Tools for DIE/MOLD & HARDENED MATERIALS

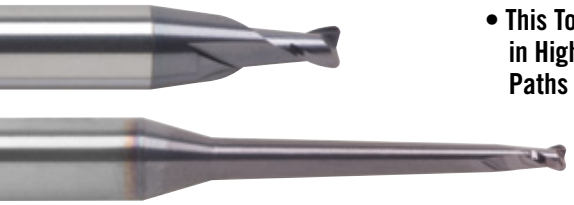
Die/Mold
Scan this code to:

- Watch Videos
- See Tips and Tricks
- Learn How to Choose the Right Tool
- And More...

Featured Tools:

TM/MTM Series – High Feed Mill

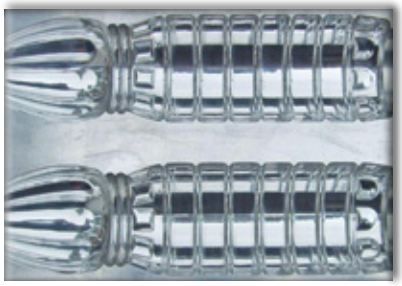
Page 128



- High Speed Geometry
- This Tool Works Great in High Speed Tool Paths and in Tight Areas

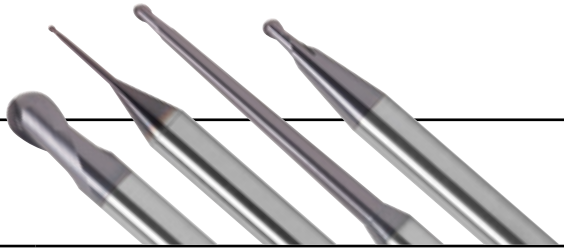
DM/MDM Series – 3-D Cutting of Cavities & Cores

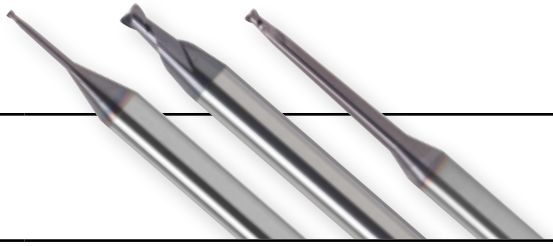
Page 125



HM/MHM Series – Straight Walls, Flat Floors, Open Areas

Page 130





P38 Lightning Diamond Coated Series End Mills

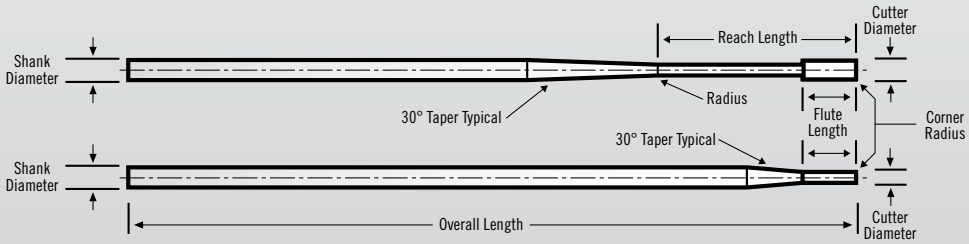
Characteristics: Ball End, Corner Radius, Square End, 2 Flute, 4 Flute

Applications: Conventional, Ramping, High Performance, 3-D, Roughing, Semi-Finishing, Finishing, Dry, Cold Air, Spray Mist

Materials: C Graphite, Composites

Coatings: Diamond Coated (DCC)

Standard Tolerances
Cutting Dia. = +0.001/–.0001"
Shank Tolerance h6
Flute Length = ±.060"
OAL = ±.060"



P38 2 Flute Lightning Diamond Coated Series End Mills for Graphite Electrodes

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length	Overall Length	Tool Number Diamond Coated
1/64"	1/8"	3/64"	Ball End		3"	P38-005101-1
1/64"	1/8"	3/64"	Sq. End		3"	P38-005102-1
1/64"	1/8"	3/64"	Ball End	1/4"	3"	P38-005103-1
1/64"	1/8"	3/64"	Sq. End	1/4"	3"	P38-005104-1
1/64"	1/8"	3/64"	Ball End	1/2"	3"	P38-005105-1
1/64"	1/8"	3/64"	Sq. End	1/2"	3"	P38-005106-1

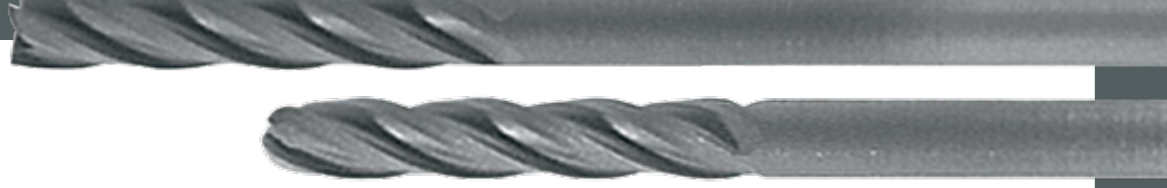
NEW!

P38 4 Flute Lightning Diamond Coated Series End Mills for Graphite Electrodes

10-20X Tool Life! DIAMOND COATED

Diamond Coated (DCC)

