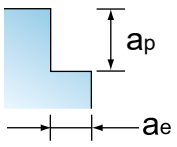
CUTTING CONDITION - ISE/IPE/ISLE/ISB/ILET SERIES

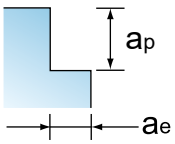
All listed cutting parameters are suggested starting values and can be adjusted accordingly depending on actual machining setups and rigidity.

Side Milling	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536					ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100					TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2				
Hardness BRINELL	≦ 175					≦ 275					> 375 ≦ 475				
HRC	≦ 6.4					≦ 28					> 39.8 ≦ 49.1				
Vc (SFM)	437 (350-525)					318 (255-382)					166 (133-199)				
ae/ap	ae(2)=0.05D ap(2)=1.5D		ae(3)=0.25D ap(3)=1.5D		ae(4)=0.25D ap(4)=1.5D	ae(2)=0.05D ap(2)=1.5D		ae(3)=0.25D ap(3)=1.5D		ae(4)=0.25D ap(4)=1.5D	ae(2)=0.05D ap(2)=1.5D		ae(3)=0.25D ap(3)=1.5D		ae(4)=0.25D ap(4)=1.5D
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes
1/64	106,838	0.00003	6.4	9.6	12.8	77,806	0.00002	3.11	4.67	6.22	40598	0.00002	1.6	2.4	3.2
1/32	53,419	0.00006	6.4	9.6	12.8	38,903	0.00005	3.89	5.84	7.78	20299	0.00005	2.0	3.0	4.1
3/64	35,613	0.00010	7.1	10.7	14.2	25,935	0.00007	3.63	5.45	7.26	13533	0.00007	1.9	2.8	3.8
1/16	26,709	0.00013	6.9	10.4	13.9	19,451	0.00009	3.50	5.25	7.00	10150	0.00009	1.8	2.7	3.7
5/64	21,368	0.00018	7.7	11.5	15.4	15,561	0.00012	3.66	5.49	7.31	8120	0.00012	1.9	2.9	3.8
3/32	17,806	0.00023	8.2	12.3	16.4	12,968	0.00015	3.76	5.64	7.52	6766	0.00015	2.0	2.9	3.9
7/64	15,263	0.00027	8.2	12.4	16.5	11,115	0.00017	3.83	5.75	7.67	5800	0.00017	2.0	3.0	4.0
1/8	13,355	0.00030	8.0	12.0	16.0	9,726	0.00020	3.89	5.84	7.78	5075	0.00020	2.0	3.0	4.1
9/64	11,871	0.00036	8.6	12.9	17.2	8,645	0.00025	4.32	6.48	8.65	4511	0.00025	2.3	3.4	4.5
5/32	10,684	0.00043	9.1	13.6	18.2	7,781	0.00030	4.67	7.00	9.34	4060	0.00030	2.4	3.7	4.9
11/64	9,713	0.00049	9.5	14.2	18.9	7,073	0.00035	4.95	7.43	9.90	3691	0.00035	2.6	3.9	5.2
3/16	8,903	0.00055	9.8	14.7	19.6	6,484	0.00040	5.19	7.78	10.37	3383	0.00040	2.7	4.1	5.4
13/64	8,218	0.00061	10.1	15.1	20.1	5,985	0.00045	5.39	8.08	10.77	3123	0.00045	2.8	4.2	5.6
7/32	7,631	0.00068	10.3	15.5	20.6	5,558	0.00050	5.56	8.34	11.12	2900	0.00050	2.9	4.3	5.8
15/64	7,123	0.00074	10.5	15.8	21.0	5,187	0.00055	5.71	8.56	11.41	2707	0.00055	3.0	4.5	6.0
1/4	6,677	0.00080	10.7	16.0	21.4	4,863	0.00060	5.84	8.75	11.67	2537	0.00060	3.0	4.6	6.1
17/64	6,285	0.00089	11.2	16.7	22.3	4,577	0.00066	6.06	9.10	12.13	2388	0.00066	3.2	4.7	6.3
9/32	5,935	0.00098	11.6	17.4	23.1	4,323	0.00073	6.27	9.40	12.54	2255	0.00073	3.3	4.9	6.5
19/64	5,623	0.00106	11.9	17.9	23.9	4,095	0.00079	6.45	9.67	12.90	2137	0.00079	3.4	5.0	6.7
5/16	5,342	0.00115	12.3	18.4	24.6	3,890	0.00085	6.61	9.92	13.23	2030	0.00085	3.5	5.2	6.9
21/64	5,088	0.00124	12.6	18.9	25.2	3,705	0.00091	6.76	10.14	13.52	1933	0.00091	3.5	5.3	7.1
11/32	4,856	0.00133	12.9	19.3	25.7	3,537	0.00098	6.90	10.34	13.79	1845	0.00098	3.6	5.4	7.2
23/64	4,645	0.00141	13.1	19.7	26.2	3,383	0.00104	7.02	10.53	14.04	1765	0.00104	3.7	5.5	7.3
3/8	4,452	0.00150	13.4	20.0	26.7	3,242	0.00110	7.13	10.70	14.26	1692	0.00110	3.7	5.6	7.4
25/64	4,274	0.00156	13.4	20.0	26.7	3,112	0.00115	7.16	10.74	14.32	1624	0.00115	3.7	5.6	7.5
13/32	4,109	0.00163	13.4	20.0	26.7	2,993	0.00120	7.18	10.77	14.36	1561	0.00120	3.7	5.6	7.5
27/64	3,957	0.00169	13.4	20.0	26.7	2,882	0.00125	7.20	10.81	14.41	1504	0.00125	3.8	5.6	7.5
7/16	3,816	0.00175	13.4	20.0	26.7	2,779	0.00130	7.22	10.84	14.45	1450	0.00130	3.8	5.7	7.5
29/64	3,684	0.00181	13.4	20.0	26.7	2,683	0.00135	7.24	10.87	14.49	1400	0.00135	3.8	5.7	7.6
15/32	3,561	0.00188	13.4	20.0	26.7	2,594	0.00140	7.26	10.89	14.52	1353	0.00140	3.8	5.7	7.6
31/64	3,446	0.00194	13.4	20.0	26.7	2,510	0.00145	7.28	10.92	14.56	1310	0.00145	3.8	5.7	7.6
1/2	3,339	0.00200	13.4	20.0	26.7	2,431	0.00150	7.29	10.94	14.59	1269	0.00150	3.8	5.7	7.6
9/16	2,968	0.00210	12.5	18.7	24.9	2,161	0.00158	6.81	10.21	13.62	1128	0.00158	3.6	5.3	7.1
5/8	2,671	0.00220	11.8	17.6	23.5	1,945	0.00165	6.42	9.63	12.84	1015	0.00165	3.3	5.0	6.7
11/16	2,428	0.00230	11.2	16.8	22.3	1,768	0.00173	6.10	9.15	12.20	923	0.00173	3.2	4.8	6.4
3/4	2,226	0.00240	10.7	16.0	21.4	1,621	0.00180	5.84	8.75	11.67	846	0.00180	3.0	4.6	6.1
7/8	1,908	0.00260	9.9	14.9	19.8	1,389	0.00195	5.42	8.13	10.84	725	0.00195	2.8	4.2	5.7
1	1,669	0.00280	9.3	14.0	18.7	1,216	0.00210	5.11	7.66	10.21	634	0.00210	2.7	4.0	5.3
Depth of cut															

