KORLOY
TECH-NEWS

R+ Endmill

High Efficient Roughing Endmill

Endmill for medium to rough cutting

- **Higher Machining Efficiency**
  Cost-effective cutting edge design for rough machining
- **Lower Cutting Force**
  Specifically designed corners with irregular flute spacing and lead angle

KORLOY

Efficient Roughing Endmill for Medium to Rough applications

R+ Endmill

R+ Endmill For medium to rough cutting

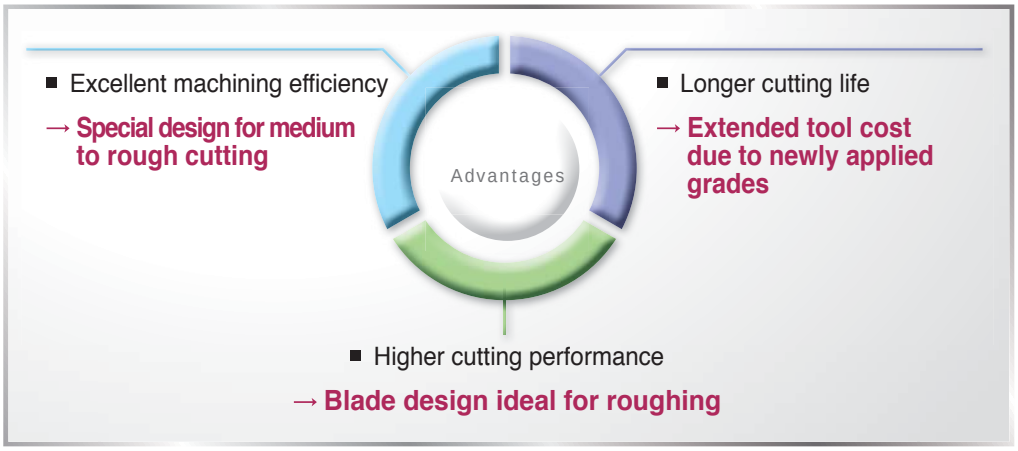
Optimizing a process with the correct tool selection will dramatically increase tool life, reduce tooling, tool changes and your overall costs.

The latest in KORLOY geometric pitch and flute science has been captured in this very unique high-tech design concept, and enhanced further using Korloy's Patented film coatings.

What this all equates to is simple.
Uncompromising rougher performance across a wider material band assortment!

The R+ Endmill, utilizes both differential pitch and unequal helix formation to intrinsically dampen harmonics and nearly alleviate all excessive vibration. This is the part you see, though what makes this R+ Endmill so superb is the micro-structure of the compiled KORLOY brand substrates, the purest advanced powder blend available, with compound range expansion strategially sintered with the toughening agent of HSS.

The R+ Endmill: Smart, Highly Developed, & Cost Efficient through our principal design philosophies. This latest edition in the Korloy SC Family will enhance productivity & deliver satisfaction.



Code System

RP(A)E	4	080	-	075	-	RG	(-H)

Roughing Plus (Aluminium) Endmill

Tooth

Drill dia.
080 : Ø8

Overall length
075 : 75mm

Flute information

<Cutting-edge>
F: Fine Pitch
M: Medium Pitch
R: Roughing Pitch
X: 2-tooth finishing, 2-tooth roughing

<Flute>
P: Irregular Flutes/Leads
F: Irregular Flutes
L: Irregular Leads
G: General

Helix angle
H: High Helix
L: Low Helix

Grade System

Carbide Roughing		HSS Roughing	
FN30T	Carbide, uncoated	HN30T	HSS PM, uncoated
PC10T	Carbide, TiCN coated	HN20T	HSS, uncoated
PC20T	Carbide, TiN coated	HC10T	HSS, TiCN coated
PC30T	Carbide, TiAlN coated	HC20T	HSS, TiN coated
PC40T	Carbide, TiAlCrN coated	HC30T	HSS PM, TiAlN coated

