

新开发
New development !
WX Super Coating
WX超强涂层铣刀系列™
WX超强涂层铣刀系列 Vol.2
WX Super Coating End Mill Series

无敌涂层隆重登场!!

实现了淬火钢的
高速·长寿命加工!

Achieves high speed and long tool life even
in direct milling of hardened steels !

超耐热·超高硬度涂层
Newly developed Super-heat-resistant and super-hard coating

新开发! WX超级涂层 隆重登场!

New development! Introducing the WX Super Coating!

采用纳米技术
超耐热·超高硬度涂层!!
氧化温度 **1300°C**!

Super-heat resistance and super-hard coating born by nanotechnology.
Oxidation temperature is 1300°C!

OSG WX 超级涂层
三大特点!!

特点1 不怕高硬度!

实现了高硬度材料的长寿命加工!
Long tool life in high speed and dry milling!

特点2 不怕高热量!

实现了高硬度材料的长寿命加工!

- 淬火钢 (~70HRC : SKD11, SKD61, SKH)
- 预硬钢

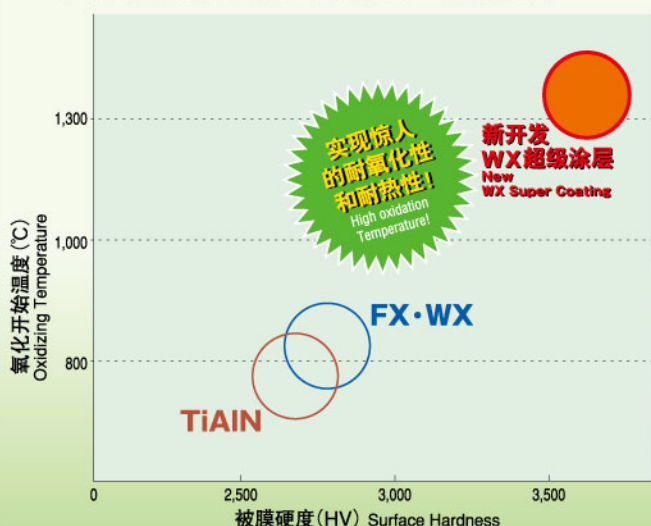
High speed and long tool life in hardened steels!
Hardened Steels (~70HRC : SKD11, SKD61, SKH)
Pre-Hardened Steels

特点3 不怕严酷的加工环境!

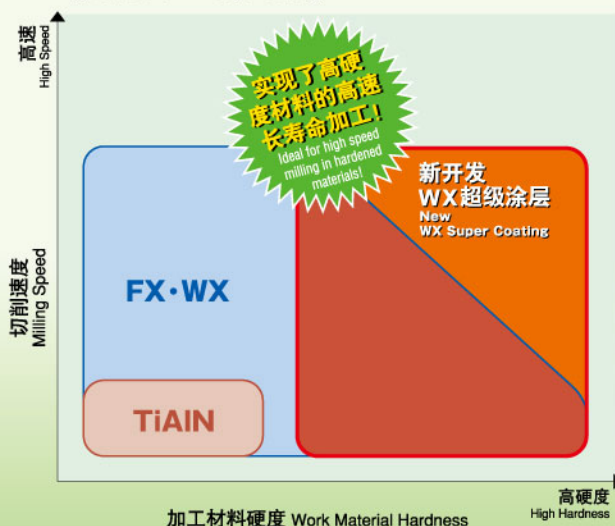
实现了高质量·高精度加工!
Good performance & High precision!



● 新开发WX超级涂层的硬度及氧化开始温度
Surface Hardness and Oxidation Temperature of WX Super Coating



● 新开发WX超级涂层的切削范围
Applications for WX Super Coating



WXS-EBD SKD11 (62HRC) 的加工

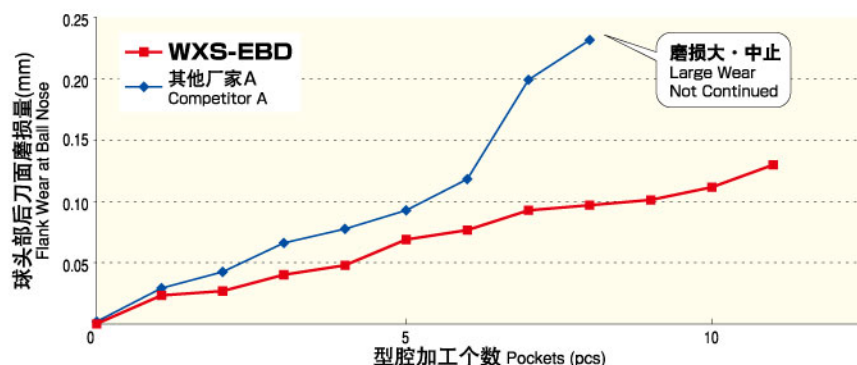
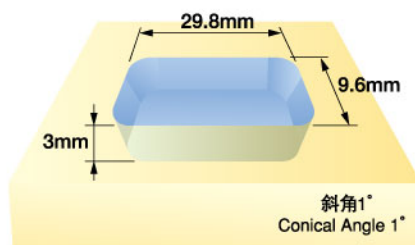
WXS-EBD Milling in SKD11 (62HRC)



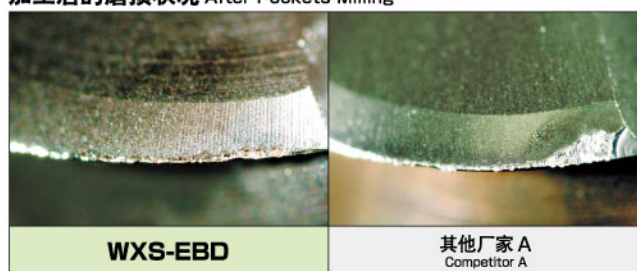
在SKD11(62HRC)的加工中，新开发的WX超级涂层发挥出耐磨性的效果。

When milling in SKD11 (62HRC), the wear-resistant of the new WX super coating was demonstrated.

使用刀具 Tool	WXS-EBD R3
加工材质 Work Material	SKD11 (62HRC)
回转速度 Speed	11,000min ⁻¹
进给速度 Feed	2,200mm/min (0.1mm/t)
切削方式 Milling Method	型腔加工 Pocket Milling
切深量 Milling Depth	a _a =0.1mm Pf=0.12mm
切削油剂 Coolant	气冷式 Air Blow
使用设备 Machine	立式加工中心 (BT40) Vertical Machining Center (BT40)



加工后的磨损状况 After Pockets Milling



WXS-EBD SKD11 (62HRC) 的加工

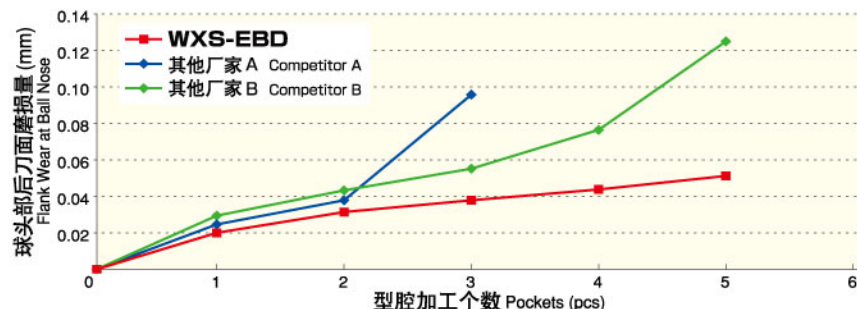
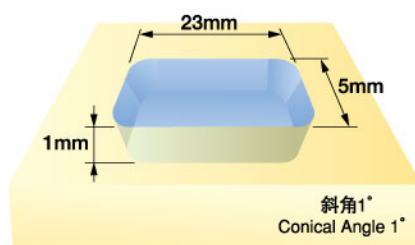
WXS-EBD Milling in SKD11 (62HRC)



新开发的WX超级涂层可长时间维持R形状，实现高精度加工。

The newly developed WX Super Coating offers high precision milling by maintaining the radius shape for extended periods.

使用刀具 Tool	WXS-EBD R1×4
加工材质 Work Material	SKD11 (62HRC)
回转速度 Speed	32,000min ⁻¹
进给速度 Feed	2,800mm/min (0.038mm/t)
切削方式 Milling Method	型腔加工 Pocket Milling
切深量 Milling Depth	a _a =0.04mm Pf=0.05mm
切削油剂 Coolant	气冷式 Air Blow
使用设备 Machine	立式加工中心 Vertical Machining Center (HSK-E32)



加工完成时的刃尖状态 Condition of the Cutting Edge at the End of Milling

铣刀 End Mill	WXS-EBD	其他厂家 A Competitor A	其他厂家 B Competitor B
加工个数 Pockets	5个 pcs	3个 pcs	5个 pcs
磨损状况 Wear Condition			
R形状 Ball Radius Form			

WXS-EBD SKH51 (65HRC) 的加工

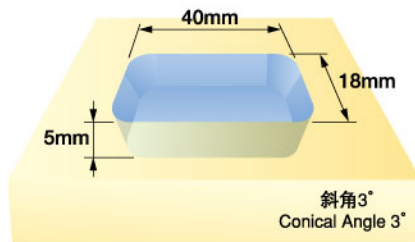
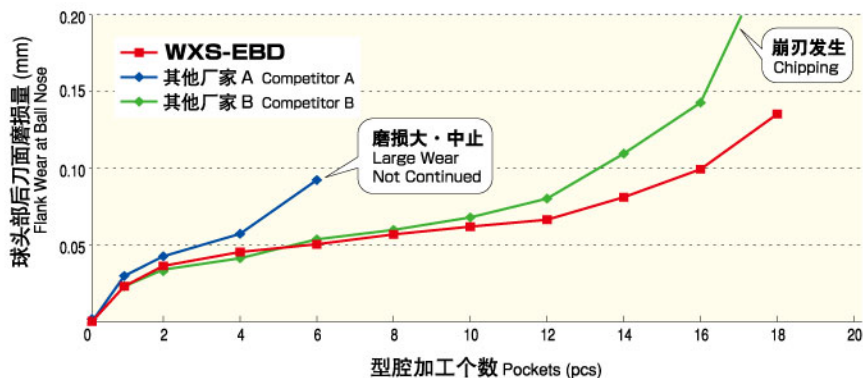
WXS-EBD Milling in SKH51 (65HRC)



在高硬度材料(65HRC)的加工中，新开发WX超级涂层的效果实现了无崩刃的稳定加工。

Even when working in hard, 65 HRC material, the newly developed WX Super Coating enabled the end mill to operate stably without chipping.

使用刀具 Tool	WXS-EBD R5
加工材质 Work Material	SKH51 (65HRC)
回转速度 Speed	5,700min ⁻¹
进给速度 Feed	1,140mm/min (0.1mm/t)
切削方式 Milling Method	型腔加工 Pocket Milling
切深量 Milling Depth	a _a =0.2mm Pf=0.5mm
切削油剂 Coolant	气冷式 Air Blow
使用设备 Machine	立式加工中心 (BT40) Vertical Machining Center (BT40)



WXS-EBD HPM38 (52HRC) 的加工

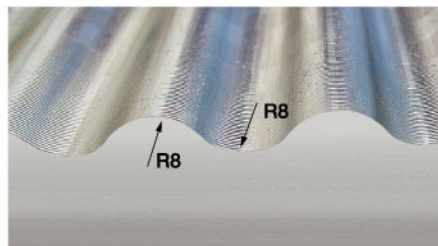
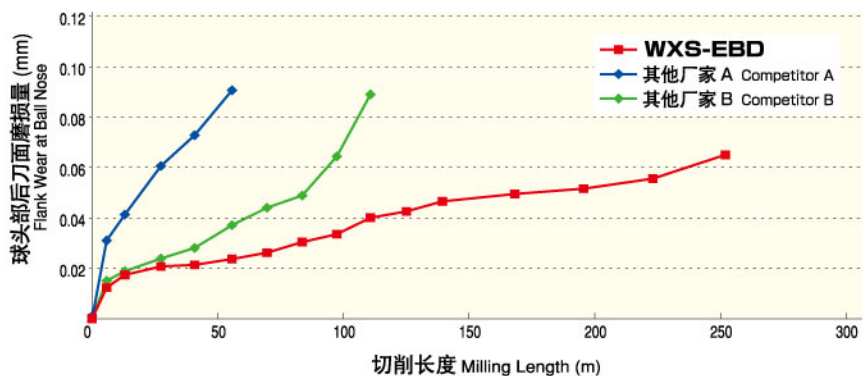
WXS-EBD Milling in HPM38 (52HRC)



在直线和等高线的面铣削加工中，新开发的WX超级涂层铣刀能发挥出巨大的威力。

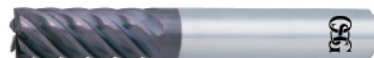
The intense ups & downs of 3D Milling demonstrates the power of the newly-developed WX Super Coating.

