



FEATURED SOLUTIONS

Mold Tool & Die



Photo courtesy of Justin R.

"Since we found Harvey, we build molds in a totally different way. Our mold manufacturing times have went from over a month down to less than a week. I wouldn't build a mold without their tools now."

– Justin R., Salt Lake City, UT

Mold Tool & Die

Building complex cavities requires **high performance tooling** that can mill **precise contours** while leaving **superior part finish**. Harvey Tool offers a selection of **tapered end mills** with unique geometries that are perfect for tackling the tough machining requirements of the **die and mold making** industries.

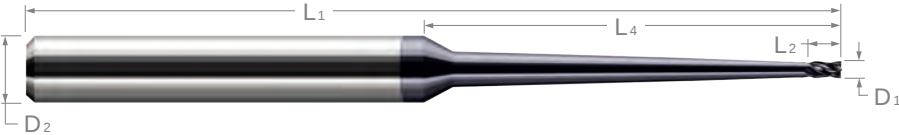
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MINIATURE END MILLS

Square – Tapered Reach (Clearance Cutters)



Maximum Reach & Maximum Rigidity!

- Designed for deep cavity profiling
- 2° tapered neck design minimizes deflection and maximizes wall clearance
- Length of cut = 1½ x diameter
- Neck behind length of cut is reduced for 1x diameter
- h6 shank tolerance for high precision tool holders
- Solid carbide
- CNC ground in the USA

CUTTER DIA.	LOC	OVERALL REACH	EFF. WALL ANGLE	SHANK DIA.	OAL	INTERFERENCE DEPTH AT WALL ANGLE*						UNCOATED			AITIN NANO COATED		
						0°	.5°	1°	2°	3°	4°	2 FL	4 FL	PRICE	2 FL	4 FL	PRICE
D1 +.000" / -.001"	L2 +.020" / -.000"	L4 +.020" / -.000"		D2 (h6)	L1												
.015	.023	1/2	6.4°	1/8	2-1/2	.060	.080	.125	.375	.395	.420		990215	76.90		990215-C6	84.50
.031	.047	1/2	5.4°	1/8	2-1/2	.115	.155	.235	.385	.410	.440		990231	59.30		990231-C6	66.90
.031	.047	1	6.3°	1/4	4	.115	.155	.235	.755	.800	.850	26631	30831	71.40	26631-C6	30831-C6	82.60
.031	.047	1-1/2	4.2°	1/4	4	.115	.155	.235	1.260	1.355	1.470	28331	31231	77.10	28331-C6	31231-C6	88.30
.031	.047	2	3.1°	1/4	4	.115	.155	.235	1.765	1.965	-	17431	913131	82.70	17431-C6	913131-C6	93.90
.047	.071	1/2	4.5°	1/8	2-1/2	.180	.245	.370	.395	.430	.470		990247	59.80		990247-C6	67.40
.047	.071	1	5.9°	1/4	4	.180	.245	.370	.765	.815	.870	26647	30847	71.40	26647-C6	30847-C6	82.60
.047	.071	1-1/2	3.9°	1/4	4	.180	.245	.370	1.275	1.380	-	28347	31247	77.10	28347-C6	31247-C6	88.30
.062	.093	1/2	3.7°	1/8	2-1/2	.220	.295	.375	.410	.460	-		990262	57.60		990262-C6	65.20
.062	.093	1	5.4°	1/4	4	.220	.295	.445	.775	.825	.890	26662	30862	69.40	26662-C6	30862-C6	80.60
.062	.093	1-1/2	3.7°	1/4	4	.220	.295	.445	1.285	1.410	-	28362	31262	75.00	28362-C6	31262-C6	86.20
.062	.093	2	2.6°	1/4	4	.220	.295	.445	1.805	-	-	17462	913162	80.70	17462-C6	913162-C6	91.90
.078	.118	1	5.0°	1/4	4	.305	.405	.610	.785	.845	.915	26678	30878	69.40	26678-C6	30878-C6	80.60
.078	.118	1-1/2	3.4°	1/4	4	.305	.405	.610	1.305	1.445	-	28378	31278	75.00	28378-C6	31278-C6	86.20
.093	.140	1	4.6°	1/4	4	.340	.455	.685	.795	.865	.945	26693	30893	70.20	26693-C6	30893-C6	81.40
.093	.140	1-1/2	3.1°	1/4	4	.340	.455	.685	1.320	-	-	28393	31293	74.40	28393-C6	31293-C6	85.60
.093	.140	2	2.2°	1/4	4	.340	.455	.685	1.890	-	-	17493	913193	78.60	17493-C6	913193-C6	89.80
.125	.188	1	3.7°	1/4	4	.450	.600	.760	.835	.930	-	26708	30908	70.20	26708-C6	30908-C6	81.40
.125	.188	1-1/2	2.5°	1/4	4	.450	.600	.905	1.395	-	-	28408	31308	74.40	28408-C6	31308-C6	85.60
.125	.188	2	1.7°	1/4	4	.450	.600	.905	-	-	-	17508	913208	78.60	17508-C6	913208-C6	89.80
.156	.234	1	2.8°	1/4	4	.525	.705	.780	.895	-	-	26710	30910	70.20	26710-C6	30910-C6	81.40
.156	.234	1-1/2	1.9°	1/4	4	.525	.705	1.060	-	-	-	28410	31310	74.40	28410-C6	31310-C6	85.60
.187	.281	1-1/2	1.3°	1/4	4	.605	.805	1.215	-	-	-	28412	31312	74.40	28412-C6	31312-C6	85.60
.250	.375	1-1/2	2.5°	3/8	4	.760	1.015	1.275	1.425	-	-	28416	31316	96.00	28416-C6	31316-C6	108.60

*Values are approximate and may vary due to tolerancing.



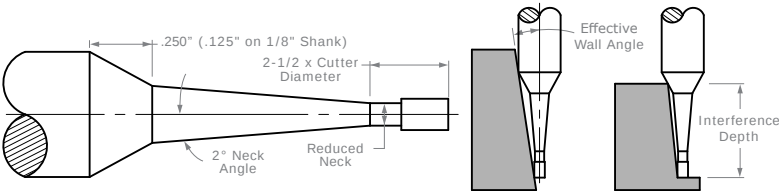
For detailed interference charts with more angles, scan the QR code or visit harveytool.com/resources

Effective Wall Angle:

Minimum wall angle (measured from centerline of tool) that can be machined at overall reach.

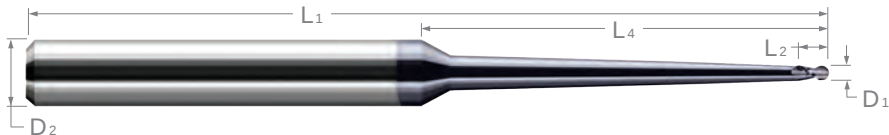
Interference Depth:

At a given angle, the depth at which the cutter interferes with the workpiece.



MINIATURE END MILLS

Ball – Tapered Reach (Clearance Cutters)



Maximum
Reach &
Maximum
Rigidity!

- Designed for deep cavity profiling
- 2° tapered neck design minimizes deflection and maximizes wall clearance
- Length of cut = 1½ x diameter • Neck behind length of cut is reduced for 1 x diameter
- h6 shank tolerance for high precision tool holders • Center cutting
- Solid carbide • CNC ground in the USA

CUTTER DIA.	LOC	EFFECTIVE		SHANK DIA.	OAL	INTERFERENCE DEPTH AT WALL ANGLE*			UNCOATED			AITIN NANO COATED			AMORPHOUS DIAMOND	
		OVERALL REACH	WALL ANGLE			0°	.5°	1°	2 FL	4 FL	PRICE	2 FL	4 FL	PRICE	2 FL	PRICE
D ₁ ^{+0.000"} -0.001"	L ₂ ^{+0.020"} -0.000"	L ₄ ^{+0.020"} -0.000"		D ₂ (h6)	L ₁											
.010	.015	1/2	6.6°	1/8	2-1/2	.054	.070	.102	29810		74.10	29810-C6		81.70		
.015	.023	1/2	6.4°	1/8	2-1/2	.060	.080	.120	29815	778115	73.40	29815-C6	778115-C6	81.00	29815-C4	86.50
.015	.023	1	6.7°	1/4	4	.060	.080	.120	17715		87.00	17715-C6		98.20		
.020	.030	1/2	6.1°	1/8	2-1/2	.070	.095	.140	29820		74.10	29820-C6		81.70		
.020	.030	1	6.6°	1/4	4	.070	.095	.140	17720		87.00	17720-C6		98.20		
.031	.047	1/2	5.5°	1/8	2-1/2	.115	.150	.220	29831	778131	57.40	29831-C6	778131-C6	65.00	29831-C4	70.50
.031	.047	1	6.3°	1/4	4	.115	.150	.220	17731	777231	71.60	17731-C6	777231-C6	82.80	17731-C4	92.20
.031	.047	1-1/2	4.2°	1/4	4	.115	.150	.220	24831	776231	77.10	24831-C6	776231-C6	88.30	24831-C4	97.70
.031	.047	2	3.2°	1/4	4	.115	.150	.220	18831		87.50	18831-C6		98.70	18831-C4	108.10
.039	.059	1/2	5.1°	1/8	2-1/2	.150	.195	.285	29839		57.90	29839-C6		65.50		
.039	.059	1	6.1°	1/4	4	.150	.195	.285	17739		71.60	17739-C6		82.80		
.047	.071	1/2	4.7°	1/8	2-1/2	.180	.235	.350	29847	778147	57.40	29847-C6	778147-C6	65.00	29847-C4	70.50
.047	.071	1	5.9°	1/4	4	.180	.235	.350	17747	777247	71.60	17747-C6	777247-C6	82.80	17747-C4	92.20
.047	.071	1-1/2	3.9°	1/4	4	.180	.235	.350	24847		77.10	24847-C6		88.30	24847-C4	97.70
.047	.071	2	2.9°	1/4	4	.180	.235	.350	18847		87.50	18847-C6		98.70	18847-C4	108.10
.062	.093	1/2	3.8°	1/8	2-1/2	.220	.285	.370	29862	778162	55.60	29862-C6	778162-C6	63.20	29862-C4	68.70
.062	.093	1	5.5°	1/4	4	.220	.285	.415	17762	777262	69.40	17762-C6	777262-C6	80.60	17762-C4	90.00
.062	.093	1-1/2	3.7°	1/4	4	.220	.285	.415	24862	776262	74.40	24862-C6	776262-C6	85.60	24862-C4	95.00
.062	.093	2	2.7°	1/4	4	.220	.285	.415	18862	775262	85.30	18862-C6	775262-C6	96.50	18862-C4	105.90
.062	.093	2-1/2	2.2°	1/4	4	.220	.285	.415	21362		87.40	21362-C6		98.60		
.078	.118	1	5.1°	1/4	4	.305	.395	.575	17778		69.40	17778-C6		80.60	17778-C4	90.00
.078	.118	1-1/2	3.4°	1/4	4	.305	.395	.575	24878		74.40	24878-C6		85.60	24878-C4	95.00
.078	.118	2	2.5°	1/4	4	.305	.395	.575	18878		85.30	18878-C6		96.50	18878-C4	105.90
.093	.140	1	4.7°	1/4	4	.340	.440	.640	17793	777293	70.20	17793-C6	777293-C6	81.40	17793-C4	90.80
.093	.140	1-1/2	3.1°	1/4	4	.340	.440	.640	24893	776293	74.40	24893-C6	776293-C6	85.60	24893-C4	95.00
.093	.140	2	2.3°	1/4	4	.340	.440	.640	18893		83.10	18893-C6		94.30	18893-C4	103.70
.118	.177	1	4.0°	1/4	4	.438	.565	.756	17805		70.90	17805-C6		82.10		
.118	.177	1-1/2	2.6°	1/4	4	.438	.565	.818	24905		75.10	24905-C6		86.30		
.125	.188	1	3.8°	1/4	4	.450	.580	.750	17808	777308	70.20	17808-C6	777308-C6	81.40	17808-C4	90.80
.125	.188	1-1/2	2.5°	1/4	4	.450	.580	.840	24908	776308	74.40	24908-C6	776308-C6	85.60	24908-C4	95.00
.125	.188	2	1.8°	1/4	4	.450	.580	.840	18908	775308	83.10	18908-C6	775308-C6	94.30	18908-C4	103.70
NEW .125	.188	2-1/2	2.2°	5/16	4	.450	.580	.840	21408	734408	87.20	21408-C6	734408-C6	99.80		

