SOLUTIONS FOR COMPOSITE
AEROSPACE

Drilling

The CVD diamond coating and cemented carbide drill equipped with an edge shape optimized by application and high abrasion resistance provide stability that minimizes burr and delamination.

High strength carbon fiber is widely used in the aeronautic and automotive frames and wind power generation blades for light structures that require high strength. In addition, it is effective to use tools with a high abrasion resistance to prevent delamination and burr.
FOR CFRP AUTOMOTIVE

Trimming

The end mill that combines an optimized edge shape and high wear resistance CVD diamond coating maintains high quality.
# SOLUTIONS FOR COMPOSITE

## DRILLING TOOLS

### DRILL

<table>
<thead>
<tr>
<th>Material Stack</th>
<th>Tool Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFRP/MCC (DD2105)</td>
<td>CNC Machine</td>
<td>The cutting edge angle = 90° setting minimizes cutting resistance in the thrust direction. This controls delamination and maintains good hole quality.</td>
</tr>
<tr>
<td>CFRP (5P)</td>
<td>Hand Tool</td>
<td>For CFRP/CFRTP, CFRP/Al Stack Materials and High Precision Holes</td>
</tr>
<tr>
<td>CFRP/Al Stack Materials (DD2110)</td>
<td>CNC Machine</td>
<td>The groove design that wraps up chips also minimizes gaps of CFRP and aluminum hole diameter in addition to preventing contact between the chips and the CFRP hole wall surface.</td>
</tr>
<tr>
<td>CFRP/Al Stack Materials (9P)</td>
<td>Hand Tool</td>
<td>The unique cutting edge shape with V-shaped grooves on the cutting edge controls the flow of chips generated at the outer circumference. Furthermore, this minimizes the hole diameter gaps in stack materials. Burr on the hole exit side is controlled by shifting the cutting load to the rotating shaft.</td>
</tr>
<tr>
<td>CFRP/Ti Stack Materials (TF15)</td>
<td>CNC Machine</td>
<td>The sharp cutting edge in titanium machining which requires good CFRP hole quality and machining that minimizes the generation of cutting heat with low thermal conductivity achieves high-quality CFRP and titanium stack material hole machining.</td>
</tr>
<tr>
<td>CFRP/Ti Stack Materials (8P)</td>
<td>Hand Tool</td>
<td>The unique cutting edge shape with V-shaped grooves on the cutting edge controls the flow of chips generated at the outer circumference. Furthermore, this minimizes the hole diameter gaps in stack materials. Burr on the hole exit side is controlled by shifting the cutting load to the rotating shaft.</td>
</tr>
</tbody>
</table>

*CFRTP = Carbon Fiber Reinforced Thermoplastic Resin*
END MILLS

Four Flutes

\[ \text{DFC4JC} \]

The low resistance cutting edge with low helix angle reduces delamination and burrs when machining CFRP.

Performance

\[ \text{DFCJRT} \]

The cross-nick type cutting edge allows high efficiency machining due to lower cutting resistance and reduced temperatures.

Features

Proprietary CVD diamond coating

The newly developed CVD diamond coated coating achieves outstanding abrasion resistance and smoothness due to a proprietary fine multilayer diamond crystal control technology.
SOLUTIONS FOR COMPOSITE

DRILLING TOOLS

MCC

90° Cutting Edge Angle
The acute cutting angle thoroughly reduces thrust and minimizes delamination.

Strong Rake Grooves
The cutting edge rake angle has been strengthened in the vertical direction on the axis of rotation. As a result, it is possible to minimize un-cutting and delamination on sharp cutting edges.

Comparison of Tool Life and Hole (Entrance/Exit)

*The tool life determination depends on the chipping

<table>
<thead>
<tr>
<th>Tool</th>
<th>MCC A</th>
<th>MCC B</th>
<th>Conventional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting speed</td>
<td>120 m/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed</td>
<td>0.10 mm/rev</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cutting mode</td>
<td>Dry cutting</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<Cutting condition>
- Tool : ø6.55
- Work material : CFRP
- For tool life (10 mm)
- For hole quality (12.5 mm)

After 820 holes machining
- MCC: Can continue

Chipping

Table:

<table>
<thead>
<tr>
<th>Number of Holes</th>
<th>Entrance</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>306</td>
<td>MCC</td>
<td>Conventional</td>
</tr>
<tr>
<td>588</td>
<td>MCC</td>
<td>Conventional</td>
</tr>
<tr>
<td>(1192 holes)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
New Groove Structure

The groove design that covers up chips also minimizes back counter in addition to minimizing contact between the chips and the CFRP hole wall surface.

