

无限白金Plus涂层
高硬度钢材高精度加工用
2刃长颈球头铣刀

可对应热缩刀柄的短柄造型

MUGEN COATING PREMIUM Plus 2-Flute Long Neck Ball End Mill with Short Shank
for Hardened Steel and High accuracy cutting

MRBSH230SF

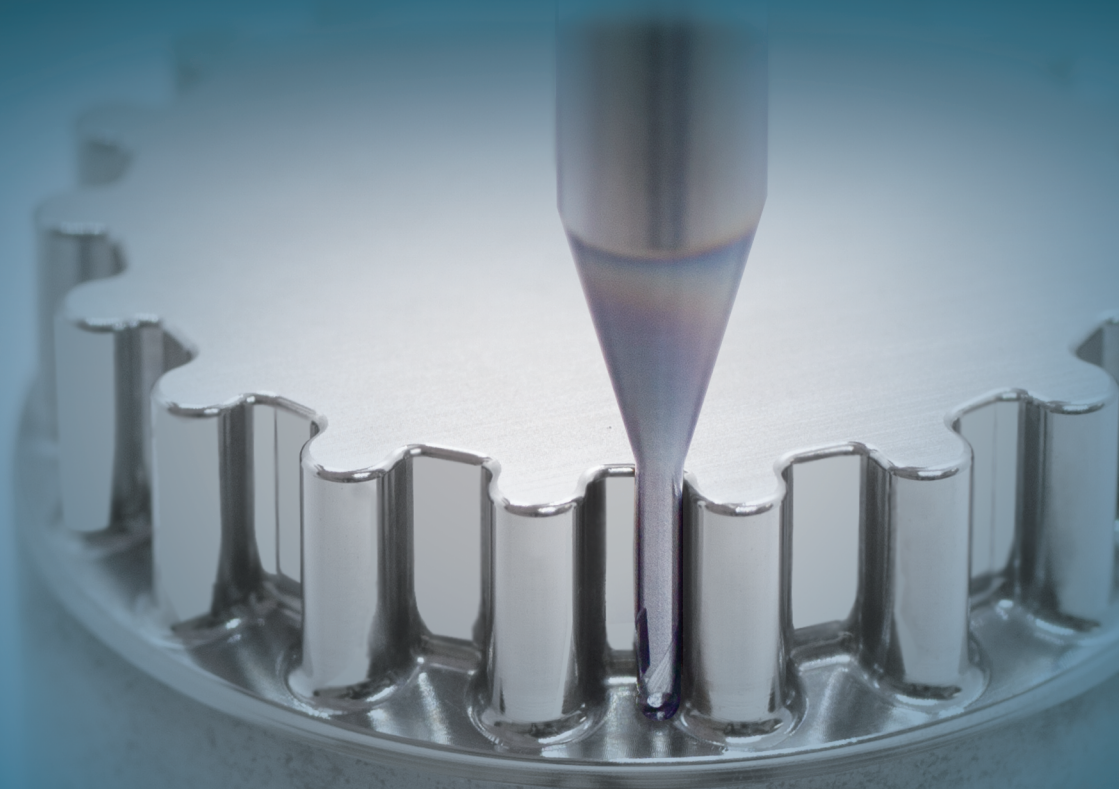
增加规格
Size Expansion

新增 32 种规格尺寸

32 sizes added

共 115 种规格

Total 115 sizes



70HRC的高硬度钢材也能实现长时间·高精度的加工

High precision and long tool life even for hardened steel up to 70 HRC

MRBSH230SF

R0.05 ~ R3

共 115 种规格

Total 115 sizes

70HRC的高硬度钢材也能实现长时间的高精度加工

Achieves long-tool life and high precision cutting even for 70 HRC hardened steel



SMG	2	30°	R ±0.003	φd -0.001 -0.003
R角精度以实际刃径的1/2为基准值 R accuracy is based on a half value of actual diameter				

特长

Features

新增加 32 种规格, 共 115 种规格尺寸, 颈下长的种类选择更加丰富!

Total 115 sizes include new addition 32 sizes realize abundant line up variations of under neck length



涂层 Coating

1	耐氧化性·耐摩擦性的无限白金 Plus 涂层 New coating MUGEN COATING PREMIUM Plus with high Oxidation resistance and abrasion resistance
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形状 Shape

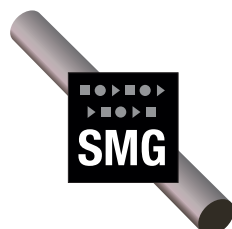
2-1	减轻切削抵抗的刃口设计 Cutting edge shape with reduced cutting load
2-2	优化刀具夹持伸出量, 实现高刚性加工 Achieves high rigidity with optimal tool overhung
	可对应高精度热缩式刀柄 High accuracy precision shrink fit chuck
2-3	无段差的高精度 R 角造型 Highly accurate R shape that is smooth and seamless



公差范围 0.002 mm
Tolerance range

母材 Material

3	采用提高耐崩损性的超超微粒子硬质合金 Super micro grain carbide with improved fracture resistance
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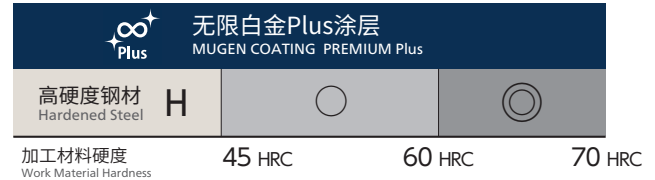


Feature
1

延长刀具寿命 Long tool life

涂层 无限白金 Plus 涂层
Coating MUGEN COATING PREMIUM Plus

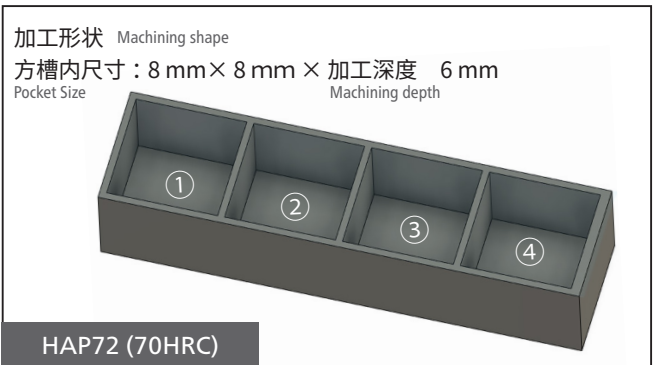
最适用于加工 60HRC ~ 70HRC 的高硬度钢材
针对 45 ~ 60HRC 的高硬度钢材加工效果与无限白金涂层系列相同
MUGEN COATING PREMIUM Plus is suitable for machining above 60HRC
Demonstrates same performance with MUGEN COATING PREMIUM even on machining 45 ~ 60HRC



尺寸精度比较

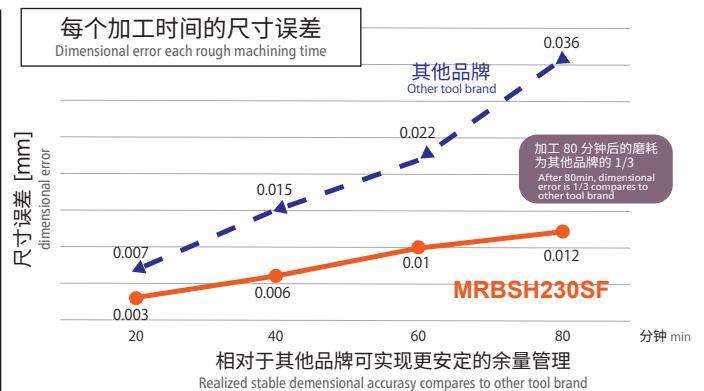
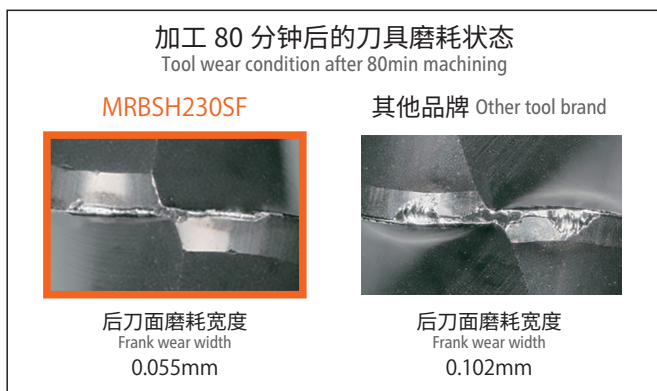
Comparison of dimensional accuracy

HAP72 (70HRC) : 粗加工后的尺寸精度对比
HAP72 (70HRC) : Comparison of dimensional accuracy after rough cutting
刀具 Tool : MRBSH230SF R1×6
加工内容 : 等高线粗加工 4 个方槽
Machining content : Roughing contour lines for 4 pockets
余量 Stock : 0.02mm
目标值 Target : 7.960mm
加工时间 Machining time : 20 分钟 / 个 min/per pocket
刀路轨迹 Tool path : 等高线粗加工 Roughing contour line



