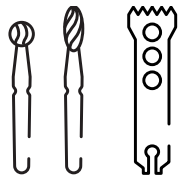
Zapp® 1.4108 Datasheet US
Medical Alloys

Zapp is certified to ISO 9001



Grade Zapp® 1.4108

Zapp® 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, Zapp® 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 [ksi]	101.5 - 130.5

* Special conditions on request

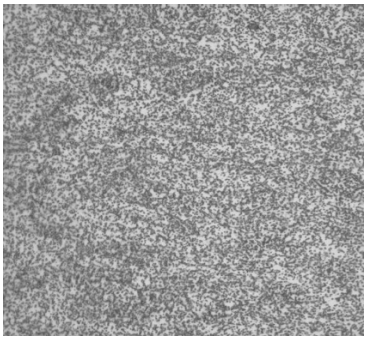
Physical Properties

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]	
70 – 210 °F	5.8
70 – 390 °F	6.0
70 – 570 °F	6.2
70 – 750 °F	6.4
70 – 930 °F	6.6
Specific Heat 70 °F [Btu/lb °F]	0.10
Electric Resistivity 70 °F [Ω circular-mil/ft]	481.2

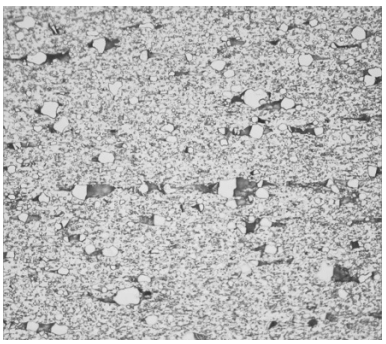
Microstructure Pictures

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

Zapp® 1.4108



Zapp® 1.4112 (AISI 440 B)



Heat Treatment

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

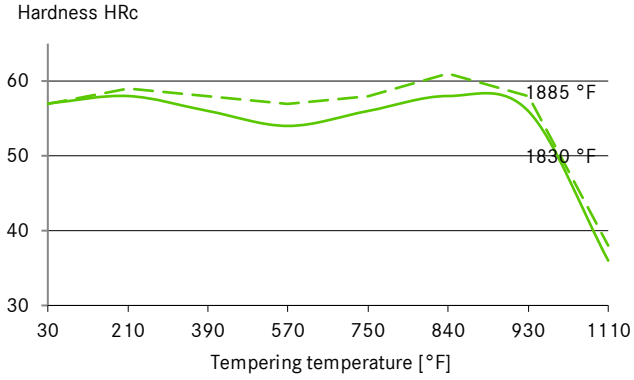
Stress Relief Annealing
570 – 805 °C/ 2 x 2 h/ Cooling: Air

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)



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

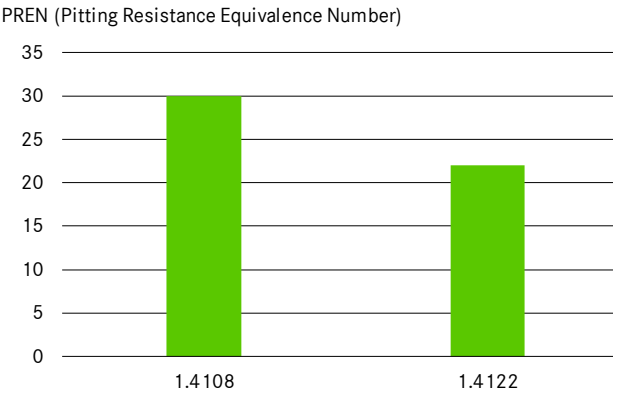
Hot working
Forging at 2,230 – 1,830 °F

Magnetism
Zapp® 1.4108 is magnetizable.

Machining
Zapp® 1.4108 is characterized by an outstanding machinability.

Polishability
Zapp® 1.4108 shows excellent abilities for grinding and polishing.

Comparison of Corrosion Resistance



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

MEDICAL ALLOYS

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

Last revision: June 2026