*Values are approximate and may vary due to tolerancing. †Tapered neck angle is 1.85°.

continued on next page



For detailed interference charts with more angles,
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MINIATURE END MILLS

Ball – Tapered Reach (Clearance Cutters) (cont.)

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CUTTER DIA.	LOC	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIA.	OAL	INTERFERENCE DEPTH AT WALL ANGLE*			UNCOATED			AITIN NANO COATED			AMORPHOUS DIAMOND	
						0°	.5°	1°	2 FL	4 FL	PRICE	2 FL	4 FL	PRICE	2 FL	PRICE
D ₁ ^{+0.000"} / _{-.001"}	L ₂ ^{+0.020"} / _{-.000"}	L ₄ ^{+0.020"} / _{-.000"}		D ₂ (h6)	L ₁											
.140	.211	1-1/2	2.2°	1/4	4	.495	.636	.919	24909		74.40	24909-C6		85.60		
.140	.211	2	1.6°	1/4	4	.495	.636	.919	18909		83.10	18909-C6		94.30		
.156	.234	1	2.9°	1/4	4	.525	.680	.775	17810		70.20	17810-C6		81.40	17810-C4	90.80
.156	.234	1-1/2	1.9°	1/4	4	.525	.680	.980	24910		74.40	24910-C6		85.60	24910-C4	95.00
.156	.234	2	1.4°	1/4	4	.540	.710	1.085	18910†	775310†	83.10	18910-C6†	775310-C6†	94.30	18910-C4†	103.70
.187	.281	1-1/2	1.3°	1/4	4	.605	.775	1.120	24912	776312	76.30	24912-C6	776312-C6	87.50	24912-C4	96.90
.187	.281	2	2.7°	3/8	4	.605	.775	1.120	18912	775312	111.60	18912-C6	775312-C6	124.20	18912-C4	136.40
.187	.281	2-1/2	2.2°	3/8	4	.605	.775	1.120	21412		115.20	21412-C6		127.80		
.250	.375	1-1/2	2.6°	3/8	4	.760	.975	1.260	24916	776316	97.90	24916-C6	776316-C6	110.50	24916-C4	122.70
.250	.375	2	1.8°	3/8	4	.760	.975	1.405	18916	775316	111.60	18916-C6	775316-C6	124.20	18916-C4	136.40
.250	.375	2-1/2	1.5°	3/8	4	.760	.975	1.405	21416		115.20	21416-C6		127.80		
.312	.468	2	2.7°	1/2	4	.915	1.170	1.685	18920		151.20	18920-C6		168.60	18920-C4	181.00
.375	.563	2	1.8°	1/2	4	1.075	1.370	1.770	18924		151.20	18924-C6		168.60	18924-C4	181.00

*Values are approximate and may vary due to tolerancing. †Tapered neck angle is 1.85°.

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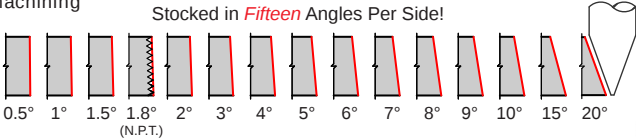


MINIATURE END MILLS

Tapered – Square



- Length of cut up to 10x end diameter
- Long length design for deep cavity machining
- 3 flutes
- Center cutting
- Solid carbide
- CNC ground in the USA



ANGLE PER SIDE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AITIN NANO COATED		TiB ₂ COATED	
A ₁ ^{+0°30'} _{-0°30'}	D ₁ ^{+0.0005"} _{-0.0005"}	L ₂ ^{+0.020"} _{-0.000"}	D ₂ (h6)	L ₁	3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
0.5°	.015 (1/64)	.078 (5x)	1/8	1-1/2	997015	44.60	997015-C6	52.20		
	.015 (1/64)	.150 (10x)	1/8	2-1/2	20515	73.40	20515-C6	81.00		
	.030	.156 (5x)	1/8	1-1/2	997030	37.90	997030-C6	45.50		
	.030	.300 (10x)	3/16	3	20530	65.30	20530-C6	73.50		
	.045	.250 (5x)	1/8	1-1/2	997045	37.90	997045-C6	45.50		
	.045	.450 (10x)	3/16	3	20545	65.30	20545-C6	73.50		
	.060	.312 (5x)	1/8	1-1/2	997060	37.90	997060-C6	45.50		
	.060	.600 (10x)	3/16	3	20560	65.30	20560-C6	73.50		
	.075	.750 (10x)	3/16	3	20575	66.50	20575-C6	74.70		
	.090	.500 (5x)	1/8	1-1/2	997090	37.90	997090-C6	45.50		
	.090	.900 (10x)	1/4	4	20590	72.30	20590-C6	83.50		
	.125 (1/8)	.625 (5x)	3/16	2	997099	58.90	997099-C6	67.10		
	.125 (1/8)	1.250 (10x)	1/4	4	20599	71.00	20599-C6	82.20		
1°	.015 (1/64)	.078 (5x)	1/8	1-1/2	992715	44.60	992715-C6	52.20		
	.015 (1/64)	.150 (10x)	1/8	2-1/2	20615	72.00	20615-C6	79.60		
	.030	.156 (5x)	1/8	1-1/2	992730	37.90	992730-C6	45.50	992730-C8	45.50
	.030	.300 (10x)	3/16	3	20630	65.30	20630-C6	73.50	20630-C8	72.90
	.045	.250 (5x)	1/8	1-1/2	992745	37.90	992745-C6	45.50		
	.045	.450 (10x)	3/16	3	20645	65.30	20645-C6	73.50		
	.060	.312 (5x)	1/8	1-1/2	992760	37.90	992760-C6	45.50		
	.060	.600 (10x)	3/16	3	20660	65.30	20660-C6	73.50		
	.075	.750 (10x)	3/16	3	20675	65.30	20675-C6	73.50		
	.090	.500 (5x)	1/8	1-1/2	992790	37.90	992790-C6	45.50		
	.090	.900 (10x)	1/4	4	20690	71.00	20690-C6	82.20		
	.125 (1/8)	.625 (5x)	3/16	2	992799	58.90	992799-C6	67.10		
	.125 (1/8)	1.250 (10x)	1/4	4	20699	71.00	20699-C6	82.20		
1.5°	.015 (1/64)	.078 (5x)	1/8	1-1/2	991815	44.60	991815-C6	52.20		
	.015 (1/64)	.150 (10x)	1/8	2-1/2	20715	73.40	20715-C6	81.00		
	.030	.156 (5x)	1/8	1-1/2	991830	38.60	991830-C6	46.20		
	.030	.300 (10x)	3/16	3	20730	66.50	20730-C6	74.70		
	.045	.250 (5x)	1/8	1-1/2	991845	37.90	991845-C6	45.50		
	.045	.450 (10x)	3/16	3	20745	65.30	20745-C6	73.50		
	.060	.312 (5x)	1/8	1-1/2	991860	38.60	991860-C6	46.20		
	.060	.600 (10x)	3/16	3	20760	66.50	20760-C6	74.70		
	.075	.750 (10x)	1/4	4	20775	72.30	20775-C6	83.50		
	.090	.500 (5x)	1/8	1-1/2	991890	38.60	991890-C6	46.20		
	.090	.900 (10x)	1/4	4	20790	71.00	20790-C6	82.20		
	.125 (1/8)	1.250 (10x)	1/4	4	20799	71.00	20799-C6	82.20		

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MINIATURE END MILLS

Tapered – Square (cont.)

