NS TOOL

「匠」心创先

无限白金Plus涂层
高硬度钢材 高精度加工用
4刃长颈圆鼻铣刀

可对应热缩刀柄的短柄造型

MUGEN COATING PREMIUM Plus 4-Flute Long Neck Corner Radius End Mill with short shank for Hardened Steel and High accuracy cutting

MHRSH430RSF 增加规格 Size Expansion

全 205 种规格
Total 205 sizes

规格增加到φ0.1～φ6，为了提升加工面粗度品质采用修光刃与高精度R角设计可改善对于高硬度钢材的高精度精加工

Lineup extended from φ 0.1 to φ 6, combining specialized tool design and high accuracy corner R enhance finishing performance on hardened steels

无限白金Plus涂层
高硬度钢材 高精度加工用 4刃长颈圆鼻刀
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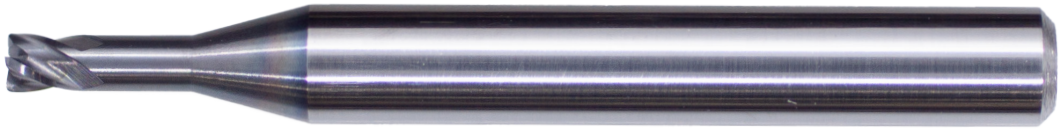
MUGEN COATING PREMIUM Plus 4-Flute Long Neck Corner Radius End Mill with short shank for Hardened Steel and High accuracy cutting

MHRSH430RSF

增加规格 Lineup Expansion

φ 0.1 × R0.01 ～φ 6 × R1

共 205 种规格
Total 205 sizes

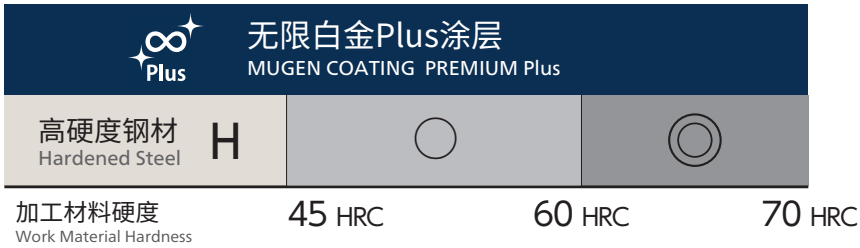


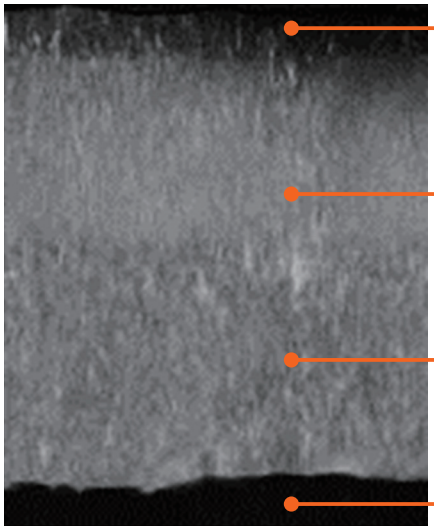
特点
Features

Feature 1 — 刀具寿命长 Long tool life — 无限白金 Plus 涂层 MUGEN COATING PREMIUM Plus

高耐氧化和高耐磨耗性的无限白金Plus涂层，对60HRC以上的材料有最佳的加工效果
对45HRC～60HRC也能拥有与无限白金涂层有同样良好的加工性能

High oxidation resistance and abrasion resistance is suitable for machining above 60HRC
Demonstrates same performance with MUGEN COATING PREMIUM even on machining 45 ~ 60HRC





耐氧化涂层
Oxidation resistant layer
可以抑制切削热所引起的氧化现象
Prevents oxidation due to heat generated during cutting

硬质涂层
Hard coating layer
加工高硬度钢材时可以抑制刀具磨耗
Tool wear can be reduced when machining on high hardened steel

高黏着性涂层
High adhesion coating layer
可抑制龟裂产生并减少冲击力的传播
Structure that is difficult to crack and propagate when impact forced

超超微粒子硬质合金
Super Micro Grain Carbide

Feature 2

提升加工面品质与精度
Excellent accuracy and surface roughness

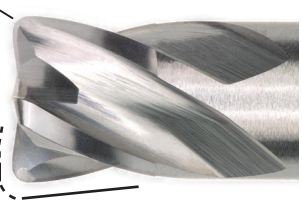
高精度 R 角与修光刃造型
High accuracy corner R and wiper

追求加工精度与表面粗糙度的圆鼻铣刀
Corner radius end mill to pursue accuracy and surface roughness

＜底刃形状＞ 无中心刃
End tooth profile no center tooth
φ 0.1 × R0.01 ～φ 2 × R0.5

＜底刃形状＞ 有中心刃
End tooth profile with center tooth
φ 3 × R0.05 ～φ 6 × R1

高精度R角造型
High accuracy corner R

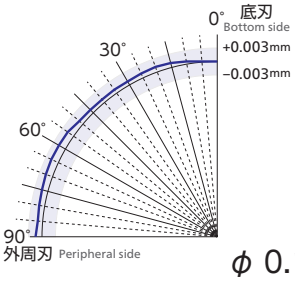


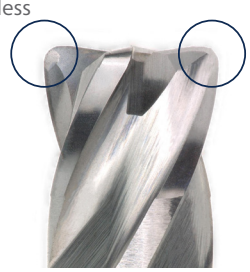
修光刃造型
Wiper

强倒锥造型
Strong back taper

可提升侧面加工的表面粗糙度与加工精度

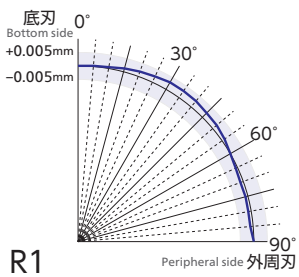
高精度R角与无段差设计
Enhances surface roughness and accuracy on side machining
High accuracy corner R and Seamless





φ 0.1 × R0.01 ～φ 2 × R0.5
R 角精度 ± 0.003 mm
Corner Radius

φ 3 × R0.05 ～φ 6 × R1
R 角精度 ± 0.005 mm
Corner Radius

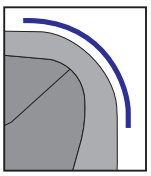


从底刃到外周刃采用无段差造型的刃口设计不仅可提升R角本身的精度更能提高加工面的品质 (D≧φ0.4)

Corner R and peripheral cutting edge are seamlessly connected, and the smooth cutting edge improves the surface roughness on side machining

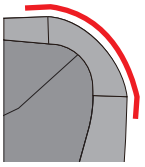
MHRSH430RSF

无段差设计
Seamless



无段差
Seamless

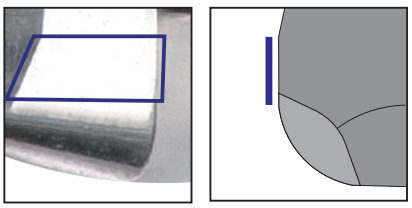
一般的R角造型
General Corner Radius



有段差
Seam

可提升平面加工的表面粗糙度

修光刃造型
Improves surface roughness on bottom by wiper
(D≧φ0.4)



底刃采用修光刃造型，可提升平面加工时的表面粗糙度品质

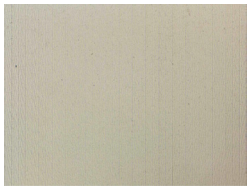
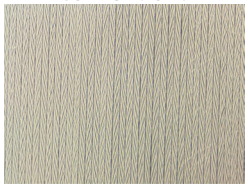
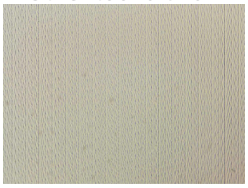
By adopting wiper at the end tooth, improves the surface roughness on bottom surface machining

平面加工后的表面粗糙度比较
Surface roughness comparison after bottom surface finishing

加工材料
Work material
HAP40 (64HRC)

刀具尺寸
Tool size
φ2×R0.2×6

拍摄倍率400倍
Magnification rate

MHRSH430RSF	现有产品 Conventional	其他品牌A Other tool brand A	其他品牌B Other tool brand B
			
Ra 0.010μm	Ra 0.028μm	Ra 0.029μm	Ra 0.026μm

规格增加到φ0.1～φ6，为了提升加工面粗度品质采用修光刃与高精度R角设计可改善对于高硬度钢材的高精度精加工

Lineup extended from φ 0.1 to φ 6, combining specialized tool design and high accuracy corner R enhance finishing performance on hardened steels

Feature 3

提升加工精度
Improved cutting accuracy

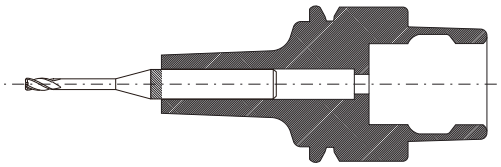
高精度刀柄与最合适的刀具伸出量设计
Optimal overhung length by high accuracy short shank

高刚性设计可实现高精度加工
Realized high rigidity and high precision machining

MHRSH430RSF

高精度柄径公差，
可对应热缩刀柄的高刚性设计

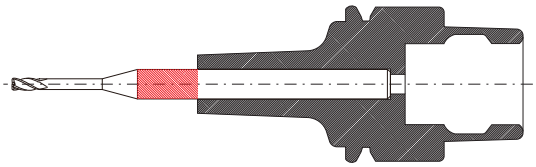
High precision short shank
High rigidity with shrink fit chuck



现有产品
Conventional

柄径公差范围大、伸出量过长
容易造成加工中所需刚性不足

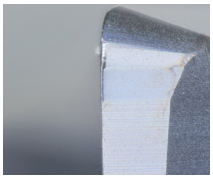
Shank tolerance with wide range
long overhung caused lower tool rigidity



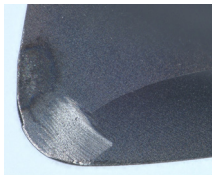
加工60分钟后的面粗度与刀具磨耗状态
Surface roughness and wear after 60 mins machining

使用刀具 Tool	MHRSH430RSF φ2×R0.2×6
加工材料 Work material	HAP40 (64HRC)
主轴转速 Spindle speed	12,000 min^{-1}
进给速度 Feed	1,000 mm/min
切深量 Depth of cut	ap 0.02×ae 0.05 mm

刀具磨耗
Tool wear



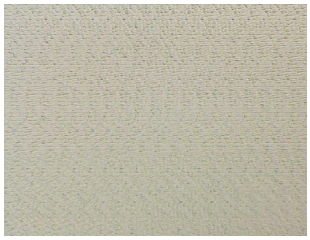
底刃
End tooth
后刀面磨耗宽度
Frank wear width
0.023mm



R角部
Corner R
R后退量
R retreat amount
0.003mm

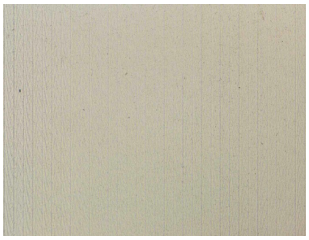
表面粗糙度
Surface roughness

1 0°直壁面 Wall



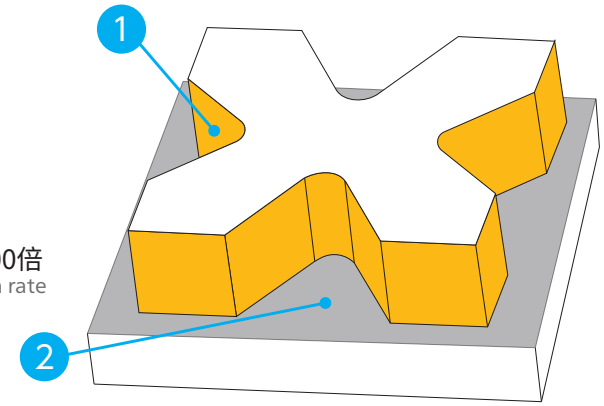
Ra 0.052μm

2 平面 Bottom



Ra 0.010μm

拍摄倍率400倍
Magnification rate



可连接各种刀具信息
Leads to various tool information

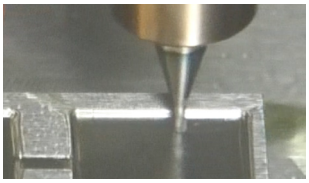
请扫描刀盒背面的二维码
From 2D barcode on back of product case

