

# Legacy

## High Performance Solid Carbide Drills



- Premium Submicron Carbide
- PVD TiAlN Coated
  - Available In Short, Long, and Extra-Long Lengths
  - Coolant Through Design



### High Performance Design for a Wide Range of Applications

The Legacy provides high performance in a wide variety of materials. It is ideally suited to perform in all general engineering steels, high-alloy and tool steels, cast iron, as well as many stainless steel applications. This reduces inventory needed to machine a broad range of materials.

### Double Margin Design

Four margins greatly enhance tool stability. This improves hole geometry and straightness. Stability is provided when inclusions, cross holes, irregular exits, and incline exits are encountered.

### Flute Design

The flute design is well matched to the point and provides rapid chip removal enabling high penetration rates.

### Lower Thrust Point Design

The 140° point is designed to lower thrust requirements making the tool more versatile in varied work environments.

### Coolant-Through Design

Coolant is delivered directly to the point which enables higher cutting speeds and chip loads.

### Factory Reconditioning

The high performance experienced with a new tool can be restored through reconditioning to factory tolerances.

In presence of  
*James O'Neil*  
*Arthur Burgess*

Inventor:  
*Stephen A. Morse*

# Legacy

Short Length  
High Performance Solid Carbide  
Coolant-Through Drills  
For Steel and Cast Iron

Drill and Shank Diameter Tolerances			
Drill Diameter (D)	Tolerance m7	Shank Diameter (d)	Tolerance h6
3<D≤6 .1181<D≤.2362	+0.004/+0.016 +.0002/+0.0006	6 .2362	0.000/-0.008 .0000/-0.0003
6<D≤10 .2362<D≤.3937	+0.006/+0.021 +.0002/+0.0008	8 - 10 .3150 - .3937	0.000/-0.009 .0000/-0.0004
10<D≤18 .3937<D≤.7087	+0.007/+0.025 +.0003/+0.0010	12 - 18 .4724 - .7087	0.000/-0.011 .0000/-0.0004
18<D .7087<D	+0.008/+0.029 +.0003/+0.0011	20 .7874	0.000/-0.013 .0000/-0.0005

Foret à haut rendement au carbure

Broca de carburo de alto rendimiento



Speeds & Feeds: Page 9

### List 5400S Short Coolant Through

INCH	FRACTION	SIZE		DEC. EQUIV.	FLUTE LENGTH	OAL MM	SHANK DIA.	SHANK LENGTH	MAX DOC	EDP NO.	
		LETTER	WIRE								
5/32			21	4mm	.1562	24	66	6	36	17	52200
				.1575	24	66	6	36	17	52201	
				.1590	24	66	6	36	17	52202	
				.1654	24	66	6	36	17	52203	
				.1772	24	66	6	36	17	52204	
3/16			3	4.8mm	.1875	28	66	6	36	20	52205
				.1890	28	66	6	36	20	52206	
				.1969	28	66	6	36	20	52207	
				.2130	28	66	6	36	20	52208	
				.2165	28	66	6	36	20	52209	
7/32		A	2	5.8mm	.2188	28	66	6	36	20	52210
				.2210	28	66	6	36	20	52211	
				.2283	28	66	6	36	20	52212	
				.2340	28	66	6	36	20	52213	
				.2362	28	66	6	36	20	52214	
1/4		C	6.5mm	.2420	34	79	8	36	24	52215	
				.2500	34	79	8	36	24	52216	
				.2559	34	79	8	36	24	52217	
				.2570	34	79	8	36	24	52218	
				.2660	34	79	8	36	24	52219	
9/32		I	7mm	.2677	34	79	8	36	24	52220	
				.2720	34	79	8	36	24	52221	
				.2756	34	79	8	36	24	52222	
				.2770	34	79	8	36	24	52223	
				.2812	41	79	8	36	29	52224	
5/16		J	8mm	.2953	41	79	8	36	29	52225	
				.2969	41	79	8	36	29	52226	
				.3125	41	79	8	36	29	52227	
				.3150	41	79	8	36	29	52228	
				.3230	47	89	10	40	35	52229	

(continued)

# Legacy

## Short Length High Performance Solid Carbide Coolant-Through Drills For Steel and Cast Iron



Low Thrust Point Design.  
Honed Cutting Edges

Foret à haut rendement au carbure

Broca de carburo de alto rendimiento



(continued)

### List 5400S Short Coolant Through

INCH	FRACTION	SIZE		DEC. EQUIV.	FLUTE LENGTH	OAL MM	SHANK DIA.	SHANK LENGTH	MAX DOC	EDP NO.		
		LETTER	WIRE								METRIC	
	21/64	Q		.3281	47	89	10	40	35	52230		
				.3320	47	89	10	40	35	52231		
			8.5mm	.3346	47	89	10	40	35	52232		
			9mm	.3543	47	89	10	40	35	52233		
				.3594	47	89	10	40	35	52234		
	23/64	U		.3680	47	89	10	40	35	52235		
			9.5mm	.3740	47	89	10	40	35	52236		
			.3810	3/8		.3750	47	89	10	40	35	52237
						.3810	47	89	10	40	35	52238
			25/64		.3906	47	89	10	40	35	52239	
				10mm	.3937	47	89	10	40	35	52240	
			13/32		.4062	55	102	12	45	40	52241	
				10.5mm	.4134	55	102	12	45	40	52242	
			27/64		.4219	55	102	12	45	40	52243	
				11mm	.4331	55	102	12	45	40	52244	
7/16		.4375	55	102	12	45	40	52245				
	11.5mm	.4528	55	102	12	45	40	52246				
15/32		.4688	55	102	12	45	40	52247				
	12mm	.4724	55	102	12	45	40	52248				
	1/2		12.5mm	.4921	60	107	14	45	43	52249		
				.5000	60	107	14	45	43	52250		
				.5050	60	107	14	45	43	52251		
			13mm	.5118	60	107	14	45	43	52252		
			13.5mm	.5315	60	107	14	45	43	52253		
9/16			14mm	.5512	60	107	14	45	43	52254		
				.5625	65	115	16	48	45	52255		
			14.5mm	.5709	65	115	16	48	45	52256		
5/8			15mm	.5906	65	115	16	48	45	52257		
				.6250	65	115	16	48	45	52258		
			16mm	.6299	65	115	16	48	45	52259		
.6330				.6330	73	123	18	48	51	52260		
3/4				.7500	79	131	20	50	55	52261		

LEGACY High Performance Carbide Drills

# Legacy

Long Length  
High Performance Solid Carbide  
Coolant-Through Drills  
For Steel and Cast Iron

Drill and Shank Diameter Tolerances			
Drill Diameter (D)	Tolerance m7	Shank Diameter (d)	Tolerance h6
3<D≤6 .1181<D≤.2362	+0.004/+0.016 +.0002/+0.0006	6 .2362	0.000/-0.008 .0000/-0.0003
6<D≤10 .2362<D≤.3937	+0.006/+0.021 +.0002/+0.0008	8 - 10 .3150 - .3937	0.000/-0.009 .0000/-0.0004
10<D≤18 .3937<D≤.7087	+0.007/+0.025 +.0003/+0.0010	12 - 18 .4724 - .7087	0.000/-0.011 .0000/-0.0004
18<D .7087<D	+0.008/+0.029 +.0003/+0.0011	20 .7874	0.000/-0.013 .0000/-0.0005

Foret à haut rendement au carbure

Broca de carburo de alto rendimiento



Speeds & Feeds: Page 9

### List 5400L Long Coolant Through

INCH	SIZE		WIRE	METRIC	DEC. EQUIV.	FLUTE LENGTH	OAL MM	SHANK DIA.	SHANK LENGTH	MAX DOC	EDP NO.
	FRACTION	LETTER									
5/32			21	3.5mm	.1378	36	74	6	36	29	52280
				4mm	.1575	36	74	6	36	29	52282
				4.2mm	.1653	36	74	6	36	29	52284
				4.5mm	.1772	36	74	6	36	29	52285
3/16			3	4.5mm	.1772	36	74	6	36	29	52285
				4.8mm	.1890	44	82	6	36	35	52286
				5mm	.1969	44	82	6	36	35	52288
				5.5mm	.2130	44	82	6	36	35	52289
				5.5mm	.2165	44	82	6	36	35	52290
7/32		A	2		.2188	44	82	6	36	35	52291
					.2210	44	82	6	36	35	52292
				5.8mm	.2283	44	82	6	36	35	52293
				6mm	.2340	44	82	6	36	35	52294
				6mm	.2362	44	82	6	36	35	52295
				6mm	.2420	44	82	6	36	35	52296
1/4		C	E		.2500	53	91	8	36	43	52297
				6.5mm	.2559	53	91	8	36	43	52298
					.2570	53	91	8	36	43	52299
					.2660	53	91	8	36	43	52300
				6.8mm	.2677	53	91	8	36	43	52301
					.2720	53	91	8	36	43	52302
9/32		J	J	7mm	.2756	53	91	8	36	43	52303
					.2770	53	91	8	36	43	52304
					.2812	53	91	8	36	43	52305
				7.5mm	.2953	53	91	8	36	43	52306
				19/64	.2969	53	91	8	36	43	52307
				5/16	.3125	53	91	8	36	43	52308
				8mm	.3150	53	91	8	36	43	52309

(continued)

# Legacy

## Long Length High Performance Solid Carbide Coolant-Through Drills For Steel and Cast Iron



Low Thrust Point Design.  
Honed Cutting Edges

Foret à haut rendement au carbure

Broca de carburo de alto rendimiento



(continued)

### List 5400L Long Coolant Through

INCH	FRACTION	SIZE		METRIC	DEC. EQUIV.	FLUTE LENGTH	OAL MM	SHANK DIA.	SHANK LENGTH	MAX DOC	EDP NO.	
		LETTER	WIRE									
	21/64	P			.3281	61	103	10	40	49	52310	
					.3230	61	103	10	40	49	52311	
					.3320	61	103	10	40	49	52312	
				8.5mm	.3346	61	103	10	40	49	52313	
				9mm	.3543	61	103	10	40	49	52314	
	23/64	U			.3594	61	103	10	40	49	52315	
					.3680	61	103	10	40	49	52316	
					9.5mm	.3740	61	103	10	40	49	52317
			.3810	3/8		.3750	61	103	10	40	49	52318
						.3810	61	103	10	40	49	52319
		10mm	.3937	61	103	10	40	49	52320			
	13/32			10.5mm	.4062	71	118	12	45	56	52321	
					.4134	71	118	12	45	56	52322	
	27/64			11mm	.4219	71	118	12	45	56	52323	
					.4331	71	118	12	45	56	52324	
	7/16			11.5mm	.4375	71	118	12	45	56	52325	
					.4528	71	118	12	45	56	52326	
					.4688	71	118	12	45	56	52327	
					.4724	71	118	12	45	56	52328	
					.4921	77	124	14	45	60	52329	
.5050	1/2			13mm	.5000	77	124	14	45	60	52330	
					.5050	77	124	14	45	60	52331	
					.5118	77	124	14	45	60	52333	
					.5315	77	124	14	45	60	52334	
					.5512	77	124	14	45	60	52335	
	9/16			14.5mm	.5625	83	133	16	48	63	52336	
					.5709	83	133	16	48	63	52337	
					.5906	83	133	16	48	63	52338	
	5/8			15mm	.6250	83	133	16	48	63	52339	
					.6299	83	133	16	48	63	52340	
.6330					.6330	93	143	18	48	71	52341	
	3/4				.7500	101	153	20	50	77	52342	

LEGACY High Performance Carbide Drills

# Legacy

Extra Long Length  
High Performance Solid Carbide  
Coolant-Through Drills  
For Steel and Cast Iron

Drill and Shank Diameter Tolerances			
Drill Diameter (D)	Tolerance m7	Shank Diameter (d)	Tolerance h6
3<D≤6 .1181<D≤.2362	+0.004/+0.016 +.0002/+0.0006	6 .2362	0.000/-0.008 .0000/-0.0003
6<D≤10 .2362<D≤.3937	+0.006/+0.021 +.0002/+0.0008	8 - 10 .3150 - .3937	0.000/-0.009 .0000/-0.0004
10<D≤18 .3937<D≤.7087	+0.007/+0.025 +.0003/+0.0010	12 - 18 .4724 - .7087	0.000/-0.011 .0000/-0.0004
18<D .7087<D	+0.008/+0.029 +.0003/+0.0011	20 .7874	0.000/-0.013 .0000/-0.0005

Foret à haut rendement au carbure

Broca de carburo de alto rendimiento



Speeds & Feeds: Page 9

### List 5400XL Extra Long Coolant Through

INCH	FRACTION	SIZE		DEC. EQUIV.	FLUTE LENGTH	OAL MM	SHANK DIA.	SHANK LENGTH	MAX DOC	EDP NO.
		LETTER	WIRE							
	5/32			.1562	49	87	6	36	41	52360
			21	.1590	56	94	6	36	48	52361
	3/16			.1875	56	94	6	36	48	52362
				5mm	56	94	6	36	48	52363
			3	.2130	56	94	6	36	48	52364
				5.5mm	56	94	6	36	48	52365
	7/32			.2188	56	94	6	36	48	52366
			2	.2210	56	94	6	36	48	52367
		A		.2340	56	94	6	36	48	52368
				6mm	56	94	6	36	48	52369
	1/4	C		.2420	67	105	8	36	57	52370
		E		.2500	67	105	8	36	57	52371
			6.5mm	.2559	67	105	8	36	57	52372
		F		.2570	67	105	8	36	57	52373
	17/64			.2656	67	105	8	36	57	52374
		H		.2660	67	105	8	36	57	52375
			6.8mm	.2677	67	105	8	36	57	52376
		I		.2720	67	105	8	36	57	52377
			7mm	.2756	67	105	8	36	57	52378
		J		.2770	72	110	8	36	61	52379
	9/32			.2812	72	110	8	36	61	52380
			7.5mm	.2953	72	110	8	36	61	52381
	19/64			.2969	72	110	8	36	61	52382
	5/16			.3125	72	110	8	36	61	52383
			8mm	.3150	72	110	8	36	61	52384
		P		.3230	80	122	10	40	68	52385
	21/64			.3281	80	122	10	40	68	52386
		Q		.3320	80	122	10	40	68	52387
			8.5mm	.3346	80	122	10	40	68	52388
	11/32			.3438	80	122	10	40	68	52389

(continued)

# Legacy

## Extra Long Length High Performance Solid Carbide Coolant-Through Drills For Steel and Cast Iron



Low Thrust Point Design.  
Honed Cutting Edges

Foret à haut rendement au carbure

Broca de carburo de alto rendimiento



(continued)

### List 5400XL Extra Long Coolant Through

INCH	FRACTION	SIZE		METRIC	DEC. EQUIV.	FLUTE LENGTH	OAL MM	SHANK DIA.	SHANK LENGTH	MAX DOC	EDP NO.
		LETTER	WIRE								
				9mm	.3543	80	122	10	40	68	52390
	23/64	U			.3594	80	122	10	40	68	52391
					.3680	80	122	10	40	68	52392
					.3740	80	122	10	40	68	52393
				9.5mm							
	3/8				.3750	80	122	10	40	68	52394
.3810					.3810	80	122	10	40	68	52395
	25/64				.3906	80	122	10	40	68	52396
				10mm	.3937	80	122	10	40	68	52397
	13/32				.4062	94	141	12	45	79	52398
				10.5mm	.4134	94	141	12	45	79	52399
	27/64				.4219	94	141	12	45	79	52400
				11mm	.4331	94	141	12	45	79	52401
	7/16				.4375	94	141	12	45	79	52402
				11.5mm	.4528	94	141	12	45	79	52403
	29/64				.4531	94	141	12	45	79	52404
				12mm	.4724	94	141	12	45	79	52405
				12.5mm	.4921	108	155	14	45	91	52406
.5050	1/2				.5000	108	155	14	45	91	52407
					.5050	108	155	14	45	91	52408
				13mm	.5118	108	155	14	45	91	52409
				13.5mm	.5315	108	155	14	45	91	52410
				14mm	.5512	108	155	14	45	91	52411
	9/16				.5625	121	171	16	48	101	52412
				14.5mm	.5709	121	171	16	48	101	52413
				15mm	.5906	121	171	16	48	101	52414
	5/8				.6250	121	171	16	48	101	52415
				16mm	.6299	121	171	16	48	101	52416
.6330					.6330	135	185	18	48	113	52417
	11/16				.6875	135	185	18	48	113	52418
				18mm	.7087	135	185	18	48	113	52419
	3/4				.7500	148	200	20	50	124	52420

LEGACY High Performance Carbide Drills

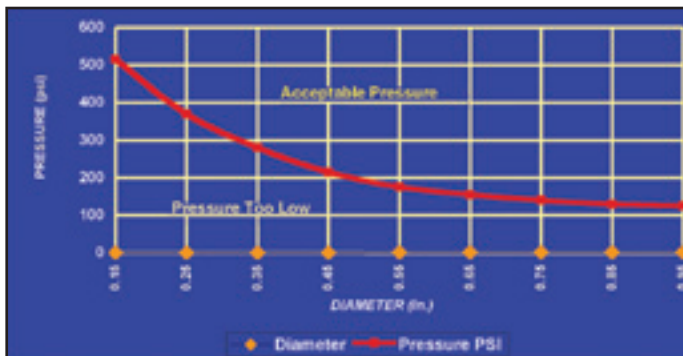


# Legacy Technical Information

## High Performance Solid Carbide Drills

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

1. Toolholding – High quality tool holders should be used. Hydraulic chucks, shrink-fit holders, or milling chucks should be used. Total indicated tool run out measured at the point should be less than .001”.
2. Machine – A rigid machine with a high quality spindle is required.
3. Workholding – The workpiece must be held rigidly so that it cannot deflect or vibrate during drilling
4. Drilling and Chamfering – A chamfer should be added to a hole only after drilling, never before.
5. The drill should be perpendicular to the surface being drilled. An inclined or rough surface should be pre-machined with an end mill to make it perpendicular before drilling.
6. Drilling On Turning Machines – When drilling on a turning machine the drill must be on center. The tolerance range for centrality should not exceed  $\pm.001$ . When drilling more than 3XD the drill may require a speed reduction.
7. Coolant – Legacy drills are high penetration drills. To perform to their potential they must be properly cooled. A high pressure and high volume with a quality high lubricity coolant will aid chip removal, enhance tool life and, increase hole quality.
  - Without adequate coolant, drills can heat up quickly and expand, sometimes leading to the drill seizing in the hole.
  - Heat at the drill point can cause coolant to vaporize resulting in thermal damage to the point. Coolant pressure should be high enough to break this barrier keeping the point within acceptable operating parameters.
  - See Minimum Favorable Coolant Pressure chart below.



**Factory Reconditioning is available. Contact your Morse Distributor For Details.**





# Solid Carbide Screw Machine Length Drills

## For Tough Drilling Applications

Recommended for tough drilling applications including carbon steel, stainless steel, cast iron, inconel, titanium, high temperature alloy steel, tool steel, work hardened and gummy materials and other high strength ferrous materials.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

**Titanium Aluminum Nitride (TiAlN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

Foret au carbure

Broca de carburo



List No. 5375 - Uncoated

List No. 5375T - TiAlN Coated

135° Point – 15° Helix Angle

**TOLERANCES**

All sizes +.0000/- .0005

**STANDARD PACKAGE**

All sizes — 1 each

**Speeds & Feeds: Page 17**

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5375 UNCOATED EDP NO.	5375T TiAlN EDP NO.
1/32	.0312	1/2	1-1/2	50860	92230
56	.0465	1/2	1-1/2	50861	92231
3/64	.0469	1/2	1-1/2	50862	92232
55	.0520	1/2	1-1/2	50863	92233
54	.0550	1/2	1-1/2	50864	92234
53	.0595	1/2	1-1/2	50865	92235
1/16	.0625	5/8	1-5/8	50866	92236
52	.0635	11/16	1-11/16	50867	92237
51	.0670	11/16	1-11/16	50868	92238
50	.0700	11/16	1-11/16	50869	92239
49	.0730	11/16	1-11/16	50870	92240
48	.0760	11/16	1-11/16	50871	92241
5/64	.0781	11/16	1-11/16	50872	92242
47	.0785	3/4	1-3/4	50873	92243
46	.0810	3/4	1-3/4	50874	92244
45	.0820	3/4	1-3/4	50875	92245
44	.0860	3/4	1-3/4	50876	92246
43	.0890	3/4	1-3/4	50877	92247
42	.0935	3/4	1-3/4	50878	92248
3/32	.0938	3/4	1-3/4	50879	92249
41	.0960	13/16	1-13/16	50880	92250
40	.0980	13/16	1-13/16	50881	92251
39	.0995	13/16	1-13/16	50882	92252
38	.1015	13/16	1-13/16	50883	92253
37	.1040	13/16	1-13/16	50884	92254
36	.1065	13/16	1-13/16	50885	92255
7/64	.1094	13/16	1-13/16	50886	92256
35	.1100	7/8	1-7/8	50887	92257
34	.1110	7/8	1-7/8	50888	92258
33	.1130	7/8	1-7/8	50889	92259

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5375 UNCOATED EDP NO.	5375T TiAlN EDP NO.
32	.1160	7/8	1-7/8	50890	92260
31	.1200	7/8	1-7/8	50891	92261
1/8	.1250	7/8	1-7/8	50892	92262
30	.1285	15/16	1-15/16	50893	92263
29	.1360	15/16	1-15/16	50894	92264
28	.1405	15/16	1-15/16	50895	92265
9/64	.1406	15/16	1-15/16	50896	92266
27	.1440	1	2-1/16	50897	92267
26	.1470	1	2-1/16	50898	92268
25	.1495	1	2-1/16	50899	92269
24	.1520	1	2-1/16	50900	92270
23	.1540	1	2-1/16	50901	92271
5/32	.1562	1	2-1/16	50902	92272
22	.1570	1-1/16	2-1/8	50903	92273
21	.1590	1-1/16	2-1/8	50904	92274
20	.1610	1-1/16	2-1/8	50905	92275
19	.1660	1-1/16	2-1/8	50906	92276
18	.1695	1-1/16	2-1/8	50907	92277
11/64	.1719	1-1/16	2-1/8	50908	92278
17	.1730	1-1/8	2-3/16	50909	92279
16	.1770	1-1/8	2-3/16	50910	92280
15	.1800	1-1/8	2-3/16	50911	92281
14	.1820	1-1/8	2-3/16	50912	92282
13	.1850	1-1/8	2-3/16	50913	92283
3/16	.1875	1-1/8	2-3/16	50914	92284
12	.1890	1-3/16	2-1/4	50915	92285
11	.1910	1-3/16	2-1/4	50916	92286
10	.1935	1-3/16	2-1/4	50917	92287
9	.1960	1-3/16	2-1/4	50918	92288
8	.1990	1-3/16	2-1/4	50919	92289

**METRIC SIZES  
ALSO AVAILABLE  
Please Inquire**

**Tool Coatings Also Available**

(continued)

# Solid Carbide Screw Machine Length Drills

## For Tough Drilling Applications

Recommended for tough drilling applications including carbon steel, stainless steel, cast iron, inconel, titanium, high temperature alloy steel, tool steel, work hardened and gummy materials and other high strength ferrous materials.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

**Titanium Aluminum Nitride (TiAlN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

Foret au carbure

Broca de carburo



List No. 5375 - Uncoated

List No. 5375T - TiAlN Coated

135° Point - 15° Helix Angle

### TOLERANCES

All sizes +.0000/-.0005

### STANDARD PACKAGE

All sizes — 1 each

(continued)

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5375 UNCOATED EDP NO.	5375T TiAlN EDP NO.	SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5375 UNCOATED EDP NO.	5375T TiAlN EDP NO.
7	.2010	1-3/16	2-1/4	50920	92290	N	.3020	1-5/8	2-13/16	50946	92316
<b>13/64</b>	.2031	1-3/16	2-1/4	50921	92291	<b>5/16</b>	.3125	1-5/8	2-13/16	50947	92317
6	.2040	1-1/4	2-3/8	50922	92292	O	.3160	1-11/16	2-15/16	50948	92318
5	.2055	1-1/4	2-3/8	50923	92293	P	.3230	1-11/16	2-15/16	50949	92319
4	.2090	1-1/4	2-3/8	50924	92294	<b>21/64</b>	.3281	1-11/16	2-15/16	50950	92320
3	.2130	1-1/4	2-3/8	50925	92295	Q	.3320	1-11/16	3	50951	92321
<b>7/32</b>	.2188	1-1/4	2-3/8	50926	92296	R	.3390	1-11/16	3	50952	92322
2	.2210	1-5/16	2-7/16	50927	92297	<b>11/32</b>	.3438	1-11/16	3	50953	92323
1	.2280	1-5/16	2-7/16	50928	92298	S	.3480	1-3/4	3-1/16	50954	92324
A	.2340	1-5/16	2-7/16	50929	92299	T	.3580	1-3/4	3-1/16	50955	92325
<b>15/64</b>	.2344	1-5/16	2-7/16	50930	92300	<b>23/64</b>	.3594	1-3/4	3-1/16	50956	92326
B	.2380	1-3/8	2-1/2	50931	92301	U	.3680	1-13/16	3-1/8	50957	92327
C	.2420	1-3/8	2-1/2	50932	92302	<b>3/8</b>	.3750	1-13/16	3-1/8	50958	92328
D	.2460	1-3/8	2-1/2	50933	92303	V	.3770	1-7/8	3-1/4	50959	92329
<b>1/4 (E)</b>	.2500	1-3/8	2-1/2	50934	92304	W	.3860	1-7/8	3-1/4	50960	92330
F	.2570	1-7/16	2-5/8	50935	92305	<b>25/64</b>	.3906	1-7/8	3-1/4	50961	92331
G	.2610	1-7/16	2-5/8	50936	92306	X	.3970	1-15/16	3-5/16	50962	92332
<b>17/64</b>	.2656	1-7/16	2-5/8	50937	92307	Y	.4040	1-15/16	3-5/16	50963	92333
H	.2660	1-1/2	2-11/16	50938	92308	<b>13/32</b>	.4062	1-15/16	3-5/16	50964	92334
I	.2720	1-1/2	2-11/16	50939	92309	Z	.4130	2	3-3/8	50965	92335
J	.2770	1-1/2	2-11/16	50940	92310	<b>27/64</b>	.4219	2	3-3/8	50966	92336
K	.2810	1-1/2	2-11/16	50941	92311	<b>7/16</b>	.4375	2-1/16	3-7/16	50967	92337
<b>9/32</b>	.2812	1-1/2	2-11/16	50942	92312	<b>29/64</b>	.4531	2-1/8	3-9/16	50968	92338
L	.2900	1-9/16	2-3/4	50943	92313	<b>15/32</b>	.4688	2-1/8	3-5/8	50969	92339
M	.2950	1-9/16	2-3/4	50944	92314	<b>31/64</b>	.4844	2-3/16	3-11/16	50970	92340
<b>19/64</b>	.2969	1-9/16	2-3/4	50945	92315	<b>1/2</b>	.5000	2-1/4	3-3/4	50971	92341

