	5000	960	0.1	4.2
EXWSD-4080 08060	5445	1680	0.2	5.6	4950	1488	0.2	5.6	4500	960	0.1	5.6
EXWSD-4100 10075	4840	1400	0.2	7	4400	1240	0.2	7	4000	800	0.1	7
EXWSD-4120 12075	4235	1400	0.2	8.4	3850	1240	0.2	8.4	3500	800	0.1	8.4
EXWSD-4140 14075	3630	1400	0.2	9.6	3300	1240	0.2	9.6	3000	800	0.1	9.6
EXWSD-4160 16100	3388	1400	0.2	11.2	3080	1240	0.2	11.2	2800	800	0.1	11.2
EXWSD-4200 20100	3025	1400	0.2	14	2750	1240	0.2	14	2500	800	0.1	14

EXWSF-4 Cutting Parameter

Workpiece	Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXWSF-4010 04050	18150	320	2	0.1	16500	320	2	0.05	15000	250	1.5	0.05
EXWSF-4012 04050	18150	320	2.4	0.1	16500	320	2.4	0.05	15000	250	1.8	0.05
EXWSF-4014 04050	15000	350	2.8	0.1	14000	340	2.8	0.1	13500	280	2.1	0.05
EXWSF-4015 04050	14520	360	3	0.1	13200	360	3	0.1	12000	300	2.25	0.05
EXWSF-4016 04050	14000	380	3.2	0.1	12500	400	3.2	0.1	11800	320	2.4	0.05
EXWSF-4020 04050	12100	400	4	0.15	11000	400	4	0.1	11000	350	3	0.05
EXWSF-4025 04050	10285	440	5	0.15	9350	440	5	0.1	8500	400	3.75	0.05
EXWSF-4030 04050	9075	480	6	0.15	8250	480	6	0.1	7500	450	4.5	0.05
EXWSF-4040 04050	7018	600	8	0.15	6380	600	8	0.1	5800	550	6	0.08
EXWSF-4050 06050	6050	700	10	0.2	5500	700	10	0.1	5000	580	7.5	0.1
EXWSF-4060 06100	5445	1000	12	0.2	4950	1000	12	0.1	4500	600	9	0.1
EXWSF-4080 08075	4598	1500	16	0.3	4180	1500	16	0.2	3800	600	12	0.1
EXWSF-4100 10075	4235	2000	20	0.3	3850	2000	20	0.2	3500	550	15	0.1
EXWSF-4120 12075	3388	2500	24	0.3	3080	2500	24	0.2	2800	500	18	0.1
EXWSF-4140 14075	3025	2000	28	0.3	2750	2000	28	0.2	2500	500	21	0.1
EXWSF-4160 16100	2662	2000	32	0.3	2420	2000	32	0.2	2200	450	24	0.1
EXWSF-4200 20100	2420	2000	40	0.3	2200	2000	40	0.2	2000	400	30	0.1

EXWRD-2 Cutting Parameter

Workpiece	Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXWRD-2002R_	36000	360	0.006	0.12	30000	300	0.005	0.12	23000	200	0.003	0.1
EXWRD-2003R_	36000	350	0.008	0.18	30000	350	0.007	0.18	22000	300	0.003	0.15
EXWRD-2004R_	36000	500	0.012	0.28	30000	450	0.01	0.24	20000	400	0.005	0.2
EXWRD-2005R_	30000	600	0.016	0.14	25000	500	0.008	0.15	18500	400	0.006	0.1
EXWRD-2006R_	30000	600	0.016	0.2	25000	480	0.01	0.15	18000	384	0.007	0.1
EXWRD-2007R_	30000	840	0.016	0.25	25000	700	0.012	0.25	16800	560	0.01	0.15
EXWRD-2008R_	28000	1020	0.02	0.3	25000	850	0.014	0.25	15280	680	0.012	0.16
EXWRD-2009R_	25000	1200	0.05	0.3	25000	900	0.03	0.3	14000	800	0.02	0.2
EXWRD-2010R_	20000	1400	0.05	0.5	18000	1260	0.05	0.4	13600	1120	0.05	0.32
EXWRD-2015R_	17950	1500	0.05	0.65	16155	1350	0.05	0.52	13000	1200	0.05	0.4
EXWRD-2020R_	15890	1600	0.1	1	14301	1440	0.1	0.8	12712	1280	0.1	0.64
EXWRD-2030R_	12285	1800	0.1	1.5	11056	1620	0.1	1.2	9828	1440	0.1	0.96
EXWRD-2040R_	9680	2000	0.2	2	8712	1800	0.2	1.6	7744	1600	0.2	1.08
EXWRD-2060R_	7260	2500	0.2	3	6534	2250	0.2	2.4	5808	2000	0.2	1.96
EXWRD-2080R_	6050	2500	0.2	4	5445	2250	0.2	3.2	4840	2000	0.2	2.52
EXWRD-2100R_	5445	3000	0.2	5	4900	2700	0.2	4	4356	2400	0.2	3.2
EXWRD-2120R_	4840	3200	0.2	6	4356	2880	0.2	4.8	3872	2560	0.2	3.84

EXWRD-4 Cutting Parameter

Planing

Workpiece	Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXWRD-4008R_	28000	1500	0.02	0.3	25000	850	0.014	0.25	23000	680	0.012	0.16
EXWRD-4009R_	25000	1600	0.05	0.3	25000	900	0.03	0.3	20000	800	0.02	0.2
EXWRD-4010R_	20000	1800	0.05	0.5	18000	1620	0.05	0.4	16000	1440	0.05	0.32
EXWRD-4015R_	17950	2000	0.05	0.65	16155	1800	0.05	0.52	14360	1600	0.05	0.4
EXWRD-4020R_	15890	2200	0.1	1	14301	1980	0.1	0.8	12712	1760	0.1	0.64
EXWRD-4025R_	13500	2300	0.1	1.25	12080	2040	0.1	1	10080	1820	0.1	0.82
EXWRD-4030R_	12285	2400	0.1	1.5	11056	2160	0.1	1.2	9828	1920	0.1	0.96
EXWRD-4040R_	9680	2800	0.2	2	8712	2520	0.2	1.6	7744	2240	0.2	1.08
EXWRD-4060R_	7260	3000	0.2	3	6534	2700	0.2	2.4	5808	2400	0.2	1.96
EXWRD-4080R_	6050	3500	0.2	4	5445	3150	0.2	3.2	4840	2800	0.2	2.52
EXWRD-4100R_	5445	3500	0.2	5	4900	3150	0.2	4	4356	2900	0.2	3.2
EXWRD-4120R_	4840	3600	0.2	6	4356	3240	0.2	4.8	3872	2880	0.2	3.84

EXWRD-4 Cutting Parameter

Side Milling

Workpiece	Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXWRD-4008R_	28000	1500	0.02	0.02	25000	850	0.014	0.02	23000	680	0.012	0.015
EXWRD-4009R_	25000	1600	0.02	0.03	25000	900	0.03	0.03	20000	800	0.02	0.015
EXWRD-4010R_	20000	1800	0.05	0.03	18000	1620	0.05	0.03	16000	1440	0.05	0.02
EXWRD-4015R_	17950	2000	0.05	0.05	16155	1800	0.05	0.05	14360	1600	0.05	0.02
EXWRD-4020R_	15890	2200	0.1	0.05	14301	1980	0.1	0.05	12712	1760	0.1	0.03
EXWRD-4025R_	13520	2300	0.1	0.05	12080	2040	0.1	0.05	10080	1840	0.1	0.03
EXWRD-4030R_	12285	2400	0.1	0.05	11056	2160	0.1	0.05	9828	1920	0.1	0.03
EXWRD-4040R_	9680	2800	0.2	0.05	8712	2520	0.2	0.05	7744	2240	0.2	0.05
EXWRD-4060R_	7260	3000	0.2	0.08	6534	2700	0.2	0.08	5808	2400	0.2	0.05
EXWRD-4080R_	6050	3500	0.2	0.08	5445	3150	0.2	0.08	4840	2800	0.2	0.05
EXWRD-4100R_	5445	3500	0.2	0.1	4900	3150	0.2	0.1	4356	2800	0.2	0.05
EXWRD-4120R_	4840	3600	0.2	0.1	4356	3240	0.2	0.1	3872	2880	0.2	0.05

EXWBD-2 Cutting Parameter

Workpiece	Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXWBD-2001	40000	150	0.003	0.005	40000	100	0.003	0.005	40000	70	0.002	0.003
EXWBD-20015	40000	200	0.003	0.005	40000	180	0.003	0.005	40000	100	0.003	0.004
EXWBD-2002	35000	300	0.005	0.008	35000	284	0.005	0.008	32000	200	0.005	0.008
EXWBD-2003	32000	500	0.01	0.01	30000	400	0.01	0.01	32000	364	0.008	0.01
EXWBD-2004	28000	600	0.01	0.03	28000	600	0.01	0.03	28000	600	0.01	0.03
EXWBD-2005	25000	720	0.01	0.03	25000	720	0.01	0.03	25000	720	0.01	0.03
EXWBD-2006	22000	800	0.02	0.03	22000	800	0.02	0.03	22000	800	0.02	0.03
EXWBD-2008	20000	1000	0.02	0.03	20000	1000	0.02	0.03	20000	1000	0.02	0.03
EXWBD-2010	18000	1200	0.03	0.05	18000	1200	0.03	0.05	18000	1200	0.03	0.05
EXWBD-2012	17000	1350	0.03	0.05	17000	1350	0.03	0.05	17000	1350	0.03	0.05
EXWBD-2015	16000	1500	0.03	0.05	16000	1500	0.03	0.05	16000	1500	0.03	0.05
EXWBD-2020	14800	1580	0.04	0.06	14800	1580	0.04	0.06	14800	1580	0.04	0.06
EXWBD-2025	14400	1680	0.04	0.06	14400	1680	0.04	0.06	14400	1680	0.04	0.06
EXWBD-2030	13000	2000	0.05	0.08	13000	2000	0.05	0.08	13000	2000	0.05	0.08
EXWBD-2040	12000	2400	0.05	0.1	12000	2400	0.05	0.1	12000	2400	0.05	0.1
EXWBD-2050	10000	2500	0.05	0.1	10000	2500	0.05	0.1	10000	2500	0.05	0.1
EXWBD-2060	9000	2800	0.05	0.15	9000	2800	0.05	0.15	9000	2800	0.05	0.15
EXWBD-2080	8000	3000	0.08	0.2	8000	3000	0.08	0.2	8000	3000	0.05	0.2
EXWBD-2100	7200	3000	0.08	0.25	7200	3000	0.08	0.2	7200	3000	0.06	0.25
EXWBD-2120	6400	3200	0.1	0.25	6400	3200	0.1	0.25	6400	3200	0.08	0.25
EXWBD-2160	6000	3600	0.1	0.3	6000	3600	0.1	0.3	6000	3600	0.1	0.3

EXWBD-2L Cutting Parameter

Workpiece		Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
R0.05	0.2	40000	120	0.003	0.005	40000	100	0.002	0.005	40000	70	0.002	0.003
	0.3	40000	100	0.003	0.005	40000	70	0.002	0.005	40000	50	0.002	0.003
	0.5	40000	70	0.002	0.003	40000	50	0.001	0.003	40000	30	0.001	0.002
	0.75	40000	70	0.002	0.003	40000	50	0.001	0.003	40000	30	0.001	0.002
	1	40000	50	0.002	0.003	40000	30	0.001	0.003	40000	30	0.001	0.002
R0.075	0.3	40000	180	0.003	0.005	40000	150	0.002	0.005	40000	100	0.002	0.003
	0.5	40000	150	0.003	0.005	40000	120	0.002	0.005	40000	70	0.002	0.003
	0.75	40000	70	0.002	0.003	40000	50	0.001	0.003	40000	30	0.001	0.002
	1	40000	70	0.002	0.003	40000	50	0.001	0.003	40000	30	0.001	0.002
	1.5	40000	50	0.002	0.003	40000	30	0.001	0.003	40000	30	0.001	0.002
R0.1	0.3	40000	350	0.01	0.01	40000	300	0.006	0.005	36000	200	0.003	0.003
	0.5	40000	320	0.008	0.01	36000	280	0.005	0.005	36000	180	0.003	0.003
	0.75	40000	280	0.005	0.01	36000	200	0.003	0.005	36000	160	0.002	0.003
	1	40000	250	0.003	0.005	36000	160	0.002	0.003	36000	120	0.001	0.002
	1.25	40000	180	0.003	0.005	36000	140	0.002	0.003	36000	100	0.001	0.002
	1.5	40000	150	0.003	0.005	36000	120	0.002	0.003	36000	80	0.001	0.002
	1.75	40000	120	0.002	0.003	36000	100	0.001	0.002	36000	60	0.001	0.002
	2	40000	100	0.002	0.003	36000	80	0.001	0.002	36000	50	0.001	0.001
	2.5	40000	70	0.001	0.002	36000	60	0.001	0.001	36000	40	0.001	0.001
	3	40000	50	0.001	0.001	36000	40	0.001	0.001	36000	30	0.001	0.001
R0.15	0.5	36300	350	0.01	0.015	33000	300	0.007	0.001	30000	260	0.003	0.005
	0.6	36300	350	0.007	0.01	33000	300	0.005	0.007	30000	260	0.003	0.005
	0.75	36300	330	0.007	0.01	33000	280	0.005	0.007	30000	230	0.003	0.005
	1	36300	320	0.007	0.01	33000	250	0.005	0.007	30000	200	0.003	0.005
	1.25	36300	280	0.005	0.007	33000	200	0.003	0.005	30000	160	0.002	0.003
	1.5	36300	230	0.005	0.007	33000	160	0.003	0.005	30000	120	0.002	0.003
	1.75	36300	180	0.003	0.005	33000	160	0.002	0.003	30000	100	0.002	0.002
	2	36300	150	0.003	0.005	33000	120	0.002	0.003	30000	90	0.002	0.002
	2.25	36300	120	0.002	0.003	33000	100	0.001	0.002	30000	80	0.001	0.001
	2.5	36300	100	0.002	0.003	33000	80	0.001	0.002	30000	70	0.001	0.001
	3	36300	60	0.001	0.003	33000	70	0.001	0.002	30000	60	0.001	0.001
	3.5	36300	70	0.001	0.002	33000	60	0.001	0.001	30000	50	0.001	0.001

EXWBD-2L Cutting Parameter

Workpiece		Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
R0.15	4	36300	60	0.001	0.002	33000	50	0.001	0.001	30000	40	0.001	0.001
R0.2	0.5	36300	800	0.03	0.05	33000	720	0.03	0.03	30000	580	0.009	0.02
	0.8	36300	800	0.02	0.05	33000	720	0.02	0.03	30000	580	0.008	0.02
	1	36300	800	0.02	0.05	33000	720	0.02	0.03	30000	580	0.008	0.02
	1.5	36300	620	0.01	0.03	33000	600	0.01	0.02	30000	400	0.005	0.01
	2	36300	500	0.01	0.02	33000	380	0.01	0.01	30000	300	0.005	0.007
	2.5	36300	420	0.007	0.01	33000	300	0.005	0.007	30000	260	0.003	0.005
	3	36300	300	0.007	0.01	33000	240	0.005	0.007	30000	200	0.003	0.005
	3.5	36300	230	0.005	0.007	33000	160	0.003	0.005	30000	120	0.002	0.003
	4	30000	100	0.005	0.005	30000	120	0.003	0.003	30000	90	0.002	0.003
	4.5	30000	100	0.003	0.005	30000	80	0.002	0.003	30000	60	0.001	0.002
	5	30000	70	0.002	0.003	30000	50	0.001	0.002	30000	40	0.001	0.002
	6	30000	50	0.001	0.002	30000	40	0.001	0.001	30000	30	0.001	0.001
	8	30000	50	0.001	0.002	30000	40	0.001	0.001	30000	30	0.001	0.001
R0.25	1	37500	650	0.01	0.025	34800	550	0.01	0.025	30000	500	0.01	0.025
	1.5	37500	650	0.008	0.02	34800	560	0.008	0.02	30000	500	0.008	0.02
	2	37500	520	0.008	0.02	34800	470	0.008	0.02	30000	400	0.008	0.02
	2.5	35000	520	0.007	0.015	32480	470	0.007	0.015	28000	400	0.007	0.015
	3	35000	468	0.007	0.01	32480	420	0.007	0.01	28000	360	0.007	0.01
	3.5	31250	480	0.006	0.01	29000	420	0.006	0.01	25000	360	0.006	0.01
	4	31250	390	0.005	0.008	29000	350	0.005	0.008	25000	300	0.005	0.008
	4.5	31250	338	0.004	0.008	29000	300	0.004	0.008	25000	260	0.004	0.008
	5	31250	338	0.004	0.008	29000	300	0.004	0.008	25000	260	0.004	0.008
	5.5	31250	312	0.004	0.008	29000	280	0.004	0.008	25000	240	0.004	0.008
	6	27500	156	0.003	0.005	25520	140	0.003	0.005	22000	120	0.003	0.005
	8	25000	104	0.003	0.003	23200	90	0.003	0.003	20000	80	0.003	0.003
	10	25000	65	0.003	0.003	23200	60	0.003	0.003	20000	50	0.003	0.003
R0.3	1	33000	975	0.02	0.03	31330	700	0.02	0.03	28800	600	0.02	0.03
	1.5	33000	975	0.02	0.03	31330	700	0.02	0.03	28800	600	0.02	0.03
	2	33000	780	0.02	0.03	31330	560	0.02	0.03	28800	480	0.02	0.03
	2.5	30800	780	0.015	0.02	29232	560	0.015	0.02	26880	480	0.015	0.02
	3	30800	702	0.015	0.02	29232	560	0.015	0.02	26880	432	0.015	0.02

EXWBD-2L Cutting Parameter

Workpiece		Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
R0.3	3.5	27500	702	0.01	0.02	26100	500	0.01	0.02	24000	432	0.01	0.02
	4	27500	585	0.01	0.02	26100	420	0.01	0.02	24000	360	0.01	0.02
	4.5	27500	507	0.01	0.02	26100	360	0.01	0.02	24000	312	0.01	0.02
	5	27500	507	0.01	0.02	26100	360	0.01	0.02	24000	312	0.01	0.02
	5.5	27500	468	0.008	0.01	26100	336	0.008	0.01	24000	289	0.008	0.01
	6	24200	234	0.008	0.01	22968	168	0.008	0.01	21120	144	0.008	0.01
	7	22000	156	0.006	0.008	20880	108	0.006	0.008	19200	96	0.006	0.008
	8	22000	975	0.005	0.008	20880	70	0.005	0.008	19200	60	0.005	0.008
	9	19040	85	0.005	0.008	18188	65	0.005	0.008	18048	50	0.005	0.008
	10	19040	80	0.003	0.005	18188	60	0.003	0.005	18000	40	0.003	0.005
	12	19040	60	0.003	0.005	18188	60	0.003	0.005	18000	30	0.003	0.005
R0.35	2	42500	1625	0.02	0.035	41200	1300	0.02	0.035	36000	1000	0.02	0.035
	3	40000	1200	0.02	0.03	40000	800	0.02	0.03	30000	800	0.02	0.03
	4	40000	1025	0.015	0.02	40000	820	0.015	0.02	30000	600	0.015	0.02
	6	30000	625	0.006	0.01	30000	600	0.006	0.01	25000	420	0.006	0.01
	8	25000	475	0.004	0.008	20000	380	0.004	0.008	20000	250	0.004	0.008
R0.4	2	24200	2000	0.03	0.05	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	2.5	24200	2000	0.03	0.05	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	3	24200	2000	0.03	0.05	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	4	24200	1600	0.03	0.05	22000	1200	0.03	0.05	20000	860	0.03	0.05
	5	24200	1600	0.02	0.03	22000	1000	0.02	0.03	20000	620	0.02	0.03
	6	21780	1200	0.02	0.03	19800	760	0.02	0.03	18000	560	0.02	0.03
	7	21780	1000	0.02	0.03	19800	680	0.02	0.03	18000	520	0.02	0.03
	8	21780	820	0.01	0.02	19800	600	0.01	0.02	18000	480	0.01	0.02
	10	19360	450	0.008	0.015	17600	380	0.008	0.015	16000	320	0.008	0.015
	12	18150	320	0.006	0.012	16500	260	0.006	0.012	15000	200	0.006	0.012
	16	18150	320	0.005	0.011	16500	260	0.005	0.011	15000	200	0.005	0.011
R0.45	2	24200	2000	0.03	0.05	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	4	24200	1600	0.03	0.05	22000	1200	0.03	0.05	20000	860	0.03	0.05
	6	21780	1200	0.02	0.03	19800	760	0.02	0.03	18000	560	0.02	0.03
	8	21780	820	0.01	0.02	19800	600	0.01	0.02	18000	480	0.01	0.02
R0.5	2.5	24000	2000	0.03	0.05	22000	1600	0.03	0.05	20000	1200	0.03	0.05

EXWBD-2L Cutting Parameter

Workpiece		Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
R0.5	3	24000	2000	0.03	0.06	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	4	24000	2000	0.03	0.06	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	5	24000	2000	0.03	0.06	22000	1600	0.03	0.05	20000	920	0.03	0.05
	6	21600	1800	0.05	0.06	19800	1200	0.03	0.05	18000	740	0.02	0.05
	7	21600	1200	0.04	0.06	19800	850	0.03	0.04	18000	680	0.02	0.03
	8	21600	1000	0.04	0.06	19800	860	0.03	0.04	18000	560	0.02	0.03
	9	19200	820	0.03	0.06	17600	750	0.02	0.03	16000	500	0.01	0.02
	10	18000	750	0.03	0.06	16500	620	0.02	0.03	15000	450	0.01	0.02
	12	18000	600	0.01	0.03	16500	620	0.007	0.02	15000	400	0.005	0.01
	14	16800	420	0.005	0.01	15400	300	0.003	0.007	14000	320	0.002	0.005
	16	16800	300	0.005	0.005	15400	250	0.003	0.005	14000	200	0.002	0.003
	18	16800	180	0.003	0.006	15400	120	0.002	0.005	14000	85	0.002	0.002
	20	14400	100	0.003	0.003	13200	75	0.002	0.003	12000	60	0.002	0.002
	22	12000	50	0.002	0.003	11000	40	0.002	0.002	10000	35	0.001	0.002
R0.6	4	24000	2000	0.03	0.06	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	6	21600	1800	0.05	0.06	19800	1200	0.04	0.05	18000	740	0.02	0.05
	8	21600	1000	0.04	0.06	19800	860	0.03	0.04	18000	560	0.02	0.03
	10	18000	750	0.03	0.06	16500	620	0.02	0.03	15000	450	0.01	0.02
	12	18000	600	0.01	0.03	16500	620	0.007	0.02	15000	400	0.005	0.01
	14	16800	420	0.005	0.01	15400	300	0.003	0.007	14000	320	0.002	0.005
	16	16800	300	0.005	0.005	15400	250	0.003	0.005	14000	200	0.002	0.003
R0.7	8	21600	2500	0.03	0.06	19800	1600	0.03	0.05	18000	1200	0.03	0.05
	12	18000	1800	0.02	0.06	16500	620	0.02	0.05	15000	780	0.02	0.05
	16	18000	720	0.01	0.02	16500	650	0.01	0.02	15000	580	0.01	0.02
R0.75	4	21600	3000	0.03	0.06	19800	2500	0.03	0.05	18000	2000	0.03	0.05
	6	21600	3000	0.03	0.06	19800	2000	0.03	0.05	18000	1600	0.03	0.05
	8	21600	2500	0.03	0.06	19800	1600	0.03	0.05	18000	1200	0.03	0.05
	10	21600	2500	0.02	0.06	19800	1200	0.02	0.05	18000	860	0.02	0.05
	12	18000	1800	0.02	0.06	16500	620	0.02	0.05	15000	780	0.02	0.05
	14	18000	1200	0.02	0.03	16500	820	0.02	0.03	15000	650	0.02	0.03
	16	18000	720	0.01	0.02	16500	650	0.01	0.02	15000	580	0.01	0.02
	18	16800	550	0.008	0.015	15400	400	0.008	0.015	14000	400	0.008	0.015

EXWBD-2L Cutting Parameter

Workpiece		Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
R0.75	20	16800	450	0.007	0.01	15400	360	0.007	0.01	14000	300	0.007	0.01
	25	14400	330	0.007	0.007	13600	250	0.007	0.007	12000	200	0.007	0.007
	30	9600	80	0.003	0.003	8800	60	0.003	0.003	8000	40	0.003	0.003
R0.8	8	21600	2500	0.03	0.05	19800	1600	0.03	0.05	18000	1200	0.03	0.05
	12	18000	1800	0.02	0.05	16500	920	0.02	0.05	15000	780	0.02	0.05
	16	18000	720	0.01	0.02	16500	650	0.01	0.02	15000	580	0.01	0.02
	20	16800	450	0.007	0.01	15400	360	0.007	0.01	14000	300	0.007	0.01
R1	6	18000	1920	0.04	0.06	16500	1780	0.04	0.06	15000	1600	0.04	0.06
	8	18000	1440	0.03	0.05	16500	1320	0.03	0.05	15000	1200	0.03	0.05
	10	16800	1440	0.03	0.05	15400	1320	0.03	0.05	14000	1200	0.03	0.05
	12	14400	1128	0.02	0.05	13300	1034	0.02	0.05	12000	940	0.02	0.05
	14	14400	1128	0.015	0.04	13300	1034	0.015	0.04	12000	940	0.015	0.04
	16	14400	1128	0.015	0.04	13300	1034	0.015	0.04	12000	940	0.015	0.04
	18	12000	1020	0.01	0.03	11000	935	0.01	0.03	10000	850	0.01	0.03
	20	12000	864	0.01	0.03	11000	792	0.01	0.03	10000	720	0.01	0.03
	22	12000	720	0.008	0.02	11000	660	0.008	0.02	10000	600	0.008	0.02
	25	10200	504	0.008	0.02	9350	462	0.008	0.02	8500	420	0.008	0.02
	30	10200	288	0.005	0.01	9350	264	0.005	0.01	8500	240	0.005	0.01
	35	8160	120	0.005	0.007	7480	110	0.005	0.007	6800	100	0.005	0.007
	40	8160	60	0.002	0.005	7480	55	0.002	0.005	6800	50	0.002	0.005
R1.25	6	18000	1920	0.04	0.06	16500	1760	0.04	0.06	15000	1600	0.04	0.06
	8	18000	1440	0.03	0.05	16500	1320	0.03	0.05	15000	1200	0.03	0.05
	10	16800	1440	0.03	0.05	15400	1320	0.03	0.05	14000	1200	0.03	0.05
	12	15000	1320	0.02	0.05	13900	1180	0.02	0.04	13000	1080	0.02	0.04
	16	14400	1128	0.015	0.04	13300	1034	0.015	0.04	12000	940	0.015	0.04
	20	12000	864	0.01	0.03	11000	792	0.01	0.03	10000	720	0.01	0.03
	25	10200	504	0.008	0.02	9350	462	0.008	0.02	8500	420	0.008	0.02
	30	10200	288	0.005	0.01	9350	264	0.005	0.01	8500	240	0.005	0.01
	35	8160	120	0.005	0.007	7480	110	0.005	0.007	6800	100	0.005	0.007
R1.5	8	16800	2520	0.04	0.08	15400	2200	0.04	0.08	14000	2000	0.04	0.08
	10	16800	1875	0.03	0.07	15400	1650	0.03	0.07	14000	1500	0.03	0.07
	12	14400	1875	0.03	0.07	13300	1650	0.03	0.07	12000	1500	0.03	0.07

EXWBD-2L Cutting Parameter

Workpiece		Carbon Steels, Alloy Steels (≤35HRC)				Pre-Hardened Steels (35~45HRC)				Hardened Steels (45-55HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
R1.5	14	14400	1500	0.03	0.07	13200	1320	0.03	0.07	12000	1200	0.03	0.07
	16	14400	1500	0.02	0.05	13200	1320	0.02	0.05	12000	1200	0.02	0.05
	20	12000	1200	0.02	0.05	11000	1056	0.02	0.05	10000	980	0.02	0.05
	25	10300	1000	0.015	0.05	9460	880	0.015	0.05	8600	800	0.015	0.05
	30	8640	750	0.015	0.04	7920	660	0.015	0.04	7200	600	0.015	0.04
	35	7680	525	0.01	0.03	7040	462	0.01	0.03	6400	420	0.01	0.03
R1.75	40	7200	325	0.01	0.03	6800	286	0.01	0.03	6000	260	0.01	0.03
	16	14400	1500	0.02	0.05	13200	1320	0.02	0.05	12000	1200	0.02	0.05
	20	12000	1200	0.02	0.05	11000	1056	0.02	0.05	10000	980	0.02	0.05
	25	10300	1000	0.015	0.05	9460	880	0.015	0.05	8600	800	0.015	0.05
	30	8640	750	0.015	0.04	7920	660	0.015	0.04	7200	600	0.015	0.04
	35	7680	525	0.01	0.03	7040	462	0.01	0.03	6400	420	0.01	0.03
	40	7200	325	0.01	0.03	6800	286	0.01	0.03	6000	260	0.01	0.03
	45	6800	300	0.01	0.03	6800	264	0.01	0.03	6000	200	0.01	0.03
R2	12	13200	3000	0.04	0.08	12100	2500	0.04	0.08	11000	2000	0.04	0.08
	14	13200	3000	0.04	0.08	12100	2000	0.04	0.08	11000	1600	0.04	0.08
	16	12000	3000	0.03	0.06	11000	2000	0.03	0.06	10000	1600	0.03	0.06
	20	12000	2400	0.03	0.06	11000	1800	0.03	0.06	10000	1400	0.03	0.06
	25	10800	1600	0.03	0.05	9800	1200	0.03	0.05	9000	1000	0.03	0.05
	30	9600	1600	0.03	0.05	9800	1200	0.03	0.05	9000	1000	0.03	0.05
	35	9000	1200	0.03	0.05	8250	1000	0.03	0.05	7500	820	0.03	0.05
	40	8160	1200	0.02	0.04	7480	1000	0.02	0.04	6800	820	0.02	0.04
	45	7800	750	0.02	0.04	7150	630	0.02	0.04	6500	500	0.02	0.04
	50	6600	550	0.015	0.03	6050	500	0.015	0.03	5500	420	0.015	0.03
R2.5	16	12000	3000	0.03	0.06	11000	2000	0.03	0.06	10000	1600	0.03	0.06
	20	12000	2400	0.03	0.06	11000	1800	0.03	0.06	10000	1400	0.03	0.06
	25	10800	1600	0.03	0.05	9800	1200	0.03	0.05	9000	1000	0.03	0.05
	30	9600	1600	0.03	0.05	9800	1200	0.03	0.05	9000	1000	0.03	0.05
	35	8500	1450	0.025	0.045	8000	1100	0.025	0.045	7500	950	0.025	0.045
	40	8160	1200	0.02	0.04	7480	1000	0.02	0.04	6800	820	0.02	0.04
	45	7800	750	0.02	0.04	7150	630	0.02	0.04	6500	500	0.02	0.04
	50	6600	550	0.015	0.03	6050	500	0.015	0.03	5500	420	0.015	0.03

EXH SERIES

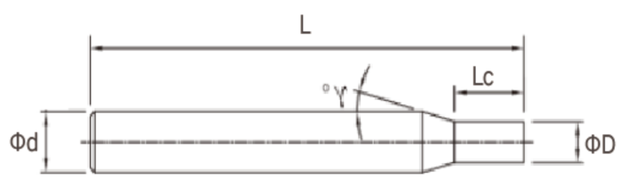
Top Solution for High Hardness Material Machining

- We use 0.3 um ultra fine carbide substrates to ensure high wear resistance
- TiSiN+X coating is a composite mutilayer coating based on TiSiN, It is suitable for micro lubrication cutting.
- It is suitable for quenched steels (55-65HRC) and alloy materials

EXHSF-4

4 Flute Square End Mill

TiSiN+X | 4 | 45° Spiral Angle | Straight Back Angle | S | Shank Dia. tolerance H5 | <65 HRC



ΦD	D Tolerance
D≤3	0~-0.010
3<D≤6	0~-0.012
6<D≤10	0~-0.015
10<D≤18	0~-0.018
D>18	0~-0.020

(mm)

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	Lc	L	Φd	
EXHSF-4010 04050	1	3	50	4	●
EXHSF-4010 06050	1	3	50	6	●
EXHSF-4012 04050	1.2	3.5	50	4	○
EXHSF-4014 04050	1.4	4	50	4	○
EXHSF-4015 04050	1.5	4	50	4	●
EXHSF-4015 06050	1.5	4	50	6	●
EXHSF-4016 04050	1.6	5	50	4	○
EXHSF-4020 04050	2	6	50	4	●
EXHSF-4020 06050	2	6	50	6	●
EXHSF-4025 04050	2.5	8	50	4	●
EXHSF-4025 06050	2.5	8	50	6	●
EXHSF-4030 04050	3	8	50	4	●
EXHSF-4030 06050	3	8	50	6	●
EXHSF-4030 06075	3	12	75	6	●
EXHSF-4040 04050	4	11	50	4	●
EXHSF-4040 04075	4	15	75	4	●
EXHSF-4040 06050	4	11	50	6	●
EXHSF-4040 06075	4	15	75	6	●
EXHSF-4050 06050	5	13	50	6	●
EXHSF-4050 06075	5	18	75	6	●
EXHSF-4060 06050	6	16	50	6	●
EXHSF-4060 06060	6	16	60	6	●
EXHSF-4060 06075	6	20	75	6	●
EXHSF-4060 06100	6	20	100	6	●
EXHSF-4080 08060	8	20	60	8	●
EXHSF-4080 08075	8	20	75	8	●
EXHSF-4080 08100	8	25	100	8	●
EXHSF-4080 08125	8	28	125	8	●
EXHSF-4100 10075	10	25	75	10	●
EXHSF-4100 10100	10	30	100	10	●
EXHSF-4100 10125	10	35	125	10	●
EXHSF-4120 12075	12	30	75	12	●
EXHSF-4120 12100	12	35	100	12	●
EXHSF-4120 12125	12	42	125	12	●

EXHSF-4

4 Flute Square End Mill

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	Lc	L	Φd	
EXHSF-4160 16100	16	45	100	16	●
EXHSF-4160 16150	16	50	150	16	●
EXHSF-4200 20100	20	45	100	20	●
EXHSF-4200 20150	20	55	150	20	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	○	○	○	○	○

COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○			○	○	

○ Very suitable ○ Suitable

EXHSG-6

6 Flute Square End Mill

TiSiN+X | 6 | 52° Spiral Angle | Straight Back Angle | S | Shank Dia. tolerance H5 | <65 HRC

ΦD	D Tolerance
6 < D≦10	0~-0.015
10 < D≦18	0~-0.018
D > 18	0~-0.020

(mm)

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	Lc	L	Φd	
EXHSG-6060 06060	6	18	60	6	○
EXHSG-6060 06075	6	24	75	6	●
EXHSG-6080 08060	8	20	60	8	●
EXHSG-6080 08075	8	32	75	8	●
EXHSG-6100 10075	10	30	75	10	●
EXHSG-6100 10100	10	40	100	10	●
EXHSG-6120 12075	12	32	75	12	●
EXHSG-6120 12100	12	45	100	12	●
EXHSG-6160 16100	16	40	100	16	●
EXHSG-6160 16150	16	64	150	16	●
EXHSG-6200 20100	20	45	100	20	●
EXHSG-6200 20150	20	75	150	20	●

TABLE OF RECOMMENDED MILLING MATERIALS

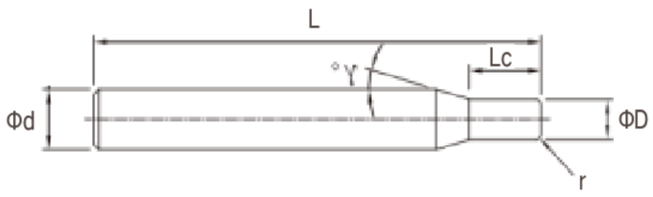
CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	○	○	○	○	○

COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○			○	○	

○ Very suitable ○ Suitable

EXHRD-4

4 Flute Corner Radius End Mill



TiSiN+X | 4 | 30° Spiral Angle | Straight Back Angle | R | Shank Dia. tolerance H5 | <65 HRC

ΦD	D Tolerance
D≤3	0~-0.010
3<D≤6	0~-0.012
6<D≤10	0~-0.015
10<D≤18	0~-0.018

(mm)

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	L	Φd	
EXHRD-4008R0.05 04050	0.8	0.05	1.6	50	4	○
EXHRD-4008R0.1 04050	0.8	0.1	1.6	50	4	○
EXHRD-4010R0.05 04050	1	0.05	2	50	4	●
EXHRD-4010R0.1 04050	1	0.1	2	50	4	●
EXHRD-4010R0.2 04050	1	0.2	2	50	4	●
EXHRD-4010R0.3 04050	1	0.3	2	50	4	●
EXHRD-4015R0.05 04050	1.5	0.05	3	50	4	●
EXHRD-4015R0.1 04050	1.5	0.1	3	50	4	●
EXHRD-4015R0.2 04050	1.5	0.2	3	50	4	●
EXHRD-4015R0.3 04050	1.5	0.3	3	50	4	●
EXHRD-4020R0.05 04050	2	0.05	4	50	4	●
EXHRD-4020R0.1 04050	2	0.1	4	50	4	●
EXHRD-4020R0.2 04050	2	0.2	4	50	4	●
EXHRD-4020R0.3 04050	2	0.3	4	50	4	●
EXHRD-4020R0.5 04050	2	0.5	4	50	4	●
EXHRD-4025R0.1 04050	2.5	0.1	5	50	4	●
EXHRD-4025R0.2 04050	2.5	0.2	5	50	4	●
EXHRD-4025R0.3 04050	2.5	0.3	5	50	4	●
EXHRD-4025R0.5 04050	2.5	0.5	5	50	4	●
EXHRD-4030R0.1 04050	3	0.1	6	50	4	●
EXHRD-4030R0.1 06060	3	0.1	6	60	6	●
EXHRD-4030R0.1 06075	3	0.1	6	75	6	●
EXHRD-4030R0.2 04050	3	0.2	6	50	4	●
EXHRD-4030R0.2 06060	3	0.2	6	60	6	●
EXHRD-4030R0.2 06075	3	0.2	6	75	6	●
EXHRD-4030R0.3 04050	3	0.3	6	50	4	●
EXHRD-4030R0.3 06060	3	0.3	6	60	6	●
EXHRD-4030R0.3 06075	3	0.3	6	75	6	●
EXHRD-4030R0.5 04050	3	0.5	6	50	4	●
EXHRD-4030R0.5 06060	3	0.5	6	60	6	●
EXHRD-4030R0.5 06075	3	0.5	6	75	6	●
EXHRD-4040R0.1 04050	4	0.1	8	50	4	●
EXHRD-4040R0.1 04075	4	0.1	8	75	4	●
EXHRD-4040R0.1 06060	4	0.1	8	60	6	●

