

# E Series Application Guide – Speed & Feed (inch)

ISO Code	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (SFM)			Feed (Inches Per Tooth)									
						Uncoated	TiCN	AlTiN	1/16	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
<b>K</b>	Cast Iron - Gray	Slotting	.5 x D	1 x D	4	--	350	350	.00032	.0006	.0010	.0013	.0016	.0019	.0026	.0032	.0038	.0051
		Peripheral - Rough	1 x D	.5 x D	4	--	400	400	.00040	.0008	.0012	.0016	.0020	.0024	.0032	.0040	.0048	.0064
		Peripheral - Finish	1.5 x D	.01 x D	4	--	450	450	.00046	.0009	.0014	.0018	.0023	.0027	.0036	.0046	.0055	.0073
	Cast Iron - Ductile	Slotting	.5 x D	1 x D	4	--	250	250	.00030	.0006	.0009	.0012	.0015	.0018	.0024	.0030	.0036	.0048
		Peripheral - Rough	1 x D	.5 x D	4	--	275	275	.00038	.0008	.0011	.0015	.0019	.0023	.0030	.0038	.0045	.0060
		Peripheral - Finish	1.5 x D	.01 x D	4	--	325	325	.00042	.0008	.0013	.0017	.0021	.0025	.0034	.0042	.0051	.0068
<b>P</b>	Low Carbon Steels 1018, 12L14, 8620	Slotting	.5 x D	1 x D	4	250	275	300	.00030	.0006	.0009	.0012	.0015	.0018	.0024	.0030	.0036	.0048
		Slotting	.5 x D	1 x D	3	250	275	300	.00030	.0006	.0009	.0012	.0015	.0018	.0024	.0030	.0036	.0048
		Peripheral - Rough	1 x D	.5 x D	4	275	300	325	.00038	.0008	.0011	.0015	.0019	.0023	.0030	.0038	.0045	.0060
		Peripheral - Rough	1 x D	.5 x D	3	275	300	325	.00038	.0008	.0011	.0015	.0019	.0023	.0030	.0038	.0045	.0060
		Finish	1.5 x D	.01 x D	4	300	325	350	.00047	.0009	.0014	.0019	.0024	.0028	.0038	.0047	.0057	.0075
		Finish	1.5 x D	.01 x D	4	300	325	350	.00047	.0009	.0014	.0019	.0024	.0028	.0038	.0047	.0057	.0075
	Medium Carbon Steels 4140, 4340	Slotting	.5 x D	1 x D	4	225	250	275	.00027	.0005	.0008	.0011	.0014	.0016	.0022	.0027	.0032	.0043
		Peripheral - Rough	1 x D	.5 x D	4	250	275	300	.00034	.0007	.0010	.0014	.0017	.0020	.0027	.0034	.0041	.0054
		Finish	1.5 x D	.01 x D	4	275	300	325	.00042	.0008	.0013	.0017	.0021	.0025	.0034	.0042	.0051	.0068
		Slotting	.5 x D	1 x D	4	225	250	275	.00025	.0005	.0008	.0010	.0013	.0015	.0020	.0025	.0030	.0040
		Peripheral - Rough	1 x D	.5 x D	4	250	275	300	.00031	.0006	.0009	.0013	.0016	.0019	.0025	.0031	.0038	.0050
		Finish	1.5 x D	.01 x D	4	275	300	325	.00039	.0008	.0012	.0016	.0020	.0024	.0031	.0039	.0047	.0063
Tool & Die Steels ≤ 48 HRC A2, D2, H13, P20	Slotting	.5 x D	1 x D	4	225	250	275	.00025	.0005	.0008	.0010	.0013	.0015	.0020	.0025	.0030	.0040	
	Peripheral - Rough	1 x D	.5 x D	4	250	275	300	.00031	.0006	.0009	.0013	.0016	.0019	.0025	.0031	.0038	.0050	
	Finish	1.5 x D	.01 x D	4	275	300	325	.00039	.0008	.0012	.0016	.0020	.0024	.0031	.0039	.0047	.0063	
<b>H</b>	Hardened Steels 49 HRC to 58 HRC	Slotting	.25 x D	1 x D	4	60	75	225	.00014	.0003	.0004	.0006	.0007	.0008	.0011	.0014	.0017	.0022