Tool Coatings Also Available

METRIC SIZES  
ALSO AVAILABLE  
Please Inquire

# Solid Carbide Standard Length Drills

Recommended for drilling cast iron, non ferrous alloys, plastics, aluminum and other easily machined materials.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

**Titanium Aluminum Nitride (TiAlN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding.

Foret au carbure

Broca de carburo



List No. 5374 - Uncoated

List No. 5374T - TiAlN Coated

118° Point

**Speeds & Feeds: Page 17**

**TOLERANCES**

All sizes +.0000/-.0005

**STANDARD PACKAGE**

All sizes — 1 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5374 UNCOATED EDP NO.	5374T TiAlN EDP NO.
80	.0135	3/16	3/4	51000	—
79	.0145	3/16	3/4	51001	—
<b>1/64</b>	.0156	3/16	3/4	51002	—
78	.0160	3/16	3/4	51003	—
77	.0180	3/16	3/4	51004	—
76	.0200	1/4	7/8	51005	—
75	.0210	1/4	7/8	51006	—
74	.0225	1/4	7/8	51007	—
73	.0240	1/4	7/8	51008	—
72	.0250	5/16	1	51009	—
71	.0260	5/16	1	51010	—
70	.0280	1/2	1-1/2	51011	—
69	.0292	1/2	1-1/2	51012	—
68	.0310	1/2	1-1/2	51013	—
<b>1/32</b>	.0312	1/2	1-1/2	51014	92090
67	.0320	1/2	1-1/2	51015	—
66	.0330	1/2	1-1/2	51016	—
65	.0350	5/8	1-1/2	51017	—
64	.0360	5/8	1-1/2	51018	—
63	.0370	5/8	1-1/2	51019	—
62	.0380	5/8	1-1/2	51020	—
61	.0390	5/8	1-1/2	51021	—
1.00 mm	.0394	5/8	1-1/2	51022	92091
60	.0400	3/4	1-1/2	51023	—
59	.0410	3/4	1-1/2	51024	—
58	.0420	3/4	1-1/2	51025	—
57	.0430	3/4	1-1/2	51026	—
56	.0465	3/4	1-1/2	51027	92092
<b>3/64</b>	.0469	3/4	1-1/2	51028	92093
55	.0520	3/4	1-1/2	51029	92094
54	.0550	3/4	1-1/2	51030	92095
1.50 mm	.0591	3/4	1-1/2	50977	92096
53	.0595	3/4	1-1/2	51031	92097
<b>1/16</b>	.0625	3/4	1-1/2	51032	92098
52	.0635	3/4	1-1/2	51033	92099
51	.0670	3/4	1-1/2	51034	92100
50	.0700	7/8	1-3/4	51035	92101
49	.0730	7/8	1-3/4	51036	92102
48	.0760	7/8	1-3/4	51037	92103
<b>5/64</b>	.0781	7/8	1-3/4	51038	92104

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5374 UNCOATED EDP NO.	5374T TiAlN EDP NO.
47	.0785	7/8	1-3/4	51039	92105
2.00 mm	.0787	7/8	1-3/4	50978	92106
46	.0810	7/8	1-3/4	51040	92107
45	.0820	7/8	1-3/4	51041	92108
44	.0860	1	2	51042	92109
43	.0890	1	2	51043	92110
42	.0935	1	2	51044	92111
<b>3/32</b>	.0938	1	2	51045	92112
41	.0960	1	2	51046	92113
40	.0980	1	2	51047	92114
2.50 mm	.0984	1	2	50979	92115
39	.0995	1-1/4	2-1/4	51048	92116
38	.1015	1-1/4	2-1/4	51049	92117
37	.1040	1-1/4	2-1/4	51050	92118
36	.1065	1-1/4	2-1/4	51051	92119
<b>7/64</b>	.1094	1-1/4	2-1/4	51052	92120
35	.1100	1-1/4	2-1/4	51053	92121
34	.1110	1-1/4	2-1/4	51054	92122
33	.1130	1-1/4	2-1/4	51055	92123
32	.1160	1-1/4	2-1/4	51056	92124
3.00 mm	.1181	1-1/4	2-1/4	50980	92125
31	.1200	1-1/4	2-1/4	51057	92126
<b>1/8</b>	.1250	1-1/4	2-1/4	51058	92127
30	.1285	1-1/4	2-1/4	51059	92128
29	.1360	1-3/8	2-1/2	51060	92129
3.50 mm	.1378	1-3/8	2-1/2	50981	92130
28	.1405	1-3/8	2-1/2	51061	92131
<b>9/64</b>	.1406	1-3/8	2-1/2	51062	92132
27	.1440	1-3/8	2-1/2	51063	92133
26	.1470	1-3/8	2-1/2	51064	92134
25	.1495	1-3/8	2-1/2	51065	92135
24	.1520	1-3/8	2-1/2	51066	92136
23	.1540	1-3/8	2-1/2	51067	92137
<b>5/32</b>	.1562	1-3/8	2-1/2	51068	92138
22	.1570	1-3/8	2-1/2	51069	92139
4.00 mm	.1575	1-3/8	2-1/2	50982	92140
21	.1590	1-3/8	2-1/2	51070	92141
20	.1610	1-3/8	2-1/2	51071	92142
19	.1660	1-5/8	2-3/4	51072	92143
18	.1695	1-5/8	2-3/4	51073	92144

Tool Coatings Also Available

(continued)

# Solid Carbide Standard Length Drills

Recommended for drilling cast iron, non ferrous alloys, plastics, aluminum and other easily machined materials.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

**Titanium Aluminum Nitride (TiAlN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding.

Foret au carbure

Broca de carburo



List No. 5374 - Uncoated

List No. 5374T - TiAlN Coated

118° Point

TOLERANCES

All sizes +.0000/-.0005

STANDARD PACKAGE

All sizes — 1 each

(continued)

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5374 UNCOATED EDP NO.	5374T TiAlN EDP NO.	SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5374 UNCOATED EDP NO.	5374T TiAlN EDP NO.
<b>11/64</b>	.1719	1-5/8	2-3/4	<b>51074</b>	<b>92145</b>	L	.2900	2-1/8	3-1/2	<b>51110</b>	<b>92186</b>
17	.1730	1-5/8	2-3/4	<b>51075</b>	<b>92146</b>	M	.2950	2-3/8	3-3/4	<b>51111</b>	<b>92187</b>
16	.1770	1-5/8	2-3/4	<b>51076</b>	<b>92147</b>	7.50 mm	.2953	2-3/8	3-3/4	<b>50989</b>	<b>92188</b>
4.50 mm	.1772	1-5/8	2-3/4	<b>50983</b>	<b>92148</b>	<b>19/64</b>	.2969	2-3/8	3-3/4	<b>51112</b>	<b>92189</b>
15	.1800	1-5/8	2-3/4	<b>51077</b>	<b>92149</b>	N	.3020	2-3/8	3-3/4	<b>51113</b>	<b>92190</b>
14	.1820	1-5/8	2-3/4	<b>51078</b>	<b>92150</b>	<b>5/16</b>	.3125	2-3/8	3-3/4	<b>51114</b>	<b>92191</b>
13	.1850	1-5/8	2-3/4	<b>51079</b>	<b>92151</b>	8.00 mm	.3150	2-3/8	3-3/4	<b>50990</b>	<b>92192</b>
<b>3/16</b>	.1875	1-5/8	2-3/4	<b>51080</b>	<b>92152</b>	O	.3160	2-3/8	3-3/4	<b>51115</b>	<b>92193</b>
12	.1890	1-5/8	2-3/4	<b>51081</b>	<b>92153</b>	P	.3230	2-3/8	3-3/4	<b>51116</b>	<b>92194</b>
11	.1910	1-5/8	2-3/4	<b>51082</b>	<b>92154</b>	<b>21/64</b>	.3281	2-1/2	4	<b>51117</b>	<b>92195</b>
10	.1935	1-5/8	2-3/4	<b>51083</b>	<b>92155</b>	Q	.3320	2-1/2	4	<b>51118</b>	<b>92196</b>
9	.1960	1-3/4	3	<b>51084</b>	<b>92156</b>	8.50 mm	.3346	2-1/2	4	<b>50991</b>	<b>92197</b>
5.00 mm	.1969	1-3/4	3	<b>50984</b>	<b>92157</b>	R	.3390	2-1/2	4	<b>51119</b>	<b>92198</b>
8	.1990	1-3/4	3	<b>51085</b>	<b>92158</b>	<b>11/32</b>	.3438	2-1/2	4	<b>51120</b>	<b>92199</b>
7	.2010	1-3/4	3	<b>51086</b>	<b>92159</b>	S	.3480	2-1/2	4	<b>51121</b>	<b>92200</b>
<b>13/64</b>	.2031	1-3/4	3	<b>51087</b>	<b>92160</b>	9.00 mm	.3543	2-1/2	4	<b>50992</b>	<b>92201</b>
6	.2040	1-3/4	3	<b>51088</b>	<b>92161</b>	T	.3580	2-3/4	4-1/4	<b>51122</b>	<b>92202</b>
5	.2055	1-3/4	3	<b>51089</b>	<b>92162</b>	<b>23/64</b>	.3594	2-3/4	4-1/4	<b>51123</b>	<b>92203</b>
4	.2090	1-3/4	3	<b>51090</b>	<b>92163</b>	U	.3680	2-3/4	4-1/4	<b>51124</b>	<b>92204</b>
3	.2130	1-3/4	3	<b>51091</b>	<b>92164</b>	9.50 mm	.3740	2-3/4	4-1/4	<b>50993</b>	<b>92205</b>
5.50 mm	.2165	1-3/4	3	<b>50985</b>	<b>92165</b>	<b>3/8</b>	.3750	2-3/4	4-1/4	<b>51125</b>	<b>92206</b>
<b>7/32</b>	.2188	1-3/4	3	<b>51092</b>	<b>92166</b>	V	.3770	2-3/4	4-1/4	<b>51126</b>	<b>92207</b>
2	.2210	1-3/4	3	<b>51093</b>	<b>92167</b>	W	.3860	2-7/8	4-1/2	<b>51127</b>	<b>92208</b>
1	.2280	1-3/4	3	<b>51094</b>	<b>92168</b>	<b>25/64</b>	.3906	2-7/8	4-1/2	<b>51128</b>	<b>92209</b>
A	.2340	2	3-1/4	<b>51095</b>	<b>92169</b>	10.00 mm	.3937	2-7/8	4-1/2	<b>50994</b>	<b>92210</b>
<b>15/64</b>	.2344	2	3-1/4	<b>51096</b>	<b>92170</b>	X	.3970	2-7/8	4-1/2	<b>51129</b>	<b>92211</b>
6.00 mm	.2362	2	3-1/4	<b>50986</b>	<b>92171</b>	Y	.4040	2-7/8	4-1/2	<b>51130</b>	<b>92212</b>
B	.2380	2	3-1/4	<b>51097</b>	<b>92172</b>	<b>13/32</b>	.4062	2-7/8	4-1/2	<b>51131</b>	<b>92213</b>
C	.2420	2	3-1/4	<b>51098</b>	<b>92173</b>	Z	.4130	2-7/8	4-1/2	<b>51132</b>	<b>92214</b>
D	.2460	2	3-1/4	<b>51099</b>	<b>92174</b>	10.50 mm	.4134	2-7/8	4-1/2	<b>50995</b>	<b>92215</b>
<b>1/4 (E)</b>	.2500	2	3-1/4	<b>51100</b>	<b>92175</b>	<b>27/64</b>	.4219	2-7/8	4-1/2	<b>51133</b>	<b>92216</b>
6.50 mm	.2559	2	3-1/4	<b>50987</b>	<b>92176</b>	11.00 mm	.4331	2-7/8	4-1/2	<b>50996</b>	<b>92217</b>
F	.2570	2	3-1/4	<b>51102</b>	<b>92177</b>	<b>7/16</b>	.4375	2-7/8	4-1/2	<b>51134</b>	<b>92218</b>
G	.2610	2-1/8	3-1/2	<b>51103</b>	<b>92178</b>	11.50 mm	.4528	3	4-3/4	<b>50997</b>	<b>92219</b>
<b>17/64</b>	.2656	2-1/8	3-1/2	<b>51104</b>	<b>92179</b>	<b>29/64</b>	.4531	3	4-3/4	<b>51135</b>	<b>92220</b>
H	.2660	2-1/8	3-1/2	<b>51105</b>	<b>92180</b>	<b>15/32</b>	.4688	3	4-3/4	<b>51136</b>	<b>92221</b>
I	.2720	2-1/8	3-1/2	<b>51106</b>	<b>92181</b>	12.00 mm	.4724	3	4-3/4	<b>50998</b>	<b>92222</b>
7.00 mm	.2756	2-1/8	3-1/2	<b>50988</b>	<b>92182</b>	<b>31/64</b>	.4844	3	4-3/4	<b>51137</b>	<b>92223</b>
J	.2770	2-1/8	3-1/2	<b>51107</b>	<b>92183</b>	12.50 mm	.4921	3	4-3/4	<b>50999</b>	<b>92224</b>
K	.2810	2-1/8	3-1/2	<b>51108</b>	<b>92184</b>	<b>1/2</b>	.5000	3	4-3/4	<b>51138</b>	<b>92225</b>
<b>9/32</b>	.2812	2-1/8	3-1/2	<b>51109</b>	<b>92185</b>						

Tool Coatings Also Available

# Solid Carbide Straight Flute Drills

## For Hardened & Abrasive Applications

Recommended for hardened, high strength & abrasive materials. Produce close tolerance holes in stainless steels, alloy steels, aerospace alloys, exotic alloys, cryogenic alloys and other materials 40Rc hardness and higher.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

**Titanium Aluminum Nitride (TiAlN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

Foret au carbure

Broca de carburo



List No. 5376 - Uncoated

List No. 5376T - TiAlN Coated

2-Flute - 140° Notch Point

**TOLERANCES**

All sizes +.0000/-.0005

**STANDARD PACKAGE**

All sizes — 1 each

Speeds & Feeds: Page 17

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5376 UNCOATED		5376T TiAlN		SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5376 UNCOATED		5376T TiAlN	
				EDP NO.	EDP NO.	EDP NO.	EDP NO.					EDP NO.	EDP NO.		
<b>1/32</b>	.0312	1/2	1-1/2	<b>50720</b>	<b>92660</b>	3.0 MM	.1181	7/8	1-7/8	<b>50755</b>	<b>92695</b>				
1.0 MM	.0394	1/2	1-1/2	<b>50721</b>	<b>92661</b>	31	.1200	7/8	1-7/8	<b>50756</b>	<b>92696</b>				
56	.0465	1/2	1-1/2	<b>50722</b>	<b>92662</b>	<b>1/8</b>	.1250	7/8	1-7/8	<b>50757</b>	<b>92697</b>				
<b>3/64</b>	.0469	1/2	1-1/2	<b>50723</b>	<b>92663</b>	30	.1285	15/16	1-15/16	<b>50758</b>	<b>92698</b>				
55	.0520	1/2	1-1/2	<b>50724</b>	<b>92664</b>	29	.1360	15/16	1-15/16	<b>50759</b>	<b>92699</b>				
54	.0550	1/2	1-1/2	<b>50725</b>	<b>92665</b>	3.5 MM	.1378	15/16	1-15/16	<b>50760</b>	<b>92700</b>				
1.5 MM	.0591	1/2	1-1/2	<b>50726</b>	<b>92666</b>	28	.1405	15/16	1-15/16	<b>50761</b>	<b>92701</b>				
53	.0595	1/2	1-1/2	<b>50727</b>	<b>92667</b>	<b>9/64</b>	.1406	15/16	1-15/16	<b>50762</b>	<b>92702</b>				
<b>1/16</b>	.0625	5/8	1-5/8	<b>50728</b>	<b>92668</b>	27	.1440	1	2-1/16	<b>50763</b>	<b>92703</b>				
52	.0635	11/16	1-11/16	<b>50729</b>	<b>92669</b>	26	.1470	1	2-1/16	<b>50764</b>	<b>92704</b>				
51	.0670	11/16	1-11/16	<b>50730</b>	<b>92670</b>	25	.1495	1	2-1/16	<b>50765</b>	<b>92705</b>				
50	.0700	11/16	1-11/16	<b>50731</b>	<b>92671</b>	24	.1520	1	2-1/16	<b>50766</b>	<b>92706</b>				
49	.0730	11/16	1-11/16	<b>50732</b>	<b>92672</b>	23	.1540	1	2-1/16	<b>50767</b>	<b>92707</b>				
48	.0760	11/16	1-11/16	<b>50733</b>	<b>92673</b>	<b>5/32</b>	.1562	1	2-1/16	<b>50768</b>	<b>92708</b>				
<b>5/64</b>	.0781	11/16	1-11/16	<b>50734</b>	<b>92674</b>	22	.1570	1-1/16	2-1/8	<b>50769</b>	<b>92709</b>				
47	.0785	3/4	1-3/4	<b>50735</b>	<b>92675</b>	4.0 MM	.1575	1-1/16	2-1/8	<b>50770</b>	<b>92710</b>				
2.0 MM	.0787	3/4	1-3/4	<b>50736</b>	<b>92676</b>	21	.1590	1-1/16	2-1/8	<b>50771</b>	<b>92711</b>				
46	.0810	3/4	1-3/4	<b>50737</b>	<b>92677</b>	20	.1610	1-1/16	2-1/8	<b>50772</b>	<b>92712</b>				
45	.0820	3/4	1-3/4	<b>50738</b>	<b>92678</b>	19	.1660	1-1/16	2-1/8	<b>50773</b>	<b>92713</b>				
44	.0860	3/4	1-3/4	<b>50739</b>	<b>92679</b>	18	.1695	1-1/16	2-1/8	<b>50774</b>	<b>92714</b>				
43	.0890	3/4	1-3/4	<b>50740</b>	<b>92680</b>	<b>11/64</b>	.1719	1-1/16	2-1/8	<b>50775</b>	<b>92715</b>				
42	.0935	3/4	1-3/4	<b>50741</b>	<b>92681</b>	17	.1730	1-1/8	2-3/16	<b>50776</b>	<b>92716</b>				
<b>3/32</b>	.0938	3/4	1-3/4	<b>50742</b>	<b>92682</b>	16	.1770	1-1/8	2-3/16	<b>50777</b>	<b>92717</b>				
41	.0960	13/16	1-13/16	<b>50743</b>	<b>92683</b>	4.5 MM	.1772	1-1/8	2-3/16	<b>50778</b>	<b>92718</b>				
40	.0980	13/16	1-13/16	<b>50744</b>	<b>92684</b>	15	.1800	1-1/8	2-3/16	<b>50779</b>	<b>92719</b>				
2.5 MM	.0984	13/16	1-13/16	<b>50745</b>	<b>92685</b>	14	.1820	1-1/8	2-3/16	<b>50780</b>	<b>92720</b>				
39	.0995	13/16	1-13/16	<b>50746</b>	<b>92686</b>	13	.1850	1-1/8	2-3/16	<b>50781</b>	<b>92721</b>				
38	.1015	13/16	1-13/16	<b>50747</b>	<b>92687</b>	<b>3/16</b>	.1875	1-1/8	2-3/16	<b>50782</b>	<b>92722</b>				
37	.1040	13/16	1-13/16	<b>50748</b>	<b>92688</b>	12	.1890	1-3/16	2-1/4	<b>50783</b>	<b>92723</b>				
36	.1065	13/16	1-13/16	<b>50749</b>	<b>92689</b>	11	.1910	1-3/16	2-1/4	<b>50784</b>	<b>92724</b>				
<b>7/64</b>	.1094	13/16	1-13/16	<b>50750</b>	<b>92690</b>	10	.1935	1-3/16	2-1/4	<b>50785</b>	<b>92725</b>				
35	.1100	7/8	1-7/8	<b>50751</b>	<b>92691</b>	9	.1960	1-3/16	2-1/4	<b>50786</b>	<b>92726</b>				
34	.1110	7/8	1-7/8	<b>50752</b>	<b>92692</b>	5.0 MM	.1969	1-3/16	2-1/4	<b>50787</b>	<b>92727</b>				
33	.1130	7/8	1-7/8	<b>50753</b>	<b>92693</b>	8	.1990	1-3/16	2-1/4	<b>50788</b>	<b>92728</b>				
32	.1160	7/8	1-7/8	<b>50754</b>	<b>92694</b>	7	.2010	1-3/16	2-1/4	<b>50789</b>	<b>92729</b>				

Tool Coatings Also Available

(continued)



# Solid Carbide Straight Flute Drills

## For Hardened & Abrasive Materials

Recommended for hardened, high strength & abrasive materials. Produce close tolerance holes in stainless steels, alloy steels, aerospace alloys, exotic alloys, cryogenic alloys and other materials 40Rc hardness and higher.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

**Titanium Aluminum Nitride (TiAlN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

Foret au carbure

Broca de carburo



List No. 5376 - Uncoated

List No. 5376T - TiAlN Coated

2-Flute – 140° Notch Point

### TOLERANCES

All sizes +.0000/-.0005

### STANDARD PACKAGE

All sizes — 1 each

(continued)

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5376 UNCOATED EDP NO.	5376T TiAlN EDP NO.
<b>13/64</b>	.2031	1-3/16	2-1/4	<b>50790</b>	<b>92730</b>
6	.2040	1-1/4	2-3/8	<b>50791</b>	<b>92731</b>
5	.2055	1-1/4	2-3/8	<b>50792</b>	<b>92732</b>
4	.2090	1-1/4	2-3/8	<b>50793</b>	<b>92733</b>
3	.2130	1-1/4	2-3/8	<b>50794</b>	<b>92734</b>
5.5 MM	.2165	1-1/4	2-3/8	<b>50795</b>	<b>92735</b>
<b>7/32</b>	.2188	1-1/4	2-3/8	<b>50796</b>	<b>92736</b>
2	.2210	1-5/16	2-7/16	<b>50797</b>	<b>92737</b>
1	.2280	1-5/16	2-7/16	<b>50798</b>	<b>92738</b>
A	.2340	1-5/16	2-7/16	<b>50799</b>	<b>92739</b>
<b>15/64</b>	.2344	1-5/16	2-7/16	<b>50800</b>	<b>92740</b>
6.0 MM	.2362	1-5/16	2-7/16	<b>50801</b>	<b>92741</b>
B	.2380	1-3/8	2-1/2	<b>50802</b>	<b>92742</b>
C	.2420	1-3/8	2-1/2	<b>50803</b>	<b>92743</b>
D	.2460	1-3/8	2-1/2	<b>50804</b>	<b>92744</b>
<b>1/4 (E)</b>	.2500	1-3/8	2-1/2	<b>50805</b>	<b>92745</b>
6.5 MM	.2559	1-3/8	2-1/2	<b>50806</b>	<b>92746</b>
F	.2570	1-7/16	2-5/8	<b>50807</b>	<b>92747</b>
G	.2610	1-7/16	2-5/8	<b>50808</b>	<b>92748</b>
<b>17/64</b>	.2656	1-7/16	2-5/8	<b>50809</b>	<b>92749</b>
H	.2660	1-1/2	2-11/16	<b>50810</b>	<b>92750</b>
I	.2720	1-1/2	2-11/16	<b>50811</b>	<b>92751</b>
7.0 MM	.2756	1-1/2	2-11/16	<b>50812</b>	<b>92752</b>
J	.2770	1-1/2	2-11/16	<b>50813</b>	<b>92753</b>
K	.2810	1-1/2	2-11/16	<b>50814</b>	<b>92754</b>
<b>9/32</b>	.2812	1-1/2	2-11/16	<b>50815</b>	<b>92755</b>
L	.2900	1-9/16	2-3/4	<b>50816</b>	<b>92756</b>
M	.2950	1-9/16	2-3/4	<b>50817</b>	<b>92757</b>
7.5 MM	.2953	1-9/16	2-3/4	<b>50818</b>	<b>92758</b>
<b>19/64</b>	.2969	1-9/16	2-3/4	<b>50819</b>	<b>92759</b>
N	.3020	1-5/8	2-13/16	<b>50820</b>	<b>92760</b>
<b>5/16</b>	.3125	1-5/8	2-13/16	<b>50821</b>	<b>92761</b>
8.0 MM	.3150	1-5/8	2-13/16	<b>50822</b>	<b>92762</b>
O	.3160	1-11/16	2-15/16	<b>50823</b>	<b>92763</b>
P	.3230	1-11/16	2-15/16	<b>50824</b>	<b>92764</b>

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	5376 UNCOATED EDP NO.	5376T TiAlN EDP NO.
<b>21/64</b>	.3281	1-11/16	2-15/16	<b>50825</b>	<b>92765</b>
Q	.3320	1-11/16	3	<b>50826</b>	<b>92766</b>
8.5 MM	.3346	1-11/16	3	<b>50827</b>	<b>92767</b>
R	.3390	1-11/16	3	<b>50828</b>	<b>92768</b>
<b>11/32</b>	.3438	1-11/16	3	<b>50829</b>	<b>92769</b>
S	.3480	1-3/4	3-1/16	<b>50830</b>	<b>92770</b>
9.0 MM	.3543	1-3/4	3-1/16	<b>50831</b>	<b>92771</b>
T	.3580	1-3/4	3-1/16	<b>50832</b>	<b>92772</b>
<b>23/64</b>	.3594	1-3/4	3-1/16	<b>50833</b>	<b>92773</b>
U	.3680	1-13/16	3-1/8	<b>50834</b>	<b>92774</b>
9.5 MM	.3740	1-13/16	3-1/8	<b>50835</b>	<b>92775</b>
<b>3/8</b>	.3750	1-13/16	3-1/8	<b>50836</b>	<b>92776</b>
V	.3770	1-7/8	3-1/4	<b>50837</b>	<b>92777</b>
W	.3860	1-7/8	3-1/4	<b>50838</b>	<b>92778</b>
<b>25/64</b>	.3906	1-7/8	3-1/4	<b>50839</b>	<b>92779</b>
10.0 MM	.3937	1-7/8	3-1/4	<b>50840</b>	<b>92780</b>
X	.3970	1-15/16	3-5/16	<b>50841</b>	<b>92781</b>
Y	.4040	1-15/16	3-5/16	<b>50842</b>	<b>92782</b>
<b>13/32</b>	.4062	1-15/16	3-5/16	<b>50843</b>	<b>92783</b>
Z	.4130	2	3-3/8	<b>50844</b>	<b>92784</b>
10.5 MM	.4134	2	3-3/8	<b>50845</b>	<b>92785</b>
<b>27/64</b>	.4219	2	3-3/8	<b>50846</b>	<b>92786</b>
11.0 MM	.4331	2	3-3/8	<b>50847</b>	<b>92787</b>
<b>7/16</b>	.4375	2-1/16	3-7/16	<b>50848</b>	<b>92788</b>
11.5 MM	.4528	2-1/16	3-7/16	<b>50849</b>	<b>92789</b>
<b>29/64</b>	.4531	2-1/8	3-9/16	<b>50850</b>	<b>92790</b>
<b>15/32</b>	.4688	2-1/8	3-5/8	<b>50851</b>	<b>92791</b>
12.0 MM	.4724	2-1/8	3-5/8	<b>50852</b>	<b>92792</b>
<b>31/64</b>	.4844	2-3/16	3-11/16	<b>50853</b>	<b>92793</b>
12.5 MM	.4921	2-3/16	3-11/16	<b>50854</b>	<b>92794</b>
<b>1/2</b>	.5000	2-1/4	3-3/4	<b>50855</b>	<b>92795</b>

Tool Coatings Also Available



# Solid Carbide Spade Drills

Foret à langue d'aspic au carbure

Broca tipo espada de carburo

Recommended for thin sheet applications, shallow hole drilling and spot drilling in a wide range of materials

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.



