SQZ aims no porosity and high quality castings for pressure tightness, heat treat-able and weld-able structure.

- **Blow hole less**
  - Ultra slow filling possible
  - Vertical shot sleeve with tilting motion
  - Less temperature drop in shot sleeve

- **Shrinkage porosity less**
  - Higher metal pressure in solidification
  - Large gating system for better pressure propagation

<table>
<thead>
<tr>
<th>Item</th>
<th>SQZ</th>
<th>HPDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shot speed</td>
<td>Max. 0.5m/s =19.69IPS =1.12mile/h</td>
<td>Max. 10m/s =22.4mile/h</td>
</tr>
<tr>
<td>Gate speed</td>
<td>0.4m/s =1.4km/h =0.89mile/h</td>
<td>50m/s =180km/h =112mile/h</td>
</tr>
<tr>
<td>Casting pressure</td>
<td>100MPa =14,504psi</td>
<td>50-80MPa =7,252-11,603psi</td>
</tr>
<tr>
<td>Gate ratio*</td>
<td>Less than 10</td>
<td>About 20</td>
</tr>
</tbody>
</table>

* Gate ratio = Tip area / gate area
Features of UBE SQZ and Applied Parts

**Features**
- Ultra Slow Filling
- High pressure with large gate area in solidification
- Directional solidification

**Advantages**
- No Blow Hole
- Heat treatable
- Weld-able
- No Shrinkage porosity
- Infiltration of preformed insert (MMC)

**Applied Parts**
- Fuel pipe
- Scroll
- Rack housing
- Wheel
- Suspension arm
- Brake caliper
- Cross member node
- Engine block
- Brake disc
- Piston
**Vertical and Horizontal shot sleeve**

**SQZ**  
Vertical shot sleeve

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-solid phase</td>
<td>Liquid phase</td>
<td>Liquid phase</td>
<td>Liquid phase</td>
<td>Liquid phase</td>
<td>Liquid phase</td>
<td>Semi-solid phase</td>
<td>Solid phase</td>
<td>Solid phase</td>
<td>Solid phase</td>
</tr>
</tbody>
</table>

**HPDC**  
Horizontal shot sleeve

**AL shape in sleeve**

- $L/D \leq 2.5$
- Long and thin

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**Time after pouring [sec]**

- 0 sec: Solid phase
- 1 sec: Semi-solid phase
- 2 sec: Liquid phase
- 3 sec: Liquid phase
- 4 sec: Liquid phase
- 5 sec: Liquid phase
- 6 sec: Semi-solid phase
- 7 sec: Solid phase
- 8 sec: Solid phase
- 9 sec: Solid phase
Squeeze casting machine type

HVSC  Horizontal-die-clamping  Vertical-shot
Squeeze Casting machine

VSC  Vertical-die-clamping  Vertical-shot
Squeeze Casting machine

<Tilting and docking system>
- Minimize the cycle time by simultaneous operation between die closing and tilting
- Gentle pouring to shot sleeve
- Less heat transfer from sleeve to die