kennametal.com

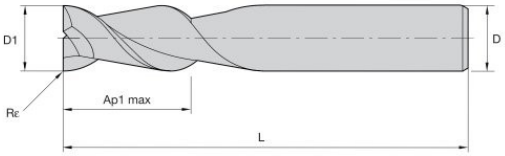
KENNAMETAL®

MASTER CATALOG 2018

VOLUME TWO | ROTATING TOOLS

HOLEMAKING | TAPPING | SOLID END MILLING | INDEXABLE MILLING

- Kennametal standards dimensions.
- Center cutting.
- Effective in thin wall applications.
- Wiper facet, special end gash, and flute geometry provide better surface finishes.
- Unique geometry delivers maximum metal removal rates.



End Mill Tolerances

D1	tolerance h6	D	tolerance h6
<1/8"	+0/-.002"	<1/8"	+0/-.00024"
1/8–7/32"	+0/-.002"	1/8–7/32"	+0/-.00031"
1/4–3/8"	+0/-.00035"	1/4–3/8"	+0/-.00035"
13/32–11/16"	+0/-.00043"	13/32–11/16"	+0/-.00043"
23/32–1 3/16"	+0/-.00051"	23/32–1 3/16"	+0/-.00051"

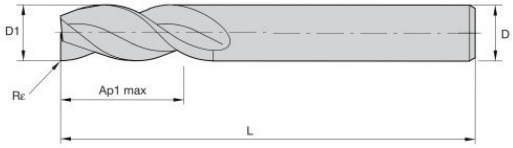
ABDF • Wiper Facet

● first choice
○ alternate choice

K600	D1	D	Ap1 max	L	Rε
ABDF0188J2ARA	3/16	3/16	3/8	2	.015
ABDF0188J2AS	3/16	3/16	3/8	2	—
ABDF0250J2ARA	1/4	1/4	1/2	2 1/2	.015
ABDF0250J2ARB	1/4	1/4	1/2	2 1/2	.030
ABDF0250J2AS	1/4	1/4	1/2	2 1/2	—
ABDF0312J2ARA	5/16	5/16	5/8	2 1/2	.015
ABDF0312J2ARB	5/16	5/16	5/8	2 1/2	.030
ABDF0312J2AS	5/16	5/16	5/8	2 1/2	—
ABDF0375J2ARB	3/8	3/8	3/4	2 1/2	.030
ABDF0375J2AS	3/8	3/8	3/4	2 1/2	—
ABDF0500J2ARB	1/2	1/2	1 1/4	3	.030
ABDF0500J2ARC	1/2	1/2	1 1/4	3	.060
ABDF0500J2ARE	1/2	1/2	1 1/4	3	.120
ABDF0500J2AS	1/2	1/2	1 1/4	3	—
ABDF0625J2AS	5/8	5/8	1 1/4	3 1/2	—
ABDF0625J2BRB	5/8	5/8	1 5/8	3 1/2	.030
ABDF0625J2BRC	5/8	5/8	1 5/8	3 1/2	.060
ABDF0625J2BRE *	5/8	5/8	1 5/8	3 1/2	.120
ABDF0625J2BS	5/8	5/8	1 5/8	3 1/2	—
ABDF0750J2ARB *	3/4	3/4	1 1/2	4	.030
ABDF0750J2ARC	3/4	3/4	1 1/2	4	.060
ABDF0750J2ARE	3/4	3/4	1 1/2	4	.120
ABDF0750J2AS	3/4	3/4	1 1/2	4	—
ABDF0750J2BRB	3/4	3/4	1 5/8	4	.030
ABDF0750J2BRC	3/4	3/4	1 5/8	4	.060
ABDF0750J2BS	3/4	3/4	1 5/8	4	—
ABDF1000J2ARB *	1	1	1 1/2	4	.030
ABDF1000J2ARC	1	1	1 1/2	4	.060
ABDF1000J2ARE *	1	1	1 1/2	4	.120
ABDF1000J2AS *	1	1	1 1/2	4	—
ABDF1000J2BRB *	1	1	2	5	.030
ABDF1000J2BRC	1	1	2	5	.060
ABDF1000J2BS	1	1	2	5	—

NOTE: For application data, see page P122.
*Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

- Kennametal standards dimensions.
- Center cutting.
- Effective in thin wall applications.
- Wiper facet, special end gash, and flute geometry provide better surface finishes.
- Unique geometry delivers maximum metal removal rates.