粗加工 Roughing

$n = 16,000 \text{ min}^{-1}$ $v_f = 1,200 \text{ mm/min}$ $a_p 0.1 \times a_e 0.3 \text{ mm}$ 油雾 Oil Mist



70HRC的高硬度钢材也能实现长时间·高精度的加工

High precision and long tool life even for hardened steel up to 70 HRC

Feature 2-1 **提升切削性能** Improved machinability **形状 刃口** Shape Cutting edge

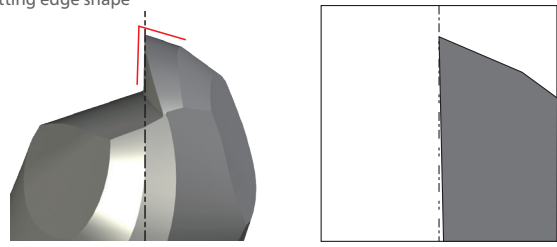
采用锐角设计，可减轻切削抵抗提高切削性能的刃口造型，并配合耐崩损性好的新母材。

使得针对高硬度钢材加工时，高硬度与高效能的要求可以得到实现

Sharp cutting edge with reduced cutting load and new material with fracture resistance realizes long tool life and high precision for hardened steel

MRBSH230SF

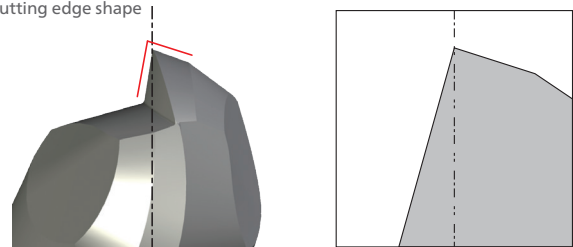
刃口形状 Cutting edge shape



锐角刃口设计
Positive cutting edge

一般高硬度用铣刀
General end mill for hardened steel

刃口形状 Cutting edge shape



钝角刃口设计
Negative cutting edge

刃口采用锐角造型来减轻切削抵抗并使用新素材制作出加工高硬度钢材也不易崩刃的造型

Cutting load is reduced by positive cutting edge and by adopting a new material Super micro grain carbide prevent chipping even with hardened steel

切削抵抗大的钝角造型

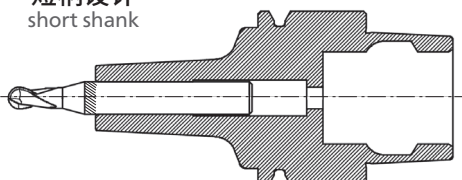
Negative cutting edge shape with high cutting load

Feature 2-2 **加工精度向上** Improved cutting accuracy **形状 最合适的刀具伸出量** Shape Optimal overhung length

MRBSH230SF

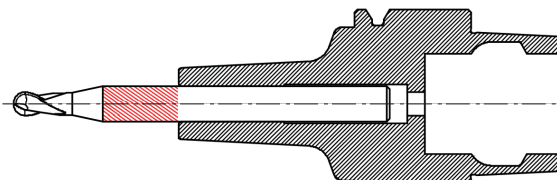
刀具夹持伸出量较短，可在高刚性状态下加工
Possible to machining with high rigidity, with short tool overhung

短柄设计
short shank



一般全长设计
Normal shank length

刀具夹持伸出量较长，低刚性状态
Tool overhung length is long, and tool rigidity is low



Feature 2-2 **可对应高精度热缩式刀柄** Compatible with high accuracy shrink-fit chuck **形状 高精度柄径** Shape High accuracy shank



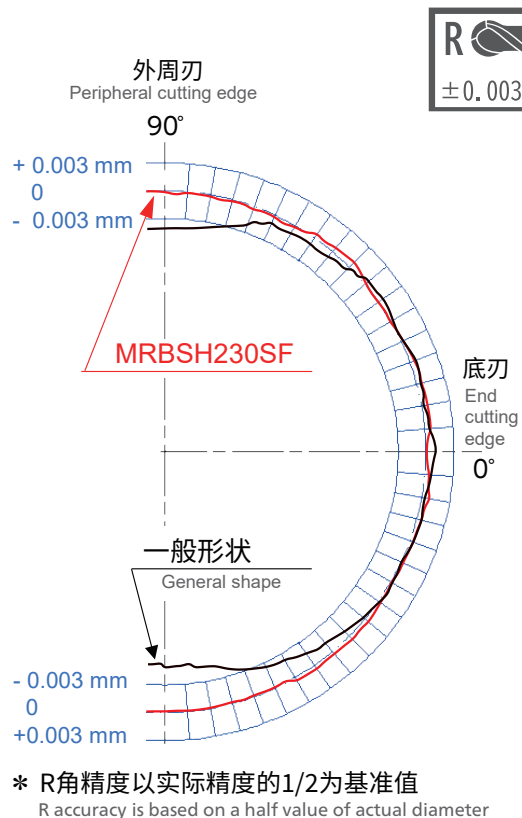
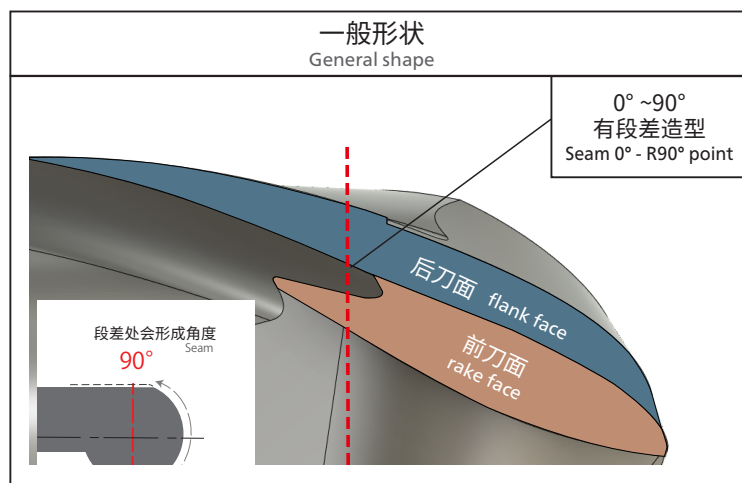
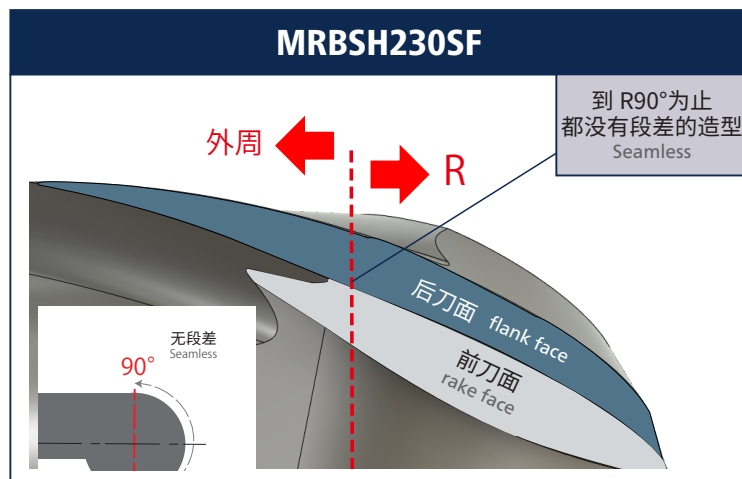
公差范围
Tolerance range
0.002 mm

Feature
2-3

高精度 R 角
High accuracy R

形状 R角的高精度化
shape Highly accurate R

从R角到侧刃的接续位置，刀面都采用无段差设计，实现R角的高精度化
Seamless design on rake face and flank face from R-curve to peripheral cutting edge. Realized high precision R accuracy



Feature
3

提升耐摩耗性
Upgrade abrasion ability

母材 硬质合金
Material Carbide material



采用新母材的「超超微粒子硬质合金」，强化耐摩耗性、耐崩损性

Uses a new material, [Super micro grain carbide] to improve abrasion resistance and fracture resistance.

无限白金Plus涂层
高硬度钢材高精度加工用 2 刃长颈球头铣刀可对应热缩刀柄的短柄造型

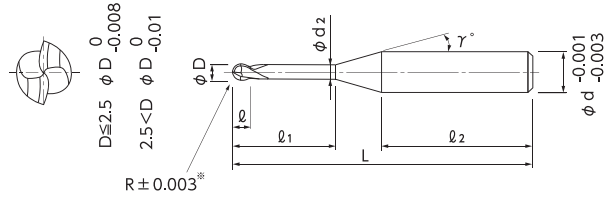
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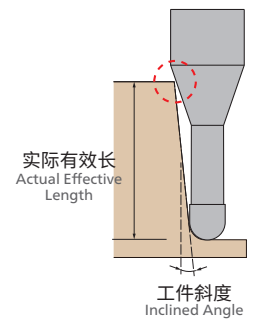
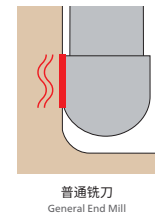
- 70HRC 的高硬度钢材也可实现长时间稳定的切削性能。
- 新研发出的无限白金 Plus 涂层，提升抗氧化性·耐磨耗性。
- 采用提升耐崩损性的新母材与减轻切削抵抗的刀刃设计。
- R 角精度为 $\pm 0.003\text{mm}$ (R 角精度以实际刃径的 1/2 为基准值)。
- 柄径公差为 $-0.001\text{mm} \sim -0.003\text{mm}$ 的高精度设计。

- Realize stable cutting performance even for 70 HRC hardened steels.
- Developed new MUGEN COATING PREMIUM Plus to upgrade oxidation resistance and abrasion resistance.
- Adopt optimized new tool material and tool design to reduce cutting load.
- R accuracy is $\pm 0.003\text{mm}$ (R accuracy is based on a half value of actual diameter).
- Shank diameter tolerance, high accuracy type, is $-0.001 \sim -0.003$.