Features

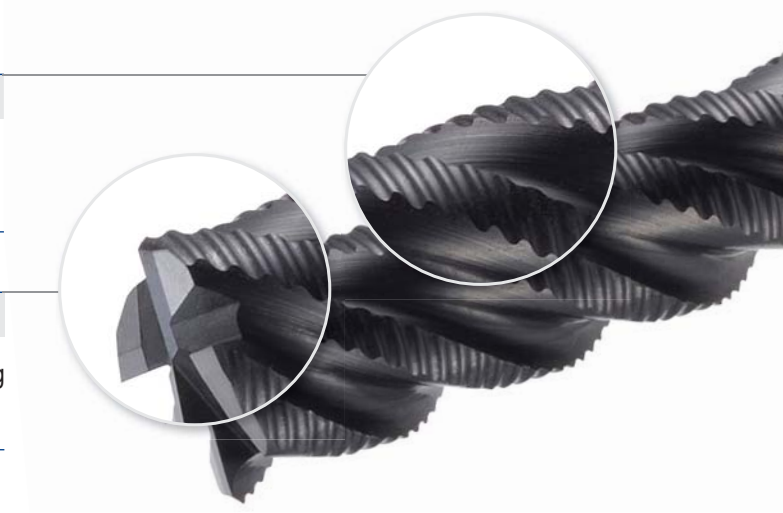
- Optimized blade design for the best performance
- Serrated edge form provides soft cutting for rough application
- The latest lubricative coating layers and high hardness grade(PC40T) applied
- The use of newly invented coating films and substrates enable stable machining even under the toughest cutting conditions

Soft cutting

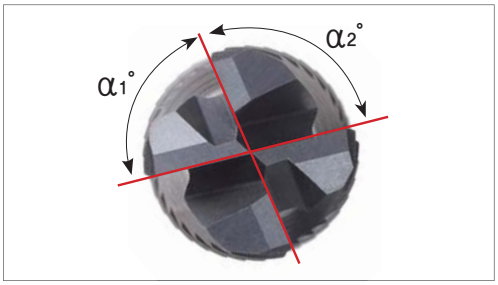
- Serrated cutting edges
- 3 Combo R

Lower cutting

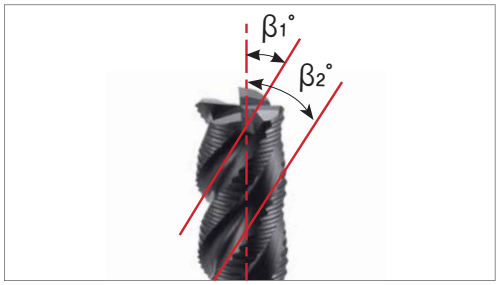
- Ideal for medium to rough cutting
- Special edge design



High quality results

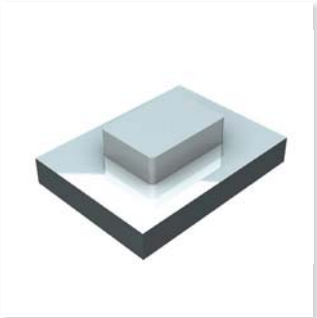


Irregular flute spacing to prevent chattering ($\alpha_1^\circ \neq \alpha_2^\circ$)



Irregular lead angles to disperse cutting force ($\beta_1^\circ \neq \beta_2^\circ$)

Application Examples



Mold

- Cutting conditions: vc(m/min) = 57, fz(mm/t) = 0.03, ap(mm) = 8, dry
- Tools: RPE4080-075-FF

R+ Endmill	7 hours long
Competitor	5.5 hours long

30% longer

More than 30% longer tool life compared to the competitor

Mold

- Cutting conditions: vc(m/min) = 2,700, fz(mm/t) = 0.06, ap(mm) = 8, dry
- Tools: RPE4080-063-FP-H

R+ Endmill	11 hours long
Competitor	8 hours long

40% longer

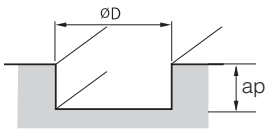
More than 40% longer tool life compared to the competitor

Recommended Cutting Conditions (RPAE)

∗For Carbide

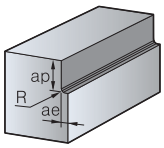
Workpiece	Aluminum, Non-ferrous metal		Aluminum, Non-ferrous metal	
Tool diameter(Ø)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)
6	13,000	1,125	13,000	1,400
8	10,400	1,300	10,400	1,600
10	10,400	1,585	10,400	2,000
12	10,400	1,950	10,400	1,650
14	7,800	1,675	7,800	2,050
16	7,800	1,755	7,800	2,250
18	5,200	1,300	5,200	1,700
20	5,200	1,495	5,200	1,800
25	5,000	1,495	5,000	1,800

■ **Slotting depth (ap)**



- ap : ≤0.2D
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

■ **Shouldering depth (ap)**



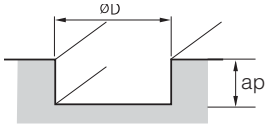
- ap : ≤1.5D
- ae : ≤0.15D
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

