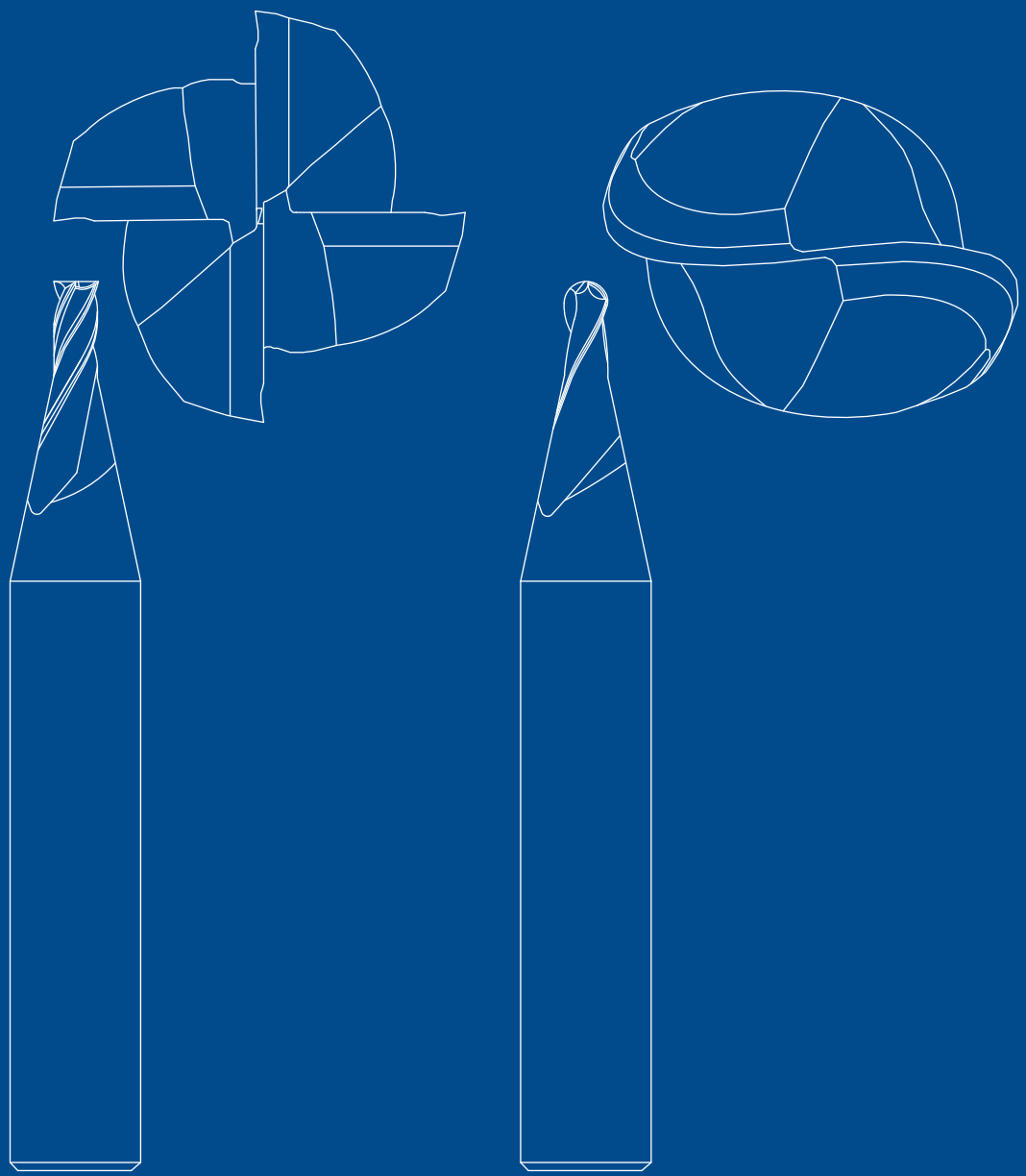
KYOCERA
SGS Precision Tools

SGS
Solid Carbide Tools

Micro End Mills



www.ksptmicrotools.com

KYOCERA
SGS Precision Tools

SGS
Solid Carbide Tools

KYOCERA SGS Precision Tools (KSPT) is an ISO-certified manufacturer of industry leading round solid carbide cutting tools. State of the art manufacturing and warehouse facilities have the capacity and processes to meet the quality and delivery demands of customers in all markets around the world. Complete inspections performed within its metallurgical lab and manufacturing quality departments ensure the use of high quality carbide and reliable manufacturing consistency regardless of when a cutting tool is produced.

KSPT is proud to have pioneered some of the world's most advanced cutting technologies due to rigorous testing of tools, coatings, and materials within its Global Innovation Center. It is this commitment to innovation that has launched patented products and technologies like the Z-Carb with its variable geometry and cutting edge preparation, Series 43 APR and APF ultra high performance aluminum cutting tools, and the JetStream coolant technology.

SGS has become an important part of the KYOCERA Precision Tools family, and while the name has changed, one thing has not. Its dedicated people and their relentless commitment to the customer. KSPT Technical Sales Engineers, Application Specialists, and Distribution Partners blanket the globe, delivering reliable service and support to all market segments. It is these people and products that drive innovative application strategies and cutting tool technologies into the end user, continually exceeding expectations and providing the most value at the spindle.

FRACTIONAL

METRIC

Ti-NAMITE-A

With excellent thermal and chemical resistance, Ti-NAMITE-A (AlTiN) allows for dry cutting and improvements in performance of carbide. The coating has a high hardness giving ultimate protection against abrasive wear and erosion. Ideal for cast iron, high temperature alloys, steels, and stainless steel applications.

Hardness (HV): 3700
Oxidation Temperature: 1100°C / 2010°F
Coefficient of Friction: 0.30
Thickness: 1 – 4 Microns (based on tool diameter)

KYOCERA SGS PRECISION TOOLS AlTiN COATING PERFORMANCE (LAB RESULTS)

SEM photography shows the KSPT proprietary coating method provides a significant reduction in macro particle deposition on the tool surface, which contributes to increased performance due to smoother chip flow. Another benefit of the KSPT micro-tool coating is a significant reduction in edge rounding due to excessive thickness, typical of most normal coatings.

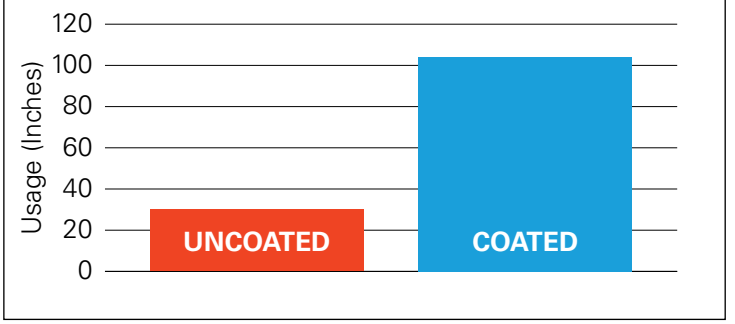
NORMAL AlTiN MICRO-TOOL COATING
@ 1.06KX MAGNIFICATION

KSPT PROPRIETARY AlTiN MICRO-TOOL COATING
@ 1.06KX MAGNIFICATION

One common misconception is that coated micro tools are often unnecessary because most machines cannot reach sufficient spindle speed to warrant the additional expense of a coated tool. Our testing shows AlTiN coating increases tool life by 250 percent, even when the cutting speed is well below that recommended for uncoated carbide. In other words, coating cost is justifiable, even at low spindle speeds.

TOOL LIFE COMPARISON

4140 alloy steel / 30 HRc / dry
15000 rpm / 6 ipm / slotting to failure
1/32 4-flute carbide end mill



Micro Tool Legend

TO ORDER: Please specify quantity and EDP number.
RETURN POLICY: An RMA number must accompany all product returns. Contact your Customer Service Representative for an RMA number.

REGULATION SAFETY GLASSES SHOULD ALWAYS BE WORN WHEN USING HIGH-SPEED CUTTING EQUIPMENT

MATERIALS

- Steels
- Stainless Steels
- Cast Iron
- High Temp Alloys
- Titanium
- Non-Ferrous
- Plastics/Composites
- Hardened Steels

TOOL LENGTH

Stub | Regular | Long | Extra Long

FLUTES

2 Flutes

4 Flutes

END CONFIGURATIONS

Ball

Square

SHANK TYPE

Common

HELIX ANGLE

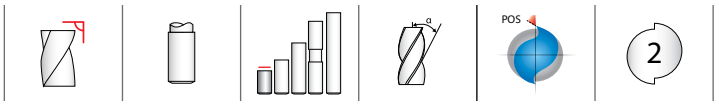
Right Spiral

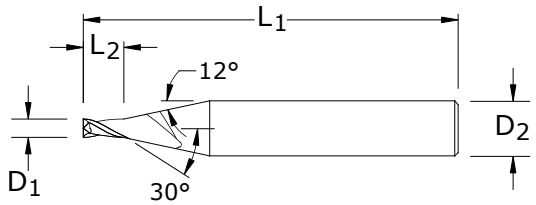
RAKE ANGLE

Positive

All tools are in Right Cut Direction unless noted

M2 1.5xD





M2 1.5xD®

FRACTIONAL SERIES

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.005	1/8	0.008	1-1/2	02201	●
0.006	1/8	0.009	1-1/2	02202	●
0.007	1/8	0.011	1-1/2	02203	●
0.008	1/8	0.012	1-1/2	02204	●
0.009	1/8	0.014	1-1/2	02205	●
0.010	1/8	0.015	1-1/2	02206	●
0.011	1/8	0.017	1-1/2	02207	●
0.012	1/8	0.018	1-1/2	02208	●
0.013	1/8	0.020	1-1/2	02209	●
0.014	1/8	0.021	1-1/2	02210	●
0.015	1/8	0.023	1-1/2	02211	●
0.016	1/8	0.024	1-1/2	02212	●
0.017	1/8	0.026	1-1/2	02213	●
0.018	1/8	0.027	1-1/2	02214	●
0.019	1/8	0.029	1-1/2	02215	●
0.020	1/8	0.030	1-1/2	02216	●
0.021	1/8	0.032	1-1/2	02217	●
0.022	1/8	0.033	1-1/2	02218	●
0.023	1/8	0.035	1-1/2	02219	●
0.024	1/8	0.036	1-1/2	02220	●
0.025	1/8	0.038	1-1/2	02221	●
0.026	1/8	0.039	1-1/2	02222	●
0.027	1/8	0.041	1-1/2	02223	●
0.028	1/8	0.042	1-1/2	02224	●
0.029	1/8	0.044	1-1/2	02225	●
0.030	1/8	0.045	1-1/2	02226	●
0.031	1/8	0.047	1-1/2	02227	●
0.032	1/8	0.048	1-1/2	02228	●
0.033	1/8	0.050	1-1/2	02229	●
0.034	1/8	0.051	1-1/2	02230	●
0.035	1/8	0.053	1-1/2	02231	●
0.036	1/8	0.054	1-1/2	02232	●
0.037	1/8	0.056	1-1/2	02233	●
0.038	1/8	0.057	1-1/2	02234	●
0.039	1/8	0.059	1-1/2	02235	●
0.040	1/8	0.060	1-1/2	02236	●

continued on next page

TOLERANCES (inch)

.005–.120 DIAMETER

D_1 = +0.000/–0.001

D_2 = h_6

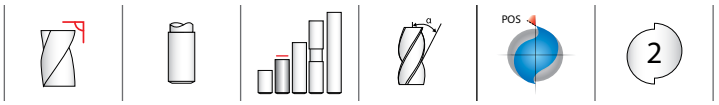
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

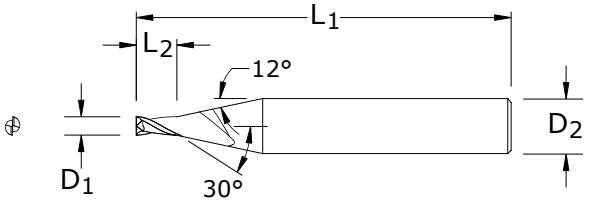
● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery

M2 1.5xD
FRACTIONAL SERIES

continued

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.041	1/8	0.062	1-1/2	02368	●
0.042	1/8	0.063	1-1/2	02369	●
0.043	1/8	0.065	1-1/2	02370	●
0.044	1/8	0.066	1-1/2	02371	●
0.045	1/8	0.068	1-1/2	02372	●
0.046	1/8	0.069	1-1/2	02373	●
0.047	1/8	0.071	1-1/2	02374	●
0.048	1/8	0.072	1-1/2	02375	●
0.049	1/8	0.074	1-1/2	02376	●
0.050	1/8	0.075	1-1/2	02377	●
0.051	1/8	0.077	1-1/2	02378	●
0.052	1/8	0.078	1-1/2	02379	●
0.053	1/8	0.080	1-1/2	02380	●
0.054	1/8	0.081	1-1/2	02381	●
0.055	1/8	0.083	1-1/2	02382	●
0.056	1/8	0.084	1-1/2	02383	●
0.057	1/8	0.086	1-1/2	02384	●
0.058	1/8	0.087	1-1/2	02385	●
0.059	1/8	0.089	1-1/2	02386	●
0.060	1/8	0.090	1-1/2	02387	●
0.062	1/8	0.093	1-1/2	02388	●
0.065	1/8	0.098	1-1/2	02389	●
0.070	1/8	0.105	1-1/2	02390	●
0.078	1/8	0.117	1-1/2	02391	●
0.080	1/8	0.120	1-1/2	02392	●
0.085	1/8	0.128	1-1/2	02393	●
0.090	1/8	0.135	1-1/2	02394	●
0.093	1/8	0.140	1-1/2	02395	●
0.095	1/8	0.143	1-1/2	02396	●
0.100	1/8	0.150	1-1/2	02397	●
0.105	1/8	0.158	1-1/2	02398	●
0.110	1/8	0.165	1-1/2	02399	●
0.115	1/8	0.173	1-1/2	02400	●
0.120	1/8	0.180	1-1/2	02401	●





M2 3xD
FRACTIONAL SERIES

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.005	1/8	0.015	1-1/2	02275	●
0.006	1/8	0.018	1-1/2	02276	●
0.007	1/8	0.021	1-1/2	02277	●
0.008	1/8	0.024	1-1/2	02278	●
0.009	1/8	0.027	1-1/2	02279	●
0.010	1/8	0.030	1-1/2	02280	●
0.011	1/8	0.033	1-1/2	02281	●
0.012	1/8	0.036	1-1/2	02282	●
0.013	1/8	0.039	1-1/2	02283	●
0.014	1/8	0.042	1-1/2	02284	●
0.015	1/8	0.045	1-1/2	02285	●
0.016	1/8	0.048	1-1/2	02286	●
0.017	1/8	0.051	1-1/2	02287	●
0.018	1/8	0.054	1-1/2	02288	●
0.019	1/8	0.057	1-1/2	02289	●
0.020	1/8	0.060	1-1/2	02290	●
0.021	1/8	0.063	1-1/2	02291	●
0.022	1/8	0.066	1-1/2	02292	●
0.023	1/8	0.069	1-1/2	02293	●
0.024	1/8	0.072	1-1/2	02294	●
0.025	1/8	0.075	1-1/2	02295	●
0.026	1/8	0.078	1-1/2	02296	●
0.027	1/8	0.081	1-1/2	02297	●
0.028	1/8	0.084	1-1/2	02298	●
0.029	1/8	0.087	1-1/2	02299	●
0.030	1/8	0.090	1-1/2	02300	●
0.031	1/8	0.093	1-1/2	02301	●
0.032	1/8	0.096	1-1/2	02302	●
0.033	1/8	0.099	1-1/2	02303	●
0.034	1/8	0.102	1-1/2	02304	●
0.035	1/8	0.105	1-1/2	02305	●
0.036	1/8	0.108	1-1/2	02306	●
0.037	1/8	0.111	1-1/2	02307	●
0.038	1/8	0.114	1-1/2	02308	●
0.039	1/8	0.117	1-1/2	02309	●
0.040	1/8	0.120	1-1/2	02310	●

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TOLERANCES (inch)

.005–.120 DIAMETER

D_1 = +0.000/–0.001

D_2 = h_6

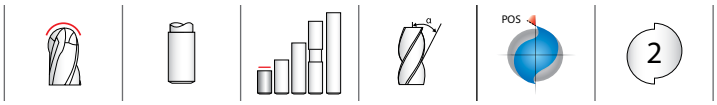
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

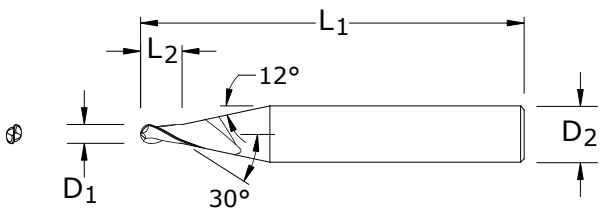
● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery

M2 3xD
FRACTIONAL SERIES

continued

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.041	1/8	0.123	1-1/2	02436	●
0.042	1/8	0.126	1-1/2	02437	●
0.043	1/8	0.129	1-1/2	02438	●
0.044	1/8	0.132	1-1/2	02439	●
0.045	1/8	0.135	1-1/2	02440	●
0.046	1/8	0.138	1-1/2	02441	●
0.047	1/8	0.141	1-1/2	02442	●
0.048	1/8	0.144	1-1/2	02443	●
0.049	1/8	0.147	1-1/2	02444	●
0.050	1/8	0.150	1-1/2	02445	●
0.051	1/8	0.153	1-1/2	02446	●
0.052	1/8	0.156	1-1/2	02447	●
0.053	1/8	0.159	1-1/2	02448	●
0.054	1/8	0.162	1-1/2	02449	●
0.055	1/8	0.165	1-1/2	02450	●
0.056	1/8	0.168	1-1/2	02451	●
0.057	1/8	0.171	1-1/2	02452	●
0.058	1/8	0.174	1-1/2	02453	●
0.059	1/8	0.177	1-1/2	02454	●
0.060	1/8	0.180	1-1/2	02455	●
0.062	1/8	0.186	1-1/2	02456	●
0.065	1/8	0.195	1-1/2	02457	●
0.070	1/8	0.210	1-1/2	02458	●
0.078	1/8	0.234	1-1/2	02459	●
0.080	1/8	0.240	1-1/2	02460	●
0.085	1/8	0.255	1-1/2	02461	●
0.090	1/8	0.270	1-1/2	02462	●
0.093	1/8	0.279	1-1/2	02463	●
0.095	1/8	0.285	1-1/2	02464	●
0.100	1/8	0.300	1-1/2	02465	●
0.105	1/8	0.315	1-1/2	02466	●
0.110	1/8	0.330	1-1/2	02467	●
0.115	1/8	0.345	1-1/2	02468	●
0.120	1/8	0.360	1-1/2	02469	●





M2B 1.5xD

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0.005	1/8	0.008	1-1/2	03029	●
0.006	1/8	0.009	1-1/2	03030	●
0.007	1/8	0.011	1-1/2	03031	●
0.008	1/8	0.012	1-1/2	03032	●
0.009	1/8	0.014	1-1/2	03033	●
0.010	1/8	0.015	1-1/2	03034	●
0.011	1/8	0.017	1-1/2	03035	●
0.012	1/8	0.018	1-1/2	03036	●
0.013	1/8	0.020	1-1/2	03037	●
0.014	1/8	0.021	1-1/2	03038	●
0.015	1/8	0.023	1-1/2	03039	●
0.016	1/8	0.024	1-1/2	03040	●
0.017	1/8	0.026	1-1/2	03041	●
0.018	1/8	0.027	1-1/2	03042	●
0.019	1/8	0.029	1-1/2	03043	●
0.020	1/8	0.030	1-1/2	03044	●
0.021	1/8	0.032	1-1/2	03045	●
0.022	1/8	0.033	1-1/2	03046	●
0.023	1/8	0.035	1-1/2	03047	●
0.024	1/8	0.036	1-1/2	03048	●
0.025	1/8	0.038	1-1/2	03049	●
0.026	1/8	0.039	1-1/2	03050	●
0.027	1/8	0.041	1-1/2	03051	●
0.028	1/8	0.042	1-1/2	03052	●
0.029	1/8	0.044	1-1/2	03053	●
0.030	1/8	0.045	1-1/2	03054	●
0.031	1/8	0.047	1-1/2	03055	●
0.032	1/8	0.048	1-1/2	03056	●
0.033	1/8	0.050	1-1/2	03057	●
0.034	1/8	0.051	1-1/2	03058	●
0.035	1/8	0.053	1-1/2	03059	●
0.036	1/8	0.054	1-1/2	03060	●
0.037	1/8	0.056	1-1/2	03061	●
0.038	1/8	0.057	1-1/2	03062	●
0.039	1/8	0.059	1-1/2	03063	●
0.040	1/8	0.060	1-1/2	03064	●

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TOLERANCES (inch)

