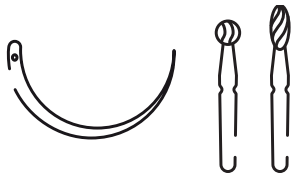


Zapp® 1.4543 GG Datasheet

Medical Alloys



Zapp is certified according to ISO 9001



Grade Zapp® 1.4543 GG

Zapp® 1.4543 GG is a precipitation hardenable 12% chromium-nickel-steel with high corrosion resistance and notched impact strength.

In the solution-annealed condition this alloy is relatively soft and therefore well formable.

In conducting an appropriate heat treatment, a maximum hardness of 48 HRC* can be achieved.

The best corrosion resistance will be achieved in the hardened condition with a metallic bright surface.

Typical Fields of Application

- Surgical instruments, e. g. burrs
- Cutting tools, e. g. rasps
- Surgical needles
- Stylets

Polishability

Zapp® 1.4543 GG is polishable.

Magnetism

Zapp® 1.4543 GG is magnetizable.

Weldability

Zapp® 1.4543 GG shows good weldability with the shielded fusion and resistance welding processes.

Preheating is not necessary.

For most applications best results are achieved in the solution-annealed condition.

Oxyacetylene welding should be avoided, as carbon carburization in the weld may occur.

Cold Working

For massive cold working please order the solution annealed condition (Condition A).

Corresponding Standards

- 1.4543 (X3CrNiCuTiNb12-9) acc. to NF S 94-090
- XM-16 (UNS S45500) acc. to ASTM F899 and A564

Typical Chemical Composition*

C	Mn	Cr	Ni	Cu	Ti	Mo	Nb
0.015	0.25	11.75	8.50	2.00	1.25	0.25	0.30

* Average in mass-%

Mechanical Properties Acc. to ASTM A564 / A564M

Condition	Tensile Strength TS [MPa]	Yield Strength YS [MPa]	Elongation [%]	Reduction of Area [%]	Hardness HRC/HB
A	-	-	-	-	≤ 36 / 331
H900	≥ 1,620	≥ 1,515	≥ 8	≥ 30	≥ 47 / 444
H950	≥ 1,015	≥ 1,415	≥ 10	≥ 40	≥ 44 / 415
H1000	≥ 1,415	≥ 1,275	≥ 10	≥ 40	≥ 40 / 363

Physical Properties

Modulus of Elasticity E 20°C	[GPa]	200
Specific Gravity	[kg/dm³]	7.76
Thermal Conductivity 20°C	[W/m K]	18.0
Mean Coefficient of Thermal Expansion	[10 ⁻⁶ /K ⁻¹]	
20 - 100 °C		10.6
20 - 200 °C		10.9
20 - 300 °C		11.2
20 - 400 °C		11.6
20 - 500 °C		12.0
Specific Heat 20°C	[kJ/kg K]	0.46
Electric Resistivity 20°C	[Ω mm²/m]	0.76

* Maximum hardness achievable under ideal hardening conditions

Hot Working

Forging temperature is 900 – 1,250 °C

(1,650 – 2,280 °F).

Heat slowly and gradually to approx. 1,100 ± 50 °C

(2,000 ± 100 °F). Hold temperature during forging.

With a finishing temperature of 820 - 930 °C

(1,500 – 1,700 °F), optimum grain size and properties can be achieved after heat treating.

Cool slowly to room temperature after forging

(e.g. in air).

Heat Treatment

Solution Annealing

Temperature: 830 ± 15 °C (1,025 ± 25 °F)

Cooling: furnace, air

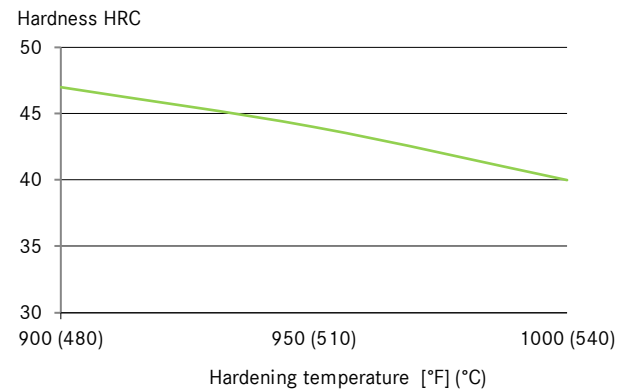
Precipitation Hardening

Temperature: 480 - 540 °C (900 – 1,000 °F)

Holding time: approx. 4 h (depending on cross-section)

Cooling: air

Hardening Chart



Corrosion Resistance

Corrosion resistance is comparable to austenitic grades (e. g. 1.4301); in some cases, due to the high copper content even better.

Zapp® 1.4543 GG shows a good corrosion resistance in normal air atmosphere and no corrosion in fresh water.

MEDICAL ALLOYS

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

The illustrations, drawings, dimensional and weight data and other information included in this data sheet are intended only for the purposes of describing our products and represent non-binding average values. They do not constitute quality data, nor can they be used as the basis for any guarantee of quality or durability. The applications presented serve only as illustrations and can be construed neither as quality data nor as a guarantee in relation to the suitability of the material. This cannot substitute for comprehensive consultation on the selection of our products and on their use in a specific application.

The brochure is not subject to change control.

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