List No. 5377

118° Point – Heavy Duty Web

**TOLERANCES**

All sizes +.0000/-.0005

**STANDARD PACKAGE**

All sizes — 1 each

SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.	SIZE	DEC. EQUIV.	FLUTE LENGTH	OAL	EDP NO.
1/32	.0312	3/16	1-1/2	50440	7/32	.2188	19/32	2	50450
3/64	.0469	7/32	1-1/2	50441	1/4	.2500	11/16	2	50451
1/16	.0625	5/16	1-1/2	50442	9/32	.2812	7/8	2-1/2	50452
3/32	.0938	7/16	1-1/2	50443	5/16	.3125	7/8	2-1/2	50453
7/64	.1094	7/16	1-1/2	50444	11/32	.3438	15/16	2-1/2	50454
1/8	.1250	1/2	1-1/2	50445	3/8	.3750	1-1/8	2-1/2	50455
9/64	.1406	1/2	2	50446	13/32	.4062	1-1/8	2-1/2	50456
5/32	.1562	9/16	2	50447	7/16	.4375	1-3/16	2-1/2	50457
11/64	.1719	9/16	2	50448	15/32	.4688	1-3/16	2-1/2	50458
3/16	.1875	11/16	2	50449	1/2	.5000	1-3/16	2-1/2	50459

## TOOL COATINGS

**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.

### TiN – Titanium Nitride

A good general purpose coating for a wide range of ferrous materials. Not recommended for non-ferrous materials. Has higher heat resistance than TiCN coating.

### TiCN – Titanium Carbonitride

Enhanced toughness, hardness & wear resistance for aggressive speeds & feeds. Recommended for difficult-to-machine, gummy & abrasive materials where moderate cutting temperatures are generated.

### TiAlN – Titanium Aluminum Nitride

### AlTiN – Aluminum Titanium Nitride

Excellent all around coatings featuring high heat resistance. Recommended for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. AlTiN has higher AL content for increased hardness & heat resistance.

### CrN – Chromium Nitride

### CrC – Chromium Carbide

Especially recommended for titanium and non-ferrous materials including aluminum, copper & brass. CrC has slightly higher hardness than CrN. These coatings resist adhesion of the material being machined and resist chipping and cracking.

### DLC – Diamond Like Carbon

A thin carbon based amorphous (non-crystalline) coating featuring very high hardness & low coefficient of friction. Highly recommended for non-ferrous materials including plastic, aluminum, copper & brass. Typically used on solid carbide tools.

# Solid Carbide Drills

## Speed and Feed Recommendations

List No. 5374 Standard Length GP • List No. 5375 Screw Machine Length • List No. 5376 Straight Flute

Workpiece Material	Brinell Hardness (BHN)	Morse List No.	Surface Speed (SFM)	FEED PER REVOLUTION BY DRILL DIAMETER (IPR)			
				1/16"	1/8"	1/4"	1/2"
Low Carbon Steel 1018, 12L12, 1108, 1213	≤ 120	5374	250	0.0015	0.0030	0.0040	0.0080
		5375					
		5376					
Low & Medium Carbon Steel 1018, 1551, 11L44	120 - 250	5374	225	0.0020	0.0040	0.0060	0.0110
		5375					
		5376					
Medium Carbon and Alloyed Steel 1040, 1140, 4340, 8640	≤ 250	5374	200	0.0015	0.0030	0.0040	0.0080
		5375	150	0.0015	0.0030	0.0040	0.0080
		5376					
Tool and Die Steels P20, A2, D2, H12	≤ 250	5374	200	0.0015	0.0030	0.0040	0.0080
		5375					
		5376					
Tool and Die Steels P20, A2, D2, H12	250 - 350	5374	150	0.0010	0.0020	0.0030	0.0060
		5375	125	0.0010	0.0020	0.0030	0.0060
		5376	125	0.0010	0.0020	0.0030	0.0060
Hard Materials, Alloys, Tool Steels 40 Rockwell C and Higher	—	5374					
		5375					
		5376	60	0.0005	0.0010	0.0015	0.0020
Free Machining Stainless Steels 303, 410, 416, 440F	≤ 260	5374	100	0.0010	0.0020	0.0030	0.0060
		5375	100	0.0010	0.0020	0.0030	0.0060
		5376					
Moderate Machining Stainless Steels 304, 316	≤ 300	5374					
		5375	75	0.0010	0.0020	0.0030	0.0060
		5376	75	0.0010	0.0020	0.0030	0.0060
Difficult Machining Stainless Steels 17-4PH, 316L, AM350	≤ 450	5374					
		5375	60	0.0010	0.0020	0.0030	0.0060
		5376	60	0.0010	0.0020	0.0030	0.0060
Cast Iron - Soft Gray	≤ 160	5374	250	0.0015	0.0030	0.0040	0.0080
		5375	275	0.0020	0.0040	0.0060	0.0110
		5376	275	0.0015	0.0030	0.0040	0.0080
Cast Iron - Gray	160 - 260	5374	250	0.0015	0.0030	0.0040	0.0080
		5375	275	0.0020	0.0040	0.0060	0.0110
		5376	250	0.0015	0.0030	0.0040	0.0080
Cast Iron - Ductile	250	5374	180	0.0015	0.0030	0.0040	0.0080
		5375	180	0.0020	0.0040	0.0060	0.0110
		5376	175	0.0015	0.0030	0.0040	0.0080
Cast Iron - Malleable	250 - 330	5374	180	0.0015	0.0030	0.0040	0.0080
		5375	180	0.0020	0.0040	0.0060	0.0110
		5376	180	0.0015	0.0030	0.0040	0.0080
Titanium Alloys Commercially Pure 99.0	110 - 170	5374					
		5375	50	0.0005	0.0010	0.0020	0.0045
		5376	50	0.0005	0.0010	0.0020	0.0045
Titanium Alloys Ti-6Al-4V, ASTM B367 Grades C-3, C-4	≤ 250	5374					
		5375	50	0.0005	0.0010	0.0020	0.0045
		5376	50	0.0005	0.0010	0.0020	0.0045
High Temperature Alloys Inconel, Hastelloy, Waspaloy	150 - 250	5374					
		5375	60	0.0005	0.0010	0.0020	0.0045
		5376	60	0.0005	0.0010	0.0020	0.0045
Aluminum Alloys 2025, 6061, A140, 514.0	≤ 150	5374	350	0.0020	0.0040	0.0060	0.0110
		5375					
		5376					
Copper Alloys Brass and Bronze	≤ 200	5374	80	0.0020	0.0040	0.0060	0.0110
		5375					
		5376					
Composites & Plastics	≤ 128	5374	175	0.0010	0.0020	0.0030	0.0060
		5375					
		5376					
Magnesium Alloys AZ80A, HM12A, AM60A, ZE41A	50 - 90	5374	325	0.0020	0.0040	0.0060	0.0110
		5375					
		5376					

SPEEDS and FEEDS are suggested starting points only and may be increased or decreased depending on actual material and machining conditions. Start conservatively and increase speed and feed until drilling cycle is optimized.

# Solid Carbide Combined Drills and Countersinks

Foret-fraise au carbure

Combinación de broca y avellanador de carburo

## Plain Type

60°, 82° &amp; 90° Included Angle

Solid Carbide offers excellent wear resistance, heat resistance and rigidity. Recommended for abrasive materials, difficult-to-drill materials and increased tool life in production applications.



List No. 5495 — Standard Length



List No. 5495 — Long Length

STANDARD PACKAGE All sizes — 1 each

### Standard Length

SIZE	DRILL DIA.	BODY DIA.	OAL	60° INCL. ANGLE EDP NO.	82° INCL. ANGLE EDP NO.	90° INCL. ANGLE EDP NO.
00	.025	1/8	1-1/2	53899	53909	53919
0	1/32	1/8	1-1/2	53900	53910	53920
1	3/64	1/8	1-1/2	53901	53911	53921
2	5/64	3/16	1-7/8	53902	53912	53922
3	7/64	1/4	2	53903	53913	53923
4	1/8	5/16	2-1/8	53904	53914	53924
5	3/16	7/16	2-3/4	53905	53915	53925
6	7/32	1/2	3	53906	53916	53926
7	1/4	5/8	3-1/4	53907	53917	53927
8	5/16	3/4	3-1/2	53908	53918	53928

### Long Length

SIZE	DRILL DIA.	BODY DIA.	OAL	60° INCL. ANGLE EDP NO.
1	3/64	1/8	4	53929
2	5/64	3/16	4	53930
3	7/64	1/4	4	53931
4	1/8	5/16	4	53932
5	3/16	7/16	6	53933
6	7/32	1/2	6	53934
7	1/4	5/8	6	53935
8	5/16	3/4	6	53936

Tool Coatings  
Also Available

## MACHINING APPLICATION SOLUTIONS

### High Performance Tools

Premium grade cutting tools specially designed for tougher machining and production applications where optimal tool performance and longer tool life is a requirement.

- High Performance Tools
- Production Tools
- Special Application Tools

### Production Tools

A full range of high speed steel, cobalt, carbide tipped and solid carbide cutting tools designed for consistent performance in production applications.

### Special Application Tools

When your application requires special custom designed cutting tools.

Engineered cutting tools optimized for lower overall machining costs.

# Carbide Single Flute Countersinks

For countersinking, chamfering, and deburring holes. Produces a smoother finish. Can be used when multi-flute countersinks chatter.

The 1/8 and 1/4 diameters are solid carbide. The larger diameters are brazed construction.

**Carbide** offers excellent wear resistance, heat resistance and rigidity. Recommended for abrasive materials, difficult-to-drill materials and increased tool life in production applications.

Fraise au carbure

Avellanador de carburo



List No. 5752

STANDARD PACKAGE All sizes — 1 each

SIZE	SHANK		EDP NO.				
	DIA.	OAL	60°	82°	90°	100°	120°
1/8	1/8	1 1/2	56101	56102	56103	56119	56120
1/4	1/4	2	56104	56105	56106	56121	56122
3/8	1/4	2	56107	56108	56109	56123	56124
1/2	1/4	2 1/2	56110	56111	56112	56125	56126
3/4	3/8	3	56113	56114	56115	56127	56128
1	1/2	3	56116	56117	56118	56129	56130

# Carbide Three Flute Countersinks

STANDARD PACKAGE  
All sizes — 1 each

For countersinking, chamfering, and deburring holes.

Three flutes allow higher feed rates than single flute countersinks and greater chip clearance than six flute countersinks.

The 1/8 and 1/4 diameters are solid carbide. The larger diameters are brazed construction.

**Carbide** offers excellent wear resistance, heat resistance and rigidity. Recommended for abrasive materials, difficult-to-drill materials and increased tool life in production applications.

Fraise au carbure

Avellanador de carburo



List No. 5753

SIZE	SHANK		EDP NO.				
	DIA.	OAL	60°	82°	90°	100°	120°
1/8	1/8	1 1/2	56163	56171	56179	56187	56193
1/4	1/4	2	56164	56172	56180	56188	56194
3/8	1/4	2 1/2	56165	56173	56181	56189	56195
1/2	1/4	2 1/2	56166	56174	56182	56190	56196
3/4	3/8	3	56167	56175	56183	56191	56197
1	1/2	3	56168	56176	56184	56192	56198
1 1/4	3/4	3 1/2	56169	56177	56185	—	—
1 1/2	3/4	3 1/2	56170	56178	56186	—	—

# Carbide Six Flute Chatterless Countersinks

Cutting edge geometry designed to reduce chatter and harmonics. Six flutes allow higher feed rates and provide longer tool life due to distributing the cutting load over a greater number of teeth.

The 1/4 diameter is solid carbide. The larger diameters are brazed construction.

**Carbide** offers excellent wear resistance, heat resistance and rigidity. Recommended for abrasive materials, difficult-to-drill materials and increased tool life in production applications.

Fraise au carbure

Avellanador de carburo



List No. 5754

STANDARD PACKAGE All sizes — 1 each

SIZE	SHANK		EDP NO.				
	DIA.	OAL	60°	82°	90°	100°	120°
1/4	1/4	2	56132	56139	56146	56153	56158
3/8	1/4	2	56133	56140	56147	56154	56159
1/2	1/4	2-1/2	56134	56141	56148	56155	56160
3/4	3/8	3	56135	56142	56149	56156	56161
1	1/2	3	56136	56143	56150	56157	56162
1-1/4	3/4	3-1/2	56137	56144	56151	—	—
1-1/2	3/4	3-1/2	56138	56145	56152	—	—

# Solid Carbide Straight Shank Chucking Reamers Straight Flute

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. High rigidity enhances hole accuracy and quality.

Recommended for general reaming of ferrous and non-ferrous materials including steel, alloy steel, stainless steel, plastic, aluminum and other abrasive non-ferrous materials.

Alésoir au carbure

Rima de carburo

**List No. 5661****STANDARD PACKAGE** All sizes — 1 each**TOLERANCES**

.0280" - .2500" - +.0000/+0.002

.2501" - .5050" - +.0000/+0.003

**NO. OF FLUTES**

Up to .2550" - 4 Flute

Over .2550" - 6 Flute

SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.
70	.0280	53950		.0480	53990		.0675	54030
69	.0292	53951		.0485	53991		.0680	54031
	.0300	53952		.0490	53992		.0685	54032
68	.0310	53953		.0495	53993		.0690	54033
<b>1/32</b>	.0312	53954		.0500	53994		.0695	54034
	.0315	53955		.0505	53995	50	.0700	54035
67	.0320	53956		.0510	53996		.0705	54036
	.0325	53957		.0515	53997		.0710	54037
66	.0330	53958	55	.0520	53998		.0715	54038
	.0335	53959		.0525	53999		.0720	54039
	.0340	53960		.0530	54000		.0725	54040
	.0345	53961		.0535	54001	49	.0730	54041
65	.0350	53962		.0540	54002		.0735	54042
	.0355	53963		.0545	54003		.0740	54043
64	.0360	53964	54	.0550	54004		.0745	54044
	.0365	53965		.0555	54005		.0750	54045
63	.0370	53966		.0560	54006		.0755	54046
	.0375	53967		.0565	54007	48	.0760	54047
62	.0380	53968		.0570	54008		.0765	54048
	.0385	53969		.0575	54009		.0770	54049
61	.0390	53970		.0580	54010		.0775	54050
1.0 mm	.0394	53971		.0585	54011	<b>5/64</b>	.0780	54051
	.0395	53972		.0590	54012		.0781	54052
60	.0400	53973	1.5 mm	.0591	54013	47	.0785	54053
	.0405	53974	53	.0595	54014	2.0 mm	.0787	54054
59	.0410	53975		.0600	54015		.0790	54055
	.0415	53976		.0605	54016		.0795	54056
58	.0420	53977		.0610	54017		.0800	54057
	.0425	53978		.0615	54018		.0805	54058
57	.0430	53979		.0620	54019	46	.0810	54059
	.0435	53980	<b>1/16</b>	.0625	54020		.0815	54060
	.0440	53981		.0630	54021	45	.0820	54061
	.0445	53982		.0635	54022		.0825	54062
	.0450	53983	52	.0640	54023		.0830	54063
	.0455	53984		.0645	54024		.0835	54064
	.0460	53985		.0650	54025		.0840	54065
56	.0465	53986		.0655	54026		.0845	54066
<b>3/64</b>	.0469	53987		.0660	54027		.0850	54067
	.0470	53988		.0665	54028		.0855	54068
	.0475	53989	51	.0670	54029	44	.0860	54069

Tool Coatings Also Available

(continued)

SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2	.0815"-.0965"	1/2	2	.1610"-.1915"	7/8	2-3/4	.3170"-.4160"	1-1/4	3-1/2
.0420"-.0650"	3/8	1-1/2	.0970"-.1300"	5/8	2-1/4	.1920"-.2550"	1	3	.4170"-.4780"	1-3/8	4
.0655"-.0810"	1/2	1-3/4	.1305"-.1605"	3/4	2-1/2	.2559"-.3160"	1-1/8	3-1/4	.4790"-.5050"	1-1/2	4

# Solid Carbide Straight Shank Chucking Reamers

Alésoir au carbure

Rima de carburo



List No. 5661

STANDARD PACKAGE All sizes — 1 each

(continued)

SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.
	.0865	54070		.1120	54124	3.5 mm	.1378	54178
	.0870	54071		.1125	54125		.1380	54179
	.0875	54072	33	.1130	54126		.1385	54180
	.0880	54073		.1135	54127		.1390	54181
	.0885	54074		.1140	54128		.1395	54182
43	.0890	54075		.1145	54129		.1400	54183
	.0895	54076		.1150	54130	28	.1405	54184
	.0900	54077		.1155	54131	9/64	.1406	54185
	.0905	54078	32	.1160	54132		.1410	54186
	.0910	54079		.1165	54133		.1415	54187
	.0915	54080		.1170	54134		.1420	54188
	.0920	54081		.1175	54135		.1425	54189
	.0925	54082	3.0 mm	.1180	54136		.1430	54190
	.0930	54083		.1181	54137		.1435	54191
42	.0935	54084		.1185	54138	27	.1440	54192
3/32	.0938	54085		.1190	54139		.1445	54193
	.0940	54086		.1195	54140		.1450	54194
	.0945	54087	31	.1200	54141		.1455	54195
	.0950	54088		.1205	54142		.1460	54196
	.0955	54089		.1210	54143		.1465	54197
41	.0960	54090		.1215	54144	26	.1470	54198
	.0965	54091		.1220	54145		.1475	54199
	.0970	54092		.1225	54146		.1480	54200
	.0975	54093	.1230 D/P	.1230	54147		.1485	54201
40	.0980	54094		.1235	54148		.1490	54202
2.5 mm	.0984	54095	.1240 U/S	.1240	54149	25	.1495	54203
	.0985	54096		.1245	54150		.1500	54204
	.0990	54097	.1247 D/P	.1247	54151		.1505	54205
	.0995	54098	1/8	.1250	54152		.1507	54206
	.1000	54099		.1255	54153		.1510	54207
	.1005	54100	.1260 O/S	.1260	54154		.1515	54208
	.1010	54101		.1265	54155	24	.1520	54209
	.1015	54102		.1270	54156		.1525	54210
	.1020	54103		.1275	54157		.1530	54211
	.1025	54104		.1280	54158		.1535	54212
	.1030	54105	30	.1285	54159	23	.1540	54213
	.1035	54106		.1290	54160		.1541	54214
	.1040	54107		.1295	54161		.1545	54215
	.1045	54108		.1300	54162		.1550	54216
	.1050	54109		.1305	54163		.1555	54217
	.1055	54110		.1310	54164	5/32	.1560	54218
	.1060	54111		.1315	54165		.1562	54219
	.1065	54112		.1320	54166		.1565	54220
	.1070	54113		.1325	54167	22	.1570	54221
	.1075	54114		.1330	54168	4.0 mm	.1575	54222
	.1080	54115		.1335	54169		.1580	54223
	.1085	54116		.1340	54170		.1585	54224
	.1090	54117		.1345	54171	21	.1590	54225
7/64	.1094	54118		.1350	54172		.1595	54226
	.1095	54119		.1355	54173		.1600	54227
35	.1100	54120	29	.1360	54174		.1605	54228
	.1105	54121		.1365	54175	20	.1610	54229
	.1110	54122		.1370	54176		.1615	54230
	.1115	54123		.1375	54177		.1620	54231

(continued)

SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2	.0815"-.0965"	1/2	2	.1610"-.1915"	7/8	2-3/4	.3170"-.4160"	1-1/4	3-1/2
.0420"-.0650"	3/8	1-1/2	.0970"-.1300"	5/8	2-1/4	.1920"-.2550"	1	3	.4170"-.4780"	1-3/8	4
.0655"-.0810"	1/2	1-3/4	.1305"-.1605"	3/4	2-1/2	.2559"-.3160"	1-1/8	3-1/4	.4790"-.5050"	1-1/2	4

# Solid Carbide Straight Shank Chucking Reamers

Alésoir au carbure

Rima de carburo



List No. 5661

STANDARD All sizes — 1 each  
PACKAGE

(continued)

SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.
	.1625	54232	3/16	.1875	54286		.2135	54340
	.1630	54233		.1880	54287		.2140	54341
	.1635	54234	.1885 O/S	.1885	54288		.2145	54342
	.1640	54235	12	.1890	54289		.2150	54343
	.1645	54236		.1895	54290		.2155	54344
	.1650	54237		.1900	54291	5.5 mm	.2160	54345
19	.1655	54238		.1905	54292		.2165	54346
	.1660	54239	11	.1910	54293		.2170	54347
	.1665	54240		.1915	54294		.2175	54348
	.1670	54241		.1920	54295		.2177	54349
	.1675	54242		.1925	54296		.2180	54350
	.1680	54243	10	.1930	54297	7/32	.2185	54351
	.1685	54244		.1935	54298		.2188	54352
18	.1690	54245		.1940	54299		.2190	54353
	.1695	54246		.1945	54300		.2195	54354
	.1700	54247		.1950	54301		.2200	54355
	.1705	54248	9	.1955	54302	2	.2205	54356
	.1710	54249		.1960	54303		.2210	54357
11/64	.1715	54250		.1965	54304		.2215	54358
	.1719	54251	5.0 mm	.1969	54305		.2220	54359
	.1720	54252		.1970	54306		.2225	54360
17	.1725	54253		.1975	54307		.2230	54361
	.1730	54254		.1980	54308		.2235	54362
	.1735	54255		.1985	54309		.2240	54363
	.1740	54256	8	.1990	54310		.2245	54364
	.1745	54257		.1995	54311		.2250	54365
	.1750	54258		.2000	54312		.2255	54366
	.1755	54259		.2005	54313		.2260	54367
	.1760	54260	7	.2010	54314		.2265	54368
	.1765	54261		.2015	54315		.2270	54369
16	.1770	54262		.2020	54316		.2275	54370
4.5 mm	.1772	54263		.2025	54317	1	.2280	54371
	.1775	54264		.2030	54318		.2285	54372
	.1780	54265		.2035	54319		.2290	54373
	.1785	54266	13/64	.2035	54320		.2295	54374
	.1790	54267		.2040	54321		.2300	54375
	.1795	54268	6	.2045	54322		.2305	54376
15	.1800	54269		.2050	54323		.2310	54377
	.1805	54270		.2055	54324		.2315	54378
	.1810	54271	5	.2060	54325		.2320	54379
	.1814	54272		.2065	54326		.2325	54380
	.1815	54273		.2070	54327		.2330	54381
14	.1820	54274		.2075	54328		.2335	54382
	.1825	54275		.2080	54329	A	.2340	54383
	.1830	54276		.2085	54330	15/64	.2344	54384
	.1835	54277		.2090	54331		.2345	54385
	.1840	54278	4	.2095	54332		.2350	54386
	.1845	54279		.2100	54333		.2355	54387
13	.1850	54280		.2105	54334		.2360	54388
.1855 D/P	.1855	54281		.2110	54335	6.0 mm	.2362	54389
	.1860	54282		.2115	54336		.2365	54390
.1865 U/S	.1865	54283		.2120	54337		.2370	54391
.1870 D/P	.1870	54284		.2125	54338		.2375	54392
	.1872	54285	3	.2130	54339	B	.2380	54393

(continued)

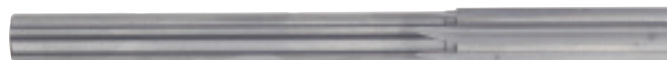
SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2	.0815"-.0965"	1/2	2	.1610"-.1915"	7/8	2-3/4	.3170"-.4160"	1-1/4	3-1/2
.0420"-.0650"	3/8	1-1/2	.0970"-.1300"	5/8	2-1/4	.1920"-.2550"	1	3	.4170"-.4780"	1-3/8	4
.0655"-.0810"	1/2	1-3/4	.1305"-.1605"	3/4	2-1/2	.2559"-.3160"	1-1/8	3-1/4	.4790"-.5050"	1-1/2	4



# Solid Carbide Straight Shank Chucking Reamers

Alésoir au carbure

Rima de carburo



List No. 5661

STANDARD All sizes — 1 each  
PACKAGE

(continued)

SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.
	.2385	54394		.2710	54448	O	.3160	54502
	.2390	54395	I	.2720	54449		.3170	54503
	.2395	54396		.2730	54450		.3180	54504
	.2400	54397		.2740	54451		.3190	54505
	.2405	54398		.2750	54452		.3200	54506
	.2410	54399	7.0 mm	.2756	54453		.3210	54507
	.2415	54400		.2760	54454	P	.3220	54508
C	.2420	54401	J	.2770	54455		.3230	54509
	.2425	54402		.2780	54456		.3240	54510
	.2430	54403		.2790	54457		.3250	54511
	.2435	54404		.2800	54458		.3260	54512
	.2440	54405	K	.2810	54459		.3270	54513
	.2445	54406	9/32	.2812	54460	21/64	.3280	54514
	.2450	54407		.2818	54461		.3281	54515
	.2455	54408		.2820	54462		.3290	54516
	.2460	54409		.2830	54463		.3300	54517
D	.2465	54410		.2840	54464	Q	.3310	54518
	.2470	54411		.2850	54465		.3320	54519
	.2475	54412		.2860	54466		.3330	54520
.2480 D/P	.2480	54413		.2870	54467		.3340	54521
	.2485	54414		.2880	54468	8.5 mm	.3346	54522
.2490 U/S	.2490	54415		.2890	54469		.3350	54523
.2495 D/P	.2495	54416	L	.2900	54470		.3360	54524
1/4 (E)	.2500	54417		.2910	54471		.3370	54525
	.2505	54418		.2920	54472		.3380	54526
.2510 O/S	.2510	54419		.2930	54473	R	.3390	54527
	.2515	54420		.2940	54474		.3400	54528
	.2520	54421	M	.2950	54475		.3410	54529
	.2525	54422	7.5 mm	.2953	54476		.3420	54530
	.2530	54423		.2960	54477		.3430	54531
	.2535	54424	19/64	.2969	54478	11/32	.3438	54532
	.2540	54425		.2970	54479		.3440	54533
	.2545	54426		.2980	54480		.3450	54534
	.2550	54427		.2990	54481		.3460	54535
6.5 mm	.2559	54428		.3000	54482		.3470	54536
	.2560	54429		.3010	54483	S	.3480	54537
	.2565	54430	N	.3020	54484		.3490	54538
F	.2570	54431		.3030	54485		.3500	54539
	.2575	54432		.3040	54486		.3510	54540
	.2580	54433		.3050	54487		.3520	54541
	.2590	54434		.3060	54488		.3530	54542
	.2600	54435		.3070	54489	9.0 mm	.3540	54543
G	.2610	54436		.3080	54490		.3543	54544
	.2620	54437		.3090	54491		.3550	54545
	.2630	54438		.3100	54492		.3560	54546
	.2635	54439	.3105 D/P	.3105	54493		.3570	54547
	.2640	54440		.3110	54494	T	.3580	54548
	.2650	54441	.3115 U/S	.3115	54495		.3590	54549
17/64	.2656	54442	.3120 D/P	.3120	54496	23/64	.3594	54550
H	.2660	54443	5/16	.3125	54497		.3600	54551
	.2670	54444		.3130	54498		.3610	54552
	.2680	54445	.3135 O/S	.3135	54499		.3620	54553
	.2690	54446		.3140	54500		.3630	54554
	.2700	54447	8.0 mm	.3150	54501		.3640	54555

(continued)

SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2	.0815"-.0965"	1/2	2	.1610"-.1915"	7/8	2-3/4	.3170"-.4160"	1-1/4	3-1/2
.0420"-.0650"	3/8	1-1/2	.0970"-.1300"	5/8	2-1/4	.1920"-.2550"	1	3	.4170"-.4780"	1-3/8	4
.0655"-.0810"	1/2	1-3/4	.1305"-.1605"	3/4	2-1/2	.2559"-.3160"	1-1/8	3-1/4	.4790"-.5050"	1-1/2	4

# Solid Carbide Straight Shank Chucking Reamers

(continued)

Alésoir au carbure

Rima de carburo



List No. 5661

STANDARD All sizes — 1 each  
PACKAGE

SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.	SIZE	DEC. SIZE	EDP NO.			
U	.3650	54556	Z 10.5 mm	.4130	54610	15/32	.4590	54664			
	.3660	54557		.4134	54611		.4600	54665			
	.3670	54558		.4140	54612		.4610	54666			
	.3680	54559		.4150	54613		.4620	54667			
	.3690	54560		.4160	54614		.4630	54668			
.3730 D/P 9.5 mm	.3700	54561	27/64	.4170	54615		12.0 mm	.4640	54669		
	.3710	54562		.4180	54616			.4650	54670		
	.3720	54563		.4190	54617			.4660	54671		
	.3730	54564		.4200	54618			.4670	54672		
	.3740	54565		.4210	54619			.4680	54673		
.3745 D/P 3/8	.3745	54566		.4219	54620			31/64	.4688	54674	
	.3750	54567		.4230	54621				.4690	54675	
	.3755	54568		.4240	54622				.4700	54676	
	.3760 O/S	.3760		54569	.4250				54623	.4710	54677
		.3765		54570	.4260				54624	.4720	54678
V		.3770		54571	11.0 mm	.4270			54625	.4724	54679
		.3780		54572		.4280			54626	.4730	54680
		.3790		54573		.4290			54627	.4740	54681
	.3800	54574		.4300		54628			.4750	54682	
	.3810	54575		.4310		54629			.4760	54683	
W	.3820	54576	.4320	54630		.4770	54684				
	.3830	54577	.4330	54631		.4780	54685				
	.3840	54578	.4331	54632		.4790	54686				
	.3850	54579	.4340	54633		.4800	54687				
	.3860	54580	.4350	54634		.4805	54688				
25/64	.3870	54581	.4355 D/P	.4355		54635	.4810	54689			
	.3880	54582	.4360	54636		.4820	54690				
	.3890	54583	.4365 U/S	.4365		54637	.4830	54691			
	.3900	54584	.4370 D/P	.4370		54638	.4840	54692			
	.3906	54585	7/16	.4375		54639	.4844	54693			
10.0 mm	.3910	54586	.4380	54640	12.5 mm	.4850	54694				
	.3920	54587	.4385 O/S	.4385		54641	.4860	54695			
	.3930	54588	.4390	54642		.4870	54696				
	.3937	54589	.4400	54643		.4880	54697				
	.3940	54590	.4410	54644		.4890	54698				
X	.3950	54591	.4420	54645		.4900	54699				
	.3960	54592	.4430	54646		.4910	54700				
	.3970	54593	.4440	54647		.4921	54701				
	.3980	54594	.4450	54648		.4930	54702				
	.3990	54595	.4460	54649		.4940	54703				
Y	.4000	54596	.4470	54650		.4950	54704				
	.4010	54597	.4480	54651		.4960	54705				
	.4020	54598	.4490	54652		.4970	54706				
	.4030	54599	.4500	54653		.4980 D/P	54707				
	.4040	54600	.4510	54654		.4990 U/S	54708				
13/32	.4050	54601	.4520	54655	.4995 D/P	54709					
	.4060	54602	11.5 mm	.4528	54656	1/2	.5000	54710			
	.4062	54603	.4530	54657	.5005	54711					
	.4070	54604	.4531	54658	.5010 O/S	.5010	54712				
	.4080	54605	.4540	54659	.5015	54713					
.4090	54606	.4550	54660	.5020	54714						
.4100	54607	.4560	54661	.5030	54715						
.4110	54608	.4570	54662	.5040	54716						
.4120	54609	.4580	54663	.5050	54717						

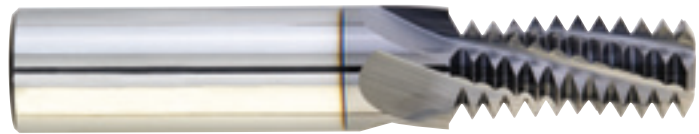
SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL	SIZE RANGE	FLUTE LENGTH	OAL
.0280"-.0415"	1/4	1-1/2	.0815"-.0965"	1/2	2	.1610"-.1915"	7/8	2-3/4	.3170"-.4160"	1-1/4	3-1/2
.0420"-.0650"	3/8	1-1/2	.0970"-.1300"	5/8	2-1/4	.1920"-.2550"	1	3	.4170"-.4780"	1-3/8	4
.0655"-.0810"	1/2	1-3/4	.1305"-.1605"	3/4	2-1/2	.2555"-.3160"	1-1/8	3-1/4	.4790"-.5050"	1-1/2	4

# Solid Carbide Thread Mills

ALTiN Coated  
10% Micrograin Carbide

Fraise à fileter au carbure

Fresa de roscar de carburo



## List No. 5900 Fractional & Machine Screw

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life.

**ALTiN - Aluminum Titanium Nitride** is an excellent all-around coating that is especially recommended for high thermal stress applications including dry machining, abrasive materials and difficult-to-machine materials. Benefits include higher cutting speeds and longer tool life.

### THREAD MILLING FEATURES & BENEFITS

- **Reduced Tool Inventory. One Thread Mill Can Produce** internal & external threads, left hand & right hand threads, different thread diameters of the same pitch and through hole & blind hole threads.
- **Requires Less Power.** Produce coarse pitches and large diameters on lower H.P. machines.
- **Tough Threading Applications.** Thread harder, difficult-to-machine & gummy materials that cause problems for taps.
- **Helical Flutes** for reduced cutting forces, improved thread quality & increased tool life.
- **Precision Threading.** Control pitch diameter precisely via programming. Precise thread depth control & positional accuracy. Produce 100% thread heights. Produce full threads to within one pitch of a shoulder or blind hole bottom.
- **Easily Removed if Broken.** No need for EDM burn-out.

## Fractional & Machine Screw

Speeds & Feeds: Page 27

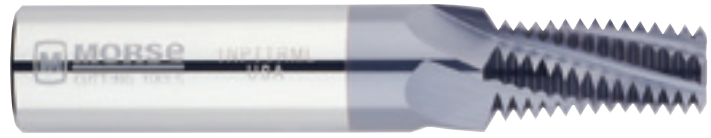
SIZE	SHANK DIA.	CUTTING DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
6-32	1/8	.100	.218	2	3	98600
8-36	1/8	.115	.250	2	3	98601
8-32	1/8	.115	.250	2	3	98602
10-24	3/16	.120	.312	2	3	98603
10-32	3/16	.120	.312	2	3	98604
1/4-20	3/16	.180	.500	2-1/2	3	98605
1/4-28	3/16	.180	.500	2-1/2	3	98606
5/16-18	1/4	.240	.625	2-1/2	3	98607
5/16-24	1/4	.240	.625	2-1/2	3	98608
3/8-16	5/16	.290	.750	3	4	98609
3/8-24	5/16	.290	.750	3	4	98610
7/16-14	3/8	.340	.875	3	4	98611
7/16-20	3/8	.340	.875	3	4	98612
1/2-13	3/8	.350	.875	3-1/2	4	98613
1/2-20	3/8	.350	.875	3-1/2	4	98614
9/16-12	1/2	.370	.875	3-1/2	4	98615
9/16-18	1/2	.370	.875	3-1/2	4	98616
5/8-11	1/2	.470	1.250	3-1/2	5	98617
5/8-18	1/2	.470	1.250	3-1/2	5	98618
3/4-10	1/2	.495	1.250	3-1/2	5	98619
3/4-16	1/2	.495	1.250	3-1/2	5	98620
7/8-9	5/8	.620	1.250	3-1/2	5	98621
7/8-14	5/8	.620	1.250	3-1/2	5	98622
1-8	3/4	.620	1.375	4	5	98623
1-12	3/4	.620	1.375	4	5	98624

# Solid Carbide Thread Mills

ALTiN Coated  
10% Micrograin Carbide

Fraise à fileter au carbure

Fresa de roscar de carburo



List No. 5902 Pipe Thread

## Pipe Thread

SIZE	SHANK DIA.	CUTTING DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
<b>NPT</b>						
1/16-27	1/4	.245	.437	2-1/2	3	<a href="#">98641</a>
1/8-27	5/16	.310	.437	2-1/2	4	<a href="#">98642</a>
1/4-18	3/8	.370	.625	3	4	<a href="#">98656</a>
3/8-18	3/8	.370	.625	3	4	<a href="#">98657</a>
1/2-14	1/2	.495	.875	3-1/2	4	<a href="#">98645</a>
3/4-14	1/2	.495	.875	3-1/2	4	<a href="#">98646</a>
1-11½	3/4	.620	1.125	4	5	<a href="#">98647</a>
<b>NPTF</b>						
1/16-27	1/4	.245	.437	2-1/2	3	<a href="#">98648</a>
1/8-27	5/16	.310	.437	2-1/2	4	<a href="#">98649</a>
1/4-18	3/8	.370	.625	3	4	<a href="#">98658</a>
3/8-18	3/8	.370	.625	3	4	<a href="#">98659</a>
1/2-14	1/2	.495	.875	3-1/2	4	<a href="#">98652</a>
3/4-14	1/2	.495	.875	3-1/2	4	<a href="#">98653</a>
1-11½	3/4	.620	1.125	4	5	<a href="#">98654</a>

# Solid Carbide Thread Mills

ALTiN Coated  
10% Micrograin Carbide

Fraise à fileter au carbure

Fresa de roscar de carburo

Speeds & Feeds: Page 27

## 6 PIECE SET Fractional & Machine Screw

With just 6 thread mills you can produce 13 different thread sizes:  
6-32, 8-32, 10-32, 10-24, 5/16"-24, 3/8"-24, 1/4"-20, 1/2"-20, 5/16"-18,  
9/16"-18, 3/8"-16, 3/4"-16, 1/2"-13

With the same thread mill you can produce:

- both left hand & right hand threads
- both internal & external threads

List No. 5900

Sizes: 6-32, 10-24, 1/4"-20, 5/16"-18, 3/8"-16, 1/2"-13  
in Plastic Case

**EDP No. 98655**

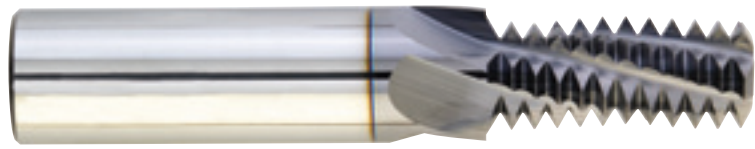


# Solid Carbide Thread Mills

Fraise à fileter au carbure

Fresa de roscar de carburo

ALTiN Coated  
10% Micrograin Carbide



## Metric

List No. 5901 Metric

SIZE	SHANK DIA.	CUTTING DIA.	LENGTH OF CUT	OAL	NO. OF FLUTES	EDP NO.
M4 x 0.7	1/8	.120	.250	2	3	98625
M4.5 x 0.75	1/8	.120	.250	2	3	98626
M5 x 0.8	3/16	.120	.312	2	3	98627
M6 x 1	3/16	.170	.500	2-1/2	3	98628
M8 x 0.75	1/4	.235	.625	2-1/2	3	98629
M8 x 1	1/4	.235	.625	2-1/2	3	98630
M8 x 1.25	1/4	.235	.625	2-1/2	3	98631
M10 x 1.25	5/16	.300	.750	3	4	98632
M10 x 1.5	5/16	.300	.750	3	4	98633
M12 x 1	3/8	.360	.875	3-1/2	4	98634
M12 x 1.25	3/8	.360	.875	3-1/2	4	98635
M12 x 1.75	3/8	.360	.875	3-1/2	4	98636
M14 x 1.5	3/8	.360	.875	3-1/2	4	98637
M16 x 2	1/2	.470	1.250	3-1/2	5	98638
M18 x 2.5	1/2	.470	1.250	3-1/2	5	98639
M20 x 3	5/8	.470	1.250	3-1/2	5	98640

## Thread Milling Feed & Speeds

Material	Speed SFM	Feed Rate (inches/tooth)						
		Tool Diameter						
		1/8	3/16	1/4	5/16	3/8	1/2	5/8
Aluminum	800-1400	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0055	.005-.007
Magnesium	800-1400	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0055	.005-.007
Brass	600-800	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0045	.005-.006
Bronze	500-600	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.003-.0045	.0035-.0045	.005-.006
Hard Bronze	200-300	.0004-.0008	.0007-.0012	.001-.002	.001-.002	.0015-.0025	.002-.003	.003-.004
Low Alloy Steels < 25 Rc	350-500	.0005-.001	.001-.0015	.0015-.0025	.002-.003	.0025-.0035	.003-.004	.004-.005
High Alloy Steels > 25 Rc	250-400	.0003-.0006	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.002-.003	.003-.004
Stainless Steel	150-250	.0004-.0008	.0006-.001	.001-.0015	.0015-.002	.0015-.003	.002-.0035	.003-.004
Cast Iron - Soft	250-350	.0004-.0008	.0007-.0013	.0007-.0013	.0015-.002	.002-.003	.002-.004	.003-.005
Cast Iron - Hard	200-300	.0003-.0006	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.002-.003	.003-.004
Titanium	80-150	.0003-.0006	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.0015-.0025	.0025-.0035
Inconel	60-100	.0003-.0006	.0005-.001	.0008-.0015	.001-.002	.0015-.0025	.0015-.0025	.002-.003



## Thread Mill Programming Request Form

Distributor Name \_\_\_\_\_ Date \_\_\_\_\_  
 Dist. Contact \_\_\_\_\_ Phone Number \_\_\_\_\_  
 End User \_\_\_\_\_ Fax Number \_\_\_\_\_  
 End User Contact \_\_\_\_\_ E-mail \_\_\_\_\_

### Machine Information

Brand \_\_\_\_\_  
 Model \_\_\_\_\_  
 Spindle taper \_\_\_\_\_  
 Max RPM \_\_\_\_\_

### Control Information

Brand \_\_\_\_\_  
 Model \_\_\_\_\_  
 ISO – ASCII Compatible  Yes  No  Don't Know  
 Helical Milling Available?  Yes  No  Don't Know

### Thread To Be Produced

Thread Specification \_\_\_\_\_  
 Length of Full Thread \_\_\_\_\_  
 Thread Form  100%  75%  Other  
 Internal Thread  External Thread  
 Drill Size \_\_\_\_\_  Thru  Blind  Counterbored

### Material Being Machined

Material \_\_\_\_\_  
 Hardness \_\_\_\_\_  
 Condition  Annealed  Normalized  Heat Treated  
 Cast  Forged  Rolled  Plate  Bar  
 Pre-Machined  Flame Cut  Scale  Sand

Morse Thread Mill To Be Used (EDP No. or Description) \_\_\_\_\_

### Programming Data

Dimensions  Inch  Metric \_\_\_\_\_  
 Program Values  Absolute (G90)  Incremental (G91) \_\_\_\_\_  
 Arc Center  I & J  R (Radius)  
 Tool Path  Offset  No Offset  
 Arc Limitation  Full Circle  Quadrant

K Value  Not Required  Required  
 If Required  In Radians  Per Revolution  
 Feed Direction  Climb  Conventional

Note: Climb Milling is always recommended for carbide tooling. In some cases where thin-walled parts, long extensions, or poor spindle conditions are encountered conventional milling may be an option to produce a given thread.



# variFLUTE™

## Variable Flute ALTiN Coated

### HPE High Performance

### Solid Carbide

### Single End Mills

#### Center Cutting

10% Cobalt Micrograin Carbide

HIGH PERFORMANCE MILLING: Carbon Steels, Alloy Steels, Stainless Steels, Mold & Die Steels, High Temperature Alloys, Titanium Alloys, Cast Iron and many other materials.

Variable Flute design reduces chatter, harmonics and cutting forces for increased feed rates, greater depths of cut, improved surface finish and accuracy, minimal tool deflection, reduced machine vibration and increased tool life.

#### TOLERANCES

Diameter +.000/ - .002  
Shank Dia. -.0001/ - .0004

**ALTiN – Aluminum Titanium Nitride** Coating is an excellent all-around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento



List No. 5985 3-Flute – Corner Radius



List No. 5988 3-Flute – Ball Nose



List No. 5994 4-Flute – Corner Radius

List No. 5995 4-Flute – Square End



List No. 5996 4-Flute – Ball Nose



List No. 5986 5-Flute – Corner Radius

List No. 5987 5-Flute – Square End



List No. 5985 – 3-Flute – Corner Radius

ALTiN  
COATED

3-Flute variFLUTE end mills feature tool geometry for high chip evacuation in slotting and roughing applications.

Corner Radius strengthens the end mill to minimize chipping and reduce corner wear. Also used when the finished part requires a radius.

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.
<b>STUB LENGTH</b>					
1/4	1/4	3/8	2	.015-.020	<a href="#">56270</a>
3/8	3/8	1/2	2	.015-.020	<a href="#">56271</a>
1/2	1/2	5/8	2 1/2	.025-.030	<a href="#">56272</a>
5/8	5/8	3/4	3	.030-.035	<a href="#">56273</a>
3/4	3/4	7/8	3	.030-.035	<a href="#">56274</a>
<b>REGULAR LENGTH</b>					
1/8	1/8	3/8	1 1/2	.010-.015	<a href="#">56275</a>
5/32	3/16	7/16	2	.010-.015	<a href="#">56276</a>
3/16	3/16	7/16	2	.010-.015	<a href="#">56277</a>
7/32	1/4	7/16	2 1/2	.015-.020	<a href="#">56278</a>
1/4	1/4	5/8	2 1/2	.015-.020	<a href="#">56279</a>
9/32	5/16	5/8	2 1/2	.015-.020	<a href="#">56280</a>
5/16	5/16	3/4	2 1/2	.015-.020	<a href="#">56281</a>
3/8	3/8	7/8	2 1/2	.015-.020	<a href="#">56282</a>
7/16	7/16	1	2 3/4	.015-.020	<a href="#">56283</a>
1/2	1/2	1	3	.025-.030	<a href="#">56284</a>
5/8	5/8	1 1/4	3 1/2	.030-.035	<a href="#">56285</a>
3/4	3/4	1 1/2	4	.030-.035	<a href="#">56286</a>
1	1	1 1/2	4	.030-.035	<a href="#">56287</a>

Speeds & Feeds: Page 33



# variFLUTE™ Solid Carbide Single End Mills



List No. 5988 – 3-Flute – Ball Nose

ALTiN  
COATED

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

**3-Flute** variFLUTE end mills feature tool geometry for high chip evacuation in slotting and roughing applications.

**Ball Nose** for surfacing applications, fillets, radius bottom slots and die cavities.

Speeds & Feeds: Page 33

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
<b>REGULAR LENGTH</b>				
1/8	1/8	3/8	1 1/2	<a href="#">56320</a>
5/32	3/16	7/16	2	<a href="#">56321</a>
3/16	3/16	7/16	2	<a href="#">56322</a>
7/32	1/4	7/16	2 1/2	<a href="#">56323</a>
1/4	1/4	5/8	2 1/2	<a href="#">56324</a>
9/32	5/16	5/8	2 1/2	<a href="#">56325</a>
5/16	5/16	3/4	2 1/2	<a href="#">56326</a>
3/8	3/8	7/8	2 1/2	<a href="#">56327</a>
7/16	7/16	1	2 3/4	<a href="#">56328</a>
1/2	1/2	1	3	<a href="#">56329</a>



List No. 5996 – 4-Flute – Ball Nose

ALTiN  
COATED

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

**4-Flute** variFLUTE end mills feature versatile tool geometry for high chip evacuation in slotting applications while providing high surface finish and rapid feed rates in profiling applications.

**Ball Nose** for surfacing applications, fillets, radius bottom slots and die cavities.

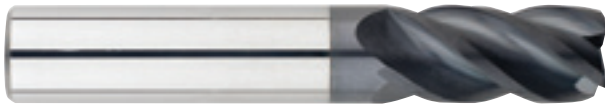
DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
<b>REGULAR LENGTH</b>				
1/8	1/8	3/8	1 1/2	<a href="#">56373</a>
5/32	3/16	7/16	2	<a href="#">56374</a>
3/16	3/16	7/16	2	<a href="#">56375</a>
7/32	1/4	7/16	2 1/2	<a href="#">56376</a>
1/4	1/4	5/8	2 1/2	<a href="#">56377</a>
9/32	5/16	5/8	2 1/2	<a href="#">56378</a>
5/16	5/16	3/4	2 1/2	<a href="#">56379</a>
3/8	3/8	7/8	2 1/2	<a href="#">56380</a>
7/16	7/16	1	2 3/4	<a href="#">56381</a>
1/2	1/2	1	3	<a href="#">56382</a>
5/8	5/8	1 1/4	3 1/2	<a href="#">56383</a>
3/4	3/4	1 1/2	4	<a href="#">56384</a>
1	1	1 1/2	4	<a href="#">56385</a>

**ALTiN - Aluminum Titanium Nitride** Coating is an excellent all-around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

# variFLUTE™ Solid Carbide Single End Mills

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento



List No. 5994 – 4-Flute – Corner Radius

ALTiN  
COATED

4-Flute variFLUTE end mills feature versatile tool geometry for high chip evacuation in slotting applications while providing high surface finish and rapid feed rates in profiling applications.

Corner Radius strengthens the end mill to minimize chipping and reduce corner wear. Also used when the finished part requires a radius.

Speeds & Feeds: Page 33

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.
<b>STUB LENGTH</b>					
1/4	1/4	3/8	2	.015 - .020	<a href="#">56335</a>
5/16	5/16	3/8	2	.015 - .020	<a href="#">56336</a>
3/8	3/8	1/2	2	.015 - .020	<a href="#">56337</a>
1/2	1/2	5/8	2 1/2	.025 - .030	<a href="#">56338</a>
5/8	5/8	3/4	3	.030 - .035	<a href="#">56339</a>
3/4	3/4	7/8	3	.030 - .035	<a href="#">56340</a>
1	1	1	4	.030 - .035	<a href="#">56341</a>
<b>REGULAR LENGTH</b>					
1/8	1/8	3/8	1 1/2	.010 - .015	<a href="#">56342</a>
5/32	3/16	7/16	2	.010 - .015	<a href="#">56343</a>
3/16	3/16	7/16	2	.010 - .015	<a href="#">56344</a>
7/32	1/4	7/16	2 1/2	.015 - .020	<a href="#">56345</a>
1/4	1/4	5/8	2 1/2	.015 - .020	<a href="#">56346</a>
9/32	5/16	5/8	2 1/2	.015 - .020	<a href="#">56347</a>
5/16	5/16	3/4	2 1/2	.015 - .020	<a href="#">56348</a>
3/8	3/8	7/8	2 1/2	.015 - .020	<a href="#">56349</a>
7/16	7/16	1	2 3/4	.015 - .020	<a href="#">56350</a>
1/2	1/2	1	3	.025 - .030	<a href="#">56351</a>
5/8	5/8	1 1/4	3 1/2	.030 - .035	<a href="#">56352</a>
3/4	3/4	1 1/2	4	.030 - .035	<a href="#">56353</a>
1	1	1 1/2	4	.030 - .035	<a href="#">56354</a>
<b>LONG LENGTH</b>					
1/4	1/4	1 1/4	3	.015 - .020	<a href="#">56355</a>
3/8	3/8	1 1/4	3	.015 - .020	<a href="#">56356</a>
1/2	1/2	2	4	.025 - .030	<a href="#">56357</a>
5/8	5/8	2 1/4	5	.030 - .035	<a href="#">56358</a>
3/4	3/4	2 1/4	5	.030 - .035	<a href="#">56359</a>
<b>EXTENDED LENGTH</b>					
1/4	1/4	5/8	4	.015 - .020	<a href="#">56360</a>
3/8	3/8	7/8	4	.015 - .020	<a href="#">56361</a>
1/2	1/2	1	6	.025 - .030	<a href="#">56362</a>
5/8	5/8	1 1/4	6	.030 - .035	<a href="#">56363</a>
3/4	3/4	1 1/2	6	.030 - .035	<a href="#">56364</a>

**ALTiN – Aluminum Titanium Nitride** Coating is an excellent all-around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resists chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

# variFLUTE™ Solid Carbide Single End Mills



List No. 5995 – 4-Flute – Square End

ALTiN  
COATED

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

**4-Flute** variFLUTE end mills feature versatile tool geometry for high chip evacuation in slotting applications while providing high surface finish and rapid feed rates in profiling applications.