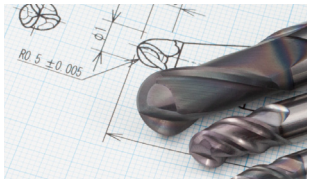
无限白金Plus涂层
高硬度钢材 高精度加工用 4刃长颈圆鼻铣刀
可对应热缩刀柄的短柄造型

MUGEN COATING PREMIUM Plus 4-Flute Long Neck Corner Radius End Mill with short shank for Hardened Steel and High accuracy cutting

可以查看最新的视频
You can check disclosure information

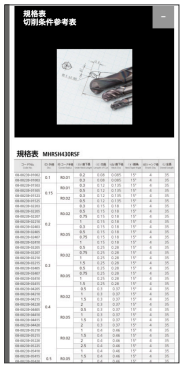
MHRSH430RSF的案例
Example for MHRSH430RSF





刀具特点
Features

尺寸·切削条件
Size and Milling conditions



加工视频等
Video etc

其他
Others

介绍网页 Corporate Web Site

网页咨询 Contact us

型录下载 Product Leaflet

咨询电话 Contact us by phone

未来预计将扩大服务范围
We will expand NS Tool Connect web service widely for future products

MHRSH430RSF

New 增加规格 Size Expansion

规格 Size φ 0.1 × R0.01 ～ φ 6 × R1

Plus ≦70 HRC

无限白金Plus涂层
高硬度钢材 高精度加工用 4刃长颈圆鼻铣刀 可对应热缩刀柄的短柄造型
MUGEN COATING PREMIUM Plus 4-Flute Long Neck Corner Radius End Mill with short shank for Hardened Steel and High accuracy cutting

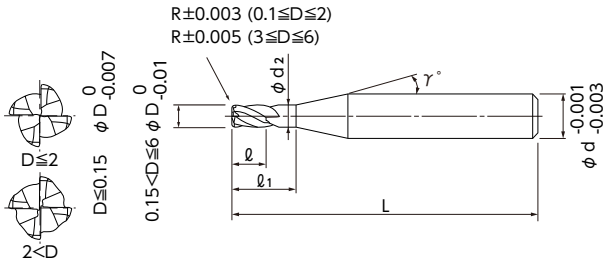
共 205 种规格
Total 205 sizes

规格增加到φ6，为了提升加工面粗度品质采用修光刃与高精度R角设计可改善对于高硬度钢材的高精度精加工

Lineup extended up to φ 6, combining specialized tool design and high accuracy corner R enhance finishing performance on hardened steels

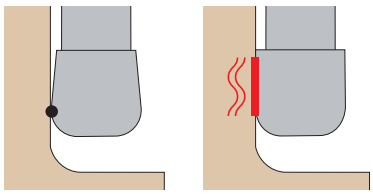
SMG | 4 | 30° | Corner R ±0.003 (D≦2) | Corner R ±0.005 (D≧3) | φd 0 -0.001 -0.003

Connect For Cutting Tomorrow | Side | Slot | Face



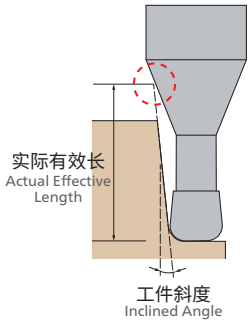
φ 0.1 ～φ 2 为底刃中心没有刃口。请留意此设计并注意加工余量。
Please be aware of stock since there is no cutting edge from the center to the bottom.

- 针对高硬度钢材用的无限白金 Plus 涂层配合强倒锥造型
  可实现稳定的刀具寿命并抑制振刀进而达到良好的精加工面。
- 可实现高效率加工的 4 刃造型。
- 4 刃刀具最小径从φ 0.1 ～φ 6，共 205 种规格。
- MUGEN COATING PREMIUM Plus for hardened steels with strong back taper reduce chattering to realize long tool life and excellent finishing surface.
- 4-flute end mill for high efficiency machining.
- The smallest diameter of 4-flute end mills standardizes from φ 0.1, total 131 sizes.



加工材料 Work Material

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



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

产品代码 Code No.	(D) 外径 Dia.	(R) 角半径 Corner Radius	(ℓ1) 颈长 Under Neck Length	(ℓ) 刃长 Length of Cut	(d2) 颈径 Neck Dia.	(γ) 颈角 Neck Taper Angle	(d) 柄径 Shank Dia.	(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 workpiece				
										30′	1°	1°30′	2°	3°
08-00239-01002	0.1	R0.01	0.2	0.08	0.085	15°	4	35	12,300	0.23	0.24	0.25	0.26	0.28
08-00239-01003			0.3	0.08	0.085	15°	4	35	12,300	0.33	0.35	0.36	0.37	0.4
08-00239-01503	0.15	R0.01	0.3	0.12	0.135	15°	4	35	12,300	0.33	0.35	0.36	0.37	0.4
08-00239-01505			0.5	0.12	0.135	15°	4	35	12,300	0.54	0.56	0.58	0.6	0.65
08-00239-01523		R0.02	0.3	0.12	0.135	15°	4	35	12,300	0.33	0.34	0.36	0.37	0.4
08-00239-01525			0.5	0.12	0.135	15°	4	35	12,300	0.54	0.56	0.58	0.6	0.65
08-00239-02203	0.2	R0.02	0.3	0.15	0.18	15°	4	35	12,300	0.34	0.35	0.37	0.38	0.41
08-00239-02205			0.5	0.15	0.18	15°	4	35	12,300	0.55	0.57	0.59	0.61	0.66
08-00239-02207			0.75	0.15	0.18	15°	4	35	12,300	0.81	0.84	0.87	0.9	0.97
08-00239-02210			1	0.15	0.18	15°	4	35	12,300	1.07	1.1	1.14	1.18	1.28
08-00239-02403		R0.05	0.3	0.15	0.18	15°	4	35	12,300	0.34	0.35	0.36	0.38	0.4
08-00239-02405			0.5	0.15	0.18	15°	4	35	12,300	0.55	0.57	0.59	0.61	0.65
08-00239-02407			0.75	0.15	0.18	15°	4	35	12,300	0.81	0.83	0.86	0.89	0.96
08-00239-02410			1	0.15	0.18	15°	4	35	12,300	1.07	1.1	1.14	1.18	1.27
08-00239-03205	0.3	R0.02	0.5	0.25	0.28	15°	4	35	12,300	0.55	0.57	0.59	0.61	0.66
08-00239-03207			0.75	0.25	0.28	15°	4	35	12,300	0.81	0.84	0.87	0.9	0.97
08-00239-03210			1	0.25	0.28	15°	4	35	12,300	1.07	1.1	1.14	1.18	1.28
08-00239-03215			1.5	0.25	0.28	15°	4	35	12,300	1.58	1.64	1.7	1.76	1.9
08-00239-03405		R0.05	0.5	0.25	0.28	15°	4	35	12,300	0.55	0.57	0.59	0.61	0.65
08-00239-03407			0.75	0.25	0.28	15°	4	35	12,300	0.81	0.83	0.86	0.89	0.96
08-00239-03410			1	0.25	0.28	15°	4	35	12,300	1.07	1.1	1.14	1.18	1.27
08-00239-03415			1.5	0.25	0.28	15°	4	35	12,300	1.58	1.64	1.69	1.76	1.89

订购方法 How to Order

请指定MHRSH430RSF 外径(D)×角半径(R)×颈长(ℓ1)
When you order, indicate MHRSH430RSF (D)×(R)×(ℓ1).