R 角精度以实际刃径的 1/2 为基准值
R accuracy is based on a half value of actual diameter

加工材料 Work Material

高硬度钢 Hardened Steel		H
45~60HRC	60~70HRC	
○	◎	



◆ 2023年10月追加尺寸 ※Released in Oct, 2023.

单位 [规格: mm / 价格: 日元]
Unit [Size: mm / Retail Price: JPY]

产品代码 Code No.	(R)球头半径 Radius	(l1)颈长 Under Neck Length	(l)刃长 Length of Cut	(D)外径 Dia.	(d2)颈径 Neck Dia.	(γ)颈角 Neck Taper Angle	(d)柄径 Shank Dia.	(l2)柄长 Shank Length	(L)全长 Overall Length	定价(日元) Retail Price	相对于工件斜度的有效长 Actual effective length depending on inclined angle of work-				
											30°	1°	1°30'	2°	3°
08-00537-00052	R0.05	0.2	0.07	0.1	0.085	15°	4	27.4	35	9,500	0.23	0.24	0.24	0.25	0.27
◆ 08-00537-00056		0.25	0.07	0.1	0.085	15°	4	27.4	35	9,500	0.28	0.29	0.30	0.31	0.33
08-00537-00053		0.3	0.07	0.1	0.085	15°	4	27.3	35	9,700	0.33	0.34	0.35	0.36	0.39
◆ 08-00537-00054		0.4	0.07	0.1	0.085	15°	4	27.2	35	9,700	0.44	0.45	0.46	0.48	0.52
08-00537-00055		0.5	0.07	0.1	0.085	15°	4	27.1	35	10,400	0.54	0.56	0.57	0.59	0.64
◆ 08-00537-00076	R0.075	0.25	0.1	0.15	0.13	15°	4	27.5	35	10,000	0.29	0.30	0.31	0.31	0.33
08-00537-00072		0.3	0.1	0.15	0.13	15°	4	27.4	35	10,000	0.34	0.35	0.36	0.37	0.40
◆ 08-00537-00077		0.4	0.1	0.15	0.13	15°	4	27.3	35	10,000	0.44	0.46	0.47	0.49	0.52
08-00537-00073		0.5	0.1	0.15	0.13	15°	4	27.2	35	10,400	0.55	0.56	0.58	0.60	0.65
◆ 08-00537-00074		0.6	0.1	0.15	0.13	15°	4	27.1	35	10,400	0.65	0.67	0.69	0.72	0.77
◆ 08-00537-00075	0.7	0.1	0.15	0.13	15°	4	27.0	35	10,400	0.75	0.78	0.80	0.83	0.89	
08-00537-00101	R0.1	0.3	0.15	0.2	0.18	15°	4	27.5	35	7,600	0.34	0.35	0.36	0.37	0.39
◆ 08-00537-00106		0.4	0.15	0.2	0.18	15°	4	27.4	35	7,600	0.44	0.46	0.47	0.48	0.51
08-00537-00102		0.5	0.15	0.2	0.18	15°	4	27.3	35	7,600	0.55	0.56	0.58	0.60	0.64
◆ 08-00537-00107		0.6	0.15	0.2	0.18	15°	4	27.2	35	7,600	0.65	0.67	0.69	0.71	0.76
08-00537-00103		0.75	0.15	0.2	0.18	15°	4	27.1	35	7,600	0.81	0.83	0.86	0.89	0.95
◆ 08-00537-00104	0.85	0.15	0.2	0.18	15°	4	27.0	35	7,600	0.91	0.94	0.97	1.00	1.07	
08-00537-00105	1	0.15	0.2	0.18	15°	4	26.8	35	7,600	1.06	1.10	1.13	1.17	1.26	
08-00537-00150	R0.15	0.5	0.2	0.3	0.28	15°	4	27.5	35	7,500	0.55	0.56	0.57	0.59	0.63
08-00537-00151		0.6	0.2	0.3	0.28	15°	4	27.4	35	7,500	0.65	0.67	0.69	0.71	0.75
08-00537-00152		0.75	0.2	0.3	0.28	15°	4	27.3	35	7,500	0.80	0.83	0.85	0.88	0.94
08-00537-00153		1	0.2	0.3	0.28	15°	4	27.0	35	7,500	1.06	1.09	1.13	1.17	1.25
◆ 08-00537-00154		1.25	0.2	0.3	0.28	15°	4	26.8	35	7,500	1.32	1.36	1.41	1.45	1.56
08-00537-00155	1.5	0.2	0.3	0.28	15°	4	26.5	35	8,000	1.58	1.63	1.68	1.74	1.87	
08-00537-00201	R0.2	0.5	0.3	0.4	0.37	15°	4	27.7	35	5,500	0.56	0.58	0.59	0.60	0.64
◆ 08-00537-00207		0.65	0.3	0.4	0.37	15°	4	27.6	35	5,500	0.72	0.74	0.76	0.78	0.83
08-00537-00202		0.8	0.3	0.4	0.37	15°	4	27.4	35	5,500	0.87	0.90	0.92	0.95	1.01

订购方法
How to Order

请指定MRBSH230SF 球头半径 (R) × 颈长 (l1)。
When you order, indicate MRBSH230SF (R) × (l1) × (d).

※(γ) 为参考值。
※(γ) is reference value.

单位 [规格: mm / 价格: 日元]
Unit [Size: mm / Retail Price: JPY]

