



### 2 Flutes 45° Helix Rib Ball End Mills for Copper

Endmills for copper, copper alloy, nonferrous and non-metallic materials.

- Improve wear resistance as well as avoid edge stress in various applications.
- High speed, feed applicable by 45° degree helix and deep chip pocket design.

### 2刃45°ヘリックス 銅加工専用 リブボール エンドミル

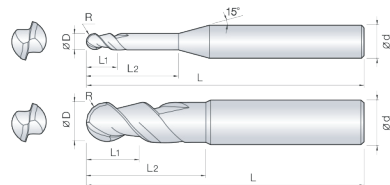
銅及び銅合金、アルミニウム合金、非鉄合金加工用エンドミル

- 多様な被削材加工時刃先にストレスが小さくて、被削材の面粗さが向上されます。
- 45°ヘリックス形状と深いポケットに設計してチップ排出が優れて、高速、高移送加工に適合します。

### 2刃45°螺旋銅加工専用半径球铣刀

鋼及銅合金、鋁合金、非鉄合金加工用铣刀

- 加工多样被削材时，减少刃线部麻烦，卓越的被削材表面光亮度。
- 45°螺旋形状设计，优秀的排出碎屑，适合高速及高进给加工。



Size	D Tolerance
D ≤ Ø6	+0 ~ -0.01mm
D > Ø6	+0 ~ -0.015mm

单位/Unit : mm

订货号 Order Number	刃径 Diameter	刃長 Length of cut	有効長 Effective Length	全长 Overall Length	柄径 Shank Dia
2HOB 010 030 S04	0.5R X 1	1.5	3	50	4
2HOB 010 050 S04	0.5R X 1	1.5	5	50	4
2HOB 010 080 S04	0.5R X 1	1.5	8	50	4
2HOB 010 100 S04	0.5R X 1	1.5	10	50	4
2HOB 010 120 S04	0.5R X 1	1.5	12	50	4
2HOB 010 160 S04	0.5R X 1	1.5	16	50	4
2HOB 010 200 S04	0.5R X 1	1.5	20	50	4
2HOB 015 050 S04	0.75R X 1.5	2	5	50	4
2HOB 015 080 S04	0.75R X 1.5	2	8	50	4
2HOB 015 100 S04	0.75R X 1.5	2	10	50	4
2HOB 015 120 S04	0.75R X 1.5	2	12	50	4
2HOB 015 160 S04	0.75R X 1.5	2	16	50	4
2HOB 015 200 S04	0.75R X 1.5	2	20	50	4
2HOB 020 050 S06	1R X 2	3	5	50	6
2HOB 020 080 S06	1R X 2	3	8	50	6
2HOB 020 100 S06	1R X 2	3	10	50	6
2HOB 020 120 S06	1R X 2	3	12	60	6
2HOB 020 160 S06	1R X 2	3	16	60	6
2HOB 020 200 S06	1R X 2	3	20	60	6
2HOB 020 250 S06	1R X 2	3	25	65	6
2HOB 025 060 S06	1.25R X 2.5	4	6	50	6
2HOB 025 100 S06	1.25R X 2.5	4	10	50	6
2HOB 025 120 S06	1.25R X 2.5	4	12	60	6
2HOB 025 160 S06	1.25R X 2.5	4	16	60	6
2HOB 025 200 S06	1.25R X 2.5	4	20	60	6
2HOB 030 080 S06	1.5R X 3	4.5	8	60	6
2HOB 030 120 S06	1.5R X 3	4.5	12	60	6

订货号 Order Number	刃径 Diameter	刃長 Length of cut	有効長 Effective Length	全长 Overall Length	柄径 Shank Dia
2HOB 030 160 S06	1.5R X 3	4.5	16	60	6
2HOB 030 200 S06	1.5R X 3	4.5	20	60	6
2HOB 030 250 S06	1.5R X 3	4.5	25	70	6
2HOB 030 300 S06	1.5R X 3	4.5	30	70	6
2HOB 030 400 S06	1.5R X 3	4.5	40	80	6
2HOB 040 100 S06	2R X 4	6	10	60	6
2HOB 040 160 S06	2R X 4	6	16	60	6
2HOB 040 200 S06	2R X 4	6	20	60	6
2HOB 040 250 S06	2R X 4	6	25	70	6
2HOB 040 300 S06	2R X 4	6	30	70	6
2HOB 040 400 S06	2R X 4	6	40	80	6
2HOB 050 160 S06	2.5R X 5	8	16	80	6
2HOB 050 200 S06	2.5R X 5	8	20	80	6
2HOB 050 250 S06	2.5R X 5	8	25	80	6
2HOB 060 150 S06	3R X 6	9	15	90	6
2HOB 060 300 S06	3R X 6	9	30	90	6
2HOB 060 400 S06	3R X 6	9	40	90	6
2HOB 080 200 S08	4R X 8	12	20	100	8
2HOB 100 250 S10	5R X 10	15	25	100	10
2HOB 120 300 S12	6R X 12	18	30	110	12
2HOB 160 600 S16	8R X 16	30	60	160	16



### 2 Flutes Rib Corner Radius End Mills for Copper

Endmills for copper, copper alloy, nonferrous and non-metallic materials.

