

CUTTING CONDITIONS

Milling | Endmills | Cutting conditions

AE-BM-H

Roughing

The machining path is on condition of contouring line operation.

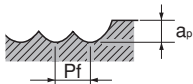
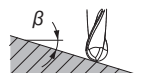
ToolSteel • Hardened Steel • Prehardened Steel			Hardened Steel																									
SKD11 • SKD61 • NAK80																												
R	~45HRC		~55HRC		~62HRC		~66HRC		~70HRC																			
	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)																		
R1	20.700	3.310	18.300	1.830	15.900	1.590	14.300	1.140	9.600	770																		
R1,5	13.800	2.760	12.200	1.710	10.600	1.480	9.600	1.150	6.400	770																		
R2	10.400	2.500	9.200	1.660	8.000	1.440	7.200	1.150	4.800	770																		
R2,5	8.300	2.660	7.300	1.900	6.400	1.660	5.700	1.370	3.800	910																		
R3	6.900	2.760	6.100	1.950	5.300	1.700	4.800	1.340	3.200	900																		
R4	5.200	2.500	4.600	1.840	4.000	1.600	3.600	1.300	2.400	860																		
R5	4.500	2.340	4.000	1.760	3.500	1.540	3.200	1.280	2.200	850																		
R6	4.000	2.240	3.600	1.730	3.200	1.540	2.900	1.160	2.100	840																		
Depth of cut	<table><tr><td>ap</td><td>Pf</td></tr><tr><td>RE<R3</td><td>0,1D 0,2D</td></tr><tr><td>R3≤RE</td><td>0,15D 0,2D</td></tr></table>		ap	Pf	RE<R3	0,1D 0,2D	R3≤RE	0,15D 0,2D			<table><tr><td>ap</td><td>Pf</td></tr><tr><td>RE<R3</td><td>0,07D 0,15D</td></tr><tr><td>R3≤RE</td><td>0,12D 0,15D</td></tr></table>		ap	Pf	RE<R3	0,07D 0,15D	R3≤RE	0,12D 0,15D			<table><tr><td>ap</td><td>Pf</td></tr><tr><td>0,05D</td><td>0,15D</td></tr></table>				ap	Pf	0,05D	0,15D
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<ol style="list-style-type: none">1. Use a rigid and precise machine and holder.2. We suggest using air blow or MQL (mist).3. 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.4. 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.5. When the radius of curvature is less than 1.5 times the tool diameter, please reduce the speed to 50-80%, the feed rate to 50-80%, and the pick feed to 20-60% of the above shown cutting conditions.6. When the machining incline angle (β) is more than 15°, please reduce the speed to 40-60%, the feed 30-50%, and the axial cutting depth to 30-60% of the above shown cutting conditions.7. If the cutting depth is small, it is possible to further increase the speed and feed.																												

Milling | Endmills | Cutting conditions

AE-BM-H

High Speed Roughing

The machining path is on condition of contouring line operation.

Tool Steel • Hardened Steel • Prehardened Steel			Hardened Steel																			
SKD11 • SKD61 • NAK80																						
R	~45HRC		~55HRC		~62HRC		~66HRC		~70HRC													
	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)												
R1	37.300	5.970	33.000	3.300	28.700	2.870	25.800	2.060	17.200	1.380												
R1,5	24.800	4.960	22.000	3.080	19.100	2.670	17.200	2.060	11.500	1.380												
R2	20.700	4.970	18.300	3.290	15.900	2.860	14.300	2.290	9.600	1.540												
R2,5	16.600	5.310	14.600	3.800	12.700	3.300	11.500	2.760	7.600	1.820												
R3	13.800	5.520	12.200	3.900	10.600	3.390	9.600	2.690	6.400	1.790												
R4	10.400	4.990	9.200	3.680	8.000	3.200	7.200	2.590	4.800	1.730												
R5	8.900	4.630	8.000	3.520	7.000	3.080	6.400	2.560	4.500	1.800												
R6	8.000	4.480	7.200	3.460	6.400	3.070	5.800	2.320	4.200	1.680												
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1. Use a rigid and precise machine and holder.
2. We suggest using air blow or MQL (mist).
3. 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.
4. 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.
5. When the radius of curvature is less than 1.5 times the tool diameter, please reduce the speed to 50-80%, the feed rate to 50-80%, and the pick feed to 20-60% of the above shown cutting conditions.
6. When the machining incline angle (β) is more than 15°; please reduce the speed to 40-60%, the feed 30-50%, and the axial cutting depth to 30-60% of the above shown cutting conditions.
7. If the cutting depth is small, it is possible to further increase the speed and feed.

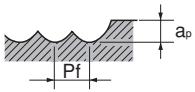
AE-BM-H

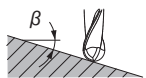
High Speed Finishing

The machining path is on condition of contouring line operation.

R	Tool Steel • Hardened Steel • Prehardened Steel SKD11 • SKD61 • NAK80		Hardened Steel							
	~45HRC		~55HRC		~62HRC		~66HRC		~70HRC	
	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)	S (min ⁻¹)	F (mm/min)
R1	40.610	6.500	37.020	3.700	33.440	2.680	27.470	2.200	20.300	1.620
R1,5	27.070	5.410	24.680	3.460	22.290	2.670	18.310	2.200	13.540	1.620
R2	24.360	5.850	22.210	4.000	20.060	3.210	16.480	2.640	12.180	1.950
R2,5	19.490	6.240	17.770	4.620	16.050	3.850	13.180	3.160	9.750	2.340
R3	16.240	6.500	14.810	4.740	13.380	3.750	10.990	3.080	8.120	2.270
R4	12.180	5.850	11.110	4.440	10.030	3.210	8.240	2.640	6.090	1.950
R5	10.320	5.370	9.460	4.160	8.600	3.100	7.170	2.580	5.450	1.960
R6	9.080	5.080	8.360	4.010	7.640	3.060	6.210	2.480	5.020	2.010

Depth of cut





ap	Pf
0,02D	0,05D

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2. We suggest using air blow or MQL (mist).
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6. When the machining incline angle (β) is more than 15° please reduce the speed to 40-60%, the feed 30-50%, and the axial cutting depth to 30-60% of the above shown cutting conditions.
7. If the cutting depth is small, it is possible to further increase the speed and feed.