使用刀具 Tool	WXS-EBD R3
加工材质 Work Material	HPM38 (52HRC)
回转速度 Speed	13,000min ⁻¹
进给速度 Feed	3,120mm/min (0.12mm/t)
切削方式 Milling Method	等高线加工 3D Milling
切深量 Milling Depth	a _a =0.3mm Pf=0.6mm
切削油剂 Coolant	气冷式 Air Blow
使用设备 Machine	立式加工中心 (BT40) Vertical Machining Center (BT40)



WXS-EMS SKD11 (60HRC) 的高速加工

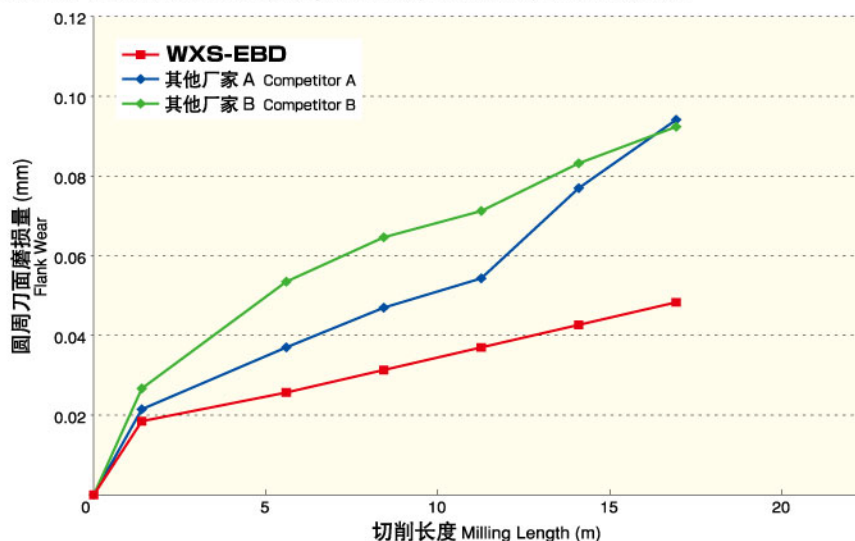
WXS-EMS High Speed Milling in SKD11 (60HRC)



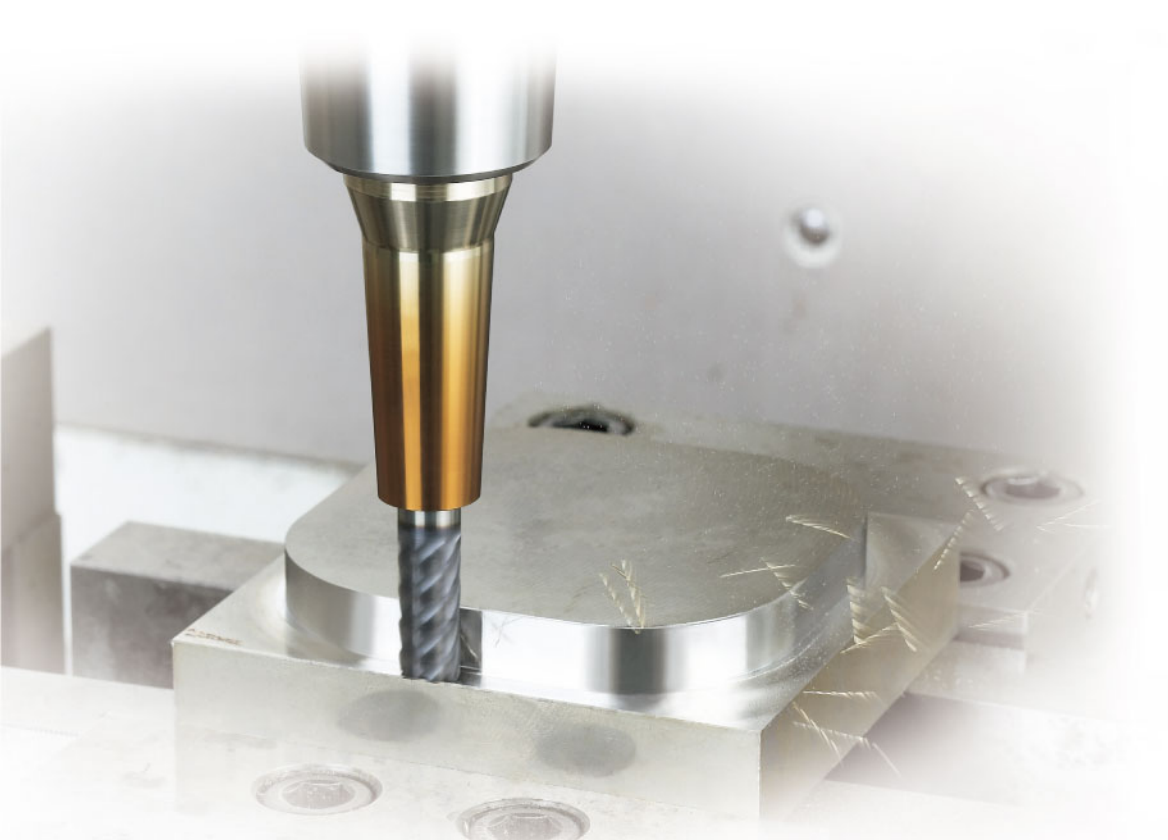
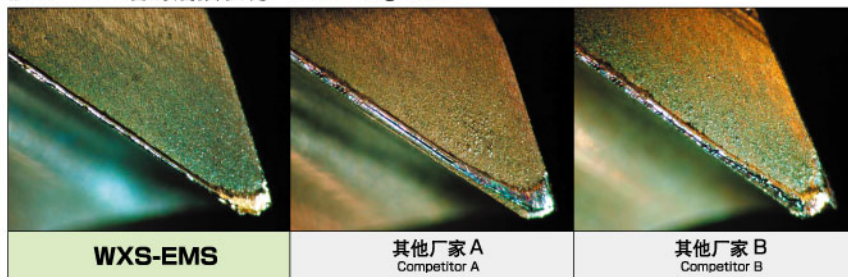
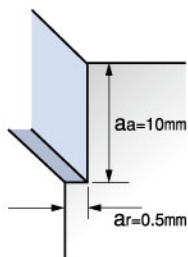
在发热量大的高硬度材料高速加工下，新开发的WX超级涂层发挥出极大的效果。

In high-speed milling of heat-generating hardened materials, the effect of the WX Super Coating was clearly demonstrated.

使用刀具 Tool	WXS-EMS $\phi 10$
加工材质 Work Material	SKD11 (60HRC)
切削速度 Milling Speed	150m/min (4,800min ⁻¹)
进给速度 Feed	860mm/min (0.03mm/t)
切削方式 Milling Method	侧面加工 Side Milling Down Cut
切深量 Milling Depth	$a_a=10\text{mm}$ $a_r=0.5\text{mm}$
切削油剂 Coolant	气冷式 Air Blow
使用设备 Machine	立式加工中心 (BT40) Vertical Machining Center (BT40)



加工16.8m后的磨损状况 After Milling 16.8m



WXS-LN-EBD SKD61 (50HRC) 的精细加工

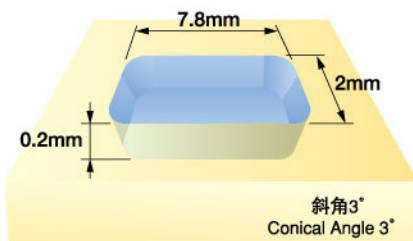
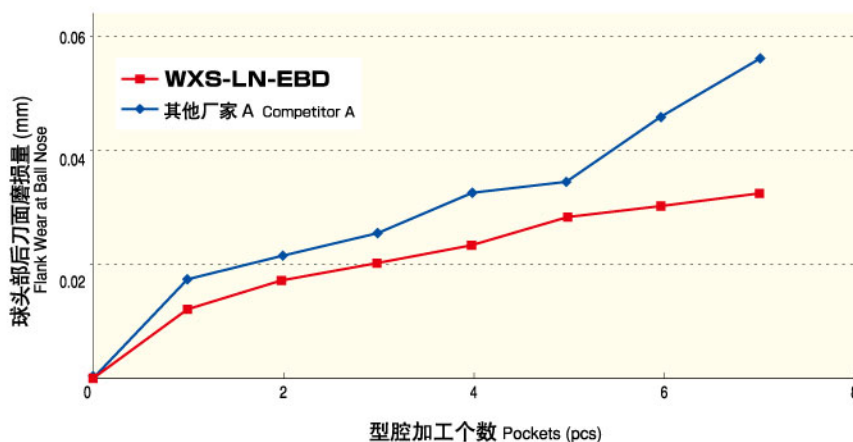
Micro-machining SKD61 (50HRC) with the WXS-LN-EBD



在刀径R0.2的精细领域加工中，新开发的WX超级涂层铣刀能发挥出优异的性能。

Micromachining with small R0.2 end mills demonstrates the capabilities of the newly-developed WX Super Coating.

使用刀具 Tool	WXS-LN-EBD R0.2×1
加工材质 Work Material	SKD61 (50HRC)
回转速度 Speed	40,000min ⁻¹
进给速度 Feed	420mm/min (0.005mm/t)
切削方式 Milling Method	型腔加工 Pocket Milling
切深量 Milling Depth	a _a =0.006mm Pf=0.012mm
切削油剂 Coolant	气冷式 Air Blow
使用设备 Machine	立式加工中心 (HSK-E32) Vertical Machining Center (HSK-E32)



加工时的磨损状况 After Pockets Milling

铣刀 End Mill	WXS-LN-EBD		其他厂家 A Competitor A	
刃端状况 Cutting Edge				

WXS-LN-EBD SKD61 (50HRC) 的加工

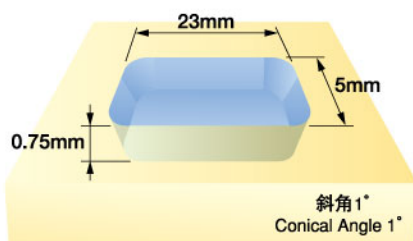
WXS-LN-EBD Milling in SKD61 (50HRC)



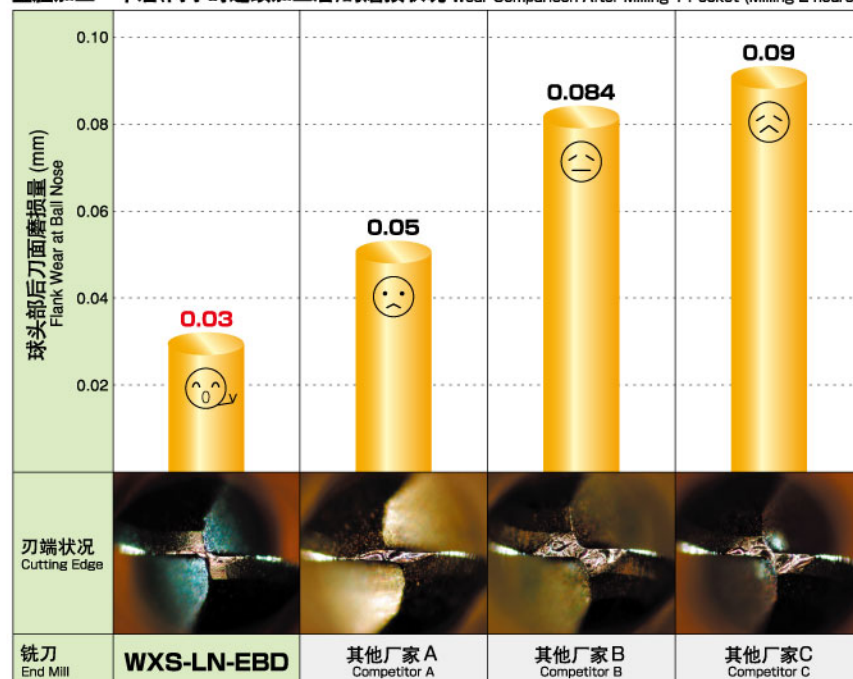
小径长颈球头（细槽）铣刀的加工中，也能发挥出新开发WX超级涂层的优越性能。

Even when working with a small-diameter ball nose with a long neck (for rib processing), the newly developed ultra-hard WX Super Coating exhibited superior performance.

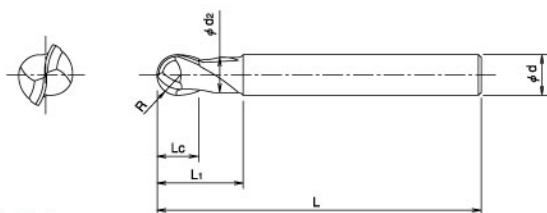
使用刀具 Tool	WXS-LN-EBD R0.5×6
加工材质 Work Material	SKD61 (50HRC)
回转速度 Speed	38,500min ⁻¹
进给速度 Feed	900mm/min (0.012mm/t)
切削方式 Milling Method	型腔加工 Pocket Milling
切深量 Milling Depth	a _a =0.015mm Pf=0.03mm
切削油剂 Coolant	气冷式 Air Blow
使用设备 Machine	立式加工中心 (HSK-E32) Vertical Machining Center (HSK-E32)



型腔加工一个后(两小时连续加工后)的磨损状况 Wear Comparison After Milling 1 Pocket (Milling 2 hours)



WX Super Coating Two Flute Ball Nose



- | | |
|-------------------------------|-----------------------------------|
| ● 材质 | 超级微粒硬质合金 |
| Tool Material | Ultra Fine Grain Carbide |
| ● 表面处理 | WX 超级涂层 |
| Surface Treatment | WX Super Coating |
| ● R容许差 | $R \leq 1 \pm 0.005\text{mm}$ |
| Tolerance of Ball Nose Radius | $1 < R \leq 6 \pm 0.007\text{mm}$ |
| | $6 < R \pm 0.010\text{mm}$ |
| ● 螺旋角 | 30° |
| Helix Angle | |

新开发!
超耐热·超高硬度!
New development!
Super heat resistance
and super hardness!

Seamless ball-side tangency

新开发的WX超级涂层
实现了高硬度材料的高速·高精度加工

The newly developed WX Super Coating achieves
high-speed, high-precision milling of hard materials.

采用提高工具刚性的短刃长设计
(R3以下为铣刃柄径大于刃径)

A short flute length has been adopted to enhance tool rigidity (sizes below R3 are shaped with a neck recess).

* R6以下為無接縫式樣
Seamless ball-side tangency : $R \leq 6$

单位:mm Unit:mm

商品号 EDP No.	R×有效长 R×L ₁	全 长 L	刃 长 L _c	柄 径 d	有效长 L ₁	颈 径 d ₂	库 存 Stock
3041410	R 0.5 × 2	50	1	4	2	0.95	●
3041415	R 0.75× 3	50	1.5	4	3	1.45	●
3041420	R 1 × 4	50	2	6	4	1.95	●
3041430	R 1.5 × 6	60	3	6	6	2.85	●
3041440	R 2 × 8	70	4	6	8	3.85	●
3041441	R 2 × 8-4	60	4	4	8	3.85	●
3041450	R 2.5 × 10	80	5	6	10	4.85	●
3041460	R 3	90	9	6	—	—	●
3041480	R 4	100	12	8	—	—	●
3041500	R 5	100	15	10	—	—	●
3041520	R 6	110	18	12	—	—	●
3041560	R 8	140	24	16	—	—	●
3041600	R10	160	30	20	—	—	●
3041650	R12.5	180	38	25	—	—	●

●=标准库存品 ●=Standard stock item.

