NS TOOL

「匠」心创先

MPX涂层
SUS420用长颈球头铣刀

MPX COATING
Long Neck Ball End Mill for 420 Hardened Stainless Steels

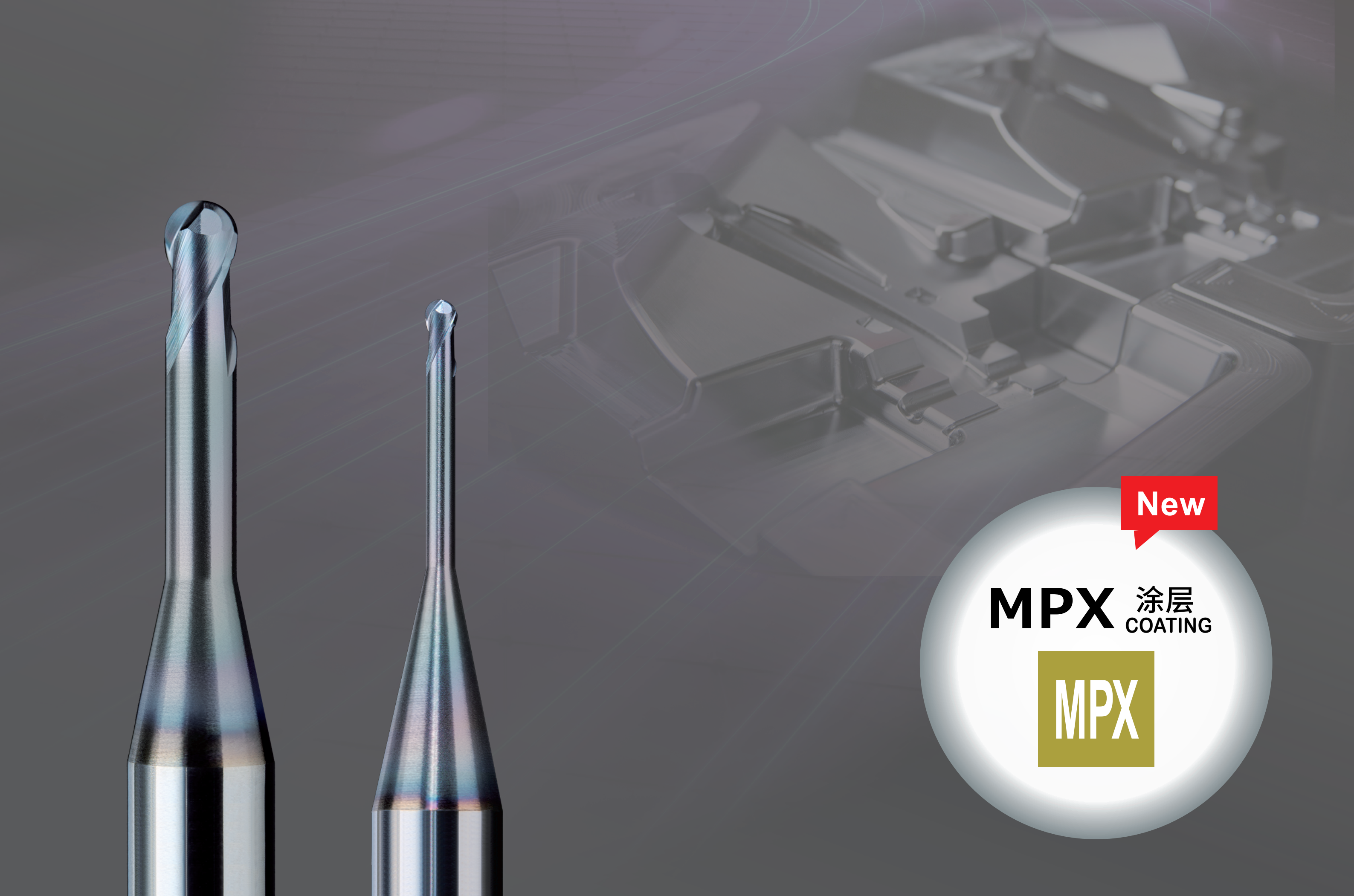
XRBH230 NEW

共 83 种规格
Total 83 sizes

H

SUS420J2　相当于52HRC（STAVAX® ESR 等）
专用小径球头铣刀
较以往产品实现 **2倍以上** 的刀具寿命

Specialized small diameter ball end mill for SUS420J2, as the same as 52HRC (STAVAX® ESR etc.)
Achieves outstanding tool life more than twice as long as conventional products



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XRBH230 *New*

MPX SMG 2 30° R ±0.003 ϕd −0.001 −0.003 3D

R0.05 ～ R1

共 83 种规格
Total 83 sizes

Point

为方便 CAD/CAM 编程人员设置参数，提供完整切削条件参考表
Recommended cutting conditions for CAD/CAM operators reference

新增了“中精加工”和“精加工”的切削参数，以确保任何人都可以根据标准参考值创建刀具路径
Newly added cutting conditions for "semi-finishing" and "finishing" processes to ensure that anyone can create tool paths at any time based on standard reference values

粗加工 Roughing

加工材料 Work Material			高硬度钢 Hardened Steels STAVAX·HPM38·M333(相当于52HRC) As the same as 52HRC						
R球头半径 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	每刃进给量 Feed per Tooth	切深量 Depth of Cut		余量 Stock allowance	切屑排出量 Material removal rate
			min⁻¹	mm/min	mm/t	ap mm	ae mm	mm	mm³/min
R0.05	0.2	2	40,000	100	0.001	0.003	0.008	0.005	0.002
	0.3	3	40,000	100	0.001	0.003	0.008	0.005	0.002
	0.4	4	40,000	80	0.001	0.002	0.006	0.004	0.001
	0.5	5	40,000	60	0.001	0.002	0.005	0.004	0.001
	0.3	2	40,000	200	0.003	0.006	0.014	0.007	0.017
	0.4	2.7	40,000	200	0.003	0.006	0.014	0.007	0.017

【粗加工】
Roughing

新增每刃进给量・余量
切屑排出量数值
Added Feed per Tooth・Stock allowance・Metal Removal Rate

中精加工 Semi-Finishing　精加工 Finishing

加工材料 Work Material			高硬度钢 Hardened Steels STAVAX·HPM38·M333(相当于52HRC) As the same as 52HRC											
			中精加工 Semi-Finishing						精加工 Finishing					
R球头半径 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	每刃进给量 Feed per Tooth	切深量 Depth of Cut	余量 Stock allowance	尖点高度 Cusp Height	主轴转速 Spindle Speed	进给速度 Feed	每刃进给量 Feed per Tooth	切深量 Depth of Cut	余量 Stock allowance	尖点高度 Cusp Height
			min⁻¹	mm/min	min⁻¹	ap mm 或 ae mm	mm/t	μm	min⁻¹	mm/min	min⁻¹	ap mm 或 ae mm	mm	μm
R0.05	0.2	2	40,000	270	0.003	0.003	0.002	0.02	40,000	160	0.002	0.002	0	0.01
	0.3	3	40,000	270	0.003	0.003	0.002	0.02	40,000	160	0.002	0.002	0	0.01