- Improve wear resistance as well as avoid edge stress in various applications.
- Smooth chip outflow by deep chip pocket.

### 2刃 銅加工用 リブ コーナー ラジウス エンドミル

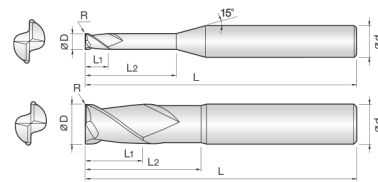
銅 及び 銅合金, アルミニウム 合金, 非鉄合金 加工用エンドミル

- 多様な 被削材 加工時 刃先部に ストレスが小さくて, 被削材の面粗さが向上されます。
- 深い ポケットに設計してチップ排出が円滑します。

### 2刃銅加工锥形半径铣刀

铜及铜合金, 铝合金, 非铁合金加工用铣刀

- 加工多样被削材时, 减少刃线部麻烦, 又提高被削材的表面光照度。
- 优秀的排屑碎屑。



Size	D Tolerance
D ≤ Ø6	+0 ~ -0.01mm
D > Ø6	+0 ~ -0.015mm

单位/Unit: mm

订货号 Order Number	刃径 Diameter	刃長 Length of cut	有効長 Effective Length	全长 Overall Length	柄径 Shank Dia
20CR 010 001 040	1 X R0.1	1.5	4	50	4
20CR 010 001 060	1 X R0.1	1.5	6	50	4
20CR 010 001 080	1 X R0.1	1.5	8	50	4
20CR 010 001 100	1 X R0.1	1.5	10	50	4
20CR 010 001 120	1 X R0.1	1.5	12	50	4
20CR 010 001 160	1 X R0.1	1.5	16	50	4
20CR 010 001 200	1 X R0.1	1.5	20	50	4
20CR 015 001 060	1.5 X R0.1	2	6	50	4
20CR 015 001 100	1.5 X R0.1	2	10	50	4
20CR 015 001 120	1.5 X R0.1	2	12	50	4
20CR 015 001 160	1.5 X R0.1	2	16	50	4
20CR 015 001 200	1.5 X R0.1	2	20	50	4
20CR 015 001 250	1.5 X R0.1	2	25	60	4
20CR 015 002 060	1.5 X R0.2	2	6	50	4
20CR 015 002 100	1.5 X R0.2	2	10	50	4
20CR 015 002 120	1.5 X R0.2	2	12	50	4
20CR 015 002 160	1.5 X R0.2	2	16	50	4
20CR 015 002 200	1.5 X R0.2	2	20	50	4
20CR 015 002 250	1.5 X R0.2	2	25	60	4
20CR 020 002 060	2 X R0.2	3	6	50	4
20CR 020 002 100	2 X R0.2	3	10	50	4
20CR 020 002 120	2 X R0.2	3	12	50	4
20CR 020 002 160	2 X R0.2	3	16	50	4
20CR 020 002 200	2 X R0.2	3	20	50	4
20CR 020 002 250	2 X R0.2	3	25	60	4
20CR 020 005 060	2 X R0.5	3	6	50	4
20CR 020 005 100	2 X R0.5	3	10	50	4
20CR 020 005 120	2 X R0.5	3	12	50	4
20CR 020 005 140	2 X R0.5	3	14	50	4
20CR 020 005 160	2 X R0.5	3	16	50	4
20CR 020 005 200	2 X R0.5	3	20	50	4
20CR 020 005 250	2 X R0.5	3	25	60	4
20CR 025 002 060	2.5 X R0.2	3.5	6	50	4
20CR 025 002 100	2.5 X R0.2	3.5	10	50	4
20CR 025 002 120	2.5 X R0.2	3.5	12	50	4
20CR 025 002 160	2.5 X R0.2	3.5	16	50	4
20CR 025 002 200	2.5 X R0.2	3.5	20	50	4
20CR 025 002 250	2.5 X R0.2	3.5	25	60	4
20CR 025 005 060	2.5 X R0.5	3.5	6	50	4
20CR 025 005 100	2.5 X R0.5	3.5	10	50	4
20CR 025 005 120	2.5 X R0.5	3.5	12	50	4
20CR 025 005 160	2.5 X R0.5	3.5	16	50	4