EXHRD-4

4 Flute Corner Radius End Mill

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	L	Φd	
EXHRD-4040R0.1 06075	4	0.1	8	75	6	●
EXHRD-4040R0.2 04050	4	0.2	8	50	4	●
EXHRD-4040R0.2 04075	4	0.2	8	75	4	●
EXHRD-4040R0.2 06060	4	0.2	8	60	6	●
EXHRD-4040R0.2 06075	4	0.2	8	75	6	●
EXHRD-4040R0.3 04050	4	0.3	8	50	4	●
EXHRD-4040R0.3 04075	4	0.3	8	75	4	●
EXHRD-4040R0.3 06060	4	0.3	8	60	6	●
EXHRD-4040R0.3 06075	4	0.3	8	75	6	●
EXHRD-4040R0.5 04050	4	0.5	8	50	4	●
EXHRD-4040R0.5 04075	4	0.5	8	75	4	●
EXHRD-4040R0.5 06060	4	0.5	8	60	6	●
EXHRD-4040R0.5 06075	4	0.5	8	75	6	●
EXHRD-4040R1.0 04050	4	1.0	8	50	4	●
EXHRD-4040R1.0 04075	4	1.0	8	75	4	●
EXHRD-4040R1.0 06060	4	1.0	8	60	6	●
EXHRD-4040R1.0 06075	4	1.0	8	75	6	●
EXHRD-4060R0.1 06050	6	0.1	12	50	6	●
EXHRD-4060R0.1 06060	6	0.1	12	60	6	●
EXHRD-4060R0.1 06075	6	0.1	12	75	6	●
EXHRD-4060R0.1 06100	6	0.1	12	100	6	●
EXHRD-4060R0.2 06050	6	0.2	12	50	6	●
EXHRD-4060R0.2 06060	6	0.2	12	60	6	●
EXHRD-4060R0.2 06075	6	0.2	12	75	6	●
EXHRD-4060R0.2 06100	6	0.2	12	100	6	●
EXHRD-4060R0.3 06050	6	0.3	12	50	6	●
EXHRD-4060R0.3 06060	6	0.3	12	60	6	●
EXHRD-4060R0.3 06075	6	0.3	12	75	6	●
EXHRD-4060R0.3 06100	6	0.3	12	100	6	●
EXHRD-4060R0.5 06050	6	0.5	12	50	6	●
EXHRD-4060R0.5 06060	6	0.5	12	60	6	●
EXHRD-4060R0.5 06075	6	0.5	12	75	6	●
EXHRD-4060R0.5 06100	6	0.5	12	100	6	●
EXHRD-4060R1.0 06050	6	1.0	12	50	6	●
EXHRD-4060R1.0 06060	6	1.0	12	60	6	●
EXHRD-4060R1.0 06075	6	1.0	12	75	6	●
EXHRD-4060R1.0 06100	6	1.0	12	100	6	●
EXHRD-4080R0.1 08060	8	0.1	16	60	8	●
EXHRD-4080R0.1 08075	8	0.1	16	75	8	●
EXHRD-4080R0.1 08100	8	0.1	16	100	8	●
EXHRD-4080R0.2 08060	8	0.2	16	60	8	●
EXHRD-4080R0.2 08075	8	0.2	16	75	8	●

EXHRD-4

4 Flute Corner Radius End Mill

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	L	Φd	
EXHRD-4080R0.2 08100	8	0.2	16	100	8	●
EXHRD-4080R0.3 08060	8	0.3	16	60	8	●
EXHRD-4080R0.3 08075	8	0.3	16	75	8	●
EXHRD-4080R0.3 08100	8	0.3	16	100	8	●
EXHRD-4080R0.5 08060	8	0.5	16	60	8	●
EXHRD-4080R0.5 08075	8	0.5	16	75	8	●
EXHRD-4080R0.5 08100	8	0.5	16	100	8	●
EXHRD-4080R0.5 08125	8	0.5	20	125	8	●
EXHRD-4080R0.5 08150	8	0.5	20	150	8	●
EXHRD-4080R1.0 08060	8	1.0	16	60	8	●
EXHRD-4080R1.0 08075	8	1.0	16	75	8	●
EXHRD-4080R1.0 08100	8	1.0	16	100	8	●
EXHRD-4080R1.0 08125	8	1.0	20	125	8	●
EXHRD-4080R1.0 08150	8	1.0	20	150	8	●
EXHRD-4100R0.2 10075	10	0.2	20	75	10	●
EXHRD-4100R0.2 10100	10	0.2	20	100	10	●
EXHRD-4100R0.5 10075	10	0.5	20	75	10	●
EXHRD-4100R0.5 10100	10	0.5	20	100	10	●
EXHRD-4100R0.5 10125	10	0.5	25	125	10	●
EXHRD-4100R0.5 10150	10	0.5	25	150	10	●
EXHRD-4100R1.0 10075	10	1.0	20	75	10	●
EXHRD-4100R1.0 10100	10	1.0	20	100	10	●
EXHRD-4100R1.0 10125	10	1.0	25	125	10	●
EXHRD-4100R1.0 10150	10	1.0	25	150	10	●
EXHRD-4120R0.5 12075	12	0.5	24	75	12	●
EXHRD-4120R0.5 12100	12	0.5	24	100	12	●
EXHRD-4120R0.5 12125	12	0.5	30	125	12	●
EXHRD-4120R0.5 12150	12	0.5	30	150	12	●
EXHRD-4120R1.0 12075	12	1.0	24	75	12	●
EXHRD-4120R1.0 12100	12	1.0	24	100	12	●
EXHRD-4120R1.0 12125	12	1.0	30	125	12	●
EXHRD-4120R1.0 12150	12	1.0	30	150	12	●
EXHRD-4120R2.0 12075	12	2.0	24	75	12	●
EXHRD-4120R2.0 12100	12	2.0	24	100	12	●
EXHRD-4120R2.0 12125	12	2.0	30	125	12	●
EXHRD-4120R2.0 12150	12	2.0	30	150	12	●
EXHRD-4160R0.5 16100	16	0.5	32	100	16	●
EXHRD-4160R1.0 16100	16	1.0	32	100	16	●
EXHRD-4160R2.0 16100	16	2.0	32	100	16	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	◎	◎	○	○	○

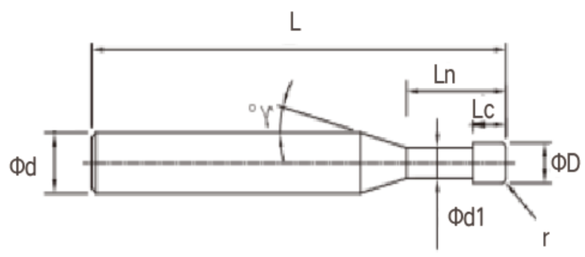
COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○			○	○	

◎ Very suitable ○ Suitable

EXHRP-4

4 Flute Corner Radius End Mill (Short)

TiSiN+X | 4 | 30° Spiral Angle | Arc Back Angle | R | Shank Dia. tolerance H5 | <65 HRC



ΦD	D Tolerance
D≤3	0~-0.010
3<D≤6	0~-0.012
6<D≤10	0~-0.015
10<D≤18	0~-0.018
D>18	0~-0.020

(mm)

Order Code	Dia.	Radius	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRP-4008R0.05 04050	0.8	0.05	0.8	2.4	0.76	50	4	○
EXHRP-4008R0.1 04050	0.8	0.1	0.8	2.4	0.76	50	4	○
EXHRP-4010R0.05 04050	1	0.05	1	3	0.95	50	4	○
EXHRP-4010R0.1 04050	1	0.1	1	3	0.95	50	4	●
EXHRP-4010R0.2 04050	1	0.2	1	3	0.95	50	4	●
EXHRP-4010R0.3 04050	1	0.3	1	3	0.95	50	4	○
EXHRP-4015R0.05 04050	1.5	0.05	1.5	4.5	1.42	50	4	○
EXHRP-4015R0.1 04050	1.5	0.1	1.5	4.5	1.42	50	4	○
EXHRP-4015R0.2 04050	1.5	0.2	1.5	4.5	1.42	50	4	●
EXHRP-4015R0.3 04050	1.5	0.3	1.5	4.5	1.42	50	4	○
EXHRP-4020R0.05 04050	2	0.05	2	6	1.9	50	4	○
EXHRP-4020R0.1 04050	2	0.1	2	6	1.9	50	4	●
EXHRP-4020R0.2 04050	2	0.2	2	6	1.9	50	4	●
EXHRP-4020R0.3 04050	2	0.3	2	6	1.9	50	4	○
EXHRP-4020R0.5 04050	2	0.5	2	6	1.9	50	4	●
EXHRP-4030R0.1 04050	3	0.1	3	9	2.9	50	4	○
EXHRP-4030R0.1 06060	3	0.1	3	9	2.9	60	6	○
EXHRP-4030R0.1 06075	3	0.1	3	9	2.9	75	6	○
EXHRP-4030R0.2 04050	3	0.2	3	9	2.9	50	4	●
EXHRP-4030R0.2 06050	3	0.2	3	9	2.9	60	6	●
EXHRP-4030R0.2 06060	3	0.2	3	9	2.9	60	6	●
EXHRP-4030R0.2 06075	3	0.2	3	9	2.9	75	6	●
EXHRP-4030R0.3 04050	3	0.3	3	9	2.9	50	4	○
EXHRP-4030R0.3 06060	3	0.3	3	9	2.9	60	6	○
EXHRP-4030R0.3 06075	3	0.3	3	9	2.9	75	6	○
EXHRP-4030R0.5 04050	3	0.5	3	9	2.9	50	4	●
EXHRP-4030R0.5 06050	3	0.5	3	9	2.9	60	6	●
EXHRP-4030R0.5 06060	3	0.5	3	9	2.9	60	6	●
EXHRP-4030R0.5 06075	3	0.5	3	9	2.9	75	6	●
EXHRP-4040R0.1 04050	4	0.1	4	12	3.9	50	4	○
EXHRP-4040R0.1 06060	4	0.1	4	12	3.9	60	6	○
EXHRP-4040R0.1 06075	4	0.1	4	12	3.9	75	6	○
EXHRP-4040R0.2 04050	4	0.2	4	12	3.9	50	4	●
EXHRP-4040R0.2 06050	4	0.2	4	12	3.9	50	6	●

EXHRP-4

4 Flute Corner Radius End Mill (Short)

Order Code	Dia.	Radius	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRP-4040R0.2 06060	4	0.2	4	12	3.9	60	6	●
EXHRP-4040R0.2 06075	4	0.2	4	12	3.9	75	6	●
EXHRP-4040R0.3 04050	4	0.3	4	12	3.9	50	4	○
EXHRP-4040R0.3 06060	4	0.3	4	12	3.9	60	6	○
EXHRP-4040R0.3 06075	4	0.3	4	12	3.9	75	6	○
EXHRP-4040R0.5 04050	4	0.5	4	12	3.9	50	4	●
EXHRP-4040R0.5 06050	4	0.5	4	12	3.9	50	6	●
EXHRP-4040R0.5 06060	4	0.5	4	12	3.9	60	6	●
EXHRP-4040R0.5 06075	4	0.5	4	12	3.9	75	6	●
EXHRP-4040R1.0 04050	4	1.0	4	12	3.9	50	4	●
EXHRP-4040R1.0 06060	4	1.0	4	12	3.9	60	6	●
EXHRP-4040R1.0 06075	4	1.0	4	12	3.9	75	6	●
EXHRP-4060R0.1 06050	6	0.1	6	18	5.85	50	6	○
EXHRP-4060R0.1 06060	6	0.1	6	18	5.85	60	6	○
EXHRP-4060R0.1 06075	6	0.1	6	18	5.85	75	6	○
EXHRP-4060R0.2 06050	6	0.2	6	18	5.85	50	6	●
EXHRP-4060R0.2 06060	6	0.2	6	18	5.85	60	6	●
EXHRP-4060R0.2 06075	6	0.2	6	18	5.85	75	6	●
EXHRP-4060R0.2 06100	6	0.2	6	18	5.85	100	6	○
EXHRP-4060R0.3 06050	6	0.3	6	18	5.85	50	6	○
EXHRP-4060R0.3 06060	6	0.3	6	18	5.85	60	6	○
EXHRP-4060R0.3 06075	6	0.3	6	18	5.85	75	6	○
EXHRP-4060R0.3 06100	6	0.3	6	18	5.85	100	6	○
EXHRP-4060R0.5 06050	6	0.5	6	18	5.85	50	6	●
EXHRP-4060R0.5 06060	6	0.5	6	18	5.85	60	6	●
EXHRP-4060R0.5 06075	6	0.5	6	18	5.85	75	6	●
EXHRP-4060R0.5 06100	6	0.5	6	18	5.85	100	6	●
EXHRP-4060R1.0 06050	6	1.0	6	18	5.85	50	6	●
EXHRP-4060R1.0 06060	6	1.0	6	18	5.85	60	6	●
EXHRP-4060R1.0 06075	6	1.0	6	18	5.85	75	6	●
EXHRP-4060R1.0 06100	6	1.0	6	18	5.85	100	6	○
EXHRP-4080R0.1 08060	8	0.1	8	24	7.8	60	8	○
EXHRP-4080R0.1 08075	8	0.1	8	24	7.8	75	8	○
EXHRP-4080R0.1 08100	8	0.1	8	24	7.8	100	8	○
EXHRP-4080R0.2 08060	8	0.2	8	24	7.8	60	8	●
EXHRP-4080R0.2 08075	8	0.2	8	24	7.8	75	8	○
EXHRP-4080R0.2 08100	8	0.2	8	24	7.8	100	8	○
EXHRP-4080R0.3 08060	8	0.3	8	24	7.8	60	8	○
EXHRP-4080R0.3 08075	8	0.3	8	24	7.8	75	8	○
EXHRP-4080R0.3 08100	8	0.3	8	24	7.8	100	8	○
EXHRP-4080R0.5 08060	8	0.5	8	24	7.8	60	8	●
EXHRP-4080R0.5 08075	8	0.5	8	24	7.8	75	8	●

EXHRP-4

4 Flute Corner Radius End Mill (Short)

Order Code	Dia.	Radius	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRP-4080R0.5 08100	8	0.5	8	24	7.8	100	8	t●
EXHRP-4080R0.5 08125	8	0.5	8	24	7.8	125	8	●
EXHRP-4080R1.0 08060	8	1.0	8	24	7.8	60	8	●
EXHRP-4080R1.0 08075	8	1.0	8	24	7.8	75	8	●
EXHRP-4080R1.0 08100	8	1.0	8	24	7.8	100	8	●
EXHRP-4080R1.0 08125	8	1.0	8	24	7.8	125	8	●
EXHRP-4100R0.2 10075	10	0.2	10	30	9.8	75	10	●
EXHRP-4100R0.2 10100	10	0.2	10	30	9.8	100	10	●
EXHRP-4100R0.5 10075	10	0.5	10	30	9.8	75	10	●
EXHRP-4100R0.5 10100	10	0.5	10	30	9.8	100	10	●
EXHRP-4100R0.5 10125	10	0.5	10	30	9.8	125	10	●
EXHRP-4100R1.0 10075	10	1	10	30	9.8	75	10	●
EXHRP-4100R1.0 10100	10	1	10	30	9.8	100	10	●
EXHRP-4100R1.0 10125	10	1	10	30	9.8	125	10	●
EXHRP-4100R2.0 10075	10	2	10	30	9.8	75	10	●
EXHRP-4120R0.5 12075	12	0.5	12	36	11.7	75	12	●
EXHRP-4120R0.5 12100	12	0.5	12	36	11.7	100	12	●
EXHRP-4120R0.5 12125	12	0.5	12	36	11.7	125	12	●
EXHRP-4120R1.0 12075	12	1	12	36	11.7	75	12	●
EXHRP-4120R1.0 12100	12	1	12	36	11.7	100	12	●
EXHRP-4120R1.0 12125	12	1	12	36	11.7	125	12	●
EXHRP-4120R2.0 12075	12	2	12	36	11.7	75	12	●
EXHRP-4120R2.0 12100	12	2	12	36	11.7	100	12	●
EXHRP-4120R2.0 12125	12	2	12	36	11.7	125	12	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	◎	◎	○	○	○

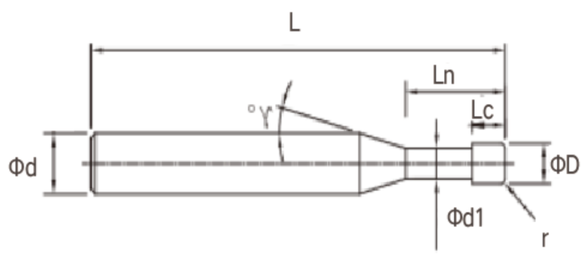
COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○			○	○	

◎ Very suitable ○ Suitable

EXHRX-4

4 Flute Power Corner Radius End Mill

TiSiN+X | 4 | -9° Spiral Angle | Straight Back Angle | R | Shank Dia. tolerance H5 | <65 HRC



ΦD	D Tolerance
D≤3	0~-0.010
3<D≤6	0~-0.012
6<D≤10	0~-0.015
10<D≤18	0~-0.018

(mm)

Order Code	Dia.	Radius	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRX-4030R0.5 06050	3	0.5	1.2	9	2.8	50	6	●
EXHRX-4030R0.5 06075	3	0.5	1.2	9	2.8	75	6	●
EXHRX-4030R1.0 06050	3	1.0	1.2	9	2.8	50	6	●
EXHRX-4030R1.0 06075	3	1.0	1.2	9	2.8	75	6	●
EXHRX-4040R0.5 06050	4	0.5	1.6	12	3.8	50	6	●
EXHRX-4040R0.5 06075	4	0.5	1.6	12	3.8	75	6	●
EXHRX-4040R1.0 06050	4	1.0	1.6	12	3.8	50	6	●
EXHRX-4040R1.0 06075	4	1.0	1.6	12	3.8	75	6	●
EXHRX-4050R1.0 06050	5	1.0	2	15	4.7	50	6	●
EXHRX-4050R1.0 06075	5	1.0	2	15	4.7	75	6	●
EXHRX-4060R1.0 06050	6	1.0	2.5	18	5.6	50	6	●
EXHRX-4060R1.0 06075	6	1.0	2.5	18	5.6	75	6	●
EXHRX-4060R1.5 06050	6	1.5	2.5	18	5.6	50	6	●
EXHRX-4060R1.5 06075	6	1.5	2.5	18	5.6	75	6	●
EXHRX-4080R1.0 08075	8	1.0	3.5	24	7.6	75	8	●
EXHRX-4080R1.0 08100	8	1.0	3.5	24	7.6	100	8	●
EXHRX-4080R2.0 08075	8	2.0	3.5	24	7.6	75	8	●
EXHRX-4080R2.0 08100	8	2.0	3.5	24	7.6	100	8	●
EXHRX-4100R1.0 10075	10	1.0	4	30	9.5	75	10	●
EXHRX-4100R1.0 10100	10	1.0	4	30	9.5	100	10	●
EXHRX-4100R2.0 10075	10	2.0	4	30	9.5	75	10	●
EXHRX-4100R2.0 10100	10	2.0	4	30	9.5	100	10	●
EXHRX-4120R2.0 12075	12	2.0	5	36	11.5	75	12	●
EXHRX-4120R2.0 12100	12	2.0	5	36	11.5	100	12	●
EXHRX-4120R3.0 12075	12	3.0	5	36	11.5	75	12	●
EXHRX-4120R3.0 12100	12	3.0	5	36	11.5	100	12	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	◎	◎	○	○	○

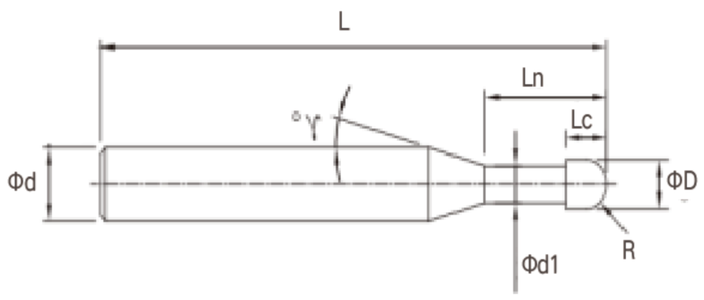
COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○			○	○	

◎ Very suitable ○ Suitable

EXHBD-2

2 Flute Ball Nose End Mill

TiSiN+X | 2 | 30° Spiral Angle | Straight Back Angle | B | Shank Dia. tolerance H5 | <65 HRC



ΦD	D Tolerance
D≤3	0~-0.010
3<D≤6	0~-0.012
6<D≤10	0~-0.015
10<D≤18	0~-0.018

ΦD	R Tolerance
D<1	±0.003
1≤D≤8	±0.005
D>8	±0.008

(mm)

Order Code	Dia.	Radius	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXHBD-2001 04050	0.1	0.05	0.1	-	-	50	4	●
EXHBD-20015 04050	0.15	0.075	0.15	-	-	50	4	●
EXHBD-2002 04050	0.2	0.1	0.2	-	-	50	4	●
EXHBD-2003 04050	0.3	0.15	0.3	-	-	50	4	●
EXHBD-2004 04050	0.4	0.2	0.6	-	-	50	4	●
EXHBD-2005 04050	0.5	0.25	0.8	-	-	50	4	●
EXHBD-2006 04050	0.6	0.3	0.9	-	-	50	4	●
EXHBD-2008 04050	0.8	0.4	1.2	-	-	50	4	●
EXHBD-2010 04050	1	0.5	0.75	2	0.95	50	4	●
EXHBD-2010 06050	1	0.5	0.75	2.5	0.95	50	6	●
EXHBD-2010 06060	1	0.5	0.75	2.5	0.95	60	6	●
EXHBD-2010 06075	1	0.5	0.75	2.5	0.95	75	6	●
EXHBD-2012 04050	1.2	0.6	0.9	2.4	1.14	50	4	●
EXHBD-2015 04050	1.5	0.75	1.2	3	1.42	50	4	●
EXHBD-2015 06050	1.5	0.75	1.2	4	1.42	50	6	●
EXHBD-2015 06060	1.5	0.75	1.2	4	1.42	60	6	●
EXHBD-2015 06075	1.5	0.75	1.2	4	1.42	75	6	●
EXHBD-2020 04050	2	1.0	1.6	4	1.9	50	4	●
EXHBD-2020 06050	2	1.0	1.6	6	1.9	50	6	●
EXHBD-2020 06060	2	1.0	1.6	6	1.9	60	6	●
EXHBD-2020 06075	2	1.0	1.6	6	1.9	75	6	●
EXHBD-2025 04050	2.5	1.25	2	5	2.4	50	4	●
EXHBD-2025 06050	2.5	1.25	2	7	2.4	50	6	●
EXHBD-2025 06060	2.5	1.25	2	7	2.4	60	6	●
EXHBD-2025 06075	2.5	1.25	2	7	2.4	75	6	●
EXHBD-2030 04050	3	1.5	2.4	6	2.9	50	4	●
EXHBD-2030 06050	3	1.5	2.4	8	2.9	50	6	●
EXHBD-2030 06060	3	1.5	2.4	8	2.9	60	6	●
EXHBD-2030 06075	3	1.5	2.4	8	2.9	75	6	●
EXHBD-2040 04050	4	2.0	6	-	-	50	4	●
EXHBD-2040 04075	4	2.0	6	-	-	75	4	●
EXHBD-2040 06050	4	2.0	3.2	10	3.9	50	6	●
EXHBD-2040 06060	4	2.0	3.2	10	3.9	60	6	●
EXHBD-2040 06075	4	2.0	3.2	10	3.9	75	6	●

EXHBD-2

2 Flute Ball Nose End Mill

Order Code	Dia.	Radius	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXHBD-2050 06050	5	2.5	4	12	4.85	50	6	●
EXHBD-2050 06060	5	2.5	4	12	4.85	60	6	●
EXHBD-2050 06075	5	2.5	4	12	4.85	75	6	●
EXHBD-2060 06050	6	3.0	9	–	–	50	6	●
EXHBD-2060 06060	6	3.0	9	–	–	60	6	●
EXHBD-2060 06075	6	3.0	9	–	–	75	6	●
EXHBD-2060 06100	6	3.0	9	–	–	100	6	●
EXHBD-2080 08060	8	4.0	12	–	–	60	8	●
EXHBD-2080 08075	8	4.0	12	–	–	75	8	●
EXHBD-2080 08100	8	4.0	12	–	–	100	8	●
EXHBD-2100 10075	10	5.0	15	–	–	75	10	●
EXHBD-2100 10100	10	5.0	15	–	–	100	10	●
EXHBD-2100 10125	10	5.0	15	–	–	125	10	●
EXHBD-2120 12075	12	6.0	18	–	–	75	12	●
EXHBD-2120 12100	12	6.0	18	–	–	100	12	●
EXHBD-2120 12125	12	6.0	18	–	–	125	12	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	◎	◎	○	○	○

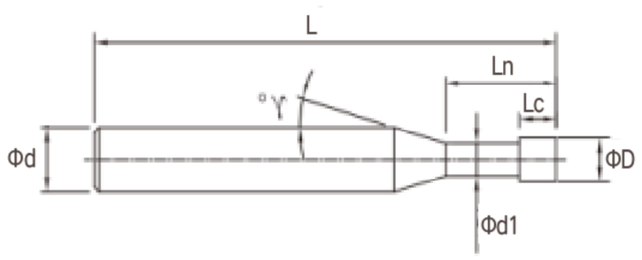
COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○			○	○	

◎ Very suitable ○ Suitable

EXHSD-2L

2 Flute Square End Mill (Long Neck)

TiSiN+X | 2 | 30° Spiral Angle | Arc Back Angle | S | Shank Dia. tolerance H5 | <65 HRC



ΦD	D Tolerance
D < 3	0~-0.010
3 < D≤6	0~-0.012

(mm)

Order Code	Dia.	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	Lc	Ln	Φd1	L	Φd	
EXHSD-2001L0.3 04050	0.1	0.07	0.3	0.085	50	4	●
EXHSD-2001L0.5 04050	0.1	0.07	0.5	0.085	50	4	●
EXHSD-2001L0.75 04050	0.1	0.07	0.75	0.085	50	4	●
EXHSD-2001L1 04050	0.1	0.07	1	0.085	50	4	●
EXHSD-20015L0.3 04050	0.15	0.1	0.3	0.13	50	4	●
EXHSD-20015L0.5 04050	0.15	0.1	0.5	0.13	50	4	●
EXHSD-20015L0.75 04050	0.15	0.1	0.75	0.13	50	4	●
EXHSD-20015L1 04050	0.15	0.1	1	0.13	50	4	●
EXHSD-20015L1.5 04050	0.15	0.1	1.5	0.13	50	4	●
EXHSD-2002L0.5 04050	0.2	0.15	0.5	0.18	50	4	●
EXHSD-2002L1 04050	0.2	0.15	1	0.18	50	4	●
EXHSD-2002L1.5 04050	0.2	0.15	1.5	0.18	50	4	●
EXHSD-2002L2 04050	0.2	0.15	2	0.18	50	4	●
EXHSD-2002L2.5 04050	0.2	0.15	2.5	0.18	50	4	●
EXHSD-2002L3 04050	0.2	0.15	3	0.18	50	4	●
EXHSD-2003L1 04050	0.3	0.2	1	0.28	50	4	●
EXHSD-2003L1.5 04050	0.3	0.2	1.5	0.28	50	4	●
EXHSD-2003L2 04050	0.3	0.2	2	0.28	50	4	●
EXHSD-2003L2.5 04050	0.3	0.2	2.5	0.28	50	4	●
EXHSD-2003L3 04050	0.3	0.2	3	0.28	50	4	●
EXHSD-2003L3.5 04050	0.3	0.2	3.5	0.28	50	4	●
EXHSD-2003L4 04050	0.3	0.2	4	0.28	50	4	●
EXHSD-2004L1 04050	0.4	0.3	1	0.37	50	4	●
EXHSD-2004L1.5 04050	0.4	0.3	1.5	0.37	50	4	●
EXHSD-2004L2 04050	0.4	0.3	2	0.37	50	4	●
EXHSD-2004L2.5 04050	0.4	0.3	2.5	0.37	50	4	●
EXHSD-2004L3 04050	0.4	0.3	3	0.37	50	4	●
EXHSD-2004L3.5 04050	0.4	0.3	3.5	0.37	50	4	●
EXHSD-2004L4 04050	0.4	0.3	4	0.37	50	4	●
EXHSD-2004L5 04050	0.4	0.3	5	0.37	50	4	●
EXHSD-2004L6 04050	0.4	0.3	6	0.37	50	4	●
EXHSD-2004L8 04050	0.4	0.3	8	0.37	50	4	●
EXHSD-2004L10 04050	0.4	0.3	10	0.37	50	4	●
EXHSD-2005L1 04050	0.5	0.35	1	0.46	50	4	●

EXHSD-2L

2 Flute Square End Mill (Long Neck)

Order Code	Dia.	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	Lc	Ln	Φd1	L	Φd	
EXHSD-2005L1.5 04050	0.5	0.35	1.5	0.46	50	4	●
EXHSD-2005L2 04050	0.5	0.35	2	0.46	50	4	●
EXHSD-2005L2.5 04050	0.5	0.35	2.5	0.46	50	4	●
EXHSD-2005L3 04050	0.5	0.35	3	0.46	50	4	●
EXHSD-2005L3.5 04050	0.5	0.35	3.5	0.46	50	4	●
EXHSD-2005L4 04050	0.5	0.35	4	0.46	50	4	●
EXHSD-2005L4.5 04050	0.5	0.35	4.5	0.46	50	4	●
EXHSD-2005L5 04050	0.5	0.35	5	0.46	50	4	●
EXHSD-2005L6 04050	0.5	0.35	6	0.46	50	4	●
EXHSD-2005L7 04050	0.5	0.35	7	0.46	50	4	●
EXHSD-2005L8 04050	0.5	0.35	8	0.46	50	4	●
EXHSD-2005L9 04050	0.5	0.35	9	0.46	50	4	●
EXHSD-2005L10 04050	0.5	0.35	10	0.46	50	4	●
EXHSD-2006L1.5 04050	0.6	0.45	1.5	0.56	50	4	●
EXHSD-2006L2 04050	0.6	0.45	2	0.56	50	4	●
EXHSD-2006L2.5 04050	0.6	0.45	2.5	0.56	50	4	●
EXHSD-2006L3 04050	0.6	0.45	3	0.56	50	4	●
EXHSD-2006L3.5 04050	0.6	0.45	3.5	0.56	50	4	●
EXHSD-2006L4 04050	0.6	0.45	4	0.56	50	4	●
EXHSD-2006L4.5 04050	0.6	0.45	4.5	0.56	50	4	●
EXHSD-2006L5 04050	0.6	0.45	5	0.56	50	4	●
EXHSD-2006L6 04050	0.6	0.45	6	0.56	50	4	●
EXHSD-2006L7 04050	0.6	0.45	7	0.56	50	4	●
EXHSD-2006L8 04050	0.6	0.45	8	0.56	50	4	●
EXHSD-2006L9 04050	0.6	0.45	9	0.56	50	4	●
EXHSD-2006L10 04050	0.6	0.45	10	0.56	50	4	●
EXHSD-2006L12 04050	0.6	0.45	12	0.56	50	4	●
EXHSD-2007L2 04050	0.7	0.5	2	0.66	50	4	●
EXHSD-2007L4 04050	0.7	0.5	4	0.66	50	4	●
EXHSD-2007L6 04050	0.7	0.5	6	0.66	50	4	●
EXHSD-2007L8 04050	0.7	0.5	8	0.66	50	4	●
EXHSD-2007L10 04050	0.7	0.5	10	0.66	50	4	●
EXHSD-2008L2 04050	0.8	0.6	2	0.76	50	4	●
EXHSD-2008L3 04050	0.8	0.6	3	0.76	50	4	●
EXHSD-2008L4 04050	0.8	0.6	4	0.76	50	4	●
EXHSD-2008L5 04050	0.8	0.6	5	0.76	50	4	●
EXHSD-2008L6 04050	0.8	0.6	6	0.76	50	4	●
EXHSD-2008L7 04050	0.8	0.6	7	0.76	50	4	●
EXHSD-2008L8 04050	0.8	0.6	8	0.76	50	4	●
EXHSD-2008L10 04050	0.8	0.6	10	0.76	50	4	●
EXHSD-2008L12 04050	0.8	0.6	12	0.76	50	4	●
EXHSD-2008L16 04050	0.8	0.6	16	0.76	50	4	●

EXHSD-2L

2 Flute Square End Mill (Long Neck)

Order Code	Dia.	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	Lc	Ln	Φd1	L	Φd	
EXHSD-2009L6 04050	0.9	0.7	6	0.85	50	4	○
EXHSD-2009L8 04050	0.9	0.7	8	0.85	50	4	○
EXHSD-2009L10 04050	0.9	0.7	10	0.85	50	4	○
EXHSD-2010L3 04050	1	0.75	3	0.95	50	4	●
EXHSD-2010L4 04050	1	0.75	4	0.95	50	4	●
EXHSD-2010L5 04050	1	0.75	5	0.95	50	4	●
EXHSD-2010L6 04050	1	0.75	6	0.95	50	4	●
EXHSD-2010L7 04050	1	0.75	7	0.95	50	4	●
EXHSD-2010L8 04050	1	0.75	8	0.95	50	4	●
EXHSD-2010L9 04050	1	0.75	9	0.95	50	4	●
EXHSD-2010L10 04050	1	0.75	10	0.95	50	4	●
EXHSD-2010L12 04050	1	0.75	12	0.95	50	4	●
EXHSD-2010L14 04050	1	0.75	14	0.95	50	4	●
EXHSD-2010L16 04050	1	0.75	16	0.95	50	4	●
EXHSD-2010L18 04060	1	0.75	18	0.95	60	4	●
EXHSD-2010L20 04060	1	0.75	20	0.95	60	4	●
EXHSD-2010L22 04060	1	0.75	22	0.95	60	4	●
EXHSD-2012L6 04050	1.2	1	6	1.14	50	4	○
EXHSD-2012L8 04050	1.2	1	8	1.14	50	4	○
EXHSD-2012L10 04050	1.2	1	10	1.14	50	4	○
EXHSD-2012L12 04050	1.2	1	12	1.14	50	4	○
EXHSD-2012L16 04050	1.2	1	16	1.14	50	4	○
EXHSD-2014L6 04050	1.4	1.1	6	1.34	50	4	○
EXHSD-2014L12 04050	1.4	1.1	12	1.34	50	4	○
EXHSD-2014L16 04050	1.4	1.1	16	1.34	50	4	○
EXHSD-2015L4 04050	1.5	1.2	4	1.42	50	4	●
EXHSD-2015L6 04050	1.5	1.2	6	1.42	50	4	●
EXHSD-2015L8 04050	1.5	1.2	8	1.42	50	4	●
EXHSD-2015L10 04050	1.5	1.2	10	1.42	50	4	●
EXHSD-2015L12 04050	1.5	1.2	12	1.42	50	4	●
EXHSD-2015L14 04050	1.5	1.2	14	1.42	50	4	●
EXHSD-2015L16 04050	1.5	1.2	16	1.42	50	4	●
EXHSD-2015L18 04060	1.5	1.2	18	1.42	60	4	●
EXHSD-2015L20 04060	1.5	1.2	20	1.42	60	4	●
EXHSD-2015L25 04060	1.5	1.2	25	1.42	60	4	●
EXHSD-2015L30 04075	1.5	1.2	30	1.42	75	4	●
EXHSD-2015L35 04075	1.5	1.2	35	1.42	75	4	●
EXHSD-2016L6 04050	1.6	1.3	6	1.52	50	4	○
EXHSD-2016L8 04050	1.6	1.3	8	1.52	50	4	○
EXHSD-2016L12 04050	1.6	1.3	12	1.52	50	4	○
EXHSD-2016L16 04050	1.6	1.3	16	1.52	50	4	○
EXHSD-2018L6 04050	1.8	1.4	6	1.72	50	4	○

EXHSD-2L

2 Flute Square End Mill (Long Neck)

Order Code	Dia.	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	Lc	Ln	Φd1	L	Φd	
EXHSD-2018L8 04050	1.8	1.4	8	1.72	50	4	○
EXHSD-2020L4 04050	2	1.6	4	1.9	50	4	●
EXHSD-2020L6 04050	2	1.6	6	1.9	50	4	●
EXHSD-2020L8 04050	2	1.6	8	1.9	50	4	●
EXHSD-2020L10 04050	2	1.6	10	1.9	50	4	●
EXHSD-2020L12 04050	2	1.6	12	1.9	50	4	●
EXHSD-2020L14 04050	2	1.6	14	1.9	50	4	●
EXHSD-2020L16 04050	2	1.6	16	1.9	50	4	●
EXHSD-2020L18 04060	2	1.6	18	1.9	60	4	●
EXHSD-2020L20 04060	2	1.6	20	1.9	60	4	●
EXHSD-2020L25 04060	2	1.6	25	1.9	60	4	●
EXHSD-2020L30 04075	2	1.6	30	1.9	75	4	●
EXHSD-2020L35 04075	2	1.6	35	1.9	75	4	●
EXHSD-2020L40 04075	2	1.6	40	1.9	75	4	●
EXHSD-2025L8 04050	2.5	2	8	2.4	50	4	●
EXHSD-2025L10 04050	2.5	2	10	2.4	50	4	●
EXHSD-2025L12 04050	2.5	2	12	2.4	50	4	●
EXHSD-2025L16 04050	2.5	2	16	2.4	50	4	●
EXHSD-2025L20 04060	2.5	2	20	2.4	60	4	●
EXHSD-2025L25 04060	2.5	2	25	2.4	60	4	●
EXHSD-2025L30 04075	2.5	2	30	2.4	75	4	●
EXHSD-2025L35 04075	2.5	2	35	2.4	75	4	●
EXHSD-2025L40 04075	2.5	2	40	2.4	75	4	●
EXHSD-2030L8 06060	3	2.4	8	2.9	60	6	●
EXHSD-2030L10 06060	3	2.4	10	2.9	60	6	●
EXHSD-2030L12 06060	3	2.4	12	2.9	60	6	●
EXHSD-2030L16 06060	3	2.4	16	2.9	60	6	●
EXHSD-2030L20 06060	3	2.4	20	2.9	60	6	●
EXHSD-2030L25 06075	3	2.4	25	2.9	75	6	●
EXHSD-2030L30 06075	3	2.4	30	2.9	75	6	●
EXHSD-2030L35 06075	3	2.4	35	2.9	75	6	●
EXHSD-2030L40 06100	3	2.4	40	2.9	100	6	●
EXHSD-2030L50 06100	3	2.4	50	2.9	100	6	●
EXHSD-2040L12 06060	4	3.2	12	3.9	60	6	●
EXHSD-2040L16 06060	4	3.2	16	3.9	60	6	●
EXHSD-2040L20 06060	4	3.2	20	3.9	60	6	●
EXHSD-2040L25 06075	4	3.2	25	3.9	75	6	●
EXHSD-2040L30 06075	4	3.2	30	3.9	75	6	●
EXHSD-2040L35 06075	4	3.2	35	3.9	75	6	●
EXHSD-2040L40 06100	4	3.2	40	3.9	100	6	●
EXHSD-2040L50 06100	4	3.2	50	3.9	100	6	●
EXHSD-2050L20 06060	5	4	20	4.85	60	6	○