【中精加工】/【精加工】
Semi-finishing / Finishing

新增每刃进给量・余量
尖点高度数值
Added Feed per Tooth・Stock allowance・Cusp Height

特长
Features

Feature 1　**长寿命** Long tool life　**MPX 涂层** MPX COATING

采用针对 SUS420J2 高硬度钢开发的全新涂层「MPX 涂层」，实现较以往产品 2 倍以上的刀具寿命

Adopting new developed MPX coating for hardened steel SUS420J2 realizes tool life more than twice as long as conventional tools

MPX

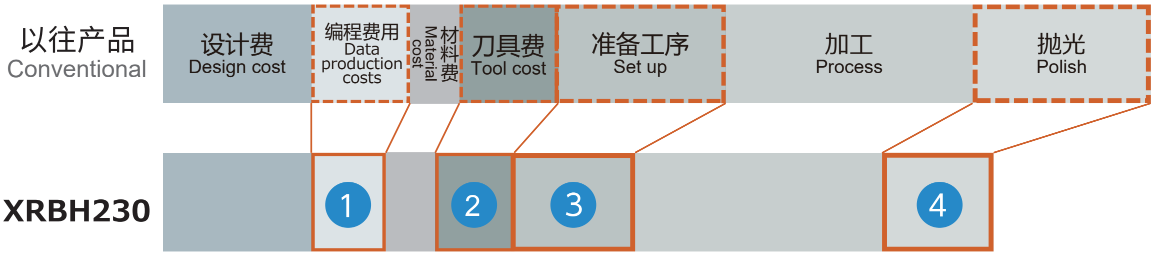
SUS420J2	H
相当于52HRC As the same as 52HRC	
◎	

Feature 2 降低成本 Cost reduction

通过提升刀具寿命实现降低成本
Realizes cost reduction by improved tool life

提升刀具寿命所带来的优势，如降低成本和缩短工作时间
Extending tool life can bring about various benefits,such as cost reduction and shortening work time

当使用的刀具数量从 2 支变为 1 支时
When the number of tools used changes from two to one

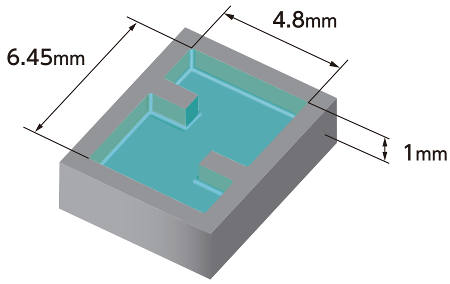


1. 减少 CAM 编程时间
   Reduced CAM operation load
2. 减少刀具费用
   Tool cost reduction
3. 缩短加工前准备工序和刀柄费用
   Reduce setup time ＋ Tooling cost reduction
4. 缩短抛光时间
   Reduce polishing time

■与以往产品的寿命比较
Tool life comparison with conventional products

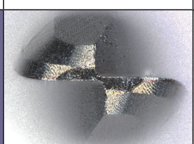
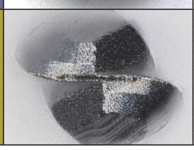
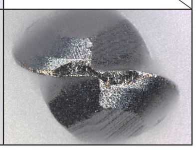
R0.2× 颈长1mm
R0.2 × Under neck length 1

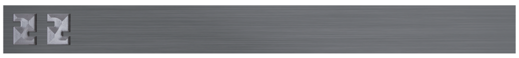
加工材料：STAVAX®ESR 52HRC
Work material
冷却方式：油雾
Coolant Oil mist



主轴转速 [min⁻¹] Spindle speed	40,000
切削速度 [m/min] Cutting speed	21.91（实际切削速度）(※ Actual cutting speed)
进给速度 [mm/min] Feed	800
每刃进给量 [mm/t] Feed per tooth	0.01
切深量 (ap×ae) Depth of cut [mm]	0.02 × 0.05
切削距离 Cutting length	26 m / 个 pc
加工时间 Machining time	40 分钟 / 个 min pc

※ Cutting speed calculated on actual diameter basis.

	加工 2 个后 After machining 2pcs 1 小时 20 分钟 hr min	加工15个后 After machining 15pcs 10 小时 hr
以往产品 Conventional		
XRBH230		



以往产品由于刀具磨耗过大，仅加工 2 个就中止（1 小时 20 分钟）
Conventional product had a large wear range after machining 2pcs and end at 1hr 20min

XRBH230 加工完成 15 个（10 小时）
XRBH230 machined 15pcs in 10hr

寿命差 5 倍以上
Tool life difference more than 5 times

XRBH230

New

规格 Size R0.05 ～ R1

MPX ≦52HRC

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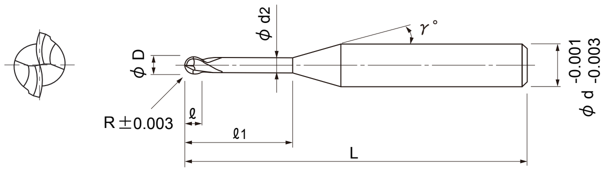
SUS420用长颈球头铣刀
MPX COATING Long Neck Ball End Mill for 420 Hardened Stainless Steels

共83种规格
Total 83 sizes

SUS420J2 52HRC相当于（STAVAX® ESR等）专用小径球头铣刀 较以往产品实现2倍以上的刀具寿命

Specialized small diameter ball end mill for SUS420J2, as the same as 52HRC (STAVAX® ESR etc.)
Achieves outstanding tool life more than twice as long as conventional products

SMG 2 30° R ±0.003 φd −0.001 −0.003 3D



- 针对SUS420J2 高硬度钢开发的全新涂层MPX！
- 比以往产品长2倍以上的寿命！
- New developed coating MPX specialized for SUS420J2, hardened steels.
- More than twice as long as conventional tools.

各尺寸与以往产品的刀具寿命比较
Tool life comparison with conventional products by each size

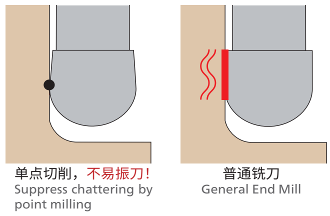
加工材料：STAVAX® ESR 52HRC
Work material

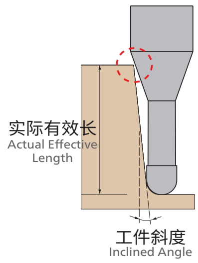
※ 除使用刀具以外，所有加工均在同一切削条件和加工环境下进行
※ Except for the tools, all other cutting conditions are under the same environment and conditions

与以往产品相比达到
２～５倍以上刀具寿命
Outstanding tool life from twice to 5 times compared to conventional products

加工材料 Work Material

SUS420J2 H
52HRC 相当 As the same as 52HRC
◎





◆2024年11月发表 ※Released in Nov, 2024.

