



# MINIATURE SOLID CARBIDE END MILLS

- Sizes .005" thru .250"
- 2-Flute — 3-Flute — 4-Flute
- Square End — Ball Nose
- Stub Length — Regular Length
- Extra Length — Extra Reach
- Micrograin Carbide
- Bright Finish
- ALTiN Coated — DLC Coated



**For Applications in Die & Mold, Medical, Aerospace,  
Swiss Machines and Graphite Machining**

Phone: 800.255.1701 • Fax: 800.338.4857  
[www.morsecuttingtools.com](http://www.morsecuttingtools.com)  
[customerservices@morsecuttingtools.com](mailto:customerservices@morsecuttingtools.com)

MADE IN THE  
**USA**

# MINIATURE

## SOLID CARBIDE END MILLS

Micrograin Carbide

Bright Finish — ALTiN Coated — DLC Coated

Sizes .005 thru .250

2-Flute — 3-Flute — 4-Flute

Square End — Ball Nose

Stub Length — Regular Length — Extra Length — Extra Reach

Center Cutting

### TOOL COATINGS

**Tool Coatings** provide many benefits including increased surface hardness, wear resistance, heat resistance & chip flow. Tool Coatings also resist chip welding.

**Bright Finish** is often used for machining non-ferrous materials. Bright Finish tools can also be coated for enhanced performance and increased tool life.

**ALTiN – Aluminum Titanium Nitride Coating** is an excellent all around coating that is especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

**DLC – Amorphous Diamond-Like Carbon** provides excellent lubricity and wear resistance for the machining of graphite and some non-ferrous materials.

### SUCCESSFUL MACHINING

All components of the milling system contribute to the quality of the cut produced and the productivity that can be realized. In order to maximize success the following should be considered.

**Toolholding** – A high quality balanced tool holder should be used. A Milling Chuck or Shrink Fit Holder should be used to avoid the tool being pulled out of the holder and to insure concentricity. Total indicated tool run out should be less than .001”.

**Machine** – A rigid machine with a high quality spindle is required.

**Workholding** – The work piece must be held rigidly so that it cannot deflect or vibrate during milling.

**Coolant** – A quality high lubricity coolant will aid chip removal, enhance tool life and increase finish quality.

**Plunging** - When Plunging or Ramping into the workpiece it is recommended that the feed rate be reduced 50%.

**Tool Choice** – Use the shortest tool that will do the job to reduce overhang and reduce deflection and chatter. Using a larger diameter tool will increase stiffness and reduce chatter further.

**Speed and Feed** – The use of proper speed and feed rates will provide a better surface finish and increase tool life.

# Solid Carbide 2-Flute Miniature Square End Single End Mills

Micrograin Carbide - Center Cutting - 30° Helix Angle  
Stub Length & Regular Length  
For materials less than 48Rc hardness  
Dia. Tolerance +.0005" / -.0005"



List No. 5914 2-Flute Square End

**ALTiN** - Aluminum Titanium Nitride Coating for abrasive and hard-to-machine materials

**DLC** - Amorphous Diamond-Like Carbon for graphite and some non-ferrous materials.

Speeds & Feeds: Page 17

DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.005	1/8	.008	1.5x	1-1/2	Stub	45465	—	—
.005	1/8	.015	3x	1-1/2	Regular	45466	96534	—
.006	1/8	.009	1.5x	1-1/2	Stub	45467	—	—
.006	1/8	.018	3x	1-1/2	Regular	45468	—	—
.007	1/8	.011	1.5x	1-1/2	Stub	45469	—	—
.007	1/8	.021	3x	1-1/2	Regular	45470	—	—
.008	1/8	.012	1.5x	1-1/2	Stub	45471	—	—
.008	1/8	.024	3x	1-1/2	Regular	45472	—	—
.009	1/8	.014	1.5x	1-1/2	Stub	45473	—	—
.009	1/8	.027	3x	1-1/2	Regular	45474	—	—
.010	1/8	.015	1.5x	1-1/2	Stub	45475	96535	—
.010	1/8	.030	3x	1-1/2	Regular	45476	96536	96625
.011	1/8	.017	1.5x	1-1/2	Stub	45477	—	—
.011	1/8	.033	3x	1-1/2	Regular	45478	—	—
.012	1/8	.018	1.5x	1-1/2	Stub	45479	—	—
.012	1/8	.036	3x	1-1/2	Regular	45480	96537	—
.013	1/8	.020	1.5x	1-1/2	Stub	45481	—	—
.013	1/8	.039	3x	1-1/2	Regular	45482	—	—
.014	1/8	.021	1.5x	1-1/2	Stub	45483	—	—
.014	1/8	.042	3x	1-1/2	Regular	45484	—	—
.015 (1/64)	1/8	.023	1.5x	1-1/2	Stub	45485	96538	—
.015 (1/64)	1/8	.045	3x	1-1/2	Regular	45486	96539	96626
.016	1/8	.024	1.5x	1-1/2	Stub	45487	—	—
.016	1/8	.048	3x	1-1/2	Regular	45488	—	—
.017	1/8	.026	1.5x	1-1/2	Stub	45489	—	—
.017	1/8	.051	3x	1-1/2	Regular	45490	—	—
.018	1/8	.027	1.5x	1-1/2	Stub	45491	—	—
.018	1/8	.054	3x	1-1/2	Regular	45492	96540	—
.019	1/8	.029	1.5x	1-1/2	Stub	45493	—	—
.019	1/8	.057	3x	1-1/2	Regular	45494	—	—
.020	1/8	.030	1.5x	1-1/2	Stub	45495	96541	—
.020	1/8	.060	3x	1-1/2	Regular	45496	96542	96627
.021	1/8	.032	1.5x	1-1/2	Stub	45497	—	—
.021	1/8	.063	3x	1-1/2	Regular	45498	—	—
.022	1/8	.033	1.5x	1-1/2	Stub	45499	—	—
.022	1/8	.066	3x	1-1/2	Regular	45500	—	—
.023	1/8	.035	1.5x	1-1/2	Stub	45501	—	—
.023	1/8	.069	3x	1-1/2	Regular	45502	—	—
.024	1/8	.036	1.5x	1-1/2	Stub	45503	—	—
.024	1/8	.072	3x	1-1/2	Regular	45504	—	—
.025	1/8	.038	1.5x	1-1/2	Stub	45505	96543	—
.025	1/8	.075	3x	1-1/2	Regular	45506	96544	96628
.026	1/8	.039	1.5x	1-1/2	Stub	45507	—	—
.026	1/8	.078	3x	1-1/2	Regular	45508	—	—
.027	1/8	.041	1.5x	1-1/2	Stub	45509	—	—
.027	1/8	.081	3x	1-1/2	Regular	45510	—	—
.028	1/8	.042	1.5x	1-1/2	Stub	45511	—	—
.028	1/8	.084	3x	1-1/2	Regular	45512	—	—
.029	1/8	.044	1.5x	1-1/2	Stub	45513	—	—
.029	1/8	.087	3x	1-1/2	Regular	45514	—	—
.030	1/8	.045	1.5x	1-1/2	Stub	45515	96545	—
.030	1/8	.090	3x	1-1/2	Regular	45516	96546	96629
.031 (1/32)	1/8	.047	1.5x	1-1/2	Stub	45517	96547	—
.031 (1/32)	1/8	.093	3x	1-1/2	Regular	45518	96548	96630
.032	1/8	.048	1.5x	1-1/2	Stub	45519	—	—
.032	1/8	.096	3x	1-1/2	Regular	45520	—	—
.033	1/8	.050	1.5x	1-1/2	Stub	45521	—	—
.033	1/8	.099	3x	1-1/2	Regular	45522	—	—
.034	1/8	.051	1.5x	1-1/2	Stub	45523	—	—
.034	1/8	.102	3x	1-1/2	Regular	45524	—	—

(continued)

# Solid Carbide 2-Flute Miniature Square End Single End Mills

List No. 5914 2-Flute Square End

(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.035	1/8	.053	1.5x	1-1/2	Stub	45525	96549	—
.035	1/8	.105	3x	1-1/2	Regular	45526	96550	96631
.036	1/8	.054	1.5x	1-1/2	Stub	45527	—	—
.036	1/8	.108	3x	1-1/2	Regular	45528	—	—
.037	1/8	.056	1.5x	1-1/2	Stub	45529	—	—
.037	1/8	.111	3x	1-1/2	Regular	45530	—	—
.038	1/8	.057	1.5x	1-1/2	Stub	45531	—	—
.038	1/8	.114	3x	1-1/2	Regular	45532	—	—
.039	1/8	.059	1.5x	1-1/2	Stub	45533	—	—
.039	1/8	.117	3x	1-1/2	Regular	45534	96551	—
.040	1/8	.060	1.5x	1-1/2	Stub	45535	96552	—
.040	1/8	.120	3x	1-1/2	Regular	45536	96553	96632
.041	1/8	.123	3x	1-1/2	Regular	45537	—	—
.042	1/8	.126	3x	1-1/2	Regular	45538	—	—
.043	1/8	.129	3x	1-1/2	Regular	45539	—	—
.044	1/8	.132	3x	1-1/2	Regular	45540	—	—
.045	1/8	.068	1.5x	1-1/2	Stub	45541	96554	—
.045	1/8	.135	3x	1-1/2	Regular	45542	96555	96633
.046	1/8	.138	3x	1-1/2	Regular	45543	—	—
.047 (3/64)	1/8	.071	1.5x	1-1/2	Stub	45544	96556	—
.047 (3/64)	1/8	.141	3x	1-1/2	Regular	45545	96557	96634
.048	1/8	.144	3x	1-1/2	Regular	45546	—	—
.049	1/8	.147	3x	1-1/2	Regular	45547	—	—
.050	1/8	.074	1.5x	1-1/2	Stub	45548	96558	—
.050	1/8	.150	3x	1-1/2	Regular	45549	96559	96635
.051	1/8	.153	3x	1-1/2	Regular	45550	—	—
.052	1/8	.156	3x	1-1/2	Regular	45551	—	—
.053	1/8	.159	3x	1-1/2	Regular	45552	—	—
.054	1/8	.162	3x	1-1/2	Regular	45553	—	—
.055	1/8	.083	1.5x	1-1/2	Stub	45554	96560	—
.055	1/8	.165	3x	1-1/2	Regular	45555	96561	96636
.056	1/8	.168	3x	1-1/2	Regular	45556	—	—
.057	1/8	.171	3x	1-1/2	Regular	45557	—	—
.058	1/8	.174	3x	1-1/2	Regular	45558	—	—
.059	1/8	.177	3x	1-1/2	Regular	45559	—	—
.060	1/8	.090	1.5x	1-1/2	Stub	45560	96562	—
.060	1/8	.180	3x	1-1/2	Regular	45561	96563	96637
.062 (1/16)	1/8	.093	1.5x	1-1/2	Stub	45562	96564	—
.062 (1/16)	1/8	.186	3x	1-1/2	Regular	45563	96565	96638
.065	1/8	.098	1.5x	1-1/2	Stub	45564	96566	—
.065	1/8	.195	3x	1-1/2	Regular	45565	96567	96639
.070	1/8	.105	1.5x	1-1/2	Stub	45566	96568	—
.070	1/8	.210	3x	1-1/2	Regular	45567	96569	96640
.075	1/8	.113	1.5x	1-1/2	Stub	45568	96570	—
.075	1/8	.225	3x	1-1/2	Regular	45569	96571	—
.078 (5/64)	1/8	.117	1.5x	1-1/2	Stub	45570	96572	—
.078 (5/64)	1/8	.234	3x	1-1/2	Regular	45571	96573	96641
.080	1/8	.120	1.5x	1-1/2	Stub	45572	96574	—
.080	1/8	.240	3x	1-1/2	Regular	45573	96575	96642
.085	1/8	.128	1.5x	1-1/2	Stub	45574	96576	—
.085	1/8	.255	3x	1-1/2	Regular	45575	96577	—
.090	1/8	.135	1.5x	1-1/2	Stub	45576	96578	—
.090	1/8	.270	3x	1-1/2	Regular	45577	96579	96643
.093 (3/32)	1/8	.140	1.5x	1-1/2	Stub	45578	96580	—
.093 (3/32)	1/8	.279	3x	1-1/2	Regular	45579	96581	96644
.095	1/8	.143	1.5x	1-1/2	Stub	45580	96582	—
.095	1/8	.285	3x	1-1/2	Regular	45581	96583	—
.100	1/8	.150	1.5x	1-1/2	Stub	45582	96584	—
.100	1/8	.300	3x	1-1/2	Regular	45583	96585	96645
.105	1/8	.158	1.5x	1-1/2	Stub	45584	96586	—
.105	1/8	.315	3x	1-1/2	Regular	45585	96587	—
.110	1/8	.165	1.5x	1-1/2	Stub	45586	96588	—
.110	1/8	.330	3x	1-1/2	Regular	45587	96589	—
.115	1/8	.173	1.5x	1-1/2	Stub	45588	96590	—
.115	1/8	.345	3x	1-1/2	Regular	45589	96591	—



# Solid Carbide 2-Flute Miniature Ball Nose Single End Mills

Micrograin Carbide - Center Cutting - 30° Helix Angle  
 Stub Length & Regular Length  
 For materials less than 48Rc hardness  
 Dia. Tolerance +.0005" / -.0005"



List No. 5915 2-Flute Ball Nose

ALTiN - Aluminum Titanium Nitride Coating for abrasive and hard-to-machine materials

DLC - Amorphous Diamond-Like Carbon for graphite and some non-ferrous materials.

