



**RobbJack**  
CORPORATION



# ALUMINUM

We feel your pain, let us help you solve it!

- » **Anti-pullout shank**
- » **Mirror Edge**
- » **Chatter-free**
- » **Thru coolant holes**
- » **DLC coating**



 **MAKINO**  
**MAG3.EX**  
FIVE-AXIS HORIZONTAL MACHINING CENTER

**THE FASTEST MILLING  
MACHINE IN THE WORLD  
JUST GOT FASTER**

**WITH ROBBJACK!**

# Aluminum Applications

## These tools are designed for Makino MAG Series Aluminum Machining

*“RobbJack’s new FMHV series paired with Makino’s new Gen2 series machines allowed us to realize 3X to 4X the metal removal rates we normally achieve on our 80kW MAG3 spindles. It’s going to be a real challenge to keep up with all the chips. What a great problem to have!”*

*—Nick Guerra, Perfekta Aerospace*



*“604 cubic inches  
peak MMR attainable”*

## RobbJack FMHV

Mirror edge allows you to take deeper Z-depths of cuts reducing vibration the deeper you go. Ability to go more than 450% deeper than stability lobes predict.

1/2" diameter, 3 flute with DLC coating and thru coolant holes.

Full slot cuts in 7075 aluminum 33,000 RPM 792 ipm 0.550" Z-depth.

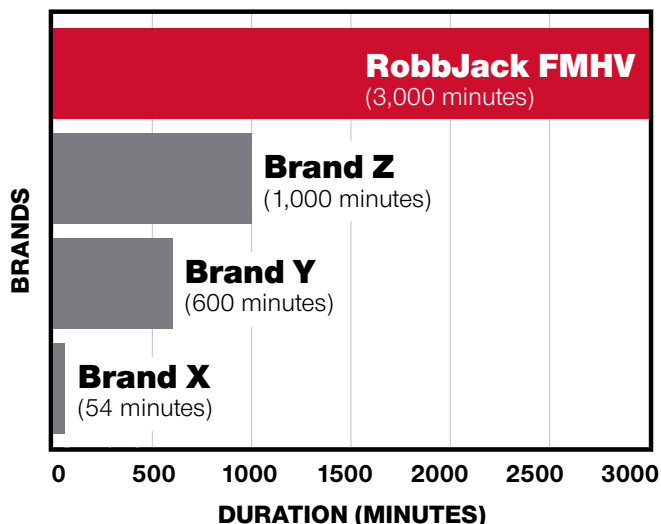
1.0" diameter removed **604 cubic inches per minute (61 lbs/min)**.

0.750" diameter removed **440 cubic inches per minute (44.4 lbs/min)**.

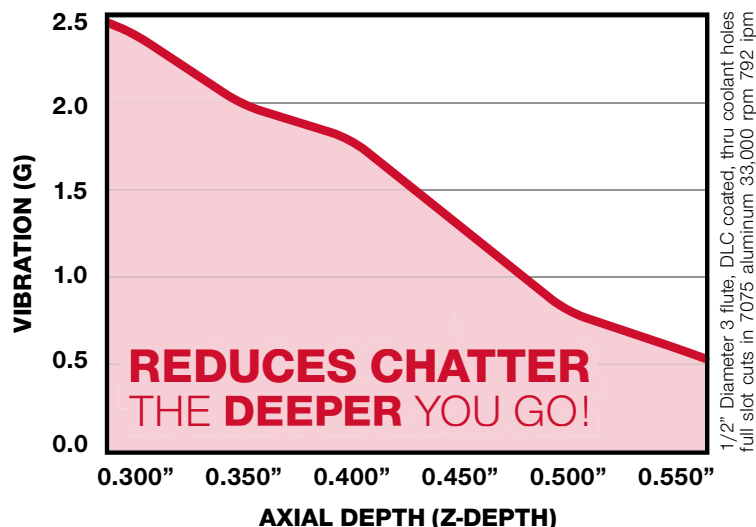
0.500" diameter removed **218 cubic inches per minute (22 lbs/min)**.



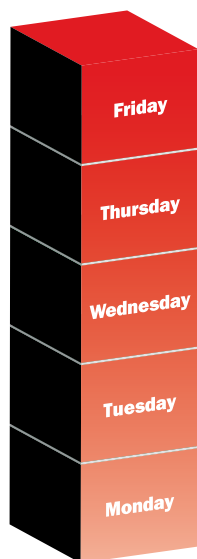
### AGGRESSIVE ROUGHING CUTS



### MIRROR EDGE = DEEPER CUTS



## FMHV-Series 41 Hours vs. 1 Hour\*



Cycle Time  
Before FMHV

**MAX RPM!  
MAX Feed Rate!  
No Chatter!**

**VS.**



Cycle Time  
After FMHV

**Eliminate  
Tool Pull Out!**  
1/4"-5/16" h5 Shank Tolerance  
3/8"-1" h4 Shank Tolerance  
**Tightest in the  
Industry!**

## Chatter Problems?

Our patented Mirror Edge geometry dampens vibration to help eliminate chatter. This geometry can be used in any application where chatter is a problem, usually for thin walls, deep pockets or where the tool sticks out more than 3:1 length

#### Applications

- Deep pocket and thin wall aluminum
- Long reaches over 3:1 length-to-diameter ratio



### Mirror Edge™



Mirror Edge



Non-Mirror Edge

\*Actual results from a major defense manufacturer in deep pocket/thin wall aluminum



## Aluminum Machining Without Chatter!

Scan this code to:

- Watch Videos
- Get Technical Info
- Get Tips and Tricks to Cut Thin Wall and Deep Pocket Parts
- And More...

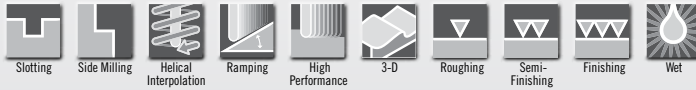


# FMHV 2 Flute Ultra-High Velocity Tools for Aluminum

## Characteristics



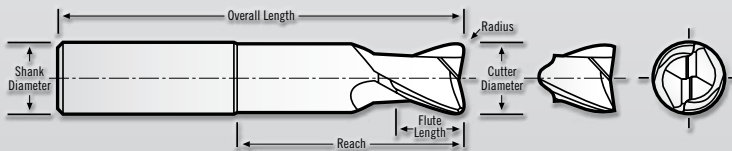
## Applications



## Materials



## Coatings



### FMHV Series Tolerances:

Cutting Dia. =  $-.001/-0.0015$ "  
 Shank Dia. =  $-.0001/-0.0002$ "  
 Flute Length =  $+.060/-0.000$ "  
 OAL =  $+/-.060$ "