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

产品代码No. 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.	(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°
◆ 08-00561-00502	R0.05	0.2	0.07	0.1	0.085	12°	4	45	14,000	0.24	0.25	0.26	0.27	0.29
◆ 08-00561-00503		0.3	0.07	0.1	0.085	12°	4	45	14,000	0.34	0.36	0.37	0.39	0.42
◆ 08-00561-00504		0.4	0.07	0.1	0.085	12°	4	45	14,000	0.45	0.46	0.48	0.51	0.56
◆ 08-00561-00505		0.5	0.07	0.1	0.085	12°	4	45	14,500	0.55	0.57	0.60	0.63	0.69
◆ 08-00561-00703	R0.075	0.3	0.1	0.15	0.13	12°	4	45	14,000	0.35	0.37	0.38	0.40	0.43
◆ 08-00561-00704		0.4	0.1	0.15	0.13	12°	4	45	14,000	0.46	0.48	0.49	0.52	0.56
◆ 08-00561-00705		0.5	0.1	0.15	0.13	12°	4	45	15,000	0.56	0.58	0.61	0.64	0.70
◆ 08-00561-00706		0.6	0.1	0.15	0.13	12°	4	45	15,000	0.67	0.69	0.72	0.75	0.83
◆ 08-00561-00707		0.75	0.1	0.15	0.13	12°	4	45	15,000	0.82	0.86	0.89	0.93	1.03
◆ 08-00561-00710		1	0.1	0.15	0.13	12°	4	45	15,500	1.08	1.13	1.18	1.23	1.36
◆ 08-00561-01003	R0.1	0.3	0.15	0.2	0.18	12°	4	45	9,900	0.35	0.36	0.38	0.39	0.42
◆ 08-00561-01004		0.4	0.15	0.2	0.18	12°	4	45	9,900	0.46	0.47	0.49	0.51	0.56
◆ 08-00561-01005		0.5	0.15	0.2	0.18	12°	4	45	9,900	0.56	0.58	0.61	0.63	0.69
◆ 08-00561-01006		0.6	0.15	0.2	0.18	12°	4	45	9,900	0.67	0.69	0.72	0.75	0.82
◆ 08-00561-01007		0.75	0.15	0.2	0.18	12°	4	45	9,900	0.82	0.85	0.89	0.93	1.02
◆ 08-00561-01010		1	0.15	0.2	0.18	12°	4	45	9,900	1.08	1.13	1.18	1.23	1.35
◆ 08-00561-01012		1.25	0.15	0.2	0.18	12°	4	45	10,700	1.34	1.40	1.46	1.53	1.68
◆ 08-00561-01015		1.5	0.15	0.2	0.18	12°	4	45	10,700	1.60	1.67	1.75	1.83	2.02
◆ 08-00561-01020		2	0.15	0.2	0.18	12°	4	45	11,000	2.13	2.22	2.32	2.43	2.68
◆ 08-00561-01505	R0.15	0.5	0.2	0.3	0.28	12°	4	45	9,800	0.56	0.58	0.60	0.62	0.67
◆ 08-00561-01506		0.6	0.2	0.3	0.28	12°	4	45	9,800	0.66	0.69	0.71	0.74	0.81
◆ 08-00561-01507		0.75	0.2	0.3	0.28	12°	4	45	9,800	0.82	0.85	0.88	0.92	1.01
◆ 08-00561-01510		1	0.2	0.3	0.28	12°	4	45	9,800	1.08	1.12	1.17	1.22	1.34

订购方式 How to Order
请指定XRBH230 球头半径(R)×颈长(ℓ1)×柄径(d
When you order, indicate XRBH230 (R)×(ℓ1)×(d).

(γ) 为参考值。
(γ) is reference value.

MPX涂层
SUS420用长颈球头铣刀
MPX COATING Long Neck Ball End Mill for 420 Hardened Stainless Steels

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Unit [Size : mm / Retail Price : JPY]

