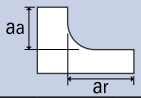
A Brand AE-CPR4-H

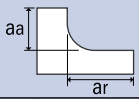
Advanced Performance Four-Fluted Long Neck Corner Radius End Mill for Hardened Steels

List 8592: 4-Flute

Standard Milling

Hardness	Up to 45 HRC						45-55 HRC					55-65 HRC				
Work Material	Tool Steels Hardened Steels Alloy Steels						Hardened Steels									
Depth of Cut																
Mill Dia.	R	Neck Length	Speed (RPM)	Feed (IPM)	IPT	Aa	Ar	Speed (RPM)	Feed (IPM)	IPT	Aa	Ar	Speed (RPM)	Feed (IPM)	IPT	Aa	Ar
0.2	0.02	0.5	40,000	44.1	0.00028	0.00024	0.00284	36,000	37.1	0.00026	0.00020	0.00237	31,500	30.0	0.00024	0.00012	0.00189
0.2	0.02	1	38,000	41.8	0.00028	0.00020	0.00284	34,000	34.7	0.00026	0.00016	0.00237	30,000	28.3	0.00024	0.00008	0.00189
0.2	0.02	1.5	36,000	33.9	0.00024	0.00016	0.00213	32,000	27.6	0.00022	0.00012	0.00178	28,500	22.4	0.00020	0.00008	0.00142
0.2	0.02	2	34,000	32.3	0.00024	0.00008	0.00213	30,000	26.0	0.00022	0.00008	0.00178	27,000	21.3	0.00020	0.00004	0.00142
0.2	0.05	0.5	40,000	44.1	0.00028	0.00024	0.00284	36,000	37.1	0.00026	0.00020	0.00237	31,500	29.9	0.00024	0.00012	0.00189
0.2	0.05	1	38,000	41.8	0.00028	0.00020	0.00284	34,000	34.7	0.00026	0.00016	0.00237	30,000	28.3	0.00024	0.00008	0.00189
0.2	0.05	1.5	36,000	33.9	0.00024	0.00016	0.00213	32,000	27.6	0.00022	0.00012	0.00178	28,500	22.4	0.00020	0.00008	0.00142
0.2	0.05	2	34,000	32.3	0.00024	0.00008	0.00213	30,000	26.0	0.00022	0.00008	0.00178	27,000	21.3	0.00020	0.00004	0.00142
0.3	0.02	1	36,500	57.1	0.00039	0.00024	0.00426	32,500	43.8	0.00034	0.00020	0.00355	30,500	37.8	0.00032	0.00012	0.00284
0.3	0.02	1.5	33,000	46.9	0.00036	0.00016	0.00355	30,000	37.1	0.00031	0.00012	0.00296	28,000	32.3	0.00029	0.00008	0.00237
0.3	0.02	2	30,000	40.2	0.00034	0.00008	0.00288	27,000	30.8	0.00029	0.00008	0.00241	25,500	26.8	0.00027	0.00004	0.00193
0.3	0.02	2.5	26,500	31.5	0.00030	0.00008	0.00288	24,000	24.9	0.00026	0.00008	0.00241	22,500	22.0	0.00025	0.00004	0.00193
0.3	0.02	3	23,000	25.2	0.00028	0.00004	0.00260	21,000	19.7	0.00024	0.00004	0.00217	19,500	17.3	0.00023	0.00004	0.00174
0.3	0.05	1	36,500	57.1	0.00039	0.00024	0.00426	32,500	43.8	0.00034	0.00020	0.00355	30,500	37.8	0.00032	0.00012	0.00284
0.3	0.05	1.5	33,000	46.9	0.00036	0.00016	0.00355	30,000	37.1	0.00031	0.00012	0.00296	28,000	32.3	0.00029	0.00008	0.00237
0.3	0.05	2	30,000	40.2	0.00034	0.00008	0.00288	27,000	30.8	0.00029	0.00008	0.00241	25,500	26.8	0.00027	0.00004	0.00193
0.3	0.05	2.5	26,500	31.5	0.00030	0.00008	0.00288	24,000	24.9	0.00026	0.00008	0.00241	22,500	22.0	0.00025	0.00004	0.00193
0.3	0.05	3	23,000	25.2	0.00028	0.00004	0.00260	21,000	19.7	0.00024	0.00004	0.00217	19,500	17.3	0.00023	0.00004	0.00174
0.4	0.02	1	29,500	59.1	0.00050	0.00032	0.00567	26,000	45.7	0.00045	0.00028	0.00473	24,500	37.0	0.00038	0.00016	0.00378
