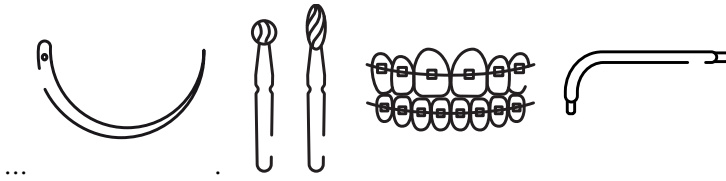


Zapp is Certified According to ISO 9001



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	[MPa]	700 - 900
Yield Strength YS	[MPa]	min. 195
Elongation A5	[%]	min. 40
Hardness HB		max. 230
Structure		Austenite

Mechanical Properties (Cold-Worked) *

Tensile Strength TS	[MPa]	800 - 2,800
Yield Strength YS	[MPa]	max. 2,500
Structure		Austenite + α' -Martensite

* Achievable mechanical properties are highly dependent on the dimensions.

Physical Properties

Modulus of Elasticity E 20°C	[GPa]	200
Specific Gravity	[kg/dm³]	7.9
Thermal Conductivity 20°C	[W/m K]	15.0
Mean Coefficient of Thermal Expansion	[10 ⁻⁶ /K ⁻¹]	16.0
20 - 100 °C		17.0
20 - 200 °C		17.0
20 - 300 °C		18.0
20 - 400 °C		18.0
Specific Heat 20°C	[kJ/kg K]	0.5
Electric Resistivity 20°C	[Ω mm²/m]	0.73

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.

Hot Working

Forging temperature is 1,150 – 1,250 °C (1,425 – 1,525 °F).
Do not forge under 930 °C (1,205 °F)!
Material should be solution annealed after forging, to restore the maximum corrosion resistance.

Heat Treatment

Solution Annealing

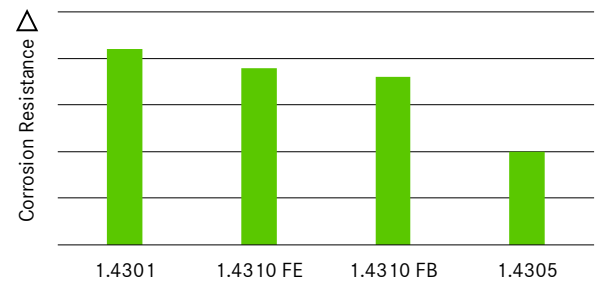
Temperature: approx. 1,050 °C (1,325 °F)
Cooling: water, or rapid air cooling, ideally under protective gas.

Precipitation Hardening

Temperature: 150 - 400 °C (425- 675 °F)
Holding time: approx. 1 – 1.5 h
Cooling: air
Precipitation hardening is only possible in the cold worked condition. Hereby, spring properties are improved.

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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