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◆ 08-00561-01512	R0.15	1.25	0.2	0.3	0.28	12°	4	45	10,400	1.34	1.39	1.45	1.52	1.67
◆ 08-00561-01515		1.5	0.2	0.3	0.28	12°	4	45	10,400	1.60	1.67	1.74	1.82	2.00
◆ 08-00561-01520		2	0.2	0.3	0.28	12°	4	45	10,400	2.12	2.21	2.31	2.42	2.66
◆ 08-00561-01525		2.5	0.2	0.3	0.28	12°	4	45	10,700	2.64	2.76	2.88	3.01	3.33
◆ 08-00561-01530		3	0.2	0.3	0.28	12°	4	45	10,700	3.17	3.30	3.45	3.61	3.99
◆ 08-00561-02005	R0.2	0.5	0.3	0.4	0.37	12°	4	45	6,600	0.58	0.60	0.62	0.64	0.69
◆ 08-00561-02008		0.8	0.3	0.4	0.37	12°	4	45	6,600	0.89	0.93	0.96	1.00	1.09
◆ 08-00561-02010		1	0.3	0.4	0.37	12°	4	45	6,600	1.10	1.14	1.19	1.24	1.35
◆ 08-00561-02015		1.5	0.3	0.4	0.37	12°	4	45	6,900	1.62	1.69	1.76	1.84	2.02
◆ 08-00561-02020		2	0.3	0.4	0.37	12°	4	45	7,000	2.15	2.23	2.33	2.43	2.68
◆ 08-00561-02025		2.5	0.3	0.4	0.37	12°	4	45	7,300	2.67	2.78	2.90	3.03	3.34
◆ 08-00561-02030		3	0.3	0.4	0.37	12°	4	45	7,700	3.19	3.32	3.47	3.63	4.01
◆ 08-00561-02040		4	0.3	0.4	0.37	12°	4	45	8,300	4.23	4.41	4.61	4.83	5.33
◆ 08-00561-02510	R0.25	1	0.35	0.5	0.46	12°	4	45	6,600	1.13	1.16	1.21	1.26	1.37
◆ 08-00561-02515		1.5	0.35	0.5	0.46	12°	4	45	6,600	1.65	1.71	1.78	1.85	2.03
◆ 08-00561-02520		2	0.35	0.5	0.46	12°	4	45	6,600	2.17	2.25	2.35	2.45	2.69
◆ 08-00561-02525		2.5	0.35	0.5	0.46	12°	4	45	6,600	2.69	2.80	2.92	3.05	3.36
◆ 08-00561-02530		3	0.35	0.5	0.46	12°	4	45	6,600	3.21	3.34	3.49	3.65	4.02
◆ 08-00561-02540		4	0.35	0.5	0.46	12°	4	45	6,600	4.25	4.43	4.63	4.85	5.35
◆ 08-00561-02550		5	0.35	0.5	0.46	12°	4	45	6,900	5.30	5.52	5.77	6.04	6.68
◆ 08-00561-03010	R0.3	1	0.45	0.6	0.56	12°	4	45	4,900	1.12	1.16	1.20	1.25	1.35
◆ 08-00561-03015		1.5	0.45	0.6	0.56	12°	4	45	4,900	1.64	1.71	1.77	1.84	2.02
◆ 08-00561-03020		2	0.45	0.6	0.56	12°	4	45	4,900	2.17	2.25	2.34	2.44	2.68
◆ 08-00561-03025		2.5	0.45	0.6	0.56	12°	4	45	5,200	2.69	2.79	2.91	3.04	3.34
◆ 08-00561-03030		3	0.45	0.6	0.56	12°	4	45	5,200	3.21	3.34	3.48	3.64	4.01
◆ 08-00561-03040		4	0.45	0.6	0.56	12°	4	45	5,500	4.25	4.43	4.62	4.84	5.33
◆ 08-00561-03050		5	0.45	0.6	0.56	12°	4	45	5,500	5.29	5.52	5.76	6.03	6.66
◆ 08-00561-03060		6	0.45	0.6	0.56	12°	4	45	5,500	6.34	6.61	6.90	7.23	7.99
◆ 08-00561-04010	R0.4	1	0.6	0.8	0.76	12°	4	45	5,200	1.12	1.15	1.19	1.23	1.32
◆ 08-00561-04020		2	0.6	0.8	0.76	12°	4	45	5,200	2.16	2.24	2.33	2.42	2.65
◆ 08-00561-04030		3	0.6	0.8	0.76	12°	4	45	5,500	3.20	3.33	3.47	3.62	3.97
◆ 08-00561-04040		4	0.6	0.8	0.76	12°	4	45	5,500	4.25	4.42	4.61	4.82	5.30
◆ 08-00561-04050		5	0.6	0.8	0.76	12°	4	45	5,500	5.29	5.51	5.75	6.01	6.63
◆ 08-00561-04060		6	0.6	0.8	0.76	12°	4	45	5,500	6.33	6.60	6.89	7.21	7.96
◆ 08-00561-04080		8	0.6	0.8	0.76	12°	4	45	5,500	8.42	8.78	9.17	9.60	10.61
◆ 08-00561-05020	R0.5	2	0.75	1	0.95	12°	4	45	4,200	2.18	2.26	2.34	2.43	2.65
◆ 08-00561-05030		3	0.75	1	0.95	12°	4	45	4,200	3.22	3.35	3.48	3.63	3.97
◆ 08-00561-05040		4	0.75	1	0.95	12°	4	45	4,700	4.27	4.44	4.62	4.83	5.30
◆ 08-00561-05050		5	0.75	1	0.95	12°	4	45	4,700	5.31	5.53	5.76	6.02	6.63
◆ 08-00561-05060		6	0.75	1	0.95	12°	4	45	4,900	6.35	6.62	6.90	7.22	7.96
◆ 08-00561-05080		8	0.75	1	0.95	12°	4	45	4,900	8.44	8.79	9.18	9.61	10.61
◆ 08-00561-05100		10	0.75	1	0.95	12°	4	45	4,900	10.52	10.97	11.46	12.01	13.26
◆ 08-00561-07503	R0.75	3	1.1	1.5	1.45	12°	4	45	5,100	3.21	3.33	3.45	3.58	3.89
◆ 08-00561-07504		4	1.1	1.5	1.45	12°	4	45	5,100	4.26	4.41	4.59	4.78	5.22
◆ 08-00561-07506		6	1.1	1.5	1.45	12°	4	45	5,100	6.34	6.59	6.87	7.17	7.88
◆ 08-00561-07508		8	1.1	1.5	1.45	12°	4	45	5,300	8.43	8.77	9.15	9.56	10.53
◆ 08-00561-07510		10	1.1	1.5	1.45	12°	4	45	5,700	10.51	10.95	11.43	11.96	13.18
◆ 08-00561-07512		12	1.1	1.5	1.45	12°	4	45	6,100	12.60	13.13	13.71	14.35	15.84
◆ 08-00561-07514		14	1.1	1.5	1.45	12°	4	50	6,100	14.69	15.31	15.99	16.74	18.49
◆ 08-00561-07516		16	1.1	1.5	1.45	12°	4	50	6,100	16.77	17.49	18.27	19.14	21.15
◆ 08-00561-10003	R1	3	1.5	2	1.94	12°	4	45	4,400	3.23	3.33	3.44	3.56	3.85
◆ 08-00561-10004		4	1.5	2	1.94	12°	4	45	4,400	4.27	4.42	4.58	4.76	5.17
◆ 08-00561-10006		6	1.5	2	1.94	12°	4	45	4,900	6.36	6.60	6.86	7.15	7.83
◆ 08-00561-10008		8	1.5	2	1.94	12°	4	45	4,900	8.44	8.78	9.14	9.54	10.48
◆ 08-00561-10010		10	1.5	2	1.94	12°	4	45	4,900	10.53	10.95	11.42	11.94	13.14
◆ 08-00561-10012		12	1.5	2	1.94	12°	4	45	4,900	12.61	13.13	13.70	14.33	15.79
◆ 08-00561-10014		14	1.5	2	1.94	12°	4	50	5,000	14.70	15.31	15.98	16.72	18.45
◆ 08-00561-10016		16	1.5	2	1.94	12°	4	50	5,000	16.78	17.49	18.27	19.12	Free
◆ 08-00561-10018		18	1.5	2	1.94	12°	4	55	5,000	18.87	19.67	20.55	21.51	Free
◆ 08-00561-10020		20	1.5	2	1.94	12°	4	55	5,000	20.96	21.85	22.83	23.90	Free

切削条件参考表 Recommended Conditions

粗加工 Roughing

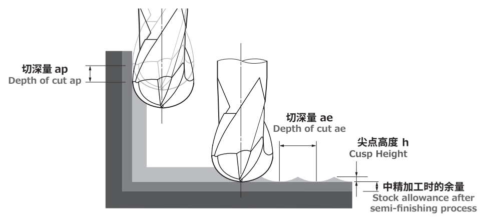
加工材料 Work Material			高硬度钢 Hardened Steels STAVAX·HPM38·M333(相当于52HRC) As the same as 52HRC						
R球头半径 Radius	颈长 Under Neck Length	L(颈长)/D(外径) L/D	主轴转速 Spindle Speed	进给速度 Feed	每刃进给量 Feed per Tooth	切深量 Depth of Cut		余量 Stock allowance	切屑排出量 Material removal rate
			min^{-1}	mm/min	mm/tooth	a_p mm	a_e mm	mm	mm^3/min
R0.05	0.2	2	40,000	100	0.001	0.003	0.008	0.005	0.002
	0.3	3	40,000	100	0.001	0.003	0.008	0.005	0.002
	0.4	4	40,000	80	0.001	0.002	0.006	0.004	0.001
	0.5	5	40,000	60	0.001	0.002	0.005	0.004	0.001
R0.075	0.3	2	40,000	200	0.003	0.006	0.014	0.007	0.017
	0.4	2.7	40,000	200	0.003	0.006	0.014	0.007	0.017
	0.5	3.3	40,000	180	0.002	0.005	0.012	0.006	0.011
	0.6	4	40,000	150	0.002	0.004	0.010	0.005	0.006
	0.75	5	40,000	120	0.002	0.003	0.008	0.004	0.003
	1	6.7	40,000	90	0.001	0.003	0.006	0.004	0.002
R0.1	0.3	1.5	40,000	300	0.004	0.008	0.020	0.009	0.048
	0.4	2	40,000	300	0.004	0.008	0.020	0.009	0.048
	0.5	2.5	40,000	300	0.004	0.008	0.020	0.009	0.048
	0.6	3	40,000	300	0.004	0.008	0.020	0.009	0.048
	0.75	3.8	40,000	240	0.003	0.007	0.016	0.007	0.027
	1	5	40,000	180	0.002	0.005	0.012	0.005	0.011
	1.25	6.3	40,000	140	0.002	0.004	0.010	0.004	0.006
	1.5	7.5	40,000	120	0.002	0.003	0.008	0.004	0.003
	2	10	40,000	90	0.001	0.002	0.006	0.004	0.001
R0.15	0.5	1.7	40,000	600	0.008	0.014	0.036	0.013	0.30
	0.6	2	40,000	600	0.008	0.014	0.036	0.013	0.30
	0.75	2.5	40,000	600	0.008	0.014	0.036	0.013	0.30
	1	3.3	40,000	540	0.007	0.013	0.032	0.012	0.23
	1.25	4.2	40,000	430	0.005	0.010	0.026	0.009	0.11
	1.5	5	40,000	360	0.005	0.009	0.022	0.008	0.07
	2	6.7	40,000	270	0.003	0.007	0.016	0.006	0.03
	2.5	8.3	40,000	220	0.003	0.005	0.013	0.005	0.01
	3	10	40,000	180	0.002	0.004	0.011	0.004	0.01
R0.2	0.5	1.3	40,000	900	0.011	0.022	0.056	0.015	1.11
	0.8	2	40,000	900	0.011	0.022	0.056	0.015	1.11
	1	2.5	40,000	900	0.011	0.022	0.056	0.015	1.11
	1.5	3.8	40,000	720	0.009	0.018	0.044	0.012	0.57
	2	5	40,000	540	0.007	0.013	0.033	0.009	0.23
	2.5	6.3	40,000	430	0.005	0.011	0.027	0.007	0.13
	3	7.5	40,000	360	0.005	0.009	0.022	0.006	0.07
	4	10	40,000	270	0.003	0.007	0.017	0.005	0.03
R0.25	1	2	40,000	1,300	0.016	0.031	0.079	0.020	3.18
	1.5	3	40,000	1,300	0.016	0.031	0.079	0.020	3.18
	2	4	40,000	980	0.012	0.024	0.059	0.015	1.39
	2.5	5	40,000	780	0.010	0.019	0.047	0.012	0.70
	3	6	40,000	650	0.008	0.016	0.039	0.010	0.41
	4	8	40,000	490	0.006	0.012	0.030	0.008	0.18
	5	10	40,000	390	0.005	0.009	0.024	0.006	0.08
R0.3	1	1.7	40,000	1,700	0.021	0.042	0.106	0.023	7.57
	1.5	2.5	40,000	1,700	0.021	0.042	0.106	0.023	7.57
	2	3.3	40,000	1,530	0.019	0.038	0.095	0.021	5.52
	2.5	4.2	40,000	1,220	0.015	0.030	0.076	0.017	2.78
	3	5.0	40,000	1,020	0.013	0.025	0.063	0.014	1.61
	4	6.7	40,000	770	0.010	0.019	0.048	0.010	0.70
	5	8.3	40,000	610	0.008	0.015	0.038	0.008	0.35
	6	10	37,000	510	0.007	0.013	0.032	0.007	0.21