**Eliminate Tool Pull Out!**  
 h4 Shank Tolerance up to  
 150% more gripping force  
**Tightest in the Industry!**

NEXT  
GENERATION

**Mirror  
Edge!**  
 Eliminates Chatter  
& Vibration



**NEW!**

## FMHV 2 Flute (Short to Long Reach)



|        | Cutting Diameter | Shank Diameter | Flute Length | Corner Radius | Reach Length (LBS) | Overall Length | Uncoated        | DLC Coated          | Uncoated w/ Thru Coolant Holes | DLC Coated w/ Thru Coolant Holes |                     |
|--------|------------------|----------------|--------------|---------------|--------------------|----------------|-----------------|---------------------|--------------------------------|----------------------------------|---------------------|
| SHORT  | 0.250            | 0.250          | 0.375        | Sq. End       | 0.75               | 2              | FMHV-201-08     | FMHV-201-08-DLC     | FMHV-201-08-TC                 | FMHV-201-08-DLC-TC               | 0.250"<br>DIAMETER  |
|        | 0.250            | 0.250          | 0.375        | 0.03          | 0.75               | 2              | FMHV-201-08-030 | FMHV-201-08-030-DLC | FMHV-201-08-030-TC             | FMHV-201-08-030-DLC-TC           |                     |
|        | 0.250            | 0.250          | 0.375        | 0.06          | 0.75               | 2              | FMHV-201-08-060 | FMHV-201-08-060-DLC | FMHV-201-08-060-TC             | FMHV-201-08-060-DLC-TC           |                     |
|        | 0.250            | 0.250          | 0.375        | 0.09          | 0.75               | 2              | FMHV-201-08-090 | FMHV-201-08-090-DLC | FMHV-201-08-090-TC             | FMHV-201-08-090-DLC-TC           |                     |
|        | 0.250            | 0.250          | 0.375        | Ball End      | 0.75               | 2              | FMHV-201-08-BN  | FMHV-201-08-BN-DLC  | FMHV-201-08-BN-TC              | FMHV-201-08-BN-DLC-TC            |                     |
| MEDIUM | 0.250            | 0.250          | 0.375        | Sq. End       | 1.063              | 2.5            | FMHV-202-08     | FMHV-202-08-DLC     | FMHV-202-08-TC                 | FMHV-202-08-DLC-TC               |                     |
|        | 0.250            | 0.250          | 0.375        | 0.03          | 1.063              | 2.5            | FMHV-202-08-030 | FMHV-202-08-030-DLC | FMHV-202-08-030-TC             | FMHV-202-08-030-DLC-TC           |                     |
|        | 0.250            | 0.250          | 0.375        | 0.06          | 1.063              | 2.5            | FMHV-202-08-060 | FMHV-202-08-060-DLC | FMHV-202-08-060-TC             | FMHV-202-08-060-DLC-TC           |                     |
|        | 0.250            | 0.250          | 0.375        | 0.09          | 1.063              | 2.5            | FMHV-202-08-090 | FMHV-202-08-090-DLC | FMHV-202-08-090-TC             | FMHV-202-08-090-DLC-TC           |                     |
|        | 0.250            | 0.250          | 0.375        | Ball End      | 1.063              | 2.5            | FMHV-202-08-BN  | FMHV-202-08-BN-DLC  | FMHV-202-08-BN-TC              | FMHV-202-08-BN-DLC-TC            |                     |
| LONG   | 0.250            | 0.250          | 0.375        | Sq. End       | 1.5                | 3              | FMHV-203-08     | FMHV-203-08-DLC     | FMHV-203-08-TC                 | FMHV-203-08-DLC-TC               |                     |
|        | 0.250            | 0.250          | 0.375        | 0.03          | 1.5                | 3              | FMHV-203-08-030 | FMHV-203-08-030-DLC | FMHV-203-08-030-TC             | FMHV-203-08-030-DLC-TC           |                     |
|        | 0.250            | 0.250          | 0.375        | 0.06          | 1.5                | 3              | FMHV-203-08-060 | FMHV-203-08-060-DLC | FMHV-203-08-060-TC             | FMHV-203-08-060-DLC-TC           |                     |
|        | 0.250            | 0.250          | 0.375        | 0.09          | 1.5                | 3              | FMHV-203-08-090 | FMHV-203-08-090-DLC | FMHV-203-08-090-TC             | FMHV-203-08-090-DLC-TC           |                     |
|        | 0.250            | 0.250          | 0.375        | Ball End      | 1.5                | 3              | FMHV-203-08-BN  | FMHV-203-08-BN-DLC  | FMHV-203-08-BN-TC              | FMHV-203-08-BN-DLC-TC            |                     |
| SHORT  | 0.3125           | 0.3125         | 0.5          | Sq. End       | 0.75               | 2              | FMHV-201-10     | FMHV-201-10-DLC     | FMHV-201-10-TC                 | FMHV-201-10-DLC-TC               | 0.3125"<br>DIAMETER |
|        | 0.3125           | 0.3125         | 0.5          | 0.03          | 0.75               | 2              | FMHV-201-10-030 | FMHV-201-10-030-DLC | FMHV-201-10-030-TC             | FMHV-201-10-030-DLC-TC           |                     |
|        | 0.3125           | 0.3125         | 0.5          | 0.06          | 0.75               | 2              | FMHV-201-10-060 | FMHV-201-10-060-DLC | FMHV-201-10-060-TC             | FMHV-201-10-060-DLC-TC           |                     |
|        | 0.3125           | 0.3125         | 0.5          | 0.09          | 0.75               | 2              | FMHV-201-10-090 | FMHV-201-10-090-DLC | FMHV-201-10-090-TC             | FMHV-201-10-090-DLC-TC           |                     |
|        | 0.3125           | 0.3125         | 0.5          | Ball End      | 0.75               | 2              | FMHV-201-10-BN  | FMHV-201-10-BN-DLC  | FMHV-201-10-BN-TC              | FMHV-201-10-BN-DLC-TC            |                     |
| MEDIUM | 0.3125           | 0.3125         | 0.5          | Sq. End       | 1.063              | 2.5            | FMHV-202-10     | FMHV-202-10-DLC     | FMHV-202-10-TC                 | FMHV-202-10-DLC-TC               |                     |
|        | 0.3125           | 0.3125         | 0.5          | 0.03          | 1.063              | 2.5            | FMHV-202-10-030 | FMHV-202-10-030-DLC | FMHV-202-10-030-TC             | FMHV-202-10-030-DLC-TC           |                     |
|        | 0.3125           | 0.3125         | 0.5          | 0.06          | 1.063              | 2.5            | FMHV-202-10-060 | FMHV-202-10-060-DLC | FMHV-202-10-060-TC             | FMHV-202-10-060-DLC-TC           |                     |
|        | 0.3125           | 0.3125         | 0.5          | 0.09          | 1.063              | 2.5            | FMHV-202-10-090 | FMHV-202-10-090-DLC | FMHV-202-10-090-TC             | FMHV-202-10-090-DLC-TC           |                     |
|        | 0.3125           | 0.3125         | 0.5          | Ball End      | 1.063              | 2.5            | FMHV-202-10-BN  | FMHV-202-10-BN-DLC  | FMHV-202-10-BN-TC              | FMHV-202-10-BN-DLC-TC            |                     |

\*Other Reach Lengths available upon request.

CONTINUED ON NEXT PAGE—



**NEW!**

2 Flute

**FMHV**

Aluminum

**FMHV 2 Flute (Short to Long Reach)**



|            | Cutting Diameter | Shank Diameter | Flute Length | Corner Radius | Reach Length (LBS) | Overall Length | Uncoated        | DLC Coated          | Uncoated w/ Thru Coolant Holes | DLC Coated w/ Thru Coolant Holes |                  |
|------------|------------------|----------------|--------------|---------------|--------------------|----------------|-----------------|---------------------|--------------------------------|----------------------------------|------------------|
| LONG       | 0.3125           | 0.3125         | 0.5          | Sq. End       | 1.5                | 3              | FMHV-203-10     | FMHV-203-10-DLC     | FMHV-203-10-TC                 | FMHV-203-10-DLC-TC               | 0.3125" DIAMETER |
|            | 0.3125           | 0.3125         | 0.5          | 0.03          | 1.5                | 3              | FMHV-203-10-030 | FMHV-203-10-030-DLC | FMHV-203-10-030-TC             | FMHV-203-10-030-DLC-TC           |                  |
|            | 0.3125           | 0.3125         | 0.5          | 0.06          | 1.5                | 3              | FMHV-203-10-060 | FMHV-203-10-060-DLC | FMHV-203-10-060-TC             | FMHV-203-10-060-DLC-TC           |                  |
|            | 0.3125           | 0.3125         | 0.5          | 0.09          | 1.5                | 3              | FMHV-203-10-090 | FMHV-203-10-090-DLC | FMHV-203-10-090-TC             | FMHV-203-10-090-DLC-TC           |                  |
|            | 0.3125           | 0.3125         | 0.5          | Ball End      | 1.5                | 3              | FMHV-203-10-BN  | FMHV-203-10-BN-DLC  | FMHV-203-10-BN-TC              | FMHV-203-10-BN-DLC-TC            |                  |
| SHORT      | 0.375            | 0.375          | 0.5          | Sq. End       | 1.25               | 3              | FMHV-201-12     | FMHV-201-12-DLC     | FMHV-201-12-TC                 | FMHV-201-12-DLC-TC               | 0.375" DIAMETER  |
|            | 0.375            | 0.375          | 0.5          | 0.03          | 1.25               | 3              | FMHV-201-12-030 | FMHV-201-12-030-DLC | FMHV-201-12-030-TC             | FMHV-201-12-030-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | 0.06          | 1.25               | 3              | FMHV-201-12-060 | FMHV-201-12-060-DLC | FMHV-201-12-060-TC             | FMHV-201-12-060-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | 0.09          | 1.25               | 3              | FMHV-201-12-090 | FMHV-201-12-090-DLC | FMHV-201-12-090-TC             | FMHV-201-12-090-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | Ball End      | 1.25               | 3              | FMHV-201-12-BN  | FMHV-201-12-BN-DLC  | FMHV-201-12-BN-TC              | FMHV-201-12-BN-DLC-TC            |                  |
| MEDIUM     | 0.375            | 0.375          | 0.5          | Sq. End       | 1.75               | 3.5            | FMHV-202-12     | FMHV-202-12-DLC     | FMHV-202-12-TC                 | FMHV-202-12-DLC-TC               | 0.375" DIAMETER  |
|            | 0.375            | 0.375          | 0.5          | 0.03          | 1.75               | 3.5            | FMHV-202-12-030 | FMHV-202-12-030-DLC | FMHV-202-12-030-TC             | FMHV-202-12-030-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | 0.06          | 1.75               | 3.5            | FMHV-202-12-060 | FMHV-202-12-060-DLC | FMHV-202-12-060-TC             | FMHV-202-12-060-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | 0.09          | 1.75               | 3.5            | FMHV-202-12-090 | FMHV-202-12-090-DLC | FMHV-202-12-090-TC             | FMHV-202-12-090-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | Ball End      | 1.75               | 3.5            | FMHV-202-12-BN  | FMHV-202-12-BN-DLC  | FMHV-202-12-BN-TC              | FMHV-202-12-BN-DLC-TC            |                  |
| LONG       | 0.375            | 0.375          | 0.5          | Sq. End       | 2.25               | 4              | FMHV-203-12     | FMHV-203-12-DLC     | FMHV-203-12-TC                 | FMHV-203-12-DLC-TC               | 0.375" DIAMETER  |
|            | 0.375            | 0.375          | 0.5          | 0.03          | 2.25               | 4              | FMHV-203-12-030 | FMHV-203-12-030-DLC | FMHV-203-12-030-TC             | FMHV-203-12-030-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | 0.06          | 2.25               | 4              | FMHV-203-12-060 | FMHV-203-12-060-DLC | FMHV-203-12-060-TC             | FMHV-203-12-060-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | 0.09          | 2.25               | 4              | FMHV-203-12-090 | FMHV-203-12-090-DLC | FMHV-203-12-090-TC             | FMHV-203-12-090-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | Ball End      | 2.25               | 4              | FMHV-203-12-BN  | FMHV-203-12-BN-DLC  | FMHV-203-12-BN-TC              | FMHV-203-12-BN-DLC-TC            |                  |
| SHORT      | 0.500            | 0.500          | 0.75         | Sq. End       | 1.25               | 3              | FMHV-201-16     | FMHV-201-16-DLC     | FMHV-201-16-TC                 | FMHV-201-16-DLC-TC               | 0.500" DIAMETER  |
|            | 0.500            | 0.500          | 0.75         | 0.03          | 1.25               | 3              | FMHV-201-16-030 | FMHV-201-16-030-DLC | FMHV-201-16-030-TC             | FMHV-201-16-030-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.06          | 1.25               | 3              | FMHV-201-16-060 | FMHV-201-16-060-DLC | FMHV-201-16-060-TC             | FMHV-201-16-060-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.09          | 1.25               | 3              | FMHV-201-16-090 | FMHV-201-16-090-DLC | FMHV-201-16-090-TC             | FMHV-201-16-090-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.12          | 1.25               | 3              | FMHV-201-16-120 | FMHV-201-16-120-DLC | FMHV-201-16-120-TC             | FMHV-201-16-120-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | Ball End      | 1.25               | 3              | FMHV-201-16-BN  | FMHV-201-16-BN-DLC  | FMHV-201-16-BN-TC              | FMHV-201-16-BN-DLC-TC            |                  |
| MEDIUM     | 0.500            | 0.500          | 0.75         | Sq. End       | 1.625              | 3.5            | FMHV-202-16     | FMHV-202-16-DLC     | FMHV-202-16-TC                 | FMHV-202-16-DLC-TC               | 0.500" DIAMETER  |
|            | 0.500            | 0.500          | 0.75         | 0.03          | 1.625              | 3.5            | FMHV-202-16-030 | FMHV-202-16-030-DLC | FMHV-202-16-030-TC             | FMHV-202-16-030-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.06          | 1.625              | 3.5            | FMHV-202-16-060 | FMHV-202-16-060-DLC | FMHV-202-16-060-TC             | FMHV-202-16-060-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.09          | 1.625              | 3.5            | FMHV-202-16-090 | FMHV-202-16-090-DLC | FMHV-202-16-090-TC             | FMHV-202-16-090-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.12          | 1.625              | 3.5            | FMHV-202-16-120 | FMHV-202-16-120-DLC | FMHV-202-16-120-TC             | FMHV-202-16-120-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | Ball End      | 1.625              | 3.5            | FMHV-202-16-BN  | FMHV-202-16-BN-DLC  | FMHV-202-16-BN-TC              | FMHV-202-16-BN-DLC-TC            |                  |
| LONG       | 0.500            | 0.500          | 0.75         | Sq. End       | 2.125              | 4              | FMHV-203-16     | FMHV-203-16-DLC     | FMHV-203-16-TC                 | FMHV-203-16-DLC-TC               | 0.500" DIAMETER  |
|            | 0.500            | 0.500          | 0.75         | 0.03          | 2.125              | 4              | FMHV-203-16-030 | FMHV-203-16-030-DLC | FMHV-203-16-030-TC             | FMHV-203-16-030-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.06          | 2.125              | 4              | FMHV-203-16-060 | FMHV-203-16-060-DLC | FMHV-203-16-060-TC             | FMHV-203-16-060-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.09          | 2.125              | 4              | FMHV-203-16-090 | FMHV-203-16-090-DLC | FMHV-203-16-090-TC             | FMHV-203-16-090-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.12          | 2.125              | 4              | FMHV-203-16-120 | FMHV-203-16-120-DLC | FMHV-203-16-120-TC             | FMHV-203-16-120-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | Ball End      | 2.125              | 4              | FMHV-203-16-BN  | FMHV-203-16-BN-DLC  | FMHV-203-16-BN-TC              | FMHV-203-16-BN-DLC-TC            |                  |
| EXTRA LONG | 0.500            | 0.500          | 0.75         | Sq. End       | 2.625              | 4.5            | FMHV-204-16     | FMHV-204-16-DLC     | FMHV-204-16-TC                 | FMHV-204-16-DLC-TC               | 0.500" DIAMETER  |
|            | 0.500            | 0.500          | 0.75         | 0.03          | 2.625              | 4.5            | FMHV-204-16-030 | FMHV-204-16-030-DLC | FMHV-204-16-030-TC             | FMHV-204-16-030-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.06          | 2.625              | 4.5            | FMHV-204-16-060 | FMHV-204-16-060-DLC | FMHV-204-16-060-TC             | FMHV-204-16-060-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.09          | 2.625              | 4.5            | FMHV-204-16-090 | FMHV-204-16-090-DLC | FMHV-204-16-090-TC             | FMHV-204-16-090-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.12          | 2.625              | 4.5            | FMHV-204-16-120 | FMHV-204-16-120-DLC | FMHV-204-16-120-TC             | FMHV-204-16-120-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | Ball End      | 2.625              | 4.5            | FMHV-204-16-BN  | FMHV-204-16-BN-DLC  | FMHV-204-16-BN-TC              | FMHV-204-16-BN-DLC-TC            |                  |