EXHSD-2L

2 Flute Square End Mill (Long Neck)

Order Code	Dia.	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	Lc	Ln	Φd1	L	Φd	
EXHSD-2050L25 06075	5	4	25	4.85	75	6	●
EXHSD-2050L30 06075	5	4	30	4.85	75	6	●
EXHSD-2050L40 06100	5	4	40	4.85	100	6	●
EXHSD-2050L50 06100	5	4	50	4.85	100	6	●
EXHSD-2060L20 06060	6	4.8	20	5.85	60	6	●
EXHSD-2060L30 06075	6	4.8	30	5.85	75	6	●
EXHSD-2060L40 06100	6	4.8	40	5.85	100	6	●
EXHSD-2060L50 06100	6	4.8	50	5.85	100	6	●

TABLE OF RECOMMENDED MILLING MATERIALS

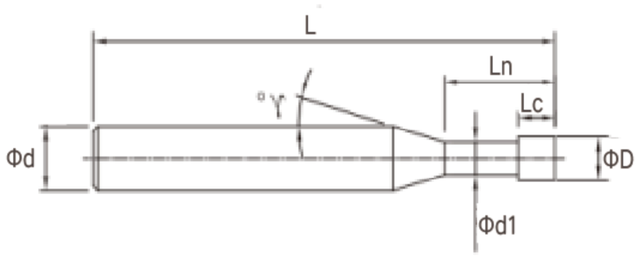
CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	◎	◎	○	○	○

COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○			○	○	

◎ Very suitable ○ Suitable

EXHSD-4L

4 Flute Square End Mill (Long Neck)



TiSiN+X | 4 | 30° Spiral Angle | Arc Back Angle | S | Shank Dia. tolerance H5 | <65 HRC

ΦD	D Tolerance
D < 3	0~-0.010
3 < D≤6	0~-0.012

(mm)

Order Code	Dia.	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	Lc	Ln	Φd1	L	Φd	
EXHSD-4008L2 04050	0.8	0.6	2	0.76	50	4	○
EXHSD-4008L3 04050	0.8	0.6	3	0.76	50	4	○
EXHSD-4008L4 04050	0.8	0.6	4	0.76	50	4	○
EXHSD-4008L5 04050	0.8	0.6	5	0.76	50	4	○
EXHSD-4008L6 04050	0.8	0.6	6	0.76	50	4	○
EXHSD-4008L7 04050	0.8	0.6	7	0.76	50	4	○
EXHSD-4008L8 04050	0.8	0.6	8	0.76	50	4	○
EXHSD-4008L10 04050	0.8	0.6	10	0.76	50	4	○
EXHSD-4008L12 04050	0.8	0.6	12	0.76	50	4	○
EXHSD-4008L16 04050	0.8	0.6	16	0.76	50	4	○
EXHSD-4010L3 04050	1	0.75	3	0.95	50	4	●
EXHSD-4010L4 04050	1	0.75	4	0.95	50	4	●
EXHSD-4010L5 04050	1	0.75	5	0.95	50	4	●
EXHSD-4010L6 04050	1	0.75	6	0.95	50	4	●
EXHSD-4010L7 04050	1	0.75	7	0.95	50	4	●
EXHSD-4010L8 04050	1	0.75	8	0.95	50	4	●
EXHSD-4010L9 04050	1	0.75	9	0.95	50	4	●
EXHSD-4010L10 04050	1	0.75	10	0.95	50	4	●
EXHSD-4010L12 04050	1	0.75	12	0.95	50	4	●
EXHSD-4010L14 04050	1	0.75	14	0.95	50	4	●
EXHSD-4010L16 04050	1	0.75	16	0.95	50	4	●
EXHSD-4010L18 04060	1	0.75	18	0.95	60	4	○
EXHSD-4010L20 04060	1	0.75	20	0.95	60	4	○
EXHSD-4010L22 04060	1	0.75	22	0.95	60	4	○
EXHSD-4012L6 04050	1.2	1	6	1.14	50	4	○
EXHSD-4012L8 04050	1.2	1	8	1.14	50	4	○
EXHSD-4012L10 04050	1.2	1	10	1.14	50	4	○
EXHSD-4012L12 04050	1.2	1	12	1.14	50	4	○
EXHSD-4014L6 04050	1.4	1.1	6	1.34	50	4	○
EXHSD-4014L12 04050	1.4	1.1	12	1.34	50	4	○
EXHSD-4014L16 04050	1.4	1.1	16	1.34	50	4	○
EXHSD-4105L4 04050	1.5	1.2	4	1.42	50	4	●
EXHSD-4015L6 04050	1.5	1.2	6	1.42	50	4	●
EXHSD-4015L8 04050	1.5	1.2	8	1.42	50	4	●

EXHSD-4L

4 Flute Square End Mill (Long Neck)

Order Code	Dia.	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	Lc	Ln	Φd1	L	Φd	
EXHSD-4015L10 04050	1.5	1.2	10	1.42	50	4	●
EXHSD-4015L12 04050	1.5	1.2	12	1.42	50	4	●
EXHSD-4015L14 04050	1.5	1.2	14	1.42	50	4	●
EXHSD-4015L16 04050	1.5	1.2	16	1.42	50	4	●
EXHSD-4015L18 04060	1.5	1.2	18	1.42	60	4	●
EXHSD-4015L20 04060	1.5	1.2	20	1.42	60	4	●
EXHSD-4015L25 04060	1.5	1.2	25	1.42	60	4	●
EXHSD-4016L8 04050	1.6	1.3	8	1.52	50	4	●
EXHSD-4016L12 04050	1.6	1.3	12	1.52	50	4	●
EXHSD-4016L16 04050	1.6	1.3	16	1.52	50	4	●
EXHSD-4020L6 04050	2	1.6	6	1.9	50	4	●
EXHSD-4020L8 04050	2	1.6	8	1.9	50	4	●
EXHSD-4020L10 04050	2	1.6	10	1.9	50	4	●
EXHSD-4020L12 04050	2	1.6	12	1.9	50	4	●
EXHSD-4020L14 04050	2	1.6	14	1.9	50	4	●
EXHSD-4020L16 04050	2	1.6	16	1.9	50	4	●
EXHSD-4020L18 04060	2	1.6	18	1.9	60	4	●
EXHSD-4020L20 04060	2	1.6	20	1.9	60	4	●
EXHSD-4020L25 04060	2	1.6	25	1.9	60	4	●
EXHSD-4020L30 04075	2	1.6	30	1.9	75	4	●
EXHSD-4020L35 04075	2	1.6	35	1.9	75	4	●
EXHSD-4025L8 04050	2.5	2	8	2.4	50	4	●
EXHSD-4025L10 04050	2.5	2	10	2.4	50	4	●
EXHSD-4025L12 04050	2.5	2	12	2.4	50	4	●
EXHSD-4025L16 04050	2.5	2	16	2.4	50	4	●
EXHSD-4025L20 04060	2.5	2	20	2.4	60	4	●
EXHSD-4025L25 04060	2.5	2	25	2.4	60	4	●
EXHSD-4025L30 04075	2.5	2	30	2.4	75	4	●
EXHSD-4025L35 04075	2.5	2	35	2.4	75	4	●
EXHSD-4030L10 04050	3	2.4	10	2.9	50	4	●
EXHSD-4030L10 06060	3	2.4	10	2.9	60	6	●
EXHSD-4030L12 04050	3	2.4	12	2.9	50	4	●
EXHSD-4030L12 06060	3	2.4	12	2.9	60	6	●
EXHSD-4030L16 04050	3	2.4	16	2.9	50	4	●
EXHSD-4030L16 06060	3	2.4	16	2.9	60	6	●
EXHSD-4030L20 06060	3	2.4	20	2.9	60	6	●
EXHSD-4030L25 06075	3	2.4	25	2.9	75	6	●
EXHSD-4030L30 06075	3	2.4	30	2.9	75	6	●
EXHSD-4030L35 06075	3	2.4	35	2.9	75	6	●
EXHSD-4030L40 06100	3	2.4	40	2.9	100	6	●
EXHSD-4040L12 06060	4	3.2	12	3.9	60	6	●
EXHSD-4040L16 06060	4	3.2	16	3.9	60	6	●

EXHSD-4L

4 Flute Square End Mill (Long Neck)

Order Code	Dia.	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	Lc	Ln	Φd1	L	Φd	
EXHSD-4040L20 06060	4	3.2	20	3.9	60	6	●
EXHSD-4040L25 06075	4	3.2	25	3.9	75	6	●
EXHSD-4040L30 06075	4	3.2	30	3.9	75	6	●
EXHSD-4040L35 06075	4	3.2	35	3.9	75	6	●
EXHSD-4040L40 06100	4	3.2	40	3.9	100	6	●
EXHSD-4040L50 06100	4	3.2	50	3.9	100	6	●

TABLE OF RECOMMENDED MILLING MATERIALS

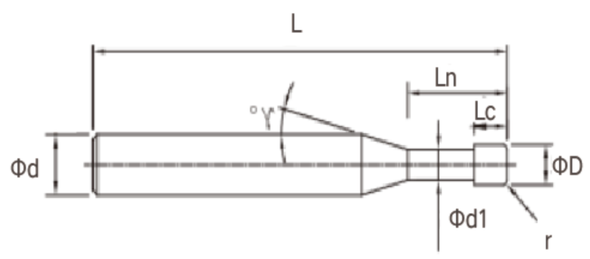
CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	○	○	○	○	○

COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○			○	○	

○ Very suitable ○ Suitable

EXHRD-2L

2 Flute Corner Radius End Mill (Long Neck)



TiSiN+X | 2 | 30° Spiral Angle | Straight Back Angle | R | Shank Dia. tolerance H5 | <65 HRC

ΦD	D Tolerance
D≤3	0~-0.010
3≤D≤6	0~-0.012

(mm)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-2002R0.05L0.5 04050	0.2	0.05	0.15	0.5	0.18	50	4	○
EXHRD-2002R0.05L1 04050	0.2	0.05	0.15	1	0.18	50	4	○
EXHRD-2002R0.05L1.5 04050	0.2	0.05	0.15	1.5	0.18	50	4	○
EXHRD-2002R0.05L2 04050	0.2	0.05	0.15	2	0.18	50	4	○
EXHRD-2003R0.05L1 04050	0.3	0.05	0.2	1	0.28	50	4	●
EXHRD-2003R0.05L1.5 04050	0.3	0.05	0.2	1.5	0.28	50	4	●
EXHRD-2003R0.05L2 04050	0.3	0.05	0.2	2	0.28	50	4	●
EXHRD-2003R0.05L2.5 04050	0.3	0.05	0.2	2.5	0.28	50	4	●
EXHRD-2003R0.05L3 04050	0.3	0.05	0.2	3	0.28	50	4	●
EXHRD-2004R0.05L1 04050	0.4	0.05	0.3	1	0.37	50	4	●
EXHRD-2004R0.05L1.5 04050	0.4	0.05	0.3	1.5	0.37	50	4	●
EXHRD-2004R0.05L2 04050	0.4	0.05	0.3	2	0.37	50	4	●
EXHRD-2004R0.05L2.5 04050	0.4	0.05	0.3	2.5	0.37	50	4	●
EXHRD-2004R0.05L3 04050	0.4	0.05	0.3	3	0.37	50	4	●
EXHRD-2004R0.05L4 04050	0.4	0.05	0.3	4	0.37	50	4	●
EXHRD-2004R0.1L1 04050	0.4	0.1	0.3	1	0.37	50	4	●
EXHRD-2004R0.1L1.5 04050	0.4	0.1	0.3	1.5	0.37	50	4	●
EXHRD-2004R0.1L2 04050	0.4	0.1	0.3	2	0.37	50	4	●
EXHRD-2004R0.1L2.5 04050	0.4	0.1	0.3	2.5	0.37	50	4	●
EXHRD-2004R0.1L3 04050	0.4	0.1	0.3	3	0.37	50	4	●
EXHRD-2004R0.1L4 04050	0.4	0.1	0.3	4	0.37	50	4	●
EXHRD-2005R0.05L1 04050	0.5	0.05	0.35	1	0.46	50	4	●
EXHRD-2005R0.05L1.5 04050	0.5	0.05	0.35	1.5	0.46	50	4	●
EXHRD-2005R0.05L2 04050	0.5	0.05	0.35	2	0.46	50	4	●
EXHRD-2005R0.05L2.5 04050	0.5	0.05	0.35	2.5	0.46	50	4	●
EXHRD-2005R0.05L3 04050	0.5	0.05	0.35	3	0.46	50	4	●
EXHRD-2005R0.05L4 04050	0.5	0.05	0.35	4	0.46	50	4	●
EXHRD-2005R0.05L5 04050	0.5	0.05	0.35	5	0.46	50	4	●
EXHRD-2005R0.05L6 04050	0.5	0.05	0.35	6	0.46	50	4	●
EXHRD-2005R0.1L1 04050	0.5	0.1	0.35	1	0.46	50	4	●
EXHRD-2005R0.1L1.5 04050	0.5	0.1	0.35	1.5	0.46	50	4	●
EXHRD-2005R0.1L2 04050	0.5	0.1	0.35	2	0.46	50	4	●
EXHRD-2005R0.1L2.5 04050	0.5	0.1	0.35	2.5	0.46	50	4	●
EXHRD-2005R0.1L3 04050	0.5	0.1	0.35	3	0.46	50	4	●

EXHRD-2L

2 Flute Corner Radius End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-2005R0.1L4 04050	0.5	0.1	0.35	4	0.46	50	4	●
EXHRD-2005R0.1L5 04050	0.5	0.1	0.35	5	0.46	50	4	●
EXHRD-2005R0.1L6 04050	0.5	0.1	0.35	6	0.46	50	4	●
EXHRD-2006R0.05L2 04050	0.6	0.05	0.45	2	0.56	50	4	●
EXHRD-2006R0.05L3 04050	0.6	0.05	0.45	3	0.56	50	4	●
EXHRD-2006R0.05L4 04050	0.6	0.05	0.45	4	0.56	50	4	●
EXHRD-2006R0.05L6 04050	0.6	0.05	0.45	6	0.56	50	4	●
EXHRD-2006R0.05L8 04050	0.6	0.05	0.45	8	0.56	50	4	●
EXHRD-2006R0.05L10 04050	0.6	0.05	0.45	10	0.56	50	4	●
EXHRD-2006R0.1L2 04050	0.6	0.1	0.45	2	0.56	50	4	●
EXHRD-2006R0.1L3 04050	0.6	0.1	0.45	3	0.56	50	4	●
EXHRD-2006R0.1L4 04050	0.6	0.1	0.45	4	0.56	50	4	●
EXHRD-2006R0.1L6 04050	0.6	0.1	0.45	6	0.56	50	4	●
EXHRD-2006R0.1L8 04050	0.6	0.1	0.45	8	0.56	50	4	●
EXHRD-2006R0.1L10 04050	0.6	0.1	0.45	10	0.56	50	4	●
EXHRD-2007R0.05L2 04050	0.7	0.05	0.5	2	0.66	50	4	●
EXHRD-2007R0.05L3 04050	0.7	0.05	0.5	3	0.66	50	4	●
EXHRD-2007R0.05L4 04050	0.7	0.05	0.5	4	0.66	50	4	●
EXHRD-2007R0.05L6 04050	0.7	0.05	0.5	6	0.66	50	4	●
EXHRD-2007R0.05L8 04050	0.7	0.05	0.5	8	0.66	50	4	●
EXHRD-2007R0.05L10 04050	0.7	0.05	0.5	10	0.66	50	4	●
EXHRD-2007R0.1L2 04050	0.7	0.1	0.5	2	0.66	50	4	●
EXHRD-2007R0.1L3 04050	0.7	0.1	0.5	3	0.66	50	4	●
EXHRD-2007R0.1L4 04050	0.7	0.1	0.5	4	0.66	50	4	●
EXHRD-2007R0.1L6 04050	0.7	0.1	0.5	6	0.66	50	4	●
EXHRD-2007R0.1L8 04050	0.7	0.1	0.5	8	0.66	50	4	●
EXHRD-2007R0.1L10 04050	0.7	0.1	0.5	10	0.66	50	4	●
EXHRD-2008R0.05L2 04050	0.8	0.05	0.6	2	0.76	50	4	●
EXHRD-2008R0.05L3 04050	0.8	0.05	0.6	3	0.76	50	4	●
EXHRD-2008R0.05L4 04050	0.8	0.05	0.6	4	0.76	50	4	●
EXHRD-2008R0.05L6 04050	0.8	0.05	0.6	6	0.76	50	4	●
EXHRD-2008R0.05L8 04050	0.8	0.05	0.6	8	0.76	50	4	●
EXHRD-2008R0.05L10 04050	0.8	0.05	0.6	10	0.76	50	4	●
EXHRD-2008R0.05L12 04050	0.8	0.05	0.6	12	0.76	50	4	●
EXHRD-2008R0.1L2 04050	0.8	0.1	0.6	2	0.76	50	4	●
EXHRD-2008R0.1L3 04050	0.8	0.1	0.6	3	0.76	50	4	●
EXHRD-2008R0.1L4 04050	0.8	0.1	0.6	4	0.76	50	4	●
EXHRD-2008R0.1L6 04050	0.8	0.1	0.6	6	0.76	50	4	●
EXHRD-2008R0.1L8 04050	0.8	0.1	0.6	8	0.76	50	4	●
EXHRD-2008R0.1L10 04050	0.8	0.1	0.6	10	0.76	50	4	●
EXHRD-2008R0.1L12 04050	0.8	0.1	0.6	12	0.76	50	4	●
EXHRD-2008R0.2L2 04050	0.8	0.2	0.6	2	0.76	50	4	●

EXHRD-2L

2 Flute Corner Radius End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-2008R0.2L3 04050	0.8	0.2	0.6	3	0.76	50	4	●
EXHRD-2008R0.2L4 04050	0.8	0.2	0.6	4	0.76	50	4	●
EXHRD-2008R0.2L6 04050	0.8	0.2	0.6	6	0.76	50	4	●
EXHRD-2008R0.2L8 04050	0.8	0.2	0.6	8	0.76	50	4	●
EXHRD-2008R0.2L10 04050	0.8	0.2	0.6	10	0.76	50	4	●
EXHRD-2008R0.2L12 04050	0.8	0.2	0.6	12	0.76	50	4	●
EXHRD-2009R0.1L4 04050	0.9	0.1	0.65	4	0.86	50	4	
EXHRD-2009R0.1L8 04050	0.9	0.1	0.65	8	0.86	50	4	
EXHRD-2009R0.2L4 04050	0.9	0.2	0.65	4	0.86	50	4	
EXHRD-2009R0.2L8 04050	0.9	0.2	0.65	8	0.86	50	4	
EXHRD-2010R0.05L3 04050	1	0.05	0.75	3	0.95	50	4	●
EXHRD-2010R0.05L4 04050	1	0.05	0.75	4	0.95	50	4	●
EXHRD-2010R0.05L5 04050	1	0.05	0.75	5	0.95	50	4	●
EXHRD-2010R0.05L6 04050	1	0.05	0.75	6	0.95	50	4	●
EXHRD-2010R0.05L8 04050	1	0.05	0.75	8	0.95	50	4	●
EXHRD-2010R0.05L10 04050	1	0.05	0.75	10	0.95	50	4	●
EXHRD-2010R0.05L12 04050	1	0.05	0.75	12	0.95	50	4	●
EXHRD-2010R0.05L16 04050	1	0.05	0.75	16	0.95	50	4	●
EXHRD-2010R0.05L20 04060	1	0.05	0.75	20	0.95	60	4	●
EXHRD-2010R0.1L2 04050	1	0.1	0.75	2	0.95	50	4	●
EXHRD-2010R0.1L3 04050	1	0.1	0.75	3	0.95	50	4	●
EXHRD-2010R0.1L4 04050	1	0.1	0.75	4	0.95	50	4	●
EXHRD-2010R0.1L5 04050	1	0.1	0.75	5	0.95	50	4	●
EXHRD-2010R0.1L6 04050	1	0.1	0.75	6	0.95	50	4	●
EXHRD-2010R0.1L8 04050	1	0.1	0.75	8	0.95	50	4	●
EXHRD-2010R0.1L10 04050	1	0.1	0.75	10	0.95	50	4	●
EXHRD-2010R0.1L12 04050	1	0.1	0.75	12	0.95	50	4	●
EXHRD-2010R0.1L16 04050	1	0.1	0.75	16	0.95	50	4	●
EXHRD-2010R0.1L20 04060	1	0.1	0.75	20	0.95	60	4	●
EXHRD-2010R0.2L2 04050	1	0.2	0.75	2	0.95	50	4	●
EXHRD-2010R0.2L3 04050	1	0.2	0.75	3	0.95	50	4	●
EXHRD-2010R0.2L4 04050	1	0.2	0.75	4	0.95	50	4	●
EXHRD-2010R0.2L5 04050	1	0.2	0.75	5	0.95	50	4	●
EXHRD-2010R0.2L6 04050	1	0.2	0.75	6	0.95	50	4	●
EXHRD-2010R0.2L8 04050	1	0.2	0.75	8	0.95	50	4	●
EXHRD-2010R0.2L10 04050	1	0.2	0.75	10	0.95	50	4	●
EXHRD-2010R0.2L12 04050	1	0.2	0.75	12	0.95	50	4	●
EXHRD-2010R0.2L16 04050	1	0.2	0.75	16	0.95	50	4	●
EXHRD-2010R0.2L20 04060	1	0.2	0.75	20	0.95	60	4	●
EXHRD-2010R0.3L3 04050	1	0.3	0.75	3	0.95	50	4	●
EXHRD-2010R0.3L4 04050	1	0.3	0.75	4	0.95	50	4	●
EXHRD-2010R0.3L5 04050	1	0.3	0.75	5	0.95	50	4	●

EXHRD-2L

2 Flute Corner Radius End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-2010R0.3L6 04050	1	0.3	0.75	6	0.95	50	4	●
EXHRD-2010R0.3L8 04050	1	0.3	0.75	8	0.95	50	4	●
EXHRD-2010R0.3L10 04050	1	0.3	0.75	10	0.95	50	4	●
EXHRD-2010R0.3L12 04050	1	0.3	0.75	12	0.95	50	4	●
EXHRD-2010R0.3L16 04050	1	0.3	0.75	16	0.95	50	4	●
EXHRD-2010R0.3L20 04060	1	0.3	0.75	20	0.95	60	4	●
EXHRD-2015R0.05L4 04050	1.5	0.05	1.2	4	1.42	50	4	●
EXHRD-2015R0.05L6 04050	1.5	0.05	1.2	6	1.42	50	4	●
EXHRD-2015R0.05L8 04050	1.5	0.05	1.2	8	1.42	50	4	●
EXHRD-2015R0.05L10 04050	1.5	0.05	1.2	10	1.42	50	4	●
EXHRD-2015R0.05L12 04050	1.5	0.05	1.2	12	1.42	50	4	●
EXHRD-2015R0.05L16 04050	1.5	0.05	1.2	16	1.42	50	4	●
EXHRD-2015R0.05L20 04060	1.5	0.05	1.2	20	1.42	60	4	●
EXHRD-2015R0.1L4 04050	1.5	0.1	1.2	4	1.42	50	4	●
EXHRD-2015R0.1L6 04050	1.5	0.1	1.2	6	1.42	50	4	●
EXHRD-2015R0.1L8 04050	1.5	0.1	1.2	8	1.42	50	4	●
EXHRD-2015R0.1L10 04050	1.5	0.1	1.2	10	1.42	50	4	●
EXHRD-2015R0.1L12 04050	1.5	0.1	1.2	12	1.42	50	4	●
EXHRD-2015R0.1L16 04050	1.5	0.1	1.2	16	1.42	50	4	●
EXHRD-2015R0.1L20 04060	1.5	0.1	1.2	20	1.42	60	4	●
EXHRD-2015R0.2L4 04050	1.5	0.2	1.2	4	1.42	50	4	●
EXHRD-2015R0.2L6 04050	1.5	0.2	1.2	6	1.42	50	4	●
EXHRD-2015R0.2L8 04050	1.5	0.2	1.2	8	1.42	50	4	●
EXHRD-2015R0.2L10 04050	1.5	0.2	1.2	10	1.42	50	4	●
EXHRD-2015R0.2L12 04050	1.5	0.2	1.2	12	1.42	50	4	●
EXHRD-2015R0.2L15 04050	1.5	0.2	1.2	15	1.42	50	4	●
EXHRD-2015R0.2L16 04050	1.5	0.2	1.2	16	1.42	50	4	●
EXHRD-2015R0.2L20 04060	1.5	0.2	1.2	20	1.42	60	4	●
EXHRD-2015R0.3L4 04050	1.5	0.3	1.2	4	1.42	50	4	●
EXHRD-2015R0.3L6 04050	1.5	0.3	1.2	6	1.42	50	4	●
EXHRD-2015R0.3L8 04050	1.5	0.3	1.2	8	1.42	50	4	●
EXHRD-2015R0.3L10 04050	1.5	0.3	1.2	10	1.42	50	4	●
EXHRD-2015R0.3L12 04050	1.5	0.3	1.2	12	1.42	50	4	●
EXHRD-2015R0.3L16 04050	1.5	0.3	1.2	16	1.42	50	4	●
EXHRD-2015R0.3L20 04060	1.5	0.3	1.2	20	1.42	60	4	●
EXHRD-2015R0.5L4 04050	1.5	0.5	1.2	4	1.42	50	4	●
EXHRD-2015R0.5L6 04050	1.5	0.5	1.2	6	1.42	50	4	●
EXHRD-2015R0.5L8 04050	1.5	0.5	1.2	8	1.42	50	4	●
EXHRD-2015R0.5L10 04050	1.5	0.5	1.2	10	1.42	50	4	●
EXHRD-2015R0.5L12 04050	1.5	0.5	1.2	12	1.42	50	4	●
EXHRD-2015R0.5L16 04050	1.5	0.5	1.2	16	1.42	50	4	●
EXHRD-2015R0.5L20 04060	1.5	0.5	1.2	20	1.42	60	4	●

EXHRD-2L

2 Flute Corner Radius End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-20175R0.2L5 04050	1.75	0.2	1.4	5	1.67	50	4	○
EXHRD-20175R0.2L10 04050	1.75	0.2	1.4	10	1.67	50	4	○
EXHRD-20175R0.2L15 04050	1.75	0.2	1.4	15	1.67	50	4	○
EXHRD-2020R0.05L6 04050	2	0.05	1.6	6	1.9	50	4	●
EXHRD-2020R0.05L8 04050	2	0.05	1.6	8	1.9	50	4	●
EXHRD-2020R0.05L10 04050	2	0.05	1.6	10	1.9	50	4	●
EXHRD-2020R0.05L12 04050	2	0.05	1.6	12	1.9	50	4	●
EXHRD-2020R0.05L16 04050	2	0.05	1.6	16	1.9	50	4	●
EXHRD-2020R0.05L20 04060	2	0.05	1.6	20	1.9	60	4	●
EXHRD-2020R0.05L25 04060	2	0.05	1.6	25	1.9	60	4	●
EXHRD-2020R0.05L30 04075	2	0.05	1.6	30	1.9	75	4	●
EXHRD-2020R0.1L6 04050	2	0.1	1.6	6	1.9	50	4	●
EXHRD-2020R0.1L8 04050	2	0.1	1.6	8	1.9	50	4	●
EXHRD-2020R0.1L10 04050	2	0.1	1.6	10	1.9	50	4	●
EXHRD-2020R0.1L12 04050	2	0.1	1.6	12	1.9	50	4	●
EXHRD-2020R0.1L16 04050	2	0.1	1.6	16	1.9	50	4	●
EXHRD-2020R0.1L20 04060	2	0.1	1.6	20	1.9	60	4	●
EXHRD-2020R0.1L25 04060	2	0.1	1.6	25	1.9	60	4	●
EXHRD-2020R0.1L30 04075	2	0.1	1.6	30	1.9	75	4	●
EXHRD-2020R0.2L4 04050	2	0.2	1.6	4	1.9	50	4	●
EXHRD-2020R0.2L6 04050	2	0.2	1.6	6	1.9	50	4	●
EXHRD-2020R0.2L8 04050	2	0.2	1.6	8	1.9	50	4	●
EXHRD-2020R0.2L10 04050	2	0.2	1.6	10	1.9	50	4	●
EXHRD-2020R0.2L12 04050	2	0.2	1.6	12	1.9	50	4	●
EXHRD-2020R0.2L16 04050	2	0.2	1.6	16	1.9	50	4	●
EXHRD-2020R0.2L20 4050	2	0.2	1.6	20	1.9	50	4	●
EXHRD-2020R0.2L20 04060	2	0.2	1.6	20	1.9	60	4	●
EXHRD-2020R0.2L25 04060	2	0.2	1.6	25	1.9	60	4	●
EXHRD-2020R0.2L30 04075	2	0.2	1.6	30	1.9	75	4	●
EXHRD-2020R0.3L6 04050	2	0.3	1.6	6	1.9	50	4	●
EXHRD-2020R0.3L8 04050	2	0.3	1.6	8	1.9	50	4	●
EXHRD-2020R0.3L10 04050	2	0.3	1.6	10	1.9	50	4	●
EXHRD-2020R0.3L12 04050	2	0.3	1.6	12	1.9	50	4	●
EXHRD-2020R0.3L16 04050	2	0.3	1.6	16	1.9	50	4	●
EXHRD-2020R0.3L20 04060	2	0.3	1.6	20	1.9	60	4	●
EXHRD-2020R0.3L25 04060	2	0.3	1.6	25	1.9	60	4	●
EXHRD-2020R0.3L30 04075	2	0.3	1.6	30	1.9	75	4	●
EXHRD-2020R0.5L6 04050	2	0.5	1.6	6	1.9	50	4	●
EXHRD-2020R0.5L8 04050	2	0.5	1.6	8	1.9	50	4	●
EXHRD-2020R0.5L10 04050	2	0.5	1.6	10	1.9	50	4	●
EXHRD-2020R0.5L12 04050	2	0.5	1.6	12	1.9	50	4	●
EXHRD-2020R0.5L16 04050	2	0.5	1.6	16	1.9	50	4	●

EXHRD-2L

2 Flute Corner Radius End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-2020R0.5L20 04060	2	0.5	1.6	20	1.9	60	4	●
EXHRD-2020R0.5L25 04060	2	0.5	1.6	25	1.9	60	4	●
EXHRD-2020R0.5L30 04075	2	0.5	1.6	30	1.9	75	4	●
EXHRD-2025R0.2L10 04050	2.5	0.2	2	10	2.4	50	4	○
EXHRD-2025R0.2L20 04060	2.5	0.2	2	20	2.4	60	4	●
EXHRD-2025R0.2L30 04075	2.5	0.2	2	30	2.4	75	4	●
EXHRD-2025R0.5L10 04050	2.5	0.5	2	10	2.4	50	4	○
EXHRD-2025R0.5L20 04060	2.5	0.5	2	20	2.4	60	4	●
EXHRD-2025R0.5L30 04075	2.5	0.5	2	30	2.4	75	4	●
EXHRD-2030R0.1L8 06060	3	0.1	2.4	8	2.9	60	6	●
EXHRD-2030R0.1L10 06060	3	0.1	2.4	10	2.9	60	6	●
EXHRD-2030R0.1L12 06060	3	0.1	2.4	12	2.9	60	6	●
EXHRD-2030R0.1L16 06060	3	0.1	2.4	16	2.9	60	6	●
EXHRD-2030R0.1L20 06060	3	0.1	2.4	20	2.9	60	6	●
EXHRD-2030R0.1L25 06075	3	0.1	2.4	25	2.9	75	6	●
EXHRD-2030R0.1L30 06075	3	0.1	2.4	30	2.9	75	6	●
EXHRD-2030R0.1L35 06075	3	0.1	2.4	35	2.9	75	6	●
EXHRD-2030R0.1L40 06100	3	0.1	2.4	40	2.9	100	6	●
EXHRD-2030R0.2L8 06060	3	0.2	2.4	8	2.9	60	6	●
EXHRD-2030R0.2L10 06060	3	0.2	2.4	10	2.9	60	6	●
EXHRD-2030R0.2L12 06060	3	0.2	2.4	12	2.9	60	6	●
EXHRD-2030R0.2L16 06060	3	0.2	2.4	16	2.9	60	6	●
EXHRD-2030R0.2L20 06060	3	0.2	2.4	20	2.9	60	6	●
EXHRD-2030R0.2L25 06075	3	0.2	2.4	25	2.9	75	6	●
EXHRD-2030R0.2L30 06075	3	0.2	2.4	30	2.9	75	6	●
EXHRD-2030R0.2L35 06075	3	0.2	2.4	35	2.9	75	6	●
EXHRD-2030R0.2L40 06100	3	0.2	2.4	40	2.9	100	6	●
EXHRD-2030R0.3L8 06060	3	0.3	2.4	8	2.9	60	6	●
EXHRD-2030R0.3L10 06060	3	0.3	2.4	10	2.9	60	6	●
EXHRD-2030R0.3L12 06060	3	0.3	2.4	12	2.9	60	6	●
EXHRD-2030R0.3L16 06060	3	0.3	2.4	16	2.9	60	6	●
EXHRD-2030R0.3L20 06060	3	0.3	2.4	20	2.9	60	6	●
EXHRD-2030R0.3L25 06075	3	0.3	2.4	25	2.9	75	6	●
EXHRD-2030R0.3L30 06075	3	0.3	2.4	30	2.9	75	6	●
EXHRD-2030R0.3L35 06075	3	0.3	2.4	35	2.9	75	6	●
EXHRD-2030R0.3L40 06100	3	0.3	2.4	40	2.9	100	6	●
EXHRD-2030R0.5L8 06060	3	0.5	2.4	8	2.9	60	6	●
EXHRD-2030R0.5L10 06060	3	0.5	2.4	10	2.9	60	6	●
EXHRD-2030R0.5L12 06060	3	0.5	2.4	12	2.9	60	6	●
EXHRD-2030R0.5L16 06060	3	0.5	2.4	16	2.9	60	6	●
EXHRD-2030R0.5L20 06060	3	0.5	2.4	20	2.9	60	6	●
EXHRD-2030R0.5L25 06075	3	0.5	2.4	25	2.9	75	6	●

EXHRD-2L

2 Flute Corner Radius End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-2030R0.5L30 06075	3	0.5	2.4	30	2.9	75	6	●
EXHRD-2030R0.5L35 06075	3	0.5	2.4	35	2.9	75	6	●
EXHRD-2030R0.5L40 06100	3	0.5	2.4	40	2.9	100	6	●
EXHRD-2040R0.1L10 06060	4	0.1	3.2	10	3.9	60	6	●
EXHRD-2040R0.1L12 06060	4	0.1	3.2	12	3.9	60	6	●
EXHRD-2040R0.1L16 06060	4	0.1	3.2	16	3.9	60	6	●
EXHRD-2040R0.1L20 06060	4	0.1	3.2	20	3.9	60	6	●
EXHRD-2040R0.1L25 06075	4	0.1	3.2	25	3.9	75	6	●
EXHRD-2040R0.1L30 06075	4	0.1	3.2	30	3.9	75	6	●
EXHRD-2040R0.1L35 06075	4	0.1	3.2	35	3.9	75	6	●
EXHRD-2040R0.1L40 06100	4	0.1	3.2	40	3.9	100	6	●
EXHRD-2040R0.1L45 06100	4	0.1	3.2	45	3.9	100	6	●
EXHRD-2040R0.1L50 06100	4	0.1	3.2	50	3.9	100	6	●
EXHRD-2040R0.2L10 06060	4	0.2	3.2	10	3.9	60	6	●
EXHRD-2040R0.2L12 06060	4	0.2	3.2	12	3.9	60	6	●
EXHRD-2040R0.2L16 06060	4	0.2	3.2	16	3.9	60	6	●
EXHRD-2040R0.2L20 06060	4	0.2	3.2	20	3.9	60	6	●
EXHRD-2040R0.2L25 06075	4	0.2	3.2	25	3.9	75	6	●
EXHRD-2040R0.2L30 06075	4	0.2	3.2	30	3.9	75	6	●
EXHRD-2040R0.2L35 06075	4	0.2	3.2	35	3.9	75	6	●
EXHRD-2040R0.2L40 06100	4	0.2	3.2	40	3.9	100	6	●
EXHRD-2040R0.2L45 06100	4	0.2	3.2	45	3.9	100	6	●
EXHRD-2040R0.2L50 06100	4	0.2	3.2	50	3.9	100	6	●
EXHRD-2040R0.3L10 06060	4	0.3	3.2	10	3.9	60	6	●
EXHRD-2040R0.3L12 06060	4	0.3	3.2	12	3.9	60	6	●
EXHRD-2040R0.3L16 06060	4	0.3	3.2	16	3.9	60	6	●
EXHRD-2040R0.3L20 06060	4	0.3	3.2	20	3.9	60	6	●
EXHRD-2040R0.3L25 06075	4	0.3	3.2	25	3.9	75	6	●
EXHRD-2040R0.3L30 06075	4	0.3	3.2	30	3.9	75	6	●
EXHRD-2040R0.3L35 06075	4	0.3	3.2	35	3.9	75	6	●
EXHRD-2040R0.3L40 06100	4	0.3	3.2	40	3.9	100	6	●
EXHRD-2040R0.3L45 06100	4	0.3	3.2	45	3.9	100	6	●
EXHRD-2040R0.3L50 06100	4	0.3	3.2	50	3.9	100	6	●
EXHRD-2040R0.5L10 06060	4	0.5	3.2	10	3.9	60	6	●
EXHRD-2040R0.5L12 06060	4	0.5	3.2	12	3.9	60	6	●
EXHRD-2040R0.5L16 06060	4	0.5	3.2	16	3.9	60	6	●
EXHRD-2040R0.5L20 06060	4	0.5	3.2	20	3.9	60	6	●
EXHRD-2040R0.5L25 06075	4	0.5	3.2	25	3.9	75	6	●
EXHRD-2040R0.5L30 06075	4	0.5	3.2	30	3.9	75	6	●
EXHRD-2040R0.5L35 06075	4	0.5	3.2	35	3.9	75	6	●
EXHRD-2040R0.5L40 06100	4	0.5	3.2	40	3.9	100	6	●
EXHRD-2040R0.5L45 06100	4	0.5	3.2	45	3.9	100	6	●

