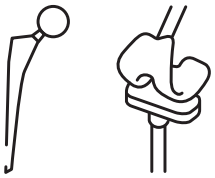
9.9135, CoCrMo, ASTM F1537
Implant Material - Data Sheet US

Zapp is certified to ISO 9001



Material 9.9135 – Surgical Steel

Material Ergiloy® 9.9135 HL is a cobalt-chromium-molybdenum (Co-Cr-Mo) alloy. It is characterized by a high biocompatibility and corrosion resistance.

The material shows wear resistance and highest hardness. Due to vacuum melting an outstanding slag cleanliness is achieved.

Typical Fields of Application

- Endoprosthetics (hip and joint prosthesis)
- Osteosynthesis
- Dental applications

Information about further medical applications at Zapp.

Polishability

Ergiloy® 9.9135 HL is high gloss polishable.

Magnetism

Ergiloy® 9.9135 HL is not-magnetizable.

Corrosion Resistance

The high molybdenum content leads to a fast regeneration of the passive layer on the steel surface. Therefore, the material has a high corrosion resistance, e.g. against seawater.

Wear Resistance

Ergiloy® 9.9135 HL has a high wear resistance. This property mostly remains at high temperatures

Machining

Due to the high chromium content Ergiloy® 9.9135 HL machining is demanding. Therefore, it needs adapted tools and respective machining parameters.

Corresponding Standards

- According to DIN EN ISO 5832-12
- According to ASTM F1537
- According to UNS R31537

Typical Chemical Analysis [Mass- %]

	C	Si	Mn	Cr	Mo	Fe
Min.	-	-	-	26.0	5.0	-
Max.	0.14	1.0	1.0	30.0	7.0	0.75

	Co	N	Ni
Min.	-	-	-
Max.	bal.	0.25	1.0

Mechanical Properties

Condition	Tensile strength Rm [MPa]	Yield strength $Rp_{0,2}$ [MPa]	Elongation A [%]	Hardness [HRC]
Annealed	> 897	> 517	> 20	~ 25
Hot-worked	> 1,000	> 700	> 12	~ 28
Warm worked	> 1,172	> 827	> 12	~ 35

Physical Properties

Modulus of Elasticity E at 20° C	[GPa]	241
Density ρ	[kg/ dm³]	8.3
Thermal Conductivity λ at 20 °C	[W/ m*K]	13.0
Coefficient of Thermal Expansion α	[10^{-6} *K^{-1}]	
20 – 100 °C		13.2
20 – 200 °C		13.3
20 – 300 °C		13.5
20 – 400 °C		13.8
20 – 500 °C		14.0
Specific Heat at 20 °C	[J/kg*K]	450

Information about further implant steel at Zapp.

Heat Treatment
Solution Annealing:
Temperature: 1,075 – 1,150 °C
Holding Time: 30 Min.
Cooling: Air

Please see our linecard of implant steels.

Zapp Precision Metals GmbH
MEDICAL ALLOYS
Letmather Straße 69
58239 Schwerte
Phone +49 2304 79-7259
Fax +49 2304 79-67259
medicalalloys@zapp.com
www.zapp.com

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

Last revision: July 2022