\*Other Reach Lengths available upon request.

CONTINUED ON NEXT PAGE—

# FMHV 2 Flute Ultra-High Velocity Tools for Aluminum



## FMHV 2 Flute (Short to Long Reach)



|            | Cutting Diameter | Shank Diameter | Flute Length | Corner Radius | Reach Length (LBS) | Overall Length | Uncoated        | DLC Coated          | Uncoated w/ Thru Coolant Holes | DLC Coated w/ Thru Coolant Holes |                 |
|------------|------------------|----------------|--------------|---------------|--------------------|----------------|-----------------|---------------------|--------------------------------|----------------------------------|-----------------|
| SHORT      | 0.625            | 0.625          | 0.875        | Sq. End       | 1.563              | 3.5            | FMHV-201-20     | FMHV-201-20-DLC     | FMHV-201-20-TC                 | FMHV-201-20-DLC-TC               | 0.625" DIAMETER |
|            | 0.625            | 0.625          | 0.875        | 0.03          | 1.563              | 3.5            | FMHV-201-20-030 | FMHV-201-20-030-DLC | FMHV-201-20-030-TC             | FMHV-201-20-030-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.06          | 1.563              | 3.5            | FMHV-201-20-060 | FMHV-201-20-060-DLC | FMHV-201-20-060-TC             | FMHV-201-20-060-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.09          | 1.563              | 3.5            | FMHV-201-20-090 | FMHV-201-20-090-DLC | FMHV-201-20-090-TC             | FMHV-201-20-090-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.12          | 1.563              | 3.5            | FMHV-201-20-120 | FMHV-201-20-120-DLC | FMHV-201-20-120-TC             | FMHV-201-20-120-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | Ball End      | 1.563              | 3.5            | FMHV-201-20-BN  | FMHV-201-20-BN-DLC  | FMHV-201-20-BN-TC              | FMHV-201-20-BN-DLC-TC            |                 |
| MEDIUM     | 0.625            | 0.625          | 0.875        | Sq. End       | 2.063              | 4              | FMHV-202-20     | FMHV-202-20-DLC     | FMHV-202-20-TC                 | FMHV-202-20-DLC-TC               |                 |
|            | 0.625            | 0.625          | 0.875        | 0.03          | 2.063              | 4              | FMHV-202-20-030 | FMHV-202-20-030-DLC | FMHV-202-20-030-TC             | FMHV-202-20-030-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.06          | 2.063              | 4              | FMHV-202-20-060 | FMHV-202-20-060-DLC | FMHV-202-20-060-TC             | FMHV-202-20-060-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.09          | 2.063              | 4              | FMHV-202-20-090 | FMHV-202-20-090-DLC | FMHV-202-20-090-TC             | FMHV-202-20-090-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.12          | 2.063              | 4              | FMHV-202-20-120 | FMHV-202-20-120-DLC | FMHV-202-20-120-TC             | FMHV-202-20-120-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | Ball End      | 2.063              | 4              | FMHV-202-20-BN  | FMHV-202-20-BN-DLC  | FMHV-202-20-BN-TC              | FMHV-202-20-BN-DLC-TC            |                 |
| LONG       | 0.625            | 0.625          | 0.875        | Sq. End       | 2.563              | 4.5            | FMHV-203-20     | FMHV-203-20-DLC     | FMHV-203-20-TC                 | FMHV-203-20-DLC-TC               |                 |
|            | 0.625            | 0.625          | 0.875        | 0.03          | 2.563              | 4.5            | FMHV-203-20-030 | FMHV-203-20-030-DLC | FMHV-203-20-030-TC             | FMHV-203-20-030-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.06          | 2.563              | 4.5            | FMHV-203-20-060 | FMHV-203-20-060-DLC | FMHV-203-20-060-TC             | FMHV-203-20-060-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.09          | 2.563              | 4.5            | FMHV-203-20-090 | FMHV-203-20-090-DLC | FMHV-203-20-090-TC             | FMHV-203-20-090-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.12          | 2.563              | 4.5            | FMHV-203-20-120 | FMHV-203-20-120-DLC | FMHV-203-20-120-TC             | FMHV-203-20-120-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | Ball End      | 2.563              | 4.5            | FMHV-203-20-BN  | FMHV-203-20-BN-DLC  | FMHV-203-20-BN-TC              | FMHV-203-20-BN-DLC-TC            |                 |
| EXTRA LONG | 0.625            | 0.625          | 0.875        | Sq. End       | 3.063              | 5              | FMHV-204-20     | FMHV-204-20-DLC     | FMHV-204-20-TC                 | FMHV-204-20-DLC-TC               |                 |
|            | 0.625            | 0.625          | 0.875        | 0.03          | 3.063              | 5              | FMHV-204-20-030 | FMHV-204-20-030-DLC | FMHV-204-20-030-TC             | FMHV-204-20-030-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.06          | 3.063              | 5              | FMHV-204-20-060 | FMHV-204-20-060-DLC | FMHV-204-20-060-TC             | FMHV-204-20-060-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.09          | 3.063              | 5              | FMHV-204-20-090 | FMHV-204-20-090-DLC | FMHV-204-20-090-TC             | FMHV-204-20-090-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.12          | 3.063              | 5              | FMHV-204-20-120 | FMHV-204-20-120-DLC | FMHV-204-20-120-TC             | FMHV-204-20-120-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | Ball End      | 3.063              | 5              | FMHV-204-20-BN  | FMHV-204-20-BN-DLC  | FMHV-204-20-BN-TC              | FMHV-204-20-BN-DLC-TC            |                 |
| SHORT      | 0.750            | 0.750          | 1            | Sq. End       | 2.125              | 4              | FMHV-201-24     | FMHV-201-24-DLC     | FMHV-201-24-TC                 | FMHV-201-24-DLC-TC               | 0.750" DIAMETER |
|            | 0.750            | 0.750          | 1            | 0.03          | 2.125              | 4              | FMHV-201-24-030 | FMHV-201-24-030-DLC | FMHV-201-24-030-TC             | FMHV-201-24-030-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.06          | 2.125              | 4              | FMHV-201-24-060 | FMHV-201-24-060-DLC | FMHV-201-24-060-TC             | FMHV-201-24-060-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.09          | 2.125              | 4              | FMHV-201-24-090 | FMHV-201-24-090-DLC | FMHV-201-24-090-TC             | FMHV-201-24-090-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.12          | 2.125              | 4              | FMHV-201-24-120 | FMHV-201-24-120-DLC | FMHV-201-24-120-TC             | FMHV-201-24-120-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.19          | 2.125              | 4              | FMHV-201-24-190 | FMHV-201-24-190-DLC | FMHV-201-24-190-TC             | FMHV-201-24-190-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | Ball End      | 2.125              | 4              | FMHV-201-24-BN  | FMHV-201-24-BN-DLC  | FMHV-201-24-BN-TC              | FMHV-201-24-BN-DLC-TC            |                 |
|            | 0.750            | 0.750          | 1            | Sq. End       | 2.625              | 4.5            | FMHV-202-24     | FMHV-202-24-DLC     | FMHV-202-24-TC                 | FMHV-202-24-DLC-TC               |                 |
| MEDIUM     | 0.750            | 0.750          | 1            | 0.03          | 2.625              | 4.5            | FMHV-202-24-030 | FMHV-202-24-030-DLC | FMHV-202-24-030-TC             | FMHV-202-24-030-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.06          | 2.625              | 4.5            | FMHV-202-24-060 | FMHV-202-24-060-DLC | FMHV-202-24-060-TC             | FMHV-202-24-060-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.09          | 2.625              | 4.5            | FMHV-202-24-090 | FMHV-202-24-090-DLC | FMHV-202-24-090-TC             | FMHV-202-24-090-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.12          | 2.625              | 4.5            | FMHV-202-24-120 | FMHV-202-24-120-DLC | FMHV-202-24-120-TC             | FMHV-202-24-120-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.19          | 2.625              | 4.5            | FMHV-202-24-190 | FMHV-202-24-190-DLC | FMHV-202-24-190-TC             | FMHV-202-24-190-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | Ball End      | 2.625              | 4.5            | FMHV-202-24-BN  | FMHV-202-24-BN-DLC  | FMHV-202-24-BN-TC              | FMHV-202-24-BN-DLC-TC            |                 |
|            | 0.750            | 0.750          | 1            | Sq. End       | 3.125              | 5              | FMHV-203-24     | FMHV-203-24-DLC     | FMHV-203-24-TC                 | FMHV-203-24-DLC-TC               |                 |
| LONG       | 0.750            | 0.750          | 1            | 0.03          | 3.125              | 5              | FMHV-203-24-030 | FMHV-203-24-030-DLC | FMHV-203-24-030-TC             | FMHV-203-24-030-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.06          | 3.125              | 5              | FMHV-203-24-060 | FMHV-203-24-060-DLC | FMHV-203-24-060-TC             | FMHV-203-24-060-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.09          | 3.125              | 5              | FMHV-203-24-090 | FMHV-203-24-090-DLC | FMHV-203-24-090-TC             | FMHV-203-24-090-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.12          | 3.125              | 5              | FMHV-203-24-120 | FMHV-203-24-120-DLC | FMHV-203-24-120-TC             | FMHV-203-24-120-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.19          | 3.125              | 5              | FMHV-203-24-190 | FMHV-203-24-190-DLC | FMHV-203-24-190-TC             | FMHV-203-24-190-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | Ball End      | 3.125              | 5              | FMHV-203-24-BN  | FMHV-203-24-BN-DLC  | FMHV-203-24-BN-TC              | FMHV-203-24-BN-DLC-TC            |                 |
|            | 0.750            | 0.750          | 1            | Sq. End       | 3.125              | 5              | FMHV-203-24-BN  | FMHV-203-24-BN-DLC  | FMHV-203-24-BN-TC              | FMHV-203-24-BN-DLC-TC            |                 |