		Peripheral - Rough	1 x D	.25 x D	4	80	100	250	.00017	.0003	.0005	.0007	.0009	.0010	.0014	.0017	.0021	.0028
		Finish	1.5 x D	.01 x D	4	100	125	275	.00019	.0004	.0006	.0008	.0009	.0011	.0015	.0019	.0023	.0030
<b>M</b>	Martensitic Stainless Steels 416, 410, 440C	Slotting	.5 x D	1 x D	4	--	250	250	.00020	.0004	.0006	.0008	.0010	.0012	.0016	.0020	.0024	.0032
		Peripheral - Rough	1 x D	.5 x D	4	--	275	275	.00025	.0005	.0008	.0010	.0013	.0015	.0020	.0025	.0030	.0040
		Finish	1.5 x D	.01 x D	4	--	325	325	.00031	.0006	.0009	.0013	.0016	.0019	.0025	.0031	.0038	.0050
	Austenitic Stainless Steels 303, 304, 316	Slotting	.5 x D	1 x D	4	200	225	250	.00020	.0004	.0006	.0008	.0010	.0012	.0016	.0020	.0024	.0032
		Slotting	.5 x D	1 x D	3	200	225	250	.00020	.0004	.0006	.0008	.0010	.0012	.0016	.0020	.0024	.0032
		Peripheral - Rough	1 x D	.5 x D	4	250	275	300	.00025	.0005	.0008	.0010	.0013	.0015	.0020	.0025	.0030	.0040
		Peripheral - Rough	1 x D	.5 x D	3	250	275	300	.00025	.0005	.0008	.0010	.0013	.0015	.0020	.0025	.0030	.0040
		Finish	1.5 x D	.01 x D	4	300	325	350	.00031	.0006	.0009	.0013	.0016	.0019	.0025	.0031	.0038	.0050
		Finish	1.5 x D	.01 x D	4	300	325	350	.00031	.0006	.0009	.0013	.0016	.0019	.0025	.0031	.0038	.0050
	Precipitation Hardening Stainless Steels 17-4 PH, 15-5 PH	Slotting	.25 x D	1 x D	4	175	200	225	.00020	.0004	.0006	.0008	.0010	.0012	.0016	.0020	.0024	.0031
		Peripheral - Rough	1 x D	.25 x D	4	200	225	250	.00025	.0005	.0007	.0010	.0012	.0015	.0020	.0025	.0029	.0039
		Finish	1.5 x D	.01 x D	4	225	250	275	.00027	.0005	.0008	.0011	.0013	.0016	.0021	.0027	.0032	.0043
<b>S</b>	Titanium Alloys	Slotting	.25 x D	1 x D	4	175	200	225	.00020	.0004	.0006	.0008	.0010	.0012	.0016	.0020	.0024	.0031
		Peripheral - Rough	1 x D	.25 x D	4	200	225	250	.00025	.0005	.0007	.0010	.0012	.0015	.0020	.0025	.0029	.0039
	High Temperature Alloys Inconel, Haynes, Stellite, Hastalloy	Finish	1.5 x D	.01 x D	4	225	250	275	.00027	.0005	.0008	.0011	.0013	.0016	.0021	.0027	.0032	.0043
		Slotting	.25 x D	1 x D	4	35	40	45	.00017	.0003	.0005	.0007	.0009	.0010	.0014	.0017	.0021	.0028
		Peripheral - Rough	1 x D	.25 x D	4	45	50	60	.00022	.0004	.0006	.0009	.0011	.0013	.0017	.0022	.0026	.0035
		Finish	1.5 x D	.01 x D	4	55	55	65	.00024	.0005	.0007	.0009	.0012	.0014	.0019	.0024	.0028	.0038
<b>N</b>	Aluminum Alloys 2024, 6061, 7075	Slotting	.5 x D	1 x D	2	350	550	--	.00038	.0008	.0011	.0015	.0019	.0023	.0030	.0038	.0046	.0061
		Peripheral - Rough	1 x D	.5 x D	2	450	650	--	.00048	.0010	.0014	.0019	.0024	.0029	.0038	.0048	.0057	.0076
		Peripheral - Finish	1.5 x D	.01 x D	3	550	--	--	.00053	.0011	.0016	.0021	.0027	.0032	.0043	.0053	.0064	.0085
	Copper Alloys Brass & Bronze	Slotting	.5 x D	1 x D	2	275	350	350	.00040	.0008	.0012	.0016	.0020	.0024	.0032	.0040	.0048	.0064