EXHRD-2L

2 Flute Corner Radius End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-2040R0.5L50 06100	4	0.5	3.2	50	3.9	100	6	●
EXHRD-2040R1.0L10 06060	4	1.0	3.2	10	3.9	60	6	●
EXHRD-2040R1.0L12 06060	4	1.0	3.2	12	3.9	60	6	●
EXHRD-2040R1.0L16 06060	4	1.0	3.2	16	3.9	60	6	●
EXHRD-2040R1.0L20 06060	4	1.0	3.2	20	3.9	60	6	●
EXHRD-2040R1.0L25 06075	4	1.0	3.2	25	3.9	75	6	●
EXHRD-2040R1.0L30 06075	4	1.0	3.2	30	3.9	75	6	●
EXHRD-2040R1.0L35 06075	4	1.0	3.2	35	3.9	75	6	●
EXHRD-2040R1.0L40 06100	4	1.0	3.2	40	3.9	100	6	●
EXHRD-2040R1.0L45 06100	4	1.0	3.2	45	3.9	100	6	●
EXHRD-2040R1.0L50 06100	4	1.0	3.2	50	3.9	100	6	●
EXHRD-2060R0.5L18 06060	6	0.5	4.8	18	5.85	60	6	●
EXHRD-2060R0.5L24 06075	6	0.5	4.8	24	5.85	75	6	●
EXHRD-2060R0.5L36 06075	6	0.5	4.8	36	5.85	75	6	●

TABLE OF RECOMMENDED MILLING MATERIALS

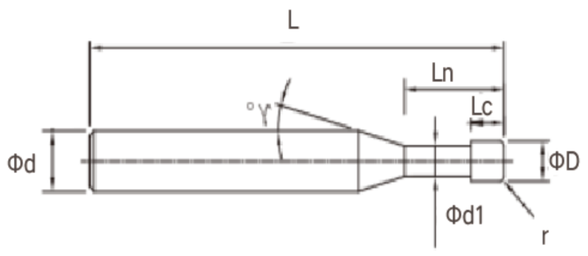
CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	◎	◎	○	○	○

COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○			○	○	

◎ Very suitable ○ Suitable

EXHRD-4L

4 Flute Coner Radius End Mill (Long Neck)



TiSiN+X | 4 | 30° Spiral Angle | Straight Back Angle | R | Shank Dia. tolerance H5 | <65 HRC

ΦD	D Tolerance
D≤3	0-0.010
3<D≤6	0-0.012

(mm)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-4008R0.05L2 04050	0.8	0.05	0.6	2	0.76	50	4	○
EXHRD-4008R0.05L4 04050	0.8	0.05	0.6	4	0.76	50	4	○
EXHRD-4008R0.05L6 04050	0.8	0.05	0.6	6	0.76	50	4	○
EXHRD-4008R0.05L8 04050	0.8	0.05	0.6	8	0.76	50	4	○
EXHRD-4008R0.05L10 04050	0.8	0.05	0.6	10	0.76	50	4	○
EXHRD-4008R0.05L12 04050	0.8	0.05	0.6	12	0.76	50	4	○
EXHRD-4008R0.1L2 04050	0.8	0.1	0.6	2	0.76	50	4	○
EXHRD-4008R0.1L4 04050	0.8	0.1	0.6	4	0.76	50	4	○
EXHRD-4008R0.1L6 04050	0.8	0.1	0.6	6	0.76	50	4	○
EXHRD-4008R0.1L8 04050	0.8	0.1	0.6	8	0.76	50	4	○
EXHRD-4008R0.1L10 04050	0.8	0.1	0.6	10	0.76	50	4	○
EXHRD-4008R0.1L12 04050	0.8	0.1	0.6	12	0.76	50	4	○
EXHRD-4010R0.05L4 04050	1	0.05	0.75	4	0.95	50	4	●
EXHRD-4010R0.05L6 04050	1	0.05	0.75	6	0.95	50	4	●
EXHRD-4010R0.05L8 04050	1	0.05	0.75	8	0.95	50	4	●
EXHRD-4010R0.05L10 04050	1	0.05	0.75	10	0.95	50	4	●
EXHRD-4010R0.05L12 04050	1	0.05	0.75	12	0.95	50	4	●
EXHRD-4010R0.05L16 04050	1	0.05	0.75	16	0.95	50	4	●
EXHRD-4010R0.05L20 04060	1	0.05	0.75	20	0.95	60	4	○
EXHRD-4010R0.1L4 04050	1	0.1	0.75	4	0.95	50	4	●
EXHRD-4010R0.1L6 04050	1	0.1	0.75	6	0.95	50	4	●
EXHRD-4010R0.1L8 04050	1	0.1	0.75	8	0.95	50	4	●
EXHRD-4010R0.1L10 04050	1	0.1	0.75	10	0.95	50	4	●
EXHRD-4010R0.1L12 04050	1	0.1	0.75	12	0.95	50	4	●
EXHRD-4010R0.1L16 04050	1	0.1	0.75	16	0.95	50	4	●
EXHRD-4010R0.1L20 04060	1	0.1	0.75	20	0.95	60	4	○
EXHRD-4010R0.2L4 04050	1	0.2	0.75	4	0.95	50	4	●
EXHRD-4010R0.2L6 04050	1	0.2	0.75	6	0.95	50	4	●
EXHRD-4010R0.2L8 04050	1	0.2	0.75	8	0.95	50	4	●
EXHRD-4010R0.2L10 04050	1	0.2	0.75	10	0.95	50	4	●
EXHRD-4010R0.2L12 04050	1	0.2	0.75	12	0.95	50	4	●
EXHRD-4010R0.2L16 04050	1	0.2	0.75	16	0.95	50	4	●
EXHRD-4010R0.2L20 04060	1	0.2	0.75	20	0.95	60	4	○
EXHRD-4010R0.3L4 04050	1	0.3	0.75	4	0.95	50	4	●

EXHRD-4L

4 Flute Coner Radius End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-4010R0.3L6 04050	1	0.3	0.75	6	0.95	50	4	●
EXHRD-4010R0.3L8 04050	1	0.3	0.75	8	0.95	50	4	●
EXHRD-4010R0.3L10 04050	1	0.3	0.75	10	0.95	50	4	●
EXHRD-4010R0.3L12 04050	1	0.3	0.75	12	0.95	50	4	●
EXHRD-4010R0.3L16 04050	1	0.3	0.75	16	0.95	50	4	●
EXHRD-4010R0.3L20 04060	1	0.3	0.75	20	0.95	60	4	○
EXHRD-4012R0.05L5 04050	1.2	0.05	1.0	5	1.14	50	4	○
EXHRD-4012R0.05L10 04050	1.2	0.05	1.0	10	1.14	50	4	○
EXHRD-4012R0.1L5 04050	1.2	0.1	1.0	5	1.14	50	4	○
EXHRD-4012R0.1L10 04050	1.2	0.1	1.0	10	1.14	50	4	○
EXHRD-4012R0.2L5 04050	1.2	0.2	1.0	5	1.14	50	4	○
EXHRD-4012R0.2L10 04050	1.2	0.2	1.0	10	1.14	50	4	○
EXHRD-4012R0.3L5 04050	1.2	0.3	1.0	5	1.14	50	4	○
EXHRD-4012R0.3L10 04050	1.2	0.3	1.0	10	1.14	50	4	○
EXHRD-4015R0.05L6 04050	1.5	0.05	1.2	6	1.42	50	4	●
EXHRD-4015R0.05L8 04050	1.5	0.05	1.2	8	1.42	50	4	●
EXHRD-4015R0.05L10 04050	1.5	0.05	1.2	10	1.42	50	4	●
EXHRD-4015R0.05L12 04050	1.5	0.05	1.2	12	1.42	50	4	●
EXHRD-4015R0.05L16 04050	1.5	0.05	1.2	16	1.42	50	4	●
EXHRD-4015R0.05L20 04060	1.5	0.05	1.2	20	1.42	60	4	○
EXHRD-4015R0.1L4 04050	1.5	0.1	1.2	4	1.42	50	4	●
EXHRD-4015R0.1L6 04050	1.5	0.1	1.2	6	1.42	50	4	●
EXHRD-4015R0.1L8 04050	1.5	0.1	1.2	8	1.42	50	4	●
EXHRD-4015R0.1L10 04050	1.5	0.1	1.2	10	1.42	50	4	●
EXHRD-4015R0.1L12 04050	1.5	0.1	1.2	12	1.42	50	4	●
EXHRD-4015R0.1L16 04050	1.5	0.1	1.2	16	1.42	50	4	●
EXHRD-4015R0.1L20 04060	1.5	0.1	1.2	20	1.42	60	4	○
EXHRD-4015R0.2L4 04050	1.5	0.2	1.2	4	1.42	50	4	●
EXHRD-4015R0.2L6 04050	1.5	0.2	1.2	6	1.42	50	4	●
EXHRD-4015R0.2L8 04050	1.5	0.2	1.2	8	1.42	50	4	●
EXHRD-4015R0.2L10 04050	1.5	0.2	1.2	10	1.42	50	4	●
EXHRD-4015R0.2L12 04050	1.5	0.2	1.2	12	1.42	50	4	●
EXHRD-4015R0.2L16 04050	1.5	0.2	1.2	16	1.42	50	4	●
EXHRD-4015R0.2L20 04060	1.5	0.2	1.2	20	1.42	60	4	○
EXHRD-4015R0.3L4 04050	1.5	0.3	1.2	4	1.42	50	4	●
EXHRD-4015R0.3L6 04050	1.5	0.3	1.2	6	1.42	50	4	●
EXHRD-4015R0.3L8 04050	1.5	0.3	1.2	8	1.42	50	4	●
EXHRD-4015R0.3L10 04050	1.5	0.3	1.2	10	1.42	50	4	●
EXHRD-4015R0.3L12 04050	1.5	0.3	1.2	12	1.42	50	4	●
EXHRD-4015R0.3L16 04050	1.5	0.3	1.2	16	1.42	50	4	●
EXHRD-4015R0.3L20 04060	1.5	0.3	1.6	20	1.42	60	4	○
EXHRD-4020R0.05L8 04050	2	0.05	1.6	8	1.9	50	4	●

EXHRD-4L

4 Flute Coner Radius End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-4020R0.05L10 04050	2	0.05	1.6	10	1.9	50	4	●
EXHRD-4020R0.05L12 04050	2	0.05	1.6	12	1.9	50	4	●
EXHRD-4020R0.05L16 04050	2	0.05	1.6	16	1.9	50	4	●
EXHRD-4020R0.05L20 04060	2	0.05	1.6	20	1.9	60	4	●
EXHRD-4020R0.05L25 04060	2	0.05	1.6	25	1.9	60	4	●
EXHRD-4020R0.05L30 04075	2	0.05	1.6	30	1.9	75	4	●
EXHRD-4020R0.1L4 04050	2	0.1	1.6	4	1.9	50	4	●
EXHRD-4020R0.1L6 04050	2	0.1	1.6	6	1.9	50	4	●
EXHRD-4020R0.1L8 04050	2	0.1	1.6	8	1.9	50	4	●
EXHRD-4020R0.1L10 04050	2	0.1	1.6	10	1.9	50	4	●
EXHRD-4020R0.1L12 04050	2	0.1	1.6	12	1.9	50	4	●
EXHRD-4020R0.1L16 04050	2	0.1	1.6	16	1.9	50	4	●
EXHRD-4020R0.1L20 04060	2	0.1	1.6	20	1.9	60	4	●
EXHRD-4020R0.1L25 04060	2	0.1	1.6	25	1.9	60	4	●
EXHRD-4020R0.1L30 04075	2	0.1	1.6	30	1.9	75	4	●
EXHRD-4020R0.2L4 04050	2	0.2	1.6	4	1.9	50	4	●
EXHRD-4020R0.2L6 04050	2	0.2	1.6	6	1.9	50	4	●
EXHRD-4020R0.2L8 04050	2	0.2	1.6	8	1.9	50	4	●
EXHRD-4020R0.2L10 04050	2	0.2	1.6	10	1.9	50	4	●
EXHRD-4020R0.2L12 04050	2	0.2	1.6	12	1.9	50	4	●
EXHRD-4020R0.2L16 04050	2	0.2	1.6	16	1.9	50	4	●
EXHRD-4020R0.2L20 04060	2	0.2	1.6	20	1.9	60	4	●
EXHRD-4020R0.2L25 04060	2	0.2	1.6	25	1.9	60	4	●
EXHRD-4020R0.2L30 04075	2	0.2	1.6	30	1.9	75	4	●
EXHRD-4020R0.3L6 04050	2	0.3	1.6	6	1.9	50	4	●
EXHRD-4020R0.3L8 04050	2	0.3	1.6	8	1.9	50	4	●
EXHRD-4020R0.3L10 04050	2	0.3	1.6	10	1.9	50	4	●
EXHRD-4020R0.3L12 04050	2	0.3	1.6	12	1.9	50	4	●
EXHRD-4020R0.3L16 04050	2	0.3	1.6	16	1.9	50	4	●
EXHRD-4020R0.3L20 04060	2	0.3	1.6	20	1.9	60	4	●
EXHRD-4020R0.3L25 04060	2	0.3	1.6	25	1.9	60	4	●
EXHRD-4020R0.3L30 04075	2	0.3	1.6	30	1.9	75	4	●
EXHRD-4020R0.5L6 04050	2	0.5	1.6	6	1.9	50	4	●
EXHRD-4020R0.5L8 04050	2	0.5	1.6	8	1.9	50	4	●
EXHRD-4020R0.5L10 04050	2	0.5	1.6	10	1.9	50	4	●
EXHRD-4020R0.5L12 04050	2	0.5	1.6	12	1.9	50	4	●
EXHRD-4020R0.5L16 04050	2	0.5	1.6	16	1.9	50	4	●
EXHRD-4020R0.5L20 04060	2	0.5	1.6	20	1.9	60	4	●
EXHRD-4020R0.5L25 04060	2	0.5	1.6	25	1.9	60	4	●
EXHRD-4020R0.5L30 04075	2	0.5	1.6	30	1.9	75	4	●
EXHRD-4025R0.1L10 04050	2.5	0.1	2	10	2.4	50	4	○
EXHRD-4025R0.1L20 04060	2.5	0.1	2	20	2.4	60	4	○

EXHRD-4L

4 Flute Coner Radius End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-4025R0.1L30 04075	2.5	0.1	2	30	2.4	75	4	○
EXHRD-4025R0.2L10 04050	2.5	0.2	2	10	2.4	50	4	○
EXHRD-4025R0.2L20 04060	2.5	0.2	2	20	2.4	60	4	○
EXHRD-4025R0.2L30 04075	2.5	0.2	2	30	2.4	75	4	○
EXHRD-4025R0.3L10 04050	2.5	0.3	2	10	2.4	50	4	○
EXHRD-4025R0.3L20 04060	2.5	0.3	2	20	2.4	60	4	○
EXHRD-4025R0.3L30 04075	2.5	0.3	2	30	2.4	75	4	○
EXHRD-4025R0.5L10 04050	2.5	0.5	2	10	2.4	50	4	○
EXHRD-4025R0.5L20 04060	2.5	0.5	2	20	2.4	60	4	○
EXHRD-4025R0.5L30 04075	2.5	0.5	2	30	2.4	75	4	○
EXHRD-4030R0.1L10 04050	3	0.1	2.4	10	2.9	50	4	●
EXHRD-4030R0.1L10 06060	3	0.1	2.4	10	2.9	60	6	●
EXHRD-4030R0.1L12 04050	3	0.1	2.4	12	2.9	50	4	●
EXHRD-4030R0.1L12 06060	3	0.1	2.4	12	2.9	60	6	●
EXHRD-4030R0.1L16 04050	3	0.1	2.4	16	2.9	50	4	●
EXHRD-4030R0.1L16 06060	3	0.1	2.4	16	2.9	60	6	●
EXHRD-4030R0.1L20 06060	3	0.1	2.4	20	2.9	60	6	●
EXHRD-4030R0.1L25 06075	3	0.1	2.4	25	2.9	75	6	●
EXHRD-4030R0.1L30 06075	3	0.1	2.4	30	2.9	75	6	●
EXHRD-4030R0.1L35 06075	3	0.1	2.4	35	2.9	75	6	●
EXHRD-4030R0.1L40 06100	3	0.1	2.4	40	2.9	100	6	●
EXHRD-4030R0.2L8 04050	3	0.2	2.4	8	2.9	50	4	●
EXHRD-4030R0.2L10 04050	3	0.2	2.4	10	2.9	50	4	●
EXHRD-4030R0.2L10 06060	3	0.2	2.4	10	2.9	60	6	●
EXHRD-4030R0.2L12 04050	3	0.2	2.4	12	2.9	50	4	●
EXHRD-4030R0.2L12 06060	3	0.2	2.4	12	2.9	60	6	●
EXHRD-4030R0.2L16 04050	3	0.2	2.4	16	2.9	50	4	●
EXHRD-4030R0.2L16 06060	3	0.2	2.4	16	2.9	60	6	●
EXHRD-4030R0.2L20 06060	3	0.2	2.4	20	2.9	60	6	●
EXHRD-4030R0.2L25 06075	3	0.2	2.4	25	2.9	75	6	●
EXHRD-4030R0.2L30 06075	3	0.2	2.4	30	2.9	75	6	●
EXHRD-4030R0.2L35 06075	3	0.2	2.4	35	2.9	75	6	●
EXHRD-4030R0.2L40 06100	3	0.2	2.4	40	2.9	100	6	●
EXHRD-4030R0.3L10 04050	3	0.3	2.4	10	2.9	50	4	●
EXHRD-4030R0.3L10 06060	3	0.3	2.4	10	2.9	60	6	●
EXHRD-4030R0.3L12 04050	3	0.3	2.4	12	2.9	50	4	●
EXHRD-4030R0.3L12 06060	3	0.3	2.4	12	2.9	60	6	●
EXHRD-4030R0.3L16 04050	3	0.3	2.4	16	2.9	50	4	●
EXHRD-4030R0.3L16 06060	3	0.3	2.4	16	2.9	60	6	●
EXHRD-4030R0.3L20 06060	3	0.3	2.4	20	2.9	60	6	●
EXHRD-4030R0.3L25 06075	3	0.3	2.4	25	2.9	75	6	●
EXHRD-4030R0.3L30 06075	3	0.3	2.4	30	2.9	75	6	●

EXHRD-4L

4 Flute Coner Radius End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-4030R0.3L35 06075	3	0.3	2.4	35	2.9	75	6	●
EXHRD-4030R0.3L40 06100	3	0.3	2.4	40	2.9	100	6	●
EXHRD-4030R0.5L8 04050	3	0.5	2.4	8	2.9	50	4	●
EXHRD-4030R0.5L10 04050	3	0.5	2.4	10	2.9	50	4	●
EXHRD-4030R0.5L10 06060	3	0.5	2.4	10	2.9	60	6	●
EXHRD-4030R0.5L12 04050	3	0.5	2.4	12	2.9	50	4	●
EXHRD-4030R0.5L12 06060	3	0.5	2.4	12	2.9	60	6	●
EXHRD-4030R0.5L16 04050	3	0.5	2.4	16	2.9	50	4	●
EXHRD-4030R0.5L16 06060	3	0.5	2.4	16	2.9	60	6	●
EXHRD-4030R0.5L20 06060	3	0.5	2.4	20	2.9	60	6	●
EXHRD-4030R0.5L25 06075	3	0.5	2.4	25	2.9	75	6	●
EXHRD-4030R0.5L30 06075	3	0.5	2.4	30	2.9	75	6	●
EXHRD-4030R0.5L35 06075	3	0.5	2.4	35	2.9	75	6	●
EXHRD-4030R0.5L40 06100	3	0.5	2.4	40	2.9	100	6	●
EXHRD-4040R0.1L12 06060	4	0.1	3.2	12	3.9	60	6	●
EXHRD-4040R0.1L16 06060	4	0.1	3.2	16	3.9	60	6	●
EXHRD-4040R0.1L20 06060	4	0.1	3.2	20	3.9	60	6	●
EXHRD-4040R0.1L25 06075	4	0.1	3.2	25	3.9	75	6	●
EXHRD-4040R0.1L30 06075	4	0.1	3.2	30	3.9	75	6	●
EXHRD-4040R0.1L35 06075	4	0.1	3.2	35	3.9	75	6	●
EXHRD-4040R0.1L40 06100	4	0.1	3.2	40	3.9	100	6	●
EXHRD-4040R0.1L45 06100	4	0.1	3.2	45	3.9	100	6	●
EXHRD-4040R0.1L50 06100	4	0.1	3.2	50	3.9	100	6	●
EXHRD-4040R0.2L12 06060	4	0.2	3.2	12	3.9	60	6	●
EXHRD-4040R0.2L16 06060	4	0.2	3.2	16	3.9	60	6	●
EXHRD-4040R0.2L20 06060	4	0.2	3.2	20	3.9	60	6	●
EXHRD-4040R0.2L25 06075	4	0.2	3.2	25	3.9	75	6	●
EXHRD-4040R0.2L30 06075	4	0.2	3.2	30	3.9	75	6	●
EXHRD-4040R0.2L35 06075	4	0.2	3.2	35	3.9	75	6	●
EXHRD-4040R0.2L40 06100	4	0.2	3.2	40	3.9	100	6	●
EXHRD-4040R0.2L45 06100	4	0.2	3.2	45	3.9	100	6	●
EXHRD-4040R0.2L50 06100	4	0.2	3.2	50	3.9	100	6	●
EXHRD-4040R0.3L12 06060	4	0.3	3.2	12	3.9	60	6	●
EXHRD-4040R0.3L16 06060	4	0.3	3.2	16	3.9	60	6	●
EXHRD-4040R0.3L20 06060	4	0.3	3.2	20	3.9	60	6	●
EXHRD-4040R0.3L25 06075	4	0.3	3.2	25	3.9	75	6	●
EXHRD-4040R0.3L30 06075	4	0.3	3.2	30	3.9	75	6	●
EXHRD-4040R0.3L35 06075	4	0.3	3.2	35	3.9	75	6	●
EXHRD-4040R0.3L40 06100	4	0.3	3.2	40	3.9	100	6	●
EXHRD-4040R0.3L45 06100	4	0.3	3.2	45	3.9	100	6	●
EXHRD-4040R0.3L50 06100	4	0.3	3.2	50	3.9	100	6	●
EXHRD-4040R0.5L12 06060	4	0.5	3.2	12	3.9	60	6	●

EXHRD-4L

4 Flute Coner Radius End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd	
EXHRD-4040R0.5L16 06060	4	0.5	3.2	16	3.9	60	6	●
EXHRD-4040R0.5L20 06060	4	0.5	3.2	20	3.9	60	6	●
EXHRD-4040R0.5L25 06075	4	0.5	3.2	25	3.9	75	6	●
EXHRD-4040R0.5L30 06075	4	0.5	3.2	30	3.9	75	6	●
EXHRD-4040R0.5L35 06075	4	0.5	3.2	35	3.9	75	6	●
EXHRD-4040R0.5L40 06100	4	0.5	3.2	40	3.9	100	6	●
EXHRD-4040R0.5L45 06100	4	0.5	3.2	45	3.9	100	6	●
EXHRD-4040R0.5L50 06100	4	0.5	3.2	50	3.9	100	6	●
EXHRD-4040R1.0L12 06060	4	1.0	3.2	12	3.9	60	6	●
EXHRD-4040R1.0L16 06060	4	1.0	3.2	16	3.9	60	6	●
EXHRD-4040R1.0L20 06060	4	1.0	3.2	20	3.9	60	6	●
EXHRD-4040R1.0L25 06075	4	1.0	3.2	25	3.9	75	6	●
EXHRD-4040R1.0L30 06075	4	1.0	3.2	30	3.9	75	6	●
EXHRD-4040R1.0L35 06075	4	1.0	3.2	35	3.9	75	6	●
EXHRD-4040R1.0L40 06100	4	1.0	3.2	40	3.9	100	6	●
EXHRD-4040R1.0L45 06100	4	1.0	3.2	45	3.9	100	6	●
EXHRD-4040R1.0L50 06100	4	1.0	3.2	50	3.9	100	6	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	○	○	○	○	○

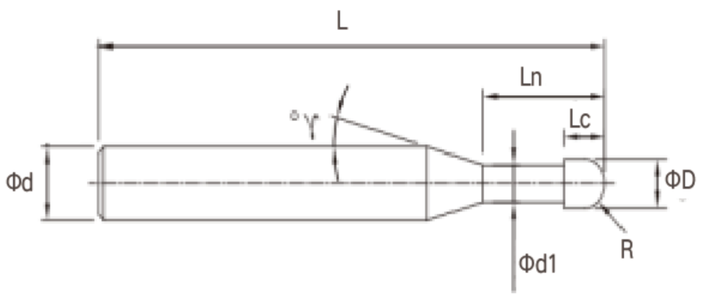
COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○			○	○	

○ Very suitable ○ Suitable

EXHBD-2L

2 Flute Ball Nose End Mill (Long Neck)

TiSiN+X | 2 | 30° Spiral Angle | Straight Back Angle | B | Shank Dia. tolerance H5 | <65 HRC



ΦD	D Tolerance
D≤3	0~-0.010
3<D≤6	0~-0.012
6<D≤10	0~-0.015
10<D≤18	0~-0.018

ΦD	R Tolerance
D<1	±0.003
1≤D≤8	±0.005
D>8	±0.008

(mm)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXHBD-2001L0.2 04050	0.1	0.05	0.07	0.2	0.085	50	4	●
EXHBD-2001L0.3 04050	0.1	0.05	0.07	0.3	0.085	50	4	●
EXHBD-2001L0.5 04050	0.1	0.05	0.07	0.5	0.085	50	4	●
EXHBD-2001L0.75 04050	0.1	0.05	0.07	0.75	0.085	50	4	●
EXHBD-2001L1 04050	0.1	0.05	0.07	1	0.085	50	4	●
EXHBD-20015L0.3 04050	0.15	0.075	0.1	0.3	0.13	50	4	●
EXHBD-20015L0.5 04050	0.15	0.075	0.1	0.5	0.13	50	4	●
EXHBD-20015L0.75 04050	0.15	0.075	0.1	0.75	0.13	50	4	●
EXHBD-20015L1 04050	0.15	0.075	0.1	1	0.13	50	4	●
EXHBD-20015L1.5 04050	0.15	0.075	0.1	1.5	0.13	50	4	●
EXHBD-2002L0.3 04050	0.2	0.1	0.15	0.3	0.18	50	4	●
EXHBD-2002L0.5 04050	0.2	0.1	0.15	0.5	0.18	50	4	●
EXHBD-2002L0.75 04050	0.2	0.1	0.15	0.75	0.18	50	4	●
EXHBD-2002L1 04050	0.2	0.1	0.15	1	0.18	50	4	●
EXHBD-2002L1.25 04050	0.2	0.1	0.15	1.25	0.18	50	4	●
EXHBD-2002L1.5 04050	0.2	0.1	0.15	1.5	0.18	50	4	●
EXHBD-2002L1.75 04050	0.2	0.1	0.15	1.75	0.18	50	4	●
EXHBD-2002L2 04050	0.2	0.1	0.15	2	0.18	50	4	●
EXHBD-2002L2.5 04050	0.2	0.1	0.15	2.5	0.18	50	4	●
EXHBD-2003L0.6 04050	0.3	0.15	0.2	0.6	0.28	50	4	●
EXHBD-2003L0.75 04050	0.3	0.15	0.2	0.75	0.28	50	4	●
EXHBD-2003L1 04050	0.3	0.15	0.2	1	0.28	50	4	●
EXHBD-2003L1.25 04050	0.3	0.15	0.2	1.25	0.28	50	4	●
EXHBD-2003L1.5 04050	0.3	0.15	0.2	1.5	0.28	50	4	●
EXHBD-2003L1.75 04050	0.3	0.15	0.2	1.75	0.28	50	4	●
EXHBD-2003L2 04050	0.3	0.15	0.2	2	0.28	50	4	●
EXHBD-2003L2.25 04050	0.3	0.15	0.2	2.25	0.28	50	4	●
EXHBD-2003L2.5 04050	0.3	0.15	0.2	2.5	0.28	50	4	●
EXHBD-2003L3 04050	0.3	0.15	0.2	3	0.28	50	4	●
EXHBD-2004L0.5 04050	0.4	0.2	0.3	0.5	0.37	50	4	●
EXHBD-2004L0.8 04050	0.4	0.2	0.3	0.8	0.37	50	4	●
EXHBD-2004L1 04050	0.4	0.2	0.3	1	0.37	50	4	●
EXHBD-2004L1.5 04050	0.4	0.2	0.3	1.5	0.37	50	4	●
EXHBD-2004L2 04050	0.4	0.2	0.3	2	0.37	50	4	●

EXHBD-2L

2 Flute Ball Nose End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXHBD-2004L2.5 04050	0.4	0.2	0.3	2.5	0.37	50	4	●
EXHBD-2004L3 04050	0.4	0.2	0.3	3	0.37	50	4	●
EXHBD-2004L3.5 04050	0.4	0.2	0.3	3.5	0.37	50	4	●
EXHBD-2004L4 04050	0.4	0.2	0.3	4	0.37	50	4	●
EXHBD-2005L1 04050	0.5	0.25	0.35	1	0.46	50	4	●
EXHBD-2005L1.5 04050	0.5	0.25	0.35	1.5	0.46	50	4	●
EXHBD-2005L2 04050	0.5	0.25	0.35	2	0.46	50	4	●
EXHBD-2005L2.5 04050	0.5	0.25	0.35	2.5	0.46	50	4	●
EXHBD-2005L3 04050	0.5	0.25	0.35	3	0.46	50	4	●
EXHBD-2005L4 04050	0.5	0.25	0.35	4	0.46	50	4	●
EXHBD-2005L5 04050	0.5	0.25	0.35	5	0.46	50	4	●
EXHBD-2005L6 04050	0.5	0.25	0.35	6	0.46	50	4	●
EXHBD-2006L1 04050	0.6	0.3	0.45	1	0.56	50	4	●
EXHBD-2006L1.5 04050	0.6	0.3	0.45	1.5	0.56	50	4	●
EXHBD-2006L2 04050	0.6	0.3	0.45	2	0.56	50	4	●
EXHBD-2006L3 04050	0.6	0.3	0.45	3	0.56	50	4	●
EXHBD-2006L4 04050	0.6	0.3	0.45	4	0.56	50	4	●
EXHBD-2006L6 04050	0.6	0.3	0.45	6	0.56	50	4	●
EXHBD-2006L8 04050	0.6	0.3	0.45	8	0.56	50	4	●
EXHBD-2007L2 04050	0.7	0.35	0.5	2	0.66	50	4	●
EXHBD-2007L3 04050	0.7	0.35	0.5	3	0.66	50	4	●
EXHBD-2007L4 04050	0.7	0.35	0.5	4	0.66	50	4	●
EXHBD-2007L6 04050	0.7	0.35	0.5	6	0.66	50	4	●
EXHBD-2008L2 04050	0.8	0.4	0.6	2	0.76	50	4	●
EXHBD-2008L2.5 04050	0.8	0.4	0.6	2.5	0.76	50	4	●
EXHBD-2008L3 04050	0.8	0.4	0.6	3	0.76	50	4	●
EXHBD-2008L4 04050	0.8	0.4	0.6	4	0.76	50	4	●
EXHBD-2008L6 04050	0.8	0.4	0.6	6	0.76	50	4	●
EXHBD-2008L8 04050	0.8	0.4	0.6	8	0.76	50	4	●
EXHBD-2008L10 04050	0.8	0.4	0.6	10	0.76	50	4	●
EXHBD-2009L2 04050	0.9	0.45	0.65	2	0.86	50	4	●
EXHBD-2009L4 04050	0.9	0.45	0.65	4	0.86	50	4	●
EXHBD-2009L6 04050	0.9	0.45	0.65	6	0.86	50	4	●
EXHBD-2009L8 04050	0.9	0.45	0.65	8	0.86	50	4	●
EXHBD-2010L2.5 04050	1	0.5	0.75	2.5	0.95	50	4	●
EXHBD-2010L3 04050	1	0.5	0.75	3	0.95	50	4	●
EXHBD-2010L4 04050	1	0.5	0.75	4	0.95	50	4	●
EXHBD-2010L4 06060	1	0.5	0.75	4	0.95	60	6	●
EXHBD-2010L5 04050	1	0.5	0.75	5	0.95	50	4	●
EXHBD-2010L6 04050	1	0.5	0.75	6	0.95	50	4	●
EXHBD-2010L6 06060	1	0.5	0.75	6	0.95	60	6	●
EXHBD-2010L7 04050	1	0.5	0.75	7	0.95	50	4	●

EXHBD-2L

2 Flute Ball Nose End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXHBD-2010L8 04050	1	0.5	0.75	8	0.95	50	4	●
EXHBD-2010L8 06060	1	0.5	0.75	8	0.95	60	6	○
EXHBD-2010L9 04050	1	0.5	0.75	9	0.95	50	4	●
EXHBD-2010L10 04050	1	0.5	0.75	10	0.95	50	4	●
EXHBD-2010L10 06060	1	0.5	0.75	10	0.95	60	6	○
EXHBD-2010L12 04050	1	0.5	0.75	12	0.95	50	4	●
EXHBD-2010L14 04050	1	0.5	0.75	14	0.95	50	4	●
EXHBD-2010L16 04050	1	0.5	0.75	16	0.95	50	4	●
EXHBD-2010L18 04060	1	0.5	0.75	18	0.95	60	4	○
EXHBD-2010L20 04060	1	0.5	0.75	20	0.95	60	4	○
EXHBD-2010L22 04060	1	0.5	0.75	22	0.95	60	4	○
EXHBD-2012L4 04050	1.2	0.6	1	4	1.14	50	4	○
EXHBD-2012L6 04050	1.2	0.6	1	6	1.14	50	4	○
EXHBD-2012L8 04050	1.2	0.6	1	8	1.14	50	4	○
EXHBD-2012L10 04050	1.2	0.6	1	10	1.14	50	4	○
EXHBD-2012L12 04050	1.2	0.6	1	12	1.14	50	4	○
EXHBD-2012L14 04050	1.2	0.6	1	14	1.14	50	4	○
EXHBD-2014L8 04050	1.4	0.7	1.1	8	1.34	50	4	○
EXHBD-2014L12 04050	1.4	0.7	1.1	12	1.34	50	4	○
EXHBD-2015L4 04050	1.5	0.75	1.2	4	1.42	50	4	●
EXHBD-2015L6 04050	1.5	0.75	1.2	6	1.42	50	4	●
EXHBD-2015L6 06060	1.5	0.75	1.2	6	1.42	60	6	●
EXHBD-2015L8 04050	1.5	0.75	1.2	8	1.42	50	4	●
EXHBD-2015L8 06060	1.5	0.75	1.2	8	1.42	60	6	●
EXHBD-2015L10 04050	1.5	0.75	1.2	10	1.42	50	4	●
EXHBD-2015L10 06060	1.5	0.75	1.2	10	1.42	60	6	●
EXHBD-2015L12 04050	1.5	0.75	1.2	12	1.42	50	4	●
EXHBD-2015L12 06060	1.5	0.75	1.2	12	1.42	60	6	●
EXHBD-2015L14 04050	1.5	0.75	1.2	14	1.42	50	4	●
EXHBD-2015L16 04050	1.5	0.75	1.2	16	1.42	50	4	●
EXHBD-2015L18 04060	1.5	0.75	1.2	18	1.42	60	4	○
EXHBD-2016L8 04050	1.6	0.8	1.3	8	1.52	50	4	○
EXHBD-2016L12 04050	1.6	0.8	1.3	12	1.52	50	4	○
EXHBD-2016L16 04050	1.6	0.8	1.3	16	1.52	50	4	○
EXHBD-2020L3 04050	2	1.0	1.6	3	1.9	50	4	●
EXHBD-2020L4 04050	2	1.0	1.6	4	1.9	50	4	●
EXHBD-2020L6 04050	2	1.0	1.6	6	1.9	50	4	●
EXHBD-2020L8 04050	2	1.0	1.6	8	1.9	50	4	●
EXHBD-2020L8 06060	2	1.0	1.6	8	1.9	60	6	●
EXHBD-2020L10 04050	2	1.0	1.6	10	1.9	50	4	●
EXHBD-2020L10 06060	2	1.0	1.6	10	1.9	60	6	●
EXHBD-2020L12 04050	2	1.0	1.6	12	1.9	50	4	●

EXHBD-2L

2 Flute Ball Nose End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXHBD-2020L12 06060	2	1.0	1.6	12	1.9	60	6	●
EXHBD-2020L14 04050	2	1.0	1.6	14	1.9	50	4	●
EXHBD-2020L16 04050	2	1.0	1.6	16	1.9	50	4	●
EXHBD-2020L16 06060	2	1.0	1.6	16	1.9	60	6	●
EXHBD-2020L18 04060	2	1.0	1.6	18	1.9	60	4	●
EXHBD-2020L20 04060	2	1.0	1.6	20	1.9	60	4	●
EXHBD-2020L22 04060	2	1.0	1.6	22	1.9	60	4	●
EXHBD-2020L25 04060	2	1.0	1.6	25	1.9	60	4	●
EXHBD-2020L30 04075	2	1.0	1.6	30	1.9	75	4	●
EXHBD-2025L6 04050	2.5	1.25	2	6	2.4	50	4	○
EXHBD-2025L8 04050	2.5	1.25	2	8	2.4	50	4	○
EXHBD-2025L10 04050	2.5	1.25	2	10	2.4	50	4	○
EXHBD-2025L12 04050	2.5	1.25	2	12	2.4	50	4	○
EXHBD-2025L16 04050	2.5	1.25	2	16	2.4	50	4	○
EXHBD-2025L20 04060	2.5	1.25	2	20	2.4	60	4	○
EXHBD-2025L25 04060	2.5	1.25	2	25	2.4	60	4	○
EXHBD-2030L8 04050	3	1.5	2.4	8	2.9	50	4	●
EXHBD-2030L8 06060	3	1.6	2.4	8	2.9	60	6	●
EXHBD-2030L10 04050	3	1.5	2.4	10	2.9	50	4	●
EXHBD-2030L10 06060	3	1.5	2.4	10	2.9	60	6	●
EXHBD-2030L12 04050	3	1.5	2.4	12	2.9	50	4	●
EXHBD-2030L12 06060	3	1.5	2.4	12	2.9	60	6	●
EXHBD-2030L14 04050	3	1.5	2.4	14	2.9	50	4	●
EXHBD-2030L14 06060	3	1.5	2.4	14	2.9	60	6	●
EXHBD-2030L16 04050	3	1.5	2.4	16	2.9	50	4	●
EXHBD-2030L16 06060	3	1.5	2.4	16	2.9	60	6	●
EXHBD-2030L20 06060	3	1.5	2.4	20	2.9	60	6	●
EXHBD-2030L25 06075	3	1.5	2.4	25	2.9	75	6	●
EXHBD-2030L30 06075	3	1.5	2.4	30	2.9	75	6	●
EXHBD-2030L35 06075	3	1.5	2.4	35	2.9	75	6	●
EXHBD-2030L40 06100	3	1.5	2.4	40	2.9	100	6	●
EXHBD-2035L16 06060	3.5	1.75	2.8	16	3.4	60	6	○
EXHBD-2035L20 06060	3.5	1.75	2.8	20	3.4	60	6	○
EXHBD-2035L25 06075	3.5	1.75	2.8	25	3.4	75	6	○
EXHBD-2035L30 06075	3.5	1.75	2.8	30	3.4	75	6	○
EXHBD-2035L35 06075	3.5	1.75	2.8	35	3.4	75	6	○
EXHBD-2040L10 04050	4	2.0	3.2	10	3.9	50	4	●
EXHBD-2040L10 06060	4	2.0	3.2	10	3.9	60	6	●
EXHBD-2040L12 06060	4	2.0	3.2	12	3.9	60	6	●
EXHBD-2040L14 06060	4	2.0	3.2	14	3.9	60	6	●
EXHBD-2040L16 06060	4	2.0	3.2	16	3.9	60	6	●
EXHBD-2040L20 06060	4	2.0	3.2	20	3.9	60	6	●

