High pressure die casting

Description

This technology can be used to manufacture aluminium or zinc alloy products at very attractive product prices.

This metal casting process is characterized by forcing molten metal under high pressure into a mold cavity. The mold cavity is created using two hardened tool steel dies which have been machined into shape and work similarly to an injection mold during the process. Depending on the type of metal being cast, a hot- or cold-chamber machine is used.

The minimum production quantities depend on the size of the product, and start from 1000 pieces.

Benefits
- The dimensional accuracy is excellent
- Suitable for small and complex thin-walled parts
- The quality of the products is consistent
- Low unit price in comparison to gravity die casting or sand casting
- High production speeds

Possible alloys
- Aluminium alloys
- Zinc alloys (such as Zamak)
- Magnesium alloys

Finishing options
- Technical anodising, but not decorative (it becomes spotty matt black)
- Grinding and polishing
- Blasting
- Vibra-polishing
- Primer, wet painting and powder coating
1. Tooling production
2. Anti-adhesion paste
3. Aluminium injection
4. Cooling under pressure
5. Product extraction
6. Gates removing
7. Measurement check

### Technical specifications

- Commonly used aluminium casting tolerance table for linear dimensions is CT6 according to ISO 8062 (wall thicknesses CT7)

- The weight depends on the alloy: 30 grams to around 10 kg (depending on the shape)

- Casting surface roughness: ± Ra 6.3 µm

- Maximum dimensions: 650 mm

- Minimum casting wall thickness for aluminium: 2.5 mm, maximum of 8-10 mm. The wall thickness should be kept as uniform as possible - there should be no material accumulations. The strength can be obtained with reinforcement ribs

- Geometric tolerances that are required for the function, should be specified on the drawing

- Minimum draft angle depends on the height of the wall or rib. The higher it is, the less draft angle is necessary. Minimum draft from 0.5°

### Dimensions (mm) Table

<table>
<thead>
<tr>
<th>Dimensions (mm)</th>
<th>CT6</th>
<th>CT7</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>≤ 10</td>
<td>± 0,26</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>≤ 16</td>
<td>± 0,27</td>
</tr>
<tr>
<td>&gt; 16</td>
<td>≤ 25</td>
<td>± 0,29</td>
</tr>
<tr>
<td>&gt; 25</td>
<td>≤ 40</td>
<td>± 0,32</td>
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<tr>
<td>&gt; 40</td>
<td>≤ 63</td>
<td>± 0,35</td>
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<tr>
<td>&gt; 63</td>
<td>≤ 100</td>
<td>± 0,39</td>
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<tr>
<td>&gt; 100</td>
<td>≤ 160</td>
<td>± 0,44</td>
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<tr>
<td>&gt; 160</td>
<td>≤ 250</td>
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<tr>
<td>&gt; 250</td>
<td>≤ 400</td>
<td>± 0,55</td>
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<tr>
<td>&gt; 400</td>
<td>≤ 630</td>
<td>± 0,6</td>
</tr>
<tr>
<td>&gt; 630</td>
<td>≤ 1000</td>
<td>± 0,7</td>
</tr>
</tbody>
</table>

### Design, avoid abrupt transitions and use radii

- Use radii for smooth transitions. Avoid sharp edges and abrupt changes in direction.