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ANGLE PER SIDE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AITIN NANO COATED		TiB ₂ COATED	
					3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
1.8° (N.P.T.)	A ₁ ^{+0°30'} _{-0°30'}	D ₁ ^{+ .0005"} _{- .0005"}	L ₂ ^{+ .020"} _{- .000"}	D ₂ (h6)	L ₁	912282	61.80	912282-C6	73.00	
		.200	.625 (3x)	1/4	2	912286	77.10	912286-C6	89.70	
		.300	.900 (3x)	3/8	2-1/2	912292	103.70	912292-C6	120.00	
2°		.400	1.250 (3x)	1/2	3					
		.015 (1/64)	.078 (5x)	1/8	1-1/2	991015	43.70	991015-C6	51.30	
		.015 (1/64)	.150 (10x)	1/8	2-1/2	20815	72.00	20815-C6	79.60	
		.030	.156 (5x)	1/8	1-1/2	991030	37.90	991030-C6	45.50	
		.030	.300 (10x)	3/16	3	20830	65.30	20830-C6	73.50	
		.045	.250 (5x)	1/8	1-1/2	991045	37.90	991045-C6	45.50	
		.045	.450 (10x)	3/16	3	20845	65.30	20845-C6	73.50	
		.060	.312 (5x)	1/8	1-1/2	991060	37.90	991060-C6	45.50	
		.060	.600 (10x)	3/16	3	20860	65.30	20860-C6	73.50	
		.075	.750 (10x)	1/4	4	20875	72.30	20875-C6	83.50	
		.090	.500 (5x)	1/8	1-1/2	991090	37.90	991090-C6	45.50	
		.090	.900 (10x)	1/4	4	20890	71.00	20890-C6	82.20	
3°		.125 (1/8)	.625 (5x)	3/16	2	991099	58.90	991099-C6	67.10	
		.125 (1/8)	1.250 (10x)	1/4	4	20899	71.00	20899-C6	82.20	
		.015 (1/64)	.078 (5x)	1/8	1-1/2	990415	43.70	990415-C6	51.30	
		.015 (1/64)	.150 (10x)	1/8	2-1/2	20915	72.00	20915-C6	79.60	
		.030	.156 (5x)	1/8	1-1/2	990430	37.90	990430-C6	45.50	990430-C8 45.50
		.030	.300 (10x)	3/16	3	20930	65.30	20930-C6	73.50	20930-C8 72.90
		.045	.250 (5x)	1/8	1-1/2	990445	37.90	990445-C6	45.50	
		.045	.450 (10x)	3/16	3	20945	65.30	20945-C6	73.50	
		.060	.312 (5x)	1/8	1-1/2	990460	37.90	990460-C6	45.50	
		.060	.600 (10x)	3/16	3	20960	65.30	20960-C6	73.50	
		.075	.750 (10x)	1/4	4	20975	72.30	20975-C6	83.50	
		.090	.500 (5x)	3/16	2	990490	58.90	990490-C6	67.10	
4°		.090	.900 (10x)	1/4	4	20990	71.00	20990-C6	82.20	
		.125 (1/8)	.625 (5x)	1/4	2-1/2	990499	86.70	990499-C6	97.90	
		.125 (1/8)	1.192 (10x)	1/4	4	20999	71.00	20999-C6	82.20	
		.015 (1/64)	.150 (10x)	1/8	2-1/2	996215	72.00	996215-C6	79.60	
		.030	.300 (10x)	3/16	3	996230	65.30	996230-C6	73.50	
		.045	.450 (10x)	3/16	3	996245	65.30	996245-C6	73.50	
		.060	.600 (10x)	3/16	3	996260	65.30	996260-C6	73.50	
		.075	.750 (10x)	1/4	4	996275	72.30	996275-C6	83.50	
5°		.090	.900 (10x)	1/4	4	996290	72.30	996290-C6	83.50	
		.125 (1/8)	1.250 (10x)	3/8	4	996299	97.70	996299-C6	110.30	
		.010	.050 (5x)	1/8	1-1/2	989610	51.80	989610-C6	59.40	
		.010	.100 (10x)	1/8	2-1/2	27110	79.90	27110-C6	87.50	
		.015 (1/64)	.078 (5x)	1/8	1-1/2	989615	43.70	989615-C6	51.30	
		.015 (1/64)	.120 (8x)	1/8	1-1/2	761915	46.20	761915-C6	53.80	
		.015 (1/64)	.150 (10x)	1/8	2-1/2	27115	72.00	27115-C6	79.60	
		.020	.100 (5x)	1/8	1-1/2	989620	42.80	989620-C6	50.40	
		.020	.200 (10x)	1/8	2-1/2	27120	70.70	27120-C6	78.30	
		.030	.156 (5x)	1/8	1-1/2	989630	37.90	989630-C6	45.50	989630-C8 45.50
		.030	.300 (10x)	3/16	3	27130	65.30	27130-C6	73.50	27130-C8 72.90
		.045	.250 (5x)	1/8	1-1/2	989645	37.90	989645-C6	45.50	
		.045	.450 (10x)	3/16	3	27145	65.30	27145-C6	73.50	

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MINIATURE END MILLS

Tapered – Square (cont.)

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ANGLE PER SIDE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AITIN NANO COATED		TiB ₂ COATED	
					3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
5°	D ₁ ^{+0°30'} _{-0°30'}	L ₂ ^{+ .0005"} _{- .0005"}	D ₂ (h6)	L ₁						
	.060	.312 (5x)	1/8	1-1/2	989660	37.90	989660-C6	45.50		
	.060	.600 (10x)	3/16	3	27160	65.30	27160-C6	73.50		
	.062 (1/16)	.312 (5x)	1/8	1-1/2	989662	37.90	989662-C6	45.50		
	.062 (1/16)	.620 (10x)	3/16	3	27162	65.30	27162-C6	73.50		
	.075	.375 (5x)	3/16	2	989675	58.90	989675-C6	67.10		
	.075	.750 (10x)	1/4	4	27175	72.30	27175-C6	83.50		
	.090	.500 (5x)	3/16	2	989690	58.90	989690-C6	67.10		
	.090	.900 (10x)	1/4	4	27190	71.00	27190-C6	82.20		
	.093 (3/32)	.500 (5x)	3/16	2	989693	58.90	989693-C6	67.10		
	.093 (3/32)	.930 (10x)	1/4	4	27193	71.00	27193-C6	82.20		
	.125 (1/8)	.625 (5x)	1/4	2-1/2	989699	86.70	989699-C6	97.90		
	.125 (1/8)	1.250 (10x)	3/8	4	27199	95.80	27199-C6	108.40		
6°	.187 (3/16)	1.000 (5x)	3/8	2-1/2	989681	95.80	989681-C6	108.40		
	.250 (1/4)	1.250 (5x)	1/2	3	989684	129.50	989684-C6	145.80		
	.015 (1/64)	.150 (10x)	1/8	2-1/2	993315	76.50	993315-C6	84.10		
	.030	.300 (10x)	3/16	3	993330	71.00	993330-C6	79.20		
	.045	.250 (5x)	1/8	1-1/2	904345	62.20	904345-C6	69.80		
	.045	.450 (10x)	3/16	3	993345	71.00	993345-C6	79.20		
	.060	.312 (5x)	3/16	2	904360	60.00	904360-C6	68.20		
	.060	.600 (10x)	3/16	3	993360	71.00	993360-C6	79.20		
7°	.090	.500 (5x)	1/4	2-1/2	904390	89.70	904390-C6	100.90		
	.125 (1/8)	.625 (5x)	5/16	2-1/2	904399	86.30	904399-C6	98.90		
	.015 (1/64)	.078 (5x)	1/8	1-1/2	922615	45.20	922615-C6	52.80		
	.015 (1/64)	.150 (10x)	1/8	2-1/2	28015	74.40	28015-C6	82.00		
	.030	.156 (5x)	1/8	1-1/2	922630	39.10	922630-C6	46.70		
	.030	.300 (10x)	3/16	3	28030	67.50	28030-C6	75.70		
	.045	.250 (5x)	1/8	1-1/2	922645	39.10	922645-C6	46.70		
	.045	.450 (10x)	3/16	3	28045	67.50	28045-C6	75.70		
	.060	.312 (5x)	3/16	2	922660	60.90	922660-C6	69.10		
	.060	.600 (10x)	1/4	4	28060	73.50	28060-C6	84.70		
	.075	.750 (10x)	3/8	4	28075	102.00	28075-C6	114.60		
8°	.090	.500 (5x)	1/4	2-1/2	922690	73.50	922690-C6	84.70		
	.090	.900 (10x)	3/8	4	28090	100.30	28090-C6	112.90		
	.125 (1/8)	.625 (5x)	5/16	2-1/2	922699	86.30	922699-C6	98.90		
	.015 (1/64)	.150 (10x)	1/8	2-1/2	995415	76.50	995415-C6	84.10		
	.030	.300 (10x)	3/16	3	995430	71.00	995430-C6	79.20		
	.045	.450 (10x)	3/16	3	995445	71.00	995445-C6	79.20		
9°	.060	.600 (10x)	1/4	4	995460	75.90	995460-C6	87.10		
	.090	.500 (5x)	1/4	2-1/2	903790	73.50	903790-C6	84.70		
	.125 (1/8)	.625 (5x)	5/16	2-1/2	903799	86.30	903799-C6	98.90		
	.015 (1/64)	.150 (10x)	1/8	2-1/2	992115	77.20	992115-C6	84.80		
	.030	.300 (10x)	3/16	3	992130	71.70	992130-C6	79.90		
	.045	.450 (10x)	3/16	3	992145	71.70	992145-C6	79.90		
	.060	.600 (10x)	1/4	4	992160	76.60	992160-C6	87.80		
	.090	.500 (5x)	1/4	2-1/2	902490	73.50	902490-C6	84.70		
	.125 (1/8)	.625 (5x)	3/8	2-1/2	902499	99.20	902499-C6	111.80		

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MINIATURE END MILLS

Tapered – Square (cont.)