EXHBD-2L

2 Flute Ball Nose End Mill (Long Neck)

Order Code	Dia.	Corner	Length of cut	Under Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	ΦD	R	Lc	Ln	Φd1	L	Φd	
EXHBD-2040L25 06075	4	2.0	3.2	25	3.9	75	6	●
EXHBD-2040L30 06075	4	2.0	3.2	30	3.9	75	6	●
EXHBD-2040L35 06075	4	2.0	3.2	35	3.9	75	6	●
EXHBD-2040L40 06100	4	2.0	3.2	40	3.9	100	6	●
EXHBD-2050L16 06060	5	2.5	4	16	4.85	60	6	●
EXHBD-2050L20 06060	5	2.5	4	20	4.85	60	6	●
EXHBD-2050L30 06075	5	2.5	4	30	4.85	75	6	●
EXHBD-2050L40 06100	5	2.5	4	40	4.85	100	6	●
EXHBD-2060L12 06060	6	3.0	4.8	12	5.85	60	6	●
EXHBD-2060L20 06075	6	3.0	4.8	20	5.85	75	6	●
EXHBD-2060L30 06075	6	3.0	4.8	30	5.85	75	6	●
EXHBD-2060L40 06100	6	3.0	4.8	40	5.85	100	6	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	○	○	○	○	○

COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
○			○	○	

○ Very suitable ○ Suitable

EXHSF-4 Cutting Parameter

Workpiece	Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXHSF-4010	15000	600	2	0.05	12000	480	2	0.03	10500	200	1	0.02
EXHSF-4012	13500	660	2.4	0.05	10800	528	2.4	0.03	9450	200	1.2	0.02
EXHSF-4015	12000	720	3	0.05	9600	576	3	0.03	8400	250	1.5	0.02
EXHSF-4016	11800	750	3.2	0.05	9440	600	3.2	0.03	8260	250	1.6	0.02
EXHSF-4020	10000	800	4	0.05	8000	640	4	0.03	7000	300	2	0.03
EXHSF-4025	8500	850	5	0.05	6800	680	5	0.03	5950	350	2.5	0.03
EXHSF-4030	7500	900	6	0.05	6000	720	6	0.03	5250	400	3	0.03
EXHSF-4040	6800	1000	8	0.1	5440	800	8	0.03	4760	440	4	0.03
EXHSF-4050	6000	1200	10	0.1	4600	960	10	0.05	4200	500	5	0.05
EXHSF-4060	5000	1500	12	0.1	4000	1200	12	0.05	3500	550	6	0.05
EXHSF-4080	4200	2000	16	0.1	3360	1600	16	0.05	2940	600	8	0.05
EXHSF-4100	4000	2500	20	0.1	3200	2000	20	0.05	2800	600	10	0.06
EXHSF-4120	3800	3000	24	0.1	3040	2400	24	0.1	2660	500	12	0.1
EXHSF-4140	3500	2600	28	0.1	2600	2080	28	0.1	2450	500	14	0.1
EXHSF-4160	3200	2500	32	0.1	2560	2000	32	0.1	2240	500	16	0.1
EXHSF-4200	3000	2000	40	0.1	2400	1600	40	0.1	2100	500	20	0.1

EXHSG-6 Cutting Parameter

Workpiece	Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXHSG-6060	4500	2420	15	0.2	4000	870	15	0.1	3200	700	15	0.05
EXHSG-6080	4000	2400	18	0.2	3500	900	18	0.1	2800	700	18	0.05
EXHSG-6100	3500	2300	25	0.2	2800	850	25	0.1	2240	680	25	0.05
EXHSG-6120	3000	2000	30	0.2	2500	800	30	0.1	2000	650	30	0.05
EXHSG-6160	2400	2000	35	0.2	2200	750	35	0.1	1760	650	35	0.05
EXHSG-6200	2200	1800	40	0.2	2000	700	40	0.1	1600	600	40	0.05

EXHRD-4 Cutting Parameter

Face Roughing Milling

Workpiece	Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXHRD-4008R_	28,000	1,450	0.02	0.56	25,000	1,305	0.014	0.48	23,000	420	0.012	0.4
EXHRD-4009R_	25,000	1,500	0.05	0.63	25,000	1,350	0.03	0.54	20,000	450	0.02	0.45
EXHRD-4010R_	18,000	1,500	0.05	0.7	16,000	1,350	0.05	0.6	15,000	500	0.03	0.5
EXHRD-4015R_	16,155	1,700	0.05	1.05	14,360	1,530	0.05	0.9	13,500	600	0.03	0.75
EXHRD-4020R_	14,301	2,000	0.1	1.4	12,712	1,800	0.1	1.2	10,000	800	0.05	1
EXHRD-4030R_	11,056	2,200	0.1	2.1	9,828	1,980	0.1	1.8	7,200	800	0.05	1.5
EXHRD-4040R_	8,712	2,500	0.2	2.8	7,744	2,250	0.2	2.4	6,000	1,000	0.08	2
EXHRD-4060R_	6,543	2,800	0.2	4.2	5,808	2,520	0.2	3.6	4,500	1,200	0.08	3
EXHRD-4080R_	5,445	3,000	0.2	5.6	4,840	2,700	0.2	4.8	4,000	1,500	0.1	4
EXHRD-4100R_	4,900	3,600	0.2	7	4,356	3,200	0.2	6	3,500	1,800	0.1	5
EXHRD-4120R_	4,356	3,600	0.2	8.4	3,872	3,200	0.2	7.2	3,200	2,000	0.15	6

Planning

Workpiece	Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXHRD-4020R_	12,000	0.36	0.03	1	10,000	0.3	0.03	1	8,800	0.2	0.02	1
EXHRD-4030R_	9,000	0.48	0.03	1.5	8,000	0.4	0.03	1.5	7,200	0.3	0.02	1.5
EXHRD-4040R_	7,500	0.6	0.05	2	7,000	0.5	0.05	2	6,000	0.4	0.03	2
EXHRD-4060R_	6,600	0.66	0.08	3.5	6,000	0.6	0.05	3.5	4,500	0.5	0.04	3.5
EXHRD-4080R_	5,500	0.88	0.08	4.5	5,000	0.8	0.05	4.5	4,200	0.6	0.04	4.5
EXHRD-4100R_	4,950	1.1	0.08	6	4,500	1	0.06	6	2,800	0.7	0.05	6
EXHRD-4120R_	4,400	1.32	0.08	8	4,000	1.2	0.06	8	2,400	0.8	0.05	8

Precision Machining

Workpiece	Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXHRD-4008R_	28,000	1,450	0.03	0.05	25,000	1,305	0.03	0.03	23,000	420	0.03	0.02
EXHRD-4009R_	25,000	1,500	0.05	0.05	25,000	1,350	0.05	0.03	20,000	450	0.05	0.02
EXHRD-4010R_	18,000	1,500	0.05	0.05	16,000	1,350	0.05	0.05	15,000	500	0.05	0.02
EXHRD-4015R_	16,155	1,700	0.05	0.05	14,360	1,530	0.05	0.05	13,500	600	0.05	0.02
EXHRD-4025R_	15,200	1,880	0.05	0.1	13,500	1,680	0.05	0.08	12,000	700	0.05	0.02
EXHRD-4020R_	14,301	2,000	0.1	0.1	12,712	1,800	0.1	0.08	10,000	800	0.1	0.03
EXHRD-4030R_	11,056	2,200	0.1	0.1	9,828	1,980	0.1	0.08	7,200	800	0.1	0.03
EXHRD-4040R_	8,712	2,500	0.2	0.1	7,744	2,250	0.2	0.1	6,000	1,000	0.2	0.05
EXHRD-4060R_	6,543	2,800	0.2	0.2	5,808	2,520	0.2	0.1	4,500	1,200	0.2	0.05
EXHRD-4080R_	5,445	3,000	0.2	0.2	4,840	2,700	0.2	0.1	4,000	1,500	0.2	0.05
EXHRD-4100R_	4,900	3,600	0.2	0.2	4,356	3,200	0.2	0.1	3,500	1,800	0.2	0.05
EXHRD-4120R_	4,356	3,600	0.2	0.2	3,872	3,200	0.2	0.1	3,200	2,000	0.2	0.05

EXHRP-4 Cutting Parameter

Workpiece	Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXHRP-4009R	28000	1450	0.03	0.05	25000	1305	0.03	0.03	23000	420	0.03	0.02
EXHRP-4009R	25000	1500	0.05	0.05	25000	1350	0.05	0.03	20000	450	0.05	0.02
EXHRP-4010R	18000	1500	0.05	0.05	16000	1350	0.05	0.05	15000	500	0.05	0.02
EXHRP-4015R	16155	1700	0.05	0.05	14360	1530	0.05	0.05	13500	600	0.05	0.02
EXHRP-4025R	15200	1880	0.05	0.1	13500	1680	0.05	0.08	12000	700	0.05	0.02
EXHRP-4020R	14301	2000	0.1	0.1	12712	1800	0.1	0.08	10000	800	0.1	0.03
EXHRP-4030R	11056	2200	0.1	0.1	9828	1980	0.1	0.08	7200	800	0.1	0.03
EXHRP-4040R	8712	2500	0.2	0.1	7744	2250	0.2	0.1	6000	1000	0.2	0.05
EXHRP-4060R	6543	2800	0.2	0.2	5808	2520	0.2	0.1	4500	1200	0.2	0.05
EXHRP-4080R	5445	3000	0.2	0.2	4840	2700	0.2	0.1	4000	1500	0.2	0.05
EXHRP-4100R	4900	3600	0.2	0.2	4356	3200	0.2	0.1	3500	1800	0.2	0.05
EXHRP-4120R	4356	3600	0.2	0.2	3872	3200	0.2	0.1	3200	2000	0.2	0.05

EXHRX-4 Cutting Parameter

Cutting Parameter

Workpiece	Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXHRX-4020R0.5 06050	12600	2200	0.1	0.5	11520	2000	0.08	0.5	8000	1000	0.05	0.5
EXHRX-4030R1.0 06050	11056	2500	0.1	0.8	9828	2500	0.1	0.8	7200	1200	0.1	0.8
EXHRX-4040R1.0 06050	8712	2800	0.15	1.5	7744	2800	0.1	1.5	6000	1400	0.1	1.5
EXHRX-4050R1.0 06060	7200	3500	0.2	2	6400	3000	0.1	2	5600	1500	0.1	2
EXHRX-4060R1.5 06060	6543	4000	0.2	2	5808	3200	0.2	2	4500	1800	0.1	2
EXHRX-4080R2.0 08075	5445	4500	0.2	2.7	5000	3500	0.2	2.7	3500	1600	0.1	2.7
EXHRX-4100R2.0 10075	4900	4200	0.3	4	4500	3500	0.2	4	2860	1600	0.1	4
EXHRX-4120R2.0 12100	4356	4000	0.3	5	4000	3200	0.2	5	2200	1500	0.1	5

NOTE

▲These cutting conditions are baseline values for rough machining.

▲When applied to semi-finishing, the typical cutting width is 0.1×D (10% of tool diameter).

EXHBD-2 Cutting Parameter

Workpiece	Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXHBD-2001	40000	100	0.005	0.005	40000	80	0.003	0.005	40000	50	0.003	0.004
EXHBD-20015	40000	300	0.007	0.008	40000	100	0.003	0.005	40000	60	0.003	0.004
EXHBD-2002	35000	384	0.01	0.01	35000	300	0.01	0.01	35000	100	0.005	0.008
EXHBD-2003	30000	500	0.01	0.01	30000	400	0.01	0.01	30000	200	0.008	0.01
EXHBD-2004	28000	600	0.011	0.013	28000	600	0.011	0.013	28600	600	0.008	0.013
EXHBD-2005	25000	720	0.02	0.03	25000	720	0.01	0.013	23750	720	0.008	0.02
EXHBD-2006	22000	800	0.03	0.03	22000	800	0.03	0.03	20900	800	0.03	0.03
EXHBD-2008	20000	1000	0.03	0.03	20000	1000	0.03	0.04	19000	1000	0.03	0.03
EXHBD-2010	18000	1200	0.03	0.05	18000	1200	0.03	0.04	17100	1200	0.03	0.05
EXHBD-2015	16000	1500	0.03	0.05	16000	500	0.04	0.05	15200	1500	0.03	0.05
EXHBD-2020	14800	1580	0.04	0.06	14800	560	0.04	0.06	14090	1580	0.04	0.06
EXHBD-2025	14400	1680	0.04	0.06	14400	1690	0.04	0.06	13680	1680	0.04	0.06
EXHBD-2030	13000	2000	0.05	0.08	13000	2000	0.04	0.08	12950	2000	0.04	0.08
EXHBD-2040	12000	2400	0.05	0.11	12000	2400	0.05	0.11	11400	2400	0.05	0.11
EXHBD-2050	10000	2500	0.05	0.11	10000	2500	0.05	0.11	9500	2500	0.05	0.11
EXHBD-2060	9000	2600	0.05	0.15	9000	2600	0.05	0.12	8550	2600	0.05	0.11
EXHBD-2080	8000	3000	0.05	0.2	8000	3000	0.05	0.15	7600	3000	0.05	0.15
EXHBD-2100	7200	3000	0.08	0.25	7200	3000	0.08	0.2	6840	3000	0.08	0.25
EXHBD-2120	6400	3000	0.1	0.25	6400	3000	0.08	0.25	6080	3000	0.1	0.25

EXHSD-2L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
0.1	0.3	48000	150	0.006	0.06	40000	150	0.005	0.06	32000	120	0.003	0.05
	0.5	48000	100	0.006	0.06	40000	100	0.005	0.06	32000	80	0.003	0.05
	0.7	48000	80	0.004	0.06	40000	80	0.003	0.06	32000	70	0.002	0.05
	1	48000	60	0.002	0.06	40000	60	0.002	0.06	32000	50	0.001	0.05
0.15	0.3	48000	180	0.006	0.09	40000	180	0.005	0.09	32000	150	0.003	0.07
	0.5	48000	150	0.006	0.09	40000	150	0.005	0.09	32000	120	0.003	0.07
	0.75	48000	120	0.004	0.09	40000	120	0.003	0.09	32000	100	0.002	0.07
	1	48000	100	0.002	0.09	40000	100	0.002	0.09	32000	80	0.001	0.07
	1.5	48000	80	0.002	0.09	40000	80	0.002	0.09	32000	60	0.001	0.07
0.2	0.5	36000	240	0.006	0.12	30000	240	0.005	0.12	24000	200	0.003	0.1
	0.75	36000	200	0.006	0.12	30000	200	0.005	0.12	24000	160	0.003	0.1
	1	36000	180	0.006	0.12	30000	180	0.005	0.12	24000	160	0.003	0.1
	1.5	36000	120	0.004	0.12	30000	180	0.003	0.12	24000	100	0.002	0.1
	2	36000	80	0.004	0.12	30000	80	0.003	0.12	24000	50	0.002	0.1
	2.5	36000	60	0.002	0.12	30000	60	0.002	0.12	24000	50	0.001	0.1
	3	36000	40	0.002	0.12	30000	40	0.002	0.12	24000	40	0.001	0.1
0.3	1	36000	350	0.008	0.18	30000	350	0.007	0.18	24000	300	0.003	0.15
	1.5	36000	260	0.008	0.18	30000	260	0.007	0.18	24000	200	0.003	0.15
	2	36000	180	0.006	0.18	30000	180	0.005	0.18	24000	160	0.003	0.15
	2.5	36000	150	0.005	0.18	30000	150	0.004	0.18	24000	100	0.002	0.15
	3	36000	70	0.005	0.18	30000	70	0.004	0.18	24000	50	0.002	0.15
	3.5	30000	70	0.005	0.18	25000	70	0.004	0.18	20000	50	0.002	0.15
	4	28000	70	0.005	0.18	24000	70	0.004	0.18	19200	50	0.002	0.15
0.4	1	36000	495	0.012	0.28	30000	450	0.01	0.24	24000	400	0.005	0.2
	1.5	36000	440	0.012	0.28	30000	400	0.01	0.24	24000	360	0.005	0.2
	2	36000	400	0.012	0.28	30000	360	0.01	0.24	24000	380	0.005	0.2
	2.5	36000	370	0.01	0.28	30000	340	0.008	0.24	24000	260	0.005	0.2
	3	36000	350	0.01	0.28	30000	320	0.008	0.24	24000	260	0.004	0.2
	3.5	36000	300	0.008	0.28	30000	280	0.007	0.24	24000	220	0.004	0.2
	4	36000	275	0.008	0.28	30000	250	0.006	0.24	24000	200	0.003	0.2
	5	30000	275	0.008	0.28	25000	250	0.005	0.24	20000	160	0.003	0.2
	6	30000	220	0.005	0.28	25000	200	0.004	0.24	20000	160	0.002	0.2

EXHSD-2L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
0.4	8	24000	166	0.003	0.29	20000	150	0.002	0.24	16000	120	0.001	0.2
	10	19200	110	0.003	0.29	16000	100	0.002	0.24	12800	80	0.001	0.2
0.5	1	36000	605	0.025	0.36	30000	550	0.02	0.3	24000	500	0.01	0.25
	1.5	36000	570	0.025	0.36	30000	520	0.02	0.3	24000	450	0.01	0.25
	2	36000	550	0.025	0.36	30000	500	0.02	0.3	24000	420	0.01	0.25
	2.5	36000	530	0.02	0.36	30000	490	0.015	0.3	24000	400	0.008	0.25
	3	36000	460	0.02	0.36	30000	420	0.015	0.3	24000	350	0.007	0.25
	3.5	30000	440	0.015	0.36	25000	400	0.012	0.3	20000	320	0.006	0.25
	4	30000	420	0.012	0.36	25000	380	0.01	0.3	20000	280	0.005	0.25
	4.5	30000	385	0.01	0.36	25000	350	0.008	0.3	20000	230	0.004	0.25
	5	30000	350	0.008	0.36	25000	320	0.007	0.3	20000	200	0.003	0.25
	6	30000	330	0.009	0.36	25000	300	0.005	0.3	20000	200	0.003	0.25
	7	24000	275	0.005	0.36	20000	220	0.005	0.3	16000	180	0.003	0.25
	8	24000	220	0.005	0.36	20000	200	0.005	0.3	16000	160	0.002	0.25
	9	24000	220	0.004	0.36	20000	200	0.003	0.3	16000	150	0.002	0.25
	10	19200	190	0.004	0.36	16000	170	0.003	0.3	12800	130	0.002	0.25
0.6	1.5	36000	720	0.025	0.42	30000	650	0.02	0.35	24000	550	0.01	0.3
	2	36000	605	0.025	0.42	30000	550	0.02	0.35	24000	500	0.01	0.3
	2.5	36000	605	0.025	0.42	30000	550	0.02	0.35	24000	500	0.01	0.3
	3	36000	550	0.02	0.42	30000	500	0.015	0.35	24000	450	0.007	0.3
	3.5	36000	550	0.02	0.42	30000	500	0.015	0.35	24000	450	0.007	0.3
	4	30000	495	0.012	0.42	25000	450	0.01	0.35	20000	400	0.005	0.3
	4.5	30000	495	0.012	0.42	25000	450	0.01	0.35	20000	400	0.005	0.3
	5	30000	440	0.01	0.42	25000	400	0.007	0.35	20000	350	0.008	0.3
	6	30000	385	0.006	0.42	25000	350	0.005	0.35	20000	300	0.002	0.3
	7	23760	340	0.003	0.24	19900	308	0.002	0.2	18000	280	0.002	0.2
	8	21120	300	0.003	0.24	17600	275	0.002	0.2	16000	250	0.002	0.2
	9	18460	260	0.003	0.18	15400	242	0.002	0.15	14000	220	0.002	0.15
	10	15340	240	0.003	0.18	13200	220	0.002	0.15	12000	200	0.002	0.15
	12	13200	180	0.003	0.12	11000	166	0.002	0.1	10000	150	0.002	0.1
0.7	2	36000	820	0.05	0.49	30000	750	0.04	0.4	24000	600	0.03	0.35
	4	30000	760	0.038	0.48	25000	690	0.03	0.4	20000	560	0.02	0.35

EXHSD-2L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
0.7	6	30000	600	0.025	0.48	25000	550	0.02	0.4	20000	410	0.015	0.35
	8	24000	470	0.015	0.48	20000	430	0.012	0.4	16000	330	0.01	0.35
	10	19200	330	0.01	0.48	16000	300	0.008	0.4	12800	200	0.005	0.35
0.8	2	30000	940	0.05	0.54	25000	850	0.04	0.45	20000	780	0.03	0.4
	3	30000	940	0.05	0.54	25000	850	0.04	0.45	20000	780	0.03	0.4
	4	30000	880	0.04	0.54	25000	800	0.03	0.45	20000	700	0.025	0.4
	5	30000	770	0.04	0.54	25000	700	0.03	0.45	20000	630	0.02	0.4
	6	24000	690	0.03	0.54	20000	620	0.025	0.45	16000	550	0.02	0.4
	7	21600	805	0.25	0.54	18000	550	0.2	0.45	14400	500	0.01	0.4
	8	19200	550	0.02	0.54	16000	500	0.015	0.45	12800	400	0.007	0.4
	10	19200	440	0.015	0.54	16000	400	0.012	0.45	12800	350	0.007	0.4
	12	19200	330	0.008	0.54	16000	300	0.007	0.45	12800	220	0.005	0.4
	16	18200	220	0.006	0.5	15000	200	0.005	0.4	12000	150	0.005	0.4
0.9	2	30000	1320	0.08	0.6	25000	1200	0.07	0.5	20000	1000	0.06	0.45
	4	30000	1100	0.06	0.6	25000	1000	0.05	0.5	20000	900	0.04	0.45
	6	24000	990	0.04	0.6	20000	600	0.03	0.5	16000	700	0.02	0.45
	8	21600	880	0.04	0.6	18000	600	0.03	0.5	14400	600	0.02	0.45
	10	19200	660	0.025	0.6	16000	600	0.02	0.5	12800	500	0.01	0.45
1	3	30000	1320	0.075	0.7	25000	1200	0.06	0.6	20000	1000	0.05	0.5
	4	30000	1100	0.06	0.7	25000	1000	0.05	0.6	20000	900	0.04	0.5
	5	24000	1100	0.05	0.7	20000	1000	0.04	0.6	16000	800	0.03	0.5
	6	24000	990	0.04	0.7	20000	900	0.03	0.6	16000	700	0.02	0.5
	7	24000	990	0.04	0.7	20000	900	0.03	0.6	16000	650	0.02	0.5
	8	21600	890	0.04	0.7	18000	600	0.03	0.6	14400	600	0.02	0.5
	9	21600	770	0.025	0.7	18000	700	0.02	0.6	14400	550	0.015	0.5
	10	19200	660	0.025	0.7	16000	600	0.02	0.6	12800	500	0.01	0.5
	12	19200	550	0.025	0.7	16000	500	0.02	0.6	12800	400	0.01	0.5
	14	19200	495	0.02	0.7	16000	450	0.015	0.6	12800	360	0.008	0.5
	16	16800	440	0.015	0.7	14000	400	0.012	0.6	11200	320	0.006	0.5
	18	16800	330	0.012	0.7	14000	300	0.01	0.6	11200	240	0.006	0.5
	20	14400	220	0.008	0.7	12000	200	0.007	0.6	9600	160	0.005	0.5
	22	14400	138	0.006	0.7	12000	180	0.005	0.6	9600	150	0.003	0.5

EXHSD-2L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
1.2	6	24000	990	0.05	0.8	20000	900	0.04	0.7	16000	700	0.03	0.6
	8	21600	880	0.05	0.8	18000	800	0.04	0.7	14400	600	0.02	0.6
	10	19200	650	0.04	0.8	16000	600	0.03	0.7	12600	500	0.02	0.6
	12	16800	660	0.025	0.8	14000	600	0.02	0.7	11200	600	0.01	0.6
	16	14400	440	0.02	0.8	12000	400	0.018	0.7	9600	300	0.01	0.6
1.4	6	26400	1100	0.075	1	22000	1000	0.06	0.8	17600	800	0.04	0.7
	12	19200	770	0.04	1	16000	700	0.03	0.8	12800	500	0.01	0.7
	16	14400	440	0.02	0.8	12000	400	0.018	0.7	9600	300	0.01	0.6
1.5	4	27600	1320	0.08	1.1	23000	1200	0.07	0.9	18400	900	0.05	0.75
	6	27600	1100	0.075	1.1	23000	1000	0.06	0.9	18400	800	0.04	0.75
	8	24000	990	0.075	1.1	20000	800	0.09	16000	600	0.03	0.75	0.75
	10	24000	880	0.05	1.1	20000	800	0.04	0.9	16000	600	0.03	0.75
	12	19200	770	0.05	1.1	16000	700	0.04	0.9	12800	500	0.02	0.75
	14	16800	660	0.04	1.1	14000	600	0.03	0.9	11200	400	0.02	0.75
	16	14400	550	0.025	1.1	12000	500	0.02	0.9	9500	360	0.01	0.75
	18	12000	440	0.025	1.1	10000	400	0.02	0.9	8000	330	0.008	0.75
	20	10800	352	0.02	1.1	9000	320	0.015	0.9	7200	280	0.005	0.75
	25	9600	275	0.012	1.1	8000	250	0.01	0.9	6400	200	0.004	0.75
	30	8400	220	0.006	1.1	7000	200	0.005	0.9	5600	150	0.003	0.75
	35	7200	165	0.004	1.1	6000	150	0.003	0.9	4800	110	0.002	0.75
1.6	6	26400	1100	0.075	1.2	22000	1000	0.06	0.96	17600	850	0.04	0.8
	8	24000	990	0.075	1.2	20000	900	0.06	0.96	16000	750	0.03	0.8
	12	19200	770	0.05	1	16000	700	0.04	0.9	12800	500	0.02	0.75
	16	14400	550	0.025	1	12000	500	0.02	0.9	9500	360	0.01	0.75
1.8	6	24000	1100	0.08	1.2	20000	1000	0.07	1	16000	900	0.05	0.9
	8	21600	990	0.075	1.2	18000	800	0.06	1	14400	800	0.04	0.9
	10	19200	880	0.075	1.2	16000	800	0.06	1	12800	700	0.04	0.9
	12	16800	770	0.06	1.2	14000	700	0.05	1	11200	600	0.03	0.9
	14	16800	770	0.06	1.2	14000	700	0.05	1	11200	600	0.03	0.9
	16	14400	680	0.05	1.2	12000	800	0.04	1	9900	500	0.02	0.9
	18	12000	550	0.05	1.2	10000	500	0.04	1	8000	410	0.02	0.9
2	2	6	24000	1100	0.1	1.4	20000	1000	0.08	1.2	16000	900	0.06

EXHSD-2L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
2	8	21600	990	0.08	1.4	18000	900	0.07	1.2	14400	800	0.05	1
	10	19200	880	0.075	1.4	16000	800	0.06	1.2	12800	700	0.05	1
	12	16800	770	0.06	1.4	14000	700	0.05	1.2	11200	600	0.04	1
	14	16800	770	0.06	1.4	14000	700	0.04	1.2	11200	600	0.03	1
	16	14400	660	0.05	1.4	12000	600	0.04	1.2	9600	500	0.03	1
	18	12000	550	0.04	1.4	10000	500	0.03	1.2	8000	410	0.02	1
	20	12000	440	0.04	1.4	10000	400	0.03	1.2	8000	380	0.02	1
	25	10800	385	0.025	1.4	9000	350	0.02	1.2	7200	330	0.015	1
	30	9600	330	0.02	1.4	8000	300	0.015	1.2	6400	280	0.01	1
	35	8400	275	0.015	1.4	7000	250	0.012	1.2	5600	290	0.008	1
	40	7200	220	0.01	1.4	6000	200	0.008	1.2	4800	190	0.005	1
	50	6000	132	0.006	1.4	5000	120	0.005	1.2	4000	100	0.004	1
2.5	8	19200	1100	0.11	1.8	16000	1000	0.08	1.5	12800	800	0.07	1.25
	10	19200	880	0.075	1.8	16000	800	0.06	1.5	12800	700	0.05	1.25
	12	16800	880	0.08	1.8	14000	800	0.07	1.5	11200	700	0.06	1.25
	16	14400	770	0.075	1.8	12000	700	0.06	1.5	9600	600	0.05	1.25
	20	12000	660	0.075	1.8	10000	600	0.06	1.5	8000	600	0.05	1.25
	25	10800	600	0.025	1.8	9000	500	0.02	1.5	7200	400	0.015	1.25
	30	9600	440	0.04	1.8	8000	400	0.03	1.5	6400	300	0.025	1.25
	35	8400	330	0.02	1.4	7000	300	0.015	1.2	5600	280	0.01	1.25
	40	7200	275	0.02	1.8	6000	250	0.015	1.5	4800	200	0.012	1.25
	50	6000	166	0.012	1.8	5000	150	0.01	1.5	4000	120	0.008	1.25
3	10	18000	880	0.15	2	15000	800	0.12	1.8	12000	700	0.08	1.5
	12	16800	990	0.125	2	14000	900	0.1	1.8	11200	800	0.08	1.5
	16	14400	880	0.1	2	12000	800	0.08	1.8	9600	700	0.07	1.5
	20	12000	880	0.1	2	10000	800	0.08	1.8	8000	700	0.07	1.5
	25	10800	770	0.08	2	9000	700	0.07	1.8	7200	600	0.06	1.5
	30	9600	770	0.06	2	8000	700	0.05	1.8	6400	600	0.03	1.5
	35	8400	330	0.02	1.8	7000	300	0.015	1.5	5600	280	0.02	1.25
	40	7200	275	0.02	1.4	6000	250	0.015	1.2	4800	200	0.012	1

EXHSD-2L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
4	12	14400	990	0.125	2.4	12000	900	0.1	2	9600	720	0.1	1.5
	16	12000	880	0.1	2.4	10000	800	0.08	2	8000	640	0.09	1.5
	20	10800	880	0.1	2.4	9000	800	0.08	2	7200	640	0.08	1.5
	25	9600	770	0.08	2.4	8000	700	0.07	2	6400	560	0.07	1.5
	30	8400	770	0.06	2.4	7000	700	0.05	2	5600	560	0.07	1.5
	35	7200	330	0.02	2.4	6000	300	0.015	2	4800	240	0.06	1.5
	40	6000	275	0.02	1.8	5000	250	0.015	1.5	4000	200	0.03	1.5
	45	4800	220	0.012	1.8	4000	200	0.01	1.5	3200	160	0.02	1.25
	50	3600	165	0.012	1.8	3000	150	0.01	1.5	2400	120	0.012	1

EXHSD-4L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
0.8	2	30000	1870	0.05	0.54	25000	1700	0.04	0.45	20000	1500	0.03	0.4
	3	30000	1870	0.05	0.54	25000	1700	0.04	0.45	20000	1500	0.03	0.4
	4	30000	1760	0.04	0.54	25000	1600	0.03	0.45	20000	1468	0.025	0.4
	5	30000	1540	0.04	0.54	25000	1400	0.03	0.45	20000	1285	0.02	0.4
	6	24000	1360	0.04	0.54	20000	1240	0.025	0.45	16000	1138	0.02	0.4
	7	21600	1200	0.25	0.54	18000	1100	0.2	0.45	14400	1009	0.01	0.4
	8	19200	1100	0.018	0.54	16000	1000	0.015	0.45	12800	920	0.007	0.4
	10	19200	880	0.015	0.54	16000	800	0.012	0.45	12800	730	0.007	0.4
	12	19200	660	0.008	0.54	16000	600	0.007	0.45	12800	550	0.005	0.4
	16	18000	880	0.006	0.48	15000	800	0.005	0.4	12000	730	0.005	0.4
1	3	30000	2850	0.075	0.72	25000	2400	0.06	0.6	20000	2200	0.05	0.5
	4	30000	2200	0.06	0.72	25000	2000	0.05	0.6	20000	1800	0.04	0.5
	5	24000	2200	0.05	0.72	20000	2000	0.04	0.6	16000	1800	0.03	0.5
	6	24000	2000	0.04	0.72	20000	1800	0.03	0.6	16000	1850	0.02	0.5
	7	24000	2000	0.04	0.72	20000	1800	0.03	0.6	16000	1650	0.02	0.5
	8	21600	1750	0.04	0.72	18000	1600	0.03	0.6	14400	1450	0.02	0.5
	9	21600	1540	0.025	0.72	18000	1400	0.02	0.6	14400	1300	0.015	0.5
	10	19200	1320	0.025	0.72	16000	1200	0.02	0.6	12800	1100	0.01	0.5
	12	19200	1100	0.025	0.72	16000	1000	0.02	0.6	12800	920	0.01	0.5
	14	19200	990	0.02	0.72	16000	900	0.015	0.6	12800	820	0.008	0.5
	16	16800	880	0.015	0.72	14000	800	0.012	0.6	11200	730	0.006	0.5
	18	16900	660	0.012	0.72	14000	600	0.01	0.6	11200	550	0.006	0.5
	20	14400	440	0.008	0.72	12000	400	0.007	0.6	9600	370	0.005	0.5
	22	14400	396	0.008	0.72	12000	380	0.005	0.6	9600	330	0.003	0.5
1.2	6	24000	2000	0.05	0.84	20000	1800	0.04	0.7	16000	1400	0.03	0.6
	8	21600	1760	0.05	0.84	18000	1600	0.04	0.7	14400	1200	0.02	0.6
	10	19200	1300	0.04	0.84	16000	1200	0.03	0.7	12800	1000	0.02	0.6
	12	16800	1300	0.025	0.84	14000	1200	0.02	0.7	11200	1000	0.01	0.6
1.4	6	26400	2200	0.075	0.96	22000	2000	0.06	0.8	17600	1600	0.04	0.7
	12	19200	1540	0.04	0.96	16000	1400	0.03	0.8	12800	1000	0.01	0.7
	16	14400	880	0.02	0.84	12000	800	0.018	0.7	9600	600	0.01	0.6
1.5	4	27600	2640	0.08	1.08	22000	2400	0.07	0	18400	1800	0.05	0.75

EXHSD-4L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
1.5	6	27600	2200	0.075	1.08	23000	2000	0.06	0.9	18400	1600	0.04	0.75
	8	24000	1980	0.075	1.08	20000	1800	0.06	0.9	16000	1200	0.03	0.75
	10	24000	1760	0.05	1.08	20000	1600	0.04	0.9	16000	1000	0.03	0.75
	12	19200	1540	0.05	1.08	16000	1400	0.04	0.9	12800	1000	0.02	0.75
	14	16800	1320	0.04	1.08	14000	1200	0.03	0.9	11200	800	0.02	0.75
	16	14400	1100	0.025	1.08	12000	1000	0.02	0.9	9600	720	0.015	0.75
	18	12000	880	0.025	1.08	10000	800	0.02	0.9	8000	660	0.015	0.75
	20	10800	700	0.018	1.08	9000	640	0.014	0.9	7200	560	0.01	0.75
	25	9600	550	0.012	1.08	8000	500	0.01	0.9	6400	400	0.008	0.75
1.6	8	24000	1980	0.075	1.15	20000	1800	0.06	0.96	16000	1500	0.03	0.8
	12	19200	1540	0.05	1.11	16000	1400	0.04	0.9	12800	1000	0.02	0.75
	16	14400	1100	0.025	1.11	12000	1000	0.02	0.9	9600	720	0.01	0.75
1.8	6	24000	2200	0.08	1.2	20000	2000	0.07	1	16000	1800	0.05	0.9
	8	21600	1980	0.075	1.2	18000	1800	0.06	1	14400	1600	0.04	0.9
	10	19200	1760	0.075	1.2	16000	1600	0.06	1	12800	1400	0.04	0.9
	12	16800	1540	0.06	1.2	14000	1400	0.05	1	11200	1200	0.03	0.9
	14	16800	1540	0.06	1.2	14000	1400	0.05	1	11200	1200	0.03	0.9
	16	14400	1320	0.05	1.2	12000	1200	0.04	1	9600	1000	0.02	0.9
	18	12000	1100	0.05	1.2	10000	1000	0.04	1	8000	820	0.02	0.9
2	6	24000	2200	0.11	1.4	20000	2000	0.08	1.2	16000	1800	0.06	1
	8	21600	1980	0.08	1.4	18000	1800	0.07	1.2	14400	1650	0.05	1
	10	19200	1760	0.075	1.4	16000	1600	0.06	1.2	12800	1500	0.05	1
	12	16800	1540	0.06	1.4	14000	1400	0.05	1.2	11200	1300	0.04	1
	14	16800	1540	0.06	1.4	14000	1400	0.04	1.2	11200	1300	0.03	1
	16	14400	1300	0.05	1.4	12000	1200	0.04	1.2	9600	1100	0.03	1
	18	12000	1100	0.04	1.4	10000	1000	0.03	1.2	8000	920	0.02	1
	20	12000	880	0.04	1.4	10000	800	0.03	1.2	8000	730	0.02	1
	25	10800	770	0.025	1.4	9000	700	0.02	1.2	7200	640	0.015	1
	30	9600	660	0.018	1.4	8000	600	0.015	1.2	6400	550	0.01	1
	35	8400	550	0.015	1.4	7000	500	0.012	1.2	5600	460	0.008	1
2.5	8	19200	2200	0.11	1.8	16000	2000	0.08	1.5	12800	1830	0.07	1.25
	10	18000	2000	0.11	1.8	15000	1800	0.08	1.5	11800	1550	0.07	1.25