\*Other Reach Lengths available upon request.

CONTINUED ON NEXT PAGE—



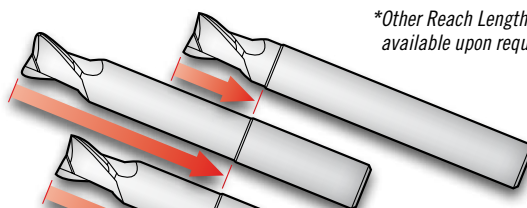
**NEW!****FMHV 2 Flute (Short to Long Reach)**

|                   | Cutting Diameter | Shank Diameter | Flute Length | Corner Radius | Reach Length (LBS) | Overall Length | Uncoated        | DLC Coated          | Uncoated w/ Thru Coolant Holes | DLC Coated w/ Thru Coolant Holes |                 |
|-------------------|------------------|----------------|--------------|---------------|--------------------|----------------|-----------------|---------------------|--------------------------------|----------------------------------|-----------------|
| EXTRA LONG        | 0.750            | 0.750          | 1            | Sq. End       | 3.625              | 5.5            | FMHV-204-24     | FMHV-204-24-DLC     | FMHV-204-24-TC                 | FMHV-204-24-DLC-TC               | 0.750" DIAMETER |
|                   | 0.750            | 0.750          | 1            | 0.03          | 3.625              | 5.5            | FMHV-204-24-030 | FMHV-204-24-030-DLC | FMHV-204-24-030-TC             | FMHV-204-24-030-DLC-TC           |                 |
|                   | 0.750            | 0.750          | 1            | 0.06          | 3.625              | 5.5            | FMHV-204-24-060 | FMHV-204-24-060-DLC | FMHV-204-24-060-TC             | FMHV-204-24-060-DLC-TC           |                 |
|                   | 0.750            | 0.750          | 1            | 0.09          | 3.625              | 5.5            | FMHV-204-24-090 | FMHV-204-24-090-DLC | FMHV-204-24-090-TC             | FMHV-204-24-090-DLC-TC           |                 |
|                   | 0.750            | 0.750          | 1            | 0.12          | 3.625              | 5.5            | FMHV-204-24-120 | FMHV-204-24-120-DLC | FMHV-204-24-120-TC             | FMHV-204-24-120-DLC-TC           |                 |
|                   | 0.750            | 0.750          | 1            | 0.19          | 3.625              | 5.5            | FMHV-204-24-190 | FMHV-204-24-190-DLC | FMHV-204-24-190-TC             | FMHV-204-24-190-DLC-TC           |                 |
|                   | 0.750            | 0.750          | 1            | Ball End      | 3.625              | 5.5            | FMHV-204-24-BN  | FMHV-204-24-BN-DLC  | FMHV-204-24-BN-TC              | FMHV-204-24-BN-DLC-TC            |                 |
| SHORT             | 1.000            | 1.000          | 1.25         | Sq. End       | 2.125              | 4              | FMHV-201-32     | FMHV-201-32-DLC     | FMHV-201-32-TC                 | FMHV-201-32-DLC-TC               | 1.000" DIAMETER |
|                   | 1.000            | 1.000          | 1.25         | 0.03          | 2.125              | 4              | FMHV-201-32-030 | FMHV-201-32-030-DLC | FMHV-201-32-030-TC             | FMHV-201-32-030-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.06          | 2.125              | 4              | FMHV-201-32-060 | FMHV-201-32-060-DLC | FMHV-201-32-060-TC             | FMHV-201-32-060-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.09          | 2.125              | 4              | FMHV-201-32-090 | FMHV-201-32-090-DLC | FMHV-201-32-090-TC             | FMHV-201-32-090-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.12          | 2.125              | 4              | FMHV-201-32-120 | FMHV-201-32-120-DLC | FMHV-201-32-120-TC             | FMHV-201-32-120-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.19          | 2.125              | 4              | FMHV-201-32-190 | FMHV-201-32-190-DLC | FMHV-201-32-190-TC             | FMHV-201-32-190-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | Ball End      | 2.125              | 4              | FMHV-201-32-BN  | FMHV-201-32-BN-DLC  | FMHV-201-32-BN-TC              | FMHV-201-32-BN-DLC-TC            |                 |
| MEDIUM            | 1.000            | 1.000          | 1.25         | Sq. End       | 2.625              | 4.5            | FMHV-202-32     | FMHV-202-32-DLC     | FMHV-202-32-TC                 | FMHV-202-32-DLC-TC               |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.03          | 2.625              | 4.5            | FMHV-202-32-030 | FMHV-202-32-030-DLC | FMHV-202-32-030-TC             | FMHV-202-32-030-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.06          | 2.625              | 4.5            | FMHV-202-32-060 | FMHV-202-32-060-DLC | FMHV-202-32-060-TC             | FMHV-202-32-060-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.09          | 2.625              | 4.5            | FMHV-202-32-090 | FMHV-202-32-090-DLC | FMHV-202-32-090-TC             | FMHV-202-32-090-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.12          | 2.625              | 4.5            | FMHV-202-32-120 | FMHV-202-32-120-DLC | FMHV-202-32-120-TC             | FMHV-202-32-120-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.19          | 2.625              | 4.5            | FMHV-202-32-190 | FMHV-202-32-190-DLC | FMHV-202-32-190-TC             | FMHV-202-32-190-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | Ball End      | 2.625              | 4.5            | FMHV-202-32-BN  | FMHV-202-32-BN-DLC  | FMHV-202-32-BN-TC              | FMHV-202-32-BN-DLC-TC            |                 |
| LONG              | 1.000            | 1.000          | 1.25         | Sq. End       | 3.125              | 5              | FMHV-203-32     | FMHV-203-32-DLC     | FMHV-203-32-TC                 | FMHV-203-32-DLC-TC               |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.03          | 3.125              | 5              | FMHV-203-32-030 | FMHV-203-32-030-DLC | FMHV-203-32-030-TC             | FMHV-203-32-030-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.06          | 3.125              | 5              | FMHV-203-32-060 | FMHV-203-32-060-DLC | FMHV-203-32-060-TC             | FMHV-203-32-060-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.09          | 3.125              | 5              | FMHV-203-32-090 | FMHV-203-32-090-DLC | FMHV-203-32-090-TC             | FMHV-203-32-090-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.12          | 3.125              | 5              | FMHV-203-32-120 | FMHV-203-32-120-DLC | FMHV-203-32-120-TC             | FMHV-203-32-120-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.19          | 3.125              | 5              | FMHV-203-32-190 | FMHV-203-32-190-DLC | FMHV-203-32-190-TC             | FMHV-203-32-190-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | Ball End      | 3.125              | 5              | FMHV-203-32-BN  | FMHV-203-32-BN-DLC  | FMHV-203-32-BN-TC              | FMHV-203-32-BN-DLC-TC            |                 |
| EXTRA LONG        | 1.000            | 1.000          | 1.25         | Sq. End       | 3.625              | 5.5            | FMHV-204-32     | FMHV-204-32-DLC     | FMHV-204-32-TC                 | FMHV-204-32-DLC-TC               |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.03          | 3.625              | 5.5            | FMHV-204-32-030 | FMHV-204-32-030-DLC | FMHV-204-32-030-TC             | FMHV-204-32-030-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.06          | 3.625              | 5.5            | FMHV-204-32-060 | FMHV-204-32-060-DLC | FMHV-204-32-060-TC             | FMHV-204-32-060-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.09          | 3.625              | 5.5            | FMHV-204-32-090 | FMHV-204-32-090-DLC | FMHV-204-32-090-TC             | FMHV-204-32-090-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.12          | 3.625              | 5.5            | FMHV-204-32-120 | FMHV-204-32-120-DLC | FMHV-204-32-120-TC             | FMHV-204-32-120-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.19          | 3.625              | 5.5            | FMHV-204-32-190 | FMHV-204-32-190-DLC | FMHV-204-32-190-TC             | FMHV-204-32-190-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | Ball End      | 3.625              | 5.5            | FMHV-204-32-BN  | FMHV-204-32-BN-DLC  | FMHV-204-32-BN-TC              | FMHV-204-32-BN-DLC-TC            |                 |
| DOUBLE EXTRA LONG | 1.000            | 1.000          | 1.25         | Sq. End       | 4.125              | 6              | FMHV-205-32     | FMHV-205-32-DLC     | FMHV-205-32-TC                 | FMHV-205-32-DLC-TC               |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.03          | 4.125              | 6              | FMHV-205-32-030 | FMHV-205-32-030-DLC | FMHV-205-32-030-TC             | FMHV-205-32-030-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.06          | 4.125              | 6              | FMHV-205-32-060 | FMHV-205-32-060-DLC | FMHV-205-32-060-TC             | FMHV-205-32-060-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.09          | 4.125              | 6              | FMHV-205-32-090 | FMHV-205-32-090-DLC | FMHV-205-32-090-TC             | FMHV-205-32-090-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.12          | 4.125              | 6              | FMHV-205-32-120 | FMHV-205-32-120-DLC | FMHV-205-32-120-TC             | FMHV-205-32-120-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.19          | 4.125              | 6              | FMHV-205-32-190 | FMHV-205-32-190-DLC | FMHV-205-32-190-TC             | FMHV-205-32-190-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | Ball End      | 4.125              | 6              | FMHV-205-32-BN  | FMHV-205-32-BN-DLC  | FMHV-205-32-BN-TC              | FMHV-205-32-BN-DLC-TC            |                 |