0.4	0.02	1.5	29,500	59.1	0.00050	0.00032	0.00567	26,000	45.7	0.00045	0.00028	0.00473	24,500	37.0	0.00038	0.00016	0.00378
0.4	0.02	2	27,500	53.6	0.00049	0.00024	0.00481	24,500	41.0	0.00042	0.00020	0.00402	23,000	33.1	0.00036	0.00012	0.00323
0.4	0.02	2.5	25,000	45.3	0.00046	0.00016	0.00418	22,500	34.7	0.00039	0.00012	0.00347	21,000	28.0	0.00034	0.00008	0.00276
0.4	0.02	3	23,000	37.1	0.00041	0.00008	0.00355	20,000	28.4	0.00036	0.00008	0.00296	19,000	22.8	0.00030	0.00004	0.00237
0.4	0.02	4	21,000	30.0	0.00036	0.00004	0.00170	18,500	22.9	0.00031	0.00004	0.00142	17,500	18.9	0.00028	0.00004	0.00115
0.4	0.05	1	29,500	59.1	0.00050	0.00032	0.00567	26,000	45.7	0.00045	0.00028	0.00473	24,500	37.0	0.00038	0.00016	0.00378
0.4	0.05	1.5	29,500	59.1	0.00050	0.00032	0.00567	26,000	45.7	0.00045	0.00028	0.00473	24,500	37.0	0.00038	0.00016	0.00378
0.4	0.05	2	27,500	53.6	0.00049	0.00024	0.00481	24,500	41.0	0.00042	0.00020	0.00402	23,000	33.1	0.00036	0.00012	0.00323
0.4	0.05	2.5	25,000	45.3	0.00046	0.00016	0.00418	22,500	34.7	0.00039	0.00012	0.00347	21,000	28.0	0.00034	0.00008	0.00276
0.4	0.05	3	23,000	37.1	0.00041	0.00008	0.00355	20,000	28.4	0.00036	0.00008	0.00296	19,000	22.8	0.00030	0.00004	0.00237
0.4	0.05	4	21,000	30.0	0.00036	0.00004	0.00170	18,500	22.9	0.00031	0.00004	0.00142	17,500	18.9	0.00028	0.00004	0.00115
0.4	0.1	1	29,500	59.1	0.00050	0.00048	0.00567	26,000	45.7	0.00045	0.00040	0.00473	24,500	37.0	0.00038	0.00024	0.00378
0.4	0.1	2	27,500	53.6	0.00049	0.00040	0.00481	24,500	41.0	0.00042	0.00032	0.00402	23,000	33.1	0.00036	0.00020	0.00323
0.4	0.1	3	23,000	37.1	0.00041	0.00016	0.00355	20,000	28.4	0.00036	0.00012	0.00296	19,000	22.8	0.00030	0.00008	0.00237
0.4	0.1	4	21,000	30.0	0.00036	0.00008	0.00170	18,500	22.9	0.00031	0.00008	0.00142	17,500	18.9	0.00028	0.00004	0.00115
0.5	0.02	1	29,000	64.6	0.00056	0.00032	0.00709	26,000	52.8	0.00051	0.00028	0.00591	26,000	48.8	0.00047	0.00016	0.00473
0.5	0.02	2	29,000	64.6	0.00056	0.00032	0.00709	26,000	52.8	0.00051	0.00028	0.00591	26,000	48.8	0.00047	0.00016	0.00473
0.5	0.02	3	27,500	55.2	0.00050	0.00016	0.00497	24,500	44.9	0.00046	0.00012	0.00414	24,500	41.7	0.00043	0.00008	0.00331
0.5	0.02	4	22,500	40.2	0.00045	0.00008	0.00426	20,000	33.1	0.00042	0.00008	0.00355	20,000	30.7	0.00039	0.00004	0.00284
0.5	0.02	5	21,000	33.1	0.00040	0.00004	0.00213	18,500	26.8	0.00037	0.00004	0.00178	18,500	25.2	0.00034	0.00004	0.00142
0.5	0.02	6	19,500	28.4	0.00037	0.00004	0.00142	17,000	23.7	0.00035	0.00004	0.00119	17,000	21.3	0.00032	0.00004	0.00095
0.5	0.05	1	29,000	64.6	0.00056	0.00032	0.00709	26,000	52.8	0.00051	0.00028	0.00591	26,000	48.8	0.00047	0.00016	0.00473
0.5	0.05	2	29,000	64.6	0.00056	0.00032	0.00709	26,000	52.8	0.00051	0.00028	0.00591	26,000	48.8	0.00047	0.00016	0.00473