.005–.120 DIAMETER

D_1 = +0.000/–0.001

D_2 = h_6

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

● U.S. Stock Standard
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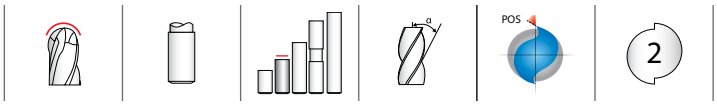
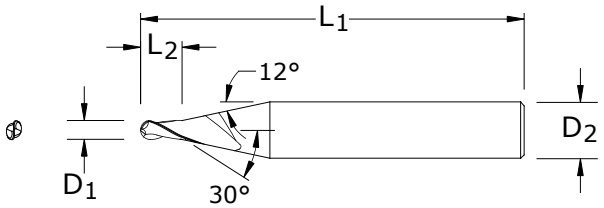
M2B 1.5xD
FRACTIONAL SERIES

continued

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.041	1/8	0.062	1-1/2	02504	●
0.042	1/8	0.063	1-1/2	02505	●
0.043	1/8	0.065	1-1/2	02506	●
0.044	1/8	0.066	1-1/2	02507	●
0.045	1/8	0.068	1-1/2	02508	●
0.046	1/8	0.069	1-1/2	02509	●
0.047	1/8	0.071	1-1/2	02510	●
0.048	1/8	0.072	1-1/2	02511	●
0.049	1/8	0.074	1-1/2	02512	●
0.050	1/8	0.075	1-1/2	02513	●
0.051	1/8	0.077	1-1/2	02514	●
0.052	1/8	0.078	1-1/2	02515	●
0.053	1/8	0.080	1-1/2	02516	●
0.054	1/8	0.081	1-1/2	02517	●
0.055	1/8	0.083	1-1/2	02518	●
0.056	1/8	0.084	1-1/2	02519	●
0.057	1/8	0.086	1-1/2	02520	●
0.058	1/8	0.087	1-1/2	02521	●
0.059	1/8	0.089	1-1/2	02522	●
0.060	1/8	0.090	1-1/2	02523	●
0.062	1/8	0.093	1-1/2	02524	●
0.065	1/8	0.098	1-1/2	02525	●
0.070	1/8	0.105	1-1/2	02526	●
0.078	1/8	0.117	1-1/2	02527	●
0.080	1/8	0.120	1-1/2	02528	●
0.085	1/8	0.128	1-1/2	02529	●
0.090	1/8	0.135	1-1/2	02530	●
0.093	1/8	0.140	1-1/2	02531	●
0.095	1/8	0.143	1-1/2	02532	●
0.100	1/8	0.150	1-1/2	02533	●
0.105	1/8	0.158	1-1/2	02534	●
0.110	1/8	0.165	1-1/2	02535	●
0.115	1/8	0.173	1-1/2	02536	●
0.120	1/8	0.180	1-1/2	02537	●





M2B 3xD
FRACTIONAL SERIES

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.005	1/8	0.015	1-1/2	03103	●
0.006	1/8	0.018	1-1/2	03104	●
0.007	1/8	0.021	1-1/2	03105	●
0.008	1/8	0.024	1-1/2	03106	●
0.009	1/8	0.027	1-1/2	03107	●
0.010	1/8	0.030	1-1/2	03108	●
0.011	1/8	0.033	1-1/2	03109	●
0.012	1/8	0.036	1-1/2	03110	●
0.013	1/8	0.039	1-1/2	03111	●
0.014	1/8	0.042	1-1/2	03112	●
0.015	1/8	0.045	1-1/2	03113	●
0.016	1/8	0.048	1-1/2	03114	●
0.017	1/8	0.051	1-1/2	03115	●
0.018	1/8	0.054	1-1/2	03116	●
0.019	1/8	0.057	1-1/2	03117	●
0.020	1/8	0.060	1-1/2	03118	●
0.021	1/8	0.063	1-1/2	03119	●
0.022	1/8	0.066	1-1/2	03120	●
0.023	1/8	0.069	1-1/2	03121	●
0.024	1/8	0.072	1-1/2	03122	●
0.025	1/8	0.075	1-1/2	03123	●
0.026	1/8	0.078	1-1/2	03124	●
0.027	1/8	0.081	1-1/2	03125	●
0.028	1/8	0.084	1-1/2	03126	●
0.029	1/8	0.087	1-1/2	03127	●
0.030	1/8	0.090	1-1/2	03128	●
0.031	1/8	0.093	1-1/2	03129	●
0.032	1/8	0.096	1-1/2	03130	●
0.033	1/8	0.099	1-1/2	03131	●
0.034	1/8	0.102	1-1/2	03132	●
0.035	1/8	0.105	1-1/2	03133	●
0.036	1/8	0.108	1-1/2	03134	●
0.037	1/8	0.111	1-1/2	03135	●
0.038	1/8	0.114	1-1/2	03136	●
0.039	1/8	0.117	1-1/2	03137	●
0.040	1/8	0.120	1-1/2	03138	●

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TOLERANCES (inch)

.005–.120 DIAMETER

D_1 = +0.000/–0.001

D_2 = h_6

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

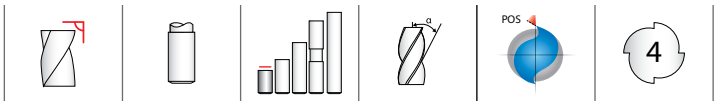
● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery

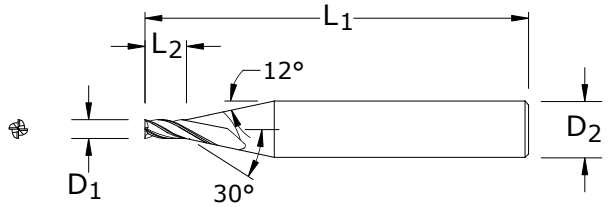
M2B 3xD
FRACTIONAL SERIES

continued

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.041	1/8	0.123	1-1/2	02572	●
0.042	1/8	0.126	1-1/2	02573	●
0.043	1/8	0.129	1-1/2	02574	●
0.044	1/8	0.132	1-1/2	02575	●
0.045	1/8	0.135	1-1/2	02576	●
0.046	1/8	0.138	1-1/2	02577	●
0.047	1/8	0.141	1-1/2	02578	●
0.048	1/8	0.144	1-1/2	02579	●
0.049	1/8	0.147	1-1/2	02580	●
0.050	1/8	0.150	1-1/2	02581	●
0.051	1/8	0.153	1-1/2	02582	●
0.052	1/8	0.156	1-1/2	02583	●
0.053	1/8	0.159	1-1/2	02584	●
0.054	1/8	0.162	1-1/2	02585	●
0.055	1/8	0.165	1-1/2	02586	●
0.056	1/8	0.168	1-1/2	02587	●
0.057	1/8	0.171	1-1/2	02588	●
0.058	1/8	0.174	1-1/2	02589	●
0.059	1/8	0.177	1-1/2	02590	●
0.060	1/8	0.180	1-1/2	02591	●
0.062	1/8	0.186	1-1/2	02592	●
0.065	1/8	0.195	1-1/2	02593	●
0.070	1/8	0.210	1-1/2	02594	●
0.078	1/8	0.234	1-1/2	02595	●
0.080	1/8	0.240	1-1/2	02596	●
0.085	1/8	0.255	1-1/2	02597	●
0.090	1/8	0.270	1-1/2	02598	●
0.093	1/8	0.279	1-1/2	02599	●
0.095	1/8	0.285	1-1/2	02600	●
0.100	1/8	0.300	1-1/2	02601	●
0.105	1/8	0.315	1-1/2	02602	●
0.110	1/8	0.330	1-1/2	02603	●
0.115	1/8	0.345	1-1/2	02604	●
0.120	1/8	0.360	1-1/2	02605	●

M4 1.5xD





M4 1.5xD
FRACTIONAL SERIES

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.005	1/8	0.008	1-1/2	02238	●
0.006	1/8	0.009	1-1/2	02239	●
0.007	1/8	0.011	1-1/2	02240	●
0.008	1/8	0.012	1-1/2	02241	●
0.009	1/8	0.014	1-1/2	02242	●
0.010	1/8	0.015	1-1/2	02243	●
0.011	1/8	0.017	1-1/2	02244	●
0.012	1/8	0.018	1-1/2	02245	●
0.013	1/8	0.020	1-1/2	02246	●
0.014	1/8	0.021	1-1/2	02247	●
0.015	1/8	0.023	1-1/2	02248	●
0.016	1/8	0.024	1-1/2	02249	●
0.017	1/8	0.026	1-1/2	02250	●
0.018	1/8	0.027	1-1/2	02251	●
0.019	1/8	0.029	1-1/2	02252	●
0.020	1/8	0.030	1-1/2	02253	●
0.021	1/8	0.032	1-1/2	02254	●
0.022	1/8	0.033	1-1/2	02255	●
0.023	1/8	0.035	1-1/2	02256	●
0.024	1/8	0.036	1-1/2	02257	●
0.025	1/8	0.038	1-1/2	02258	●
0.026	1/8	0.039	1-1/2	02259	●
0.027	1/8	0.041	1-1/2	02260	●
0.028	1/8	0.042	1-1/2	02261	●
0.029	1/8	0.044	1-1/2	02262	●
0.030	1/8	0.045	1-1/2	02263	●
0.031	1/8	0.047	1-1/2	02264	●
0.032	1/8	0.048	1-1/2	02265	●
0.033	1/8	0.050	1-1/2	02266	●
0.034	1/8	0.051	1-1/2	02267	●
0.035	1/8	0.053	1-1/2	02268	●
0.036	1/8	0.054	1-1/2	02269	●
0.037	1/8	0.056	1-1/2	02270	●
0.038	1/8	0.057	1-1/2	02271	●
0.039	1/8	0.059	1-1/2	02272	●
0.040	1/8	0.060	1-1/2	02273	●

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TOLERANCES (inch)

.005–.120 DIAMETER

D_1 = +0.000/–0.001

D_2 = h_6

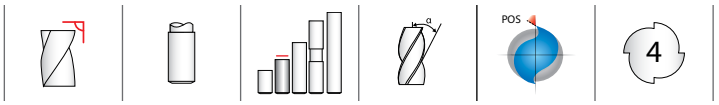
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

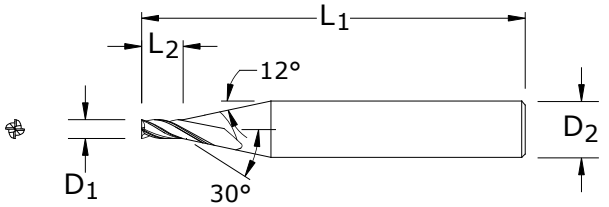
● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery

M4 1.5xD
FRACTIONAL SERIES

continued

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.041	1/8	0.062	1-1/2	02402	●
0.042	1/8	0.063	1-1/2	02403	●
0.043	1/8	0.065	1-1/2	02404	●
0.044	1/8	0.066	1-1/2	02405	●
0.045	1/8	0.068	1-1/2	02406	●
0.046	1/8	0.069	1-1/2	02407	●
0.047	1/8	0.071	1-1/2	02408	●
0.048	1/8	0.072	1-1/2	02409	●
0.049	1/8	0.074	1-1/2	02410	●
0.050	1/8	0.075	1-1/2	02411	●
0.051	1/8	0.077	1-1/2	02412	●
0.052	1/8	0.078	1-1/2	02413	●
0.053	1/8	0.080	1-1/2	02414	●
0.054	1/8	0.081	1-1/2	02415	●
0.055	1/8	0.083	1-1/2	02416	●
0.056	1/8	0.084	1-1/2	02417	●
0.057	1/8	0.086	1-1/2	02418	●
0.058	1/8	0.087	1-1/2	02419	●
0.059	1/8	0.089	1-1/2	02420	●
0.060	1/8	0.090	1-1/2	02421	●
0.062	1/8	0.093	1-1/2	02422	●
0.065	1/8	0.098	1-1/2	02423	●
0.070	1/8	0.105	1-1/2	02424	●
0.078	1/8	0.117	1-1/2	02425	●
0.080	1/8	0.120	1-1/2	02426	●
0.085	1/8	0.128	1-1/2	02427	●
0.090	1/8	0.135	1-1/2	02428	●
0.093	1/8	0.140	1-1/2	02429	●
0.095	1/8	0.143	1-1/2	02430	●
0.100	1/8	0.150	1-1/2	02431	●
0.105	1/8	0.158	1-1/2	02432	●
0.110	1/8	0.165	1-1/2	02433	●
0.115	1/8	0.173	1-1/2	02434	●
0.120	1/8	0.180	1-1/2	02435	●





M4 3xD
FRACTIONAL SERIES

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.005	1/8	0.015	1-1/2	02312	●
0.006	1/8	0.018	1-1/2	02313	●
0.007	1/8	0.021	1-1/2	02314	●
0.008	1/8	0.024	1-1/2	02315	●
0.009	1/8	0.027	1-1/2	02316	●
0.010	1/8	0.030	1-1/2	02317	●
0.011	1/8	0.033	1-1/2	02318	●
0.012	1/8	0.036	1-1/2	02319	●
0.013	1/8	0.039	1-1/2	02320	●
0.014	1/8	0.042	1-1/2	02321	●
0.015	1/8	0.045	1-1/2	02322	●
0.016	1/8	0.048	1-1/2	02323	●
0.017	1/8	0.051	1-1/2	02324	●
0.018	1/8	0.054	1-1/2	02325	●
0.019	1/8	0.057	1-1/2	02326	●
0.020	1/8	0.060	1-1/2	02327	●
0.021	1/8	0.063	1-1/2	02328	●
0.022	1/8	0.066	1-1/2	02329	●
0.023	1/8	0.069	1-1/2	02330	●
0.024	1/8	0.072	1-1/2	02331	●
0.025	1/8	0.075	1-1/2	02332	●
0.026	1/8	0.078	1-1/2	02333	●
0.027	1/8	0.081	1-1/2	02334	●
0.028	1/8	0.084	1-1/2	02335	●
0.029	1/8	0.087	1-1/2	02336	●
0.030	1/8	0.090	1-1/2	02337	●
0.031	1/8	0.093	1-1/2	02338	●
0.032	1/8	0.096	1-1/2	02339	●
0.033	1/8	0.099	1-1/2	02340	●
0.034	1/8	0.102	1-1/2	02341	●
0.035	1/8	0.105	1-1/2	02342	●
0.036	1/8	0.108	1-1/2	02343	●
0.037	1/8	0.111	1-1/2	02344	●
0.038	1/8	0.114	1-1/2	02345	●
0.039	1/8	0.117	1-1/2	02346	●
0.040	1/8	0.120	1-1/2	02347	●

continued on next page

TOLERANCES (inch)

.005–.120 DIAMETER

D_1 = +0.000/–0.001

D_2 = h_6

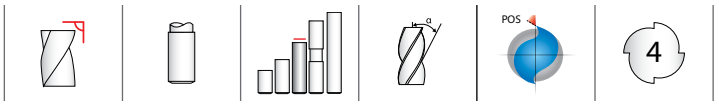
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

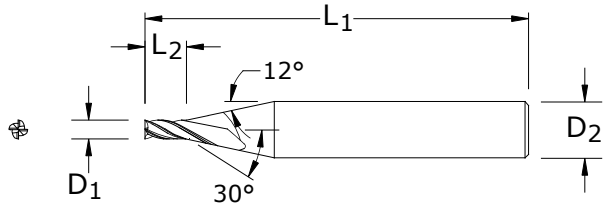
● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery

M4 3xD
FRACTIONAL SERIES

continued

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.041	1/8	0.123	1-1/2	02470	●
0.042	1/8	0.126	1-1/2	02471	●
0.043	1/8	0.129	1-1/2	02472	●
0.044	1/8	0.132	1-1/2	02473	●
0.045	1/8	0.135	1-1/2	02474	●
0.046	1/8	0.138	1-1/2	02475	●
0.047	1/8	0.141	1-1/2	02476	●
0.048	1/8	0.144	1-1/2	02477	●
0.049	1/8	0.147	1-1/2	02478	●
0.050	1/8	0.150	1-1/2	02479	●
0.051	1/8	0.153	1-1/2	02480	●
0.052	1/8	0.156	1-1/2	02481	●
0.053	1/8	0.159	1-1/2	02482	●
0.054	1/8	0.162	1-1/2	02483	●
0.055	1/8	0.165	1-1/2	02484	●
0.056	1/8	0.168	1-1/2	02485	●
0.057	1/8	0.171	1-1/2	02486	●
0.058	1/8	0.174	1-1/2	02487	●
0.059	1/8	0.177	1-1/2	02488	●
0.060	1/8	0.180	1-1/2	02489	●
0.062	1/8	0.186	1-1/2	02490	●
0.065	1/8	0.195	1-1/2	02491	●
0.070	1/8	0.210	1-1/2	02492	●
0.078	1/8	0.234	1-1/2	02493	●
0.080	1/8	0.240	1-1/2	02494	●
0.085	1/8	0.255	1-1/2	02495	●
0.090	1/8	0.270	1-1/2	02496	●
0.093	1/8	0.279	1-1/2	02497	●
0.095	1/8	0.285	1-1/2	02498	●
0.100	1/8	0.300	1-1/2	02499	●
0.105	1/8	0.315	1-1/2	02500	●
0.110	1/8	0.330	1-1/2	02501	●
0.115	1/8	0.345	1-1/2	02502	●
0.120	1/8	0.360	1-1/2	02503	●





M4L 5xD
FRACTIONAL SERIES

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.010	1/8	0.050	2-1/2	02640	●
0.015	1/8	0.075	2-1/2	02641	●
0.020	1/8	0.100	2-1/2	02642	●
0.025	1/8	0.125	2-1/2	02643	●
0.030	1/8	0.150	2-1/2	02644	●
0.031	1/8	0.155	2-1/2	02645	●
0.035	1/8	0.175	2-1/2	02646	●
0.040	1/8	0.200	2-1/2	02647	●
0.045	1/8	0.225	2-1/2	02648	●
0.047	1/8	0.235	2-1/2	02649	●
0.050	1/8	0.250	2-1/2	02650	●
0.055	1/8	0.275	2-1/2	02651	●
0.060	1/8	0.300	2-1/2	02652	●
0.062	1/8	0.310	2-1/2	02653	●
0.065	1/8	0.325	2-1/2	02654	●
0.070	1/8	0.350	2-1/2	02655	●
0.075	1/8	0.375	2-1/2	02656	●
0.078	1/8	0.390	2-1/2	02657	●
0.080	1/8	0.400	2-1/2	02658	●
0.085	1/8	0.425	2-1/2	02659	●
0.090	1/8	0.450	2-1/2	02660	●
0.093	1/8	0.465	2-1/2	02661	●
0.095	1/8	0.475	2-1/2	02662	●
0.100	1/8	0.500	2-1/2	02663	●
0.110	1/8	0.550	2-1/2	02664	●
0.115	1/8	0.575	2-1/2	02665	●
0.120	1/8	0.600	2-1/2	02666	●

TOLERANCES (inch)

.010–.120 DIAMETER

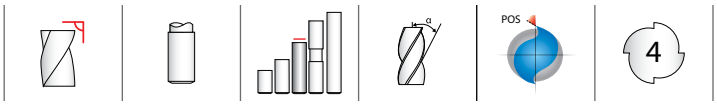
D_1 = +0.000/–0.001

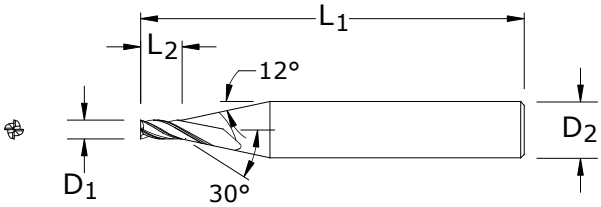
D_2 = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

● U.S. Stock Standard

■ NOT STOCKED—Call for Delivery





TOLERANCES (inch)

.010–.120 DIAMETER
D_1 = +0.000/–0.001
D_2 = h_6

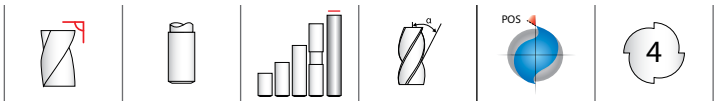
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

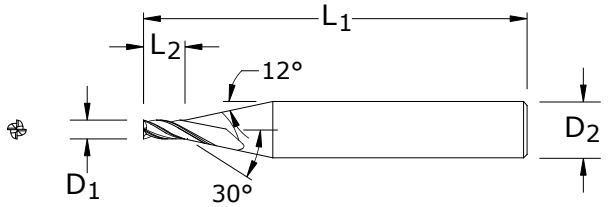
● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery

M4E 8xD
FRACTIONAL SERIES

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.010	1/8	0.080	2-1/2	02667	●
0.015	1/8	0.120	2-1/2	02668	●
0.020	1/8	0.160	2-1/2	02669	●
0.025	1/8	0.200	2-1/2	02670	●
0.030	1/8	0.240	2-1/2	02671	●
0.031	1/8	0.248	2-1/2	02672	●
0.035	1/8	0.280	2-1/2	02673	●
0.040	1/8	0.320	2-1/2	02674	●
0.045	1/8	0.360	2-1/2	02675	●
0.047	1/8	0.376	2-1/2	02676	●
0.050	1/8	0.400	2-1/2	02677	●
0.055	1/8	0.440	2-1/2	02678	●
0.060	1/8	0.480	2-1/2	02679	●
0.062	1/8	0.496	2-1/2	02680	●
0.065	1/8	0.520	2-1/2	02681	●
0.070	1/8	0.560	2-1/2	02682	●
0.075	1/8	0.600	2-1/2	02683	●
0.078	1/8	0.624	2-1/2	02684	●
0.080	1/8	0.640	2-1/2	02685	●
0.085	1/8	0.680	2-1/2	02686	●
0.090	1/8	0.720	2-1/2	02687	●
0.093	1/8	0.744	2-1/2	02688	●
0.095	1/8	0.760	2-1/2	02689	●
0.100	1/8	0.800	2-1/2	02690	●
0.110	1/8	0.880	2-1/2	02691	●
0.115	1/8	0.920	2-1/2	02692	●
0.120	1/8	0.960	2-1/2	02693	●

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.