rpm=sfm×3.82/D1
ipm=(inch/flute)×4×rpm

CUTTING CONDITION - ISE/IPE/ISLE/ISB/ILET SERIES

All listed cutting parameters are suggested starting values and can be adjusted accordingly depending on actual machining setups and rigidity.

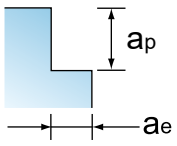
Side Milling	CAST IRONS Gray, Malleable, Ductile					STAINLESS STEELS (Free Machining) 303, 416, 420F, 430F 440F					STAINLESS STEELS (Difficult) 304, 304L,316, 316L				
Hardness BRINELL	≦ 220					≦ 275					≦ 275				
HRC	≦ 18.8					≦ 28					≦ 28				
Vc (SFM)	335 (255-382)					318 (281-422)					242 (194-290)				
ae/ap	ae(2)=0.05D ap(2)=1.5D		ae(3)=0.25D ap(3)=1.5D		ae(4)=0.25D ap(4)=1.5D	ae(2)=0.05D ap(2)=1.5D		ae(3)=0.25D ap(3)=1.5D		ae(4)=0.25D ap(4)=1.5D	ae(2)=0.05D ap(2)=1.5D		ae(3)=0.25D ap(3)=1.5D		ae(4)=0.25D ap(4)=1.5D
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes
1/64	77,806	0.00003	4.7	7.0	9.3	85,935	0.00002	3.4	5.2	6.9	59,225	0.00002	2.4	3.6	4.7
1/32	38,903	0.00006	4.7	7.0	9.3	42,967	0.00005	4.3	6.4	8.6	29,613	0.00004	2.4	3.6	4.7
3/64	25,935	0.00010	5.2	7.8	10.4	28,645	0.00007	4.0	6.0	8.0	19,742	0.00006	2.4	3.6	4.7
1/16	19,451	0.00013	5.1	7.6	10.1	21,484	0.00009	3.9	5.8	7.7	14,806	0.00008	2.4	3.6	4.7
5/64	15,561	0.00018	5.6	8.4	11.2	17,187	0.00012	4.0	6.1	8.1	11,845	0.00011	2.6	3.9	5.2
3/32	12,968	0.00023	6.0	8.9	11.9	14,322	0.00015	4.2	6.2	8.3	9,871	0.00014	2.8	4.1	5.5
7/64	11,115	0.00027	6.0	9.0	12.0	12,276	0.00017	4.2	6.4	8.5	8,461	0.00017	2.9	4.3	5.8
1/8	9,726	0.00030	5.8	8.8	11.7	10,742	0.00020	4.3	6.4	8.6	7,403	0.00020	3.0	4.4	5.9
9/64	8,645	0.00036	6.3	9.4	12.5	9,548	0.00025	4.8	7.2	9.5	6,581	0.00024	3.1	4.7	6.3
5/32	7,781	0.00043	6.6	9.9	13.2	8,593	0.00030	5.2	7.7	10.3	5,923	0.00028	3.3	4.9	6.5
11/64	7,073	0.00049	6.9	10.3	13.8	7,812	0.00035	5.5	8.2	10.9	5,384	0.00031	3.4	5.0	6.7
3/16	6,484	0.00055	7.1	10.7	14.3	7,161	0.00040	5.7	8.6	11.5	4,935	0.00035	3.5	5.2	6.9
13/64	5,985	0.00061	7.3	11.0	14.7	6,610	0.00045	5.9	8.9	11.9	4,556	0.00039	3.5	5.3	7.1
7/32	5,558	0.00068	7.5	11.3	15.0	6,138	0.00050	6.1	9.2	12.3	4,230	0.00043	3.6	5.4	7.2
15/64	5,187	0.00074	7.7	11.5	15.3	5,729	0.00055	6.3	9.5	12.6	3,948	0.00046	3.7	5.5	7.3
1/4	4,863	0.00080	7.8	11.7	15.6	5,371	0.00060	6.4	9.7	12.9	3,702	0.00050	3.7	5.6	7.4
