

加工材料 Work Material				高硬度钢 Hardened Steels STAVAX · SKD61 (~52HRC)				高硬度钢 Hardened Steels SKD11 · ELMAX (~62HRC)				高速钢 High Speed Steels SKH · HAP (~68HRC)			
外径 Dia.	角半径 Corner Radius	颈长 Under Neck Length	L(颈长)/ D(外径)	切深量 Depth of Cut		进给速度 Feed	主轴转速 Spindle Speed	切深量 Depth of Cut		进给速度 Feed	主轴转速 Spindle Speed	切深量 Depth of Cut		进给速度 Feed	主轴转速 Spindle Speed
				ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹
0.1	R0.01	0.2	2	0.002	0.015	320	50,000	0.002	0.01	240	50,000	0.001	0.01	160	50,000
		0.3	3	0.002	0.015	240	50,000	0.001	0.01	160	50,000	0.001	0.01	60	50,000
		0.5	5	0.002	0.01	240	50,000	0.001	0.01	160	50,000	0.001	0.01	60	50,000
	R0.02	0.2	2	0.002	0.015	400	50,000	0.002	0.01	300	50,000	0.001	0.01	200	50,000
		0.3	3	0.002	0.015	300	50,000	0.001	0.01	200	50,000	0.001	0.01	100	50,000
		0.5	5	0.002	0.01	300	50,000	0.001	0.01	200	50,000	0.001	0.01	100	50,000
0.15	R0.02	0.2	1.3	0.003	0.02	500	50,000	0.003	0.02	400	50,000	0.002	0.015	300	50,000
		0.3	2	0.003	0.02	400	50,000	0.003	0.02	300	50,000	0.002	0.015	200	50,000
		0.5	3.3	0.002	0.02	400	50,000	0.002	0.02	300	50,000	0.001	0.015	200	50,000
	R0.03	0.2	1.3	0.003	0.02	500	50,000	0.003	0.02	400	50,000	0.002	0.015	300	50,000
		0.3	2	0.003	0.02	400	50,000	0.003	0.02	300	50,000	0.002	0.015	200	50,000
		0.5	3.3	0.002	0.02	400	50,000	0.002	0.02	300	50,000	0.001	0.015	200	50,000
0.2	R0.02	0.3	1.5	0.003	0.03	800	50,000	0.003	0.03	700	50,000	0.002	0.02	500	50,000
		0.5	2.5	0.003	0.03	600	50,000	0.003	0.03	600	50,000	0.002	0.02	400	50,000
		1	5	0.003	0.02	400	50,000	0.003	0.02	400	50,000	0.002	0.01	200	50,000
	R0.03	0.3	1.5	0.003	0.03	800	50,000	0.003	0.03	700	50,000	0.002	0.02	500	50,000
		0.5	2.5	0.003	0.03	600	50,000	0.003	0.03	600	50,000	0.002	0.02	400	50,000
		1	5	0.003	0.02	400	50,000	0.003	0.02	400	50,000	0.002	0.01	200	50,000
0.3	R0.02	0.5	1.7	0.003	0.05	800	50,000	0.003	0.05	700	50,000	0.002	0.03	500	50,000
		0.75	2.5	0.003	0.05	800	50,000	0.003	0.05	640	50,000	0.002	0.03	480	50,000
		1	3.3	0.003	0.05	800	50,000	0.003	0.05	640	50,000	0.002	0.03	480	50,000
		1.5	5	0.003	0.03	640	50,000	0.003	0.03	480	50,000	0.002	0.02	320	50,000
	R0.05	2	6.7	0.003	0.03	640	50,000	0.003	0.03	480	50,000	0.002	0.02	320	50,000
		0.5	1.7	0.003	0.05	1,000	50,000	0.003	0.05	800	50,000	0.002	0.03	600	50,000