End Mill Tolerances

D1	tolerance h6	D	tolerance h6
<1/8"	+0/-.002"	<1/8"	+0/-.00024"
1/8–7/32"	+0/-.002"	1/8–7/32"	+0/-.00031"
1/4–3/8"	+0/-.00035"	1/4–3/8"	+0/-.00035"
13/32–11/16"	+0/-.00043"	13/32–11/16"	+0/-.00043"
23/32–1 3/16"	+0/-.00051"	23/32–1 3/16"	+0/-.00051"

ABDE • Wiper Facet

● first choice
○ alternate choice

K600	D1	D	Ap1 max	L	Rε
ABDE0188J3ARA	3/16	3/16	7/32	2	.015
ABDE0188J3AS	3/16	3/16	7/32	2	—
ABDE0250J3ARB	1/4	1/4	1/2	2 1/2	.030
ABDE0250J3AS	1/4	1/4	1/2	2 1/2	—
ABDE0312J3ARB	5/16	5/16	5/8	2 1/2	.030
ABDE0312J3AS	5/16	5/16	5/8	2 1/2	—
ABDE0375J3ARB	3/8	3/8	3/4	2 1/2	.030
ABDE0375J3AS	3/8	3/8	3/4	2 1/2	—
ABDE0500J3ARB	1/2	1/2	1 1/4	3	.030
ABDE0500J3ARC	1/2	1/2	1 1/4	3	.060
ABDE0500J3ARE	1/2	1/2	1 1/4	3	.120
ABDE0500J3AS	1/2	1/2	1 1/4	3	—
ABDE0625J3AS	5/8	5/8	1 1/4	3 1/2	—
ABDE0625J3BRB	5/8	5/8	1 5/8	3 1/2	.030
ABDE0625J3BS	5/8	5/8	1 5/8	3 1/2	—
ABDE0750J3ARB	3/4	3/4	1 1/2	4	.030
ABDE0750J3ARC	3/4	3/4	1 1/2	4	.060
ABDE0750J3ARE	3/4	3/4	1 1/2	4	.120
ABDE0750J3AS	3/4	3/4	1 1/2	4	—
ABDE0750J3BRB	3/4	3/4	1 5/8	4	.030
ABDE0750J3BRC	3/4	3/4	1 5/8	4	.060
ABDE0750J3BRE	3/4	3/4	1 5/8	4	.120
ABDE0750J3BS	3/4	3/4	1 5/8	4	—
ABDE1000J3ARB	1	1	1 1/2	4	.030
ABDE1000J3ARC	1	1	1 1/2	4	.060
ABDE1000J3ARE	1	1	1 1/2	4	.120
ABDE1000J3AS	1	1	1 1/2	4	—
ABDE1000J3BRB	1	1	2	5	.030
ABDE1000J3BRC	1	1	2	5	.060
ABDE1000J3BRE	1	1	2	5	.120
ABDE1000J3BS	1	1	2	5	—

NOTE: For application data, see page P122.

Material Overview • ANSI

KENNAMETAL

P	Steel	N	Non-Ferrous	H	Hardened Materials
M	Stainless Steel	S	High-Temp Alloys	C	CFRP Materials
K	Cast Iron				