17/64	4,577	0.00089	8.1	12.2	16.2	5,055	0.00066	6.7	10.0	13.4	3,484	0.00055	3.8	5.7	7.7
9/32	4,323	0.00098	8.4	12.6	16.9	4,774	0.00073	6.9	10.4	13.8	3,290	0.00060	3.9	5.9	7.9
19/64	4,095	0.00106	8.7	13.1	17.4	4,523	0.00079	7.1	10.7	14.2	3,117	0.00065	4.1	6.1	8.1
5/16	3,890	0.00115	8.9	13.4	17.9	4,297	0.00085	7.3	11.0	14.6	2,961	0.00070	4.1	6.2	8.3
21/64	3,705	0.00124	9.2	13.8	18.3	4,092	0.00091	7.5	11.2	14.9	2,820	0.00075	4.2	6.3	8.5
11/32	3,537	0.00133	9.4	14.1	18.7	3,906	0.00098	7.6	11.4	15.2	2,692	0.00080	4.3	6.5	8.6
23/64	3,383	0.00141	9.6	14.3	19.1	3,736	0.00104	7.8	11.6	15.5	2,575	0.00085	4.4	6.6	8.8
3/8	3,242	0.00150	9.7	14.6	19.5	3,581	0.00110	7.9	11.8	15.8	2,468	0.00090	4.4	6.7	8.9
25/64	3,112	0.00156	9.7	14.6	19.5	3,437	0.00115	7.9	11.9	15.8	2,369	0.00094	4.4	6.7	8.9
13/32	2,993	0.00163	9.7	14.6	19.5	3,305	0.00120	7.9	11.9	15.9	2,278	0.00098	4.4	6.7	8.9
27/64	2,882	0.00169	9.7	14.6	19.5	3,183	0.00125	8.0	11.9	15.9	2,194	0.00101	4.4	6.7	8.9
7/16	2,779	0.00175	9.7	14.6	19.5	3,069	0.00130	8.0	12.0	16.0	2,115	0.00105	4.4	6.7	8.9
29/64	2,683	0.00181	9.7	14.6	19.5	2,963	0.00135	8.0	12.0	16.0	2,042	0.00109	4.4	6.7	8.9
15/32	2,594	0.00188	9.7	14.6	19.5	2,864	0.00140	8.0	12.0	16.0	1,974	0.00125	4.9	7.4	9.9
31/64	2,510	0.00194	9.7	14.6	19.5	2,772	0.00145	8.0	12.1	16.1	1,910	0.00116	4.4	6.7	8.9
1/2	2,431	0.00200	9.7	14.6	19.5	2,685	0.00150	8.1	12.1	16.1	1,851	0.00120	4.4	6.7	8.9
9/16	2,161	0.00210	9.1	13.6	18.2	2,387	0.00158	7.5	11.3	15.0	1,645	0.00125	4.1	6.2	8.2
5/8	1,945	0.00220	8.6	12.8	17.1	2,148	0.00165	7.1	10.6	14.2	1,481	0.00130	3.8	5.8	7.7
11/16	1,768	0.00230	8.1	12.2	16.3	1,953	0.00173	6.7	10.1	13.5	1,346	0.00135	3.6	5.5	7.3
3/4	1,621	0.00240	7.8	11.7	15.6	1,790	0.00180	6.4	9.7	12.9	1,234	0.00140	3.5	5.2	6.9
7/8	1,389	0.00260	7.2	10.8	14.4	1,535	0.00195	6.0	9.0	12.0	1,058	0.00155	3.3	4.9	6.6
1	1,216	0.00280	6.8	10.2	13.6	1,343	0.00210	5.6	8.5	11.3	925	0.00170	3.1	4.7	6.3
Depth of cut															

rpm=sfm×3.82/D1
ipm=(inch/flute)×4×rpm

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CUTTING CONDITION - ISE/IPE/ISLE/ISB/ILET SERIES

All listed cutting parameters are suggested starting values and can be adjusted accordingly depending on actual machining setups and rigidity.