EXHSD-4L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
2.5	12	16800	1760	0.08	1.8	14000	1600	0.07	1.5	11200	1450	0.06	1.25
	16	14400	1540	0.075	1.8	12000	1400	0.06	1.5	9600	1280	0.05	1.25
	20	12000	1300	0.075	1.8	10000	1200	0.06	1.5	8000	1100	0.05	1.25
	25	10800	990	0.025	1.8	9000	900	0.02	1.5	7200	830	0.015	1.25
	30	9600	880	0.04	1.8	8000	800	0.03	1.5	6400	734	0.025	1.25
	35	8400	660	0.018	1.44	7000	600	0.015	1.2	5600	550	0.01	1
3	10	19200	2200	0.18	2.16	16000	2000	0.15	1.8	12800	1800	0.1	1.5
	12	16900	2000	0.12	2.16	14000	1800	0.11	1.8	11200	1650	0.08	1.5
	16	14400	1500	0.1	2.16	12000	1400	0.08	1.8	9600	1280	0.07	1.5
	20	12000	1300	0.1	2.16	10000	1200	0.08	1.8	8000	1100	0.07	1.5
	25	10800	1100	0.08	2.16	9000	1000	0.07	1.8	7200	820	0.06	1.5
	30	9600	880	0.06	2.16	8000	800	0.05	1.8	6400	730	0.03	1.5
	35	8400	660	0.018	1.44	7000	600	0.015	1.2	5600	550	0.02	1.2
	40	7200	600	0.018	1.2	6000	650	0.015	1	4800	500	0.012	1
4	12	12000	2000	0.2	2.5	9500	2000	0.15	2	8000	1600	0.08	1.6
	16	10000	2000	0.15	2.5	8000	1800	0.11	2	7000	1400	0.06	1.6
	20	8500	1600	0.12	2.5	7000	1600	0.08	2	6500	1200	0.05	1.6
	25	8000	1600	0.1	2.5	6000	1400	0.07	2	5200	1200	0.04	1.6
	30	6800	1400	0.08	2.5	4800	1000	0.05	2	4200	850	0.03	1.6
	35	5500	1000	0.07	2.5	4200	880	0.04	2	3800	720	0.02	1.6
	40	4000	860	0.05	2.5	3600	720	0.03	2	3000	600	0.01	1.6
	45	3600	600	0.04	2.5	3200	500	0.03	2	2850	400	0.01	1.6
	50	3200	380	0.02	2.5	3000	300	0.03	2	2600	220	0.01	1.6
5	16	10000	2000	0.2	3	7000	1800	0.12	2.5	5500	1600	0.08	2
	25	8000	1600	0.15	3	5800	1400	0.07	2.5	4200	1200	0.05	2
	35	6000	1200	0.1	3	4200	900	0.05	2.5	3500	800	0.03	2
	50	3500	750	0.07	3	2800	620	0.03	2.5	2500	500	0.02	2

EXHRD-2L Cutting Parameter

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.			Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
0.2	R0.02	0.5	36000	360	0.006	0.12	30000	300	0.005	0.12	24000	200	0.003	0.1
		1	36000	300	0.006	0.12	30000	240	0.005	0.12	24000	150	0.003	0.1
		1.5	36000	240	0.004	0.12	30000	180	0.003	0.12	24000	100	0.002	0.1
		2	36000	180	0.004	0.12	30000	120	0.003	0.12	24000	50	0.002	0.1
	R0.05	0.5	36000	440	0.006	0.12	30000	400	0.005	0.12	24000	300	0.003	0.1
		1	36000	360	0.008	0.12	30000	300	0.005	0.12	24000	200	0.003	0.1
		1.5	36000	240	0.004	0.12	30000	200	0.003	0.12	24000	150	0.002	0.1
		2	36000	200	0.004	0.12	30000	150	0.003	0.12	24000	100	0.002	0.1
0.3	R0.02	1	36000	350	0.008	0.18	30000	350	0.007	0.18	24000	300	0.003	0.15
		1.5	36000	260	0.008	0.18	30000	260	0.007	0.18	24000	200	0.003	0.15
		2	36000	180	0.006	0.18	30000	180	0.006	0.18	24000	150	0.003	0.15
		2.5	36000	150	0.005	0.18	30000	150	0.004	0.18	24000	100	0.002	0.15
		3	36000	70	0.005	0.18	30000	70	0.004	0.18	24000	50	0.002	0.15
	R0.05	1	36000	450	0.008	0.18	30000	400	0.007	0.18	24000	350	0.003	0.15
		1.5	36000	330	0.008	0.18	30000	300	0.007	0.18	24000	250	0.003	0.15
		2	36000	280	0.006	0.18	30000	250	0.005	0.18	24000	200	0.003	0.15
		2.5	36000	250	0.005	0.18	30000	200	0.004	0.18	24000	150	0.002	0.15
		3	36000	150	0.005	0.18	30000	100	0.004	0.18	24000	80	0.002	0.15
0.4	R0.02	1	36000	500	0.012	0.28	30000	450	0.01	0.24	24000	400	0.005	0.2
		1.5	36000	440	0.012	0.28	30000	400	0.01	0.24	24000	360	0.005	0.2
		2	36000	400	0.012	0.28	30000	360	0.01	0.24	24000	320	0.005	0.2
		2.5	36000	370	0.01	0.28	30000	340	0.008	0.24	24000	280	0.005	0.2
		3	36000	350	0.01	0.28	30000	320	0.008	0.24	24000	260	0.004	0.2
		4	36000	275	0.008	0.28	30000	250	0.008	0.24	24000	200	0.003	0.2
	R0.05	1	36000	600	0.012	0.28	30000	500	0.01	0.24	24000	400	0.005	0.2
		1.5	36000	540	0.012	0.28	30000	450	0.01	0.24	24000	360	0.005	0.2
		2.5	36000	450	0.01	0.28	30000	380	0.008	0.24	24000	304	0.005	0.2
		3	36000	430	0.01	0.28	30000	360	0.008	0.24	24000	288	0.004	0.2
		4	36000	360	0.008	0.28	30000	300	0.006	0.24	24000	240	0.003	0.2
	R0.1	1	36000	660	0.012	0.28	30000	550	0.01	0.24	24000	440	0.005	0.2
		1.5	36000	600	0.012	0.28	30000	500	0.01	0.24	24000	400	0.005	0.2

EXHRD-2L Cutting Parameter

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.			Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
0.4	R0.1	2	30000	550	0.012	0.28	30000	460	0.01	0.24	24000	360	0.005	0.2
		2.5	36000	500	0.01	0.28	30000	420	0.008	0.24	24000	340	0.005	0.2
		3	36000	450	0.01	0.28	30000	380	0.008	0.24	24000	300	0.004	0.2
		4	36000	420	0.008	0.28	30000	350	0.008	0.24	24000	280	0.003	0.2
0.5	R0.02	1	30000	600	0.016	0.14	25000	500	0.008	0.15	23000	400	0.006	0.1
		1.5	30000	550	0.016	0.14	25000	460	0.008	0.15	23000	370	0.008	0.1
		2	30000	500	0.014	0.14	25000	420	0.007	0.15	23000	340	0.005	0.1
		2.5	30000	450	0.014	0.14	25000	380	0.007	0.15	23000	300	0.005	0.1
		3	30000	420	0.012	0.14	25000	350	0.006	0.15	23000	280	0.004	0.1
		4	25000	360	0.01	0.14	25000	300	0.004	0.15	23000	240	0.002	0.1
		5	25000	240	0.008	0.14	20000	200	0.003	0.15	18000	160	0.002	0.1
		6	25000	190	0.004	0.14	20000	160	0.002	0.15	18000	130	0.001	0.1
	R0.05 R0.1	1	30000	720	0.03	0.14	25000	600	0.01	0.15	23000	480	0.007	0.1
		1.5	30000	660	0.03	0.14	25000	550	0.01	0.15	23000	440	0.007	0.1
		2	30000	576	0.025	0.14	25000	480	0.01	0.15	23000	384	0.007	0.1
		2.5	30000	540	0.025	0.14	25000	450	0.01	0.15	23000	360	0.007	0.1
		3	30000	480	0.02	0.14	25000	400	0.008	0.15	23000	320	0.005	0.1
		4	25000	420	0.015	0.14	25000	350	0.005	0.15	23000	280	0.003	0.1
		5	25000	300	0.01	0.14	20000	250	0.004	0.15	18000	200	0.003	0.1
		6	25000	240	0.008	0.14	20000	200	0.003	0.15	18000	160	0.002	0.1
0.6	R0.02	2	30000	600	0.016	0.2	25000	500	0.012	0.2	23000	400	0.006	0.15
		3	28000	540	0.014	0.2	24000	450	0.01	0.2	21000	360	0.005	0.15
		4	25000	480	0.012	0.2	23000	400	0.007	0.2	20000	320	0.004	0.15
		6	23000	240	0.008	0.2	20000	200	0.005	0.2	18000	160	0.003	0.15
		8	18000	180	0.006	0.2	16000	150	0.003	0.2	14000	120	0.001	0.15
		10	16000	120	0.003	0.2	14000	100	0.001	0.2	12000	80	0.001	0.15
	R0.05 R0.1	2	30000	720	0.035	0.2	25000	600	0.02	0.2	23000	480	0.01	0.15
		3	28000	600	0.03	0.2	24000	500	0.02	0.2	21000	400	0.008	0.15
		4	25000	480	0.025	0.2	23000	400	0.015	0.2	20000	320	0.007	0.15
		6	23000	264	0.015	0.2	20000	220	0.008	0.2	18000	180	0.005	0.15
		8	18000	216	0.01	0.2	16000	180	0.005	0.2	14000	140	0.002	0.15
		10	16000	144	0.005	0.2	14000	120	0.002	0.2	12000	100	0.001	0.15

EXHRD-2L Cutting Parameter

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.			Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
0.7	R0.02	2	30000	840	0.016	0.25	25000	700	0.012	0.25	23000	560	0.01	0.15
		3	30000	840	0.016	0.25	25000	700	0.012	0.25	23000	560	0.01	0.15
		4	28000	720	0.012	0.25	25000	600	0.01	0.25	23000	480	0.008	0.15
		6	25000	480	0.008	0.25	20000	400	0.008	0.25	18000	320	0.006	0.15
		8	18000	240	0.005	0.2	16000	200	0.005	0.2	14000	160	0.005	0.15
		10	16000	216	0.005	0.2	14000	180	0.005	0.2	12000	140	0.005	0.15
	R0.05 R0.1	2	30000	840	0.05	0.25	25000	700	0.03	0.25	23000	560	0.02	0.15
		3	30000	780	0.04	0.25	25000	650	0.03	0.25	23000	520	0.015	0.15
		4	28000	720	0.03	0.25	25000	600	0.02	0.25	23000	480	0.01	0.15
		6	25000	480	0.02	0.25	20000	400	0.01	0.25	18000	320	0.01	0.15
		8	18000	360	0.02	0.25	16000	300	0.01	0.25	14000	240	0.008	0.15
		10	16000	240	0.015	0.25	14000	200	0.01	0.25	12000	160	0.006	0.15
0.8	R0.02	2	28000	1020	0.02	0.3	25000	850	0.014	0.25	23000	680	0.012	0.16
		3	28000	960	0.02	0.3	25000	800	0.014	0.25	23000	640	0.012	0.16
		4	28000	840	0.015	0.3	25000	700	0.012	0.25	23000	560	0.01	0.16
		6	23000	660	0.012	0.3	20000	550	0.01	0.25	18000	440	0.01	0.15
		8	18000	480	0.012	0.3	16000	400	0.01	0.25	14000	320	0.008	0.15
		10	16000	360	0.01	0.25	15000	300	0.008	0.2	13500	240	0.006	0.12
		12	14000	240	0.01	0.2	13000	200	0.008	0.15	12000	160	0.006	0.12
	R0.05 R0.1	2	28000	1200	0.02	0.3	25000	1000	0.014	0.25	23000	800	0.012	0.16
		3	28000	1080	0.02	0.3	25000	900	0.014	0.25	23000	720	0.012	0.16
		4	28000	960	0.015	0.3	25000	800	0.012	0.25	23000	640	0.01	0.16
		6	23000	720	0.012	0.3	20000	600	0.01	0.25	18000	480	0.01	0.15
		8	18000	600	0.012	0.3	16000	500	0.01	0.25	14000	400	0.008	0.15
		10	16000	480	0.01	0.25	15000	400	0.008	0.2	13500	320	0.006	0.12
		12	14000	360	0.01	0.2	13000	300	0.008	0.15	12000	240	0.006	0.12
0.9	R0.1	4	25000	1200	0.05	0.3	25000	900	0.03	0.3	20000	800	0.02	0.2
		8	18000	800	0.03	0.3	16000	500	0.01	0.3	14000	400	0.008	0.2
1	R0.05	3	30000	1450	0.04	0.35	25000	1300	0.03	0.3	22000	1000	0.025	0.3
		4	30000	1440	0.03	0.35	25000	1200	0.025	0.3	21000	960	0.02	0.25
		5	28000	1200	0.03	0.35	23000	1000	0.025	0.3	20000	800	0.02	0.25
		6	25000	1080	0.02	0.35	21000	900	0.02	0.3	18000	720	0.015	0.25

EXHRD-2L Cutting Parameter

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.			Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
1	R0.05	8	23000	960	0.02	0.35	19000	800	0.02	0.3	16000	640	0.015	0.25
		10	20000	840	0.02	0.35	16000	700	0.015	0.3	14000	560	0.01	0.25
		12	18000	720	0.015	0.35	15000	600	0.015	0.3	13000	480	0.01	0.25
		16	16000	480	0.015	0.35	13000	400	0.01	0.3	11000	320	0.008	0.25
		20	14000	400	0.015	0.35	13000	300	0.01	0.3	11000	240	0.008	0.25
	R0.1 R0.2 R0.3	3	30000	1500	0.04	0.35	25000	1350	0.03	0.3	22000	1080	0.025	0.3
		4	30000	1440	0.07	0.35	25000	1200	0.05	0.3	21000	960	0.04	0.25
		5	28000	1200	0.06	0.35	23000	1000	0.05	0.3	20000	800	0.04	0.25
		6	25000	1080	0.055	0.35	21000	900	0.04	0.3	18000	720	0.03	0.25
		8	23000	960	0.05	0.35	19000	800	0.03	0.3	16000	640	0.02	0.25
		10	20000	840	0.045	0.35	16000	700	0.02	0.3	14000	560	0.01	0.25
		12	18000	720	0.035	0.35	15000	600	0.015	0.3	13000	480	0.008	0.25
		16	18000	480	0.035	0.35	15000	400	0.015	0.3	13000	320	0.008	0.25
		20	14000	450	0.015	0.35	13000	350	0.01	0.3	11000	280	0.008	0.25
1.5	R0.05 R0.1 R0.2 R0.3	4	28000	1500	0.11	0.55	24000	1250	0.05	0.5	22000	1000	0.04	0.4
		6	28000	1440	0.11	0.55	23000	1200	0.05	0.5	20000	960	0.04	0.4
		8	25000	1200	0.08	0.55	21000	1000	0.05	0.5	18000	800	0.04	0.4
		10	23000	1080	0.08	0.55	19000	900	0.045	0.5	16000	720	0.03	0.4
		12	20000	960	0.06	0.55	16000	800	0.04	0.5	14000	640	0.025	0.4
		16	16000	720	0.06	0.55	13000	600	0.03	0.5	11000	480	0.02	0.4
		20	12000	480	0.03	0.55	11000	400	0.02	0.5	9000	320	0.007	0.4
2	R0.05 R0.1 R0.2 R0.3 R0.5	6	24000	1320	0.13	0.7	20000	1100	0.06	0.6	17000	880	0.05	0.5
		8	24000	1320	0.13	0.7	20000	1100	0.06	0.6	17000	880	0.05	0.5
		10	22000	1200	0.12	0.7	18000	1000	0.06	0.6	15000	800	0.05	0.5
		12	20000	1080	0.11	0.7	16000	900	0.05	0.6	14000	720	0.04	0.5
		16	16000	840	0.09	0.7	13000	700	0.04	0.6	11000	560	0.03	0.5
		20	14000	720	0.07	0.7	11000	600	0.03	0.6	9500	480	0.02	0.5
		25	12000	600	0.06	0.7	9000	500	0.03	0.6	8000	400	0.02	0.5
		30	10000	480	0.05	0.7	8000	400	0.02	0.6	7000	320	0.01	0.5
3	R0.1 R0.2 R0.3 R0.5	8	18000	1440	0.18	1	15000	1200	0.1	0.8	13000	960	0.07	0.7
		10	18000	1440	0.18	1	15000	1200	0.1	0.8	13000	960	0.07	0.7
		12	16000	1320	0.17	1	13000	1100	0.1	0.8	11000	880	0.07	0.7

EXHRD-2L Cutting Parameter

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.			Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
3	R0.1 R0.2 R0.3 R0.5	16	14000	1200	0.16	1	11000	1000	0.1	0.8	9500	800	0.07	0.7
		20	13500	1080	0.16	1	11000	900	0.08	0.8	8500	720	0.06	0.7
		25	12000	900	0.14	1	10000	750	0.07	0.8	8500	600	0.05	0.7
		30	10000	780	0.12	1	8000	650	0.05	0.8	7000	520	0.04	0.7
		35	9000	600	0.08	1	7500	500	0.04	0.8	6500	400	0.02	0.7
		40	8000	480	0.06	1	6500	400	0.03	0.8	5500	320	0.02	0.7
4	R0.1 R0.2 R0.3 R0.5 R1	10	14000	1800	0.3	2.5	13000	1500	0.15	2	12000	1200	0.12	1.5
		12	13000	1500	0.3	2.5	12000	1300	0.15	2	10000	1000	0.12	1.5
		16	12000	1300	0.25	1.4	10000	1100	0.15	1.2	8500	900	0.1	1
		20	12000	1300	0.25	1.4	10000	1000	0.15	1.2	8500	900	0.1	1
		25	10000	1100	0.17	1.4	8000	900	0.1	1.2	7000	800	0.08	1
		30	8000	800	0.14	1.4	6500	800	0.08	1.2	5500	660	0.08	1
		35	6500	700	0.08	1.4	5500	700	0.06	1.2	4500	540	0.05	1
		40	5800	660	0.06	1.2	5200	600	0.05	1	4000	480	0.05	0.8
		45	5200	550	0.05	1.2	4800	500	0.04	1	3800	420	0.04	0.8
		50	4800	450	0.04	1.2	4500	400	0.03	1	3200	360	0.04	0.8

EXHRD-4L Cutting Parameter

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.			Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
0.5	R0.02	1	30000	1200	0.016	0.14	25000	1000	0.008	0.15	23000	800	0.006	0.1
		1.5	30000	1100	0.016	0.14	25000	920	0.008	0.15	23000	740	0.006	0.1
		2	30000	1000	0.014	0.14	25000	840	0.007	0.15	23000	670	0.005	0.1
		2.5	30000	910	0.014	0.14	25000	760	0.007	0.15	23000	610	0.005	0.1
		3	30000	840	0.012	0.14	25000	700	0.008	0.15	23000	560	0.004	0.1
		4	25000	720	0.01	0.14	25000	600	0.004	0.15	23000	480	0.002	0.1
		5	25000	490	0.008	0.14	20000	400	0.003	0.15	18000	320	0.002	0.1
		6	25000	280	0.004	0.14	20000	230	0.002	0.15	18000	180	0.001	0.1
	R0.05 R0.1	1	30000	1440	0.03	0.14	25000	1200	0.01	0.15	23000	960	0.007	0.1
		1.5	30000	1300	0.03	0.14	25000	1100	0.01	0.15	23000	880	0.007	0.1
		2	30000	1150	0.025	0.14	25000	960	0.01	0.15	23000	770	0.007	0.1
		2.5	30000	1100	0.025	0.14	25000	900	0.01	0.15	23000	720	0.007	0.1
		3	30000	960	0.02	0.14	25000	800	0.008	0.15	23000	640	0.005	0.1
		4	25000	840	0.015	0.14	25000	700	0.005	0.15	23000	560	0.003	0.1
		5	25000	600	0.01	0.14	20000	500	0.004	0.15	18000	400	0.003	0.1
		6	25000	490	0.008	0.14	20000	400	0.003	0.15	18000	320	0.002	0.1
0.6	R0.02	2	30000	1200	0.016	0.12	25000	1000	0.012	0.2	23000	800	0.006	0.15
		3	28000	1080	0.014	0.2	24000	900	0.01	0.2	21000	720	0.005	0.15
		4	25000	960	0.012	0.2	23000	800	0.007	0.2	20000	640	0.004	0.15
		6	23000	480	0.008	0.2	20000	400	0.005	0.2	18000	320	0.003	0.15
		8	18000	360	0.006	0.2	16000	300	0.005	0.2	14000	240	0.003	0.15
		10	16000	240	0.003	0.2	14000	200	0.002	0.2	12000	160	0.002	0.15
	R0.05 R0.1	2	30000	1440	0.035	0.2	25000	1200	0.02	0.2	23000	960	0.01	0.15
		3	28000	1200	0.03	0.2	24000	1000	0.02	0.2	21000	800	0.008	0.15
		4	25000	960	0.025	0.2	20000	800	0.015	0.2	20000	640	0.007	0.15
		6	23000	530	0.015	0.2	20000	440	0.008	0.2	18000	350	0.005	0.15
		8	18000	430	0.01	0.2	16000	360	0.005	0.2	14000	290	0.002	0.15
		10	16000	290	0.005	0.2	14000	240	0.002	0.2	12000	190	0.001	0.15
0.7	R0.02	2	30000	1680	0.016	0.25	25000	1400	0.012	0.25	23000	1120	0.01	0.15
		3	30000	1690	0.016	0.25	25000	1400	0.012	0.25	23000	1120	0.01	0.15
		4	28000	1440	0.012	0.25	25000	1200	0.01	0.25	23000	960	0.008	0.15
		6	25000	960	0.008	0.25	20000	800	0.008	0.25	18000	640	0.006	0.15

EXHRD-4L Cutting Parameter

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.			Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
0.7	R0.02	8	18000	480	0.006	0.2	16000	400	0.005	0.2	14000	320	0.005	0.15
		10	16000	430	0.005	0.2	14000	360	0.005	0.2	12000	290	0.005	0.15
	R0.05 R0.1	2	30000	1680	0.05	0.25	25000	1400	0.03	0.25	23000	1120	0.02	0.15
		3	30000	1560	0.04	0.25	25000	1300	0.03	0.25	23000	1040	0.015	0.15
		4	28000	1440	0.03	0.25	25000	1200	0.02	0.25	23000	960	0.01	0.15
		6	25000	960	0.02	0.25	20000	800	0.01	0.25	18000	640	0.01	0.15
		8	18000	720	0.02	0.25	16000	600	0.01	0.25	14000	480	0.008	0.15
		10	16000	480	0.02	0.25	14000	400	0.01	0.25	12000	320	0.005	0.15
0.8	R0.02	2	28000	2040	0.02	0.3	25000	1700	0.014	0.25	23000	1360	0.012	0.16
		4	28000	1680	0.015	0.3	25000	1400	0.012	0.25	23000	1120	0.01	0.16
		6	23000	1320	0.012	0.3	20000	1100	0.01	0.25	16000	880	0.01	0.15
		8	18000	960	0.012	0.3	16000	800	0.01	0.25	14000	640	0.008	0.15
		10	16000	720	0.01	0.25	15000	600	0.008	0.2	13500	480	0.006	0.12
		12	14000	480	0.01	0.2	13000	400	0.008	0.15	12000	320	0.006	0.12
	R0.05 R0.1 R0.2	2	28000	2400	0.02	0.3	25000	2000	0.014	0.25	23000	1600	0.012	0.16
		4	28000	1920	0.015	0.3	25000	1600	0.012	0.25	23000	1280	0.01	0.16
		6	23000	1440	0.012	0.3	20000	1200	0.01	0.25	18000	960	0.01	0.15
		8	18000	1200	0.012	0.3	16000	1000	0.01	0.25	14000	800	0.008	0.15
		10	16000	960	0.01	0.25	15000	800	0.008	0.2	13500	640	0.006	0.12
		12	14000	720	0.01	0.2	13000	600	0.008	0.15	12000	480	0.006	0.12
0.9	R0.1	4	25000	2200	0.05	0.3	25000	1700	0.03	0.3	20000	1400	0.02	0.2
		8	18000	1000	0.03	0.3	16000	800	0.01	0.3	14000	700	0.008	0.2
1	R0.02	4	30000	2880	0.03	0.35	25000	2400	0.025	0.3	21000	1920	0.02	0.25
		5	28000	2400	0.03	0.35	23000	2000	0.025	0.3	20000	1600	0.02	0.25
		6	25000	2160	0.02	0.35	21000	1800	0.02	0.3	18000	1440	0.015	0.25
		8	23000	1920	0.02	0.35	19000	1600	0.02	0.3	16000	1280	0.015	0.25
		10	20000	1680	0.02	0.35	16000	1400	0.015	0.3	14000	1120	0.01	0.25
		12	18000	1440	0.015	0.35	15000	1200	0.015	0.3	13000	960	0.01	0.25
		16	16000	960	0.015	0.35	13000	800	0.01	0.3	11000	640	0.008	0.25
		20	14000	720	0.015	0.35	13000	600	0.01	0.3	11000	480	0.008	0.25
	R0.05 R0.1 R0.2 R0.3	4	30000	2880	0.065	0.35	25000	2400	0.05	0.3	21000	1920	0.04	0.25
		5	28000	2400	0.06	0.35	23000	2000	0.05	0.3	20000	1600	0.04	0.25

EXHRD-4L Cutting Parameter

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.			Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
1	R0.05 R0.1 R0.2 R0.3	6	25000	2160	0.055	0.35	21000	1800	0.04	0.3	18000	1440	0.03	0.25
		8	23000	1920	0.05	0.35	19000	1600	0.03	0.3	16000	1280	0.02	0.25
		10	20000	1680	0.045	0.35	16000	1400	0.02	0.3	14000	1120	0.01	0.25
		12	18000	1440	0.035	0.35	15000	1200	0.015	0.3	13000	960	0.008	0.25
		16	18000	960	0.035	0.35	15000	800	0.015	0.3	13000	640	0.008	0.25
		20	14000	840	0.015	0.35	13000	700	0.01	0.3	11000	560	0.008	0.25
1.2	R0.05 R0.1 R0.2 R0.3	5	24000	2200	0.06	0.45	20000	1800	0.045	0.4	17000	1500	0.03	0.3
		10	16000	1400	0.04	0.45	13000	1100	0.03	0.4	11000	950	0.01	0.3
1.5	R0.02	6	28000	2800	0.016	0.55	23000	2300	0.012	0.5	20000	2000	0.01	0.4
		8	25000	2400	0.016	0.55	21000	2000	0.012	0.5	18000	1700	0.01	0.4
		10	23000	2200	0.014	0.55	19000	1800	0.01	0.5	16000	1500	0.008	0.4
		12	20000	1800	0.014	0.55	16000	1500	0.01	0.5	14000	1300	0.008	0.4
		16	16000	1400	0.012	0.55	13000	1100	0.008	0.5	11000	950	0.005	0.4
		20	14000	1000	0.008	0.55	11000	800	0.005	0.5	9000	700	0.003	0.4
	R0.05 R0.1 R0.2 R0.3	6	28000	2800	0.11	0.55	23000	2300	0.05	0.5	20000	2000	0.04	0.4
		8	25000	2400	0.08	0.55	21000	2000	0.05	0.5	18000	1700	0.04	0.4
		10	23000	2200	0.08	0.55	19000	1800	0.045	0.5	16000	1500	0.03	0.4
		12	20000	1800	0.06	0.55	16000	1500	0.04	0.5	14000	1300	0.025	0.4
		16	16000	1400	0.06	0.55	13000	1100	0.03	0.5	11000	950	0.02	0.4
		20	14000	1000	0.03	0.55	11000	800	0.02	0.5	9000	700	0.007	0.4
2	R0.02	8	24000	2800	0.02	0.7	20000	2300	0.015	0.6	17000	2000	0.012	0.5
		10	23000	2500	0.018	0.7	18000	2100	0.012	0.6	14000	1500	0.01	0.5
		16	16000	1700	0.014	0.7	13000	1400	0.01	0.6	11000	1200	0.008	0.5
		20	14000	1400	0.012	0.7	11000	1100	0.008	0.6	9500	950	0.005	0.5
		25	10000	800	0.01	0.7	8000	650	0.005	0.6	7000	550	0.003	0.5
		30	10000	480	0.005	0.7	8000	400	0.002	0.6	7000	320	0.002	0.5
	R0.05 R0.1 R0.2 R0.3	8	24000	2800	0.13	0.7	20000	2300	0.06	0.6	17000	2000	0.05	0.5
		10	22000	2500	0.12	0.7	18000	2100	0.06	0.6	15000	1800	0.05	0.5
		12	20000	2200	0.11	0.7	16000	1800	0.05	0.6	14000	1500	0.04	0.5
		16	16000	1700	0.09	0.7	13000	1400	0.04	0.6	11000	1200	0.03	0.5
		20	14000	1400	0.07	0.7	11000	1100	0.03	0.6	9500	950	0.02	0.5

EXHRD-4L Cutting Parameter

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.			Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
2	R0.05 R0.1 R0.2 R0.3 R0.5	25	12000	960	0.06	0.7	9000	800	0.03	0.6	8000	640	0.02	0.5
		30	10000	800	0.05	0.7	8000	650	0.02	0.6	7000	550	0.01	0.5
2.5	R0.05 R0.1 R0.2 R0.3 R0.5	10	16000	2200	0.14	0.85	13000	1600	0.07	0.7	11000	1500	0.05	0.5
		20	11000	1400	0.08	0.85	9000	1100	0.04	0.7	7500	950	0.02	0.5
		30	7000	800	0.03	0.85	5500	850	0.01	0.7	4500	550	0.01	0.5
3	R0.05	10	18000	2800	0.18	1	15000	2300	0.1	0.8	13000	2000	0.07	0.7
		12	16000	2500	0.17	1	13000	2100	0.1	0.8	11000	1800	0.07	0.7
		16	14000	2200	0.16	1	11000	1800	0.1	0.8	9500	1500	0.07	0.7
		20	13500	2000	0.16	1	11000	1600	0.08	0.8	9500	1400	0.06	0.7
		25	12000	1800	0.14	1	10000	1500	0.07	0.8	6500	1300	0.05	0.7
		30	10000	1400	0.12	1	8000	1100	0.05	0.8	7000	950	0.04	0.7
		35	9000	1200	0.08	1	7500	1000	0.04	0.8	6500	800	0.02	0.7
		40	8000	960	0.06	1	6500	800	0.03	0.8	5500	640	0.02	0.7
	R0.1 R0.2 R0.3 R0.5	10	18000	2800	0.18	1	15000	2300	0.1	0.8	13000	2000	0.07	0.7
		12	16000	2500	0.17	1	13000	2100	0.1	0.8	11000	1800	0.07	0.7
		16	14000	2200	0.16	1	11000	1800	0.1	0.8	9500	1500	0.07	0.7
		20	13500	2000	0.16	1	11000	1600	0.08	0.8	9500	1400	0.06	0.7
		25	12000	1800	0.14	1	10000	1500	0.07	0.8	6500	1300	0.05	0.7
		30	10000	1400	0.12	1	8000	1100	0.05	0.8	7000	950	0.04	0.7
		35	9000	1200	0.08	1	7500	1050	0.04	0.8	6500	850	0.02	0.7
		40	8000	1000	0.06	1	6500	800	0.03	0.8	5500	700	0.02	0.7
	R1	10	14000	2200	0.16	1	11000	1800	0.1	0.8	9500	1500	0.07	0.7
		12	13500	2000	0.16	1	11000	1600	0.08	0.8	9500	1400	0.06	0.7
		16	12000	1800	0.14	1	10000	1500	0.07	0.8	8500	1300	0.05	0.7
		20	10000	1400	0.12	1	8000	1100	0.05	0.8	7000	950	0.04	0.7
		25	9000	1200	0.08	1	7500	1100	0.04	0.8	6500	850	0.02	0.7
		30	9000	1200	0.08	1	7500	1100	0.04	0.8	6500	800	0.02	0.7
		35	9000	1200	0.08	1	7500	1050	0.04	0.8	6500	750	0.02	0.7
		40	8000	1000	0.06	1	6500	800	0.03	0.8	5500	700	0.02	0.7
4	R0.1 R0.2 R0.3 R0.5 R1	16	12000	2650	0.25	1.4	10000	2200	0.15	1.2	8500	1760	0.1	1
		20	12000	2400	0.25	1.4	10000	2000	0.15	1.2	8500	1600	0.1	1
		25	10000	2160	0.17	1.4	8000	1800	0.1	1.2	7000	1440	0.08	1

EXHRD-4L Cutting Parameter

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.			Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
4	R0.1 R0.2 R0.3 R0.5 R1	30	8000	1900	0.14	1.4	6500	1600	0.08	1.2	5500	1290	0.08	1
		35	6500	1680	0.08	1.4	5500	1400	0.06	1.2	4500	1100	0.05	1
		40	5800	1440	0.06	1.2	5200	1200	0.05	1	4000	900	0.05	0.8
		45	5200	1200	0.05	1.2	4800	1000	0.04	1	3800	800	0.04	0.8
		50	4800	960	0.04	1.2	4500	800	0.03	1	3200	640	0.04	0.8
5	R0.1 R0.2 R0.3 R0.5 R1	16	9500	2400	0.25	2.2	8000	2000	0.15	2	7000	1700	0.08	1.6
		20	8000	2000	0.18	2.2	6500	1600	0.1	2	5500	1400	0.07	1.6
		40	5000	1200	0.09	2.2	4000	1000	0.05	2	3500	850	0.02	1.6

EXHBD-2L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
R0.05	0.2	40000	120	0.003	0.005	40000	100	0.002	0.005	40000	70	0.002	0.003
	0.3	40000	100	0.003	0.005	40000	70	0.002	0.005	40000	50	0.002	0.003
	0.5	40000	70	0.002	0.003	40000	50	0.001	0.003	40000	30	0.001	0.002
	0.75	40000	70	0.002	0.003	40000	50	0.001	0.003	40000	30	0.001	0.002
	1	40000	50	0.002	0.003	40000	30	0.001	0.003	40000	30	0.001	0.002
R0.075	0.3	40000	180	0.003	0.005	40000	150	0.002	0.005	40000	100	0.002	0.003
	0.5	40000	150	0.003	0.005	40000	120	0.002	0.005	40000	70	0.002	0.003
	0.75	40000	70	0.002	0.003	40000	50	0.001	0.003	40000	30	0.001	0.002
	1	40000	70	0.002	0.003	40000	50	0.001	0.003	40000	30	0.001	0.002
	1.5	40000	50	0.002	0.003	40000	30	0.001	0.003	40000	30	0.001	0.002
R0.1	0.3	40000	350	0.01	0.01	40000	300	0.006	0.005	36000	200	0.003	0.003
	0.5	40000	320	0.008	0.01	39600	280	0.005	0.005	36000	180	0.003	0.003
	0.75	40000	280	0.005	0.01	39600	200	0.003	0.005	36000	150	0.002	0.003
	1	40000	250	0.003	0.005	39600	160	0.002	0.003	36000	120	0.001	0.002
	1.25	40000	180	0.003	0.005	39600	140	0.002	0.003	36000	100	0.001	0.002
	1.5	40000	150	0.003	0.005	39600	120	0.002	0.003	36000	80	0.001	0.002
	1.75	40000	120	0.002	0.003	39600	100	0.001	0.002	36000	60	0.001	0.002
	2	40000	100	0.002	0.003	39600	80	0.001	0.002	36000	50	0.001	0.001
	2.5	40000	70	0.001	0.002	39600	60	0.001	0.001	36000	40	0.001	0.001
	3	40000	50	0.001	0.001	39600	40	0.001	0.001	36000	30	0.001	0.001
R0.15	0.5	36300	350	0.01	0.015	33000	300	0.007	0.01	30000	280	0.003	0.005
	0.6	36300	350	0.007	0.01	33000	300	0.005	0.007	30000	250	0.003	0.005
	0.75	36300	330	0.007	0.01	33000	280	0.005	0.007	30000	230	0.003	0.005
	1	36300	320	0.007	0.01	33000	250	0.005	0.007	30000	200	0.003	0.005
	1.25	36300	280	0.005	0.007	33000	200	0.003	0.005	30000	160	0.002	0.003
	1.5	36300	230	0.005	0.007	33000	180	0.003	0.005	30000	120	0.002	0.003
	1.75	36300	180	0.003	0.005	33000	150	0.002	0.003	30000	100	0.002	0.002
	2	36300	150	0.003	0.005	33000	120	0.002	0.003	30000	90	0.002	0.002
	2.25	36300	120	0.002	0.003	33000	100	0.001	0.002	30000	80	0.001	0.001
	2.5	36300	100	0.002	0.003	33000	80	0.001	0.002	30000	70	0.001	0.001
	3	36300	80	0.001	0.003	33000	70	0.001	0.002	30000	60	0.001	0.001
	3.5	36300	70	0.001	0.002	33000	60	0.001	0.001	30000	50	0.001	0.001