**Square End** for peripheral milling and finishing applications requiring machining to a sharp corner.

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
<b>REGULAR LENGTH</b>				
1/4	1/4	5/8	2 1/2	<a href="#">56365</a>
5/16	5/16	3/4	2 1/2	<a href="#">56366</a>
3/8	3/8	7/8	2 1/2	<a href="#">56367</a>
7/16	7/16	1	2 3/4	<a href="#">56368</a>
1/2	1/2	1	3	<a href="#">56369</a>
5/8	5/8	1 1/4	3 1/2	<a href="#">56370</a>
3/4	3/4	1 1/2	4	<a href="#">56371</a>
1	1	1 1/2	4	<a href="#">56372</a>



List No. 5986 – 5-Flute – Corner Radius

ALTiN  
COATED

Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

**5-Flute** variFLUTE end mills with increased core thickness and five flutes provide higher feed rates in profiling and finishing applications and enhanced surface finish.

**Corner Radius** strengthens the end mill to minimize chip-ping and reduce corner wear. Also used when the finished part requires a radius.

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	EDP NO.
<b>STUB LENGTH</b>					
1/4	1/4	3/8	2	.015-.020	<a href="#">56290</a>
3/8	3/8	1/2	2	.015-.020	<a href="#">56291</a>
1/2	1/2	5/8	2 1/2	.025-.030	<a href="#">56292</a>
5/8	5/8	3/4	3	.030-.035	<a href="#">56293</a>
3/4	3/4	7/8	3	.030-.035	<a href="#">56294</a>
<b>REGULAR LENGTH</b>					
1/4	1/4	5/8	2 1/2	.015-.020	<a href="#">56295</a>
5/16	5/16	3/4	2 1/2	.015-.020	<a href="#">56296</a>
3/8	3/8	7/8	2 1/2	.015-.020	<a href="#">56297</a>
7/16	7/16	1	2 3/4	.015-.020	<a href="#">56298</a>
1/2	1/2	1	3	.025-.030	<a href="#">56299</a>
5/8	5/8	1 1/4	3 1/2	.030-.035	<a href="#">56300</a>
3/4	3/4	1 1/2	4	.030-.035	<a href="#">56301</a>
1	1	1 1/2	4	.030-.035	<a href="#">56302</a>
<b>LONG LENGTH</b>					
1/4	1/4	1 1/4	3	.015-.020	<a href="#">56330</a>
3/8	3/8	1 1/4	3	.015-.020	<a href="#">56331</a>
1/2	1/2	2	4	.025-.030	<a href="#">56332</a>
5/8	5/8	2 1/4	5	.030-.035	<a href="#">56333</a>
3/4	3/4	2 1/4	5	.030-.035	<a href="#">56334</a>
<b>EXTENDED LENGTH</b>					
1/4	1/4	5/8	4	.015-.020	<a href="#">56303</a>
3/8	3/8	7/8	4	.015-.020	<a href="#">56304</a>
1/2	1/2	1	6	.025-.030	<a href="#">56305</a>
5/8	5/8	1 1/4	6	.030-.035	<a href="#">56306</a>
3/4	3/4	1 1/2	6	.030-.035	<a href="#">56307</a>

Speeds & Feeds: Page 33

# variFLUTE™ Solid Carbide Single End Mills



Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

**5-Flute** variFLUTE end mills with increased core thickness and five flutes provide higher feed rates in profiling and finishing applications and enhanced surface finish.

**Square End** for peripheral milling and finishing applications requiring machining to a sharp corner.

List No. 5987 – 5-Flute – Square End

ALTiN  
COATED

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	EDP NO.
<b>REGULAR LENGTH</b>				
1/4	1/4	5/8	2 1/2	<b>56310</b>
5/16	5/16	3/4	2 1/2	<b>56311</b>
3/8	3/8	7/8	2 1/2	<b>56312</b>
7/16	7/16	1	2 3/4	<b>56313</b>
1/2	1/2	1	3	<b>56314</b>
5/8	5/8	1 1/4	3 1/2	<b>56315</b>
3/4	3/4	1 1/2	4	<b>56316</b>
1	1	1 1/2	4	<b>56317</b>

## variFLUTE™ SPEEDS & FEEDS

Workpiece Material	Hardness BHN	Type of Cut	Surface Speed (SFM)	FEED PER TOOTH BY END MILL DIAMETER				
				1/8"	1/4"	1/2"	3/4"	1"
<b>Plain Steels - Low &amp; Medium Carbon</b> 1008, 1010, 1020	175	Profile Slot	500	0.0004	0.0013	0.0030	0.0038	0.0042
			400	0.0003	0.0010	0.0024	0.0030	0.0034
<b>Plain Steels - Low &amp; Medium Carbon</b> 1008, 1010, 1020	275	Profile Slot	400	0.0004	0.0013	0.0030	0.0038	0.0042
			320	0.0003	0.0010	0.0024	0.0030	0.0034
<b>Alloy Steels - Medium Carbon</b> 4140, 4150, 4340	275	Profile Slot	400	0.0003	0.0010	0.0025	0.0035	0.0040
			320	0.0002	0.0008	0.0020	0.0028	0.0032
<b>Alloy Steels - Medium Carbon</b> 4140, 4150, 4340	375	Profile Slot	300	0.0003	0.0010	0.0025	0.0035	0.0040
			240	0.0002	0.0008	0.0020	0.0028	0.0032
<b>Mold &amp; Die Steels</b> O1, A2, D2, H13, P20	275	Profile Slot	180	0.0002	0.0010	0.0025	0.0035	0.0040
			145	0.0002	0.0008	0.0020	0.0028	0.0032
<b>Stainless Steels 300 Series</b> 304, 310, 316	275	Profile Slot	300	0.0003	0.0010	0.0025	0.0035	0.0042
			240	0.0002	0.0008	0.0020	0.0028	0.0034
<b>Stainless Steels 400 Series</b> 409, 430, 436	325	Profile Slot	250	0.0003	0.0010	0.0025	0.0035	0.0042
			200	0.0002	0.0008	0.0020	0.0028	0.0034
<b>Stainless Steels Precipitation Hardened</b> 15-5PH, 17-4PH	325	Profile Slot	250	0.0002	0.0010	0.0022	0.0030	0.0040
			200	0.0002	0.0008	0.0018	0.0024	0.0032
<b>High Temperature Alloys</b> Inconel, Hastelloy, Waspaloy	300	Profile Slot	75	0.0002	0.0007	0.0020	0.0025	0.0032
			60	0.0002	0.0006	0.0016	0.0020	0.0026
<b>Titanium Alloys</b> Ti-6Al-4V, ASTM B367 Grades C-3, C-4	300	Profile Slot	300	0.0003	0.0010	0.0025	0.0027	0.0035
			240	0.0002	0.0008	0.0020	0.0022	0.0028
<b>Cast Iron</b> Grey	200	Profile Slot	550	0.0004	0.0012	0.0030	0.0038	0.0042
			440	0.0003	0.0010	0.0024	0.0030	0.0034
<b>Cast Iron</b> Ductile	300	Profile Slot	250	0.0003	0.0010	0.0030	0.0033	0.0042
			200	0.0002	0.0008	0.0024	0.0026	0.0034

SPEEDS and FEEDS are suggested starting points and may be increased or decreased depending on actual material and machining conditions. In pocketing operations ramping and spiral plunging are the preferred methods of entry. A 5° ramp angle at about 50% feed are suggested.

RECOMMENDED MAXIMUM DEPTHS OF CUT	PROFILING Radial Depth = .5XD Axial Depth = 1.5XD	SLOTING Axial Depth = 1XD

May be increased or decreased depending on actual material and machining conditions.

# variFLUTE™ NF

## Solid Carbide Variable Flute

### HPE Ultra-High Performance

### Single End Mills For Aluminum and Non-Ferrous Materials

Center Cutting  
 Premium Micrograin Carbide  
 10% Cobalt Content

High Performance Milling in Aluminum and Non-Ferrous Materials, Copper Alloys, Bronze/Brass

The Variable Flute Design reduces chatter and improves tool life. The high shear flute designed for rapid chip removal combined with an ultra high polish enable extremely high cutting rates and long tool life.

**ZrN - Zirconium Nitride** coating is a pale gold hard thin high-lubricity coating particularly well suited to machining non-ferrous materials including aluminum, copper alloys and brass.

**DLC, CrN**, and other high performance coatings also available.

**TOLERANCES:**

Diameter -.0001 / -.0003  
 Shank -.0001/ -.0003  
 Runout Less Than 0.0001 TIR



Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento



List No. 5990 & 5990Z 2-Flute — Standard Corner Radius



List No. 5991 & 5991Z 2-Flute — Square End



List No. 5992 & 5992Z 3-Flute — Standard Corner Radius



List No. 5993 & 5993Z 2-Flute — Ball End

**2-Flute** mills have greater chip capacity and are recommended for slotting and roughing operations.

**3-Flute** mills offer greater feed rates than two flute mills while still offering high chip capacity, recommended for profile applications.

**Corner Radius** strengthens the endmill and improves wear characteristics. Small .007- .010 radius enables use in most applications.

**List No. 5990 & 5990Z 2-Flute Standard Corner Radius**

Dia.	Shank Dia.	Length Of Cut	OAL	Corner Radius	List No. 5990 Bright Finish EDP No.	List No. 5990Z ZrN Coated EDP No.
<b>STANDARD LENGTH</b>						
1/4	1/4	3/4	2-1/2	.007 - .010	<b>52900</b>	<b>92600</b>
5/16	5/16	3/4	2-1/2	.007 - .010	<b>52901</b>	<b>92601</b>
3/8	3/8	1	2-1/2	.007 - .010	<b>52902</b>	<b>92602</b>
1/2	1/2	1-1/4	3	.007 - .010	<b>52903</b>	<b>92603</b>
5/8	5/8	1-5/8	3-1/2	.007 - .010	<b>52904</b>	<b>92604</b>
3/4	3/4	1-3/4	4	.007 - .010	<b>52905</b>	<b>92605</b>
1	1	1-3/4	4	.007 - .010	<b>52906</b>	<b>92606</b>
<b>LONG LENGTH</b>						
1/4	1/4	1-1/4	3	.007 - .010	<b>52910</b>	<b>92610</b>
5/16	5/16	1-3/8	3	.007 - .010	<b>52911</b>	<b>92611</b>
3/8	3/8	1-1/2	3-1/2	.007 - .010	<b>52912</b>	<b>92612</b>
1/2	1/2	2	4	.007 - .010	<b>52913</b>	<b>92613</b>
5/8	5/8	2-3/8	5	.007 - .010	<b>52914</b>	<b>92614</b>
3/4	3/4	2-1/2	5	.007 - .010	<b>52915</b>	<b>92615</b>
1	1	3	6	.007 - .010	<b>52916</b>	<b>92616</b>

Speeds & Feeds: Page 36

# variFLUTE™ NF

## Solid Carbide High Performance End Mills for Aluminum and Non Ferrous Materials

Fraise à queue à rainurer à haut rendement au carbure  
Cortador vertical de carburo de alto rendimiento



**Corner Radius** strengthens the end mill and improves wear characteristics. Small .007- .010 radius enables use in most applications.

**ZrN - Zirconium Nitride** coating is a pale gold hard thin high-lubricity coating particularly well suited to machining non-ferrous materials including aluminum, copper alloys and brass.

**DLC, CrN,** and other high performance coatings also available.

### List No. 5992 & 5992Z 3-Flute Standard Corner Radius

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	CORNER RADIUS	LIST NO. 5992	LIST NO. 5992Z
					BRIGHT FINISH EDP NO.	ZrN COATED EDP NO.
<b>STANDARD LENGTH</b>						
1/4	1/4	3/4	2-1/2	.007 - .010	<b>52930</b>	<b>92630</b>
5/16	5/16	3/4	2-1/2	.007 - .010	<b>52931</b>	<b>92631</b>
3/8	3/8	1	2-1/2	.007 - .010	<b>52932</b>	<b>92632</b>
1/2	1/2	1-1/4	3	.007 - .010	<b>52933</b>	<b>92633</b>
5/8	5/8	1-5/8	3-1/2	.007 - .010	<b>52934</b>	<b>92634</b>
3/4	3/4	1-3/4	4	.007 - .010	<b>52935</b>	<b>92635</b>
1	1	1-3/4	4	.007 - .010	<b>52936</b>	<b>92636</b>
<b>LONG LENGTH</b>						
1/4	1/4	1-1/4	3	.007 - .010	<b>52940</b>	<b>92940</b>
5/16	5/16	1-3/8	3	.007 - .010	<b>52941</b>	<b>92941</b>
3/8	3/8	1-1/2	3-1/2	.007 - .010	<b>52942</b>	<b>92942</b>
1/2	1/2	2	4	.007 - .010	<b>52943</b>	<b>92943</b>
5/8	5/8	2-3/8	5	.007 - .010	<b>52944</b>	<b>92944</b>
3/4	3/4	2-1/2	5	.007 - .010	<b>52945</b>	<b>92945</b>
1	1	3	6	.007 - .010	<b>52946</b>	<b>92946</b>

Speeds & Feeds: Page 36



**Square End** for milling and finishing where a sharp corner is required

**ZrN - Zirconium Nitride** coating is a pale gold hard thin high-lubricity coating particularly well suited to machining non-ferrous materials including aluminum, copper alloys and brass.

**DLC, CrN,** and other high performance coatings also available.

### List No. 5991 & 5991Z 2-Flute Square End

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	LIST NO. 5991	LIST NO. 5991Z
				BRIGHT FINISH EDP NO.	ZrN COATED EDP NO.
<b>STANDARD LENGTH</b>					
1/4	1/4	3/4	2-1/2	<b>52920</b>	<b>92920</b>
5/16	5/16	3/4	2-1/2	<b>52921</b>	<b>92921</b>
3/8	3/8	1	2-1/2	<b>52922</b>	<b>92922</b>
1/2	1/2	1-1/4	3	<b>52923</b>	<b>92923</b>
5/8	5/8	1-5/8	3-1/2	<b>52924</b>	<b>92924</b>
3/4	3/4	1-3/4	4	<b>52925</b>	<b>92925</b>
1	1	1-3/4	4	<b>52926</b>	<b>92926</b>



# variFLUTE™ NF

## Solid Carbide High Performance End Mills for Aluminum and Non Ferrous Materials



Fraise à queue à rainurer à haut rendement au carbure

Cortador vertical de carburo de alto rendimiento

**Ball End** for use in contour milling, radius bottom slots, fillets, and cavity milling.

**ZrN - Zirconium Nitride** coating is a pale gold hard thin high-lubricity coating particularly well suited to machining non-ferrous materials including aluminum, copper alloys and brass.

**DLC, CrN,** and other high performance coatings also available.

### List No. 5993 & 5993Z 2-Flute Ball End

DIA.	SHANK DIA.	LENGTH OF CUT	OAL	LIST NO. 5993	LIST NO. 5993Z
				BRIGHT FINISH EDP NO.	ZrN COATED EDP NO.
STANDARD LENGTH					
1/4	1/4	3/4	2-1/2	<b>52950</b>	<b>92650</b>
5/16	5/16	3/4	2-1/2	<b>52951</b>	<b>92651</b>
3/8	3/8	1	2-1/2	<b>52952</b>	<b>92652</b>
1/2	1/2	1-1/4	3	<b>52953</b>	<b>92653</b>
5/8	5/8	1-5/8	3-1/2	<b>52954</b>	<b>92654</b>
3/4	3/4	1-3/4	4	<b>52955</b>	<b>92655</b>
1	1	1-3/4	4	<b>52956</b>	<b>92656</b>

variFLUTE™ NF SPEEDS & FEEDS								
MATERIAL	CUTTING SPEED SFM M/MIN	CHIP LOAD PER TOOTH IN / MM						
		1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"
Aluminum	1500 - 2000	.0030	.0041	.0049	.0060	.0071	.0082	.0102
	460 - 610	0.076	0.104	0.124	0.152	0.180	0.208	0.259
Copper Alloys	750 - 1200	.0030	.0041	.0049	.0060	.0071	.0082	.0102
	230 - 370	0.076	0.104	0.124	0.152	0.180	0.208	0.259
Brass/Bronze	750 - 1550	.0030	.0041	.0049	.0060	.0071	.0082	.0102
	230 - 470	0.076	0.104	0.124	0.152	0.180	0.208	0.259
Plastics	1200 - 1650	.0063	.0078	.0095	.0125	0.0148	.0168	.0212
	370 - 505	0.152	0.203	0.254	0.305	0.358	0.406	0.508

Morse variFLUTE NF mills are capable of very high removal rates

- Use adequate coolant.
- High quality balanced tool holding is recommended
- Increase chip load based on available machine capability

RECOMMENDED MAXIMUM DEPTHS OF CUT	PROFILING Radial Depth = .5XD Axial Depth = 1.5XD	SLOTING Axial Depth = 1XD
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**SPEEDS and FEEDS** are suggested starting points and may be increased or decreased depending on actual material and machining conditions. The speeds and feed values listed are conservative in most cases.

# Solid Carbide Stub Length Single End Mills

Micrograin Carbide — Center Cutting  
30° Helix Angle

2-Flute & 4-Flute  
Square End & Ball Nose

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. Tool Coatings further enhance milling performance in a wide range of applications.

#### TOLERANCES

Size to 1/4" +.000 - .002  
5/16" to 3/4" +.000 - .003  
Shank Dia. +.0000 - .0005

#### STANDARD PACKAGE

All sizes - 1 each

Fraise à queue à rainurer au carbure

cortador vertical de carburo



List No. 5973 2-Flute Square End



List No. 5974 2-Flute Ball Nose



List No. 5975 4-Flute Square End



List No. 5976 4-Flute Ball Nose

Stub Length for high rigidity & minimal tool deflection.

## 2-Flute

DIA.	SHANK DIA.	LOC	OAL	SQUARE END - LIST 5973		BALL NOSE - LIST 5974	
				UNCOATED EDP NO.	TIALN COATED EDP NO.	UNCOATED EDP NO.	TIALN COATED EDP NO.
1/32	1/8	1/16	1-1/2	57085	92860	57089	92864
3/64	1/8	3/32	1-1/2	57086	92861	57090	92865
1/16	1/8	1/8	1-1/2	57025	92800	57055	92830
3/32	1/8	3/16	1-1/2	57026	92801	57056	92831
1/8	1/8	1/4	1-1/2	57027	92802	57057	92832
5/32	3/16	5/16	2	57028	92803	57058	92833
3/16	3/16	3/8	2	57029	92804	57059	92834
7/32	1/4	7/16	2	57030	92805	57060	92835
1/4	1/4	1/2	2	57031	92806	57061	92836
5/16	5/16	1/2	2	57032	92807	57062	92837
3/8	3/8	5/8	2	57033	92808	57063	92838
7/16	7/16	5/8	2-1/2	57034	92809	57064	92839
1/2	1/2	5/8	2-1/2	57035	92810	57065	92840
5/8	5/8	3/4	3	57036	92811	57066	92841
3/4	3/4	1	3	57037	92812	57067	92842

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## 4-Flute

DIA.	SHANK DIA.	LOC	OAL	SQUARE END - LIST 5975		BALL NOSE - LIST 5976	
				UNCOATED EDP NO.	TIALN COATED EDP NO.	UNCOATED EDP NO.	TIALN COATED EDP NO.
1/32	1/8	1/16	1-1/2	57087	92862	57091	92866
3/64	1/8	3/32	1-1/2	57088	92863	57092	92867
1/16	1/8	1/8	1-1/2	57040	92815	57070	92845
3/32	1/8	3/16	1-1/2	57041	92816	57071	92846
1/8	1/8	1/4	1-1/2	57042	92817	57072	92847
5/32	3/16	5/16	2	57043	92818	57073	92848
3/16	3/16	3/8	2	57044	92819	57074	92849
7/32	1/4	7/16	2	57045	92820	57075	92850
1/4	1/4	1/2	2	57046	92821	57076	92851
5/16	5/16	1/2	2	57047	92822	57077	92852
3/8	3/8	5/8	2	57048	92823	57078	92853
7/16	7/16	5/8	2-1/2	57049	92824	57079	92854
1/2	1/2	5/8	2-1/2	57050	92825	57080	92855
5/8	5/8	3/4	3	57051	92826	57081	92856
3/4	3/4	1	3	57052	92827	57082	92857

Tool Coatings Also Available

# Solid Carbide

## 2-Flute Single End Mills

Micrograin Carbide - Center Cutting  
30° Helix Angle

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. Ideal for plunge cutting and slotting. **Center Cutting** end allows for plunge cutting like a drill into solid material.

### TOLERANCES

Size to 1/4" +.000 - .002  
9/32" to 1" +.000 - .003  
Shank Dia. +.0000 - .0005

### List No. 5944 Regular Length

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TIALN COATED EDP NO.
	DIA.	LOC	OAL				
1/64	1/8	3/64	1 1/2	58001	89999	—	89996
1/32	1/8	1/8	1 1/2	58002	90000	—	89997
3/64	1/8	1/8	1 1/2	58003	90001	—	89998
1/16	1/8	3/16	1 1/2	58004	90002	90039	90076
5/64	1/8	3/16	1 1/2	58005	90003	90040	90077
3/32	1/8	3/8	1 1/2	58006	90004	90041	90078
7/64	1/8	3/8	1 1/2	58007	90005	90042	90079
1/8	1/8	1/2	1 1/2	58008	90006	90043	90080
9/64	3/16	9/16	2	58009	90007	90044	90081
5/32	3/16	9/16	2	58010	90008	90045	90082
11/64	3/16	5/8	2	58011	90009	90046	90083
3/16	3/16	5/8	2	58012	90010	90047	90084
13/64	1/4	5/8	2 1/2	58013	90011	90048	90085
7/32	1/4	5/8	2 1/2	58014	90012	90049	90086
1/4	1/4	3/4	2 1/2	58016	90014	90051	90088
9/32	5/16	3/4	2 1/2	58018	90016	90053	90090
5/16	5/16	13/16	2 1/2	58020	90018	90055	90092
3/8	3/8	7/8	2 1/2	58024	90022	90059	90096
7/16	7/16	7/8	2 1/2	58028	90026	90063	90100
1/2	1/2	1	3	58032	90030	90067	90104
9/16	9/16	1 1/4	3 1/2	58036	90031	90068	90105
5/8	5/8	1 1/4	3 1/2	58040	90032	90069	90106
11/16	3/4	1 1/2	4	58044	90033	90070	90107
3/4	3/4	1 1/2	4	58048	90034	90071	90108
7/8	7/8	1 1/2	4	58056	90035	90072	90109
1	1	1 1/2	4	58064	90036	90073	90110

### List No. 5954 Long Length

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TIALN COATED EDP NO.
	DIA.	LOC	OAL				
1/8	1/8	3/4	2 1/4	58238	90120	90130	90140
3/16	3/16	3/4	2 1/2	58239	90121	90131	90141
1/4	1/4	1 1/8	3	58241	90122	90132	90142
5/16	5/16	1 1/8	3	58250	90123	90133	90143
3/8	3/8	1 1/8	3	58254	90124	90134	90144
7/16	7/16	2	4	58258	90125	90135	90145
1/2	1/2	2	4	58262	90126	90136	90146
5/8	5/8	2 1/4	5	58270	90127	90137	90147
3/4	3/4	2 1/4	5	58278	90128	90138	90148
1	1	2 1/4	5	58294	90129	90139	90149

### List No. 5950 Extra Long Length

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TIALN COATED EDP NO.
	DIA.	LOC	OAL				
1/8	1/8	1	3	58408	90160	90170	90180
3/16	3/16	1 1/8	3	58412	90161	90171	90181
1/4	1/4	1 1/2	4	58416	90162	90172	90182
5/16	5/16	1 5/8	4	58420	90163	90173	90183
3/8	3/8	1 3/4	4	58424	90164	90174	90184
7/16	7/16	3	6	58428	90165	90175	90185
1/2	1/2	3	6	58432	90166	90176	90186
5/8	5/8	3	6	58440	90167	90177	90187
3/4	3/4	3	6	58448	90168	90178	90188
1	1	3	6	58464	90169	90179	90189

Fraise à queue à rainurer au carbure

cortador vertical de carburo



List No. 5944 Regular Length



List No. 5954 Long Length



List No. 5950 Extra Long Length

# Solid Carbide Metric 2-Flute Single End Mills

Fraise à queue à rainurer au carbure cortador vertical de carburo



Micrograin Carbide - Center Cutting  
30° Helix Angle

## TOLERANCES

All Sizes +.000mm/-.051mm  
Shank Dia. +000mm/-.013mm

## STANDARD PACKAGE

All sizes - 1 each

## List No. 5959

**2-Flute** end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. Ideal for plunge cutting and slotting. **Center Cutting** end allows for plunge cutting like a drill into solid material.