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length	Overall Length	Tool Number Diamond Coated
1/32"	1/8"	3/32"	Sq. End	—	1-1/2"	P38-200219-1
1/32"	1/8"	3/32"	Sq. End	—	3"	P38-005108-1
1/32"	1/8"	3/32"	.005"	—	3"	P38-005109-1
1/32"	1/8"	3/32"	Ball End	—	1-1/2"	P38-200202-1
1/32"	1/8"	3/32"	Ball End	—	3"	P38-005107-1
1/32"	1/8"	3/32"	Sq. End	13/32"	3"	P38-005111-1
1/32"	1/8"	3/32"	.005"	13/32"	3"	P38-005112-1
1/32"	1/8"	3/32"	Ball End	13/32"	3"	P38-005110-1
1/32"	1/8"	3/32"	Sq. End	5/8"	3"	P38-005114-1
1/32"	1/8"	3/32"	.005"	5/8"	3"	P38-005115-1
1/32"	1/8"	3/32"	Ball End	5/8"	3"	P38-005113-1
1/32"	1/8"	3/32"	Sq. End	29/32"	3"	P38-005117-1
1/32"	1/8"	3/32"	.005"	29/32"	3"	P38-005118-1
1/32"	1/8"	3/32"	Ball End	29/32"	3"	P38-005116-1
3/64"	1/8"	9/64"	Sq. End	—	3"	P38-005120-1
3/64"	1/8"	9/64"	.010"	—	3"	P38-005121-1
3/64"	1/8"	9/64"	Ball End	—	3"	P38-005119-1
3/64"	1/8"	9/64"	Sq. End	9/16"	3"	P38-005123-1
3/64"	1/8"	9/64"	.010"	9/16"	3"	P38-005124-1
3/64"	1/8"	9/64"	Ball End	9/16"	3"	P38-005122-1
3/64"	1/8"	9/64"	Sq. End	3/4"	3"	P38-005126-1
3/64"	1/8"	9/64"	.010"	3/4"	3"	P38-005127-1
3/64"	1/8"	9/64"	Ball End	3/4"	3"	P38-005125-1
1/16"	1/16"	1/16"	Sq. End	5/16"	3"	P38-005156-1
1/16"	1/16"	1/16"	Ball End	5/16"	3"	P38-005155-1
1/16"	1/8"	3/16"	Sq. End	—	1-1/2"	P38-200477-1
1/16"	1/8"	3/16"	Sq. End	—	3"	P38-005129-1
1/16"	1/8"	3/16"	.010"	—	3"	P38-005130-1



P38 4 Flute Lightning Diamond Coated Series End Mills for Graphite Electrodes

Cutting Diameter	Shank Diameter	Flute Length	Corner Radius	Reach Length	Overall Length	Tool Number Diamond Coated
1/16"	1/8"	3/16"	Ball End	—	1-1/2"	P38-200175-1
1/16"	1/8"	3/16"	Ball End	—	3"	P38-005128-1
1/16"	1/8"	3/16"	Sq. End	3/4"	3"	P38-005132-1
1/16"	1/8"	3/16"	.010"	3/4"	3"	P38-005133-1
1/16"	1/8"	3/16"	Ball End	3/4"	3"	P38-005131-1
1/16"	1/8"	3/16"	Sq. End	1"	3"	P38-005135-1
1/16"	1/8"	3/16"	.010"	1"	3"	P38-005136-1
1/16"	1/8"	3/16"	Ball End	1"	3"	P38-005134-1
3/32"	3/32"	3/32"	Sq. End	11/32"	3"	P38-005158-1
3/32"	3/32"	3/32"	Ball End	11/32"	3"	P38-005157-1
3/32"	1/8"	9/32"	Sq. End	—	3"	P38-005138-1
3/32"	1/8"	9/32"	.010"	—	3"	P38-005139-1
3/32"	1/8"	9/32"	Ball End	—	3"	P38-005137-1
3/32"	1/8"	9/32"	Sq. End	1"	3"	P38-005141-1
3/32"	1/8"	9/32"	.010"	1"	3"	P38-005142-1
3/32"	1/8"	9/32"	Ball End	1"	3"	P38-005140-1
3/32"	1/8"	9/32"	Sq. End	1-1/2"	3"	P38-005144-1
3/32"	1/8"	9/32"	.010"	1-1/2"	3"	P38-005145-1
3/32"	1/8"	9/32"	Ball End	1-1/2"	3"	P38-005143-1
3/32"	1/8"	3/8"	Sq. End	—	1-1/2"	P38-200002-1
3/32"	1/8"	3/8"	Ball End	—	1-1/2"	P38-200004-1
1/8"	1/8"	1/8"	Sq. End	5/8"	3"	P38-005160-1
1/8"	1/8"	1/8"	.015"	5/8"	3"	P38-005161-1
1/8"	1/8"	1/8"	.031"	5/8"	3"	P38-005162-1
1/8"	1/8"	1/8"	Ball End	5/8"	3"	P38-005159-1
1/8"	1/8"	3/8"	Sq. End	—	3"	P38-005147-1
1/8"	1/8"	3/8"	.010"	—	3"	P38-005148-1
1/8"	1/8"	3/8"	Ball End	—	3"	P38-005146-1
1/8"	1/8"	3/8"	Sq. End	1"	3"	P38-005150-1
1/8"	1/8"	3/8"	.010"	1"	3"	P38-005151-1
1/8"	1/8"	3/8"	Ball End	1"	3"	P38-005149-1
1/8"	1/8"	3/8"	Sq. End	2"	3"	P38-005153-1
1/8"	1/8"	3/8"	.010"	2"	3"	P38-005154-1
1/8"	1/8"	3/8"	Ball End	2"	3"	P38-005152-1
1/8"	1/8"	1/2"	Sq. End	—	1-1/2"	P38-200006-1
1/8"	1/8"	1/2"	Ball End	—	1-1/2"	P38-200008-1
1/8"	1/8"	1"	Sq. End	—	3"	P38-200010-1
1/8"	1/8"	1"	Ball End	—	3"	P38-200012-1
3/16"	3/16"	3/16"	Sq. End	0.688"	3"	P38-005164-1
3/16"	3/16"	3/16"	.062"	0.688"	3"	P38-005165-1
3/16"	3/16"	3/16"	Ball End	0.688"	3"	P38-005163-1
3/16"	3/16"	5/8"	Sq. End	—	2"	P38-200014-1
3/16"	3/16"	5/8"	Ball End	—	2"	P38-200016-1
1/4"	1/4"	1/4"	Sq. End	3/4"	4"	P38-005167-1
1/4"	1/4"	1/4"	.015"	3/4"	4"	P38-005168-1
1/4"	1/4"	1/4"	.030"	3/4"	4"	P38-005169-1
1/4"	1/4"	1/4"	.062"	3/4"	4"	P38-005170-1
1/4"	1/4"	1/4"	Ball End	3/4"	4"	P38-005166-1
1/4"	1/4"	3/4"	Sq. End	—	2-1/2"	P38-200022-1
1/4"	1/4"	3/4"	Ball End	—	2-1/2"	P38-200024-1
1/4"	1/4"	1-1/4"	Sq. End	—	3"	P38-200026-1
1/4"	1/4"	1-1/4"	Ball End	—	3"	P38-200028-1
3/8"	3/8"	7/8"	Sq. End	—	2-1/2"	P38-200038-1
3/8"	3/8"	7/8"	Ball End	—	2-1/2"	P38-200040-1
1/2"	1/2"	1"	Sq. End	—	3"	P38-200054-1
1/2"	1/2"	1"	Ball End	—	3"	P38-200056-1
1/2"	1/2"	2"	Sq. End	—	4"	P38-200058-1
1/2"	1/2"	2"	Ball End	—	4"	P38-200060-1

The Lightning series of tools offer a cost-effective solution for the machining of graphite electrodes. By reducing the coating thickness the edge sharpness is increased and cost is reduced. These tools offer a cost-effective solution.