Recommended Cutting Conditions (RP(L)E-FP-H)

∗For Carbide

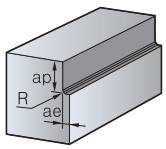
Workpiece	Alloy steel, Carbon steel		Alloy steel, Carbon steel, Pre-hardened steel		Alloy steel, Carbon steel		Alloy steel, Carbon steel, Pre-hardened steel	
Hardness	≤ HRC25		HRC25 ~ HRC40		≤ HRC25		HRC25 ~ HRC40	
Tool diameter(Ø)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)
6	12,000	1,550	10,600	1,100	15,800	2,570	14,300	1,850
8	9,000	1,650	8,100	1,180	11,900	2,700	10,700	1,950
10	7,200	1,650	6,400	1,180	9,500	2,700	8,500	1,950
12	6,000	1,540	5,400	1,140	8,000	2,570	7,100	1,850
14	5,200	1,540	4,750	1,095	7,000	2,510	6,250	1,800
16	4,500	1,540	4,100	1,050	6,000	2,450	5,400	1,750
18	4,400	1,435	3,650	975	5,400	2,295	4,850	1,625
20	3,600	1,330	3,200	900	4,800	2,140	4,300	1,500
25	3,200	1,200	2,800	850	4,400	2,000	3,800	1,400

■ **Slotting depth (ap)**



- ap : ≤1.0D (≤HRC25)
  ≤0.8D (HRC25~40)
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

■ **Shouldering depth (ap)**



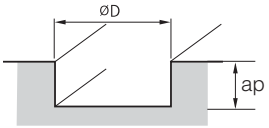
- ap : ≤1.0D
- ae : ≤0.5D (≤HRC25)
  ≤0.35D (HRC25~40)
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

Recommended Cutting Conditions (RPE-XG)

∗For Carbide

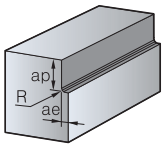
Workpiece	Alloy steel, Carbon steel		Alloy steel, Carbon steel, Pre-hardened steel		Alloy steel, Carbon steel		Alloy steel, Carbon steel, Pre-hardened steel	
Hardness	≤ HRC25		HRC25 ~ HRC40		≤ HRC25		HRC25 ~ HRC40	
Tool diameter(Ø)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)
6	12,000	1,090	10,600	770	15,800	1,800	14,300	1,300
8	9,000	1,160	8,100	830	11,900	1,890	10,700	1,370
10	7,200	1,160	6,400	830	9,500	1,890	8,500	1,370
12	6,000	1,080	5,400	800	8,000	1,800	7,100	1,300
14	5,200	1,080	4,750	770	7,000	1,760	6,250	1,260
16	4,500	1,080	4,100	740	6,000	1,720	5,400	1,230
18	4,400	1,000	3,650	680	5,400	1,610	4,850	1,140
20	3,600	930	3,200	630	4,800	1,500	4,300	1,050
25	3,200	840	2,800	600	4,400	1,400	3,800	980

■ **Slotting depth (ap)**



- ap : ≤1.0D (≤HRC25)
  ≤0.8D (HRC25~40)
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

■ **Shouldering depth (ap)**



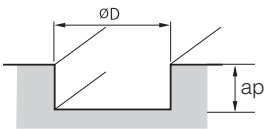
- ap : ≤1.0D
- ae : ≤0.5D (≤HRC25)
  ≤0.35D (HRC25~40)
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

Recommended Cutting Conditions (RPE-FP-L)

∗For Carbide

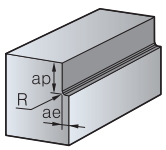
Workpiece	Alloy steel, Carbon steel		Pre-hardened steel		High hardened steel	
Hardness	≤ HRC35		HRC35 ~ HRC45		HRC45 ~ HRC55	
Tool diameter(Ø)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)
6	12,400	840	8,400	570	3,400	260
8	9,200	840	6,300	570	2,400	240
10	7,600	840	5,100	570	2,000	290
12	6,000	840	4,200	570	1,680	260
14	5,200	840	3,600	570	1,400	200
16	4,800	760	3,300	510	1,200	160
18	4,400	720	2,700	420	1,100	150
20	3,600	560	2,400	360	1,000	150
25	3,200	620	2,160	410	900	160