0.5	0.05	3	27,500	55.2	0.00050	0.00016	0.00497	24,500	44.9	0.00046	0.00012	0.00414	24,500	41.7	0.00043	0.00008	0.00331
0.5	0.05	4	22,500	40.2	0.00045	0.00008	0.00426	20,000	33.1	0.00042	0.00008	0.00355	20,000	30.7	0.00039	0.00004	0.00284
0.5	0.05	5	21,000	33.1	0.00040	0.00004	0.00213	18,500	26.8	0.00037	0.00004	0.00178	18,500	25.2	0.00034	0.00004	0.00142
0.5	0.05	6	19,500	28.4	0.00037	0.00004	0.00142	17,000	23.7	0.00035	0.00004	0.00119	17,000	21.3	0.00032	0.00004	0.00095
0.5	0.1	1	29,000	64.6	0.00056	0.00048	0.00709	26,000	52.8	0.00051	0.00040	0.00591	26,000	48.8	0.00047	0.00024	0.00473
0.5	0.1	2	29,000	64.6	0.00056	0.00048	0.00709	26,000	52.8	0.00051	0.00040	0.00591	26,000	48.8	0.00047	0.00024	0.00473
0.5	0.1	3	27,500	55.2	0.00050	0.00024	0.00497	24,500	44.9	0.00046	0.00020	0.00414	24,500	41.7	0.00043	0.00012	0.00331
0.5	0.1	4	22,500	40.2	0.00045	0.00016	0.00426	20,000	33.1	0.00042	0.00012	0.00355	20,000	30.7	0.00039	0.00008	0.00284
0.5	0.1	5	21,000	33.1	0.00040	0.00008	0.00213	18,500	26.8	0.00037	0.00008	0.00178	18,500	25.2	0.00034	0.00004	0.00142
0.5	0.1	6	19,500	28.4	0.00037	0.00004	0.00142	17,000	23.7	0.00035	0.00004	0.00119	17,000	21.3	0.00032	0.00004	0.00095
0.6	0.1	2	29,000	77.2	0.00067	0.00056	0.00851	26,000	63.8	0.00062	0.00048	0.00709	21,500	48.8	0.00057	0.00028	0.00567
0.6	0.1	4	24,500	55.2	0.00057	0.00024	0.00575	21,500	44.9	0.00053	0.00020	0.00481	18,000	34.6	0.00049	0.00012	0.00386
0.6	0.1	6	21,000	39.4	0.00047	0.00008	0.00256	18,500	32.3	0.00044	0.00008	0.00213	15,500	25.2	0.00041	0.00004	0.00170
0.7	0.02	2	27,000	83.1	0.00077	0.00032	0.01040	23,500	67.4	0.00072	0.00028	0.00867	19,500	50.8	0.00065	0.00016	0.00693
0.7	0.02	4	24,000	68.2	0.00071	0.00016	0.00756	21,000	54.8	0.00066	0.00012	0.00630	17,500	41.3	0.00060	0.00008	0.00504
0.7	0.02	6	20,000	47.3	0.00060	0.00008	0.00378	17,500	38.6	0.00056	0.00008	0.00315	14,500	28.7	0.00050	0.00004	0.00252
0.7	0.05	2	27,000	83.1	0.00077	0.00048	0.01040	23,500	67.4	0.00072	0.00040	0.00867	19,500	50.8	0.00065	0.00024	0.00693
0.7	0.05	4	24,000	68.2	0.00071	0.00024	0.00756	21,000	54.8	0.00066	0.00020	0.00630	17,500	41.3	0.00060	0.00012	0.00504

1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL(Minimum Quantity Lubrication / mist coolant) is recommended.
3. 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.
4. Adjust the speed, feed rate, and depth of cut if chattering, vibration or abnormal grinding sounds occur.
5. Helical or ramp milling is recommended during the approach of a Z cut.
6. When using a tool with a diameter of φ 0.5 or less, or L/D (aspect ratio) is greater than 10, high loads can cause tool breakage.
   Therefore, adjust the cutting conditions based on the machining situation.
