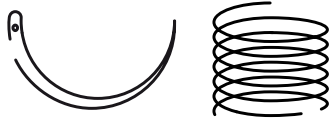


Zapp certified acc. to ISO 9001



#### Material Zapp® 1.4031 YC

Zapp® 1.4031 YC is a martensitic stainless chromium steel that is corrosion resistant to water and steam. This requires the hardened and low tempered state and a shiny, polished surface preference. Due to a higher carbon content, Zapp® 1.4031 YC can achieve a higher hardness than Zapp® 1.4021 YB.

#### Typical Applications

– Surgical needle wire (hardenable)

#### Polishability

Zapp® 1.4031 YC enables best mirror finish after polishing.

#### Weldability

Generally, welding is not recommended.

#### Machinability

Machining conditions of Zapp® 1.4031 YC can be equated with unalloyed mild steel.

#### Magnetism

Zapp® 1.4031 YC is magnetizable.

#### Hot Working

Forging at 2,012 – 1,472 °F, slow cooling.

#### Corrosion Resistance

Due to its chromium content, Zapp® 1.4031 YC has good corrosion resistance in moderately aggressive, non-chlorine-containing media, such as soaps, solvents and organic acids.

#### Corresponding Standards

DIN EN 10088-3 (X20Cr13)

ASTM F899 AISI 420X (UNS S42000)

#### Chemical Composition \*

| C    | Si   | Mn   | P     | S     | Cr    |
|------|------|------|-------|-------|-------|
| 0.40 | 0.40 | 0.50 | 0.020 | 0.020 | 13.20 |

\* Average in mass -%

#### Product Conditions\*

|                                |               |           |
|--------------------------------|---------------|-----------|
| Wire, drawn<br>(Coils, Spools) | Tensile [ksi] | 102 - 131 |
|--------------------------------|---------------|-----------|

\* Other conditions on request

#### Physical Properties

|                                                                                                                                                 |                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Modulus of Elasticity at 68 °F [ksi]                                                                                                            | 31,183                               |
| Specific Gravity $\rho$ [lb/in³]                                                                                                                | 0.278                                |
| Thermal Conductivity $\lambda$ at 68°F<br>[Btu in/hr ft² °F]                                                                                    | 208                                  |
| Coefficient of Thermal Expansion $\alpha$ [ $10^{-6} \cdot K^{-1}$ ]<br>68 – 212 °F<br>68 – 392 °F<br>68 – 572 °F<br>68 – 752 °F<br>68 – 932 °F | 5.83<br>6.11<br>6.39<br>6.66<br>6.66 |
| Specific Heat at 68 °F [Btu/lb °F]                                                                                                              | 110                                  |
| Electric Resistivity $\rho$ at 68 °F<br>[ $\Omega$ circular-mil/ft]                                                                             | 331                                  |

## Heat Treatment

### Soft Annealing

Temperature: 1,373 – 1,517 °F

Cooling: Air

### Hardening

Temperature: 1,742 – 1,922 °F

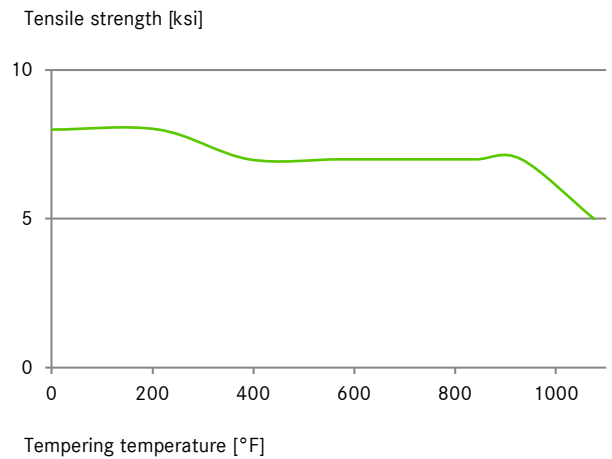
Cooling: Oil, air

### Tempering

Temperature I: 1,202 – 1,382 °F

Temperature II: 1,112 – 1,292 °F

## Tempering Chart



## MEDICAL ALLOYS

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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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Last revision: June 2026