产品代码 Code No.	(R)球头半径 Radius	(ℓ ₁)颈长 Under Neck Length	(ℓ)刃长 Length of Cut	(D)外径 Dia.	(d ₂)颈径 Neck Dia.	(γ)颈角 Neck Taper Angle	(d)柄径 Shank Dia.	(ℓ ₂)柄长 Shank Length	(L)全长 Overall Length	定价(日元) Retail Price	相对于工件斜度的有效长 Actual effective length depending on inclined angle of work-					
											30°	1°	1°30′	2°	3°	
08-00537-00203	R0.2	1	0.3	0.4	0.37	15°	4	27.2	35	5,500	1.08	1.11	1.14	1.18	1.26	
◆ 08-00537-00208		1.25	0.3	0.4	0.37	15°	4	27.0	35	5,700	1.34	1.38	1.42	1.47	1.57	
08-00537-00204		1.5	0.3	0.4	0.37	15°	4	26.7	35	5,700	1.60	1.65	1.70	1.75	1.88	
◆ 08-00537-00209		1.75	0.3	0.4	0.37	15°	4	26.5	35	5,800	1.86	1.91	1.98	2.04	2.19	
08-00537-00205		2	0.3	0.4	0.37	15°	4	26.2	35	5,800	2.11	2.18	2.25	2.33	2.50	
◆ 08-00537-00210		2.25	0.3	0.4	0.37	15°	4	26.0	35	6,000	2.37	2.45	2.53	2.62	2.81	
08-00537-00206	R0.25	2.5	0.3	0.4	0.37	15°	4	25.7	35	6,000	2.63	2.72	2.81	2.90	3.13	
◆ 08-00537-00251		0.5	0.35	0.5	0.46	15°	4	27.8	35	5,500	0.58	0.59	0.61	0.62	0.65	
08-00537-00252		1	0.35	0.5	0.46	15°	4	27.3	35	5,500	1.10	1.13	1.16	1.19	1.27	
08-00537-00253		1.5	0.35	0.5	0.46	15°	4	26.8	35	5,500	1.61	1.66	1.71	1.77	1.89	
08-00537-00254		2	0.35	0.5	0.46	15°	4	26.3	35	5,500	2.13	2.20	2.27	2.34	2.51	
08-00537-00255		2.5	0.35	0.5	0.46	15°	4	25.8	35	5,500	2.65	2.73	2.82	2.92	3.14	
08-00537-00256	3	0.35	0.5	0.46	15°	4	25.3	35	5,500	3.16	3.27	3.38	3.49	3.76		
◆ 08-00537-00307	R0.3	0.6	0.45	0.6	0.56	15°	4	27.9	35	4,700	0.68	0.70	0.71	0.73	0.76	
08-00537-00300		1	0.45	0.6	0.56	15°	4	27.5	35	4,700	1.10	1.12	1.15	1.19	1.26	
08-00537-00301		1.5	0.45	0.6	0.56	15°	4	27.0	35	4,300	1.61	1.66	1.71	1.76	1.88	
08-00537-00302		2	0.45	0.6	0.56	15°	4	26.5	35	4,300	2.13	2.19	2.26	2.34	2.50	
08-00537-00303		2.5	0.45	0.6	0.56	15°	4	26.0	35	4,400	2.65	2.73	2.82	2.91	3.12	
08-00537-00304		3	0.45	0.6	0.56	15°	4	25.5	35	4,400	3.16	3.26	3.37	3.49	3.75	
08-00537-00305	R0.4	3.5	0.45	0.6	0.56	15°	4	25.0	35	4,500	3.68	3.80	3.92	4.06	4.37	
08-00537-00306		4	0.45	0.6	0.56	15°	4	29.5	40	4,500	4.20	4.33	4.48	4.64	4.99	
◆ 08-00537-00401		1	0.6	0.8	0.76	15°	4	27.9	35	4,300	1.09	1.12	1.14	1.17	1.24	
08-00537-00402		2	0.6	0.8	0.76	15°	4	26.9	35	4,300	2.13	2.19	2.25	2.32	2.48	
08-00537-00403		3	0.6	0.8	0.76	15°	4	25.9	35	4,500	3.16	3.26	3.36	3.47	3.72	
08-00537-00405		4	0.6	0.8	0.76	15°	4	24.9	35	4,500	4.19	4.33	4.47	4.62	4.97	
08-00537-00406	R0.5	5	0.6	0.8	0.76	15°	4	28.9	40	4,500	5.23	5.40	5.58	5.77	6.21	
◆ 08-00537-00507		1	0.75	1	0.95	15°	4	28.3	35	3,700	1.11	1.13	1.15	1.18	1.24	
◆ 08-00537-00508		1.5	0.75	1	0.95	15°	4	27.8	35	3,700	1.63	1.66	1.71	1.75	1.86	
08-00537-00501		2	0.75	1	0.95	15°	4	27.3	35	3,700	2.14	2.20	2.26	2.33	2.48	
08-00537-00502		2.5	0.75	1	0.95	15°	4	26.8	35	3,700	2.66	2.73	2.82	2.90	3.10	
08-00537-00503		3	0.75	1	0.95	15°	4	26.3	35	3,700	3.18	3.27	3.37	3.48	3.72	
08-00537-00504	R0.6	4	0.75	1	0.95	15°	4	25.3	35	4,100	4.21	4.34	4.48	4.63	4.97	
08-00537-00505		5	0.75	1	0.95	15°	4	29.3	40	4,100	5.24	5.41	5.59	5.78	6.21	
08-00537-00506		6	0.75	1	0.95	15°	4	28.3	40	4,500	6.28	6.48	6.69	6.93	7.45	
08-00537-00602		2.4	0.9	1.2	1.15	15°	4	27.2	35	5,400	2.55	2.62	2.69	2.77	2.95	
08-00537-00603		4	0.9	1.2	1.15	15°	4	25.6	35	5,400	4.21	4.33	4.47	4.61	4.94	
08-00537-00605		6	0.9	1.2	1.15	15°	4	28.6	40	5,900	6.27	6.47	6.68	6.91	7.43	
08-00537-00606	R0.75	8	0.9	1.2	1.15	15°	4	26.6	40	5,900	8.34	8.61	8.90	9.21	9.91	
◆ 08-00537-00751		2	1.1	1.5	1.45	15°	4	28.2	35	4,200	2.13	2.18	2.23	2.29	2.42	
08-00537-00752		3	1.1	1.5	1.45	15°	4	27.2	35	4,200	3.17	3.25	3.34	3.44	3.66	
08-00537-00753		4	1.1	1.5	1.45	15°	4	26.2	35	4,200	4.20	4.32	4.45	4.59	4.91	
08-00537-00754		6	1.1	1.5	1.45	15°	4	29.2	40	4,200	6.27	6.46	6.67	6.89	7.39	
08-00537-00755		8	1.1	1.5	1.45	15°	4	27.2	40	4,400	8.34	8.60	8.88	9.19	9.88	
08-00537-00756	R0.8	10	1.1	1.5	1.45	15°	4	25.2	40	4,700	10.40	10.74	11.10	11.49	12.36	
08-00537-00805		8	1.2	1.6	1.55	15°	4	27.4	40	5,900	8.33	8.60	8.88	9.18	9.87	
◆ 08-00537-00901		R0.9	3	1.3	1.8	1.74	15°	4	27.8	35	5,600	3.18	3.26	3.35	3.44	3.65
◆ 08-00537-00902			4	1.3	1.8	1.74	15°	4	26.8	35	5,600	4.22	4.33	4.46	4.59	4.89
◆ 08-00537-00903			6	1.3	1.8	1.74	15°	4	29.8	40	6,200	6.28	6.47	6.67	6.89	7.38
◆ 08-00537-00904			8	1.3	1.8	1.74	15°	4	27.8	40	6,600	8.35	8.61	8.89	9.19	9.87
◆ 08-00537-00905	10		1.3	1.8	1.74	15°	4	25.8	40	6,600	10.42	10.75	11.11	11.49	12.35	
◆ 08-00537-01006	R1		2	1.5	2	1.94	15°	4	29.1	35	3,700	2.14	2.19	2.23	2.28	2.38
08-00537-01000		3	1.5	2	1.94	15°	4	28.1	35	3,700	3.18	3.25	3.34	3.43	3.63	
08-00537-01001		4	1.5	2	1.94	15°	4	27.1	35	3,700	4.21	4.32	4.45	4.58	4.87	
08-00537-01002		6	1.5	2	1.94	15°	4	25.1	35	4,100	6.28	6.46	6.66	6.88	7.36	

无限白金Plus涂层

高硬度钢材高精度加工用 2 刃长颈球头铣刀可对应热缩刀柄的短柄造型

MUGEN COATING PREMIUM Plus 2-Flute Long Neck Ball End Mill with Short Shank for Hardened Steel and High accuracy cutting

单位 [规格: mm / 价格: 日元]
Unit [Size : mm / Retail Price : JPY]

◆ 2023年10月追加尺寸 ※Released in Oct, 2023.

产品代码 Code No.	(R)球头半径 Radius	(ℓ ₁)颈长 Under Neck Length	(ℓ)刃长 Length of Cut	(D)外径 Dia.	(d ₂)颈径 Neck Dia.	(γ)颈角 Neck Taper Angle	(d)柄径 Shank Dia.	(ℓ ₂)柄长 Shank Length	(L)全长 Overall Length	定价(日元) Retail Price	相对于工件斜度的有效长 Actual effective length depending on inclined angle of work-				
											30°	1°	1°30′	2°	3°
08-00537-01003	R1	8	1.5	2	1.94	15°	4	28.1	40	4,400	8.35	8.60	8.88	9.18	9.84
08-00537-01004		10	1.5	2	1.94	15°	4	26.1	40	4,400	10.41	10.74	11.10	11.48	12.33
08-00537-01005		12	1.5	2	1.94	15°	4	29.1	45	4,400	12.48	12.88	13.31	13.77	14.82
◆ 08-00537-01251	R1.25	4	2.3	2.5	2.4	15°	4	28.0	35	5,500	4.28	4.39	4.50	4.62	4.90
08-00537-01252		6	2.3	2.5	2.4	15°	4	26.0	35	5,500	6.35	6.53	6.72	6.92	7.39
08-00537-01253		8	2.3	2.5	2.4	15°	4	29.0	40	4,800	8.42	8.67	8.93	9.22	9.88
08-00537-01254		10	2.3	2.5	2.4	15°	4	27.0	40	5,800	10.48	10.81	11.15	11.52	12.36
08-00537-01256		15	2.3	2.5	2.4	15°	4	27.0	45	5,900	15.65	16.15	16.69	17.27	Free
08-00537-01500	R1.5	6	2.5	3	2.85	15°	6	33.1	45	4,600	6.44	6.61	6.79	7.00	7.45
08-00537-01501		8	2.5	3	2.85	15°	6	31.1	45	4,600	8.50	8.75	9.01	9.29	9.93
08-00537-01502		10	2.5	3	2.85	15°	6	29.1	45	5,300	10.57	10.89	11.23	11.59	12.42
08-00537-01503		12	2.5	3	2.85	15°	6	27.1	45	5,500	12.64	13.03	13.44	13.89	14.91
08-00537-01504		14	2.5	3	2.85	15°	6	30.1	50	6,200	14.71	15.17	15.66	16.19	17.39
08-00537-01505		16	2.5	3	2.85	15°	6	28.1	50	6,200	16.77	17.31	17.88	18.49	19.88
◆ 08-00537-01507		18	2.5	3	2.85	15°	6	31.1	55	6,200	18.84	19.45	20.09	20.79	22.36
08-00537-01506	20	2.5	3	2.85	15°	6	29.1	55	5,900	20.91	21.58	22.31	23.09	24.85	
08-00537-02000	R2	8	3	4	3.8	15°	6	32.8	45	4,700	8.58	8.81	9.06	9.33	9.93
08-00537-02001		10	3	4	3.8	15°	6	30.8	45	4,700	10.65	10.95	11.28	11.63	12.42
08-00537-02002		12	3	4	3.8	15°	6	28.8	45	6,200	12.72	13.09	13.49	13.93	14.90
08-00537-02004		15	3	4	3.8	15°	6	30.8	50	6,200	15.82	16.30	16.82	17.38	18.63
08-00537-02005		20	3	4	3.8	15°	6	30.8	55	6,200	20.99	21.65	22.36	23.13	Free
08-00537-02006		25	3	4	3.8	15°	6	30.8	60	6,200	26.16	27.00	27.90	28.88	Free
08-00537-02502	R2.5	10	3.5	5	4.8	15°	6	32.7	45	7,200	10.63	10.92	11.22	11.55	Free
08-00537-02503		15	3.5	5	4.8	15°	6	27.7	45	9,900	15.80	16.27	16.77	Free	Free
08-00537-02504		20	3.5	5	4.8	15°	6	27.7	50	10,000	20.97	21.62	Free	Free	Free
◆ 08-00537-02505		25	3.5	5	4.8	15°	6	27.7	55	10,500	26.14	26.96	Free	Free	Free
◆ 08-00537-02506	30	3.5	5	4.8	15°	6	27.7	60	11,000	31.31	Free	Free	Free	Free	
08-00537-03000	R3	10	6	6	5.7	-	6	34.4	45	7,700	Free	Free	Free	Free	Free
08-00537-03001		15	6	6	5.7	-	6	29.4	45	7,700	Free	Free	Free	Free	Free
08-00537-03002		20	6	6	5.7	-	6	29.4	50	7,700	Free	Free	Free	Free	Free
08-00537-03003		25	6	6	5.7	-	6	29.4	55	7,700	Free	Free	Free	Free	Free
08-00537-03004		30	6	6	5.7	-	6	29.4	60	7,900	Free	Free	Free	Free	Free
◆ 08-00537-03005		35	6	6	5.7	-	6	29.4	65	8,700	Free	Free	Free	Free	Free
◆ 08-00537-03006		40	6	6	5.7	-	6	29.4	70	9,200	Free	Free	Free	Free	Free

