

# Tools for **DIE/MOLD & HARDENED MATERIALS**

Die/Mold



## Die/Mold

Scan this code to:

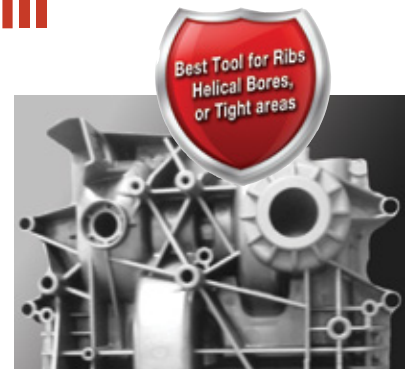
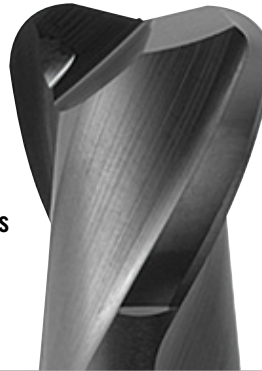
- Watch Videos
- See Tips and Tricks
- Learn How to Choose the Right Tool
- And More...

## Featured Tools: **TM/MTM Series – High Feed Mill**



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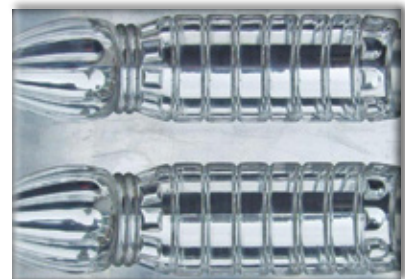
- High Speed Geometry
- This Tool Works Great in High Speed Tool Paths and in Tight Areas



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



Page 125



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



Page 130



# Die/Mold & Hardened Materials **TOOLS**

**P38**



4 Flute  
Lightning Series End Mills  
Diamond Coated for Graphite Electrodes



**122**

**P820**



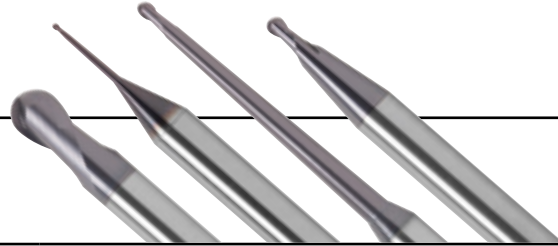
4 and 6 Flute  
Replaceable Tip End Mills  
Diamond Coated for Graphite Electrodes



**124**

**DM**

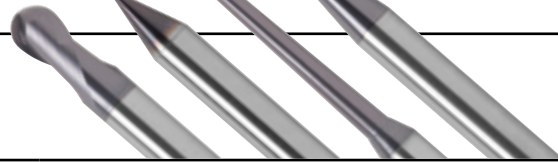
2 Flute Extended Length  
Ball Nose



**125**

**MDM**

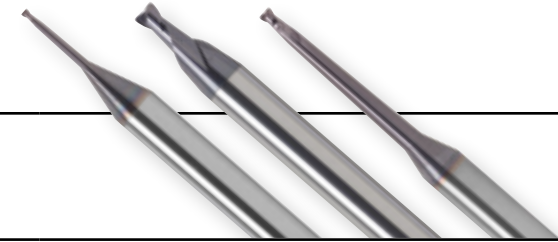
2 Flute Extended Length  
Ball Nose



**126**

**TM**

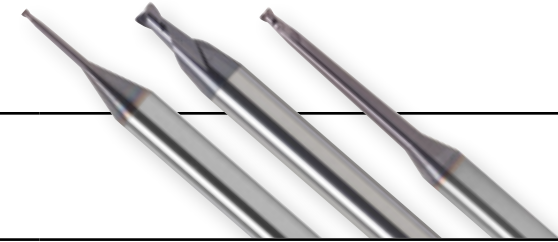
2 Flute Extended Length  
Toroidal Corner Radius



**128**

**MTM**

2 Flute Extended Length  
Toroidal Corner Radius



**129**

**HM**

4, 6, 8 and 10 Flute  
Corner Radius



**130**

**MHM**

4, 6, 8 and 10 Flute  
Corner Radius



**130**

**ET**

Engraving Tools  
(See Multiple Applications)



**166**

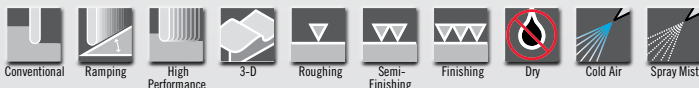
# P38 Lightning Diamond Coated Series End Mills