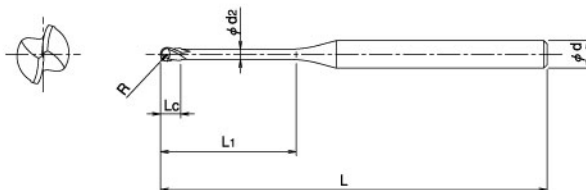
WX超级涂层2刃长颈球头铣刀（深细槽型）

WX Super Coating Two Flute Ball Nose · with Long neck (for Rib processing)

WXS-LN-EBD NEW SIZES



接前页



单位:mm Unit:mm

NEW	商品号 EDP No.	R×有效长 R×L ₁	全 长 L	刃 长 L _c	柄 径 d	颈 径 d ₂	■ 对应工件斜角α的实际有效长(Le)※1						库 存 Stock
							30°	1°	1°30'	2°	2°30'	3°	
NEW	3050303	R0.15 × 1.5	45	0.24	4	0.28	1.64	1.78	1.92	2.07	2.22	2.37	●
NEW	3049933	R0.15 × 1.75	45	0.24	4	0.28	1.91	2.07	2.23	2.39	2.55	2.71	●
NEW	3050304	R0.15 × 2	45	0.24	4	0.28	2.18	2.35	2.53	2.70	2.88	3.05	●
NEW	3049934	R0.15 × 2.25	45	0.24	4	0.28	2.45	2.64	2.83	3.02	3.20	3.38	●
NEW	3050305	R0.15 × 2.5	45	0.24	4	0.28	2.72	2.93	3.13	3.33	3.52	3.71	●
NEW	3050306	R0.15 × 3	45	0.24	4	0.28	3.26	3.49	3.72	3.94	4.15	4.36	●
NEW	3050307	R0.15 × 3.5	45	0.24	4	0.28	3.79	4.06	4.31	4.54	4.77	4.99	●
NEW	3050308	R0.15 × 4	45	0.24	4	0.28	4.33	4.62	4.89	5.14	5.38	5.61	●
NEW	3050309	R0.15 × 4.5	45	0.24	4	0.28	4.86	5.18	5.47	5.74	5.99	6.24	●
NEW	3050310	R0.15 × 5	45	0.24	4	0.28	5.40	5.74	6.04	6.32	6.59	6.86	●
NEW	3050401	R0.2 × 0.8	45	0.3	4	0.37	0.87	0.95	1.03	1.13	1.23	1.34	●
NEW	3050402	R0.2 × 1	45	0.3	4	0.37	1.09	1.18	1.29	1.39	1.51	1.63	●
NEW	3050403	R0.2 × 1.5	45	0.3	4	0.37	1.63	1.76	1.90	2.04	2.19	2.34	●
NEW	3050404	R0.2 × 2	45	0.3	4	0.37	2.17	2.34	2.51	2.68	2.85	3.01	●
NEW	3050405	R0.2 × 2.5	45	0.3	4	0.37	2.71	2.91	3.11	3.30	3.49	3.67	●
NEW	3050406	R0.2 × 3	45	0.3	4	0.37	3.24	3.48	3.70	3.91	4.12	4.32	●
NEW	3050407	R0.2 × 3.5	45	0.3	4	0.37	3.78	4.04	4.28	4.51	4.74	4.95	●
NEW	3050408	R0.2 × 4	45	0.3	4	0.37	4.32	4.60	4.86	5.11	5.35	5.58	●
NEW	3050409	R0.2 × 4.5	45	0.3	4	0.37	4.85	5.16	5.44	5.70	5.95	6.20	●
NEW	3050410	R0.2 × 5	45	0.3	4	0.37	5.38	5.71	6.01	6.29	6.55	6.82	●
NEW	3050411	R0.2 × 5.5	45	0.3	4	0.37	5.91	6.27	6.58	6.87	7.15	7.44	●
NEW	3050412	R0.2 × 6	45	0.3	4	0.37	6.45	6.82	7.15	7.46	7.75	8.06	●
NEW	3050500	R0.25 × 1	45	0.4	4	0.45	1.08	1.17	1.26	1.36	1.47	1.58	●
NEW	3050501	R0.25 × 1.5	45	0.4	4	0.45	1.62	1.74	1.87	2.00	2.14	2.28	●
NEW	3050502	R0.25 × 2	45	0.4	4	0.45	2.16	2.31	2.47	2.63	2.79	2.96	●
NEW	3049952	R0.25 × 2.5	45	0.4	4	0.45	2.69	2.88	3.07	3.25	3.43	3.61	●
NEW	3050503	R0.25 × 3	45	0.4	4	0.45	3.23	3.44	3.65	3.86	4.06	4.25	●
NEW	3049953	R0.25 × 3.5	45	0.4	4	0.45	3.76	4.00	4.24	4.46	4.67	4.88	●
NEW	3050504	R0.25 × 4	45	0.4	4	0.45	4.29	4.56	4.81	5.05	5.28	5.51	●
NEW	3049954	R0.25 × 4.5	45	0.4	4	0.45	4.83	5.12	5.39	5.65	5.89	6.13	●
NEW	3050505	R0.25 × 5	45	0.4	4	0.45	5.36	5.67	5.96	6.23	6.49	6.75	●
NEW	3049955	R0.25 × 5.5	45	0.4	4	0.45	5.89	6.22	6.53	6.81	7.09	7.37	●
NEW	3050506	R0.25 × 6	45	0.4	4	0.45	6.42	6.77	7.10	7.39	7.68	7.99	●
NEW	3050507	R0.25 × 7	45	0.4	4	0.45	7.48	7.87	8.22	8.54	8.88	9.24	●
NEW	3050508	R0.25 × 8	45	0.4	4	0.45	8.53	8.96	9.34	9.69	10.07	10.48	●
NEW	3050509	R0.25 × 9	45	0.4	4	0.45	9.59	10.05	10.45	10.84	11.27	11.72	●
NEW	3050510	R0.25 × 10	45	0.4	4	0.45	10.64	11.13	11.56	11.99	12.46	12.97	●
NEW	3050601	R0.3 × 1.2	45	0.5	4	0.55	1.30	1.40	1.51	1.62	1.74	1.86	●
	3050602	R0.3 × 2	45	0.5	4	0.55	2.16	2.31	2.47	2.63	2.79	2.96	●
NEW	3049962	R0.3 × 2.5	45	0.5	4	0.55	2.69	2.88	3.07	3.25	3.43	3.61	●
	3050603	R0.3 × 3	45	0.5	4	0.55	3.23	3.44	3.65	3.86	4.06	4.25	●
NEW	3049963	R0.3 × 3.5	45	0.5	4	0.55	3.76	4.00	4.24	4.46	4.67	4.88	●
	3050604	R0.3 × 4	45	0.5	4	0.55	4.29	4.56	4.81	5.06	5.28	5.51	●
NEW	3049964	R0.3 × 4.5	45	0.5	4	0.55	4.83	5.12	5.39	5.65	5.89	6.13	●

●=标准库存品 ●=Standard stock item.



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WX超级涂层2刃长颈球头铣刀（深细槽型）

WX Super Coating Two Flute Ball Nose • with Long neck (for Rib processing)

WXS-LN-EBD

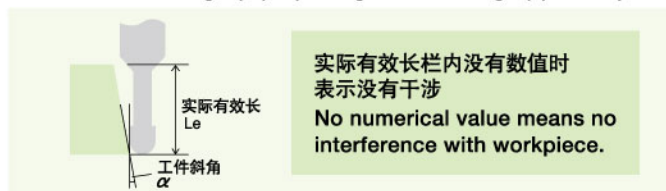
NEW SIZES

※1: 对应工件斜角 α 的实际有效长(Le)

Effective Neck length (Le) depending on Inclined Angle (α) of workpiece



接前页



单位:mm Unit:mm

	商品号 EDP No.	R×有效长 R×L _i	全 长 L	刃 长 L _c	柄 径 d	颈 径 d _e	■ 对应工件斜角 α 的实际有效长(Le) ※1						库 存 Stock
							30°	1°	1°30'	2°	2°30'	3°	
	3050605	R0.3 × 5	45	0.5	4	0.55	5.36	5.67	5.96	6.23	6.49	6.75	●
NEW	3049965	R0.3 × 5.5	45	0.5	4	0.55	5.89	6.22	6.53	6.81	7.09	7.37	●
	3050606	R0.3 × 6	45	0.5	4	0.55	6.42	6.77	7.10	7.39	7.68	7.99	●
NEW	3049966	R0.3 × 6.5	45	0.5	4	0.55	6.95	7.32	7.66	7.97	8.28	8.62	●
NEW	3050607	R0.3 × 7	45	0.5	4	0.55	7.48	7.87	8.22	8.54	8.88	9.24	●
NEW	3049967	R0.3 × 7.5	45	0.5	4	0.55	8.00	8.42	8.78	9.12	9.47	9.86	●
	3050608	R0.3 × 8	45	0.5	4	0.55	8.53	8.96	9.34	9.69	10.07	10.48	●
NEW	3049968	R0.3 × 8.5	45	0.5	4	0.55	9.06	9.51	9.90	10.27	10.67	11.10	●
NEW	3050609	R0.3 × 9	45	0.5	4	0.55	9.59	10.05	10.45	10.84	11.27	11.72	●
NEW	3049969	R0.3 × 9.5	45	0.5	4	0.55	10.11	10.59	11.01	11.42	11.86	12.35	●
NEW	3050610	R0.3 × 10	45	0.5	4	0.55	10.64	11.13	11.56	11.99	12.46	12.97	●
NEW	3050611	R0.3 × 11	50	0.5	4	0.55	11.69	12.21	12.67	13.14	13.66	14.21	●
NEW	3050612	R0.3 × 12	50	0.5	4	0.55	12.74	13.29	13.78	14.29	14.85	15.45	●
	3050802	R0.4 × 2	45	0.6	4	0.75	2.16	2.31	2.47	2.63	2.79	2.96	●
NEW	3050803	R0.4 × 3	45	0.6	4	0.75	3.23	3.44	3.65	3.86	4.06	4.25	●
	3050804	R0.4 × 4	45	0.6	4	0.75	4.29	4.56	4.81	5.06	5.28	5.51	●
NEW	3050805	R0.4 × 5	45	0.6	4	0.75	5.36	5.67	5.96	6.23	6.49	6.75	●
	3050806	R0.4 × 6	45	0.6	4	0.75	6.42	6.77	7.10	7.39	7.68	7.99	●
NEW	3050807	R0.4 × 7	45	0.6	4	0.75	7.48	7.87	8.22	8.54	8.88	9.24	●
	3050808	R0.4 × 8	45	0.6	4	0.75	8.53	8.96	9.34	9.69	10.07	10.48	●
	3050810	R0.4 × 10	45	0.6	4	0.75	10.64	11.13	11.56	11.99	12.46	12.97	●
NEW	3050812	R0.4 × 12	50	0.6	4	0.75	12.74	13.29	13.78	14.29	14.85	15.45	●
NEW	3051002	R0.5 × 2	45	0.8	4	0.95	2.16	2.31	2.47	2.63	2.79	2.96	●
	3051003	R0.5 × 3	45	0.8	4	0.95	3.23	3.44	3.65	3.86	4.06	4.25	●
	3051004	R0.5 × 4	45	0.8	4	0.95	4.29	4.56	4.81	5.06	5.28	5.51	●
	3051005	R0.5 × 5	45	0.8	4	0.95	5.36	5.67	5.96	6.23	6.49	6.75	●
	3051006	R0.5 × 6	45	0.8	4	0.95	6.42	6.77	7.10	7.39	7.68	7.99	●
	3051007	R0.5 × 7	45	0.8	4	0.95	7.48	7.87	8.22	8.54	8.88	9.24	●
	3051008	R0.5 × 8	45	0.8	4	0.95	8.53	8.96	9.34	9.69	10.07	10.48	●
	3051009	R0.5 × 9	45	0.8	4	0.95	9.59	10.05	10.45	10.84	11.27	11.72	●
	3051010	R0.5 × 10	45	0.8	4	0.95	10.64	11.13	11.56	11.99	12.46	12.97	●
	3051012	R0.5 × 12	45	0.8	4	0.95	12.74	13.29	13.78	14.29	14.85	15.45	●
	3051014	R0.5 × 14	50	0.8	4	0.95	14.83	15.44	15.99	16.59	17.24	17.94	●
	3051016	R0.5 × 16	50	0.8	4	0.95	16.92	17.58	18.21	18.89	19.63	20.43	●
NEW	3051018	R0.5 × 18	55	0.8	4	0.95	19.01	19.71	20.43	21.19	22.02	22.91	●
	3051020	R0.5 × 20	55	0.8	4	0.95	21.09	21.85	22.64	23.49	24.41	—	●
NEW	3051022	R0.5 × 22	60	0.8	4	0.95	23.17	23.99	24.86	25.79	26.80	27.88	●
NEW	3051202	R0.6 × 2.4	45	1	4	1.15	2.58	2.77	2.95	3.13	3.30	3.48	●
NEW	3051204	R0.6 × 4	45	1	4	1.15	4.29	4.56	4.81	5.05	5.28	5.51	●
	3051206	R0.6 × 6	45	1	4	1.15	6.42	6.77	7.10	7.39	7.68	7.99	●
NEW	3051208	R0.6 × 8	45	1	4	1.15	8.53	8.96	9.34	9.69	10.07	10.48	●
NEW	3051210	R0.6 × 10	45	1	4	1.15	10.64	11.13	11.56	11.99	12.46	12.97	●
	3051212	R0.6 × 12	45	1	4	1.15	12.74	13.29	13.78	14.29	14.85	15.45	●
NEW	3051214	R0.6 × 14	50	1	4	1.15	14.83	15.44	15.99	16.59	17.24	17.94	●

●=标准库存品 ●=Standard stock item.



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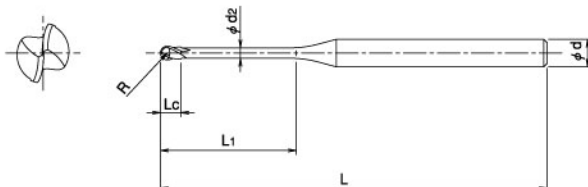
WX超级涂层2刃长颈球头铣刀（深细槽型）

WX Super Coating Two Flute Ball Nose · with Long neck (for Rib processing)