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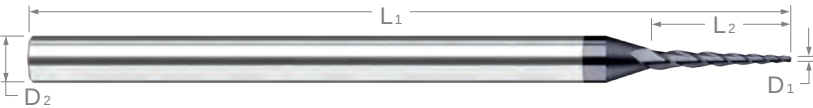
ANGLE PER SIDE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AITIN NANO COATED		TiB ₂ COATED	
					3 FL	PRICE	3 FL	PRICE	3 FL	PRICE
10°	A ₁ ^{+0°30'} -0°30'	D ₁ ^{+0.0005"} -0.0005"	L ₂ ^{+0.020"} -0.000"	D ₂ (h6)	L ₁					
		.010	.050 (5x)	1/8	1-1/2	988210	51.80	988210-C6	59.40	
		.010	.100 (10x)	1/8	2-1/2	29410	78.40	29410-C6	86.00	
		.015 (1/64)	.078 (5x)	1/8	1-1/2	988215	43.70	988215-C6	51.30	
		.015 (1/64)	.150 (10x)	1/8	2-1/2	29415	72.00	29415-C6	79.60	
		.020	.100 (5x)	1/8	1-1/2	988220	43.70	988220-C6	51.30	
		.020	.200 (10x)	1/8	2-1/2	29420	70.70	29420-C6	78.30	
		.030	.156 (5x)	1/8	1-1/2	988230	37.90	988230-C6	45.50	988230-C8 45.50
		.030	.300 (10x)	3/16	3	29430	65.30	29430-C6	73.50	29430-C8 72.90
		.045	.250 (5x)	3/16	2	988245	65.30	988245-C6	73.50	
		.045	.360 (8x)	3/16	3	760845	66.50	760845-C6	74.70	
		.045	.450 (10x)	1/4	4	29445	72.30	29445-C6	83.50	
		.060	.312 (5x)	3/16	2	988260	65.30	988260-C6	73.50	
		.060	.600 (10x)	3/8	4	29460	95.80	29460-C6	108.40	
		.075	.375 (5x)	1/4	2-1/2	988275	68.70	988275-C6	79.90	
		.075	.750 (10x)	3/8	4	29475	97.70	29475-C6	110.30	
		.090	.500 (5x)	5/16	2-1/2	988290	81.30	988290-C6	93.90	
		.125 (1/8)	.625 (5x)	3/8	2-1/2	988299	95.80	988299-C6	108.40	
		.187 (3/16)	.890 (5x)	1/2	3	988281	129.50	988281-C6	145.80	
		.250 (1/4)	1.065 (5x)	5/8	3-1/2	988284	139.20	988284-C6	158.00	
15°		.015 (1/64)	.031 (3x)	1/8	1-1/2	799415	41.80	799415-C6	49.40	
		.015 (1/64)	.078 (5x)	1/8	1-1/2	919515	43.70	919515-C6	51.30	
		.015 (1/64)	.120 (8x)	1/8	1-1/2	799315	48.40	799315-C6	56.00	
		.015 (1/64)	.150 (10x)	1/8	1-1/2	411115	68.70	411115-C6	76.30	
		.030	.093 (3x)	1/8	1-1/2	799430	41.80	799430-C6	49.40	
		.030	.156 (5x)	1/8	1-1/2	919530	43.70	919530-C6	51.30	
		.030	.240 (8x)	3/16	2	799330	48.40	799330-C6	56.60	
		.030	.294 (10x)	3/16	2	411130	67.10	411130-C6	75.30	
		.045	.250 (5x)	3/16	2	919545	58.90	919545-C6	67.10	
		.045	.383 (8x)	1/4	2-1/2	411145	72.00	411145-C6	83.20	
		.060	.312 (5x)	1/4	2-1/2	919560	70.70	919560-C6	81.90	
		.060	.588 (10x)	3/8	2-1/2	411160	97.70	411160-C6	110.30	
		.075	.750 (10x)	1/2	3	411175	136.00	411175-C6	152.30	
		.090	.765 (8x)	1/2	3	411190	133.40	411190-C6	149.70	
		.125 (1/8)	.700 (5x)	1/2	3	411199	133.40	411199-C6	149.70	
20°		.015	.078 (5x)	1/8	1-1/2	832815	43.70	832815-C6	51.30	
		.015	.120 (8x)	1/8	1-1/2	799215	48.40	799215-C6	56.00	
		.030	.156 (5x)	3/16	2	832830	43.70	832830-C6	51.90	
		.030	.240 (8x)	1/4	2-1/2	799230	72.00	799230-C6	83.20	
		.045	.250 (5x)	1/4	2-1/2	832845	58.90	832845-C6	70.10	
		.045	.360 (8x)	5/16	2-1/2	799245	76.60	799245-C6	89.20	
		.060	.312 (5x)	5/16	2-1/2	832860	63.50	832860-C6	76.10	

For larger angles, please see Chamfer Cutters on page 297.

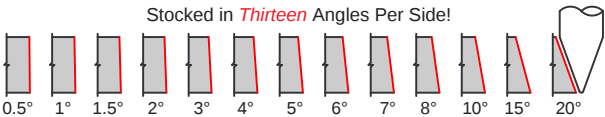
TAPERED

MINIATURE END MILLS

Tapered – Ball



- Stocked in 0.5° to 20° tapers
- Long length design for deep cavity machining
- 3 flutes • Center cutting
- Solid carbide • CNC ground in the USA



ANGLE PER SIDE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		A1TiN NANO COATED	
					3 FL	PRICE	3 FL	PRICE
A ₁ ^{+0°30'} -0°30'	D ₁ ^{+0.0005"} -0.0005"	L ₂ ^{+0.020"} -0.000"	D ₂ (h6)	L ₁				
0.5°	.015 (1/64)	.150 (10x)	1/8	2-1/2	21515	78.30	21515-C6	85.90
	.030	.300 (10x)	3/16	3	21530	71.70	21530-C6	79.90
	.045	.450 (10x)	3/16	3	21545	73.10	21545-C6	81.30
	.060	.600 (10x)	3/16	3	21560	71.70	21560-C6	79.90
	.090	.900 (10x)	1/4	4	21590	77.10	21590-C6	88.30
	.125 (1/8)	1.250 (10x)	1/4	4	21599	77.10	21599-C6	88.30
1°	.015 (1/64)	.150 (10x)	1/8	2-1/2	21615	78.30	21615-C6	85.90
	.030	.156 (5x)	1/8	1-1/2	879830	42.30	879830-C6	49.90
	.030	.300 (10x)	3/16	3	21630	71.70	21630-C6	79.90
	.045	.450 (10x)	3/16	3	21645	73.10	21645-C6	81.30
	.060	.312 (5x)	1/8	1-1/2	879860	42.30	879860-C6	49.90
	.060	.600 (10x)	3/16	3	21660	71.70	21660-C6	79.90
	.090	.900 (10x)	1/4	4	21690	75.70	21690-C6	86.90
	.125 (1/8)	1.250 (10x)	1/4	4	21699	75.70	21699-C6	86.90
1.5°	.015 (1/64)	.150 (10x)	1/8	2-1/2	21715	76.80	21715-C6	84.40
	.030	.300 (10x)	3/16	3	21730	71.70	21730-C6	79.90
	.045	.450 (10x)	3/16	3	21745	74.50	21745-C6	82.70
	.060	.600 (10x)	3/16	3	21760	71.70	21760-C6	79.90
	.090	.900 (10x)	1/4	4	21790	77.10	21790-C6	88.30
	.125 (1/8)	1.250 (10x)	1/4	4	21799	75.70	21799-C6	86.90
2°	.015 (1/64)	.150 (10x)	1/8	2-1/2	21815	76.80	21815-C6	84.40
	.030	.300 (10x)	3/16	3	21830	71.70	21830-C6	79.90
	.045	.450 (10x)	3/16	3	21845	73.10	21845-C6	81.30
	.060	.600 (10x)	3/16	3	21860	71.70	21860-C6	79.90
	.090	.900 (10x)	1/4	4	21890	75.70	21890-C6	86.90
	.125 (1/8)	1.250 (10x)	1/4	4	21899	75.70	21899-C6	86.90
3°	.015 (1/64)	.150 (10x)	1/8	2-1/2	21915	76.80	21915-C6	84.40
	.030	.156 (5x)	1/8	1-1/2	880230	42.30	880230-C6	49.90
	.030	.300 (10x)	3/16	3	21930	71.70	21930-C6	79.90
	.045	.450 (10x)	3/16	3	21945	73.10	21945-C6	81.30
	.060	.312 (5x)	1/8	1-1/2	880260	42.30	880260-C6	49.90
	.060	.600 (10x)	3/16	3	21960	71.70	21960-C6	79.90
	.090	.900 (10x)	1/4	4	21990	75.70	21990-C6	86.90
	.125 (1/8)	1.192 (10x)	1/4	4	21999	75.70	21999-C6	86.90

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TAPERED

MINIATURE END MILLS

Tapered – Ball (cont.)

