MFAH
Milling Cutter for Finishing Aluminum

Low Cutting Forces Minimize Burrs and Chipping for High Quality Machining

Easily Adjust Blade Runout for Efficient Machining
Large Lineup for Milling Various Applications
Steel Body and Light-weight Hybrid Body with Internal Coolant Available
3 Different Cutting Edge Designs
MFAH
Milling Cutter for Finishing Aluminum

Low Cutting Forces Minimize Burrs for High Quality Machining Results
Easily Adjustable Blade Runout with 2 Body Types and 3 Inserts for a Variety of Milling Applications

1 Minimizes Burrs for High Quality Machining Results

Large True Rake Angle and Double-edge Insert Designs

Burr and Chipping Comparison (Internal Evaluation)

<table>
<thead>
<tr>
<th></th>
<th>Finishing (Burrs More Likely)</th>
<th>Roughing (Chipping More Likely)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFAH Edge Preparation G (Double-Edge)</td>
<td>D.O.C. = 0.020&quot;, ae = 2.165&quot;, fz = 0.002 ipt</td>
<td>D.O.C. = 0.059&quot;, ae = 2.165&quot;, fz = 0.006 ipt</td>
</tr>
<tr>
<td>Competitor A (R0.8)</td>
<td>Burrs</td>
<td>Chipping</td>
</tr>
</tbody>
</table>

Cutting Conditions: Vc = 8,200 sfm, Wet, Cutting Dia. Ø80mm
MFAH0800-10T-SF, ENET0905PAER-G KPD001
Workpiece: 383.0 Aluminum

2 Low Cutting Force Design

Low Cutting Force, Reduced Chattering and High Efficiency Machining

Cutting Force Comparison (Internal Evaluation)

Cutting Conditions: Vc = 8,200 sfm, Wet, Cutting Dia. Ø80mm
MFAH0800-10T-SF, ENET0905PAER-G KPD001
Workpiece: 383.0 Aluminum
3 Adjustable Blade Runout

Easily Install Inserts and Adjust Blade Runout

Burr and Chipping Comparison (Internal Evaluation)

Easy Insert Installation
Guide Pin Allows for Easier Positioning

- Mount the insert onto the guide pin

Easily Adjust Blade Runout
Adjustable from Both the Front and Outer Periphery

Unique Design for Easily Adjusting from the Front

Blade Runout Setting Time Comparison (Internal Evaluation)
Operation Time of 5 Workers

Setting Time (min)

- MFAH
- Competitor A
- Competitor B

Worker 1
Worker 2
Worker 3
Worker 4
Worker 5

The MFAH can drastically shorten insert setting time

4 Large Tooling Lineup

Steel Body and Light-weight Hybrid Body with Internal Coolant Available

3 Different Edge Designs Offer a Variety of Machining Applications

Cutter Body

- Steel Body
  Ø50mm – Ø125mm
- Light-Weight Hybrid Body
  Ø80mm – Ø315mm

Insert (Edge Design)

- PCD (KPD001)
- ENET0905PAER-G
  Minimizes Burs and Chipping
  First Recommendation
- ENET0905PAER-C
  Low Cutting Force
  Low Rigidity Workpiece
- ENET0905PAER-R
  Tough Edge
  High Interruption Workpiece

3 Different Edge Designs Offer a Variety of Machining Applications

5 Safety Enhancements During High-Speed Revolution

1 Prevention of Scattering by Wedge-shape Design
New wedge-shape feature holds insert firmly in place and reduces chattering

