EDRO #5™ is a Chromium-Molybdenum-Vanadium-alloyed steel characterized by:
- Good resistance to thermal shock and thermal fatigue
- Good high-temperature strength
- Good toughness and ductility
- Good machinability
- Good polishibility
- Good through-hardening properties
- Good size stability during hardening

### Typical analysis %

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>Cr</th>
<th>Mo</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>0.4</td>
<td>1.0</td>
<td>0.4</td>
<td>5.3</td>
<td>1.4</td>
<td>1.0</td>
</tr>
</tbody>
</table>

### Standard spec.

AISI H13, W.-Nr. 1.2344

### Delivery condition

Soft annealed to approx. 185 HB

### Color code

Green

### PROPERTIES

Approximate tensile strength at room temperature

<table>
<thead>
<tr>
<th></th>
<th>Hardness</th>
<th>Tensile Strength</th>
<th>Yield Strength</th>
<th>Reduction in Area</th>
<th>Elongation in 2&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>52 HRC</td>
<td>263,000 psi</td>
<td>220,000 psi</td>
<td>45%</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>45 HRC</td>
<td>206,000 psi</td>
<td>185,000 psi</td>
<td>55%</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1820 N/mm²</td>
<td>1520 N/mm²</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1420 N/mm²</td>
<td>1280 N/mm²</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Heat treatment

**Stress Relieving**

After rough machining the tool should be heated through to 1200°F (650°C), holding time 2 hours. Cool slowly to 930°F (550°C), then freely in air.

**Hardening**

- Pre-heating temperature: 1110-1480°F (600-850°C)
- Austenitizing temperature: 1800-1980°F (980-1080°C) normally 1870°F (1020°C)

Holding time: 20-30 minutes

Holding time = time at temperature after the tool is fully heated through.
- Quenching:
- Circulating air or atmosphere
- Air blast
- Vacuum
- Mar-tempering bath at 390-1020°F (200-550°C) for 1 to 100 minutes, then cool in air
- Oil

### HOT HARDNESS

- Hardening Temp. °F 1850 (1010°C)
- Tempering Temp. °F 1100 (593°C)
- Tempering Time-Hours 2 + 2

Measurements made after holding at Testing Temperature for 30 minutes
Tempering
After rough machining the tool should be heated through to 1200° F (650° C), holding time 2 hours. Cool slowly to 930° F (550° C).

Nitriding
Nitriding gives a hard surface which is very resistant to wear and erosion. In diecasting dies, nitried cavities are less subject to welding-on. The nitried layer is brittle and may crack or spall when exposed to mechanical or thermal shock. The risk increases with case thickness. Before nitriding, the tool should be hardened, and tempered at approximately 90° F (50°C) above the nitriding temperature.

Nitriding in ammonia at 975° F (525° C) gives a surface hardness of 1000-1250 HV.

EDRO #5™ H13 can be nitried in the soft annealed condition. The hardness and depth of case will, however, be somewhat reduced.

Tufftriding
The Tufftriding Process is done in a special salt bath at 1080° F (570° C). Holding time: normally 2 hours. It gives a surface hardness of approx. 950-1000 HV.

Edro will be pleased to provide additional information on our full line of quality mold steels, machining capabilities, and special mold bases.

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