M4X 12xD

FRACTIONAL SERIES

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.015	1/8	0.180	2-1/2	02694	●
0.020	1/8	0.240	2-1/2	02695	●
0.025	1/8	0.300	2-1/2	02696	●
0.030	1/8	0.360	2-1/2	02697	●
0.031	1/8	0.372	2-1/2	02698	●
0.035	1/8	0.420	2-1/2	02699	●
0.040	1/8	0.480	2-1/2	02700	●
0.045	1/8	0.540	2-1/2	02701	●
0.047	1/8	0.564	2-1/2	02702	●
0.050	1/8	0.600	2-1/2	02703	●
0.055	1/8	0.660	2-1/2	02704	●
0.060	1/8	0.720	2-1/2	02705	●
0.062	1/8	0.744	2-1/2	02706	●
0.065	1/8	0.780	2-1/2	02707	●
0.070	1/8	0.840	2-1/2	02708	●
0.075	1/8	0.900	2-1/2	02709	●
0.078	1/8	0.936	2-1/2	02710	●
0.080	1/8	0.960	2-1/2	02711	●
0.085	1/8	1.020	2-1/2	02712	●
0.090	1/8	1.080	2-1/2	02713	●
0.093	1/8	1.116	2-1/2	02714	●
0.095	1/8	1.140	2-1/2	02715	●
0.100	1/8	1.200	2-1/2	02716	●
0.110	1/8	1.320	2-1/2	02717	●
0.115	1/8	1.380	2-1/2	02718	●
0.120	1/8	1.440	2-1/2	02719	●

TOLERANCES (inch)

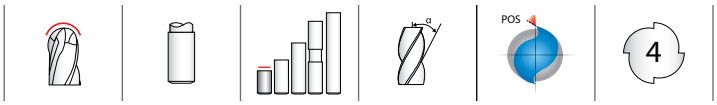
.015–.120 DIAMETER

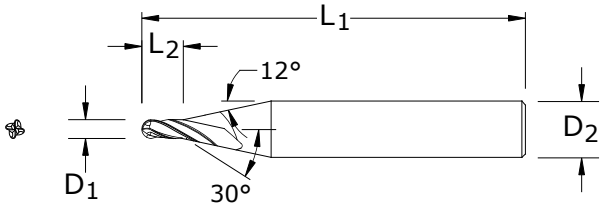
D_1 = +0.000/–0.001

D_2 = h_6

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery





TOLERANCES (inch)

.010–.120 DIAMETER
D_1 = +0.000/–0.001
D_2 = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery

M4B 1.5xD
FRACTIONAL SERIES

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.010	1/8	0.015	1-1/2	03071	●
0.011	1/8	0.017	1-1/2	03072	●
0.012	1/8	0.018	1-1/2	03073	●
0.013	1/8	0.020	1-1/2	03074	●
0.014	1/8	0.021	1-1/2	03075	●
0.015	1/8	0.023	1-1/2	03076	●
0.016	1/8	0.024	1-1/2	03077	●
0.017	1/8	0.026	1-1/2	03078	●
0.018	1/8	0.027	1-1/2	03079	●
0.019	1/8	0.029	1-1/2	03080	●
0.020	1/8	0.030	1-1/2	03081	●
0.021	1/8	0.032	1-1/2	03082	●
0.022	1/8	0.033	1-1/2	03083	●
0.023	1/8	0.035	1-1/2	03084	●
0.024	1/8	0.036	1-1/2	03085	●
0.025	1/8	0.038	1-1/2	03086	●
0.026	1/8	0.039	1-1/2	03087	●
0.027	1/8	0.041	1-1/2	03088	●
0.028	1/8	0.042	1-1/2	03089	●
0.029	1/8	0.044	1-1/2	03090	●
0.030	1/8	0.045	1-1/2	03091	●
0.031	1/8	0.047	1-1/2	03092	●
0.032	1/8	0.048	1-1/2	03093	●
0.033	1/8	0.050	1-1/2	03094	●
0.034	1/8	0.051	1-1/2	03095	●
0.035	1/8	0.053	1-1/2	03096	●
0.036	1/8	0.054	1-1/2	03097	●
0.037	1/8	0.056	1-1/2	03098	●
0.038	1/8	0.057	1-1/2	03099	●
0.039	1/8	0.059	1-1/2	03100	●
0.040	1/8	0.060	1-1/2	03101	●
0.041	1/8	0.062	1-1/2	02538	●
0.042	1/8	0.063	1-1/2	02539	●

continued on next page

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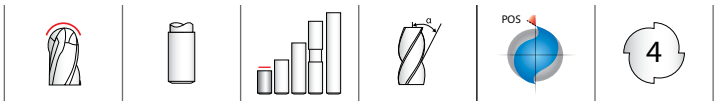
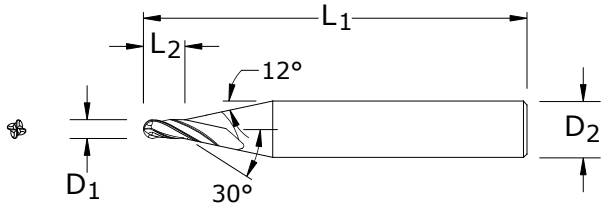




M4B 1.5xD
FRACTIONAL SERIES

continued

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.043	1/8	0.065	1-1/2	02540	●
0.044	1/8	0.066	1-1/2	02541	●
0.045	1/8	0.068	1-1/2	02542	●
0.046	1/8	0.069	1-1/2	02543	●
0.047	1/8	0.071	1-1/2	02544	●
0.048	1/8	0.072	1-1/2	02545	●
0.049	1/8	0.074	1-1/2	02546	●
0.050	1/8	0.075	1-1/2	02547	●
0.051	1/8	0.077	1-1/2	02548	●
0.052	1/8	0.078	1-1/2	02549	●
0.053	1/8	0.080	1-1/2	02550	●
0.054	1/8	0.081	1-1/2	02551	●
0.055	1/8	0.083	1-1/2	02552	●
0.056	1/8	0.084	1-1/2	02553	●
0.057	1/8	0.086	1-1/2	02554	●
0.058	1/8	0.087	1-1/2	02555	●
0.059	1/8	0.089	1-1/2	02556	●
0.060	1/8	0.090	1-1/2	02557	●
0.062	1/8	0.093	1-1/2	02558	●
0.065	1/8	0.098	1-1/2	02559	●
0.070	1/8	0.105	1-1/2	02560	●
0.078	1/8	0.117	1-1/2	02561	●
0.080	1/8	0.120	1-1/2	02562	●
0.085	1/8	0.128	1-1/2	02563	●
0.090	1/8	0.135	1-1/2	02564	●
0.093	1/8	0.140	1-1/2	02565	●
0.095	1/8	0.143	1-1/2	02566	●
0.100	1/8	0.150	1-1/2	02567	●
0.105	1/8	0.158	1-1/2	02568	●
0.110	1/8	0.165	1-1/2	02569	●
0.115	1/8	0.173	1-1/2	02570	●
0.120	1/8	0.180	1-1/2	02571	●

TOLERANCES (inch)

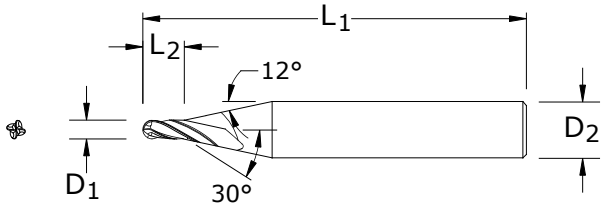
.010–.120 DIAMETER

D_1 = +0.000/–0.001

D_2 = h_6

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery



TOLERANCES (inch)

.010–.120 DIAMETER

D_1 = +0.000/–0.001

D_2 = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery

M4B 3xD
FRACTIONAL SERIES

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.010	1/8	0.030	1-1/2	03145	●
0.011	1/8	0.033	1-1/2	03146	●
0.012	1/8	0.036	1-1/2	03147	●
0.013	1/8	0.039	1-1/2	03148	●
0.014	1/8	0.042	1-1/2	03149	●
0.015	1/8	0.045	1-1/2	03150	●
0.016	1/8	0.048	1-1/2	03151	●
0.017	1/8	0.051	1-1/2	03152	●
0.018	1/8	0.054	1-1/2	03153	●
0.019	1/8	0.057	1-1/2	03154	●
0.020	1/8	0.060	1-1/2	03155	●
0.021	1/8	0.063	1-1/2	03156	●
0.022	1/8	0.066	1-1/2	03157	●
0.023	1/8	0.069	1-1/2	03158	●
0.024	1/8	0.072	1-1/2	03159	●
0.025	1/8	0.075	1-1/2	03160	●
0.026	1/8	0.078	1-1/2	03161	●
0.027	1/8	0.081	1-1/2	03162	●
0.028	1/8	0.084	1-1/2	03163	●
0.029	1/8	0.087	1-1/2	03164	●
0.030	1/8	0.090	1-1/2	03165	●
0.031	1/8	0.093	1-1/2	03166	●
0.032	1/8	0.096	1-1/2	03167	●
0.033	1/8	0.099	1-1/2	03168	●
0.034	1/8	0.102	1-1/2	03169	●
0.035	1/8	0.105	1-1/2	03170	●
0.036	1/8	0.108	1-1/2	03171	●
0.037	1/8	0.111	1-1/2	03172	●
0.038	1/8	0.114	1-1/2	03173	●
0.039	1/8	0.117	1-1/2	03174	●
0.040	1/8	0.120	1-1/2	03175	●
0.041	1/8	0.123	1-1/2	02606	●
0.042	1/8	0.126	1-1/2	02607	●
0.043	1/8	0.129	1-1/2	02608	●

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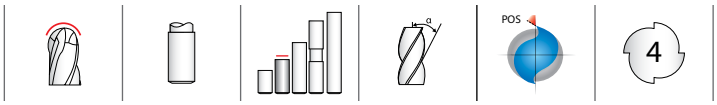
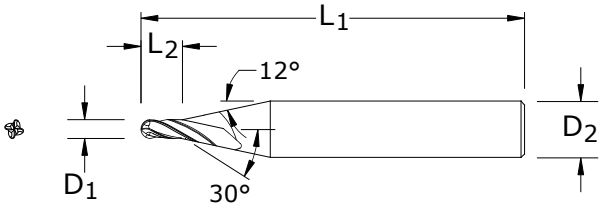




M4B 3xD
FRACTIONAL SERIES

continued

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.044	1/8	0.132	1-1/2	02609	●
0.045	1/8	0.135	1-1/2	02610	●
0.046	1/8	0.138	1-1/2	02611	●
0.047	1/8	0.141	1-1/2	02612	●
0.048	1/8	0.144	1-1/2	02613	●
0.049	1/8	0.147	1-1/2	02614	●
0.050	1/8	0.150	1-1/2	02615	●
0.051	1/8	0.153	1-1/2	02616	●
0.052	1/8	0.156	1-1/2	02617	●
0.053	1/8	0.159	1-1/2	02618	●
0.054	1/8	0.162	1-1/2	02619	●
0.055	1/8	0.165	1-1/2	02620	●
0.056	1/8	0.168	1-1/2	02621	●
0.057	1/8	0.171	1-1/2	02622	●
0.058	1/8	0.174	1-1/2	02623	●
0.059	1/8	0.177	1-1/2	02624	●
0.060	1/8	0.180	1-1/2	02625	●
0.062	1/8	0.186	1-1/2	02626	●
0.065	1/8	0.195	1-1/2	02627	●
0.070	1/8	0.210	1-1/2	02628	●
0.078	1/8	0.234	1-1/2	02629	●
0.080	1/8	0.240	1-1/2	02630	●
0.085	1/8	0.255	1-1/2	02631	●
0.090	1/8	0.270	1-1/2	02632	●
0.093	1/8	0.279	1-1/2	02633	●
0.095	1/8	0.285	1-1/2	02634	●
0.100	1/8	0.300	1-1/2	02635	●
0.105	1/8	0.315	1-1/2	02636	●
0.110	1/8	0.330	1-1/2	02637	●
0.115	1/8	0.345	1-1/2	02638	●
0.120	1/8	0.360	1-1/2	02639	●

TOLERANCES (inch)

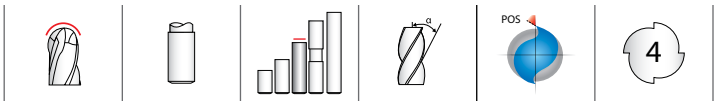
.010–.120 DIAMETER

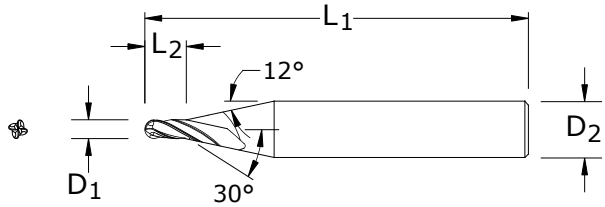
D_1 = +0.000/–0.001

D_2 = h_6

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery





TOLERANCES (inch)

.010–.120 DIAMETER
D_1 = +0.000/–0.001
D_2 = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

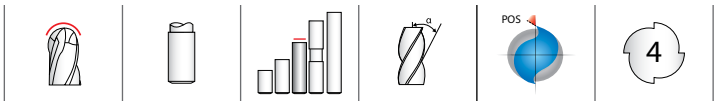
● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery

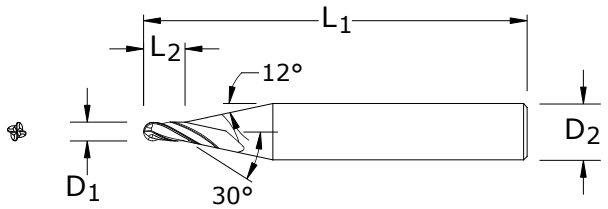
M4LB 5xD
FRACTIONAL SERIES

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.010	1/8	0.050	2-1/2	02720	●
0.015	1/8	0.075	2-1/2	02721	●
0.020	1/8	0.100	2-1/2	02722	●
0.025	1/8	0.125	2-1/2	02723	●
0.030	1/8	0.150	2-1/2	02724	●
0.031	1/8	0.155	2-1/2	02725	●
0.035	1/8	0.175	2-1/2	02726	●
0.040	1/8	0.200	2-1/2	02727	●
0.045	1/8	0.225	2-1/2	02728	●
0.047	1/8	0.235	2-1/2	02729	●
0.050	1/8	0.250	2-1/2	02730	●
0.055	1/8	0.275	2-1/2	02731	●
0.060	1/8	0.300	2-1/2	02732	●
0.062	1/8	0.310	2-1/2	02733	●
0.065	1/8	0.325	2-1/2	02734	●
0.070	1/8	0.350	2-1/2	02735	●
0.075	1/8	0.375	2-1/2	02736	●
0.078	1/8	0.390	2-1/2	02737	●
0.080	1/8	0.400	2-1/2	02738	●
0.085	1/8	0.425	2-1/2	02739	●
0.090	1/8	0.450	2-1/2	02740	●
0.093	1/8	0.465	2-1/2	02741	●
0.095	1/8	0.475	2-1/2	02742	●
0.100	1/8	0.500	2-1/2	02743	●
0.110	1/8	0.550	2-1/2	02744	●
0.115	1/8	0.575	2-1/2	02745	●
0.120	1/8	0.600	2-1/2	02746	●

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

M4EB 8xD





M4EB 8xD

FRACTIONAL SERIES

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inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.010	1/8	0.080	2-1/2	02747	●
0.015	1/8	0.120	2-1/2	02748	●
0.020	1/8	0.160	2-1/2	02749	●
0.025	1/8	0.200	2-1/2	02750	●
0.030	1/8	0.240	2-1/2	02751	●
0.031	1/8	0.248	2-1/2	02752	●
0.035	1/8	0.280	2-1/2	02753	●
0.040	1/8	0.320	2-1/2	02754	●
0.045	1/8	0.360	2-1/2	02755	●
0.047	1/8	0.376	2-1/2	02756	●
0.050	1/8	0.400	2-1/2	02757	●
0.055	1/8	0.440	2-1/2	02758	●
0.060	1/8	0.480	2-1/2	02759	●
0.062	1/8	0.496	2-1/2	02760	●
0.065	1/8	0.520	2-1/2	02761	●
0.070	1/8	0.560	2-1/2	02762	●
0.075	1/8	0.600	2-1/2	02763	●
0.078	1/8	0.624	2-1/2	02764	●
0.080	1/8	0.640	2-1/2	02765	●
0.085	1/8	0.680	2-1/2	02766	●
0.090	1/8	0.720	2-1/2	02767	●
0.093	1/8	0.744	2-1/2	02768	●
0.095	1/8	0.760	2-1/2	02769	●
0.100	1/8	0.800	2-1/2	02770	●
0.110	1/8	0.880	2-1/2	02771	●
0.115	1/8	0.920	2-1/2	02772	●
0.120	1/8	0.960	2-1/2	02773	●

TOLERANCES (inch)

.010–.120 DIAMETER

D_1 = +0.000/–0.001

D_2 = h_6

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

● U.S. Stock Standard
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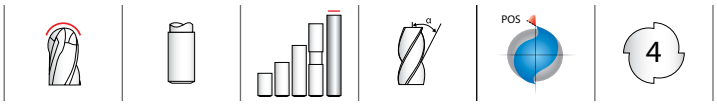

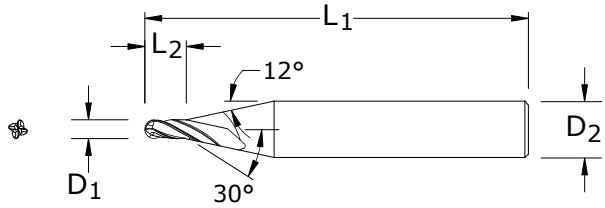

TOLERANCES (inch)

.015–.120 DIAMETER
D_1 = +0.000/–0.001
D_2 = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery

M4XB 12xD
FRACTIONAL SERIES

inch				EDP NO.	
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0.015	1/8	0.180	2-1/2	02774	●
0.020	1/8	0.240	2-1/2	02775	●
0.025	1/8	0.300	2-1/2	02776	●
0.030	1/8	0.360	2-1/2	02777	●
0.031	1/8	0.372	2-1/2	02778	●
0.035	1/8	0.420	2-1/2	02779	●
0.040	1/8	0.480	2-1/2	02780	●
0.045	1/8	0.540	2-1/2	02781	●
0.047	1/8	0.564	2-1/2	02782	●
0.050	1/8	0.600	2-1/2	02783	●
0.055	1/8	0.660	2-1/2	02784	●
0.060	1/8	0.720	2-1/2	02785	●
0.062	1/8	0.744	2-1/2	02786	●
0.065	1/8	0.780	2-1/2	02787	●
0.070	1/8	0.840	2-1/2	02788	●
0.075	1/8	0.900	2-1/2	02789	●
0.078	1/8	0.936	2-1/2	02790	●
0.080	1/8	0.960	2-1/2	02791	●
0.085	1/8	1.020	2-1/2	02792	●
0.090	1/8	1.080	2-1/2	02793	●
0.093	1/8	1.116	2-1/2	02794	●
0.095	1/8	1.140	2-1/2	02795	●
0.100	1/8	1.200	2-1/2	02796	●
0.110	1/8	1.320	2-1/2	02797	●
0.115	1/8	1.380	2-1/2	02798	●
0.120	1/8	1.440	2-1/2	02799	●

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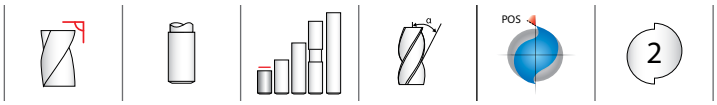

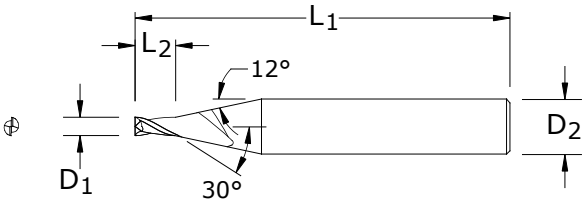

M2M 1.5xD

METRIC SERIES

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
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mm					EDP NO.	
CUTTING DIAMETER D_1	DECIMAL EQUIVALENT	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0,2	0.0079	3,0	0,3	38,0	02801	●
0,3	0.0118	3,0	0,4	38,0	02802	●
0,4	0.0157	3,0	0,6	38,0	02803	●
0,5	0.0197	3,0	0,7	38,0	02804	●
0,6	0.0236	3,0	0,9	38,0	02805	●
0,7	0.0276	3,0	1,0	38,0	02806	●
0,8	0.0315	3,0	1,2	38,0	02807	●
0,9	0.0354	3,0	1,3	38,0	02808	●
1,0	0.0394	3,0	1,5	38,0	02809	●
1,0	0.0394	4,0	1,5	50,0	02819	●
1,1	0.0433	3,0	1,6	38,0	02860	●
1,1	0.0433	4,0	1,6	50,0	02892	●
1,2	0.0472	3,0	1,8	38,0	02861	●
1,2	0.0472	4,0	1,8	50,0	02893	●
1,3	0.0512	3,0	1,9	38,0	02862	●
1,3	0.0512	4,0	1,9	50,0	02894	●
1,4	0.0551	3,0	2,1	38,0	02863	●
1,4	0.0551	4,0	2,1	50,0	02895	●
1,5	0.0591	3,0	2,2	38,0	02864	●
1,5	0.0591	4,0	2,2	50,0	02896	●
1,6	0.0630	3,0	2,4	38,0	02865	●
1,6	0.0630	4,0	2,4	50,0	02897	●
1,7	0.0669	3,0	2,5	38,0	02866	●
1,7	0.0669	4,0	2,5	50,0	02898	●
1,8	0.0709	3,0	2,7	38,0	02867	●
1,8	0.0709	4,0	2,7	50,0	02899	●
1,9	0.0748	3,0	2,8	38,0	02868	●
1,9	0.0748	4,0	2,8	50,0	02900	●
2,0	0.0787	3,0	3,0	38,0	02869	●
2,0	0.0787	4,0	3,0	50,0	02901	●
2,5	0.0984	3,0	3,7	38,0	02870	●
2,5	0.0984	4,0	3,7	50,0	02902	●
3,0	0.1181	3,0	4,5	38,0	02871	●
3,0	0.1181	4,0	4,5	50,0	02903	●