2 Prevention of Scattering with Guide Pin
Guide pins improve safety during high-speed rotation
Toolholder Dimensions (Metric Size)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Stock No. of Inserts</th>
<th>Dimensions (mm)</th>
<th>Coolant Hole</th>
<th>Max. RPM</th>
<th>Weight (kg)</th>
<th>Arbor (Attachment)</th>
<th>Coolant Cover (Attachment)</th>
<th>Coolant Cover (Optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFAH 080RA-6T-SF</td>
<td>6 80 62 1.000&quot; 20 13</td>
<td>Ø26mm Ø101.6mm Ø22mm</td>
<td>Fig.1</td>
<td>14,600</td>
<td>0.83</td>
<td>HH12X35HC</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>080RA-10T-SF</td>
<td>10</td>
<td>80</td>
<td>1.063&quot; 0.236&quot; 0.374&quot;</td>
<td>Fig.2</td>
<td>13,000</td>
<td>1.21</td>
<td>HH16X44HC</td>
<td>-</td>
</tr>
<tr>
<td>100RA-8T-254-SF</td>
<td>8</td>
<td>100</td>
<td>1.339&quot; 0.315&quot; 0.500&quot;</td>
<td>Fig.1</td>
<td>1.8</td>
<td>HH12X35SH</td>
<td>CC-125-MFAH</td>
<td>-</td>
</tr>
<tr>
<td>100RA-8T-SF</td>
<td>8</td>
<td>85 1.250&quot; 42</td>
<td>0.945&quot; 0.236&quot; 0.374&quot;</td>
<td>Fig.2</td>
<td>11,400</td>
<td>1.74</td>
<td>HH20X53HA</td>
<td>3.4</td>
</tr>
<tr>
<td>125RA-10T-254-SF</td>
<td>10</td>
<td>125 60 1.000&quot; 20 13</td>
<td>1.496&quot; 0.433&quot; 0.752&quot;</td>
<td>Fig.3</td>
<td>5,600</td>
<td>4.9</td>
<td>CC-200-MFAH</td>
<td>-</td>
</tr>
<tr>
<td>125RA-16T-254-SF</td>
<td>16</td>
<td>89 1.500&quot; 55</td>
<td>1.378&quot; 0.551&quot; 1.000&quot;</td>
<td>Fig.2</td>
<td>4,500</td>
<td>7</td>
<td>CC-250-MFAH</td>
<td>6.9</td>
</tr>
<tr>
<td>160RA-12T-SF</td>
<td>12</td>
<td>160 130 2.000&quot; 70</td>
<td>1.496&quot;</td>
<td>Fig.4</td>
<td>3,500</td>
<td>11.7</td>
<td>CC-315-MFAH</td>
<td>11.5</td>
</tr>
<tr>
<td>160RA-20T-SF</td>
<td>20</td>
<td>200 175 126</td>
<td>1.496&quot;</td>
<td>Fig.3</td>
<td>5,600</td>
<td>4.9</td>
<td>CC-200-MFAH</td>
<td>-</td>
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<tr>
<td>200RA-16T-SF</td>
<td>16</td>
<td>250 140 1.875&quot; 165</td>
<td>1.378&quot; 0.551&quot; 1.000&quot;</td>
<td>Fig.2</td>
<td>4,500</td>
<td>7</td>
<td>CC-250-MFAH</td>
<td>6.9</td>
</tr>
<tr>
<td>200RA-24T-SF</td>
<td>24</td>
<td>315 220 220</td>
<td>1.496&quot;</td>
<td>Fig.4</td>
<td>3,500</td>
<td>11.7</td>
<td>CC-315-MFAH</td>
<td>11.5</td>
</tr>
<tr>
<td>250RA-20T-SF</td>
<td>20</td>
<td>250</td>
<td>1.496&quot;</td>
<td>Fig.3</td>
<td>5,600</td>
<td>4.9</td>
<td>CC-200-MFAH</td>
<td>-</td>
</tr>
<tr>
<td>250RA-32T-SF</td>
<td>32</td>
<td>315 220 220</td>
<td>1.496&quot;</td>
<td>Fig.4</td>
<td>3,500</td>
<td>11.7</td>
<td>CC-315-MFAH</td>
<td>11.5</td>
</tr>
<tr>
<td>315RA-24T-SF</td>
<td>24</td>
<td>250</td>
<td>1.496&quot;</td>
<td>Fig.3</td>
<td>5,600</td>
<td>4.9</td>
<td>CC-200-MFAH</td>
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<tr>
<td>315RA-40T-SF</td>
<td>40</td>
<td>315</td>
<td>1.496&quot;</td>
<td>Fig.4</td>
<td>3,500</td>
<td>11.7</td>
<td>CC-315-MFAH</td>
<td>11.5</td>
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</tbody>
</table>

