Grade Ergste® 1.4543GG
Ergste® 1.4543GG is a precipitation hardenable 12% chromium-nickel-steel with high corrosion resistance and notched impact strength. In the solution-annealed condition this alloy is relatively soft and therefore well formable. In conducting an appropriate heat treatment, a maximum hardness of 48 HRC* can be achieved. The best corrosion resistance will be achieved in the hardened condition with a metallic bright surface.

Typical Fields of Application
- Surgical instruments, e. g. burrs
- Cutting tools, e. g. rasps
- Surgical needles
- Stylets

Polishability
Ergste® 1.4543GG is polishable.

Magnetism
Ergste® 1.4543GG is magnetisable.

Weldability
Ergste® 1.4543GG shows good weldability with the shielded fusion and resistance welding processes. Preheating is not necessary. For most applications best results are achieved in the solution-annealed condition. Oxyacetylene welding should be avoided, as carbon carburization in the weld may occur.

Cold Working
For massive cold working please order the solution annealed condition (Condition A).

* Maximum hardness achievable under ideal hardening conditions

Corresponding Standards
- 1.4543 (X3CrNiCuTiNb12-9) acc. to NF S 94-090
- XM-16 (UNS S45500) acc. to ASTM F899 and A564

Typical Chemical Composition*

<table>
<thead>
<tr>
<th>C</th>
<th>Mn</th>
<th>Cr</th>
<th>Ni</th>
<th>Cu</th>
<th>Ti</th>
<th>Mo</th>
<th>Nb</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.015</td>
<td>0.25</td>
<td>11.75</td>
<td>8.50</td>
<td>2.00</td>
<td>1.25</td>
<td>0.25</td>
<td>0.30</td>
</tr>
</tbody>
</table>

* Average in mass-%

Mechanical Properties Acc. to ASTM A564/ A564M

<table>
<thead>
<tr>
<th>Condition</th>
<th>Tensile Strength TS [ksi]</th>
<th>Yield Strength YS [ksi]</th>
<th>Elongation [%]</th>
<th>Reduction of Area [%]</th>
<th>Hardness HRC/HB</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>≤ 36/331</td>
</tr>
<tr>
<td>H900</td>
<td>≥ 235</td>
<td>≥ 220</td>
<td>≥ 8</td>
<td>≥ 30</td>
<td>≥ 47/444</td>
</tr>
<tr>
<td>H950</td>
<td>≥ 220</td>
<td>≥ 205</td>
<td>≥ 10</td>
<td>≥ 40</td>
<td>≥ 44/415</td>
</tr>
<tr>
<td>H1000</td>
<td>≥ 205</td>
<td>≥ 185</td>
<td>≥ 10</td>
<td>≥ 40</td>
<td>≥ 40/363</td>
</tr>
</tbody>
</table>

Physical Properties

<table>
<thead>
<tr>
<th>Modulus of Elasticity E 70 °F [ksi]</th>
<th>29,007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Density [lb/in³]</td>
<td>0.28</td>
</tr>
<tr>
<td>Thermal Conductivity 70 °F [Btu/hr ft² °F]</td>
<td>124.8</td>
</tr>
<tr>
<td>Coefficient of Thermal Expansion [µin/in °F]</td>
<td>4.9</td>
</tr>
<tr>
<td>70 - 210 °F</td>
<td>6.1</td>
</tr>
<tr>
<td>70 - 390 °F</td>
<td>6.2</td>
</tr>
<tr>
<td>70 - 750 °F</td>
<td>6.4</td>
</tr>
<tr>
<td>70 - 930 °F</td>
<td>6.7</td>
</tr>
<tr>
<td>Specific Heat 70 °F [Btu/lb °F]</td>
<td>0.11</td>
</tr>
<tr>
<td>Electric Resistivity 70 °F [Ω circular-mil/ft]</td>
<td>439.1</td>
</tr>
</tbody>
</table>
Hot Working
Forging temperature is 1,650 – 2,280 °F.
Heat slowly and gradually to approx. 2,000 ± 100 °F.
Hold temperature during forging.
With a finishing temperature of 1,500 – 1,700 °F,
optimum grain size and properties can be achieved
after heat treating.
Cool slowly to room temperature after forging
(e.g. in air).

Heat Treatment

Solution Annealing
Temperature: 1,025 ± 25 °F
Cooling: furnace, air

Precipitation hardening
Temperature: 900 – 1,000 °F
Holding time: approx. 4 h (depending on cross-section)
Cooling: air

Corrosion Resistance
Corrosion resistance is comparable to austenitic grades
(e.g. 1.4301); in some cases, due to the high copper
content even better.
Ergste® 1.4543GG shows a good corrosion resistance in
normal air atmosphere and no corrosion in fresh water.

Further information regarding our products and locations are available in
our image brochure and under www.zapp.com

The illustrations, drawings, dimensional and weight data and other
information included in this data sheet are intended only for the purposes
of describing our products and represent non-binding average values.
They do not constitute quality data, nor can they be used as the basis for
any guarantee of quality or durability. The applications presented serve
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guarantee in relation to the suitability of the material. This cannot
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products and on their use in a specific application.
The brochure is not subject to change control.
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