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ANGLE PER SIDE	CUTTER DIAMETER	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AITiN NANO COATED	
A ₁ ^{+0°30'} -0°30'	D ₁ ^{+0.0005"} -0.0005"	L ₂ ^{+0.020"} -0.000"	D ₂ (h6)	L ₁	3 FL	PRICE	3 FL	PRICE
4°	.015 (1/64)	.150 (10x)	1/8	2-1/2	840415	80.20	840415-C6	87.80
	.030	.300 (10x)	3/16	3	840430	74.80	840430-C6	83.00
	.060	.600 (10x)	3/16	3	840460	74.80	840460-C6	83.00
	.090	.900 (10x)	1/4	4	840490	79.00	840490-C6	90.20
5°	.015 (1/64)	.150 (10x)	1/8	2-1/2	32615	76.80	32615-C6	84.40
	.030	.156 (5x)	1/8	1-1/2	880630	42.30	880630-C6	49.90
	.030	.300 (10x)	3/16	3	32630	71.70	32630-C6	79.90
	.045	.250 (5x)	1/8	1-1/2	880645	42.30	880645-C6	49.90
	.045	.450 (10x)	3/16	3	32645	73.10	32645-C6	81.30
	.060	.312 (5x)	1/8	1-1/2	880660	42.30	880660-C6	49.90
	.060	.480 (8x)	3/16	2	761960	65.90	761960-C6	74.10
	.060	.600 (10x)	3/16	3	32660	71.70	32660-C6	79.90
	.090	.900 (10x)	1/4	4	32690	75.70	32690-C6	86.90
	.125 (1/8)	1.250 (10x)	3/8	4	32699	100.80	32699-C6	113.40
6°	.015 (1/64)	.150 (10x)	1/8	2-1/2	835615	80.20	835615-C6	87.80
	.030	.300 (10x)	3/16	3	835630	74.10	835630-C6	82.30
	.060	.600 (10x)	3/16	3	835660	78.30	835660-C6	86.50
	.090	.900 (10x)	3/8	4	835690	104.20	835690-C6	116.80
7°	.015 (1/64)	.150 (10x)	1/8	2-1/2	34415	79.40	34415-C6	87.00
	.030	.300 (10x)	3/16	3	34430	74.10	34430-C6	82.30
	.045	.450 (10x)	3/16	3	34445	75.60	34445-C6	83.80
	.060	.600 (10x)	1/4	4	34460	78.30	34460-C6	89.50
	.090	.900 (10x)	3/8	4	34490	104.20	34490-C6	116.80
8°	.015 (1/64)	.150 (10x)	1/8	2-1/2	853815	80.20	853815-C6	87.80
	.030	.300 (10x)	3/16	3	853830	74.80	853830-C6	83.00
	.060	.600 (10x)	1/4	4	853860	78.30	853860-C6	89.50
	.090	.900 (10x)	3/8	4	853890	104.20	853890-C6	116.80
10°	.015 (1/64)	.078 (5x)	1/8	1-1/2	881015	43.60	881015-C6	51.20
	.015 (1/64)	.150 (10x)	1/8	2-1/2	35315	79.40	35315-C6	87.00
	.030	.156 (5x)	1/8	1-1/2	881030	43.60	881030-C6	51.20
	.030	.300 (10x)	3/16	3	35330	74.10	35330-C6	82.30
	.045	.250 (5x)	3/16	2	881045	71.80	881045-C6	80.00
	.045	.450 (10x)	1/4	4	35345	79.40	35345-C6	90.60
	.060	.312 (5x)	3/16	2	881060	71.80	881060-C6	80.00
	.060	.600 (10x)	3/8	4	35360	104.20	35360-C6	116.80
	.090	.500 (5x)	5/16	2-1/2	881090	115.90	881090-C6	128.50
	.125 (1/8)	.625 (5x)	3/8	2-1/2	881099	142.50	881099-C6	155.10
	.187 (3/16)	.937 (5x)	1/2	3	881081	163.30	881081-C6	179.60
	.250 (1/4)	1.177 (5x)	5/8	3-1/2	881084	175.50	881084-C6	192.20
15°	.015 (1/64)	.078 (5x)	1/8	1-1/2	785915	43.20	785915-C6	50.80
	.015 (1/64)	.150 (10x)	1/8	1-1/2	916115	79.10	916115-C6	86.70
	.030	.156 (5x)	1/8	1-1/2	785930	43.20	785930-C6	50.80
	.030	.300 (10x)	3/16	2	916130	73.70	916130-C6	81.90
	.045	.402 (9x)	1/4	2-1/2	916145	79.10	916145-C6	90.30
	.060	.312 (5x)	1/4	2	785960	75.00	785960-C6	86.20
	.060	.600 (10x)	3/8	2-1/2	916160	104.00	916160-C6	116.60
20°	.015 (1/64)	.078 (5x)	1/8	1-1/2	802115	43.60	802115-C6	51.20
	.030	.156 (5x)	3/16	2	802130	71.10	802130-C6	79.30
	.045	.250 (5x)	1/4	2-1/2	802145	79.90	802145-C6	91.10

TAPERED

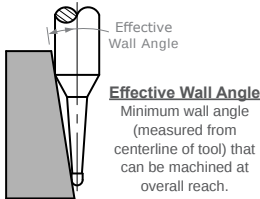
HIGH HELIX END MILLS FOR MEDIUM ALLOY STEELS

Ball – Tapered Reach (Mold Cutters)



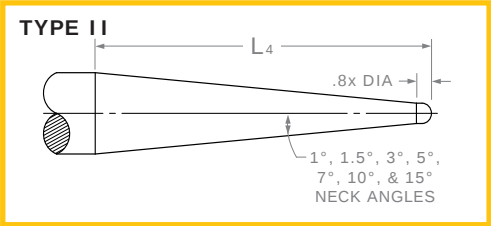
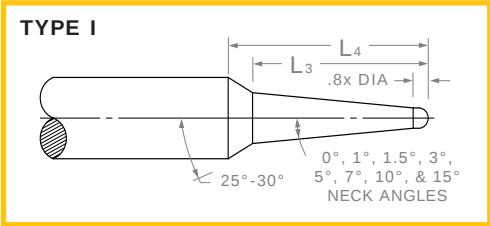
Excellent in Readily
Machinable Mold Steels,
Stainless Steels, & Tool Steels

- Very short length of cut and solid tapered neck for maximum rigidity
- Ideal for contour machining of mold and die cavities
- 35° helix for increased cutting performance
- h6 shank tolerance for high precision tool holders
- Latest generation AlTiN Nano coating offers superior hardness and heat resistance
- 2 flutes to center
- Solid carbide
- CNC ground in the USA



NECK ANGLE	CUTTER DIAMETER	LENGTH OF CUT	TYPE	TAPERED REACH	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIAMETER	OVERALL LENGTH	AlTiN NANO COATED	
A ₁ ^{+0°00'} -0°30'	D ₁ ^{+0.000"} -0.001"	L ₂ ^{+0.010"} -0.000"		L ₃	L ₄		D ₂ (h6)	L ₁	2 FL	PRICE
0° (straight neck)	.062 (1/16)	.050	I	.500	.610	6.2°	3/16	2	882843-C6	60.90
	.062 (1/16)	.050	I	1.000	1.110	3.3°	3/16	2-1/2	882850-C6	66.50
	.093 (3/32)	.074	I	.750	.833	3.4°	3/16	2	882864-C6	60.90
	.093 (3/32)	.074	I	1.125	1.208	2.3°	3/16	2-1/2	882871-C6	66.50
	.125 (1/8)	.100	I	1.000	1.058	1.8°	3/16	2-1/2	882877-C6	66.50
	.125 (1/8)	.100	I	1.750	1.808	1.0°	3/16	3	882885-C6	68.50
1°	.062 (1/16)	.050	I	.500	.595	6.4°	3/16	2	927543-C6	59.90
	.062 (1/16)	.050	I	1.000	1.080	3.5°	3/16	2-1/2	927550-C6	65.40
	.093 (3/32)	.074	I	.750	.811	3.6°	3/16	2	927564-C6	60.50
	.093 (3/32)	.074	I	1.125	1.175	2.4°	3/16	2-1/2	927571-C6	65.40
	.125 (1/8)	.100	I	1.000	1.027	1.9°	3/16	2	927577-C6	62.30
	.125 (1/8)	.100	II	1.890	1.890	1.0°	3/16	3	927585-C6	67.60
	.187 (3/16)	.150	II	1.940	1.940	1.0°	1/4	4	927587-C6	79.40
	.250 (1/4)	.200	II	1.990	1.990	1.0°	5/16	4	927592-C6	84.80
1.5°	.015 (1/64)	.012	I	.125	.269	18.2°	3/16	2	19001-C6	68.00
	.015 (1/64)	.012	I	.250	.389	12.8°	3/16	2	19008-C6	68.00
	.031 (1/32)	.025	I	.250	.375	12.3°	3/16	2	19015-C6	66.50
	.031 (1/32)	.025	I	.500	.614	7.5°	3/16	2	19022-C6	66.50
	.039 (1 mm)	.031	I	.375	.488	9.0°	3/16	2	19025-C6	63.60
	.047 (3/64)	.038	I	.375	.481	8.7°	3/16	2	19029-C6	63.60
	.047 (3/64)	.038	I	.750	.839	5.0°	3/16	2	19036-C6	63.60
	.062 (1/16)	.050	I	.500	.588	6.4°	3/16	2	19043-C6	59.90
	.062 (1/16)	.050	I	1.000	1.066	3.5°	3/16	2-1/2	19050-C6	66.00
	.062 (1/16)	.050	I	1.500	1.543	2.4°	3/16	3	19053-C6	67.90
	.078 (5/64)	.062	I	.625	.694	4.8°	3/16	2	19057-C6	60.50
	.093 (3/32)	.074	I	.750	.801	3.6°	3/16	2	19064-C6	59.90
	.093 (3/32)	.074	I	1.500	1.517	1.9°	3/16	2-1/2	19066-C6	65.40
	.093 (3/32)	.074	II	1.878	1.878	1.5°	3/16	3	19068-C6	68.50
	.125 (1/8)	.100	II	1.293	1.293	1.5°	3/16	2-1/2	19071-C6	62.30
	.125 (1/8)	.100	II	2.487	2.487	1.5°	1/4	4	19078-C6	73.20
	.187 (3/16)	.150	II	1.343	1.343	1.5°	1/4	2-1/2	19085-C6	67.70
	.250 (1/4)	.200	II	1.393	1.393	1.5°	5/16	2-1/2	19092-C6	86.40

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HIGH HELIX END MILLS FOR MEDIUM ALLOY STEELS

Ball – Tapered Reach (Mold Cutters) (cont.)