※(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.	(D)外径 Dia.	(R)角半径 Corner Radius	(ℓ1)颈长 Under Neck Length	(ℓ)刃长 Length of Cut	(d2)颈径 Neck Dia.	(γ)颈角 Neck Taper Angle	(d)柄径 Shank Dia.	(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 workpiece				
										30′	1°	1°30′	2°	3°
08-00239-04205	0.4	R0.02	0.5	0.3	0.37	15°	4	35	7,900	0.57	0.59	0.61	0.63	0.68
08-00239-04210			1	0.3	0.37	15°	4	35	7,900	1.09	1.12	1.16	1.21	1.3
08-00239-04215			1.5	0.3	0.37	15°	4	35	7,900	1.6	1.66	1.72	1.78	1.92
08-00239-04220			2	0.3	0.37	15°	4	35	7,900	2.12	2.19	2.27	2.36	2.55
08-00239-04405		R0.05	0.5	0.3	0.37	15°	4	35	7,900	0.57	0.59	0.61	0.63	0.67
08-00239-04410			1	0.3	0.37	15°	4	35	7,900	1.08	1.12	1.16	1.2	1.3
08-00239-04415			1.5	0.3	0.37	15°	4	35	7,900	1.6	1.66	1.71	1.78	1.92
08-00239-04420			2	0.3	0.37	15°	4	35	7,900	2.12	2.19	2.27	2.35	2.54
08-00239-05210	0.5	R0.02	1	0.4	0.46	15°	4	35	6,400	1.11	1.14	1.18	1.23	1.33
08-00239-05215			1.5	0.4	0.46	15°	4	35	6,400	1.62	1.68	1.74	1.8	1.95
08-00239-05220			2	0.4	0.46	15°	4	35	6,400	2.14	2.21	2.29	2.38	2.57
08-00239-05225			2.5	0.4	0.46	15°	4	35	6,400	2.66	2.75	2.85	2.95	3.19
08-00239-05410		R0.05	1	0.4	0.46	15°	4	35	6,400	1.1	1.14	1.18	1.22	1.32
08-00239-05415			1.5	0.4	0.46	15°	4	35	6,400	1.62	1.68	1.73	1.8	1.94
08-00239-05420			2	0.4	0.46	15°	4	35	6,400	2.14	2.21	2.29	2.37	2.56
08-00239-05425			2.5	0.4	0.46	15°	4	35	6,400	2.65	2.75	2.84	2.95	3.18
08-00239-05510		R0.1	1	0.4	0.46	15°	4	35	6,400	1.1	1.14	1.18	1.22	1.31
08-00239-05515			1.5	0.4	0.46	15°	4	35	6,400	1.62	1.67	1.73	1.79	1.93
08-00239-05520			2	0.4	0.46	15°	4	35	6,400	2.14	2.21	2.28	2.37	2.55
08-00239-05525			2.5	0.4	0.46	15°	4	35	6,400	2.65	2.74	2.84	2.94	3.17
08-00239-06210	0.6	R0.02	1	0.5	0.56	15°	4	35	6,400	1.11	1.14	1.18	1.23	1.33
08-00239-06220			2	0.5	0.56	15°	4	35	6,400	2.14	2.21	2.29	2.38	2.57
08-00239-06230			3	0.5	0.56	15°	4	35	6,400	3.17	3.28	3.4	3.53	3.81
08-00239-06410		R0.05	1	0.5	0.56	15°	4	35	6,400	1.1	1.14	1.18	1.22	1.32
08-00239-06420			2	0.5	0.56	15°	4	35	6,400	2.14	2.21	2.29	2.37	2.56
08-00239-06430			3	0.5	0.56	15°	4	35	6,400	3.17	3.28	3.4	3.52	3.81
08-00239-06510		R0.1	1	0.5	0.56	15°	4	35	6,400	1.1	1.14	1.18	1.22	1.31
08-00239-06520			2	0.5	0.56	15°	4	35	6,400	2.14	2.21	2.28	2.37	2.55
08-00239-06530			3	0.5	0.56	15°	4	35	6,400	3.17	3.28	3.39	3.52	3.79
08-00239-08202	0.8	R0.02	2	0.65	0.76	15°	4	35	7,100	2.14	2.21	2.29	2.38	2.57
08-00239-08203			3	0.65	0.76	15°	4	35	7,100	3.17	3.28	3.4	3.53	3.81
08-00239-08204			4	0.65	0.76	15°	4	35	7,100	4.21	4.35	4.51	4.68	5.06
08-00239-08402		R0.05	2	0.65	0.76	15°	4	35	7,100	2.14	2.21	2.29	2.37	2.56
08-00239-08403			3	0.65	0.76	15°	4	35	7,100	3.17	3.28	3.4	3.52	3.81
08-00239-08404			4	0.65	0.76	15°	4	35	7,100	4.21	4.35	4.51	4.67	5.05
08-00239-08502		R0.1	2	0.65	0.76	15°	4	35	7,100	2.14	2.21	2.28	2.37	2.55
08-00239-08503			3	0.65	0.76	15°	4	35	7,100	3.17	3.28	3.39	3.52	3.79
08-00239-08504			4	0.65	0.76	15°	4	35	7,100	4.2	4.35	4.5	4.67	5.04
08-00239-08602		R0.2	2	0.65	0.76	15°	4	35	7,100	2.13	2.2	2.27	2.35	2.53
08-00239-08603			3	0.65	0.76	15°	4	35	7,100	3.17	3.27	3.38	3.5	3.77
08-00239-08604			4	0.65	0.76	15°	4	35	7,100	4.2	4.34	4.49	4.65	5.01
08-00239-10202	1	R0.02	2	0.8	0.95	15°	4	35	6,500	2.16	2.23	2.31	2.4	2.59
08-00239-10203			3	0.8	0.95	15°	4	35	6,500	3.19	3.3	3.42	3.55	3.84
08-00239-10204			4	0.8	0.95	15°	4	35	6,500	4.23	4.37	4.53	4.7	5.08
08-00239-10205			5	0.8	0.95	15°	4	40	6,500	5.26	5.44	5.64	5.85	6.32
08-00239-10402		R0.05	2	0.8	0.95	15°	4	35	6,500	2.16	2.23	2.31	2.39	2.59
08-00239-10403			3	0.8	0.95	15°	4	35	6,500	3.19	3.3	3.42	3.54	3.83
08-00239-10404			4	0.8	0.95	15°	4	35	6,500	4.22	4.37	4.53	4.69	5.07
08-00239-10405			5	0.8	0.95	15°	4	40	6,500	5.26	5.44	5.63	5.84	6.31
08-00239-10502		R0.1	2	0.8	0.95	15°	4	35	6,500	2.16	2.23	2.3	2.39	2.57
08-00239-10503			3	0.8	0.95	15°	4	35	6,500	3.19	3.3	3.41	3.54	3.82
08-00239-10504			4	0.8	0.95	15°	4	35	6,500	4.22	4.37	4.52	4.69	5.06
08-00239-10505			5	0.8	0.95	15°	4	40	6,500	5.26	5.44	5.63	5.84	6.3
08-00239-10602		R0.2	2	0.8	0.95	15°	4	35	6,500	2.15	2.22	2.29	2.37	2.55
08-00239-10603			3	0.8	0.95	15°	4	35	6,500	3.19	3.29	3.4	3.52	3.79
08-00239-10604			4	0.8	0.95	15°	4	35	6,500	4.22	4.36	4.51	4.67	5.04
08-00239-10605			5	0.8	0.95	15°	4	40	6,500	5.25	5.43	5.62	5.82	6.28

MHRSH430RSF

New 增加规格 Size Expansion

无限白金Plus涂层
高硬度钢材 高精度加工用 4刃长颈圆鼻铣刀 可对应热缩刀柄的短柄造型
MUGEN COATING PREMIUM Plus 4-Flute Long Neck Corner Radius 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]

产品代码 Code No.	(D)外径 Dia.	(R)角半径 Corner Radius	(ℓ1)颈长 Under Neck Length	(ℓ)刃长 Length of Cut	(d2)颈径 Neck Dia.	(γ)颈角 Neck Taper Angle	(d)柄径 Shank Dia.	(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 workpiece				
										30´	1°	1°30´	2°	3°
08-00239-10702	1	R0.3	2	0.8	0.95	15°	4	35	6,500	2.15	2.21	2.28	2.36	2.53
08-00239-10703			3	0.8	0.95	15°	4	35	6,500	3.18	3.28	3.39	3.51	3.77
08-00239-10704			4	0.8	0.95	15°	4	35	6,500	4.22	4.35	4.5	4.66	5.01
08-00239-10705			5	0.8	0.95	15°	4	40	6,500	5.25	5.42	5.61	5.81	6.26
08-00239-15203	1.5	R0.02	3	1.2	1.43	15°	4	35	6,800	3.23	3.34	3.46	3.59	3.88
08-00239-15204			4	1.2	1.43	15°	4	35	6,800	4.26	4.41	4.57	4.74	5.13
08-00239-15206			6	1.2	1.43	15°	4	40	6,800	6.33	6.55	6.79	7.04	7.61
08-00239-15208			8	1.2	1.43	15°	4	40	7,200	8.4	8.69	9	9.34	10.1
08-00239-15403		R0.05	3	1.2	1.43	15°	4	35	6,800	3.23	3.34	3.46	3.59	3.87
08-00239-15404			4	1.2	1.43	15°	4	35	6,800	4.26	4.41	4.57	4.74	5.12
08-00239-15406			6	1.2	1.43	15°	4	40	6,800	6.33	6.55	6.78	7.04	7.6
08-00239-15408			8	1.2	1.43	15°	4	40	7,200	8.4	8.69	9	9.34	10.09
08-00239-15503		R0.1	3	1.2	1.43	15°	4	35	6,800	3.23	3.34	3.45	3.58	3.86
08-00239-15504			4	1.2	1.43	15°	4	35	6,800	4.26	4.41	4.56	4.73	5.11
08-00239-15506			6	1.2	1.43	15°	4	40	6,800	6.33	6.55	6.78	7.03	7.59
08-00239-15508			8	1.2	1.43	15°	4	40	7,200	8.4	8.69	9	9.33	10.08
08-00239-15603		R0.2	3	1.2	1.43	15°	4	35	6,800	3.22	3.33	3.44	3.57	3.84
08-00239-15604			4	1.2	1.43	15°	4	35	6,800	4.26	4.4	4.55	4.72	5.08
08-00239-15606			6	1.2	1.43	15°	4	40	6,800	6.33	6.54	6.77	7.01	7.57
08-00239-15608			8	1.2	1.43	15°	4	40	7,200	8.39	8.68	8.98	9.31	10.06
08-00239-15703		R0.3	3	1.2	1.43	15°	4	35	6,800	3.22	3.32	3.43	3.55	3.82
08-00239-15704			4	1.2	1.43	15°	4	35	6,800	4.25	4.39	4.54	4.7	5.06
08-00239-15706			6	1.2	1.43	15°	4	40	6,800	6.32	6.53	6.76	7	7.55
08-00239-15708			8	1.2	1.43	15°	4	40	7,200	8.39	8.67	8.97	9.3	10.03
08-00239-15803		R0.5	3	1.2	1.43	15°	4	35	6,800	3.21	3.31	3.41	3.52	3.77
08-00239-15804			4	1.2	1.43	15°	4	35	6,800	4.25	4.38	4.52	4.67	5.01
08-00239-15806			6	1.2	1.43	15°	4	40	6,800	6.32	6.52	6.74	6.97	7.5
08-00239-15808			8	1.2	1.43	15°	4	40	7,200	8.38	8.66	8.95	9.27	9.98
08-00239-20204	2	R0.02	4	1.6	1.91	15°	4	35	6,800	4.3	4.45	4.61	4.78	5.17
08-00239-20206			6	1.6	1.91	15°	4	35	6,800	6.37	6.59	6.83	7.08	7.66
08-00239-20208			8	1.6	1.91	15°	4	40	7,200	8.44	8.73	9.05	9.38	10.14
08-00239-20210			10	1.6	1.91	15°	4	40	7,200	10.5	10.87	11.26	11.68	12.63
08-00239-20404		R0.05	4	1.6	1.91	15°	4	35	6,800	4.3	4.45	4.61	4.78	5.16
08-00239-20406			6	1.6	1.91	15°	4	35	6,800	6.37	6.59	6.83	7.08	7.65
08-00239-20408			8	1.6	1.91	15°	4	40	7,200	8.44	8.73	9.04	9.38	10.14
08-00239-20410			10	1.6	1.91	15°	4	40	7,200	10.5	10.87	11.26	11.68	12.62
08-00239-20504		R0.1	4	1.6	1.91	15°	4	35	6,800	4.3	4.45	4.6	4.77	5.15
08-00239-20506			6	1.6	1.91	15°	4	35	6,800	6.37	6.59	6.82	7.07	7.64
08-00239-20508			8	1.6	1.91	15°	4	40	7,200	8.43	8.73	9.04	9.37	10.13
08-00239-20510			10	1.6	1.91	15°	4	40	7,200	10.5	10.86	11.25	11.67	12.61
08-00239-20604		R0.2	4	1.6	1.91	15°	4	35	6,800	4.3	4.44	4.59	4.76	5.13
08-00239-20606			6	1.6	1.91	15°	4	35	6,800	6.36	6.58	6.81	7.06	7.62
08-00239-20608			8	1.6	1.91	15°	4	40	7,200	8.43	8.72	9.03	9.36	10.1
08-00239-20610			10	1.6	1.91	15°	4	40	7,200	10.5	10.86	11.24	11.66	12.59
08-00239-20704		R0.3	4	1.6	1.91	15°	4	35	6,800	4.29	4.43	4.58	4.74	5.11
08-00239-20706			6	1.6	1.91	15°	4	35	6,800	6.36	6.57	6.8	7.04	7.59
08-00239-20708			8	1.6	1.91	15°	4	40	7,200	8.43	8.71	9.02	9.34	10.08
08-00239-20710			10	1.6	1.91	15°	4	40	7,200	10.5	10.85	11.23	11.64	12.56
08-00239-20804		R0.5	4	1.6	1.91	15°	4	35	6,800	4.29	4.42	4.56	4.71	5.06
08-00239-20806			6	1.6	1.91	15°	4	35	6,800	6.35	6.56	6.78	7.01	7.54
08-00239-20808			8	1.6	1.91	15°	4	40	7,200	8.42	8.7	8.99	9.31	10.03
08-00239-20810			10	1.6	1.91	15°	4	40	7,200	10.49	10.84	11.21	11.61	12.52

订购方法 How to Order

请指定MHRSH430RSF 外径(D)×角半径(R)×颈长(ℓ1)
When you order, indicate MHRSH430RSF (D)×(R)×(ℓ1).