material group	description	content	tensile strength RM (MPa)*	hardness (HB)	hardness (HRC)	material number
P0	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	–	A36, 1008, 1010, 1018 through 1029; 1108, 1117
P1	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	–	10L18, 1200 Series, 1213, 12L14
P2	Medium- and High-Carbon Steels	C >0,25%	>530	<220	<25	1035, 1045, 10L45, 1050, 10L50, 1080, 1137, 1144, 11L44, 1525, 1545, 1572
P3	Alloy Steels and Tool Steels	C >0,25%	600–850	<330	<35	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T
P4	Alloy Steels and Tool Steels	C >0,25%	850–1400	340–450	35–48	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T
P5	Ferritic, Martensitic, and PH Stainless Steels	–	600–900	<330	<35	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series
P6	High-Strength Ferritic, Martensitic, and PH Stainless Steels	–	900–1350	350–450	35–48	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series
M1	Austenitic Stainless Steel	–	<600	130–200	–	200 Series, 301, 302, 304, 304L, 309
M2	High-Strength Austenitic Stainless and Cast Stainless Steels	–	600–800	150–230	<25	310, 316, 316L, 321, 347, 384 ASTM Cast XM-1, XM-5, XM-7, XM-21
M3	Duplex Stainless Steel	–	<800	135–275	<30	323, 329, F55, 2205, S329000
K1	Gray Cast Iron	–	125–500	120–290	<32	class 20, 25, 30, 35, 40, 45, 50, 55, 60, G1800, G3000, G3500, G4000
K2	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	–	<600	130–260	<28	60-40-18, 65-45-12, 80-55-06; SAE J434: D4018, D4512, D5506; ASTM A47: Grade 32510, 35018; SAE J158: Grade M3210, M4504, M5003, M5503, M7002; ASTMA842: Grade 250, 300, 350, 400, 450
K3	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	–	>600	180–350	<43	ASTM A536:100-70-03, 120-90-02, SAE J434: D7003, SAE J158: Grade M8501AST A897: 125-80-10, 150-100-7, 175-125-4, 200-150-1, 230-185
N1	Wrought Aluminum	–	–	–	–	2025, 5050, 7050, 1000, 2017
N2	Low-Silicon Aluminum Alloys and Magnesium Alloys	Si <12,2%	–	–	–	2024, 6061, 7075
N3	High-Silicon Aluminum Alloys and Magnesium Alloys	Si >12,2%	–	–	–	–
N4	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	–	–	–	–	C81500
N5	Nylon, Plastics, Rubbers, Phenolics, Resins, Fiberglass	–	–	–	–	–
N6	Carbon, Graphite Composites, CFRP	–	–	–	–	Graphite, CFK, CFRP
N7	Metal Matrix Composites (MMC)	–	–	–	–	C63000
S1	Iron-Based, Heat-Resistant Alloys	–	500–1200	160–260	25–48	A-286, INCOLOY® 800 Series, A608, A567, Discaloy™, INVAR®, N-155, 16-25-6, 19-9 DL; Cast: ASTM A-297, A-351, A-567, A-608
S2	Cobalt-Based, Heat-Resistant Alloys	–	1000–1450	250–450	25–48	Haynes® 25 (L605), Haynes 188, J-1570, Stellite, AiResist 213; Cast: AiResist 13, Haynes 21, MAR-M302, MAR-M509, NASA Co-W-Re, WI-52
S3	Nickel-Based, Heat-Resistant Alloys	–	600–1700	160–450	<48	Astroloy™, Hastelloy® B/C/ C-276 /X, INCONEL® 600 and 700 Series, IN102, INCOLOY 900 Series, Rene 41, Waspalloy, Monel®, K-500, MAR-M20, NIMONIC®, UDIMET®
S4	Titanium and Titanium Alloys	–	900–1600	300–400	33–48	Pure: Ti 98.8, Ti 98.9,Ti 99.9; Alloyed: Ti 5Al-2.5Sn, Ti6Al-4V, Ti6Al-2Sn-4Zr-2Mo, Ti-3Al-8V-6Cr-4Mo-4Zr, Ti-10V-2Fe-3Al, Ti-13V-11Cr-3Al
H1	Hardened Materials	–	–	–	44–48	Tool Steel H10, H11, H13, D2, D3, 4340, P20
H2	Hardened Materials	–	–	–	48–55	Tool Steel H10, H11, H13, D2, D3, 4340, P20
H3	Hardened Materials	–	–	–	56–60	Tool Steel H10, H11, H13, D2, D3, 4340, P20
H4	Hardened Materials	–	–	–	>60	Tool Steel H10, H11, H13, D2, D3, 4340, P20
C1	CFRP, CFRP/CFRP	–	–	–	–	–
C2	CFRP/Non-Ferrous	–	–	–	–	–
C3	CFRP/High-Temp	–	–	–	–	–
C4	CFRP/Stainless Steel	–	–	–	–	–
C5	CFRP/Non-Ferrous/High-Temp	–	–	–	–	–

P	Steel	N	Non-Ferrous	H	Hardened Materials
M	Stainless Steel	S	High-Temp Alloys	C	CFRP Materials
K	Cast Iron				