Speeds & Feeds: Page 17

DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.005	1/8	.008	1.5x	1-1/2	Stub	45594	—	—
.005	1/8	.015	3x	1-1/2	Regular	45595	—	—
.006	1/8	.009	1.5x	1-1/2	Stub	45596	—	—
.006	1/8	.018	3x	1-1/2	Regular	45597	—	—
.007	1/8	.011	1.5x	1-1/2	Stub	45598	—	—
.007	1/8	.021	3x	1-1/2	Regular	45599	—	—
.008	1/8	.012	1.5x	1-1/2	Stub	45600	—	—
.008	1/8	.024	3x	1-1/2	Regular	45601	—	—
.009	1/8	.014	1.5x	1-1/2	Stub	45602	—	—
.009	1/8	.027	3x	1-1/2	Regular	45603	—	—
.010	1/8	.015	1.5x	1-1/2	Stub	45604	96594	—
.010	1/8	.030	3x	1-1/2	Regular	45605	96595	96649
.011	1/8	.017	1.5x	1-1/2	Stub	45606	—	—
.011	1/8	.033	3x	1-1/2	Regular	45607	—	—
.012	1/8	.018	1.5x	1-1/2	Stub	45608	—	—
.012	1/8	.036	3x	1-1/2	Regular	45609	—	—
.013	1/8	.020	1.5x	1-1/2	Stub	45610	—	—
.013	1/8	.039	3x	1-1/2	Regular	45611	—	—
.014	1/8	.021	1.5x	1-1/2	Stub	45612	—	—
.014	1/8	.042	3x	1-1/2	Regular	45613	—	—
.015 (1/64)	1/8	.023	1.5x	1-1/2	Stub	45614	96596	—
.015 (1/64)	1/8	.045	3x	1-1/2	Regular	45615	96597	96650
.016	1/8	.024	1.5x	1-1/2	Stub	45616	—	—
.016	1/8	.048	3x	1-1/2	Regular	45617	—	—
.017	1/8	.026	1.5x	1-1/2	Stub	45618	—	—
.017	1/8	.051	3x	1-1/2	Regular	45619	—	—
.018	1/8	.027	1.5x	1-1/2	Stub	45620	—	—
.018	1/8	.054	3x	1-1/2	Regular	45621	—	—
.019	1/8	.029	1.5x	1-1/2	Stub	45622	—	—
.019	1/8	.057	3x	1-1/2	Regular	45623	—	—
.020	1/8	.030	1.5x	1-1/2	Stub	45624	96598	—
.020	1/8	.060	3x	1-1/2	Regular	45625	96599	96651
.021	1/8	.032	1.5x	1-1/2	Stub	45626	—	—
.021	1/8	.063	3x	1-1/2	Regular	45627	—	—
.022	1/8	.033	1.5x	1-1/2	Stub	45628	—	—
.022	1/8	.066	3x	1-1/2	Regular	45629	—	—
.023	1/8	.035	1.5x	1-1/2	Stub	45630	—	—
.023	1/8	.069	3x	1-1/2	Regular	45631	—	—
.024	1/8	.036	1.5x	1-1/2	Stub	45632	—	—
.024	1/8	.072	3x	1-1/2	Regular	45633	—	—
.025	1/8	.038	1.5x	1-1/2	Stub	45634	96600	—
.025	1/8	.075	3x	1-1/2	Regular	45635	96601	96652
.026	1/8	.039	1.5x	1-1/2	Stub	45636	—	—
.026	1/8	.078	3x	1-1/2	Regular	45637	—	—
.027	1/8	.041	1.5x	1-1/2	Stub	45638	—	—
.027	1/8	.081	3x	1-1/2	Regular	45639	—	—
.028	1/8	.042	1.5x	1-1/2	Stub	45640	—	—
.028	1/8	.084	3x	1-1/2	Regular	45641	—	—
.029	1/8	.044	1.5x	1-1/2	Stub	45642	—	—
.029	1/8	.087	3x	1-1/2	Regular	45643	—	—
.030	1/8	.045	1.5x	1-1/2	Stub	45644	96602	—
.030	1/8	.090	3x	1-1/2	Regular	45645	96603	96653
.031 (1/32)	1/8	.047	1.5x	1-1/2	Stub	45646	96604	—
.031 (1/32)	1/8	.093	3x	1-1/2	Regular	45647	96605	96654
.032	1/8	.048	1.5x	1-1/2	Stub	45648	—	—
.032	1/8	.096	3x	1-1/2	Regular	45649	—	—

(continued)

# Solid Carbide 2-Flute Miniature Ball Nose Single End Mills

List No. 5915 2-Flute Ball Nose

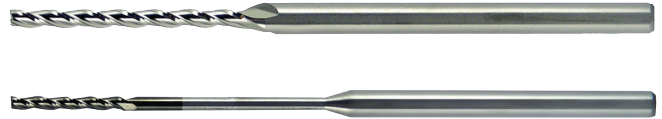
(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTIN COATED EDP NO.	DLC COATED EDP NO.
.033	1/8	.050	1.5x	1-1/2	Stub	45650	—	—
.033	1/8	.099	3x	1-1/2	Regular	45651	—	—
.034	1/8	.051	1.5x	1-1/2	Stub	45652	—	—
.034	1/8	.102	3x	1-1/2	Regular	45653	—	—
.035	1/8	.053	1.5x	1-1/2	Stub	45654	96606	—
.035	1/8	.105	3x	1-1/2	Regular	45655	96607	96655
.036	1/8	.054	1.5x	1-1/2	Stub	45656	—	—
.036	1/8	.108	3x	1-1/2	Regular	45657	—	—
.037	1/8	.056	1.5x	1-1/2	Stub	45658	—	—
.037	1/8	.111	3x	1-1/2	Regular	45659	—	—
.038	1/8	.057	1.5x	1-1/2	Stub	45660	—	—
.038	1/8	.114	3x	1-1/2	Regular	45661	—	—
.039	1/8	.059	1.5x	1-1/2	Stub	45662	—	—
.039	1/8	.117	3x	1-1/2	Regular	45663	—	—
.040	1/8	.060	1.5x	1-1/2	Stub	45664	96608	—
.040	1/8	.120	3x	1-1/2	Regular	45665	96609	96656
.041	1/8	.123	3x	1-1/2	Regular	45666	—	—
.042	1/8	.126	3x	1-1/2	Regular	45667	—	—
.043	1/8	.129	3x	1-1/2	Regular	45668	—	—
.044	1/8	.132	3x	1-1/2	Regular	45669	—	—
.045	1/8	.068	1.5x	1-1/2	Stub	45670	—	—
.045	1/8	.135	3x	1-1/2	Regular	45671	96610	96657
.046	1/8	.138	3x	1-1/2	Regular	45672	—	—
.047 (3/64)	1/8	.071	1.5x	1-1/2	Stub	45673	96611	—
.047 (3/64)	1/8	.141	3x	1-1/2	Regular	45674	96612	96658
.048	1/8	.144	3x	1-1/2	Regular	45675	—	—
.049	1/8	.147	3x	1-1/2	Regular	45676	—	—
.050	1/8	.075	1.5x	1-1/2	Stub	45677	—	—
.050	1/8	.150	3x	1-1/2	Regular	45678	96613	96659
.051	1/8	.153	3x	1-1/2	Regular	45679	—	—
.052	1/8	.156	3x	1-1/2	Regular	45680	—	—
.053	1/8	.159	3x	1-1/2	Regular	45681	—	—
.054	1/8	.162	3x	1-1/2	Regular	45682	—	—
.055	1/8	.083	1.5x	1-1/2	Stub	45683	—	—
.055	1/8	.165	3x	1-1/2	Regular	45684	96614	96660
.056	1/8	.168	3x	1-1/2	Regular	45685	—	—
.057	1/8	.171	3x	1-1/2	Regular	45686	—	—
.058	1/8	.174	3x	1-1/2	Regular	45687	—	—
.059	1/8	.177	3x	1-1/2	Regular	45688	—	—
.060	1/8	.090	1.5x	1-1/2	Stub	45689	—	—
.060	1/8	.180	3x	1-1/2	Regular	45690	96615	96661
.062 (1/16)	1/8	.093	1.5x	1-1/2	Stub	45691	96616	—
.062 (1/16)	1/8	.186	3x	1-1/2	Regular	45692	96617	96662
.065	1/8	.098	1.5x	1-1/2	Stub	45693	—	—
.065	1/8	.195	3x	1-1/2	Regular	45694	—	96663
.070	1/8	.105	1.5x	1-1/2	Stub	45695	—	—
.070	1/8	.210	3x	1-1/2	Regular	45696	—	96664
.075	1/8	.113	1.5x	1-1/2	Stub	45697	—	—
.075	1/8	.225	3x	1-1/2	Regular	45698	—	—
.078 (5/64)	1/8	.117	1.5x	1-1/2	Stub	45699	96618	—
.078 (5/64)	1/8	.234	3x	1-1/2	Regular	45700	96619	96665
.080	1/8	.120	1.5x	1-1/2	Stub	45701	—	—
.080	1/8	.240	3x	1-1/2	Regular	45702	—	96666
.085	1/8	.128	1.5x	1-1/2	Stub	45703	—	—
.085	1/8	.255	3x	1-1/2	Regular	45704	—	—
.090	1/8	.135	1.5x	1-1/2	Stub	45705	—	—
.090	1/8	.270	3x	1-1/2	Regular	45706	—	96667
.093 (3/32)	1/8	.140	1.5x	1-1/2	Stub	45707	96620	—
.093 (3/32)	1/8	.279	3x	1-1/2	Regular	45708	96621	96668
.095	1/8	.143	1.5x	1-1/2	Stub	45709	—	—
.095	1/8	.285	3x	1-1/2	Regular	45710	—	—
.100	1/8	.150	1.5x	1-1/2	Stub	45711	—	—
.100	1/8	.300	3x	1-1/2	Regular	45712	—	96669
.105	1/8	.315	3x	1-1/2	Regular	45713	—	—
.110	1/8	.330	3x	1-1/2	Regular	45714	—	—
.115	1/8	.345	3x	1-1/2	Regular	45715	—	—
.120	1/8	.360	3x	1-1/2	Regular	45716	—	—



# Solid Carbide 3-Flute Miniature Square End Single End Mills

Micrograin Carbide - Center Cutting - 30° Helix Angle  
For materials less than 48Rc hardness  
Dia. Tolerance +.0005" / -.0005"



List No. 5916 3-Flute Square End

ALTiN - Aluminum Titanium Nitride Coating for abrasive and hard-to-machine materials

DLC - Amorphous Diamond-Like Carbon for graphite and some non-ferrous materials.

