<table>
<thead>
<tr>
<th>Material no.</th>
<th>1.4116 to EN 10 088-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code names</td>
<td>D (DIN/EN) X 50 CrMoV 15</td>
</tr>
<tr>
<td></td>
<td>USA (ASTM) –</td>
</tr>
<tr>
<td></td>
<td>Japan –</td>
</tr>
<tr>
<td></td>
<td>CIS –</td>
</tr>
</tbody>
</table>

### Chemical composition

<table>
<thead>
<tr>
<th>(in % by weight)</th>
<th>C</th>
<th>Cr</th>
<th>Mo</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>min.</td>
<td>0.45</td>
<td>14.0</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>max.</td>
<td>0.55</td>
<td>15.0</td>
<td>0.8</td>
<td>0.2</td>
</tr>
</tbody>
</table>

1) Special arrangements may be made within the analysis limits depending on the properties required.

### Product forms

- Hot-rolled wide strip, cold-rolled wide strip, slit strip, cut sheets, circles, blanks

### Mechanical properties

#### Dimensions

- Cold-rolled strip
  - s ≤ 8 mm
  - max. 850
- Hot-rolled strip
  - s ≤ 13.5 mm
  - ≥ 12

#### Heat treatment

- Hardened
- Cooling: Oil/air
- Microstructure: Martensite (transformation structure)

#### Physical properties

<table>
<thead>
<tr>
<th>Density (kg/dm³)</th>
<th>Modulus of elasticity (N/mm²)</th>
<th>Thermal expansion in 10⁻⁶ · K⁻¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20°C</td>
<td>100°C</td>
</tr>
<tr>
<td>7.7</td>
<td>215</td>
<td>212</td>
</tr>
</tbody>
</table>

- Thermal conductivity (W/m · K)
- Specific heat capacity (J/kg · K)
- Electrical resistivity (Ω · mm²/m)
- Magnetisability

- Thermal conductivity at 20 °C: 30
- Specific heat capacity at 20 °C: 460
- Electrical resistivity at 20 °C: 0.65
- Magnetisability: present

### Surface finish

- 1 E (II a), 2 B (III c), 2 R (III d), 2 G (IV)

### Edge finish

- Untrimmed, cut edges, dressed edges on request

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### Chemical resistance

Our publication “Chemical Resistance of NIROSTA® Steels” contains tables giving some guide to chemical resistance.

NIROSTA® 4116 belongs to group 1 in the publication.

### Processing

This material can be heat treated to achieve high strength values due to its high C content.

Heat tints or scale from heat treatment reduce corrosion resistance and should be removed chemically (e.g. pickling baths or pickling pastes) or mechanically (e.g. by grinding or blasting with glass beads or iron- and sulfur-free quartz sand).

Machining is comparable to that of an unalloyed structural steel. Tools should be made of good quality high-speed steel or carbide.

NIROSTA® 4116 can be polished.

### Welding

Weldability:

NIROSTA® 4116 is not suitable for welding.

### Applications

NIROSTA® 4116 is used for parts which are subject to wear, e.g. for high-quality table and kitchen knives, penknife blades and meat knives. Adding vanadium improves wear resistance. The addition of Mo improves corrosion resistance compared to standard martensitics.