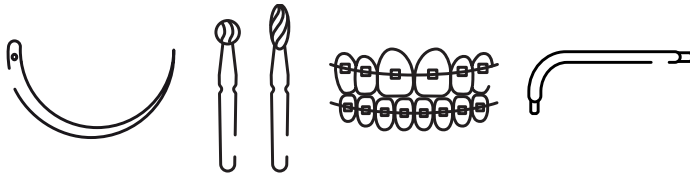


Zapp is certified according to ISO 9001



Grade Zapp® 1.4310 FB/FE

Zapp® 1.4310 FB/FE is an austenitic chromium-nickel steel with 18 % chromium content. It is characterized by high ductility and excellent elastic properties.

Due to the instable austenitic structure of this material, high tensile strengths can be achieved by cold working. This leads to an increased precipitation hardening capability. By means of electroslag-remelting, Zapp® 1.4310 FE shows a higher purity level for high-precision instruments.

Typical Fields of Application

- Dental Instruments, e.g. Root Canal Files, Cutters,
- Burrs
- Orthodontic Products
- Surgical Instruments
- Surgical Needles
- Vascular Intervention, e. g. Cannulas, Guide Wires
- Stamping- and Bending Parts, e.g. Stylets

Weldability

Zapp® 1.4310 FB/FE shows good weldability with fusion welding and resistance welding. Nevertheless, in the welding zone the mechanical properties of cold worked material will fall back to the annealed condition. Post-weld annealing is recommended as it dissolves the chromium carbides which results in maximum resistance against intercrystalline corrosion.

Polishability

Zapp® 1.4310 FB/FE is high gloss polishable.

Magnetism

Magnetizability of Zapp® 1.4310 FB/FE increases with the level of cold working.

Corresponding Standards

- 1.4310 (X10CrNi18-8) acc. to DIN EN 10088-3
- 1.4310 (X10CrNi18-08) acc. to NF S 94-090
- AISI 302 (UNS S30200) acc. to ASTM F899

Typical Chemical Composition*

C	Si	Mn	Cr	Mo	Ni	S
0.10	1.00	1.00	17.50	0.40	8.00	0.008

* Average in mass-%

Mechanical Properties (Soft-Annealed)

Tensile Strength TS	[ksi]	101 - 130
Yield Strength YS	[ksi]	min. 28.3
Elongation A5	[%]	min. 40
Hardness HB		max. 230
Structure		Austenite

Mechanical Properties (Cold-Worked) *

Tensile Strength TS	[ksi]	116 - 406
Yield Strength YS	[ksi]	max. 363
Structure		Austenite + α'-Martensite

* Achievable mechanical properties are highly dependent on the dimensions.

Physical Properties

Modulus of Elasticity E 70 °F	[ksi]	29,007
Specific Density	[lb/in³]	0.29
Thermal Conductivity 70 °F	[Btu in/hr ft² °F]	104.0
Coefficient of Thermal Expansion	[µin/in °F]	
70 - 210 °F		8.9
70 - 390 °F		9.4
70 - 570 °F		9.4
70 - 750 °F		10.0
70 - 930 °F		10.0
Specific Heat 70 °F	[Btu/lb °F]	0.12
Electric Resistivity 70 °F	[Ω circular-mil/ft]	439.1

Hot Working

Forging temperature is 1,425 – 1,525 °F.

Do not forge under 1,205 °F!

Material should be solution annealed after forging, to restore the maximum corrosion resistance.

Heat Treatment

Solution Annealing

Temperature: approx. 1,325 °F

Cooling: Water or rapid air cooling ideally under protective gas.

Precipitation Hardening

Temperature: 425- 675 °F

Holding time: approx. 1 - 1.5 h

Cooling: Air

Precipitation hardening is only possible in the cold worked condition. Hereby the spring properties are improved.

Cold Working

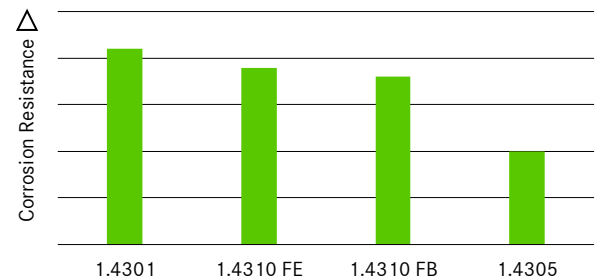
Zapp® 1.4310 FB/FE is generally used in spring temper condition. It is characterized by a good residual ductility for further processing.

Machining

In comparison with soft annealed austenitic conditions, Zapp® 1.4310 FB/FE shows insufficient chipping properties in the cold drawn condition.

Corrosion Resistance

Zapp® 1.4310 FB/FE is resistant against corrosion in normal air atmosphere, fresh water and mild environments. Surface polishing improves corrosion resistance in comparison with rough surfaces.



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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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