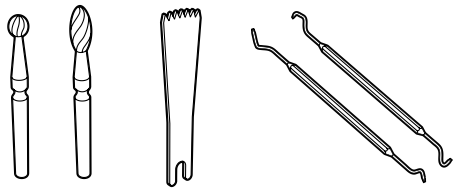
Ergste® 1.4108 Datasheet
Medical Alloys

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*

C	Si	Mn	Cr	Mo	N
0.30	0.60	0.40	15.00	1.00	0.40

* average in mass-%

Product Conditions*

Bars, drawn, straightened, ground	Tensile [MPa]	700-900

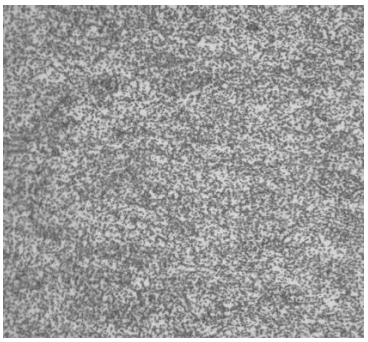
* Special conditions on request

Physical Properties	
Modulus of Elasticity E 20 °C [GPa]	223
Specific Gravity [kg/dm³]	7.72
Thermal Conductivity 20°C [W/m*K]	14
Coefficient of Thermal Expansion α [10^{-6}*K^{-1}]	
20 – 100 °C	10.4
20 – 200 °C	10.8
20 – 300 °C	11.2
20 – 400 °C	11.6
20 – 500 °C	11.9
Specific Heat c at 20 °C [kJ/kg*°C]	430
Electric Resistivity ρ at 20 °C [Ω*mm²/m]	0.8

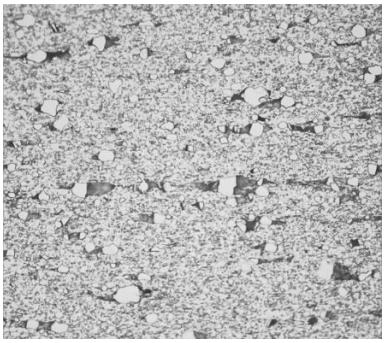
Microstructure Pictures

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

Ergste® 1.4108



Ergste® 1.4112 (AISI 440 B)



Heat Treatment

Soft Annealing
780 – 820 °C/ 7 h / Cooling: furnace or air

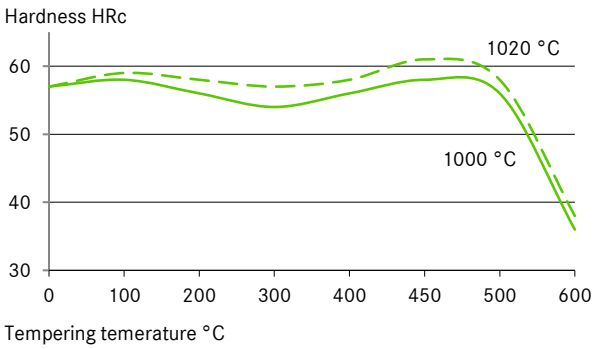
Stress Relief Annealing
150 – 220 °C/ 2 x 2 h/ Cooling: Air

Hardening
1,000 – 1,050 °C/ 0,5 h/ Cooling: Oil
Hardening has to be conducted under nitrogen partial pressure to prevent reduction or increase of the nitrogen content.

Tempering
100 – 475 °C/ 2 x 2 h/ Cooling: Air

Subzero Refrigeration
-80 – -196 °C/ 1 h/ applied to eliminate remaining austenite at hardening temperatures of > 1,010 °C

Tempering Chart (Hardening with Subzero Refrigeration)



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

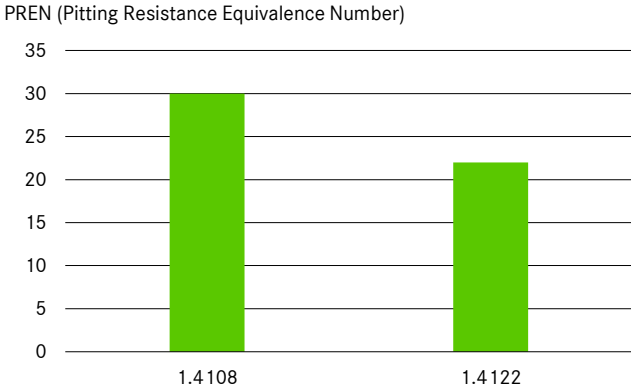
Hot Working
Forging at 1,220 – 1,000 °C

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



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

Zapp Precision Metals GmbH
MEDICAL ALLOYS
Letmather Straße 69
58239 Schwerte
P.O. Box 17 20
58212 Schwerte
Phone +49 2304 79-7259
Fax +49 2304 79-482
medicalalloys@zapp.com

www.zapp.com

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

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