

4 Flutes / 6 Flutes HARDMAX



Size $\phi 3 \sim \phi 12$

HMERS

Super
MG

HARD
MAX

45°

R

R
 ± 0.01

Shank Dia
0/-0.005

Material Applications (★ Highly Recommended ● Recommended ○ Suggested)

Work Material																	
Carbon Steels S45C S55C	Alloy Steels SK / SCM SUS	Prehardened Steels NAK HPM	Hardened Steels					Cast Iron	Aluminum Alloys	Graphite	Copper	Plastics	Glass Filled Plastics	Titanium Alloys	Heat Resistant Alloys	Cemented Carbide	Hard Brittle (Non-Metallic) Materials
			~ 50HRC	~ 55HRC	~ 60HRC	~ 65HRC	~ 70HRC										
		○	●	●	●	●											

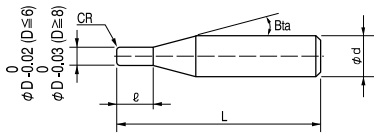
Features

Radius End Mills for Hard Materials.

4 and 6 Flutes have been applied to suitable sizes to offer outstandingly long tool life.

HARDMAX coat enables highly efficient milling for 65HRC High Speed Steels.

Various Corner Radius sizes available.



The shank taper angle shown is not an exact value and to avoid contact with the work piece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the work piece.

A lineup of 4 flutes and 6 flutes that considers high efficiency and chip evacuation performance according to the tool diameter.

$\phi 3 \sim \phi 5$ 4 flutes



$\phi 6 \sim \phi 12$ 6 flutes



- φ3mm Shank V Series
- UDC-PCD Series
- CBN Series
- Square
- Long Neck Square
- Radius
- Long Neck Radius
- Taper Neck Radius
- Ball / Long Shank Ball
- Long Neck Ball
- Taper Neck Ball
- Taper
- Barrel
- Spiral V Cutter
- Drill
- Technical Data

Total 37 models

Unit (mm)

Model Number	Outside Diameter ϕD	Corner Radius CR	Length of Cut ℓ	Shank Taper Angle Bta	Overall Length L	Shank Diameter ϕd	Number of Flutes	Suggested Retail Price ¥
HMERS 4030-01-075	3	R0.1	7.5	16°	60	6	4	15,000
HMERS 4030-02-075		R0.2			60	6		15,000
HMERS 4030-03-075		R0.3			60	6		15,000
HMERS 4030-05-075		R0.5			60	6		15,000
HMERS 4040-01-100	4	R0.1	10	16°	60	6	4	16,200
HMERS 4040-02-100		R0.2			60	6		16,200
HMERS 4040-03-100		R0.3			60	6		16,200
HMERS 4040-05-100		R0.5			60	6		16,200
HMERS 4040-10-100		R1			60	6		16,200
HMERS 4050-01-125	5	R0.1	12.5	16°	60	6	4	17,400
HMERS 4050-02-125		R0.2			60	6		17,400
HMERS 4050-03-125		R0.3			60	6		17,400
HMERS 4050-05-125		R0.5			60	6		17,400
HMERS 4050-10-125		R1			60	6		17,400
HMERS 6060-01-130	6	R0.1	13	—	60	6	6	18,600
HMERS 6060-02-130		R0.2			60	6		18,600
HMERS 6060-03-130		R0.3			60	6		18,600
HMERS 6060-05-130		R0.5			60	6		18,600
HMERS 6060-10-130		R1			60	6		18,600
HMERS 6060-15-130		R1.5			60	6		18,600
HMERS 6080-02-190	8	R0.2	19	—	70	8	6	23,400
HMERS 6080-03-190		R0.3			70	8		23,400
HMERS 6080-05-190		R0.5			70	8		23,400
HMERS 6080-10-190		R1			70	8		23,400
HMERS 6080-20-190		R2			70	8		23,400
HMERS 6100-02-220	10	R0.2	22	—	80	10	6	31,800
HMERS 6100-03-220		R0.3			80	10		31,800
HMERS 6100-05-220		R0.5			80	10		31,800
HMERS 6100-10-220		R1			80	10		31,800
HMERS 6100-15-220		R1.5			80	10		31,800
HMERS 6100-20-220		R2			80	10		31,800
HMERS 6120-02-260	12	R0.2	26	—	100	12	6	38,400
HMERS 6120-03-260		R0.3			100	12		38,400
HMERS 6120-05-260		R0.5			100	12		38,400
HMERS 6120-10-260		R1			100	12		38,400
HMERS 6120-15-260		R1.5			100	12		38,400
HMERS 6120-20-260		R2			100	12		38,400