■ **Slotting depth (ap)**



- ap : ≤0.3D (≤HRC45)
  ≤0.05D (HRC45~55)
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

■ **Shouldering depth (ap)**



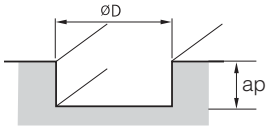
- ap : ≤1.0D
- ae : ≤0.3D (≤HRC45)
  ≤0.05D (HRC45~55)
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

Recommended Cutting Conditions (RPE-RG)

*For Carbide

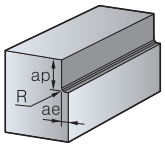
Workpiece	Alloy steel, Carbon steel		Alloy steel, Carbon steel, Pre-hardened steel		Alloy steel, Carbon steel		Alloy steel, Carbon steel, Pre-hardened steel	
Hardness	≤ HRC25		HRC25 ~ HRC40		≤ HRC25		HRC25 ~ HRC40	
Tool diameter(Ø)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)
6	12,000	1,240	10,600	880	15,800	2,060	14,300	1,480
8	9,000	1,320	8,100	940	11,900	2,160	10,700	1,560
10	7,200	1,320	6,400	940	9,500	2,160	8,500	1,560
12	6,000	1,230	5,400	910	8,000	2,060	7,100	1,480
14	5,200	1,230	4,750	880	7,000	2,010	6,250	1,440
16	4,500	1,230	4,100	840	6,000	1,960	5,400	1,400
18	4,400	1,150	3,650	780	5,400	1,840	4,850	1,300
20	3,600	1,060	3,200	720	4,800	1,710	4,300	1,200
25	3,200	960	2,800	680	4,400	1,600	3,800	1,120

■ **Slotting depth (ap)**



- ap : ≤1.0D (≤HRC25)
  ≤0.8D (HRC25~40)
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

■ **Shouldering depth (ap)**



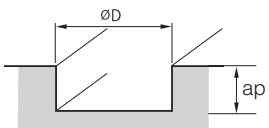
- ap : ≤1.0D
- ae : ≤0.5D (≤HRC25)
  ≤0.35D (HRC25~40)
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

Recommended Cutting Conditions (RPE-FF, FP, RG)

*For HSS PM

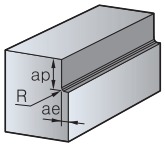
Workpiece	Alloy steel, Carbon steel, Tool steel		Structural steel, Carbon steel, Cast iron		Structural steel, Alloy steel, Tool steel		Pre-hardened steel , Alloy steel, Tool steel	
Hardness	–		≤ HRC20		HRC20 ~ HRC30		HRC30 ~ HRC40	
Tool diameter(Ø)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)
6	2,700	200	2,100	155	1,500	100	1,250	90
8	2,300	250	1,800	200	1,300	140	1,000	110
10	1,800	360	1,400	275	1,000	170	850	140
12	1,500	360	1,150	290	850	200	700	155
14	1,300	360	1,000	290	720	200	600	155
16	1,150	360	900	290	625	200	520	155
18	1,000	360	850	290	580	200	470	155
20	920	370	720	290	500	200	420	155
22	850	370	620	290	450	200	380	155
25	750	360	570	275	400	190	340	155

■ **Slotting depth (ap)**



- ap : ≤0.15D
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

■ **Shouldering depth (ap)**



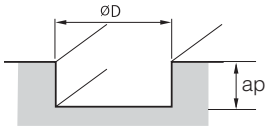
- ap : ≤1.5D (All dia.)
- ae : ≤0.5D (All dia.)
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

Recommended Cutting Conditions (RPE-RG)

∗For HSS Co

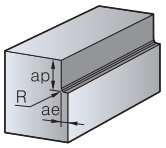
Workpiece	Alloy steel, Carbon steel, Tool steel							
Hardness	–		≤ HRC20		HRC20 ~ HRC30		HRC30 ~ HRC40	
Tool diameter(Ø)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)	RPM n(min^{-1})	Feed vf(mm/min)
6	1,800	80	1,600	60	1,200	55	800	30
8	1,400	105	1,100	75	900	65	560	45
10	1,100	150	900	120	800	110	450	60
12	900	180	800	140	630	110	400	70
14	800	180	700	140	560	110	350	70
16	700	180	560	140	450	110	280	70
18	630	180	500	140	400	110	250	70
20	560	180	450	140	400	110	220	70
22	500	220	450	170	350	140	220	70
25	450	220	400	170	310	140	180	85
28	400	210	350	160	280	130	160	85
30	350	210	310	160	250	130	160	85
32	350	210	280	160	220	130	140	85
36	310	210	250	160	200	130	120	85
40	280	200	220	150	180	120	110	80
50	220	200	180	170	160	140	90	80