Speeds & Feeds: Page 17

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.010	1/8	.015	1.5x	.030	3x	2-1/2	45970	97020	—
.010	1/8	.015	1.5x	.050	5x	2-1/2	45971	97021	97480
.010	1/8	.015	1.5x	.080	8x	2-1/2	45972	97022	97481
.010	1/8	.015	1.5x	.125	12x	2-1/2	45973	97023	97482
.010	1/8	.015	1.5x	.150	15x	2-1/2	45974	97024	—
.010	1/8	.050	5x	—	—	2-1/2	45975	97025	97483
.010	1/8	.050	5x	.100	10x	2-1/2	45976	97026	97484
.015 (1/64)	1/8	.022	1.5x	.045	3x	2-1/2	45977	97027	—
.015 (1/64)	1/8	.022	1.5x	.078	5x	2-1/2	45978	97028	97485
.015 (1/64)	1/8	.022	1.5x	.125	8x	2-1/2	45979	97029	97486
.015 (1/64)	1/8	.022	1.5x	.156	10x	2-1/2	45980	97030	—
.015 (1/64)	1/8	.022	1.5x	.225	15x	2-1/2	45981	97031	97487
.015 (1/64)	1/8	.022	1.5x	.270	18x	2-1/2	45982	97032	—
.015 (1/64)	1/8	.022	1.5x	.300	20x	2-1/2	45983	97033	—
.015 (1/64)	1/8	.022	1.5x	.375	25x	2-1/2	45984	97034	—
.015 (1/64)	1/8	.078	5x	—	—	2-1/2	45985	97035	97488
.015 (1/64)	1/8	.078	5x	.150	10x	2-1/2	45986	97036	97489
.015 (1/64)	1/8	.125	8x	—	—	2-1/2	45987	97037	97490
.015 (1/64)	1/8	.187	12x	—	—	2-1/2	45988	97038	—
.020	1/8	.030	1.5x	.100	5x	2-1/2	45989	97039	97491
.020	1/8	.030	1.5x	.160	8x	2-1/2	45990	97040	97492
.020	1/8	.030	1.5x	.200	10x	2-1/2	45991	97041	—
.020	1/8	.030	1.5x	.250	12x	2-1/2	45992	97042	97493
.020	1/8	.030	1.5x	.300	15x	2-1/2	45993	97043	97494
.020	1/8	.030	1.5x	.500	25x	2-1/2	45994	97044	—
.020	1/8	.100	5x	—	—	2-1/2	45995	97045	97495
.020	1/8	.100	5x	.200	10x	2-1/2	45996	97046	97496
.020	1/8	.160	8x	—	—	2-1/2	45997	97047	—
.020	1/8	.250	12x	—	—	2-1/2	45998	97048	—
.025	1/8	.037	1.5x	.075	3x	2-1/2	45999	97049	—
.025	1/8	.037	1.5x	.125	5x	2-1/2	46000	97050	97497
.025	1/8	.037	1.5x	.203	8x	2-1/2	46001	97051	97498
.025	1/8	.037	1.5x	.250	10x	2-1/2	46002	97052	—
.025	1/8	.037	1.5x	.375	15x	2-1/2	46003	97053	97499
.025	1/8	.037	1.5x	.500	20x	2-1/2	46004	97054	—
.025	1/8	.125	5x	—	—	2-1/2	46005	97055	97500
.025	1/8	.125	5x	.250	10x	2-1/2	46006	97056	97501
.025	1/8	.203	8x	—	—	2-1/2	46007	97057	—
.030	1/8	.045	1.5x	.090	3x	2-1/2	46008	97058	—
.030	1/8	.045	1.5x	.156	5x	2-1/2	46009	97059	97502
.030	1/8	.045	1.5x	.250	8x	2-1/2	46010	97060	97503
.030	1/8	.045	1.5x	.312	10x	2-1/2	46011	97061	—
.030	1/8	.045	1.5x	.375	12x	2-1/2	46012	97062	97504
.030	1/8	.150	5x	—	—	2-1/2	46013	97063	97505
.030	1/8	.150	5x	.300	10x	2-1/2	46014	97064	97506
.030	1/8	.250	8x	—	—	2-1/2	46015	97065	—
.031 (1/32)	1/8	.046	1.5x	.093	3x	2-1/2	46016	97066	—
.031 (1/32)	1/8	.046	1.5x	.156	5x	2-1/2	46017	97067	97507
.031 (1/32)	1/8	.046	1.5x	.250	8x	2-1/2	46018	97068	97508
.031 (1/32)	1/8	.046	1.5x	.312	10x	2-1/2	46019	97069	—
.031 (1/32)	1/8	.046	1.5x	.375	12x	2-1/2	46020	97070	97509
.031 (1/32)	1/8	.046	1.5x	.470	15x	2-1/2	46021	97071	97510
.031 (1/32)	1/8	.046	1.5x	.565	18x	2-1/2	46022	97072	—
.031 (1/32)	1/8	.046	1.5x	.625	20x	2-1/2	46023	97073	—
.031 (1/32)	1/8	.046	1.5x	.775	25x	2-1/2	46024	97074	—
.031 (1/32)	1/8	.046	1.5x	.937	30x	2-1/2	46025	—	—
.031 (1/32)	1/8	.156	5x	—	—	2-1/2	46026	97075	97511
.031 (1/32)	1/8	.156	5x	.310	10x	2-1/2	46027	97076	97512

(continued)

# Solid Carbide 3-Flute Miniature Square End Single End Mills

List No. 5916 3-Flute Square End

(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.031 (1/32)	1/8	.250	8x	—	—	2-1/2	46028	97077	97513
.031 (1/32)	1/8	.312	10x	—	—	2-1/2	46029	97078	—
.031 (1/32)	1/8	.375	12x	—	—	2-1/2	46030	97079	97514
.031 (1/32)	1/8	.470	15x	—	—	2-1/2	46031	97080	—
.035	1/8	.052	1.5x	.105	3x	2-1/2	46032	97081	—
.035	1/8	.052	1.5x	.187	5x	2-1/2	46033	97082	97515
.035	1/8	.052	1.5x	.281	8x	2-1/2	46034	97083	97516
.035	1/8	.052	1.5x	.425	12x	2-1/2	46035	97084	97517
.035	1/8	.052	1.5x	.525	15x	2-1/2	46036	97085	—
.035	1/8	.175	5x	—	—	2-1/2	46037	97086	97518
.035	1/8	.175	5x	.350	10x	2-1/2	46038	97087	97519
.035	1/8	.280	8x	—	—	2-1/2	46039	97088	—
.039	1/8	.059	1.5x	.117	3x	2-1/2	46040	97089	—
.039	1/8	.059	1.5x	.203	5x	2-1/2	46041	97090	—
.039	1/8	.059	1.5x	.325	8x	2-1/2	46042	97091	—
.039	1/8	.059	1.5x	.480	12x	2-1/2	46043	97092	—
.039	1/8	.203	5x	—	—	2-1/2	46044	97093	—
.040	1/8	.060	1.5x	.120	3x	2-1/2	46045	97094	—
.040	1/8	.060	1.5x	.203	5x	2-1/2	46046	97095	97520
.040	1/8	.060	1.5x	.325	8x	2-1/2	46047	97096	97521
.040	1/8	.060	1.5x	.400	10x	2-1/2	46048	97097	—
.040	1/8	.060	1.5x	.480	12x	2-1/2	46049	97098	97522
.040	1/8	.060	1.5x	.600	15x	2-1/2	46050	97099	—
.040	1/8	.060	1.5x	.800	20x	2-1/2	46051	97100	—
.040	1/8	.200	5x	—	—	2-1/2	46052	97101	97523
.040	1/8	.200	5x	.400	10x	2-1/2	46053	97102	97524
.040	1/8	.325	8x	—	—	2-1/2	46054	97103	—
.040	1/8	.480	12x	—	—	2-1/2	46055	97104	—
.045	1/8	.067	1.5x	.450	10x	2-1/2	46056	97105	—
.045	1/8	.067	1.5x	.550	12x	2-1/2	46057	97106	97525
.045	1/8	.067	1.5x	.680	15x	2-1/2	46058	97107	—
.045	1/8	.067	1.5x	.900	20x	2-1/2	46059	97108	—
.045	1/8	.225	5x	—	—	2-1/2	46060	97109	97526
.045	1/8	.375	8x	—	—	2-1/2	46061	97110	—
.045	1/8	.550	12x	—	—	2-1/2	46062	97111	—
.047 (3/64)	1/8	.070	1.5x	.141	3x	2-1/2	46063	97112	—
.047 (3/64)	1/8	.070	1.5x	.250	5x	2-1/2	46064	97113	97527
.047 (3/64)	1/8	.070	1.5x	.375	8x	2-1/2	46065	97114	97528
.047 (3/64)	1/8	.070	1.5x	.480	10x	2-1/2	46066	97115	—
.047 (3/64)	1/8	.070	1.5x	.570	12x	2-1/2	46067	97116	97529
.047 (3/64)	1/8	.070	1.5x	.710	15x	2-1/2	46068	97117	—
.047 (3/64)	1/8	.070	1.5x	.850	18x	2-1/2	46069	97118	—
.047 (3/64)	1/8	.070	1.5x	.950	20x	2-1/2	46070	97119	—
.047 (3/64)	1/8	.250	5x	—	—	2-1/2	46071	97120	97530
.047 (3/64)	1/8	.250	5x	.500	10x	2-1/2	46072	97121	97531
.047 (3/64)	1/8	.375	8x	—	—	2-1/2	46073	97122	97532
.047 (3/64)	1/8	.480	10x	—	—	2-1/2	46074	97123	—
.047 (3/64)	1/8	.570	12x	—	—	2-1/2	46075	97124	97533
.047 (3/64)	1/8	.710	15x	—	—	2-1/2	46076	97125	—
.050	1/8	.075	1.5x	.150	3x	2-1/2	46077	97126	—
.050	1/8	.075	1.5x	.250	5x	2-1/2	46078	97127	97534
.050	1/8	.075	1.5x	.400	8x	2-1/2	46079	97128	97535
.050	1/8	.075	1.5x	.500	10x	2-1/2	46080	97129	—
.050	1/8	.075	1.5x	.600	12x	2-1/2	46081	97130	97536
.050	1/8	.075	1.5x	.750	15x	2-1/2	46082	97131	—
.050	1/8	.300	6x	—	—	2-1/2	46083	97132	97537
.050	1/8	.400	8x	—	—	2-1/2	46084	97133	—
.050	1/8	.600	12x	—	—	2-1/2	46085	97134	—
.055	1/8	.082	1.5x	.165	3x	2-1/2	46086	97135	—
.055	1/8	.082	1.5x	.275	5x	2-1/2	46087	97136	97538
.055	1/8	.082	1.5x	.450	8x	2-1/2	46088	97137	97539
.055	1/8	.082	1.5x	.560	10x	2-1/2	46089	97138	—
.055	1/8	.082	1.5x	.660	12x	2-1/2	46090	97139	97540

(continued)





