

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				SQUARE END - LIST 5973		BALL NOSE - LIST 5974	
DIA.	SHANK DIA.	LOC	OAL	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				SQUARE END - LIST 5975		BALL NOSE - LIST 5976	
DIA.	SHANK DIA.	LOC	OAL	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

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 mills allow for plunge cutting like a drill into solid material.

TOLERANCES

All Sizes +.000mm/-.051mm
Shank Dia. +0.000mm/-.013mm

STANDARD PACKAGE

All sizes - 1 each

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TiAlN COATED EDP NO.
	DIA.	LOC	OAL				
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

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TiAlN COATED EDP NO.
	DIA.	LOC	OAL				
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

DIA.	SHANK			UNCOATED EDP NO.	TIN COATED EDP NO.	TICN COATED EDP NO.	TiAlN COATED EDP NO.
	DIA.	LOC	OAL				
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

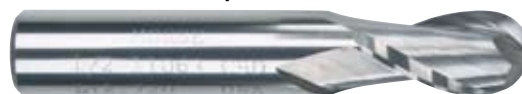
Solid Carbide 2-Flute Ball Nose Single End Mills

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
11/16	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

cordador 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

cordador vertical de carburo

Speeds & Feeds:
Page 266



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	11/16	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	58224	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 266

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 DIA.	LOC	OAL	CORNER RADIUS	UNCOATED	TIN COATED	TICN COATED	TIALN COATED
					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

List No. 5968 **4-Flute**

cortador vertical con radio de esquina de carburo

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 266

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 & 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



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
60° 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.

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

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

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 \leq 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 \leq 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 \leq 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 & \leq 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.