■ **Slotting depth (ap)**



- ap : ≤0.15D
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

■ **Shouldering depth (ap)**

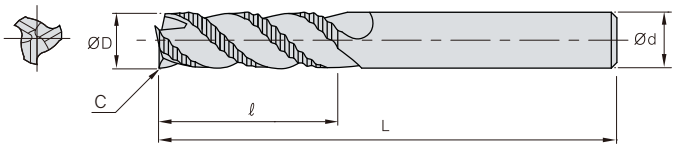


- ap : ≤1.5D
- ae : ≤0.1D
- Workpiece should be clamped rigidly. In case of vibrations, reduce R.P.M and feed rate by the same ratio.

RPAE (Roughing Endmill for Wave Form of Al)

- Carbide endmill

Shouldering | Slotting | Ramping | Helical Cutting



Hardness of workpiece			Workpiece				
~HRC45	~HRC55	~HRC65	Carbon steel Alloy steel Pre hardened steel	Stainless steel	Cast iron	Aluminum	Heat resistant alloy
						◎	

3 | Helix Angle 45° | Grade FN30T | h6 shank

ØD	Tolerance
Ø6~Ø25	0.0 ~ -0.05

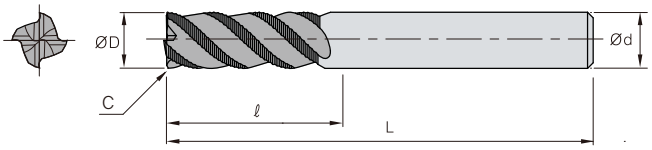
(mm)

Designation		ØD	Ød	ℓ	L	C
RPAE 3	3060-063	6.0	6	18	63	0.3
	3070-063	7.0	8	23	63	0.3
	3080-063	8.0	8	23	63	0.3
	3090-080	9.0	10	30	80	0.3
	3100-080	10.0	10	30	80	0.3
	3110-080	11.0	12	32	80	0.5
	3120-080	12.0	12	32	80	0.5
	3140-080	14.0	14	32	80	0.5
	3160-105	16.0	16	48	105	0.5
	3180-105	18.0	18	48	105	0.5
	3200-105	20.0	20	50	105	0.5
	3250-105	25.0	25	50	105	0.5

RPE-FP-H (Standard Roughing Endmill for Fine Pitches)

- High-helix carbide endmill with irregular flute spacing and lead

Shouldering | Slotting | Ramping | Helical Cutting



Hardness of workpiece			Workpiece				
~HRC45	~HRC55	~HRC65	Carbon steel Alloy steel Pre hardened steel	Stainless steel	Cast iron	Aluminum	Heat resistant alloy
◎	○		◎	○	◎		○

4 | Helix Angle 40°/42° | Grade PC30T | h6 shank

ØD	Tolerance
Ø5~Ø20	0.00 ~ -0.05

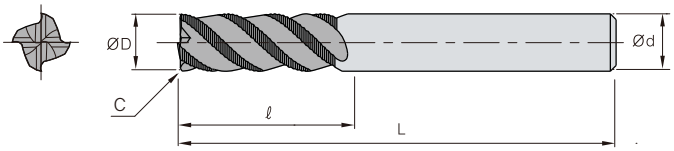
(mm)

Designation		ØD	Ød	ℓ	L	C
RPE 4	4050-057-FP-H	5.0	6	13	57	0.3
	4060-057-FP-H	6.0	6	13	57	0.5
	4080-063-FP-H	8.0	8	19	63	0.5
	4100-072-FP-H	10.0	10	22	72	0.5
	4120-082-FP-H	12.0	12	26	82	0.5
	4140-082-FP-H	14.0	16	26	82	0.6
	4160-092-FP-H	16.0	16	32	92	0.6
	4180-092-FP-H	18.0	20	32	92	0.6
	4200-0104-FP-H	20.0	20	38	104	0.6

RPLE-FP-H (Long Type Roughing Endmill for Fine Pitches)