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NECK ANGLE	CUTTER DIAMETER	LENGTH OF CUT	TYPE	TAPERED REACH	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIAMETER	OVERALL LENGTH	AITIN NANO COATED	
A ₁ ^{+0°00'} -0°30'	D ₁ ^{+0.000"} -0.001"	L ₂ ^{+0.010"} -0.000"		L ₃	L ₄		D ₂ (h6)	L ₁	2 FL	PRICE
3°	.015 (1/64)	.012	I	.156	.292	16.8°	3/16	2-1/2	36901-C6	73.10
	.015 (1/64)	.012	I	.375	.491	10.1°	3/16	2-1/2	66643-C6	68.50
	.015 (1/64)	.012	I	.875	.946	5.3°	3/16	2-1/2	66648-C6	67.90
	.020	.016	I	.250	.374	13.0°	3/16	2-1/2	36904-C6	72.40
	.020	.016	I	.500	.601	8.1°	3/16	2-1/2	36907-C6	72.40
	.025	.020	I	.250	.370	12.8°	3/16	2-1/2	36910-C6	72.80
	.025	.020	I	.500	.597	7.9°	3/16	2-1/2	36913-C6	72.10
	.031 (1/32)	.025	I	.312	.421	10.9°	3/16	2-1/2	36916-C6	72.80
	.031 (1/32)	.025	I	.750	.820	5.6°	3/16	2-1/2	67046-C6	59.70
	.031 (1/32)	.025	II	1.518	1.518	3.0°	3/16	2-1/2	36931-C6	59.70
	.039 (1 mm)	.031	I	.375	.472	9.3°	3/16	2-1/2	36917-C6	72.80
	.039 (1 mm)	.031	I	.750	.813	5.4°	3/16	2-1/2	36919-C6	72.10
	.039 (1 mm)	.031	II	1.448	1.448	3.0°	3/16	2-1/2	36921-C6	72.80
	.047 (3/64)	.038	I	.375	.466	9.0°	3/16	2-1/2	36922-C6	69.70
	.047 (3/64)	.038	I	.875	.921	4.5°	3/16	2-1/2	67348-C6	56.30
	.047 (3/64)	.038	II	1.378	1.378	3.0°	3/16	2-1/2	36947-C6	56.30
	.050	.040	I	.500	.577	7.1°	3/16	2-1/2	36925-C6	69.70
	.060	.048	I	.625	.683	5.6°	3/16	2-1/2	36928-C6	69.70
	.062 (1/16)	.050	I	.375	.454	8.4°	3/16	2-1/2	36934-C6	65.70
	.062 (1/16)	.050	I	.625	.681	5.5°	3/16	2-1/2	66946-C6	56.30
	.062 (1/16)	.050	I	.875	.909	4.1°	3/16	2-1/2	36937-C6	65.10
	.062 (1/16)	.050	II	1.247	1.247	3.0°	3/16	2-1/2	36962-C6	56.30
	.062 (1/16)	.050	II	1.843	1.843	3.0°	1/4	3	37362-C6	74.40
	.078 (5/64)	.062	I	.500	.555	6.1°	3/16	2-1/2	36940-C6	65.10
	.078 (5/64)	.062	II	1.107	1.107	3.0°	3/16	2-1/2	36978-C6	54.80
	.093 (3/32)	.074	I	.625	.657	4.5°	3/16	2	36943-C6	59.90
	.093 (3/32)	.074	II	.976	.976	3.0°	3/16	2	36993-C6	49.90
	.093 (3/32)	.074	II	1.572	1.572	3.0°	1/4	3	37393-C6	73.10
	.100	.080	II	1.511	1.511	3.0°	1/4	3	37400-C6	75.60
	.109 (7/64)	.087	II	1.432	1.432	3.0°	1/4	3	37402-C6	75.60
	.118 (3 mm)	.094	II	1.354	1.354	2.9°	1/4	2-1/2	37405-C6	74.90
	.125 (1/8)	.100	I	.875	.913	4.2°	1/4	2-1/2	36946-C6	71.60
	.125 (1/8)	.100	II	1.293	1.293	2.9°	1/4	2-1/2	37408-C6	68.10
	.125 (1/8)	.100	II	2.485	2.485	3.0°	3/8	4	37708-C6	106.70
	.156 (5/32)	.125	II	1.020	1.020	2.8°	1/4	2-1/2	37410-C6	74.40
	.187 (3/16)	.150	II	.746	.746	2.8°	1/4	2-1/2	37412-C6	73.70
	.187 (3/16)	.150	II	1.343	1.343	2.9°	5/16	2-1/2	36949-C6	86.40
	.187 (3/16)	.150	II	1.939	1.939	2.9°	3/8	4	37712-C6	106.70
	.250 (1/4)	.200	II	1.393	1.393	2.9°	3/8	2-1/2	37716-C6	89.00
5°	.015 (1/64)	.012	I	.375	.469	10.6°	3/16	2	66664-C6	61.50
	.015 (1/64)	.012	II	.998	.998	5.0°	3/16	2	38515-C6	61.20
	.020	.016	I	.562	.624	7.8°	3/16	2	38907-C6	66.80
	.020	.016	II	.973	.973	5.0°	3/16	2	38520-C6	66.50
	.025	.020	I	.562	.621	7.6°	3/16	2	38914-C6	67.50
	.025	.020	II	.949	.949	5.0°	3/16	2	38525-C6	67.20
	.031 (1/32)	.025	I	.375	.457	10.1°	3/16	2	67065-C6	54.70
	.031 (1/32)	.025	II	.919	.919	5.0°	3/16	2	38531-C6	54.70
	.039 (1 mm)	.031	I	.625	.664	6.6°	3/16	2	38921-C6	66.50

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MEDIUM ALLOY STEELS

HIGH HELIX END MILLS FOR MEDIUM ALLOY STEELS

Ball – Tapered Reach (Mold Cutters) (cont.)

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NECK ANGLE	CUTTER DIAMETER	LENGTH OF CUT	TYPE	TAPERED REACH	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIAMETER	OVERALL LENGTH	AITIN NANO COATED	
A ₁ ^{+0°00'} _{-0°30'}	D ₁ ^{+0.000"} _{-0.001"}	L ₂ ^{+0.010"} _{-0.000"}		L ₃	L ₄		D ₂ (h6)	L ₁	2 FL	PRICE
5°	.047 (3/64)	.038	II	.841	.841	5.0°	3/16	2	38547-C6	55.20
	.047 (3/64)	.038	II	1.198	1.198	5.0°	1/4	2-1/2	38947-C6	73.70
	.050	.040	II	.826	.826	4.9°	3/16	2	38928-C6	55.60
	.060	.048	II	.777	.777	4.9°	3/16	2	38935-C6	55.10
	.060	.048	II	1.134	1.134	5.0°	1/4	2-1/2	38960-C6	73.70
	.062 (1/16)	.050	I	.375	.434	8.8°	3/16	2	66963-C6	52.00
	.062 (1/16)	.050	II	.767	.767	4.9°	3/16	2	38562-C6	51.50
	.062 (1/16)	.050	II	1.124	1.124	5.0°	1/4	2-1/2	38962-C6	73.70
	.078 (5/64)	.062	II	1.045	1.045	4.9°	1/4	2-1/2	38978-C6	70.30
	.093 (3/32)	.074	II	.972	.972	4.9°	1/4	2-1/2	38993-C6	71.00
	.093 (3/32)	.074	II	1.686	1.686	5.0°	3/8	3	39293-C6	94.20
	.100	.080	II	.937	.937	4.9°	1/4	2-1/2	39000-C6	71.50
	.109 (7/64)	.087	II	.893	.893	4.8°	1/4	2-1/2	39002-C6	71.50
	.118 (3 mm)	.094	II	.849	.849	4.7°	1/4	2-1/2	39005-C6	70.80
	.125 (1/8)	.100	I	.500	.548	7.3°	1/4	2-1/2	38942-C6	67.40
	.125 (1/8)	.100	II	.814	.814	4.8°	1/4	2-1/2	39008-C6	67.00
	.125 (1/8)	.100	II	1.529	1.529	4.9°	3/8	3	39308-C6	90.00
	.156 (5/32)	.125	II	.661	.661	4.6°	1/4	2-1/2	39010-C6	70.30
	.187 (3/16)	.150	II	1.222	1.222	4.8°	3/8	2-1/2	39312-C6	86.40
	.187 (3/16)	.150	II	1.222	1.222	4.8°	3/8	4	922312-C6	96.30
	.250 (1/4)	.200	II	.914	.914	4.5°	3/8	2-1/2	39316-C6	87.20
	.250 (1/4)	.200	II	.914	.914	4.5°	3/8	4	922316-C6	96.30
7°	.015 (1/64)	.012	I	.187	.299	16.5°	3/16	2	66678-C6	61.50
	.015 (1/64)	.012	II	.714	.714	7.0°	3/16	2	40015-C6	62.10
	.020	.016	II	.698	.698	7.0°	3/16	2	40020-C6	61.50
	.031 (1/32)	.025	I	.250	.338	13.6°	3/16	2	67078-C6	55.10
	.031 (1/32)	.025	II	.662	.662	6.9°	3/16	2	40031-C6	55.10
	.031 (1/32)	.025	II	.917	.917	7.0°	1/4	2-1/2	40431-C6	70.30
	.039 (1 mm)	.031	II	.636	.636	6.9°	3/16	2	40007-C6	55.10
	.047 (3/64)	.038	I	.375	.425	9.9°	3/16	2	40014-C6	55.10
	.047 (3/64)	.038	II	.610	.610	6.9°	3/16	2	40047-C6	55.10
	.047 (3/64)	.038	II	.864	.864	6.9°	1/4	2-1/2	40447-C6	70.30
	.060	.048	II	.822	.822	6.9°	1/4	2-1/2	40460-C6	71.00
	.062 (1/16)	.050	I	.500	.567	9.9°	1/4	2-1/2	66980-C6	70.30
	.062 (1/16)	.050	II	.815	.815	6.9°	1/4	2-1/2	40462-C6	70.30
	.062 (1/16)	.050	II	1.324	1.324	6.9°	3/8	2-1/2	40862-C6	90.20
	.078 (5/64)	.062	II	1.272	1.272	6.9°	3/8	2-1/2	40878-C6	90.20
	.093 (3/32)	.074	II	.714	.714	6.7°	1/4	2-1/2	40493-C6	67.00
	.093 (3/32)	.074	II	1.223	1.223	6.9°	3/8	2-1/2	40893-C6	90.20
	.125 (1/8)	.100	II	.609	.609	6.5°	1/4	2-1/2	40508-C6	63.90
	.125 (1/8)	.100	II	1.118	1.118	6.8°	3/8	2-1/2	40908-C6	87.20
	.187 (3/16)	.150	II	.914	.914	6.5°	3/8	2-1/2	40912-C6	87.20
	.187 (3/16)	.150	II	.914	.914	6.5°	3/8	4	917212-C6	97.30
10°	.031 (1/32)	.025	I	.250	.317	14.5°	3/16	2	774631-C6	55.60
	.062 (1/16)	.050	I	.500	.525	10.7°	1/4	2	774662-C6	71.00
	.125 (1/8)	.100	II	.632	.632	9.0°	5/16	2-1/2	774608-C6	87.20
15°	.031 (1/32)	.025	I	.250	.281	16.3°	3/16	2	773931-C6	55.60
	.062 (1/16)	.050	II	.401	.401	14.1°	1/4	2	773962-C6	71.00
	.125 (1/8)	.100	II	.567	.567	13.7°	3/8	2-1/2	773908-C6	87.20