7. When RPM are insufficient, please reduce the RPM and feed rates at same ratio as listed above.

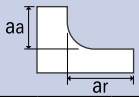
Hardness			Up to 45 HRC					45-55 HRC					55-65 HRC				
Work Material			Tool Steels Hardened Steels Alloy Steels					Hardened Steels									
Depth of Cut																	
Mill Dia.	R	Neck Length	Speed (RPM)	Feed (IPM)	IPT	Aa	Ar	Speed (RPM)	Feed (IPM)	IPT	Aa	Ar	Speed (RPM)	Feed (IPM)	IPT	Aa	Ar
0.7	0.05	6	20,000	47.3	0.00060	0.00016	0.00378	17,500	38.6	0.00056	0.00012	0.00315	14,500	28.7	0.00050	0.00008	0.00252
0.7	0.1	2	27,000	83.1	0.00077	0.00087	0.01040	23,500	67.4	0.00072	0.00071	0.00867	19,500	50.8	0.00065	0.00044	0.00693
0.7	0.1	4	24,000	68.2	0.00071	0.00048	0.00756	21,000	54.8	0.00066	0.00040	0.00630	17,500	41.3	0.00060	0.00024	0.00504
0.7	0.1	6	20,000	47.3	0.00060	0.00024	0.00378	17,500	38.6	0.00056	0.00020	0.00315	14,500	28.7	0.00050	0.00012	0.00252
0.8	0.1	4	23,500	78.8	0.00084	0.00075	0.01134	20,500	63.0	0.00077	0.00063	0.00945	17,000	44.9	0.00067	0.00040	0.00756
0.8	0.1	6	19,500	55.2	0.00071	0.00032	0.01134	16,500	44.1	0.00067	0.00028	0.00945	14,000	30.7	0.00055	0.00016	0.00756
0.8	0.2	4	23,500	78.8	0.00084	0.00150	0.01134	20,500	63.0	0.00077	0.00126	0.00945	17,000	44.9	0.00067	0.00075	0.00756
0.8	0.2	6	19,500	55.2	0.00071	0.00067	0.01134	16,500	44.1	0.00067	0.00056	0.00945	14,000	30.7	0.00055	0.00032	0.00756
0.8	0.2	8	18,000	44.9	0.00063	0.00040	0.01020	15,500	35.5	0.00058	0.00032	0.00851	13,000	25.2	0.00049	0.00020	0.00682
0.9	0.1	4	23,000	90.6	0.00099	0.00087	0.01276	20,000	72.5	0.00091	0.00071	0.01063	17,000	52.4	0.00077	0.00044	0.00851
0.9	0.1	8	18,000	62.3	0.00087	0.00024	0.01087	15,500	48.9	0.00079	0.00020	0.00906	13,000	34.6	0.00067	0.00012	0.00725
1	0.05	4	23,000	102.4	0.00112	0.00048	0.01418	20,000	82.7	0.00104	0.00040	0.01182	17,000	59.8	0.00089	0.00024	0.00945
1	0.05	6	20,500	82.7	0.00101	0.00024	0.00993	18,000	66.2	0.00092	0.00020	0.00827	15,500	48.0	0.00078	0.00012	0.00662
1	0.05	8	18,000	63.0	0.00088	0.00016	0.00851	15,500	51.2	0.00083	0.00012	0.00709	13,500	37.0	0.00069	0.00008	0.00567
1	0.05	10	16,500	51.2	0.00078	0.00008	0.00426	14,500	41.8	0.00073	0.00008	0.00355	12,500	29.9	0.00060	0.00004	0.00284
1	0.05	12	15,500	44.9	0.00073	0.00004	0.00284	13,500	36.3	0.00067	0.00004	0.00237	11,500	26.8	0.00059	0.00004	0.00189
1	0.1	4	23,000	102.4	0.00112	0.00095	0.01418	20,000	82.7	0.00104	0.00079	0.01182	17,000	59.8	0.00089	0.00048	0.00945
1	0.1	6	20,500	82.7	0.00101	0.00048	0.00993	18,000	66.2	0.00092	0.00040	0.00827	15,500	48.0	0.00078	0.00024	0.00662
1	0.1	8	18,000	63.0	0.00088	0.00028	0.00851	15,500	51.2	0.00083	0.00024	0.00709	13,500	37.0	0.00069	0.00016	0.00567
1	0.1	10	16,500	51.2	0.00078	0.00020	0.00426	14,500	41.8	0.00073	0.00016	0.00355	12,500	29.9	0.00060	0.00008	0.00284
1	0.1	12	15,500	44.9	0.00073	0.00016	0.00284	13,500	36.3	0.00067	0.00012	0.00237	11,500	26.8	0.00059	0.00008	0.00189
1	0.2	4	23,000	102.4	0.00112	0.00189	0.01418	20,000	82.7	0.00104	0.00158	0.01182	17,000	59.8	0.00089	0.00095	0.00945
1	0.2	6	20,500	82.7	0.00101	0.00095	0.00993	18,000	66.2	0.00092	0.00079	0.00827	15,500	48.0	0.00078	0.00048	0.00662