加工材料 Work Material			高硬度钢 Hardened Steels STAVAX·HPM38·M333(相当于52HRC) As the same as 52HRC						
R球头半径 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	每刃进给量 Feed per Tooth	切深量 Depth of Cut		余量 Stock allowance	切屑排出量 Material removal rate
			min^{-1}	mm/min	mm/tooth	ap mm	ae mm	mm	mm^3/min
R0.4	1	1.3	40,000	2,700	0.034	0.068	0.170	0.029	31.21
	2	2.5	40,000	2,700	0.034	0.068	0.170	0.029	31.21
	3	3.8	37,400	2,160	0.029	0.054	0.136	0.023	15.86
	4	5	34,300	1,620	0.024	0.041	0.102	0.017	6.77
	5	6.3	32,100	1,300	0.020	0.033	0.082	0.014	3.52
	6	7.5	30,400	1,080	0.018	0.027	0.068	0.012	1.98
	8	10	27,900	810	0.015	0.020	0.051	0.009	0.83
R0.5	2	2	31,800	2,900	0.046	0.100	0.250	0.040	72.50
	3	3	31,800	2,900	0.046	0.100	0.250	0.040	72.50
	4	4	29,200	2,175	0.037	0.075	0.188	0.030	30.67
	5	5	27,300	1,740	0.032	0.060	0.150	0.024	15.66
	6	6	25,800	1,450	0.028	0.050	0.125	0.020	9.06
	8	8	23,700	1,088	0.023	0.038	0.094	0.015	3.88
	10	10	22,200	870	0.020	0.030	0.075	0.012	1.96
R0.75	3	2	21,200	2,900	0.068	0.150	0.375	0.056	163.13
	4	2.7	21,200	2,900	0.068	0.150	0.375	0.056	163.13
	6	4.0	19,400	2,180	0.056	0.113	0.281	0.042	69.22
	8	5.3	17,800	1,630	0.046	0.084	0.211	0.032	28.89
	10	6.7	16,700	1,310	0.039	0.068	0.169	0.025	15.05
	12	8	15,800	1,090	0.034	0.056	0.141	0.021	8.61
	14	9.3	15,100	930	0.031	0.048	0.121	0.018	5.40
	16	10.7	14,500	820	0.028	0.042	0.105	0.016	3.62
R1	3	1.5	15,900	2,900	0.091	0.200	0.500	0.068	290.00
	4	2	15,900	2,900	0.091	0.200	0.500	0.068	290.00
	6	3	15,900	2,900	0.091	0.200	0.500	0.068	290.00
	8	4	14,600	2,180	0.075	0.150	0.375	0.051	122.63
	10	5	13,600	1,740	0.064	0.120	0.300	0.041	62.64
	12	6	12,900	1,450	0.056	0.100	0.250	0.034	36.25
	14	7	12,300	1,240	0.050	0.086	0.214	0.029	22.82
	16	8	11,800	1,090	0.046	0.075	0.188	0.026	15.37
	18	9	11,400	970	0.043	0.067	0.167	0.023	10.85
	20	10	11,100	870	0.039	0.060	0.150	0.020	7.83

备 注
Notes

※1 切深量的ap表示为轴向切深量，ae表示步距量。
※2 请根据机床刚性和工件的夹持状态等调整切削参数。
※3 发生振刀等情况时，请根据需要调整切深参数。
※4 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。
※5 进行高效率加工时,请以相同比率提升主轴转速和进给速度。
※6 当机床的最高主轴转速低于以上参考值时,请以相同比率调整主轴转速和进给速度。
※7 请尽量缩短刀具的伸出量。
※8 建议使用油雾冷却方式,但是不水溶性切削液、水溶性切削液、吹气方式也可使用。
※9 中精加工和精加工的余量为参考值,请根据前一工序的加工状态和要求精度进行调整。
※10 中精加工、精加工的每刃进给量ap、ae是根据尖点高度的参考值为设定条件。
尖点高度为参考值,请根据要求精度进行调整。

※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 If the cutting load is high at corner, adjust the cutting conditions and tool path to reduce the cutting load.
※5 In case high-efficient machining, increase spindle speed and feed rate at the same rate.
※6 If the maximum spindle speed of the machine tool is lower than the reference value, please reduce the spindle speed and feed rate at the same rate.
※7 Length of tool overhang must be as short as possible.
※8 Oil mist coolant is recommended. Water-insoluble, water-soluble, and air blow can also be used.
※9 The stock allowances of semi-finishing and finishing are guide values, please adjust them according to the machining condition of the previous process and the required accuracy.
※10 Feed per tooth, ap and ae of semi-finishing and finishing are set as reference values for the cusp height. The cusp height is a guideline, please adjust it according to the required accuracy.