# Need a Different Reach?

Any neck length (LBS) available upon request!

\*Other Reach Lengths available upon request.

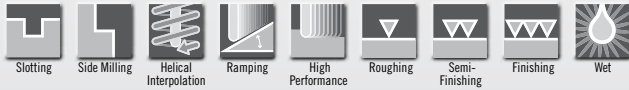


# FMHV 3 Flute Ultra-High Velocity Tools for Aluminum

## Characteristics



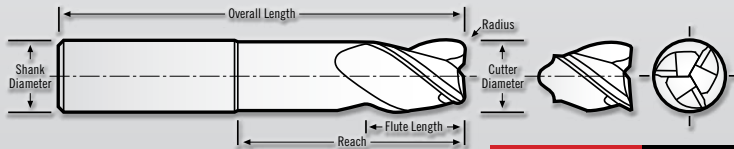
## Applications



## Materials



## Coatings



## FM Series Tolerances:

Cutting Dia. =  $-.001/-0.0015$ "  
 Shank Dia. =  $-.0001/-0.0002$ "  
 Flute Length =  $+.060/-0.000$ "  
 OAL =  $+/-0.060$ "

**ALL-NEW BALANCED END DESIGN**

CANNOT PLUNGE



**NEW!**

## FMHV 3 Flute (Short to Long Reach)



|        | Cutting Diameter | Shank Diameter | Flute Length | Corner Radius | Reach Length (LBS) | Overall Length | Uncoated        | DLC Coated          | Uncoated w/ Thru Coolant Holes | DLC Coated w/ Thru Coolant Holes |                  |
|--------|------------------|----------------|--------------|---------------|--------------------|----------------|-----------------|---------------------|--------------------------------|----------------------------------|------------------|
| SHORT  | 0.250            | 0.250          | 0.375        | Sq. End       | 0.75               | 2              | FMHV-301-08     | FMHV-301-08-DLC     | FMHV-301-08-TC                 | FMHV-301-08-DLC-TC               | 0.250" DIAMETER  |
|        | 0.250            | 0.250          | 0.375        | 0.03          | 0.75               | 2              | FMHV-301-08-030 | FMHV-301-08-030-DLC | FMHV-301-08-030-TC             | FMHV-301-08-030-DLC-TC           |                  |
|        | 0.250            | 0.250          | 0.375        | 0.06          | 0.75               | 2              | FMHV-301-08-060 | FMHV-301-08-060-DLC | FMHV-301-08-060-TC             | FMHV-301-08-060-DLC-TC           |                  |
|        | 0.250            | 0.250          | 0.375        | 0.09          | 0.75               | 2              | FMHV-301-08-090 | FMHV-301-08-090-DLC | FMHV-301-08-090-TC             | FMHV-301-08-090-DLC-TC           |                  |
|        | 0.250            | 0.250          | 0.375        | Ball End      | 0.75               | 2              | FMHV-301-08-BN  | FMHV-301-08-BN-DLC  | FMHV-301-08-BN-TC              | FMHV-301-08-BN-DLC-TC            |                  |
| MEDIUM | 0.250            | 0.250          | 0.375        | Sq. End       | 1.063              | 2.5            | FMHV-302-08     | FMHV-302-08-DLC     | FMHV-302-08-TC                 | FMHV-302-08-DLC-TC               |                  |
|        | 0.250            | 0.250          | 0.375        | 0.03          | 1.063              | 2.5            | FMHV-302-08-030 | FMHV-302-08-030-DLC | FMHV-302-08-030-TC             | FMHV-302-08-030-DLC-TC           |                  |
|        | 0.250            | 0.250          | 0.375        | 0.06          | 1.063              | 2.5            | FMHV-302-08-060 | FMHV-302-08-060-DLC | FMHV-302-08-060-TC             | FMHV-302-08-060-DLC-TC           |                  |
|        | 0.250            | 0.250          | 0.375        | 0.09          | 1.063              | 2.5            | FMHV-302-08-090 | FMHV-302-08-090-DLC | FMHV-302-08-090-TC             | FMHV-302-08-090-DLC-TC           |                  |
|        | 0.250            | 0.250          | 0.375        | Ball End      | 1.063              | 2.5            | FMHV-302-08-BN  | FMHV-302-08-BN-DLC  | FMHV-302-08-BN-TC              | FMHV-302-08-BN-DLC-TC            |                  |
| LONG   | 0.250            | 0.250          | 0.375        | Sq. End       | 1.5                | 3              | FMHV-303-08     | FMHV-303-08-DLC     | FMHV-303-08-TC                 | FMHV-303-08-DLC-TC               |                  |
|        | 0.250            | 0.250          | 0.375        | 0.03          | 1.5                | 3              | FMHV-303-08-030 | FMHV-303-08-030-DLC | FMHV-303-08-030-TC             | FMHV-303-08-030-DLC-TC           |                  |
|        | 0.250            | 0.250          | 0.375        | 0.06          | 1.5                | 3              | FMHV-303-08-060 | FMHV-303-08-060-DLC | FMHV-303-08-060-TC             | FMHV-303-08-060-DLC-TC           |                  |
|        | 0.250            | 0.250          | 0.375        | 0.09          | 1.5                | 3              | FMHV-303-08-090 | FMHV-303-08-090-DLC | FMHV-303-08-090-TC             | FMHV-303-08-090-DLC-TC           |                  |
|        | 0.250            | 0.250          | 0.375        | Ball End      | 1.5                | 3              | FMHV-303-08-BN  | FMHV-303-08-BN-DLC  | FMHV-303-08-BN-TC              | FMHV-303-08-BN-DLC-TC            |                  |
| SHORT  | 0.3125           | 0.3125         | 0.5          | Sq. End       | 0.75               | 2              | FMHV-301-10     | FMHV-301-10-DLC     | FMHV-301-10-TC                 | FMHV-301-10-DLC-TC               | 0.3125" DIAMETER |
|        | 0.3125           | 0.3125         | 0.5          | 0.03          | 0.75               | 2              | FMHV-301-10-030 | FMHV-301-10-030-DLC | FMHV-301-10-030-TC             | FMHV-301-10-030-DLC-TC           |                  |
|        | 0.3125           | 0.3125         | 0.5          | 0.06          | 0.75               | 2              | FMHV-301-10-060 | FMHV-301-10-060-DLC | FMHV-301-10-060-TC             | FMHV-301-10-060-DLC-TC           |                  |
|        | 0.3125           | 0.3125         | 0.5          | 0.09          | 0.75               | 2              | FMHV-301-10-090 | FMHV-301-10-090-DLC | FMHV-301-10-090-TC             | FMHV-301-10-090-DLC-TC           |                  |
|        | 0.3125           | 0.3125         | 0.5          | Ball End      | 0.75               | 2              | FMHV-301-10-BN  | FMHV-301-10-BN-DLC  | FMHV-301-10-BN-TC              | FMHV-301-10-BN-DLC-TC            |                  |
| MEDIUM | 0.3125           | 0.3125         | 0.5          | Sq. End       | 1.063              | 2.5            | FMHV-302-10     | FMHV-302-10-DLC     | FMHV-302-10-TC                 | FMHV-302-10-DLC-TC               |                  |
|        | 0.3125           | 0.3125         | 0.5          | 0.03          | 1.063              | 2.5            | FMHV-302-10-030 | FMHV-302-10-030-DLC | FMHV-302-10-030-TC             | FMHV-302-10-030-DLC-TC           |                  |
|        | 0.3125           | 0.3125         | 0.5          | 0.06          | 1.063              | 2.5            | FMHV-302-10-060 | FMHV-302-10-060-DLC | FMHV-302-10-060-TC             | FMHV-302-10-060-DLC-TC           |                  |
|        | 0.3125           | 0.3125         | 0.5          | 0.09          | 1.063              | 2.5            | FMHV-302-10-090 | FMHV-302-10-090-DLC | FMHV-302-10-090-TC             | FMHV-302-10-090-DLC-TC           |                  |
|        | 0.3125           | 0.3125         | 0.5          | Ball End      | 1.063              | 2.5            | FMHV-302-10-BN  | FMHV-302-10-BN-DLC  | FMHV-302-10-BN-TC              | FMHV-302-10-BN-DLC-TC            |                  |

\*Other Reach Lengths available upon request.

