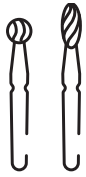


Zapp is certified to ISO 9001



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

Zapp® 1.4028 YN 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

Zapp® 1.4028 YN is polishable.

Weldability

Zapp® 1.4028 YN is usually not welded.

If welding is unavoidable, the following precautions should be taken: preheating to a temperature range of 572 – 752 °F. Furthermore, annealing after welding is required to regain a certain degree of ductility.

Machining

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

Magnetism

Zapp® 1.4028 YN is magnetizable.

Hot Working

Forging temperature is 2,012 – 1,472 °F

Slow cooling

Corrosion Resistance

Zapp® 1.4028 YN 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	[ksi]	max. 116.0
Hardness HB		max. 245

Mechanical Properties (Quenched and Tempered)

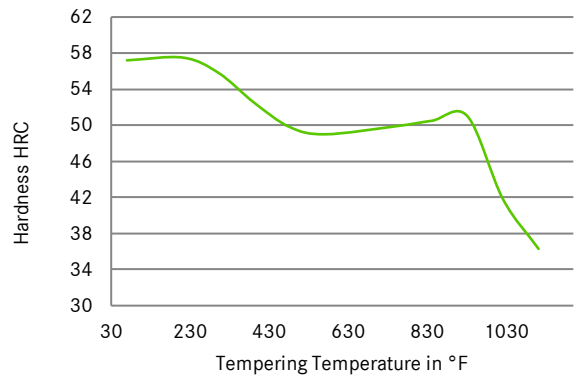
Tensile strength R _m	[ksi]	123.3 – 145.0
Yield strength R _{p0.2}	[ksi]	min. 94.3
Elongation A	[%]	min. 10

[Information on implant steel and other medical materials at Zapp.](#)

Physical Properties

Modulus of Elasticity E 70°F	[ksi]	31,181
Specific Density ρ	[lb/ in³]	0.28
Thermal Conductivity λ at 70°F	[Btu in/hr ft²°F]	208.0
Coefficient of Thermal Expansion α	[µin/in °F]	
70 - 210 °F		5.8
70 - 390 °F		6.1
70 - 570 °F		6.4
70 - 750 °F		6.7
70 - 930 °F		6.7
Specific Heat c at 70°F	[Btu/lb °F]	0.11
Specific Electric Resistivity ρ at 70°F	[Ωcircularmil/ft]	391

Tempering Diagram [1922 °F/ 0.5 h/ Oil]



Heat Treatment

Soft Annealing

Temperature: 1,273 – 1,517 °F

Cooling: Air

Hardening

Temperature: 1,742 – 1,922 °F

Cooling: Oil, Air

Tempering

Temperature: 1,157 – 1,247 °F

Please see our [linecard of grades for medical instruments and further medical grades](#).

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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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