※(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.	(D) 外径 Dia.	(R) 角半径 Corner Radius	(ℓ1) 颈长 Under Neck Length	(ℓ) 刃长 Length of Cut	(d2) 颈径 Neck Dia.	(γ) 颈角 Neck Taper Angle	(d) 柄径 Shank Dia.	(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 workpiece				
										30´	1°	1°30´	2°	3°
08-00239-30404	3	R0.05	4	2.5	2.85	15°	6	45	7,900	4.42	4.57	4.73	4.91	5.30
08-00239-30406			6	2.5	2.85	15°	6	45	7,900	6.48	6.71	6.95	7.21	7.79
08-00239-30408			8	2.5	2.85	15°	6	45	7,900	8.55	8.85	9.17	9.51	10.28
08-00239-30410			10	2.5	2.85	15°	6	50	8,800	10.62	10.99	11.38	11.81	12.76
08-00239-30412			12	2.5	2.85	15°	6	50	8,800	12.69	13.13	13.60	14.11	15.25
08-00239-30415			15	2.5	2.85	15°	6	55	9,700	15.79	16.34	16.92	17.56	18.98
08-00239-30504		R0.1	4	2.5	2.85	15°	6	45	7,900	4.42	4.57	4.73	4.90	5.29
08-00239-30506			6	2.5	2.85	15°	6	45	7,900	6.48	6.71	6.94	7.20	7.78
08-00239-30508			8	2.5	2.85	15°	6	45	7,900	8.55	8.84	9.16	9.50	10.26
08-00239-30510			10	2.5	2.85	15°	6	50	8,800	10.62	10.98	11.38	11.80	12.75
08-00239-30512			12	2.5	2.85	15°	6	50	8,800	12.68	13.12	13.59	14.10	15.24
08-00239-30515			15	2.5	2.85	15°	6	55	9,700	15.79	16.33	16.92	17.55	18.97
08-00239-30604		R0.2	4	2.5	2.85	15°	6	45	7,900	4.41	4.56	4.72	4.89	5.27
08-00239-30606			6	2.5	2.85	15°	6	45	7,900	6.48	6.70	6.93	7.19	7.75
08-00239-30608			8	2.5	2.85	15°	6	45	7,900	8.55	8.84	9.15	9.49	10.24
08-00239-30610			10	2.5	2.85	15°	6	50	8,800	10.61	10.98	11.37	11.79	12.73
08-00239-30612			12	2.5	2.85	15°	6	50	8,800	12.68	13.12	13.58	14.09	15.21
08-00239-30615			15	2.5	2.85	15°	6	55	9,700	15.78	16.33	16.91	17.54	18.94
08-00239-30704		R0.3	4	2.5	2.85	15°	6	45	7,900	4.41	4.55	4.71	4.87	5.24
08-00239-30706			6	2.5	2.85	15°	6	45	7,900	6.48	6.69	6.92	7.17	7.73
08-00239-30708			8	2.5	2.85	15°	6	45	7,900	8.54	8.83	9.14	9.47	10.22
08-00239-30710			10	2.5	2.85	15°	6	50	8,800	10.61	10.97	11.36	11.77	12.70
08-00239-30712			12	2.5	2.85	15°	6	50	8,800	12.68	13.11	13.57	14.07	15.19
08-00239-30715			15	2.5	2.85	15°	6	55	9,700	15.78	16.32	16.90	17.52	18.92
08-00239-30804		R0.5	4	2.5	2.85	15°	6	45	7,900	4.40	4.54	4.69	4.84	5.20
08-00239-30806			6	2.5	2.85	15°	6	45	7,900	6.47	6.68	6.90	7.14	7.68
08-00239-30808			8	2.5	2.85	15°	6	45	7,900	8.54	8.82	9.12	9.44	10.17
08-00239-30810			10	2.5	2.85	15°	6	50	8,800	10.60	10.96	11.33	11.74	12.66
08-00239-30812			12	2.5	2.85	15°	6	50	8,800	12.67	13.10	13.55	14.04	15.14
08-00239-30815			15	2.5	2.85	15°	6	55	9,700	15.77	16.31	16.88	17.49	18.87
08-00239-40508	4	R0.1	8	3.2	3.8	15°	6	45	10,800	8.65	8.94	9.26	9.61	10.38
08-00239-40512			12	3.2	3.8	15°	6	50	10,800	12.78	13.22	13.70	14.21	15.35
08-00239-40516			16	3.2	3.8	15°	6	55	10,800	16.92	17.50	18.13	18.81	Free
08-00239-40520			20	3.2	3.8	15°	6	55	12,100	21.05	21.78	22.56	23.41	Free
08-00239-40608		R0.2	8	3.2	3.8	15°	6	45	10,800	8.64	8.94	9.25	9.59	10.36
08-00239-40612			12	3.2	3.8	15°	6	50	10,800	12.78	13.22	13.69	14.19	15.33
08-00239-40616			16	3.2	3.8	15°	6	55	10,800	16.91	17.50	18.12	18.79	Free
08-00239-40620			20	3.2	3.8	15°	6	55	12,100	21.05	21.77	22.55	23.39	Free
08-00239-40708		R0.3	8	3.2	3.8	15°	6	45	10,800	8.64	8.93	9.24	9.58	10.33
08-00239-40712			12	3.2	3.8	15°	6	50	10,800	12.77	13.21	13.68	14.18	15.31
08-00239-40716			16	3.2	3.8	15°	6	55	10,800	16.91	17.49	18.11	18.78	Free
08-00239-40720			20	3.2	3.8	15°	6	55	12,100	21.04	21.77	22.54	23.38	Free
08-00239-40808		R0.5	8	3.2	3.8	15°	6	45	10,800	8.63	8.92	9.22	9.55	10.29
08-00239-40812			12	3.2	3.8	15°	6	50	10,800	12.77	13.20	13.65	14.15	15.26
08-00239-40816			16	3.2	3.8	15°	6	55	10,800	16.90	17.47	18.09	18.75	Free
08-00239-40820			20	3.2	3.8	15°	6	55	12,100	21.04	21.75	22.52	23.35	Free
08-00239-50515	5	R0.1	15	4	4.75	15°	6	50	15,200	15.98	16.53	17.13	Free	Free
08-00239-50520			20	4	4.75	15°	6	55	15,200	21.15	21.88	Free	Free	Free
08-00239-50615		R0.2	15	4	4.75	15°	6	50	15,200	15.98	16.53	17.12	Free	Free
08-00239-50620			20	4	4.75	15°	6	55	15,200	21.14	21.87	Free	Free	Free
08-00239-50715		R0.3	15	4	4.75	15°	6	50	15,200	15.97	16.52	17.10	Free	Free
08-00239-50720			20	4	4.75	15°	6	55	15,200	21.14	21.87	Free	Free	Free
08-00239-50815		R0.5	15	4	4.75	15°	6	50	15,200	15.97	16.50	17.08	Free	Free
08-00239-50820			20	4	4.75	15°	6	55	15,200	21.13	21.85	Free	Free	Free

MHRSH430RSF

New
增加规格
Size Expansion

无限白金Plus涂层
高硬度钢材 高精度加工用 4刃长颈圆鼻铣刀 可对应热缩刀柄的短柄造型
MUGEN COATING PREMIUM Plus 4-Flute Long Neck Corner Radius 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]

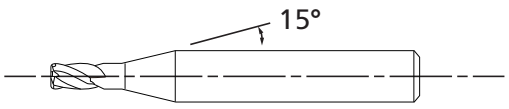
产品代码 Code No.	(D) 外径 Dia.	(R) 角半径 Corner Radius	(ℓ1) 颈长 Under Neck Length	(ℓ) 刃长 Length of Cut	(d2) 颈径 Neck Dia.	(γ) 颈角 Neck Taper Angle	(d) 柄径 Shank Dia.	(L) 全长 Overall Length	定价(日元) Retail Price	相对于工件斜度的有效长 Actual effective length depending on inclined angle of workpiece				
										30′	1°	1°30′	2°	3°
08-00239-60512	6	R0.1	12	5	5.7	-	6	45	11,000	Free	Free	Free	Free	Free
08-00239-60518			18	5	5.7	-	6	50	13,600	Free	Free	Free	Free	Free
08-00239-60524			24	5	5.7	-	6	60	13,600	Free	Free	Free	Free	Free
08-00239-60530			30	5	5.7	-	6	65	13,600	Free	Free	Free	Free	Free
08-00239-60612		R0.2	12	5	5.7	-	6	45	11,000	Free	Free	Free	Free	Free
08-00239-60618			18	5	5.7	-	6	50	13,600	Free	Free	Free	Free	Free
08-00239-60624			24	5	5.7	-	6	60	13,600	Free	Free	Free	Free	Free
08-00239-60630			30	5	5.7	-	6	65	13,600	Free	Free	Free	Free	Free
08-00239-60712		R0.3	12	5	5.7	-	6	45	11,000	Free	Free	Free	Free	Free
08-00239-60718			18	5	5.7	-	6	50	13,600	Free	Free	Free	Free	Free
08-00239-60724			24	5	5.7	-	6	60	13,600	Free	Free	Free	Free	Free
08-00239-60730			30	5	5.7	-	6	65	13,600	Free	Free	Free	Free	Free
08-00239-60812		R0.5	12	5	5.7	-	6	45	11,000	Free	Free	Free	Free	Free
08-00239-60818			18	5	5.7	-	6	50	13,600	Free	Free	Free	Free	Free
08-00239-60824			24	5	5.7	-	6	60	13,600	Free	Free	Free	Free	Free
08-00239-60830			30	5	5.7	-	6	65	13,600	Free	Free	Free	Free	Free
08-00239-60912		R1	12	5	5.7	-	6	45	11,000	Free	Free	Free	Free	Free
08-00239-60918			18	5	5.7	-	6	50	13,600	Free	Free	Free	Free	Free
08-00239-60924			24	5	5.7	-	6	60	13,600	Free	Free	Free	Free	Free
08-00239-60930			30	5	5.7	-	6	65	13,600	Free	Free	Free	Free	Free

订购方法 How to Order

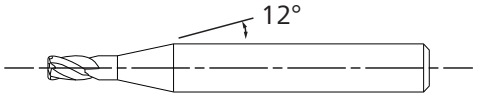
请指定MHRSH430RSF 外径(D)×角半径(R)×颈长(ℓ1)
When you order, indicate MHRSH430RSF (D)×(R)×(ℓ1).

※(γ)为参考值。
※(γ) is reference value.

MHRSH430RSF 颈角（γ）为15°。我公司其他产品也有颈角（γ）12°的产品。
Neck taper angle (γ) of MHRSH430RSF is 15°. Our other products have a neck taper angle (γ) of 12°.