NEW!

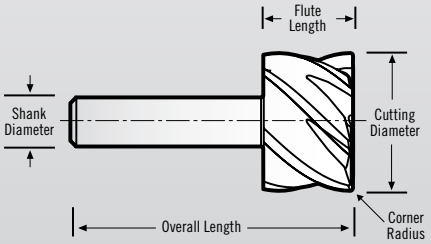
P820 Replaceable Tip End Mills

Characteristics: Ball End, Square End, 4 Flute

Applications: Conventional, Ramping, High Performance, 3-D, Roughing, Semi-Finishing, Finishing, Dry, Cold Air, Spray Mist

Materials: C Graphite, Composites

Coatings: Diamond Coated (DCC)



Standard Tolerances
Cutting Dia. = +0.001/–.0001"
Shank Tolerance h6
Flute Length = ±.060"
OAL = ±.060"

NEW!

RobbJack is proud to introduce our latest diamond coated product to enhance your productivity: The 1/2" Replaceable Tip End Mill.

This tool is intended to be held in a heat shrink holder and give you 4 and 6 flute productivity as compared to the 2 flutes available from insert end mills this size. Depending on your application several configurations are currently available from stock.

P820 4 & 6 Flute 1/2" Replaceable Tip End Mill (with 1/4" h6 shank) for Graphite Electrodes

Cutting Diameter	Shank Diameter	Flute Length	Flute Number	Corner Radius	Overall Length	Tool Number Diamond Coated
1/2"	1/4"	1/2"	6	Sq. End	1-1/2"	P820-201143-1
1/2"	1/4"	1/2"	4	Sq. End	1-1/2"	P820-201142-1
1/2"	1/4"	1/2"	4	.030"	1-1/2"	P820-201206-1
1/2"	1/4"	1/2"	4	Ball End	1-1/2"	P820-201145-1

Speeds and Feeds for Graphite

CUTTING FEEDS

Tool Diameter	Soft Graphite Chipload Per Tooth (CLPT)		Medium Graphite Chipload Per Tooth (CLPT)		Hard Graphite Chipload Per Tooth (CLPT)	
	Roughing (clpt)	Finishing (clpt)	Roughing (clpt)	Finishing (clpt)	Roughing (clpt)	Finishing (clpt)
1/32"	0.0006–0.0008	0.0005–0.0006	0.0005–0.0006	0.0004–0.0005	0.0004–0.0005	0.0003-0.0004
1/16"	0.0013–0.0015	0.0010–0.0013	0.0010–0.0013	0.0008–0.0010	0.0008–0.0010	0.0005-0.0008
3/32"	0.0019–0.0023	0.0015–0.0019	0.0015–0.0019	0.0011–0.0015	0.0011–0.0015	0.0008-0.0011
1/8"	0.0025–0.0030	0.0020–0.0025	0.0020–0.0025	0.0015–0.0020	0.0015–0.0020	0.0010-0.0015
3/16"	0.0038–0.0045	0.0030–0.0038	0.0030–0.0038	0.0023–0.0030	0.0023–0.0030	0.0015-0.0023
1/4"	0.0050–0.0060	0.0040–0.0050	0.0040–0.0050	0.0030–0.0040	0.0030–0.0040	0.0020-0.0030
5/16"	0.0063–0.0075	0.0050–0.0063	0.0050–0.0063	0.0038–0.0050	0.0038–0.0050	0.0025-0.0038
3/8"	0.0075–0.0090	0.0060–0.0075	0.0060–0.0075	0.0045–0.0060	0.0045–0.0060	0.0030-0.0045
7/16"	0.0088–0.0105	0.0070–0.0088	0.0070–0.0088	0.0053–0.0070	0.0053–0.0070	0.0035-0.0053
1/2"	0.0100–0.0120	0.0080–0.0100	0.0080–0.0100	0.0060–0.0080	0.0060–0.0080	0.0040-0.0060

Speeds and Feeds are only general starting points and may vary depending on specific applications.

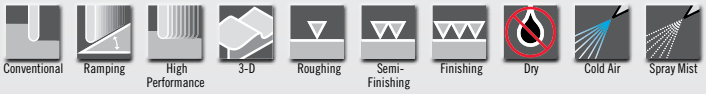
CUTTING SPEEDS

Graphite Hardness	Cutting Speed
	Surface Feet Per Minute
Soft Graphite	1000–2000 sfm
Medium Graphite	750–1500 sfm
Hard Graphite	500–1250 sfm

Die/Mold End Mills **DM/MDM**

Characteristics

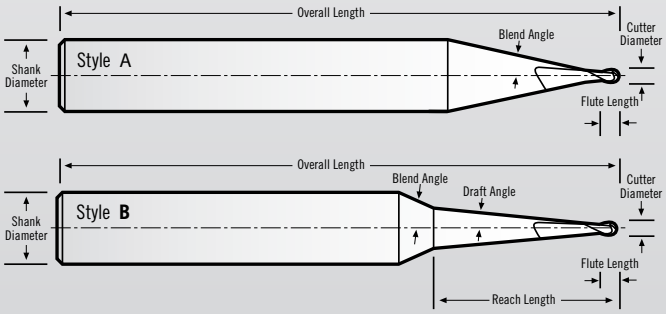
Applications

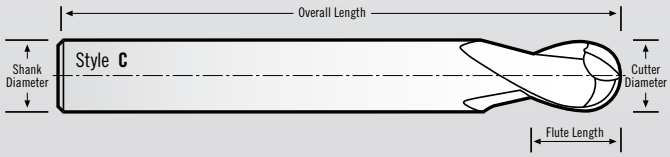


Materials

Used for Hardened Materials

Coatings





DM Tolerances

Cutting Dia. (1/32–0.1875) = ±.0003
(0.250–0.50) = –.0007/–.0013
Shank Dia. = –.0001/–.0002
Flute Length (1/32–0.50) = +.000/+.020
OAL = ±.060