EXHBD-2L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
R0.15	4	36300	60	0.001	0.002	33000	50	0.001	0.001	30000	40	0.001	0.001
	0.5	36300	600	0.03	0.05	33000	720	0.03	0.03	30000	580	0.009	0.02
	0.8	36300	800	0.02	0.05	33000	720	0.02	0.03	30000	580	0.008	0.02
	1	36300	800	0.02	0.05	33000	720	0.02	0.03	30000	580	0.008	0.02
	1.5	36300	620	0.01	0.03	33000	500	0.01	0.02	30000	400	0.005	0.01
	2	36300	500	0.01	0.02	33000	380	0.01	0.01	30000	300	0.005	0.007
	2.5	36300	420	0.007	0.01	33000	300	0.005	0.007	30000	280	0.003	0.005
R0.2	3	36300	300	0.007	0.01	33000	240	0.005	0.007	30000	200	0.003	0.005
	3.5	36300	230	0.005	0.007	33000	160	0.003	0.005	30000	120	0.002	0.003
	4	30000	160	0.005	0.005	30000	120	0.003	0.003	30000	90	0.002	0.003
	4.5	30000	100	0.003	0.005	30000	80	0.002	0.003	30000	60	0.001	0.002
	5	30000	70	0.002	0.003	30000	50	0.001	0.002	30000	40	0.001	0.002
	6	30000	50	0.001	0.002	30000	40	0.001	0.001	30000	30	0.001	0.001
	8	30000	50	0.001	0.002	30000	40	0.001	0.001	30000	30	0.001	0.001
	1	37500	650	0.01	0.025	34800	590	0.01	0.025	30000	500	0.01	0.025
	1.5	37500	650	0.009	0.02	34800	590	0.009	0.02	30000	500	0.009	0.02
	2	37500	520	0.008	0.02	34800	470	0.008	0.02	30000	400	0.008	0.02
	2.5	35000	520	0.007	0.015	32480	470	0.007	0.015	28000	400	0.007	0.015
	3	35000	468	0.007	0.01	32480	420	0.007	0.01	28000	360	0.007	0.01
	3.5	31250	488	0.006	0.01	29000	420	0.006	0.01	25000	360	0.006	0.01
R0.25	4	31250	390	0.005	0.008	29000	350	0.005	0.008	25000	300	0.005	0.008
	4.5	31250	338	0.004	0.008	29000	300	0.004	0.008	25000	260	0.004	0.008
	5	31250	338	0.004	0.008	29000	300	0.004	0.008	25000	260	0.004	0.008
	5.5	31250	312	0.004	0.006	29000	280	0.004	0.006	25000	240	0.004	0.006
	6	27500	156	0.003	0.005	25520	140	0.003	0.005	22000	120	0.003	0.005
	8	25000	104	0.003	0.003	23200	90	0.003	0.003	20000	80	0.003	0.003
	10	25000	65	0.003	0.003	23200	60	0.003	0.003	20000	50	0.003	0.003
	1	33000	975	0.02	0.03	31320	700	0.02	0.03	28800	600	0.02	0.03
R0.3	2	33000	780	0.02	0.03	31320	560	0.02	0.03	28800	480	0.02	0.03
	2.5	30800	780	0.015	0.02	29232	560	0.015	0.02	26880	480	0.015	0.02
	3	30800	702	0.015	0.02	29232	500	0.015	0.02	26880	432	0.015	0.02

EXHBD-2L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
R0.3	3.5	27500	702	0.01	0.02	26100	500	0.01	0.02	24000	432	0.01	0.02
	4	27500	585	0.01	0.02	26100	420	0.01	0.02	24000	360	0.01	0.02
	4.5	27500	507	0.01	0.02	26100	360	0.01	0.02	24000	312	0.01	0.02
	5	27500	507	0.01	0.02	26100	360	0.01	0.02	24000	312	0.01	0.02
	5.5	27500	468	0.008	0.01	26100	336	0.008	0.01	24000	288	0.008	0.01
	6	24200	234	0.008	0.01	22968	168	0.008	0.01	21120	144	0.008	0.01
	7	22000	156	0.006	0.008	20880	108	0.006	0.008	19200	96	0.006	0.008
	8	22000	97.5	0.005	0.008	20880	70	0.005	0.008	19200	60	0.005	0.008
	9	19040	85	0.005	0.008	18188	65	0.005	0.008	18048	50	0.005	0.008
	10	19040	80	0.003	0.005	18188	60	0.003	0.005	18000	40	0.003	0.005
	12	19040	60	0.003	0.005	18188	50	0.003	0.005	18000	30	0.003	0.005
R0.35	2	42500	1625	0.02	0.035	41200	1300	0.02	0.035	36000	1000	0.02	0.035
	3	40000	1200	0.02	0.03	40000	960	0.02	0.03	30000	800	0.02	0.03
	4	40000	1025	0.015	0.02	40000	820	0.015	0.02	30000	600	0.015	0.02
	6	30000	625	0.006	0.01	30000	600	0.006	0.01	25000	420	0.006	0.01
	8	25000	475	0.004	0.006	20000	380	0.004	0.006	20000	250	0.004	0.006
R0.4	2	24200	2000	0.03	0.05	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	2.5	24200	2000	0.03	0.05	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	3	24200	2000	0.03	0.05	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	4	24200	1600	0.03	0.06	22000	1200	0.03	0.05	20000	860	0.03	0.05
	5	24200	1600	0.02	0.03	22000	1000	0.02	0.03	20000	620	0.02	0.03
	6	21780	1200	0.02	0.03	19800	760	0.02	0.03	18000	560	0.02	0.03
	7	21780	1000	0.02	0.03	19800	680	0.02	0.03	18000	520	0.02	0.03
	8	21780	820	0.01	0.02	19800	600	0.01	0.02	18000	480	0.01	0.02
	10	19360	450	0.008	0.015	17600	380	0.008	0.015	16000	320	0.008	0.015
	12	18150	320	0.006	0.012	16500	260	0.006	0.012	15000	200	0.006	0.012
	16	18150	320	0.005	0.01	16500	260	0.005	0.01	15000	200	0.005	0.01
R0.45	2	24200	2000	0.03	0.05	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	4	24200	1600	0.03	0.05	22000	1200	0.03	0.05	20000	860	0.03	0.05
	6	21780	1200	0.02	0.03	19800	760	0.02	0.03	18000	560	0.02	0.03
	8	21780	820	0.01	0.02	19800	600	0.01	0.02	18000	480	0.01	0.02
R0.5	2.5	24000	2000	0.03	0.06	22000	1600	0.03	0.05	20000	1200	0.03	0.05

EXHBD-2L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
R0.5	3	24000	2000	0.03	0.06	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	4	24000	2000	0.03	0.06	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	5	24000	2000	0.03	0.05	22000	1600	0.03	0.05	20000	920	0.03	0.05
	6	21600	1800	0.05	0.05	19800	1200	0.03	0.05	18000	740	0.02	0.05
	7	21600	1200	0.04	0.05	19800	950	0.03	0.04	18000	680	0.02	0.03
	8	21600	1000	0.04	0.05	19800	860	0.03	0.04	18000	560	0.02	0.03
	9	19200	820	0.03	0.05	17600	750	0.02	0.03	16000	500	0.01	0.02
	10	18000	750	0.03	0.05	16500	620	0.02	0.03	15000	450	0.01	0.02
	12	18000	600	0.01	0.03	16500	520	0.007	0.02	15000	400	0.005	0.01
	14	16800	420	0.005	0.01	15400	360	0.003	0.007	14000	320	0.002	0.005
	16	16800	300	0.005	0.005	15400	250	0.003	0.005	14000	200	0.002	0.003
	18	16800	180	0.003	0.005	15400	120	0.002	0.005	14000	85	0.002	0.002
	20	14400	100	0.003	0.003	13200	75	0.002	0.003	12000	60	0.002	0.002
	22	12000	50	0.002	0.003	11000	40	0.002	0.002	10000	35	0.001	0.002
R0.6	4	24000	2000	0.03	0.06	22000	1600	0.03	0.05	20000	1200	0.03	0.05
	6	21600	1800	0.05	0.05	19800	1200	0.04	0.05	18000	740	0.02	0.05
	8	21600	1000	0.04	0.05	19800	860	0.03	0.04	18000	560	0.02	0.03
	10	18000	750	0.03	0.05	16500	620	0.02	0.03	15000	450	0.01	0.02
	12	18000	600	0.01	0.03	16500	520	0.007	0.02	15000	400	0.005	0.01
	14	16800	420	0.005	0.01	15400	360	0.003	0.007	14000	320	0.002	0.005
	16	16800	300	0.005	0.005	15400	250	0.003	0.005	14000	200	0.002	0.003
R0.7	8	21600	2500	0.03	0.05	19800	1600	0.03	0.05	18000	1200	0.03	0.05
	12	18000	1800	0.02	0.05	16500	920	0.02	0.05	15000	780	0.02	0.05
	16	18000	720	0.01	0.02	16500	650	0.01	0.02	15000	580	0.01	0.02
R0.75	4	21600	3000	0.03	0.05	19800	2500	0.03	0.05	18000	2000	0.03	0.05
	6	21600	3000	0.03	0.05	19800	2000	0.03	0.05	18000	1600	0.03	0.05
	8	21600	2500	0.03	0.05	19800	1600	0.03	0.05	18000	1200	0.03	0.05
	10	21600	2500	0.02	0.05	19800	1200	0.02	0.05	18000	860	0.02	0.05
	12	18000	1800	0.02	0.05	16500	920	0.02	0.05	15000	780	0.02	0.05
	14	18000	1200	0.02	0.03	16500	820	0.02	0.03	15000	650	0.02	0.03
	16	18000	720	0.01	0.02	16500	650	0.01	0.02	15000	580	0.01	0.02
	18	16800	550	0.008	0.015	15400	400	0.008	0.015	14000	400	0.008	0.015

EXHBD-2L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
R0.75	20	16800	450	0.007	0.01	15400	360	0.007	0.01	14000	300	0.007	0.01
	25	14400	330	0.007	0.007	13200	250	0.007	0.007	12000	200	0.007	0.007
	30	9600	80	0.003	0.003	8800	60	0.003	0.003	8000	40	0.003	0.003
R0.8	8	21600	2500	0.03	0.05	19600	1600	0.03	0.05	16000	1200	0.03	0.05
	12	18000	1800	0.02	0.05	16500	920	0.02	0.05	15000	780	0.02	0.05
	16	19000	720	0.01	0.02	16500	650	0.01	0.02	15000	580	0.01	0.02
	20	16900	450	0.007	0.01	15400	360	0.007	0.01	14000	300	0.007	0.01
R1	6	18000	1920	0.04	0.06	16500	1760	0.04	0.06	15000	1600	0.04	0.06
	8	18000	1440	0.03	0.05	16500	1320	0.03	0.05	15000	1200	0.03	0.05
	10	16800	1440	0.03	0.05	15400	1320	0.03	0.05	14000	1200	0.03	0.05
	12	14400	1128	0.02	0.05	13200	1034	0.02	0.05	12000	940	0.02	0.05
	14	14400	1128	0.015	0.04	13200	1034	0.015	0.04	12000	940	0.015	0.04
	16	14400	1128	0.015	0.04	13200	1034	0.015	0.04	12000	940	0.015	0.04
	18	12000	1020	0.01	0.03	11000	935	0.01	0.03	10000	850	0.01	0.03
	20	12000	864	0.01	0.03	11000	792	0.01	0.03	10000	720	0.01	0.03
	22	12000	720	0.008	0.02	11000	660	0.008	0.02	10000	600	0.008	0.02
	25	10200	504	0.008	0.02	9350	462	0.008	0.02	8500	420	0.008	0.02
	30	10200	288	0.005	0.01	9350	264	0.005	0.01	8500	240	0.005	0.01
	35	8160	120	0.005	0.007	7480	110	0.005	0.007	6800	100	0.005	0.007
	40	8160	60	0.002	0.005	7480	55	0.002	0.005	6800	50	0.002	0.005
R1.25	6	18000	1920	0.04	0.06	16500	1760	0.04	0.06	15000	1600	0.04	0.06
	8	18000	1440	0.03	0.05	16500	1320	0.03	0.05	15000	1200	0.03	0.05
	10	16800	1440	0.03	0.05	15400	1320	0.03	0.05	14000	1200	0.03	0.05
	12	15000	1320	0.02	0.05	13800	1180	0.02	0.04	13000	1080	0.02	0.04
	16	14400	1128	0.015	0.04	13200	1034	0.015	0.04	12000	940	0.015	0.04
	20	12000	864	0.01	0.03	11000	792	0.01	0.03	10000	720	0.01	0.03
	25	10200	504	0.008	0.02	9350	462	0.008	0.02	8500	420	0.008	0.02
	30	10200	288	0.005	0.01	9350	264	0.005	0.01	8500	240	0.005	0.01
	35	8160	120	0.005	0.007	7480	110	0.005	0.007	6800	100	0.005	0.007
R1.5	8	16800	2500	0.04	0.08	15400	2200	0.04	0.08	14000	2000	0.04	0.08
	10	16800	1875	0.03	0.07	15400	1650	0.03	0.07	14000	1500	0.03	0.07
	12	14400	1875	0.03	0.07	13300	1650	0.03	0.07	12000	1500	0.03	0.07

EXHBD-2L Cutting Parameter

Workpiece		Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.		Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
R1.5	14	14400	1500	0.03	0.07	13200	1320	0.03	0.07	12000	1200	0.03	0.07
	16	14400	1500	0.02	0.05	13200	1320	0.02	0.05	12000	1200	0.02	0.05
	20	12000	1200	0.02	0.05	11000	1056	0.02	0.05	10000	960	0.02	0.05
	25	10320	1000	0.015	0.05	9460	880	0.015	0.05	8600	800	0.015	0.05
	30	8640	750	0.015	0.04	7920	660	0.015	0.04	7200	600	0.015	0.04
	35	7680	525	0.01	0.03	7040	462	0.01	0.03	6400	420	0.01	0.03
	40	7200	325	0.01	0.03	6600	296	0.01	0.03	6000	260	0.01	0.03
R1.75	16	14400	1500	0.02	0.05	13200	1320	0.02	0.05	12000	1200	0.02	0.05
	20	12000	1200	0.02	0.05	11000	1056	0.02	0.05	10000	960	0.02	0.05
	25	10320	1000	0.015	0.05	9460	880	0.015	0.05	8600	800	0.015	0.05
	30	8640	750	0.015	0.04	7920	660	0.015	0.04	7200	600	0.015	0.04
	35	7680	525	0.01	0.03	7040	462	0.01	0.03	6400	420	0.01	0.03
	40	7200	325	0.01	0.03	6600	296	0.01	0.03	6000	260	0.01	0.03
	45	6800	300	0.01	0.03	6500	264	0.01	0.03	6000	200	0.01	0.03
R2	12	13200	3000	0.04	0.08	12100	2500	0.04	0.08	11000	2000	0.04	0.08
	14	13200	3000	0.04	0.08	12100	2000	0.04	0.08	11000	1600	0.04	0.08
	16	12000	3000	0.03	0.06	11000	2000	0.03	0.06	10000	1600	0.03	0.06
	20	12000	2400	0.03	0.06	11000	1800	0.03	0.06	10000	1400	0.03	0.06
	25	10800	1600	0.03	0.05	9800	1200	0.03	0.05	9000	1000	0.03	0.05
	30	9600	1600	0.03	0.05	8800	1200	0.03	0.05	8000	1000	0.03	0.05
	35	9000	1200	0.03	0.05	8250	1000	0.03	0.05	7500	820	0.03	0.05
	40	8160	1200	0.02	0.04	7480	1000	0.02	0.04	6800	820	0.02	0.04
	45	7800	750	0.02	0.04	7150	620	0.02	0.04	6500	500	0.02	0.04
	50	6600	550	0.015	0.03	6050	500	0.015	0.03	5500	420	0.015	0.03
R2.5	16	12000	3000	0.03	0.06	11000	2000	0.03	0.06	10000	1600	0.03	0.06
	20	12000	2400	0.03	0.06	11000	1800	0.03	0.06	10000	1400	0.03	0.06
	25	10800	1600	0.03	0.05	9800	1200	0.03	0.05	9000	1000	0.03	0.05
	30	9600	1600	0.03	0.05	8800	1200	0.03	0.05	8000	1000	0.03	0.05
	35	8500	1450	0.025	0.045	8000	1100	0.025	0.045	7500	950	0.025	0.045
	40	8160	1200	0.02	0.04	7480	1000	0.02	0.04	6800	820	0.02	0.04
	45	7800	750	0.02	0.04	7150	620	0.02	0.04	6500	500	0.02	0.04
	50	6600	550	0.015	0.03	6050	500	0.015	0.03	5500	420	0.015	0.03

EEH SERIES

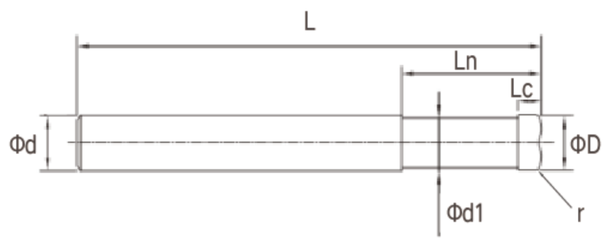
For High Efficiency & High Hardness application

- Robust linear cutting edge.
- TiSiN multilayer coatings with Chrome concentration > 13%.
- Wide range of shank diameters for different machining purposes.
- Specially designed for hardened materials (eg: SKD11, Cr12MoV, S-136 and etc.).

EEHRQ-4

4 Flute Corner Radius End Mill

TiSiN | 4 | 0° Spiral Angle | Arc Back Angle | R | Shank Dia. tolerance H5 | <65 HRC



ΦD	D Tolerance
6≤D≤12	0~-0.02

(mm)

Order Code	Radius	Dia.	Length of cut	Neck Length	Neck Dia.	Overall Length	Shank Dia.	Stock
	r	ΦD	Lc	Ln	Φd1	L	Φd	
EEHRQ-4060R0.55 06060	0.55	6	3	18	5.8	60	6	●
EEHRQ-4080R0.75 08075	0.75	8	4	24	7.8	75	8	●
EEHRQ-4100R0.95 10075	0.95	10	5	30	9.8	75	10	●
EEHRQ-4120R1.15 12075	1.15	12	6	36	11.6	75	12	●

TABLE OF RECOMMENDED MILLING MATERIALS

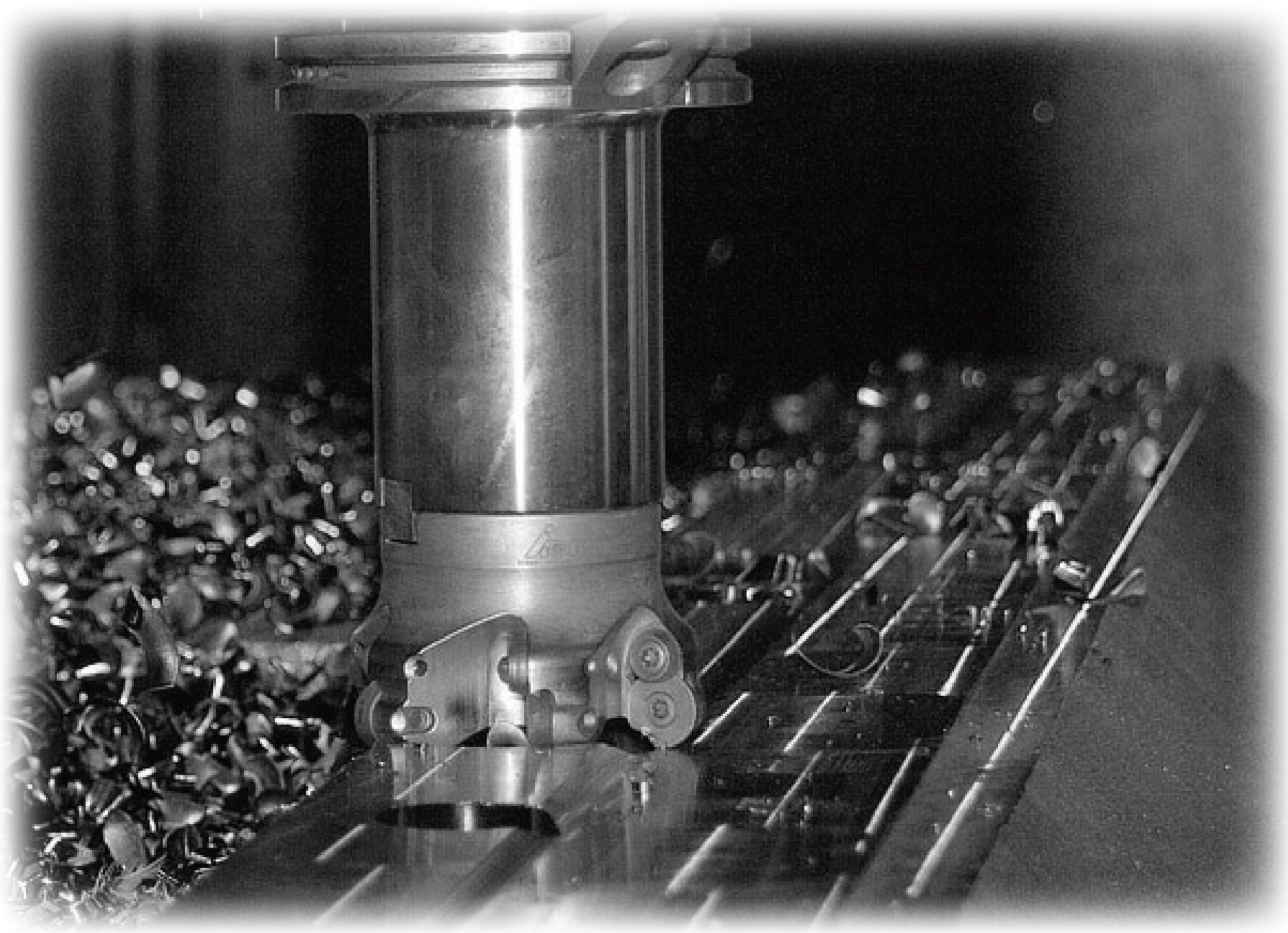
CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~40HRC	~50HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB
○	○	◎	◎	○	○	○

COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
		○	○		

◎ Very suitable ○ Suitable

EEHRQ-4 Cutting Parameter

Workpiece	Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EEHRQ-4060R0.55 06060	6000	4000	0.2	3	6000	4000	0.2	2.5	4200	2500	0.1	2
EEHRQ-4080R0.75 08075	4500	5000	0.3	4	4500	5000	0.3	3	4000	3000	0.1	2.5
EEHRQ-4100R0.95 10075	4000	4500	0.35	5	4000	4500	0.35	4	3600	3000	0.1	3
EEHRQ-4120R1.0 12075	4000	4000	0.42	6	4000	4000	0.42	5	3200	3000	0.1	4



EM SERIES

First choice for Stainless steel Machining <380HB

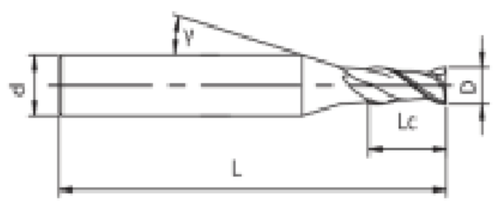
- The large front angle design, with a sharp cutting edge, ensures good surface quality.
- The double-edged design, with a curved edge, makes the side edges sharper. The special groove design ensures the rigidity of the cutting edge.
- The tool features an excellent substrate combined with TiAlCrSiN, enhancing the tool's resistance to chipping and wear.
- Suitable for finishing and rough machining of stainless steel (<380HB).

EMRE-2

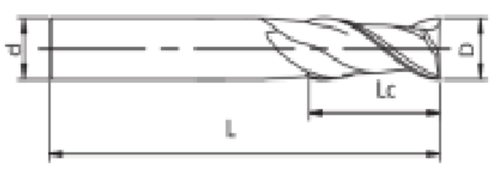
2 Flute Square End Mill

TiAlCrSiN | 2 | 35° Spiral Angle | 6° | S | Shank Dia. tolerance H5 | <380 HB

Type A



Type B



ΦD	D Tolerance
D≤12	0~-0.02
D>12	0~-0.03

(mm)

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	Lc	L	Φd		
EMSE-2005 04050	0.5	1	50	4	A	○
EMSE-2008 04050	0.8	2	50	4	A	●
EMSE-2010 04050	1	3	50	4	A	●
EMSE-2015 04050	1.5	4	50	4	A	●
EMSE-2020 04050	2	6	50	4	A	●
EMSE-2025 04050	2.5	8	50	4	A	●
EMSE-2030 04050	3	9	50	4	A	●
EMSE-2040 04050	4	11	50	4	B	●
EMSE-2060 06050	6	16	50	6	B	●
EMSE-2080 08060	8	20	60	8	B	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	Tialloy Heat-resistant alloy	COPPER ALLOYS	Aluminium alloy
~38HRC	~45HRC	~50HRC	~35HRC			
○			◎			

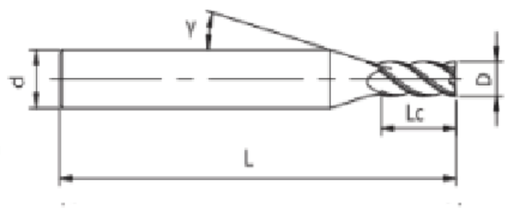
◎ Very suitable ○ Suitable

EMSE-4

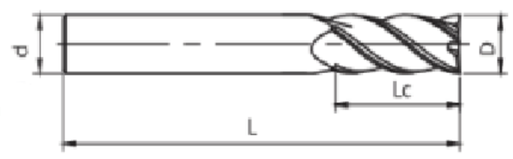
4 Flute Square End Mill

TiAlCrSiN | 4 | 35° Spiral Angle | 6° | S | Shank Dia. tolerance H5 | <380 HB

Type A



Type B



ΦD	D Tolerance
D≦12	0~-0.02
D>12	0~-0.03

(mm)

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	Lc	L	Φd		
EMSE-4010 04050	1	3	50	4	A	●
EMSE-4015 04050	1.5	4	50	4	A	●
EMSE-4020 04050	2	6	50	4	A	●
EMSE-4025 04050	2.5	8	50	4	A	●
EMSE-4030 04050	3	9	50	4	A	●
EMSE-4035 04050	3.5	10	50	4	A	●
EMSE-4040 04050	4	11	50	4	B	●
EMSE-4040 06050	4	11	50	6	A	●
EMSE-4050 06050	5	13	50	6	A	●
EMSE-4060 06050	6	16	50	6	B	●
EMSE-4080 08060	8	20	60	8	B	●
EMSE-4100 10075	10	25	75	10	B	●
EMSE-4120 12075	12	30	75	12	B	●
EMSE-4140 14100	14	34	100	14	B	●
EMSE-4160 16100	16	36	100	16	B	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	Tialloy Heat-resistant alloy	COPPER ALLOYS	Aluminium alloy
~38HRC	~45HRC	~50HRC	~35HRC			
○			○			

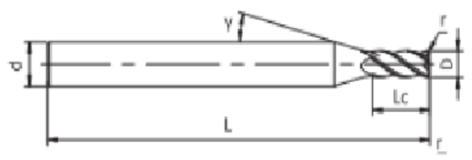
○ Very suitable ○ Suitable

EMRE-4

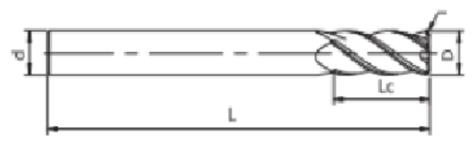
4 Flute Coner Radius End Mill

TiAlCrSiN | 4 | 35° Spiral Angle | 6° | R | Shank Dia. tolerance H5 | <380 HB

Type A



Type B



ΦD	D Tolerance
D≦12	0~-0.02
D>12	0~-0.03

(mm)

Order Code	Dia.	Corner	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	r	Lc	L	Φd		
EMRE-4020R0.2 04050	2	0.2	6	50	4	A	●
EMRE-4030R0.3 04050	3	0.3	9	50	4	A	○
EMRE-4030R0.5 04050	3	0.5	9	50	4	A	●
EMRE-4040R0.3 04050	4	0.3	11	50	4	B	○
EMRE-4040R0.5 04050	4	0.5	11	50	4	B	●
EMRE-4040R0.2 06050	4	0.2	11	50	6	A	○
EMRE-4040R0.3 06050	4	0.3	11	50	6	A	○
EMRE-4050R0.5 06050	5	0.5	13	50	6	A	○
EMRE-4060R0.5 06050	6	0.5	16	50	6	B	●
EMRE-4080R0.2 08060	8	0.2	20	60	8	B	●
EMRE-4080R0.5 08060	8	0.5	20	60	8	B	●
EMRE-4080R1 08060	8	1.0	20	60	8	B	○
EMRE-4100R0.5 10075	10	0.5	25	75	10	B	●

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	Tialloy Heat-resistant alloy	COPPER ALLOYS	Aluminium alloy
~38HRC	~45HRC	~50HRC	~35HRC			
○			◎			

◎ Very suitable ○ Suitable

EMSE-2 Cutting Parameter

Side Milling

Workpiece Materials	Depth of cut (mm)	VC m/min	刀径 (mm)	1	2	4	6	8
Stainless Steels	ap≤1D	80~120	(n) (r/min)	25000	15900	7960	5300	3980
	ae≤0.1D		(m/min)	290	330	450	450	480

Slotting

Workpiece Materials	Depth of cut (mm)	VC m/min	刀径 (mm)	1	2	4	6	8
Stainless Steels	ap≤1D	35-55	(n) (r/min)	14330	7165	3580	2390	1790
	ae≤0.1D		(m/min)	200	140	120	155	155

EMSE-4 / EMRE-4 Cutting Parameter

Side Milling

Workpiece Materials	Depth of cut (mm)	VC m/min	刀径 (mm)	1	2	4	6	8	10	12
Stainless Steels	ap≤1D	80~120	(n) (r/min)	25000	15900	7960	5300	3980	3180	2650
	ae≤0.1D		(m/min)	950	850	950	900	950	900	850

Slotting

Workpiece Materials	Depth of cut (mm)	VC m/min	刀径 (mm)	1	2	4	6	8	10	12
Stainless Steels	ap≤0.3D	35-55	(n) (r/min)	14330	7165	3580	2390	1790	1430	1195
	ae≤0.1D		(m/min)	350	300	400	400	400	400	400

NOTE

▲Prefer to use the high-rigidity and high accuracy machine.

▲Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.

▲Please adjust the parameters when chatter or abnormal vibration occurs.

ES SERIES

First Choice for Titanium, High-temperature Alloy and Stainless Steel Machining
⩽55HRC

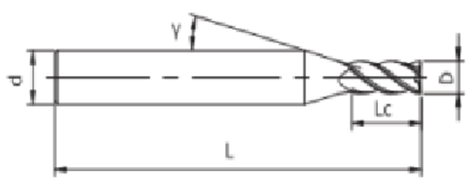
- Variable helix + unequal pitch design for excellent vibration damping in titanium alloy machining
- Extra-large chip space for excellent evacuation, combining high-speed and heavy-duty machining performance
- High-performance substrate with AlTiN-Z coating for improved heat and wear resistance.
- Suitable for titanium alloys, heat-resistant alloys, and stainless steel machining.

ESSI-4

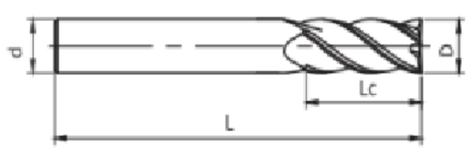
4 Flute Square Variable Helix End Mill

AlTiNZ | 4 | 34° 36° Spiral Angle | S | Shank Dia. tolerance H6 | <55 HRC

Type A



Type B



ΦD	D Tolerance
00.3-00.9	-0.002 -0.006
01-03.9	-0.002 -0.007
04	-0.005 -0.009
06	
08	-0.005 -0.01
010	-0.005 -0.012
012	
014-020	-0.01 -0.015

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	Lc	L	Φd		
ESSI-4010 04050	1	3	50	4	A	○
ESSI-4015 04050	1.5	4	50	4	A	○
ESSI-4020 04050	2	6	50	4	A	○
ESSI-4025 04050	2.5	6	50	4	A	○
ESSI-4030 04050	3	8	50	4	A	○
ESSI-4040 04050	4	10	50	4	B	●
ESSI-4050 06050	5	13	50	6	A	○
ESSI-4060 06050	6	15	50	6	B	●
ESSI-4080 08060	8	20	60	8	B	●
ESSI-4100 10075	10	25	75	10	B	●
ESSI-4120 12075	12	30	75	12	B	●
ESSI-4140 14100	14	35	100	14	B	○
ESSI-4160 16100	16	40	100	16	B	○
ESSI-4180 18100	18	40	100	18	B	○
ESSI-4200 20100	20	45	100	20	B	○

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	Tialloy Heat-resistant alloy	Cast iron	COPPER ALLOYS	Aluminium alloy
~38HRC	~45HRC	~50HRC	~35HRC				
○	○		◯	◯	○	◯	◯

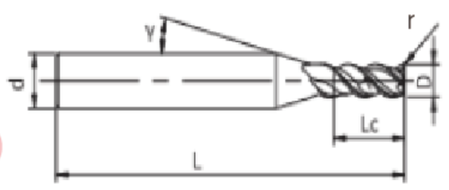
◯ Very suitable ○ Suitable

ESRI-4

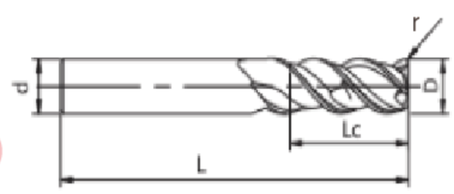
4 Flute Corner Radius Variable Helix End Mill

AlTiNZ | 4 | 34° 36° Spiral Angle | R | Shank Dia. tolerance H6 | <55 HRC

Type A



Type B



ΦD	D Tolerance
00.3-00.9	-0.002 -0.006
01-03.9	-0.002 -0.007
04	-0.005 -0.009
06	
08	-0.005 -0.01
010	-0.005 -0.012
012	
014-020	-0.01 -0.015

Order Code	Dia.	Radius	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	r	Lc	L	Φd		
ESRI-4030R0.5 04050	3	0.5	8	50	4	A	●
ESRI-4040R0.5 04050	4	0.5	10	50	4	B	●
ESRI-4050R0.5 06050	5	0.5	13	50	6	A	○
ESRI-4050R1 06050	5	1.0	13	50	6	B	○
ESRI-4060R0.5 06050	6	0.5	15	50	6	B	●
ESRI-4060R1 06050	6	1.0	16	50	6	B	○
ESRI-4080R0.5 08060	8	0.5	20	60	8	B	●
ESRI-4080R1 08060	8	1.0	20	60	8	B	●
ESRI-4100R0.5 10075	10	0.5	25	75	10	B	●
ESRI-4100R1 10075	10	1.0	25	75	10	B	●
ESRI-4100R2 10075	10	2	25	75	10	B	○
ESRI-4100R3 10075	10	3	25	75	10	B	○
ESRI-4120R1 12075	12	1	30	75	12	B	●
ESRI-4120R2 12075	12	2	30	75	12	B	●
ESRI-4120R3 12075	12	3	30	75	12	B	●
ESRI-4160R1 16100	16	1	40	100	16	B	○
ESRI-4160R2 16100	16	2	40	100	16	B	○
ESRI-4160R3 16100	16	3	40	100	16	B	○
ESRI-4160R4 16100	16	4	40	100	16	B	○
ESRI-4160R5 16100	16	5	40	100	16	B	○
ESRI-4200R1 20100	20	1	45	100	20	B	○
ESRI-4200R2 20100	20	2	45	100	20	B	○
ESRI-4200R3 20100	20	3	45	100	20	B	○
ESRI-4200R4 20100	20	4	45	100	20	B	○
ESRI-4200R5 20100	20	5	45	100	20	B	○

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	Tialloy Heat-resistant alloy	Cast iron	COPPER ALLOYS	Aluminium alloy
~38HRC	~45HRC	~50HRC	~35HRC				
○	○		◎	◎	○	◎	◎

◎ Very suitable ○ Suitable

ESSI-4 / ESRI-4 Cutting Parameter

Side Milling

Workpiece Materials	Titanium alloy		Stainless steel	
Depth of cut (mm)	ap≤1.5D		ap≤1.5D	
	ae≤0.25D		ae≤0.25D	
Mill Dia (mm)	(n) (r/min)	(Vf) (mm/r/min)	(n) (r/min)	(Vf) (mm/r/min)
2	9550	380	12750	760
3	6360	310	8490	575
4	4785	285	6380	510
5	3820	305	5095	510
6	3180	300	4245	510
8	2395	320	3185	510
10	1915	340	2545	510
12	1590	350	2020	485
16	1190	310	1590	445
20	960	305	1280	430

Slotting

Workpiece Materials	Titanium alloy		Stainless steel	
Depth of cut (mm)	ap≤1D		ap≤1D	
	ae≤1D		ae≤1D	
Mill Dia (mm)	(n) (r/min)	(Vf) (mm/r/min)	(n) (r/min)	(Vf) (mm/r/min)
2	6370	255	9550	390
3	4245	200	6375	310
4	3180	200	4775	290
5	2550	180	3830	310
6	2130	180	3180	320
8	1590	200	2395	340
10	1280	200	1910	350
12	1060	215	1600	360
16	800	195	1200	320
20	630	195	960	310

NOTE

▲Prefer to use the high-rigidity and high accuracy machine.

▲Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.

▲Please adjust the parameters when chatter or abnormal vibration occurs.