1	0.2	8	18,000	63.0	0.00088	0.00056	0.00851	15,500	51.2	0.00083	0.00048	0.00709	13,500	37.0	0.00069	0.00028	0.00567
1	0.2	10	16,500	51.2	0.00078	0.00040	0.00426	14,500	41.8	0.00073	0.00032	0.00355	12,500	29.9	0.00060	0.00020	0.00284
1	0.2	12	15,500	44.9	0.00073	0.00028	0.00284	13,500	36.3	0.00067	0.00024	0.00237	11,500	26.8	0.00059	0.00016	0.00189
1	0.2	16	12,000	31.5	0.00066	0.00020	0.00142	10,500	26.0	0.00062	0.00016	0.00119	9,150	18.9	0.00052	0.00008	0.00095
1	0.2	20	10,000	22.9	0.00058	0.00016	0.00115	8,900	18.2	0.00051	0.00012	0.00095	7,650	13.4	0.00044	0.00008	0.00075
1	0.3	4	23,000	102.4	0.00112	0.00237	0.01418	20,000	82.7	0.00104	0.00197	0.01182	17,000	59.8	0.00089	0.00119	0.00945
1	0.3	6	20,500	82.7	0.00101	0.00119	0.00993	18,000	66.2	0.00092	0.00099	0.00827	15,500	48.0	0.00078	0.00060	0.00662
1	0.3	8	18,000	63.0	0.00088	0.00071	0.00851	15,500	51.2	0.00083	0.00060	0.00709	13,500	37.0	0.00069	0.00036	0.00567
1	0.3	10	16,500	51.2	0.00078	0.00048	0.00426	14,500	41.8	0.00073	0.00040	0.00355	12,500	29.9	0.00060	0.00024	0.00284
1	0.3	12	15,500	44.9	0.00073	0.00032	0.00284	13,500	36.3	0.00067	0.00028	0.00237	11,500	26.8	0.00059	0.00016	0.00189
1.2	0.2	6	19,000	94.5	0.00125	0.00150	0.01701	18,000	82.7	0.00115	0.00126	0.01418	14,500	58.3	0.00101	0.00075	0.01134
1.2	0.2	8	17,000	76.4	0.00113	0.00087	0.01189	16,000	67.0	0.00105	0.00071	0.00993	13,000	45.7	0.00088	0.00044	0.00796
1.2	0.2	10	16,000	67.0	0.00105	0.00052	0.01020	15,000	58.3	0.00098	0.00044	0.00851	12,000	40.2	0.00084	0.00028	0.00682
1.2	0.3	6	19,000	94.5	0.00125	0.00189	0.01701	18,000	82.7	0.00115	0.00158	0.01418	14,500	58.3	0.00101	0.00095	0.01134
1.2	0.3	8	17,000	76.4	0.00113	0.00103	0.01189	16,000	67.0	0.00105	0.00087	0.00993	13,000	45.7	0.00088	0.00052	0.00796
1.2	0.3	10	16,000	67.0	0.00105	0.00067	0.01020	15,000	58.3	0.00098	0.00056	0.00851	12,000	40.2	0.00084	0.00032	0.00682
1.5	0.2	6	17,000	114.2	0.00168	0.00189	0.02126	16,000	98.5	0.00154	0.00158	0.01772	13,500	69.3	0.00129	0.00095	0.01418
1.5	0.2	8	16,000	98.5	0.00154	0.00123	0.01804	15,500	86.7	0.00140	0.00103	0.01504	12,500	59.1	0.00119	0.00063	0.01205
1.5	0.2	10	14,500	78.8	0.00136	0.00087	0.01378	13,500	70.9	0.00132	0.00071	0.01150	11,000	49.6	0.00113	0.00044	0.00922
1.5	0.2	12	13,500	70.9	0.00132	0.00056	0.01276	12,500	62.3	0.00125	0.00048	0.01063	10,500	43.3	0.00104	0.00028	0.00851
1.5	0.2	16	9,150	41.8	0.00115	0.00032	0.00528	8,650	36.3	0.00105	0.00028	0.00441	7,150	25.2	0.00089	0.00016	0.00355
1.5	0.3	6	17,000	114.2	0.00168	0.00284	0.02126	16,000	98.5	0.00154	0.00237	0.01772	13,500	69.3	0.00129	0.00142	0.01418
1.5	0.3	8	16,000	98.5	0.00154	0.00186	0.01804	15,500	86.7	0.00140	0.00154	0.01504	12,500	59.1	0.00119	0.00091	0.01205
1.5	0.3	10	14,500	78.8	0.00136	0.00126	0.01378	13,500	70.9	0.00132	0.00107	0.01150	11,000	49.6	0.00113	0.00063	0.00922
1.5	0.3	12	13,500	70.9	0.00132	0.00087	0.01276	12,500	62.3	0.00125	0.00071	0.01063	10,500	43.3	0.00104	0.00044	0.00851
1.5	0.3	16	9,150	41.8	0.00115	0.00048	0.00528	8,650	36.3	0.00105	0.00040	0.00441	7,150	25.2	0.00089	0.00024	0.00355
2	0.1	8	13,000	114.2	0.00220	0.00095	0.02835	13,000	102.4	0.00197	0.00079	0.02363	11,500	78.7	0.00172	0.00048	0.01890