TOLERANCES (mm)

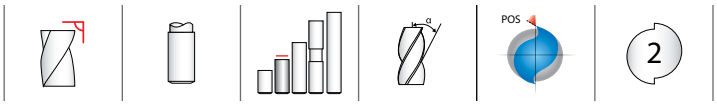
0,2–3,0 DIAMETER

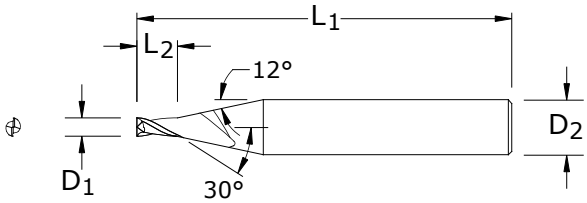
D_1 = +0.0000/–0.0254

D_2 = h_6

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery





TOLERANCES (mm)

0,2–3,0 DIAMETER

D_1 = +0.0000/–0.0254

D_2 = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

● U.S. Stock Standard

■ NOT STOCKED—Call for Delivery

M2M 3xD

METRIC SERIES

mm					EDP NO.	
CUTTING DIAMETER D_1	DECIMAL EQUIVALENT	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0,2	0.0079	3,0	0,6	38,0	02811	●
0,2	0.0079	4,0	0,6	50,0	02349	●
0,3	0.0118	3,0	0,9	38,0	02350	●
0,3	0.0118	4,0	0,9	50,0	02360	●
0,4	0.0157	3,0	1,2	38,0	02351	●
0,4	0.0157	4,0	1,2	50,0	02361	●
0,5	0.0197	3,0	1,5	38,0	02352	●
0,5	0.0197	4,0	1,5	50,0	02362	●
0,6	0.0236	3,0	1,8	38,0	02353	●
0,6	0.0236	4,0	1,8	50,0	02363	●
0,7	0.0276	3,0	2,1	38,0	02354	●
0,7	0.0276	4,0	2,1	50,0	02364	●
0,8	0.0315	3,0	2,4	38,0	02355	●
0,8	0.0315	4,0	2,4	50,0	02365	●
0,9	0.0354	3,0	2,7	38,0	02356	●
0,9	0.0354	4,0	2,7	50,0	02366	●
1,0	0.0394	3,0	3,0	38,0	02357	●
1,0	0.0394	4,0	3,0	50,0	02367	●
1,1	0.0433	3,0	3,3	38,0	02872	●
1,1	0.0433	4,0	3,3	50,0	02904	●
1,2	0.0472	3,0	3,6	38,0	02873	●
1,2	0.0472	4,0	3,6	50,0	02905	●
1,3	0.0512	3,0	3,9	38,0	02874	●
1,3	0.0512	4,0	3,9	50,0	02906	●
1,4	0.0551	3,0	4,2	38,0	02875	●
1,4	0.0551	4,0	4,2	50,0	02907	●
1,5	0.0591	3,0	4,5	38,0	02876	●
1,5	0.0591	4,0	4,5	50,0	02908	●
1,6	0.0630	3,0	4,8	38,0	02877	●
1,6	0.0630	4,0	4,8	50,0	02909	●
1,7	0.0669	3,0	5,1	38,0	02878	●
1,7	0.0669	4,0	5,1	50,0	02910	●
1,8	0.0709	3,0	5,4	38,0	02879	●
1,8	0.0709	4,0	5,4	50,0	02911	●
1,9	0.0748	3,0	5,7	38,0	02880	●
1,9	0.0748	4,0	5,7	50,0	02912	●
2,0	0.0787	3,0	6,0	38,0	02881	●
2,0	0.0787	4,0	6,0	50,0	02913	●
2,1	0.0827	3,0	6,3	38,0	02882	●
2,2	0.0866	3,0	6,6	38,0	02883	●
2,3	0.0906	3,0	6,9	38,0	02884	●
2,4	0.0945	3,0	7,2	38,0	02885	●
2,5	0.0984	3,0	7,5	38,0	02886	●
2,5	0.0984	4,0	7,5	50,0	02914	●
2,6	0.1024	3,0	7,8	38,0	02887	●
2,7	0.1063	3,0	8,1	38,0	02888	●
2,8	0.1102	3,0	8,4	38,0	02889	●
2,9	0.1142	3,0	8,7	38,0	02890	●
3,0	0.1181	3,0	9,0	38,0	02891	●
3,0	0.1181	4,0	9,0	50,0	02915	●

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
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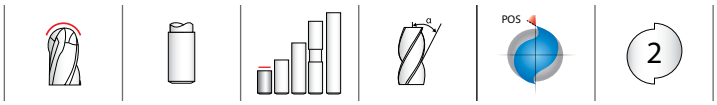
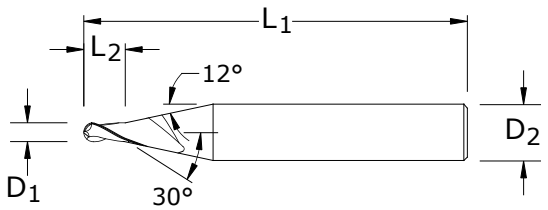
M2MB 1.5xD





M2MB 1.5xD

METRIC SERIES

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mm					EDP NO.	
CUTTING DIAMETER D_1	DECIMAL EQUIVALENT	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0,5	0.0197	3,0	0,7	38,0	03180	●
0,6	0.0236	3,0	0,9	38,0	03181	●
0,7	0.0276	3,0	1,0	38,0	03182	●
0,8	0.0315	3,0	1,2	38,0	03183	●
0,9	0.0354	3,0	1,3	38,0	03184	●
1,0	0.0394	3,0	1,5	38,0	03185	●
1,0	0.0394	4,0	1,5	50,0	02849	●
1,1	0.0433	3,0	1,6	38,0	02916	●
1,1	0.0433	4,0	1,6	50,0	02980	●
1,2	0.0472	3,0	1,8	38,0	02917	●
1,2	0.0472	4,0	1,8	50,0	02981	●
1,3	0.0512	3,0	1,9	38,0	02918	●
1,3	0.0512	4,0	1,9	50,0	02982	●
1,4	0.0551	3,0	2,1	38,0	02919	●
1,4	0.0551	4,0	2,1	50,0	02983	●
1,5	0.0591	3,0	2,2	38,0	02920	●
1,5	0.0591	4,0	2,2	50,0	02984	●
1,6	0.0630	3,0	2,4	38,0	02921	●
1,6	0.0630	4,0	2,4	50,0	02985	●
1,7	0.0669	3,0	2,5	38,0	02922	●
1,7	0.0669	4,0	2,5	50,0	02986	●
1,8	0.0709	3,0	2,7	38,0	02923	●
1,8	0.0709	4,0	2,7	50,0	02987	●
1,9	0.0748	3,0	2,8	38,0	02924	●
1,9	0.0748	4,0	2,8	50,0	02988	●
2,0	0.0787	3,0	3,0	38,0	02925	●
2,0	0.0787	4,0	3,0	50,0	02989	●
2,5	0.0984	3,0	3,7	38,0	02926	●
2,5	0.0984	4,0	3,7	50,0	02990	●
3,0	0.1181	3,0	4,5	38,0	02927	●
3,0	0.1181	4,0	4,5	50,0	02991	●

TOLERANCES (mm)

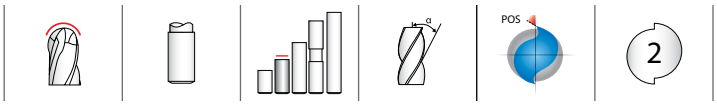
0,5–3,0 DIAMETER

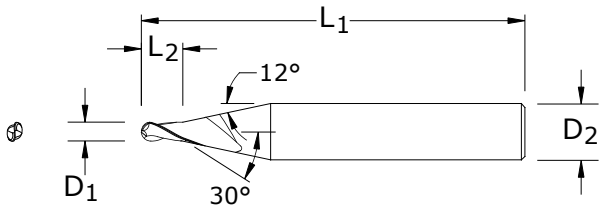
D_1 = +0.0000/–0.0254

D_2 = h_6

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

● U.S. Stock Standard
■ NOT STOCKED—Call for Delivery





TOLERANCES (mm)

0,5–3,0 DIAMETER

D_1 = +0.0000/–0.0254

D_2 = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

● U.S. Stock Standard

■ NOT STOCKED—Call for Delivery

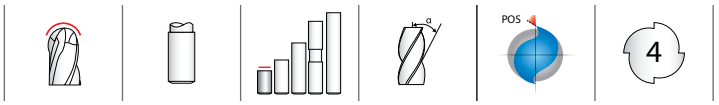
M2MB 3xD

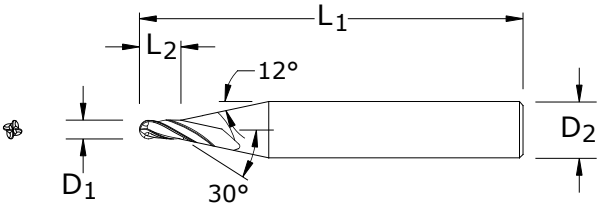
METRIC SERIES

mm					EDP NO.	
CUTTING DIAMETER D_1	DECIMAL EQUIVALENT	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
0,5	0.0197	4,0	1,5	50,0	03200	●
0,6	0.0236	4,0	1,8	50,0	03201	●
0,7	0.0276	4,0	2,1	50,0	03202	●
0,8	0.0315	4,0	2,4	50,0	03203	●
0,9	0.0354	4,0	2,7	50,0	03204	●
1,0	0.0394	3,0	3,0	38,0	02829	●
1,0	0.0394	4,0	3,0	50,0	03205	●
1,1	0.0433	3,0	3,3	38,0	02940	●
1,1	0.0433	4,0	3,3	50,0	03004	●
1,2	0.0472	3,0	3,6	38,0	02941	●
1,2	0.0472	4,0	3,6	50,0	03005	●
1,3	0.0512	3,0	3,9	38,0	02942	●
1,3	0.0512	4,0	3,9	50,0	03006	●
1,4	0.0551	3,0	4,2	38,0	02943	●
1,4	0.0551	4,0	4,2	50,0	03007	●
1,5	0.0591	3,0	4,5	38,0	02944	●
1,5	0.0591	4,0	4,5	50,0	03008	●
1,6	0.0630	3,0	4,8	38,0	02945	●
1,6	0.0630	4,0	4,8	50,0	03009	●
1,7	0.0669	3,0	5,1	38,0	02946	●
1,7	0.0669	4,0	5,1	50,0	03010	●
1,8	0.0709	3,0	5,4	38,0	02947	●
1,8	0.0709	4,0	5,4	50,0	03011	●
1,9	0.0748	3,0	5,7	38,0	02948	●
1,9	0.0748	4,0	5,7	50,0	03012	●
2,0	0.0787	3,0	6,0	38,0	02949	●
2,0	0.0787	4,0	6,0	50,0	03013	●
2,1	0.0827	3,0	6,3	38,0	02950	●
2,2	0.0866	3,0	6,6	38,0	02951	●
2,3	0.0906	3,0	6,9	38,0	02952	●
2,4	0.0945	3,0	7,2	38,0	02953	●
2,5	0.0984	3,0	7,5	38,0	02954	●
2,5	0.0984	4,0	7,5	50,0	03014	●
2,6	0.1024	3,0	7,8	38,0	02955	●
2,7	0.1063	3,0	8,1	38,0	02956	●
2,8	0.1102	3,0	8,4	38,0	02957	●
2,9	0.1142	3,0	8,7	38,0	02958	●
3,0	0.1181	3,0	9,0	38,0	02959	●
3,0	0.1181	4,0	9,0	50,0	03015	●

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

M4MB 1.5xD





M4MB 1.5xD

METRIC SERIES

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

mm					EDP NO.	
CUTTING DIAMETER D_1	DECIMAL EQUIVALENT	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
1,0	0.0394	3,0	1,5	38,0	03195	●
1,0	0.0394	4,0	1,5	50,0	02859	●
1,1	0.0433	3,0	1,6	38,0	02928	●
1,1	0.0433	4,0	1,6	50,0	02992	●
1,2	0.0472	3,0	1,8	38,0	02929	●
1,2	0.0472	4,0	1,8	50,0	02993	●
1,3	0.0512	3,0	1,9	38,0	02930	●
1,3	0.0512	4,0	1,9	50,0	02994	●
1,4	0.0551	3,0	2,1	38,0	02931	●
1,4	0.0551	4,0	2,1	50,0	02995	●
1,5	0.0591	3,0	2,2	38,0	02932	●
1,5	0.0591	4,0	2,2	50,0	02996	●
1,6	0.0630	3,0	2,4	38,0	02933	●
1,6	0.0630	4,0	2,4	50,0	02997	●
1,7	0.0669	3,0	2,5	38,0	02934	●
1,7	0.0669	4,0	2,5	50,0	02998	●
1,8	0.0709	3,0	2,7	38,0	02935	●
1,8	0.0709	4,0	2,7	50,0	02999	●
1,9	0.0748	3,0	2,8	38,0	02936	●
1,9	0.0748	4,0	2,8	50,0	03000	●
2,0	0.0787	3,0	3,0	38,0	02937	●
2,0	0.0787	4,0	3,0	50,0	03001	●
2,5	0.0984	3,0	3,7	38,0	02938	●
2,5	0.0984	4,0	3,7	50,0	03002	●
3,0	0.1181	3,0	4,5	38,0	02939	●
3,0	0.1181	4,0	4,5	50,0	03003	●

TOLERANCES (mm)

1,0–3,0 DIAMETER

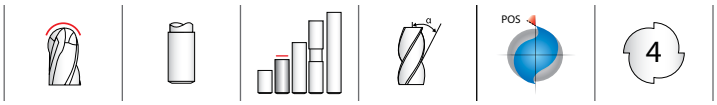
D_1 = +0.0000/–0.0254

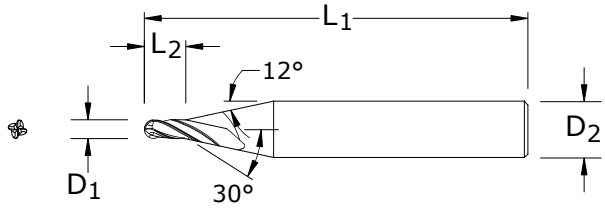
D_2 = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

● U.S. Stock Standard

■ NOT STOCKED—Call for Delivery





TOLERANCES (mm)

1,0–3,0 DIAMETER

D_1 = +0.0000/–0.0254

D_2 = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

● U.S. Stock Standard

■ NOT STOCKED—Call for Delivery

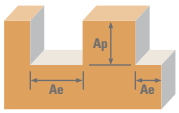
M4MB 3xD

METRIC SERIES

mm					EDP NO.	
CUTTING DIAMETER D_1	DECIMAL EQUIVALENT	SHANK DIAMETER D_2	LENGTH OF CUT L_2	OVERALL LENGTH L_1	TI-NAMITE-A (AlTiN) EDP NO.	STOCK
1,0	0.0394	3,0	3,0	38,0	02839	●
1,0	0.0394	4,0	3,0	50,0	03215	●
1,1	0.0433	3,0	3,3	38,0	02960	●
1,1	0.0433	4,0	3,3	50,0	03016	●
1,2	0.0472	3,0	3,6	38,0	02961	●
1,2	0.0472	4,0	3,6	50,0	03017	●
1,3	0.0512	3,0	3,9	38,0	02962	●
1,3	0.0512	4,0	3,9	50,0	03018	●
1,4	0.0551	3,0	4,2	38,0	02963	●
1,4	0.0551	4,0	4,2	50,0	03019	●
1,5	0.0591	3,0	4,5	38,0	02964	●
1,5	0.0591	4,0	4,5	50,0	03020	●
1,6	0.0630	3,0	4,8	38,0	02965	●
1,6	0.0630	4,0	4,8	50,0	03021	●
1,7	0.0669	3,0	5,1	38,0	02966	●
1,7	0.0669	4,0	5,1	50,0	03022	●
1,8	0.0709	3,0	5,4	38,0	02967	●
1,8	0.0709	4,0	5,4	50,0	03023	●
1,9	0.0748	3,0	5,7	38,0	02968	●
1,9	0.0748	4,0	5,7	50,0	03024	●
2,0	0.0787	3,0	6,0	38,0	02969	●
2,0	0.0787	4,0	6,0	50,0	03025	●
2,1	0.0827	3,0	6,3	38,0	02970	●
2,2	0.0866	3,0	6,6	38,0	02971	●
2,3	0.0906	3,0	6,9	38,0	02972	●
2,4	0.0945	3,0	7,2	38,0	02973	●
2,5	0.0984	3,0	7,5	38,0	02974	●
2,5	0.0984	4,0	7,5	50,0	03026	●
2,6	0.1024	3,0	7,8	38,0	02975	●
2,7	0.1063	3,0	8,1	38,0	02976	●
2,8	0.1102	3,0	8,4	38,0	02977	●
2,9	0.1142	3,0	8,7	38,0	02978	●
3,0	0.1181	3,0	9,0	38,0	02979	●
3,0	0.1181	4,0	9,0	50,0	03027	●

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

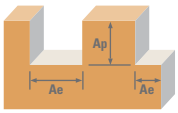
2 Flute: Square, Ball



	M2, M2B 1.5xD Fractional	Hardness		Ae x D_1		Ap x D_1		Vc (SFM)		Diameter (D_1) (inch) 0.005	0.015	0.031	0.062	0.093	0.120
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .30	≤ .50	≤ 1		365	RPM	278860	89378	44689	22309	14865	11619
								(292-438)	Fz	0.000022	0.00007	0.00013	0.00027	0.00041	0.00052
									Feed (ipm)	12.05	12.05	12.05	12.05	12.05	12.05
			Slot	1		≤ .20	≤ .50	290	RPM	221560	71013	35506	17725	11810	9232
								(232-348)	Fz	0.000022	0.00007	0.00013	0.00027	0.00041	0.00052
									Feed (ipm)	9.57	9.57	9.57	9.57	9.57	9.57
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .30	≤ .50	≤ 1		210	RPM	160440	51423	25712	12835	8552	6685
								(168-252)	Fz	0.000019	0.00006	0.00012	0.00024	0.00036	0.00046
									Feed (ipm)	6.16	6.16	6.16	6.16	6.16	6.16
			Slot	1		≤ .20	≤ .50	165	RPM	126060	40404	20202	10085	6720	5253
								(132-198)	Fz	0.000019	0.00006	0.00012	0.00024	0.00036	0.00046
									Feed (ipm)	4.84	4.84	4.84	4.84	4.84	4.84
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .30	≤ .50	≤ 1		175	RPM	133700	42853	21426	10696	7127	5571
								(140-210)	Fz	0.000016	0.00005	0.00010	0.00020	0.00030	0.00038
									Feed (ipm)	4.28	4.28	4.28	4.28	4.28	4.28
			Slot	1		≤ .20	≤ .50	140	RPM	106960	34282	17141	8557	5701	4457
								(112-168)	Fz	0.000016	0.00005	0.00010	0.00020	0.00030	0.00038
									Feed (ipm)	3.42	3.42	3.42	3.42	3.42	3.42
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ .30	≤ .50	≤ 1		305	RPM	233020	74686	37343	18642	12421	9709
								(244-366)	Fz	0.000022	0.00007	0.00014	0.00027	0.00041	0.00052
									Feed (ipm)	10.08	10.08	10.08	10.08	10.08	10.08
			Slot	1		≤ .20	≤ .50	245	RPM	187180	59994	29997	14974	9978	7799
								(196-294)	Fz	0.000022	0.00007	0.00014	0.00027	0.00041	0.00052
									Feed (ipm)	8.10	8.10	8.10	8.10	8.10	8.10
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .30	≤ .50	≤ 1		340	RPM	259760	83256	41628	20781	13846	10823
								(272-408)	Fz	0.000022	0.00007	0.00013	0.00027	0.00041	0.00052
									Feed (ipm)	11.22	11.22	11.22	11.22	11.22	11.22
			Slot	1		≤ .20	≤ .50	270	RPM	206280	66115	33058	16502	10996	8595
								(216-324)	Fz	0.000022	0.00007	0.00013	0.00027	0.00041	0.00052
									Feed (ipm)	8.91	8.91	8.91	8.91	8.91	8.91
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .30	≤ .50	≤ 1		235	RPM	179540	57545	28772	14363	9570	7481
								(188-282)	Fz	0.000019	0.00006	0.00012	0.00024	0.00036	0.00046
									Feed (ipm)	6.90	6.90	6.90	6.90	6.90	6.90
			Slot	1		≤ .20	≤ .50	185	RPM	141340	45301	22651	11307	7534	5889
								(148-222)	Fz	0.000019	0.00006	0.00012	0.00024	0.00036	0.00046
									Feed (ipm)	5.43	5.43	5.43	5.43	5.43	5.43
	STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ .30	≤ .50	≤ 1		215	RPM	164260	52647	26324	13141	8756	6844
								(172-258)	Fz	0.000014	0.00004	0.00008	0.00017	0.00025	0.00033
									Feed (ipm)	4.46	4.46	4.46	4.46	4.46	4.46
			Slot	1		≤ .20	≤ .50	170	RPM	129880	41628	20814	10390	6923	5412
								(136-204)	Fz	0.000014	0.00004	0.00008	0.00017	0.00025	0.00033
									Feed (ipm)	3.53	3.53	3.53	3.53	3.53	3.53

