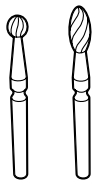
1.4028, AISI 420B, ASTM F899
Medical Steel for Instruments - Datasheet

Zapp is certified to ISO 9001



Grade 1.4028 from Zapp – Steel for Instruments
Ergste® 1.4028 YN is a Material for Medical Instruments According to ASTM F899 and AISI 420B

Ergste® 1.4028YN is a stainless martensitic chromium steel. This grade shows better spring properties than austenitic or ferritic steel and improved fatigue strength under corrosive stress.
Requirement for this is a low-hardened and tempered condition and a shiny, preferably polished surface. In high tempered or annealed condition, the corrosion resistance is reduced.

Typical Applications

- Rotary instruments
- Cutter
- Curettes

Information about further medical applications at Zapp.

Polishability

Ergste® 1.4028YN is polishable.

Weldability

Ergste® 1.4028YN is usually not welded.
If welding is unavoidable, the following precautions should be taken: preheating to a temperature range of 300 – 400 °C. Furthermore, annealing after welding is required to regain a certain degree of ductility.

Machining

During machining processes, Ergste® 1.4028YN behaves similarly to unalloyed structural steel of the same hardness. Tools should be made of quality high-speed steel or carbide.

Magnetism

Ergste® 1.4028YN is magnetizable.

Hot Working

Forging temperature is 1100 – 800 °C
Slow cooling

Corrosion Resistance

Ergste® 1.4028YN has sufficient resistance in moderate, non-chlorine-containing media. Good corrosion resistance can be observed in oxidizing atmospheres at temperatures exceeding 600 °C. Best corrosion resistance can be achieved with polished surface in the quenched and tempered condition.

Corresponding Standards

DIN EN 10088-3 (X30Cr 13)
ASTM F899, AISI 420B (UNS S42000)

Typical Chemical Composition

C	Si	Mn	P	S	Cr
0.26–0.35	max. 1.00	max. 1.00	max. 0.040	max. 0.030	12.00–14.00

Mechanical Properties (Annealed)

Tensile strength R_m	[MPa]	max. 800
Hardness HB		max. 245

Mechanical Properties (Quenched and Tempered)

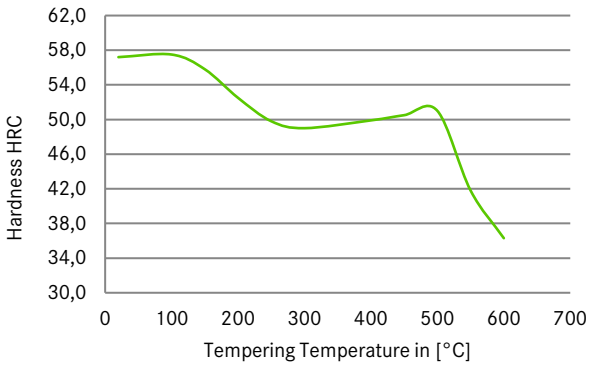
Tensile strength R_m	[MPa]	850 - 1000
Yield strength $Rp_{0,2}$	[MPa]	min. 650
Elongation A	[%]	min. 10

Information on implant steel and other medical materials at Zapp.

Physical Properties

Modulus of Elasticity E 20° C	[GPa]	215
Specific Density ρ	[kg/ dm³]	7.7
Thermal Conductivity λ at 20°C	[W/ m*K]	30
Coefficient of Thermal Expansion α	[10^{-6} * K^{-1}]	
20 - 100 °C		10.5
20 - 200 °C		11.0
20 - 300 °C		11.5
20 - 400 °C		12.0
20 - 500 °C		12.0
Specific Heat c at 20°C	[kJ/ kg*K]	460
Specific Electric Resistivity ρ at 20°C	[Ω*mm²/ m]	0.65

Tempering Diagram [1,050 °C/ 0.5 h/ Oil]



Heat Treatment

Soft Annealing
Temperature: 745 – 825 °C
Cooling: Air

Hardening
Temperature: 950 – 1050 °C
Cooling: Oil, Air

Tempering
Temperature: 625 – 675 °C

Please see our linecard of grades for medical instruments and further medical grades.

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 only as illustrations and can be construed neither as quality data nor as a guarantee in relation to the suitability of the material. This cannot substitute for comprehensive consultation on the selection of our products and on their use in a specific application. The brochure is not subject to change control.
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Zapp Precision Metals GmbH
Letmather Straße 69
58239 Schwerte
medicalalloys@zapp.com
www.zapp.com