		Peripheral - Rough	1 x D	.5 x D	2	300	400	400	.00050	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080
		Peripheral - Rough	1 x D	.5 x D	3	300	--	400	.00045	.0009	.0014	.0018	.0023	.0027	.0036	.0045	.0054	.0072
		Peripheral - Finish	1.5 x D	.01 x D	2	350	450	450	.00063	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0101
		Peripheral - Finish	1.5 x D	.01 x D	3	350	--	450	.00057	.0011	.0017	.0023	.0028	.0034	.0045	.0057	.0068	.0090
		Peripheral - Finish	1.5 x D	.01 x D	3	350	--	450	.00057	.0011	.0017	.0023	.0028	.0034	.0045	.0057	.0068	.0090
	Composites, Plastics	Slotting	.5 x D	1 x D	4	300	350	350	.00040	.0008	.0012	.0016	.0020	.0024	.0032	.0040	.0048	.0064
		Peripheral - Rough	1 x D	.5 x D	4	375	450	450	.00050	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080
		Peripheral - Finish	1.5 x D	.01 x D	4	450	650	650	.00057	.0011	.0017	.0023	.0028	.0034	.0045	.0057	.0068	.0090
	Magnesium Alloys	Slotting	.5 x D	1 x D	2	350	550	550	.00040	.0008	.0012	.0016	.0020	.0024	.0032	.0040	.0048	.0064
		Peripheral - Rough	1 x D	.5 x D	2	450	650	650	.00050	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080
		Peripheral - Finish	1.5 x D	.01 x D	2	550	750	750	.00057	.0011	.0017	.0023	.0028	.0034	.0045	.0057	.0068	.0090
	Graphite	Slotting	.5 x D	1 x D	4	350	400	450	.00045	.0009	.0014	.0018	.0023	.0027	.0036	.0045	.0054	.0072
		Peripheral - Rough	1 x D	.5 x D	4	425	475	525	.00056	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090
		Peripheral - Finish	1.5 x D	.01 x D	4	500	550	600	.00063	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0101

D = Tool Diameter

Information on tips and adjustments can be found in our Technical Resources section beginning on page 125.

# E Series Application Guide – Speed & Feed (metric)

ISO Code	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (M/min)			Feed (MM per Tooth)									
						Uncoated	TiCN	AlTiN	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	20.0
<b>K</b>	Cast Iron - Gray	Slotting	.5 x D	1 x D	4	--	107	107	.0154	.0205	.0256	.0307	.0410	.0512	.0614	.0717	.0768	.1026
		Peripheral - Rough	1 x D	.5 x D	4	--	122	122	.0192	.0256	.0320	.0384	.0512	.0640	.0768	.0896	.0960	.1282
		Peripheral - Finish	1.5 x D	.01 x D	4	--	137	137	.0219	.0291	.0364	.0437	.0583	.0729	.0874	.1020	.1093	.1460
	Cast Iron - Ductile	Slotting	.5 x D	1 x D	4	--	76	76	.0144	.0192	.0240	.0288	.0384	.0480	.0576	.0672	.0720	.0962
		Peripheral - Rough	1 x D	.5 x D	4	--	84	84	.0180	.0240	.0300	.0360	.0480	.0600	.0720	.0840	.0900	.1202
		Peripheral - Finish	1.5 x D	.01 x D	4	--	99	99	.0204	.0271	.0339	.0407	.0543	.0678	.0814	.0950	.1018	.1359