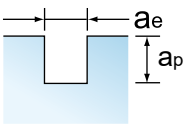
Side Milling	SUPER ALLOYS (NICKEL,COBALT,IRON,BASE) Inconel 601,617,625,718,Incoly 800,Monel 400,Rene,Waspalloy					TITANIUM ALLOYS Ti6Al4V,Ti6Al2Sn4Zr2Mo,Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al,Ti5Al53Mo3Cr,Ti7Al4Mo,Ti3Al8V 6Cr4Zr4Mo,Ti6Al6V6Sn,Ti52 Cr3Sn3Al					GRAPHITE				
Hardness BRINELL	≦ 300					≦ 350								
HRC	≦ 32					≦ 37.9								
Vc (SFM)	62 (49-74)					170 (137-205)					627 (502-752)			
ae/ap	ae(2)=0.05D ap(2)=1.5D	ae(3)=0.25D ap(3)=1.5D	ae(4)=0.25D ap(4)=1.5D			ae(2)=0.05D ap(2)=1.5D	ae(3)=0.25D ap(3)=1.5D	ae(4)=0.25D ap(4)=1.5D			ae(2)=0.05D ap(2)=1.5D	ae(3)=0.25D ap(3)=1.5D	ae(4)=0.25D ap(4)=1.5D	
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes
1/64	15,097	0.00002	0.6	0.9	1.2	41,806	0.00002	1.7	2.5	3.3	153,289	0.00006	18.4	27.6	36.8
1/32	7,548	0.00003	0.5	0.7	0.9	20,903	0.00004	1.7	2.5	3.3	76,644	0.00012	18.4	27.6	36.8
3/64	5,032	0.00005	0.5	0.7	0.9	13,935	0.00006	1.7	2.5	3.3	51,096	0.00020	20.4	30.7	40.9
1/16	3,774	0.00006	0.5	0.7	0.9	10,452	0.00008	1.7	2.5	3.3	38,322	0.00026	19.9	29.9	39.9
5/64	3,019	0.00010	0.6	0.9	1.1	8,361	0.00011	1.8	2.8	3.7	30,658	0.00036	22.1	33.1	44.1
3/32	2,516	0.00013	0.7	1.0	1.3	6,968	0.00014	2.0	2.9	3.9	25,548	0.00046	23.5	35.3	47.0
7/64	2,157	0.00017	0.7	1.1	1.4	5,972	0.00017	2.0	3.0	4.1	21,898	0.00054	23.7	35.5	47.3
1/8	1,887	0.00020	0.8	1.1	1.5	5,226	0.00020	2.1	3.1	4.2	19,161	0.00060	23.0	34.5	46.0
9/64	1,677	0.00023	0.8	1.1	1.5	4,645	0.00024	2.2	3.3	4.4	17,032	0.00073	24.7	37.0	49.4
5/32	1,510	0.00025	0.8	1.1	1.5	4,181	0.00028	2.3	3.4	4.6	15,329	0.00085	26.1	39.1	52.1
11/64	1,372	0.00028	0.8	1.1	1.5	3,801	0.00031	2.4	3.6	4.8	13,935	0.00098	27.2	40.8	54.3
3/16	1,258	0.00030	0.8	1.1	1.5	3,484	0.00035	2.4	3.7	4.9	12,774	0.00110	28.1	42.2	56.2
13/64	1,161	0.00033	0.8	1.1	1.5	3,216	0.00039	2.5	3.7	5.0	11,791	0.00123	28.9	43.3	57.8
7/32	1,078	0.00035	0.8	1.1	1.5	2,986	0.00043	2.5	3.8	5.1	10,949	0.00135	29.6	44.3	59.1
15/64	1,006	0.00038	0.8	1.1	1.5	2,787	0.00046	2.6	3.9	5.2	10,219	0.00148	30.1	45.2	60.3
1/4	944	0.00040	0.8	1.1	1.5	2,613	0.00050	2.6	3.9	5.2	9,581	0.00160	30.7	46.0	61.3