CONTINUED ON NEXT PAGE—



**NEW!**

# 3 Flute FMHV

Aluminum

## FMHV 3 Flute (Short to Long Reach)



|            | Cutting Diameter | Shank Diameter | Flute Length | Corner Radius | Reach Length (LBS) | Overall Length | Uncoated        | DLC Coated          | Uncoated w/ Thru Coolant Holes | DLC Coated w/ Thru Coolant Holes |                  |
|------------|------------------|----------------|--------------|---------------|--------------------|----------------|-----------------|---------------------|--------------------------------|----------------------------------|------------------|
| LONG       | 0.3125           | 0.3125         | 0.5          | Sq. End       | 1.5                | 3              | FMHV-303-10     | FMHV-303-10-DLC     | FMHV-303-10-TC                 | FMHV-303-10-DLC-TC               | 0.3125" DIAMETER |
|            | 0.3125           | 0.3125         | 0.5          | 0.03          | 1.5                | 3              | FMHV-303-10-030 | FMHV-303-10-030-DLC | FMHV-303-10-030-TC             | FMHV-303-10-030-DLC-TC           |                  |
|            | 0.3125           | 0.3125         | 0.5          | 0.06          | 1.5                | 3              | FMHV-303-10-060 | FMHV-303-10-060-DLC | FMHV-303-10-060-TC             | FMHV-303-10-060-DLC-TC           |                  |
|            | 0.3125           | 0.3125         | 0.5          | 0.09          | 1.5                | 3              | FMHV-303-10-090 | FMHV-303-10-090-DLC | FMHV-303-10-090-TC             | FMHV-303-10-090-DLC-TC           |                  |
|            | 0.3125           | 0.3125         | 0.5          | Ball End      | 1.5                | 3              | FMHV-303-10-BN  | FMHV-303-10-BN-DLC  | FMHV-303-10-BN-TC              | FMHV-303-10-BN-DLC-TC            |                  |
| SHORT      | 0.375            | 0.375          | 0.5          | Sq. End       | 1.25               | 3              | FMHV-301-12     | FMHV-301-12-DLC     | FMHV-301-12-TC                 | FMHV-301-12-DLC-TC               | 0.375" DIAMETER  |
|            | 0.375            | 0.375          | 0.5          | 0.03          | 1.25               | 3              | FMHV-301-12-030 | FMHV-301-12-030-DLC | FMHV-301-12-030-TC             | FMHV-301-12-030-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | 0.06          | 1.25               | 3              | FMHV-301-12-060 | FMHV-301-12-060-DLC | FMHV-301-12-060-TC             | FMHV-301-12-060-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | 0.09          | 1.25               | 3              | FMHV-301-12-090 | FMHV-301-12-090-DLC | FMHV-301-12-090-TC             | FMHV-301-12-090-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | Ball End      | 1.25               | 3              | FMHV-301-12-BN  | FMHV-301-12-BN-DLC  | FMHV-301-12-BN-TC              | FMHV-301-12-BN-DLC-TC            |                  |
| MEDIUM     | 0.375            | 0.375          | 0.5          | Sq. End       | 1.75               | 3.5            | FMHV-302-12     | FMHV-302-12-DLC     | FMHV-302-12-TC                 | FMHV-302-12-DLC-TC               |                  |
|            | 0.375            | 0.375          | 0.5          | 0.03          | 1.75               | 3.5            | FMHV-302-12-030 | FMHV-302-12-030-DLC | FMHV-302-12-030-TC             | FMHV-302-12-030-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | 0.06          | 1.75               | 3.5            | FMHV-302-12-060 | FMHV-302-12-060-DLC | FMHV-302-12-060-TC             | FMHV-302-12-060-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | 0.09          | 1.75               | 3.5            | FMHV-302-12-090 | FMHV-302-12-090-DLC | FMHV-302-12-090-TC             | FMHV-302-12-090-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | Ball End      | 1.75               | 3.5            | FMHV-302-12-BN  | FMHV-302-12-BN-DLC  | FMHV-302-12-BN-TC              | FMHV-302-12-BN-DLC-TC            |                  |
| LONG       | 0.375            | 0.375          | 0.5          | Sq. End       | 2.25               | 4              | FMHV-303-12     | FMHV-303-12-DLC     | FMHV-303-12-TC                 | FMHV-303-12-DLC-TC               |                  |
|            | 0.375            | 0.375          | 0.5          | 0.03          | 2.25               | 4              | FMHV-303-12-030 | FMHV-303-12-030-DLC | FMHV-303-12-030-TC             | FMHV-303-12-030-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | 0.06          | 2.25               | 4              | FMHV-303-12-060 | FMHV-303-12-060-DLC | FMHV-303-12-060-TC             | FMHV-303-12-060-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | 0.09          | 2.25               | 4              | FMHV-303-12-090 | FMHV-303-12-090-DLC | FMHV-303-12-090-TC             | FMHV-303-12-090-DLC-TC           |                  |
|            | 0.375            | 0.375          | 0.5          | Ball End      | 2.25               | 4              | FMHV-303-12-BN  | FMHV-303-12-BN-DLC  | FMHV-303-12-BN-TC              | FMHV-303-12-BN-DLC-TC            |                  |
| SHORT      | 0.500            | 0.500          | 0.75         | Sq. End       | 1.25               | 3              | FMHV-301-16     | FMHV-301-16-DLC     | FMHV-301-16-TC                 | FMHV-301-16-DLC-TC               | 0.500" DIAMETER  |
|            | 0.500            | 0.500          | 0.75         | 0.03          | 1.25               | 3              | FMHV-301-16-030 | FMHV-301-16-030-DLC | FMHV-301-16-030-TC             | FMHV-301-16-030-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.06          | 1.25               | 3              | FMHV-301-16-060 | FMHV-301-16-060-DLC | FMHV-301-16-060-TC             | FMHV-301-16-060-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.09          | 1.25               | 3              | FMHV-301-16-090 | FMHV-301-16-090-DLC | FMHV-301-16-090-TC             | FMHV-301-16-090-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.12          | 1.25               | 3              | FMHV-301-16-120 | FMHV-301-16-120-DLC | FMHV-301-16-120-TC             | FMHV-301-16-120-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | Ball End      | 1.25               | 3              | FMHV-301-16-BN  | FMHV-301-16-BN-DLC  | FMHV-301-16-BN-TC              | FMHV-301-16-BN-DLC-TC            |                  |
| MEDIUM     | 0.500            | 0.500          | 0.75         | Sq. End       | 1.625              | 3.5            | FMHV-302-16     | FMHV-302-16-DLC     | FMHV-302-16-TC                 | FMHV-302-16-DLC-TC               |                  |
|            | 0.500            | 0.500          | 0.75         | 0.03          | 1.625              | 3.5            | FMHV-302-16-030 | FMHV-302-16-030-DLC | FMHV-302-16-030-TC             | FMHV-302-16-030-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.06          | 1.625              | 3.5            | FMHV-302-16-060 | FMHV-302-16-060-DLC | FMHV-302-16-060-TC             | FMHV-302-16-060-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.09          | 1.625              | 3.5            | FMHV-302-16-090 | FMHV-302-16-090-DLC | FMHV-302-16-090-TC             | FMHV-302-16-090-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.12          | 1.625              | 3.5            | FMHV-302-16-120 | FMHV-302-16-120-DLC | FMHV-302-16-120-TC             | FMHV-302-16-120-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | Ball End      | 1.625              | 3.5            | FMHV-302-16-BN  | FMHV-302-16-BN-DLC  | FMHV-302-16-BN-TC              | FMHV-302-16-BN-DLC-TC            |                  |
| LONG       | 0.500            | 0.500          | 0.75         | Sq. End       | 2.125              | 4              | FMHV-303-16     | FMHV-303-16-DLC     | FMHV-303-16-TC                 | FMHV-303-16-DLC-TC               |                  |
|            | 0.500            | 0.500          | 0.75         | 0.03          | 2.125              | 4              | FMHV-303-16-030 | FMHV-303-16-030-DLC | FMHV-303-16-030-TC             | FMHV-303-16-030-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.06          | 2.125              | 4              | FMHV-303-16-060 | FMHV-303-16-060-DLC | FMHV-303-16-060-TC             | FMHV-303-16-060-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.09          | 2.125              | 4              | FMHV-303-16-090 | FMHV-303-16-090-DLC | FMHV-303-16-090-TC             | FMHV-303-16-090-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.12          | 2.125              | 4              | FMHV-303-16-120 | FMHV-303-16-120-DLC | FMHV-303-16-120-TC             | FMHV-303-16-120-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | Ball End      | 2.125              | 4              | FMHV-303-16-BN  | FMHV-303-16-BN-DLC  | FMHV-303-16-BN-TC              | FMHV-303-16-BN-DLC-TC            |                  |
| EXTRA LONG | 0.500            | 0.500          | 0.75         | Sq. End       | 2.625              | 4.5            | FMHV-304-16     | FMHV-304-16-DLC     | FMHV-304-16-TC                 | FMHV-304-16-DLC-TC               |                  |
|            | 0.500            | 0.500          | 0.75         | 0.03          | 2.625              | 4.5            | FMHV-304-16-030 | FMHV-304-16-030-DLC | FMHV-304-16-030-TC             | FMHV-304-16-030-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.06          | 2.625              | 4.5            | FMHV-304-16-060 | FMHV-304-16-060-DLC | FMHV-304-16-060-TC             | FMHV-304-16-060-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.09          | 2.625              | 4.5            | FMHV-304-16-090 | FMHV-304-16-090-DLC | FMHV-304-16-090-TC             | FMHV-304-16-090-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | 0.12          | 2.625              | 4.5            | FMHV-304-16-120 | FMHV-304-16-120-DLC | FMHV-304-16-120-TC             | FMHV-304-16-120-DLC-TC           |                  |
|            | 0.500            | 0.500          | 0.75         | Ball End      | 2.625              | 4.5            | FMHV-304-16-BN  | FMHV-304-16-BN-DLC  | FMHV-304-16-BN-TC              | FMHV-304-16-BN-DLC-TC            |                  |

\*Other Reach Lengths available upon request.

