

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		高硬度钢・高速钢 Hardened Steels・High Speed Tool Steels (~70HRC)					硬质合金 Cemented Carbide (~92.5HRA)				
(R)球头半径 Radius	颈长 Under Neck Length	余量 Stock	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	余量 Stock	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed
		mm	ap mm	ae mm	min ⁻¹	mm/min	mm	ap mm	ae mm	min ⁻¹	mm/min
0.05	0.15	0.001	0.001	0.001	40,000	50	0.001	0.001	0.001	40,000	50
	0.25	0.001	0.001	0.001	40,000	25	0.001	0.001	0.001	40,000	25
0.075	0.23	0.001	0.001	0.001	40,000	100	0.001	0.001	0.001	40,000	100
	0.38	0.001	0.001	0.001	40,000	50	0.001	0.001	0.001	40,000	50
0.1	0.5	0.001	0.001	0.001	40,000	100	0.001	0.001	0.001	40,000	100
0.15	0.75	0.001	0.001	0.001	40,000	150	0.001	0.001	0.001	40,000	120
0.2	1	0.002	0.002	0.002	40,000	200	0.002	0.002	0.002	40,000	150
0.25	1.25	0.002	0.002	0.002	40,000	300	0.002	0.002	0.002	40,000	170
0.3	1.5	0.003	0.003	0.003	40,000	400	0.002	0.002	0.002	40,000	200
0.5	2.5	0.005	0.005	0.005	40,000	500	0.003	0.003	0.003	40,000	300
0.75	3.8	0.005	0.005	0.005	40,000	600	0.004	0.004	0.004	40,000	400
1	5	0.005	0.005	0.005	40,000	800	0.005	0.005	0.005	40,000	500
1.5	7.5	0.005	0.006	0.006	30,000	800	0.005	0.005	0.005	30,000	500
2	10	0.005	0.007	0.007	22,000	800	0.005	0.006	0.006	20,000	500
3	15	0.005	0.009	0.009	16,000	800	0.005	0.007	0.007	12,000	500
备注 Notes		※1 切深量的ap表示轴向切深量，ae表示径向切深量。 ※2 切深量为最大值。请根据机床刚性、主轴刚性或要求精度进行调整。 ※3 预加工（中精加工）时请注意精加工余量相对于加工面需保持均匀。 ※4 请注意所注入的冷却液必须到达加工点，避免导致加工时的润滑性、排屑性降低。 ※5 R角、沟槽等负载大的加工部位，请特别注意参数设定和刀路轨迹等。 ※6 建议使用油冷冷却方式。 ※7 使用油冷冷却方式时，加工时产生的火花及破损有引发火灾甚至火灾的危险。请务必采取防火措施。 ※1 ap: Axial Depth of Cut, ae: Radial Depth of Cut. ※2 Described Depth of Cut is max value. Adjust it depending on machine rigidity, main spindle rigidity, and required precision. ※3 Obtain uniform stock amount on the cutting surface in the pre-stage cutting (semi-finishing). ※4 In order to perform lubricity and chip flow well, coolant must be always reached cutting points. ※5 Careful set up for milling condition and tool path are required especially when operate with high cutting load such as corner area and slotting. ※6 Water-insoluble fluid is recommended. ※7 Using water-insoluble fluid could lead to fires due to sparks generated during machining or heat caused by breakage. Ensure that you take proper fire-prevention measures.									

长颈
Long Neck

球头
Ball



无涂层
Non-Coating

Ball

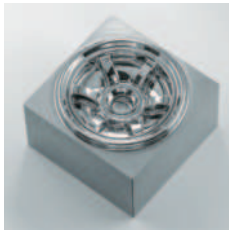
加工案例1 Machining Case 1

轮形模型 Wheel model

- 加工材料：ELMAX 60HRC
- 冷却方式：油冷
- 总加工时间：50 小时 13 分钟

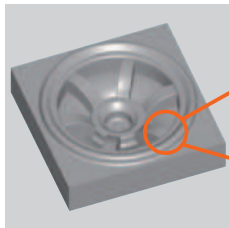
Work material: ELMAX 60HRC
Coolant: Water-insoluble fluid
Total machining time: 50hr 13min

工件尺寸：50×50mm
Work size: 50×50mm



加工工序 Process	粗加工① Roughing①	粗加工② Roughing②	中精加工 Semi-finishing	精加工 Finishing
使用刀具 Tool	MRBH230 R1×6	MRBH230 R1×6	SSPB220 R1×5	PCDRB R1×5
主轴转速 [min ⁻¹] Spindle speed	25,000	25,000	40,000	40,000
进给速度 [mm/min] Feed	2,000	1,000	800	500
切深量[mm] Depth of cut	ap 0.15 ae 0.3	ap 0.02 ae 0.05	ap 0.01 ae 0.01	ap 0.003 ae 0.003
余量[mm] Stock	0.033	0.013	0.003	0
加工时间 Machining time	2小时17分钟 2hr 17min	1小时45分钟 1hr 45min	7小时12分钟 7hr 12min	38小时58分钟 38hr 58min

表面粗糙度 Surface roughness



- 圆角上部 (0° 附近)
Upper fillet
- 圆角下部 (90° 附近)
Lower fillet
- 平坦部 1
Flat part 1
- 平坦部 2
Flat part 2

	Rz[μm]
①	0.209
②	0.212
③	0.159
④	0.330

- 持续进行精加工约39小时，可获得镜面般光泽的精加工面，表面粗糙度（Rz）达到次微米级别。
- 进行精加工之前，使用CBN刀具进行中精加工。预加工中加工余量的均匀性会很大程度影响到精加工的结果。
- PCDRB can realize mirror like finishing on full surface machining and achieve the sub-micro level surface roughness, even for approx. 39hrs finishing process.
- Before finishing, use CBN to process semi-finishing. Leaving constant stock amount on semi-finished surface will have great affects in the finishing process.

- 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

0 硬脆材
Hard Brittle
Material

PCD
核心系列
PCD
Core Line