MHRSH430RSF



我公司其他产品也有颈角（γ）12°的产品
Our other products have a neck taper angle (γ) of 12°

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)			
外径 Dia.	半角径 Corner Radius	颈长 Under Neck Length	L(颈长)/D(外径) L/D	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
				min^{-1}	mm/min	a_p mm	a_e mm	min^{-1}	mm/min	a_p mm	a_e mm	min^{-1}	mm/min	a_p mm	a_e mm
0.1	0.01	0.2	2	40,000	200	0.002	0.01	40,000	150	0.002	0.01	40,000	120	0.002	0.01
		0.3	3	40,000	160	0.002	0.01	40,000	120	0.002	0.01	40,000	90	0.002	0.01
0.15	0.01	0.3	2	40,000	240	0.002	0.015	40,000	180	0.002	0.01	40,000	140	0.002	0.01
		0.5	3.3	40,000	160	0.002	0.015	40,000	120	0.002	0.01	40,000	90	0.002	0.01
	0.02	0.3	2	40,000	240	0.002	0.015	40,000	180	0.002	0.01	40,000	140	0.002	0.01
		0.5	3.3	40,000	160	0.002	0.015	40,000	120	0.002	0.01	40,000	90	0.002	0.01
0.2	0.02	0.3	1.5	30,000	360	0.003	0.02	30,000	280	0.003	0.01	30,000	220	0.003	0.01
		0.5	2.5	30,000	320	0.003	0.02	30,000	240	0.003	0.01	30,000	180	0.003	0.01
		0.75	3.8	30,000	270	0.003	0.02	30,000	190	0.003	0.01	30,000	150	0.003	0.01
		1	5	30,000	240	0.002	0.02	30,000	160	0.002	0.01	30,000	120	0.002	0.01
	0.05	0.3	1.5	30,000	360	0.003	0.02	30,000	280	0.003	0.01	30,000	220	0.003	0.01
		0.5	2.5	30,000	320	0.003	0.02	30,000	240	0.003	0.01	30,000	180	0.003	0.01
		0.75	3.8	30,000	270	0.003	0.02	30,000	190	0.003	0.01	30,000	150	0.003	0.01
		1	5	30,000	240	0.003	0.02	30,000	160	0.003	0.01	30,000	120	0.003	0.01
0.3	0.02	0.5	1.7	30,000	600	0.003	0.04	30,000	500	0.003	0.03	30,000	400	0.003	0.03
		0.75	2.5	30,000	560	0.003	0.04	30,000	460	0.003	0.03	30,000	360	0.003	0.03
		1	3.3	30,000	500	0.003	0.04	30,000	400	0.003	0.03	30,000	300	0.003	0.03
		1.5	5	30,000	320	0.003	0.04	30,000	240	0.003	0.03	30,000	180	0.003	0.03
	0.05	0.5	1.7	30,000	600	0.003	0.04	30,000	500	0.003	0.03	30,000	400	0.003	0.03
		0.75	2.5	30,000	560	0.003	0.04	30,000	460	0.003	0.03	30,000	360	0.003	0.03
		1	3.3	30,000	500	0.003	0.04	30,000	400	0.003	0.03	30,000	300	0.003	0.03
		1.5	5	30,000	320	0.003	0.04	30,000	240	0.003	0.03	30,000	180	0.003	0.03
0.4	0.02	0.5	1.3	28,000	760	0.005	0.05	25,000	650	0.004	0.04	22,000	480	0.004	0.04
		1	2.5	28,000	700	0.005	0.05	25,000	600	0.004	0.04	22,000	450	0.004	0.04
		1.5	3.8	28,000	600	0.005	0.05	25,000	520	0.004	0.04	22,000	390	0.004	0.04
		2	5	25,000	500	0.005	0.05	25,000	440	0.003	0.04	22,000	330	0.003	0.04
	0.05	0.5	1.3	28,000	760	0.005	0.05	25,000	650	0.005	0.04	22,000	480	0.005	0.04
		1	2.5	28,000	700	0.005	0.05	25,000	600	0.005	0.04	22,000	450	0.005	0.04
		1.5	3.8	28,000	600	0.005	0.05	25,000	520	0.005	0.04	22,000	390	0.005	0.04
		2	5	25,000	500	0.005	0.05	25,000	440	0.005	0.04	22,000	330	0.005	0.04
0.5	0.02	1	2	23,000	900	0.006	0.1	20,000	800	0.004	0.08	18,000	600	0.004	0.08
		1.5	3	23,000	800	0.006	0.1	20,000	640	0.004	0.08	18,000	480	0.004	0.08
		2	4	23,000	720	0.005	0.1	20,000	600	0.003	0.08	18,000	450	0.003	0.08
		2.5	5	23,000	680	0.005	0.1	20,000	580	0.003	0.08	18,000	420	0.003	0.08
	0.05	1	2	23,000	900	0.007	0.1	20,000	800	0.005	0.08	18,000	600	0.005	0.08
		1.5	3	23,000	800	0.007	0.1	20,000	640	0.005	0.08	18,000	480	0.005	0.08
		2	4	23,000	720	0.007	0.1	20,000	600	0.005	0.08	18,000	450	0.005	0.08
		2.5	5	23,000	680	0.006	0.1	20,000	580	0.004	0.08	18,000	420	0.004	0.08
	0.1	1	2	23,000	900	0.007	0.1	20,000	800	0.005	0.08	18,000	600	0.005	0.08
		1.5	3	23,000	800	0.007	0.1	20,000	640	0.005	0.08	18,000	480	0.005	0.08
		2	4	23,000	720	0.007	0.1	20,000	600	0.005	0.08	18,000	450	0.005	0.08
		2.5	5	23,000	680	0.006	0.1	20,000	580	0.004	0.08	18,000	420	0.004	0.08
0.6	0.02	1	1.7	23,000	1,000	0.006	0.15	20,000	850	0.004	0.1	17,000	640	0.004	0.1
		2	3.3	23,000	800	0.006	0.15	20,000	640	0.004	0.1	17,000	480	0.004	0.1
		3	5	23,000	700	0.005	0.15	20,000	600	0.003	0.1	17,000	450	0.003	0.1
	0.05	1	1.7	23,000	1,000	0.01	0.15	20,000	850	0.01	0.1	17,000	640	0.008	0.1
		2	3.3	23,000	800	0.01	0.15	20,000	640	0.007	0.1	17,000	480	0.006	0.1
		3	5	23,000	700	0.008	0.15	20,000	600	0.006	0.1	17,000	450	0.005	0.1
	0.1	1	1.7	23,000	1,000	0.01	0.15	20,000	850	0.01	0.1	17,000	640	0.008	0.1
		2	3.3	23,000	800	0.01	0.15	20,000	640	0.007	0.1	17,000	480	0.006	0.1
		3	5	23,000	700	0.008	0.15	20,000	600	0.006	0.1	17,000	450	0.005	0.1

MHRSH430RSF

New 增加规格 Size Expansion

切削参数参考表 Recommended Milling 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）			
外径 Dia.	半角径 Corner Radius	颈长 Under Neck Length	L（颈长）/D（外径） L/D	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
				min^{-1}	mm/min	a_p mm	a_e mm	min^{-1}	mm/min	a_p mm	a_e mm	min^{-1}	mm/min	a_p mm	a_e mm
0.8	0.02	2	2.5	23,000	1,400	0.006	0.16	20,000	1,000	0.005	0.14	17,000	700	0.005	0.14
		3	3.8	23,000	1,300	0.005	0.16	20,000	900	0.003	0.14	17,000	650	0.003	0.14
		4	5	23,000	1,200	0.005	0.16	20,000	800	0.003	0.14	17,000	600	0.003	0.14
	0.05	2	2.5	23,000	1,400	0.02	0.16	20,000	1,000	0.015	0.14	17,000	700	0.012	0.14
		3	3.8	23,000	1,300	0.015	0.16	20,000	900	0.01	0.14	17,000	650	0.008	0.14
		4	5	23,000	1,200	0.015	0.16	20,000	800	0.01	0.14	17,000	600	0.006	0.14
	0.1	2	2.5	23,000	1,400	0.02	0.16	20,000	1,000	0.015	0.14	17,000	700	0.012	0.14
		3	3.8	23,000	1,300	0.015	0.16	20,000	900	0.01	0.14	17,000	650	0.008	0.14
		4	5	23,000	1,200	0.015	0.16	20,000	800	0.01	0.14	17,000	600	0.006	0.14
	0.2	2	2.5	23,000	1,400	0.02	0.16	20,000	1,000	0.015	0.14	17,000	700	0.012	0.14
		3	3.8	23,000	1,300	0.015	0.16	20,000	900	0.01	0.14	17,000	650	0.008	0.14
		4	5	23,000	1,200	0.015	0.16	20,000	800	0.01	0.14	17,000	600	0.006	0.14
1	0.02	2	2	21,000	2,000	0.01	0.25	17,000	1,400	0.008	0.2	15,000	1,000	0.005	0.2
		3	3	20,000	1,800	0.01	0.25	16,000	1,300	0.008	0.2	14,000	900	0.005	0.2
		4	4	18,000	1,500	0.008	0.25	14,000	1,100	0.005	0.2	12,000	750	0.003	0.2
		5	5	16,000	1,400	0.005	0.25	13,000	1,000	0.003	0.2	11,000	650	0.003	0.2
	0.05	2	2	21,000	2,000	0.04	0.25	17,000	1,400	0.03	0.2	15,000	1,000	0.018	0.2
		3	3	20,000	1,800	0.04	0.25	16,000	1,300	0.03	0.2	14,000	900	0.018	0.2
		4	4	18,000	1,500	0.03	0.25	14,000	1,100	0.02	0.2	12,000	750	0.012	0.2
		5	5	16,000	1,400	0.02	0.25	13,000	1,000	0.01	0.2	11,000	650	0.006	0.2
	0.1	2	2	21,000	2,000	0.04	0.25	17,000	1,400	0.03	0.2	15,000	1,000	0.018	0.2
		3	3	20,000	1,800	0.04	0.25	16,000	1,300	0.03	0.2	14,000	900	0.018	0.2
		4	4	18,000	1,500	0.03	0.25	14,000	1,100	0.02	0.2	12,000	750	0.012	0.2
		5	5	16,000	1,400	0.02	0.25	13,000	1,000	0.01	0.2	11,000	650	0.006	0.2
	0.2	2	2	21,000	2,000	0.04	0.25	17,000	1,400	0.03	0.2	15,000	1,000	0.018	0.2
		3	3	20,000	1,800	0.04	0.25	16,000	1,300	0.03	0.2	14,000	900	0.018	0.2
		4	4	18,000	1,500	0.03	0.25	14,000	1,100	0.02	0.2	12,000	750	0.012	0.2
		5	5	16,000	1,400	0.02	0.25	13,000	1,000	0.01	0.2	11,000	650	0.006	0.2
	0.3	2	2	21,000	2,000	0.04	0.25	17,000	1,400	0.03	0.2	15,000	1,000	0.018	0.2
		3	3	20,000	1,800	0.04	0.25	16,000	1,300	0.03	0.2	14,000	900	0.018	0.2
		4	4	18,000	1,500	0.03	0.25	14,000	1,100	0.02	0.2	12,000	750	0.012	0.2
		5	5	16,000	1,400	0.02	0.25	13,000	1,000	0.01	0.2	11,000	650	0.006	0.2
1.5	0.02	3	2	20,000	2,000	0.01	0.4	16,000	1,400	0.008	0.3	14,000	1,000	0.006	0.3
		4	2.7	18,000	1,700	0.01	0.4	14,000	1,200	0.008	0.3	12,000	800	0.006	0.3
		6	4	16,000	1,500	0.008	0.4	13,000	1,100	0.005	0.3	11,000	750	0.004	0.3
		8	5.3	14,000	1,300	0.008	0.4	11,000	900	0.003	0.3	10,000	600	0.003	0.3
	0.05	3	2	20,000	2,000	0.04	0.4	16,000	1,400	0.03	0.3	14,000	1,000	0.018	0.3
		4	2.7	18,000	1,700	0.04	0.4	14,000	1,200	0.03	0.3	12,000	800	0.018	0.3
		6	4	16,000	1,500	0.03	0.4	13,000	1,100	0.02	0.3	11,000	750	0.012	0.3
		8	5.3	14,000	1,300	0.025	0.4	11,000	900	0.01	0.3	10,000	600	0.006	0.3
	0.1	3	2	20,000	2,000	0.04	0.4	16,000	1,400	0.03	0.3	14,000	1,000	0.018	0.3
		4	2.7	18,000	1,700	0.04	0.4	14,000	1,200	0.03	0.3	12,000	800	0.018	0.3
		6	4	16,000	1,500	0.03	0.4	13,000	1,100	0.02	0.3	11,000	750	0.012	0.3
		8	5.3	14,000	1,300	0.025	0.4	11,000	900	0.01	0.3	10,000	600	0.006	0.3
	0.2	3	2	20,000	2,000	0.04	0.4	16,000	1,400	0.03	0.3	14,000	1,000	0.018	0.3
		4	2.7	18,000	1,700	0.04	0.4	14,000	1,200	0.03	0.3	12,000	800	0.018	0.3
		6	4	16,000	1,500	0.03	0.4	13,000	1,100	0.02	0.3	11,000	750	0.012	0.3
		8	5.3	14,000	1,300	0.025	0.4	11,000	900	0.01	0.3	10,000	600	0.006	0.3
	0.3	3	2	20,000	2,000	0.04	0.4	16,000	1,400	0.03	0.3	14,000	1,000	0.018	0.3
		4	2.7	18,000	1,700	0.04	0.4	14,000	1,200	0.03	0.3	12,000	800	0.018	0.3
		6	4	16,000	1,500	0.03	0.4	13,000	1,100	0.02	0.3	11,000	750	0.012	0.3
		8	5.3	14,000	1,300	0.025	0.4	11,000	900	0.01	0.3	10,000	600	0.006	0.3
	0.5	3	2	20,000	2,000	0.04	0.4	16,000	1,400	0.03	0.3	14,000	1,000	0.018	0.3
		4	2.7	18,000	1,700	0.04	0.4	14,000	1,200	0.03	0.3	12,000	800	0.018	0.3
		6	4	16,000	1,500	0.03	0.4	13,000	1,100	0.02	0.3	11,000	750	0.012	0.3
		8	5.3	14,000	1,300	0.025	0.4	11,000	900	0.01	0.3	10,000	600	0.006	0.3

