Physical properties

◆ Coefficient of thermal expansion

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>30 - 100</th>
<th>30 - 200</th>
<th>30 - 300</th>
<th>30 - 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>± 10 °C</td>
<td>11.9</td>
<td>12.8</td>
<td>12.6</td>
<td>12.9</td>
</tr>
</tbody>
</table>

◆ Thermal conductivity

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>24</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>W/m·K</td>
<td>33.8</td>
<td>34.1</td>
<td>34.2</td>
<td>34.2</td>
<td>33.5</td>
</tr>
<tr>
<td>(atmos. sec. °C)</td>
<td>[0.0867]</td>
<td>[0.0808]</td>
<td>[0.0812]</td>
<td>[0.0817]</td>
<td>[0.0860]</td>
</tr>
</tbody>
</table>

◆ Specific heat

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>24</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>J/kg·K</td>
<td>465</td>
<td>472</td>
<td>504</td>
<td>546</td>
<td>591</td>
</tr>
<tr>
<td>(atmos. °C)</td>
<td>[0.109]</td>
<td>[0.113]</td>
<td>[0.120]</td>
<td>[0.130]</td>
<td>[0.141]</td>
</tr>
</tbody>
</table>

◆ Young’s modulus

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>25</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>G/ (MPa)</td>
<td>203.4</td>
<td>204.5</td>
<td>199.8</td>
<td>190.9</td>
<td>162.3</td>
</tr>
<tr>
<td>(kgf/mm²)</td>
<td>[21.26]</td>
<td>[20.85]</td>
<td>[20.22]</td>
<td>[19.46]</td>
<td>[18.98]</td>
</tr>
</tbody>
</table>

Mechanical properties

<table>
<thead>
<tr>
<th>Hardness (HRB)</th>
<th>Tensile strength (MPa)</th>
<th>0.2% Proof stress (MPa)</th>
<th>Elongation (%)</th>
<th>Reduction of area (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>1,244</td>
<td>1,127</td>
<td>15.9</td>
<td>61.7</td>
</tr>
</tbody>
</table>

Test piece : JS1-4A (6 x 150mm)

Daido Plastic Mold Steel Series

PAC5000

40HRC Pre-hardened type, General-purpose Plastic Mold Steel

Features

PAC5000 is general-purpose plastic mold steel that outperforms P20 improved grades in wear resistance and mirror polishing.

◆ Polishability : In spite of single melt steel, it polishes up to #5000 or higher.
◆ Texture processing : Suitable for various types of processing.

Applications

◆ Automobile related (for lens cover etc.)
◆ Home electric appliances, Audio set, Information equipment, Office automation equipment
◆ Other plastic molds required higher hardness than 30HRC for wear resistance

Chemical composition

<table>
<thead>
<tr>
<th>Daido brand</th>
<th>Supplied condition (Hardness)</th>
<th>Chemical composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAC5000</td>
<td>Pre-hardened (36~40HRC)</td>
<td>C  Si  Mn  Cr  Mo  V</td>
</tr>
</tbody>
</table>

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Document Disclaimer
The product characteristics included in this brochure are the representative values based on the result of our measurements, and do not guarantee the performance in use of the products. Please inquire the latest information to our department in charge as the information of this brochure is updated without previous notice as needed.

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**Properties**

**Mirror polishability**

By differential interference contrast

- PAC5000
- P20 improved (40HRC)

Polishing procedures:
- Turning, Milling → Grinding (#220 ~ #320 ~ #400) → Emery paper polishing (#320 ~ #400 ~ #600 ~ #800 ~ #1000 ~ #1200 ~ #1500) → Diamond paste finishing (#1200 ~ #1800 ~ #3000 ~ #5000)

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**Mechanization**

- **Drilling condition**
  - Tool: SKH51
  - Shape: #5 Straight Shank
  - Feed: 0.15mm/rev
  - Lubricant: Yusho FG6360 (5% solution)
  - Criteria: Breakage or corrosion

- **End milling condition**
  - Tool: UT102 (No-coated)
  - Speed: 150m/min
  - Feed: 0.15mm/rev
  - Depth of cut: 1x4mm
  - Coating: Air blow
  - Milling: Down cut

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**Weldability**

1. Preparation
   1. Fully clean all oils, foreign material, and scales
   2. Remove all cracks and surface treatment layers
   3. Edge preparation: corner sections 3R or above

2. Build-up Welding Rod
   - PXA50-W is recommended.

3. Pre-heating
   1. 200 to 300 °C
   2. Gradually heat by furnace, or propane or natural gas burner

4. Welding
   - TIG welding is recommended.

   **Conditions**
   - Electrode diameter (mm): 1.6 ~ 2.4
   - Rod diameter (mm): 1.6 ~ 2.4
   - Current (A): 70 ~ 150, 150 ~ 250
   - Argon (L/min): 6 ~ 9, 7 ~ 10

5. Post-heating
   - 500 °C

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**Humidity cabinet test**

- Temperature: 50°C, Humidity: 98%, Holding time: 24h

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**Toughness**

- Product size: 460H x 1200W
- Center: 39HRC

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**Hysteresis distribution**

- Product size: 460H x 1200W
- Distance from the center (mm): 200

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**Nitriding property**

- Gas soft-nitriding: 510°C x 3h

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**Nitride layer thickness**

- Dimensional change and hardness decrease may occur when processed at the higher than 520 °C

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**Wear resistance**

- Deposit metal: NAK-W
- Filler rod: NAK-W

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*1) When build-up welded with PXA50-W filler, PAC5000 shows superb photo-etched surface without unevenness. The small difference in hardness between the deposit metal and the base metal (around 40HRC) would reduce the risk of defects such as short-term mold life in the repaired part or polishing unevenness.*