Super Lightweight TAC MILL Series

T/EFE12, DPD09, and EDPD09 types

Performs excellent ability even on a BT30- taper machining center!!
Allow High Efficiency Machining of Aluminum Alloy Parts!
Lightweight design allows these TAC mills to be used on a BT30-taper machining center!

Super lightweight general purpose TAC Mills

T/EFE12 type

- Used for roughing to finishing of aluminum alloys.
- By the use of dedicated inserts, the cutters can be also used for milling steels, cast irons and stainless steels.

Lightweight pocket
By simulating the stress applied on the cutter body, lightweight design was realized without sacrificing the rigidity.

Reliability
Use of TORK PLUS screw has improved the clamping torque by 20%.

Reduction body thickness and weight reduction
Realized 900g in weight and 35 mm in cutter height for ∅ 125 mm cutter. Required time to the set number of revolutions can be shortened.

A number of insert variations
Economical four corner design. A number of insert variations allows the cutter to be used for milling a wide range of work materials.

Hole for center-through coolant supply

Comparison of power requirement
By the use of AJ-type inserts, 6-tooth cutter can reduce power requirement to the same level as the competitive 5-tooth cutter and allows high efficiency machining.

CUTTING PERFORMANCE

Comparison of surface roughness
By the use of AJ-type inserts, TFE type cutter produced better surface finish than the competitor’s cutter with chipbreaker inserts.

Results
□ Work material: Cast aluminum alloy □ Tool: TFE12125R (6-teeth) □ Cutting conditions:Vc=1500 m/min, fz=0.2 mm/t, ap=2 mm, ae=60 mm. Wet cutting

For aluminum and copper alloys
For steels, cast irons and stainless steels

Cemented carbide
General purpose type Low cutting force type (AJ)

PCD (Polycrystalline diamond)

Regular insert Wiper insert Deburring wiper insert

Regular insert

Weight reduced portion
Use of high-hardness and high-strength micro-grain cemented carbide contributes to improved wear resistance and impact resistance.

New insert grade KS05F

General purpose type
Low cutting force type (AJ)

For aluminum and copper alloys
For steels, cast irons and stainless steels
Machinable at $V_c=4000$ m/min!
Together with dedicated inserts, allows improved surface finish and reduced burr occurrence!

Super lightweight all PCD-tipped TAC Mills

**DPD09** and **EDPD09type**

- Used for roughing to finishing of aluminum alloys.

### CUTTING PERFORMANCE

#### Comparison of surface roughness

- Even when only regular inserts are used, the surface roughness was the same as those obtained with competitor’s inserts.
- By mounting the wiper insert, the surface roughness was far better than the competitor.

#### Comparison of burr occurrence

- Even when only regular inserts are used, the burr occurrence was the same as those obtained with competitor’s inserts.
- By mounting the deburring wiper inserts, burr occurrence was far suppressed compared with competitor’s inserts.

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**Work material:** Cast aluminum alloy  
**Tool:** DPD09125R (6-teeth)  
**Cutting conditions:** $V_c=3000$ m/min, $f_z=0.1$ mm/t, $a_p=0.5$ mm, $a_e=60$ mm, Wet cutting
**SPECIFICATIONS**

![Diagram of shapes and dimensions](image)

<table>
<thead>
<tr>
<th>Cutter body Cat. No.</th>
<th>Stock</th>
<th>No. of teeth</th>
<th>Shape</th>
<th>Dimensions (mm)</th>
<th>Weight (kg)</th>
<th>Center bolt</th>
<th>Recommended clamping torque (N.㎡)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFE12050R</td>
<td>4</td>
<td>3</td>
<td>Fig.2</td>
<td>50 20 30</td>
<td>95 60 35</td>
<td>CM10X30H</td>
<td>IP-15D</td>
</tr>
<tr>
<td>TFE12063R</td>
<td>4</td>
<td>4</td>
<td>Fig.1</td>
<td>63 22 45 19</td>
<td>10</td>
<td>CM10X30H</td>
<td>40(408)</td>
</tr>
<tr>
<td>TFE12080R</td>
<td>4</td>
<td>6</td>
<td>Fig.1</td>
<td>120 50 24.5</td>
<td>9.5</td>
<td>CM10X30H</td>
<td>70(714)</td>
</tr>
<tr>
<td>TFE12100R</td>
<td>6</td>
<td></td>
<td>Fig.2</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TFE12125R</td>
<td>6</td>
<td></td>
<td>Fig.2</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**For aluminum and copper alloys**