# Solid Carbide 3-Flute Miniature Square End Single End Mills

List No. 5916 3-Flute Square End

Speeds & Feeds: Page 17

(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.055	1/8	.082	1.5x	.825	15x	2-1/2	46091	97140	—
.055	1/8	.275	5x	—	—	2-1/2	46092	97141	—
.055	1/8	.385	7x	—	—	2-1/2	46093	97142	97541
.055	1/8	.385	7x	.770	14x	2-1/2	46094	97143	97542
.055	1/8	.660	12x	—	—	2-1/2	46095	97144	—
.060	1/8	.090	1.5x	.180	3x	2-1/2	46096	97145	—
.060	1/8	.090	1.5x	.312	5x	2-1/2	46097	97146	97543
.060	1/8	.090	1.5x	.500	8x	2-1/2	46098	97147	97544
.060	1/8	.090	1.5x	.625	10x	2-1/2	46099	97148	—
.060	1/8	.090	1.5x	.720	12x	2-1/2	46100	97149	97545
.060	1/8	.090	1.5x	.900	15x	2-1/2	46101	97150	—
.060	1/8	.312	5x	—	—	2-1/2	46102	97151	—
.060	1/8	.500	8x	—	—	2-1/2	46103	97152	97546
.062 (1/16)	1/8	.093	1.5x	.186	3x	2-1/2	46104	97153	—
.062 (1/16)	1/8	.093	1.5x	.312	5x	2-1/2	46105	97154	97547
.062 (1/16)	1/8	.093	1.5x	.500	8x	2-1/2	46106	97155	97548
.062 (1/16)	1/8	.093	1.5x	.625	10x	2-1/2	46107	97156	—
.062 (1/16)	1/8	.093	1.5x	.750	12x	2-1/2	46108	97157	97549
.062 (1/16)	1/8	.093	1.5x	.950	15x	2-1/2	46109	97158	97550
.062 (1/16)	1/8	.093	1.5x	1.125	18x	2-1/2	46110	97159	—
.062 (1/16)	1/8	.093	1.5x	1.250	20x	2-1/2	46111	97160	—
.062 (1/16)	1/8	.093	1.5x	1.375	22x	3	46112	97161	—
.062 (1/16)	1/8	.093	1.5x	1.550	25x	3	46113	97162	—
.062 (1/16)	1/8	.312	5x	—	—	2-1/2	46114	97163	97551
.062 (1/16)	1/8	.500	8x	—	—	2-1/2	46115	97164	97552
.062 (1/16)	1/8	.500	8x	1.000	16x	2-1/2	46116	97165	97553
.062 (1/16)	1/8	.625	10x	—	—	2-1/2	46117	97166	—
.062 (1/16)	1/8	.750	12x	—	—	2-1/2	46118	97167	97554
.062 (1/16)	1/8	.950	15x	—	—	2-1/2	46119	97168	97555
.065	1/8	.097	1.5x	.325	5x	2-1/2	46120	97169	—
.065	1/8	.097	1.5x	.530	8x	2-1/2	46121	97170	97556
.065	1/8	.097	1.5x	.800	12x	2-1/2	46122	97171	—
.065	1/8	.325	5x	—	—	2-1/2	46123	97172	—
.065	1/8	.500	8x	—	—	2-1/2	46124	97173	97557
.070	1/8	.105	1.5x	.375	5x	2-1/2	46125	97174	—
.070	1/8	.105	1.5x	.570	8x	2-1/2	46126	97175	97558
.070	1/8	.105	1.5x	.850	12x	2-1/2	46127	97176	—
.070	1/8	.105	1.5x	1.062	15x	2-1/2	46128	97177	—
.070	1/8	.375	5x	—	—	2-1/2	46129	97178	—
.070	1/8	.500	7x	—	—	2-1/2	46130	97179	97559
.070	1/8	.500	7x	1.000	14x	2-1/2	46131	97180	97560
.075	1/8	.112	1.5x	.375	5x	2-1/2	46132	97181	—
.075	1/8	.112	1.5x	.625	8x	2-1/2	46133	97182	97561
.075	1/8	.112	1.5x	.900	12x	2-1/2	46134	97183	—
.075	1/8	.375	5x	—	—	2-1/2	46135	97184	—
.075	1/8	.500	7x	—	—	2-1/2	46136	97185	97562
.078 (5/64)	1/8	.117	1.5x	.234	3x	2-1/2	46137	97186	—
.078 (5/64)	1/8	.117	1.5x	.406	5x	2-1/2	46138	97187	97563
.078 (5/64)	1/8	.117	1.5x	.625	8x	2-1/2	46139	97188	97564
.078 (5/64)	1/8	.117	1.5x	.800	10x	2-1/2	46140	97189	—
.078 (5/64)	1/8	.117	1.5x	.940	12x	2-1/2	46141	97190	97565
.078 (5/64)	1/8	.117	1.5x	1.187	15x	2-1/2	46142	97191	—
.078 (5/64)	1/8	.117	1.5x	1.562	20x	3	46143	97192	—
.078 (5/64)	1/8	.406	5x	—	—	2-1/2	46144	97193	97566
.078 (5/64)	1/8	.500	6x	1.000	12x	2-1/2	46145	97194	97567
.078 (5/64)	1/8	.625	8x	—	—	2-1/2	46146	97195	97568
.078 (5/64)	1/8	.800	10x	—	—	2-1/2	46147	97196	—
.078 (5/64)	1/8	.940	12x	—	—	2-1/2	46148	97197	97569
.078 (5/64)	1/8	1.187	15x	—	—	2-1/2	46149	97198	97570
.080	1/8	.120	1.5x	.406	5x	2-1/2	46150	97199	—
.080	1/8	.120	1.5x	.650	8x	2-1/2	46151	97200	97571
.080	1/8	.120	1.5x	.960	12x	2-1/2	46152	97201	—
.080	1/8	.406	5x	—	—	2-1/2	46153	97202	—

(continued)



# Solid Carbide 3-Flute Miniature Square End Single End Mills

List No. 5916 3-Flute Square End

(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.080	1/8	.750	9x	—	—	2-1/2	46154	97203	97572
.080	1/8	.750	9x	1.250	15x	2-1/2	46155	97204	97573
.080	1/8	.960	12x	—	—	2-1/2	46156	97205	—
.085	1/8	.127	1.5x	.425	5x	2-1/2	46157	97206	—
.085	1/8	.127	1.5x	.700	8x	2-1/2	46158	97207	97574
.085	1/8	.127	1.5x	1.020	12x	2-1/2	46159	97208	—
.085	1/8	.425	5x	—	—	2-1/2	46160	97209	—
.085	1/8	.750	9x	—	—	2-1/2	46161	97210	97575
.085	1/8	.750	9x	1.250	14x	2-1/2	46162	97211	97576
.090	1/8	.135	1.5x	.450	5x	2-1/2	46163	97212	—
.090	1/8	.135	1.5x	.750	8x	2-1/2	46164	97213	97577
.090	1/8	.135	1.5x	1.080	12x	2-1/2	46165	97214	—
.090	1/8	.450	5x	—	—	2-1/2	46166	97215	—
.090	1/8	.750	8x	—	—	2-1/2	46167	97216	97578
.090	1/8	.750	8x	1.250	13x	2-1/2	46168	97217	97579
.090	1/8	1.080	12x	—	—	2-1/2	46169	97218	—
.093 (3/32)	1/8	.139	1.5x	.279	3x	2-1/2	46170	97219	—
.093 (3/32)	1/8	.139	1.5x	.500	5x	2-1/2	46171	97220	97580
.093 (3/32)	1/8	.139	1.5x	.750	8x	2-1/2	46172	97221	97581
.093 (3/32)	1/8	.139	1.5x	.950	10x	2-1/2	46173	97222	—
.093 (3/32)	1/8	.139	1.5x	1.125	12x	2-1/2	46174	97223	97582
.093 (3/32)	1/8	.139	1.5x	1.400	15x	3	46175	97224	97583
.093 (3/32)	1/8	.139	1.5x	1.675	18x	3	46176	97225	—
.093 (3/32)	1/8	.139	1.5x	1.875	20x	4	46177	97226	—
.093 (3/32)	1/8	.500	5x	—	—	2-1/2	46178	97227	97584
.093 (3/32)	1/8	.750	8x	—	—	2-1/2	46179	97228	97585
.093 (3/32)	1/8	.750	8x	1.250	13x	2-1/2	46180	97229	97586
.093 (3/32)	1/8	.950	10x	—	—	2-1/2	46181	97230	—
.093 (3/32)	1/8	1.125	12x	—	—	2-1/2	46182	97231	97587
.093 (3/32)	1/8	1.400	15x	—	—	3	46183	97232	97588
.095	1/8	.142	1.5x	.500	5x	2-1/2	46184	97233	—
.095	1/8	.142	1.5x	.750	8x	2-1/2	46185	97234	97589
.095	1/8	.142	1.5x	1.150	12x	2-1/2	46186	97235	—
.100	1/8	.150	1.5x	.500	5x	2-1/2	46187	97236	—
.100	1/8	.150	1.5x	.800	8x	2-1/2	46188	97237	97590
.100	1/8	.150	1.5x	1.200	12x	2-1/2	46189	97238	—
.100	1/8	.150	1.5x	1.500	15x	3	46190	97239	—
.100	1/8	.500	5x	—	—	2-1/2	46191	97240	—
.100	1/8	.750	7.5x	—	—	2-1/2	46192	97241	97591
.100	1/8	.750	7.5x	1.250	12x	2-1/2	46193	97242	97592
.100	1/8	1.200	12x	—	—	2-1/2	46194	97243	—
.109 (7/64)	1/8	.163	1.5x	.570	5x	2-1/2	46195	97244	—
.109 (7/64)	1/8	.163	1.5x	.900	8x	2-1/2	46196	97245	—
.109 (7/64)	1/8	.570	5x	—	—	2-1/2	46197	97246	—
.109 (7/64)	1/8	.900	8x	—	—	2-1/2	46198	97247	—
.118	1/8	.177	1.5x	.625	5x	2-1/2	46199	97248	—
.118	1/8	.177	1.5x	.950	8x	2-1/2	46200	97249	—
.118	1/8	.177	1.5x	1.420	12x	3	46201	97250	—
.118	1/8	.625	5x	—	—	2-1/2	46202	97251	—
.118	1/8	.950	8x	—	—	2-1/2	46203	97252	—
.125 (1/8)	1/8	.187	1.5x	.375	3x	2-1/2	46204	97253	—
.125 (1/8)	1/8	.187	1.5x	.625	5x	2-1/2	46205	97254	97593
.125 (1/8)	1/8	.187	1.5x	1.000	8x	2-1/2	46206	97255	97594
.125 (1/8)	1/8	.187	1.5x	1.250	10x	2-1/2	46207	97256	—
.125 (1/8)	1/8	.187	1.5x	1.500	12x	3	46208	97257	97595
.125 (1/8)	1/8	.187	1.5x	1.875	15x	3	46209	97258	—
.125 (1/8)	1/8	.187	1.5x	2.250	18x	4	46210	97259	—
.125 (1/8)	1/8	.187	1.5x	2.500	20x	4	46211	97260	—
.125 (1/8)	1/8	.187	1.5x	3.125	25x	4	46212	97261	—
.125 (1/8)	1/8	.625	5x	—	—	2-1/2	46213	97262	97596
.125 (1/8)	1/8	1.000	8x	—	—	2-1/2	46214	97263	97597
.125 (1/8)	1/8	1.000	8x	1.500	12x	2-1/2	46215	97264	97598
.125 (1/8)	1/8	1.250	10x	—	—	2-1/2	46216	97265	—

(continued)