MDM Tolerances

Cutting Dia. (0.5–5.0) = ±.008mm
(6.0–12.0) = –.018/ –.033mm
Shank Dia. = –.002/–.005mm
Flute Length (0.5–12.0) = +.000/+.500mm
OAL = ±10mm

DM 2 Flute Grade Ball End Extended Length

Cutting Diameter	Shank Diameter	Flute Length	Reach Length	Draft Angle	Blend Angle	Tool Style	Overall Length	Tool Number AlTiN Coated
1/32"	1/4"	1/32"	–	–	8°	A	2-1/2"	DM-201-01
1/32"	1/4"	1/32"	1/8"	3°	18°	B	2-1/2"	DM-202-01
1/32"	1/4"	1/32"	3/16"	1.5°	16.5°	B	2-1/2"	DM-203-01
1/32"	1/4"	1/32"	3/8"	1.5°	16.5°	B	2-1/2"	DM-204-01
1/32"	1/4"	1/32"	9/16"	1.5°	16.5°	B	2-1/2"	DM-205-01
1/16"	1/4"	1/16"	–	–	8°	A	2-1/2"	DM-201-02
1/16"	1/4"	1/16"	3/16"	3°	18°	B	2-1/2"	DM-202-02
1/16"	1/4"	1/16"	3/8"	1.5°	16.5°	B	2-1/2"	DM-203-02
1/16"	1/4"	1/16"	3/4"	1.5°	16.5°	B	2-1/2"	DM-204-02
1/16"	1/4"	1/16"	1-1/8"	1.5°	16.5°	B	2-1/2"	DM-205-02
3/32"	1/4"	3/32"	–	–	8°	A	2-1/2"	DM-201-03
3/32"	1/4"	3/32"	1/4"	3°	18°	B	2-1/2"	DM-202-03
3/32"	1/4"	3/32"	1/2"	1.5°	16.5°	B	2-1/2"	DM-203-03
3/32"	1/4"	3/32"	15/16"	1.5°	16.5°	B	2-1/2"	DM-204-03
3/32"	1/4"	3/32"	1-5/16"	1.5°	16.5°	B	2-1/2"	DM-205-03
1/8"	1/4"	1/8"	–	–	8°	A	3	DM-201-04
1/8"	1/4"	1/8"	5/16"	3°	18°	B	3	DM-202-04
1/8"	1/4"	1/8"	5/8"	1.5°	16.5°	B	3	DM-203-04
1/8"	1/4"	1/8"	1	1°	16°	B	3	DM-204-04
1/8"	1/4"	1/8"	1-1/2"	1°	16°	B	3	DM-205-04

DM Die/Mold End Mills

DM 2 Flute Grade Ball End Extended Length —CONTINUED FROM PREVIOUS

Cutting Diameter	Shank Diameter	Flute Length	Reach Length	Draft Angle	Blend Angle	Tool Style	Overall Length	Tool Number AlTiN Coated
3/16"	1/4"	3/16"	–	–	8°	A	3	DM-201-06
3/16"	1/4"	3/16"	3/8"	2°	17°	B	3	DM-202-06
3/16"	1/4"	3/16"	3/4"	1.5°	16.5°	B	3	DM-203-06
3/16"	1/4"	3/16"	1-1/8"	1°	16°	B	3	DM-204-06
3/16"	1/4"	3/16"	1-9/16"	1°	16°	B	3	DM-205-06
1/4"	1/4"	1/4"	–	–	–	C	3	DM-201-08
5/16"	5/16"	5/16"	–	–	–	C	3-1/8"	DM-201-10
3/8"	3/8"	3/8"	–	–	–	C	3-1/2"	DM-201-12
7/16"	7/16"	7/16"	–	–	–	C	3-3/4"	DM-201-14
1/2"	1/2"	1/2"	–	–	–	C	4	DM-201-16

MDM 2 Flute Tuffy Ball End Extended Length METRIC

Cutting Diameter	Shank Diameter	Flute Length	Reach Length	Draft Angle	Blend Angle	Tool Style	Overall Length	Tool Number AlTiN Coated
0.5mm	6mm	0.5mm	–	–	8°	A	63mm	MDM-201-0.5
0.5mm	6mm	0.5mm	1mm	3°	18°	B	63mm	MDM-203-0.5
0.5mm	6mm	0.5mm	3mm	1.5°	16.5°	B	63mm	MDM-204-0.5
0.5mm	6mm	0.5mm	5mm	1.5°	16.5°	B	63mm	MDM-205-0.5
0.5mm	6mm	0.5mm	10mm	1.5°	16.5°	B	63mm	MDM-206-0.5
0.8mm	6mm	0.8mm	–	–	8°	A	63mm	MDM-201-0.8
0.8mm	6mm	0.8mm	3mm	3°	18°	B	63mm	MDM-203-0.8
0.8mm	6mm	0.8mm	5mm	1.5°	16.5°	B	63mm	MDM-204-0.8
0.8mm	6mm	0.8mm	10mm	1.5°	16.5°	B	63mm	MDM-205-0.8
0.8mm	6mm	0.8mm	15mm	1.5°	16.5°	B	63mm	MDM-206-0.8
1mm	6mm	1mm	–	–	8°	A	63mm	MDM-201-01
1mm	6mm	1mm	3mm	3°	18°	B	63mm	MDM-203-01
1mm	6mm	1mm	5mm	1.5°	16.5°	B	63mm	MDM-204-01
1mm	6mm	1mm	10mm	1.5°	16.5°	B	63mm	MDM-205-01
1mm	6mm	1mm	20mm	1.5°	16.5°	B	63mm	MDM-206-01
1.5mm	6mm	1.5mm	–	–	8°	A	63mm	MDM-201-01.5
1.5mm	6mm	1.5mm	5mm	3°	18°	B	63mm	MDM-203-01.5
1.5mm	6mm	1.5mm	10mm	1.5°	16.5°	B	63mm	MDM-204-01.5
1.5mm	6mm	1.5mm	20mm	1.5°	16.5°	B	63mm	MDM-205-01.5
1.5mm	6mm	1.5mm	30mm	1.5°	16.5°	B	63mm	MDM-206-01.5
2mm	6mm	2mm	–	–	8°	A	63mm	MDM-201-02
2mm	6mm	2mm	5mm	3°	18°	B	63mm	MDM-203-02
2mm	6mm	2mm	10mm	1.5°	16.5°	B	63mm	MDM-204-02
2mm	6mm	2mm	20mm	1.5°	16.5°	B	63mm	MDM-205-02
2mm	6mm	2mm	30mm	1.5°	16.5°	B	63mm	MDM-206-02
3mm	6mm	3mm	–	–	8°	A	75mm	MDM-201-03
3mm	6mm	3mm	5mm	3°	18°	B	75mm	MDM-203-03
3mm	6mm	3mm	15mm	1.5°	16.5°	B	75mm	MDM-204-03
3mm	6mm	3mm	30mm	1°	16°	B	75mm	MDM-205-03
3mm	6mm	3mm	45mm	1°	16°	B	75mm	MDM-206-03
4mm	6mm	4mm	–	–	8°	A	75mm	MDM-201-04
4mm	6mm	4mm	10mm	2°	17°	B	75mm	MDM-203-04
4mm	6mm	4mm	15mm	1.5°	16.5°	B	75mm	MDM-204-04
4mm	6mm	4mm	20mm	1°	16°	B	75mm	MDM-205-04
5mm	6mm	5mm	–	–	8°	B	75mm	MDM-201-05
5mm	6mm	5mm	10mm	2°	17°	B	75mm	MDM-203-05
5mm	6mm	5mm	25mm	1°	16°	B	75mm	MDM-204-05
6mm	6mm	6mm	–	–	–	C	75mm	MDM-201-06
8mm	8mm	8mm	–	–	–	C	80mm	MDM-201-08
10mm	10mm	10mm	–	–	–	C	82mm	MDM-201-10
12mm	12mm	12mm	–	–	–	C	100mm	MDM-201-12