XRBH230 New

切削条件参考表 Recommended Conditions

中精加工 Semi-Finishing　精加工 Finishing

加工材料 Work Material			高硬度钢 Hardened Steels STAVAX·HPM38·M333(相当于52HRC) As the same as 52HRC											
			中精加工 Semi-Finishing						精加工 Finishing					
R球头半径 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	每刃进给量 Feed per Tooth	切深量 Depth of Cut	余量 Stock allowance	尖点高度 Cusp Height	主轴转速 Spindle Speed	进给速度 Feed	每刃进给量 Feed per Tooth	切深量 Depth of Cut	余量 Stock allowance	尖点高度 Cusp Height
			min^{-1}	mm/min	mm/tooth	ap mm 或 ae mm	mm	μm	min^{-1}	mm/min	mm/tooth	ap mm 或 ae mm	mm	μm
R0.05	0.2	2	40,000	270	0.003	0.003	0.002	0.02	40,000	160	0.002	0.002	0	0.01
	0.3	3	40,000	270	0.003	0.003	0.002	0.02	40,000	160	0.002	0.002	0	0.01
	0.4	4	40,000	270	0.003	0.003	0.002	0.02	40,000	160	0.002	0.002	0	0.01
	0.5	5	40,000	270	0.003	0.003	0.002	0.02	40,000	160	0.002	0.002	0	0.01
R0.075	0.3	2	40,000	390	0.005	0.005	0.003	0.04	40,000	270	0.003	0.003	0	0.02
	0.4	2.7	40,000	390	0.005	0.005	0.003	0.04	40,000	270	0.003	0.003	0	0.02
	0.5	3.3	40,000	390	0.005	0.005	0.003	0.04	40,000	270	0.003	0.003	0	0.02
	0.6	4	40,000	390	0.005	0.005	0.003	0.04	40,000	270	0.003	0.003	0	0.02
	0.75	5	40,000	390	0.005	0.005	0.002	0.04	40,000	270	0.003	0.003	0	0.02
	1	6.7	40,000	390	0.005	0.005	0.002	0.04	40,000	270	0.003	0.003	0	0.02
R0.1	0.3	1.5	40,000	450	0.006	0.006	0.004	0.04	40,000	320	0.004	0.004	0	0.02
	0.4	2	40,000	450	0.006	0.006	0.004	0.04	40,000	320	0.004	0.004	0	0.02
	0.5	2.5	40,000	450	0.006	0.006	0.004	0.04	40,000	320	0.004	0.004	0	0.02
	0.6	3	40,000	450	0.006	0.006	0.004	0.04	40,000	320	0.004	0.004	0	0.02
	0.75	3.8	40,000	450	0.006	0.006	0.003	0.04	40,000	320	0.004	0.004	0	0.02
	1	5	40,000	450	0.006	0.006	0.002	0.04	40,000	320	0.004	0.004	0	0.02
	1.25	6.3	40,000	450	0.006	0.006	0.002	0.04	40,000	320	0.004	0.004	0	0.02
	1.5	7.5	40,000	450	0.006	0.006	0.002	0.04	40,000	320	0.004	0.004	0	0.02
	2	10	40,000	450	0.006	0.006	0.002	0.04	40,000	320	0.004	0.004	0	0.02
R0.15	0.5	1.7	40,000	610	0.008	0.008	0.006	0.05	40,000	480	0.006	0.006	0	0.03
	0.6	2	40,000	610	0.008	0.008	0.006	0.05	40,000	480	0.006	0.006	0	0.03
	0.75	2.5	40,000	610	0.008	0.008	0.006	0.05	40,000	480	0.006	0.006	0	0.03
	1	3.3	40,000	610	0.008	0.008	0.005	0.05	40,000	480	0.006	0.006	0	0.03
	1.25	4.2	40,000	610	0.008	0.008	0.004	0.05	40,000	480	0.006	0.006	0	0.03
	1.5	5	40,000	610	0.008	0.008	0.004	0.05	40,000	480	0.006	0.006	0	0.03
	2	6.7	40,000	610	0.008	0.008	0.003	0.05	40,000	480	0.006	0.006	0	0.03
	2.5	8.3	40,000	610	0.008	0.008	0.002	0.05	40,000	480	0.006	0.006	0	0.03
	3	10	40,000	610	0.008	0.008	0.002	0.05	40,000	480	0.006	0.006	0	0.03
R0.2	0.5	1.3	40,000	780	0.010	0.010	0.007	0.06	40,000	560	0.007	0.007	0	0.03
	0.8	2	40,000	780	0.010	0.010	0.007	0.06	40,000	560	0.007	0.007	0	0.03
	1	2.5	40,000	780	0.010	0.010	0.007	0.06	40,000	560	0.007	0.007	0	0.03
	1.5	3.8	40,000	780	0.010	0.010	0.006	0.06	40,000	560	0.007	0.007	0	0.03
	2	5	40,000	780	0.010	0.010	0.004	0.06	40,000	560	0.007	0.007	0	0.03
	2.5	6.3	40,000	780	0.010	0.010	0.003	0.06	40,000	560	0.007	0.007	0	0.03
	3	7.5	40,000	780	0.010	0.010	0.003	0.06	40,000	560	0.007	0.007	0	0.03
	4	10	40,000	780	0.010	0.010	0.002	0.06	40,000	560	0.007	0.007	0	0.03
R0.25	1	2	40,000	1,010	0.013	0.013	0.009	0.08	40,000	710	0.009	0.009	0	0.04
	1.5	3	40,000	1,010	0.013	0.013	0.009	0.08	40,000	710	0.009	0.009	0	0.04
	2	4	40,000	1,010	0.013	0.013	0.007	0.08	40,000	710	0.009	0.009	0	0.04
	2.5	5	40,000	1,010	0.013	0.013	0.005	0.08	40,000	710	0.009	0.009	0	0.04
	3	6	40,000	1,010	0.013	0.013	0.004	0.08	40,000	710	0.009	0.009	0	0.04
	4	8	40,000	1,010	0.013	0.013	0.003	0.08	40,000	710	0.009	0.009	0	0.04
	5	10	40,000	1,010	0.013	0.013	0.003	0.08	40,000	710	0.009	0.009	0	0.04
R0.3	1	1.7	40,000	1,170	0.015	0.015	0.010	0.09	40,000	780	0.010	0.010	0	0.04
	1.5	2.5	40,000	1,170	0.015	0.015	0.010	0.09	40,000	780	0.010	0.010	0	0.04
	2	3.3	40,000	1,170	0.015	0.015	0.009	0.09	40,000	780	0.010	0.010	0	0.04
	2.5	4.2	40,000	1,170	0.015	0.015	0.007	0.09	40,000	780	0.010	0.010	0	0.04
	3	5.0	40,000	1,170	0.015	0.015	0.006	0.09	40,000	780	0.010	0.010	0	0.04
	4	6.7	40,000	1,170	0.015	0.015	0.004	0.09	40,000	780	0.010	0.010	0	0.04