		0.75	2.5	0.003	0.05	1,000	50,000	0.003	0.05	800	50,000	0.002	0.03	600	50,000
		1	3.3	0.003	0.05	1,000	50,000	0.003	0.05	800	50,000	0.002	0.03	600	50,000
		1.5	5	0.003	0.03	800	50,000	0.003	0.03	600	50,000	0.002	0.02	400	50,000
		2	6.7	0.003	0.03	800	50,000	0.003	0.03	600	50,000	0.002	0.02	400	50,000
0.4	R0.02	0.5	1.3	0.004	0.1	900	50,000	0.004	0.1	800	50,000	0.003	0.08	600	50,000
		1	2.5	0.004	0.1	900	50,000	0.004	0.1	800	50,000	0.003	0.08	600	50,000
		1.5	3.8	0.004	0.1	900	50,000	0.004	0.1	800	50,000	0.003	0.08	600	50,000
		2	5	0.004	0.08	800	50,000	0.004	0.08	700	50,000	0.003	0.05	500	50,000
	R0.05	2.5	6.3	0.004	0.08	800	50,000	0.004	0.08	700	50,000	0.003	0.05	500	50,000
		0.5	1.3	0.005	0.1	1,100	50,000	0.005	0.1	1,000	50,000	0.004	0.08	800	50,000
		1	2.5	0.005	0.1	1,100	50,000	0.005	0.1	1,000	50,000	0.004	0.08	800	50,000
		1.5	3.8	0.005	0.1	1,100	50,000	0.005	0.1	1,000	50,000	0.004	0.08	800	50,000
		2	5	0.005	0.08	1,000	50,000	0.005	0.08	800	50,000	0.004	0.05	600	50,000
		2.5	6.3	0.005	0.08	1,000	50,000	0.005	0.08	800	50,000	0.004	0.05	600	50,000
	R0.1	0.5	1.3	0.008	0.1	1,200	50,000	0.008	0.1	1,100	50,000	0.005	0.08	900	50,000
		1	2.5	0.008	0.1	1,200	50,000	0.008	0.1	1,100	50,000	0.005	0.08	900	50,000
		1.5	3.8	0.008	0.1	1,200	50,000	0.008	0.1	1,100	50,000	0.005	0.08	900	50,000
		2	5	0.005	0.08	1,200	50,000	0.005	0.08	1,100	50,000	0.004	0.05	900	50,000
2.5		6.3	0.005	0.08	1,200	50,000	0.005	0.08	1,100	50,000	0.004	0.05	900	50,000	
0.5		1	0.005	0.15	1,000	50,000	0.005	0.15	1,000	50,000	0.003	0.1	800	50,000	
0.5	R0.02	1	2	0.005	0.15	1,000	50,000	0.005	0.15	1,000	50,000	0.003	0.1	800	50,000
		1.5	3	0.005	0.15	1,000	50,000	0.005	0.15	1,000	50,000	0.003	0.1	800	50,000
		2	4	0.005	0.1	1,000	50,000	0.005	0.1	1,000	50,000	0.003	0.08	800	50,000
		2.5	5	0.005	0.08	1,000	50,000	0.005	0.08	1,000	50,000	0.003	0.05	800	50,000
		0.5	1	0.01	0.15	1,200	50,000	0.01	0.15	1,200	50,000	0.007	0.1	1,000	50,000
	R0.05	1	2	0.01	0.15	1,200	50,000	0.01	0.15	1,200	50,000	0.007	0.1	1,000	50,000
		1.5	3	0.01	0.15	1,200	50,000	0.01	0.15	1,200	50,000	0.007	0.1	1,000	50,000
		2	4	0.007	0.12	1,200	50,000	0.007	0.12	1,200	50,000	0.005	0.08	1,000	50,000
		2.5	5	0.007	0.1	1,200	50,000	0.007	0.1	1,200	50,000	0.005	0.07	1,000	50,000

