

# GENERAL PURPOSE

Solid Carbide Micro End Mills For Ferrous And Non-Ferrous Materials



INTRO

MILLING

SPECIALTY

HOLEMAKING

THREADING

INSERTS



FEATURES/DESCRIPTION	APPLICATION	FEATURES								
<p><b>Micro 2-Flute Square Mills</b></p> <ul style="list-style-type: none"> <li>• Universal application</li> <li>• Sub-micron grade carbide substrate for wear resistance</li> <li>• Multiple coating options</li> <li>• Diameter Tol.: +/- 0.0005"</li> <li>• Shank Tol.: +0/-0.0003"</li> <li>• LOC Tol.: +0/-0.0120"</li> </ul>		<table border="1"> <tr> <td>CARBIDE</td> <td>2FL</td> </tr> <tr> <td>30°</td> <td>SQ</td> </tr> <tr> <td>P200</td> <td>Bright</td> </tr> <tr> <td>AlTiN</td> <td></td> </tr> </table>	CARBIDE	2FL	30°	SQ	P200	Bright	AlTiN	
CARBIDE	2FL									
30°	SQ									
P200	Bright									
AlTiN										

STEEL			STAINLESS		CAST IRON		NON-FERROUS		HRSA		HARDENED STEEL	
P1	P2	P3	M1	M2	K1	K2	N1	N2	S1	S2	H1	H2
○	○	○			○	○	○	○			○	

● Best ○ Good

**Series 250** | 2FL | Square | Micro

Diameter(D <sub>1</sub> )	LOC(L <sub>1</sub> )	OAL(L)	Shank(D)	Bright	AlTiN
0.016	0.125	2.50	1/8	251-001000	251-001000B
0.031	0.250	2.50	1/8	251-001001	251-001001B
0.031	0.375	2.50	1/8	251-001002	251-001002B
0.047	0.250	2.50	1/8	251-001010	251-001010B
0.047	0.375	2.50	1/8	251-001011	251-001011B
0.047	0.500	2.50	1/8	251-001013	251-001013B
0.063	0.500	2.50	1/8	251-001020	251-001020B
0.063	0.750	2.50	1/8	251-001021	251-001021B
0.063	1.000	2.50	1/8	251-001022	251-001022B
0.078	0.500	2.50	1/8	251-001030	251-001030B
0.094	0.500	2.50	1/8	251-001040	251-001040B
0.094	0.750	2.50	1/8	251-001041	251-001041B

\*bold numbers are EDPs for ordering

## Popular Custom Milling Options

- Proprietary GWS tool coatings
- Longer lengths
- Enhanced geometry
- Special shank modifications like **SAFE-LOCK**®

CUSTOM COMES STANDARD

**Series 250 - 252, 254 - 256**

GP | Micro End Mills | 2 - 4 FL | SQ, CR, BN

Profiling			Inches Per Tooth (IPT)										
			Cutting Diameter										
Material		Hardness	SFM	0.015	0.031	0.047	0.062	0.078	0.093	0.125	0.187	0.250	
<b>P</b>	Steel	Free Machining & Low Carbon: 10XX, 11XX, 12XX, A36	≤ 28 Rc	400									
	Steel	Medium/High Carbon Steels, Alloy Steels: 13XX, 41XX, 43XX, 86XX	28 - 38 Rc	300	0.00007	0.00015	0.00023	0.00027	0.00034	0.00040	0.00054	0.00081	0.00100
	Die Steels	A2, H13, L6, P20, S7	28 - 44 Rc	200									
<b>M</b>	Stainless Steels	Easy to Machine, 430F, 301, 303, 410, 416 Annealed, 420F, 430, 430F	≤ 28 Rc	400									
	Stainless Steels	Moderately Difficult to Machine, Nitronic 50, 301, 303, 304, 304L, 316, 316L, 321, 347	≤ 28 Rc	200	0.00007	0.00015	0.00023	0.00027	0.00034	0.00040	0.00054	0.00081	0.00100
	Stainless Steels	Difficult to Machine, 302B, 304B, 309, 310, 316, 316Ti, PH13-8Mo	> 28 Rc	150									
<b>S</b>	Super Alloys	High Temp, Nimonics, Inconel, Monel, Hastelloy	≤ 42 Rc	70									
	Super Alloys	Titanium: Ti 3Al-2.5V, Ti 6Al-4V Ti 10V-2Fe-3Al	≤ 42 Rc	150	0.00004	0.00008	0.00015	0.00023	0.00027	0.00034	0.00040	0.00054	0.00080
<b>H</b>	Hardened Steels	Tool Steel, Die Steel: D2, CPM-10V	45-55 Rc	100	0.00010	0.00030	0.00050	0.00140	0.00180	0.00210	0.00300	0.00360	0.00420
<b>K</b>	Cast Iron	Gray: SAE J431, ASTM A48	160-200 HB	400									
	Cast Iron	Ductile & Malleable, ASTM A536, ASTM 897, ASTM A47, ASTM A220	200-250 HB	250	0.00007	0.00015	0.00023	0.00027	0.00034	0.00040	0.00054	0.00081	0.00100
<b>N</b>	Non-Ferrous	Aluminum, Brass, Bronze, Copper, Plastics, Graphite	-	100	0.00004	0.00008	0.00015	0.00023	0.00027	0.00034	0.00040	0.00054	0.00080

Slotting			Inches Per Tooth (IPT)										
			Cutting Diameter										
Material		Hardness	SFM	0.015	0.031	0.047	0.062	0.078	0.093	0.125	0.187	0.250	
<b>P</b>	Steel	Free Machining & Low Carbon: 10XX, 11XX, 12XX, A36	≤ 28 Rc	400					0.0003	0.0004	0.0005	0.0007	0.0010
	Steel	Medium/High Carbon Steels, Alloy Steels: 13XX, 41XX, 43XX, 86XX	28 - 38 Rc	300	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0007	0.0009
	Die Steels	A2, H13, L6, P20, S7	28 - 44 Rc	200					0.0002	0.0003	0.0004	0.0006	0.0008
<b>M</b>	Stainless Steels	Easy to Machine, 430F, 301, 303, 410, 416 Annealed, 420F, 430, 430F	≤ 28 Rc	400			0.0002	0.0002	0.0003	0.0004	0.0005	0.0007	0.0010
	Stainless Steels	Moderately Difficult to Machine, Nitronic 50, 301, 303, 304, 304L, 316, 316L, 321, 347	≤ 28 Rc	200	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0007	0.0009
	Stainless Steels	Difficult to Machine, 302B, 304B, 309, 310, 316, 316Ti, PH13-8Mo	> 28 Rc	150			0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005
<b>S</b>	Super Alloys	High Temp, Nimonics, Inconel, Monel, Hastelloy	≤ 42 Rc	70									
	Super Alloys	Titanium: Ti 3Al-2.5V, Ti 6Al-4V Ti 10V-2Fe-3Al	≤ 42 Rc	150	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005
<b>H</b>	Hardened Steels	Tool Steel, Die Steel: S7, H13, A2	35-45 Rc	100	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004
<b>K</b>	Cast Iron	Gray: SAE J431, ASTM A48	160-200 HB	400						0.0004	0.0005	0.0007	0.0010
	Cast Iron	Ductile & Malleable, ASTM A536, ASTM 897, ASTM A47, ASTM A220	200-250 HB	250	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0007	0.0009
<b>N</b>	Non-Ferrous	Aluminum, Brass, Bronze, Copper, Plastics, Graphite	-	750	0.0002	0.0003	0.0005	0.0006	0.0007	0.0008	0.0011	0.0017	0.0022