<b>P</b>	Low Carbon Steels 1018, 12L14, 8620	Slotting	.5 x D	1 x D	4	76	84	91	.0144	.0192	.0240	.0288	.0384	.0480	.0576	.0672	.0720	.0962
		Slotting	.5 x D	1 x D	3	76	84	91	.0144	.0192	.0240	.0288	.0384	.0480	.0576	.0672	.0720	.0962
		Peripheral - Rough	1 x D	.5 x D	4	84	91	99	.0180	.0240	.0300	.0360	.0480	.0600	.0720	.0840	.0900	.1202
		Peripheral - Rough	1 x D	.5 x D	3	84	91	99	.0180	.0240	.0300	.0360	.0480	.0600	.0720	.0840	.0900	.1202
		Finish	1.5 x D	.01 x D	4	91	99	107	.0226	.0301	.0377	.0452	.0603	.0754	.0904	.1055	.1131	.1510
	Medium Carbon Steels 4140, 4340	Slotting	.5 x D	1 x D	4	69	76	84	.0130	.0173	.0216	.0259	.0346	.0432	.0518	.0605	.0648	.0866
		Peripheral - Rough	1 x D	.5 x D	4	76	84	91	.0162	.0216	.0270	.0324	.0432	.0540	.0648	.0756	.0810	.1082
		Finish	1.5 x D	.01 x D	4	84	91	99	.0204	.0271	.0339	.0407	.0543	.0678	.0814	.0950	.1018	.1359
	Tool & Die Steels ≤ 48 HRC A2, D2, H13, P20	Slotting	.5 x D	1 x D	4	69	76	84	.0120	.0160	.0200	.0240	.0320	.0400	.0480	.0560	.0600	.0802
		Peripheral - Rough	1 x D	.5 x D	4	76	84	91	.0150	.0200	.0250	.0300	.0400	.0500	.0600	.0700	.0750	.1002
		Finish	1.5 x D	.01 x D	4	84	91	99	.0188	.0251	.0314	.0377	.0503	.0628	.0754	.0879	.0942	.1259
	<b>H</b>	Hardened Steels 49 HRC to 58 HRC	Slotting	.25 x D	1 x D	4	18	23	69	.0067	.0089	.0111	.0133	.0177	.0222	.0266	.0310	.0333
Peripheral - Rough			1 x D	.25 x D	4	24	30	76	.0083	.0111	.0139	.0166	.0222	.0277	.0333	.0388	.0416	.0555
Finish			1.5 x D	.01 x D	4	30	38	84	.0090	.0121	.0151	.0181	.0241	.0301	.0362	.0422	.0452	.0604
<b>M</b>	Martensitic Stainless Steels 416, 410, 440C	Slotting	.5 x D	1 x D	4	--	76	76	.0096	.0128	.0160	.0192	.0256	.0320	.0384	.0448	.0480	.0641
		Peripheral - Rough	1 x D	.5 x D	4	--	84	84	.0120	.0160	.0200	.0240	.0320	.0400	.0480	.0560	.0600	.0802
		Finish	1.5 x D	.01 x D	4	--	99	99	.0151	.0201	.0251	.0301	.0402	.0502	.0603	.0703	.0754	.1007
	Austenitic Stainless Steels 303, 304, 316	Slotting	.5 x D	1 x D	4	61	69	76	.0096	.0128	.0160	.0192	.0256	.0320	.0384	.0448	.0480	.0641
		Slotting	.5 x D	1 x D	3	61	69	76	.0096	.0128	.0160	.0192	.0256	.0320	.0384	.0448	.0480	.0641
		Peripheral - Rough	1 x D	.5 x D	4	76	84	91	.0120	.0160	.0200	.0240	.0320	.0400	.0480	.0560	.0600	.0802
		Peripheral - Rough	1 x D	.5 x D	3	76	84	91	.0120	.0160	.0200	.0240	.0320	.0400	.0480	.0560	.0600	.0802
	Precipitation Hardening Stainless Steels 17-4 PH, 15-5 PH	Finish	1.5 x D	.01 x D	4	91	99	107	.0151	.0201	.0251	.0301	.0402	.0502	.0603	.0703	.0754	.1007
		Slotting	.25 x D	1 x D	4	53	61	69	.0094	.0126	.0157	.0188	.0251	.0314	.0377	.0440	.0471	.0629
Peripheral - Rough	1 x D	.25 x D	4	61	69	76	.0118	.0157	.0196	.0236	.0314	.0393	.0471	.0550	.0589	.0787		
	Finish	1.5 x D	.01 x D	4	69	76	84	.0128	.0171	.0214	.0256	.0342	.0427	.0513	.0598	.0641	.0856	