TRI-Cooling® Technology

Controlling the cutting heat reduces deterioration of the CFRP hole precision caused by heat (improves the internal air effectiveness).

Groove Shape Effect

Conventional

**Cutting condition**
- Tool: 0.251"(ø6.38)
- Work material: CFRP(11mm)+Al(5mm)
- CFRP Cutting speed: 100m/min
- CFRP Feed: 0.15mm/rev
- Al Cutting speed: 100m/min
- Al Feed: 0.15mm/rev
- Cutting mode: Internal air

*Enlarged view

*Hatching: Required hole precision

Outside the hole tolerance standards (5 holes)
## SOLUTIONS FOR COMPOSITE DRILLING TOOLS

**MCC**

**CNC Machine / CFRP**

### RECOMMENDED CUTTING CONDITIONS

<table>
<thead>
<tr>
<th>Work Material</th>
<th>CFRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dia. DC (inch)</td>
<td>Dia. DC (mm)</td>
</tr>
<tr>
<td>.1875</td>
<td>4.76</td>
</tr>
<tr>
<td>.251</td>
<td>6.38</td>
</tr>
<tr>
<td>.3125</td>
<td>7.96</td>
</tr>
<tr>
<td>.375</td>
<td>9.55</td>
</tr>
<tr>
<td>.4375</td>
<td>11.14</td>
</tr>
</tbody>
</table>

---

*AWG*: American Wire Gage

* : Inventory maintained in Japan.  □ : Non stock, produced to order only.
**DRILLING TOOLS**

### MCA

**CNC Machine / CFRP + Al**

- **Hole Dia.** | **Drill Dia.** | **Hole Depth** | **Order Number** | **Grade** | **Dimensions (mm)**
- 1/4 | 6.38 | .251 | 5 | MCA0638X05S070 | □ | 33.4 | 51 | 51 | 91 | 89.5 | 1.5 | 7
- 3/8 | 9.55 | .375 | 5 | MCA0955X05S100 | □ | 50.0 | 77 | 77 | 118 | 115.8 | 2.2 | 10

*AWG : American Wire Gage

**RECOMMENDED CUTTING CONDITIONS**

<table>
<thead>
<tr>
<th>Dia. DC (inch)</th>
<th>Dia. DC (mm)</th>
<th>Cutting speed (m/min)</th>
<th>Revolution (min⁻¹)</th>
<th>Feed (Min.-Max.) (mm/rev)</th>
<th>Feed rate (mm/min)</th>
<th>Cutting speed (m/min)</th>
<th>Revolution (min⁻¹)</th>
<th>Feed (Min.-Max.) (mm/rev)</th>
<th>Feed rate (mm/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.251</td>
<td>6.38</td>
<td>100</td>
<td>5000</td>
<td>0.15 (0.10-0.20)</td>
<td>750</td>
<td>100</td>
<td>5000</td>
<td>0.03 (0.02-0.04)</td>
<td>150</td>
</tr>
<tr>
<td>.375</td>
<td>9.55</td>
<td>100</td>
<td>3400</td>
<td>0.15 (0.10-0.20)</td>
<td>680</td>
<td>100</td>
<td>3400</td>
<td>0.03 (0.02-0.04)</td>
<td>100</td>
</tr>
</tbody>
</table>

1) We recommend to divide cutting conditions in each work materials.