* Confirm the total weight of the cutter and the arbor is within the machine’s acceptable range

○ : World Express (Shipping: 7-10 Business Days)
□ : Made to Order

Applicable Inserts: P6
Toolholder Dimensions (Metric Size)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Stock</th>
<th>No. of Inserts</th>
<th>Dimensions (mm)</th>
<th>Coolant Hole</th>
<th>Drawing</th>
<th>Max. RPM</th>
<th>Weight (kg)</th>
<th>Arbor (Attachment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFAH 080RS-6T-SF</td>
<td>○</td>
<td>6</td>
<td>80 50 1.000&quot; 20 13</td>
<td>H 50</td>
<td>1.063&quot; 0.236&quot; 0.374&quot;</td>
<td>14,600</td>
<td>1</td>
<td>HH12X3S</td>
</tr>
<tr>
<td>080RS-10T-SF</td>
<td>○</td>
<td>10</td>
<td>100 70 1.250&quot; 45</td>
<td>1.339&quot; 0.315&quot; 0.500&quot;</td>
<td>13,000</td>
<td>2</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>100RS-8T-SF</td>
<td>○</td>
<td>8</td>
<td>125 89 1.500&quot; 55</td>
<td>1.496&quot; 0.394&quot; 0.626&quot;</td>
<td>11,400</td>
<td>2.63</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>100RS-12T-SF</td>
<td>○</td>
<td>12</td>
<td>125 89 1.500&quot; 55</td>
<td>1.496&quot; 0.394&quot; 0.626&quot;</td>
<td>11,400</td>
<td>2.63</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>125RS-10T-SF</td>
<td>○</td>
<td>10</td>
<td>125 89 1.500&quot; 55</td>
<td>1.496&quot; 0.394&quot; 0.626&quot;</td>
<td>11,400</td>
<td>2.63</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>125RS-16T-SF</td>
<td>○</td>
<td>16</td>
<td>125 89 1.500&quot; 55</td>
<td>1.496&quot; 0.394&quot; 0.626&quot;</td>
<td>11,400</td>
<td>2.63</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

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○ : World Express (Shipping: 7-10 Business Days)
□ : Made to Order

Applicable Inserts ▲ P6

Spare Parts

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Clamp</th>
<th>Clamp Screw</th>
<th>Wrench</th>
<th>Adjustment Screw</th>
<th>Wrench</th>
<th>Balance Screw</th>
<th>Anti-Seize Compound</th>
<th>Applicable Inserts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light-Weight Hybrid Body MFAH080RSA-…</td>
<td>C08R</td>
<td>WSX13L</td>
<td>TTW-15</td>
<td>AJ-4170</td>
<td>DTPM-8</td>
<td>HS6X4</td>
<td>P-37</td>
<td>ENET0905…</td>
</tr>
<tr>
<td>Steel Body MFAH050RSA-…</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 1

Fig. 2
### Applicable Inserts

<table>
<thead>
<tr>
<th>Shape</th>
<th>Part Number</th>
<th>Dimensions (mm)</th>
<th>Angle (°)</th>
<th>PCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Purpose (Double-Edge)</td>
<td>ENET 0905PAER-G</td>
<td>9.61 7.9 3.4 6.02 2.6 5.6 3°</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Low Cutting Force</td>
<td>ENET 0905PAER-C</td>
<td>9.61 7.9 3.4 6.02 3.0 5.6 3°</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Tough Edge</td>
<td>ENET 0905PAER-R</td>
<td>9.61 7.9 3.4 6.02 3.1 5.6 3°</td>
<td>○</td>
<td></td>
</tr>
</tbody>
</table>

### Recommended Cutting Conditions

<table>
<thead>
<tr>
<th>Workpiece Property</th>
<th>Cutting Speed Vc (sfm)</th>
<th>Feed, Fz (ipt)</th>
<th>Recommended Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Si Ratio ≤ 12.5%</td>
<td>3,280 – 8,200 – 9,840</td>
<td>0.002 – 0.004 – 0.008</td>
<td>KPD001</td>
</tr>
<tr>
<td>Si Ratio ≥ 12.5%</td>
<td>1,310 – 1,970 – 2,630</td>
<td>0.002 – 0.004 – 0.008</td>
<td></td>
</tr>
</tbody>
</table>

Recommended cutting conditions are reference values. Please adjust cutting speed and feed rate according to actual machining conditions taking into account machine and workpiece rigidity. Do not use the cutter at speeds exceeding the maximum cutting speed limit.