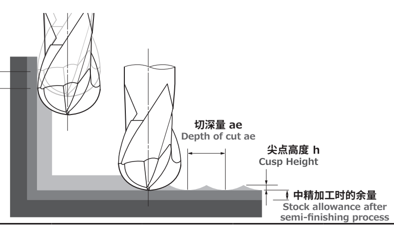
切削条件参考表 Recommended Conditions

加工材料 Work Material			高硬度钢 Hardened Steels STAVAX·HPM38·M333(相当于52HRC) As the same as 52HRC											
			中精加工 Semi-Finishing						精加工 Finishing					
R球头半径 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	每刃进给量 Feed per Tooth	切深量 Depth of Cut	余量 Stock allowance	尖点高度 Cusp Height	主轴转速 Spindle Speed	进给速度 Feed	每刃进给量 Feed per Tooth	切深量 Depth of Cut	余量 Stock allowance	尖点高度 Cusp Height
			min^{-1}	mm/min	mm/tooth	ap mm 或 ae mm	mm	μm	min^{-1}	mm/min	mm/tooth	ap mm 或 ae mm	mm	μm
R0.3	5	8.3	40,000	1,170	0.015	0.015	0.004	0.09	40,000	780	0.010	0.010	0	0.04
	6	10	37,000	1,080	0.015	0.015	0.003	0.09	37,000	720	0.010	0.010	0	0.04
R0.4	1	1.3	40,000	1,430	0.018	0.018	0.013	0.10	40,000	1,010	0.013	0.013	0	0.05
	2	2.5	40,000	1,430	0.018	0.018	0.013	0.10	40,000	1,010	0.013	0.013	0	0.05
	3	3.8	37,400	1,330	0.018	0.018	0.010	0.10	37,400	940	0.013	0.013	0	0.05
	4	5	34,300	1,220	0.018	0.018	0.008	0.10	34,300	860	0.013	0.013	0	0.05
	5	6.3	32,100	1,140	0.018	0.018	0.006	0.10	32,100	810	0.013	0.013	0	0.05
	6	7.5	30,400	1,080	0.018	0.018	0.005	0.10	30,400	760	0.013	0.013	0	0.05
	8	10	27,900	990	0.018	0.018	0.004	0.10	27,900	700	0.013	0.013	0	0.05
R0.5	2	2	31,800	1,550	0.024	0.024	0.017	0.14	31,800	1,060	0.017	0.017	0	0.07
	3	3	31,800	1,550	0.024	0.024	0.017	0.14	31,800	1,060	0.017	0.017	0	0.07
	4	4	29,200	1,430	0.024	0.024	0.013	0.14	29,200	970	0.017	0.017	0	0.07
	5	5	27,300	1,330	0.024	0.024	0.010	0.14	27,300	910	0.017	0.017	0	0.07
	6	6	25,800	1,260	0.024	0.024	0.008	0.14	25,800	860	0.017	0.017	0	0.07
	8	8	23,700	1,160	0.024	0.024	0.006	0.14	23,700	790	0.017	0.017	0	0.07
	10	10	22,200	1,080	0.024	0.024	0.005	0.14	22,200	740	0.017	0.017	0	0.07
R0.75	3	2	21,200	1,350	0.032	0.032	0.022	0.17	21,200	920	0.022	0.022	0	0.08
	4	2.7	21,200	1,350	0.032	0.032	0.022	0.17	21,200	920	0.022	0.022	0	0.08
	6	4.0	19,400	1,230	0.032	0.032	0.016	0.17	19,400	850	0.022	0.022	0	0.08
	8	5.3	17,800	1,130	0.032	0.032	0.012	0.17	17,800	770	0.022	0.022	0	0.08
	10	6.7	16,700	1,060	0.032	0.032	0.010	0.17	16,700	730	0.022	0.022	0	0.08
	12	8	15,800	1,000	0.032	0.032	0.008	0.17	15,800	690	0.022	0.022	0	0.08
	14	9.3	15,100	960	0.032	0.032	0.007	0.17	15,100	660	0.022	0.022	0	0.08
	16	10.7	14,500	920	0.032	0.032	0.006	0.17	14,500	630	0.022	0.022	0	0.08
R1	3	1.5	15,900	1,270	0.040	0.040	0.028	0.2	15,900	890	0.028	0.028	0	0.1
	4	2	15,900	1,270	0.040	0.040	0.028	0.2	15,900	890	0.028	0.028	0	0.1
	6	3	15,900	1,270	0.040	0.040	0.028	0.2	15,900	890	0.028	0.028	0	0.1
	8	4	14,600	1,160	0.040	0.040	0.021	0.2	14,600	820	0.028	0.028	0	0.1
	10	5	13,600	1,080	0.040	0.040	0.017	0.2	13,600	760	0.028	0.028	0	0.1
	12	6	12,900	1,030	0.040	0.040	0.014	0.2	12,900	720	0.028	0.028	0	0.1
	14	7	12,300	980	0.040	0.040	0.012	0.2	12,300	690	0.028	0.028	0	0.1
	16	8	11,800	940	0.040	0.040	0.011	0.2	11,800	660	0.028	0.028	0	0.1
	18	9	11,400	910	0.040	0.040	0.009	0.2	11,400	640	0.028	0.028	0	0.1
	20	10	11,100	880	0.040	0.040	0.008	0.2	11,100	620	0.028	0.028	0	0.1

备 注 Notes

※1 切深量的ap表示为轴向切深量，ae表示步距量。
※2 请根据机床刚性和工件的夹持状态等调整切削参数。
※3 发生振刀等情况时，请根据需要调整切深参数。
※4 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。
※5 进行高效率加工时，请以相同比率提升主轴转速和进给速度。
※6 当机床的最高主轴转速低于以上参考值时，请以相同比率调整主轴转速和进给速度。
※7 请尽量缩短刀具的伸出量。
※8 建议使用油雾冷却方式，但是不水溶性切削液、水溶性切削液、吹气方式也可使用。
※9 中精加工和精加工的余量为参考值，请根据前一工序的加工状态和要求精度进行调整。
※10 中精加工、精加工的每刃进给量ap、ae是根据尖点高度的参考值为设定条件。
尖点高度为参考值，请根据要求精度进行调整。

※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 If the cutting load is high at corner, adjust the cutting conditions and tool path to reduce the cutting load.
※5 In case high-efficient machining, increase spindle speed and feed rate at the same rate.
※6 If the maximum spindle speed of the machine tool is lower than the reference value, please reduce the spindle speed and feed rate at the same rate.
※7 Length of tool overhang must be as short as possible.
※8 Oil mist coolant is recommended. Water-insoluble, water-soluble, and air blow can also be used.
※9 The stock allowances of semi-finishing and finishing are guide values, please adjust them according to the machining condition of the previous process and the required accuracy.
※10 Feed per tooth, ap and ae of semi-finishing and finishing are set as reference values for the cusp height. The cusp height is a guideline, please adjust it according to the required accuracy.