- High-helix carbide endmill with irregular flute spacing and lead

Shouldering | Slotting | Ramping | Helical Cutting



4 | Helix Angle 40˚/42˚ | Grade PC30T | h6 shank

ØD	Tolerance
Ø5~Ø20	0.00 ~ -0.05

Hardness of workpiece			Workpiece				
~HRC45	~HRC55	~HRC65	Carbon steel Alloy steel Pre hardened steel	Stainless steel	Cast iron	Aluminum	Heat resistant alloy
◎	○		◎	○	◎		○

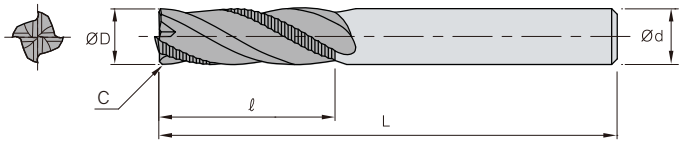
(mm)

Designation		ØD	Ød	ℓ	L	C
RPLE 4	4050-063-FP-H	5.0	6	19	63	0.3
	4060-063-FP-H	6.0	6	19	63	0.5
	4080-072-FP-H	8.0	8	28	72	0.5
	4100-082-FP-H	10.0	10	34	82	0.5
	4120-097-FP-H	12.0	12	40	97	0.5
	4140-097-FP-H	14.0	16	40	97	0.6
	4160-108-FP-H	16.0	16	48	108	0.6
	4180-108-FP-H	18.0	20	48	108	0.6
	4200-122-FP-H	20.0	20	56	122	0.6

RPE-XG (Roughing Endmill with Finishing Capability)

- Carbide endmill

Shouldering | Slotting | Ramping | Helical Cutting



4 | Helix Angle 30° | Grade PC30T | h6 shank

ØD	Tolerance
Ø6~Ø20	0.0 ~ -0.05

Hardness of workpiece			Workpiece				
~HRC45	~HRC55	~HRC65	Carbon steel Alloy steel Pre hardened steel	Stainless steel	Cast iron	Aluminum	Heat resistant alloy
◎	○		◎	○	◎		○

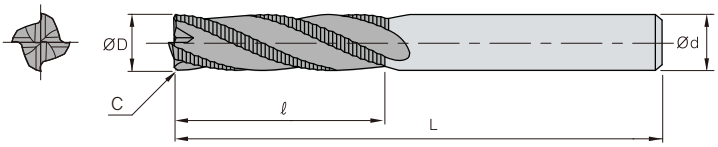
(mm)

Designation		ØD	Ød	ℓ	L	C
RPE 4	4060-052-XG	6.0	6	14	52	0.25
	4070-063-XG	7.0	8	18	63	0.3
	4080-063-XG	8.0	8	18	63	0.3
	4090-080-XG	9.0	10	22	80	0.3
	4100-080-XG	10.0	10	22	80	0.3
	4110-080-XG	11.0	12	26	80	0.4
	4120-080-XG	12.0	12	26	80	0.4
	4140-080-XG	14.0	14	30	80	0.4
	4160-105-XG	16.0	16	34	105	0.6
	4180-105-XG	18.0	18	38	105	0.6
	4200-105-XG	20.0	20	42	105	0.6

RPE-FP-L (Roughing Endmill for Fine Pitches)

- High-helix carbide endmill with irregular flute spacing and lead

Shouldering | Slotting | Ramping | Helical Cutting



4 | Helix Angle 18˚/23˚ | Grade PC30T | h6 shank

ØD	Tolerance
Ø5~Ø20	0.00 ~ -0.05

Hardness of workpiece			Workpiece				
~HRC45	~HRC55	~HRC65	Carbon steel Alloy steel Pre hardened steel	Stainless steel	Cast iron	Aluminum	Heat resistant alloy
◎	○		◎	○	◎		○

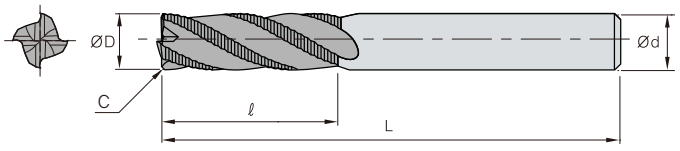
(mm)

Designation		ØD	Ød	ℓ	L	C
RPE 4	4050-060-FP-L	5.0	6	13	60	0.3
	4060-080-FP-L	6.0	6	13	80	0.5
	4080-080-FP-L	8.0	8	19	80	0.5
	4100-080-FP-L	10.0	10	22	80	0.5
	4120-080-FP-L	12.0	12	26	80	0.5
	4140-085-FP-L	14.0	16	26	85	0.6
	4160-100-FP-L	16.0	16	32	100	0.6
	4180-100-FP-L	18.0	20	32	100	0.6
	4200-105-FP-L	20.0	20	38	105	0.6