17/64	888	0.00045	0.8	1.2	1.6	2,459	0.00055	2.7	4.1	5.4	9,017	0.00178	32.0	48.0	64.0
9/32	839	0.00050	0.8	1.3	1.7	2,323	0.00060	2.8	4.2	5.6	8,516	0.00195	33.2	49.8	66.4
19/64	795	0.00055	0.9	1.3	1.7	2,200	0.00065	2.9	4.3	5.7	8,068	0.00213	34.3	51.4	68.6
5/16	755	0.00060	0.9	1.4	1.8	2,090	0.00070	2.9	4.4	5.9	7,664	0.00230	35.3	52.9	70.5
21/64	719	0.00065	0.9	1.4	1.9	1,991	0.00075	3.0	4.5	6.0	7,299	0.00248	36.1	54.2	72.3
11/32	686	0.00070	1.0	1.4	1.9	1,900	0.00080	3.0	4.6	6.1	6,968	0.00265	36.9	55.4	73.9
23/64	656	0.00075	1.0	1.5	2.0	1,818	0.00085	3.1	4.6	6.2	6,665	0.00283	37.7	56.5	75.3
3/8	629	0.00080	1.0	1.5	2.0	1,742	0.00090	3.1	4.7	6.3	6,387	0.00300	38.3	57.5	76.6
25/64	604	0.00083	1.0	1.5	2.0	1,672	0.00094	3.1	4.7	6.3	6,132	0.00313	38.3	57.5	76.6
13/32	581	0.00085	1.0	1.5	2.0	1,608	0.00098	3.1	4.7	6.3	5,896	0.00325	38.3	57.5	76.6
27/64	559	0.00088	1.0	1.5	2.0	1,548	0.00101	3.1	4.7	6.3	5,677	0.00338	38.3	57.5	76.6
7/16	539	0.00090	1.0	1.5	1.9	1,493	0.00105	3.1	4.7	6.3	5,475	0.00350	38.3	57.5	76.6
29/64	521	0.00093	1.0	1.4	1.9	1,442	0.00109	3.1	4.7	6.3	5,286	0.00363	38.3	57.5	76.6
15/32	503	0.00095	1.0	1.4	1.9	1,394	0.00125	3.5	5.2	7.0	5,110	0.00375	38.3	57.5	76.6
31/64	487	0.00098	0.9	1.4	1.9	1,349	0.00116	3.1	4.7	6.3	4,945	0.00388	38.3	57.5	76.6
1/2	472	0.00100	0.9	1.4	1.9	1,306	0.00120	3.1	4.7	6.3	4,790	0.00400	38.3	57.5	76.6
9/16	419	0.00105	0.9	1.3	1.8	1,161	0.00125	2.9	4.4	5.8	4,258	0.00420	35.8	53.7	71.5
5/8	377	0.00110	0.8	1.2	1.7	1,045	0.00130	2.7	4.1	5.4	3,832	0.00440	33.7	50.6	67.4
11/16	343	0.00115	0.8	1.2	1.6	950	0.00135	2.6	3.8	5.1	3,484	0.00460	32.1	48.1	64.1
3/4	315	0.00120	0.8	1.1	1.5	871	0.00140	2.4	3.7	4.9	3,194	0.00480	30.7	46.0	61.3
7/8	270	0.00155	0.8	1.3	1.7	747	0.00155	2.3	3.5	4.6	2,737	0.00520	28.5	42.7	56.9
1	236	0.00140	0.7	1.0	1.3	653	0.00170	2.2	3.3	4.4	2,395	0.00560	26.8	40.2	53.7
Depth of cut															

rpm=sfm×3.82/D1
ipm=(inch/flute)×4×rpm

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CUTTING CONDITION - ISE/IPE/ISLE/ISB/ILET SERIES

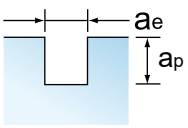
All listed cutting parameters are suggested starting values and can be adjusted accordingly depending on actual machining setups and rigidity.

