

GENERAL PURPOSE

Solid Carbide End Mills For Ferrous And Non-Ferrous Materials



INTRO

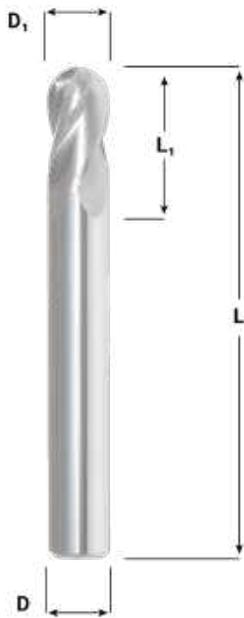
MILLING

SPECIALTY

HOLEMAKING

THREADING

INSERTS



FEATURES/DESCRIPTION				APPLICATION		FEATURES						
4-Flute Ball Nose End Mills <ul style="list-style-type: none"> • Universal application • Sub-micron grade carbide substrate for wear resistance • Multiple coating options • Diameter Tol.: +0/-0.002" • Shank Tol.: +0/-0.0005" 												
STEEL		STAINLESS		CAST IRON		NON-FERROUS		HBSA		HARDENED STEEL		
P1	P2	P3	M1	M2	K1	K2	N1	N2	S1	S2	H1	H2
○	○	○			○	○	○	○			○	

● Best ○ Good

Series 220 | 4FL | Multi Length | Ball Nose

Diameter(D ₁)	LOC(L ₁)	OAL(L)	Shank(D)	Bright	TiN	TiCN	AlTiN
1/64	3/64	1-1/2	1/8	223-000998	223-000995	223-020998	223-001007
1/32	1/8	1-1/2	1/8	223-000999	223-001003	223-000996	223-001009
3/64	1/8	1-1/2	1/8	223-001000	223-001004	223-021000	223-001014
1/16	1/4	1-1/2	1/8	223-001001	223-001002	223-001015	223-001016
5/64	1/4	1-1/2	1/8	223-001005	223-001006	223-001008	223-001019
3/32	3/8	1-1/2	1/8	223-001010	223-001011	223-001012	223-001013
7/64	3/8	1-1/2	1/8	223-001017	223-001052	223-021051	223-001039
1/8	1/2	1-1/2	1/8	223-001020	223-001021	223-001023	223-001028
1/8	3/4	2-1/4	1/8	226-001001	226-001002	226-001003	226-001004
1/8	1	3	1/8	229-001001	229-001002	229-001003	229-001004
9/64	9/16	2	3/16	223-001025	223-001026	223-001027	223-001029
5/32	9/16	2	3/16	223-001030	223-001031	223-001033	223-001032
5/32	3/4	2-1/2	3/16	226-001005	226-001006	226-001008	226-001007
5/32	1-1/8	3	3/16	229-001005	229-001006	229-001008	229-001009
11/64	9/16	2	3/16	223-001035	223-001055	223-021054	223-001043
3/16	5/8	2	3/16	223-001040	223-001041	223-001042	223-001034
3/16	3/4	2-1/2	3/16	226-001012	226-001013	226-001014	226-001016
3/16	1	4	3/16	229-001015	-	-	-
3/16	1-1/8	3	3/16	229-001010	229-001011	229-001012	229-001014
13/64	5/8	2-1/2	1/4	223-001046	223-001059	223-021058	223-001047
7/32	5/8	2-1/2	1/4	223-001050	223-001056	223-001037	223-001036
15/64	3/4	2-1/2	1/4	223-001053	223-001057	223-021053	223-001045
1/4	3/4	2-1/2	1/4	223-001060	223-001062	223-001063	223-001066
1/4	1-1/8	3	1/4	226-001020	226-001021	226-001022	226-001024
1/4	1-1/2	4	1/4	229-001020	229-001021	229-001022	229-001024
1/4	1-1/2	6	1/4	229-001026	229-001026A	229-001026C	229-001027
17/64	3/4	2-1/2	5/16	223-001061	223-001064	223-021061	223-031061
9/32	3/4	2-1/2	5/16	223-001070	223-001065	223-001067	223-001068
19/64	13/16	2-1/2	5/16	223-001071	223-001072	223-021071	223-031071
5/16	13/16	2-1/2	5/16	223-001080	223-001082	223-001083	223-001073
5/16	1-1/8	3	5/16	226-001030	226-001031	226-001032	226-001034
5/16	1-1/2	6	5/16	229-001035	229-001035A	229-001035C	229-001036
5/16	1-5/8	4	5/16	229-001030	229-001031	229-001032	229-001034
21/64	1	2-1/2	3/8	223-001084	223-001085	223-021084	223-031084
11/32	1	2-1/2	3/8	223-001086	223-001087	223-001169	223-001115
23/64	1	2-1/2	3/8	223-001088	223-001089	223-021088	223-031088
3/8	1	2-1/2	3/8	223-001090	223-001092	223-001093	223-001116
3/8	1-1/8	3	3/8	226-001040	226-001041	226-001042	226-001044
3/8	1-1/2	6	3/8	229-001046	229-001048	229-001049	229-001047
3/8	1-3/4	4	3/8	229-001040	229-001041	229-001042	229-001044
25/64	1	2-3/4	7/16	223-001094	223-001096	223-021094	223-031094
13/32	1	2-3/4	7/16	223-001095	223-001097	223-021095	223-001117
27/64	1	2-3/4	7/16	223-001098	223-001099	223-021098	223-031098
7/16	1	2-3/4	7/16	223-001100	223-001101	223-001102	223-001118
7/16	2	4	7/16	226-001050	226-001051	226-001052	226-001054