# Solid Carbide 3-Flute Miniature Square End Single End Mills

List No. 5916 3-Flute Square End

(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTIN COATED EDP NO.	DLC COATED EDP NO.
.125 (1/8)	1/8	1.500	12x	—	—	3	46217	97266	97599
.125 (1/8)	1/8	1.875	15x	—	—	3	46218	97267	97600
.140 (9/64)	3/16	.211	1.5x	.750	5x	3	46219	97268	—
.140 (9/64)	3/16	.211	1.5x	1.125	8x	3	46220	97269	—
.156 (5/32)	3/16	.234	1.5x	.470	3x	3	46221	97270	—
.156 (5/32)	3/16	.234	1.5x	.750	5x	3	46222	97271	—
.156 (5/32)	3/16	.234	1.5x	1.250	8x	3	46223	97272	—
.156 (5/32)	3/16	.234	1.5x	1.875	12x	4	46224	97273	—
.156 (5/32)	3/16	.234	1.5x	2.375	15x	4	46225	97274	—
.187 (3/16)	3/16	.281	1.5x	.570	3x	3	46226	97275	—
.187 (3/16)	3/16	.281	1.5x	1.000	5x	3	46227	97276	97601
.187 (3/16)	3/16	.281	1.5x	1.500	8x	3	46228	97277	97602
.187 (3/16)	3/16	.281	1.5x	1.875	10x	4	46229	97278	—
.187 (3/16)	3/16	.281	1.5x	2.250	12x	4	46230	97279	97603
.187 (3/16)	3/16	.281	1.5x	2.812	15x	4	46231	97280	—
.187 (3/16)	3/16	.281	1.5x	3.750	20x	6	46232	97281	—
.187 (3/16)	3/16	1.125	6x	1.625	8x	3	46233	97282	97604
.250 (1/4)	1/4	.375	1.5x	1.250	5x	4	46234	97283	97605
.250 (1/4)	1/4	.375	1.5x	2.000	8x	4	46235	97284	97606
.250 (1/4)	1/4	.375	1.5x	2.500	10x	4	46236	97285	—
.250 (1/4)	1/4	.375	1.5x	3.000	12x	6	46237	97286	97607
.250 (1/4)	1/4	.375	1.5x	3.750	15x	6	46238	97287	—
.250 (1/4)	1/4	1.500	6x	2.000	8x	4	46239	97288	97608

# Solid Carbide 3-Flute Miniature Ball Nose Single End Mills

Micrograin Carbide - Center Cutting - 30° Helix Angle

For materials less than 48Rc hardness

Dia. Tolerance +.0005" / -.0005"



List No. 5917 3-Flute Ball Nose

ALTIN - Aluminum Titanium Nitride Coating for abrasive and hard-to-machine materials

DLC - Amorphous Diamond-Like Carbon for graphite and some non-ferrous materials.

Speeds & Feeds: Page 17

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTIN COATED EDP NO.	DLC COATED EDP NO.
.010	1/8	.015	1.5x	.050	5x	2-1/2	46250	97295	97620
.010	1/8	.015	1.5x	.080	8x	2-1/2	46251	97296	97621
.010	1/8	.015	1.5x	.125	12x	2-1/2	46252	97297	97622
.010	1/8	.015	1.5x	.150	15x	2-1/2	46253	97298	97623
.010	1/8	.050	5x	—	—	2-1/2	46254	97299	97624
.010	1/8	.050	5x	.100	10x	2-1/2	46255	97300	97625
.015 (1/64)	1/8	.022	1.5x	.045	3x	2-1/2	46256	97301	—
.015 (1/64)	1/8	.022	1.5x	.078	5x	2-1/2	46257	97302	97626
.015 (1/64)	1/8	.022	1.5x	.125	8x	2-1/2	46258	97303	97627
.015 (1/64)	1/8	.022	1.5x	.156	10x	2-1/2	46259	97304	97628
.015 (1/64)	1/8	.022	1.5x	.187	12x	2-1/2	46260	97305	97629
.015 (1/64)	1/8	.022	1.5x	.225	15x	2-1/2	46261	97306	97630
.015 (1/64)	1/8	.022	1.5x	.300	20x	2-1/2	46262	97307	97631
.015 (1/64)	1/8	.078	5x	—	—	2-1/2	46263	97308	97632
.015 (1/64)	1/8	.078	5x	.150	10x	2-1/2	46264	97309	97633
.015 (1/64)	1/8	.125	8x	—	—	2-1/2	46265	97310	97634
.020	1/8	.030	1.5x	.060	3x	2-1/2	46266	97311	—
.020	1/8	.030	1.5x	.100	5x	2-1/2	46267	97312	97635
.020	1/8	.030	1.5x	.160	8x	2-1/2	46268	97313	97636
.020	1/8	.030	1.5x	.200	10x	2-1/2	46269	97314	—
.020	1/8	.030	1.5x	.250	12x	2-1/2	46270	97315	97637
.020	1/8	.030	1.5x	.300	15x	2-1/2	46271	97316	97638
.020	1/8	.030	1.5x	.400	20x	2-1/2	46272	97317	—

# Solid Carbide 3-Flute Miniature Ball Nose Single End Mills

List No. 5917 3-Flute Ball Nose

(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.020	1/8	.100	5x	—	—	2-1/2	46273	97318	97639
.020	1/8	.100	5x	.200	10x	2-1/2	46274	97319	97640
.020	1/8	.160	8x	—	—	2-1/2	46275	97320	—
.025	1/8	.037	1.5x	.075	3x	2-1/2	46276	97321	—
.025	1/8	.037	1.5x	.125	5x	2-1/2	46277	97322	97641
.025	1/8	.037	1.5x	.203	8x	2-1/2	46278	97323	97642
.025	1/8	.037	1.5x	.312	12x	2-1/2	46279	97324	97643
.025	1/8	.037	1.5x	.375	15x	2-1/2	46280	97325	97644
.030	1/8	.045	1.5x	.156	5x	2-1/2	46281	97326	97645
.030	1/8	.045	1.5x	.250	8x	2-1/2	46282	97327	97646
.030	1/8	.045	1.5x	.375	12x	2-1/2	46283	97328	97647
.030	1/8	.045	1.5x	.450	15x	2-1/2	46284	97329	—
.030	1/8	.150	5x	—	—	2-1/2	46285	97330	97648
.030	1/8	.150	5x	.300	10x	2-1/2	46286	97331	97649
.031 (1/32)	1/8	.046	1.5x	.093	3x	2-1/2	46287	97332	97650
.031 (1/32)	1/8	.046	1.5x	.156	5x	2-1/2	46288	97333	97651
.031 (1/32)	1/8	.046	1.5x	.250	8x	2-1/2	46289	97334	97652
.031 (1/32)	1/8	.046	1.5x	.312	10x	2-1/2	46290	97335	97653
.031 (1/32)	1/8	.046	1.5x	.375	12x	2-1/2	46291	97336	97654
.031 (1/32)	1/8	.046	1.5x	.470	15x	2-1/2	46292	97337	97655
.031 (1/32)	1/8	.046	1.5x	.565	18x	2-1/2	46293	97338	97656
.031 (1/32)	1/8	.046	1.5x	.625	20x	2-1/2	46294	97339	97657
.031 (1/32)	1/8	.046	1.5x	.775	25x	2-1/2	46295	97340	—
.031 (1/32)	1/8	.156	5x	—	—	2-1/2	46296	97341	97658
.031 (1/32)	1/8	.156	5x	.310	10x	2-1/2	46297	97342	97659
.031 (1/32)	1/8	.250	8x	—	—	2-1/2	46298	97343	97660
.031 (1/32)	1/8	.312	10x	—	—	2-1/2	46299	97344	—
.031 (1/32)	1/8	.375	12x	—	—	2-1/2	46300	97345	97661
.031 (1/32)	1/8	.470	15x	—	—	2-1/2	46301	97346	—
.035	1/8	.052	1.5x	.187	5x	2-1/2	46302	97347	97662
.035	1/8	.052	1.5x	.281	8x	2-1/2	46303	97348	97663
.035	1/8	.175	5x	—	—	2-1/2	46304	97349	97664
.040	1/8	.060	1.5x	.120	3x	2-1/2	46305	97350	—
.040	1/8	.060	1.5x	.203	5x	2-1/2	46306	97351	97665
.040	1/8	.060	1.5x	.325	8x	2-1/2	46307	97352	97666
.040	1/8	.060	1.5x	.400	10x	2-1/2	46308	97353	—
.040	1/8	.060	1.5x	.480	12x	2-1/2	46309	97354	97667
.040	1/8	.060	1.5x	.600	15x	2-1/2	46310	97355	97668
.040	1/8	.060	1.5x	.800	20x	2-1/2	46311	97356	—
.040	1/8	.200	5x	—	—	2-1/2	46312	97357	97669
.040	1/8	.200	5x	.400	10x	2-1/2	46313	97358	97670
.040	1/8	.325	8x	—	—	2-1/2	46314	97359	—
.040	1/8	.480	12x	—	—	2-1/2	46315	97360	—
.045	1/8	.067	1.5x	.225	5x	2-1/2	46316	97361	97671
.045	1/8	.067	1.5x	.375	8x	2-1/2	46317	97362	97672
.045	1/8	.067	1.5x	.550	12x	2-1/2	46318	97363	97673
.045	1/8	.225	5x	.450	10x	2-1/2	46319	97364	97674
.047 (3/64)	1/8	.070	1.5x	.141	3x	2-1/2	46320	97365	—
.047 (3/64)	1/8	.070	1.5x	.250	5x	2-1/2	46321	97366	97675
.047 (3/64)	1/8	.070	1.5x	.375	8x	2-1/2	46322	97367	97676
.047 (3/64)	1/8	.070	1.5x	.480	10x	2-1/2	46323	97368	—
.047 (3/64)	1/8	.070	1.5x	.570	12x	2-1/2	46324	97369	97677
.047 (3/64)	1/8	.070	1.5x	.710	15x	2-1/2	46325	97370	97678
.047 (3/64)	1/8	.070	1.5x	.950	20x	2-1/2	46326	97371	97679
.047 (3/64)	1/8	.070	1.5x	1.187	25x	2-1/2	46327	97372	—
.047 (3/64)	1/8	.250	5x	—	—	2-1/2	46328	97373	97680
.047 (3/64)	1/8	.250	5x	.500	10x	2-1/2	46329	97374	97681
.047 (3/64)	1/8	.375	8x	—	—	2-1/2	46330	97375	97682
.050	1/8	.075	1.5x	.250	5x	2-1/2	46331	97376	97683
.050	1/8	.075	1.5x	.400	8x	2-1/2	46332	97377	97684
.050	1/8	.075	1.5x	.600	12x	2-1/2	46333	97378	97685
.050	1/8	.300	6x	—	—	2-1/2	46334	97379	97686
.050	1/8	.300	6x	.600	12x	2-1/2	46335	97380	97687

(continued)