RPE-RG (Standard Roughing Endmill)

- Carbide endmill

Shouldering | Slotting | Ramping | Helical Cutting



4 | Helix Angle 30° | Grade PC40T | h6 shank

ØD	Tolerance
Ø5~Ø20	0.00 ~ -0.05

Hardness of workpiece			Workpiece				
~HRC45	~HRC55	~HRC65	Carbon steel Alloy steel Pre hardened steel	Stainless steel	Cast iron	Aluminum	Heat resistant alloy
◎	○		◎	○	◎		○

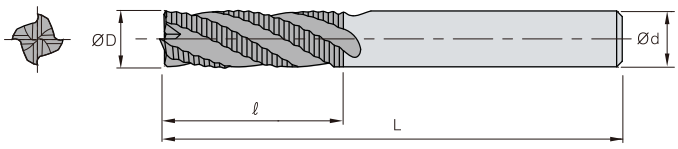
(mm)

Designation		ØD	Ød	ℓ	L	C
RPE 4	4050-050-RG	5.0	6	13	50	0.3
	4060-050-RG	6.0	6	16	50	0.3
	4080-060-RG	8.0	8	20	60	0.3
	4100-075-RG	10.0	10	25	75	0.3
	4120-080-RG	12.0	12	30	80	0.4
	4140-100-RG	14.0	16	35	100	0.6
	4160-100-RG	16.0	16	40	100	0.6
	4180-110-RG	18.0	20	40	110	0.6
	4200-110-RG	20.0	20	45	110	0.6

RPE-RG (4F Roughing Endmill)

- HSS PM endmill

Shouldering | Slotting | Ramping | Helical Cutting



4 | Helix Angle 30° | HSS PM | Grade HN30T HC30T | h6 shank

ØD	Tolerance
Ø6~Ø20	±0.1

Hardness of workpiece			Workpiece				
~HRC45	~HRC55	~HRC65	Carbon steel Alloy steel Pre hardened steel	Stainless steel	Cast iron	Aluminum	Heat resistant alloy
◎	○		◎	○	◎		○

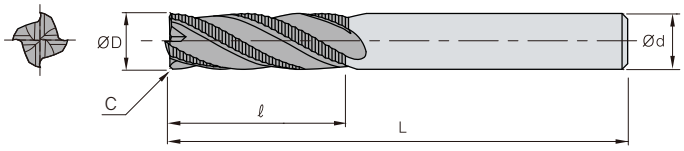
(mm)

Designation		ØD	Ød	ℓ	L
RPE 4	4060-060-RG	6.0	6	20	60
	4070-070-RG	7.0	10	20	70
	4080-075-RG	8.0	10	25	75
	4090-075-RG	9.0	10	30	75
	4100-085-RG	10.0	10	35	85
	4120-100-RG	12.0	12	40	100
	4140-100-RG	14.0	16	40	100
	4160-110-RG	16.0	16	50	110
	4180-110-RG	18.0	20	50	110
	4200-125-RG	20.0	20	60	125

RPE-FF (Roughing Endmill for Fine Pitches)

- HSS PM endmill with irregular flute spacing

Shouldering | Slotting | Ramping | Helical Cutting



4 | Helix Angle 25°/30° | HSS PM | Grade HC30T | h6 shank

ØD	Tolerance
Ø6~Ø20	±0.1

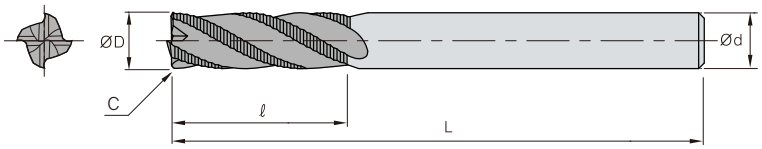
Hardness of workpiece			Workpiece				
~HRC45	~HRC55	~HRC65	Carbon steel Alloy steel Pre hardened steel	Stainless steel	Cast iron	Aluminum	Heat resistant alloy
◎	○		◎	○	◎		○

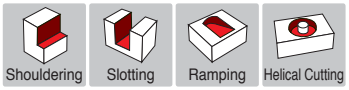
(mm)