MEDIUM ALLOY STEELS

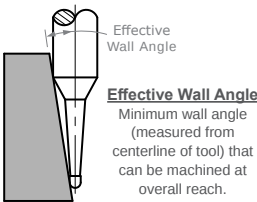
HIGH HELIX END MILLS FOR ALUMINUM ALLOYS

Ball – Tapered Reach (Mold Cutters)



Excellent in Aluminum & Other Non-Ferrous Materials

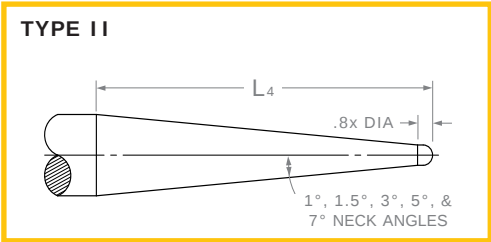
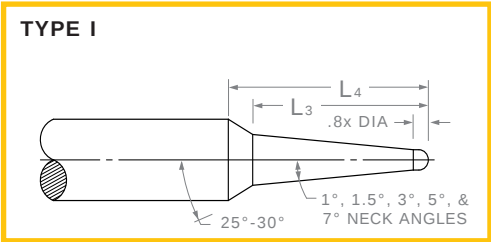
- Very short length of cut and solid tapered neck for maximum rigidity
- 1°, 1.5°, 3°, 5°, and 7° neck angles to address common draft angles for molds
- 45° helix, large flute valley, and sharper cutting edge for faster chip removal and better finish
- Offered with TiB₂ coating to minimize galling and enhance performance
- 2 flutes to center
- Solid carbide
- CNC ground in the USA



ALUMINUM ALLOYS

NECK ANGLE	CUTTER DIA.	LENGTH OF CUT	TYPE	TAPERED REACH	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIA.	OAL	UNCOATED		TiB ₂ COATED	
									2 FL	PRICE	2 FL	PRICE
A ₁ ^{+0°00'} / _{-0°30'}	D ₁ ^{+0.000"} / _{-.001"}	L ₂ ^{+0.010"} / _{-.000"}		L ₃	L ₄		D ₂ (h6)	L ₁				
1°	.062 (1/16)	.050	I	.500	.595	6.4°	3/16	2	925049	54.00	925049-C8	61.60
	.062 (1/16)	.050	I	1.000	1.080	3.5°	3/16	2-1/2	925056	54.00	925056-C8	61.60
	.093 (3/32)	.074	I	.750	.811	3.6°	3/16	2	925070	51.70	925070-C8	59.30
	.093 (3/32)	.074	I	1.125	1.175	2.4°	3/16	2-1/2	925072	54.00	925072-C8	61.60
	.125 (1/8)	.100	I	1.000	1.027	1.9°	3/16	2	925091	65.40	925091-C8	73.00
	.125 (1/8)	.100	II	1.890	1.890	1.0°	3/16	3	925077	67.60	925077-C8	75.20
	.187 (3/16)	.150	II	1.940	1.940	1.0°	1/4	4	925087	68.10	925087-C8	77.30
	.250 (1/4)	.200	II	1.990	1.990	1.0°	5/16	4	925092	73.00	925092-C8	94.10
1.5°	.015 (1/64)	.012	I	.125	.269	18.2°	3/16	2	997807	61.10	997807-C8	68.70
	.015 (1/64)	.012	I	.250	.389	12.8°	3/16	2	997814	60.50	997814-C8	68.10
	.031 (1/32)	.025	I	.250	.375	12.3°	3/16	2	997821	55.60	997821-C8	63.20
	.031 (1/32)	.025	I	.500	.614	7.5°	3/16	2	997828	55.60	997828-C8	63.20
	.047 (3/64)	.038	I	.375	.481	8.7°	3/16	2	997835	55.30	997835-C8	62.90
	.047 (3/64)	.038	I	.750	.839	5.0°	3/16	2	997842	55.30	997842-C8	62.90
	.062 (1/16)	.050	I	.500	.588	6.4°	3/16	2	997849	54.00	997849-C8	61.60
	.062 (1/16)	.050	I	1.000	1.066	3.5°	3/16	2-1/2	997856	54.00	997856-C8	61.60
	.078 (5/64)	.062	I	.625	.694	4.8°	3/16	2	997863	52.70	997863-C8	60.30
	.093 (3/32)	.074	I	.750	.801	3.6°	3/16	2	997870	51.70	997870-C8	59.30
	.125 (1/8)	.100	II	1.293	1.293	1.5°	3/16	2-1/2	997877	65.40	997877-C8	73.00
	.187 (3/16)	.150	II	1.343	1.343	1.5°	1/4	2-1/2	997887	66.20	997887-C8	74.40
	.250 (1/4)	.200	II	1.393	1.393	1.5°	5/16	2-1/2	997892	71.50	997892-C8	88.90

continued on next page



HIGH HELIX END MILLS FOR ALUMINUM ALLOYS

Ball – Tapered Reach (Mold Cutters) (cont.)

continued from previous page

NECK ANGLE	CUTTER DIA.	LENGTH OF CUT	TYPE	TAPERED REACH	OVERALL REACH	EFFECTIVE WALL ANGLE	SHANK DIA.	OAL	UNCOATED		TiB ₂ COATED	
A ₁ +0°00' -0°30'	D ₁ +.000" -.001"	L ₂ +.010" -.000"		L ₃	L ₄		D ₂ (h6)	L ₁	2 FL	PRICE	2 FL	PRICE
3°	.031 (1/32)	.025	I	.750	.820	5.6°	3/16	2-1/2	996607	57.50	996607-C8	65.10
	.031 (1/32)	.025	II	1.518	1.518	3.0°	3/16	2-1/2	996614	57.50	996614-C8	65.10
	.047 (3/64)	.038	I	.875	.921	4.5°	3/16	2-1/2	996621	53.80	996621-C8	61.40
	.047 (3/64)	.038	II	1.378	1.378	3.0°	3/16	2-1/2	996628	54.30	996628-C8	61.90
	.062 (1/16)	.050	I	.625	.681	5.5°	3/16	2-1/2	996635	54.30	996635-C8	61.90
	.062 (1/16)	.050	II	1.247	1.247	3.0°	3/16	2-1/2	996642	54.30	996642-C8	61.90
	.078 (5/64)	.062	II	1.107	1.107	3.0°	3/16	2-1/2	996649	52.70	996649-C8	60.30
	.093 (3/32)	.074	II	.976	.976	3.0°	3/16	2	996656	47.70	996656-C8	55.30
	.125 (1/8)	.100	II	1.293	1.293	2.9°	1/4	2-1/2	996663	65.40	996663-C8	73.60
	.187 (3/16)	.150	II	.746	.746	2.8°	1/4	2-1/2	996670	70.80	996670-C8	79.00
	.187 (3/16)	.150	II	1.939	1.939	2.9°	3/8	4	996674	73.70	996674-C8	98.50
	.250 (1/4)	.200	II	1.393	1.393	2.9°	3/8	2-1/2	996692	72.10	996692-C8	93.20
5°	.031 (1/32)	.025	II	.919	.919	5.0°	3/16	2	996007	52.40	996007-C8	60.00
	.047 (3/64)	.038	II	.841	.841	5.0°	3/16	2	996014	51.90	996014-C8	59.50
	.062 (1/16)	.050	II	.767	.767	4.9°	3/16	2	996021	48.80	996021-C8	56.40
	.078 (5/64)	.062	II	1.045	1.045	4.9°	1/4	2-1/2	996028	67.60	996028-C8	75.80
	.093 (3/32)	.074	II	.971	.971	4.9°	1/4	2-1/2	996035	68.20	996035-C8	76.40
	.125 (1/8)	.100	II	.814	.814	4.8°	1/4	2-1/2	996042	70.30	996042-C8	78.50
	.187 (3/16)	.150	II	1.222	1.222	4.8°	3/8	2-1/2	996087	72.80	996087-C8	93.90
	.250 (1/4)	.200	II	.914	.914	4.5°	3/8	2-1/2	996092	72.80	996092-C8	93.90
7°	.031 (1/32)	.025	II	.662	.662	6.9°	3/16	2	995607	51.90	995607-C8	59.50
	.047 (3/64)	.038	II	.610	.610	6.9°	3/16	2	995614	52.40	995614-C8	60.00
	.062 (1/16)	.050	II	.816	.816	6.9°	1/4	2-1/2	995621	67.60	995621-C8	75.80
	.078 (5/64)	.062	II	.762	.762	6.8°	1/4	2-1/2	995628	68.20	995628-C8	76.40
	.093 (3/32)	.074	II	.713	.713	6.7°	1/4	2-1/2	995635	64.20	995635-C8	72.40
	.125 (1/8)	.100	II	.609	.609	6.5°	1/4	2-1/2	995642	61.70	995642-C8	69.90
	.187 (3/16)	.150	II	.914	.914	6.5°	3/8	2-1/2	995687	72.80	995687-C8	93.90

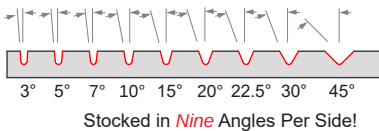
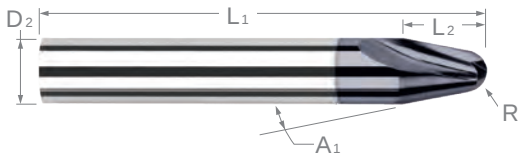
ALUMINUM ALLOYS