DM SERIES SPEEDS & FEEDS (Chipload per Tooth)

Tool Number	Cutter Diameter	Steels 30–40 HRc		Steels 40–50 HRc		Steels 50–60 HRc	
		ROUGHING	FINISHING	ROUGHING	FINISHING	ROUGHING	FINISHING
DM-201-01	1/32"	0.0006–0.0008	0.0005–0.0006	0.0005–0.0006	0.0004–0.0005	0.0004–0.0005	0.0003–0.0004
DM-201-02	1/16"	0.0013–0.0015	0.0010–0.0013	0.0010–0.0013	0.0008–0.0010	0.0008–0.0010	0.0005–0.0008
DM-201-03	3/32"	0.0019–0.0023	0.0015–0.0019	0.0015–0.0019	0.0011–0.0015	0.0011–0.0015	0.0008–0.0011
DM-201-04	1/8"	0.0025–0.0030	0.0020–0.0025	0.0020–0.0025	0.0015–0.0020	0.0015–0.0020	0.0010–0.0015
DM-201-06	3/16"	0.0038–0.0045	0.0030–0.0038	0.0030–0.0038	0.0023–0.0030	0.0023–0.0030	0.0015–0.0023
DM-201-08	1/4"	0.0050–0.0060	0.0040–0.0050	0.0040–0.0050	0.0030–0.0040	0.0030–0.0040	0.0020–0.0030
DM-201-10	5/16"	0.0063–0.0075	0.0050–0.0063	0.0050–0.0063	0.0038–0.0050	0.0038–0.0050	0.0025–0.0038
DM-201-12	3/8"	0.0075–0.0090	0.0060–0.0075	0.0060–0.0075	0.0045–0.0060	0.0045–0.0060	0.0030–0.0045
DM-201-14	7/16"	0.0088–0.0105	0.0070–0.0088	0.0070–0.0088	0.0053–0.0070	0.0053–0.0070	0.0035–0.0053
DM-201-16	1/2"	0.0100–0.0120	0.0080–0.0100	0.0080–0.0100	0.0060–0.0080	0.0060–0.0080	0.0040–0.0060

DM SERIES SPEEDS & FEEDS (Roughing & Semi-Finishing)

Tool Number	Cutter Diameter	Rotations Per Minute (RPM)		
		STEELS 30–40 HRc	STEELS 40–50 HRc	STEELS 50–60 HRc
DM-201-01	1/32"	20,000–40,000	20,000–40,000	20,000–40,000
DM-201-02	1/16"	20,000–40,000	20,000–40,000	20,000–36,000
DM-201-03	3/32"	20,000–32,000	20,000–32,000	16,000–24,000
DM-201-04	1/8"	15,000–24,000	18,000–24,000	12,000–18,000
DM-201-06	3/16"	10,000–16,000	12,000–16,000	8,100–12,000
DM-201-08	1/4"	7,600–12,000	9,100–12,000	6,100–9,100
DM-201-10	5/16"	6,000–9,700	7,300–9,700	4,800–7,300
DM-201-12	3/8"	5,000–8,100	6,100–8,100	4,000–6,100
DM-201-14	7/16"	4,300–6,900	5,200–6,900	3,400–5,200
DM-201-16	1/2"	3,800–6,100	4,500–6,100	3,000–4,500

DM Series Guidelines

- Special diameters and lengths are available on a make-to-order basis.
- Air or mist coolant on materials greater than 40 HRc.

Radial Step Over

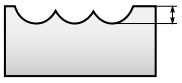
Roughing or Semi-Finishing
25%–40% of tool diameter

Radial Step Over for finishing depends on finish requirements.

DM SERIES SPEEDS & FEEDS (Finishing)

Tool Number	Cutter Diameter	Rotations Per Minute (RPM)		
		STEELS 30–40 HRc	STEELS 40–50 HRc	STEELS 50–60 HRc
DM-201-01	1/32"	20,000–40,000	20,000–40,000	20,000–40,000
DM-201-02	1/16"	20,000–40,000	20,000–40,000	20,000–36,000
DM-201-03	3/32"	20,000–32,000	20,000–32,000	16,000–24,000
DM-201-04	1/8"	15,000–24,000	18,000–24,000	12,000–18,000
DM-201-06	3/16"	10,000–16,000	12,000–16,000	8,100–12,000
DM-201-08	1/4"	7,600–12,000	9,100–12,000	6,100–9,100
DM-201-10	5/16"	6,000–9,700	7,300–9,700	4,800–7,300
DM-201-12	3/8"	5,000–8,100	6,100–8,100	4,000–6,100
DM-201-14	7/16"	4,300–6,900	5,200–6,900	3,400–5,200
DM-201-16	1/2"	3,800–6,100	4,500–6,100	3,000–4,500

Axial Depth



30–40 HRc Axial depth = 10% of tool diameter
40–50 HRc Axial depth = 5% of tool diameter
50–60 HRc Axial depth = 4% of tool diameter

