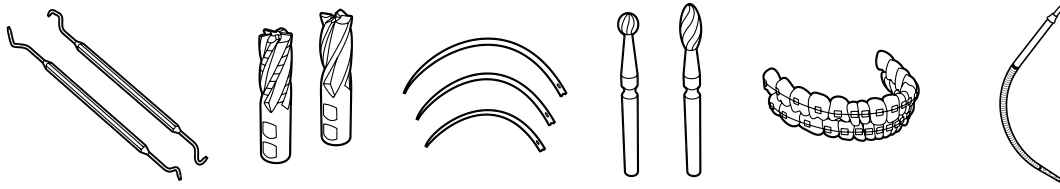


Ergste® 1.4310FB/FE Datasheet

Medical Alloys



Zapp is Certified According to ISO 9001



Grade Ergste® 1.4310FB/FE

Ergste® 1.4310FB/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, Ergste® 1.4310FE 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

Ergste® 1.4310FB/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

Ergste® 1.4310FB/FE is high gloss polishable.

Magnetism

Magnetizability of Ergste® 1.4310FB/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

Ergste® 1.4310FB/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, Ergste® 1.4310FB/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)

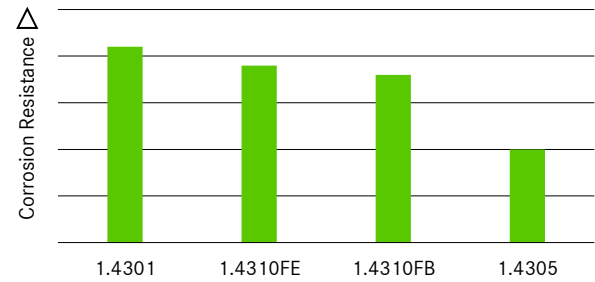
Holding time: approx. 1 – 1.5 h

Cooling: air

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

Corrosion Resistance

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



Zapp Precision Metals GmbH

MEDICAL ALLOYS

Letmather Straße 69

58239 Schwerte

P.O. Box 17 20

58212 Schwerte

Phone +49 2304 79-540

Fax +49 2304 79-482

medicalalloys@zapp.com

www.zapp.com

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

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