WXS-LN-EBD NEW SIZES



接前页



单位:mm Unit:mm

商品号 EDP No.	R×有效长 R×L ₁	全 长 L	刃 长 L _c	柄 径 d	颈 径 d ₂	■ 对应工件斜角α的实际有效长(Le)※1						库 存 Stock
						30°	1°	1°30'	2°	2°30'	3°	
NEW 3051216	R0.6 × 16	50	1	4	1.15	16.92	17.58	18.21	18.89	19.63	20.43	●
NEW 3051218	R0.6 × 18	55	1	4	1.15	19.01	19.71	20.43	21.19	22.02	22.91	●
NEW 3051220	R0.6 × 20	55	1	4	1.15	21.09	21.85	22.64	23.49	24.41	25.40	●
NEW 3051503	R0.75 × 3	45	1.2	4	1.45	3.23	3.44	3.65	3.86	4.06	4.25	●
NEW 3051504	R0.75 × 4	45	1.2	4	1.45	4.29	4.56	4.81	5.05	5.28	5.51	●
NEW 3051506	R0.75 × 6	45	1.2	4	1.45	6.42	6.77	7.10	7.39	7.68	7.99	●
3051508	R0.75 × 8	45	1.2	4	1.45	8.53	8.96	9.34	9.69	10.07	10.48	●
NEW 3051510	R0.75 × 10	45	1.2	4	1.45	10.64	11.13	11.56	11.99	12.46	12.97	●
3051512	R0.75 × 12	45	1.2	4	1.45	12.74	13.29	13.78	14.29	14.85	15.45	●
NEW 3051514	R0.75 × 14	50	1.2	4	1.45	14.83	15.44	15.99	16.59	17.24	17.94	●
3051516	R0.75 × 16	50	1.2	4	1.45	16.92	17.58	18.21	18.89	19.63	20.43	●
NEW 3051518	R0.75 × 18	55	1.2	4	1.45	19.01	19.71	20.43	21.19	22.02	22.91	●
3051520	R0.75 × 20	55	1.2	4	1.45	21.09	21.85	22.64	23.49	24.41	—	●
NEW 3051522	R0.75 × 22	60	1.2	4	1.45	23.17	23.99	24.86	25.79	26.80	—	●
NEW 3051530	R0.75 × 30	70	1.2	4	1.45	31.46	32.55	33.73	34.99	—	—	●
NEW 3051608	R0.8 × 8	45	1.3	4	1.55	8.53	8.96	9.34	9.69	10.07	10.48	●
NEW 3051612	R0.8 × 12	45	1.3	4	1.55	12.74	13.29	13.78	14.29	14.85	15.45	●
NEW 3051616	R0.8 × 16	50	1.3	4	1.55	16.92	17.58	18.21	18.89	19.63	20.43	●
NEW 3051620	R0.8 × 20	55	1.3	4	1.55	21.09	21.85	22.64	23.49	24.41	—	●
3052004	R1 × 4	45	1.6	4	1.95	4.29	4.56	4.81	5.06	5.28	5.51	●
3052006	R1 × 6	45	1.6	4	1.95	6.42	6.77	7.10	7.39	7.68	7.99	●
3052008	R1 × 8	45	1.6	4	1.95	8.53	8.96	9.34	9.69	10.07	10.48	●
3052010	R1 × 10	45	1.6	4	1.95	10.64	11.13	11.56	11.99	12.46	12.97	●
3052012	R1 × 12	45	1.6	4	1.95	12.74	13.29	13.78	14.29	14.85	15.45	●
3052014	R1 × 14	50	1.6	4	1.95	14.83	15.44	15.99	16.59	17.24	17.94	●
3052016	R1 × 16	50	1.6	4	1.95	16.92	17.58	18.21	18.89	19.63	20.43	●
3052018	R1 × 18	55	1.6	4	1.95	19.01	19.71	20.43	21.19	22.02	22.91	●
3052020	R1 × 20	55	1.6	4	1.95	21.09	21.85	22.64	23.49	—	—	●
NEW 3052022	R1 × 22	60	1.6	4	1.95	23.17	23.99	24.86	25.79	—	—	●
3052025	R1 × 25	65	1.6	4	1.95	26.28	27.2	28.19	—	—	—	●
3052030	R1 × 30	70	1.6	4	1.95	31.46	32.55	33.73	—	—	—	●
NEW 3052035	R1 × 35	70	1.6	4	1.95	36.62	37.90	—	—	—	—	●
NEW 3052040	R1 × 40	80	1.6	4	1.95	41.79	43.25	—	—	—	—	●
NEW 3052510	R1.25 × 10	45	2	4	2.35	10.51	10.95	11.35	11.77	12.23	12.73	●
NEW 3052515	R1.25 × 15	50	2	4	2.35	15.72	16.30	16.89	17.52	—	—	●
NEW 3052520	R1.25 × 20	55	2	4	2.35	20.91	21.65	22.43	—	—	—	●
NEW 3052525	R1.25 × 25	65	2	4	2.35	26.09	27.00	27.97	—	—	—	●
NEW 3052530	R1.25 × 30	70	2	4	2.35	31.26	32.35	—	—	—	—	●
NEW 3052535	R1.25 × 35	70	2	4	2.35	36.43	37.69	—	—	—	—	●
NEW 3053006	R1.5 × 6	50	2.4	6	2.85	6.33	6.63	6.91	7.17	7.45	7.76	●
3053008	R1.5 × 8	50	2.4	6	2.85	8.42	8.79	9.13	9.74	9.84	10.24	●
3053010	R1.5 × 10	50	2.4	6	2.85	10.51	10.95	11.35	11.77	12.23	12.73	●
NEW 3053012	R1.5 × 12	55	2.4	6	2.85	12.60	13.09	13.56	14.07	14.62	15.21	●
NEW 3053014	R1.5 × 14	55	2.4	6	2.85	14.68	15.23	15.78	16.37	17.01	17.70	●

●=标准库存品 ●=Standard stock item.



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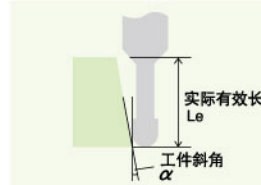
WX超级涂层2刃长颈球头铣刀（深细槽型）

WX Super Coating Two Flute Ball Nose · with Long neck (for Rib processing)

WXS-LN-EBD NEW SIZES

※1: 对应工件斜角 α 的实际有效长(Le)

Effective Neck length (Le) depending on Inclined Angle (α) of workpiece



实际有效长栏内没有数值时
表示没有干涉
No numerical value means no
interference with workpiece.

单位:mm Unit:mm



接前页

	商品号 EDP No.	R×有效长 R×L ₁	全 长 L	刃 长 L _c	柄 径 d	颈 径 d _e	■ 对应工件斜角 α 的实际有效长(Le)※1						库 存 Stock
							30°	1°	1°30'	2°	2°30'	3°	
NEW	3053015	R1.5 × 15	55	2.4	6	2.85	15.72	16.30	16.89	17.52	18.21	18.94	●
	3053016	R1.5 × 16	55	2.4	6	2.85	16.76	17.37	18.00	18.67	19.40	20.19	●
	3053020	R1.5 × 20	60	2.4	6	2.85	20.91	21.65	22.43	23.27	24.18	25.16	●
	3053025	R1.5 × 25	65	2.4	6	2.85	26.09	27.00	27.97	29.02	30.15	—	●
	3053030	R1.5 × 30	70	2.4	6	2.85	31.26	32.35	33.51	34.77	—	—	●
NEW	3053035	R1.5 × 35	80	2.4	6	2.85	36.43	37.69	39.06	40.52	—	—	●
NEW	3053040	R1.5 × 40	90	2.4	6	2.85	41.59	43.04	44.60	—	—	—	●
NEW	3053515	R1.75 × 15	55	2.8	6	3.35	15.72	16.30	16.89	17.52	18.21	18.94	●
NEW	3053520	R1.75 × 20	60	2.8	6	3.35	20.91	21.65	22.43	23.27	24.18	—	●
NEW	3053525	R1.75 × 25	65	2.8	6	3.35	26.09	27.00	27.97	29.02	—	—	●
NEW	3053530	R1.75 × 30	70	2.8	6	3.35	31.26	32.35	33.51	34.77	—	—	●
NEW	3053535	R1.75 × 35	80	2.8	6	3.35	36.43	37.69	39.06	—	—	—	●
NEW	3053540	R1.75 × 40	90	2.8	6	3.35	41.59	43.04	44.60	—	—	—	●
NEW	3053545	R1.75 × 45	90	2.8	6	3.35	46.76	48.39	—	—	—	—	●
NEW	3054008	R2 × 8	60	3.2	6	3.85	12.60	13.09	13.56	14.07	14.62	15.21	●
	3054010	R2 × 10	60	3.2	6	3.85	10.51	10.95	11.35	11.77	12.23	12.73	●
NEW	3054012	R2 × 12	60	3.2	6	3.85	12.60	13.09	13.56	14.07	14.62	15.21	●
NEW	3054015	R2 × 15	60	3.2	6	3.85	15.72	16.30	16.89	17.52	18.21	18.94	●
	3054016	R2 × 16	60	3.2	6	3.85	16.76	17.37	18.00	18.67	19.40	—	●
	3054020	R2 × 20	65	3.2	6	3.85	20.91	21.65	22.43	23.27	—	—	●
	3054025	R2 × 25	70	3.2	6	3.85	26.09	27.00	27.97	—	—	—	●
	3054030	R2 × 30	80	3.2	6	3.85	31.26	32.35	33.51	—	—	—	●
	3054035	R2 × 35	80	3.2	6	3.85	36.43	37.69	—	—	—	—	●
	3054040	R2 × 40	90	3.2	6	3.85	41.59	43.04	—	—	—	—	●
NEW	3054045	R2 × 45	90	3.2	6	3.85	46.76	48.39	—	—	—	—	●
NEW	3054050	R2 × 50	100	3.2	6	3.85	51.93	53.74	—	—	—	—	●
NEW	3055010	R2.5 × 10	60	4	6	4.85	10.51	10.95	11.35	11.77	—	—	●
NEW	3055015	R2.5 × 15	60	4	6	4.85	15.72	16.30	16.89	—	—	—	●
NEW	3055020	R2.5 × 20	70	4	6	4.85	20.91	21.65	—	—	—	—	●
NEW	3055025	R2.5 × 25	70	4	6	4.85	26.09	27.00	—	—	—	—	●
NEW	3055030	R2.5 × 30	80	4	6	4.85	31.26	—	—	—	—	—	●
NEW	3055035	R2.5 × 35	80	4	6	4.85	36.43	—	—	—	—	—	●
NEW	3055040	R2.5 × 40	90	4	6	4.85	41.59	—	—	—	—	—	●
NEW	3055045	R2.5 × 45	100	4	6	4.85	46.76	—	—	—	—	—	●
NEW	3055050	R2.5 × 50	100	4	6	4.85	51.93	—	—	—	—	—	●
NEW	3056012	R3 × 12	60	4.8	6	5.85	—	—	—	—	—	—	●
NEW	3056020	R3 × 20	70	4.8	6	5.85	—	—	—	—	—	—	●
NEW	3056025	R3 × 25	70	4.8	6	5.85	—	—	—	—	—	—	●
NEW	3056030	R3 × 30	80	4.8	6	5.85	—	—	—	—	—	—	●
NEW	3056035	R3 × 35	80	4.8	6	5.85	—	—	—	—	—	—	●
NEW	3056040	R3 × 40	90	4.8	6	5.85	—	—	—	—	—	—	●
NEW	3056045	R3 × 45	100	4.8	6	5.85	—	—	—	—	—	—	●
NEW	3056050	R3 × 50	120	4.8	6	5.85	—	—	—	—	—	—	●

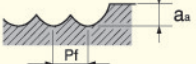
●=标准库存品 ●=Standard stock item.

WXS-EBD

标准切削 STANDARD MILLING

●加工路径以等高线加工为前提。

The machining path is on condition of contouring line operation.

加工材质 WORK MATERIAL	工具钢・调质钢(～45HRC)・ 预硬钢 TOOL STEELS・HARDENED STEELS・ PREHARDENED STEELS SKD, NAK80, HPM50		调质钢 (45～55HRC) HARDENED STEELS		调质钢 (55～60HRC) HARDENED STEELS		调质钢 (60～65HRC) HARDENED STEELS		调质钢 (65～70HRC) HARDENED STEELS											
R	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)										
R 0.5	32,000	2,350	32,000	2,350	32,000	2,000	32,000	1,600	32,000	1,450										
R 0.75	32,000	3,050	32,000	3,050	32,000	2,500	26,500	1,900	21,000	1,400										
R 1	32,000	3,600	32,000	3,550	24,000	2,200	20,000	1,750	16,000	1,250										
R 1.5	26,500	4,000	21,000	3,200	16,000	2,000	13,500	1,600	10,500	1,200										
R 2	20,000	3,650	16,000	2,950	12,000	1,900	9,950	1,500	7,950	1,150										
R 2.5	16,000	3,500	12,500	2,650	9,550	1,700	7,950	1,350	6,350	1,000										
R 3	13,500	3,350	10,500	2,300	7,950	1,550	6,650	1,250	5,300	955										
R 4	9,950	2,850	7,950	2,050	5,950	1,350	4,950	1,050	4,000	830										
R 5	7,950	2,550	6,350	1,800	4,800	1,150	4,000	875	3,200	700										
R 6	6,650	2,400	5,300	1,650	4,000	955	3,300	795	2,650	635										
R 8	4,950	1,800	4,000	1,250	3,000	775	2,500	595	2,000	475										
R10	4,000	1,450	3,200	1,000	2,400	620	2,000	475	1,600	380										
R12.5	3,200	1,150	2,550	815	1,900	495	1,600	380	1,250	305										
切深量 DEPTH OF CUT			<table><tr><td>a_a</td><td>P_f</td></tr><tr><td>0.05D</td><td>0.1D</td></tr></table>		a _a	P _f	0.05D	0.1D	<table><tr><td>a_a</td><td>P_f</td></tr><tr><td>0.03D</td><td>0.1D</td></tr></table>		a _a	P _f	0.03D	0.1D	<table><tr><td>a_a</td><td>P_f</td></tr><tr><td>0.02D</td><td>0.05D</td></tr></table>		a _a	P _f	0.02D	0.05D
			a _a	P _f																
			0.05D	0.1D																
a _a	P _f																			
0.03D	0.1D																			
a _a	P _f																			
0.02D	0.05D																			
		a _a Max=0.6mm以下		a _a Max=0.5mm以下		a _a Max=0.3mm以下														

- 请使用高精度高刚性的机械设备及夹持具。
- 请使用气冷或油雾(MQL)冷却方式。
- 上表适用于负荷较小的等高线加工(侧面加工)根据加工形状、切深量、机械刚性、工件固定等使用情况不同,可能产生异常切削噪音、振动。请调整回转速度、进给速度及切深量。
- 切深量小时,还可适当上调回转速度及进给速度。
- 铣刀的选定向导:
要增加切深量的请选用FX重切削强力球头铣刀(FX-HS-EBDS), 要提高进给速度, 请选用FX多刃球头铣刀(FXS-EBT, EXS-EBM)。

- Use a rigid and precise machine and holder.
- We suggest using air blow or MQL(mist).
- These milling conditions are for an end mill where the tool extension length is 4 times the diameter of the end mill. When length of the tool extension from the machine is long, reduce the speed and feed and milling depth.
- The above condition shows an approximate standard for contouring operation (side milling) with a low machining load. If abnormal cutting sounds, vibration or chattering occur depending on the machining shape, cutting amount, rigidity of the machine or work holding condition, etc., please adjust the speed, feed and the depth of cut.
- As a guideline in selecting end mills,
To increase the depth of cut, use the FX Heavy Cutting Strong Ball Series (FX-HS-EBDS).
To increase the feed rate, use the FX Multiple Flute Ball Series (FXS-EBT, FXS-EBM).

高速切削 HIGH-SPEED LIGHT MILLING

⚠ 加工时产生的火花及破损引起的发热可能会导致燃烧或火灾, 请注意防火。

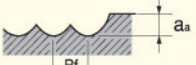
使用高速高精度加工中心的基准条件表。

●加工路径以等高线加工为前提。

Caution: Sparks generated during operation or heat caused by tool breakage can cause fire. Be sure to use all proper fire-prevention measures.

The conditions below are for high speed / high precision machining centers.

The machining path is on condition of contouring line operation.