4 Flutes

6 Flutes

$\phi 3mm$ Shank V Series

UDC-PCD Series

CBN Series

Square

Long Neck Square

Radius

Long Neck Radius

Taper Neck Radius

Ball / Long Shank Ball

Long Neck Ball

Taper Neck Ball

Taper

Barrel

Spiral V Cutter

Drill

Technical Data

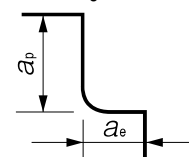
Milling Conditions for HMERS

WORK MATERIAL				PREHARDENED STEELS HARDENED STEELS (40~50HRC)				HARDENED STEELS (50~60HRC)				HARDENED STEELS (60HRC~)			
Model Number	Number of Flutes	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p Axial Depth (mm)	a _e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p Axial Depth (mm)	a _e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p Axial Depth (mm)	a _e Radial Depth (mm)
4030	4	3	7.5	13,100	1,680	6	0.06	4,200	720	6	0.06	8,600	465	6	0.06
4040	4	4	10	11,300	1,950	8	0.08	3,150	540	8	0.08	6,450	350	8	0.08
4050	4	5	12.5	10,100	2,300	10	0.1	2,520	430	10	0.1	5,160	280	10	0.1
6060	6	6	13	8,900	2,930	12	0.12	4,300	1,200	9	0.12	4,300	1,200	9	0.12
6080	6	8	19	4,000	2,400	12	0.24	3,220	1,450	12	0.08	3,220	1,450	12	0.08
6100	6	10	22	3,200	2,000	15	0.3	2,580	1,160	15	0.1	2,580	1,160	15	0.1
6120	6	12	26	2,670	1,600	18	0.36	2,150	970	18	0.12	2,150	970	18	0.12

Note:

- Recommend down cut processing.
- Reduce cutting amount, feed rate, and apply zero-cut in accordance with required surface quality.
- Recommend air blow or oil mist.

Side Milling



Side Milling Example

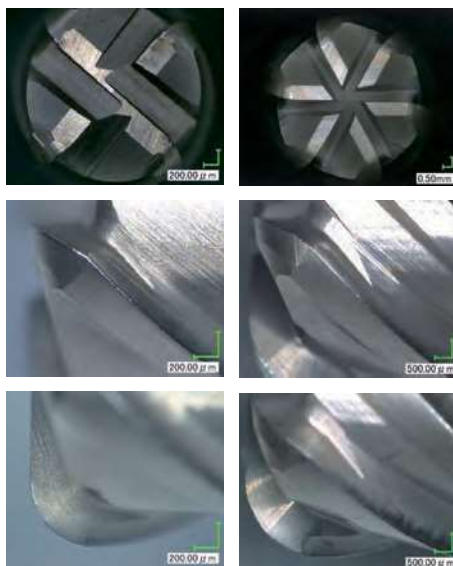
HMERS $\phi 3 \times CR0.5 \times L7.5 / \phi 10 \times CR2 \times L22$

SKH51 (63 HRC)

Tools after Milling

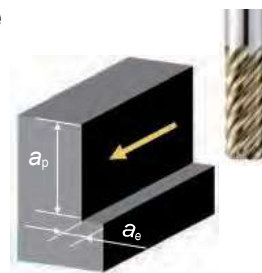
4030-05-075

6100-20-220



Tool	HMERS 4030-05-075 ($\phi 3 \times CR0.5$)	HMERS 6100-20-220 ($\phi 10 \times CR2$)
Spindle Speed	8,600 min ⁻¹	2,580 min ⁻¹
Feed Rate	465 mm/min	1,160 mm/min
a _p	6 mm	15 mm
a _e	0.06 mm	0.1 mm
Milling Distance	12.7 m	28 m
Coolant	Air Blow (Through Spindle)	

Milling Image



Side Milling (Down-cut)

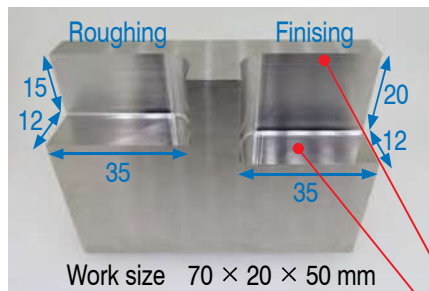
No chipping when milling Hard Materials.
More tool life left.

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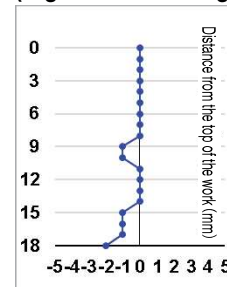
HMERS $\phi 10 \times CR1 \times L22$ Milling example

SKD11 (59HRC)

1. Deflection amount and surface roughness



Deflection amount (Right side finishing)



Wall surface Ra 0.21 μm
Bottom surface Ra 0.04 μm

Coolant: Air blow (Through spindle)
Milling direction: Down cut

Tool
HMERS $\phi 10 \times CR1 \times L22$

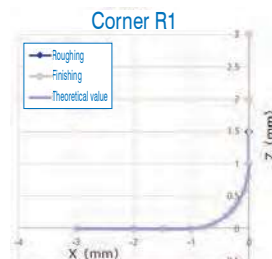
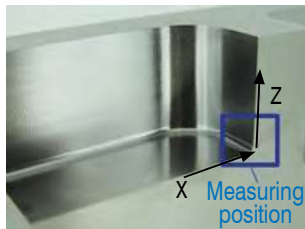


	Process	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p (mm)	a_e (mm)	Allowance (mm)	Cycle Time (h:m:s)
Roughing	Roughing	2,580	1,160	15	0.10	0	0:05:22
Right side of work	Roughing	2,580	1,160	20	0.05	0.05	0:10:38
	Semi-Roughing		580	20	0.04	0.01	0:25:11
	Finishing				0.01	0	1:40:43

Right side total 2:16:32

2. Corner Radius measurement

R1



Radius accuracy (mm)
Roughing -0.003/0.006
Finishing 0/0.007

High-precision machining is possible even with the bottom R.

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6 Flutes

$\phi 3\text{mm}$ Shank V Series

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