长颈
Long Neck无涂层
Non-Coating圆鼻
Corner
RadiusCorner
Radius

H ~52高硬度钢
HRC Hardened Steel

H ~60高硬度钢
HRC Hardened Steel

H ~65高硬度钢
HRC Hardened Steel

H ~70高硬度钢
HRC Hardened Steel

CBN
核心系列
CBN
Core Line

SHPR400

切削参数参考表

Recommended Milling Conditions

加工材料 Work Material				高硬度钢 Hardened Steels STAVAX · SKD61 (~52HRC)				高硬度钢 Hardened Steels SKD11 · ELMAX (~62HRC)				高速钢 High Speed Steels SKH · HAP (~68HRC)			
外径 Dia.	角半径 Corner Radius	颈长 Under Neck Length	L(颈长)/ D(外径)	切深量 Depth of Cut		进给速度 Feed	主轴转速 Spindle Speed	切深量 Depth of Cut		进给速度 Feed	主轴转速 Spindle Speed	切深量 Depth of Cut		进给速度 Feed	主轴转速 Spindle Speed
				ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹
0.5	R0.1	0.5	1	0.02	0.15	1,600	50,000	0.02	0.15	1,500	50,000	0.01	0.1	1,400	50,000
		1	2	0.02	0.15	1,600	50,000	0.02	0.15	1,500	50,000	0.01	0.1	1,400	50,000
		1.5	3	0.02	0.15	1,600	50,000	0.02	0.15	1,500	50,000	0.01	0.1	1,400	50,000
		2	4	0.01	0.12	1,600	50,000	0.01	0.12	1,500	50,000	0.008	0.08	1,400	50,000
		2.5	5	0.008	0.1	1,600	50,000	0.008	0.1	1,500	50,000	0.005	0.07	1,400	50,000
0.6	R0.02	0.5	0.8	0.005	0.18	1,200	50,000	0.005	0.18	1,200	50,000	0.003	0.15	1,000	50,000
		1	1.7	0.005	0.18	1,200	50,000	0.005	0.18	1,200	50,000	0.003	0.15	1,000	50,000
		1.5	2.5	0.005	0.18	1,200	50,000	0.005	0.18	1,200	50,000	0.003	0.15	1,000	50,000
		2	3.3	0.005	0.18	1,200	50,000	0.005	0.18	1,200	50,000	0.003	0.15	1,000	50,000
		2.5	4.2	0.005	0.15	1,200	50,000	0.005	0.15	1,200	50,000	0.003	0.12	1,000	50,000
	R0.05	0.5	0.8	0.01	0.18	1,400	50,000	0.01	0.18	1,400	50,000	0.007	0.15	1,200	50,000
		1	1.7	0.01	0.18	1,400	50,000	0.01	0.18	1,400	50,000	0.007	0.15	1,200	50,000
		1.5	2.5	0.01	0.18	1,400	50,000	0.01	0.18	1,400	50,000	0.007	0.15	1,200	50,000
		2	3.3	0.01	0.18	1,400	50,000	0.01	0.18	1,400	50,000	0.007	0.15	1,200	50,000
		2.5	4.2	0.01	0.15	1,400	50,000	0.01	0.15	1,400	50,000	0.007	0.12	1,200	50,000
R0.1	0.5	0.8	0.02	0.2	1,800	50,000	0.02	0.18	1,600	50,000	0.01	0.15	1,400	50,000	
	1	1.7	0.02	0.2	1,800	50,000	0.02	0.18	1,600	50,000	0.01	0.15	1,400	50,000	
	1.5	2.5	0.02	0.2	1,800	50,000	0.02	0.18	1,600	50,000	0.01	0.15	1,400	50,000	
	2	3.3	0.02	0.2	1,800	50,000	0.02	0.18	1,600	50,000	0.01	0.15	1,400	50,000	
	2.5	4.2	0.02	0.18	1,800	50,000	0.02	0.15	1,600	50,000	0.01	0.12	1,400	50,000	
0.8	R0.02	1.5	1.9	0.005	0.2	1,400	45,000	0.005	0.2	1,400	45,000	0.003	0.1	1,000	40,000