CONTINUED ON NEXT PAGE—

# FMHV 3 Flute Ultra-High Velocity Tools for Aluminum



## FMHV 3 Flute (Short to Long Reach)



|            | Cutting Diameter | Shank Diameter | Flute Length | Corner Radius | Reach Length (LBS) | Overall Length | Uncoated        | DLC Coated          | Uncoated w/ Thru Coolant Holes | DLC Coated w/ Thru Coolant Holes |                 |
|------------|------------------|----------------|--------------|---------------|--------------------|----------------|-----------------|---------------------|--------------------------------|----------------------------------|-----------------|
| SHORT      | 0.625            | 0.625          | 0.875        | Sq. End       | 1.563              | 3.5            | FMHV-301-20     | FMHV-301-20-DLC     | FMHV-301-20-TC                 | FMHV-301-20-DLC-TC               | 0.625" DIAMETER |
|            | 0.625            | 0.625          | 0.875        | 0.03          | 1.563              | 3.5            | FMHV-301-20-030 | FMHV-301-20-030-DLC | FMHV-301-20-030-TC             | FMHV-301-20-030-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.06          | 1.563              | 3.5            | FMHV-301-20-060 | FMHV-301-20-060-DLC | FMHV-301-20-060-TC             | FMHV-301-20-060-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.09          | 1.563              | 3.5            | FMHV-301-20-090 | FMHV-301-20-090-DLC | FMHV-301-20-090-TC             | FMHV-301-20-090-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.12          | 1.563              | 3.5            | FMHV-301-20-120 | FMHV-301-20-120-DLC | FMHV-301-20-120-TC             | FMHV-301-20-120-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | Ball End      | 1.563              | 3.5            | FMHV-301-20-BN  | FMHV-301-20-BN-DLC  | FMHV-301-20-BN-TC              | FMHV-301-20-BN-DLC-TC            |                 |
| MEDIUM     | 0.625            | 0.625          | 0.875        | Sq. End       | 2.063              | 4              | FMHV-302-20     | FMHV-302-20-DLC     | FMHV-302-20-TC                 | FMHV-302-20-DLC-TC               |                 |
|            | 0.625            | 0.625          | 0.875        | 0.03          | 2.063              | 4              | FMHV-302-20-030 | FMHV-302-20-030-DLC | FMHV-302-20-030-TC             | FMHV-302-20-030-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.06          | 2.063              | 4              | FMHV-302-20-060 | FMHV-302-20-060-DLC | FMHV-302-20-060-TC             | FMHV-302-20-060-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.09          | 2.063              | 4              | FMHV-302-20-090 | FMHV-302-20-090-DLC | FMHV-302-20-090-TC             | FMHV-302-20-090-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.12          | 2.063              | 4              | FMHV-302-20-120 | FMHV-302-20-120-DLC | FMHV-302-20-120-TC             | FMHV-302-20-120-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | Ball End      | 2.063              | 4              | FMHV-302-20-BN  | FMHV-302-20-BN-DLC  | FMHV-302-20-BN-TC              | FMHV-302-20-BN-DLC-TC            |                 |
| LONG       | 0.625            | 0.625          | 0.875        | Sq. End       | 2.563              | 4.5            | FMHV-303-20     | FMHV-303-20-DLC     | FMHV-303-20-TC                 | FMHV-303-20-DLC-TC               |                 |
|            | 0.625            | 0.625          | 0.875        | 0.03          | 2.563              | 4.5            | FMHV-303-20-030 | FMHV-303-20-030-DLC | FMHV-303-20-030-TC             | FMHV-303-20-030-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.06          | 2.563              | 4.5            | FMHV-303-20-060 | FMHV-303-20-060-DLC | FMHV-303-20-060-TC             | FMHV-303-20-060-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.09          | 2.563              | 4.5            | FMHV-303-20-090 | FMHV-303-20-090-DLC | FMHV-303-20-090-TC             | FMHV-303-20-090-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.12          | 2.563              | 4.5            | FMHV-303-20-120 | FMHV-303-20-120-DLC | FMHV-303-20-120-TC             | FMHV-303-20-120-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | Ball End      | 2.563              | 4.5            | FMHV-303-20-BN  | FMHV-303-20-BN-DLC  | FMHV-303-20-BN-TC              | FMHV-303-20-BN-DLC-TC            |                 |
| EXTRA LONG | 0.625            | 0.625          | 0.875        | Sq. End       | 3.063              | 5              | FMHV-304-20     | FMHV-304-20-DLC     | FMHV-304-20-TC                 | FMHV-304-20-DLC-TC               |                 |
|            | 0.625            | 0.625          | 0.875        | 0.03          | 3.063              | 5              | FMHV-304-20-030 | FMHV-304-20-030-DLC | FMHV-304-20-030-TC             | FMHV-304-20-030-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.06          | 3.063              | 5              | FMHV-304-20-060 | FMHV-304-20-060-DLC | FMHV-304-20-060-TC             | FMHV-304-20-060-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.09          | 3.063              | 5              | FMHV-304-20-090 | FMHV-304-20-090-DLC | FMHV-304-20-090-TC             | FMHV-304-20-090-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | 0.12          | 3.063              | 5              | FMHV-304-20-120 | FMHV-304-20-120-DLC | FMHV-304-20-120-TC             | FMHV-304-20-120-DLC-TC           |                 |
|            | 0.625            | 0.625          | 0.875        | Ball End      | 3.063              | 5              | FMHV-304-20-BN  | FMHV-304-20-BN-DLC  | FMHV-304-20-BN-TC              | FMHV-304-20-BN-DLC-TC            |                 |
| SHORT      | 0.750            | 0.750          | 1            | Sq. End       | 2.125              | 4              | FMHV-301-24     | FMHV-301-24-DLC     | FMHV-301-24-TC                 | FMHV-301-24-DLC-TC               | 0.750" DIAMETER |
|            | 0.750            | 0.750          | 1            | 0.03          | 2.125              | 4              | FMHV-301-24-030 | FMHV-301-24-030-DLC | FMHV-301-24-030-TC             | FMHV-301-24-030-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.06          | 2.125              | 4              | FMHV-301-24-060 | FMHV-301-24-060-DLC | FMHV-301-24-060-TC             | FMHV-301-24-060-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.09          | 2.125              | 4              | FMHV-301-24-090 | FMHV-301-24-090-DLC | FMHV-301-24-090-TC             | FMHV-301-24-090-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.12          | 2.125              | 4              | FMHV-301-24-120 | FMHV-301-24-120-DLC | FMHV-301-24-120-TC             | FMHV-301-24-120-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.19          | 2.125              | 4              | FMHV-301-24-190 | FMHV-301-24-190-DLC | FMHV-301-24-190-TC             | FMHV-301-24-190-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | Ball End      | 2.125              | 4              | FMHV-301-24-BN  | FMHV-301-24-BN-DLC  | FMHV-301-24-BN-TC              | FMHV-301-24-BN-DLC-TC            |                 |
|            | 0.750            | 0.750          | 1            | Sq. End       | 2.625              | 4.5            | FMHV-302-24     | FMHV-302-24-DLC     | FMHV-302-24-TC                 | FMHV-302-24-DLC-TC               |                 |
| MEDIUM     | 0.750            | 0.750          | 1            | 0.03          | 2.625              | 4.5            | FMHV-302-24-030 | FMHV-302-24-030-DLC | FMHV-302-24-030-TC             | FMHV-302-24-030-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.06          | 2.625              | 4.5            | FMHV-302-24-060 | FMHV-302-24-060-DLC | FMHV-302-24-060-TC             | FMHV-302-24-060-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.09          | 2.625              | 4.5            | FMHV-302-24-090 | FMHV-302-24-090-DLC | FMHV-302-24-090-TC             | FMHV-302-24-090-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.12          | 2.625              | 4.5            | FMHV-302-24-120 | FMHV-302-24-120-DLC | FMHV-302-24-120-TC             | FMHV-302-24-120-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.19          | 2.625              | 4.5            | FMHV-302-24-190 | FMHV-302-24-190-DLC | FMHV-302-24-190-TC             | FMHV-302-24-190-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | Ball End      | 2.625              | 4.5            | FMHV-302-24-BN  | FMHV-302-24-BN-DLC  | FMHV-302-24-BN-TC              | FMHV-302-24-BN-DLC-TC            |                 |
|            | 0.750            | 0.750          | 1            | Sq. End       | 3.125              | 5              | FMHV-303-24     | FMHV-303-24-DLC     | FMHV-303-24-TC                 | FMHV-303-24-DLC-TC               |                 |
| LONG       | 0.750            | 0.750          | 1            | 0.03          | 3.125              | 5              | FMHV-303-24-030 | FMHV-303-24-030-DLC | FMHV-303-24-030-TC             | FMHV-303-24-030-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.06          | 3.125              | 5              | FMHV-303-24-060 | FMHV-303-24-060-DLC | FMHV-303-24-060-TC             | FMHV-303-24-060-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.09          | 3.125              | 5              | FMHV-303-24-090 | FMHV-303-24-090-DLC | FMHV-303-24-090-TC             | FMHV-303-24-090-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.12          | 3.125              | 5              | FMHV-303-24-120 | FMHV-303-24-120-DLC | FMHV-303-24-120-TC             | FMHV-303-24-120-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | 0.19          | 3.125              | 5              | FMHV-303-24-190 | FMHV-303-24-190-DLC | FMHV-303-24-190-TC             | FMHV-303-24-190-DLC-TC           |                 |
|            | 0.750            | 0.750          | 1            | Ball End      | 3.125              | 5              | FMHV-303-24-BN  | FMHV-303-24-BN-DLC  | FMHV-303-24-BN-TC              | FMHV-303-24-BN-DLC-TC            |                 |
|            | 0.750            | 0.750          | 1            | Sq. End       | 3.125              | 5              | FMHV-304-24     | FMHV-304-24-DLC     | FMHV-304-24-TC                 | FMHV-304-24-DLC-TC               |                 |

\*Other Reach Lengths available upon request.