## Characteristics



## Applications



## Materials

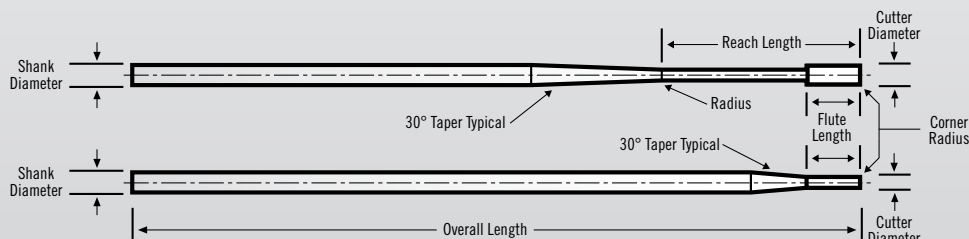


## Coatings



## Standard Tolerances

Cutting Dia. =  $+0.001/-0.001$ "  
 Shank Tolerance h6  
 Flute Length =  $\pm 0.060$ "  
 OAL =  $\pm 0.060$ "



## 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<br>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

| Cutting Diameter | Shank Diameter | Flute Length | Corner Radius | Reach Length | Overall Length | Tool Number<br>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                  |

**10-20X  
Tool Life!** **DIAMOND  
COATED**



## 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!**

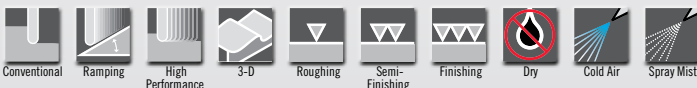
# P820 Replaceable Tip End Mills



## Characteristics



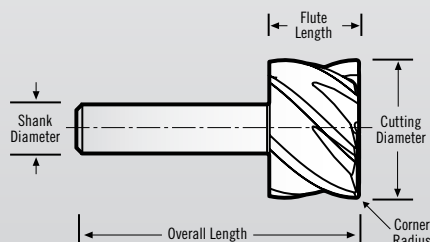
## Applications



## Materials



## Coatings



## Standard Tolerances

Cutting Dia. =  $+0.001/-0.001$ "  
Shank Tolerance h6  
Flute Length =  $\pm 0.060$ "  
OAL =  $\pm 0.060$ "

**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<br>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

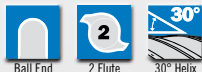
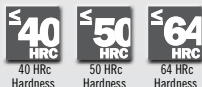
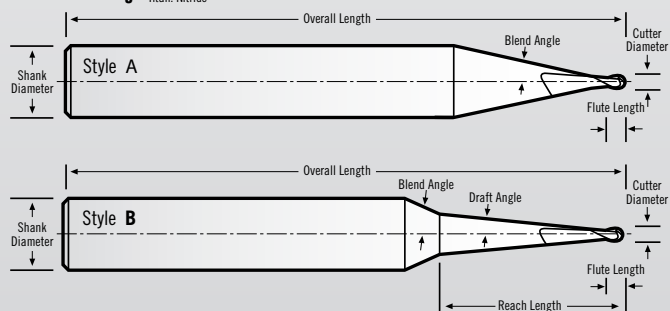
| Tool Diameter | Soft Graphite Chipload Per Tooth (CLPT) |                  | Medium Graphite Chipload Per Tooth (CLPT) |                  | Hard Graphite Chipload Per Tooth (CLPT) |                  |
|---------------|---|------------------|---|------------------|---|------------------|
|               | 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            |



**Characteristics****Applications****Materials****Used for Hardened Materials****Coatings****DM Tolerances**

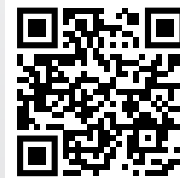
Cutting Dia. (1/32–0.1875) =  $\pm 0.0003$   
 (0.250–0.50) =  $-0.0007/-0.0013$   
 Shank Dia. =  $-0.0001/-0.0002$   
 Flute Length (1/32–0.50) =  $+0.000/+0.020$   
 OAL =  $\pm 0.060$

**MDM Tolerances**

Cutting Dia. (0.5–5.0) =  $\pm 0.008\text{mm}$   
 (6.0–12.0) =  $-0.018/-0.033\text{mm}$   
 Shank Dia. =  $-0.002/-0.005\text{mm}$   
 Flute Length (0.5–12.0) =  $+0.000/+0.500\text{mm}$   
 OAL =  $\pm 10\text{mm}$

**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<br>AITiN 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



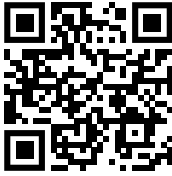
| Cutting Diameter | Shank Diameter | Flute Length | Reach Length | Draft Angle | Blend Angle | Tool Style | Overall Length | Tool Number<br>AITiN Coated |
|------------------|----------------|--------------|--------------|-------------|-------------|------------|----------------|-----------------------------|
| 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 Tuffly Ball End Extended Length **METRIC**



| Cutting Diameter | Shank Diameter | Flute Length | Reach Length | Draft Angle | Blend Angle | Tool Style | Overall Length | Tool Number<br>AITiN 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 30–40HRc            | STEELS 40–50HRc | STEELS 50–60HRc |
| 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 30–40HRc            | STEELS 40–50HRc | STEELS 50–60HRc |
| 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