STAVAX®ESR (52HRC) 五角星造型 STAVAX®ESR (52HRC) The pentagon

与同一尺寸的以往产品在同样切削条件下的加工寿命比较

Achieves longer tool life when compared to conventional products of the same size (machined under the same cutting conditions)

加工材料：**STAVAX®ESR (52HRC)**
Work material

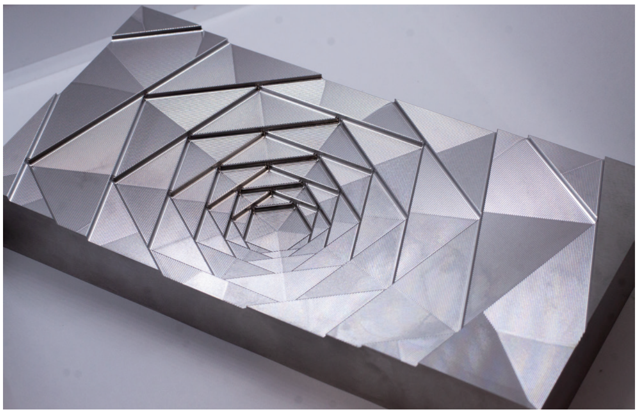
加工尺寸：100 × 200 × 30 mm（加工深度 24 mm）
Work size Machining depth

冷却方式：油雾
Coolant : Oil mist

总加工时间：9 小时 12 分钟
Total machining time : 9 hr 12 min

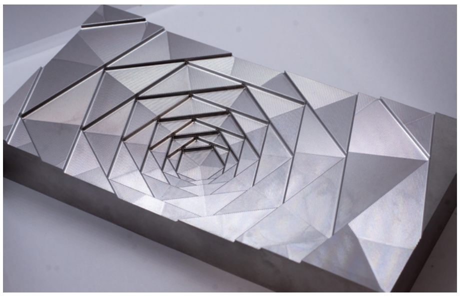
XRBH230和以往产品在同一尺寸・同样条件下的加工比较
Comparison of machining with XRBH230 and conventional products under the same cutting conditions and size

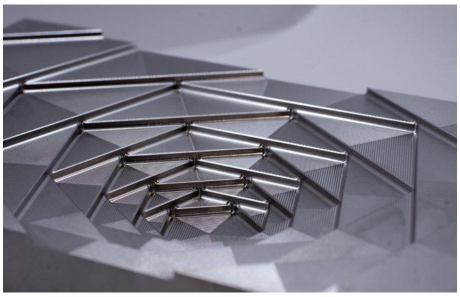
加工工序 Process	粗加工 Roughing	
使用工具 Tool	XRBH230 R1 × 6	以往产品 Conventional R1 × 6
主轴转速 [min⁻¹] Spindle speed	15,900	
进给速度 [mm/min] Feed	3,200	
切深量 [mm] ap × ae Depth of cut	0.2 × 0.5	
加工时间 Machining time	9 小时 12 分钟 9 hr 12 min	8 小时 29 分钟 8 hr 29 min （折损） (Broken)

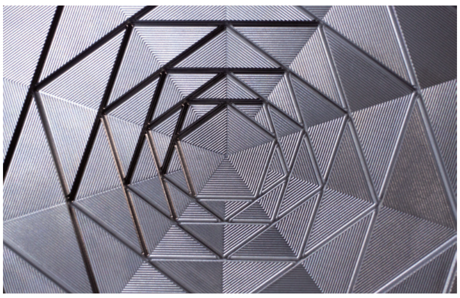


加工结果 Result

XRBH230



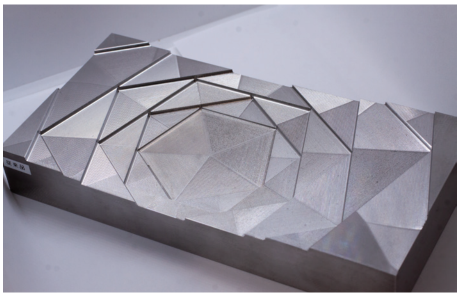


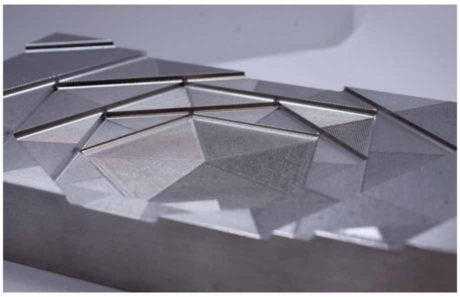


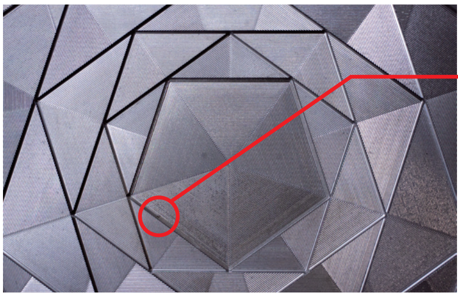
XRBH230仅用1支刀具加工完成
XRBH230 completes machining in a single tool

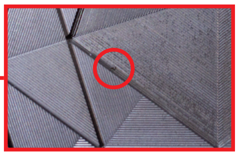
使用刀具 Tool	加工深度 [mm] Machining depth	除去体积 [cm^3] Removal volume
XRBH230 R1 × 6	24	160

以往产品
Conventional







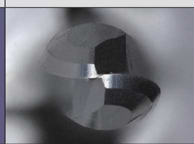
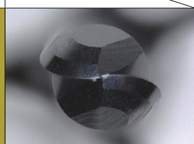
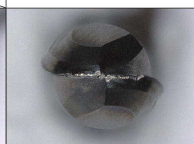
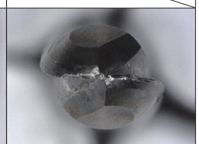
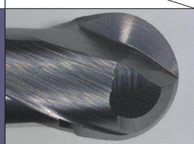
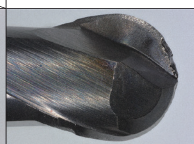
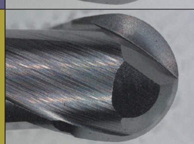
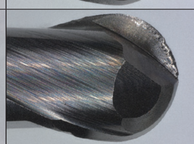
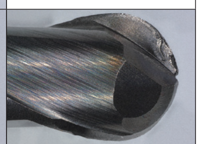
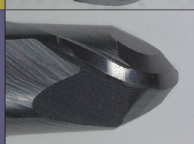
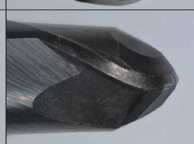
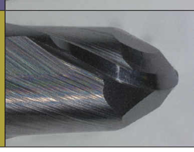
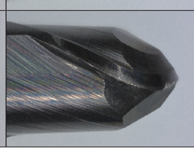
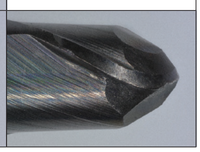


折损点
Broken point

以往产品在加工过程中发生折损
The conventional product breaks during machining

使用刀具 Tool	加工深度 [mm] Machining depth	除去体积 [cm^3] Removal volume
以往产品 Conventional R1 × 6	13.532	150

工具磨耗状态
Tool wear condition

	经过时间 Time passage	新品状态 New tool	加工6小时54分钟后 After machining 6hr 54min	加工9小时12分钟后 After machining 9hr 12min
球头中心附近 Near the center of the ball	以往产品 Conventional R1 × 6			8小时29分钟折损 Broken at 8hr 29min
	磨耗宽度 Tool wear		0.169	
	XRBH230 R1 × 6			
	磨耗宽度 Tool wear		**0.083**	**0.107**
前刀面 Rake face	以往产品 Conventional R1 × 6			8小时29分钟折损 Broken at 8hr 29min
	XRBH230 R1 × 6			
外周部 Peripheral	以往产品 Conventional R1 × 6			8小时29分钟折损 Broken at 8hr 29min
	XRBH230 R1 × 6			

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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.

25'02
XRBH230_A1_202502_CN

ISO 9001 JQA-QM6096
ISO 14001 JQA-EM3712

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