# Ergste® 1.4108 Datasheet US Medical Alloys



Zapp is Certified to ISO 9001



# Grade Ergste® 1.4108

Ergste® 1.4108 is a nitrogen-alloyed, high corrosion resistant martensitic steel with excessive toughness at hardness up to 60 HRC. Partly replacing carbon with nitrogen results in a much higher corrosion resistance and wear resistance compared to conventional, hardenable martensitic grades. In combining the Pressure Electro-Slag-Remelting-Process (PESR) with an elaborate forging technique, an extremely high purity level of a fine and homogeneous microstructure can be achieved. This implies excellent machinability, outstanding polishing and high dimensional stability after heat treatment. Consequently, Ergste® 1.4108 is the ideal grade for bending-stressed or break-endangered medical instruments which are in contact with highly corrosive mediums.

# **Typical Fields of Application**

Medical Instruments e. g.
Drills
Screwdrivers
Chisels
Saw Blades, Cutting Tools

# **Corresponding Standards**

DIN X30CrMoN15-1 UNS S42027 acc. ASTM F899

## Typical Chemical Composition\*

| С    | Si   | Mn   | Cr    | Мо   | N    |
|------|------|------|-------|------|------|
| 0.30 | 0.60 | 0.40 | 15.00 | 1.00 | 0.40 |

<sup>\*</sup> average in mass-%

### **Product Conditions\***

| Bars, drawn,<br>straightened, ground | Tensile [ksi] | 101.5 - 130.5 |
|--------------------------------------|---------------|---------------|
|                                      |               |               |

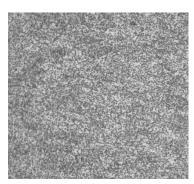
<sup>\*</sup> Special conditions on request

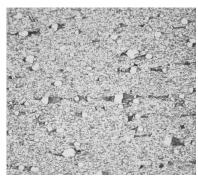
| Physical Properties                                                                                                     |                                 |
|-------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Modulus of Elasticity E 70 °F [ksi]                                                                                     | 32,343                          |
| Specific Density [lb/in³]                                                                                               | 0.279                           |
| Thermal Conductivity 70 °F [Btu in/hr ft² °F]                                                                           | 97.1                            |
| Coefficient of Thermal Expansion [µin/in °F]<br>70 - 210 °F<br>70 - 390 °F<br>70 - 570 °F<br>70 - 750 °F<br>70 - 930 °F | 5.8<br>6.0<br>6.2<br>6.4<br>6.6 |
| Specific Heat 70 °F [Btu/lb °F]                                                                                         | 0.10                            |
| Electric Resistivity 70 °F [ $\Omega$ circular-mil/ft]                                                                  | 481.2                           |
|                                                                                                                         |                                 |

# Microstructure Pictures

In comparison to conventional martensitic grades, Ergste® 1.4108 shows significantly smaller primary carbides.

Ergste® 1.4108 Ergste® 1.4108 Ergste® 1.4108 Hall (AISI 440 B)





PAGE 1/2

### **Heat Treatment**

# **Soft Annealing**

1,435 – 1,510 °F/7 h / Cooling: furnace or air

# Stress Relief Annealing

570 - 805 °C/  $2 \times 2$  h/ Cooling: Air

### Hardening

1,830 - 1,920 °F/ 0,5 h/ Cooling: Oil

Hardening has to be conducted under nitrogen partial pressure to prevent reduction or increase of the nitrogen content.

# **Tempering**

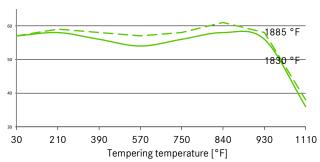
210 - 885 °F/2 x 2 h/ Cooling: Air

# Subzero Refrigeration

-110 – -320 °F/ 1 h/ applied to eliminate remaining austenite at hardening temperatures of > 1,850 °F

### Tempering Chart (Hardening with Subzero Refrigeration)

Hardness HRc



### **Corrosion Resistance**

Through the addition of nitrogen, Ergste® 1.4108 shows an exceptional corrosion resistance.

# Hot working

Forging at 2,230 - 1,830 °F

#### Magnetism

Ergste® 1.4108 is magnetizable.

## Machining

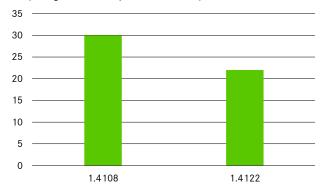
Ergste® 1.4108 is characterized by an outstanding machinability.

### Polishability

Ergste® 1.4108 shows excellent abilities for grinding and polishing.

#### Comparison of Corrosion Resistance

PREN (Pitting Resistance Equivalence Number)



Corrosion Resistance of Ergste® 1.4108 in comparison to conventionally hardenable martensitic grades.

## Zapp Precision Metals GmbH

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

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