# Solid Carbide 3-Flute Miniature Ball Nose Single End Mills

List No. 5917 3-Flute Ball Nose

Speeds & Feeds: Page 17

(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.055	1/8	.082	1.5x	.165	3x	2-1/2	46336	97381	—
.055	1/8	.082	1.5x	.275	5x	2-1/2	46337	97382	97688
.055	1/8	.082	1.5x	.450	8x	2-1/2	46338	97383	97689
.055	1/8	.082	1.5x	.660	12x	2-1/2	46339	97384	97690
.055	1/8	.275	5x	—	—	2-1/2	46340	97385	—
.060	1/8	.090	1.5x	.180	3x	2-1/2	46341	97386	—
.060	1/8	.090	1.5x	.312	5x	2-1/2	46342	97387	97691
.060	1/8	.090	1.5x	.500	8x	2-1/2	46343	97388	97692
.060	1/8	.090	1.5x	.625	10x	2-1/2	46344	97389	—
.060	1/8	.090	1.5x	.720	12x	2-1/2	46345	97390	97693
.060	1/8	.312	5x	—	—	2-1/2	46346	97391	—
.060	1/8	.500	8x	1.000	16x	2-1/2	46347	97392	97694
.062 (1/16)	1/8	.093	1.5x	.186	3x	2-1/2	46348	97393	97695
.062 (1/16)	1/8	.093	1.5x	.312	5x	2-1/2	46349	97394	97696
.062 (1/16)	1/8	.093	1.5x	.500	8x	2-1/2	46350	97395	97697
.062 (1/16)	1/8	.093	1.5x	.625	10x	2-1/2	46351	97396	97698
.062 (1/16)	1/8	.093	1.5x	.750	12x	2-1/2	46352	97397	97699
.062 (1/16)	1/8	.093	1.5x	.950	15x	2-1/2	46353	97398	97700
.062 (1/16)	1/8	.093	1.5x	1.125	18x	2-1/2	46354	97399	—
.062 (1/16)	1/8	.093	1.5x	1.250	20x	2-1/2	46355	97400	97701
.062 (1/16)	1/8	.093	1.5x	1.550	25x	3	46356	97401	—
.062 (1/16)	1/8	.312	5x	—	—	2-1/2	46357	97402	97702
.062 (1/16)	1/8	.500	8x	—	—	2-1/2	46358	97403	97703
.062 (1/16)	1/8	.500	8x	1.000	16x	2-1/2	46359	97404	97704
.062 (1/16)	1/8	.625	10x	—	—	2-1/2	46360	97405	—
.062 (1/16)	1/8	.750	12x	—	—	2-1/2	46361	97406	97705
.062 (1/16)	1/8	.950	15x	—	—	2-1/2	46362	97407	97706
.065	1/8	.097	1.5x	.325	5x	2-1/2	46363	—	—
.065	1/8	.097	1.5x	.530	8x	2-1/2	46364	97408	97707
.065	1/8	.500	8x	—	—	2-1/2	46365	97409	97708
.070	1/8	.105	1.5x	.375	5x	2-1/2	46366	—	—
.070	1/8	.105	1.5x	.570	8x	2-1/2	46367	97410	97709
.070	1/8	.500	7x	—	—	2-1/2	46368	97411	97710
.070	1/8	.500	7x	1.000	14x	2-1/2	46369	97412	97711
.075	1/8	.112	1.5x	.375	5x	2-1/2	46370	—	—
.075	1/8	.112	1.5x	.625	8x	2-1/2	46371	97413	97712
.078 (5/64)	1/8	.117	1.5x	.406	5x	2-1/2	46372	97414	97713
.078 (5/64)	1/8	.117	1.5x	.625	8x	2-1/2	46373	97415	97714
.078 (5/64)	1/8	.117	1.5x	.800	10x	2-1/2	46374	97416	—
.078 (5/64)	1/8	.117	1.5x	.940	12x	2-1/2	46375	97417	97715
.078 (5/64)	1/8	.117	1.5x	1.187	15x	2-1/2	46376	97418	—
.078 (5/64)	1/8	.117	1.5x	1.562	20x	3	46377	97419	—
.078 (5/64)	1/8	.406	5x	—	—	2-1/2	46378	97420	97716
.078 (5/64)	1/8	.500	6x	1.000	12x	2-1/2	46379	97421	97717
.078 (5/64)	1/8	.625	8x	—	—	2-1/2	46380	97422	97718
.078 (5/64)	1/8	.940	12x	—	—	2-1/2	46381	97423	97719
.078 (5/64)	1/8	1.187	15x	—	—	2-1/2	46382	97424	97720
.085	1/8	.127	1.5x	.425	5x	2-1/2	46383	97425	—
.085	1/8	.750	9x	1.250	14x	2-1/2	46384	97426	97721
.090	1/8	.135	1.5x	.450	5x	2-1/2	46385	—	—
.090	1/8	.750	8x	1.250	13x	2-1/2	46386	97427	97722
.093 (3/32)	1/8	.139	1.5x	.279	3x	2-1/2	46387	97428	—
.093 (3/32)	1/8	.139	1.5x	.500	5x	2-1/2	46388	97429	97723
.093 (3/32)	1/8	.139	1.5x	.750	8x	2-1/2	46389	97430	97724
.093 (3/32)	1/8	.139	1.5x	.950	10x	2-1/2	46390	97431	—
.093 (3/32)	1/8	.139	1.5x	1.125	12x	2-1/2	46391	97432	97725
.093 (3/32)	1/8	.139	1.5x	1.400	15x	3	46392	97433	97726
.093 (3/32)	1/8	.139	1.5x	1.875	20x	4	46393	97434	—
.093 (3/32)	1/8	.139	1.5x	2.312	25x	4	46394	97435	—
.093 (3/32)	1/8	.500	5x	—	—	2-1/2	46395	97436	97727
.093 (3/32)	1/8	.750	8x	—	—	2-1/2	46396	97437	97728
.093 (3/32)	1/8	.750	8x	1.250	13x	2-1/2	46397	97438	97729
.093 (3/32)	1/8	1.125	12x	—	—	2-1/2	46398	97439	97730
.093 (3/32)	1/8	1.400	15x	—	—	3	46399	97440	97731

(continued)



# Solid Carbide 3-Flute Miniature Ball Nose Single End Mills

List No. 5917 3-Flute Ball Nose

(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	TOTAL REACH	TOTAL REACH x DIA.	OAL	UNCOATED EDP NO.	ALTIN COATED EDP NO.	DLC COATED EDP NO.
.100	1/8	.150	1.5x	.500	5x	2-1/2	46400	97441	—
.100	1/8	.150	1.5x	.800	8x	2-1/2	46401	97442	97732
.100	1/8	.150	1.5x	1.200	12x	2-1/2	46402	97443	—
.100	1/8	.500	5x	—	—	2-1/2	46403	97444	—
.125 (1/8)	1/8	.187	1.5x	.375	3x	2-1/2	46404	97445	—
.125 (1/8)	1/8	.187	1.5x	.625	5x	2-1/2	46405	97446	97733
.125 (1/8)	1/8	.187	1.5x	1.000	8x	2-1/2	46406	97447	97734
.125 (1/8)	1/8	.187	1.5x	1.250	10x	2-1/2	46407	97448	—
.125 (1/8)	1/8	.187	1.5x	1.500	12x	3	46408	97449	97735
.125 (1/8)	1/8	.187	1.5x	1.875	15x	3	46409	97450	97736
.125 (1/8)	1/8	.187	1.5x	2.250	18x	4	46410	97451	—
.125 (1/8)	1/8	.187	1.5x	2.500	20x	4	46411	97452	97737
.125 (1/8)	1/8	.187	1.5x	3.125	25x	4	46412	—	—
.125 (1/8)	1/8	.625	5x	—	—	2-1/2	46413	97453	97738
.125 (1/8)	1/8	1.000	8x	—	—	2-1/2	46414	97454	97739
.125 (1/8)	1/8	1.000	8x	1.500	12x	2-1/2	46415	97455	97740
.125 (1/8)	1/8	1.250	10x	—	—	2-1/2	46416	97456	—
.125 (1/8)	1/8	1.500	12x	—	—	3	46417	97457	97741
.125 (1/8)	1/8	1.875	15x	—	—	3	46418	97458	97742
.156 (5/32)	3/16	.234	1.5x	1.250	8x	3	46419	97459	—
.187 (3/16)	3/16	.281	1.5x	1.000	5x	3	46420	97460	97743
.187 (3/16)	3/16	.281	1.5x	1.500	8x	3	46421	97461	97744
.187 (3/16)	3/16	.281	1.5x	1.875	10x	4	46422	97462	—
.187 (3/16)	3/16	.281	1.5x	2.250	12x	4	46423	97463	97745
.187 (3/16)	3/16	.281	1.5x	2.812	15x	4	46424	97464	—
.250 (1/4)	1/4	.375	1.5x	1.250	5x	4	46425	97465	97746
.250 (1/4)	1/4	.375	1.5x	2.000	8x	4	46426	97466	97747
.250 (1/4)	1/4	.375	1.5x	2.500	10x	4	46427	97467	—
.250 (1/4)	1/4	.375	1.5x	3.000	12x	6	46428	97468	97748
.250 (1/4)	1/4	.375	1.5x	3.750	15x	6	46429	97469	—

## CUTTING FLUIDS

Coolants and lubricants offer many benefits including reduced friction and heat, enhanced chip removal, improved accuracy and surface finish, higher speeds and feeds, corrosion protection and increased tool life.

Proper selection and application of cutting fluids is critical to optimizing machining applications. **Please consult your cutting fluids supplier for advice on your specific machining application.**

## TOOL COATING SERVICE

**Tool Coatings** enhance cutting tool performance for increased productivity and lower overall tooling cost. Benefits include increased surface hardness, lubricity & heat resistance and decreased chemical reactivity. Results include reduced friction & torque, higher speeds & feeds, increased tool life, decreased galling & chip welding and improved surface finish. **PLEASE INQUIRE.**

**TiN** — Titanium Nitride

**TiCN** — Titanium Carbonitride

**TiAlN** — Titanium Aluminum Nitride

**AlTiN** — Aluminum Titanium Nitride

**CrN** — Chromium Nitride

**CrC** — Chromium Carbide

**DLC** — Amorphous Diamond-Like Carbon



# Solid Carbide 4-Flute Miniature Square End Single End Mills

Micrograin Carbide - Center Cutting - 30° Helix Angle  
 Stub Length & Regular Length  
 For materials less than 48Rc hardness  
 Dia. Tolerance +.0005" / -.0005"



List No. 5918 4-Flute Square End

ALTiN - Aluminum Titanium Nitride Coating for abrasive and hard-to-machine materials

DLC - Amorphous Diamond-Like Carbon for graphite and some non-ferrous materials.