订货号 Order Number	刃径 Diameter	刃長 Length of cut	有効長 Effective Length	全长 Overall Length	柄径 Shank Dia
20CR 025 005 200	2.5 X R0.5	3.5	20	50	4
20CR 025 005 250	2.5 X R0.5	3.5	25	60	4
20CR 030 002 100	3 X R0.2	4	10	55	6
20CR 030 002 120	3 X R0.2	4	12	55	6
20CR 030 002 160	3 X R0.2	4	16	55	6
20CR 030 002 200	3 X R0.2	4	20	55	6
20CR 030 002 250	3 X R0.2	4	25	65	6
20CR 030 002 300	3 X R0.2	4	30	70	6
20CR 030 002 350	3 X R0.2	4	35	75	6
20CR 030 002 400	3 X R0.2	4	40	80	6
20CR 030 005 100	3 X R0.5	4	10	55	6
20CR 030 005 120	3 X R0.5	4	12	55	6
20CR 030 005 160	3 X R0.5	4	16	55	6
20CR 030 005 200	3 X R0.5	4	20	55	6
20CR 030 005 250	3 X R0.5	4	25	65	6
20CR 030 005 300	3 X R0.5	4	30	70	6
20CR 030 005 350	3 X R0.5	4	35	75	6
20CR 030 005 400	3 X R0.5	4	40	80	6
20CR 040 002 120	4 X R0.2	5	12	55	6
20CR 040 002 160	4 X R0.2	5	16	55	6
20CR 040 002 200	4 X R0.2	5	20	55	6
20CR 040 002 300	4 X R0.2	5	30	70	6
20CR 040 002 400	4 X R0.2	5	40	80	6
20CR 040 005 120	4 X R0.5	5	12	55	6
20CR 040 005 160	4 X R0.5	5	16	55	6
20CR 040 005 200	4 X R0.5	5	20	55	6
20CR 040 005 300	4 X R0.5	5	30	70	6
20CR 040 005 400	4 X R0.5	5	40	80	6
20CR 060 002 200	6 X R0.2	7	20	60	6
20CR 060 005 200	6 X R0.5	7	20	60	6
20CR 060 010 200	6 X R1	7	20	60	6
20CR 060 015 200	6 X R1.5	7	20	60	6
20CR 080 005 250	8 X R0.5	9	25	65	8
20CR 080 010 250	8 X R1	9	25	65	8
20CR 080 015 250	8 X R1.5	9	25	65	8
20CR 100 005 320	10 X R0.5	11	32	70	10
20CR 100 010 320	10 X R1	11	32	70	10
20CR 100 015 320	10 X R1.5	11	32	70	10
20CR 120 005 380	12 X R0.5	12	38	80	12
20CR 120 010 380	12 X R1	12	38	80	12
20CR 120 015 380	12 X R1.5	12	38	80	12



### 3 Flutes 45° Helix Rib Corner Radius End Mills for Copper

Endmills for copper, copper alloy, nonferrous and non-metallic materials.

- Improve wear resistance as well as avoid edge stress in various applications.
- High speed, feed applicable by 3 flute 45° degree helix and deep chip pocket design.

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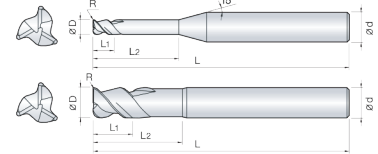
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### 3刃45°螺旋銅加工锥形半径铣刀

铜及铜合金、铝合金、非铁合金加工用铣刀

- 加工多样被削材时，减少刃线部麻烦，又提高被削材的表面光照度。
- 3刃45°螺旋形状设计，优秀的排出碎屑，适合高速及高进给加工。



Size	D Tolerance
D ≤ Ø6	+0 ~ -0.01mm
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単位/Unit : mm