![Diagram of shapes and dimensions](image)

- **Fig.1:** General purpose insert
- **Fig.2:** Low cutting force type (AJ)
- **Fig.3:** General purpose insert
- **Fig.4:** Regular insert
- **Fig.5:** Wiper insert
- **Fig.6:** Deburring wiper insert

**Standard Cutting Conditions**

<table>
<thead>
<tr>
<th>Work materials</th>
<th>Insert grade</th>
<th>Shape</th>
<th>Cutting speed (V_c) (m/min)</th>
<th>Feed per tooth (f_z) (mm/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast aluminum alloy / die-cast (Si &lt; 13%)</td>
<td>KS05F</td>
<td>Fig.2</td>
<td>200~1500</td>
<td>0.05~0.2</td>
</tr>
<tr>
<td>Cast aluminum alloy / die-cast (Si &gt; 13%)</td>
<td>KS05F</td>
<td>Fig.2</td>
<td>80~200</td>
<td>0.05~0.2</td>
</tr>
<tr>
<td>Cast aluminum alloy (US 1000, 3000, 5000, and 6000 types)</td>
<td>KS05F</td>
<td>Fig.2</td>
<td>200~1500</td>
<td>0.05~0.2</td>
</tr>
<tr>
<td>Aluminum alloys (US 2000, 4000, and 7000 types)</td>
<td>KS05F</td>
<td>Fig.2</td>
<td>200~1500</td>
<td>0.05~0.2</td>
</tr>
<tr>
<td>Copper alloys</td>
<td>KS05F</td>
<td>Fig.2</td>
<td>200~500</td>
<td>0.05~0.2</td>
</tr>
<tr>
<td>Carbon steels and alloy steels (&lt; 300HB)</td>
<td>AH120</td>
<td>Fig.3</td>
<td>100~180</td>
<td>0.03~0.15</td>
</tr>
<tr>
<td>Stainless steels (&lt; 250HB)</td>
<td>AH140</td>
<td>Fig.3</td>
<td>80~180</td>
<td>0.03~0.15</td>
</tr>
<tr>
<td>Gray and ductile cast irons</td>
<td>AH120</td>
<td>Fig.3</td>
<td>100~200</td>
<td>0.03~0.15</td>
</tr>
</tbody>
</table>
**SPECIFICATIONS**

![Diagram](image)

<table>
<thead>
<tr>
<th>Cutter body Cat. No.</th>
<th>Stock No. of teeth</th>
<th>Shape</th>
<th>Dimensions (mm)</th>
<th>Weight (kg)</th>
<th>Center bolt</th>
<th>Recommended clamping torque (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPD09063R</td>
<td>3</td>
<td>Fig.2</td>
<td>63 25 37</td>
<td>100 60 40</td>
<td>0.75</td>
<td>-</td>
</tr>
<tr>
<td>DPD09080R</td>
<td>4</td>
<td>Fig.1</td>
<td>80 23 41</td>
<td>1.13</td>
<td>TMBA M12H</td>
<td>70 (714)</td>
</tr>
<tr>
<td>DPD09100R</td>
<td>6</td>
<td>100 25 45</td>
<td>125</td>
<td>1.70</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- **Cutter body Cat. No.**: EDPD09063R, DPD09080R, DPD09100R, DPD09125R
- **Shape**: Fig.1, Fig.2, Fig.3

### Standard Cutting Conditions

**Work materials**
- Cast aluminum alloy / die-cast (Si < 13%)
- Cast aluminum alloy / die-cast (Si > 13%)
- Aluminum alloys
- Copper alloys

**Insert grade**: DX140

<table>
<thead>
<tr>
<th>Work materials</th>
<th>Insert grade</th>
<th>Shape</th>
<th>Cutting speed Vc (m/min)</th>
<th>Feed per tooth fz (mm/tooth)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DX140</td>
<td>Fig.1</td>
<td>500~4000</td>
<td>0.05~0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>200~500</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>500~4000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>200~500</td>
<td></td>
</tr>
</tbody>
</table>

### Configuration of Inserts

- **Insert type**: Regular insert, Wiper insert, Deburring wiper insert
- **Insert Cat. No.**: YDEN0905PDFR-D, YDEN0905PDFR-WD, YDEN0905PDFR-BD
- **Type of insert**: Regular, Wiper, Deburring
- **Honing**: Without