continued on next page

2 Flute: Square, Ball

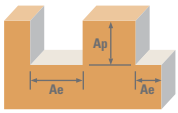


	M2, M2B 1.5xD Fractional	Hardness		Ae x D_1		Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 0.005	0.015	0.031	0.062	0.093	0.120
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400**	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ .30	≤ .50	≤ 1	60	RPM	45840	14692	7346	3667	2443	1910
							(48-72)	Fz	0.000012	0.00004	0.00008	0.00015	0.00023	0.00029
								Feed (ipm)	1.11	1.11	1.11	1.11	1.11	1.11
			Slot	1		≤ .20	45	RPM	34380	11019	5510	2750	1833	1433
						≤ .50	(36-54)	Fz	0.000012	0.00004	0.00008	0.00015	0.00023	0.00029
								Feed (ipm)	0.83	0.83	0.83	0.83	0.83	0.83
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ .30	≤ .50	≤ 1	45	RPM	34380	11019	5510	2750	1833	1433
							(36-54)	Fz	0.000008	0.00003	0.00005	0.00010	0.00015	0.00019
								Feed (ipm)	0.55	0.55	0.55	0.55	0.55	0.55
			Slot	1		≤ .20	35	RPM	26740	8571	4285	2139	1425	1114
						≤ .50	(28-42)	Fz	0.000008	0.00003	0.00005	0.00010	0.00015	0.00019
								Feed (ipm)	0.43	0.43	0.43	0.43	0.43	0.43
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ .30	≤ .50	≤ 1	160	RPM	122240	39179	19590	9779	6516	5093
							(128-192)	Fz	0.000014	0.00004	0.00008	0.00017	0.00025	0.00033
								Feed (ipm)	3.32	3.32	3.32	3.32	3.32	3.32
			Slot	1		≤ .20	130	RPM	99320	31833	15917	7946	5294	4138
						≤ .50	(104-156)	Fz	0.000014	0.00004	0.00008	0.00017	0.00025	0.00033
								Feed (ipm)	2.70	2.70	2.70	2.70	2.70	2.70
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ .30	≤ .50	≤ 1	60	RPM	45840	14692	7346	3667	2443	1910
							(48-72)	Fz	0.000010	0.00003	0.00006	0.00012	0.00018	0.00023
								Feed (ipm)	0.88	0.88	0.88	0.88	0.88	0.88
			Slot	1		≤ .20	45	RPM	34380	11019	5510	2750	1833	1433
						≤ .50	(36-54)	Fz	0.000010	0.00003	0.00006	0.00012	0.00018	0.00023
								Feed (ipm)	0.66	0.66	0.66	0.66	0.66	0.66
N	**ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075**	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ .30	≤ .50	≤ 1	1000	RPM	764000	244872	122436	61120	40725	31833
							(800-1200)	Fz	0.000064	0.00020	0.00040	0.00080	0.00120	0.00153
								Feed (ipm)	97.50	97.50	97.50	97.50	97.50	97.50
			Slot	1		≤ .20	800	RPM	611200	195897	97949	48896	32580	25467
						≤ .50	(640-960)	Fz	0.000064	0.00020	0.00040	0.00080	0.00120	0.00153
								Feed (ipm)	78.00	78.00	78.00	78.00	78.00	78.00
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	≤ .30	≤ .50	≤ 1	515	RPM	393460	126109	63054	31477	20973	16394
							(412-618)	Fz	0.000048	0.00015	0.00030	0.00060	0.00090	0.00115
								Feed (ipm)	37.68	37.68	37.68	37.68	37.68	37.68
			Slot	1		≤ .20	410	RPM	313240	100397	50199	25059	16697	13052
						≤ .50	(328-492)	Fz	0.000048	0.00015	0.00030	0.00060	0.00090	0.00115
								Feed (ipm)	30.00	30.00	30.00	30.00	30.00	30.00
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ .30	≤ .50	≤ 1	1000	RPM	764000	244872	122436	61120	40725	31833
							(800-1200)	Fz	0.000064	0.00020	0.00040	0.00080	0.00120	0.00153
								Feed (ipm)	97.50	97.50	97.50	97.50	97.50	97.50
			Slot	1		≤ .20	800	RPM	611200	195897	97949	48896	32580	25467
						≤ .50	(640-960)	Fz	0.000064	0.00020	0.00040	0.00080	0.00120	0.00153
								Feed (ipm)	78.00	78.00	78.00	78.00	78.00	78.00

Note:
- Bhn (Brinell) HRc (Rockwell C)
- when recommended speed exceeds your capability, use maximum available and recalculate ipm
- rpm = Vc x 3.82 / D1
- ipm = Fz x 2 x rpm
- helical ramp at 2 degrees or less, using slotting speed and feed rates (plunging is not recommended)
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D1 maximum)
- refer to the KYOCERA SGS Tool Wizard for complete technical information (www.kyocera-sgstool.com)

FRACTIONAL

2 Flute: Square, Ball



	M2, M2B 3xD Fractional	Hardness		Ae x D_1		Ap x D_1		Vc (SFM)		Diameter (D_1) (inch) 0.005	0.015	0.031	0.062	0.093	0.120
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 2		365	RPM	278860	89378	44689	22309	14865	11619
								(292-438)	Fz	0.000019	0.00006	0.00012	0.00024	0.00036	0.00047
									Feed (ipm)	10.84	10.84	10.84	10.84	10.84	10.84
			Slot	1		≤ .15	≤ .35	290	RPM	221560	71013	35506	17725	11810	9232
								(232-348)	Fz	0.000019	0.00006	0.00012	0.00024	0.00036	0.00047
									Feed (ipm)	8.61	8.61	8.61	8.61	8.61	8.61
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .10	≤ .25	≤ 2		210	RPM	160440	51423	25712	12835	8552	6685
								(168-252)	Fz	0.000017	0.00005	0.00011	0.00022	0.00032	0.00042
									Feed (ipm)	5.55	5.55	5.55	5.55	5.55	5.55
			Slot	1		≤ .15	≤ .35	165	RPM	126060	40404	20202	10085	6720	5253
								(132-198)	Fz	0.000017	0.00005	0.00011	0.00022	0.00032	0.00042
									Feed (ipm)	4.36	4.36	4.36	4.36	4.36	4.36
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .10	≤ .25	≤ 2		175	RPM	133700	42853	21426	10696	7127	5571
								(140-210)	Fz	0.000014	0.00004	0.00009	0.00018	0.00026	0.00034
									Feed (ipm)	3.75	3.75	3.75	3.75	3.75	3.75
			Slot	1		≤ .15	≤ .35	140	RPM	106960	34282	17141	8557	5701	4457
								(112-168)	Fz	0.000014	0.00004	0.00009	0.00018	0.00026	0.00034
									Feed (ipm)	3.00	3.00	3.00	3.00	3.00	3.00
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ .10	≤ .25	≤ 2		305	RPM	233020	74686	37343	18642	12421	9709
								(244-366)	Fz	0.000019	0.00006	0.00012	0.00024	0.00037	0.00047
									Feed (ipm)	9.09	9.09	9.09	9.09	9.09	9.09
			Slot	1		≤ .15	≤ .35	245	RPM	187180	59994	29997	14974	9978	7799
								(196-294)	Fz	0.000019	0.00006	0.00012	0.00024	0.00037	0.00047
									Feed (ipm)	7.30	7.30	7.30	7.30	7.30	7.30
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 2		340	RPM	259760	83256	41628	20781	13846	10823
								(272-408)	Fz	0.000019	0.00006	0.00012	0.00024	0.00036	0.00047
									Feed (ipm)	10.07	10.07	10.07	10.07	10.07	10.07
			Slot	1		≤ .15	≤ .35	270	RPM	206280	66115	33058	16502	10996	8595
								(216-324)	Fz	0.000019	0.00006	0.00012	0.00024	0.00036	0.00047
									Feed (ipm)	8.00	8.00	8.00	8.00	8.00	8.00
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 2		235	RPM	179540	57545	28772	14363	9570	7481
								(188-282)	Fz	0.000017	0.00005	0.00011	0.00022	0.00032	0.00042
									Feed (ipm)	6.21	6.21	6.21	6.21	6.21	6.21
			Slot	1		≤ .15	≤ .35	185	RPM	141340	45301	22651	11307	7534	5889
								(148-222)	Fz	0.000017	0.00005	0.00011	0.00022	0.00032	0.00042
									Feed (ipm)	4.89	4.89	4.89	4.89	4.89	4.89
	STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ .10	≤ .25	≤ 2		215	RPM	164260	52647	26324	13141	8756	6844
								(172-258)	Fz	0.000012	0.00004	0.00008	0.00015	0.00023	0.00029
									Feed (ipm)	4.02	4.02	4.02	4.02	4.02	4.02
			Slot	1		≤ .15	≤ .35	170	RPM	129880	41628	20814	10390	6923	5412
								(136-204)	Fz	0.000012	0.00004	0.00008	0.00015	0.00023	0.00029
									Feed (ipm)	3.18	3.18	3.18	3.18	3.18	3.18

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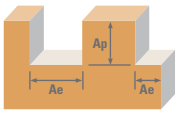
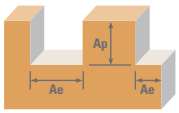
2 Flute: Square, Ball



	M2, M2B 3xD Fractional	Hardness		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 0.005	0.015	0.031	0.062	0.093	0.120
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ .10	≤ .25	≤ 2	60	RPM	45840	14692	7346	3667	2443	1910
							(48-72)	Fz	0.000011	0.00003	0.00007	0.00014	0.00020	0.00026
								Feed (ipm)	1.00	1.00	1.00	1.00	1.00	1.00
			Slot	1		≤ .15	45	RPM	34380	11019	5510	2750	1833	1433
						≤ .35	(36-54)	Fz	0.000011	0.00003	0.00007	0.00014	0.00020	0.00026
								Feed (ipm)	0.75	0.75	0.75	0.75	0.75	0.75
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ .10	≤ .25	≤ 2	45	RPM	34380	11019	5510	2750	1833	1433
							(36-54)	Fz	0.000007	0.00002	0.00005	0.00009	0.00014	0.00018
								Feed (ipm)	0.50	0.50	0.50	0.50	0.50	0.50
			Slot	1		≤ .15	35	RPM	26740	8571	4285	2139	1425	1114
						≤ .35	(28-42)	Fz	0.000007	0.00002	0.00005	0.00009	0.00014	0.00018
								Feed (ipm)	0.39	0.39	0.39	0.39	0.39	0.39
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ .10	≤ .25	≤ 2	160	RPM	122240	39179	19590	9779	6516	5093
							(128-192)	Fz	0.000012	0.00004	0.00008	0.00015	0.00023	0.00029
								Feed (ipm)	2.99	2.99	2.99	2.99	2.99	2.99
			Slot	1		≤ .15	130	RPM	99320	31833	15917	7946	5294	4138
						≤ .35	(104-156)	Fz	0.000012	0.00004	0.00008	0.00015	0.00023	0.00029
								Feed (ipm)	2.43	2.43	2.43	2.43	2.43	2.43
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ .10	≤ .25	≤ 2	60	RPM	45840	14692	7346	3667	2443	1910
							(48-72)	Fz	0.000009	0.00003	0.00005	0.00011	0.00016	0.00021
								Feed (ipm)	0.79	0.79	0.79	0.79	0.79	0.79
			Slot	1		≤ .15	45	RPM	34380	11019	5510	2750	1833	1433
						≤ .35	(36-54)	Fz	0.000009	0.00003	0.00005	0.00011	0.00016	0.00021
								Feed (ipm)	0.59	0.59	0.59	0.59	0.59	0.59
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ .10	≤ .25	≤ 2	1000	RPM	764000	244872	122436	61120	40725	31833
							(800-1200)	Fz	0.000057	0.00018	0.00036	0.00072	0.00107	0.00137
								Feed (ipm)	87.50	87.50	87.50	87.50	87.50	87.50
			Slot	1		≤ .15	800	RPM	611200	195897	97949	48896	32580	25467
						≤ .35	(640-960)	Fz	0.000057	0.00018	0.00036	0.00072	0.00107	0.00137
								Feed (ipm)	70.00	70.00	70.00	70.00	70.00	70.00
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	≤ .10	≤ .25	≤ 2	515	RPM	393460	126109	63054	31477	20973	16394
							(412-618)	Fz	0.000043	0.00013	0.00027	0.00054	0.00081	0.00103
								Feed (ipm)	33.91	33.91	33.91	33.91	33.91	33.91
			Slot	1		≤ .15	410	RPM	313240	100397	50199	25059	16697	13052
						≤ .35	(328-492)	Fz	0.000043	0.00013	0.00027	0.00054	0.00081	0.00103
								Feed (ipm)	27.00	27.00	27.00	27.00	27.00	27.00
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ .10	≤ .25	≤ 2	1000	RPM	764000	244872	122436	61120	40725	31833
							(800-1200)	Fz	0.000057	0.00018	0.00036	0.00072	0.00107	0.00137
								Feed (ipm)	87.50	87.50	87.50	87.50	87.50	87.50
			Slot	1		≤ .15	800	RPM	611200	195897	97949	48896	32580	25467
						≤ .35	(640-960)	Fz	0.000057	0.00018	0.00036	0.00072	0.00107	0.00137
								Feed (ipm)	70.00	70.00	70.00	70.00	70.00	70.00

Note:
- Bhn (Brinell) HRc (Rockwell C)
- when recommended speed exceeds your capability, use maximum available and recalculate ipm
- rpm = Vc x 3.82 / D_1
- ipm = Fz x 2 x rpm
- helical ramp at 2 degrees or less, using slotting speed and feed rates (plunging is not recommended)
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D_1 maximum)
- refer to the KYOCERA SGS Tool Wizard for complete technical information (www.kyocera-sgstool.com)

4 Flute: Square, Ball



	M4, M4B 1.5xD Fractional	Hardness		Ae x D_1		Ap x D_1		Vc (SFM)		Diameter (D_1) (inch) 0.005	0.015	0.031	0.062	0.093	0.120
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .30	≤ .50	≤ 1		365	RPM	278860	89378	44689	22309	14865	11619
								(292-438)	Fz	0.000017	0.00005	0.00011	0.00021	0.00032	0.00041
									Feed (ipm)	18.88	18.88	18.88	18.88	18.88	18.88
			Slot	1		≤ .20	≤ .50	290	RPM	221560	71013	35506	17725	11810	9232
								(232-348)	Fz	0.000017	0.00005	0.00011	0.00021	0.00032	0.00041
									Feed (ipm)	15.00	15.00	15.00	15.00	15.00	15.00
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .30	≤ .50	≤ 1		210	RPM	160440	51423	25712	12835	8552	6685
								(168-252)	Fz	0.000015	0.00005	0.00010	0.00019	0.00029	0.00037
									Feed (ipm)	9.80	9.80	9.80	9.80	9.80	9.80
			Slot	1		≤ .20	≤ .50	165	RPM	126060	40404	20202	10085	6720	5253
								(132-198)	Fz	0.000015	0.00005	0.00010	0.00019	0.00029	0.00037
									Feed (ipm)	7.70	7.70	7.70	7.70	7.70	7.70
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .30	≤ .50	≤ 1		175	RPM	133700	42853	21426	10696	7127	5571
								(140-210)	Fz	0.000013	0.00004	0.00008	0.00016	0.00024	0.00030
									Feed (ipm)	6.75	6.75	6.75	6.75	6.75	6.75
			Slot	1		≤ .20	≤ .50	140	RPM	106960	34282	17141	8557	5701	4457
								(112-168)	Fz	0.000013	0.00004	0.00008	0.00016	0.00024	0.00030
									Feed (ipm)	5.40	5.40	5.40	5.40	5.40	5.40
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ .30	≤ .50	≤ 1		305	RPM	233020	74686	37343	18642	12421	9709
								(244-366)	Fz	0.000017	0.00005	0.00011	0.00021	0.00032	0.00041
									Feed (ipm)	15.81	15.81	15.81	15.81	15.81	15.81
			Slot	1		≤ .20	≤ .50	245	RPM	187180	59994	29997	14974	9978	7799
								(196-294)	Fz	0.000017	0.00005	0.00011	0.00021	0.00032	0.00041
									Feed (ipm)	12.70	12.70	12.70	12.70	12.70	12.70
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .30	≤ .50	≤ 1		340	RPM	259760	83256	41628	20781	13846	10823
								(272-408)	Fz	0.000017	0.00005	0.00010	0.00021	0.00031	0.00040
									Feed (ipm)	17.38	17.38	17.38	17.38	17.38	17.38
			Slot	1		≤ .20	≤ .50	270	RPM	206280	66115	33058	16502	10996	8595
								(216-324)	Fz	0.000017	0.00005	0.00010	0.00021	0.00031	0.00040
									Feed (ipm)	13.80	13.80	13.80	13.80	13.80	13.80
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .30	≤ .50	≤ 1		235	RPM	179540	57545	28772	14363	9570	7481
								(188-282)	Fz	0.000015	0.00005	0.00009	0.00019	0.00029	0.00037
									Feed (ipm)	10.92	10.92	10.92	10.92	10.92	10.92
			Slot	1		≤ .20	≤ .50	185	RPM	141340	45301	22651	11307	7534	5889
								(148-222)	Fz	0.000015	0.00005	0.00009	0.00019	0.00029	0.00037
									Feed (ipm)	8.60	8.60	8.60	8.60	8.60	8.60
	STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ .30	≤ .50	≤ 1		215	RPM	164260	52647	26324	13141	8756	6844
								(172-258)	Fz	0.000011	0.00003	0.00007	0.00013	0.00020	0.00026
									Feed (ipm)	7.08	7.08	7.08	7.08	7.08	7.08
			Slot	1		≤ .20	≤ .50	170	RPM	129880	41628	20814	10390	6923	5412
								(136-204)	Fz	0.000011	0.00003	0.00007	0.00013	0.00020	0.00026
									Feed (ipm)	5.60	5.60	5.60	5.60	5.60	5.60

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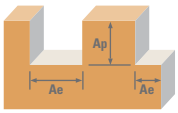
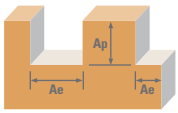
4 Flute: Square, Ball



	M4, M4B 1.5xD Fractional	Hardness		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 0.005	0.015	0.031	0.062	0.093	0.120
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ .30	≤ .50	≤ 1	60	RPM	45840	14692	7346	3667	2443	1910
							(48-72)	Fz	0.000009	0.00003	0.00006	0.00012	0.00018	0.00023
								Feed (ipm)	1.73	1.73	1.73	1.73	1.73	1.73
			Slot	1		≤ .20	45	RPM	34380	11019	5510	2750	1833	1433
						≤ .50	(36-54)	Fz	0.000009	0.00003	0.00006	0.00012	0.00018	0.00023
								Feed (ipm)	1.30	1.30	1.30	1.30	1.30	1.30
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ .30	≤ .50	≤ 1	45	RPM	34380	11019	5510	2750	1833	1433
							(36-54)	Fz	0.000006	0.00002	0.00004	0.00008	0.00012	0.00015
								Feed (ipm)	0.87	0.87	0.87	0.87	0.87	0.87
			Slot	1		≤ .20	35	RPM	26740	8571	4285	2139	1425	1114
						≤ .50	(28-42)	Fz	0.000006	0.00002	0.00004	0.00008	0.00012	0.00015
								Feed (ipm)	0.68	0.68	0.68	0.68	0.68	0.68
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ .30	≤ .50	≤ 1	160	RPM	122240	39179	19590	9779	6516	5093
							(128-192)	Fz	0.000011	0.00003	0.00007	0.00013	0.00020	0.00025
								Feed (ipm)	5.17	5.17	5.17	5.17	5.17	5.17
			Slot	1		≤ .20	130	RPM	99320	31833	15917	7946	5294	4138
						≤ .50	(104-156)	Fz	0.000011	0.00003	0.00007	0.00013	0.00020	0.00025
								Feed (ipm)	4.20	4.20	4.20	4.20	4.20	4.20
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ .30	≤ .50	≤ 1	60	RPM	45840	14692	7346	3667	2443	1910
							(48-72)	Fz	0.000007	0.00002	0.00005	0.00009	0.00014	0.00017
								Feed (ipm)	1.33	1.33	1.33	1.33	1.33	1.33
			Slot	1		≤ .20	45	RPM	34380	11019	5510	2750	1833	1433
						≤ .50	(36-54)	Fz	0.000007	0.00002	0.00005	0.00009	0.00014	0.00017
								Feed (ipm)	1.00	1.00	1.00	1.00	1.00	1.00
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ .30	≤ .50	≤ 1	1000	RPM	764000	244872	122436	61120	40725	31833
							(800-1200)	Fz	0.000051	0.00016	0.00032	0.00064	0.00096	0.00123
								Feed (ipm)	156.25	156.25	156.25	156.25	156.25	156.25
			Slot	1		≤ .20	800	RPM	611200	195897	97949	48896	32580	25467
						≤ .50	(640-960)	Fz	0.000051	0.00016	0.00032	0.00064	0.00096	0.00123
								Feed (ipm)	125.00	125.00	125.00	125.00	125.00	125.00
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	≤ .30	≤ .50	≤ 1	515	RPM	393460	126109	63054	31477	20973	16394
							(412-618)	Fz	0.000038	0.00012	0.00024	0.00048	0.00072	0.00092
								Feed (ipm)	60.29	60.29	60.29	60.29	60.29	60.29
			Slot	1		≤ .20	410	RPM	313240	100397	50199	25059	16697	13052
						≤ .50	(328-492)	Fz	0.000038	0.00012	0.00024	0.00048	0.00072	0.00092
								Feed (ipm)	48.00	48.00	48.00	48.00	48.00	48.00
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ .30	≤ .50	≤ 1	1000	RPM	764000	244872	122436	61120	40725	31833
							(800-1200)	Fz	0.000051	0.00016	0.00032	0.00064	0.00096	0.00123
								Feed (ipm)	156.25	156.25	156.25	156.25	156.25	156.25
			Slot	1		≤ .20	800	RPM	611200	195897	97949	48896	32580	25467
						≤ .50	(640-960)	Fz	0.000051	0.00016	0.00032	0.00064	0.00096	0.00123
								Feed (ipm)	125.00	125.00	125.00	125.00	125.00	125.00