CONTINUED ON NEXT PAGE—

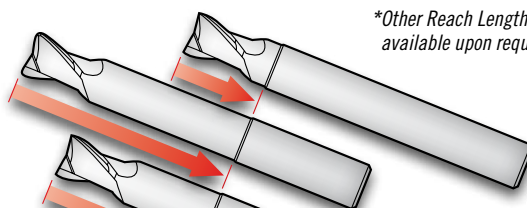
**NEW!****FMHV 3 Flute (Short to Long Reach)**

|                   | Cutting Diameter | Shank Diameter | Flute Length | Corner Radius | Reach Length (LBS) | Overall Length | Uncoated        | DLC Coated          | Uncoated w/ Thru Coolant Holes | DLC Coated w/ Thru Coolant Holes |                 |
|-------------------|------------------|----------------|--------------|---------------|--------------------|----------------|-----------------|---------------------|--------------------------------|----------------------------------|-----------------|
| EXTRA LONG        | 0.750            | 0.750          | 1            | Sq. End       | 3.625              | 5.5            | FMHV-304-24     | FMHV-304-24-DLC     | FMHV-304-24-TC                 | FMHV-304-24-DLC-TC               | 0.750" DIAMETER |
|                   | 0.750            | 0.750          | 1            | 0.03          | 3.625              | 5.5            | FMHV-304-24-030 | FMHV-304-24-030-DLC | FMHV-304-24-030-TC             | FMHV-304-24-030-DLC-TC           |                 |
|                   | 0.750            | 0.750          | 1            | 0.06          | 3.625              | 5.5            | FMHV-304-24-060 | FMHV-304-24-060-DLC | FMHV-304-24-060-TC             | FMHV-304-24-060-DLC-TC           |                 |
|                   | 0.750            | 0.750          | 1            | 0.09          | 3.625              | 5.5            | FMHV-304-24-090 | FMHV-304-24-090-DLC | FMHV-304-24-090-TC             | FMHV-304-24-090-DLC-TC           |                 |
|                   | 0.750            | 0.750          | 1            | 0.12          | 3.625              | 5.5            | FMHV-304-24-120 | FMHV-304-24-120-DLC | FMHV-304-24-120-TC             | FMHV-304-24-120-DLC-TC           |                 |
|                   | 0.750            | 0.750          | 1            | 0.19          | 3.625              | 5.5            | FMHV-304-24-190 | FMHV-304-24-190-DLC | FMHV-304-24-190-TC             | FMHV-304-24-190-DLC-TC           |                 |
|                   | 0.750            | 0.750          | 1            | Ball End      | 3.625              | 5.5            | FMHV-304-24-BN  | FMHV-304-24-BN-DLC  | FMHV-304-24-BN-TC              | FMHV-304-24-BN-DLC-TC            |                 |
| SHORT             | 1.000            | 1.000          | 1.25         | Sq. End       | 2.125              | 4              | FMHV-301-32     | FMHV-301-32-DLC     | FMHV-301-32-TC                 | FMHV-301-32-DLC-TC               | 1.000" DIAMETER |
|                   | 1.000            | 1.000          | 1.25         | 0.03          | 2.125              | 4              | FMHV-301-32-030 | FMHV-301-32-030-DLC | FMHV-301-32-030-TC             | FMHV-301-32-030-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.06          | 2.125              | 4              | FMHV-301-32-060 | FMHV-301-32-060-DLC | FMHV-301-32-060-TC             | FMHV-301-32-060-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.09          | 2.125              | 4              | FMHV-301-32-090 | FMHV-301-32-090-DLC | FMHV-301-32-090-TC             | FMHV-301-32-090-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.12          | 2.125              | 4              | FMHV-301-32-120 | FMHV-301-32-120-DLC | FMHV-301-32-120-TC             | FMHV-301-32-120-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.19          | 2.125              | 4              | FMHV-301-32-190 | FMHV-301-32-190-DLC | FMHV-301-32-190-TC             | FMHV-301-32-190-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | Ball End      | 2.125              | 4              | FMHV-301-32-BN  | FMHV-301-32-BN-DLC  | FMHV-301-32-BN-TC              | FMHV-301-32-BN-DLC-TC            |                 |
| MEDIUM            | 1.000            | 1.000          | 1.25         | Sq. End       | 2.625              | 4.5            | FMHV-302-32     | FMHV-302-32-DLC     | FMHV-302-32-TC                 | FMHV-302-32-DLC-TC               |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.03          | 2.625              | 4.5            | FMHV-302-32-030 | FMHV-302-32-030-DLC | FMHV-302-32-030-TC             | FMHV-302-32-030-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.06          | 2.625              | 4.5            | FMHV-302-32-060 | FMHV-302-32-060-DLC | FMHV-302-32-060-TC             | FMHV-302-32-060-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.09          | 2.625              | 4.5            | FMHV-302-32-090 | FMHV-302-32-090-DLC | FMHV-302-32-090-TC             | FMHV-302-32-090-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.12          | 2.625              | 4.5            | FMHV-302-32-120 | FMHV-302-32-120-DLC | FMHV-302-32-120-TC             | FMHV-302-32-120-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.19          | 2.625              | 4.5            | FMHV-302-32-190 | FMHV-302-32-190-DLC | FMHV-302-32-190-TC             | FMHV-302-32-190-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | Ball End      | 2.625              | 4.5            | FMHV-302-32-BN  | FMHV-302-32-BN-DLC  | FMHV-302-32-BN-TC              | FMHV-302-32-BN-DLC-TC            |                 |
| LONG              | 1.000            | 1.000          | 1.25         | Sq. End       | 3.125              | 5              | FMHV-303-32     | FMHV-303-32-DLC     | FMHV-303-32-TC                 | FMHV-303-32-DLC-TC               |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.03          | 3.125              | 5              | FMHV-303-32-030 | FMHV-303-32-030-DLC | FMHV-303-32-030-TC             | FMHV-303-32-030-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.06          | 3.125              | 5              | FMHV-303-32-060 | FMHV-303-32-060-DLC | FMHV-303-32-060-TC             | FMHV-303-32-060-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.09          | 3.125              | 5              | FMHV-303-32-090 | FMHV-303-32-090-DLC | FMHV-303-32-090-TC             | FMHV-303-32-090-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.12          | 3.125              | 5              | FMHV-303-32-120 | FMHV-303-32-120-DLC | FMHV-303-32-120-TC             | FMHV-303-32-120-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.19          | 3.125              | 5              | FMHV-303-32-190 | FMHV-303-32-190-DLC | FMHV-303-32-190-TC             | FMHV-303-32-190-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | Ball End      | 3.125              | 5              | FMHV-303-32-BN  | FMHV-303-32-BN-DLC  | FMHV-303-32-BN-TC              | FMHV-303-32-BN-DLC-TC            |                 |
| EXTRA LONG        | 1.000            | 1.000          | 1.25         | Sq. End       | 3.625              | 5.5            | FMHV-304-32     | FMHV-304-32-DLC     | FMHV-304-32-TC                 | FMHV-304-32-DLC-TC               |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.03          | 3.625              | 5.5            | FMHV-304-32-030 | FMHV-304-32-030-DLC | FMHV-304-32-030-TC             | FMHV-304-32-030-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.06          | 3.625              | 5.5            | FMHV-304-32-060 | FMHV-304-32-060-DLC | FMHV-304-32-060-TC             | FMHV-304-32-060-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.09          | 3.625              | 5.5            | FMHV-304-32-090 | FMHV-304-32-090-DLC | FMHV-304-32-090-TC             | FMHV-304-32-090-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.12          | 3.625              | 5.5            | FMHV-304-32-120 | FMHV-304-32-120-DLC | FMHV-304-32-120-TC             | FMHV-304-32-120-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.19          | 3.625              | 5.5            | FMHV-304-32-190 | FMHV-304-32-190-DLC | FMHV-304-32-190-TC             | FMHV-304-32-190-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | Ball End      | 3.625              | 5.5            | FMHV-304-32-BN  | FMHV-304-32-BN-DLC  | FMHV-304-32-BN-TC              | FMHV-304-32-BN-DLC-TC            |                 |
| DOUBLE EXTRA LONG | 1.000            | 1.000          | 1.25         | Sq. End       | 4.125              | 6              | FMHV-305-32     | FMHV-305-32-DLC     | FMHV-305-32-TC                 | FMHV-305-32-DLC-TC               |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.03          | 4.125              | 6              | FMHV-305-32-030 | FMHV-305-32-030-DLC | FMHV-305-32-030-TC             | FMHV-305-32-030-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.06          | 4.125              | 6              | FMHV-305-32-060 | FMHV-305-32-060-DLC | FMHV-305-32-060-TC             | FMHV-305-32-060-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.09          | 4.125              | 6              | FMHV-305-32-090 | FMHV-305-32-090-DLC | FMHV-305-32-090-TC             | FMHV-305-32-090-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.12          | 4.125              | 6              | FMHV-305-32-120 | FMHV-305-32-120-DLC | FMHV-305-32-120-TC             | FMHV-305-32-120-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | 0.19          | 4.125              | 6              | FMHV-305-32-190 | FMHV-305-32-190-DLC | FMHV-305-32-190-TC             | FMHV-305-32-190-DLC-TC           |                 |
|                   | 1.000            | 1.000          | 1.25         | Ball End      | 4.125              | 6              | FMHV-305-32-BN  | FMHV-305-32-BN-DLC  | FMHV-305-32-BN-TC              | FMHV-305-32-BN-DLC-TC            |                 |

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