### Cutting Performance

**BT50 M/C (Machine Power 30kw)**

- Cutting Conditions: Vc = 8,200 sfm, ae = 2.165", Wet, Cutting Dia. Ø80mm
- CWP#005-10T SF ENET0905PAER G KPD001 Workpiece: 303.0 Aluminum

### Max. Revolution and Max. Cutting Speed for Each Cutting Diameter

<table>
<thead>
<tr>
<th>Cutting Diameter øD (mm)</th>
<th>Cutter Max. Revolution n (RPM)</th>
<th>Max. Cutting Speed Vc max (sfm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø50</td>
<td>19,200</td>
<td>9,990</td>
</tr>
<tr>
<td>Ø63</td>
<td>16,800</td>
<td>10,910</td>
</tr>
<tr>
<td>Ø80</td>
<td>14,600</td>
<td>12,040</td>
</tr>
<tr>
<td>Ø100</td>
<td>13,000</td>
<td>13,400</td>
</tr>
<tr>
<td>Ø125</td>
<td>11,400</td>
<td>14,690</td>
</tr>
<tr>
<td>Ø160</td>
<td>8,000</td>
<td>13,190</td>
</tr>
<tr>
<td>Ø200</td>
<td>5,600</td>
<td>11,550</td>
</tr>
<tr>
<td>Ø250</td>
<td>4,500</td>
<td>11,590</td>
</tr>
<tr>
<td>Ø315</td>
<td>3,500</td>
<td>11,370</td>
</tr>
</tbody>
</table>
How to Mount Inserts

1. Adjust the clearance between adjustment screw for cutting edge and the surface of insert to be 0.5mm

2. Mount insert on guide pin
   (Be sure to install from the head)
   (Mounting from outer periphery is not recommended)

3. Tighten the clamp screw while lightly pressing the insert against the holding surface
   (Recommended Torque 4.2 Nm)

4. Make sure that there is no clearance between the insert side surfaces and the holding surface

How to Adjust Blade Runout

1. Install an Insert
2. Partially Tighten
3. Adjustable Blade Runout
4. Fully Tighten
5. Adjustable Blade Runout

1. Install inserts into all pockets
2. Partially tighten the clamp screw
   (Recommended Torque 2.0 Nm)
3. Turn the screw with the wrench to adjust and make sure that all screw heights are within 20 μm of each other (Recommended)
4. Fully tighten the clamp screw with tightening torque of 4.2 Nm
5. Slightly adjust position of cutting edge
   (Recommended Position Difference: ≤ 5 μm)
   *All inserts should be fine-tuned

* Caution
Mounting from outer periphery is not recommended

* Caution
Do not adjust cutting edge to lower position

Adjustment edge fluctuation from outer periphery is workable
Caution

While in Use

⚠️ Caution

Only use within recommended cutting conditions

Do not run the cutter at revolutions exceeding the printed maximum revolution limit of the cutter body

- Inserts or cutter body may be damaged due to centrifugal force and cutting load

Please do not use under the following conditions:

- When cutter is not fully loaded with inserts
- If the body and/or clamp is damaged
- If a clamp or clamp screw is removed
- If inserts that have different regrind amounts are mounted

Please wear protective equipment such as protective glove when changing inserts or adjusting edge fluctuation

- Injury can occur when touching the cutting edge

Dynamic Balance

⚠️ Caution

Balance adjustment on the cutter is completed before shipping

Balance adjustment has been made with special high precision inserts to be ISO balance grade (ISO1940/1) G2.5

* See P5 for Recommended Cutting Conditions at Max. Revolution

Do not operate the balance adjustment screw at the outer periphery of cutter

⇒ This could lead to improper dynamic balance

Do not completely remove clamp and clamp screw from cutter

⇒ This requires additional balance adjustment

Balance Adjustment Screw is Mounted at the Necessary Point

* Do Not Operate