		2.5	3.1	0.005	0.2	1,400	45,000	0.005	0.2	1,400	45,000	0.003	0.1	1,000	40,000
		5	6.3	0.005	0.1	1,400	45,000	0.005	0.1	1,400	45,000	0.003	0.05	1,000	40,000
	R0.05	1.5	1.9	0.01	0.25	1,800	45,000	0.01	0.2	1,600	45,000	0.007	0.1	1,200	40,000
		2.5	3.1	0.01	0.25	1,800	45,000	0.01	0.2	1,600	45,000	0.007	0.1	1,200	40,000
		5	6.3	0.01	0.2	1,800	45,000	0.01	0.15	1,600	45,000	0.005	0.1	1,200	40,000
	R0.1	1.5	1.9	0.02	0.3	2,200	45,000	0.02	0.2	1,800	45,000	0.01	0.1	1,400	40,000
		2.5	3.1	0.02	0.3	2,200	45,000	0.02	0.2	1,800	45,000	0.01	0.1	1,400	40,000
		5	6.3	0.01	0.2	2,200	45,000	0.01	0.15	1,800	45,000	0.005	0.1	1,400	40,000
	1	R0.02	1	1	0.005	0.4	1,400	40,000	0.005	0.3	1,400	40,000	0.005	0.2	1,200
2			2	0.005	0.4	1,400	40,000	0.005	0.3	1,400	40,000	0.005	0.2	1,200	36,000
3			3	0.005	0.3	1,400	40,000	0.005	0.2	1,400	40,000	0.005	0.1	1,200	36,000
R0.05		1	1	0.015	0.4	2,000	40,000	0.01	0.3	1,600	40,000	0.01	0.2	1,200	36,000
		2	2	0.015	0.4	2,000	40,000	0.01	0.3	1,600	40,000	0.01	0.2	1,200	36,000
		3	3	0.015	0.3	2,000	40,000	0.01	0.2	1,600	40,000	0.01	0.1	1,200	36,000
R0.1		1	1	0.02	0.4	2,200	40,000	0.02	0.3	2,000	40,000	0.01	0.2	1,500	36,000
		2	2	0.02	0.4	2,200	40,000	0.02	0.3	2,000	40,000	0.01	0.2	1,500	36,000
		3	3	0.02	0.3	2,200	40,000	0.02	0.2	2,000	40,000	0.01	0.1	1,500	36,000
		5	5	0.015	0.3	2,200	40,000	0.015	0.2	2,000	40,000	0.007	0.1	1,500	36,000
R0.2	1	1	0.03	0.4	2,500	40,000	0.03	0.3	2,000	40,000	0.01	0.2	1,500	36,000	
	2	2	0.03	0.4	2,500	40,000	0.03	0.3	2,000	40,000	0.01	0.2	1,500	36,000	
	3	3	0.02	0.3	2,500	40,000	0.02	0.2	2,000	40,000	0.01	0.1	1,500	36,000	
1.5	R0.02	2	1.3	0.005	0.6	2,200	36,000	0.005	0.5	1,800	30,000	0.005	0.3	1,300	24,000
		3	2	0.005	0.6	2,200	36,000	0.005	0.5	1,800	30,000	0.005	0.3	1,300	24,000
		4.5	3	0.005	0.6	2,200	36,000	0.005	0.5	1,800	30,000	0.005	0.3	1,200	24,000
		7.5	5	0.005	0.5	2,000	36,000	0.005	0.4	1,700	30,000	0.005	0.2	1,200	24,000
	R0.05	2	1.3	0.02	0.6	2,500	36,000	0.02	0.5	2,000	30,000	0.01	0.3	1,500	24,000
		3	2	0.02	0.6	2,500	36,000	0.02	0.5	2,000	30,000	0.01	0.3	1,500	24,000
		4.5	3	0.02	0.6	2,500	36,000	0.02	0.5	2,000	30,000	0.01	0.3	1,500	24,000
		7.5	5	0.02	0.6	2,500	36,000	0.02	0.5	2,000	30,000	0.01	0.3	1,500	24,000
		2	1.3	0.02	0.5	2,400	36,000	0.01	0.4	2,000	30,000	0.01	0.2	1,400	24,000
		5	5	0.02	0.5	2,400	36,000	0.01	0.4	2,000	30,000	0.01	0.2	1,400	24,000