Slot Milling	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536					ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100					TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2				
Hardness BRINELL	≦ 175					≦ 275					> 375 ≦ 475				
HRC	≦ 6.4					≦ 28					> 39.8 ≦ 49.1				
Vc (SFM)	350 (278-418)					255 (203-306)					133 (106-159)				
ae/ap	ae(2)=1D ap(2)=1D		ae(3)=1D ap(3)=0.5D		ae(4)=1D ap(4)=0.4D	ae(2)=1D ap(2)=1D		ae(3)=1D ap(3)=0.5D		ae(4)=1D ap(4)=0.4D	ae(2)=1D ap(2)=1D		ae(3)=1D ap(3)=0.5D		ae(4)=1D ap(4)=0.4D
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes
1/64	85,470	0.00003	5.1	7.7	10.3	62,245	0.00002	2.49	3.73	4.98	32479	0.00002	1.3	1.9	2.6
1/32	42,735	0.00006	5.1	7.7	10.3	31,122	0.00005	3.11	4.67	6.22	16239	0.00005	1.6	2.4	3.2
3/64	28,490	0.00010	5.7	8.5	11.4	20,748	0.00007	2.90	4.36	5.81	10826	0.00007	1.5	2.3	3.0
1/16	21,368	0.00013	5.6	8.3	11.1	15,561	0.00009	2.80	4.20	5.60	8120	0.00009	1.5	2.2	2.9
5/64	17,094	0.00018	6.2	9.2	12.3	12,449	0.00012	2.93	4.39	5.85	6496	0.00012	1.5	2.3	3.1
3/32	14,245	0.00023	6.6	9.8	13.1	10,374	0.00015	3.01	4.51	6.02	5413	0.00015	1.6	2.4	3.1
7/64	12,210	0.00027	6.6	9.9	13.2	8,892	0.00017	3.07	4.60	6.14	4640	0.00017	1.6	2.4	3.2
1/8	10,684	0.00030	6.4	9.6	12.8	7,781	0.00020	3.11	4.67	6.22	4060	0.00020	1.6	2.4	3.2
9/64	9,497	0.00036	6.9	10.3	13.8	6,916	0.00025	3.46	5.19	6.92	3609	0.00025	1.8	2.7	3.6
5/32	8,547	0.00043	7.3	10.9	14.5	6,224	0.00030	3.73	5.60	7.47	3248	0.00030	1.9	2.9	3.9
11/64	7,770	0.00049	7.6	11.4	15.2	5,659	0.00035	3.96	5.94	7.92	2953	0.00035	2.1	3.1	4.1
3/16	7,123	0.00055	7.8	11.8	15.7	5,187	0.00040	4.15	6.22	8.30	2707	0.00040	2.2	3.2	4.3
13/64	6,575	0.00061	8.1	12.1	16.1	4,788	0.00045	4.31	6.46	8.62	2498	0.00045	2.2	3.4	4.5
7/32	6,105	0.00068	8.2	12.4	16.5	4,446	0.00050	4.45	6.67	8.89	2320	0.00050	2.3	3.5	4.6
15/64	5,698	0.00074	8.4	12.6	16.8	4,150	0.00055	4.56	6.85	9.13	2165	0.00055	2.4	3.6	4.8
1/4	5,342	0.00080	8.5	12.8	17.1	3,890	0.00060	4.67	7.00	9.34	2030	0.00060	2.4	3.7	4.9
17/64	5,028	0.00089	8.9	13.4	17.8	3,661	0.00066	4.85	7.28	9.70	1911	0.00066	2.5	3.8	5.1
9/32	4,748	0.00098	9.3	13.9	18.5	3,458	0.00073	5.01	7.52	10.03	1804	0.00073	2.6	3.9	5.2
19/64	4,498	0.00106	9.6	14.3	19.1	3,276	0.00079	5.16	7.74	10.32	1709	0.00079	2.7	4.0	5.4
5/16	4,274	0.00115	9.8	14.7	19.7	3,112	0.00085	5.29	7.94	10.58	1624	0.00085	2.8	4.1	5.5
21/64	4,070	0.00124	10.1	15.1	20.1	2,964	0.00091	5.41	8.11	10.82	1547	0.00091	2.8	4.2	5.6
11/32	3,885	0.00133	10.3	15.4	20.6	2,829	0.00098	5.52	8.28	11.03	1476	0.00098	2.9	4.3	5.8
23/64	3,716	0.00141	10.5	15.7	21.0	2,706	0.00104	5.62	8.42	11.23	1412	0.00104	2.9	4.4	5.9
3/8	3,561	0.00150	10.7	16.0	21.4	2,594	0.00110	5.71	8.56	11.41	1353	0.00110	3.0	4.5	6.0
25/64	3,419	0.00156	10.7	16.0	21.4	2,490	0.00115	5.73	8.59	11.45	1299	0.00115	3.0	4.5	6.0
13/32	3,287	0.00163	10.7	16.0	21.4	2,394	0.00120	5.75	8.62	11.49	1249	0.00120	3.0	4.5	6.0
27/64	3,166	0.00169	10.7	16.0	21.4	2,305	0.00125	5.76	8.65	11.53	1203	0.00125	3.0	4.5	6.0
7/16	3,053	0.00175	10.7	16.0	21.4	2,223	0.00130	5.78	8.67	11.56	1160	0.00130	3.0	4.5	6.0
29/64	2,947	0.00181	10.7	16.0	21.4	2,146	0.00135	5.80	8.69	11.59	1120	0.00135	3.0	4.5	6.0
15/32	2,849	0.00188	10.7	16.0	21.4	2,075	0.00140	5.81	8.71	11.62	1083	0.00140	3.0	4.5	6.1
31/64	2,757	0.00194	10.7	16.0	21.4	2,008	0.00145	5.82	8.73	11.65	1048	0.00145	3.0	4.6	6.1
1/2	2,671	0.00200	10.7	16.0	21.4	1,945	0.00150	5.84	8.75	11.67	1015	0.00150	3.0	4.6	6.1
9/16	2,374	0.00210	10.0	15.0	19.9	1,729	0.00158	5.45	8.17	10.89	902	0.00158	2.8	4.3	5.7
5/8	2,137	0.00220	9.4	14.1	18.8	1,556	0.00165	5.14	7.70	10.27	812	0.00165	2.7	4.0	5.4
11/16	1,943	0.00230	8.9	13.4	17.9	1,415	0.00173	4.88	7.32	9.76	738	0.00173	2.5	3.8	5.1
3/4	1,781	0.00240	8.5	12.8	17.1	1,297	0.00180	4.67	7.00	9.34	677	0.00180	2.4	3.7	4.9
7/8	1,526	0.00260	7.9	11.9	15.9	1,112	0.00195	4.33	6.50	8.67	580	0.00195	2.3	3.4	4.5
1	1,335	0.00280	7.5	11.2	15.0	973	0.00210	4.08	6.13	8.17	507	0.00210	2.1	3.2	4.3
Depth of cut															