### MCT

**CNC Machine / CFRP + Ti**

- **Hole Dia.** | **Drill Dia.** | **Hole Depth** | **Order Number** | **Grade** | **Dimensions (mm)**
- 1/4 | 6.38 | .251 | 5 | MCT0638X05S070 | □ | 32.8 | 47 | 47 | 96 | 95.1 | 0.9 | 7
- 3/8 | 9.55 | .375 | 5 | MCT0955X05S100 | □ | 49.1 | 71 | 71 | 122 | 120.7 | 1.3 | 10

*AWG : American Wire Gage

**RECOMMENDED CUTTING CONDITIONS**

<table>
<thead>
<tr>
<th>Dia. DC (inch)</th>
<th>Dia. DC (mm)</th>
<th>Cutting speed (m/min)</th>
<th>Revolution (min⁻¹)</th>
<th>Feed (Min.-Max.) (mm/rev)</th>
<th>Feed rate (mm/min)</th>
<th>Cutting speed (m/min)</th>
<th>Revolution (min⁻¹)</th>
<th>Feed (Min.-Max.) (mm/rev)</th>
<th>Feed rate (mm/min)</th>
<th>Peck machining (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.251</td>
<td>6.38</td>
<td>100</td>
<td>5000</td>
<td>0.15 (0.10-0.20)</td>
<td>750</td>
<td>15</td>
<td>750</td>
<td>0.02 (0.01-0.03)</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>.375</td>
<td>9.55</td>
<td>100</td>
<td>3400</td>
<td>0.15 (0.10-0.20)</td>
<td>680</td>
<td>15</td>
<td>3400</td>
<td>0.02 (0.01-0.03)</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

1) This condition is for when internal air or mist is used.

2) We recommend to divide cutting conditions in each work materials.

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SOLUTIONS FOR COMPOSITE

DRILLING TOOLS

CNC Machine / CFRP and stack material high precision

MCW

*AWG: American Wire Gauge

<table>
<thead>
<tr>
<th>Hole Dia.</th>
<th>Drill Dia.</th>
<th>Hole Depth</th>
<th>Order Number</th>
<th>Grade</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWG</td>
<td>inch</td>
<td>DC (mm)</td>
<td>(L/D)</td>
<td></td>
<td>HT110</td>
</tr>
<tr>
<td>1/4</td>
<td>6.38</td>
<td>.251</td>
<td>5</td>
<td>MCW0638X05S070</td>
<td>r</td>
</tr>
<tr>
<td>3/8</td>
<td>9.55</td>
<td>.375</td>
<td>5</td>
<td>MCW0955X05S100</td>
<td>r</td>
</tr>
</tbody>
</table>

RECOMMENDED CUTTING CONDITIONS

<table>
<thead>
<tr>
<th>Work Material</th>
<th>CFRP</th>
<th>Aluminum Alloy (Si&lt;5%)</th>
<th>Titanium Alloy Ti-6Al-4V etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dia. DC (inch)</td>
<td>Dia. DC (mm)</td>
<td>Cutting speed (m/min)</td>
<td>Revolution (min⁻¹)</td>
</tr>
<tr>
<td>.251</td>
<td>6.38</td>
<td>100</td>
<td>5000</td>
</tr>
<tr>
<td>.375</td>
<td>9.55</td>
<td>100</td>
<td>3400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
<td>.375</td>
<td>9.55</td>
<td>100</td>
<td>3400</td>
</tr>
</tbody>
</table>

1) This condition is for when internal air or mist is used.
2) We recommend to divide cutting conditions in each work materials.

Peck Machining Method (Applicable for MCT and MCW)

Set the machining start position to 3 mm above normal.
Refer to the recommend conditions for CFRP. Machine the cutting edge of the drill to at least 1 mm (0.040”) before the metal.
Peck machine 3 mm (0.115”) for aluminum and 1 mm (0.040”) for titanium for the metal machining area.
Set it so that it returns to its start position during peck machining.