*bold numbers are EDPs for ordering

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Diameter(D ₁)	LOC(L ₁)	OAL(L)	Shank(D)	Bright	TiN	TiCN	AlTiN
7/16	3	6	7/16	229-001050	229-001051	229-001052	229-001053
29/64	1	3	1/2	223-001103	223-001104	223-021103	223-031103
15/32	1	3	1/2	223-001105	223-001107	223-001121	223-001119
31/64	1	3	1/2	223-001109	223-001108	223-021108	223-031108
1/2	1	3	1/2	223-001110	223-001111	223-001112	223-001114
1/2	1-1/2	4	1/2	226-001059	226-001057	226-001058	226-001059A
1/2	1-1/2	6	1/2	229-001053A	229-001055	229-001056	229-001057
1/2	2	4	1/2	226-001060	226-001061	226-001062	226-001064
1/2	3	6	1/2	229-001053AA	229-001066	229-001067	229-001068
9/16	1-1/4	3-1/2	9/16	223-001120	223-001125	223-001126	223-001127
5/8	1-1/4	3-1/2	5/8	223-001130	223-001131	223-001132	223-001135
5/8	1-1/2	6	5/8	229-001076	229-001076A	229-001076C	229-001077
5/8	2-1/4	5	5/8	226-001070	226-001071	226-001072	226-001074
5/8	3	6	5/8	229-001070	229-001071	229-001072	229-001074
11/16	1-1/2	4	3/4	223-001140	223-001155	223-021156	223-001167
3/4	1-1/2	4	3/4	223-001150	223-001151	223-001152	223-001154
3/4	1-1/2	6	3/4	229-001085	229-001085A	229-001085C	229-001086
3/4	2-1/4	5	3/4	226-001080	226-001081	226-001082	226-001084
3/4	3	6	3/4	229-001080	229-001081	229-001082	229-001084
3/4	4	7	3/4	229-001080A	-	229-001080C	229-001080B
7/8	1-1/2	4	7/8	223-001157	223-001159	223-021157	223-001165
1	1-1/2	4	1	223-001160	223-001162	-	223-001163
1	1-1/2	6	1	229-001095	229-001095C	-	229-001096
1	2-1/4	5	1	226-001090	226-001092	-	226-001097
1	3	6	1	229-001090	229-001092	-	229-001094

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Popular Custom Milling Options

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

CUSTOM
COMES
STANDARD

INTRO

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INSERTS