Machinability

Main applications

<table>
<thead>
<tr>
<th>Applications</th>
<th>Hardness (HRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL Zn, Mg Die casting</td>
<td>41 ~ 48</td>
</tr>
<tr>
<td>Hot extrusion dies</td>
<td>43 ~ 50</td>
</tr>
<tr>
<td>Hot shear blades</td>
<td>35 ~ 45</td>
</tr>
<tr>
<td>Hot forging dies</td>
<td>42 ~ 50</td>
</tr>
</tbody>
</table>

Physical properties

- **Thermal expansion rate**
  - Temp: 100~150°C
  - Expansion rate at 1270°C: 11.8 ~ 11.8

- **Thermal conductivity**
  - Temp: 100°C
  - Conductivity: 25 W/m.K

- **Specific heat**
  - Temp: 1000°C
  - Specific heat: 467 J/kg.K

High performance Hot Work Die Steel

- **High toughness** throughout large Die Casting Dies and Forging Dies contributes to prevent from the risk of gross cracking in service
- **High hardenability**: High toughness even in large sized dies
- **High hot strength**: Great heat checking and wear resistance
- **Double melted**: Homogeneous and almost isotropic properties throughout dies

Heat treatment

<table>
<thead>
<tr>
<th>Re-forging Temperature (°C)</th>
<th>Heat treatment (°C)</th>
<th>Hardness</th>
<th>Transformation Temp. (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>900 ~ 1200</td>
<td>Annealing</td>
<td>235HBW</td>
<td>35 ~ 53HRC</td>
</tr>
<tr>
<td>820 ~ 870</td>
<td>Quenching</td>
<td>805 ~ 885</td>
<td>300 (Austenitized at 1030°C)</td>
</tr>
<tr>
<td>1000 ~ 1050 Air cooling</td>
<td>Tempering</td>
<td>550 ~ 650</td>
<td></td>
</tr>
</tbody>
</table>

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DH31-EX™

Strength at elevated temperature