EN/EXN SERIES

First choice for Non ferrous alloy Machining
30-45HRC

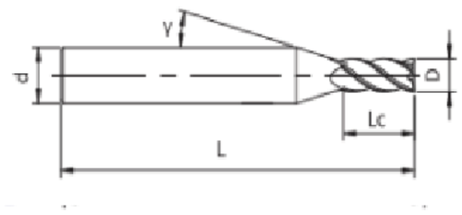
- DLC-coated for high hardness, low friction, and excellent wear resistance.
- Specially prepared edge + DLC coating for superior surface finish.
- Low core, high torque, large helix + DLC coating for excellent chip evacuation.
- Optimized for non-ferrous alloys cutting

EN/EXN-3

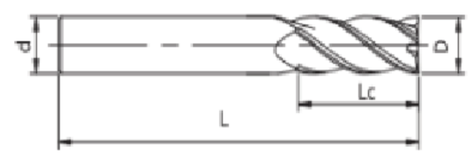
3 Flute Square End Mill

DLC | 3 | 45° Spiral Angle | 39° 40° 41° | S | Shank Dia. tolerance H6 | <30-45 HRC

Type A



Type B



ΦD	D Tolerance
00.3-00.9	-0.002 -0.006
01-03.9	-0.002 -0.007
04	-0.005 -0.009
06	
08	-0.005 -0.01
010	-0.005 -0.012
012	
014-020	-0.01 -0.015

Order Code	Dia.	Length of cut	Overall Length	Shank Dia.	Type	Stock
	ΦD	Lc	L	Φd		
ENSF-3030 04050	3	9	50	4	A	○
ENSF-3030 04100	3	12	100	4	A	●
ENSF-3040 04050	4	12	50	4	B	●
ENSF-3040 04100	4	16	100	4	B	●
ENSF-3050 06050	5	15	50	6	A	●
ENSF-3050 06100	5	20	100	6	A	●
ENSJ-3060 06050	6	18	50	6	B	●
ENSF-3060 06100	6	24	100	6	B	●
ENSJ-3080 08060	8	24	60	8	B	●
ENSJ-3080 08100	8	32	100	8	B	●
ENSJ-3100 10075	10	30	75	10	B	●
ENSJ-3100 10100	10	40	100	10	B	●
ENSJ-3120 12075	12	30	75	12	B	●
ENSJ-3120 12100	12	45	100	12	B	●
ENSJ-3160 16100	16	40	100	16	B	●
ENSF-3200 20100	20	45	100	20	B	●
EXNSF-3030 04050	3	9	50	4	A	○
EXNSF-3030 04100	3	12	100	4	A	○
EXNSF-3040 04050	4	12	50	4	B	○
EXNSF-3040 04100	4	16	100	4	B	○
EXNSF-3050 06050	5	15	50	6	A	○
EXNSF-3050 06100	5	20	100	6	A	○
EXNSJ-3060 06050	6	18	50	6	B	○
EXNSF-3060 06100	6	24	100	6	B	○
EXNSJ-3080 08060	8	20	60	8	B	○
EXNSJ-3080 08100	8	32	100	8	B	○
EXNSJ-3100 10075	10	30	75	10	B	○
EXNSJ-3100 10100	10	40	100	10	B	○
EXNSJ-3120 12075	12	30	75	12	B	○
EXNSJ-3120 12100	12	45	100	12	B	○
EXNSJ-3160 16100	16	40	100	16	B	○
EXNSF-3200 20100	20	45	100	20	B	○

TABLE OF RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS		STAINLESS STEELS	Tialloy Heat-resistant alloy	Cast iron	COPPER ALLOYS	Aluminium alloy
~38HRC	~45HRC	~50HRC	~35HRC				
						○	○

○ Very suitable ○ Suitable

EN/EXN-3 Cutting Parameter

Side Milling

Workpiece Materials	Forging and Casting Aluminum Alloys(Si<12%)		Copper Alloy	
Depth of cut (mm)	ap≤1D		ap≤1D	
	ae≤0.1D		ae≤0.1D	
Mill Dia (mm)	(n) (r/min)	(Vf) (mm/r/min)	(n) (r/min)	(Vf) (mm/r/min)
2	12700	900	13000	850
4	12000	1430	12000	1200
6	10600	1530	10600	1200
8	10000	1670	10000	1500
10	9500	2050	9500	1800
12	9280	2800	9280	2225

Slotting

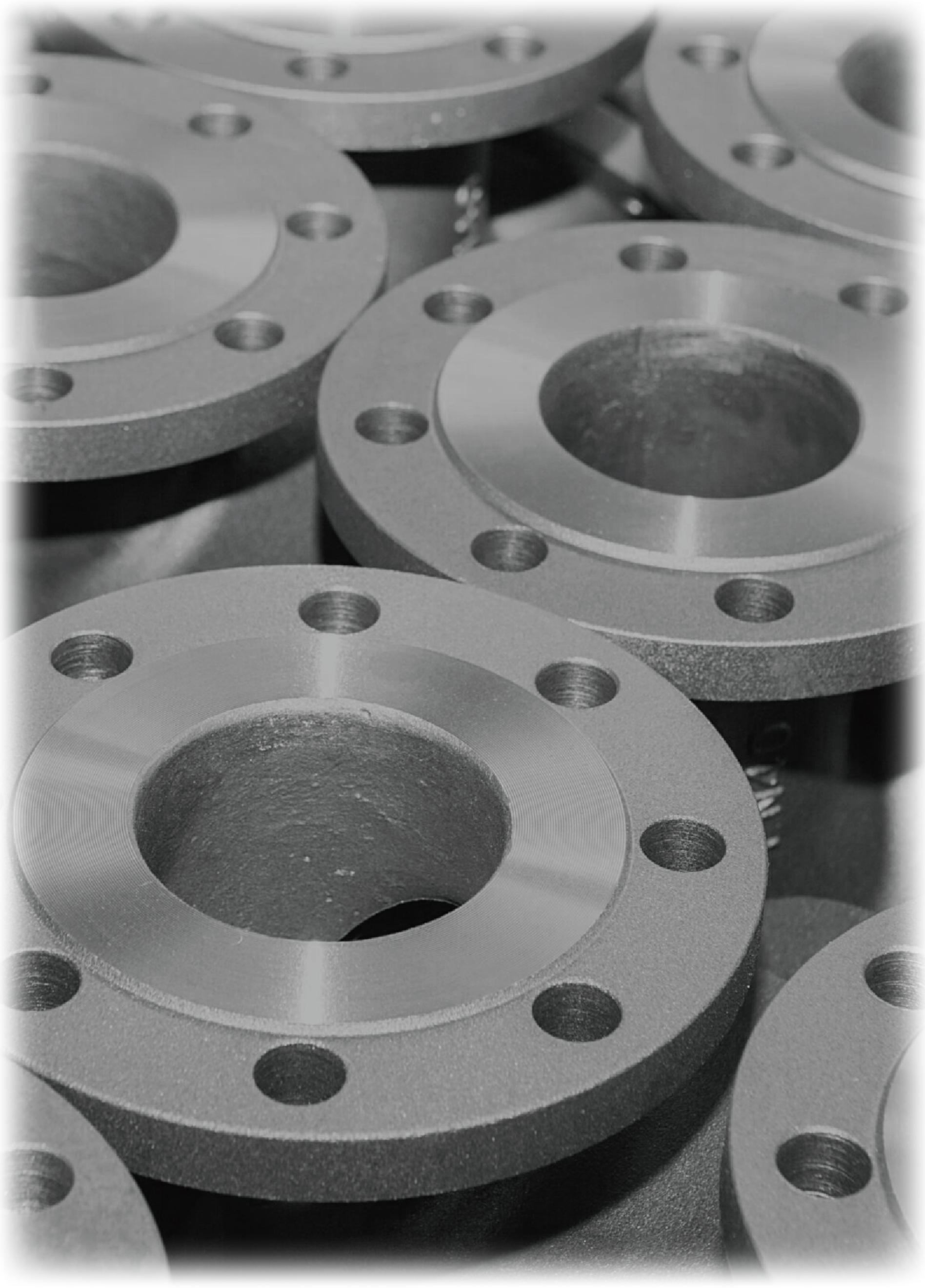
Workpiece Materials	Forging and Casting Aluminum Alloys(Si<12%)		Copper Alloy	
Depth of cut (mm)	ap≤0.5D		ap≤0.5D	
	ae≤1D		ae≤1D	
Mill Dia (mm)	(n) (r/min)	(Vf) (mm/r/min)	(n) (r/min)	(Vf) (mm/r/min)
2	10000	570	10000	520
4	9000	960	9000	860
6	8000	1050	8000	830
8	7800	1300	7800	960
10	8000	1500	8000	1240
12	6800	1620	6800	1500

NOTE

▲Prefer to use the high-rigidity and high accuracy machine.

▲Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.

▲Please adjust the parameters when chatter or abnormal vibration occurs.



EXR SERIES

Suitable for Dynamic Trochoidal Roughing and Slotting ⩽ 45HRC

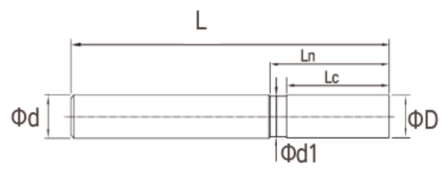
- Use of carbide rods specially designed for roughing increases mill's resistance in high efficiency machining.
- Unequal teeth space and variable spiral design reduce the cutting vibration, making the cutting process more smoother.
- Use of the U-shaped gash provides enough space for chip pocket, which in return increase the ability of chip removal during the side high efficiency roughing and grooving.
- Adopting 42~45 degree helix angle to reduce cutting resistance and make cutting more efficient.
- The AlCr/TiSi-based wear-resistant coating ensures the tool performance in general steel and stainless steel machining.

EXRSO-5

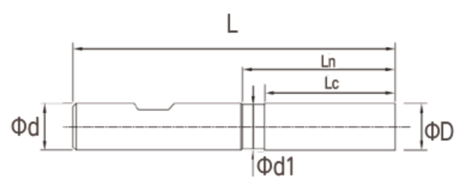
5 Flute Square Roughing End Mill (3.5D)

AlCrSiN | 5 | 42° Spiral Angle | Straight Back Angle | S | Shank Dia. tolerance H5 | < 45 HRC

Type A



Type B



ΦD	D Tolerance
1≤D≤6	0~-0.015
6＜D≤20	0~-0.02

(mm)

Order Code	Dia.	Length of cut	Neck length	Neck Dia.	Overall Length	Shank Dia.	Shank	Stock
	ΦD	Lc	Ln	Φd1	L	Φd		
EXRSO-5060-21 06060	6	18	21	5.6	60	6	Cylinder Shank	●
EXRSO-5080-28 08075	8	24	28	7.6	75	8	Cylinder Shank	●
EXRSO-5100-35 10075	10	30	35	9.5	75	10	Cylinder Shank	●
EXRSO-5120-42 12089-W	12	36	42	11.5	89	12	Weldon Shank	●
EXRSO-5160-56 16106-W	16	48	56	15.5	106	16	Weldon Shank	●
EXRSO-5200-70 20122-W	20	60	70	19.5	122	20	Weldon Shank	●

RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS			STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~30HRC	~45HRC	~55HRC	~35HRC		
○	○			○	○

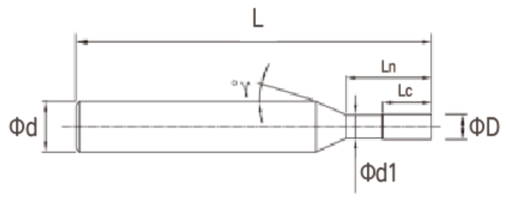
○ Very suitable ○ Suitable

EXRSO-4

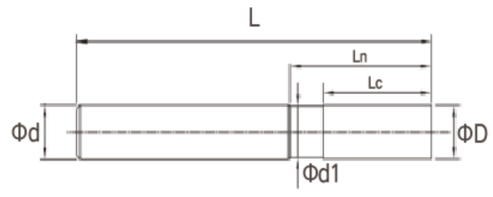
4 Flute Square Roughing End Mill (3D)

AlCrSiN | 4 | 42° Spiral Angle | Straight Back Angle | S | Shank Dia. tolerance H5 | < 45 HRC

Type A



Type B



ΦD	D Tolerance
1≤D≤6	0~-0.015
6＜D≤20	0~-0.02

(mm)

Order Code	Dia.	Length of cut	Neck length	Neck Dia.	Overall Length	Shank Dia.	Shank	Stock
	ΦD	Lc	Ln	Φd1	L	Φd		
EXRSO-4010-3 06050	1	2.3	3	0.95	50	6	Cylinder Shank	●
EXRSO-4020-6 06050	2	4.6	6	1.9	50	6	Cylinder Shank	●
EXRSO-4030-9 06050	3	6.9	9	2.9	50	6	Cylinder Shank	●
EXRSO-4040-12 06050	4	9.2	12	3.8	50	6	Cylinder Shank	●
EXRSO-4050-15 06060	5	11.5	15	4.7	60	6	Cylinder Shank	●
EXRSO-4060-18 06060	6	13.8	18	5.6	60	6	Cylinder Shank	●
EXRSO-4080-24 08060	8	18.4	24	7.6	60	8	Cylinder Shank	●
EXRSO-4100-30 10075	10	23.0	30	9.5	75	10	Cylinder Shank	●
EXRSO-4120-36 12075	12	27.6	36	11.5	75	12	Cylinder Shank	●
EXRSO-4120-36 12100	12	27.6	36	11.5	100	12	Cylinder Shank	●
EXRSO-4160-48 16100	16	36.8	48	15.5	100	16	Cylinder Shank	●
EXRSO-4200-60 20120	20	46.0	60	19.5	120	20	Cylinder Shank	●

RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS			STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~30HRC	~45HRC	~55HRC	~35HRC		
○	○			○	○

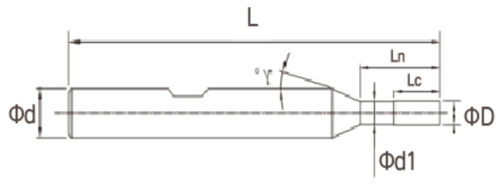
○ Very suitable ○ Suitable

EXRSO-4

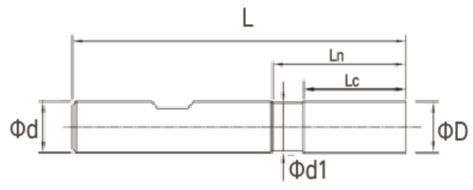
4 Flute Square Roughing End Mill with Weldon Shank (3D)

AlCrSiN | 4 | 42° Spiral Angle | Straight Back Angle | S | Shank Dia. tolerance H5 | < 45 HRC

Type A



Type B



ΦD	D Tolerance
1≤D≤6	0~-0.015
6＜D≤20	0~-0.02

(mm)

Order Code	Dia.	Length of cut	Neck length	Neck Dia.	Overall Length	Shank Dia.	Shank	Stock
	ΦD	Lc	Ln	Φd1	L	Φd		
EXRSO-4010-3 06056-W	1	2.3	3	0.95	56	6	Weldon Shank	●
EXRSO-4020-6 06056-W	2	4.6	6	1.9	56	6	Weldon Shank	●
EXRSO-4030-9 06056-W	3	6.9	9	2.9	56	6	Weldon Shank	●
EXRSO-4040-12 06056-W	4	9.2	12	3.8	56	6	Weldon Shank	●
EXRSO-4050-15 06056-W	5	11.5	15	4.7	56	6	Weldon Shank	●
EXRSO-4060-18 06056-W	6	13.8	18	5.6	56	6	Weldon Shank	●
EXRSO-4080-24 08062-W	8	18.4	24	7.6	62	8	Weldon Shank	●
EXRSO-4100-30 10072-W	10	23.0	30	9.5	72	10	Weldon Shank	●
EXRSO-4120-36 12083-W	12	27.6	36	11.5	83	12	Weldon Shank	●
EXRSO-4160-48 16098-W	16	36.8	48	15.5	98	16	Weldon Shank	●
EXRSO-4200-60 20112-W	20	46.0	60	19.5	112	20	Weldon Shank	●

RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS			STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~30HRC	~45HRC	~55HRC	~35HRC		
○	○			○	○

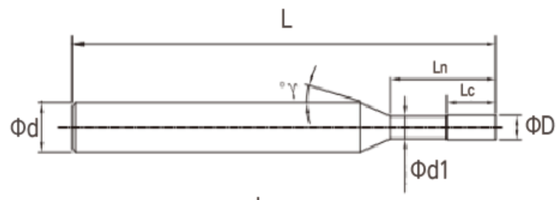
○ Very suitable ○ Suitable

EXRSO-4

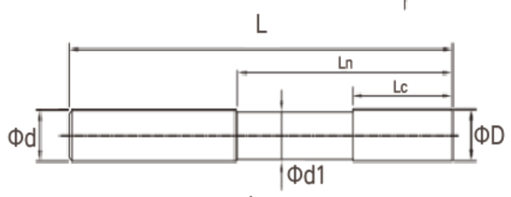
4 Flute Square Roughing End Mill (5D)

AlCrSiN | 4 | 42° Spiral Angle | Straight Back Angle | S | Shank Dia. tolerance H5 | < 45 HRC

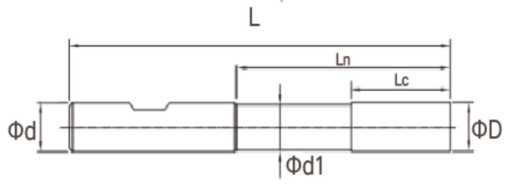
Type A



Type B



Type C



ΦD	D Tolerance
1≦D≦6	0~-0.015
6＜D≦20	0~-0.02

(mm)

Order Code	Dia.	Length of cut	Neck length	Neck Dia.	Overall Length	Shank Dia.	Shank	Stock
	ΦD	Lc	Ln	Φd1	L	Φd		
EXRSO-4010-5 06050	1	1.8	5	0.95	50	6	Cylinder Shank	●
EXRSO-4020-10 06050	2	3.6	10	1.9	50	6	Cylinder Shank	●
EXRSO-4030-15 06060	3	5.4	15	2.9	60	6	Cylinder Shank	●
EXRSO-4040-20 06060	4	7.2	20	3.8	60	6	Cylinder Shank	●
EXRSO-4050-25 06075	5	9.0	25	4.7	75	6	Cylinder Shank	●
EXRSO-4060-30 06075	6	10.8	30	5.6	75	6	Cylinder Shank	●
EXRSO-4080-40 08100	8	14.4	40	7.6	100	8	Cylinder Shank	●
EXRSO-4100-50 10100	10	18.0	50	9.5	100	10	Cylinder Shank	●
EXRSO-4120-60 12107-W	12	21.6	60	11.5	107	12	Weldon Shank	●
EXRSO-4160-80 16130-W	16	28.8	80	15.5	130	16	Weldon Shank	●
EXRSO-4200-100 20152-W	20	36.0	100	19.5	152	20	Weldon Shank	●

RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS			STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~30HRC	~45HRC	~55HRC	~35HRC		
○	○			○	○

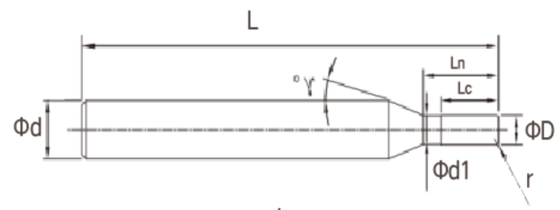
○ Very suitable ○ Suitable

EXRRO-4

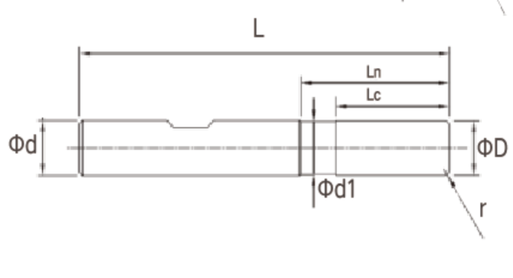
4 Flute Corner Radius Roughing End Mill (3D)

AlCrSiN | 4 | 42° Spiral Angle | Straight Back Angle | S | Shank Dia. tolerance H5 | < 45 HRC

Type A



Type B



ΦD	D Tolerance
1≤D≤6	0~-0.015
6 < D≤20	0~-0.02

(mm)

Order Code	Dia.	Radius	Length of cut	Neck length	Neck Dia.	Overall Length	Shank Dia.	Shank	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd		
EXRRO-4010R0.2-3 06050	1	0.2	2.3	3	0.95	50	6	Cylinder Shank	●
EXRRO-4020R0.2-6 06050	2	0.2	4.6	6	1.9	50	6	Cylinder Shank	●
EXRRO-4030R0.2-9 06050	3	0.2	6.9	9	2.9	50	6	Cylinder Shank	●
EXRRO-4040R0.2-12 06050	4	0.2	9.2	12	3.8	50	6	Cylinder Shank	●
EXRRO-4040R0.5-12 06050	4	0.5	9.2	12	3.8	50	6	Cylinder Shank	●
EXRRO-4050R0.5-15 06056-W	5	0.5	11.5	15	4.7	56	6	Weldon Shank	●
EXRRO-4060R0.5-18 06056-W	6	0.5	13.8	18	5.6	56	6	Weldon Shank	●
EXRRO-4060R1-18 06056-W	6	1.0	13.8	18	5.6	56	6	Weldon Shank	●
EXRRO-4080R0.5-24 08062-W	8	0.5	18.4	24	7.6	62	8	Weldon Shank	●
EXRRO-4080R1-24 08062-W	8	1.0	18.4	24	7.6	62	8	Weldon Shank	●
EXRRO-4080R2-24 08062-W	8	2.0	18.4	24	7.6	62	8	Weldon Shank	●
EXRRO-4100R0.5-30 10072-W	10	0.5	23	30	9.5	72	10	Weldon Shank	●
EXRRO-4100R1-30 10072-W	10	1.0	23	30	9.5	72	10	Weldon Shank	●
EXRRO-4100R2-30 10072-W	10	2.0	23	30	9.5	72	10	Weldon Shank	●
EXRRO-4120R0.5-36 12083-W	12	0.5	27.6	36	11.5	83	12	Weldon Shank	●
EXRRO-4120R1-36 12083-W	12	1.0	27.6	36	11.5	83	12	Weldon Shank	●
EXRRO-4120R2-36 12083-W	12	2.0	27.6	36	11.5	83	12	Weldon Shank	●
EXRRO-4160R1-48 16098-W	16	1.0	36.8	48	15.5	98	16	Weldon Shank	●
EXRRO-4200R1-60 20112-W	20	1.0	46	60	19.5	112	20	Weldon Shank	●

RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS			STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~30HRC	~45HRC	~55HRC	~35HRC		
○	○			○	○

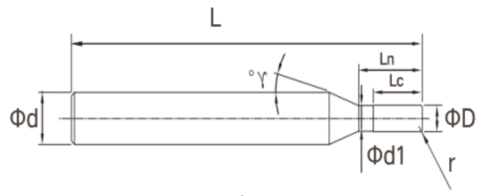
○ Very suitable ○ Suitable

EXRRO-4

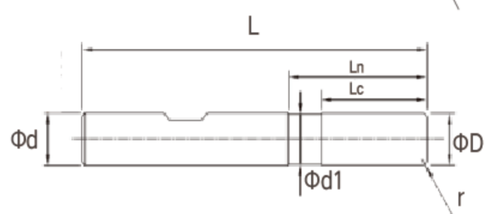
4 Flute Corner Radius Roughing End Mill (5D)

AlCrSiN | 4 | 42° Spiral Angle | Straight Back Angle | S | Shank Dia. tolerance H5 | <45 HRC

Type A



Type B



ΦD	D Tolerance
1≤D≤6	0~-0.015
6 < D≤20	0~-0.02

(mm)

Order Code	Dia.	Radius	Length of cut	Neck length	Neck Dia.	Overall Length	Shank Dia.	Shank	Stock
	ΦD	r	Lc	Ln	Φd1	L	Φd		
EXRRO-4010R0.2-5 06050	1	0.2	1.8	5	0.95	50	6	Cylinder Shank	●
EXRRO-4020R0.2-10 06050	2	0.2	3.6	10	1.9	50	6	Cylinder Shank	●
EXRRO-4030R0.2-15 06060	3	0.2	5.4	15	2.9	60	6	Cylinder Shank	●
EXRRO-4040R0.2-20 06060	4	0.2	7.2	20	3.8	60	6	Cylinder Shank	●
EXRRO-4040R0.5-20 06060	4	0.5	7.2	20	3.8	60	6	Cylinder Shank	●
EXRRO-4050R0.5-25 06075	5	0.5	9	25	4.7	75	6	Cylinder Shank	●
EXRRO-4060R0.5-30 06075	6	0.5	10.8	30	5.6	75	6	Cylinder Shank	●
EXRRO-4060R1-30 06075	6	1.0	10.8	30	5.6	75	6	Cylinder Shank	●
EXRRO-4080R0.5-40 08100	8	0.5	14.4	40	7.6	100	8	Cylinder Shank	●
EXRRO-4080R1-40 08100	8	1.0	14.4	40	7.6	100	8	Cylinder Shank	●
EXRRO-4100R0.5-50 10100	10	0.5	18	50	9.5	100	10	Cylinder Shank	●
EXRRO-4100R1-50 10100	10	1.0	18	50	9.5	100	10	Cylinder Shank	●
EXRRO-4100R2-50 10100	10	2.0	18	50	9.5	100	10	Cylinder Shank	●
EXRRO-4120R0.5-60 12107-W	12	0.5	21.6	60	11.5	107	12	Weldon Shank	●
EXRRO-4120R1-60 12107-W	12	1.0	21.6	60	11.5	107	12	Weldon Shank	●
EXRRO-4120R2-60 12107-W	12	2.0	21.6	60	11.5	107	12	Weldon Shank	●
EXRRO-4160R1-80 16130-W	16	1.0	28.8	80	15.5	130	16	Weldon Shank	●
EXRRO-4200R1-100 20152-W	20	1.0	36	100	19.5	152	20	Weldon Shank	●

RECOMMENDED MILLING MATERIALS

CARBON STEELS ALLOY STEELS TOOL STEELS PREHARDNEED STEELS	PREHARDNEED STEELS HARDENED STEELS			STAINLESS STEELS	CAST IRON DUCTILE CAST IRON
~30HRC	~45HRC	~55HRC	~35HRC		
○	○			○	○

○ Very suitable ○ Suitable

EXRSO-4 Cutting Parameter

Slotting

workpiece	Pre-Hardened Steels (~30HRC)				Hardened Steels (30~40HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXRSO-4010	36000	300	1	1	31800	200	1	1
EXRSO-4020	18000	400	2	2	15200	240	2	2
EXRSO-4030	12000	500	3	3	10600	320	3	3
EXRSO-4040	9000	600	4	4	7960	540	4	4
EXRSO-4050	7200	700	5	5	6360	600	5	5
EXRSO-4060	6000	800	6	6	5300	650	6	6
EXRSO-4080	4450	1000	8	8	3980	800	8	8
EXRSO-4100	3600	1200	10	10	3185	900	10	10
EXRSO-4120	3000	1200	12	12	2750	1000	12	12
EXRSO-4160	2250	1000	16	16	2050	800	16	16
EXRSO-4200	1800	800	20	20	1640	600	20	20

NOTE

▲For 5-flute tools of the same diameter, feed rates can be increased by 10~15% over the table values for machining.

▲Parameters for tools with corner radius (R) and without R can remain identical.

▲When the tool overhang is 5D, reduce spindle speed and feed rate by approximately 40% proportionally.

Side milling & Trochodial milling

workpiece	Pre-Hardened Steels (~30HRC)				Hardened Steels (30~40HRC)			
Type No.	Spindle Speed min	Feed mm/min	Ap mm	Ae mm	Spindle Speed min	Feed mm/min	Ap mm	Ae mm
EXRSO-4010	40000	300	2	0.2	36000	270	1	0.18
EXRSO-4020	20000	400	4	0.4	18000	360	2	0.36
EXRSO-4030	13500	600	6	0.6	12150	540	3	0.54
EXRSO-4040	10000	1000	8	0.8	9000	900	4	0.72
EXRSO-4050	8000	1500	10	1	7200	1350	5	0.9
EXRSO-4060	6500	2000	12	1.2	5850	1800	6	1.08
EXRSO-4080	5000	2000	16	1.6	4500	1800	8	1.44
EXRSO-4100	4000	2500	20	2	3600	2250	10	1.8
EXRSO-4120	3350	3000	24	2.4	3015	2700	12	2.16
EXRSO-4160	2500	2500	32	2	2250	2250	16	1.8
EXRSO-4200	2000	2000	40	2	1800	1800	20	1.8

NOTE

▲For 5-flute tools of the same diameter, feed rates can be increased by 5－20% over the table values for machining.

▲Parameters for tools with corner radius (R) and without R can remain identical.

▲When the tool overhang is 5D, reduce spindle speed and feed rate by approximately 40% proportionally.

Key Factors for Machining

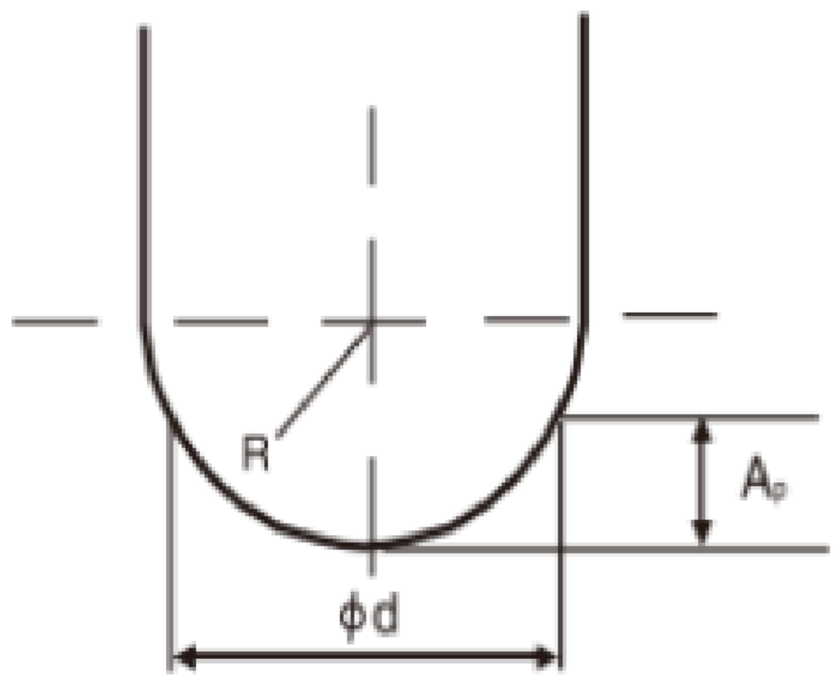
Rigidity of Machine	1.Use a rigid machine.
	2.Adjust cutting conditions according to the rigidity of machine.
Run out Adjustment	1.Use a rigid and precise collect chuck.
	2.Minimize the run out of end mill.
Work Clamp+choice	1.Work piece must be firmly clamped.
	2.In case work piece cannot be firmly clamped, change Ap and Ae.
Cutting Fluid and Chips	1.Give a sufficient cutting fluid.
	2.Recommend water-base cutting fluid for heavy cutting.
	3.Some end mills apply dry cutting only.
	4.Use air blow for dry cutting.
	5.Remove chips from working area.
Selection of End Mill	1.Select most suitable end mills according to work material and dimension.
	2.Refer to the index table on front page.
Cutting Conditions	1.Refer to recommended milling condition table.
	2.Adjust conditions according to the machine rigidity and clamping condition of work piece.
Overhang of End Mill	1.Overhang of end mill must be as short as possible from tool holder.
	2.In case overhang cannot be shorten, change Ap and Ae.

Troubleshooting for End Mill Machining

Chattering	Excessive spindle speed	Reduce spindle speed
	Excessive feed	Reduce feed
	Excessive long of effective length or overhang of end mill	Adjust effective length and overhang as short as possible
	Work piece is not firmly clamped	Clamp work piece firmly
	Wear of cutting edge progressed	Use new end mill or regrind
	Excessive chucking runout	Adjust chucking runout
Breaking of end mill	Excessive depth of cut	Reduce depth of cut
	Chips clogged	Adjust coolant nozzle to right direction to dispose chips
	Excessive feed per tooth	Reduce feed per tooth
	Wear of cutting edge progressed	Use new end mill or regrind
Shipping of cutting edge	Excessive depth of cut	Reduce depth of cut
	Excessive feed	Reduce feed
	Work piece is not firmly clamped	Clamp work piece firmly
	Excessive spindle speed	Reduce spindle speed
	Excessive long of effective length or overhang of end mill	Adjust effective length and overhang as short as possible
	Wear of cutting edge progressed	Use new end mill or regrind
	Built up edge	Choose appropriate coating
	Excessive cooling	Use air blow or oil mist
Abnormal wear	Excessive spindle speed	Reduce spindle speed
	Too low feed	Increasec feed
Clogging and Depositing	- Chips are not well disposed	Adjust coolant nozzle to right direction to dispose chips
	- Excessive feed	Reduce feed
	- Excessive depth of cut	Reduce depth of cut
	- Inappropriate number of flute	Select a cutting tool with fewer flutes
	- Wear of cutting edge progressed	Use new end mill or regrind
Deflection of end mill	- Excessive feed	Reduce feed
	- Excessive depth of cut	Reduce depth of cut
	- Excessive long of effective length or overhang of end mill	Adjust effective length and overhang as short as possible
	- Large helix angle of flutes	Use small helix angle
Burn on finished surface	- Wear of cutting edge progressed	- Use new end mill or regrind
	- Small helix angle of flutes	- Use larger helix angle
	- Excessive depth of cut	- Reduce depth of cut
Unsmooth Application Surface	- Wear of cutting edge progressed	- Use new end mill or regrind
	- Chip bite	- Use coolant to remove chips
	- Excessive feed	- Reduce feed
	- Excessive long of effective length or overhang of end mill	- Adjust effective length and overhang as short as possible
	- Top low spindle speed	- Increase spindle speed
	- Stock removals vary for finishing	- Improve semi-finishing process
	- Excessive chuncking runout	- Adjust chucking runout
Poor machining accuracy	- Inconsistent thermal extension of spindle	- Warm up spindle by idling before starting operation
	- Stock removals vary for finishing	- Improve semi-finishing process
	- Excessive feed	- Reduce feed
	- Excessive chuncking runout	- Adjust chucking runout

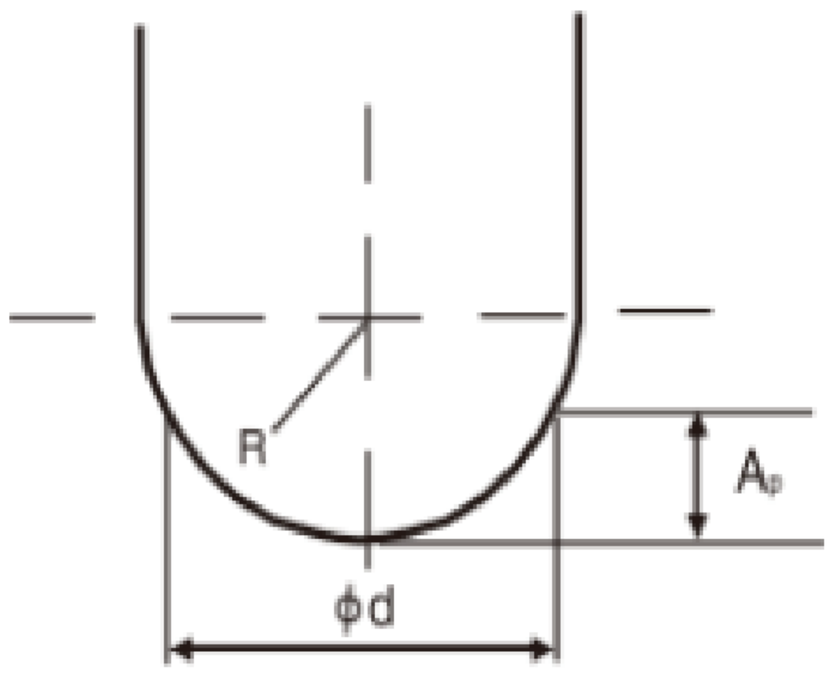
Ball Nose End Mill Actual Cutting Dia.

R \ A_p	0.01	0.02	0.03	0.04	0.05	0.1	0.15	0.2	0.25	0.3
R0.1	0.087	0.12	0.143	0.16	0.173	0.2	-	-	-	-
R0.15	0.109	0.15	0.18	0.204	0.224	0.283	0.3	-	-	-
R0.2	0.125	0.174	0.211	0.24	0.225	0.346	0.387	0.4	-	-
R0.25	0.14	0.196	0.237	0.271	0.3	0.4	0.458	0.49	0.5	-
R0.3	0.154	0.215	0.262	0.299	0.332	0.447	0.52	0.566	0.582	0.6
R0.4	0.178	0.25	0.304	0.349	0.387	0.523	0.624	0.693	0.742	0.77
R0.5	0.169	0.26	0.341	0.368	0.436	0.6	0.714	0.8	0.868	0.917
R0.6	0.218	0.307	0.375	0.431	0.46	0.663	0.794	0.894	0.975	1.039
R0.7	0.236	0.332	0.4	0.466	0.52	0.721	0.866	0.96	1.072	1.149
R0.75	0.24	0.34	0.42	0.48	0.54	0.74	0.9	1.02	1.12	1.2
R0.8	0.252	0.356	0.434	0.5	0.557	0.775	0.933	1.058	1.162	1.249
R0.9	0.268	0.377	0.461	0.531	0.592	0.825	0.995	1.131	1.245	1.342
R1	0.282	0.338	0.486	0.56	0.624	0.872	1.054	1.2	1.323	1.428
R1.5	0.346	0.488	0.597	0.688	0.768	1.077	1.308	1.497	1.658	1.8
R2	0.399	0.594	0.69	0.706	0.869	1.249	1.52	1.744	1.936	2.107
R2.5	0.447	0.631	0.772	0.981	0.965	1.4	1.705	1.99	2.179	2.375
R3	0.489	0.662	0.846	0.977	1.091	1.536	1.873	2.154	2.338	2.615
R4	0.565	0.769	0.978	1.129	1.261	1.778	2.175	2.468	2.784	3.04
R5	0.632	0.694	1.094	1.262	1.411	1.93	2.431	2.8	3.122	3.412
R6	0.693	0.979	1.198	1.383	1.546	2.182	2.666	3.072	3.428	3.747
R8	0.8	1.13	1.384	1.558	1.766	2.522	3.084	3.556	3.969	4.34
R10	0.894	1.264	1.584	1.788	1.968	2.822	3.452	3.96	4.444	4.862
R12.5	1	1.414	1.732	1.998	2.234	3.156	3.862	4.454	4.974	5.444
R15	1.096	1.548	1.896	2.19	2.448	3.458	4.232	4.882	5.454	5.97



Ball End Mill Actual Cutting Diameter: $\phi d=2\sqrt{A_p=(2R\ A_p)}$

0.4	0.5	0.6	0.7	0.8	0.9	1	1.5	2	2.5	3
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
0.8	–	–	–	–	–	–	–	–	–	–
0.98	1	–	–	–	–	–	–	–	–	–
1.131	1.183	1.2	–	–	–	–	–	–	–	–
1.265	1.342	1.386	1.4	–	–	–	–	–	–	–
1.326	1.414	1.47	1.496	–	–	–	–	–	–	–
1.386	1.493	1.549	1.597	1.6	–	–	–	–	–	–
1.497	1.612	1.697	1.755	1.789	1.8	–	–	–	–	–
1.6	1.732	1.833	1.908	1.96	1.9	2	–	–	–	–
2.04	2.236	2.4	2.538	2.663	2.75	2.828	3	–	–	–
2.4	2.646	2.857	3.04	3.2	3.341	3.464	3.873	4	–	–
2.713	3	3.25	3.47	3.666	3.842	4	4.583	4.889	5	–
2.993	3.317	3.6	3.852	4.079	4.265	4.472	5.196	5.657	5.916	6
3.467	3.873	4.214	4.521	4.6	5.056	5.292	6.245	6.828	7.416	7.746
3.919	4.359	4.75	5.103	5.426	5.724	6	7.141	8	8.66	9.165
4.308	4.798	5.231	5.625	5.967	6.321	6.633	7.937	8.944	9.747	10.392
4.996	5.568	6.08	6.546	6.974	7.372	7.746	9.382	10.584	11.618	12.49
5.6	6.244	6.824	7.352	7.838	8.232	8.718	10.536	12	13.228	14.282
6.274	7	7.652	8.248	8.6	9.314	9.799	11.946	13.564	15	16.248
6.882	7.682	8.4	9.058	9.686	10.236	10.77	13.076	14.966	16.584	18



Ball End Mill Actual Cutting Diameter: $\phi d=2\sqrt{A_p=(2R\ A_p)}$

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