				UNCOATED	TiN COATED	TiCN COATED	TiAlN COATED
DIA.	SHANK DIA.	LOC	OAL	EDP NO.	EDP NO.	EDP NO.	EDP NO.
1 mm	3 mm	3 mm	39 mm	59280	90200	90220	90240
1.5 mm	3 mm	5 mm	39 mm	59281	90201	90221	90241
2 mm	3 mm	7 mm	39 mm	59282	90202	90222	90242
2.5 mm	3 mm	7 mm	39 mm	59283	90203	90223	90243
3 mm	3 mm	9 mm	39 mm	59284	90204	90224	90244
3.5 mm	4 mm	12 mm	51 mm	59285	90205	90225	90245
4 mm	4 mm	14 mm	51 mm	59286	90206	90226	90246
4.5 mm	5 mm	14 mm	51 mm	59287	90207	90227	90247
5 mm	5 mm	16 mm	51 mm	59288	90208	90228	90248
6 mm	6 mm	19 mm	64 mm	59289	90209	90229	90249
7 mm	8 mm	19 mm	64 mm	59290	90210	90230	90250
8 mm	8 mm	21 mm	64 mm	59291	90211	90231	90251
9 mm	10 mm	22 mm	70 mm	59292	90212	90232	90252
10 mm	10 mm	22 mm	70 mm	59293	90213	90233	90253
11 mm	11 mm	25 mm	70 mm	59294	90214	90234	90254
12 mm	12 mm	25 mm	76 mm	59295	90215	90235	90255
14 mm	14 mm	31 mm	89 mm	59297	90216	90236	90256
16 mm	16 mm	32 mm	89 mm	59298	90217	90237	90257
18 mm	18 mm	35 mm	102 mm	59299	90218	90238	90258
20 mm	20 mm	38 mm	102 mm	59300	90219	90239	90259
22 mm	22 mm	38 mm	102 mm	59301*	—	—	—

\* Available While Supplies Last

# Solid Carbide 2-Flute Double End Mills

Fraise à queue à rainurer au carbure cortador vertical de carburo

Speeds & Feeds:  
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List No. 5947 Stub Length



List No. 5896 Regular Length

Micrograin Carbide - Center Cutting  
30° Helix Angle

## List No. 5947 Stub Length

				UNCOATED	TiN COATED	TiCN COATED	TiAlN COATED
DIA.	SHANK DIA.	LOC	OAL	EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/16	1/8	1/8	1 1/2	57250	90300	90311	90322
3/32	1/8	3/16	1 1/2	57251	90301	90312	90323
1/8	1/8	1/4	1 1/2	57252	90302	90313	90324
5/32	3/16	5/16	2	57253	90303	90314	90325
3/16	3/16	3/8	2	57254	90304	90315	90326
7/32	1/4	1/2	2 1/2	57255	90305	90316	90327
1/4	1/4	1/2	2 1/2	57256	90306	90317	90328
5/16	5/16	1/2	2 1/2	57257	90307	90318	90329
3/8	3/8	9/16	3	57258	90308	90319	90330
7/16	7/16	9/16	3	57259	90309	90320	90331
1/2	1/2	5/8	3	57260	90310	90321	90332

## List No. 5896 Regular Length

				UNCOATED	TiN COATED	TiCN COATED	TiAlN COATED
DIA.	SHANK DIA.	LOC	OAL	EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	3/8	3/8	3 1/8	57158	90350	90360	90370
5/32	3/8	7/16	3 1/8	57160	90351	90361	90371
3/16	3/8	1/2	3 1/4	57162	90352	90362	90372
7/32	3/8	9/16	3 3/8	57164	90353	90363	90373
1/4	3/8	5/8	3 3/8	57166	90354	90364	90374
9/32	3/8	11/16	3 3/8	57168	90355	90365	90375
5/16	3/8	3/4	3 1/2	57170	90356	90366	90376
3/8	3/8	3/4	3 1/2	57174	90357	90367	90377
7/16	7/16	7/8	4	57178	90358	90368	90378
1/2	1/2	1	4	57182	90359	90369	90379

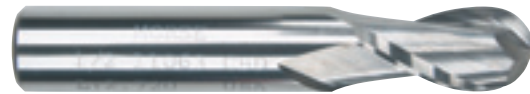
# Solid Carbide 2-Flute Ball Nose Single End Mills

Micrograin Carbide - Center Cutting  
30° Helix Angle

2-Flute end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Fraise cylindrique deux tailles à bout hémisphérique au carbure

cortador vertical con punta esférica de carburo



List No. 5940 Regular Length



List No. 5956 Long Length



List No. 5952 Extra Long Length

## List No. 5940 Regular Length

DIA.	SHANK		OAL	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
	DIA.	LOC		EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/64	1/8	3/64	1 1/2	58101	90397	—	90394
1/32	1/8	1/8	1 1/2	58102	90398	—	90395
3/64	1/8	1/8	1 1/2	58103	90399	—	90396
1/16	1/8	3/16	1 1/2	58104	90400	90423	90446
5/64	1/8	3/16	1 1/2	58105	90401	90424	90447
3/32	1/8	3/8	1 1/2	58106	90402	90425	90448
7/64	1/8	3/8	1 1/2	58107	90403	90426	90449
1/8	1/8	1/2	1 1/2	58108	90404	90427	90450
9/64	3/16	9/16	2	58109	90405	90428	90451
5/32	3/16	9/16	2	58110	90406	90429	90452
11/64	3/16	5/8	2	58111	90407	90430	90453
3/16	3/16	5/8	2	58112	90408	90431	90454
13/64	1/4	5/8	2 1/2	58113	90409	90432	90455
7/32	1/4	5/8	2 1/2	58114	90410	90433	90456
1/4	1/4	3/4	2 1/2	58116	90411	90434	90457
9/32	5/16	3/4	2 1/2	58118	90412	90435	90458
5/16	5/16	13/16	2 1/2	58120	90413	90436	90459
3/8	3/8	7/8	2 1/2	58124	90414	90437	90460
7/16	7/16	1	2 3/4	58128	90415	90438	90461
1/2	1/2	1	3	58132	90416	90439	90462
9/16	9/16	1 1/4	3 1/2	58136	90417	90440	90463
5/8	5/8	1 1/4	3 1/2	58140	90418	90441	90464
1 1/16	3/4	1 1/2	4	58144	90419	90442	90465
3/4	3/4	1 1/2	4	58148	90420	90443	90466
7/8	7/8	1 1/2	4	58156	90421	90444	90467
1	1	1 1/2	4	58164	90422	90445	90468

## List No. 5956 Long Length

DIA.	SHANK		OAL	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
	DIA.	LOC		EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	1/8	3/4	2 1/4	57575	90470	90480	90490
3/16	3/16	3/4	2 1/2	57577	90471	90481	90491
1/4	1/4	1 1/8	3	57581	90472	90482	90492
5/16	5/16	1 1/8	3	57583	90473	90483	90493
3/8	3/8	1 1/8	3	57585	90474	90484	90494
7/16	7/16	2	4	57587	90475	90485	90495
1/2	1/2	2	4	57589	90476	90486	90496
5/8	5/8	2 1/4	5	57591	90477	90487	90497
3/4	3/4	2 1/4	5	57593	90478	90488	90498
1	1	2 1/4	5	57595	90479	90489	90499

## List No. 5952 Extra Long Length

DIA.	SHANK		OAL	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
	DIA.	LOC		EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	1/8	1	3	58608	90500	90510	90520
3/16	3/16	1 1/8	3	58612	90501	90511	90521
1/4	1/4	1 1/2	4	58616	90502	90512	90522
5/16	5/16	1 5/8	4	58620	90503	90513	90523
3/8	3/8	1 3/4	4	58624	90504	90514	90524
7/16	7/16	3	6	58628	90505	90515	90525
1/2	1/2	3	6	58632	90506	90516	90526
5/8	5/8	3	6	58640	90507	90517	90527
3/4	3/4	3	6	58648	90508	90518	90528
1	1	3	6	58664	90509	90519	90529

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

Micrograin Carbide - Center Cutting  
30° Helix Angle

**2-Flute** end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Fraise cylindrique deux tailles à bout hémisphérique au carbure  
cortador vertical con punta esférica de carburo



List No. 5963

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

#### TOLERANCES

All Sizes +.000mm/-.051mm  
Shank Dia. +000mm/-.013mm

#### STANDARD PACKAGE

All sizes - 1 each

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TIALN COATED EDP NO.
1 mm	3 mm	3 mm	39 mm	59400	90540	90560	90580
1.5 mm	3 mm	5 mm	39 mm	59401	90541	90561	90581
2 mm	3 mm	7 mm	39 mm	59402	90542	90562	90582
2.5 mm	3 mm	7 mm	39 mm	59403	90543	90563	90583
3 mm	3 mm	9 mm	39 mm	59404	90544	90564	90584
3.5 mm	4 mm	12 mm	51 mm	59405	90545	90565	90585
4 mm	4 mm	14 mm	51 mm	59406	90546	90566	90586
4.5 mm	5 mm	14 mm	51 mm	59407	90547	90567	90587
5 mm	5 mm	16 mm	51 mm	59408	90548	90568	90588
6 mm	6 mm	19 mm	64 mm	59409	90549	90569	90589
7 mm	8 mm	19 mm	64 mm	59410	90550	90570	90590
8 mm	8 mm	21 mm	64 mm	59411	90551	90571	90591
9 mm	10 mm	22 mm	70 mm	59412	90552	90572	90592
10 mm	10 mm	22 mm	70 mm	59413	90553	90573	90593
11 mm	11 mm	25 mm	70 mm	59414	90554	90574	90594
12 mm	12 mm	25 mm	76 mm	59415	90555	90575	90595
14 mm	14 mm	31 mm	89 mm	59417	90556	90576	90596
16 mm	16 mm	32 mm	89 mm	59418	90557	90577	90597
18 mm	18 mm	35 mm	102 mm	59419	90558	90578	90598
20 mm	20 mm	38 mm	102 mm	59420	90559	90579	90599
22 mm	22 mm	38 mm	102 mm	59421*	—	—	—
25 mm	25 mm	38 mm	102 mm	59422*	—	—	—

\* Available While Supplies Last

Speeds & Feeds:  
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# Solid Carbide 2-Flute Stub Length Ball Nose Double End Mills

Micrograin Carbide - Center Cutting  
30° Helix Angle

#### TOLERANCES

Size to 1/4" +.000 - .002  
9/32" to 1" +.000 - .003  
Shank Dia. +.0000 - .0005

#### STANDARD PACKAGE

All sizes - 1 each

Fraise cylindrique deux tailles à bout hémisphérique au carbure  
cortador vertical con punta esférica de carburo



List No. 5948

**2-Flute** end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

DIA.	SHANK DIA.	LOC	OAL	UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TIALN COATED EDP NO.
1/16	1/8	1/8	1 1/2	58304	90600	90611	90622
3/32	1/8	3/16	1 1/2	58306	90601	90612	90623
1/8	1/8	1/4	1 1/2	58308	90602	90613	90624
5/32	3/16	5/16	2	58310	90603	90614	90625
3/16	3/16	3/8	2	58312	90604	90615	90626
7/32	1/4	1/2	2 1/2	58314	90605	90616	90627
1/4	1/4	1/2	2 1/2	58316	90606	90617	90628
5/16	5/16	1/2	2 1/2	58320	90607	90618	90629
3/8	3/8	9/16	3	58324	90608	90619	90630
7/16	7/16	9/16	3	58328	90609	90620	90631
1/2	1/2	5/8	3	58332	90610	90621	90632



# Solid Carbide

## 4-Flute

### Single End Mills

Fraise à queue à rainurer au carbure

cortador vertical de carburo



List No. 5943 Regular Length



List No. 5955 Long Length



List No. 5951 Extra Long Length

#### Micrograin Carbide - Center Cutting

#### 30° Helix Angle

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Center Cutting** end allows for plunge cutting like a drill into solid material.

#### TOLERANCES

Size to 1/4" +.000 - .002  
 9/32" to 1" +.000 - .003  
 Shank Dia. +.0000 - .0005

#### List No. 5943 Regular Length

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TIALN COATED EDP NO.
	DIA.	LOC	OAL				
1/64	1/8	3/64	1 1/2	57901	90699	—	90696
1/32	1/8	1/8	1 1/2	57902	90700	—	90697
3/64	1/8	1/8	1 1/2	57903	90701	—	90698
1/16	1/8	3/16	1 1/2	57904	90702	90739	90776
5/64	1/8	3/16	1 1/2	57905	90703	90740	90777
3/32	1/8	3/8	1 1/2	57906	90704	90741	90778
7/64	1/8	3/8	1 1/2	57907	90705	90742	90779
1/8	1/8	1/2	1 1/2	57908	90706	90743	90780
9/64	3/16	9/16	2	57909	90707	90744	90781
5/32	3/16	9/16	2	57910	90708	90745	90782
11/64	3/16	5/8	2	57911	90709	90746	90783
3/16	3/16	5/8	2	57912	90710	90747	90784
13/64	1/4	5/8	2 1/2	57913	90711	90748	90785
7/32	1/4	5/8	2 1/2	57914	90712	90749	90786
1/4	1/4	3/4	2 1/2	57916	90714	90751	90788
9/32	5/16	3/4	2 1/2	57918	90716	90753	90790
5/16	5/16	13/16	2 1/2	57920	90718	90755	90792
3/8	3/8	7/8	2 1/2	57924	90722	90759	90796
7/16	7/16	7/8	2 1/2	57928	90726	90763	90800
1/2	1/2	1	3	57932	90730	90767	90804
9/16	9/16	1 1/4	3 1/2	57936	90731	90768	90805
5/8	5/8	1 1/4	3 1/2	57940	90732	90769	90806
11/16	3/4	1 1/2	4	57944	90733	90770	90807
3/4	3/4	1 1/2	4	57948	90734	90771	90808
7/8	7/8	1 1/2	4	57956	90735	90772	90809
1	1	1 1/2	4	57964	90736	90773	90810

#### List No. 5955 Long Length

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TIALN COATED EDP NO.
	DIA.	LOC	OAL				
1/8	1/8	3/4	2 1/4	58138	90820	90830	90840
3/16	3/16	3/4	2 1/2	58139	90821	90831	90841
1/4	1/4	1 1/8	3	58141	90822	90832	90842
5/16	5/16	1 1/8	3	58150	90823	90833	90843
3/8	3/8	1 1/8	3	58154	90824	90834	90844
7/16	7/16	2	4	58158	90825	90835	90845
1/2	1/2	2	4	58162	90826	90836	90846
5/8	5/8	2 1/4	5	58170	90827	90837	90847
3/4	3/4	2 1/4	5	58178	90828	90838	90848
1	1	2 1/4	5	58194	90829	90839	90849

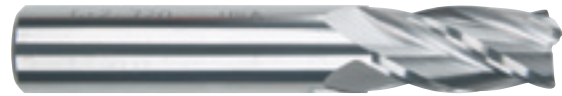
#### List No. 5951 Extra Long Length

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TIALN COATED EDP NO.
	DIA.	LOC	OAL				
1/8	1/8	1	3	58508	90860	90870	90880
3/16	3/16	1 1/8	3	58512	90861	90871	90881
1/4	1/4	1 1/2	4	58516	90862	90872	90882
5/16	5/16	1 5/8	4	58520	90863	90873	90883
3/8	3/8	1 3/4	4	58524	90864	90874	90884
7/16	7/16	3	6	58528	90865	90875	90885
1/2	1/2	3	6	58532	90866	90876	90886
5/8	5/8	3	6	58540	90867	90877	90887
3/4	3/4	3	6	58548	90868	90878	90888
1	1	3	6	58564	90869	90879	90889

# Solid Carbide Metric 4-Flute Single End Mills

Fraise à queue à rainurer au carbure

cortador vertical de carburo



List No. 5961

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Micrograin Carbide  
Center Cutting  
30° Helix Angle

**TOLERANCE**

All Sizes +.000mm/-.051mm  
Shank Dia. +.000mm/-.013mm

DIA.	SHANK DIA.	LOC	OAL	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
1 mm	3 mm	3 mm	39 mm	59310	90900	90920	90940
1.5 mm	3 mm	5 mm	39 mm	59311	90901	90921	90941
2 mm	3 mm	7 mm	39 mm	59312	90902	90922	90942
2.5 mm	3 mm	7 mm	39 mm	59313	90903	90923	90943
3 mm	3 mm	9 mm	39 mm	59314	90904	90924	90944
3.5 mm	4 mm	12 mm	51 mm	59315	90905	90925	90945
4 mm	4 mm	14 mm	51 mm	59316	90906	90926	90946
4.5 mm	5 mm	14 mm	51 mm	59317	90907	90927	90947
5 mm	5 mm	16 mm	51 mm	59318	90908	90928	90948
6 mm	6 mm	19 mm	64 mm	59319	90909	90929	90949
7 mm	8 mm	19 mm	64 mm	59320	90910	90930	90950
8 mm	8 mm	21 mm	64 mm	59321	90911	90931	90951
9 mm	10 mm	22 mm	70 mm	59322	90912	90932	90952
10 mm	10 mm	22 mm	70 mm	59323	90913	90933	90953
11 mm	11 mm	25 mm	70 mm	59324	90914	90934	90954
12 mm	12 mm	25 mm	76 mm	59325	90915	90935	90955
14 mm	14 mm	31 mm	89 mm	59327	90916	90936	90956
16 mm	16 mm	32 mm	89 mm	59328	90917	90937	90957
18 mm	18 mm	35 mm	102 mm	59329	90918	90938	90958
20 mm	20 mm	38 mm	102 mm	59330	90919	90939	90959

# Solid Carbide 4-Flute Double End Mills

Fraise à queue à rainurer au carbure

cortador vertical de carburo

Speeds & Feeds:  
Page 54



List No. 5946 Stub Length

Micrograin Carbide - Center Cutting  
30° Helix Angle

STANDARD PACKAGE  
All sizes - 1 each



List No. 5895 Regular Length

List No. 5946 Stub Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/16	1/8	1/8	1 1/2	57270	91000	91011	91022
3/32	1/8	3/16	1 1/2	57271	91001	91012	91023
1/8	1/8	1/4	1 1/2	57272	91002	91013	91024
5/32	3/16	5/16	2	57273	91003	91014	91025
3/16	3/16	3/8	2	57274	91004	91015	91026
7/32	1/4	1/2	2 1/2	57275	91005	91016	91027
1/4	1/4	1/2	2 1/2	57276	91006	91017	91028
5/16	5/16	1/2	2 1/2	57277	91007	91018	91029
3/8	3/8	9/16	3	57278	91008	91019	91030
7/16	7/16	9/16	3	57279	91009	91020	91031
1/2	1/2	5/8	3	57280	91010	91021	91032

List No. 5895 Regular Length

DIA.	SHANK DIA.	LOC	OAL	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	3/8	3/8	3 1/8	57108	91050	91060	91070
5/32	3/8	7/16	3 1/8	57110	91051	91061	91071
3/16	3/8	1/2	3 1/4	57112	91052	91062	91072
7/32	3/8	9/16	3 3/8	57114	91053	91063	91073
1/4	3/8	5/8	3 3/8	57116	91054	91064	91074
9/32	3/8	1 1/16	3 3/8	57118	91055	91065	91075
5/16	3/8	3/4	3 1/2	57120	91056	91066	91076
3/8	3/8	3/4	3 1/2	57124	91057	91067	91077
7/16	7/16	7/8	4	57128	91058	91068	91078
1/2	1/2	1	4	57132	91059	91069	91079

# Solid Carbide

## 4-Flute Ball Nose

### Single End Mills

Micrograin Carbide - Center Cutting  
30° Helix Angle

4-Flute end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

#### List No. 5942 Regular Length

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TIALN COATED EDP NO.
	DIA.	LOC	OAL				
1/64	1/8	3/64	1 1/2	58201	91097	—	91094
1/32	1/8	1/8	1 1/2	58202	91098	—	91095
3/64	1/8	1/8	1 1/2	58203	91099	—	91096
1/16	1/8	3/16	1 1/2	58204	91100	91123	91146
5/64	1/8	3/16	1 1/2	58205	91101	91124	91147
3/32	1/8	3/8	1 1/2	58206	91102	91125	91148
7/64	1/8	3/8	1 1/2	58207	91103	91126	91149
1/8	1/8	1/2	1 1/2	58208	91104	91127	91150
9/64	3/16	9/16	2	58209	91105	91128	91151
5/32	3/16	9/16	2	58210	91106	91129	91152
11/64	3/16	5/8	2	58211	91107	91130	91153
3/16	3/16	5/8	2	58212	91108	91131	91154
13/64	1/4	5/8	2 1/2	58213	91109	91132	91155
7/32	1/4	5/8	2 1/2	58214	91110	91133	91156
1/4	1/4	3/4	2 1/2	58216	91111	91134	91157
9/32	5/16	3/4	2 1/2	58218	91112	91135	91158
5/16	5/16	13/16	2 1/2	58220	91113	91136	91159
3/8	3/8	7/8"	2 1/2	58222	91114	91137	91160
7/16	7/16	1	2 3/4	58228	91115	91138	91161
1/2	1/2	1	3	58232	91116	91139	91162
9/16	9/16	1 1/4	3 1/2	58236	91117	91140	91163
5/8	5/8	1 1/4	3 1/2	58240	91118	91141	91164
11/16	3/4	1 1/2	4	58244	91119	91142	91165
3/4	3/4	1 1/2	4	58248	91120	91143	91166
7/8	7/8	1 1/2	4	58256	91121	91144	91167
1	1	1 1/2	4	58264	91122	91145	91168

#### List No. 5957 Long Length

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TIALN COATED EDP NO.
	DIA.	LOC	OAL				
1/8	1/8	3/4	2 1/4	58838	91170	91180	91190
3/16	3/16	3/4	2 1/2	58840	91171	91181	91191
1/4	1/4	1 1/8	3	58844	91172	91182	91192
5/16	5/16	1 1/8	3	58850	91173	91183	91193
3/8	3/8	1 1/8	3	58854	91174	91184	91194
7/16	7/16	2	4	58858	91175	91185	91195
1/2	1/2	2	4	58862	91176	91186	91196
5/8	5/8	2 1/4	5	58870	91177	91187	91197
3/4	3/4	2 1/4	5	58878	91178	91188	91198
1	1	2 1/4	5	58894	91179	91189	91199

#### List No. 5953 Extra Long Length

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TIALN COATED EDP NO.
	DIA.	LOC	OAL				
1/8	1/8	1	3	58708	91200	91210	91220
3/16	3/16	1 1/8	3	58712	91201	91211	91221
1/4	1/4	1 1/2	4	58716	91202	91212	91222
5/16	5/16	1 5/8	4	58720	91203	91213	91223
3/8	3/8	1 3/4	4	58724	91204	91214	91224
7/16	7/16	3	6	58728	91205	91215	91225
1/2	1/2	3	6	58732	91206	91216	91226
5/8	5/8	3	6	58740	91207	91217	91227
3/4	3/4	3	6	58748	91208	91218	91228
1	1	3	6	58764	91209	91219	91229

Fraise cylindrique deux tailles à bout hémisphérique au carbure

cortador vertical con punta esférica de carburo



List No. 5942 Regular Length



List No. 5957 Long Length



List No. 5953 Extra Long Length

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

Micrograin Carbide - Center Cutting  
30° Helix Angle

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

Fraise cylindrique deux tailles à bout hémisphérique au carbure  
cortador vertical con punta esférica de carburo



List No. 5965

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

**TOLERANCE**

All Sizes +.000mm/-.051mm

Shank Dia. +.000mm/-.013mm

**STANDARD PACKAGE**

All sizes - 1 each

DIA.	SHANK DIA.	LOC	OAL	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
1 mm	3 mm	3 mm	39 mm	59440	91240	91260	91280
1.5 mm	3 mm	5 mm	39 mm	59441	91241	91261	91281
2 mm	3 mm	7 mm	39 mm	59442	91242	91262	91282
2.5 mm	3 mm	7 mm	39 mm	59443	91243	91263	91283
3 mm	3 mm	9 mm	39 mm	59444	91244	91264	91284
3.5 mm	4 mm	12 mm	51 mm	59445	91245	91265	91285
4 mm	4 mm	14 mm	51 mm	59446	91246	91266	91286
4.5 mm	5 mm	14 mm	51 mm	59447	91247	91267	91287
5 mm	5 mm	16 mm	51 mm	59448	91248	91268	91288
6 mm	6 mm	19 mm	64 mm	59449	91249	91269	91289
7 mm	8 mm	19 mm	64 mm	59450	91250	91270	91290
8 mm	8 mm	21 mm	64 mm	59451	91251	91271	91291
9 mm	10 mm	22 mm	70 mm	59452	91252	91272	91292
10 mm	10 mm	22 mm	70 mm	59453	91253	91273	91293
11 mm	11 mm	25 mm	70 mm	59454	91254	91274	91294
12 mm	12 mm	25 mm	76 mm	59455	91255	91275	91295
14 mm	14 mm	31 mm	89 mm	59457	91256	91276	91296
16 mm	16 mm	32 mm	89 mm	59458	91257	91277	91297
18 mm	18 mm	35 mm	102 mm	59459	91258	91278	91298
20 mm	20 mm	38 mm	102 mm	59460	91259	91279	91299
25 mm	25 mm	38 mm	102 mm	59462*	—	—	—

\* Available While Supplies Last

# Solid Carbide 4-Flute Stub Length Ball Nose Double End Mills

Micrograin Carbide - Center Cutting  
30° Helix Angle

**TOLERANCES**

Size to 1/4" +.000 - .002

9/32" to 1" +.000 - .003

Shank Dia. +.0000 - .0005

**STANDARD PACKAGE**

All sizes - 1 each

Fraise cylindrique deux tailles à bout hémisphérique au carbure  
cortador vertical con punta esférica de carburo



List No. 5949

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish. **Ball Nose** mills are recommended for milling die cavities, fillets, radius bottom slots and special contours. **Center Cutting** end allows for plunge cutting like a drill into solid material.

DIA.	SHANK DIA.	LOC	OAL	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/16	1/8	1/8	1 1/2	58354	91300	91311	91322
3/32	1/8	3/16	1 1/2	58356	91301	91312	91323
1/8	1/8	1/4	1 1/2	58358	91302	91313	91324
5/32	3/16	5/16	2	58360	91303	91314	91325
3/16	3/16	3/8	2	58362	91304	91315	91326
7/32	1/4	1/2	2 1/2	58364	91305	91316	91327
1/4	1/4	1/2	2 1/2	58366	91306	91317	91328
5/16	5/16	1/2	2 1/2	58370	91307	91318	91329
3/8	3/8	9/16	3	58374	91308	91319	91330
7/16	7/16	9/16	3	58378	91309	91320	91331
1/2	1/2	5/8	3	58382	91310	91321	91332

# Solid Carbide Corner Radius Single End Mills

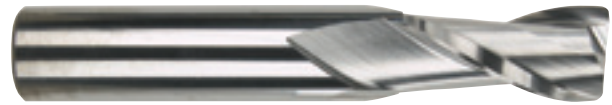
Micrograin Carbide - Center Cutting  
30° Helix Angle

**Corner Radius** strengthens the end mill corners to minimize chipping especially in tougher milling applications. **Corner Radius** also used when the finished part requires a radius.

**2-Flute** end mills provide increased chip capacity for higher feed rates. Recommended for easy-to-machine materials including low alloy steels, non-ferrous materials and cast iron.

**4-Flute** end mills with a greater core thickness offer increased tool strength and reduced tool deflection. 4-Flutes also reduce chip load per tooth for the milling of tougher materials, greater wear resistance and improved surface finish.

