

CobaltChrome MPI : for medical devices and high-temperature applications

CobaltChrome MPI produces parts in a cobalt-chrome-molybdenumbased superalloy. This class of superalloy is characterized by having excellent mechanical properties (strength, hardness etc.), corrosion resistance and temperature resistance. Such alloys are commonly used in biomedical applications (note: widely used in Europe but much less so in North America), and also for high-temperature engineering applications such as in aero engines.

Properties and Applications

- High strength, temperature and corrosion-resistance. Mechanical properties improve with increased temperature up to 500-600 °C. Chemistry conforms to the composition UNS R31538 of high carbon CoCrMo alloy. Nickel-free (< 0.1 % nickel content). Fulfils the mechanical and chemical specifications of ISO 5832-4 and ASTM F75 for cast CoCrMo implant alloys.
- High-temperature engineering applications, e.g. turbines, medical devices.



Mechanical properties (at 20 °C)		
	As built	After heat treatment
Ultimate tensile strength	1200 ± 150 MPa 174 ± 22 ksi	1100 ± 100 MPa 160 ± 15 ksi
Yield strength (Rp 0.2 %)	800 ± 100 MPa 116 ± 15 ksi	600 ± 50 MPa 87 ± 7 ksi
Elongation at break	min. 8 %	min. 20 %
Young's modulus	190 ± 20 GPa 28 ± 3 Msi	200 ± 20 GPa 29 ± 3 Msi
Fatigue life	> 10 million cycles	
Hardness	35 - 45 HRC	

Physical properties	
Relative density	approx. 100 %
Density	8.3 g/cm ³ 2.16 lb/in ³
Coefficient of thermal expansion, as built	
- over 20 – 500 °C (36 - 900 °F)	13.6 x 10 ⁻⁶ (m/m°C) 7.6 x 10 ⁻⁶ in/in °F
Thermal conductivity, as built	
- at 20 °C (36 °F)	13 W/m°C 90 Btu/(h ft ² °F/in)
- at 1000 °C (1800 °F)	33 W/m°C 229 Btu/(h ft ² °F/in)
Maximum operating temperature	1150 °C
	2100 °F
Melting range	1350 - 1430 °C 2460 - 2600 °F

NOTE: EOS GmbH e-Manufacturing Solutions
Detailed specifications may be found at <http://www.eos.info/en/products/materials.html>