material group	description	content	tensile strength RM (MPa)*	hardness (HB)	hardness (HRC)	material number
P0	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	–	–
P1	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	–	C15, Ck22, ST37-2, S235JR, 9SMnPb28, GS38
P2	Medium- and High-Carbon Steels	C >0,25%	>530	<220	<25	ST52, S355JR, C35, GS60, Cf53
P3	Alloy Steels and Tool Steels	C >0,25%	600–850	<330	<35	16MnCr5, Ck45, 21CrMoV5-7, 38SMn28
P4	Alloy Steels and Tool Steels	C >0,25%	850–1400	340–450	35–48	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
P5	Ferritic, Martensitic, and PH Stainless Steels	–	600–900	<330	<35	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
P6	High-Strength Ferritic, Martensitic, and PH Stainless Steels	–	900–1350	350–450	35–48	X102CrMo17, G-X120Cr29
M1	Austenitic Stainless Steel	–	<600	130–200	–	X5CrNi 18 10, X2CrNiMo 17 13 2, G-X25CrNiSi18 9, X15CrNiSi 20 12
M2	High-Strength Austenitic Stainless and Cast Stainless Steels	–	600–800	150–230	<25	X2CrNiMo 13 4, X5NiCr 32 21, X5CrNiNb 18 10, G-X15CrNi 25-20
M3	Duplex Stainless Steel	–	<800	135–275	<30	X8CrNiMo27 5, X2CrNiMoN22 5 3, X20CrNiSi25 4, G-X40CrNiSi27 4
K1	Gray Cast Iron	–	125–500	120–290	<32	GG15, GG25, GG30, GG40, GTW40
K2	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	–	<600	130–260	<28	GGG40, GTS35
K3	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	–	>600	180–350	<43	GGG60, GTW55, GTS65
N1	Wrought Aluminum	–	–	–	–	AlMg1, Al99.5, AlCuMg1, AlCuBiPb, AlMgSi1, ALMgSiPb
N2	Low-Silicon Aluminum Alloys and Magnesium Alloys	Si <12,2%	–	–	–	GALSiCu4, GDAlSi10Mg
N3	High-Silicon Aluminum Alloys and Magnesium Alloys	Si >12,2%	–	–	–	G-ALSi12, G-AlSi17Cu4, G-AlSi21CuNiMg
N4	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	–	–	–	–	CuZn40, Ms60, G-CuSn5ZnPb, CuZn37, CuSi3Mn
N5	Nylon, Plastics, Rubbers, Phenolics, Resins, Fiberglass	–	–	–	–	Lexan®, Hostalen™, Polystyrol, Makrolon®
N6	Carbon, Graphite Composites, CFRP	–	–	–	–	CFK, GFK
N7	Metal Matrix Composites (MMC)	–	–	–	–	–
S1	Iron-Based, Heat-Resistant Alloys	–	500–1200	160–260	25–48	X1NiCrMoCu32 28 7, X12NiCrSi36 16, X5NiCrAlTi31 20, X40CoCrNi20 20
S2	Cobalt-Based, Heat-Resistant Alloys	–	1000–1450	250–450	25–48	Haynes® 188, Stellite® 6,21,31
S3	Nickel-Based, Heat-Resistant Alloys	–	600–1700	160–450	<48	INCONEL® 690, INCONEL 625, Hastelloy®, NIMONIC® 75
S4	Titanium and Titanium Alloys	–	900–1600	300–400	33–48	Ti1, TiAl5Sn2, TiAl6V4, TiAl4Mo4Sn2
H1	Hardened Materials	–	–	–	44–48	GX260NiCr42, GX330NiCr42, GX300CrNiSi952, GX300CrMo153, Hardox® 400
H2	Hardened Materials	–	–	–	48–55	–
H3	Hardened Materials	–	–	–	56–60	–
H4	Hardened Materials	–	–	–	>60	–
C1	CFRP, CFRP/CFRP	–	–	–	–	–
C2	CFRP/Non-Ferrous	–	–	–	–	–
C3	CFRP/High Temp	–	–	–	–	–
C4	CFRP/Stainless Steel	–	–	–	–	–
C5	CFRP/Non-Ferrous/High-Temp	–	–	–	–	–

ABDF...

Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	K600 Cutting Speed — vc SFM min	max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter frac.	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
							dec.	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
N	1	1.5 x D	0.5 x D	1.0 x D	1640	6560	IPT	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090
	2	1.5 x D	0.5 x D	1.0 x D	1640	4920	IPT	.0014	.0018	.0023	.0027	.0036	.0045	.0054	.0072
	3	1.5 x D	0.5 x D	1.0 x D	1640	4920	IPT	.0012	.0016	.0020	.0024	.0032	.0039	.0047	.0063
	4	1.5 x D	0.5 x D	1.0 x D	1310	2460	IPT	.0012	.0016	.0020	.0024	.0032	.0039	.0047	.0063
	5	1.5 x D	0.5 x D	1.0 x D	820	3280	IPT	.0015	.0020	.0025	.0030	.0041	.0051	.0061	.0081

ABDE...

Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	K600 Cutting Speed — vc SFM min	max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. D1 — Diameter frac.	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
							dec.	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
N	1	1.5 x D	0.5 x D	1.0 x D	1640	6560	IPT	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090
	2	1.5 x D	0.5 x D	1.0 x D	1640	4920	IPT	.0014	.0018	.0023	.0027	.0036	.0045	.0054	.0072
	3	1.5 x D	0.5 x D	1.0 x D	1640	4920	IPT	.0012	.0016	.0020	.0024	.0032	.0039	.0047	.0063
	4	1.5 x D	0.5 x D	1.0 x D	1310	2460	IPT	.0012	.0016	.0020	.0024	.0032	.0039	.0047	.0063
	5	1.5 x D	0.5 x D	1.0 x D	820	3280	IPT	.0015	.0020	.0025	.0030	.0041	.0051	.0061	.0081

NOTE: These guidelines may require variations to achieve optimum results. For better surface finish, reduce feed per tooth.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.
For cutting aluminum with high silicon, coating is recommended.
Ap for spindle with ceramic bearings, multiply by 0.5.
For better surface finish, reduce feed per tooth.
For tools with reach > 3 x D, reduce fz by 20%.
For tools with reach > 5 x D, reduce fz by 30%.
For tools with reach > 10 x D, reduce vc and fz by 30%.