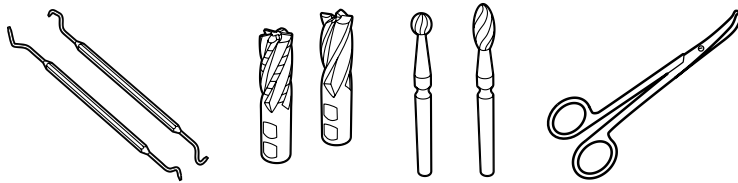


Zapp is Certified to ISO 9001



### Grade Ergste® 1.4034YK

Ergste® 1.4034YK is a martensitic stainless steel with 13 % chromium content. 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.

### 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® 1.4034YK is not used for welding. Limited weldability with arc welding. Parts should be heat treated after welding.

### Polishability

Ergste® 1.4034YK is high gloss polishable.

### Magnetism

Ergste® 1.4034YK is magnetizable.

### Cold Working

Ergste® 1.4034YK should be cold worked in 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

- 1.4034 (X46Cr13) acc. to DIN EN 10088-3
- 1.4034 (X46Cr13) acc. to NF S 94-090
- AISI 420C (UNS S42000) acc. to ASTM F899
- Reference letter D acc. to EN ISO 7153-1

### Typical Chemical Composition \*

C	Si	Mn	Cr	P	S
0.46	0.50	0.50	13.50	0.02	0.015

\* Average in mass-%

### Mechanical Properties (Soft-Annealed)

Tensile Strength TS	[ksi]	600 - 750
Yield Strength	[MPa]	min. 350
Elongation A5	[%]	min. 20
Hardness HB		max. 245
Structure		Ferrite + Carbides

### Mechanical Properties (Cold-Worked)

Tensile Strength TS	[MPa]	800 - 1,100
Yield Strength YS	[MPa]	max. 800

### Physical Properties

Modulus of Elasticity E 20°	[GPa]	215
Specific Gravity	[kg/dm³]	7.7
Thermal Conductivity 20°C	[W/m*K]	30.0
Mean Coefficient of Thermal Expansion	[10 <sup>-6</sup> 1/K]	
20 - 100 °C		10.5
20 - 200 °C		11.0
20 - 300 °C		11.5
20 - 400 °C		12.0
20 - 500 °C		12.0
Specific Heat 20°C	[kJ/kg*K]	0.46
Electrical Resistivity 20°C	[Ω*mm²/m]	0.55

### Hot Working

Forging temperature is 800-1,100 °C (1,470 – 2,010 °F): heat slowly up to approx. 800 °C (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: 750 – 850 °C (1,380 – 1,560 °F)  
Holding time: 2 - 6 h  
Cooling : furnace, air

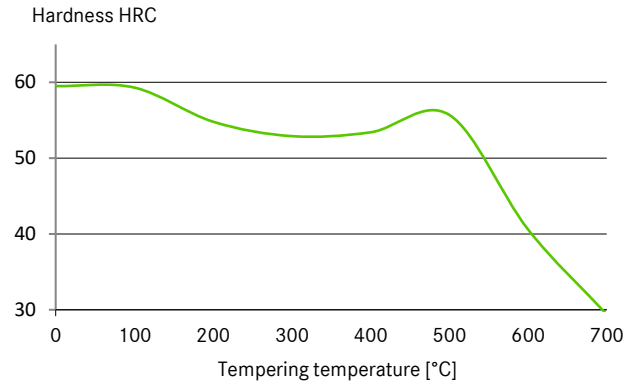
#### Hardening

Temperature: 1,000 – 1,050 °C (1,830 – 1,920 °F)  
Holding time: approx. 0,5 h (depends on cross-section)  
Cooling: oil  
Hardened structure: martensite + carbides

#### Tempering

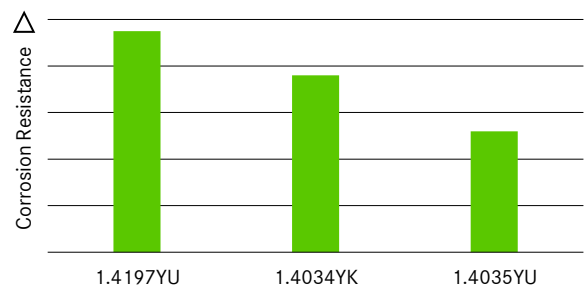
Temperature: see tempering chart  
Holding time: approx. 1 h (depends on cross-section)  
Cooling: oil, air  
Due to the 475 °C (855 °F) embrittlement tempering in this range should be avoided.

### 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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Further information regarding our products and locations are available in our image brochure and under [www.zapp.com](http://www.zapp.com)

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