加工材质 WORK MATERIAL	工具钢・调质钢(~45HRC)・ 预硬钢 TOOL STEELS・HARDENED STEELS・ PREHARDENED STEELS SKD, NAK80, HPM50		调质钢 (45~55HRC) HARDENED STEELS		调质钢 (55~60HRC) HARDENED STEELS		调质钢 (60~65HRC) HARDENED STEELS		调质钢 (65~70HRC) HARDENED STEELS											
R	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)										
R 0.5	50,000	3,700	50,000	3,700	50,000	3,100	50,000	2,600	47,500	2,400										
R 0.75	50,000	4,800	50,000	4,800	50,000	3,900	42,500	3,050	32,000	2,300										
R 1	50,000	5,600	47,500	5,350	40,000	3,650	32,000	2,800	24,000	2,100										
R 1.5	41,500	6,200	32,000	4,800	26,500	3,350	21,000	2,550	16,000	1,900										
R 2	31,000	5,700	24,000	4,400	20,000	3,200	16,000	2,400	12,000	1,800										
R 2.5	25,000	5,450	19,000	4,000	16,000	2,850	13,000	2,150	9,550	1,600										
R 3	20,500	5,200	16,000	3,450	13,500	2,550	10,500	2,050	7,950	1,550										
R 4	15,500	4,450	12,000	3,050	9,950	2,250	7,950	1,800	5,950	1,350										
R 5	12,500	3,950	9,550	2,650	7,950	1,900	6,350	1,550	4,800	1,150										
R 6	10,500	3,700	7,950	2,500	6,650	1,600	5,300	1,350	4,000	995										
R 8	7,750	2,800	5,950	1,900	4,950	1,300	4,000	1,050	3,000	775										
R10	6,200	2,250	4,800	1,550	4,000	1,050	3,200	830	2,400	620										
R12.5	4,950	1,800	3,800	1,200	3,200	830	2,550	660	1,900	495										
切深量 DEPTH OF CUT			<table><tr><td>a_a</td><td>P_f</td></tr><tr><td>0.02D</td><td>0.05D</td></tr></table>		a _a	P _f	0.02D	0.05D	<table><tr><td>a_a</td><td>P_f</td></tr><tr><td>0.02D</td><td>0.05D</td></tr></table>		a _a	P _f	0.02D	0.05D	<table><tr><td>a_a</td><td>P_f</td></tr><tr><td>0.01D</td><td>0.05D</td></tr></table>		a _a	P _f	0.01D	0.05D
			a _a	P _f																
			0.02D	0.05D																
a _a	P _f																			
0.02D	0.05D																			
a _a	P _f																			
0.01D	0.05D																			
		a _a Max=0.3mm以下		a _a Max=0.2mm以下		a _a Max=0.1mm以下														

- 请使用高精度高刚性的机械设备及夹持具。
- 请使用气冷或油雾(MQL)冷却方式。
- 上表适用于负荷较小的等高线加工(侧面加工)根据加工形状、切深量、机械刚性、工件固定等使用情况不同,可能产生异常切削噪音、振动。请调整回转速度、进给速度及切深量。
- 切深量小时,还可适当上调回转速度及进给速度。
- 铣刀的选定向导:
要增加切深量的请选用FX重切削强力球头铣刀(FX-HS-EBDS), 要提高进给速度, 请选用FX多刃球头铣刀(FXS-EBT, EXS-EBM)。

- Use a rigid and precise machine and holder.
- We suggest using air blow or MQL(mist).
- These milling conditions are for an end mill where the tool extension length is 4 times the diameter of the end mill. When length of the tool extension from the machine is long, reduce the speed and feed and milling depth.
- The above condition shows an approximate standard for contouring operation (side milling) with a low machining load. If abnormal cutting sounds, vibration or chattering occur depending on the machining shape, cutting amount, rigidity of the machine or work holding condition, etc., please adjust the speed, feed and the depth of cut.
- As a guideline in selecting end mills,
To increase the depth of cut, use the FX Heavy Cutting Strong Ball Series (FX-HS-EBDS).
To increase the feed rate, use the FX Multiple Flute Ball Series (FXS-EBT, FXS-EBM).

WXS-EMS

侧面切削 SIDE MILLING

加工材质 WORK MATERIAL	调质钢 (~40HRC) • 预硬钢 HARDENED STEELS- PREHARDENED STEELS NAK55, HPM1, SKT		工具钢·调质钢(40~45HRC) • 预硬钢 TOOL STEELS-HARDENED STEELS- PREHARDENED STEELS SKD11, SKD61, NAK80		调质钢 (45~55HRC) HARDENED STEELS		调质钢 (55~60HRC) HARDENED STEELS		调质钢 (60~65HRC) HARDENED STEELS		调质钢 (65~70HRC) HARDENED STEELS	
尺寸 MILL DIA. (mm)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)
1	20,000	800	20,000	800	20,000	800	20,000	560	20,000	480	16,000	335
2	20,000	1,600	20,000	1,600	16,000	1,250	12,000	670	11,000	535	7,950	335
3	15,000	1,800	13,500	1,600	10,500	1,250	7,950	670	7,450	535	5,300	335
4	11,000	1,800	9,950	1,600	7,950	1,250	5,950	670	5,550	535	4,000	335
5	8,900	1,800	7,950	1,600	6,350	1,250	4,800	670	4,450	535	3,200	335
6	7,450	2,650	6,650	2,400	5,300	1,900	4,000	1,000	3,700	800	2,650	505
8	5,550	2,650	4,950	2,400	4,000	1,900	3,000	1,000	2,800	800	2,000	505
10	4,450	2,650	4,000	2,400	3,200	1,900	2,400	1,000	2,250	800	1,600	505
12	3,700	2,650	3,300	2,400	2,650	1,900	2,000	1,000	1,850	800	1,350	505
切深量 DEPTH OF CUT			$\frac{a_a}{a_r}$ $D \leq \phi 1.5$ 1.5D 0.02D $\phi 1.5 < D \leq \phi 2.5$ 1.5D 0.05D $\phi 2.5 < D$ 1.5D 0.1D $a_r \text{Max} = 1\text{mm}$ 以下		$\frac{a_a}{a_r}$ 1.5D 0.05D $a_r \text{Max} = 1\text{mm}$ 以下		$\frac{a_a}{a_r}$ 1.5D 0.03D $a_r \text{Max} = 0.5\text{mm}$ 以下		$\frac{a_a}{a_r}$ 1D 0.02D $a_r \text{Max} = 0.5\text{mm}$ 以下		$\frac{a_a}{a_r}$ 1D 0.02D $a_r \text{Max} = 0.5\text{mm}$ 以下	

1. 请使用高精度高刚性的机械设备及夹持具。
2. 发生震动时，请同步下调回转速度和进给速度。
3. 请选用发烟量少的切削油剂。

1. Use a rigid and precise machine and holder.
2. When chattering occurs, reduce the speed and feed simultaneously.
3. Use a suitable cutting fluid with high smoke retardant properties.

高速侧面切削 HIGH-SPEED SIDE MILLING

⚠ 加工时产生的火花及破损引起的发热可能会导致燃烧或火灾。
请注意防火。

Caution: Sparks generated during operation or heat caused by tool breakage can cause fire. Be sure to use all proper fire-prevention measures.

加工材质 WORK MATERIAL	调质钢 (~40HRC) • 预硬钢 HARDENED STEELS- PREHARDENED STEELS NAK55, HPM1, SKT		工具钢·调质钢(40~45HRC) • 预硬钢 TOOL STEELS-HARDENED STEELS- PREHARDENED STEELS SKD11, SKD61, NAK80		调质钢 (45~55HRC) HARDENED STEELS		调质钢 (55~60HRC) HARDENED STEELS		调质钢 (60~65HRC) HARDENED STEELS		调质钢 (65~70HRC) HARDENED STEELS	
尺寸 MILL DIA. (mm)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)
1	50,000	1,600	50,000	2,000	50,000	2,000	50,000	1,600	47,500	1,350	32,000	715
2	47,500	3,250	47,500	3,800	40,000	3,200	25,500	1,650	24,000	1,350	16,000	800
3	32,000	3,450	32,000	3,800	26,500	3,200	17,000	1,650	16,000	1,350	10,500	800
4	24,000	3,900	24,000	3,800	20,000	3,200	12,500	1,650	12,000	1,350	7,950	800
5	19,000	4,100	19,000	3,800	16,000	3,200	10,000	1,650	9,550	1,350	6,350	800
6	16,000	5,750	16,000	5,750	13,500	4,800	8,500	2,450	7,950	2,000	5,300	1,200
8	12,000	5,750	12,000	5,750	9,950	4,800	6,350	2,450	5,950	2,000	4,000	1,200
10	9,550	5,750	9,550	5,750	7,950	4,800	5,100	2,450	4,800	2,000	3,200	1,200
12	7,950	5,750	7,950	5,750	6,650	4,800	4,250	2,450	4,000	2,000	2,650	1,200
切深量 DEPTH OF CUT			$\frac{a_a}{a_r}$ 1D 0.05D $a_r \text{Max} = 0.5\text{mm}$ 以下		$\frac{a_a}{a_r}$ 1D 0.03D $a_r \text{Max} = 0.5\text{mm}$ 以下		$\frac{a_a}{a_r}$ 1D 0.02D $a_r \text{Max} = 0.2\text{mm}$ 以下		$\frac{a_a}{a_r}$ 1D 0.01D $a_r \text{Max} = 0.2\text{mm}$ 以下		$\frac{a_a}{a_r}$ 1D 0.01D $a_r \text{Max} = 0.2\text{mm}$ 以下	

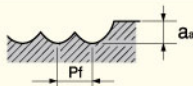
1. 上述条件是用高速高精度加工中心进行切深量小的轻切削时所用的条件表。
2. 刀具磨损后易在加工中产生火花，因此请不要使用易燃切削液。
3. 请采用吹气冷却方式，或使用不易产生油烟的切削液。

1. The indicated speeds and feeds are for high speed light milling with high speed / high precision machining centers.
2. Tools can cause sparks. Do not use flammable fluids.
3. We recommend using an air blow. When using cutting fluids, use a high-quality fluid with high smoke retardant properties.

WXS-LN-EBD

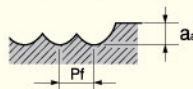
加工材质 WORK MATERIAL		一般构造用钢·炭素钢·铸铁 MILD STEELS·CARBON STEELS·CAST IRON SS400, S55C, FC250 (~750N/mm ²)				合金钢·工具钢 ALLOY STEELS·TOOL STEELS SCM, SKT, SKS, SKD (~30HRC)				调质钢(30~38HRC)·预硬钢 HARDENED STEELS·PREHARDENED STEELS SKT, SKD, NAK55, HPM1			
R	有效长 L ₁ (mm)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf
R0.05	0.3	50,000	70	0.003	0.003	50,000	70	0.003	0.003	50,000	70	0.003	0.003
	0.5	50,000	50	0.003	0.003	50,000	50	0.003	0.003	50,000	50	0.003	0.003
R0.1	0.5	50,000	400	0.005	0.005	50,000	400	0.005	0.005	50,000	380	0.005	0.005
	0.75	50,000	360	0.005	0.005	50,000	360	0.005	0.005	50,000	340	0.005	0.005
	1	50,000	360	0.005	0.005	50,000	360	0.005	0.005	50,000	340	0.005	0.005
	1.25	47,000	320	0.005	0.005	47,000	320	0.005	0.005	47,000	300	0.005	0.005
	1.5	45,000	300	0.005	0.005	45,000	300	0.005	0.005	45,000	280	0.005	0.005
	1.75	42,000	260	0.005	0.005	42,000	260	0.005	0.005	42,000	240	0.005	0.005
	2	38,000	230	0.005	0.005	38,000	230	0.005	0.005	38,000	210	0.005	0.005
	2.5	32,000	170	0.004	0.005	32,000	170	0.005	0.004	32,000	160	0.004	0.005
	3	32,000	150	0.004	0.005	32,000	150	0.005	0.004	32,000	140	0.004	0.005
R0.15	0.6	50,000	600	0.005	0.01	50,000	600	0.005	0.01	50,000	570	0.005	0.01
	1	50,000	600	0.005	0.01	50,000	600	0.005	0.01	50,000	570	0.005	0.01
	1.25	50,000	600	0.005	0.01	50,000	600	0.005	0.01	50,000	570	0.005	0.01
	1.5	50,000	600	0.005	0.01	50,000	600	0.005	0.01	50,000	570	0.005	0.01
	1.75	47,000	510	0.005	0.01	47,000	510	0.005	0.01	47,000	480	0.005	0.01
	2	45,000	480	0.005	0.005	45,000	480	0.005	0.005	45,000	450	0.005	0.005
	2.25	45,000	400	0.005	0.005	45,000	400	0.005	0.005	45,000	380	0.005	0.005
	2.5	40,000	300	0.005	0.005	40,000	300	0.005	0.005	40,000	280	0.005	0.005
	3	38,000	250	0.005	0.005	38,000	250	0.005	0.005	38,000	230	0.005	0.005
	3.5	34,000	200	0.004	0.005	34,000	200	0.004	0.005	34,000	190	0.005	0.004
	4	32,000	150	0.004	0.005	32,000	150	0.004	0.005	32,000	140	0.005	0.004
	4.5	32,000	130	0.004	0.005	32,000	130	0.004	0.005	32,000	120	0.005	0.004
	5	29,000	100	0.004	0.005	29,000	100	0.004	0.005	29,000	95	0.005	0.004
R0.2	0.8	50,000	900	0.01	0.02	50,000	900	0.01	0.02	50,000	850	0.01	0.02
	1	50,000	900	0.01	0.02	50,000	900	0.01	0.02	50,000	850	0.01	0.02
	1.5	50,000	800	0.01	0.02	50,000	800	0.01	0.02	50,000	760	0.01	0.02
	2	50,000	700	0.01	0.02	50,000	700	0.01	0.02	50,000	660	0.01	0.02
	2.5	45,000	550	0.008	0.015	45,000	550	0.008	0.015	45,000	520	0.008	0.015
	3	43,000	500	0.005	0.01	43,000	500	0.005	0.01	43,000	470	0.005	0.01
	3.5	40,000	420	0.005	0.01	40,000	420	0.005	0.01	40,000	400	0.005	0.01
	4	36,000	370	0.005	0.005	36,000	370	0.005	0.005	36,000	350	0.005	0.005
	4.5	32,000	290	0.004	0.005	32,000	290	0.004	0.005	32,000	270	0.004	0.005
	5	32,000	280	0.004	0.005	32,000	280	0.004	0.005	32,000	260	0.004	0.005
	5.5	30,000	230	0.004	0.005	30,000	230	0.004	0.005	30,000	210	0.004	0.005
	6	30,000	200	0.004	0.005	30,000	200	0.004	0.005	30,000	190	0.004	0.005
R0.25	1	50,000	1,100	0.015	0.03	50,000	1,100	0.015	0.03	50,000	1,050	0.015	0.03
	1.5	50,000	1,100	0.015	0.03	50,000	1,100	0.015	0.03	50,000	1,050	0.015	0.03
	2	50,000	1,000	0.015	0.03	50,000	1,000	0.015	0.03	50,000	950	0.015	0.03
	2.5	50,000	1,000	0.015	0.03	50,000	1,000	0.015	0.03	50,000	950	0.015	0.03
	3	48,000	900	0.01	0.02	48,000	900	0.01	0.02	48,000	850	0.01	0.02
	3.5	45,000	700	0.01	0.02	45,000	700	0.01	0.02	45,000	650	0.01	0.02
	4	43,000	600	0.01	0.01	43,000	600	0.01	0.01	43,000	570	0.01	0.01
	4.5	38,000	500	0.01	0.01	38,000	500	0.01	0.01	38,000	470	0.01	0.01
	5	30,000	400	0.005	0.01	30,000	400	0.005	0.01	30,000	380	0.005	0.01
	5.5	28,000	300	0.004	0.005	28,000	300	0.004	0.005	28,000	280	0.004	0.005
	6	26,000	250	0.004	0.005	26,000	250	0.004	0.005	26,000	230	0.004	0.005
	7	24,000	200	0.004	0.005	24,000	200	0.004	0.005	24,000	190	0.004	0.005
	8	22,000	160	0.004	0.005	22,000	160	0.004	0.005	22,000	150	0.004	0.005
R0.3	1.2	50,000	1,350	0.03	0.05	50,000	1,350	0.03	0.05	50,000	1,200	0.03	0.05
	2	50,000	1,300	0.03	0.05	50,000	1,300	0.03	0.05	50,000	1,200	0.03	0.05