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### MCCH

**Hand tool / CFRP**

<table>
<thead>
<tr>
<th>Hole Dia.</th>
<th>Drill Dia.</th>
<th>Hole Depth</th>
<th>Order Number</th>
<th>Grade</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWG</td>
<td>inch</td>
<td>DC (mm)</td>
<td>inch (L/D)</td>
<td></td>
<td>LU LCF LH OAL LF PL DCON</td>
</tr>
<tr>
<td>#40</td>
<td>2.5</td>
<td>.0985</td>
<td>15</td>
<td></td>
<td>42.1 48 50 100 95.4 4.6 3</td>
</tr>
<tr>
<td>#30</td>
<td>3.26</td>
<td>.1285</td>
<td>10</td>
<td></td>
<td>38.6 48 50 100 94.0 6.0 4</td>
</tr>
<tr>
<td>#20</td>
<td>4.1</td>
<td>.1615</td>
<td>8</td>
<td></td>
<td>40.3 48 50 100 92.5 7.5 5</td>
</tr>
<tr>
<td>#11</td>
<td>4.86</td>
<td>.1915</td>
<td>5</td>
<td></td>
<td>33.2 48 50 100 91.1 8.9 5</td>
</tr>
<tr>
<td>1/4</td>
<td>6.38</td>
<td>.251</td>
<td>3</td>
<td></td>
<td>30.8 48 50 100 88.3 11.7 7</td>
</tr>
<tr>
<td>3/8</td>
<td>9.55</td>
<td>.375</td>
<td>2</td>
<td></td>
<td>36.6 48 50 100 82.5 17.5 10</td>
</tr>
</tbody>
</table>

*AWG: American Wire Gage

### MCAH

**Hand tool / CFRP + Al**

<table>
<thead>
<tr>
<th>Hole Dia.</th>
<th>Drill Dia.</th>
<th>Hole Depth</th>
<th>Order Number</th>
<th>Grade</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWG</td>
<td>inch</td>
<td>DC (mm)</td>
<td>inch (L/D)</td>
<td></td>
<td>LU LCF LH OAL LF PL DCON</td>
</tr>
<tr>
<td>#40</td>
<td>2.5</td>
<td>.0985</td>
<td>15</td>
<td></td>
<td>38.2 50 50 100 99.3 0.7 3</td>
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<td>#30</td>
<td>3.26</td>
<td>.1285</td>
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<td>49.8 50 50 100 99.1 0.9 4</td>
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<tr>
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<td>4.1</td>
<td>.1615</td>
<td>10</td>
<td></td>
<td>42.2 50 50 100 98.8 1.2 5</td>
</tr>
<tr>
<td>#11</td>
<td>4.86</td>
<td>.1915</td>
<td>8</td>
<td></td>
<td>40.3 50 50 100 98.6 1.4 5</td>
</tr>
<tr>
<td>1/4</td>
<td>6.38</td>
<td>.251</td>
<td>5</td>
<td></td>
<td>33.7 50 50 100 98.2 1.8 7</td>
</tr>
<tr>
<td>3/8</td>
<td>9.55</td>
<td>.375</td>
<td>3</td>
<td></td>
<td>31.5 50 50 100 97.2 2.8 10</td>
</tr>
</tbody>
</table>

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SOLUTIONS FOR COMPOSITE

DRILLING TOOLS

Request sizes other than those in the inventory by inserting the code and numerical value in the □ of the following model numbers. Contact our sales department for details on the dimensions.

Order number

```
MC □ □ □ □ □ □ □ X □ □ □ □ □ □ □ S □ □ □ □ □ □ □
```

Hole Depth (L/D) Shank Dia. DCON
Drill Dia. DC

*Minimum diameter with internal coolant is φ4mm (1.575").

Applications
C : CNC Machine / CFRP
A : CNC Machine / CFRP + Al
T : CNC Machine / CFRP + Ti
W : CNC Machine / CFRP and stack material high precision
CH : Hand tool / CFRP
AH : Hand tool / CFRP + Al

< Example >
Hole Depth (L/D)
• L/D2 → X02
• L/D10 → X10
Shank Dia. DCON
• φ3mm → S030
• φ10mm → S100

*For inch sizes please convert to metric (1" = 25.4mm)

Work material

Type
- CFRP: Thermosetting and thermoplasticity
- Type of reinforcing fiber
- Metal: Aluminum or titanium, etc.

Combination
- CFRP or CFRTF
- CFRP + stack materials (aluminum or titanium)
- Lap joint method

Other
- Thickness for each work material
- Affixture of film

Equipment

Type
- CNC Machine
- Hand Tool
- Power feeders etc.

Coolant
- Internal through
- Air, MQL and dry, etc.