- 高硬度钢~52
Hardened Steel HRC H
- 高硬度钢~60
Hardened Steel HRC H
- 高硬度钢~65
Hardened Steel HRC H
- 高硬度钢~70
Hardened Steel HRC H

CBN
核心系列
CBN
Core Line

加工材料 Work Material				高硬度钢 Hardened Steels STAVAX · SKD61 (~52HRC)				高硬度钢 Hardened Steels SKD11 · ELMAX (~62HRC)				高速钢 High Speed Steels SKH · HAP (~68HRC)				
外径 Dia.	角半径 Corner Radius	颈长 Under Neck Length	L(颈长)/ D(外径)	切深量 Depth of Cut		进给速度 Feed	主轴转速 Spindle Speed	切深量 Depth of Cut		进给速度 Feed	主轴转速 Spindle Speed	切深量 Depth of Cut		进给速度 Feed	主轴转速 Spindle Speed	
				ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	
1.5	R0.1	2	1.3	0.04	0.6	4,000	36,000	0.03	0.5	3,200	30,000	0.015	0.3	2,000	24,000	
		3	2	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.015	0.3	1,800	24,000	
		4.5	3	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.01	0.3	1,800	24,000	
		7.5	5	0.03	0.5	3,000	36,000	0.02	0.4	2,500	30,000	0.01	0.2	1,600	24,000	
	R0.2	2	1.3	0.04	0.6	4,000	36,000	0.03	0.5	3,200	30,000	0.015	0.3	2,000	24,000	
		3	2	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.015	0.3	1,800	24,000	
		4.5	3	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.01	0.3	1,800	24,000	
		7.5	5	0.03	0.5	3,000	36,000	0.02	0.4	2,500	30,000	0.01	0.2	1,600	24,000	
2	R0.02	3	1.5	0.005	0.8	2,500	30,000	0.005	0.7	2,000	24,000	0.005	0.4	1,200	16,000	
		4	2	0.005	0.8	2,300	30,000	0.005	0.7	1,800	24,000	0.005	0.4	1,100	16,000	
		6	3	0.005	0.8	2,300	30,000	0.005	0.7	1,800	24,000	0.005	0.4	1,100	16,000	
		10	5	0.005	0.6	2,200	30,000	0.005	0.5	1,700	24,000	0.005	0.3	1,000	16,000	
	R0.05	3	1.5	0.025	0.8	2,700	30,000	0.02	0.7	2,200	24,000	0.015	0.4	1,300	16,000	
		4	2	0.025	0.8	2,700	30,000	0.02	0.7	2,200	24,000	0.015	0.3	1,300	16,000	
		6	3	0.025	0.8	2,700	30,000	0.02	0.7	2,200	24,000	0.015	0.3	1,300	16,000	
		10	5	0.02	0.6	2,500	30,000	0.015	0.5	2,000	24,000	0.01	0.3	1,200	16,000	
	R0.1	3	1.5	0.05	0.8	4,000	30,000	0.04	0.7	3,200	24,000	0.02	0.4	1,500	16,000	
		4	2	0.05	0.8	3,500	30,000	0.04	0.7	2,800	24,000	0.02	0.3	1,500	16,000	
		6	3	0.04	0.8	3,500	30,000	0.03	0.7	2,800	24,000	0.02	0.3	1,500	16,000	
		10	5	0.03	0.6	3,000	30,000	0.02	0.5	2,400	24,000	0.01	0.3	1,300	16,000	
	R0.2	3	1.5	0.05	0.8	4,000	30,000	0.04	0.7	3,200	24,000	0.02	0.4	1,500	16,000	
		4	2	0.05	0.8	3,500	30,000	0.04	0.7	2,800	24,000	0.02	0.3	1,500	16,000	
		6	3	0.04	0.8	3,500	30,000	0.03	0.7	2,800	24,000	0.02	0.3	1,500	16,000	
		10	5	0.03	0.6	3,000	30,000	0.02	0.5	2,400	24,000	0.01	0.3	1,300	16,000	
	3	R0.05	6	2	0.03	1	2,700	24,000	0.02	0.85	2,200	20,000	0.015	0.6	1,300	12,000
			9	3	0.03	1	2,700	24,000	0.02	0.85	2,200	20,000	0.015	0.6	1,300	12,000
			12	4	0.03	0.85	2,700	24,000	0.02	0.7	2,200	20,000	0.015	0.5	1,300	12,000
			15	5	0.02	0.85	2,500	24,000	0.02	0.7	2,000	20,000	0.01	0.5	1,200	12,000
R0.1		6	2	0.05	1	4,000	24,000	0.04	0.85	3,200	20,000	0.02	0.6	1,500	12,000	
		9	3	0.05	1	3,500	24,000	0.04	0.85	2,800	20,000	0.02	0.6	1,500	12,000	
		12	4	0.04	0.85	3,500	24,000	0.04	0.7	2,800	20,000	0.02	0.5	1,500	12,000	
		15	5	0.03	0.85	3,000	24,000	0.03	0.7	2,400	20,000	0.015	0.5	1,300	12,000	
R0.2		6	2	0.05	1	4,000	24,000	0.04	0.85	3,200	20,000	0.02	0.6	1,500	12,000	
		9	3	0.05	1	3,500	24,000	0.04	0.85	2,800	20,000	0.02	0.6	1,500	12,000	
		12	4	0.04	0.85	3,500	24,000	0.04	0.7	2,800	20,000	0.02	0.5	1,500	12,000	
		15	5	0.03	0.85	3,000	24,000	0.03	0.7	2,400	20,000	0.015	0.5	1,300	12,000	