Fraise à queue à rainurer de rayon de bec au carbure  
cortador vertical con radio de esquina de carburo



List No. 5967 2-Flute



List No. 5968 4-Flute

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance, and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

Speeds & Feeds: Page 54

#### TOLERANCES

Size to 1/4" +.000 - .002  
5/16" to 1" +.000 - .003  
Shank Dia. +.0000 - .0005

#### STANDARD PACKAGE

All sizes - 1 each

## List No. 5967 2-Flute

DIA.	SHANK		CORNER RADIUS	UNCOATED	TIN COATED	TICN COATED	TIALN COATED	
	DIA.	LOC		EDP NO.	EDP NO.	EDP NO.	EDP NO.	
1/8	1/8	1/2	1 1/2	.020	58910	94830	94875	94920
3/16	3/16	5/8	2	.020	58913	94833	94878	94923
3/16	3/16	5/8	2	.030	58914	94834	94879	94924
1/4	1/4	3/4	2 1/2	.020	58916	94836	94881	94926
1/4	1/4	3/4	2 1/2	.030	58917	94837	94882	94927
5/16	5/16	13/16	2 1/2	.020	58920	94840	94885	94930
5/16	5/16	13/16	2 1/2	.030	58921	94841	94886	94931
3/8	3/8	1	2 1/2	.020	58924	94844	94889	94934
3/8	3/8	1	2 1/2	.030	58925	94845	94890	94935
1/2	1/2	1	3	.020	58929	94849	94894	94939
1/2	1/2	1	3	.030	58930	94850	94895	94940
1/2	1/2	1	3	.060	58932	94852	94897	94942
5/8	5/8	1 1/4	3 1/2	.020	58936	94856	94901	94946
5/8	5/8	1 1/4	3 1/2	.030	58937	94857	94902	94947
5/8	5/8	1 1/4	3 1/2	.060	58939	94859	94904	94949
5/8	5/8	1 1/4	3 1/2	.090	58940	94860	94905	94950
3/4	3/4	1 1/2	4	.020	58942	94862	94907	94952
3/4	3/4	1 1/2	4	.030	58943	94863	94908	94953
3/4	3/4	1 1/2	4	.060	58945	94865	94910	94955
3/4	3/4	1 1/2	4	.090	58946	94866	94911	94956
3/4	3/4	1 1/2	4	.125	58947	94867	94912	94957
1	1	1 1/2	4	.020	58949	94869	94914	94959
1	1	1 1/2	4	.030	58950	94870	94915	94960
1	1	1 1/2	4	.060	58952	94872	94917	94962
1	1	1 1/2	4	.090	58953	94873	94918	94963
1	1	1 1/2	4	.125	58954	94874	94919	94964

# Solid Carbide Corner Radius Single End Mills

Fraise à queue à rainurer de rayon de bec au carbure

cortador vertical con radio de esquina de carburo

## List No. 5968 4-Flute

DIA.	SHANK		OAL	CORNER RADIUS	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
	DIA.	LOC			EDP NO.	EDP NO.	EDP NO.	EDP NO.
1/8	1/8	1/2	1 1/2	.020	59000	94965	95010	95055
3/16	3/16	5/8	2	.020	59003	94968	95013	95058
3/16	3/16	5/8	2	.030	59004	94969	95014	95059
1/4	1/4	3/4	2 1/2	.020	59006	94971	95016	95061
1/4	1/4	3/4	2 1/2	.030	59007	94972	95017	95062
5/16	5/16	13/16	2 1/2	.020	59010	94975	95020	95065
5/16	5/16	13/16	2 1/2	.030	59011	94976	95021	95066
3/8	3/8	1	2 1/2	.020	59014	94979	95024	95069
3/8	3/8	1	2 1/2	.030	59015	94980	95025	95070
1/2	1/2	1	3	.020	59019	94984	95029	95074
1/2	1/2	1	3	.030	59020	94985	95030	95075
1/2	1/2	1	3	.060	59022	94987	95032	95077
5/8	5/8	1 1/4	3 1/2	.020	59026	94991	95036	95081
5/8	5/8	1 1/4	3 1/2	.030	59027	94992	95037	95082
5/8	5/8	1 1/4	3 1/2	.060	59029	94994	95039	95084
5/8	5/8	1 1/4	3 1/2	.090	59030	94995	95040	95085
3/4	3/4	1 1/2	4	.020	59032	94997	95042	95087
3/4	3/4	1 1/2	4	.030	59033	94998	95043	95088
3/4	3/4	1 1/2	4	.060	59035	95000	95045	95090
3/4	3/4	1 1/2	4	.090	59036	95001	95046	95091
3/4	3/4	1 1/2	4	.125	59037	95002	95047	95092
1	1	1 1/2	4	.020	59039	95004	95049	95094
1	1	1 1/2	4	.030	59040	95005	95050	95095
1	1	1 1/2	4	.060	59042	95007	95052	95097
1	1	1 1/2	4	.090	59043	95008	95053	95098
1	1	1 1/2	4	.125	59044	95009	95054	95099

## TOOL COATINGS

**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.

### TiN – Titanium Nitride

A good general purpose coating for a wide range of ferrous materials. Not recommended for non-ferrous materials. Has higher heat resistance than TiCN coating.

### TiCN – Titanium Carbonitride

Enhanced toughness, hardness & wear resistance for aggressive speeds & feeds. Recommended for difficult-to-machine, gummy & abrasive materials where moderate cutting temperatures are generated.

### TiALN – Titanium Aluminum Nitride

### ALTiN – Aluminum Titanium Nitride

Excellent all around coatings featuring high heat resistance. Recommended for high thermal stress applications including dry machining, abrasive materials and hard-to-machine materials that generate higher cutting temperatures. ALTiN has higher AL content for increased hardness & heat resistance.

### CrN – Chromium Nitride

### CrC – Chromium Carbide

Especially recommended for titanium and non-ferrous materials including aluminum, copper & brass. CrC has slightly higher hardness than CrN. These coatings resist adhesion of the material being machined and resist chipping and cracking.

### DLC – Diamond Like Carbon

A thin carbon based amorphous (non-crystalline) coating featuring very high hardness & low coefficient of friction. Highly recommended for non-ferrous materials including plastic, aluminum, copper & brass. Typically used on solid carbide tools.



# CARBIDE DRILL-MILL™

2-Flute & 4-Flute

**Micrograin Carbide • 30° Right Hand Helix**

**DRILL-MILL performs** drilling, spotting, countersinking, chamfering, slotting, side milling, profile milling, "V" grooving and other drilling & milling operations with the same tool in vertical milling machine applications.

**Solid Carbide** offers excellent hardness, wear resistance and heat resistance for higher cutting speeds and longer tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

**TOLERANCE** +.000 - .002

Fraise de forage au carbure Broca fresadora de carburo



List No. 5989 - 2-Flute



List No. 5989 - 4-Flute

**STANDARD PACKAGE** All sizes — 1 each

Speeds & Feeds: Page 54

## 2-Flute 90° Point Angle

DIA.	SHANK DIA.	LOC*	OAL*	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
				EDP NO.	EDP NO.	EDP NO.	EDP NO.
.030	1/8	.090	1 1/2	59055	—	—	95356
.045	1/8	.105	1 1/2	59056	—	—	95357
.060	1/8	.180	1 1/2	59057	—	—	95358
1/16	1/8	3/16	1 1/2	59058	—	—	95359
3/32	1/8	3/8	1 1/2	59059	—	—	95360
1/8	1/8	1/2	1 1/2	59060	95300	95320	95340
1/8**	1/8	1/2	1 1/2	59061	95301	95321	95341
3/16	3/16	5/8	2	59062	95302	95322	95342
3/16**	3/16	5/8	2	59063	95303	95323	95343
1/4	1/4	3/4	2 1/2	59064	95304	95324	95344
1/4**	1/4	3/4	2 1/2	59065	95305	95325	95345
5/16	5/16	13/16	2 1/2	59066	95306	95326	95346
5/16**	5/16	13/16	2 1/2	59067	95307	95327	95347
3/8	3/8	1	2 1/2	59068	95308	95328	95348
3/8**	3/8	1	2 1/2	59069	95309	95329	95349
7/16	7/16	1	2 3/4	59070	95310	95330	95350
1/2	1/2	1	3	59071	95311	95331	95351
1/2**	1/2	1	3	59072	95312	95332	95352
5/8	5/8	1 1/4	3 1/2	59073	95313	95333	95353
5/8**	5/8	1 1/4	3 1/2	59074	95314	95334	95354
3/4	3/4	1 1/2	4	59075	95315	95335	95355

\* Lengths include the conical cutting point

\*\* Features sharper point with a .005"/.008" tip diameter for "V" grooving where a sharper point is required. (Standard carbide Drill-Mills supplied with tip diameter of .030" or larger to provide strength.)

## 2-Flute 60° Point Angle

DIA.	SHANK DIA.	LOC*	OAL*	UNCOATED	TIALN COATED
				EDP NO.	EDP NO.
1/16	1/8	3/16	1 1/2	59076	95361
3/32	1/8	3/8	1 1/2	59077	95362
1/8	1/8	1/2	1 1/2	59078	95363
3/16	3/16	5/8	2	59079	95364
1/4	1/4	3/4	2 1/2	59080	95365
3/8	3/8	1	2 1/2	59081	95366
1/2	1/2	1	3	59082	95367
5/8	5/8	1 1/4	3 1/2	59083	95368
3/4	3/4	1 1/2	4	59084	95369

## 4-Flute 90° Point Angle

DIA.	SHANK DIA.	LOC*	OAL*	UNCOATED	TIALN COATED
				EDP NO.	EDP NO.
1/16	1/8	3/16	1 1/2	59085	95370
3/32	1/8	3/8	1 1/2	59086	95371
1/8	1/8	1/2	1 1/2	59087	95372
3/16	3/16	5/8	2	59088	95373
1/4	1/4	3/4	2 1/2	59089	95374
3/8	3/8	1	2 1/2	59090	95375
1/2	1/2	1	3	59091	95376
5/8	5/8	1 1/4	3 1/2	59092	95377
3/4	3/4	1 1/2	4	59093	95378

\* Lengths include the conical cutting point.

# Solid Carbide Miniature Decimal Size Stub Length Single End Mills

Fraise à queue à rainurer au carbure      cortador vertical de carburo

Micrograin Carbide - Center Cutting  
30° Helix Angle  
2-Flute & 4-Flute  
Square End & Ball Nose  
1/8" Shank Dia. • 1-1/2" OAL

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance, and long tool life.

Stub Length provides increased rigidity in shallow milling applications.

**Tool Coatings Also Available**



List No. 5906 — 2-Flute Square End



List No. 5907 — 2-Flute Ball Nose



List No. 5908 — 4-Flute Square End



List No. 5909 — 4-Flute Ball Nose

#### TOLERANCES

Dia.                    +.0005 - .0005  
Shank Dia.         +.0000 - .0003

DIA.	SHANK DIA.	LOC	OAL	LIST 5906 2-FLUTE SQUARE EDP NO.	LIST 5907 2-FLUTE BALL NOSE EDP NO.	LIST 5908 4-FLUTE SQUARE EDP NO.	LIST 5909 4-FLUTE BALL NOSE EDP NO.
.010	1/8	.015	1-1/2	52430	52455	52480	52505
.015	1/8	.023	1-1/2	52431	52456	52481	52506
.020	1/8	.030	1-1/2	52432	52457	52482	52507
.025	1/8	.038	1-1/2	52433	52458	52483	52508
.030	1/8	.045	1-1/2	52434	52459	52484	52509
.035	1/8	.053	1-1/2	52435	52460	52485	52510
.040	1/8	.060	1-1/2	52436	52461	52486	52511
.045	1/8	.068	1-1/2	52437	52462	52487	52512
.050	1/8	.075	1-1/2	52438	52463	52488	52513
.055	1/8	.083	1-1/2	52439	52464	52489	52514
.060	1/8	.090	1-1/2	52440	52465	52490	52515
.065	1/8	.098	1-1/2	52441	52466	52491	52516
.070	1/8	.105	1-1/2	52442	52467	52492	52517
.075	1/8	.113	1-1/2	52443	52468	52493	52518
.080	1/8	.120	1-1/2	52444	52469	52494	52519
.085	1/8	.128	1-1/2	52445	52470	52495	52520
.090	1/8	.135	1-1/2	52446	52471	52496	52521
.095	1/8	.143	1-1/2	52447	52472	52497	52522
.100	1/8	.150	1-1/2	52448	52473	52498	52523
.105	1/8	.158	1-1/2	52449	52474	52499	52524
.110	1/8	.165	1-1/2	52450	52475	52500	52525
.115	1/8	.173	1-1/2	52451	52476	52501	52526
.120	1/8	.180	1-1/2	52452	52477	52502	52527

**MORSE®  
Modifications  
& Specials**

Complete Tool Design  
And Manufacturing Services  
From Blueprint Specials to  
Modified Regulars

# Solid Carbide

## Miniature Decimal Size

### Regular Length

### Single End Mills

Fraise à queue à rainurer au carbure

cortador vertical de carburo

Micrograin Carbide - Center Cutting

30° Helix Angle

2-Flute &amp; 4-Flute

Square End &amp; Ball Nose

1/8" Shank Dia. • 1-1/2" OAL

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance, and long tool life.

**TOLERANCES**

Dia. +.0005 - .0005

Shank Dia. +.0000 - .0003



List No. 5910 — 2-Flute Square End



List No. 5911 — 2-Flute Ball Nose



List No. 5912 — 4-Flute Square End



List No. 5913 — 4-Flute Ball Nose

DIA.	SHANK DIA.	LOC	OAL	LIST 5910 2-FLUTE SQUARE EDP NO.	LIST 5911 2-FLUTE BALL NOSE EDP NO.	LIST 5912 4-FLUTE SQUARE EDP NO.	LIST 5913 4-FLUTE BALL NOSE EDP NO.
.005	1/8	.015	1-1/2	52530	—	52680	—
.006	1/8	.018	1-1/2	52531	—	52681	—
.007	1/8	.021	1-1/2	52532	—	52682	—
.008	1/8	.024	1-1/2	52533	—	52683	—
.009	1/8	.027	1-1/2	52534	—	52684	—
.010	1/8	.030	1-1/2	52535	52610	52685	52760
.011	1/8	.033	1-1/2	52536	52611	52686	52761
.012	1/8	.036	1-1/2	52537	52612	52687	52762
.013	1/8	.039	1-1/2	52538	52613	52688	52763
.014	1/8	.042	1-1/2	52539	52614	52689	52764
.015	1/8	.045	1-1/2	52540	52615	52690	52765
.016	1/8	.048	1-1/2	52541	52616	52691	52766
.017	1/8	.051	1-1/2	52542	52617	52692	52767
.018	1/8	.054	1-1/2	52543	52618	52693	52768
.019	1/8	.057	1-1/2	52544	52619	52694	52769
.020	1/8	.060	1-1/2	52545	52620	52695	52770
.021	1/8	.063	1-1/2	52546	52621	52696	52771
.022	1/8	.066	1-1/2	52547	52622	52697	52772
.023	1/8	.069	1-1/2	52548	52623	52698	52773
.024	1/8	.072	1-1/2	52549	52624	52699	52774
.025	1/8	.075	1-1/2	52550	52625	52700	52775
.026	1/8	.078	1-1/2	52551	52626	52701	52776
.027	1/8	.081	1-1/2	52552	52627	52702	52777
.028	1/8	.084	1-1/2	52553	52628	52703	52778
.029	1/8	.087	1-1/2	52554	52629	52704	52779
.030	1/8	.090	1-1/2	52555	52630	52705	52780
.031	1/8	.093	1-1/2	52556	52631	52706	52781
.032	1/8	.096	1-1/2	52557	52632	52707	52782
.033	1/8	.099	1-1/2	52558	52633	52708	52783
.034	1/8	.102	1-1/2	52559	52634	52709	52784
.035	1/8	.105	1-1/2	52560	52635	52710	52785
.036	1/8	.108	1-1/2	52561	52636	52711	52786
.037	1/8	.111	1-1/2	52562	52637	52712	52787
.038	1/8	.114	1-1/2	52563	52638	52713	52788
.039	1/8	.117	1-1/2	52564	52639	52714	52789

Tool Coatings Also Available

(continued)

# Solid Carbide Miniature Decimal Size Regular Length Single End Mills

Fraise à queue à rainurer au carbure

cortador vertical de carburo

Micrograin Carbide - Center Cutting

30° Helix Angle

2-Flute & 4-Flute

Square End & Ball Nose

1/8" Shank Dia. • 1-1/2" OAL

Solid Carbide offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance, and long tool life.

## TOLERANCES

Dia. +.0005 - .0005

Shank Dia. +.0000 - .0003

(continued)



List No. 5910 — 2-Flute Square End



List No. 5911 — 2-Flute Ball Nose



List No. 5912 — 4-Flute Square End



List No. 5913 — 4-Flute Ball Nose

DIA.	SHANK DIA.	LOC	OAL	LIST 5910 2-FLUTE SQUARE EDP NO.	LIST 5911 2-FLUTE BALL NOSE EDP NO.	LIST 5912 4-FLUTE SQUARE EDP NO.	LIST 5913 4-FLUTE BALL NOSE EDP NO.
.040	1/8	.120	1-1/2	52565	52640	52715	52790
.041	1/8	.123	1-1/2	52566	52641	52716	52791
.042	1/8	.126	1-1/2	52567	52642	52717	52792
.043	1/8	.129	1-1/2	52568	52643	52718	52793
.044	1/8	.132	1-1/2	52569	52644	52719	52794
.045	1/8	.135	1-1/2	52570	52645	52720	52795
.046	1/8	.138	1-1/2	52571	52646	52721	52796
.047	1/8	.141	1-1/2	52572	52647	52722	52797
.048	1/8	.144	1-1/2	52573	52648	52723	52798
.049	1/8	.147	1-1/2	52574	52649	52724	52799
.050	1/8	.150	1-1/2	52575	52650	52725	52800
.051	1/8	.153	1-1/2	52576	52651	52726	52801
.052	1/8	.156	1-1/2	52577	52652	52727	52802
.053	1/8	.159	1-1/2	52578	52653	52728	52803
.054	1/8	.162	1-1/2	52579	52654	52729	52804
.055	1/8	.165	1-1/2	52580	52655	52730	52805
.056	1/8	.168	1-1/2	52581	52656	52731	52806
.057	1/8	.171	1-1/2	52582	52657	52732	52807
.058	1/8	.174	1-1/2	52583	52658	52733	52808
.059	1/8	.177	1-1/2	52584	52659	52734	52809
.060	1/8	.180	1-1/2	52585	52660	52735	52810
.061	1/8	.183	1-1/2	52586	52661	52736	52811
.062	1/8	.186	1-1/2	52587	52662	52737	52812
.063	1/8	.189	1-1/2	52588	52663	52738	52813
.064	1/8	.192	1-1/2	52589	52664	52739	52814
.065	1/8	.195	1-1/2	52590	52665	52740	52815
.070	1/8	.210	1-1/2	52591	52666	52741	52816
.075	1/8	.225	1-1/2	52592	52667	52742	52817
.080	1/8	.240	1-1/2	52593	52668	52743	52818
.085	1/8	.255	1-1/2	52594	52669	52744	52819
.090	1/8	.270	1-1/2	52595	52670	52745	52820
.095	1/8	.285	1-1/2	52596	52671	52746	52821
.100	1/8	.300	1-1/2	52597	52672	52747	52822
.105	1/8	.315	1-1/2	52598	52673	52748	52823
.110	1/8	.330	1-1/2	52599	52674	52749	52824
.115	1/8	.345	1-1/2	52600	52675	52750	52825
.120	1/8	.360	1-1/2	52601	52676	52751	52826

## Solid Carbide 3-Flute 60° High Helix Single End Mills

Micrograin Carbide - Center Cutting  
30° Helix Angle

**3-Flute** end mills are a compromise between the chip capacity of 2-Flute mills and the strength and wear resistance of 4-Flute mills. **60° High Helix** angle keeps the cutting edges constantly engaged in the workpiece reducing cutting load variations. The result is a clean efficient cutting action with decreased cutting resistance, enhanced chip control, excellent surface finish and long tool life. Recommended for difficult-to-machine materials including stainless steels, alloy steels, titanium, inconel and other materials that generate high cutting forces. **Center Cutting** end allows for plunge cutting like a drill into solid material.

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TiCN COATED EDP NO.	TiAlN COATED EDP NO.
	DIA.	LOC	OAL				
1/4	1/4	3/4	2 1/2	57677	90640	90648	90656
5/16	5/16	13/16	2 1/2	57678	90641	90649	90657
3/8	3/8	7/8	2 1/2	57679	90642	90650	90658
7/16	7/16	1	2 3/4	57680	90643	90651	90659
1/2	1/2	1	3	57681	90644	90652	90660
5/8	5/8	1 1/4	3 1/2	57682	90645	90653	90661
3/4	3/4	1 1/2	4	57683	90646	90654	90662
1	1	1 1/2	4	57684	90647	90655	90663

Fraise à queue à rainurer à hélice serrée au carbure  
cortador vertical carburo con espiral rapida



List No. 5945

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

#### TOLERANCES

Size to 1/4" +.000 - .002  
9/32" to 1" +.000 - .003  
Shank Dia. +.0000 - .0005

#### STANDARD PACKAGE

All sizes - 1 each

## Solid Carbide Multi-Flute Roughing End Mills

Micrograin Carbide - Center Cutting  
30° Helix Angle

**Roughing** end mills feature a chip breaker type cutting edge for heavier cuts, higher speeds and feeds and greatly increased productivity. Recommended for a wide range of materials including mild steel, steel alloys, stainless steel, cast iron and many other applications. **Center Cutting** end allows for plunge cutting like a drill into solid material.

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance and long tool life. **Tool Coatings** further enhance milling performance in a wide range of applications.

DIA.	SHANK			NO. OF FLUTES	TiN COATED EDP NO.	TiCN COATED EDP NO.
	DIA.	LOC	OAL			
1/4	1/4	3/4	2 1/2	4	56760	56780
5/16	5/16	13/16	2 1/2	4	56761	56781
3/8	3/8	1	2 1/2	4	56762	56782
1/2	1/2	1 1/4	3	4	56764	56784
5/8	5/8	1 1/4	3 1/2	4	56765	56785
3/4	3/4	1 1/2	4	4	56766	56786
1	1	1 1/2	4	5	56767*	—

\* Available while supplies last

Fraise à queue à rainurer de dégrossissage au carbure  
cortador vertical de carburo para desbaste



List No. 5972G — TiN Coated

List No. 5972C — TiCN Coated

#### STANDARD PACKAGE

All sizes - 1 each

# Solid Carbide Roughing / Finishing Single End Mills

## Micrograin Carbide - Center Cutting 3-Flute & 4-Flute

Chipbreaker geometry permits high feed rates in roughing operations while producing a finish near that produced by standard end mills. Benefits include smaller more manageable chips and reduced cutting forces, chatter, deflection & horsepower required. Increased productivity with longer tool life. Recommended for aggressive milling in stainless steels, difficult-to-machine materials and wide range of other materials.

**Solid Carbide** offers higher cutting speeds, high rigidity, excellent hardness, wear resistance and heat resistance, and long tool life.

**Titanium Aluminum Nitride (TiAlN) Coating** is an excellent all around coating that increases surface hardness, wear resistance, heat resistance, chip flow and resist chip welding. Especially recommended for abrasive and hard-to-machine materials that generate higher cutting temperatures.

Fraise à queue à rainurer de dégrossissage et de finition au carbure  
cortador vertical de carburo para desbaste/acabado



List No. 5928 3-Flute Square End



List No. 5929 4-Flute Square End

Also Available  
in Ball Nose

Please inquire

### TOLERANCES

Dia. +.000 - .002  
Shank Dia. +.0000 - .0005

Fewer flutes provide increased chip capacity. Especially recommended for slotting & pocket milling applications.

## 3-Flute

DIA.	SHANK DIA.	LOC	OAL	LIST 5928 UNCOATED EDP NO.	LIST 5928T TiAlN COATED EDP NO.
1/8	1/8	1/2	1-1/2	57455	92350
3/16	3/16	5/8	2	57456	92351
1/4	1/4	3/4	2-1/2	57457	92352
5/16	5/16	13/16	2-1/2	57458	92353
3/8	3/8	1	2-1/2	57459	92354
7/16	7/16	1	2-3/4	57460	92355
1/2	1/2	1	3	57461	92356
5/8	5/8	1-1/4	3-1/2	57462	92357
3/4	3/4	1-1/2	4	57463	92358
1	1	1-1/2	4	57464	92359

## 4-Flute

DIA.	SHANK DIA.	LOC	OAL	LIST 5929 UNCOATED EDP NO.	LIST 5929T TiAlN COATED EDP NO.
1/8	1/8	1/2	1-1/2	57465	92360
3/16	3/16	5/8	2	57466	92361
1/4	1/4	3/4	2-1/2	57467	92362
5/16	5/16	13/16	2-1/2	57468	92363
3/8	3/8	1	2-1/2	57469	92364
7/16	7/16	1	2-3/4	57470	92365
1/2	1/2	1	3	57471	92366
5/8	5/8	1-1/4	3-1/2	57472	92367
3/4	3/4	1-1/2	4	57473	92368
1	1	1-1/2	4	57474	92369

Tool Coatings Also Available



# Solid Carbide End Mill

## Speed and Feed Recommendations

WORKPIECE MATERIAL	TYPE OF CUT	SURFACE SPEED (SFM)	FEED PER TOOTH BY END MILL DIAMETER				
			1/8"	1/4"	1/2"	3/4"	1"
Low Carbon Steel ≤ 40 Rc 1018, 12L12, 1108, 1213	Profile	275	0.0006	0.0012	0.0025	0.0037	0.0050
	Slot	220	0.0005	0.0010	0.0020	0.0030	0.0040
Medium Carbon Steel ≤ 40 Rc 1040, 1140, 4340, 8640	Profile	250	0.0006	0.0012	0.0025	0.0037	0.0050
	Slot	200	0.0005	0.0010	0.0020	0.0030	0.0040
Tool and Die Steels ≤ 40 Rc P20, A2, D2, H12	Profile	250	0.0006	0.0012	0.0025	0.0037	0.0050
	Slot	200	0.0005	0.0010	0.0020	0.0030	0.0040
Tool and Die Steels > 40 & ≤ 50 Rc P20, A2, D2, H12	Profile	200	0.0003	0.0007	0.0015	0.0022	0.0030
	Slot	160	0.0002	0.0006	0.0012	0.0018	0.0024
Free Machining Stainless Steels 303, 410, 416, 440F	Profile	250	0.0005	0.0010	0.0020	0.0030	0.0040
	Slot	200	0.0004	0.0008	0.0016	0.0024	0.0032
Moderate Machining Stainless Steels 304, 316	Profile	225	0.0003	0.0007	0.0015	0.0022	0.0030
	Slot	180	0.0002	0.0006	0.0012	0.0018	0.0024
Difficult Machining Stainless Steels 17-4PH, 316L, AM350	Profile	150	0.0002	0.0006	0.0012	0.0018	0.0024
	Slot	120	0.0002	0.0004	0.0010	0.0014	0.0019
Cast Iron Gray	Profile	300	0.0005	0.0010	0.0020	0.0030	0.0040
	Slot	240	0.0004	0.0008	0.0016	0.0024	0.0032
Cast Iron Ductile	Profile	250	0.0005	0.0010	0.0020	0.0030	0.0040
	Slot	200	0.0004	0.0008	0.0016	0.0024	0.0032
Cast Iron Malleable	Profile	200	0.0005	0.0011	0.0022	0.0033	0.0044
	Slot	160	0.0004	0.0009	0.0018	0.0026	0.0035
Titanium Alloys Ti-6Al-4V, ASTM B367 Grades C-3, C-4	Profile	125	0.0005	0.0010	0.0020	0.0040	0.0060
	Slot	100	0.0004	0.0008	0.0016	0.0032	0.0048
High Temperature Alloys Inconel, Hastelloy, Waspaloy	Profile	90	0.0005	0.0011	0.0022	0.0033	0.0044
	Slot	70	0.0004	0.0009	0.0018	0.0026	0.0035
Aluminum Alloys 2025, 6061, A140, 514.0	Profile	650	0.0010	0.0020	0.0040	0.0060	0.0080
	Slot	520	0.0008	0.0016	0.0032	0.0048	0.0064
Copper Alloys Brass and Bronze	Profile	300	0.0008	0.0015	0.0030	0.0047	0.0060
	Slot	240	0.0006	0.0012	0.0024	0.0038	0.0048
Composites & Plastics	Profile	375	0.0009	0.0018	0.0035	0.0055	0.0070
	Slot	300	0.0007	0.0014	0.0028	0.0044	0.0056
Magnesium Alloys AZ80A, HM12A, AM60A, ZE41A	Profile	450	0.0010	0.0020	0.0040	0.0060	0.0080
	Slot	360	0.0008	0.0016	0.0032	0.0048	0.0064
Graphite	Profile	450	0.0009	0.0018	0.0035	0.0055	0.0070
	Slot	360	0.0007	0.0014	0.0028	0.0044	0.0056

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 long and extra long tools reduce feed rates by 50%.