2	0.1	10	12,000	102.4	0.00214	0.00075	0.02410	12,000	90.6	0.00189	0.00063	0.02008	11,000	71.7	0.00163	0.00040	0.01607
2	0.1	12	11,500	90.6	0.00197	0.00048	0.01985	11,500	82.7	0.00180	0.00040	0.01654	10,000	63.8	0.00160	0.00024	0.01323
2	0.1	16	10,000	70.9	0.00178	0.00028	0.01701	10,000	63.0	0.00158	0.00024	0.01418	8,900	49.6	0.00140	0.00016	0.01134
2	0.1	20	9,300	57.5	0.00155	0.00020	0.00851	9,300	51.2	0.00138	0.00016	0.00709	8,250	40.2	0.00122	0.00008	0.00567
2	0.1	25	8,600	49.7	0.00145	0.00008	0.00567	8,600	44.1	0.00129	0.00008	0.00473	7,650	34.6	0.00114	0.00004	0.00378
2	0.2	8	13,000	114.2	0.00220	0.00189	0.02835	13,000	102.4	0.00197	0.00158	0.02363	11,500	78.7	0.00172	0.00095	0.01890
2	0.2	10	12,000	102.4	0.00214	0.00150	0.02410	12,000	90.6	0.00189	0.00126	0.02008	11,000	71.7	0.00163	0.00075	0.01607
2	0.2	12	11,500	90.6	0.00197	0.00095	0.01985	11,500	82.7	0.00180	0.00079	0.01654	10,000	63.8	0.00160	0.00048	0.01323
2	0.2	16	10,000	70.9	0.00178	0.00056	0.01701	10,000	63.0	0.00158	0.00048	0.01418	8,900	49.6	0.00140	0.00028	0.01134
2	0.2	20	9,300	57.5	0.00155	0.00040	0.00851	9,300	51.2	0.00138	0.00032	0.00709	8,250	40.2	0.00122	0.00020	0.00567

1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL(Minimum Quantity Lubrication / mist coolant) is recommended.
3. 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.
4. Adjust the speed, feed rate, and depth of cut if chattering, vibration or abnormal grinding sounds occur.
5. Helical or ramp milling is recommended during the approach of a Z cut.
6. When using a tool with a diameter of φ 0.5 or less, or L/D (aspect ratio) is greater than 10, high loads can cause tool breakage.
   Therefore, adjust the cutting conditions based on the machining situation.
7. When RPM are insufficient, please reduce the RPM and feed rates at same ratio as listed above.

continued on next page

List 8592: 4-Flute (Continued)

Standard Milling

Hardness	Up to 45 HRC						45-55 HRC					55-65 HRC				
Work Material	Tool Steels Hardened Steels Alloy Steels						Hardened Steels									
Depth of Cut																
Mill Dia.	R	Neck Length	Speed (RPM)	Feed (IPM)	IPT	Aa	Ar	Speed (RPM)	Feed (IPM)	IPT	Aa	Ar	Speed (RPM)	Feed (IPM)	IPT	Aa	Ar
2	0.2	25	8,600	49.7	0.00145	0.00020	0.00567	8,600	44.1	0.00129	0.00016	0.00473	7,650	34.6	0.00114	0.00008	0.00378
2	0.3	8	13,000	114.2	0.00220	0.00284	0.02835	13,000	102.4	0.00197	0.00237	0.02363	11,500	78.7	0.00172	0.00142	0.01890
2	0.3	10	12,000	102.4	0.00214	0.00229	0.02410	12,000	90.6	0.00189	0.00189	0.02008	11,000	71.7	0.00163	0.00115	0.01607
2	0.3	12	11,500	90.6	0.00197	0.00142	0.01985	11,500	82.7	0.00180	0.00119	0.01654	10,000	63.8	0.00160	0.00071	0.01323
2	0.3	16	10,000	70.9	0.00178	0.00087	0.01701	10,000	63.0	0.00158	0.00071	0.01418	8,900	49.6	0.00140	0.00044	0.01134
2	0.3	20	9,300	57.5	0.00155	0.00056	0.00851	9,300	51.2	0.00138	0.00048	0.00709	8,250	40.2	0.00122	0.00028	0.00567
2	0.5	8	13,000	114.2	0.00220	0.00355	0.02835	13,000	102.4	0.00197	0.00296	0.02363	11,500	78.7	0.00172	0.00178	0.01890
2	0.5	10	12,000	102.4	0.00214	0.00284	0.02410	12,000	90.6	0.00189	0.00237	0.02008	11,000	71.7	0.00163	0.00142	0.01607