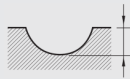
订货号 Order Number	刃径 Diameter	刃長 Length of cut	有効長 Effective Length	全长 Overall Length	柄径 Shank Dia
	DxR	L1	L2	L	d
3HOR 010 001 030	1 X R0.1	1.5	3	45	4
3HOR 010 001 060	1 X R0.1	1.5	6	45	4
3HOR 010 001 100	1 X R0.1	1.5	10	45	4
3HOR 010 002 030	1 X R0.2	1.5	3	45	4
3HOR 010 002 060	1 X R0.2	1.5	6	45	4
3HOR 010 002 100	1 X R0.2	1.5	10	45	4
3HOR 015 001 050	1.5 X R0.1	2	5	45	4
3HOR 015 001 080	1.5 X R0.1	2	8	45	4
3HOR 015 001 120	1.5 X R0.1	2	12	45	4
3HOR 015 002 050	1.5 X R0.2	2	5	45	4
3HOR 015 002 080	1.5 X R0.2	2	8	45	4
3HOR 015 002 120	1.5 X R0.2	2	12	45	4
3HOR 020 001 060	2 X R0.1	3	6	45	4
3HOR 020 001 100	2 X R0.1	3	10	45	4
3HOR 020 001 140	2 X R0.1	3	14	45	4
3HOR 020 002 060	2 X R0.2	3	6	45	4
3HOR 020 002 100	2 X R0.2	3	10	45	4
3HOR 020 002 140	2 X R0.2	3	14	45	4
3HOR 025 001 080	2.5 X R0.1	3.5	8	45	4
3HOR 025 001 120	2.5 X R0.1	3.5	12	45	4
3HOR 025 001 160	2.5 X R0.1	3.5	16	45	4
3HOR 025 002 080	2.5 X R0.2	3.5	8	45	4
3HOR 025 002 120	2.5 X R0.2	3.5	12	45	4
3HOR 025 002 160	2.5 X R0.2	3.5	16	45	4
3HOR 025 005 080	2.5 X R0.5	3.5	8	45	4
3HOR 025 005 120	2.5 X R0.5	3.5	12	45	4
3HOR 025 005 160	2.5 X R0.5	3.5	16	45	4
3HOR 030 002 100	3 X R0.2	4	10	50	4
3HOR 030 002 160	3 X R0.2	4	16	50	4
3HOR 030 002 200	3 X R0.2	4	20	50	4
3HOR 030 003 100	3 X R0.3	4	10	50	4
3HOR 030 003 160	3 X R0.3	4	16	50	4
3HOR 030 003 200	3 X R0.3	4	20	50	4
3HOR 030 005 100	3 X R0.5	4	10	50	4
3HOR 030 005 160	3 X R0.5	4	16	50	4

订货号 Order Number	刃径 Diameter	刃長 Length of cut	有効長 Effective Length	全长 Overall Length	柄径 Shank Dia
	DxR	L1	L2	L	d
3HOR 030 005 200	3 X R0.5	4	20	50	4
3HOR 040 002 120	4 X R0.2	6	12	50	4
3HOR 040 002 160	4 X R0.2	6	16	50	4
3HOR 040 002 200	4 X R0.2	6	20	50	4
3HOR 040 003 120	4 X R0.3	6	12	50	4
3HOR 040 003 160	4 X R0.3	6	16	50	4
3HOR 040 003 200	4 X R0.3	6	20	50	4
3HOR 040 005 120	4 X R0.5	6	12	50	4
3HOR 040 005 160	4 X R0.5	6	16	50	4
3HOR 040 005 200	4 X R0.5	6	20	50	4
3HOR 060 003 200	6 X R0.3	9	20	55	6
3HOR 060 003 300	6 X R0.3	9	30	70	6
3HOR 060 005 200	6 X R0.5	9	20	55	6
3HOR 060 005 300	6 X R0.5	9	30	70	6
3HOR 060 010 200	6 X R1	9	20	55	6
3HOR 060 010 300	6 X R1	9	30	70	6
3HOR 080 003 S08	8 X R0.3	12	25	65	8
3HOR 080 005 S08	8 X R0.5	12	25	65	8
3HOR 080 010 S08	8 X R1	12	25	65	8
3HOR 100 005 S10	10 X R0.5	15	30	70	10
3HOR 100 010 S10	10 X R1	15	30	70	10
3HOR 120 005 S12	12 X R0.5	20	35	80	12
3HOR 120 010 S12	12 X R1	20	35	80	12

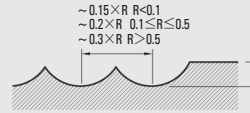
• RPM : rev./min • Feed : mm/min

Material	Aluminum Alloys		Copper Alloys		
	Radius	RPM	FEED	RPM	FEED
R0.5		43,200	1,300	43,200	900
R0.75		31,500	1,200	31,500	1,000
R1		21,600	1,000	21,600	1,100
R1.5		14,400	840	14,400	1,100
R2		11,000	840	10,800	1,100
R2.5		8,700	840	8,700	1,100
R3		7,200	840	7,200	1,100
R4		5,400	810	5,400	1,100
R5		4,300	810	4,300	1,000
R6		3,600	810	3,600	950
R8		2,700	810	2,700	900

