1. **Main characteristics and applications**

Steel with excellent hardening penetration up to 400 mm. Generally supplied in hardened and tempered condition with excellent polishing and photoengraving properties. This steel is suitable for nitriding (around 800 HV), chrome and nickel plating. Used for plastic dies with excellent surface finish properties. It is also used for dies of light alloys with low melting point, plates, dies box, etc.

2. **Comparable standards**

<table>
<thead>
<tr>
<th>UNI</th>
<th>W.Nr</th>
<th>DIN</th>
<th>AFNOR</th>
<th>AISI/SAE</th>
<th>BS</th>
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<tbody>
<tr>
<td>-</td>
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<td>X40CrMnMo7</td>
<td>40CMD8</td>
<td>-P20</td>
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3. **Chemical analysis**

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<tr>
<th>C</th>
<th>Mn</th>
<th>Si</th>
<th>Cr</th>
<th>Mo</th>
<th>Ni</th>
<th>P+S</th>
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<tbody>
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</table>

4. **Critical points**

- **Ac1**: 740 °C
- **Ms**: 310 °C

5. **Supply Conditions**

Hardened and Tempered HB 280 - 325

6. **Heat treatments**

**Annealing**
- Heat to 720 - 750 °C for 2 - 4 h furnace cool

**Stress relieving**
- Up to 560 - 600 °C, hold for 2 - 4 h
- Furnace or steel air cooling

**Hardening**
- Preheating to 600 - 650 °C
- Heat to hardening temperature to 840 - 870 °C and hold at temperature
- Cooling in oil
- Hardness after hardening: HRC 51

**Tempering**
- To be carried out soon after the hardening in the range 580 - 650 °C for 1 hour for 25 mm of thickness minimum 2 h

Reference Standard UNI EN ISO 4957
7 C.C.T. curve

Austenitizing temperature: 850°C

8 Tempering curve