Note:
- Bhn (Brinell) HRc (Rockwell C)
- when recommended speed exceeds your capability, use maximum available and recalculate ipm
- rpm = Vc x 3.82 / D1
- ipm = Fz x 4 x rpm
- helical ramp at 2 degrees or less, using slotting speed and feed rates (plunging is not recommended)
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D1 maximum)
- refer to the KYOCERA SGS Tool Wizard for complete technical information (www.kyocera-sgstool.com)

4 Flute: Square, Ball



	M4, M4B 3xD Fractional	Hardness		Ae x D_1		Ap x D_1		Vc (SFM)		Diameter (D_1) (inch) 0.005	0.015	0.031	0.062	0.093	0.120
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 2		365	RPM	278860	89378	44689	22309	14865	11619
								(292-438)	Fz	0.000015	0.00005	0.00010	0.00019	0.00029	0.00037
									Feed (ipm)	16.99	16.99	16.99	16.99	16.99	16.99
			Slot	1		≤ .15	≤ .35	290	RPM	221560	71013	35506	17725	11810	9232
								(232-348)	Fz	0.000015	0.00005	0.00010	0.00019	0.00029	0.00037
									Feed (ipm)	13.50	13.50	13.50	13.50	13.50	13.50
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .10	≤ .25	≤ 2		210	RPM	160440	51423	25712	12835	8552	6685
								(168-252)	Fz	0.000014	0.00004	0.00009	0.00017	0.00026	0.00033
									Feed (ipm)	8.91	8.91	8.91	8.91	8.91	8.91
			Slot	1		≤ .15	≤ .35	165	RPM	126060	40404	20202	10085	6720	5253
								(132-198)	Fz	0.000014	0.00004	0.00009	0.00017	0.00026	0.00033
									Feed (ipm)	7.00	7.00	7.00	7.00	7.00	7.00
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .10	≤ .25	≤ 2		175	RPM	133700	42853	21426	10696	7127	5571
								(140-210)	Fz	0.000011	0.00003	0.00007	0.00014	0.00021	0.00026
									Feed (ipm)	5.88	5.88	5.88	5.88	5.88	5.88
			Slot	1		≤ .15	≤ .35	140	RPM	106960	34282	17141	8557	5701	4457
								(112-168)	Fz	0.000011	0.00003	0.00007	0.00014	0.00021	0.00026
									Feed (ipm)	4.70	4.70	4.70	4.70	4.70	4.70
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ .10	≤ .25	≤ 2		305	RPM	233020	74686	37343	18642	12421	9709
								(244-366)	Fz	0.000015	0.00005	0.00010	0.00019	0.00029	0.00037
									Feed (ipm)	14.32	14.32	14.32	14.32	14.32	14.32
			Slot	1		≤ .15	≤ .35	245	RPM	187180	59994	29997	14974	9978	7799
								(196-294)	Fz	0.000015	0.00005	0.00010	0.00019	0.00029	0.00037
									Feed (ipm)	11.50	11.50	11.50	11.50	11.50	11.50
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 2		340	RPM	259760	83256	41628	20781	13846	10823
								(272-408)	Fz	0.000015	0.00005	0.00009	0.00019	0.00028	0.00036
									Feed (ipm)	15.74	15.74	15.74	15.74	15.74	15.74
			Slot	1		≤ .15	≤ .35	270	RPM	206280	66115	33058	16502	10996	8595
								(216-324)	Fz	0.000015	0.00005	0.00009	0.00019	0.00028	0.00036
									Feed (ipm)	12.50	12.50	12.50	12.50	12.50	12.50
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 2		235	RPM	179540	57545	28772	14363	9570	7481
								(188-282)	Fz	0.000014	0.00004	0.00009	0.00017	0.00026	0.00034
									Feed (ipm)	10.04	10.04	10.04	10.04	10.04	10.04
			Slot	1		≤ .15	≤ .35	185	RPM	141340	45301	22651	11307	7534	5889
								(148-222)	Fz	0.000014	0.00004	0.00009	0.00017	0.00026	0.00034
									Feed (ipm)	7.90	7.90	7.90	7.90	7.90	7.90
	STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ .10	≤ .25	≤ 2		215	RPM	164260	52647	26324	13141	8756	6844
								(172-258)	Fz	0.000010	0.00003	0.00006	0.00012	0.00018	0.00024
									Feed (ipm)	6.45	6.45	6.45	6.45	6.45	6.45
			Slot	1		≤ .15	≤ .35	170	RPM	129880	41628	20814	10390	6923	5412
								(136-204)	Fz	0.000010	0.00003	0.00006	0.00012	0.00018	0.00024
									Feed (ipm)	5.10	5.10	5.10	5.10	5.10	5.10

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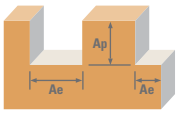
4 Flute: Square, Ball

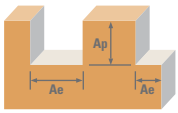


	M4, M4B 3xD Fractional	Hardness		Ae x D_1		Ap x D_1		Vc (SFM)		Diameter (D_1) (inch) 0.005	0.015	0.031	0.062	0.093	0.120
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ .10	≤ .25	≤ 2		60	RPM	45840	14692	7346	3667	2443	1910
								(48-72)	Fz	0.000008	0.00002	0.00005	0.00010	0.00015	0.00019
									Feed (ipm)	1.47	1.47	1.47	1.47	1.47	1.47
			Slot	1		≤ .15	≤ .35	45	RPM	34380	11019	5510	2750	1833	1433
								(36-54)	Fz	0.000008	0.00002	0.00005	0.00010	0.00015	0.00019
									Feed (ipm)	1.10	1.10	1.10	1.10	1.10	1.10
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ .10	≤ .25	≤ 2		45	RPM	34380	11019	5510	2750	1833	1433
								(36-54)	Fz	0.000006	0.00002	0.00004	0.00007	0.00011	0.00013
									Feed (ipm)	0.77	0.77	0.77	0.77	0.77	0.77
			Slot	1		≤ .15	≤ .35	35	RPM	26740	8571	4285	2139	1425	1114
								(28-42)	Fz	0.000006	0.00002	0.00004	0.00007	0.00011	0.00013
									Feed (ipm)	0.60	0.60	0.60	0.60	0.60	0.60
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ .10	≤ .25	≤ 2		160	RPM	122240	39179	19590	9779	6516	5093
								(128-192)	Fz	0.000010	0.00003	0.00006	0.00012	0.00018	0.00024
									Feed (ipm)	4.80	4.80	4.80	4.80	4.80	4.80
			Slot	1		≤ .15	≤ .35	130	RPM	99320	31833	15917	7946	5294	4138
								(104-156)	Fz	0.000010	0.00003	0.00006	0.00012	0.00018	0.00024
									Feed (ipm)	3.90	3.90	3.90	3.90	3.90	3.90
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ .10	≤ .25	≤ 2		60	RPM	45840	14692	7346	3667	2443	1910
								(48-72)	Fz	0.000007	0.00002	0.00004	0.00008	0.00012	0.00016
									Feed (ipm)	1.20	1.20	1.20	1.20	1.20	1.20
			Slot	1		≤ .15	≤ .35	45	RPM	34380	11019	5510	2750	1833	1433
								(36-54)	Fz	0.000007	0.00002	0.00004	0.00008	0.00012	0.00016
									Feed (ipm)	0.90	0.90	0.90	0.90	0.90	0.90
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ .10	≤ .25	≤ 2		1000	RPM	764000	244872	122436	61120	40725	31833
								(800-1200)	Fz	0.000047	0.00015	0.00029	0.00058	0.00087	0.00112
									Feed (ipm)	142.50	142.50	142.50	142.50	142.50	142.50
			Slot	1		≤ .15	≤ .35	800	RPM	611200	195897	97949	48896	32580	25467
								(640-960)	Fz	0.000047	0.00015	0.00029	0.00058	0.00087	0.00112
									Feed (ipm)	114.00	114.00	114.00	114.00	114.00	114.00
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	≤ .10	≤ .25	≤ 2		515	RPM	393460	126109	63054	31477	20973	16394
								(412-618)	Fz	0.000034	0.00011	0.00021	0.00043	0.00064	0.00082
									Feed (ipm)	54.01	54.01	54.01	54.01	54.01	54.01
			Slot	1		≤ .15	≤ .35	410	RPM	313240	100397	50199	25059	16697	13052
								(328-492)	Fz	0.000034	0.00011	0.00021	0.00043	0.00064	0.00082
									Feed (ipm)	43.00	43.00	43.00	43.00	43.00	43.00
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ .10	≤ .25	≤ 2		1000	RPM	764000	244872	122436	61120	40725	31833
								(800-1200)	Fz	0.000047	0.00015	0.00029	0.00058	0.00087	0.00112
									Feed (ipm)	142.50	142.50	142.50	142.50	142.50	142.50
			Slot	1		≤ .15	≤ .35	800	RPM	611200	195897	97949	48896	32580	25467
								(640-960)	Fz	0.000047	0.00015	0.00029	0.00058	0.00087	0.00112
									Feed (ipm)	114.00	114.00	114.00	114.00	114.00	114.00

Note:
- Bhn (Brinell) HRc (Rockwell C)
- when recommended speed exceeds your capability, use maximum available and recalculate ipm
- rpm = Vc x 3.82 / D1
- ipm = Fz x 4 x rpm
- helical ramp at 2 degrees or less, using slotting speed and feed rates (plunging is not recommended)
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D1 maximum)
- refer to the KYOCERA SGS Tool Wizard for complete technical information (www.kyocera-sgstool.com)

FRACTIONAL

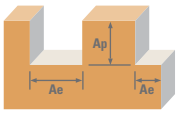
4 Flute: Square, Ball



	M4L, M4LB 5xD Fractional	Hardness		Ae x D_1		Ap x D_1		Vc (SFM)		Diameter (D_1) (inch) 0.005	0.015	0.031	0.062	0.093	0.120
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 3		365	RPM	278860	89378	44689	22309	14865	11619
								(292-438)	Fz	0.000006	0.00002	0.00004	0.00008	0.00012	0.00015
									Feed (ipm)	7.11	7.11	7.11	7.11	7.11	7.11
			Slot	1		≤ .10	≤ .20	290	RPM	221560	71013	35506	17725	11810	9232
								(232-348)	Fz	0.000006	0.00002	0.00004	0.00008	0.00012	0.00015
									Feed (ipm)	5.65	5.65	5.65	5.65	5.65	5.65
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .10	≤ .25	≤ 3		210	RPM	160440	51423	25712	12835	8552	6685
								(168-252)	Fz	0.000006	0.00002	0.00004	0.00007	0.00011	0.00014
									Feed (ipm)	3.64	3.64	3.64	3.64	3.64	3.64
			Slot	1		≤ .10	≤ .20	165	RPM	126060	40404	20202	10085	6720	5253
								(132-198)	Fz	0.000006	0.00002	0.00004	0.00007	0.00011	0.00014
									Feed (ipm)	2.86	2.86	2.86	2.86	2.86	2.86
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .10	≤ .25	≤ 3		175	RPM	133700	42853	21426	10696	7127	5571
								(140-210)	Fz	0.000005	0.00001	0.00003	0.00006	0.00009	0.00011
									Feed (ipm)	2.50	2.50	2.50	2.50	2.50	2.50
			Slot	1		≤ .10	≤ .20	140	RPM	106960	34282	17141	8557	5701	4457
								(112-168)	Fz	0.000005	0.00001	0.00003	0.00006	0.00009	0.00011
									Feed (ipm)	2.00	2.00	2.00	2.00	2.00	2.00
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ .10	≤ .25	≤ 3		305	RPM	233020	74686	37343	18642	12421	9709
								(244-366)	Fz	0.000006	0.00002	0.00004	0.00008	0.00012	0.00015
									Feed (ipm)	5.95	5.95	5.95	5.95	5.95	5.95
			Slot	1		≤ .10	≤ .20	245	RPM	187180	59994	29997	14974	9978	7799
								(196-294)	Fz	0.000006	0.00002	0.00004	0.00008	0.00012	0.00015
									Feed (ipm)	4.78	4.78	4.78	4.78	4.78	4.78
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 3		340	RPM	259760	83256	41628	20781	13846	10823
								(272-408)	Fz	0.000006	0.00002	0.00004	0.00008	0.00012	0.00015
									Feed (ipm)	6.62	6.62	6.62	6.62	6.62	6.62
			Slot	1		≤ .10	≤ .20	270	RPM	206280	66115	33058	16502	10996	8595
								(216-324)	Fz	0.000006	0.00002	0.00004	0.00008	0.00012	0.00015
									Feed (ipm)	5.26	5.26	5.26	5.26	5.26	5.26
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 3		235	RPM	179540	57545	28772	14363	9570	7481
								(188-282)	Fz	0.000006	0.00002	0.00004	0.00007	0.00011	0.00014
									Feed (ipm)	4.06	4.06	4.06	4.06	4.06	4.06
			Slot	1		≤ .10	≤ .20	185	RPM	141340	45301	22651	11307	7534	5889
								(148-222)	Fz	0.000006	0.00002	0.00004	0.00007	0.00011	0.00014
									Feed (ipm)	3.20	3.20	3.20	3.20	3.20	3.20
	STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ .10	≤ .25	≤ 3		215	RPM	164260	52647	26324	13141	8756	6844
								(172-258)	Fz	0.000004	0.00001	0.00003	0.00005	0.00008	0.00010
									Feed (ipm)	2.66	2.66	2.66	2.66	2.66	2.66
			Slot	1		≤ .10	≤ .20	170	RPM	129880	41628	20814	10390	6923	5412
								(136-204)	Fz	0.000004	0.00001	0.00003	0.00005	0.00008	0.00010
									Feed (ipm)	2.10	2.10	2.10	2.10	2.10	2.10

continued on next page

4 Flute: Square, Ball

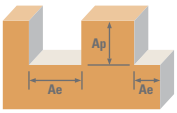


	M4L, M4LB 5xD Fractional	Hardness		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 0.005	0.015	0.031	0.062	0.093	0.120
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ .10	≤ .25	≤ 3	60	RPM	45840	14692	7346	3667	2443	1910
							(48-72)	Fz	0.000004	0.00001	0.00002	0.00005	0.00007	0.00009
								Feed (ipm)	0.67	0.67	0.67	0.67	0.67	0.67
			Slot	1		≤ .10	45	RPM	34380	11019	5510	2750	1833	1433
						≤ .20	(36-54)	Fz	0.000004	0.00001	0.00002	0.00005	0.00007	0.00009
								Feed (ipm)	0.50	0.50	0.50	0.50	0.50	0.50
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ .10	≤ .25	≤ 3	45	RPM	34380	11019	5510	2750	1833	1433
							(36-54)	Fz	0.000002	0.00001	0.00001	0.00003	0.00004	0.00006
								Feed (ipm)	0.32	0.32	0.32	0.32	0.32	0.32
			Slot	1		≤ .10	35	RPM	26740	8571	4285	2139	1425	1114
						≤ .20	(28-42)	Fz	0.000002	0.00001	0.00001	0.00003	0.00004	0.00006
								Feed (ipm)	0.25	0.25	0.25	0.25	0.25	0.25
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ .10	≤ .25	≤ 3	160	RPM	122240	39179	19590	9779	6516	5093
							(128-192)	Fz	0.000004	0.00001	0.00003	0.00005	0.00008	0.00010
								Feed (ipm)	1.97	1.97	1.97	1.97	1.97	1.97
			Slot	1		≤ .10	130	RPM	99320	31833	15917	7946	5294	4138
						≤ .20	(104-156)	Fz	0.000004	0.00001	0.00003	0.00005	0.00008	0.00010
								Feed (ipm)	1.60	1.60	1.60	1.60	1.60	1.60
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ .10	≤ .25	≤ 3	60	RPM	45840	14692	7346	3667	2443	1910
							(48-72)	Fz	0.000003	0.00001	0.00002	0.00004	0.00005	0.00007
								Feed (ipm)	0.53	0.53	0.53	0.53	0.53	0.53
			Slot	1		≤ .10	45	RPM	34380	11019	5510	2750	1833	1433
						≤ .20	(36-54)	Fz	0.000003	0.00001	0.00002	0.00004	0.00005	0.00007
								Feed (ipm)	0.40	0.40	0.40	0.40	0.40	0.40
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ .10	≤ .25	≤ 3	1000	RPM	764000	244872	122436	61120	40725	31833
							(800-1200)	Fz	0.000019	0.00006	0.00012	0.00024	0.00035	0.00045
								Feed (ipm)	57.50	57.50	57.50	57.50	57.50	57.50
			Slot	1		≤ .10	800	RPM	611200	195897	97949	48896	32580	25467
						≤ .20	(640-960)	Fz	0.000019	0.00006	0.00012	0.00024	0.00035	0.00045
								Feed (ipm)	46.00	46.00	46.00	46.00	46.00	46.00
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	≤ .10	≤ .25	≤ 3	515	RPM	393460	126109	63054	31477	20973	16394
							(412-618)	Fz	0.000014	0.00004	0.00009	0.00018	0.00027	0.00034
								Feed (ipm)	22.23	22.23	22.23	22.23	22.23	22.23
			Slot	1		≤ .10	410	RPM	313240	100397	50199	25059	16697	13052
						≤ .20	(328-492)	Fz	0.000014	0.00004	0.00009	0.00018	0.00027	0.00034
								Feed (ipm)	17.70	17.70	17.70	17.70	17.70	17.70
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ .10	≤ .25	≤ 3	1000	RPM	764000	244872	122436	61120	40725	31833
							(800-1200)	Fz	0.000019	0.00006	0.00012	0.00024	0.00035	0.00045
								Feed (ipm)	57.50	57.50	57.50	57.50	57.50	57.50
			Slot	1		≤ .10	800	RPM	611200	195897	97949	48896	32580	25467
						≤ .20	(640-960)	Fz	0.000019	0.00006	0.00012	0.00024	0.00035	0.00045
								Feed (ipm)	46.00	46.00	46.00	46.00	46.00	46.00

Note:
- Bhn (Brinell) HRc (Rockwell C)
- when recommended speed exceeds your capability, use maximum available and recalculate ipm
- rpm = Vc x 3.82 / D_1
- ipm = Fz x 4 x rpm
- helical ramp at 2 degrees or less, using slotting speed and feed rates (plunging is not recommended)
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D_1 maximum)
- refer to the KYOCERA SGS Tool Wizard for complete technical information (www.kyocera-sgstool.com)

