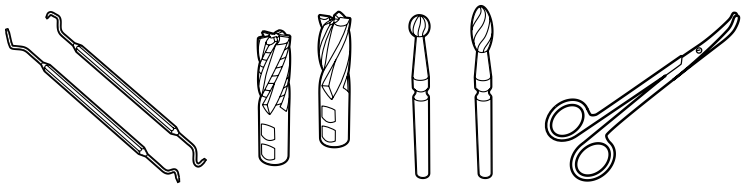
Ergste® 1.4035YU Data Sheet US
Medical Alloys

Zapp is Certified to ISO 9001



Grade Ergste® 1.4035YU

Ergste® 1.4035YU is a martensitic stainless steel with 13 % chromium content and sulfur addition. Thereby the machinability increases considerably in comparison with the Ergste® 1.4034YK. In conducting an appropriate heat treatment a maximum hardness of 57 HRC* can be achieved. The best corrosion resistance to moderate aggressive, non-chloric media is achieved in the hardened and high gloss polished condition with a metallic bright surface. Due to the sulfur addition the corrosion resistance decreases compared to Ergste® 1.4034YK.

Typical Fields of Application

- Surgical Instruments
- Cutting Tools, e.g. Scissors, Doctor Blades
- Bone Cutters, Burrs
- Medical Screwdrivers
- Dental Instruments, e.g. Cutters, Burrs and Curettes

Weldability

Usually, Ergste® 1.4035YU is not used for welding. Due to the sulfur addition weldability decreases in comparison with Ergste® 1.4034YK.

Polishability

Ergste® 1.4035YU is polishable. Due to the sulfur content and the related sulfides it is conditionally high gloss polishable.

Magnetism

Ergste® 1.4035YU is magnetizable.

Cold Working

Ergste® 1.4035YU should be cold worked from the soft-annealed condition.

Machining

Best results can be achieved in the soft-annealed and redrawn condition.

* Maximum hardness achievable under ideal hardening conditions

Corresponding Standards

- 1.4035 (X46CrS13) acc. to DIN EN 10088-3
- ~ AISI 420C (+S)

Typical Chemical Composition *

C	Si	Mn	Cr	P	S
0.46	0.50	1.00	13.50	0.02	0.25

* Average in mass-%

Mechanical Properties (Soft-Annealed)

Tensile Strength TS	[ksi]	87.0 – 108.8
Yield Strength YS	[ksi]	min. 65.3
Elongation A5	[%]	min. 20
Hardness HB		max. 245
Structure		Ferrite + Carbides + Sulfides

Mechanical Properties (Cold-Worked)

Tensile Strength TS	[ksi]	116.0 – 159.5
Yield Strength YS	[ksi]	max. 116.0

Physical Properties

Modulus of Elasticity E 70 °F	[ksi]	31,183
Specific Density	[lb/in³]	0.28
Thermal Conductivity 70 °F	[Btu in/hr ft² °F]	208.0
Coefficient of Thermal Expansion	[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 70 °F	[Btu/lb °F]	0.11
Electric Resistivity 70 °F	[Ω circular-mil/ft]	330.8

Hot Working
Forging temperature is 1,470 – 2,010 °F:
Heat slowly and gradually to approx. 1,470 °F. Afterwards heat up rapidly to the required forging temperature. Cool slowly after forging (e.g. in furnace).

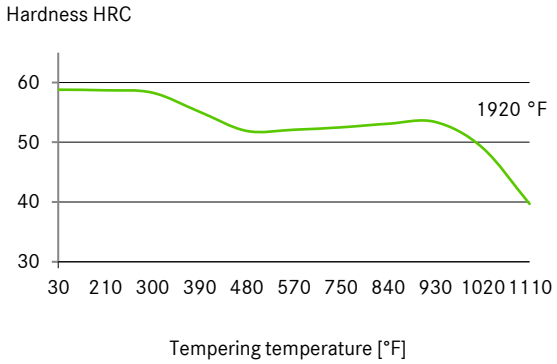
Heat Treatment

Soft-Annealing
Temperature: 1,380 – 1,560 °F
Holding time: 2-6 h
Cooling: furnace, air

Hardening
Temperature: 1,875 – 1,965 °F
Holding time: approx. 0,5 h (depending on cross-section)
Cooling: oil
Hardened structure: martensite + carbides + sulfides

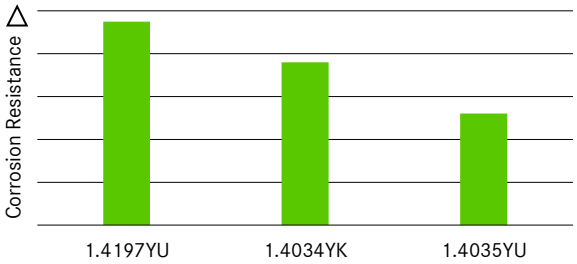
Tempering
Temperature: see tempering chart
Holding time: approx. 1 h (depending on cross-section)
Cooling: oil, air
Due to the 885 °F embrittlement tempering in this range should be avoided.

Tempering Chart



According to the required hardness and the actual dimension the hardening and tempering temperature have to be selected from the respective ranges.

Corrosion Resistance



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