For TiN and TiCN coated tools, increase speed by up to 20% with the feed rate unchanged. For TiAlN coated tools, speeds may be increased by up to 50% with the feed rate unchanged.

# Carbide Burrs

## 1/4" Shank

### Single Cut

General Purpose—Recommended for steel, cast iron, ferrous materials. Offers good stock removal and smooth workpiece finish.

### Double Cut

For rapid stock removal in tough applications. Design reduces the pulling action, reduces size of chips, ensures rapid stock removal.

### Cylinder Shape No End Cut



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SNGL. CUT	DBL. CUT
1/8	SA-11	1/2	59715	59500
1/8	SA-12	5/8	59816	59501
5/32	SA-13	5/8	59817	59502
3/16	SA-14	5/8	59818	59503
1/4	SA-1	5/8	59716	59504
1/4	SA-1L	1	59717	59505
5/16	SA-2	3/4	59718	59506
3/8	SA-3	3/4	59719	59507
3/8	SA-3L	1	59720	59508
3/8	SA-3X	1 1/2	59819	59509
7/16	SA-4	1	59820	59510
1/2	SA-5	1	59721	59511
5/8	SA-6	1	59722	59512
3/4	SA-15	1/2	59821	59513
3/4	SA-16	3/4	59723	59516
3/4	SA-7	1	59822	59517
7/8	SA-8	1	59823	59518
1	SA-9	1	59824	59519

### Cylinder Shape End Cut



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SNGL. CUT	DBL. CUT
1/8	SB-11	1/2	59825	59875
1/8	SB-12	5/8	59826	59876
5/32	SB-13	5/8	59827	59877
3/16	SB-14	5/8	59828	59878
1/4	SB-1	5/8	59829	59879
1/4	SB-1L	1	59830	59880
5/16	SB-2	3/4	59831	59881
3/8	SB-3	3/4	59832	59882
3/8	SB-3L	1	59833	59883
3/8	SB-3X	1 1/2	59834	59884
7/16	SB-4	1	59835	59885
1/2	SB-5	1	59836	59886
5/8	SB-6	1	59837	59887
3/4	SB-15	1/2	59838	59888
3/4	SB-16	3/4	59839	59889
3/4	SB-7	1	59840	59890
7/8	SB-8	1	59841	59891
1	SB-9	1	59842	59892

Fraise rotative au carbure

Rebabeador de carburo

List No. 5970  
Single Cut



List No. 5970  
Double Cut



STANDARD PACKAGE All sizes — 1 each

### Cylinder Shape Radius End



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SNGL. CUT	DBL. CUT
1/8	SC-11	1/2	59724	59536
1/8	SC-12	5/8	59843	59537
5/32	SC-13	5/8	59844	59538
3/16	SC-14	5/8	59845	59539
1/4	SC-1	5/8	59846	59540
1/4	SC-1L	1	59725	59541
5/16	SC-2	3/4	59726	59542
3/8	SC-3	3/4	59847	59543
3/8	SC-3L	1	59727	59544
3/8	SC-3X	1 1/2	59848	59545
7/16	SC-4	1	59849	59546
1/2	SC-5	1	59728	59547
5/8	SC-6	1	59729	59548
3/4	SC-15	1/2	59850	59550
3/4	SC-16	3/4	59730	59549
3/4	SC-7	1	59851	59551
1	SC-9	1	59852	59552

### Ball Shape



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SNGL. CUT	DBL. CUT
1/8	SD-11	3/32	59731	59554
3/16	SD-14	1/8	59732	59555
1/4	SD-1	1/4	59733	59556
5/16	SD-2	1/4	59734	59557
3/8	SD-3	5/16	59735	59558
7/16	SD-4	3/8	59853	59559
1/2	SD-5	7/16	59736	59560
5/8	SD-6	9/16	59737	59561
3/4	SD-7	1 1/16	59738	59562
1	SD-9	1 5/16	59854	59563

(continued)

# Carbide Burrs 1/4" Shank (continued)

List No. 5970

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## Oval Shape



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SNGL. CUT	DBL. CUT
3/16	SE-11	5/16	59739	59564
1/4	SE-1	3/8	59740	59565
3/8	SE-3	3/4	59741	59566
1/2	SE-5	7/8	59742	59567
5/8	SE-6	1	59743	59568
3/4	SE-7	1	59744	59569

## 60° Cone Shape



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SNGL. CUT	DBL. CUT
1/4	SJ-1	3/16	59861	59793
3/8	SJ-3	5/16	59862	59794
1/2	SJ-5	7/16	59863	59795
5/8	SJ-6	9/16	59864	59796
3/4	SJ-7	11/16	59865	59797
1	SJ-9	15/16	59866	59798

## Tree Shape Radius End



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SNGL. CUT	DBL. CUT
1/8	SF-11	1/2	59855	59570
1/4	SF-1	5/8	59745	59571
3/8	SF-3	3/4	59746	59572
7/16	SF-4	1	59856	59573
1/2	SF-13	3/4	59857	59575
1/2	SF-5	1	59747	59574
5/8	SF-6	1	59748	59576
3/4	SF-14	1 1/4	59749	59578
3/4	SF-15	1 1/2	59859	59579

## 90° Cone Shape



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SNGL. CUT	DBL. CUT
1/4	SK-1	1/8	59867	59800
3/8	SK-3	3/16	59868	59801
1/2	SK-5	1/4	59869	59802
5/8	SK-6	5/16	59870	59803
3/4	SK-7	3/8	59871	59804
1	SK-9	1/2	59872	59805

## Tree Shape Pointed End



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SNGL. CUT	DBL. CUT
1/4	SG-1	5/8	59750	59580
5/16	SG-2	3/4	59751	59581
3/8	SG-3	3/4	59752	59582
1/2	SG-13	3/4	59753	59583
1/2	SG-5	1	59754	59584
5/8	SG-6	1	59755	59585
3/4	SG-7	1	59756	59586
3/4	SG-15	1 1/2	59860	59587

## Taper Shape Radius End 14° Included Angle



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SNGL. CUT	DBL. CUT
1/4	SL-1	5/8	59757	59605
5/16	SL-2	7/8	59758	59606
3/8	SL-3	1 1/16	59759	59607
1/2	SL-4	1 1/8	59760	59608
5/8	SL-5	1 3/16	59873	59609
5/8	SL-6	1 5/16	59761	59610
3/4	SL-7	1 1/2	59762	59611

## Flame Shape



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SNGL. CUT	DBL. CUT
1/4	SH-1	5/8	59774	59780
5/16	SH-2	3/4	59775	59781
1/2	SH-5	1 1/4	59776	59782
5/8	SH-6	1 7/16	59777	59783
3/4	SH-7	1 5/8	59778	59784

## Cone Shape



DIA.	TOOL NO.	INCL. ANGLE	LENGTH OF CUT	EDP NO.	
				SNGL. CUT	DBL. CUT
1/4	SM-1	22°	1/2	59763	59612
1/4	SM-2	14°	3/4	59764	59613
1/4	SM-3	10°	1	59765	59614
3/8	SM-4	28°	5/8	59766	59615
1/2	SM-5	31°	7/8	59767	59616
5/8	SM-6	16°	1	59768	59617

(continued)

# Carbide Burrs 1/4" Shank (continued)

List No. 5970

## Inverted Cone Shape



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DIA.	TOOL NO.	INCL. ANGLE	LENGTH OF CUT	EDP NO.	
				SINGL. CUT	DBL. CUT
1/4	SN-1	10°	5/16	59769	59618
3/8	SN-2	13°	3/8	59770	59619
1/2	SN-4	28°	1/2	59771	59620
5/8	SN-6	18°	3/4	59772	59621
3/4	SN-7	30°	5/8	59773	59622

## Carbide Burrs For Non-Ferrous Materials

### 1/4" Shank

NF Burrs are designed for use on aluminum, non-ferrous metals, soft steel, reinforced plastics, and other soft materials. High flute design for easy chip flow and fast stock removal. Provides excellent work finish with minimum loading when cutting soft, sticky metals.

Fraise rotative au carbure

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### List 5970

STANDARD PACKAGE

All sizes — 1 each

## Cylinder Shape



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.
1/4	SA-1-NF	3/4	59625
3/8	SA-3-NF	3/4	59626
1/2	SA-5-NF	1	59627
5/8	SA-6-NF	1	59628
3/4	SA-7-NF	1	59629
3/4	SA-7-NF 3/8	1	59810*

## Oval Shape



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.
3/8	SE-3-NF	5/8	59640
1/2	SE-5-NF	7/8	59641
5/8	SE-6-NF	1	59642
3/4	SE-7-NF	1	59643
3/4	SE-7-NF 3/8	1	59813*

## Cylinder Shape Radius End



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.
1/4	SC-1-NF	3/4	59630
3/8	SC-3-NF	3/4	59631
1/2	SC-5-NF	1	59632
5/8	SC-6-NF	1	59633
3/4	SC-7-NF	1	59634
3/4	SC-7-NF 3/8	1	59811*

## Tree Shape Radius End



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.
1/4	SF-1-NF	3/4	59644
3/8	SF-3-NF	3/4	59645
1/2	SF-5-NF	1	59646
5/8	SF-6-NF	1	59647
3/4	SF-14-NF	1 1/4	59648
3/4	SF-14-NF 3/8	1 1/4	59814*

## Ball Shape



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.
1/4	SD-1-NF	3/16	59635
3/8	SD-3-NF	5/16	59636
1/2	SD-5-NF	7/16	59637
5/8	SD-6-NF	9/16	59638
3/4	SD-7-NF	1 1/16	59639
3/4	SD-7-NF 3/8	1 1/16	59812*

## Taper Shape Radius End 14° Included Angle



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.
3/8	SL-3-NF	1 1/16	59649
1/2	SL-4-NF	1 1/8	59650
5/8	SL-5-NF	1 3/16	59651
5/8	SL-6-NF	1 5/16	59652
3/4	SL-7-NF	1 1/2	59653
3/4	SF-7-NF 3/8	1 1/2	59815*

# Long Shank Carbide Burrs 1/4" x 6" Long Steel Shank

Single Cut & Double Cut

## Cylinder Shape



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
1/4	SA-1L6	1/2	59655	59925
3/8	SA-3L6	3/4	59656	59926
1/2	SA-5L6	1	59657	59927

## Cylinder Shape Radius End



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
1/4	SC-1L6	1/2	59658	59928
3/8	SC-3L6	3/4	59659	59929
1/2	SC-5L6	1	59660	59930

## Ball Shape



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
1/4	SD-1L6	3/16	59661	59931
3/8	SD-3L6	5/16	59662	59932
1/2	SD-5L6	7/16	59663	59933

## Oval Shape



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
1/4	SE-1L6	3/8	59664	59934
3/8	SE-3L6	5/8	59665	59935
1/2	SE-5L6	7/8	59666	59936

# Carbide Burrs 1/4" Dia. - 1/8" Steel Shank

Single Cut



EDP NO.	59678	59679	59680	59681	59682	59683	59684	59685	59686
TOOL NO.	SA-51	SB-51	SC-51	SD-51	SE-51	SF-51	SG-51	SM-51	SN-51
LOC	1/2	1/4	1/2	1/4	3/8	1/2	1/2	1/2	1/4

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List 5970

STANDARD PACKAGE All sizes — 1 each

## Tree Shape Radius End



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
1/4	SF-1L6	1/2	59667	59937
3/8	SF-3L6	3/4	59668	59938
1/2	SF-5L6	1	59669	59939

## Tree Shape Pointed End



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
1/4	SG-1L6	1/2	59670	59940
3/8	SG-3L6	3/4	59671	59941
1/2	SG-5L6	1	59672	59942

## Flame Shape



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
5/16	SH-2L6	3/4	59673	59943
1/2	SH-5L6	7/8	59674	59944

## Taper Shape Radius End — 14°



DIA.	TOOL NO.	LENGTH OF CUT	EDP NO.	
			SINGLE CUT	DOUBLE CUT
1/4	SL-1L6	3/8	59675	59945
3/8	SL-3L6	5/8	59676	59946
1/2	SL-4L6	7/8	59677	59947

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List 5970

STANDARD PACKAGE All sizes — 1 each

# Carbide Burrs – 1/8" Shank

Double Cut

Fraise rotative au carbure

Rebabeador de carburo

List 5970  
STANDARD  
PACKAGE

All sizes — 1 each



EDP NO.	59688	59689	59713	59690	59691	59692	59693	59694	59695	59696	59697	59698	59699	59700	59701	59702	59703	59714
TOOL NO.	SC-53	SD-53	SA-41	SA-43	SA-42	SC-42	SC-41	SD-42	SE-41	SF-41	SG-41	SJ-42	SL-41	SH-41	SN-42	SK-42	SB-41	SB-43
DIA.	3/16	3/16	1/16	1/8	3/32	1/8	3/32	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
L.O.C.	1/2	5/32	1/4	5/8	1/2	5/8	1/2	1/8	3/16	1/4	1/4	3/16	13/32	3/16	1/8	1/8	1/8	5/8

Burrs



EDP NO.	59893	59894	59895	59896	59897	59898	59899	59900
TOOL NO.	SL-42	SD-41	SF-42	SF-53	SG-43	SG-44	SM-42	SM-43
DIA.	1/8	3/32	1/8	3/16	1/8	1/8	1/8	1/8
L.O.C.	1/2	3/32	1/2	1/2	3/8	1/2	7/16	5/8

## MORSE® Modifications & Specials

Complete Tool Design  
And Manufacturing Services  
From Blueprint Specials to  
Modified Regulars

# Carbide Burrs

## 1/4" Shank – 2" O.A.L.

Double Cut

Fraise rotative au carbure

Rebabeador de carburo

List 5970  
STANDARD  
PACKAGE

All sizes — 1 each



EDP NO.	59504	59704	59706	59565	59571	59580	59707	59605	59708	59618	59709	59710
TOOL NO.	SA-1	SA-14	SC-14	SE-1	SF-1	SG-1	SJ-1	SL-1	SH-1	SN-1	SK-1	SQ-1
DIA.	1/4	3/16	3/16	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
L.O.C.	5/8	1/2	1/2	3/8	5/8	5/8	60°	1/2	3/8	1/4	82°	1/4



# Carbide Burr Sets — Double Cut

List 5970

Jeu de fraises rotatives au carbure

Conjunto de rebabadores de carburo



Supplied in a premium hardwood case.

EDP	SET NO.	SHANK DIA.	INCLUDES
59687	C-300	1/8	SA-51, SB-51, SC-51, SD-51, SE-51, SF-51, SG-51, SM-51, SN-51
59711	C-100	1/8	SA-43, SA-42, SC-42, SC-41, SD-42, SE-41, SF-41, SG-41, SJ-42, SL-41, SH-41, SN-42
59901	C-150	1/8	SA-42, SA-43, SC-42, SC-41, SF-42, SG-42, SM-43, SE-41, SD-42
59712	C-200	1/4	SA-1, SA-14, SC-1, SC-14, SD-1, SE-1, SF-1, SG-1, SK-1, SL-1, SH-1, SN-1
59903	C-350	1/8	SA-51, SC-51, SF-51, SG-51, SM-51, SD-51
59905	C-400	1/4	SA-1, SC-1, SF-1, SG-1, SM-2, SE-1, SL-1, SD-1
59907	C-450	1/4	SA-5, SC-5, SF-5, SG-5, SM-5, SE-5, SL-4, SD-5
59909	C-500	1/4	SA-5, SC-5, SD-5, SE-5, SG-5, SM-5, SL-4, SH-5
59911	C-550	1/4	SA-5, SC-1, SC-3, SD-3, SE-5, SH-5, SK-5, SG-1
59913	C-600	1/4	SA-1, SA-5, SC-1, SC-3, SC-5, SF-5, SL-3, SL-4
59915	C-650	1/4	SB-1, SC-3, SD-2, SE-5, SF-5, SL-4, SG-3, SM-5
59917	C-700	1/4	SA-1, SA-3, SA-5, SC-1, SC-3, SC-5, SF-1, SF-3, SF-5
59918	C-725	1/4	SA-5, SC-3, SC-5, SD-5, SF-3, SF-5, SG-3, SL-4
59919	C-750	1/4	SA-1, SA-3, SA-5, SC-1, SC-3, SC-5, SD-3, SD-5 SE-3, SF-1, SF-3, SF-5, SG-1, SG-3, SL-3, SL-4

## Carbide Burs Application Data

STYLE OF CUT	MATERIAL			
	ALUMINUM	BRASS, COPPER	CAST IRON	PLASTICS
Single		☆	☆	
Double		☆	☆	
NF Style	☆			☆

STYLE OF CUT	MATERIAL		
	STEEL-UP TO 40-60 Rc	TITANIUM	ZINC
Single	☆	☆	
Double	☆	☆	
NF Style			☆

## RECOMMENDED CUTTING SPEEDS

BURR DIAMETER	R.P.M.
1/16	55000-85000
3/32	50000-60000
1/8	35000-65000
3/16	30000-55000
1/4	25000-50000
5/16	18000-38000
3/8	17000-38000
7/16	13000-37000
1/2	14000-36000
5/8	11000-23000
3/4	8000-19000
1	7000-18000

Increase speeds for softer non-ferrous materials.  
Decrease speeds for harder ferrous materials.



### Double Cut

Most popular style. For rapid stock removal in tough applications. Design reduces the pulling action, reduces size of chips, ensures rapid stock removal.



### Single Cut

General Purpose. Recommended for steel, cast iron, ferrous materials. Offers good stock removal and smooth workpiece finish.



### Non-Ferrous Cut

For use on aluminum, non-ferrous metals, soft steel, reinforced plastics, and other soft materials. High flute design for easy chip flow and fast stock removal. Provides excellent work finish with minimum loading when cutting soft, sticky metals.



High Speed Steel  
Cobalt  
Carbide Tipped  
Solid Carbide  
Coatings

## **MORSE® Modifications & Specials**

Complete Tool Design  
And Manufacturing Services  
From Blueprint Specials to  
Modified Regulars

### **With MORSE® Modifications Why Start From Scratch?**

When standard cutting tools aren't quite right for your application, let **Morse® Modifications** make them perfect for the task. Morse®-modified off-the-shelf standard cutting tools let you start with a standard tool at a standard price.

Add a little for modifications, and save by not having to go with expensive custom-designed special cutting tools.

### **With MORSE® Specials Fast Delivery on Custom Tools.**

When your application requires special custom designed cutting tools, **Morse® Specials** offers complete tool design and manufacturing services. Fast quotes, quick delivery, specifically designed for your machining application.

Engineered cutting tools optimized for lower overall machining costs.

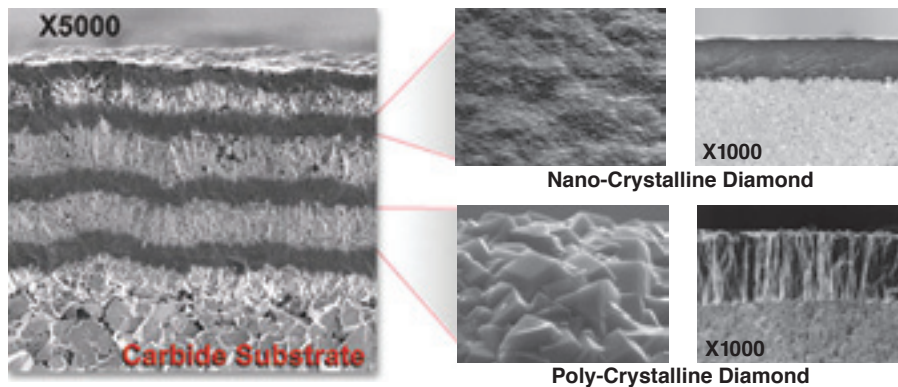
**Another Application Solution From Morse**

Morse **MMD** Multilayer Diamond Coating

**CVD Diamond Coating for Highest Performance in Hard and Abrasive Non-Ferrous Materials**



- Solid Carbide Diamond Coated Tools Custom Designed for the Specific Application
- Unsurpassed Performance In A Wide Variety of Materials and Applications
- Increases Tool Life Dramatically Over Uncoated Solid Carbide Tools and DLC Coatings
- Multilayer Poly-Crystalline and Nano-Crystalline Coating Offers the Highest Resistance To Fracture and a Smoother Surface than Other Diamond Coatings



**Morse MMD Multilayer Diamond Coating Applications**

**Non-Ferrous Material**

- Carbon Fiber Components
- High Silicon Aluminum
- Glass Fiber Reinforced Plastics
- Solid and Reinforced Plastics
- Graphite and Hard Carbon
- Wood Materials
- Metal Matrix Composites
- Copper Alloys
- Brass and Magnesium
- Green and Bisque-Fired Ceramics

**Application**

- Aircraft Skins and Components
- Auto and Truck Parts
- Fiberglass Boats, Circuit Boards
- Medical Products
- EDM Mold Electrodes
- Cabinet and Furniture Making
- Brake System Components
- Mold Cavities and Components
- Valves and Screw Machine Parts
- Insulators

Solid carbide tools that can be coated include drills, end mills, routers, burrs, thread mills, taps, and more. Simple-design tools to tools with very complex geometry can be coated.

See the Second page of this flyer for an Application Form for your specific needs.



<b>MMD Multilayer Diamond Coating Application Form</b>	Complete this form to provide essential information about the application. The completed form should be faxed to Morse Cutting Tools.	Date:
		Morse Rep
End User Name	Location	Phone
	Contact Name	FAX
Distributor	Location	Phone
	Contact Name	FAX
<b>Job Description</b>		
Part Description:		<input type="checkbox"/> Part Print Available
Workpiece Material:		Hardness:
Drilling	Hole Diameter	Depth
		Blind/Through Hole (Circle One)
Milling	Slot / Profile / Surfacing (Circle One)	Radial DOC
		Axial DOC
		Diameter
Threading	Thread Mill/Tap (Circle One)	Thread Spec.
		Interior/Exterior
		Through/Blind
Other (Describe)		
Machine Description:	Spindle RPM:	Feed Rate (IPM):
<b>Tool Description</b>		
<input type="checkbox"/> New Application	<input type="checkbox"/> Tool Print Available	<input type="checkbox"/> Sample Tool Available
<input type="checkbox"/> Existing Application – Current Tool Being Used (Describe)		
Comments/Goals:		
A tool print is required for all special tools. If help is needed to develop a print, Morse Cutting Tools can help. Standardized print forms are available for common special tools. Contact Morse Cutting Tools for assistance		
Fax or send a copy of this completed form together with supporting prints and application information to Morse Cutting Tools.		
MMD Diamond Coated Tools are custom manufactured and coated for each specific application. Tools are designed and built with the correct substrate for diamond coating and the correct geometry for the material being machined.		
Contact your Morse Representative or call Morse Cutting Tools for assistance Phone 800.255.1701 Fax 800.338.4857		

# HPC

## COBALT WIDE LAND HIGH PERFORMANCE PARABOLIC FLUTE DRILLS

**M35** - Premium Cobalt Steel  
**TIN** - Titanium Nitride Coated  
**TIALN** - Titanium Aluminum Nitride Coated

See Morse® Catalog  
for Complete Offering

### WIDE LAND PARABOLIC FLUTE DRILLS

The next generation in parabolic flute design, wide land parabolic flute drills are effective in a wider range of materials than standard parabolic flute drills. An enhanced flute design with reinforced web provides increased drill strength and rigidity, straighter closer tolerance holes, improved chip formation and evacuation, improved coolant flow to the drill point and higher speeds and feeds for increased productivity. Recommended for deep hole drilling greater than three diameters deep without the need to reduce the feed rate or withdraw the drill to clear chips.

### PREMIUM M35 COBALT STEEL

Offers increased hardness, toughness, wear resistance and heat resistance. Highly recommended for drilling tough, high tensile strength materials up to 35 Rc hardness and materials that generate higher cutting temperatures. Applications include high alloy steels, ferrous castings, titanium, inconel, stainless steels and other difficult-to-drill materials.



Screw Machine Length  
Jobber Length  
Taper Length

Heavy-Duty  
130° Self-Centering Point

# Morse® Specials Fast Delivery on Custom Tools

When your application requires special custom designed cutting tools, **Morse Specials** offers complete tool design and manufacturing services. Fast quotes, quick delivery, specifically designed for your machining application.

Engineered cutting tools optimized for lower overall machining costs.

## DRILLS & REAMERS

- Combination Tools
- Coolant Fed
- End Cutting
- Engineered Specials
- Modified Point
- Modified Shank
- Optional Flutes
- Piloted
- Right & Left Hand
- Special Diameter
- Special Length
- Step & Subland
- Surface Treatments
- Tight Tolerance
- Tool Coatings