Speeds & Feeds: Page 17

DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.005	1/8	.008	1.5x	1-1/2	Stub	45719	—	—
.005	1/8	.015	3x	1-1/2	Regular	45720	—	—
.006	1/8	.009	1.5x	1-1/2	Stub	45721	—	—
.006	1/8	.018	3x	1-1/2	Regular	45722	—	—
.007	1/8	.011	1.5x	1-1/2	Stub	45723	—	—
.007	1/8	.021	3x	1-1/2	Regular	45724	—	—
.008	1/8	.012	1.5x	1-1/2	Stub	45725	—	—
.008	1/8	.024	3x	1-1/2	Regular	45726	—	—
.009	1/8	.014	1.5x	1-1/2	Stub	45727	—	—
.009	1/8	.027	3x	1-1/2	Regular	45728	—	—
.010	1/8	.015	1.5x	1-1/2	Stub	45729	96675	96910
.010	1/8	.030	3x	1-1/2	Regular	45730	96676	96911
.011	1/8	.017	1.5x	1-1/2	Stub	45731	96677	—
.011	1/8	.033	3x	1-1/2	Regular	45732	96678	96912
.012	1/8	.018	1.5x	1-1/2	Stub	45733	96679	—
.012	1/8	.036	3x	1-1/2	Regular	45734	96680	96913
.013	1/8	.020	1.5x	1-1/2	Stub	45735	96681	—
.013	1/8	.039	3x	1-1/2	Regular	45736	96682	96914
.014	1/8	.021	1.5x	1-1/2	Stub	45737	96683	—
.014	1/8	.042	3x	1-1/2	Regular	45738	96684	96915
.015 (1/64)	1/8	.023	1.5x	1-1/2	Stub	45739	96685	96916
.015 (1/64)	1/8	.045	3x	1-1/2	Regular	45740	96686	96917
.016	1/8	.024	1.5x	1-1/2	Stub	45741	96687	—
.016	1/8	.048	3x	1-1/2	Regular	45742	96688	96918
.017	1/8	.026	1.5x	1-1/2	Stub	45743	96689	—
.017	1/8	.051	3x	1-1/2	Regular	45744	96690	96919
.018	1/8	.027	1.5x	1-1/2	Stub	45745	96691	—
.018	1/8	.054	3x	1-1/2	Regular	45746	96692	96920
.019	1/8	.029	1.5x	1-1/2	Stub	45747	96693	—
.019	1/8	.057	3x	1-1/2	Regular	45748	96694	96921
.020	1/8	.030	1.5x	1-1/2	Stub	45749	96695	96922
.020	1/8	.060	3x	1-1/2	Regular	45750	96696	96923
.021	1/8	.032	1.5x	1-1/2	Stub	45751	96697	—
.021	1/8	.063	3x	1-1/2	Regular	45752	96698	96924
.022	1/8	.033	1.5x	1-1/2	Stub	45753	96699	—
.022	1/8	.066	3x	1-1/2	Regular	45754	96700	96925
.023	1/8	.035	1.5x	1-1/2	Stub	45755	96701	—
.023	1/8	.069	3x	1-1/2	Regular	45756	96702	96926
.024	1/8	.036	1.5x	1-1/2	Stub	45757	96703	—
.024	1/8	.072	3x	1-1/2	Regular	45758	96704	96927
.025	1/8	.038	1.5x	1-1/2	Stub	45759	96705	96928
.025	1/8	.075	3x	1-1/2	Regular	45760	96706	96929
.026	1/8	.039	1.5x	1-1/2	Stub	45761	96707	—
.026	1/8	.078	3x	1-1/2	Regular	45762	96708	96930
.027	1/8	.041	1.5x	1-1/2	Stub	45763	96709	—
.027	1/8	.081	3x	1-1/2	Regular	45764	96710	96931
.028	1/8	.042	1.5x	1-1/2	Stub	45765	96711	—
.028	1/8	.084	3x	1-1/2	Regular	45766	96712	96932
.029	1/8	.044	1.5x	1-1/2	Stub	45767	96713	—
.029	1/8	.087	3x	1-1/2	Regular	45768	96714	96933
.030	1/8	.045	1.5x	1-1/2	Stub	45769	96715	96934
.030	1/8	.090	3x	1-1/2	Regular	45770	96716	96935
.031 (1/32)	1/8	.047	1.5x	1-1/2	Stub	45771	96717	96936
.031 (1/32)	1/8	.093	3x	1-1/2	Regular	45772	96718	96937
.032	1/8	.048	1.5x	1-1/2	Stub	45773	96719	—
.032	1/8	.096	3x	1-1/2	Regular	45774	96720	—
.033	1/8	.050	1.5x	1-1/2	Stub	45775	96721	—
.033	1/8	.099	3x	1-1/2	Regular	45776	96722	—
.034	1/8	.051	1.5x	1-1/2	Stub	45777	96723	—
.034	1/8	.102	3x	1-1/2	Regular	45778	96724	—

(continued)

# Solid Carbide 4-Flute Miniature Square End Single End Mills

List No. 5918 4-Flute Square End

(continued)

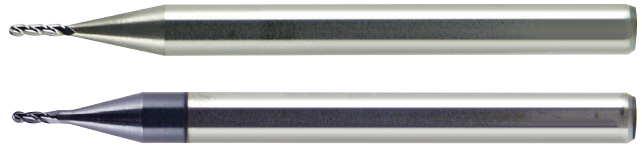
DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.035	1/8	.053	1.5x	1-1/2	Stub	45779	96725	96938
.035	1/8	.105	3x	1-1/2	Regular	45780	96726	96939
.036	1/8	.054	1.5x	1-1/2	Stub	45781	96727	—
.036	1/8	.108	3x	1-1/2	Regular	45782	96728	—
.037	1/8	.056	1.5x	1-1/2	Stub	45783	96729	—
.037	1/8	.111	3x	1-1/2	Regular	45784	96730	—
.038	1/8	.057	1.5x	1-1/2	Stub	45785	96731	—
.038	1/8	.114	3x	1-1/2	Regular	45786	96732	—
.039	1/8	.059	1.5x	1-1/2	Stub	45787	96733	—
.039	1/8	.117	3x	1-1/2	Regular	45788	96734	—
.040	1/8	.060	1.5x	1-1/2	Stub	45789	96735	96940
.040	1/8	.120	3x	1-1/2	Regular	45790	96736	96941
.041	1/8	.123	3x	1-1/2	Regular	45791	96737	—
.042	1/8	.126	3x	1-1/2	Regular	45792	96738	—
.043	1/8	.129	3x	1-1/2	Regular	45793	96739	—
.044	1/8	.132	3x	1-1/2	Regular	45794	96740	—
.045	1/8	.068	1.5x	1-1/2	Stub	45795	96741	96942
.045	1/8	.135	3x	1-1/2	Regular	45796	96742	96943
.046	1/8	.138	3x	1-1/2	Regular	45797	96743	—
.047 (3/64)	1/8	.071	1.5x	1-1/2	Stub	45798	96744	96944
.047 (3/64)	1/8	.141	3x	1-1/2	Regular	45799	96745	96945
.048	1/8	.144	3x	1-1/2	Regular	45800	96746	—
.049	1/8	.147	3x	1-1/2	Regular	45801	96747	—
.050	1/8	.075	1.5x	1-1/2	Stub	45802	96748	96946
.050	1/8	.150	3x	1-1/2	Regular	45803	96749	96947
.051	1/8	.153	3x	1-1/2	Regular	45804	96750	—
.052	1/8	.156	3x	1-1/2	Regular	45805	96751	—
.053	1/8	.159	3x	1-1/2	Regular	45806	96752	—
.054	1/8	.162	3x	1-1/2	Regular	45807	96753	—
.055	1/8	.083	1.5x	1-1/2	Stub	45808	96754	96948
.055	1/8	.165	3x	1-1/2	Regular	45809	96755	96949
.056	1/8	.168	3x	1-1/2	Regular	45810	96756	—
.057	1/8	.171	3x	1-1/2	Regular	45811	96757	—
.058	1/8	.174	3x	1-1/2	Regular	45812	96758	—
.059	1/8	.177	3x	1-1/2	Regular	45813	96759	—
.060	1/8	.090	1.5x	1-1/2	Stub	45814	96760	96950
.060	1/8	.180	3x	1-1/2	Regular	45815	96761	96951
.062 (1/16)	1/8	.093	1.5x	1-1/2	Stub	45816	96762	96952
.062 (1/16)	1/8	.186	3x	1-1/2	Regular	45817	96763	96953
.065	1/8	.098	1.5x	1-1/2	Stub	45818	96764	—
.065	1/8	.195	3x	1-1/2	Regular	45819	96765	96954
.070	1/8	.105	1.5x	1-1/2	Stub	45820	96766	—
.070	1/8	.210	3x	1-1/2	Regular	45821	96767	96955
.075	1/8	.113	1.5x	1-1/2	Stub	45822	96768	—
.075	1/8	.225	3x	1-1/2	Regular	45823	96769	96956
.078 (5/64)	1/8	.117	1.5x	1-1/2	Stub	45824	96770	96957
.078 (5/64)	1/8	.234	3x	1-1/2	Regular	45825	96771	96958
.080	1/8	.120	1.5x	1-1/2	Stub	45826	96772	—
.080	1/8	.240	3x	1-1/2	Regular	45827	96773	96959
.085	1/8	.128	1.5x	1-1/2	Stub	45828	96774	—
.085	1/8	.255	3x	1-1/2	Regular	45829	96775	96960
.090	1/8	.135	1.5x	1-1/2	Stub	45830	96776	—
.090	1/8	.270	3x	1-1/2	Regular	45831	96777	96961
.093 (3/32)	1/8	.140	1.5x	1-1/2	Stub	45832	96778	96962
.093 (3/32)	1/8	.279	3x	1-1/2	Regular	45833	96779	96963
.095	1/8	.143	1.5x	1-1/2	Stub	45834	96780	—
.095	1/8	.285	3x	1-1/2	Regular	45835	96781	96964
.100	1/8	.150	1.5x	1-1/2	Stub	45836	96782	—
.100	1/8	.300	3x	1-1/2	Regular	45837	96783	96965
.105	1/8	.158	1.5x	1-1/2	Stub	45838	96784	—
.105	1/8	.315	3x	1-1/2	Regular	45839	96785	96966
.110	1/8	.165	1.5x	1-1/2	Stub	45840	96786	—
.110	1/8	.330	3x	1-1/2	Regular	45841	96787	96967
.115	1/8	.173	1.5x	1-1/2	Stub	45842	96788	—
.115	1/8	.345	3x	1-1/2	Regular	45843	96789	96968





# Solid Carbide 4-Flute Miniature Ball Nose Single End Mills

Micrograin Carbide - Center Cutting - 30° Helix Angle  
Stub Length & Regular Length  
For materials less than 48Rc hardness  
Dia. Tolerance +.0005" / -.0005"



List No. 5919 4-Flute Ball Nose

**ALTiN** - Aluminum Titanium Nitride Coating for abrasive and hard-to-machine materials

**DLC** - Amorphous Diamond-Like Carbon for graphite and some non-ferrous materials.

Speeds & Feeds: Page 17

DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTiN COATED EDP NO.	DLC COATED EDP NO.
.010	1/8	.015	1.5x	1-1/2	Stub	45849	96794	96974
.010	1/8	.030	3x	1-1/2	Regular	45850	96795	96975
.011	1/8	.017	1.5x	1-1/2	Stub	45851	96796	—
.011	1/8	.033	3x	1-1/2	Regular	45852	96797	—
.012	1/8	.018	1.5x	1-1/2	Stub	45853	96798	—
.012	1/8	.036	3x	1-1/2	Regular	45854	96799	—
.013	1/8	.020	1.5x	1-1/2	Stub	45855	96800	—
.013	1/8	.039	3x	1-1/2	Regular	45856	96801	—
.014	1/8	.021	1.5x	1-1/2	Stub	45857	96802	—
.014	1/8	.042	3x	1-1/2	Regular	45858	96803	—
.015 (1/64)	1/8	.023	1.5x	1-1/2	Stub	45859	96804	96976
.015 (1/64)	1/8	.045	3x	1-1/2	Regular	45860	96805	96977
.016	1/8	.024	1.5x	1-1/2	Stub	45861	96806	—
.016	1/8	.048	3x	1-1/2	Regular	45862	96807	—
.017	1/8	.026	1.5x	1-1/2	Stub	45863	96808	—
.017	1/8	.051	3x	1-1/2	Regular	45864	96809	—
.018	1/8	.027	1.5x	1-1/2	Stub	45865	96810	—
.018	1/8	.054	3x	1-1/2	Regular	45866	96811	—
.019	1/8	.029	1.5x	1-1/2	Stub	45867	96812	—
.019	1/8	.057	3x	1-1/2	Regular	45868	96813	—
.020	1/8	.030	1.5x	1-1/2	Stub	45869	96814	96978
.020	1/8	.060	3x	1-1/2	Regular	45870	96815	96979
.021	1/8	.032	1.5x	1-1/2	Stub	45871	96816	—
.021	1/8	.063	3x	1-1/2	Regular	45872	96817	—
.022	1/8	.033	1.5x	1-1/2	Stub	45873	96818	—
.022	1/8	.066	3x	1-1/2	Regular	45874	96819	—
.023	1/8	.035	1.5x	1-1/2	Stub	45875	96820	—
.023	1/8	.069	3x	1-1/2	Regular	45876	96821	—
.024	1/8	.036	1.5x	1-1/2	Stub	45877	96822	—
.024	1/8	.072	3x	1-1/2	Regular	45878	96823	—
.025	1/8	.038	1.5x	1-1/2	Stub	45879	96824	96980
.025	1/8	.075	3x	1-1/2	Regular	45880	96825	96981
.026	1/8	.039	1.5x	1-1/2	Stub	45881	96826	—
.026	1/8	.078	3x	1-1/2	Regular	45882	96827	—
.027	1/8	.041	1.5x	1-1/2	Stub	45883	96828	—
.027	1/8	.081	3x	1-1/2	Regular	45884	96829	—
.028	1/8	.042	1.5x	1-1/2	Stub	45885	96830	—
.028	1/8	.084	3x	1-1/2	Regular	45886	96831	—
.029	1/8	.044	1.5x	1-1/2	Stub	45887	96832	—
.029	1/8	.087	3x	1-1/2	Regular	45888	96833	—
.030	1/8	.045	1.5x	1-1/2	Stub	45889	96834	96982
.030	1/8	.090	3x	1-1/2	Regular	45890	96835	96983
.031 (1/32)	1/8	.047	1.5x	1-1/2	Stub	45891	96836	96984
.031 (1/32)	1/8	.093	3x	1-1/2	Regular	45892	96837	96985
.032	1/8	.048	1.5x	1-1/2	Stub	45893	96838	—
.032	1/8	.096	3x	1-1/2	Regular	45894	96839	—
.033	1/8	.050	1.5x	1-1/2	Stub	45895	96840	—
.033	1/8	.099	3x	1-1/2	Regular	45896	96841	—
.034	1/8	.051	1.5x	1-1/2	Stub	45897	96842	—
.034	1/8	.102	3x	1-1/2	Regular	45898	96843	—
.035	1/8	.053	1.5x	1-1/2	Stub	45899	96844	96986
.035	1/8	.105	3x	1-1/2	Regular	45900	96845	96987
.036	1/8	.054	1.5x	1-1/2	Stub	45901	96846	—
.036	1/8	.108	3x	1-1/2	Regular	45902	96847	—
.037	1/8	.056	1.5x	1-1/2	Stub	45903	96848	—
.037	1/8	.111	3x	1-1/2	Regular	45904	96849	—