<b>S</b>	Titanium Alloys	Slotting	.25 x D	1 x D	4	53	61	69	.0094	.0126	.0157	.0188	.0251	.0314	.0377	.0440	.0471	.0629
		Peripheral - Rough	1 x D	.25 x D	4	61	69	76	.0118	.0157	.0196	.0236	.0314	.0393	.0471	.0550	.0589	.0787
		Finish	1.5 x D	.01 x D	4	69	76	84	.0128	.0171	.0214	.0256	.0342	.0427	.0513	.0598	.0641	.0856
	High Temperature Alloys Inconel, Haynes, Stellite, Hastalloy	Slotting	.25 x D	1 x D	4	11	12	14	.0083	.0111	.0139	.0166	.0222	.0277	.0333	.0388	.0416	.0555
		Peripheral - Rough	1 x D	.25 x D	4	14	15	18	.0104	.0139	.0173	.0208	.0277	.0346	.0416	.0485	.0520	.0694
		Finish	1.5 x D	.01 x D	4	17	17	20	.0113	.0151	.0188	.0226	.0302	.0377	.0452	.0528	.0565	.0755
<b>N</b>	Aluminum Alloys 2024, 6061, 7075	Slotting	.5 x D	1 x D	2	107	168	--	.0182	.0243	.0304	.0365	.0486	.0608	.0730	.0851	.0912	.1218
		Peripheral - Rough	1 x D	.5 x D	2	137	198	--	.0228	.0304	.0380	.0456	.0608	.0760	.0912	.1064	.1140	.1523
		Peripheral - Finish	1.5 x D	.01 x D	3	168	--	--	.0256	.0342	.0427	.0513	.0683	.0854	.1025	.1196	.1281	.1712
	Copper Alloys Brass & Bronze	Slotting	.5 x D	1 x D	2	84	107	107	.0192	.0256	.0320	.0384	.0512	.0640	.0768	.0896	.0960	.1282
		Peripheral - Rough	1 x D	.5 x D	2	91	122	122	.0240	.0320	.0400	.0480	.0640	.0800	.0960	.1120	.1200	.1603
		Peripheral - Rough	1 x D	.5 x D	3	91	--	122	.0216	.0288	.0360	.0432	.0576	.0720	.0864	.1008	.1080	.1443
		Peripheral - Finish	1.5 x D	.01 x D	2	107	137	137	.0301	.0402	.0502	.0603	.0804	.1005	.1206	.1407	.1507	.2014
		Peripheral - Finish	1.5 x D	.01 x D	3	107	--	137	.0271	.0362	.0452	.0543	.0724	.0904	.1085	.1266	.1357	.1813
	Composites, Plastics	Slotting	.5 x D	1 x D	4	91	107	107	.0192	.0256	.0320	.0384	.0512	.0640	.0768	.0896	.0960	.1282
		Peripheral - Rough	1 x D	.5 x D	4	114	137	137	.0240	.0320	.0400	.0480	.0640	.0800	.0960	.1120	.1200	.1603
		Peripheral - Finish	1.5 x D	.01 x D	4	137	198	198	.0271	.0362	.0452	.0543	.0724	.0904	.1085	.1266	.1357	.1813
	Magnesium Alloys	Slotting	.5 x D	1 x D	2	107	168	168	.0192	.0256	.0320	.0384	.0512	.0640	.0768	.0896	.0960	.1282
		Peripheral - Rough	1 x D	.5 x D	2	137	198	198	.0240	.0320	.0400	.0480	.0640	.0800	.0960	.1120	.1200	.1603
	Peripheral - Finish	1.5 x D	.01 x D	2	168	229	229	.0271	.0362	.0452	.0543	.0724	.0904	.1085	.1266	.1357	.1813	
	Graphite	Slotting	.5 x D	1 x D	4	107	122	137	.0216	.0288	.0360	.0432	.0576	.0720	.0864	.1008	.1080	.1443
		Peripheral - Rough	1 x D	.5 x D	4	130	145	160	.0270	.0360	.0450	.0540	.0720	.0900	.1080	.1260	.1350	.1803
		Peripheral - Finish	1.5 x D	.01 x D	4	152	168	183	.0301	.0402	.0502	.0603	.0804	.1005	.1206	.1407	.1507	.2014

D = Tool Diameter

Information on tips and adjustments can be found in our Technical Resources section beginning on page 125.