Hole Quality
- Required hole diameter (upper and lower limit of tolerance)
- Surface roughness of the hole inner wall
- Metal burr height
- CFRP and metal hole diameter gap
MILLING TOOLS

CVD diamond coating with outstanding abrasion resistance and superior sharpness for high quality CFRP machining.

DFC Series
CVD diamond coated end mill for CFRP machining

Geometry for CFRP machining

DFC4JC
For finishing

The low resistance cutting edge with low helix angle reduces delamination and burrs when machining CFRP.

DFCJRT
For efficient machining

The cross-nick type cutting edge allows high efficiency machining due to lower cutting resistance and reduced temperatures.

Long tool life

<table>
<thead>
<tr>
<th>End mill</th>
<th>DFC4JCD1000 (ø10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work material</td>
<td>CFRP (Thick: 5.3mm)</td>
</tr>
<tr>
<td>Revolution</td>
<td>6400min⁻¹ (200m/min)</td>
</tr>
<tr>
<td>Feed rate</td>
<td>800mm/min (0.03mm/tooth)</td>
</tr>
<tr>
<td>Coolant mode</td>
<td>Air blow</td>
</tr>
</tbody>
</table>

Excellent surface finish

<table>
<thead>
<tr>
<th>End mill</th>
<th>DFC4JCD1000 (ø10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work material</td>
<td>CFRP (Thick: 6mm)</td>
</tr>
<tr>
<td>Revolution</td>
<td>6000min⁻¹ (188m/min)</td>
</tr>
<tr>
<td>Feed rate</td>
<td>750mm/min (0.03mm/tooth)</td>
</tr>
<tr>
<td>Coolant mode</td>
<td>Air blow</td>
</tr>
</tbody>
</table>

Less burrs
Cutting direction

Conventional

Burrs
Cutting direction

Conventional

DFC4JC

End mill

DFC4JCD1000 (ø10)

Work material
CFRP (Thick: 5.3mm)

Revolution
6400min⁻¹ (200m/min)

Feed rate
800mm/min (0.03mm/tooth)

Coolant mode
Air blow

End mill

DFC4JCD1000 (ø10)

Work material
CFRP (Thick: 6mm)

Revolution
6000min⁻¹ (188m/min)

Feed rate
750mm/min (0.03mm/tooth)

Coolant mode
Air blow
MILLING TOOLS

**DFC4JC**

End mill, Semi long cut length, 4 flute, for CFRP

**DFCJRT**

Cross-nick type end mill, Semi long cut length, for CFRP

---

**RECOMMENDED CUTTING CONDITIONS**

<table>
<thead>
<tr>
<th>Work material</th>
<th>CFRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dia. DC (mm)</td>
<td>Revolution (min⁻¹)</td>
</tr>
<tr>
<td>6</td>
<td>11000</td>
</tr>
<tr>
<td>8</td>
<td>8000</td>
</tr>
<tr>
<td>10</td>
<td>6400</td>
</tr>
<tr>
<td>12</td>
<td>5300</td>
</tr>
</tbody>
</table>

Please contact Mitsubishi Materials for geometries and through coolant types other than standard.

1) Cutting conditions may differ considerably due to the kind of CFRP, the rigidity of the machine, or the clamping and geometry of the workpiece. Please use the left table as a standard starting point.
2) When high machining accuracy is needed, or large burrs or delamination occurs, we recommend reducing the feed rate.
3) When the depth of cut is greater than 0.8DC, we recommend reducing the feed rate.
4) Please take precautions against dust.

---

**Order Number**

<table>
<thead>
<tr>
<th>Order Number</th>
<th>DC</th>
<th>APMX</th>
<th>LF</th>
<th>DCON</th>
<th>No. of Flutes</th>
<th>Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFC4JCD0600</td>
<td>6</td>
<td>20</td>
<td>70</td>
<td>6</td>
<td>4</td>
<td>●</td>
</tr>
<tr>
<td>DFC4JCD0800</td>
<td>8</td>
<td>30</td>
<td>80</td>
<td>8</td>
<td>4</td>
<td>●</td>
</tr>
<tr>
<td>DFC4JCD1000</td>
<td>10</td>
<td>30</td>
<td>90</td>
<td>10</td>
<td>4</td>
<td>●</td>
</tr>
<tr>
<td>DFC4JCD1200</td>
<td>12</td>
<td>30</td>
<td>100</td>
<td>12</td>
<td>4</td>
<td>●</td>
</tr>
</tbody>
</table>

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3) When the depth of cut is greater than 0.8DC, we recommend reducing the feed rate.
4) Please take precautions against dust.