切深量
DEPTH OF CUT



1. 请使用高精度高刚性的机械设备及夹持具。
2. 炭素钢及淬火钢加工时，请使用气雾或油雾(MQL)冷却方式。
3. 请根据加工材质及加工内容选用适合的切削油剂。
4. 上表适用于负荷较小，加工稳定的等高线加工。
5. 请根据加工精度、加工形状、加工路线调整参数。
6. $\phi 0.5(R0.25)$ 以下的有效长 / 刃长(L/D)为10以上，加工时由于负荷增大有折损的可能，请根据切削状况调整切削条件。
7. 转速不足时，请同步调整上表中的转速及进给速度。

不锈钢·调质钢(38~45HRC)·预硬钢 STAINLESS STEELS·HARDENED STEELS· PREHARDENED STEELS SUS304, SKD, NAK80, HPM50				调质钢(45~55HRC) HARDENED STEELS				调质钢(55~60HRC) HARDENED STEELS			
回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf
50,000	70	0.003	0.003	50,000	60	0.003	0.003	—	—	—	—
50,000	50	0.003	0.003	50,000	40	0.003	0.003	—	—	—	—
50,000	380	0.005	0.005	50,000	260	0.005	0.005	50,000	200	0.004	0.005
50,000	340	0.005	0.005	50,000	230	0.005	0.005	50,000	180	0.004	0.005
50,000	340	0.005	0.005	50,000	230	0.005	0.005	50,000	180	0.004	0.005
47,000	300	0.005	0.005	47,000	210	0.005	0.005	43,000	150	0.004	0.005
45,000	280	0.005	0.005	45,000	190	0.005	0.005	41,000	130	0.004	0.005
42,000	240	0.005	0.005	42,000	170	0.005	0.005	38,000	120	0.004	0.005
38,000	210	0.005	0.005	37,000	140	0.005	0.005	33,000	100	0.004	0.005
32,000	160	0.004	0.005	31,000	100	0.004	0.005	31,000	80	0.004	0.005
32,000	140	0.004	0.005	31,000	90	0.004	0.005	31,000	70	0.004	0.005
50,000	570	0.005	0.01	50,000	390	0.005	0.01	50,000	300	0.005	0.01
50,000	570	0.005	0.01	50,000	390	0.005	0.01	50,000	310	0.005	0.01
50,000	570	0.005	0.01	50,000	380	0.005	0.01	50,000	300	0.005	0.01
50,000	570	0.005	0.01	50,000	370	0.005	0.01	50,000	290	0.005	0.01
47,000	480	0.005	0.01	47,000	310	0.005	0.01	43,000	220	0.005	0.01
45,000	450	0.005	0.005	45,000	290	0.005	0.005	41,000	210	0.004	0.005
45,000	380	0.005	0.005	45,000	250	0.005	0.005	41,000	180	0.004	0.005
40,000	280	0.005	0.005	40,000	190	0.005	0.005	36,000	130	0.004	0.005
38,000	230	0.005	0.005	37,000	150	0.005	0.005	33,000	100	0.004	0.005
34,000	190	0.004	0.005	33,000	120	0.004	0.005	33,000	95	0.004	0.005
32,000	140	0.004	0.005	31,000	90	0.004	0.005	31,000	70	0.004	0.005
32,000	120	0.004	0.005	31,000	80	0.004	0.005	31,000	60	0.004	0.005
29,000	95	0.004	0.005	28,000	60	0.004	0.005	28,000	50	0.004	0.005
50,000	850	0.01	0.02	50,000	590	0.01	0.02	50,000	470	0.008	0.015
50,000	850	0.01	0.02	50,000	550	0.01	0.02	50,000	440	0.008	0.015
50,000	760	0.01	0.02	50,000	520	0.01	0.02	50,000	410	0.008	0.015
50,000	660	0.01	0.02	50,000	460	0.01	0.02	45,000	330	0.008	0.015
45,000	520	0.008	0.015	45,000	360	0.008	0.015	41,000	260	0.008	0.015
43,000	470	0.005	0.01	43,000	320	0.005	0.01	38,000	220	0.005	0.01
40,000	400	0.005	0.01	40,000	280	0.005	0.01	36,000	200	0.005	0.01
36,000	350	0.005	0.005	35,000	230	0.005	0.005	31,000	160	0.005	0.005
32,000	270	0.004	0.005	31,000	180	0.004	0.005	28,000	130	0.004	0.005
32,000	260	0.004	0.005	31,000	170	0.004	0.005	28,000	120	0.004	0.005
30,000	210	0.004	0.005	29,000	140	0.004	0.005	26,000	100	0.004	0.005
30,000	190	0.004	0.005	29,000	120	0.004	0.005	26,000	100	0.004	0.005
50,000	1,050	0.015	0.03	50,000	730	0.015	0.03	50,000	580	0.01	0.02
50,000	1,050	0.015	0.03	50,000	700	0.015	0.03	50,000	560	0.01	0.02
50,000	950	0.015	0.03	50,000	650	0.015	0.03	50,000	520	0.01	0.02
50,000	950	0.015	0.03	50,000	600	0.015	0.03	45,000	430	0.01	0.02
48,000	850	0.01	0.02	48,000	550	0.01	0.02	43,000	390	0.01	0.02
45,000	650	0.01	0.02	45,000	450	0.01	0.02	40,000	320	0.01	0.02
43,000	570	0.01	0.01	43,000	390	0.01	0.01	38,000	270	0.01	0.01
38,000	470	0.01	0.01	38,000	320	0.01	0.01	34,000	220	0.01	0.01
30,000	380	0.005	0.01	29,000	250	0.005	0.01	26,000	170	0.005	0.01
28,000	280	0.004	0.005	27,000	180	0.004	0.005	24,000	120	0.004	0.005
26,000	230	0.004	0.005	25,000	150	0.004	0.005	22,000	100	0.004	0.005
24,000	190	0.004	0.005	23,000	130	0.004	0.005	20,000	100	0.004	0.005
22,000	150	0.004	0.005	21,000	110	0.004	0.005	20,000	100	0.004	0.005
20,000	110	0.004	0.005	21,000	100	0.004	0.005	20,000	90	0.004	0.005
20,000	95	0.004	0.005	21,000	100	0.004	0.005	20,000	90	0.004	0.005
50,000	1,200	0.03	0.05	50,000	840	0.03	0.05	50,000	670	0.01	0.02
50,000	1,200	0.03	0.05	50,000	820	0.03	0.05	50,000	650	0.01	0.02



1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL (Minimum Quantity Lubrication / mist coolant) or air blow is recommended.
3. When using cutting fluid, choose based on work material and cutting conditions.
4. The cutting conditions shown for 3D milling are low-load, safe conditions for reference.
5. Please adjust conditions based on machining accuracy, machining shape and machining path.
6. When using a tool with a diameter of $\phi 0.5$ (R0.25) or less, or an L/D (effective length/tool diameter) ratio of greater than 10, high loads can cause tool breakage. Therefore, adjust the cutting conditions based on the machining situation.
7. When the available RPM are insufficient, please reduce the RPM and feed rates in proportion.

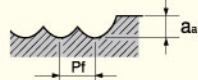


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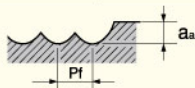


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加工材质 WORK MATERIAL		一般构造用钢・炭素钢・铸铁 MILD STEELS・CARBON STEELS・CAST IRON SS400, S55C, FC250 (~750N/mm ²)				合金钢・工具钢 ALLOY STEELS・TOOL STEELS SCM, SKT, SKS, SKD (~30HRC)				调质钢(30~38HRC)・预硬钢 HARDENED STEELS・PREHARDENED STEELS SKT, SKD, NAK55, HPM1				
R	有效长 L _i (mm)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	
R0.3	2.5	50,000	1,200	0.03	0.05	50,000	1,200	0.03	0.05	50,000	1,100	0.03	0.05	
	3	50,000	1,200	0.02	0.03	50,000	1,200	0.02	0.03	50,000	1,100	0.02	0.03	
	3.5	45,000	1,000	0.02	0.03	45,000	1,000	0.02	0.03	45,000	950	0.02	0.03	
	4	40,000	900	0.01	0.02	40,000	900	0.01	0.02	40,000	850	0.01	0.02	
	4.5	34,000	780	0.01	0.02	34,000	780	0.01	0.02	34,000	740	0.01	0.02	
	5	30,000	680	0.01	0.02	30,000	680	0.01	0.02	30,000	640	0.01	0.02	
	5.5	28,000	650	0.01	0.02	28,000	650	0.01	0.02	28,000	610	0.01	0.02	
	6	26,000	600	0.01	0.02	26,000	600	0.01	0.02	26,000	570	0.01	0.02	
	6.5	24,000	550	0.01	0.01	24,000	550	0.01	0.01	24,000	520	0.01	0.01	
	7	23,000	450	0.01	0.01	23,000	450	0.01	0.01	23,000	420	0.01	0.01	
	7.5	23,000	400	0.01	0.01	23,000	400	0.01	0.01	23,000	380	0.01	0.01	
	8	20,000	320	0.005	0.01	20,000	320	0.005	0.01	20,000	300	0.005	0.01	
R0.4	2	50,000	2,000	0.04	0.08	50,000	2,000	0.04	0.08	50,000	1,900	0.04	0.08	
	3	48,000	1,600	0.04	0.08	48,000	1,600	0.04	0.08	48,000	1,500	0.04	0.08	
	4	40,000	1,200	0.04	0.08	40,000	1,200	0.04	0.08	40,000	1,100	0.04	0.08	
	5	34,000	950	0.03	0.05	34,000	950	0.03	0.05	34,000	900	0.03	0.05	
	6	30,000	800	0.03	0.05	30,000	800	0.03	0.05	30,000	760	0.03	0.05	
	7	25,000	600	0.01	0.02	25,000	600	0.01	0.02	25,000	570	0.01	0.02	
	8	23,000	450	0.005	0.01	23,000	450	0.005	0.01	23,000	420	0.005	0.01	
	10	18,000	320	0.005	0.008	18,000	320	0.005	0.008	18,000	300	0.005	0.008	
	12	17,000	250	0.005	0.005	17,000	250	0.005	0.005	17,000	230	0.005	0.005	
	R0.5	2	50,000	3,700	0.05	0.1	50,000	3,700	0.05	0.1	50,000	3,700	0.05	0.1
		3	45,000	3,200	0.05	0.1	45,000	3,200	0.05	0.1	45,000	3,000	0.05	0.1
		4	40,000	3,000	0.05	0.1	40,000	3,000	0.05	0.1	40,000	2,850	0.05	0.1
5		36,000	2,300	0.05	0.1	36,000	2,300	0.05	0.1	36,000	2,100	0.05	0.1	
6		30,000	2,000	0.05	0.1	30,000	2,000	0.05	0.1	30,000	1,900	0.05	0.1	
7		27,000	1,700	0.05	0.1	27,000	1,700	0.05	0.1	27,000	1,600	0.05	0.1	
8		26,000	1,600	0.05	0.1	26,000	1,600	0.05	0.1	26,000	1,500	0.05	0.1	
9		24,000	1,200	0.03	0.05	24,000	1,200	0.03	0.05	24,000	1,100	0.03	0.05	
10		22,000	1,100	0.01	0.02	22,000	1,100	0.01	0.02	22,000	1,000	0.01	0.02	
12		20,000	800	0.01	0.01	20,000	800	0.01	0.01	20,000	760	0.01	0.01	
14		18,000	600	0.005	0.01	18,000	600	0.005	0.01	18,000	570	0.005	0.01	
16		16,000	420	0.005	0.01	16,000	420	0.005	0.01	16,000	400	0.005	0.01	
R0.6	2.4	50,000	3,800	0.06	0.12	50,000	3,800	0.06	0.12	50,000	3,600	0.06	0.12	
	4	40,000	3,000	0.06	0.12	40,000	3,000	0.06	0.12	40,000	2,850	0.06	0.12	
	6	32,000	2,100	0.06	0.12	32,000	2,100	0.06	0.12	32,000	2,000	0.06	0.12	
	8	25,000	1,700	0.06	0.12	25,000	1,700	0.06	0.12	25,000	1,600	0.06	0.12	
	10	20,000	1,200	0.05	0.1	20,000	1,200	0.05	0.1	20,000	1,100	0.05	0.1	
	12	19,000	900	0.03	0.05	19,000	900	0.03	0.05	19,000	850	0.03	0.05	
	14	18,000	650	0.03	0.05	18,000	650	0.03	0.05	18,000	610	0.03	0.05	
	16	16,000	450	0.02	0.05	16,000	450	0.02	0.05	16,000	420	0.02	0.05	
	18	16,000	350	0.005	0.005	16,000	350	0.005	0.005	16,000	330	0.005	0.005	
	20	14,000	320	0.005	0.005	14,000	320	0.005	0.005	14,000	300	0.005	0.005	
	R0.75	3	50,000	4,800	0.075	0.15	50,000	4,800	0.075	0.15	50,000	4,800	0.075	0.15
	切深量 DEPTH OF CUT													

1. 请使用高精度高刚性的机械设备及夹持具。
2. 炭素钢及淬火钢加工时, 请使用气雾或油雾(MQL)冷却方式。
3. 请根据加工材质及加工内容选用适合的切削油剂。
4. 上表适用于负荷较小, 加工稳定的等高线加工。
5. 请根据加工精度、加工形状、加工路线调整参数。
6. $\phi 0.5(R0.25)$ 以下的有效长 / 刃长(L/D)为10以上, 加工时由于负荷增大有折损的可能, 请根据切削状况调整切削条件。
7. 转速不足时, 请同步调整上表中的转速及进给速度。