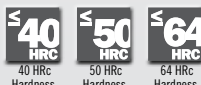
## Characteristics



## Applications

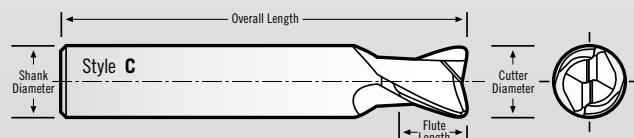
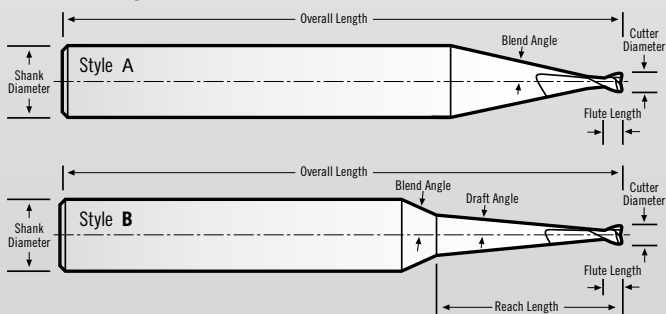


## Materials



Used for Hardened Materials

## Coatings



### TM Tolerances:

Cutting Dia. =  $-.001/-0.002$   
Shank Dia. =  $-.0001/-0.0002$   
Flute Length (1/32 to 0.50) =  $+.000/+0.020$   
OAL =  $\pm 0.060$

### MTM Tolerances

Cutting Dia. =  $-.025/-0.050$ mm  
Shank Dia. =  $-.002/-0.005$ mm  
Flute Length =  $+0.50/+1.50$ mm  
OAL =  $\pm 10$ mm



## TM 2 Flute Tuffly Grade Toroid End Mill

| Cutting Diameter | Shank Diameter | Flute Length | Reach Length | Draft Angle | Blend Angle | Corner Radius | Tool Style | Overall Length | Tool Number<br>AITiN 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 Tuffly Grade Toroid End Mill

METRIC



| Cutting Diameter | Shank Diameter | Flute Length | Reach Length | Draft Angle | Blend Angle | Corner Radius | Tool Style | Overall Length | Tool Number<br>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)

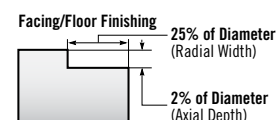
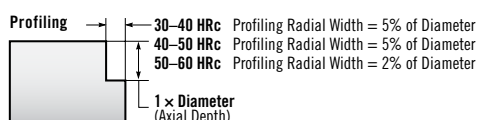
| Tool Number | Cutter Diameter | Steels 30–40 HRC |                    | Steels 40–50 HRC |                    | Steels 50–60 HRC |                    |
|-------------|-----------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|
|             |                 | 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      | 25,000–30,000    | 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"            | 9,000–10,400     | 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)

### 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.

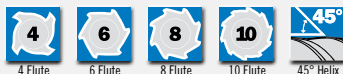
- Good machines, tool holders, and programming methods all help in extending tool life.
- The best way to engage into the material is by helical interpolation or entering from off the part.
- Use for tight areas like helical bores or tight corners. For large open areas use HM/MHM Series.



### 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.

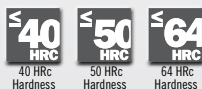
# HM/MHM Die/Mold End Mills



## Characteristics



## Applications



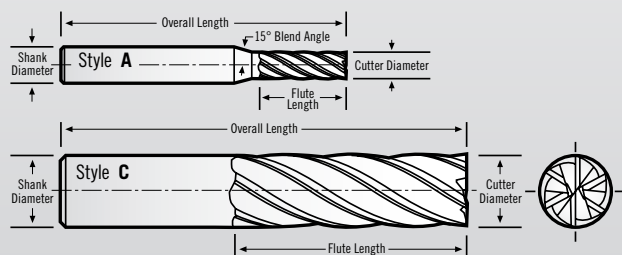
## Materials

Used for Hardened Materials



## Coatings

Aluminum  
Titan, Nitride



## HM Tolerances

Cutting Dia. =  $-.001/-0.002$   
Shank Dia. =  $-.0001/-0.0002$   
Flute Length =  $+.060/-0.000$   
OAL =  $\pm0.060$

## MHM Tolerances

Cutting Dia. =  $-.025/-0.050$ mm  
Shank Dia. =  $-.002/-0.005$ mm  
Flute Length =  $+0.50/+1.50$ mm  
OAL =  $\pm10$ mm



## HM Multi-Flute Tuffy Grade



| Cutting Diameter | Shank Diameter | Number of Flutes | Flute Length | Corner Radius | Tool Style | Overall Length | Tool Number<br>AITIN 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<br>AITIN 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)

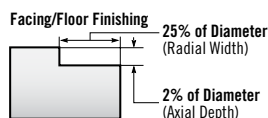
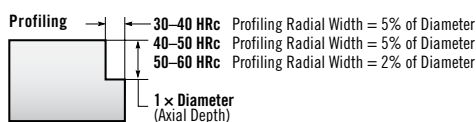
| Tool Number | Cutter Diameter | Steels<br>30–40 HRc |               | Steels<br>40–50 HRc |               | Steels<br>50–60 HRc |               |
|-------------|-----------------|---------------------|---------------|---------------------|---------------|---------------------|---------------|
|             |                 | 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