切削参数参考表 Recommended Milling 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）			
外径 Dia.	半角径 Corner Radius	颈长 Under Neck Length	L（颈长）/D（外径） L/D	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
				min^{-1}	mm/min	a_p mm	a_e mm	min^{-1}	mm/min	a_p mm	a_e mm	min^{-1}	mm/min	a_p mm	a_e mm
2	0.02	4	2	17,000	2,000	0.012	0.5	14,000	1,400	0.008	0.35	12,000	1,000	0.006	0.35
		6	3	15,000	1,800	0.012	0.5	12,000	1,200	0.008	0.35	11,000	900	0.006	0.35
		8	4	14,000	1,500	0.01	0.5	11,000	1,100	0.005	0.35	10,000	750	0.004	0.35
		10	5	12,000	1,300	0.01	0.5	10,000	1,000	0.003	0.35	9,000	650	0.003	0.35
	0.05	4	2	17,000	2,000	0.05	0.5	14,000	1,400	0.03	0.35	12,000	1,000	0.018	0.35
		6	3	15,000	1,800	0.05	0.5	12,000	1,200	0.03	0.35	11,000	900	0.018	0.35
		8	4	14,000	1,500	0.04	0.5	11,000	1,100	0.02	0.35	10,000	750	0.012	0.35
		10	5	12,000	1,300	0.04	0.5	10,000	1,000	0.02	0.35	9,000	650	0.012	0.35
	0.1	4	2	17,000	2,000	0.05	0.5	14,000	1,400	0.03	0.35	12,000	1,000	0.018	0.35
		6	3	15,000	1,800	0.05	0.5	12,000	1,200	0.03	0.35	11,000	900	0.018	0.35
		8	4	14,000	1,500	0.04	0.5	11,000	1,100	0.02	0.35	10,000	750	0.012	0.35
		10	5	12,000	1,300	0.04	0.5	10,000	1,000	0.02	0.35	9,000	650	0.012	0.35
	0.2	4	2	17,000	2,000	0.05	0.5	14,000	1,400	0.03	0.35	12,000	1,000	0.018	0.35
		6	3	15,000	1,800	0.05	0.5	12,000	1,200	0.03	0.35	11,000	900	0.018	0.35
		8	4	14,000	1,500	0.04	0.5	11,000	1,100	0.02	0.35	10,000	750	0.012	0.35
		10	5	12,000	1,300	0.04	0.5	10,000	1,000	0.02	0.35	9,000	650	0.012	0.35
	0.3	4	2	17,000	2,000	0.05	0.5	14,000	1,400	0.03	0.35	12,000	1,000	0.018	0.35
		6	3	15,000	1,800	0.05	0.5	12,000	1,200	0.03	0.35	11,000	900	0.018	0.35
		8	4	14,000	1,500	0.04	0.5	11,000	1,100	0.02	0.35	10,000	750	0.012	0.35
		10	5	12,000	1,300	0.04	0.5	10,000	1,000	0.02	0.35	9,000	650	0.012	0.35
	0.5	4	2	17,000	2,000	0.05	0.5	14,000	1,400	0.03	0.35	12,000	1,000	0.018	0.35
		6	3	15,000	1,800	0.05	0.5	12,000	1,200	0.03	0.35	11,000	900	0.018	0.35
		8	4	14,000	1,500	0.04	0.5	11,000	1,100	0.02	0.35	10,000	750	0.012	0.35
		10	5	12,000	1,300	0.04	0.5	10,000	1,000	0.02	0.35	9,000	650	0.012	0.35
3	0.05	4	1.3	13,000	2,000	0.05	0.7	10,000	1,400	0.05	0.6	8,000	1,100	0.03	0.6
		6	2	11,500	1,700	0.05	0.7	9,500	1,300	0.05	0.6	7,500	1,000	0.03	0.6
		8	2.7	10,500	1,500	0.05	0.7	8,000	1,100	0.05	0.6	6,000	800	0.03	0.6
		10	3.3	10,000	1,350	0.05	0.7	7,500	1,000	0.05	0.6	6,000	750	0.03	0.6
		12	4	10,000	1,350	0.04	0.7	7,500	1,000	0.04	0.6	6,000	750	0.024	0.6
		15	5	9,000	1,200	0.03	0.7	7,000	900	0.03	0.6	5,500	650	0.018	0.6
	0.1	4	1.3	13,000	2,000	0.07	0.7	10,000	1,400	0.05	0.6	8,000	1,100	0.03	0.6
		6	2	11,500	1,700	0.07	0.7	9,500	1,300	0.05	0.6	7,500	1,000	0.03	0.6
		8	2.7	10,500	1,500	0.07	0.7	8,000	1,100	0.05	0.6	6,000	800	0.03	0.6
		10	3.3	10,000	1,350	0.07	0.7	7,500	1,000	0.05	0.6	6,000	750	0.03	0.6
		12	4	10,000	1,350	0.06	0.7	7,500	1,000	0.04	0.6	6,000	750	0.024	0.6
		15	5	9,000	1,200	0.05	0.7	7,000	900	0.03	0.6	5,500	650	0.018	0.6
	0.2	4	1.3	13,000	2,000	0.07	0.7	10,000	1,400	0.05	0.6	8,000	1,100	0.03	0.6
		6	2	11,500	1,700	0.07	0.7	9,500	1,300	0.05	0.6	7,500	1,000	0.03	0.6
		8	2.7	10,500	1,500	0.07	0.7	8,000	1,100	0.05	0.6	6,000	800	0.03	0.6
		10	3.3	10,000	1,350	0.07	0.7	7,500	1,000	0.05	0.6	6,000	750	0.03	0.6
		12	4	10,000	1,350	0.06	0.7	7,500	1,000	0.04	0.6	6,000	750	0.024	0.6
		15	5	9,000	1,200	0.05	0.7	7,000	900	0.03	0.6	5,500	650	0.018	0.6
	0.3	4	1.3	13,000	2,000	0.07	0.7	10,000	1,400	0.05	0.6	8,000	1,100	0.03	0.6
		6	2	11,500	1,700	0.07	0.7	9,500	1,300	0.05	0.6	7,500	1,000	0.03	0.6
		8	2.7	10,500	1,500	0.07	0.7	8,000	1,100	0.05	0.6	6,000	800	0.03	0.6
		10	3.3	10,000	1,350	0.07	0.7	7,500	1,000	0.05	0.6	6,000	750	0.03	0.6
		12	4	10,000	1,350	0.06	0.7	7,500	1,000	0.04	0.6	6,000	750	0.024	0.6
		15	5	9,000	1,200	0.05	0.7	7,000	900	0.03	0.6	5,500	650	0.018	0.6
	0.5	4	1.3	13,000	2,000	0.07	0.7	10,000	1,400	0.05	0.6	8,000	1,100	0.03	0.6
		6	2	11,500	1,700	0.07	0.7	9,500	1,300	0.05	0.6	7,500	1,000	0.03	0.6
		8	2.7	10,500	1,500	0.07	0.7	8,000	1,100	0.05	0.6	6,000	800	0.03	0.6
		10	3.3	10,000	1,350	0.07	0.7	7,500	1,000	0.05	0.6	6,000	750	0.03	0.6
		12	4	10,000	1,350	0.06	0.7	7,500	1,000	0.04	0.6	6,000	750	0.024	0.6
		15	5	9,000	1,200	0.05	0.7	7,000	900	0.03	0.6	5,500	650	0.018	0.6