订购方法
How to Order

请指定MRBSH230SF 球头半径(R) × 颈长(ℓ₁)。
When you order, indicate MRBSH230SF (R) × (ℓ₁) × (d).

※(γ) 为参考值。
※(γ) is reference value.

加工材料 Work Material			高速钢·高硬度钢 High Speed Steels/Hardened Steels SKH51·SKD11(~62HRC)				高速钢 High Speed Steels SKH55·HAP40(~66HRC)				高速钢 High Speed Steels SKH57·HAP72(~70HRC)			
球头半径 (R) Radius	颈长 Under Neck Length	L(颈长)/ D(外径)	切深量 Depth of Cut		进给速度 Feed mm/min	主轴转速 Spindle Speed min ⁻¹	切深量 Depth of Cut		进给速度 Feed mm/min	主轴转速 Spindle Speed min ⁻¹	切深量 Depth of Cut		进给速度 Feed mm/min	主轴转速 Spindle Speed min ⁻¹
			a _p mm	a _e mm			a _p mm	a _e mm			a _p mm	a _e mm		
R0.05	0.2	2	0.002	0.005	100	40,000	0.002	0.003	70	40,000	0.002	0.003	50	40,000
	0.25	2.5	0.002	0.005	80	40,000	0.002	0.003	50	40,000	0.002	0.003	40	40,000
	0.3	3	0.002	0.005	70	40,000	0.002	0.003	50	40,000	0.002	0.003	40	40,000
	0.4	4	0.001	0.005	70	40,000	0.001	0.003	50	40,000	0.001	0.002	30	40,000
	0.5	5	0.001	0.003	50	40,000	0.001	0.002	30	40,000	0.001	0.002	20	40,000
R0.075	0.25	1.7	0.002	0.005	160	40,000	0.002	0.003	120	40,000	0.002	0.003	100	40,000
	0.3	2	0.002	0.005	150	40,000	0.002	0.003	100	40,000	0.002	0.003	80	40,000
	0.4	2.7	0.002	0.005	120	40,000	0.002	0.003	70	40,000	0.002	0.003	50	40,000
	0.5	3.3	0.002	0.005	120	40,000	0.002	0.003	70	40,000	0.002	0.003	50	40,000
	0.6	4	0.001	0.003	100	40,000	0.001	0.002	50	40,000	0.001	0.002	40	40,000
R0.1	0.7	4.7	0.001	0.003	80	40,000	0.001	0.002	40	40,000	0.001	0.002	30	40,000
	0.3	1.5	0.005	0.005	300	40,000	0.003	0.003	200	40,000	0.003	0.003	150	40,000
	0.4	2	0.005	0.005	290	40,000	0.003	0.003	200	40,000	0.003	0.003	150	40,000
	0.5	2.5	0.005	0.005	280	40,000	0.003	0.003	180	40,000	0.003	0.003	130	40,000
	0.6	3	0.003	0.005	250	40,000	0.002	0.003	160	40,000	0.002	0.003	120	40,000
	0.75	3.75	0.003	0.005	200	40,000	0.002	0.003	150	40,000	0.002	0.003	110	40,000
	0.85	4.3	0.002	0.005	180	40,000	0.001	0.003	130	40,000	0.001	0.002	100	40,000
R0.15	1	5	0.002	0.003	160	40,000	0.001	0.002	120	40,000	0.001	0.002	90	40,000
	0.5	1.7	0.007	0.01	300	40,000	0.003	0.005	280	40,000	0.003	0.005	210	40,000
	0.6	2	0.005	0.007	300	40,000	0.003	0.005	250	40,000	0.003	0.005	180	40,000
	0.75	2.5	0.005	0.007	280	40,000	0.003	0.005	230	40,000	0.003	0.005	170	40,000
	1	3.3	0.005	0.007	250	40,000	0.003	0.005	200	40,000	0.003	0.005	150	40,000
	1.25	4.2	0.003	0.005	200	40,000	0.002	0.003	160	40,000	0.002	0.003	120	40,000
R0.2	1.5	5	0.003	0.005	180	40,000	0.002	0.003	120	40,000	0.002	0.003	90	40,000
	0.5	1.25	0.03	0.03	720	40,000	0.009	0.02	580	40,000	0.009	0.02	420	35,000
	0.65	1.6	0.025	0.03	720	40,000	0.009	0.02	580	40,000	0.009	0.02	420	35,000
	0.8	2	0.02	0.03	720	40,000	0.008	0.02	580	40,000	0.008	0.02	420	35,000
	1	2.5	0.02	0.03	720	40,000	0.008	0.02	580	40,000	0.008	0.02	400	35,000
	1.25	3.1	0.015	0.02	620	40,000	0.006	0.02	470	40,000	0.006	0.02	320	35,000
	1.5	3.75	0.01	0.02	500	40,000	0.005	0.01	400	40,000	0.005	0.01	280	35,000
	1.75	4.4	0.01	0.02	450	40,000	0.005	0.01	340	40,000	0.005	0.01	250	35,000
	2	5	0.007	0.01	380	40,000	0.005	0.007	300	40,000	0.005	0.007	220	35,000
R0.25	2.25	5.6	0.005	0.01	330	40,000	0.003	0.005	280	40,000	0.003	0.005	200	35,000
	2.5	6.25	0.005	0.007	300	40,000	0.003	0.005	260	40,000	0.003	0.005	190	35,000
	0.5	1	0.03	0.04	860	40,000	0.015	0.03	650	40,000	0.015	0.02	450	30,000
	1	2	0.02	0.03	860	40,000	0.01	0.02	650	35,000	0.01	0.02	450	30,000
	1.5	3	0.01	0.03	720	40,000	0.007	0.02	520	35,000	0.007	0.02	350	30,000
	2	4	0.01	0.02	650	40,000	0.007	0.01	400	35,000	0.007	0.01	270	30,000
	2.5	5	0.007	0.01	530	40,000	0.005	0.007	360	35,000	0.005	0.007	240	30,000
	3	6	0.007	0.01	420	35,000	0.005	0.007	320	35,000	0.005	0.007	220	30,000
	R0.3	0.6	1	0.03	0.08	1,000	40,000	0.02	0.05	720	35,000	0.02	0.05	540
1		1.7	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	0.02	0.05	540	25,000
1.5		2.5	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	0.02	0.05	540	25,000
2		3.3	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	0.02	0.05	540	25,000
2.5		4.1	0.02	0.04	840	40,000	0.02	0.03	640	30,000	0.02	0.03	480	25,000
3		5	0.02	0.04	840	40,000	0.02	0.03	600	30,000	0.02	0.03	450	25,000
3.5		5.9	0.01	0.03	600	30,000	0.01	0.02	420	30,000	0.01	0.02	310	25,000
4		6.7	0.01	0.03	600	30,000	0.01	0.02	420	30,000	0.01	0.02	310	25,000
R0.4	1	1.3	0.08	0.12	1,600	38,000	0.06	0.1	1,200	35,000	0.035	0.1	900	28,000
	2	2.5	0.07	0.1	1,600	35,000	0.05	0.1	1,200	30,000	0.03	0.1	900	25,000
	3	3.75	0.05	0.1	1,600	35,000	0.05	0.05	1,200	30,000	0.03	0.05	900	25,000
	4	5	0.04	0.06	1,200	30,000	0.03	0.05	860	25,000	0.02	0.05	640	20,000
	5	6.25	0.03	0.05	1,000	25,000	0.02	0.03	620	25,000	0.015	0.03	460	20,000