2	0.5	12	11,500	90.6	0.00197	0.00174	0.01985	11,500	82.7	0.00180	0.00146	0.01654	10,000	63.8	0.00160	0.00087	0.01323
2	0.5	16	10,000	70.9	0.00178	0.00103	0.01701	10,000	63.0	0.00158	0.00087	0.01418	8,900	49.6	0.00140	0.00052	0.01134
2	0.5	20	9,300	57.5	0.00155	0.00071	0.00851	9,300	51.2	0.00138	0.00060	0.00709	8,250	40.2	0.00122	0.00036	0.00567
2	0.5	25	8,600	49.7	0.00145	0.00044	0.00567	8,600	44.1	0.00129	0.00036	0.00473	7,650	34.6	0.00114	0.00020	0.00378
2.5	0.2	10	11,500	126.0	0.00275	0.00189	0.03544	10,500	94.5	0.00225	0.00158	0.02953	9,150	78.7	0.00215	0.00095	0.02363
2.5	0.2	20	8,900	78.8	0.00222	0.00095	0.02126	8,000	58.3	0.00183	0.00079	0.01772	7,150	49.6	0.00174	0.00048	0.01418
2.5	0.5	10	11,500	126.0	0.00275	0.00355	0.03544	10,500	94.5	0.00225	0.00296	0.02953	9,150	78.7	0.00215	0.00178	0.02363
2.5	0.5	20	8,900	78.8	0.00222	0.00174	0.02126	8,000	58.3	0.00183	0.00146	0.01772	7,150	49.6	0.00174	0.00087	0.01418
3	0.2	8	9,550	118.2	0.00310	0.00189	0.04252	8,600	90.6	0.00264	0.00158	0.03544	7,650	65.4	0.00214	0.00095	0.02835
3	0.2	12	9,550	118.2	0.00310	0.00189	0.04252	8,600	90.6	0.00264	0.00158	0.03544	7,650	65.4	0.00214	0.00095	0.02835
3	0.2	16	8,500	94.5	0.00278	0.00134	0.03402	7,650	71.7	0.00235	0.00111	0.02835	6,800	52.0	0.00191	0.00067	0.02268
3	0.2	20	7,400	78.0	0.00264	0.00087	0.02890	6,700	59.1	0.00221	0.00071	0.02410	5,950	43.3	0.00182	0.00044	0.01930
3	0.2	25	7,100	65.4	0.00231	0.00056	0.02552	6,400	50.4	0.00197	0.00048	0.02126	5,700	36.2	0.00160	0.00028	0.01701
3	0.2	30	6,900	59.9	0.00217	0.00040	0.01276	6,200	45.7	0.00185	0.00032	0.01063	5,500	33.1	0.00151	0.00020	0.00851
3	0.2	35	6,350	52.0	0.00205	0.00028	0.00851	5,700	39.4	0.00173	0.00024	0.00709	5,100	29.1	0.00143	0.00016	0.00567
3	0.3	12	9,550	118.2	0.00310	0.00284	0.04252	8,600	90.6	0.00264	0.00237	0.03544	7,650	65.4	0.00214	0.00142	0.02835
3	0.3	16	8,500	94.5	0.00278	0.00197	0.03402	7,650	71.7	0.00235	0.00166	0.02835	6,800	52.0	0.00191	0.00099	0.02268
3	0.3	20	7,400	78.0	0.00264	0.00126	0.02890	6,700	59.1	0.00221	0.00107	0.02410	5,950	43.3	0.00182	0.00063	0.01930
3	0.3	25	7,100	65.4	0.00231	0.00087	0.02552	6,400	50.4	0.00197	0.00071	0.02126	5,700	36.2	0.00160	0.00044	0.01701
3	0.3	30	6,900	59.9	0.00217	0.00056	0.01276	6,200	45.7	0.00185	0.00048	0.01063	5,500	33.1	0.00151	0.00028	0.00851
3	0.3	35	6,350	52.0	0.00205	0.00044	0.00851	5,700	39.4	0.00173	0.00036	0.00709	5,100	29.1	0.00143	0.00020	0.00567
3	0.5	12	9,550	118.2	0.00310	0.00355	0.04252	8,600	90.6	0.00264	0.00296	0.03544	7,650	65.4	0.00214	0.00178	0.02835
3	0.5	16	8,500	94.5	0.00278	0.00245	0.03402	7,650	71.7	0.00235	0.00205	0.02835	6,800	52.0	0.00191	0.00123	0.02268
3	0.5	20	7,400	78.0	0.00264	0.00158	0.02890	6,700	59.1	0.00221	0.00130	0.02410	5,950	43.3	0.00182	0.00079	0.01930
3	0.5	25	7,100	65.4	0.00231	0.00103	0.02552	6,400	50.4	0.00197	0.00087	0.02126	5,700	36.2	0.00160	0.00052	0.01701
3	0.5	30	6,900	59.9	0.00217	0.00071	0.01276	6,200	45.7	0.00185	0.00060	0.01063	5,500	33.1	0.00151	0.00036	0.00851
3	0.5	35	6,350	52.0	0.00205	0.00052	0.00851	5,700	39.4	0.00173	0.00044	0.00709	5,100	29.1	0.00143	0.00028	0.00567