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RUNNER CUTTERS



- Designed to mill 3°, 5°, 7°, 10°, 15°, 20°, 22.5°, 30°, or 45° channels in molds
- 2 helical flutes (12° helix)
- AlTiN coating for increased performance in ferrous materials
- AlTiN Nano coating for superior performance in ferrous and difficult to machine materials
- Center cutting
- Solid carbide
- CNC ground in the USA

RUNNER CUTTERS

ANGLE PER SIDE	RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		AITiN COATED		AITiN NANO COATED	
					2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
A ₁ ^{+0°30'} -0°30'	R ^{+.0005"} -.0005"	L ₂	D ₂ (h6)	L ₁						
3°	1/64	.921	1/8	1-1/2	843600	47.30	843600-C3	52.50		
	1/32	.631	1/8	1-1/2	843602	47.30	843602-C3	52.50		
	1/16	.666	3/16	2	843604	52.10	843604-C3	57.70		
5°	1/64	.557	1/8	1-1/2	936300	47.30	936300-C3	52.50		
	1/32	.390	1/8	1-1/2	936302	47.30	936302-C3	52.50		
	3/64	.579	3/16	2	936303	52.10	936303-C3	57.70		
	1/16	.422	3/16	2	936304	52.10	936304-C3	57.70		
	3/32	.812	5/16	2-1/2	936306	66.90	936306-C3	75.80		
	1/8	.834	3/8	2-1/2	936308	75.10	936308-C3	85.20		
7°	1/64	.401	1/8	1-1/2	764600	47.80	764600-C3	53.00		
	1/32	.286	1/8	1-1/2	764602	47.80	764602-C3	53.00		
	1/16	.571	1/4	2-1/2	764604	52.10	764604-C3	59.70		
10°	.005	.331	1/8	1-1/2	75050	41.50	75050-C3	46.70		
	.010	.307	1/8	1-1/2	75052	41.50	75052-C3	46.70	75052-C6	49.10
	1/64	.283	1/8	1-1/2	75000	41.50	75000-C3	46.70	75000-C6	49.10
	.020	.259	1/8	1-1/2	75001	41.50	75001-C3	46.70	75001-C6	49.10
	.025	.235	1/8	1-1/2	75054	41.50	75054-C3	46.70		
	1/32	.384	3/16	2	75002	47.30	75002-C3	52.90	75002-C6	55.50
	.040	.341	3/16	2	75062	52.10	75062-C3	57.70		
	3/64	.308	3/16	2	75003	52.10	75003-C3	57.70		
	1/16	.414	1/4	2-1/2	75004	58.40	75004-C3	66.00	75004-C6	69.60
	5/64	.338	1/4	2-1/2	75005	59.90	75005-C3	67.50		
	3/32	.444	5/16	2-1/2	75006	66.90	75006-C3	75.80		
	7/64	.367	5/16	2-1/2	75007	67.20	75007-C3	76.10		
	1/8	.469	3/8	2-1/2	75008	75.10	75008-C3	85.20		
	5/32	.675	1/2	3	75010	88.40	75010-C3	103.50		

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RUNNER CUTTERS

(cont.)

continued from previous page

ANGLE PER SIDE	RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		A1TiN COATED		A1TiN NANO COATED	
					2 FL	PRICE	2 FL	PRICE	2 FL	PRICE
A1 ^{+0°30'} _{-0°30'}	R ^{+.0005"} _{-.0005"}	L ₂	D ₂ (h6)	L ₁						
15°	.005	.219	1/8	1-1/2	75150	42.30	75150-C3	47.50		
	.010	.205	1/8	1-1/2	75152	41.50	75152-C3	46.70	75152-C6	49.10
	1/64	.190	1/8	1-1/2	75100	41.50	75100-C3	46.70	75100-C6	49.10
	.020	.176	1/8	1-1/2	75101	41.50	75101-C3	46.70	75101-C6	49.10
	.025	.162	1/8	1-1/2	75154	41.50	75154-C3	46.70	75154-C6	49.10
	1/32	.261	3/16	2	75102	47.30	75102-C3	52.90	75102-C6	55.50
	.039	.238	3/16	2	75160	52.10	75160-C3	57.70		
	.040	.235	3/16	2	75162	52.10	75162-C3	57.70		
	3/64	.215	3/16	2	75103	52.10	75103-C3	57.70		
	1/16	.289	1/4	2-1/2	75104	58.40	75104-C3	66.00	75104-C6	69.60
	5/64	.243	1/4	2-1/2	75105	59.90	75105-C3	67.50		
	3/32	.317	5/16	2-1/2	75106	66.90	75106-C3	75.80		
	7/64	.271	5/16	2-1/2	75107	67.20	75107-C3	76.10		
	1/8	.342	3/8	2-1/2	75108	75.10	75108-C3	85.20		
20°	5/32	.486	1/2	3	75110	88.40	75110-C3	103.50		
	.005	.162	1/8	1-1/2	979950	43.40	979950-C3	48.60		
	.010	.152	1/8	1-1/2	979952	43.40	979952-C3	48.60		
	1/64	.143	1/8	1-1/2	979900	41.50	979900-C3	46.70	979900-C6	49.10
	.020	.133	1/8	1-1/2	979901	44.70	979901-C3	49.90	979901-C6	52.30
	.025	.124	1/8	1-1/2	979954	44.70	979954-C3	49.90		
	1/32	.198	3/16	2	979902	47.30	979902-C3	52.90	979902-C6	55.50
	3/64	.167	3/16	2	979903	52.10	979903-C3	57.70		
	1/16	.224	1/4	2-1/2	979904	58.40	979904-C3	66.00		
	5/64	.193	1/4	2-1/2	979905	60.50	979905-C3	68.10		
22.5°	3/32	.250	5/16	2-1/2	979906	66.90	979906-C3	75.80		
	1/8	.275	3/8	2-1/2	979908	75.10	979908-C3	85.20		
	.010	.135	1/8	1-1/2	867852	43.40	867852-C3	48.60		
	1/64	.127	1/8	1-1/2	867800	41.50	867800-C3	46.70		
	.020	.194	3/16	2	867801	47.30	867801-C3	52.90		
30°	1/32	.176	3/16	2	867802	47.30	867802-C3	52.90		
	1/16	.277	5/16	2-1/2	867804	66.90	867804-C3	75.80		
	.005	.157	3/16	2	934550	61.80	934550-C3	67.40		
	.010	.152	3/16	2	934552	61.80	934552-C3	67.40	934552-C6	70.00
	1/64	.147	3/16	2	934500	59.90	934500-C3	65.50	934500-C6	68.10
	.020	.142	3/16	2	934501	59.90	934501-C3	65.50	934501-C6	68.10
	.025	.192	1/4	2-1/2	934554	59.90	934554-C3	67.50		
	1/32	.186	1/4	2-1/2	934502	59.90	934502-C3	67.50	934502-C6	71.10
45°	3/64	.224	5/16	2-1/2	934503	66.90	934503-C3	75.80		
	1/16	.263	3/8	2-1/2	934504	75.10	934504-C3	85.20	934504-C6	87.70
	.005	.123	1/4	2-1/2	856550	63.00	856550-C3	70.60		
	.010	.121	1/4	2-1/2	856552	63.00	856552-C3	70.60	856552-C6	74.20
	1/64	.119	1/4	2-1/2	856500	61.10	856500-C3	68.70		
	.020	.148	5/16	2-1/2	856501	61.10	856501-C3	70.00		
	1/32	.143	5/16	2-1/2	856502	68.00	856502-C3	76.90		
	3/64	.168	3/8	2-1/2	856503	76.50	856503-C3	86.60		
NEW	1/16	.224	1/2	3	856504	92.40	856504-C3	107.50		

RUNNER CUTTERS

NEW

NEW

NEW

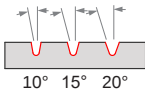
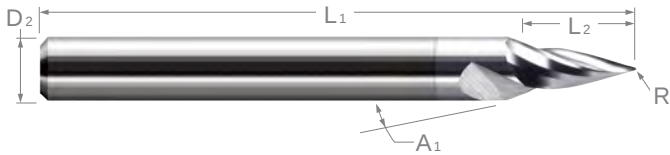
NEW

NEW

NEW

RUNNER CUTTERS

For Non-Ferrous Materials



Stocked in **Three** Angles Per Side!

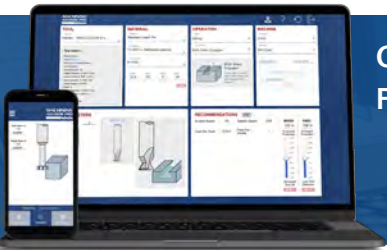
- Optimized for aluminum and aluminum alloys with excellent performance in copper, brass, and bronze alloys
- Designed to mill 10°, 15°, and 20° channels in molds
- 2 helical flutes (approx. 25° helix)
- Offered with TiB₂ coating to minimize galling
- Center cutting
- Solid carbide
- CNC ground in the USA

RUNNER CUTTERS

ANGLE PER SIDE	RADIUS	LENGTH OF CUT	SHANK DIAMETER	OVERALL LENGTH	UNCOATED		TiB ₂ COATED	
					2 FL	PRICE	2 FL	PRICE
A ₁ ^{+0°30'} -0°30'	R ^{+.0005"} -.0005"	L ₂	D ₂ (h6)	L ₁	773452	42.50	773452-C8	50.10
10°	.010	.307	1/8	1-1/2	773400	42.50	773400-C8	50.10
	.015	.283	1/8	1-1/2	773402	48.30	773402-C8	55.90
	.031	.384	3/16	2	772252	42.50	772252-C8	50.10
15°	.010	.205	1/8	1-1/2	772200	42.90	772200-C8	50.50
	.015	.190	1/8	1-1/2	772202	48.30	772202-C8	55.90
	.031	.261	3/16	2	771252	42.50	771252-C8	50.10
20°	.010	.152	1/8	1-1/2	771200	42.50	771200-C8	50.10
	.015	.143	1/8	1-1/2	771202	48.30	771202-C8	55.90
	.031	.198	3/16	2				

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