FRACTIONAL

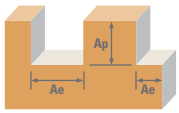
4 Flute: Square, Ball



	M4E, M4EB 8xD Fractional	Hardness		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 0.015	0.031	0.062	0.093	0.120
P	**CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .05	≤ .10	≤ 4	365	RPM	89378	44689	22309	14865	11619
							(292-438)	Fz	0.000020	0.000040	0.000081	0.000121	0.000155
								Feed (ipm)	7.20	7.20	7.20	7.20	7.20
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .05	≤ .10	≤ 4	175	RPM	51423	25712	12835	8552	6685
							(140-210)	Fz	0.000018	0.000035	0.000070	0.000105	0.000135
								Feed (ipm)	3.60	3.60	3.60	3.60	3.60
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .05	≤ .10	≤ 4	340	RPM	42853	21426	10696	7127	5571
							(272-408)	Fz	0.000015	0.000029	0.000058	0.000088	0.000112
								Feed (ipm)	2.50	2.50	2.50	2.50	2.50
K	**CAST IRONS (LOW & MEDIUM ALLOY)** Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ .05	≤ .10	≤ 4	305	RPM	74686	37343	18642	12421	9709
							(244-366)	Fz	0.000020	0.000040	0.000080	0.000121	0.000154
								Feed (ipm)	6.00	6.00	6.00	6.00	6.00
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .05	≤ .10	≤ 4	340	RPM	83256	41628	20781	13846	10823
							(272-408)	Fz	0.000020	0.000040	0.000081	0.000121	0.000155
								Feed (ipm)	6.70	6.70	6.70	6.70	6.70
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .05	≤ .10	≤ 4	235	RPM	57545	28772	14363	9570	7481
							(188-282)	Fz	0.000018	0.000036	0.000071	0.000107	0.000137
								Feed (ipm)	4.10	4.10	4.10	4.10	4.10
	STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ .05	≤ .10	≤ 4	215	RPM	52647	26324	13141	8756	6844
							(172-258)	Fz	0.000012	0.000025	0.000049	0.000074	0.000095
								Feed (ipm)	2.60	2.60	2.60	2.60	2.60
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ .05	≤ .10	≤ 4	60	RPM	14692	7346	3667	2443	1910
							(48-72)	Fz	0.000011	0.000022	0.000045	0.000068	0.000086
								Feed (ipm)	0.66	0.66	0.66	0.66	0.66
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ .05	≤ .10	≤ 4	45	RPM	11019	5510	2750	1833	1433
							(36-54)	Fz	0.000007	0.000015	0.000030	0.000045	0.000058
								Feed (ipm)	0.33	0.33	0.33	0.33	0.33
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ .05	≤ .10	≤ 4	160	RPM	39179	19590	9779	6516	5093
							(128-192)	Fz	0.000013	0.000026	0.000051	0.000077	0.000098
								Feed (ipm)	2.00	2.00	2.00	2.00	2.00
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ .05	≤ .10	≤ 4	60	RPM	14692	7346	3667	2443	1910
							(48-72)	Fz	0.000009	0.000018	0.000036	0.000054	0.000069
								Feed (ipm)	0.53	0.53	0.53	0.53	0.53
N	**ALUMINUM ALLOYS** 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ .05	≤ .10	≤ 4	1000	RPM	244872	122436	61120	40725	31833
							(800-1200)	Fz	0.000059	0.000118	0.000237	0.000356	0.000455
								Feed (ipm)	58.00	58.00	58.00	58.00	58.00
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	≤ .05	≤ .10	≤ 4	515	RPM	126109	63054	31477	20973	16394
							(412-618)	Fz	0.000046	0.000091	0.000183	0.000274	0.000351
								Feed (ipm)	23.00	23.00	23.00	23.00	23.00
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ .05	≤ .10	≤ 4	1000	RPM	244872	122436	61120	40725	31833
							(800-1200)	Fz	0.000059	0.000118	0.000237	0.000356	0.000455
								Feed (ipm)	58.00	58.00	58.00	58.00	58.00

Note:
- Bhn (Brinell) HRc (Rockwell C)
- when recommended speed exceeds your capability, use maximum available and recalculate ipm
- rpm = Vc x 3.82 / D_1
- ipm = Fz x 4 x rpm
- helical ramp at 2 degrees or less, using slotting speed and feed rates (plunging is not recommended)
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D_1 maximum)
- refer to the KYOCERA SGS Tool Wizard for complete technical information (www.kyocera-sgstool.com)

4 Flute: Square, Ball

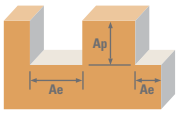


	M4X, M4XB 12xD Fractional	Hardness		Ae x D_1		Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 0.0156	0.0312	0.0625	0.0938	0.1200
P	**CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .03	≤ .06	≤ 6	365	RPM	89378	44689	22309	14865	11619
							(292-438)	Fz	0.000012	0.000025	0.000049	0.000074	0.000095
								Feed (ipm)	4.40	4.40	4.40	4.40	4.40
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .03	≤ .06	≤ 6	175	RPM	51423	25712	12835	8552	6685
							(140-210)	Fz	0.000011	0.000021	0.000043	0.000064	0.000082
								Feed (ipm)	2.20	2.20	2.20	2.20	2.20
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .03	≤ .06	≤ 6	340	RPM	42853	21426	10696	7127	5571
							(272-408)	Fz	0.000009	0.000018	0.000035	0.000053	0.000067
								Feed (ipm)	1.50	1.50	1.50	1.50	1.50
K	**CAST IRONS (LOW & MEDIUM ALLOY)** Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ .03	≤ .06	≤ 6	305	RPM	74686	37343	18642	12421	9709
							(244-366)	Fz	0.000009	0.000018	0.000036	0.000054	0.000070
								Feed (ipm)	2.70	2.70	2.70	2.70	2.70
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .03	≤ .06	≤ 6	340	RPM	83256	41628	20781	13846	10823
							(272-408)	Fz	0.000012	0.000025	0.000049	0.000074	0.000095
								Feed (ipm)	4.10	4.10	4.10	4.10	4.10
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .03	≤ .06	≤ 6	235	RPM	57545	28772	14363	9570	7481
							(188-282)	Fz	0.000011	0.000022	0.000044	0.000065	0.000084
								Feed (ipm)	2.50	2.50	2.50	2.50	2.50
	STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ .03	≤ .06	≤ 6	215	RPM	52647	26324	13141	8756	6844
							(172-258)	Fz	0.000008	0.000015	0.000030	0.000046	0.000058
								Feed (ipm)	1.60	1.60	1.60	1.60	1.60
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ .03	≤ .06	≤ 6	60	RPM	14692	7346	3667	2443	1910
							(48-72)	Fz	0.000007	0.000014	0.000027	0.000041	0.000052
								Feed (ipm)	0.40	0.40	0.40	0.40	0.40
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ .03	≤ .06	≤ 6	45	RPM	11019	5510	2750	1833	1433
							(36-54)	Fz	0.000005	0.000009	0.000018	0.000027	0.000035
								Feed (ipm)	0.20	0.20	0.20	0.20	0.20
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ .03	≤ .06	≤ 6	160	RPM	39179	19590	9779	6516	5093
							(128-192)	Fz	0.000008	0.000015	0.000031	0.000046	0.000059
								Feed (ipm)	1.20	1.20	1.20	1.20	1.20
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ .03	≤ .06	≤ 6	60	RPM	14692	7346	3667	2443	1910
							(48-72)	Fz	0.000005	0.000011	0.000022	0.000033	0.000042
								Feed (ipm)	0.32	0.32	0.32	0.32	0.32
N	**ALUMINUM ALLOYS** 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ .03	≤ .06	≤ 6	1000	RPM	244872	122436	61120	40725	31833
							(800-1200)	Fz	0.000037	0.000074	0.000147	0.000221	0.000283
								Feed (ipm)	36.00	36.00	36.00	36.00	36.00
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	≤ .03	≤ .06	≤ 6	515	RPM	126109	63054	31477	20973	16394
							(412-618)	Fz	0.000028	0.000056	0.000111	0.000167	0.000213
								Feed (ipm)	14.00	14.00	14.00	14.00	14.00
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ .03	≤ .06	≤ 6	1000	RPM	244872	122436	61120	40725	31833
							(800-1200)	Fz	0.000037	0.000074	0.000147	0.000221	0.000283
								Feed (ipm)	36.00	36.00	36.00	36.00	36.00

Note:
- Bhn (Brinell) HRc (Rockwell C)
- when recommended speed exceeds your capability, use maximum available and recalculate ipm
- rpm = Vc x 3.82 / D_1
- ipm = Fz x 4 x rpm
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D_1 maximum)
- refer to the KYOCERA SGS Tool Wizard for complete technical information (www.kyocera-sgstool.com)

METRIC

2 Flute: Square, Ball



	M2M, M2MB 1.5xD Metric	Hardness		Ae x D_1		Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 0.1	0.5	1	1.5	2	2.5	3
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .30	≤ .50	≤ 1	111	RPM	353837	70767	35384	23589	17692	14153	11795
							(89-134)	Fz	0.00043	0.00216	0.00432	0.00648	0.00865	0.01081	0.01297
								Feed (mm/min)	306	306	306	306	306	306	306
			Slot	1		≤ .20	88	RPM	281131	56226	28113	18742	14057	11245	9371
						≤ .50	(71-106)	Fz	0.00043	0.00216	0.00432	0.00648	0.00865	0.01081	0.01297
								Feed (mm/min)	243	243	243	243	243	243	243
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .30	≤ .50	≤ 1	64	RPM	203577	40715	20358	13572	10179	8143	6786
							(51-77)	Fz	0.00038	0.00192	0.00384	0.00576	0.00769	0.00961	0.01153
								Feed (mm/min)	156	156	156	156	156	156	156
			Slot	1		≤ .20	50	RPM	159954	31991	15995	10664	7998	6398	5332
						≤ .50	(40-60)	Fz	0.00038	0.00192	0.00384	0.00576	0.00769	0.00961	0.01153
								Feed (mm/min)	123	123	123	123	123	123	123
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .30	≤ .50	≤ 1	53	RPM	169648	33930	16965	11310	8482	6786	5655
							(43-64)	Fz	0.00032	0.00160	0.00320	0.00480	0.00640	0.00800	0.00962
								Feed (mm/min)	109	109	109	109	109	109	109
			Slot	1		≤ .20	43	RPM	135718	27144	13572	9048	6786	5429	4524
						≤ .50	(34-51)	Fz	0.00032	0.00160	0.00320	0.00480	0.00640	0.00800	0.00962
								Feed (mm/min)	87	87	87	87	87	87	87
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ .30	≤ .50	≤ 1	93	RPM	295672	59134	29567	19711	14784	11827	9856
							(74-112)	Fz	0.00043	0.00217	0.00433	0.00650	0.00866	0.01083	0.01301
								Feed (mm/min)	256	256	256	256	256	256	256
			Slot	1		≤ .20	75	RPM	237507	47501	23751	15834	11875	9500	7917
						≤ .50	(60-90)	Fz	0.00043	0.00217	0.00433	0.00650	0.00866	0.01083	0.01301
								Feed (mm/min)	206	206	206	206	206	206	206
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .30	≤ .50	≤ 1	104	RPM	329602	65920	32960	21973	16480	13184	10987
							(83-124)	Fz	0.00043	0.00216	0.00432	0.00648	0.00865	0.01081	0.01295
								Feed (mm/min)	285	285	285	285	285	285	285
			Slot	1		≤ .20	82	RPM	261742	52348	26174	17449	13087	10470	8725
						≤ .50	(66-99)	Fz	0.00043	0.00216	0.00432	0.00648	0.00865	0.01081	0.01295
								Feed (mm/min)	226	226	226	226	226	226	226
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .30	≤ .50	≤ 1	72	RPM	227813	45563	22781	15188	11391	9113	7594
							(57-86)	Fz	0.00038	0.00192	0.00385	0.00577	0.00769	0.00961	0.01154
								Feed (mm/min)	175	175	175	175	175	175	175
			Slot	1		≤ .20	56	RPM	179342	35868	17934	11956	8967	7174	5978
						≤ .50	(45-68)	Fz	0.00038	0.00192	0.00385	0.00577	0.00769	0.00961	0.01154
								Feed (mm/min)	138	138	138	138	138	138	138
	STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ .30	≤ .50	≤ 1	66	RPM	208425	41685	20842	13895	10421	8337	6947
							(52-79)	Fz	0.00027	0.00136	0.00272	0.00408	0.00544	0.00680	0.00819
								Feed (mm/min)	113	113	113	113	113	113	113
			Slot	1		≤ .20	52	RPM	164801	32960	16480	10987	8240	6592	5493
						≤ .50	(41-62)	Fz	0.00027	0.00136	0.00272	0.00408	0.00544	0.00680	0.00819
								Feed (mm/min)	90	90	90	90	90	90	90

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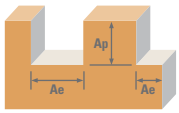
2 Flute: Square, Ball

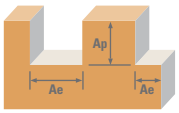


	M2M, M2MB 1.5xD Metric	Hardness		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 0.1	0.5	1	1.5	2	2.5	3
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ .30	≤ .50	18 (15-22)	RPM	58165	11633	5816	3878	2908	2327	1939
							Fz	0.00024	0.00121	0.00242	0.00362	0.00483	0.00604	0.00722
							Feed (mm/min)	28	28	28	28	28	28	28
			Slot	1	≤ .20	14 (11-16)	RPM	43624	8725	4362	2908	2181	1745	1454
					≤ .50		Fz	0.00024	0.00121	0.00242	0.00362	0.00483	0.00604	0.00722
							Feed (mm/min)	21	21	21	21	21	21	21
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ .30	≤ .50	14 (11-16)	RPM	43624	8725	4362	2908	2181	1745	1454
					≤ 1		Fz	0.00016	0.00080	0.00161	0.00241	0.00322	0.00402	0.00486
							Feed (mm/min)	14	14	14	14	14	14	14
			Slot	1	≤ .20	11 (9-13)	RPM	33930	6786	3393	2262	1696	1357	1131
					≤ .50		Fz	0.00016	0.00080	0.00161	0.00241	0.00322	0.00402	0.00486
							Feed (mm/min)	11	11	11	11	11	11	11
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ .30	≤ .50	49 (39-59)	RPM	155107	31021	15511	10340	7755	6204	5170
					≤ 1		Fz	0.00027	0.00136	0.00272	0.00408	0.00544	0.00680	0.00821
							Feed (mm/min)	84	84	84	84	84	84	84
			Slot	1	≤ .20	40 (32-48)	RPM	126024	25205	12602	8402	6301	5041	4201
					≤ .50		Fz	0.00027	0.00136	0.00272	0.00408	0.00544	0.00680	0.00821
							Feed (mm/min)	69	69	69	69	69	69	69
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ .30	≤ .50	18 (15-22)	RPM	58165	11633	5816	3878	2908	2327	1939
					≤ 1		Fz	0.00019	0.00096	0.00192	0.00288	0.00384	0.00480	0.00585
							Feed (mm/min)	22	22	22	22	22	22	22
			Slot	1	≤ .20	14 (11-16)	RPM	43624	8725	4362	2908	2181	1745	1454
					≤ .50		Fz	0.00019	0.00096	0.00192	0.00288	0.00384	0.00480	0.00585
							Feed (mm/min)	17	17	17	17	17	17	17
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ .30	≤ .50	305 (244-366)	RPM	969416	193883	96942	64628	48471	38777	32314
					≤ 1		Fz	0.00128	0.00639	0.01277	0.01916	0.02555	0.03193	0.03832
							Feed (mm/min)	2477	2477	2477	2477	2477	2477	2477
			Slot	1	≤ .20	244 (195-293)	RPM	775533	155107	77553	51702	38777	31021	25851
					≤ .50		Fz	0.00128	0.00639	0.01277	0.01916	0.02555	0.03193	0.03832
							Feed (mm/min)	1981	1981	1981	1981	1981	1981	1981
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	≤ .30	≤ .50	157 (126-188)	RPM	499249	99850	49925	33283	24962	19970	16642
					≤ 1		Fz	0.00096	0.00479	0.00959	0.01438	0.01917	0.02396	0.02876
							Feed (mm/min)	957	957	957	957	957	957	957
			Slot	1	≤ .20	125 (100-150)	RPM	397461	79492	39746	26497	19873	15898	13249
					≤ .50		Fz	0.00096	0.00479	0.00959	0.01438	0.01917	0.02396	0.02876
							Feed (mm/min)	762	762	762	762	762	762	762
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ .30	≤ .50	305 (244-366)	RPM	969416	193883	96942	64628	48471	38777	32314
					≤ 1		Fz	0.00128	0.00639	0.01277	0.01916	0.02555	0.03193	0.03832
							Feed (mm/min)	2477	2477	2477	2477	2477	2477	2477
			Slot	1	≤ .20	244 (195-293)	RPM	775533	155107	77553	51702	38777	31021	25851
					≤ .50		Fz	0.00128	0.00639	0.01277	0.01916	0.02555	0.03193	0.03832
							Feed (mm/min)	1981	1981	1981	1981	1981	1981	1981

Note:
- Bhn (Brinell) HRc (Rockwell C)
- when recommended speed exceeds your capability, use maximum available and recalculate ipm
- rpm = (Vc x 1000) / (D_1 x 3.14)
- mm/min = Fz x 2 x rpm
- helical ramp at 2 degrees or less, using slotting speed and feed rates (plunging is not recommended)
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D_1 maximum)
- refer to the KYOCERA SGS Tool Wizard for complete technical information (www.kyocera-sgstool.com)

METRIC

2 Flute: Square, Ball



	M2M, M2MB 3xD Metric	Hardness		Ae x D_1		Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 0.1	0.5	1	1.5	2	2.5	3
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 2	111	RPM	353837	70767	35384	23589	17692	14153	11795
							(89-134)	Fz	0.00039	0.00194	0.00389	0.00583	0.00778	0.00972	0.01168
								Feed (mm/min)	275	275	275	275	275	275	275
			Slot	1		≤ .15	≤ .35	88	RPM	281131	56226	28113	18742	14057	11245	9371
							(71-106)	Fz	0.00039	0.00194	0.00389	0.00583	0.00778	0.00972	0.01168
								Feed (mm/min)	219	219	219	219	219	219	219
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .10	≤ .25	≤ 2	64	RPM	203577	40715	20358	13572	10179	8143	6786
							(51-77)	Fz	0.00035	0.00173	0.00346	0.00519	0.00692	0.00865	0.01041
								Feed (mm/min)	141	141	141	141	141	141	141
			Slot	1		≤ .15	≤ .35	50	RPM	159954	31991	15995	10664	7998	6398	5332
							(40-60)	Fz	0.00035	0.00173	0.00346	0.00519	0.00692	0.00865	0.01041
								Feed (mm/min)	111	111	111	111	111	111	111
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .10	≤ .25	≤ 2	53	RPM	169648	33930	16965	11310	8482	6786	5655
							(43-64)	Fz	0.00028	0.00140	0.00281	0.00421	0.00561	0.00702	0.00840
								Feed (mm/min)	95	95	95	95	95	95	95
			Slot	1		≤ .15	≤ .35	43	RPM	135718	27144	13572	9048	6786	5429	4524
							(34-51)	Fz	0.00028	0.00140	0.00281	0.00421	0.00561	0.00702	0.00840
								Feed (mm/min)	76	76	76	76	76	76	76
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ .10	≤ .25	≤ 2	93	RPM	295672	59134	29567	19711	14784	11827	9856
							(74-112)	Fz	0.00039	0.00195	0.00390	0.00586	0.00781	0.00976	0.01168
								Feed (mm/min)	231	231	231	231	231	231	231
			Slot	1		≤ .15	≤ .35	75	RPM	237507	47501	23751	15834	11875	9500	7917
							(60-90)	Fz	0.00039	0.00195	0.00390	0.00586	0.00781	0.00976	0.01168
								Feed (mm/min)	185	185	185	185	185	185	185
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 2	104	RPM	329602	65920	32960	21973	16480	13184	10987
							(83-124)	Fz	0.00039	0.00194	0.00388	0.00582	0.00776	0.00970	0.01163
								Feed (mm/min)	256	256	256	256	256	256	256
			Slot	1		≤ .15	≤ .35	82	RPM	261742	52348	26174	17449	13087	10470	8725
							(66-99)	Fz	0.00039	0.00194	0.00388	0.00582	0.00776	0.00970	0.01163
								Feed (mm/min)	203	203	203	203	203	203	203
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 2	72	RPM	227813	45563	22781	15188	11391	9113	7594
							(57-86)	Fz	0.00035	0.00173	0.00346	0.00519	0.00693	0.00866	0.01037
								Feed (mm/min)	158	158	158	158	158	158	158
			Slot	1		≤ .15	≤ .35	56	RPM	179342	35868	17934	11956	8967	7174	5978
							(45-68)	Fz	0.00035	0.00173	0.00346	0.00519	0.00693	0.00866	0.01037
								Feed (mm/min)	124	124	124	124	124	124	124
	STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ .10	≤ .25	≤ 2	66	RPM	208425	41685	20842	13895	10421	8337	6947
							(52-79)	Fz	0.00025	0.00123	0.00245	0.00368	0.00490	0.00613	0.00737
								Feed (mm/min)	102	102	102	102	102	102	102
			Slot	1		≤ .15	≤ .35	52	RPM	164801	32960	16480	10987	8240	6592	5493
							(41-62)	Fz	0.00025	0.00123	0.00245	0.00368	0.00490	0.00613	0.00737
								Feed (mm/min)	81	81	81	81	81	81	81

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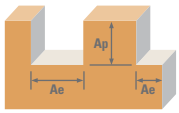
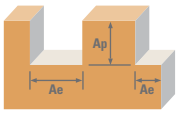
2 Flute: Square, Ball