备注
Notes

- ※1 切深量为中精加工、精加工时的参考值。请根据机床刚性、要求精度和加工形状进行适当调整。
- ※2 切深量的ap表示轴向切深量，ae表示径向切深量。
- ※3 为了获得优质的加工面，预加工（中精加工）时请注意精加工余量需保持均匀。
- ※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 轴向进刀建议采用螺旋进刀及倾斜进刀方式。
- ※6 发生振刀时，请以相同的比率降低主轴转速和进给速度。主轴转速过低时，也以相同的比率降低。
- ※7 建议使用油雾冷却方式。
- ※1 Depth of Cut shows maximum value for semi-finishing and finishing. Adjust milling conditions depending on rigidity of machine, desired accuracy and milling shape.
- ※2 Depth of Cut: ap = Axial Depth of Cut / ae = Radial Depth of Cut.
- ※3 To achieve better cutting surface, obtain uniform stock amount on cutting surface in semi-finishing.
- ※4 When machining at high load area, such as corners, please pay attention to set cutting condition and tool paths.
- ※5 Recommend to apply helical or ramping for approaching into axial direction.
- ※6 Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.
- ※7 We recommend using oil mist coolant.

长颈
Long Neck



无涂层
Non-Coating

圆鼻
Corner
Radius

Corner
Radius

H ~52高硬度钢
HRC Hardened Steel

H ~60高硬度钢
HRC Hardened Steel

H ~65高硬度钢
HRC Hardened Steel

H ~70高硬度钢
HRC Hardened Steel

CBN
核心系列
CBN
Core Line