TM/MTM Solid Carbide Toroid Style End Mills

Characteristics: Corner Radius; 2 Flute; 30° Helix

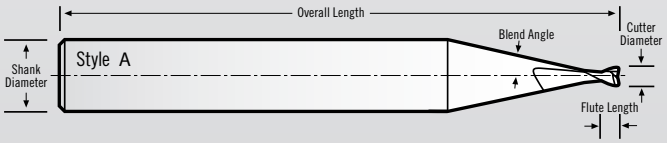
Applications: Side Milling; Helical Interpolation; Conventional; Ramping; High Performance; Roughing; Semi-Finishing; Finishing; Dry; Cold Air; Spray Mist

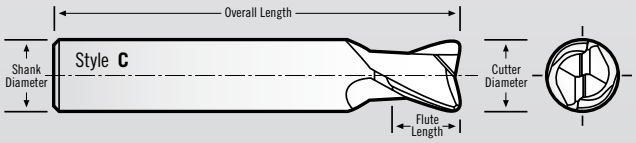
Materials: 40 HRc Hardness; 50 HRc Hardness; 64 HRc Hardness

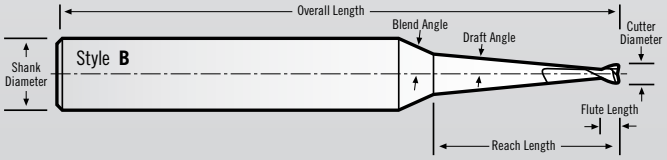
Used for Hardened Materials

Best Tool for Helical Bores or Tight Corners

Coatings: AlTiN Aluminum Titan. Nitride







TM Tolerances:
Cutting Dia. = –.001/ –.002
Shank Dia. = –.0001/ –.0002
Flute Length (1/32 to 0.50) = +.000/+.020
OAL = ±.060

MTM Tolerances
Cutting Dia. = –.025/–.050mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.50/+1.50mm
OAL = ±10mm

TM 2 Flute Tuffy Grade Toroid End Mill

Cutting Diameter	Shank Diameter	Flute Length	Reach Length	Draft Angle	Blend Angle	Corner Radius	Tool Style	Overall Length	Tool Number AlTiN Coated
1/32"	1/4"	1/32"	–	–	8°	.008	A	2-1/2"	TM-201-01
1/32"	1/4"	1/32"	1/8"	3°	18°	.008	B	2-1/2"	TM-202-01
1/32"	1/4"	1/32"	3/16"	1.5°	16.5°	.008	B	2-1/2"	TM-203-01
1/32"	1/4"	1/32"	3/8"	1.5°	16.5°	.008	B	2-1/2"	TM-204-01
1/32"	1/4"	1/32"	9/16"	1.5°	16.5°	.008	B	2-1/2"	TM-205-01
1/16"	1/4"	1/16"	–	–	8°	.012	A	2-1/2"	TM-201-02
1/16"	1/4"	1/16"	3/16"	3°	18°	.012	B	2-1/2"	TM-202-02
1/16"	1/4"	1/16"	3/8"	1.5°	16.5°	.012	B	2-1/2"	TM-203-02
1/16"	1/4"	1/16"	3/4"	1.5°	16.5°	.012	B	2-1/2"	TM-204-02
1/16"	1/4"	1/16"	1-1/8"	1.5°	16.5°	.012	B	2-1/2"	TM-205-02
3/32"	1/4"	3/32"	–	–	8°	.020	A	2-1/2"	TM-201-03
3/32"	1/4"	3/32"	1/4"	3°	18°	.020	B	2-1/2"	TM-202-03
3/32"	1/4"	3/32"	1/2"	1.5°	16.5°	.020	B	2-1/2"	TM-203-03
3/32"	1/4"	3/32"	15/16"	1.5°	16.5°	.020	B	2-1/2"	TM-204-03
3/32"	1/4"	3/32"	1-5/16"	1.5°	16.5°	.020	B	2-1/2"	TM-205-03
1/8"	1/4"	1/8"	–	–	8°	.020	A	3"	TM-201-04
1/8"	1/4"	1/8"	5/16"	3°	18°	.020	B	3"	TM-202-04
1/8"	1/4"	1/8"	5/8"	1.5°	16.5°	.020	B	3"	TM-203-04
1/8"	1/4"	1/8"	1"	1°	16°	.020	B	3"	TM-204-04
1/8"	1/4"	1/8"	1-1/2"	1°	16°	.020	B	3"	TM-205-04
3/16"	1/4"	3/16"	–	–	8°	.040	A	3"	TM-201-06
3/16"	1/4"	3/16"	3/8"	2°	17°	.040	B	3"	TM-202-06
3/16"	1/4"	3/16"	3/4"	1.5°	16.5°	.040	B	3"	TM-203-06
3/16"	1/4"	3/16"	1-1/8"	1°	16°	.040	B	3"	TM-204-06
3/16"	1/4"	3/16"	1-9/16"	1°	16°	.040	B	3"	TM-205-06
1/4"	1/4"	1/4"	–	–	–	.040	C	3"	TM-201-08
5/16"	5/16"	5/16"	–	–	–	.040	C	3-1/8"	TM-201-10
3/8"	3/8"	3/8"	–	–	–	.080	C	3-1/5	TM-201-12
7/16"	7/16"	7/16"	–	–	–	.080	C	3-3/4"	TM-201-14
1/2"	1/2"	1/2"	–	–	–	.120	C	4"	TM-201-16