MHRSH430RSF

New 规格追加 Size Expansion

切削参数参考表 Recommended Milling 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）			
外径 Dia.	半角径 Corner Radius	颈长 Under Neck Length	L（颈长）/ D（外径） L/D	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
				min^{-1}	mm/min	ap mm	ae mm	min^{-1}	mm/min	ap mm	ae mm	min^{-1}	mm/min	ap mm	ae mm
4	0.1	8	2	8,500	1,800	0.08	1	7,000	1,300	0.06	0.8	5,500	1,000	0.036	0.8
		12	3	8,500	1,800	0.07	1	7,000	1,300	0.05	0.8	5,500	1,000	0.03	0.8
		16	4	7,500	1,500	0.06	1	5,500	1,000	0.05	0.8	5,200	900	0.03	0.8
		20	5	6,000	1,200	0.06	1	4,500	800	0.05	0.8	4,000	650	0.03	0.8
	0.2	8	2	8,500	1,800	0.08	1	7,000	1,300	0.06	0.8	5,500	1,000	0.036	0.8
		12	3	8,500	1,800	0.07	1	7,000	1,300	0.05	0.8	5,500	1,000	0.03	0.8
		16	4	7,500	1,500	0.06	1	5,500	1,000	0.05	0.8	5,200	900	0.03	0.8
		20	5	6,000	1,200	0.06	1	4,500	800	0.05	0.8	4,000	650	0.03	0.8
	0.3	8	2	8,500	1,800	0.08	1	7,000	1,300	0.06	0.8	5,500	1,000	0.036	0.8
		12	3	8,500	1,800	0.07	1	7,000	1,300	0.05	0.8	5,500	1,000	0.03	0.8
		16	4	7,500	1,500	0.06	1	5,500	1,000	0.05	0.8	5,200	900	0.03	0.8
		20	5	6,000	1,200	0.06	1	4,500	800	0.05	0.8	4,000	650	0.03	0.8
	0.5	8	2	8,500	1,800	0.08	1	7,000	1,300	0.06	0.8	5,500	1,000	0.036	0.8
		12	3	8,500	1,800	0.07	1	7,000	1,300	0.05	0.8	5,500	1,000	0.03	0.8
		16	4	7,500	1,500	0.06	1	5,500	1,000	0.05	0.8	5,200	900	0.03	0.8
		20	5	6,000	1,200	0.06	1	4,500	800	0.05	0.8	4,000	650	0.03	0.8
5	0.1	15	3	7,000	1,700	0.08	1.6	5,500	1,300	0.06	1.2	4,400	900	0.036	1.2
		20	4	6,000	1,400	0.07	1.6	5,000	1,100	0.05	1.2	4,000	750	0.03	1.2
	0.2	15	3	7,000	1,700	0.08	1.6	5,500	1,300	0.06	1.2	4,400	900	0.036	1.2
		20	4	6,000	1,400	0.07	1.6	5,000	1,100	0.05	1.2	4,000	750	0.03	1.2
	0.3	15	3	7,000	1,700	0.08	1.6	5,500	1,300	0.06	1.2	4,400	900	0.036	1.2
		20	4	6,000	1,400	0.07	1.6	5,000	1,100	0.05	1.2	4,000	750	0.03	1.2
	0.5	15	3	7,000	1,700	0.08	1.6	5,500	1,300	0.06	1.2	4,400	900	0.036	1.2
		20	4	6,000	1,400	0.07	1.6	5,000	1,100	0.05	1.2	4,000	750	0.03	1.2
6	0.1	12	2	5,500	1,800	0.08	2	4,500	1,400	0.06	1.5	3,600	1,000	0.036	1.5
		18	3	5,000	1,500	0.08	2	4,000	1,100	0.06	1.5	3,000	800	0.036	1.5
		24	4	4,500	1,300	0.07	2	3,500	900	0.05	1.5	2,700	700	0.036	1.5
		30	5	3,000	800	0.07	2	3,000	650	0.05	1.5	2,300	500	0.03	1.5
	0.2	12	2	5,500	1,800	0.08	2	4,500	1,400	0.06	1.5	3,600	1,000	0.036	1.5
		18	3	5,000	1,500	0.08	2	4,000	1,100	0.06	1.5	3,000	800	0.036	1.5
		24	4	4,500	1,300	0.07	2	3,500	900	0.05	1.5	2,700	700	0.036	1.5
		30	5	3,000	800	0.07	2	3,000	650	0.05	1.5	2,300	500	0.03	1.5
	0.3	12	2	5,500	1,800	0.08	2	4,500	1,400	0.06	1.5	3,600	1,000	0.036	1.5
		18	3	5,000	1,500	0.08	2	4,000	1,100	0.06	1.5	3,000	800	0.036	1.5
		24	4	4,500	1,300	0.07	2	3,500	900	0.05	1.5	2,700	700	0.036	1.5
		30	5	3,000	800	0.07	2	3,000	650	0.05	1.5	2,300	500	0.03	1.5
	0.5	12	2	5,500	1,800	0.08	2	4,500	1,400	0.06	1.5	3,600	1,000	0.036	1.5
		18	3	5,000	1,500	0.08	2	4,000	1,100	0.06	1.5	3,000	800	0.036	1.5
		24	4	4,500	1,300	0.07	2	3,500	900	0.05	1.5	2,700	700	0.036	1.5
		30	5	3,000	800	0.07	2	3,000	650	0.05	1.5	2,300	500	0.03	1.5
	1	12	2	5,500	1,800	0.08	2	4,500	1,400	0.06	1.5	3,600	1,000	0.036	1.5
		18	3	5,000	1,500	0.08	2	4,000	1,100	0.06	1.5	3,000	800	0.036	1.5
		24	4	4,500	1,300	0.07	2	3,500	900	0.05	1.5	2,700	700	0.036	1.5
		30	5	3,000	800	0.07	2	3,000	650	0.05	1.5	2,300	500	0.03	1.5

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 请根据机械刚性和加工材料的夹持状态等调整切削条件。
※3 发生振刀时，请于相同的比率调整切削条件。
※4 加工R角等负载大的部位或复杂的形状时，请特别注意参数设定和刀路轨迹等。
※5 轴向进刀时建议采用螺旋进刀及倾斜进刀方式。
※6 沟槽切削时建议参考切削参数表，切深量：ap 及进给速度设定为50%以下，并采用来回切削加工方式。
※7 请以相同的比率调整主轴转速与进给速度。
※8 建议使用热缩式刀柄。如使用筒夹式刀柄时请确认刀具所需要的最短夹持量。
※9 建议使用油雾冷却方式。

※1 Depth of Cut : ap = Axial Depth of Cut / ae = Radial Depth of Cut.
※2 Adjust milling condition according to machine rigidity and clamp condition of work material.
※3 In case of chattering etc., please adjust cutting conditions if necessary.
※4 At point where cutting load is high such as at corners, pay attention to setting cutting conditions and tool paths particularly.
※5 Recommend to apply helical or ramping for approaching into axial direction.
※6 For slotting, recommend reciprocating milling by adjusting feed & ap in below 50% of recommended milling condition.
※7 Adjust both spindle speed and feed at the same rate.
※8 A shrink fit type is recommended for tool holder. When using collet type or others, strictly adhere to minimum gripping length.
※9 We recommend using oil mist coolant.

SKH55 (64HRC)　双层凹槽造型

SKH55 (64HRC) Two-stage pocket model

高硬度钢加工时，在加工初期至加工完成后加工精度差异极小，可实现长时间稳定的加工。

Achieved stable machining accuracy on hardened steels from the beginning to the end by long tool life

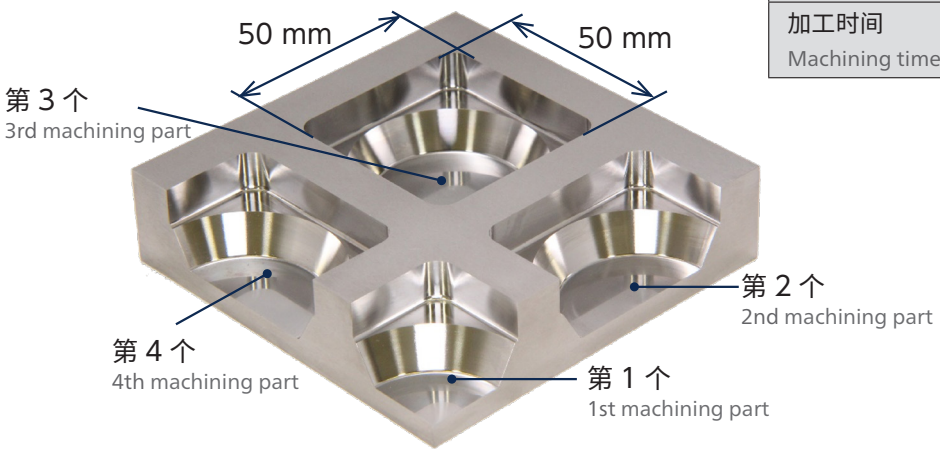
加工材料：**SKH55（64HRC）**
Work material

工件尺寸：**100 × 100 × 25 mm**
Work size
（加工深度 19 mm）
Machining depth

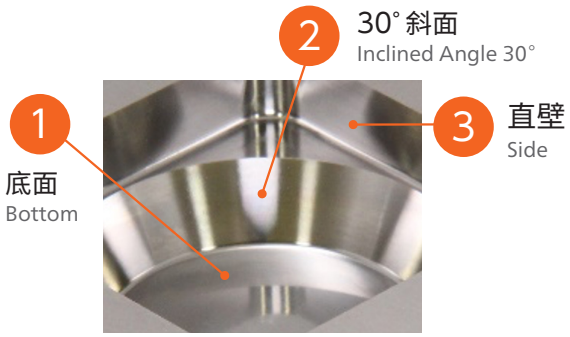
冷却方式：**油雾**
Coolant : Oil mist

加工时间：**2 小时 59 分钟（精加工）**
Machining time : 2 hr 59 min (Finishing Only)

加工工序 Process	精加工（侧面） Finishing (Side)	精加工（底面） Finishing (Bottom)
使用刀具 Tool	MHRSH430RSF φ6 × R1 × 24	
主轴转速 [min⁻¹] Spindle speed	4,000	
进给速度 [mm/min] Feed	600	
切深量 Depth of cut [mm]	pf 0.1	pf 0.2
余量 [mm] Stock	0.03	
加工时间 Machining time	2 小时 59 分钟 2 hr 59 min	

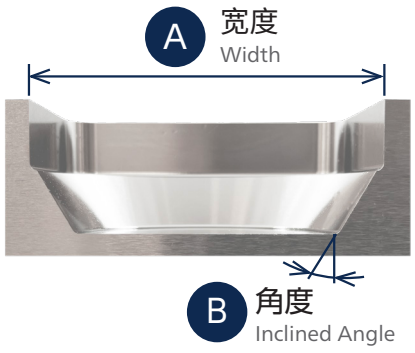


面粗度 Surface Roughness



测定位置 Measuring position		1	2	3
第 2 个 2nd	Ra [μm]	0.05	0.35	0.42
第 4 个 4th		0.06	0.49	0.28

加工精度 Accuracy



测定位置 Measuring position		A	B
目标值 Target		50.000 mm	30° 0' 0''
第 2 个 2nd	实测值 Actual	49.990 mm	30° 0'43''
第 4 个 4th	实测值 Actual	49.983 mm	30° 0'23''

加工案例2 Machining case 2

VANADIS23 (63HRC) 封装模具造型 VANADIS23 (63HRC) Sealed mold

即使加工高硬度钢材，也能维持稳定的刀具寿命与加工精度
针对平面加工，修光刃的效果可有效实现高精度加工

Realized stable dimension accuracy on machining hardened steels
By adopting wiper at the end cutting edge achieves high precision surface roughness on plane machining

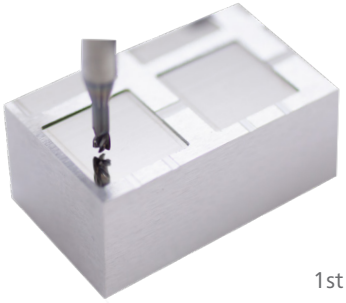
加工材料： **VANADIS23 (63HRC)**
Work material

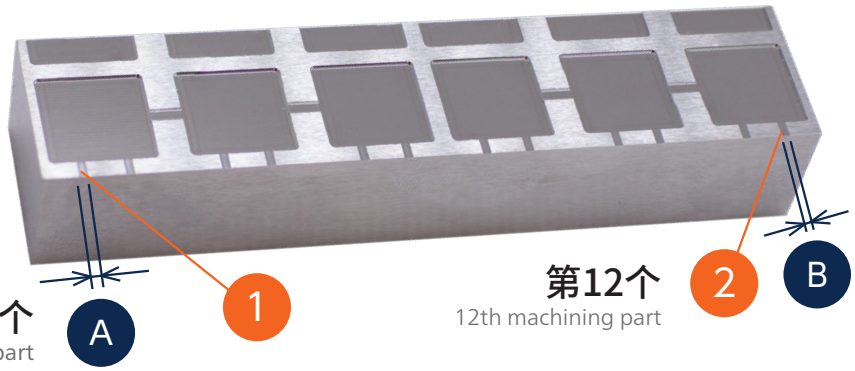
工件尺寸：**20 × 90 × 15 mm（加工深度 0.3 mm）**
Work size　　Machining depth

冷却方式：**油雾**
Coolant : Oil mist

总加工时间：**1 小时 44 分钟**
Total machining time : 1 hr 44 min

沟槽部加工
Machining at air vent
第1个与第12个比较
Comparison between 1st and 12th places





面粗度 Surface Roughness

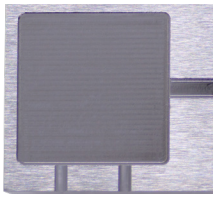
测定位置 Measuring position	1	2
Ra [μm]	0.055	0.066
Rz [μm]	0.387	0.445