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## Recommended Tools According to Type of CFRP

<table>
<thead>
<tr>
<th>Type</th>
<th>Surface and inside: Cloth material</th>
<th>Surface → Cloth material Inside → Uni-direction material</th>
<th>Surface → Glass fiber material Inside → Uni-direction material</th>
</tr>
</thead>
<tbody>
<tr>
<td>End mill</td>
<td><img src="image1.png" alt="Diagram" /></td>
<td><img src="image2.png" alt="Diagram" /></td>
<td><img src="image3.png" alt="Diagram" /></td>
</tr>
<tr>
<td>DFC4JC</td>
<td>✖</td>
<td>✖</td>
<td>✖</td>
</tr>
<tr>
<td>DFCJRT</td>
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- Liable to occur
Mitsubishi Materials Corporation, Advanced Materials & Tools Company, offers a “Comprehensive Craftsman Studio” which addresses the individual needs and requirements of our customers’ in order to make their business successful. Here the Machining Technology Center is the front-line base. It is fully equipped with advanced machines, measuring instruments, extensive cutting data, knowledge, technologies as well as having a team of highly-experienced technical staff members. All of which allows Mitsubishi Materials Corporation to offer the best solution and services for our valued customers.

RESPONSIVE, ATTRACTIVE, PROACTIVE

We try answering questions and demands from customers around the world by providing detailed solutions to meet our customer’s expectations.

We identify the potential needs of customers and develop innovative tools to cultivate markets to widen future business possibilities.

Showing and demonstrating. Attractive events and practical seminars present the new possibilities in machining which evoke a feeling of curiosity.
Strengthening of total tooling solutions for our cutting tools

In order to provide our customers with a total tooling solution for our cutting tools Mitsubishi Materials has opened 2 technical centers within Japan. In addition to this there are also 4 other locations globally, Spain, North America, China and Thailand. Since establishing the Machining Technology Center (East Japan Technical Center - MTEC Saitama) in 2010, services to our valued customers are provided based on the know-how, that has been developed over the years, this in combination with the use of the latest cutting edge machine tools, measuring equipment and CAM/CAE software, allows us to provide the most suitable solution to meet our customers’ needs. This experience enables effective use of the Central Japan Technical Center (MTEC Gifu) as our second technical support base in Japan. From the Central Japan Technical Center, we will strive to continue to provide various technical solutions especially for cutting tool customers in Central and West Japan. This particular region has a high density of automotive and aerospace customers.

Direction of Research & Development

Base for developing of New Products

Responding to the common needs developing of new and standard tools.
- Proposal for machining technology.
- Proposal for process improvement.
- Independent development.

Base for providing Solutions

Responding to the needs of our customers. Research on advanced machining technology and proposals for exclusively developed tools.
- Support for setting up new machining process line.
- Direct proposal for process improvement.
- Cooperated development with customers.
- Tooling proposal in collaboration with machine tool builders.

Driving Force for the Research & Development Base

- Machining Technology Center (Machining technology for next generation, education)
- R & D centers (at our 3 main manufacturing plants: Basic technology, Product development)
- Central Research Institute (Development base, Analysis and Evaluation, CAE)
- Open Innovation
- Human Resources Development (Globalization, Diversification)

State of the Art Machine Tools

Recently installed several of the latest machine tools, such as a high rigidity & high power horizontal machining center, a MQL function equipped machining center, a fully 5-axis controlled vertical machining center, an exclusive machining center for machining of CFRP materials, a multi-tasking machine with double head turning axis, a CNC automatic lathe with a frequency vibration cutting function.
The Scope of the Registration:
Design, Development and Production of Cemented Carbide Tools and Carbide Blanks

ISO 9001 (JSAQ080)
ISO 14001 (JSAE036)

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