	M2M, M2MB 3xD Metric	Hardness		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 0.1	0.5	1	1.5	2	2.5	3
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ .10	≤ .25	≤ 2	18 (15-22)	RPM	58165	11633	5816	3878	2908	2327	1939
								Fz	0.00022	0.00109	0.00218	0.00328	0.00437	0.00546	0.00653
								Feed (mm/min)	25	25	25	25	25	25	25
			Slot	1		≤ .15	≤ .35	14 (11-16)	RPM	43624	8725	4362	2908	2181	1745	1454
									Fz	0.00022	0.00109	0.00218	0.00328	0.00437	0.00546	0.00653
									Feed (mm/min)	19	19	19	19	19	19	19
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ .10	≤ .25	≤ 2	14 (11-16)	RPM	43624	8725	4362	2908	2181	1745	1454
								Fz	0.00015	0.00073	0.00146	0.00219	0.00292	0.00365	0.00442
								Feed (mm/min)	13	13	13	13	13	13	13
			Slot	1		≤ .15	≤ .35	11 (9-13)	RPM	33930	6786	3393	2262	1696	1357	1131
									Fz	0.00015	0.00073	0.00146	0.00219	0.00292	0.00365	0.00442
									Feed (mm/min)	10	10	10	10	10	10	10
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ .10	≤ .25	≤ 2	49 (39-59)	RPM	155107	31021	15511	10340	7755	6204	5170
								Fz	0.00024	0.00122	0.00245	0.00367	0.00490	0.00612	0.00738
								Feed (mm/min)	76	76	76	76	76	76	76
			Slot	1		≤ .15	≤ .35	40 (32-48)	RPM	126024	25205	12602	8402	6301	5041	4201
									Fz	0.00024	0.00122	0.00245	0.00367	0.00490	0.00612	0.00738
									Feed (mm/min)	62	62	62	62	62	62	62
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ .10	≤ .25	≤ 2	18 (15-22)	RPM	58165	11633	5816	3878	2908	2327	1939
								Fz	0.00017	0.00086	0.00172	0.00258	0.00344	0.00429	0.00516
								Feed (mm/min)	20	20	20	20	20	20	20
			Slot	1		≤ .15	≤ .35	14 (11-16)	RPM	43624	8725	4362	2908	2181	1745	1454
									Fz	0.00017	0.00086	0.00172	0.00258	0.00344	0.00429	0.00516
									Feed (mm/min)	15	15	15	15	15	15	15
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ .10	≤ .25	≤ 2	305 (244-366)	RPM	969416	193883	96942	64628	48471	38777	32314
								Fz	0.00115	0.00573	0.01146	0.01719	0.02293	0.02866	0.03439
								Feed (mm/min)	2223	2223	2223	2223	2223	2223	2223
			Slot	1		≤ .15	≤ .35	244 (195-293)	RPM	775533	155107	77553	51702	38777	31021	25851
									Fz	0.00115	0.00573	0.01146	0.01719	0.02293	0.02866	0.03439
									Feed (mm/min)	1778	1778	1778	1778	1778	1778	1778
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	≤ .10	≤ .25	≤ 2	157 (126-188)	RPM	499249	99850	49925	33283	24962	19970	16642
								Fz	0.00086	0.00431	0.00863	0.01294	0.01725	0.02157	0.02589
								Feed (mm/min)	861	861	861	861	861	861	861
			Slot	1		≤ .15	≤ .35	125 (100-150)	RPM	397461	79492	39746	26497	19873	15898	13249
									Fz	0.00086	0.00431	0.00863	0.01294	0.01725	0.02157	0.02589
									Feed (mm/min)	686	686	686	686	686	686	686
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ .10	≤ .25	≤ 2	305 (244-366)	RPM	969416	193883	96942	64628	48471	38777	32314
								Fz	0.00115	0.00573	0.01146	0.01719	0.02293	0.02866	0.03439
								Feed (mm/min)	2223	2223	2223	2223	2223	2223	2223
			Slot	1		≤ .15	≤ .35	244 (195-293)	RPM	775533	155107	77553	51702	38777	31021	25851
									Fz	0.00115	0.00573	0.01146	0.01719	0.02293	0.02866	0.03439
									Feed (mm/min)	1778	1778	1778	1778	1778	1778	1778

Note:
- Bhn (Brinell) HRc (Rockwell C)
- when recommended speed exceeds your capability, use maximum available and recalculate ipm
- rpm = (Vc x 1000) / (D_1 x 3.14)
- mm/min = Fz x 2 x rpm
- helical ramp at 2 degrees or less, using slotting speed and feed rates (plunging is not recommended)
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D_1 maximum)
- refer to the KYOCERA SGS Tool Wizard for complete technical information (www.kyocera-sgstool.com)

4 Flute: Ball



	M4MB 1.5xD Metric	Hardness		Ae x D_1		Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 0.1	0.5	1	1.5	2	2.5	3
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .30	≤ .50	≤ 1	111	RPM	353837	70767	35384	23589	17692	14153	11795
							(89-134)	Fz	0.00034	0.00169	0.00339	0.00508	0.00678	0.00847	0.01016
								Feed (mm/min)	480	480	480	480	480	480	480
			Slot	1		≤ .20	88	RPM	281131	56226	28113	18742	14057	11245	9371
						≤ .50	(71-106)	Fz	0.00034	0.00169	0.00339	0.00508	0.00678	0.00847	0.01016
								Feed (mm/min)	381	381	381	381	381	381	381
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .30	≤ .50	≤ 1	64	RPM	203577	40715	20358	13572	10179	8143	6786
							(51-77)	Fz	0.00031	0.00153	0.00306	0.00459	0.00611	0.00764	0.00919
								Feed (mm/min)	249	249	249	249	249	249	249
			Slot	1		≤ .20	50	RPM	159954	31991	15995	10664	7998	6398	5332
						≤ .50	(40-60)	Fz	0.00031	0.00153	0.00306	0.00459	0.00611	0.00764	0.00919
								Feed (mm/min)	196	196	196	196	196	196	196
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .30	≤ .50	≤ 1	53	RPM	169648	33930	16965	11310	8482	6786	5655
							(43-64)	Fz	0.00025	0.00126	0.00253	0.00379	0.00505	0.00632	0.00757
								Feed (mm/min)	171	171	171	171	171	171	171
			Slot	1		≤ .20	43	RPM	135718	27144	13572	9048	6786	5429	4524
						≤ .50	(34-51)	Fz	0.00025	0.00126	0.00253	0.00379	0.00505	0.00632	0.00757
								Feed (mm/min)	137	137	137	137	137	137	137
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ .30	≤ .50	≤ 1	93	RPM	295672	59134	29567	19711	14784	11827	9856
							(74-112)	Fz	0.00034	0.00170	0.00340	0.00509	0.00679	0.00849	0.01020
								Feed (mm/min)	402	402	402	402	402	402	402
			Slot	1		≤ .20	75	RPM	237507	47501	23751	15834	11875	9500	7917
						≤ .50	(60-90)	Fz	0.00034	0.00170	0.00340	0.00509	0.00679	0.00849	0.01020
								Feed (mm/min)	323	323	323	323	323	323	323
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .30	≤ .50	≤ 1	104	RPM	329602	65920	32960	21973	16480	13184	10987
							(83-124)	Fz	0.00033	0.00167	0.00335	0.00502	0.00670	0.00837	0.01006
								Feed (mm/min)	441	441	441	441	441	441	441
			Slot	1		≤ .20	82	RPM	261742	52348	26174	17449	13087	10470	8725
						≤ .50	(66-99)	Fz	0.00033	0.00167	0.00335	0.00502	0.00670	0.00837	0.01006
								Feed (mm/min)	351	351	351	351	351	351	351
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .30	≤ .50	≤ 1	72	RPM	227813	45563	22781	15188	11391	9113	7594
							(57-86)	Fz	0.00030	0.00152	0.00305	0.00457	0.00609	0.00761	0.00912
								Feed (mm/min)	277	277	277	277	277	277	277
			Slot	1		≤ .20	56	RPM	179342	35868	17934	11956	8967	7174	5978
						≤ .50	(45-68)	Fz	0.00030	0.00152	0.00305	0.00457	0.00609	0.00761	0.00912
								Feed (mm/min)	218	218	218	218	218	218	218
	STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ .30	≤ .50	≤ 1	66	RPM	208425	41685	20842	13895	10421	8337	6947
							(52-79)	Fz	0.00022	0.00108	0.00216	0.00324	0.00432	0.00539	0.00646
								Feed (mm/min)	180	180	180	180	180	180	180
			Slot	1		≤ .20	52	RPM	164801	32960	16480	10987	8240	6592	5493
						≤ .50	(41-62)	Fz	0.00022	0.00108	0.00216	0.00324	0.00432	0.00539	0.00646
								Feed (mm/min)	142	142	142	142	142	142	142

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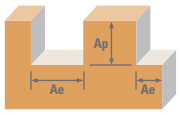
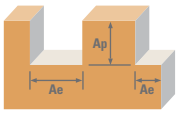


	M4MB 1.5xD Metric	Hardness		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 0.1	0.5	1	1.5	2	2.5	3
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ .30	≤ .50	≤ 1	18 (15-22)	RPM	58165	11633	5816	3878	2908	2327	1939
								Fz	0.00019	0.00095	0.00189	0.00284	0.00378	0.00473	0.00567
								Feed (mm/min)	44	44	44	44	44	44	44
			Slot	1		≤ .20	≤ .50	14 (11-16)	RPM	43624	8725	4362	2908	2181	1745	1454
								Fz	0.00019	0.00095	0.00189	0.00284	0.00378	0.00473	0.00567
								Feed (mm/min)	33	33	33	33	33	33	33
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ .30	≤ .50	≤ 1	14 (11-16)	RPM	43624	8725	4362	2908	2181	1745	1454
								Fz	0.00013	0.00064	0.00127	0.00191	0.00255	0.00318	0.00376
								Feed (mm/min)	22	22	22	22	22	22	22
			Slot	1		≤ .20	≤ .50	11 (9-13)	RPM	33930	6786	3393	2262	1696	1357	1131
								Fz	0.00013	0.00064	0.00127	0.00191	0.00255	0.00318	0.00376
								Feed (mm/min)	17	17	17	17	17	17	17
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ .30	≤ .50	≤ 1	49 (39-59)	RPM	155107	31021	15511	10340	7755	6204	5170
								Fz	0.00021	0.00106	0.00212	0.00317	0.00423	0.00529	0.00637
								Feed (mm/min)	131	131	131	131	131	131	131
			Slot	1		≤ .20	≤ .50	40 (32-48)	RPM	126024	25205	12602	8402	6301	5041	4201
								Fz	0.00021	0.00106	0.00212	0.00317	0.00423	0.00529	0.00637
								Feed (mm/min)	107	107	107	107	107	107	107
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ .30	≤ .50	≤ 1	18 (15-22)	RPM	58165	11633	5816	3878	2908	2327	1939
								Fz	0.00015	0.00073	0.00146	0.00218	0.00291	0.00364	0.00430
								Feed (mm/min)	34	34	34	34	34	34	34
			Slot	1		≤ .20	≤ .50	14 (11-16)	RPM	43624	8725	4362	2908	2181	1745	1454
								Fz	0.00015	0.00073	0.00146	0.00218	0.00291	0.00364	0.00430
								Feed (mm/min)	25	25	25	25	25	25	25
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ .30	≤ .50	≤ 1	305 (244-366)	RPM	969416	193883	96942	64628	48471	38777	32314
								Fz	0.00102	0.00512	0.01023	0.01535	0.02047	0.02559	0.03070
								Feed (mm/min)	3969	3969	3969	3969	3969	3969	3969
			Slot	1		≤ .20	≤ .50	244 (195-293)	RPM	775533	155107	77553	51702	38777	31021	25851
								Fz	0.00102	0.00512	0.01023	0.01535	0.02047	0.02559	0.03070
								Feed (mm/min)	3175	3175	3175	3175	3175	3175	3175
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	≤ .30	≤ .50	≤ 1	157 (126-188)	RPM	499249	99850	49925	33283	24962	19970	16642
								Fz	0.00077	0.00383	0.00767	0.01150	0.01534	0.01917	0.02300
								Feed (mm/min)	1531	1531	1531	1531	1531	1531	1531
			Slot	1		≤ .20	≤ .50	125 (100-150)	RPM	397461	79492	39746	26497	19873	15898	13249
								Fz	0.00077	0.00383	0.00767	0.01150	0.01534	0.01917	0.02300
								Feed (mm/min)	1219	1219	1219	1219	1219	1219	1219
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ .30	≤ .50	≤ 1	305 (244-366)	RPM	969416	193883	96942	64628	48471	38777	32314
								Fz	0.00102	0.00512	0.01023	0.01535	0.02047	0.02559	0.03070
								Feed (mm/min)	3969	3969	3969	3969	3969	3969	3969
			Slot	1		≤ .20	≤ .50	244 (195-293)	RPM	775533	155107	77553	51702	38777	31021	25851
								Fz	0.00102	0.00512	0.01023	0.01535	0.02047	0.02559	0.03070
								Feed (mm/min)	3175	3175	3175	3175	3175	3175	3175

Note:

- Bhn (Brinell) HRc (Rockwell C)
- when recommended speed exceeds your capability, use maximum available and recalculate ipm
- rpm = (Vc x 1000) / (D_1 x 3.14)
- mm/min = Fz x 4 x rpm
- helical ramp at 2 degrees or less, using slotting speed and feed rates (plunging is not recommended)
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D_1 maximum)
- refer to the KYOCERA SGS Tool Wizard for complete technical information (www.kyocera-sgstool.com)

4 Flute: Ball



	M4MB 3xD Metric	Hardness		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 0.1	0.5	1	1.5	2	2.5	3
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 2	111	RPM	353837	70767	35384	23589	17692	14153	11795
							(89-134)	Fz	0.00030	0.00152	0.00305	0.00457	0.00610	0.00762	0.00915
								Feed (mm/min)	432	432	432	432	432	432	432
			Slot	1		≤ .15	≤ .35	88	RPM	281131	56226	28113	18742	14057	11245	9371
								(71-106)	Fz	0.00030	0.00152	0.00305	0.00457	0.00610	0.00762	0.00915
									Feed (mm/min)	343	343	343	343	343	343	343
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .10	≤ .25	≤ 2	64	RPM	203577	40715	20358	13572	10179	8143	6786
							(51-77)	Fz	0.00028	0.00139	0.00278	0.00417	0.00556	0.00695	0.00835
								Feed (mm/min)	226	226	226	226	226	226	226
			Slot	1		≤ .15	≤ .35	50	RPM	159954	31991	15995	10664	7998	6398	5332
								(40-60)	Fz	0.00028	0.00139	0.00278	0.00417	0.00556	0.00695	0.00835
									Feed (mm/min)	178	178	178	178	178	178	178
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ .10	≤ .25	≤ 2	53	RPM	169648	33930	16965	11310	8482	6786	5655
							(43-64)	Fz	0.00022	0.00110	0.00220	0.00330	0.00440	0.00550	0.00658
								Feed (mm/min)	149	149	149	149	149	149	149
			Slot	1		≤ .15	≤ .35	43	RPM	135718	27144	13572	9048	6786	5429	4524
								(34-51)	Fz	0.00022	0.00110	0.00220	0.00330	0.00440	0.00550	0.00658
									Feed (mm/min)	119	119	119	119	119	119	119
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ .10	≤ .25	≤ 2	93	RPM	295672	59134	29567	19711	14784	11827	9856
							(74-112)	Fz	0.00031	0.00154	0.00307	0.00461	0.00615	0.00769	0.00922
								Feed (mm/min)	364	364	364	364	364	364	364
			Slot	1		≤ .15	≤ .35	75	RPM	237507	47501	23751	15834	11875	9500	7917
								(60-90)	Fz	0.00031	0.00154	0.00307	0.00461	0.00615	0.00769	0.00922
									Feed (mm/min)	292	292	292	292	292	292	292
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 2	104	RPM	329602	65920	32960	21973	16480	13184	10987
							(83-124)	Fz	0.00030	0.00152	0.00303	0.00455	0.00607	0.00758	0.00911
								Feed (mm/min)	400	400	400	400	400	400	400
			Slot	1		≤ .15	≤ .35	82	RPM	261742	52348	26174	17449	13087	10470	8725
								(66-99)	Fz	0.00030	0.00152	0.00303	0.00455	0.00607	0.00758	0.00911
									Feed (mm/min)	318	318	318	318	318	318	318
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ .10	≤ .25	≤ 2	72	RPM	227813	45563	22781	15188	11391	9113	7594
							(57-86)	Fz	0.00028	0.00140	0.00280	0.00420	0.00559	0.00699	0.00841
								Feed (mm/min)	255	255	255	255	255	255	255
			Slot	1		≤ .15	≤ .35	56	RPM	179342	35868	17934	11956	8967	7174	5978
								(45-68)	Fz	0.00028	0.00140	0.00280	0.00420	0.00559	0.00699	0.00841
									Feed (mm/min)	201	201	201	201	201	201	201
	STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ .10	≤ .25	≤ 2	66	RPM	208425	41685	20842	13895	10421	8337	6947
							(52-79)	Fz	0.00020	0.00098	0.00197	0.00295	0.00393	0.00491	0.00592
								Feed (mm/min)	164	164	164	164	164	164	164
			Slot	1		≤ .15	≤ .35	52	RPM	164801	32960	16480	10987	8240	6592	5493
								(41-62)	Fz	0.00020	0.00098	0.00197	0.00295	0.00393	0.00491	0.00592
									Feed (mm/min)	130	130	130	130	130	130	130

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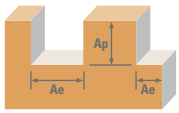

	M4MB 3xD Metric	Hardness		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 0.1	0.5	1	1.5	2	2.5	3
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ .10	≤ .25	≤ 2	18 (15-22)	RPM	58165	11633	5816	3878	2908	2327	1939
								Fz	0.00016	0.00080	0.00160	0.00240	0.00320	0.00400	0.00481
								Feed (mm/min)	37	37	37	37	37	37	37
			Slot	1		≤ .15	≤ .35	14 (11-16)	RPM	43624	8725	4362	2908	2181	1745	1454
									Fz	0.00016	0.00080	0.00160	0.00240	0.00320	0.00400	0.00481
									Feed (mm/min)	28	28	28	28	28	28	28
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ .10	≤ .25	≤ 2	14 (11-16)	RPM	43624	8725	4362	2908	2181	1745	1454
								Fz	0.00011	0.00056	0.00112	0.00168	0.00225	0.00281	0.00332
								Feed (mm/min)	20	20	20	20	20	20	20
			Slot	1		≤ .15	≤ .35	11 (9-13)	RPM	33930	6786	3393	2262	1696	1357	1131
									Fz	0.00011	0.00056	0.00112	0.00168	0.00225	0.00281	0.00332
									Feed (mm/min)	15	15	15	15	15	15	15
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ .10	≤ .25	≤ 2	49 (39-59)	RPM	155107	31021	15511	10340	7755	6204	5170
								Fz	0.00020	0.00098	0.00197	0.00295	0.00393	0.00491	0.00589
								Feed (mm/min)	122	122	122	122	122	122	122
			Slot	1		≤ .15	≤ .35	40 (32-48)	RPM	126024	25205	12602	8402	6301	5041	4201
									Fz	0.00020	0.00098	0.00197	0.00295	0.00393	0.00491	0.00589
									Feed (mm/min)	99	99	99	99	99	99	99
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ .10	≤ .25	≤ 2	18 (15-22)	RPM	58165	11633	5816	3878	2908	2327	1939
								Fz	0.00013	0.00066	0.00131	0.00197	0.00262	0.00328	0.00395
								Feed (mm/min)	30	30	30	30	30	30	30
			Slot	1		≤ .15	≤ .35	14 (11-16)	RPM	43624	8725	4362	2908	2181	1745	1454
									Fz	0.00013	0.00066	0.00131	0.00197	0.00262	0.00328	0.00395
									Feed (mm/min)	23	23	23	23	23	23	23
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ .10	≤ .25	≤ 2	305 (244-366)	RPM	969416	193883	96942	64628	48471	38777	32314
								Fz	0.00093	0.00467	0.00933	0.01400	0.01867	0.02334	0.02801
								Feed (mm/min)	3620	3620	3620	3620	3620	3620	3620
			Slot	1		≤ .15	≤ .35	244 (195-293)	RPM	775533	155107	77553	51702	38777	31021	25851
									Fz	0.00093	0.00467	0.00933	0.01400	0.01867	0.02334	0.02801
									Feed (mm/min)	2896	2896	2896	2896	2896	2896	2896
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	≤ .10	≤ .25	≤ 2	157 (126-188)	RPM	499249	99850	49925	33283	24962	19970	16642
								Fz	0.00069	0.00343	0.00687	0.01030	0.01374	0.01717	0.02061
								Feed (mm/min)	1372	1372	1372	1372	1372	1372	1372
			Slot	1		≤ .15	≤ .35	125 (100-150)	RPM	397461	79492	39746	26497	19873	15898	13249
									Fz	0.00069	0.00343	0.00687	0.01030	0.01374	0.01717	0.02061
									Feed (mm/min)	1092	1092	1092	1092	1092	1092	1092
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ .10	≤ .25	≤ 2	305 (244-366)	RPM	969416	193883	96942	64628	48471	38777	32314
								Fz	0.00093	0.00467	0.00933	0.01400	0.01867	0.02334	0.02801
								Feed (mm/min)	3620	3620	3620	3620	3620	3620	3620
			Slot	1		≤ .15	≤ .35	244 (195-293)	RPM	775533	155107	77553	51702	38777	31021	25851
									Fz	0.00093	0.00467	0.00933	0.01400	0.01867	0.02334	0.02801
									Feed (mm/min)	2896	2896	2896	2896	2896	2896	2896

Note:

- Bhn (Brinell) HRc (Rockwell C)
- when recommended speed exceeds your capability, use maximum available and recalculate ipm
- rpm = (Vc x 1000) / (D_1 x 3.14)
- mm/min = Fz x 4 x rpm
- helical ramp at 2 degrees or less, using slotting speed and feed rates (plunging is not recommended)
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D_1 maximum)
- refer to the KYOCERA SGS Tool Wizard for complete technical information (www.kyocera-sgstool.com)

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KYOCERA SGS Precision Tools is an ISO-certified leader of round solid carbide cutting tool technology for the aerospace, metalworking, and automotive industries with manufacturing sites in the United States and United Kingdom. Our global network of Sales Representatives, Industrial Distributors, and Agents blanket the world selling into more than 60 countries.

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