rpm=sfm×3.82/D1
ipm=(inch/flute)×4×rpm

CUTTING CONDITION - ISE/IPE/ISLE/ISB/ILET SERIES

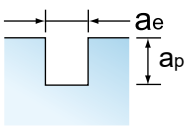
All listed cutting parameters are suggested starting values and can be adjusted accordingly depending on actual machining setups and rigidity.

Slot Milling 	CAST IRONS Gray, Malleable, Ductile					STAINLESS STEELS (Free MachiNIng) 303, 416, 420F, 430F 440F					STAINLESS STEELS (Difficult) 304, 304L,316, 316L				
Hardness BRINELL	≦ 220					≦ 275					≦ 275				
HRC	≦ 18.8					≦ 28					≦ 28				
Vc (SFM)	255 (204-306)					281 (225-337)					194 (154-231)				
ae/ap	ae(2)=1D ap(2)=1D		ae(3)=1D ap(3)=0.5D		ae(4)=1D ap(4)=0.4D	ae(2)=1D ap(2)=1D		ae(3)=1D ap(3)=0.5D		ae(4)=1D ap(4)=0.4D	ae(2)=1D ap(2)=1D		ae(3)=1D ap(3)=0.5D		ae(4)=1D ap(4)=0.4D
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes
1/64	62,245	0.00003	3.7	5.6	7.5	68,748	0.00002	2.7	4.1	5.5	47,380	0.00002	1.9	2.8	3.8
1/32	31,122	0.00006	3.7	5.6	7.5	34,374	0.00005	3.4	5.2	6.9	23,690	0.00004	1.9	2.8	3.8
3/64	20,748	0.00010	4.1	6.2	8.3	22,916	0.00007	3.2	4.8	6.4	15,793	0.00006	1.9	2.8	3.8
1/16	15,561	0.00013	4.0	6.1	8.1	17,187	0.00009	3.1	4.6	6.2	11,845	0.00008	1.9	2.8	3.8
5/64	12,449	0.00018	4.5	6.7	9.0	13,750	0.00012	3.2	4.8	6.5	9,476	0.00011	2.1	3.1	4.2
3/32	10,374	0.00023	4.8	7.2	9.5	11,458	0.00015	3.3	5.0	6.6	7,897	0.00014	2.2	3.3	4.4
7/64	8,892	0.00027	4.8	7.2	9.6	9,821	0.00017	3.4	5.1	6.8	6,769	0.00017	2.3	3.5	4.6
1/8	7,781	0.00030	4.7	7.0	9.3	8,593	0.00020	3.4	5.2	6.9	5,923	0.00020	2.4	3.6	4.7
9/64	6,916	0.00036	5.0	7.5	10.0	7,639	0.00025	3.8	5.7	7.6	5,264	0.00024	2.5	3.8	5.0
5/32	6,224	0.00043	5.3	7.9	10.6	6,875	0.00030	4.1	6.2	8.2	4,738	0.00028	2.6	3.9	5.2
11/64	5,659	0.00049	5.5	8.3	11.0	6,250	0.00035	4.4	6.6	8.7	4,307	0.00031	2.7	4.0	5.4
3/16	5,187	0.00055	5.7	8.6	11.4	5,729	0.00040	4.6	6.9	9.2	3,948	0.00035	2.8	4.1	5.5
13/64	4,788	0.00061	5.9	8.8	11.7	5,288	0.00045	4.8	7.1	9.5	3,645	0.00039	2.8	4.2	5.6
7/32	4,446	0.00068	6.0	9.0	12.0	4,911	0.00050	4.9	7.4	9.8	3,384	0.00043	2.9	4.3	5.8
15/64	4,150	0.00074	6.1	9.2	12.2	4,583	0.00055	5.0	7.6	10.1	3,159	0.00046	2.9	4.4	5.8
1/4	3,890	0.00080	6.2	9.3	12.4	4,297	0.00060	5.2	7.7	10.3	2,961	0.00050	3.0	4.4	5.9
17/64	3,661	0.00089	6.5	9.7	13.0	4,044	0.00066	5.4	8.0	10.7	2,787	0.00055	3.1	4.6	6.1
9/32	3,458	0.00098	6.7	10.1	13.5	3,819	0.00073	5.5	8.3	11.1	2,632	0.00060	3.2	4.7	6.3
19/64	3,276	0.00106	7.0	10.4	13.9	3,618	0.00079	5.7	8.5	11.4	2,494	0.00065	3.2	4.9	6.5
5/16	3,112	0.00115	7.2	10.7	14.3	3,437	0.00085	5.8	8.8	11.7	2,369	0.00070	3.3	5.0	6.6
21/64	2,964	0.00124	7.3	11.0	14.7	3,274	0.00091	6.0	9.0	11.9	2,256	0.00075	3.4	5.1	6.8
11/32	2,829	0.00133	7.5	11.2	15.0	3,125	0.00098	6.1	9.1	12.2	2,154	0.00080	3.4	5.2	6.9
23/64	2,706	0.00141	7.6	11.5	15.3	2,989	0.00104	6.2	9.3	12.4	2,060	0.00085	3.5	5.3	7.0
3/8	2,594	0.00150	7.8	11.7	15.6	2,864	0.00110	6.3	9.5	12.6	1,974	0.00090	3.6	5.3	7.1
25/64	2,490	0.00156	7.8	11.7	15.6	2,750	0.00115	6.3	9.5	12.6	1,895	0.00094	3.6	5.3	7.1
13/32	2,394	0.00163	7.8	11.7	15.6	2,644	0.00120	6.3	9.5	12.7	1,822	0.00098	3.6	5.3	7.1
27/64	2,305	0.00169	7.8	11.7	15.6	2,546	0.00125	6.4	9.5	12.7	1,755	0.00101	3.6	5.3	7.1
7/16	2,223	0.00175	7.8	11.7	15.6	2,455	0.00130	6.4	9.6	12.8	1,692	0.00105	3.6	5.3	7.1
29/64	2,146	0.00181	7.8	11.7	15.6	2,371	0.00135	6.4	9.6	12.8	1,634	0.00109	3.6	5.3	7.1
15/32	2,075	0.00188	7.8	11.7	15.6	2,292	0.00140	6.4	9.6	12.8	1,579	0.00125	3.9	5.9	7.9
31/64	2,008	0.00194	7.8	11.7	15.6	2,218	0.00145	6.4	9.6	12.9	1,528	0.00116	3.6	5.3	7.1
1/2	1,945	0.00200	7.8	11.7	15.6	2,148	0.00150	6.4	9.7	12.9	1,481	0.00120	3.6	5.3	7.1
9/16	1,729	0.00210	7.3	10.9	14.5	1,910	0.00158	6.0	9.0	12.0	1,316	0.00125	3.3	4.9	6.6
5/8	1,556	0.00220	6.8	10.3	13.7	1,719	0.00165	5.7	8.5	11.3	1,185	0.00130	3.1	4.6	6.2
11/16	1,415	0.00230	6.5	9.8	13.0	1,562	0.00173	5.4	8.1	10.8	1,077	0.00135	2.9	4.4	5.8
3/4	1,297	0.00240	6.2	9.3	12.4	1,432	0.00180	5.2	7.7	10.3	987	0.00140	2.8	4.1	5.5
7/8	1,112	0.00260	5.8	8.7	11.6	1,228	0.00195	4.8	7.2	9.6	846	0.00155	2.6	3.9	5.2
1	973	0.00280	5.4	8.2	10.9	1,074	0.00210	4.5	6.8	9.0	740	0.00170	2.5	3.8	5.0
Depth of cut															

rpm=sfm×3.82/D1
ipm=(inch/flute)×4×rpm

CUTTING CONDITION - ISE/IPE/ISLE/ISB/ILET SERIES

All listed cutting parameters are suggested starting values and can be adjusted accordingly depending on actual machining setups and rigidity.