4	0.2	16	7,150	161.5	0.00565	0.00189	0.05670	6,450	122.1	0.00474	0.00158	0.04725	5,000	76.4	0.00382	0.00095	0.03780
4	0.2	20	6,750	153.6	0.00569	0.00150	0.04819	6,100	114.2	0.00469	0.00126	0.04016	4,750	71.7	0.00378	0.00075	0.03213
4	0.2	25	5,950	133.9	0.00563	0.00095	0.03855	5,350	102.4	0.00479	0.00079	0.03213	4,150	63.0	0.00380	0.00048	0.02571
4	0.2	30	5,550	126.0	0.00568	0.00067	0.03516	5,000	94.5	0.00473	0.00056	0.02930	3,900	59.1	0.00379	0.00032	0.02343
4	0.2	40	5,150	118.2	0.00574	0.00040	0.01701	4,650	86.7	0.00466	0.00032	0.01418	3,600	55.1	0.00383	0.00020	0.01134
4	0.3	16	7,150	161.5	0.00565	0.00284	0.05670	6,450	122.1	0.00474	0.00237	0.04725	5,000	76.4	0.00382	0.00142	0.03780
4	0.3	20	6,750	153.6	0.00569	0.00229	0.04819	6,100	114.2	0.00469	0.00189	0.04016	4,750	71.7	0.00378	0.00115	0.03213
4	0.3	25	5,950	133.9	0.00563	0.00142	0.03855	5,350	102.4	0.00479	0.00119	0.03213	4,150	63.0	0.00380	0.00071	0.02571
4	0.3	30	5,550	126.0	0.00568	0.00099	0.03516	5,000	94.5	0.00473	0.00083	0.02930	3,900	59.1	0.00379	0.00052	0.02343
4	0.3	40	5,150	118.2	0.00574	0.00056	0.01701	4,650	86.7	0.00466	0.00048	0.01418	3,600	55.1	0.00383	0.00028	0.01134
4	0.5	16	7,150	161.5	0.00565	0.00355	0.05670	6,450	122.1	0.00474	0.00296	0.04725	5,000	76.4	0.00382	0.00178	0.03780
4	0.5	20	6,750	153.6	0.00569	0.00284	0.04819	6,100	114.2	0.00469	0.00237	0.04016	4,750	71.7	0.00378	0.00142	0.03213
4	0.5	25	5,950	133.9	0.00563	0.00174	0.03855	5,350	102.4	0.00479	0.00146	0.03213	4,150	63.0	0.00380	0.00087	0.02571
4	0.5	30	5,550	126.0	0.00568	0.00123	0.03516	5,000	94.5	0.00473	0.00103	0.02930	3,900	59.1	0.00379	0.00063	0.02343
4	0.5	40	5,150	118.2	0.00574	0.00071	0.01701	4,650	86.7	0.00466	0.00060	0.01418	3,600	55.1	0.00383	0.00036	0.01134
4	0.5	50	4,550	102.4	0.00563	0.00044	0.01020	4,100	77.2	0.00471	0.00036	0.00851	3,150	48.0	0.00382	0.00020	0.00682
4	1	16	7,150	161.5	0.00565	0.00567	0.05670	6,450	122.1	0.00474	0.00473	0.04725	5,000	76.4	0.00382	0.00284	0.03780
4	1	20	6,750	153.6	0.00569	0.00473	0.04819	6,100	114.2	0.00469	0.00394	0.04016	4,750	71.7	0.00378	0.00237	0.03213
4	1	25	5,950	133.9	0.00563	0.00284	0.03855	5,350	102.4	0.00479	0.00237	0.03213	4,150	63.0	0.00380	0.00142	0.02571
4	1	30	5,550	126.0	0.00568	0.00189	0.03516	5,000	94.5	0.00473	0.00158	0.02930	3,900	59.1	0.00379	0.00095	0.02343
4	1	40	5,150	118.2	0.00574	0.00115	0.01701	4,650	86.7	0.00466	0.00095	0.01418	3,600	55.1	0.00383	0.00056	0.01134

1. Use a rigid and precise machine and holder.
2. When machining carbon steels or hardened steels, using MQL(Minimum Quantity Lubrication / mist coolant) is recommended.
3. 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.
4. Adjust the speed, feed rate, and depth of cut if chattering, vibration or abnormal grinding sounds occur.
5. Helical or ramp milling is recommended during the approach of a Z cut.
6. When using a tool with a diameter of φ 0.5 or less, or L/D (aspect ratio) is greater than 10, high loads can cause tool breakage.
   Therefore, adjust the cutting conditions based on the machining situation.
7. When RPM are insufficient, please reduce the RPM and feed rates at same ratio as listed above.