**Positioning conditions of inserts**
- **General purpose cutter**
- **All PCD tipped cutter**

**Notes**:
- When using the wiper insert or deburring wiper insert, set the table feed (Vf) as follows:
  
  \[ Vf = n \times f_z \times t \]

  - \( n \): Number of revolutions
  - \( f_z \): Feed per tooth
  - \( t \): Number of regular inserts
- When using the wiper or deburring insert in T/EFE12 type cutters, the general purpose or low cutting force carbide inserts can be used as the regular inserts.
### MACHINING EXAMPLES

<table>
<thead>
<tr>
<th>Shape of workpiece</th>
<th>Machine</th>
<th>Work material</th>
<th>Cutter body</th>
<th>Insert</th>
<th>Cutting conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BT30 Machining center</td>
<td>Housing (AC3A)</td>
<td>DPD09100R</td>
<td>YDEN0905PDR-D (DX140)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cutting speed: Vc=1900 m/min</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Number of revolutions: n=6048 min⁻¹</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Feed per tooth: fz=0.04 mm/t</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Feed: Vf=1452 mm/min</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Depth of cut: aₚ=1 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cutting fluid: Dry</td>
</tr>
</tbody>
</table>

**Results**

Compared with the existing tool, required time to get up to the specified number of revolutions was shortened, resulting in reduced cycle time. Surface roughness was also improved.

<table>
<thead>
<tr>
<th>Shape of workpiece</th>
<th>Machine</th>
<th>Work material</th>
<th>Cutter body</th>
<th>Insert</th>
<th>Cutting conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BT30 Machining center</td>
<td>Test piece (AC4B-T6)</td>
<td>TFE12125R</td>
<td>SEGT12X2ZER-AJ (KS05F)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cutting speed: Vc=1500 m/min</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Number of revolutions: n=3820 min⁻¹</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Feed per tooth: fz=0.2 mm/t</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Feed: Vf=4584 mm/min</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Depth of cut: aₚ=2 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cutting fluid: Wet</td>
</tr>
</tbody>
</table>

**Results**

When machining the surface in two passes, a bump formed in the boundary between passes was minute. Surface finish was also good.
**EPS**

Also for EPS11-type, New Specifications Have Been Added for Low Power Machines!!

### SPECIFICATIONS

![Diagram of EPS specification]

<table>
<thead>
<tr>
<th>Body Cat. No.</th>
<th>Stock</th>
<th>No. of inserts</th>
<th>Dimensions (mm)</th>
<th>Applicable insert</th>
<th>Clamping screw</th>
<th>Wrench</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS11025RSS20</td>
<td>2</td>
<td>25 23</td>
<td></td>
<td>ASMT11T3</td>
<td>CSPB-2.5</td>
<td>IP-8D</td>
</tr>
<tr>
<td>EPS11030RSS20</td>
<td>2</td>
<td>30 28</td>
<td></td>
<td>PDPR 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS11032RSS20</td>
<td>2</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS11040RSS20</td>
<td>3</td>
<td>40 30</td>
<td>95 60 35</td>
<td>ASMT11T3</td>
<td>CSPB-2.5</td>
<td>IP-8D</td>
</tr>
<tr>
<td>EPS11050RSS20</td>
<td>3</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Insert Specifications

<table>
<thead>
<tr>
<th>Insert Cat. No.</th>
<th>Corner R</th>
<th>Shape</th>
<th>Honing</th>
<th>Stocked grades</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASMT11T304PDPR-MJ</td>
<td>0.4</td>
<td>Fig.1</td>
<td>With</td>
<td>11.6 6.7 3.7</td>
<td></td>
</tr>
<tr>
<td>ASMT11T308PDPR-MJ</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASMT11T316PDPR-MJ</td>
<td>1.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASMT11T304PDPR-MS</td>
<td>0.4</td>
<td>Fig.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: For features of EPS-type, see Tungaloy Report No.340.

### Allowable Cutting Condition Ranges for EPS11 Type on BT30-Class Machining Centers

![Graph of cutting conditions]

- **Work material**: Carbon steel (JIS S55C, 200HB)
- **Machine**: BT30 vertical machining center
- **Cutter body**: EPS11 type
- **Insert**: ASMT11T304PDPR-MS (AH140)
- **Cutting speed**: Vc=100 m/min
- **Feed per tooth**: fz=0.1 mm/t
- **Cutting fluid**: Dry cutting
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