MTM Metrics 2 Flute Tuffy Grade Toroid End Mill METRIC

AlTiN

Cutting Diameter	Shank Diameter	Flute Length	Reach Length	Draft Angle	Blend Angle	Corner Radius	Tool Style	Overall Length	Tool Number AlTiN Coated
0.8mm	6mm	0.8mm	–	–	8°	0.2mm	A	63mm	MTM-201-0.8
0.8mm	6mm	0.8mm	3mm	3°	18°	0.2mm	B	63mm	MTM-202-0.8
0.8mm	6mm	0.8mm	5mm	1.5°	16.5°	0.2mm	B	63mm	MTM-203-0.8
0.8mm	6mm	0.8mm	10mm	1.5°	16.5°	0.2mm	B	63mm	MTM-204-0.8
0.8mm	6mm	0.8mm	15mm	1.5°	16.5°	0.2mm	B	63mm	MTM-205-0.8
1mm	6mm	1mm	–	–	8°	0.3mm	A	63mm	MTM-201-01
1mm	6mm	1mm	3mm	3°	18°	0.3mm	B	63mm	MTM-202-01
1mm	6mm	1mm	5mm	1.5°	16.5°	0.3mm	B	63mm	MTM-203-01
1mm	6mm	1mm	10mm	1.5°	16.5°	0.3mm	B	63mm	MTM-204-01
1mm	6mm	1mm	20mm	1.5°	16.5°	0.3mm	B	63mm	MTM-205-01
1.5mm	6mm	1.5mm	–	–	8°	0.5mm	A	63mm	MTM-201-01.5
1.5mm	6mm	1.5mm	5mm	3°	18°	0.5mm	B	63mm	MTM-202-01.5
1.5mm	6mm	1.5mm	10mm	1.5°	16.5°	0.5mm	B	63mm	MTM-203-01.5
1.5mm	6mm	1.5mm	20mm	1.5°	16.5°	0.5mm	B	63mm	MTM-204-01.5
1.5mm	6mm	1.5mm	30mm	1.5°	16.5°	0.5mm	B	63mm	MTM-205-01.5
2mm	6mm	2mm	–	–	8°	0.5mm	A	63mm	MTM-201-02
2mm	6mm	2mm	5mm	3°	18°	0.5mm	B	63mm	MTM-202-02
2mm	6mm	2mm	10mm	1.5°	16.5°	0.5mm	B	63mm	MTM-203-02
2mm	6mm	2mm	20mm	1.5°	16.5°	0.5mm	B	63mm	MTM-204-02
2mm	6mm	2mm	30mm	1.5°	16.5°	0.5mm	B	63mm	MTM-205-02
3mm	6mm	3mm	–	–	8°	0.5mm	A	75mm	MTM-201-03
3mm	6mm	3mm	5mm	3°	18°	0.5mm	B	75mm	MTM-202-03
3mm	6mm	3mm	15mm	1.5°	16.5°	0.5mm	B	75mm	MTM-203-03
3mm	6mm	3mm	30mm	1°	16°	0.5mm	B	75mm	MTM-204-03
3mm	6mm	3mm	45mm	1°	16°	0.5mm	B	75mm	MTM-205-03
4mm	6mm	4mm	–	–	8°	0.5mm	A	75mm	MTM-201-04
4mm	6mm	4mm	10mm	2°	17°	0.5mm	B	75mm	MTM-202-04
4mm	6mm	4mm	15mm	1.5°	16.5°	0.5mm	B	75mm	MTM-203-04
4mm	6mm	4mm	20mm	1°	16°	0.5mm	B	75mm	MTM-204-04
5mm	6mm	5mm	–	–	8°	1mm	A	75mm	MTM-201-05
5mm	6mm	5mm	10mm	3°	18°	1mm	B	75mm	MTM-202-05
5mm	6mm	5mm	25mm	1°	16°	1mm	B	75mm	MTM-203-05
6mm	6mm	6mm	–	–	–	1mm	C	75mm	MTM-201-06
8mm	8mm	8mm	–	–	–	1mm	C	80mm	MTM-201-08
10mm	10mm	10mm	–	–	–	2mm	C	82mm	MTM-201-10
12mm	12mm	12mm	–	–	–	3mm	C	100mm	MTM-201-12

TM SERIES SPEEDS & FEEDS (Semi-Finishing & Finishing)

Tool Number	Cutter Diameter	Steels 30–40 HRc		Steels 40–50 HRc		Steels 50–60 HRc	
		RPM	CHIPLOAD PER TOOTH	RPM	CHIPLOAD PER TOOTH	RPM	CHIPLOAD PER TOOTH
TM-201-01	1/32"	34,000–40,000	0.0001–0.00025	26,000–30,000	0.0001–0.0002	16,000–18,000	0.0001–0.0002
TM-201-02	1/16"	34,000–40,000	0.0003–0.0005	25000–30,000	0.0003–0.0005	16,000–18,000	0.0002–0.0004
TM-201-03	3/32"	22,000–26,000	0.0006–0.00075	16,000–19,000	0.0005–0.0007	10,000–12,000	0.0005–0.0006
TM-201-04	1/8"	17,000–20,000	0.0008–0.001	13,000–17,000	0.0007–0.0009	8,000–13,000	0.0006–0.0008
TM-201-06	3/16"	12,000–14,000	0.0011–0.0015	9,000–12,000	0.0001–0.0014	5,300–9,000	0.0009–0.0012
TM-201-08	1/4"	9,000–10400	0.0015–0.002	7,000–9,000	0.0014–0.0018	4,000–6,600	0.0012–0.0016
TM-201-10	5/16"	7,200–8,300	0.0019–0.0025	5,500–7,200	0.0017–0.0023	3,200–5,400	0.0015–0.0020
TM-201-12	3/8"	6,000–6,900	0.0020–0.003	4,600–6,000	0.0018–0.0027	2,700–4,500	0.0016–0.0024
TM-201-14	7/16"	5,200–6,000	0.0023–0.0035	4,000–5,200	0.0021–0.0032	2,300–3,900	0.0019–0.0028
TM-201-16	1/2"	4,500–5,200	0.0025–0.004	3,500–4,500	0.0023–0.0036	2,100–3,500	0.0020–0.0032

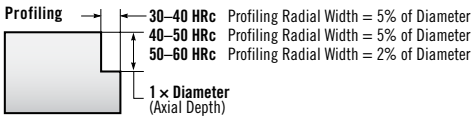
(Use maximum RPM if suggested RPM is higher than the machine's capabilities)

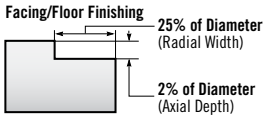
Additional Notes

- Special diameters, lengths, and corner radii are available on a make-to-order basis.
- Special draft angles (blend angle) or necked shanks for part clearance are available upon request and usually ship within the next business day.

TM Series Guidelines

- Speeds and feeds are only general starting points and may vary depending on specific applications.
- Use Climb Milling for better finish and longer tool life.
- Air or mist coolant on materials greater than 40 HRc.
- Good machines, tool holders, and programming methods all help in extending tool life.
- The best way to engage into the material is by helical interpolation or entering from off the part.
- Use for tight areas like helical bores or tight corners. For large open areas use HM/MHM Series.