Designation		ØD	Ød	ℓ	L	C
RPE 4	4060-060-FF	6.0	6	20	60	0.5
	4070-070-FF	7.0	10	20	70	0.5
	4080-075-FF	8.0	10	25	75	0.5
	4090-075-FF	9.0	10	30	75	0.5
	4100-085-FF	10.0	10	35	85	0.5
	4120-100-FF	12.0	12	40	100	0.6
	4140-100-FF	14.0	12	40	100	0.6
	4160-110-FF	16.0	16	50	110	0.6
	4180-110-FF	18.0	16	50	110	0.6
	4200-125-FF	20.0	20	60	125	0.6

RPE-FP (Roughing Endmill for Fine Pitches)

- HSS PM endmill with irregular flute spacing and lead





4 | Helix Angle 25˚/30˚ | HSS PM | Grade HC30T | h6 shank

ØD	Tolerance
Ø6~Ø12.0	0.0 ~ -0.05
Ø12.1~Ø20.0	0.0 ~ -0.1

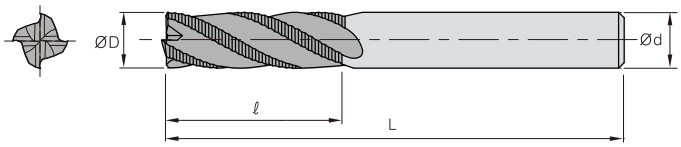
Hardness of workpiece			Workpiece				
~HRC45	~HRC55	~HRC65	Carbon steel Alloy steel Pre hardened steel	Stainless steel	Cast iron	Aluminum	Heat resistant alloy
◎	○		◎	○	◎		○

(mm)

Designation		ØD	Ød	ℓ	L	C
RPE 4	4060-080-FP	6.0	6	13	80	0.5
	4070-080-FP	7.0	10	16	80	0.5
	4080-085-FP	8.0	10	19	85	0.5
	4090-095-FP	9.0	10	19	95	0.5
	4100-100-FP	10.0	10	22	100	0.5
	4120-110-FP	12.0	12	26	110	0.6
	4140-110-FP	14.0	12	26	110	0.6
	4160-125-FP	16.0	16	32	125	0.6
	4180-125-FP	18.0	16	32	125	0.6
	4200-140-FP	20.0	20	38	140	0.6

RPE-RG (Roughing Endmill)

- HSS endmill



Shouldering | Slotting | Ramping | Helical Cutting

4	Helix Angle 30°	HSS Co 8%	Grade HN20T HC20T HC10T	h6 shank

ØD	Tolerance
Ø6~Ø50	±0.1

Hardness of workpiece			Workpiece				
~HRC45	~HRC55	~HRC65	Carbon steel Alloy steel Pre hardened steel	Stainless steel	Cast iron	Aluminum	Heat resistant alloy
◎	○		◎	○	◎		○

(mm)

Designation		ØD	Ød	ℓ	L
RPE 4	4060-060-RG	6.0	6	15	60
	4070-065-RG	7.0	8	20	65
	4080-065-RG	8.0	8	20	65
	4090-075-RG	9.0	10	25	75
	4100-075-RG	10.0	10	25	75
	4110-080-RG	11.0	12	30	80
	4120-080-RG	12.0	12	30	80
	4130-090-RG	13.0	12	35	90
	4140-090-RG	14.0	12	35	90
	4150-095-RG	15.0	12	40	95
	4160-095-RG	16.0	16	40	95
	4170-095-RG	17.0	16	40	95
	4180-105-RG	18.0	16	40	105
	4190-110-RG	19.0	16	45	110
	4200-110-RG	20.0	20	45	110
	4210-110-RG	21.0	20	45	110
	4220-110-RG	22.0	20	45	110
	4230-110-RG	23.0	20	45	110
	4240-120-RG	24.0	25	50	120
	4250-120-RG	25.0	25	50	120
	4260-120-RG	26.0	25	50	120
	4270-125-RG	27.0	25	55	125
	4280-125-RG	28.0	25	55	125
	4300-125-RG	30.0	25	55	125
	4320-145-RG	32.0	32	60	145
	4340-145-RG	34.0	32	60	145
	4350-145-RG	35.0	32	60	145
	4360-145-RG	36.0	32	60	145
	4380-150-RG	38.0	32	65	150
	4400-150-RG	40.0	32	65	150
	4420-155-RG	42.0	42	65	155
	4440-155-RG	44.0	42	65	155
	4450-160-RG	45.0	42	70	160
	4460-160-RG	46.0	42	70	160
	4500-160-RG	50.0	42	70	160

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