(continued)

# Solid Carbide 4-Flute Miniature Ball Nose Single End Mills

List No. 5919 4-Flute Ball Nose

(continued)

DIA.	SHANK DIA.	LOC	LOC x DIA.	OAL	LENGTH	UNCOATED EDP NO.	ALTIN COATED EDP NO.	DLC COATED EDP NO.
.038	1/8	.057	1.5x	1-1/2	Stub	45905	96850	—
.038	1/8	.114	3x	1-1/2	Regular	45906	96851	—
.039	1/8	.059	1.5x	1-1/2	Stub	45907	96852	—
.039	1/8	.117	3x	1-1/2	Regular	45908	96853	—
.040	1/8	.060	1.5x	1-1/2	Stub	45909	96854	96988
.040	1/8	.120	3x	1-1/2	Regular	45910	96855	96989
.041	1/8	.123	3x	1-1/2	Regular	45911	96856	—
.042	1/8	.126	3x	1-1/2	Regular	45912	96857	—
.043	1/8	.129	3x	1-1/2	Regular	45913	96858	—
.044	1/8	.132	3x	1-1/2	Regular	45914	96859	—
.045	1/8	.068	1.5x	1-1/2	Stub	45915	96860	96990
.045	1/8	.135	3x	1-1/2	Regular	45916	96861	96991
.046	1/8	.138	3x	1-1/2	Regular	45917	96862	—
.047 (3/64)	1/8	.071	1.5x	1-1/2	Stub	45918	96863	96992
.047 (3/64)	1/8	.141	3x	1-1/2	Regular	45919	96864	96993
.048	1/8	.144	3x	1-1/2	Regular	45920	96865	—
.049	1/8	.147	3x	1-1/2	Regular	45921	96866	—
.050	1/8	.075	1.5x	1-1/2	Stub	45922	96867	96994
.050	1/8	.150	3x	1-1/2	Regular	45923	96868	96995
.051	1/8	.153	3x	1-1/2	Regular	45924	96869	—
.052	1/8	.156	3x	1-1/2	Regular	45925	96870	—
.053	1/8	.159	3x	1-1/2	Regular	45926	96871	—
.054	1/8	.162	3x	1-1/2	Regular	45927	96872	—
.055	1/8	.083	1.5x	1-1/2	Stub	45928	96873	96996
.055	1/8	.165	3x	1-1/2	Regular	45929	96874	96997
.056	1/8	.168	3x	1-1/2	Regular	45930	96875	—
.057	1/8	.171	3x	1-1/2	Regular	45931	96876	—
.058	1/8	.174	3x	1-1/2	Regular	45932	96877	—
.059	1/8	.177	3x	1-1/2	Regular	45933	96878	—
.060	1/8	.090	1.5x	1-1/2	Stub	45934	96879	96998
.060	1/8	.180	3x	1-1/2	Regular	45935	96880	96999
.062 (1/16)	1/8	.093	1.5x	1-1/2	Stub	45936	96881	97000
.062 (1/16)	1/8	.186	3x	1-1/2	Regular	45937	96882	97001
.065	1/8	.098	1.5x	1-1/2	Stub	45938	96883	—
.065	1/8	.195	3x	1-1/2	Regular	45939	96884	97002
.070	1/8	.105	1.5x	1-1/2	Stub	45940	96885	—
.070	1/8	.210	3x	1-1/2	Regular	45941	96886	97003
.075	1/8	.113	1.5x	1-1/2	Stub	45942	96887	—
.075	1/8	.225	3x	1-1/2	Regular	45943	96888	—
.078 (5/64)	1/8	.117	1.5x	1-1/2	Stub	45944	96889	97004
.078 (5/64)	1/8	.234	3x	1-1/2	Regular	45945	96890	97005
.080	1/8	.120	1.5x	1-1/2	Stub	45946	96891	—
.080	1/8	.240	3x	1-1/2	Regular	45947	96892	97006
.085	1/8	.128	1.5x	1-1/2	Stub	45948	96893	—
.085	1/8	.255	3x	1-1/2	Regular	45949	96894	—
.090	1/8	.135	1.5x	1-1/2	Stub	45950	96895	—
.090	1/8	.270	3x	1-1/2	Regular	45951	96896	97007
.093 (3/32)	1/8	.140	1.5x	1-1/2	Stub	45952	96897	97008
.093 (3/32)	1/8	.279	3x	1-1/2	Regular	45953	96898	97009
.095	1/8	.143	1.5x	1-1/2	Stub	45954	96899	—
.095	1/8	.285	3x	1-1/2	Regular	45955	96900	—
.100	1/8	.150	1.5x	1-1/2	Stub	45956	96901	—
.100	1/8	.300	3x	1-1/2	Regular	45957	96902	97010
.105	1/8	.315	3x	1-1/2	Regular	45958	96903	—
.110	1/8	.330	3x	1-1/2	Regular	45959	96904	—
.115	1/8	.345	3x	1-1/2	Regular	45960	96905	—
.120	1/8	.360	3x	1-1/2	Regular	45961	96906	—



# Miniature Solid Carbide End Mill Speed and Feed Recommendations

Workpiece		Type and Depth of Cut	Surface Speed (SFM)	FEED PER TOOTH BY END MILL DIAMETER								
Material	Examples			.005 - .015	.015 - .030	.030 - .045	.045 - .060	.060 - .075	.075 - .090	.090 - .105	.105 - .125	
Steel (ISO P)	Low Alloy Steels - Maraging	10XX, 11XX, 13XX	Slotting $\leq$ 15% of D	150	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007
			Profiling 6% of D Axial & $\leq$ 35% of D Radial	300	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007
	Medium Alloy Steels	200, 250, 300	Slotting $\leq$ 15% of D	125	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006
			Profiling 6% of D Axial & $\leq$ 30% of D Radial	250	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006
	High Alloy Steels - Mold and Die	A-2, P20, O1, D2, H-13	Slotting $\leq$ 10% of D	125	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & $\leq$ 20% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
	High Strength Steels	4140, 4340, 52100	Slotting $\leq$ 15% of D	100	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & $\leq$ 30% of D Radial	180	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
Stainless Steel (ISO M)	Martensitic	403, 410, 416	Slotting $\leq$ 15% of D	100	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & $\leq$ 30% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
	Austenitic	302, 303, 304L, 316L	Slotting $\leq$ 15% of D	100	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & $\leq$ 30% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
	Precipitation Hardened	13-8, 15-5 PH, 17-4 PH, A-236, AM-350	Slotting $\leq$ 10% of D	90	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & $\leq$ 20% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
Cast Iron (ISO K)	Cast Iron	Grey Cast Iron	Slotting $\leq$ 25% of D	125	0.0004	0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0010
			Profiling 10% of D Axial & $\leq$ 35% of D Radial	400	0.0004	0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0010
	Ductile Iron	Ductile Cast Iron	Slotting $\leq$ 15% of D	100	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007
			Profiling 10% of D Axial & $\leq$ 25% of D Radial	250	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007	0.0007
High Temperature Alloys (ISO S)	Iron Base	Incoloy 800-802, Multimet N-155, Timken 16-26-6	Slotting $\leq$ 7% of D	80	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
			Profiling 5% of D Axial & $\leq$ 20% of D Radial	100	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
	Nickel Base	Inconel 600, 625, 718, Nickel 200, 270, Invar, Monel 400, 405, K-Monel, PermoNikel 300, Incoly 600	Slotting $\leq$ 7% of D	40	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
			Profiling 5% of D Axial & $\leq$ 20% of D Radial	60	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
	Cobalt Base	Stellite, Haynes 25, 188, X-40, L-605	Slotting $\leq$ 7% of D	50	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
			Profiling 5% of D Axial & $\leq$ 20% of D Radial	80	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
	Titanium Alloys	6AL-4V, ASTM 1, 2, 3, 6AL-25 (Decrease SFM & IPM 25% for 5553)	Slotting $\leq$ 15% of D	125	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
			Profiling 6% of D Axial & $\leq$ 20% of D Radial	250	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
Al (ISO N)	Aluminum Alloys	6061-T6, 7075	Slotting $\leq$ 15% of D	650	0.0004	0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0010
			Profiling 10% of D Axial & $\leq$ 35% of D Radial	775	0.0004	0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0010

Speeds and Feeds are suggested starting points and may be increased or decreased depending on actual material and machining conditions.

In general, use lower speeds and feeds for hard and difficult-to-machine materials. Use higher speeds and feeds for easy-to-machine materials. Use higher surface speed for lighter cuts, smaller tools, and better finishes. Higher feed rates can improve tool life and performance in softer materials and more abrasive materials.

For longer length tools, reduce feed rates by 50%.

For coated tools, speeds may be increased by up to 20% with the feed rate unchanged.

**NOTE:** Information in this chart is for reference only. We will not be held liable for any consequential damages or economic loss due to the use of information contained within this chart.





# MORSE<sup>®</sup>

## CUTTING TOOLS



### *Certificate of Registration*

This certifies that the Quality Management System of

## Morse Cutting Tools

31695 Stephenson Hwy.  
Madison Heights, Michigan, 48071-1672, United States

has been assessed by NSF-ISR and found to be in conformance to the following standard(s):

### ISO 9001:2008

#### Scope of Registration:

The design of cutting tools and accessories including distribution services and sales thereof.



Certificate Number: 64541-IS3  
Certificate Issue Date: 07-MAY-2015  
Registration Date: 29-AUG-2015  
Expiration Date \*: 28-AUG-2018

Carl Blazik,  
Director, Technical  
Operations & Business Units,  
NSF-ISR, Ltd.

#### NSF International Strategic Registrations

789 North Dixboro Road, Ann Arbor, Michigan 48105 | (888) NSF-9000 | [www.nsf-isr.org](http://www.nsf-isr.org)

Authorized Registration and /or Accreditation Marks. This certificate is property of NSF-ISR and must be returned upon request.  
\*Company is audited for conformance at regular intervals. To verify registrations call (888) NSF-9000 or visit our web site at [www.nsf-isr.org](http://www.nsf-isr.org)

Distributed By:



QUALITY SYSTEM  
REGISTERED TO  
ISO 9001:2008

Phone: 800.255.1701 Fax: 800.338.4857  
[www.morsecuttingtools.com](http://www.morsecuttingtools.com)  
[customerservices@morsecuttingtools.com](mailto:customerservices@morsecuttingtools.com)