不锈钢·调质钢(38~45HRC)·预硬钢 STAINLESS STEELS·HARDENED STEELS· PREHARDENED STEELS SUS304, SKD, NAK80, HPM50				调质钢(45~55HRC) HARDENED STEELS				调质钢(55~60HRC) HARDENED STEELS			
回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf
50,000	1,100	0.03	0.05	50,000	770	0.03	0.05	50,000	610	0.01	0.02
50,000	1,100	0.02	0.03	50,000	750	0.02	0.03	45,000	540	0.01	0.02
45,000	950	0.02	0.03	45,000	660	0.02	0.03	41,000	480	0.01	0.02
40,000	850	0.01	0.02	40,000	590	0.01	0.02	36,000	420	0.01	0.02
34,000	740	0.01	0.02	34,000	510	0.01	0.02	31,000	370	0.01	0.02
30,000	640	0.01	0.02	30,000	440	0.01	0.02	27,000	310	0.01	0.02
28,000	610	0.01	0.02	28,000	420	0.01	0.02	25,000	300	0.01	0.02
26,000	570	0.01	0.02	25,000	380	0.01	0.02	22,000	260	0.01	0.02
24,000	520	0.01	0.01	23,000	340	0.01	0.01	20,000	230	0.01	0.01
23,000	420	0.01	0.01	22,000	280	0.01	0.01	19,000	190	0.01	0.01
23,000	380	0.01	0.01	22,000	250	0.01	0.01	19,000	170	0.01	0.01
20,000	300	0.005	0.01	19,000	200	0.005	0.01	17,000	140	0.005	0.01
20,000	280	0.005	0.01	19,000	180	0.005	0.01	17,000	130	0.005	0.01
20,000	260	0.005	0.01	19,000	170	0.005	0.01	17,000	120	0.005	0.01
20,000	220	0.005	0.008	19,000	140	0.005	0.008	17,000	110	0.005	0.008
20,000	190	0.005	0.008	19,000	120	0.005	0.008	17,000	100	0.005	0.008
18,000	140	0.005	0.008	17,000	90	0.005	0.008	17,000	80	0.005	0.008
18,000	110	0.005	0.005	17,000	80	0.005	0.005	17,000	70	0.004	0.005
50,000	1,900	0.04	0.08	50,000	1,600	0.04	0.08	50,000	1,200	0.015	0.03
48,000	1,500	0.04	0.08	48,000	1,100	0.04	0.08	45,000	820	0.015	0.03
40,000	1,100	0.04	0.08	40,000	1,000	0.04	0.08	38,000	760	0.015	0.03
34,000	900	0.03	0.05	34,000	800	0.03	0.05	31,000	580	0.015	0.03
30,000	760	0.03	0.05	30,000	650	0.03	0.05	27,000	460	0.015	0.03
25,000	570	0.01	0.02	25,000	450	0.01	0.02	22,000	310	0.01	0.02
23,000	420	0.005	0.01	23,000	300	0.005	0.01	20,000	200	0.005	0.01
18,000	300	0.005	0.008	17,000	200	0.005	0.008	17,000	170	0.005	0.008
17,000	230	0.005	0.005	16,000	160	0.005	0.005	16,000	110	0.005	0.005
50,000	3,700	0.05	0.1	50,000	3,700	0.05	0.1	50,000	3,000	0.02	0.05
45,000	3,000	0.05	0.1	45,000	2,400	0.05	0.1	45,000	1,900	0.02	0.05
40,000	2,850	0.05	0.1	40,000	2,200	0.05	0.1	40,000	1,700	0.02	0.05
36,000	2,100	0.05	0.1	36,000	1,600	0.05	0.1	36,000	1,200	0.02	0.05
30,000	1,900	0.05	0.1	30,000	1,500	0.05	0.1	30,000	1,200	0.02	0.05
27,000	1,600	0.05	0.1	27,000	1,300	0.05	0.1	27,000	1,000	0.02	0.05
26,000	1,500	0.05	0.1	26,000	1,200	0.05	0.1	26,000	960	0.02	0.05
24,000	1,100	0.03	0.05	24,000	880	0.03	0.05	24,000	700	0.02	0.05
22,000	1,000	0.01	0.02	21,000	760	0.01	0.02	18,000	520	0.01	0.02
20,000	760	0.01	0.01	19,000	570	0.01	0.01	17,000	400	0.01	0.01
18,000	570	0.005	0.01	17,000	430	0.005	0.01	15,000	300	0.005	0.01
16,000	400	0.005	0.01	15,000	300	0.005	0.01	13,000	200	0.005	0.01
14,000	300	0.005	0.005	13,000	220	0.005	0.005	12,000	160	0.004	0.005
13,000	285	0.005	0.005	12,000	180	0.005	0.005	12,000	140	0.004	0.005
12,000	190	0.005	0.005	12,000	110	0.005	0.005	12,000	100	0.004	0.005
50,000	3,600	0.06	0.12	50,000	3,600	0.06	0.12	50,000	3,000	0.02	0.05
40,000	2,850	0.06	0.12	40,000	2,300	0.06	0.12	38,000	1,750	0.02	0.05
32,000	2,000	0.06	0.12	32,000	1,600	0.06	0.12	30,000	1,200	0.02	0.05
25,000	1,600	0.06	0.12	25,000	1,200	0.06	0.12	25,000	960	0.02	0.05
20,000	1,100	0.05	0.1	18,000	800	0.05	0.1	16,000	560	0.02	0.05
17,000	850	0.03	0.05	16,000	640	0.03	0.05	14,000	440	0.02	0.05
16,000	610	0.03	0.05	15,000	450	0.03	0.05	13,000	310	0.02	0.05
15,000	420	0.02	0.05	14,000	300	0.02	0.05	12,000	200	0.02	0.05
15,000	330	0.005	0.005	14,000	200	0.005	0.005	12,000	130	0.004	0.005
13,000	300	0.005	0.005	12,000	180	0.005	0.005	10,000	120	0.004	0.005
50,000	4,800	0.075	0.15	50,000	4,800	0.075	0.15	50,000	3,900	0.03	0.06



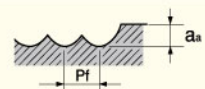
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1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL (Minimum Quantity Lubrication / mist coolant) or air blow is recommended.
3. When using cutting fluid, choose based on work material and cutting conditions.
4. The cutting conditions shown for 3D milling are low-load, safe conditions for reference.
5. Please adjust conditions based on machining accuracy, machining shape and machining path.
6. When using a tool with a diameter of $\phi 0.5$ (R0.25) or less, or an L/D (effective length/tool diameter) ratio of greater than 10, high loads can cause tool breakage. Therefore, adjust the cutting conditions based on the machining situation.
7. When the available RPM are insufficient, please reduce the RPM and feed rates in proportion.

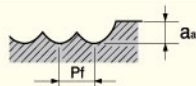
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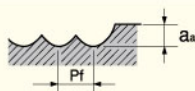
加工材质 WORK MATERIAL		一般构造用钢・炭素钢・铸铁 MILD STEELS・CARBON STEELS・CAST IRON SS400, S55C, FC250 (~750N/mm ²)				合金钢・工具钢 ALLOY STEELS・TOOL STEELS SCM, SKT, SKS, SKD (~30HRC)				调质钢(30~38HRC)・预硬钢 HARDENED STEELS・PREHARDENED STEELS SKT, SKD, NAK55, HPM1			
R	有效长 L ₁ (mm)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf
R0.75	4	40,000	3,900	0.075	0.15	40,000	3,900	0.075	0.15	40,000	3,700	0.075	0.15
	6	30,000	2,900	0.075	0.15	30,000	2,900	0.075	0.15	30,000	2,700	0.075	0.15
	8	24,000	2,300	0.075	0.15	24,000	2,300	0.075	0.15	24,000	2,100	0.075	0.15
	10	24,000	2,000	0.075	0.15	24,000	2,000	0.075	0.15	24,000	1,900	0.075	0.15
	12	21,000	1,400	0.075	0.1	21,000	1,400	0.075	0.1	21,000	1,300	0.075	0.1
	14	18,000	1,200	0.05	0.1	18,000	1,200	0.05	0.1	18,000	1,100	0.05	0.1
	16	16,000	800	0.05	0.1	16,000	800	0.05	0.1	16,000	760	0.05	0.1
	18	14,000	500	0.03	0.05	14,000	500	0.03	0.05	14,000	470	0.03	0.05
	20	13,000	360	0.02	0.05	13,000	360	0.02	0.05	13,000	340	0.02	0.05
	22	13,000	320	0.02	0.05	13,000	320	0.02	0.05	13,000	300	0.02	0.05
30	12,000	200	0.005	0.01	12,000	200	0.005	0.01	12,000	190	0.005	0.01	
R0.8	8	24,000	3,000	0.08	0.16	24,000	3,000	0.08	0.16	24,000	2,800	0.08	0.16
	12	21,000	1,800	0.05	0.1	21,000	1,800	0.05	0.1	21,000	1,700	0.05	0.1
	16	16,000	800	0.05	0.1	16,000	800	0.05	0.1	16,000	760	0.05	0.1
	20	13,000	380	0.03	0.05	13,000	380	0.03	0.05	13,000	360	0.03	0.05
R1	4	50,000	5,600	0.1	0.2	50,000	5,600	0.1	0.2	50,000	5,600	0.1	0.2
	6	36,000	3,000	0.1	0.2	36,000	3,000	0.1	0.2	36,000	2,800	0.1	0.2
	8	25,000	2,600	0.1	0.2	25,000	2,600	0.1	0.2	25,000	2,400	0.1	0.2
	10	20,000	2,400	0.1	0.2	20,000	2,400	0.1	0.2	20,000	2,200	0.1	0.2
	12	16,000	2,000	0.1	0.2	16,000	2,000	0.1	0.2	16,000	1,900	0.1	0.2
	14	15,000	1,800	0.1	0.2	15,000	1,800	0.1	0.2	15,000	1,700	0.1	0.2
	16	14,000	1,700	0.1	0.1	14,000	1,700	0.1	0.1	14,000	1,600	0.1	0.1
	18	13,000	1,600	0.1	0.1	13,000	1,600	0.1	0.1	13,000	1,500	0.1	0.1
	20	12,000	1,200	0.05	0.1	12,000	1,200	0.05	0.1	12,000	1,100	0.05	0.1
	22	10,000	1,000	0.05	0.1	10,000	1,000	0.05	0.1	10,000	950	0.05	0.1
	25	10,000	800	0.03	0.05	10,000	800	0.03	0.05	10,000	760	0.03	0.05
	30	10,000	500	0.02	0.05	10,000	500	0.02	0.05	10,000	470	0.02	0.05
	35	8,000	250	0.02	0.03	8,000	250	0.02	0.03	8,000	230	0.02	0.03
	40	7,000	150	0.02	0.03	7,000	150	0.02	0.03	7,000	140	0.02	0.03
R1.25	10	20,000	3,300	0.1	0.2	20,000	3,300	0.1	0.2	20,000	3,100	0.1	0.2
	15	17,000	2,800	0.1	0.2	17,000	2,800	0.1	0.2	17,000	2,600	0.1	0.2
	20	15,000	1,800	0.1	0.2	15,000	1,800	0.1	0.2	15,000	1,700	0.1	0.2
	25	12,000	1,000	0.03	0.05	12,000	1,000	0.03	0.05	12,000	950	0.03	0.05
	30	10,000	800	0.03	0.05	10,000	800	0.03	0.05	10,000	760	0.03	0.05
	35	8,000	500	0.02	0.03	8,000	500	0.02	0.03	8,000	470	0.02	0.03
R1.5	6	41,500	6,200	0.15	0.3	41,500	6,200	0.15	0.3	41,500	6,200	0.15	0.3
	8	30,000	4,500	0.15	0.3	30,000	4,500	0.15	0.3	30,000	4,200	0.15	0.3
	10	25,000	3,800	0.15	0.3	25,000	3,800	0.15	0.3	25,000	3,600	0.15	0.3
	12	20,000	3,000	0.15	0.3	20,000	3,000	0.15	0.3	20,000	2,800	0.15	0.3
	14	18,000	2,700	0.15	0.3	18,000	2,700	0.15	0.3	18,000	2,500	0.15	0.3
	15	16,000	2,400	0.1	0.3	16,000	2,400	0.1	0.3	16,000	2,200	0.1	0.3
	16	16,000	2,000	0.1	0.2	16,000	2,000	0.1	0.2	16,000	1,900	0.1	0.2
	20	14,000	1,800	0.1	0.2	14,000	1,800	0.1	0.2	14,000	1,700	0.1	0.2
	25	12,000	1,200	0.05	0.1	12,000	1,200	0.05	0.1	12,000	1,100	0.05	0.1
	30	10,000	800	0.03	0.05	10,000	800	0.03	0.05	10,000	760	0.03	0.05
	35	8,000	600	0.02	0.05	8,000	600	0.02	0.05	8,000	570	0.02	0.05
	40	7,000	500	0.02	0.03	7,000	500	0.02	0.03	7,000	470	0.02	0.03
R1.75	15	18,000	3,000	0.1	0.3	18,000	3,000	0.1	0.3	18,000	2,800	0.1	0.3
	20	16,000	2,700	0.1	0.2	16,000	2,700	0.1	0.2	16,000	2,500	0.1	0.2
	25	12,000	2,000	0.1	0.1	12,000	2,000	0.1	0.1	12,000	1,900	0.1	0.1
	30	10,000	1,600	0.05	0.1	10,000	1,600	0.05	0.1	10,000	1,500	0.05	0.1
	35	10,000	1,000	0.05	0.05	10,000	1,000	0.05	0.05	10,000	950	0.05	0.05
	40	8,000	800	0.05	0.05	8,000	800	0.05	0.05	8,000	760	0.05	0.05
切深量 DEPTH OF CUT													

切深量
DEPTH OF CUT



1. 请使用高精度高刚性的机械设备及夹持具。
2. 炭素钢及淬火钢加工时，请使用气雾或油雾(MQL)冷却方式。
3. 请根据加工材质及加工内容选用适合的切削油剂。
4. 上表适用于负荷较小，加工稳定的等高线加工。
5. 请根据加工精度、加工形状、加工路线调整参数。
6. $\phi 0.5(R0.25)$ 以下的有效长 / 刃长(L/D)为10以上，加工时由于负荷增大有折损的可能，请根据切削状况调整切削条件。
7. 转速不足时，请同步调整上表中的转速及进给速度。

