GOA
Excellent Hardenability and Wear Resistance
Special Tool Steel

Features

1. Stable quality is built in by vacuum degassing in refining process.
2. High hardness is attained even with products of relatively large size because hardenability is better than of JIS SKS3.
3. Fine tungsten and chrome carbides are distributed uniformly, excellent wear resistance.
4. Complete spheroidized microstructure resulting in excellent machinability.

Applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Use hardness (HRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trimming dies</td>
<td>58–62</td>
</tr>
<tr>
<td>Forming dies</td>
<td>58–62</td>
</tr>
<tr>
<td>Punch</td>
<td>58–62</td>
</tr>
<tr>
<td>Cold press</td>
<td>58–62</td>
</tr>
<tr>
<td>Coining dies</td>
<td>58–62</td>
</tr>
<tr>
<td>Shear blade</td>
<td>58–62</td>
</tr>
<tr>
<td>Sheets (less than 6 mm)</td>
<td>58–62</td>
</tr>
<tr>
<td>Plates (6–8 mm)</td>
<td>55–60</td>
</tr>
<tr>
<td>Gauges</td>
<td>60–64</td>
</tr>
</tbody>
</table>

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 need.

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**Chemical composition**

<table>
<thead>
<tr>
<th>DAIDO Brand</th>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>Cr</th>
<th>Mo</th>
<th>W</th>
<th>Special elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOA</td>
<td>0.9</td>
<td>0.3</td>
<td>1.2</td>
<td>0.5</td>
<td>0.1</td>
<td>0.5</td>
<td>Additives</td>
</tr>
</tbody>
</table>

Impurities: P ≤ 0.025, S ≤ 0.015, Cu ≤ 0.25, Ni ≤ 0.25

**Heat treatment**

- **Re-heating temperature (°C):** 1100–850
  - Annealing
  - Quenching
  - Tempering

- **Heat treatment temperature (°C):**
  - Annealing: 750–880
  - Quenching: 820–850
  - Tempering: 150–200

- **Hardness**
  - Annealing temperature: HBW
  - Quenching temperature: HRC

- **Transformation temperature (°C):**
  - Ac
  - Ar
  - Ms

- **Test pieces size:** 25 x 100mm

**[Standard heat treatment]**

- **Quenching**
  - Ordinary quenching
  - Quenching temperature: 850°C
  - 600–650°C
  - Oil quenching

- **Tempering**
  - Tempering temperature: 180–200°C
  - Air cooling
  - 25mm diameter

**[Technical data]**

1. **Hardenability curve** (End quenching method)
   - GOA 830°C
   - SKS3 830°C
   - Test piece size: 25 x 100mm

2. **Hardening temperature, hardness attained and residual austenite**
   - Residual austenite (%)
   - Test piece size: 30 x 100mm

3. **Tempering curve**
   - Tempering temperature (°C)
   - Dimensional change (%)

4. **Wear resistance**
   - Friction velocity (m/sec)
   - Test conditions
   - Ohtoshi rapid wear test
   - Maximum load: 6.5kg
   - Wear distance: 200mm
   - Mating metal: SKS (85/31BHR)