Slot Milling 	SUPER ALLOYS (NICKEL,COBALT,IRON,BASE) Inconel 601,617,625,718,Incoly 800,Monel 400,Rene,Waspalloy					TITANIUM ALLOYS Ti6Al4V,Ti6Al2Sn4Zr2Mo,Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al,Ti5Al53Mo3Cr,Ti7Al4Mo,Ti3Al8 V6Cr4Zr4Mo,Ti6Al6V6Sn,Ti52 Cr3Sn3Al					GRAPHITE				
Hardness BRINELL	≦ 300					≦ 350								
HRC	≦ 32					≦ 37.9								
Vc (SFM)	50 (37-56)					137 (108-162)					500 (399-599)			
ae/ap	ae(2)=1D ap(2)=1D		ae(3)=1D ap(3)=0.5D		ae(4)=1D ap(4)=0.4D	ae(2)=1D ap(2)=1D		ae(3)=1D ap(3)=0.5D		ae(4)=1D ap(4)=0.4D	ae(2)=1D ap(2)=1D		ae(3)=1D ap(3)=0.5D		ae(4)=1D ap(4)=0.4D
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes	RPM	Fz	Feed (IPM) 2 flutes	3 flutes	4 flutes
1/64	12,077	0.00002	0.5	0.7	1.0	33,445	0.00002	1.3	2.0	2.7	122,631	0.00006	14.7	22.1	29.4
1/32	6,039	0.00003	0.4	0.5	0.7	16,722	0.00004	1.3	2.0	2.7	61,316	0.00012	14.7	22.1	29.4
3/64	4,026	0.00005	0.4	0.5	0.7	11,148	0.00006	1.3	2.0	2.7	40,877	0.00020	16.4	24.5	32.7
1/16	3,019	0.00006	0.4	0.5	0.7	8,361	0.00008	1.3	2.0	2.7	30,658	0.00026	15.9	23.9	31.9
5/64	2,415	0.00010	0.5	0.7	0.9	6,689	0.00011	1.5	2.2	2.9	24,526	0.00036	17.7	26.5	35.3
3/32	2,013	0.00013	0.5	0.8	1.0	5,574	0.00014	1.6	2.3	3.1	20,439	0.00046	18.8	28.2	37.6
7/64	1,725	0.00017	0.6	0.9	1.1	4,778	0.00017	1.6	2.4	3.2	17,519	0.00054	18.9	28.4	37.8
1/8	1,510	0.00020	0.6	0.9	1.2	4,181	0.00020	1.7	2.5	3.3	15,329	0.00060	18.4	27.6	36.8
9/64	1,342	0.00023	0.6	0.9	1.2	3,716	0.00024	1.8	2.6	3.5	13,626	0.00073	19.8	29.6	39.5
5/32	1,208	0.00025	0.6	0.9	1.2	3,344	0.00028	1.8	2.8	3.7	12,263	0.00085	20.8	31.3	41.7
11/64	1,098	0.00028	0.6	0.9	1.2	3,040	0.00031	1.9	2.9	3.8	11,148	0.00098	21.7	32.6	43.5
3/16	1,006	0.00030	0.6	0.9	1.2	2,787	0.00035	2.0	2.9	3.9	10,219	0.00110	22.5	33.7	45.0
13/64	929	0.00033	0.6	0.9	1.2	2,573	0.00039	2.0	3.0	4.0	9,433	0.00123	23.1	34.7	46.2
7/32	863	0.00035	0.6	0.9	1.2	2,389	0.00043	2.0	3.0	4.1	8,759	0.00135	23.7	35.5	47.3
15/64	805	0.00038	0.6	0.9	1.2	2,230	0.00046	2.1	3.1	4.1	8,175	0.00148	24.1	36.2	48.2
1/4	755	0.00040	0.6	0.9	1.2	2,090	0.00050	2.1	3.1	4.2	7,664	0.00160	24.5	36.8	49.1
17/64	710	0.00045	0.6	1.0	1.3	1,967	0.00055	2.2	3.2	4.3	7,214	0.00178	25.6	38.4	51.2
9/32	671	0.00050	0.7	1.0	1.3	1,858	0.00060	2.2	3.3	4.5	6,813	0.00195	26.6	39.9	53.1
19/64	636	0.00055	0.7	1.0	1.4	1,760	0.00065	2.3	3.4	4.6	6,454	0.00213	27.4	41.1	54.9
5/16	604	0.00060	0.7	1.1	1.4	1,672	0.00070	2.3	3.5	4.7	6,132	0.00230	28.2	42.3	56.4
21/64	575	0.00065	0.7	1.1	1.5	1,593	0.00075	2.4	3.6	4.8	5,840	0.00248	28.9	43.4	57.8
11/32	549	0.00070	0.8	1.2	1.5	1,520	0.00080	2.4	3.6	4.9	5,574	0.00265	29.5	44.3	59.1
23/64	525	0.00075	0.8	1.2	1.6	1,454	0.00085	2.5	3.7	4.9	5,332	0.00283	30.1	45.2	60.2
3/8	503	0.00080	0.8	1.2	1.6	1,394	0.00090	2.5	3.8	5.0	5,110	0.00300	30.7	46.0	61.3
25/64	483	0.00083	0.8	1.2	1.6	1,338	0.00094	2.5	3.8	5.0	4,905	0.00313	30.7	46.0	61.3
13/32	465	0.00085	0.8	1.2	1.6	1,286	0.00098	2.5	3.8	5.0	4,717	0.00325	30.7	46.0	61.3
27/64	447	0.00088	0.8	1.2	1.6	1,239	0.00101	2.5	3.8	5.0	4,542	0.00338	30.7	46.0	61.3
7/16	431	0.00090	0.8	1.2	1.6	1,194	0.00105	2.5	3.8	5.0	4,380	0.00350	30.7	46.0	61.3
29/64	416	0.00093	0.8	1.2	1.5	1,153	0.00109	2.5	3.8	5.0	4,229	0.00363	30.7	46.0	61.3
15/32	403	0.00095	0.8	1.1	1.5	1,115	0.00125	2.8	4.2	5.6	4,088	0.00375	30.7	46.0	61.3
31/64	390	0.00098	0.8	1.1	1.5	1,079	0.00116	2.5	3.8	5.0	3,956	0.00388	30.7	46.0	61.3
1/2	377	0.00100	0.8	1.1	1.5	1,045	0.00120	2.5	3.8	5.0	3,832	0.00400	30.7	46.0	61.3
9/16	335	0.00105	0.7	1.1	1.4	929	0.00125	2.3	3.5	4.6	3,406	0.00420	28.6	42.9	57.2
5/8	302	0.00110	0.7	1.0	1.3	836	0.00130	2.2	3.3	4.3	3,066	0.00440	27.0	40.5	54.0
11/16	274	0.00115	0.6	0.9	1.3	760	0.00135	2.1	3.1	4.1	2,787	0.00460	25.6	38.5	51.3
3/4	252	0.00120	0.6	0.9	1.2	697	0.00140	2.0	2.9	3.9	2,555	0.00480	24.5	36.8	49.1
7/8	216	0.00155	0.7	1.0	1.3	597	0.00155	1.9	2.8	3.7	2,190	0.00520	22.8	34.2	45.5
1	189	0.00140	0.5	0.8	1.1	523	0.00170	1.8	2.7	3.6	1,916	0.00560	21.5	32.2	42.9
Depth of cut															

rpm=sfm×3.82/D1
ipm=(inch/flute)×4×rpm