不锈钢·调质钢(38~45HRC)·预硬钢 STAINLESS STEELS·HARDENED STEELS· PREHARDENED STEELS SUS304, SKD, NAK80, HPM50				调质钢(45~55HRC) HARDENED STEELS				调质钢(55~60HRC) HARDENED STEELS			
回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf
40,000	3,700	0.075	0.15	40,000	2,900	0.075	0.15	38,000	2,200	0.03	0.06
30,000	2,700	0.075	0.15	30,000	2,200	0.075	0.15	27,000	1,500	0.03	0.06
24,000	2,100	0.075	0.15	24,000	1,700	0.075	0.15	21,000	1,100	0.03	0.06
24,000	1,900	0.075	0.15	24,000	1,500	0.075	0.15	21,000	1,000	0.03	0.06
21,000	1,300	0.075	0.1	21,000	1,000	0.075	0.1	18,000	680	0.03	0.06
17,000	1,100	0.05	0.1	17,000	900	0.05	0.1	15,000	630	0.03	0.06
14,000	760	0.05	0.1	13,000	560	0.05	0.1	10,000	340	0.03	0.05
13,000	470	0.03	0.05	12,000	350	0.03	0.05	10,000	230	0.03	0.05
12,000	340	0.02	0.05	11,000	240	0.02	0.05	9,000	150	0.02	0.05
12,000	300	0.02	0.05	11,000	220	0.02	0.05	9,000	140	0.02	0.05
11,000	190	0.005	0.01	10,000	120	0.005	0.01	9,000	90	0.005	0.01
24,000	2,800	0.08	0.16	23,000	2,100	0.08	0.16	20,000	1,400	0.03	0.08
21,000	1,700	0.05	0.1	20,000	1,380	0.05	0.1	18,000	990	0.03	0.08
14,000	760	0.05	0.1	13,000	600	0.05	0.1	11,000	400	0.03	0.08
12,000	360	0.03	0.05	11,000	280	0.03	0.05	10,000	200	0.03	0.05
50,000	5,600	0.1	0.2	47,000	5,300	0.1	0.2	40,000	3,600	0.05	0.1
36,000	2,800	0.1	0.2	35,000	2,700	0.1	0.2	30,000	1,800	0.05	0.1
25,000	2,400	0.1	0.2	24,000	2,300	0.1	0.2	20,000	1,500	0.05	0.1
20,000	2,200	0.1	0.2	19,000	2,000	0.1	0.2	17,000	1,400	0.05	0.1
16,000	1,900	0.1	0.2	15,000	1,700	0.1	0.2	13,000	1,100	0.05	0.1
15,000	1,700	0.1	0.2	14,000	1,500	0.1	0.2	12,000	1,000	0.05	0.1
14,000	1,600	0.1	0.1	13,000	1,400	0.1	0.1	11,000	950	0.05	0.1
13,000	1,500	0.1	0.1	12,000	1,200	0.1	0.1	10,000	800	0.05	0.1
11,000	1,100	0.05	0.1	10,000	890	0.05	0.1	9,000	640	0.05	0.1
9,000	950	0.05	0.1	9,000	860	0.05	0.1	7,500	570	0.05	0.1
9,000	760	0.03	0.05	9,000	680	0.03	0.05	7,500	450	0.03	0.05
9,000	470	0.02	0.05	9,000	360	0.02	0.05	7,500	240	0.02	0.05
7,500	230	0.02	0.03	7,000	130	0.02	0.03	6,000	100	0.02	0.03
6,000	140	0.02	0.03	6,000	100	0.02	0.03	6,000	90	0.02	0.03
20,000	3,100	0.1	0.2	19,000	2,900	0.1	0.2	16,000	1,900	0.05	0.1
17,000	2,600	0.1	0.2	16,000	2,400	0.1	0.2	14,000	1,600	0.05	0.1
15,000	1,700	0.1	0.2	14,000	1,600	0.1	0.2	12,000	1,000	0.05	0.1
11,000	950	0.03	0.05	10,000	830	0.03	0.05	9,000	590	0.03	0.05
9,000	760	0.03	0.05	8,000	650	0.03	0.05	7,000	450	0.03	0.05
7,500	470	0.02	0.03	7,000	430	0.02	0.03	6,000	290	0.02	0.03
41,500	6,200	0.15	0.3	32,000	4,800	0.15	0.3	26,500	3,300	0.06	0.15
30,000	4,200	0.15	0.3	25,000	3,500	0.15	0.3	22,000	2,400	0.06	0.15
25,000	3,600	0.15	0.3	20,000	2,800	0.15	0.3	18,000	2,000	0.06	0.15
20,000	2,800	0.15	0.3	18,000	2,500	0.15	0.3	16,000	1,700	0.06	0.15
18,000	2,500	0.15	0.3	15,000	2,000	0.15	0.3	13,000	1,300	0.06	0.15
16,000	2,200	0.1	0.3	13,000	1,800	0.1	0.3	11,000	1,200	0.06	0.15
16,000	1,900	0.1	0.2	13,000	1,500	0.1	0.2	11,000	1,100	0.06	0.15
14,000	1,700	0.1	0.2	11,000	1,600	0.1	0.2	10,000	1,000	0.06	0.15
12,000	1,100	0.05	0.1	9,000	820	0.05	0.1	8,000	580	0.05	0.1
9,000	760	0.03	0.05	7,000	590	0.03	0.05	6,000	400	0.03	0.05
7,500	570	0.02	0.05	6,000	460	0.02	0.05	5,000	300	0.02	0.05
6,500	470	0.02	0.03	5,000	360	0.02	0.03	4,000	230	0.02	0.03
18,000	2,800	0.1	0.3	14,000	2,000	0.1	0.3	12,000	1,300	0.07	0.15
16,000	2,500	0.1	0.2	12,000	1,800	0.1	0.2	10,000	1,200	0.07	0.15
12,000	1,900	0.1	0.1	9,000	1,300	0.1	0.1	8,000	920	0.07	0.15
10,000	1,500	0.05	0.1	8,000	1,100	0.05	0.1	7,000	770	0.05	0.1
9,000	950	0.05	0.05	7,000	700	0.05	0.05	5,000	400	0.05	0.05
7,500	760	0.05	0.05	6,000	580	0.05	0.05	4,000	300	0.05	0.05



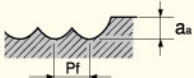
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1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL (Minimum Quantity Lubrication / mist coolant) or air blow is recommended.
3. When using cutting fluid, choose based on work material and cutting conditions.
4. The cutting conditions shown for 3D milling are low-load, safe conditions for reference.
5. Please adjust conditions based on machining accuracy, machining shape and machining path.
6. When using a tool with a diameter of $\phi 0.5$ (R0.25) or less, or an L/D (effective length/tool diameter) ratio of greater than 10, high loads can cause tool breakage. Therefore, adjust the cutting conditions based on the machining situation.
7. When the available RPM are insufficient, please reduce the RPM and feed rates in proportion.

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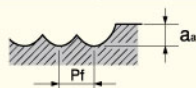


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加工材质 WORK MATERIAL		一般构造用钢・炭素钢・铸铁 MILD STEELS・CARBON STEELS・CAST IRON SS400, S55C, FC250 (~750N/mm ²)				合金钢・工具钢 ALLOY STEELS・TOOL STEELS SCM, SKT, SKS, SKD (~30HRC)				调质钢(30~38HRC)・预硬钢 HARDENED STEELS・PREHARDENED STEELS SKT, SKD, NAK55, HPM1			
R	有效长 L ₁ (mm)	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf
R1.75	45	7,000	600	0.03	0.03	7,000	600	0.03	0.03	7,000	570	0.03	0.03
R2	8	31,000	5,700	0.2	0.5	31,000	5,700	0.2	0.5	31,000	5,700	0.2	0.5
	10	25,000	4,500	0.2	0.5	25,000	4,500	0.2	0.5	25,000	4,200	0.2	0.5
	12	20,000	3,600	0.2	0.5	20,000	3,600	0.2	0.5	20,000	3,400	0.2	0.5
	15	20,000	3,600	0.2	0.5	20,000	3,600	0.2	0.5	20,000	3,400	0.2	0.5
	16	18,000	3,200	0.2	0.5	18,000	3,200	0.2	0.5	18,000	3,000	0.2	0.5
	20	16,000	2,800	0.2	0.4	16,000	2,800	0.2	0.4	16,000	2,600	0.2	0.4
	25	16,000	2,800	0.1	0.3	16,000	2,800	0.1	0.3	16,000	2,600	0.1	0.3
	30	14,000	2,400	0.1	0.2	14,000	2,400	0.1	0.2	14,000	2,200	0.1	0.2
	35	12,000	1,800	0.1	0.2	12,000	1,800	0.1	0.2	12,000	1,700	0.1	0.2
	40	10,000	1,300	0.05	0.1	10,000	1,300	0.05	0.1	10,000	1,200	0.05	0.1
	45	8,000	1,000	0.05	0.05	8,000	1,000	0.05	0.05	8,000	950	0.05	0.05
	50	7,000	700	0.02	0.05	7,000	700	0.02	0.05	7,000	660	0.02	0.05
R2.5	10	25,000	5,400	0.25	0.5	25,000	5,400	0.25	0.5	25,000	5,400	0.25	0.5
	15	20,000	4,200	0.25	0.5	20,000	4,200	0.25	0.5	20,000	3,900	0.25	0.5
	20	16,000	3,500	0.25	0.5	16,000	3,500	0.25	0.5	16,000	3,300	0.25	0.5
	25	15,000	3,200	0.2	0.3	15,000	3,200	0.2	0.3	15,000	3,000	0.2	0.3
	30	14,000	2,500	0.1	0.3	14,000	2,500	0.1	0.3	14,000	2,300	0.1	0.3
	35	12,000	1,600	0.1	0.3	12,000	1,600	0.1	0.3	12,000	1,500	0.1	0.3
	40	10,000	1,200	0.1	0.2	10,000	1,200	0.1	0.2	10,000	1,100	0.1	0.2
	45	9,000	900	0.1	0.1	9,000	900	0.1	0.1	9,000	850	0.1	0.1
	50	8,000	800	0.1	0.1	8,000	800	0.1	0.1	8,000	760	0.1	0.1
R3	12	20,000	5,200	0.3	0.5	20,000	5,200	0.3	0.5	20,000	5,200	0.3	0.5
	20	16,000	4,200	0.3	0.5	16,000	4,200	0.3	0.5	16,000	3,900	0.3	0.5
	25	12,000	3,200	0.3	0.5	12,000	3,200	0.3	0.5	12,000	3,000	0.3	0.5
	30	10,000	2,600	0.3	0.5	10,000	2,600	0.3	0.5	10,000	2,400	0.3	0.5
	35	9,000	2,300	0.2	0.4	9,000	2,300	0.2	0.4	9,000	2,100	0.2	0.4
	40	9,000	2,000	0.2	0.3	9,000	2,000	0.2	0.3	9,000	1,900	0.2	0.3
	45	8,000	1,800	0.2	0.3	8,000	1,800	0.2	0.3	8,000	1,700	0.2	0.3
	50	7,000	1,600	0.2	0.3	7,000	1,600	0.2	0.3	7,000	1,500	0.2	0.3
切深量 DEPTH OF CUT													

1. 请使用高精度高刚性的机械设备及夹持具。
2. 炭素钢及淬火钢加工时，请使用气雾或油雾(MQL)冷却方式。
3. 请根据加工材质及加工内容选用适合的切削油剂。
4. 上表适用于负荷较小，加工稳定的等高线加工。
5. 请根据加工精度、加工形状、加工路线调整参数。
6. $\phi 0.5$ (R0.25)以下的有效长/刃长(L/D)为10以上，加工时由于负荷增大有折损的可能，请根据切削状况调整切削条件。
7. 转速不足时，请同步调整上表中的转速及进给速度。

不锈钢·调质钢(38~45HRC)·预硬钢 STAINLESS STEELS·HARDENED STEELS· PREHARDENED STEELS SUS304, SKD, NAK80, HPM50				调质钢(45~55HRC) HARDENED STEELS				调质钢(55~60HRC) HARDENED STEELS			
回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf	回转速度 SPEED (min ⁻¹)	进给速度 FEED (mm/min)	a _a	Pf
6,500	570	0.03	0.03	5,000	420	0.03	0.03	4,000	260	0.05	0.05
31,000	5,700	0.2	0.5	24,000	4,400	0.2	0.5	20,000	3,200	0.08	0.2
25,000	4,200	0.2	0.5	20,000	3,300	0.2	0.5	18,000	2,300	0.08	0.2
20,000	3,400	0.2	0.5	17,000	2,900	0.2	0.5	14,000	1,900	0.08	0.2
20,000	3,400	0.2	0.5	16,000	2,700	0.2	0.5	12,000	1,600	0.08	0.2
18,000	3,000	0.2	0.5	15,000	2,500	0.2	0.5	10,000	1,300	0.08	0.2
16,000	2,600	0.2	0.4	14,000	2,300	0.2	0.4	8,000	1,000	0.08	0.2
16,000	2,600	0.1	0.3	13,000	2,200	0.1	0.3	6,000	810	0.08	0.2
14,000	2,200	0.1	0.2	12,000	1,900	0.1	0.2	5,000	630	0.08	0.2
12,000	1,700	0.1	0.2	9,000	1,200	0.1	0.2	4,000	420	0.08	0.2
9,000	1,200	0.05	0.1	8,000	1,000	0.05	0.1	4,000	400	0.05	0.1
7,500	950	0.05	0.05	7,000	890	0.05	0.05	3,600	360	0.05	0.05
6,500	660	0.02	0.05	6,000	600	0.02	0.05	3,600	280	0.02	0.05
25,000	5,400	0.25	0.5	19,000	4,000	0.25	0.5	16,000	2,800	0.1	0.25
20,000	3,900	0.25	0.5	17,000	3,300	0.25	0.5	13,000	2,000	0.1	0.25
16,000	3,300	0.25	0.5	13,000	2,700	0.25	0.5	8,000	1,300	0.1	0.25
15,000	3,000	0.2	0.3	12,000	2,400	0.2	0.3	6,000	960	0.1	0.25
14,000	2,300	0.1	0.3	11,000	1,800	0.1	0.3	4,000	520	0.1	0.25
12,000	1,500	0.1	0.3	10,000	1,100	0.1	0.3	3,200	280	0.1	0.25
10,000	1,100	0.1	0.2	9,000	990	0.1	0.2	3,000	260	0.1	0.2
9,000	850	0.1	0.1	8,000	660	0.1	0.1	3,000	200	0.1	0.1
7,500	760	0.1	0.1	7,000	610	0.1	0.1	2,800	190	0.1	0.1
20,000	5,200	0.3	0.5	16,000	3,400	0.3	0.5	13,500	2,500	0.1	0.2
16,000	3,900	0.3	0.5	12,000	3,000	0.3	0.5	8,000	1,600	0.1	0.2
12,000	3,000	0.3	0.5	10,000	2,500	0.3	0.5	6,000	1,200	0.1	0.2
10,000	2,400	0.3	0.5	9,000	2,100	0.3	0.5	4,000	740	0.1	0.2
9,000	2,100	0.2	0.4	9,000	2,000	0.2	0.4	3,500	620	0.1	0.2
9,000	1,900	0.2	0.3	9,000	1,800	0.2	0.3	3,000	480	0.1	0.2
8,000	1,700	0.2	0.3	8,000	1,600	0.2	0.3	2,800	440	0.1	0.2
7,000	1,500	0.2	0.3	7,000	1,400	0.2	0.3	2,500	400	0.1	0.2



1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL (Minimum Quantity Lubrication / mist coolant) or air blow is recommended.
3. When using cutting fluid, choose based on work material and cutting conditions.
4. The cutting conditions shown for 3D milling are low-load, safe conditions for reference.
5. Please adjust conditions based on machining accuracy, machining shape and machining path.
6. When using a tool with a diameter of $\phi 0.5$ (R0.25) or less, or an L/D (effective length/tool diameter) ratio of greater than 10, high loads can cause tool breakage. Therefore, adjust the cutting conditions based on the machining situation.
7. When the available RPM are insufficient, please reduce the RPM and feed rates in proportion.