Depth of Cut



$0.1 \times R$  (~45HRc)  
 $\sim 0.08 \times R$  (~55HRc)



$\sim 0.15 \times R$   $R < 0.1$   
 $\sim 0.2 \times R$   $0.1 \leq R \leq 0.5$   
 $\sim 0.3 \times R$   $R > 0.5$

$\sim 0.16 \times R$   $R \leq 0.3$  (~45HRc)  
 $\sim 0.25 \times R$   $R \leq 3$  (~45HRc)  
 $\sim 0.17 \times R$   $R \geq 4$  (~45HRc)  
 $\sim 0.05 \times R$  (~55HRc)

## 2OCR/3HOR

- Apply 10% down values of below condition for 2OCR
- 2OCRは下記数値の10% Down 適用
- 2OCRの値适用于下面的数值10%降低

• RPM : rev./min • Feed : mm/min

Material	Side Milling											
	Aluminum Alloy Expanding Material A7075				Aluminum Alloy Casting < Si13%				Aluminum Alloy Steels / Copper AZ91 / AZ80A / C100			
	Regular Milling		High Speed Milling		Regular Milling		High Speed Milling		Regular Milling		High Speed Milling	
Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1mm	24,000	680	40,000	1,100	24,000	690	27,000	580	12,700	200	19,200	220
2mm	20,600	800	37,000	1,400	20,600	800	24,000	800	9,600	230	15,200	340
3mm	16,800	900	32,000	1,700	16,800	900	19,200	1,000	6,400	260	13,600	500
4mm	12,400	1,000	25,600	2,000	12,400	1,000	15,400	1,200	4,800	290	11,400	640
6mm	8,400	1,100	21,200	2,800	8,300	1,120	12,700	1,700	3,200	320	8,500	770
8mm	6,400	1,200	16,000	3,000	6,400	1,200	9,600	1,800	2,400	370	6,400	900
10mm	5,100	1,360	12,800	3,400	5,100	1,360	7,700	2,000	1,900	380	5,100	920
12mm	4,200	1,400	10,600	3,500	4,200	1,400	6,400	2,100	1,600	400	4,200	1,000

Depth of Cut	Parameters											
	Aluminum Alloy Expanding Material A7075		Aluminum Alloy Casting < Si13%		Aluminum Alloy Casting < Si13%		Aluminum Alloy Casting < Si13%		Aluminum Alloy Steels / Copper AZ91 / AZ80A / C100		Aluminum Alloy Steels / Copper AZ91 / AZ80A / C100	
	•Ap : 1D •Ae : 0.2D		•Ap : 1D •Ae : 0.1D		•Ap : 1D •Ae : 0.2D		•Ap : 1D •Ae : 0.1D		•Ap : 1D •Ae : 0.2D		•Ap : 1D •Ae : 0.1D	

- Apply 10% down values of below condition for 2OCR
- 2OCRは下記数値の 10% Down 適用
- 2OCRの値适用于下面的数值10%降低

• RPM : rev./min • Feed : mm/min

Material	Slotting									
	Aluminum Alloy Expanding Material A7075				Aluminum Alloy Casting < Si13%				Aluminum Alloy Steels / Copper AZ91 / AZ80A / C100	
	Regular Milling		High Speed Milling		Regular Milling		High Speed Milling		Regular Milling	
Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1mm	24,000	520	40,000	660	24,000	520	27,000	480	12,700	130
2mm	20,600	590	37,000	940	20,600	590	24,000	600	9,600	200
3mm	16,800	620	32,000	1,200	16,800	620	19,200	700	6,400	260
4mm	12,400	650	25,600	1,400	12,400	650	15,400	800	4,800	300
6mm	8,400	760	21,200	1,900	8,300	760	12,700	1,160	3,200	320
8mm	6,400	800	16,000	2,000	6,400	800	9,600	1,200	2,400	370
10mm	5,100	920	12,800	2,200	5,100	920	7,700	1,360	1,900	380
12mm	4,200	960	10,600	2,400	4,200	960	6,400	1,440	1,600	410

Depth of Cut	Parameters									
	Aluminum Alloy Expanding Material A7075		Aluminum Alloy Casting < Si13%		Aluminum Alloy Casting < Si13%		Aluminum Alloy Casting < Si13%		Aluminum Alloy Steels / Copper AZ91 / AZ80A / C100	
	•Ap : 0.5D		•Ap : 0.25D		•Ap : 0.5D		•Ap : 0.25D		•Ap : 0.5D	