切削参数参考表 Recommended Conditions

加工材料 Work Material			高速钢·高硬度钢 High Speed Steels/Hardened Steels SKH51·SKD11(~62HRC)				高速钢 High Speed Steels SKH55·HAP40(~66HRC)				高速钢 High Speed Steels SKH57·HAP72(~70HRC)			
球头半径 (R) Radius	颈长 Under Neck Length	L(颈长)/ D(外径)	切深量 Depth of Cut		进给速度 Feed	主轴转速 Spindle Speed	切深量 Depth of Cut		进给速度 Feed	主轴转速 Spindle Speed	切深量 Depth of Cut		进给速度 Feed	主轴转速 Spindle Speed
			ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹
R0.5	1	1	0.1	0.2	2,000	30,000	0.08	0.12	1,400	25,000	0.05	0.12	1,000	20,000
	1.5	1.5	0.1	0.2	2,000	30,000	0.08	0.12	1,400	25,000	0.05	0.12	1,000	20,000
	2	2	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000	0.05	0.1	1,000	20,000
	2.5	2.5	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000	0.05	0.1	1,000	20,000
	3	3	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000	0.05	0.1	1,000	20,000
	4	4	0.05	0.15	1,600	28,000	0.05	0.1	1,200	25,000	0.03	0.1	900	20,000
R0.6	5	5	0.04	0.1	1,400	25,000	0.03	0.05	920	20,000	0.02	0.05	700	16,000
	6	6	0.04	0.05	1,200	22,000	0.02	0.05	740	20,000	0.015	0.05	550	16,000
	2.4	2	0.1	0.2	2,000	30,000	0.08	0.1	1,600	25,000	0.05	0.1	1,200	20,000
	4	3.3	0.1	0.2	2,000	30,000	0.06	0.1	1,600	25,000	0.05	0.1	1,200	20,000
R0.75	6	5	0.05	0.1	1,400	25,000	0.03	0.07	1,000	20,000	0.02	0.07	750	16,000
	8	6.7	0.03	0.07	1,200	22,000	0.02	0.05	850	20,000	0.015	0.05	650	16,000
	2	1.3	0.1	0.3	2,500	30,000	0.1	0.2	2,000	25,000	0.06	0.2	1,500	20,000
	3	2	0.1	0.3	2,500	30,000	0.1	0.2	2,000	25,000	0.06	0.2	1,500	20,000
R0.8	4	2.7	0.1	0.3	2,000	25,000	0.1	0.2	1,600	22,000	0.06	0.2	1,200	18,000
	6	4	0.1	0.2	1,600	22,000	0.1	0.1	1,200	20,000	0.06	0.1	950	16,000
	8	5.3	0.05	0.2	1,400	20,000	0.05	0.1	1,000	18,000	0.03	0.1	700	13,000
R0.9	10	6.7	0.05	0.1	1,200	18,000	0.05	0.05	850	16,000	0.03	0.05	650	13,000
	8	5	0.07	0.2	1,400	20,000	0.05	0.1	1,000	16,000	0.03	0.1	750	13,000
	3	1.7	0.12	0.3	2,500	25,000	0.1	0.25	2,000	20,000	0.08	0.2	1,500	16,000
	4	2.2	0.12	0.25	2,500	25,000	0.1	0.2	1,800	20,000	0.08	0.2	1,500	16,000
	6	3.3	0.12	0.25	2,500	25,000	0.1	0.2	1,600	18,000	0.08	0.2	1,200	16,000
R1	8	4.4	0.08	0.2	2,300	23,000	0.08	0.15	1,400	17,000	0.06	0.1	750	13,000
	10	5.6	0.08	0.2	1,700	18,000	0.08	0.12	1,100	14,000	0.03	0.1	750	11,000
	2	1	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000	0.1	0.3	1,500	16,000
	3	1.5	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000	0.1	0.3	1,500	16,000
	4	2	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000	0.1	0.3	1,500	16,000
R1.25	6	3	0.2	0.3	2,000	22,000	0.15	0.3	1,600	20,000	0.1	0.3	1,200	16,000
	8	4	0.1	0.2	1,600	18,000	0.1	0.15	1,200	16,000	0.06	0.15	950	13,000
	10	5	0.1	0.2	1,400	16,000	0.1	0.1	1,000	14,000	0.06	0.1	750	11,000
	12	6	0.07	0.1	1,200	14,000	0.05	0.1	850	12,000	0.03	0.1	650	9,500
	4	1.6	0.2	0.5	2,500	20,000	0.15	0.4	2,000	18,000	0.1	0.4	1,500	14,000
	6	2.4	0.2	0.5	2,500	20,000	0.15	0.4	2,000	18,000	0.1	0.4	1,500	14,000
R1.5	8	3.2	0.2	0.3	2,100	20,000	0.15	0.3	1,800	18,000	0.1	0.3	1,300	14,000
	10	4	0.15	0.2	1,800	18,000	0.1	0.15	1,500	16,000	0.06	0.15	1,100	13,000
	15	6	0.07	0.15	1,200	14,000	0.05	0.1	900	12,000	0.03	0.1	700	9,500
	6	2	0.2	0.6	2,500	18,000	0.2	0.5	2,000	15,000	0.12	0.5	1,500	12,000
	8	2.7	0.2	0.6	2,500	18,000	0.2	0.5	2,000	15,000	0.12	0.5	1,500	12,000
	10	3.3	0.2	0.4	2,100	18,000	0.15	0.3	1,800	15,000	0.1	0.3	1,300	12,000
	12	4	0.2	0.4	2,000	18,000	0.1	0.3	1,500	15,000	0.06	0.3	1,100	12,000
	14	4.7	0.1	0.3	1,600	16,000	0.1	0.2	1,200	12,000	0.06	0.2	900	10,000
R2	16	5.3	0.1	0.3	1,600	16,000	0.1	0.2	1,200	12,000	0.06	0.2	900	10,000
	18	6	0.1	0.2	1,400	16,000	0.1	0.15	960	12,000	0.06	0.15	750	9,500
	20	6.7	0.08	0.2	1,200	14,000	0.08	0.1	850	12,000	0.06	0.1	650	9,500
	8	2	0.2	0.8	2,500	15,000	0.2	0.6	2,000	12,000	0.15	0.6	1,500	9,500
	10	2.5	0.2	0.8	2,500	15,000	0.2	0.6	2,000	12,000	0.15	0.6	1,500	9,500
	12	3	0.2	0.8	2,500	15,000	0.2	0.6	2,000	12,000	0.15	0.6	1,500	9,500
R2.5	15	3.75	0.2	0.8	2,000	15,000	0.15	0.6	1,600	12,000	0.12	0.6	1,200	9,500
	20	5	0.1	0.6	1,700	14,000	0.1	0.4	1,200	10,000	0.08	0.4	900	8,000
	25	6.25	0.1	0.4	1,200	14,000	0.1	0.2	850	10,000	0.08	0.2	650	8,000
	10	2	0.2	1.2	2,500	12,000	0.2	0.7	2,000	10,000	0.15	0.7	1,500	8,000
	15	3	0.2	1.2	2,500	12,000	0.2	0.7	2,000	10,000	0.15	0.7	1,500	8,000
R2.5	20	4	0.2	1	2,000	10,000	0.15	0.6	1,600	8,500	0.12	0.6	1,200	6,500