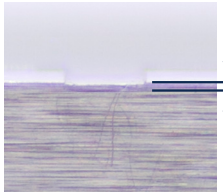
加工精度 Accuracy

单位 [mm] Unit

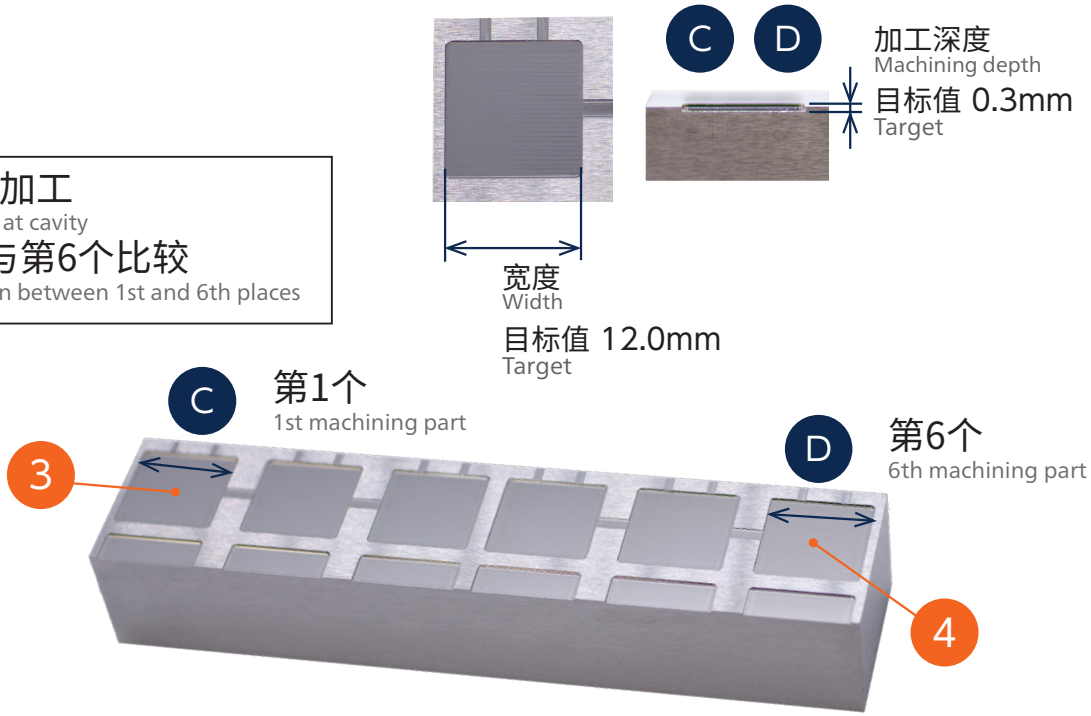
测定位置 Measuring position	沟槽部 Groove A		沟槽部 Groove B	
	宽度 Width	深度 Depth	宽度 Width	深度 Depth
加工后 After machining	1.001	0.039	0.999	0.041

加工工序 Process	沟槽部 Groove	
	粗加工 Roughing	精加工 Finishing
使用刀具 Tool	MHRSH430RSF ϕ0.8 × R0.02 × 2	MHRSH430RSF ϕ0.8 × R0.02 × 2
主轴转速 [min⁻¹] Spindle speed	11,000	11,000
进给速度 [mm/min] Feed	500	300
切深量 ap×ae [mm] Depth of cut	0.003×0.18	0.005×0.01 侧面 Side 0.003×0.2 底面 Bottom
余量 [mm] Stock	0.01 侧面 Side 0.003 底面 Bottom	-
加工时间 Machining time	3分钟 3 min	4分钟 4 min





凹槽部加工
Machining at cavity
第1个与第6个比较
Comparison between 1st and 6th places



面粗度
Surface Roughness

测定位置 Measuring position	3	4
Ra [μm]	0.053	0.051
Rz [μm]	0.370	0.336

加工精度
Accuracy

单位 [mm]
Unit

测定位置 Measuring position	凹槽部 Cavity C		凹槽部 Cavity D	
	宽度 Width	深度 Depth	宽度 Width	深度 Depth
加工后 After machining	11.999	0.298	11.998	0.296

加工工序 Process	凹槽部 Cavity				
	粗加工 Roughing	清角加工 Stock removal	底面中精加工 Bottom Semi-finishing	精加工 Finishing	拐角部精加工 Corner finishing
使用刀具 Tool	MHRSH430RSF φ1.5 × R0.1 × 4	MHRSH430RSF φ1 × R0.05 × 2		MHRSH430RSF φ1 × R0.05 × 2	
主轴转速 [min⁻¹] Spindle speed	11,000	11,000		11,000	
进给速度 [mm/min] Feed	800	800		800	800
切深量 ap×ae [mm] Depth of cut	0.06 × 0.3	0.01×0.12	ae 0.2	0.01 ×0.01侧面 Side 0.004×0.2 底面 Bottom	0.01×0.05
余量 [mm] Stock	0.01 侧面 Side 0.004 底面 Bottom	0.01 侧面 Side 0.004 底面 Bottom	0.004 底面 Bottom	-	-
加工时间 Machining time	40 分钟 40 min	14 分钟 14 min	8 分钟 8 min	26 分钟 26 min	9 分钟 9 min

加工案例3 Machining case 3

HAP40 (64HRC)　齿轮造型　HAP40 (64HRC) Gear model

可提升刀具寿命的无限白金Plus涂层与高精度的刀具设计 即使长时间加工也能维持高精度的加工需求

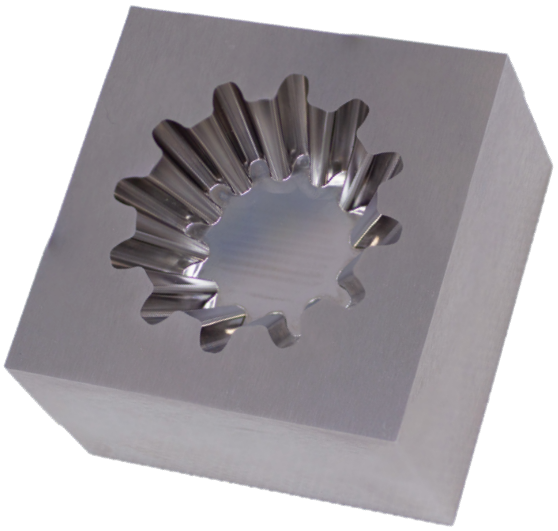
High precision tool design combines MUGEN COATING PREMIUM Plus extends tool life maintain high surface quality and accuracy even after long time machining

加工材料：**HAP40（64HRC）**
Work material

工件尺寸：**50 × 50 mm（加工深度 10 mm）**
Work size　Machining depth

冷却方式：**油雾**
Coolant : Oil mist

总加工时间：**7 小时 26 分钟**
Total machining time : 7 hr 26 min

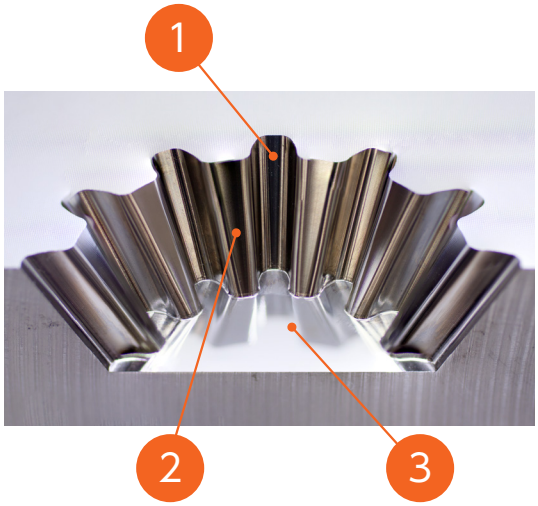


加工工序 Process	粗加工※ Roughing	中精加工 Semi-finishing		精加工 Finishing	
		底面 Bottom	侧面 Side	底面 Bottom	侧面 Side
使用刀具 Tool	MHRSH430RSF φ2 × R0.2 × 6	MHRSH430RSF φ2 × R0.2 × 6		MHRSH430RSF φ2 × R0.2 × 6	
主轴转速 [min^{-1}] Spindle speed	12,000	12,000		12,000	
进给速度 [mm/min] Feed	1,300	650	1,300	650	1,300
切深量 ap × ae [mm] Depth of cut	0.04 × 0.5	pf 0.1	pf 0.08	pf 0.05	pf 0.04
余量 [mm] Stock	0.03	0.01		-	
加工时间 Machining time	4 小时 25 分钟 4 hr 25 min	1 小时 5 分钟 1 hr 5 min		1 小时 56 分钟 1 hr 56 min	

※ 粗加工时使用2支刀具。
※ Using 2 tools for roughing

面粗度
Surface Roughness

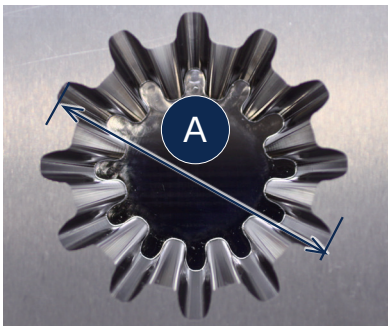
测定位置 Measuring position	1	2	3
Ra [μm]	0.189	0.228	0.036
Rz [μm]	1.169	1.131	0.352



加工精度
Accuracy

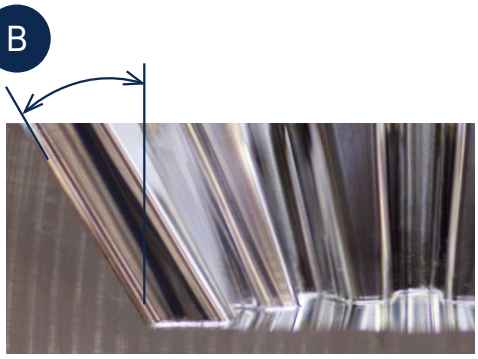
测定位置 Measuring position	A
目标值 Target	37.100 mm
实测值 Actual	37.099 mm
尺寸误差 Error	0.001 mm

齿轮直径
Tip circle diameter

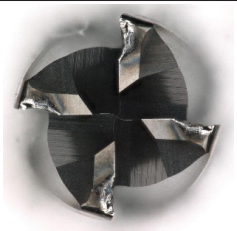
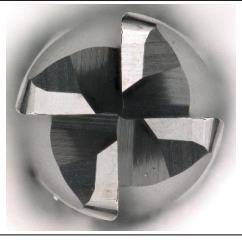
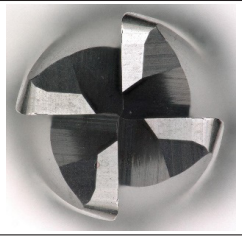
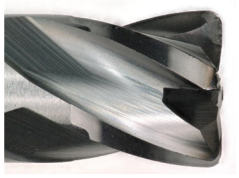
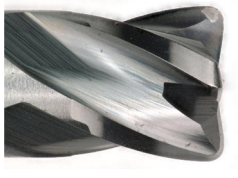


测定位置 Measuring position	B
目标值 Target	30° 45′
实测值 Actual	30° 44′ 48″
尺寸误差 Error	0° 0′ 12″

角度
Angle



加工后的刀尖状态
Cutting edge condition after machining

	粗加工 Roughing	中精加工 Semi-finishing	精加工 Finishing
底刃 Bottom edge			
外周刃・前刀面 Peripheral cutting edge Rake face			

对HAP40 (64HRC) 进行粗加工时，即使加工约2个小时后也能维持稳定加工。
即使是中精加工・精加工也只产生微小磨耗，实现了可维持高精度的加工。
Realized stable machining on HAP40 (64HRC) for about 2 hours
Maintain high accuracy with less wear even after semi-finishing and finishing

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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.

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MHRSH430RSF_C1_202211_CN_A