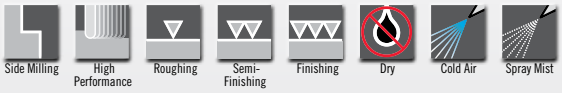




HM/MHM Die/Mold End Mills

Characteristics

Applications

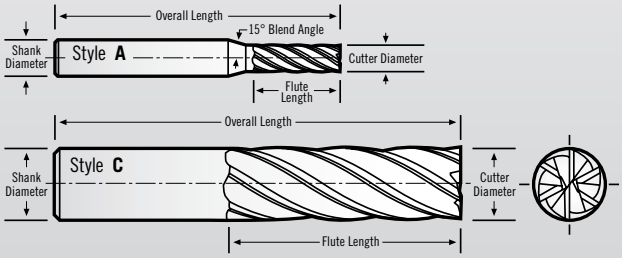


Materials

Used for Hardened Materials

Coatings

Best Tool for Open Areas of Floors & Walls



HM Tolerances
Cutting Dia. = –.001/–.002
Shank Dia. = –.0001/–.0002
Flute Length = +.060/–.000
OAL = ±.060

MHM Tolerances
Cutting Dia. = –.025/–.050mm
Shank Dia. = –.002/–.005mm
Flute Length = +0.50/+1.50mm
OAL = ±10mm

HM Multi-Flute Tuffy Grade

Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Corner Radius	Tool Style	Overall Length	Tool Number AlTiN Coated
1/8"	1/4"	4	3/8"	0.015	A	3	HM-402-04
3/16"	1/4"	4	9/16"	0.02	A	3	HM-402-06
1/4"	1/4"	6	5/8"	0.02	C	3-1/2"	HM-602-08
5/16"	5/16"	6	3/4"	0.03	C	4	HM-602-10
3/8"	3/8"	6	1"	0.03	C	4	HM-602-12
7/16"	7/16"	6	1-1/8"	0.04	C	4	HM-602-14
1/2"	1/2"	6	1-1/4"	0.04	C	4	HM-602-16
5/8"	5/8"	6	1-5/8"	0.04	C	6	HM-602-20
3/4"	3/4"	8	1-3/4"	0.06	C	6	HM-802-24
1"	1"	10	2"	0.06	C	6	HM-102-32

MHM Metric Multi-Flute Tuffy Grade METRIC

Cutting Diameter	Shank Diameter	Number of Flutes	Flute Length	Corner Radius	Tool Style	Overall Length	Tool Number AlTiN Coated
3mm	6mm	4	9mm	0.4mm	A	76mm	MHM-402-03
4mm	6mm	4	12mm	0.5mm	A	76mm	MHM-402-04
5mm	6mm	4	15mm	0.5mm	C	90mm	MHM-402-05
6mm	6mm	6	15mm	0.5mm	C	90mm	MHM-602-06
8mm	8mm	6	20mm	0.75mm	C	100mm	MHM-602-08
10mm	10mm	6	25mm	0.75mm	C	100mm	MHM-602-10
12mm	12mm	6	30mm	1mm	C	100mm	MHM-602-12
16mm	16mm	6	40mm	1mm	C	150mm	MHM-602-16
20mm	20mm	8	45mm	1.5mm	C	150mm	MHM-802-20
25mm	25mm	10	50mm	1.5mm	C	150mm	MHM-102-25

HM SERIES SPEEDS & FEEDS (Semi-Finishing & Finishing)

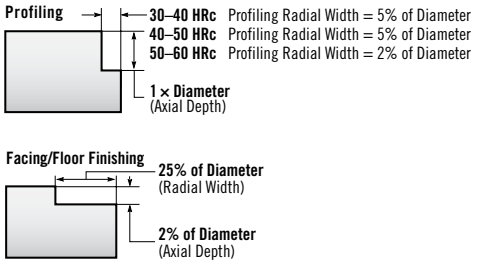
Tool Number	Cutter Diameter	Steels 30–40 HRc		Steels 40–50 HRc		Steels 50–60 HRc	
		RPM	CLPT	RPM	CLPT	RPM	CLPT
HM-402-04	1/8"	17,000–20,000	0.0008–0.001	13,000–17,000	0.0007–0.0009	8,000–13,000	0.0006–0.0008
HM-402-06	3/16"	12,000–14,000	0.0011–0.0015	9,000–12,000	0.0010–0.0014	5,300–9,000	0.0009–0.0012
HM-602-08	1/4"	9,000–10,400	0.0015–0.002	7,000–9,000	0.0014–0.0018	4,000–6,600	0.0012–0.0016
HM-602-10	5/16"	7,200–8,300	0.0019–0.0025	5,500–7,200	0.0017–0.0023	3,200–5,400	0.0015–0.0020
HM-602-12	3/8"	6,000–6,900	0.0020–0.003	4,600–6,000	0.0018–0.0027	2,700–4,500	0.0016–0.0024
HM-602-14	7/16"	5,200–6,000	0.0023–0.0035	4,000–5,200	0.0021–0.0032	2,300–3,900	0.0019–0.0028
HM-602-16	1/2"	4,500–5,200	0.0025–0.004	3,500–4,500	0.0023–0.0036	2,100–3,500	0.0020–0.0032
HM-602-20	5/8"	3,600–4,150	0.0026–0.0042	2,800–3,600	0.0023–0.0038	1,600–2,750	0.0021–0.0034
HM-802-24	3/4"	3,000–3,500	0.0028–0.005	2,300–3,000	0.0025–0.0045	1,350–2,250	0.0023–0.0041
HM-102-32	1	2,200–2,600	0.0030–0.006	1,700–2,200	0.0027–0.0054	1,000–1,700	0.0024–0.0049

HM Series Guidelines

- Speeds and feeds are only general starting points and may vary depending on specific applications.
- Use Climb Milling for better finish and longer tool life.
- Air or mist coolant on materials greater than 40 HRc.
- Good machines, tool holders, and programming methods all help in extending tool life.
- The best way to engage into the material is by helical interpolation or entering from off the part.
- Use for open areas of floors or walls. For tight areas like helical bores or tight corners use TM/MTM Series.

Additional Notes

- Special draft angles (blend angle) or necked shanks for part clearance are available upon request.
- Special diameters, lengths, and corner radii are available on a make-to-order basis.



Die/Mold Tools in Other Sections

ET Engraving Tools
(See Multiple Applications)

166