加工材料 Work Material			高速钢·高硬度钢 High Speed Steels/Hardened Steels SKH51·SKD11(~62HRC)				高速钢 High Speed Steels SKH55·HAP40(~66HRC)				高速钢 High Speed Steels SKH57·HAP72(~70HRC)			
球头半径 (R) Radius	颈长 Under Neck Length	L(颈长)/ D(外径)	切深量 Depth of Cut		进给速度 Feed mm/min	主轴转速 Spindle Speed min ⁻¹	切深量 Depth of Cut		进给速度 Feed mm/min	主轴转速 Spindle Speed min ⁻¹	切深量 Depth of Cut		进给速度 Feed mm/min	主轴转速 Spindle Speed min ⁻¹
			ap mm	ae mm			ap mm	ae mm			ap mm	ae mm		
R2.5	25	5	0.15	0.8	1,800	8,600	0.1	0.3	1,200	7,200	0.08	0.3	1,000	6,500
	30	6	0.15	0.5	1,500	7,600	0.1	0.2	860	6,400	0.08	0.2	750	6,000
R3	10	1.7	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000	0.15	1	1,500	5,500
	15	2.5	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000	0.15	1	1,500	5,500
	20	3.3	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000	0.15	1	1,500	5,500
	25	4.1	0.2	1	2,200	8,000	0.15	0.7	1,600	7,000	0.12	0.7	1,200	5,500
	30	5	0.2	1	1,800	7,000	0.15	0.7	1,300	6,500	0.12	0.7	950	5,000
	35	5.8	0.17	0.8	1,600	6,800	0.12	0.5	1,200	5,800	0.1	0.5	800	4,500
	40	6.7	0.15	0.6	1,200	6,400	0.1	0.4	1,000	5,200	0.08	0.4	650	4,000
备注 Notes			※1 切深量的ap表示轴向切深量，ae表示径向切深量。 ※2 发生振刀等情况时，请根据需要调整切削参数。 ※3 R角等切削阻力大的部位，请特别注意参数设定和刀路轨迹等。 ※4 请以相同的比率调整主轴转速和进给速度。 ※5 刀具的夹持方法建议采用热缩刀柄型。使用弹簧筒夹型等夹持方法时，请确认最小夹持长度。 ※6 建议使用油雾冷却方式。 ※1 Depth of Cut ap indicates Axial Depth of Cut, ae indicates Radial Depth of Cut. ※2 In case of chattering etc., please adjust cutting conditions if necessary. ※3 At point where cutting load is high such as at corners, pay attention to setting cutting conditions and tool paths particularly. ※4 Adjust both spindle speed and feed at the same rate. ※5 A shrink fit type is recommended for tool holder. When using collet type or others, strictly adhere to minimum gripping length. ※6 We recommend using oil mist coolant.											

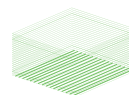
尺寸精度比较

Comparison of dimensional accuracy

HAP72 (70HRC): 精加工后的尺寸精度对比
HAP72 (70HRC): Comparison of dimensional accuracy after finish cutting

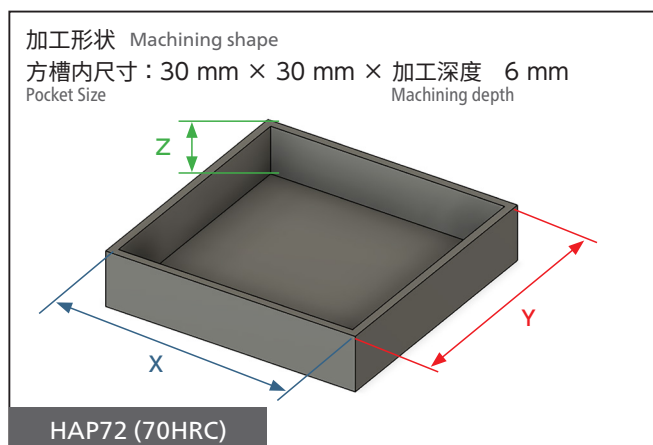
工具 Tool : MRBSH230SF R1×6
加工内容 : 精加工 1 个方槽
Machining content : Finishing cutting for 1 pocket

加工时间 Machining time : 32 分钟 / 个 min/per pocket
刀路轨迹 Tool path : 等高线精加工 (侧面)
Contour line finishing
平行线精加工 (底面)
Scanning line finishing



精加工 Finishing

n = 16,000min⁻¹ vf = 1,000mm/min ap 0.03 × ae 0.03mm 油雾 Oil Mist



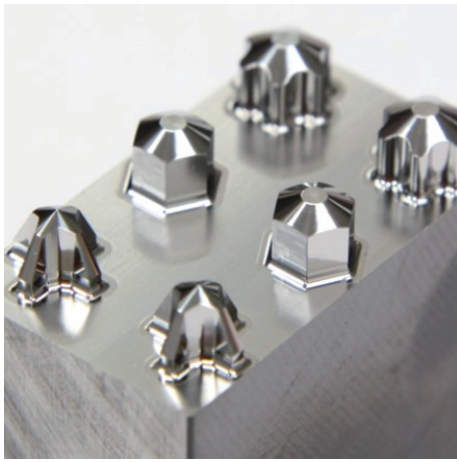
加工案例 1

Machining Case 1

HAP72 (68HRC) 螺丝头部形状3种冲头造型

即使是68HRC的高硬度钢也能实现高精度加工

Realize high precision even machining on 68HRC hardened steel



加工材料：HAP72 (68HRC)

Work Material

冷却方式：油雾

Coolant Oil mist

总加工时间：8 小时 25 分钟

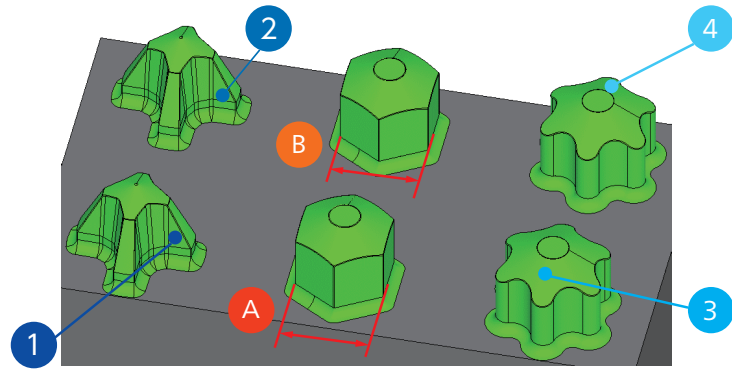
Total machining time 8hr 25min

工件尺寸：20×35mm

Work size

加工深度：5.1mm

Machining depth



面粗度

Surface Roughness

单位
Unit [μm]

测定位置 Measuring position	Ra	Rz
1 加工初期 At the beginning	0.176	1.320
2 加工終期 At the end	0.155	1.125
3 加工初期 At the beginning	0.114	0.963
4 加工終期 At the end	0.142	0.877

加工精度

Accuracy

单位
Unit [mm]

测定位置 Measuring position	目标值 Target	实测值 Actual	误差 Error	倾斜量 Deflection
A 加工初期 At the beginning	5.080	5.087	0.007	0.001 以下 under
B 加工終期 At the end	5.080	5.090	0.010	0.001

加工工序 Process	粗加工 Roughing	侧面中精加工 & 底面精加工 Side semi-finishing & Bottom finishing	余量 Stock	精加工 Finishing
使用工具 Tool	MRBSH230SF R1×4	MRBSH230SF R1×4	MRBSH230SF R0.5×4	MRBSH230SF R0.5×4
主轴转速 [min ⁻¹] Spindle speed	16,000		18,000	
进给速度 [mm/min] Feed	1,500	600	300	400
切深量 [mm] Depth of cut ap × ae	0.1 × 0.3	pf: 0.03	pf: 0.03	pf: 0.02
余量 [mm] Stock	0.015	侧面 Side 0.01 底面 Bottom —	0.01	—
加工时间 Machining time	181 分钟 181 min	95 分钟 95 min	80 分钟 80 min	149 分钟 149 min

※ pf: 步距量
※ pf: Pick feed

加工案例 2

Machining Case 2

HAP40 (65HRC) 齿轮冲压形状

HAP40 (65HRC) Gear shape punch mold

即使超过4小时的长时间精加工也能实现高精度

High precision even during long finishing over 4 hours



加工材料：HAP40 (65HRC)

Work Material

冷却方式：油雾

Coolant Oil mist

总加工时间：8 小时 46 分钟

Total machining time 8hr 46min

工件尺寸：Φ25×50mm

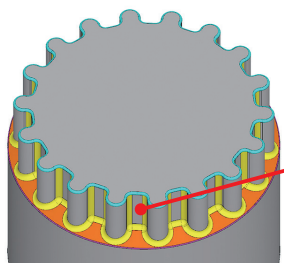
Work size

加工深度：6mm

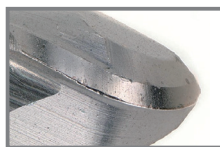
Machining depth

面粗度

Surface Roughness



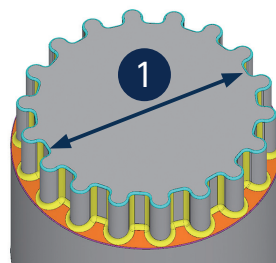
单位 Unit [μm]	
测定位置 Measuring position	侧面部 Side
Ra	0.031
Rz	0.225



刀刃磨耗量 0.003mm
(侧面精加工2小时后)
R edge retreat amount 0.003mm
after side finishing for 2 hours

加工精度

Accuracy



单位 Unit [mm]	
测定位置 Measuring position	1
目标值 Target	20.644
实测值 Actual	20.647
误差 Error	0.003

工具磨损

Tool wear

加工工序 Process	粗加工 Roughing	清角加工 Stock	中精加工 Semi-finishing	精加工 Finishing
使用工具 Tool	MRBSH230SF R1×6	MRBSH230SF R0.5×5	MRBSH230SF R0.5×5	MRBSH230SF R0.5×5
前刀面 Rake side				
外周刃 Peripheral cutting edge				
R 底刃部 R end cutting edge				
主轴转速 [min ⁻¹] Spindle speed	20,000			12,000
进给速度 [mm/min] Feed	1,600	920	920	460
切深量 [mm] Depth of cut ap × ae	0.15 × 0.3	0.03 × 0.1	侧面 Side 0.03 × 0.02 平面 Flat 0.02 × 0.05	pf : 0.015
余量 [mm] Stock	0.03		0.01	—
加工时间 Machining time	24 分钟 24 min	3小时 8分钟 3 hr 8 min	1小时 8分钟 1 hr 8 min	4小时 6分钟 4 hr 6 min

实现±3μm的高精度R角加工

Machining accuracy achieved by high R accuracy of ±3μm



加工材料：YXR3 (61HRC)

Work Material

冷却方式：油雾

Coolant Oil mist

总加工时间：7 小时 27 分钟

Total machining time 7hr 27min

工件尺寸：60 × 60mm

Work size

加工深度：4mm

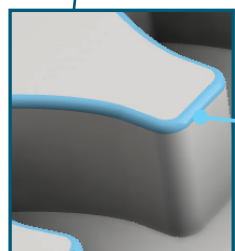
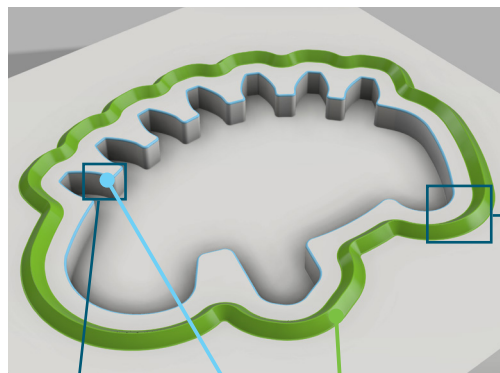
Machining depth

※总加工时间包含压板部、凹模与形状部分(白色部)的加工时间

※Total machining time includes WEDM process (white part) both blank holder part and die part

面粗度

Surface Roughness

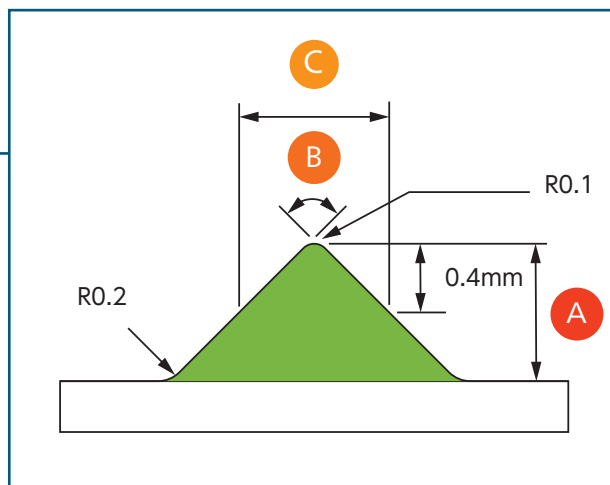


1 面粗度
Surface roughness

2 面粗度
Surface roughness

加工精度

Accuracy

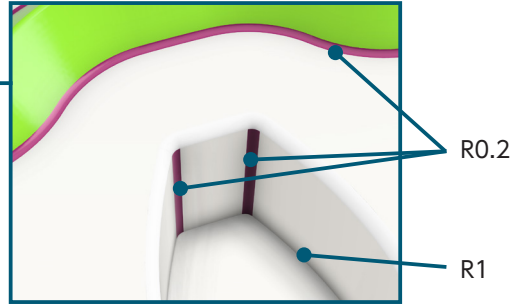
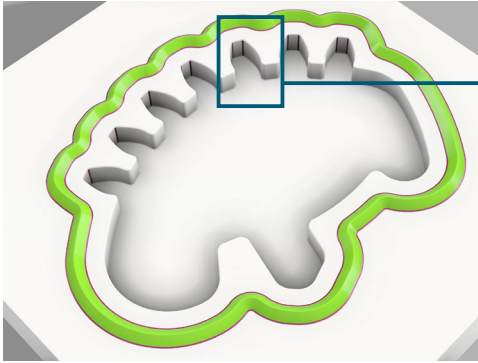


单位
Unit [μm]

测定位置 Measuring position	1	2
使用工具 Tool	MRBSH230SF R0.5×2	MRBSH230SF R0.2×1
Ra	0.145	0.080
Rz	1.192	0.521

测定位置 Measuring position	A	B	C
目标值 Target	0.958mm	90°0'00"	0.883mm
实测值 Actual	0.958mm	90°15'10"	0.888mm
误差 Error	0.000mm	0°15'10"	0.005mm

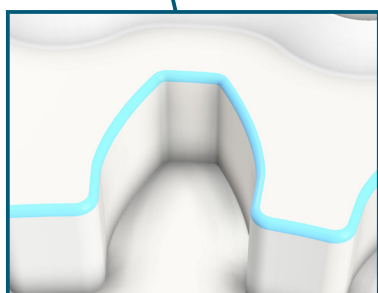
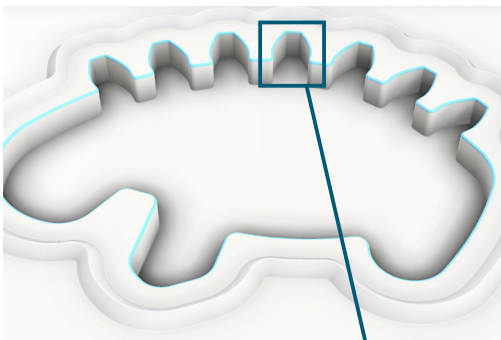
压板部 Blank holder



加工工序 Process	粗加工 Roughing	中精加工 Semi-finishing	平坦部精加工 Finishing	清角加工 Stock	精加工 Finishing	清角加工 Stock	清角加工 Stock
使用工具 Tool	MRBSH230SF R1 × 4	MRBSH230SF R1 × 4		MRBSH230SF R0.5 × 2		MRBSH230SF R0.25 × 1.5	MRBSH230SF R0.2 × 1
主轴转速 [min ⁻¹] Spindle speed	25,000			30,000			
进给速度 [mm/min] Feed	2,500			1,000	540	540	
切深量 [mm] Depth of cut ap × ae	0.2 × 0.5	pf : 0.05	pf : 0.08	pf : 0.05	pf : 0.03	pf : 0.03	pf : 0.02
余量 [mm] Stock	0.03	0.01	-	0.01	- (只加工内角部 0.005) Only corner part		-
加工时间 Machining time	39 分钟 39 min	40 分钟 40 min	1 小时 6 分钟 1 hr 6 min	1 小时 3 分钟 1 hr 3 min		47 分钟 47 min	1 小时 26 分钟 1 hr 26 min

※ pf : 步距量
※ pf : Pick feed

凹模部 Die



加工工序 Process	粗加工 Roughing	精加工 Finishing
使用工具 Tool	MRBSH230SF R0.25 × 1.5	MRBSH230SF R0.2 × 1
主轴转速 [min ⁻¹] Spindle speed	30,000	
进给速度 [mm/min] Feed	540	
切深量 [mm] Depth of cut ap × ae	0.01 × 0.03	pf : 0.01
余量 [mm] Stock	0.003	-
加工时间 Machining time	1 小时 11 分钟 1 hr 11 min	35 分钟 35 min

※ pf : 步距量
※ pf : Pick feed

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公众号



警告 CAUTION 使用上的安全注意事项 Attention on Safety

- 1) 拿取刀具使用时, 请特别小心避免损坏刀刃。
- 2) 请勿空手触摸刀刃。
- 3) 为了安全, 使用刀具时请带防护眼镜。
- 4) 选用适合刀具和实际加工内容的刀柄。刀柄装夹后将刀柄的偏摆量控制最低。
- 5) 加工工件必须固定好。
- 6) 请预先测量刀具及加工材料的尺寸。
- 7) 请根据工件形状和使用设备情况来调节切削参数。
- 8) 根据实际用途请选择适合的冷却方式。使用切削油时, 请采取防火措施以免发生火花引起火灾等发生。
- 9) 加工过程中如发生异常现象(异常声音或烟雾)时, 请立即停止机床。
- 10) 请勿改造刀具。

- 1) When removing tools from cases, be careful of getting-out of tools and don't touch directly the cutting edges.
- 2) Never touch the cutting edges directly with bare hand.
- 3) Use safety covers and eye protection, as tools may be broken.
- 4) Use holders, etc. that match the tools and nature of the processing operations. The tool should be firmly attached to the holder to prevent shaking.
- 5) The work materials clamp firmly.
- 6) Make sure of dimensions of tools and work pieces before starting operation.
- 7) It is necessary to adjust conditions according to the dimensions of work materials and the machine.
- 8) Select a cutting fluid appropriate to the particular usage. Using a non-water cutting fluid could lead to fires due to sparks generated during processing or heat caused by breakage. Ensure that you take proper fire-prevention measures.
- 9) If abnormal sound, etc. occurs during processing, stop the machine immediately.
- 10) Don't modify tools.

XXX

23'12

MRBSH2305F_CN_A1_202312



JQA-QM096

JQA-EM0712

■ 本册中列出的产品规格将来可能会发生改变, 恕不另行通知。
Specifications may change without notice for improvement.