

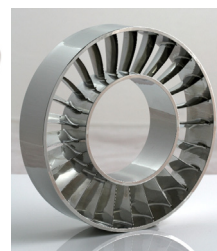
Material Specification

Cobalt Chrome Alloy Co28Cr6Mo

Building Success
Layer by Layer™



Application: Co28Cr6Mo is a cobalt-chrome-molybdenum-based superalloy. This class of superalloy is characterized by having excellent mechanical properties (strength, hardness etc.), corrosion and temperature resistance. Such alloys are commonly used in biomedical applications such as dental and medical implants and also for high-temperature engineering applications such as in aero engines.



The chemistry of Co28Cr6Mo conforms to the composition UNS R31538 of high carbon CoCrMo alloy. Parts built from this material are nickel-free (< 0.1% nickel content), sterilisable and suitable for biomedical applications, and are characterised by a fine, uniform crystal grain structure. They fully meet the requirements of ISO 5832-4 and ASTM F75 for cast CoCrMo implant alloys, as well as the requirements of ISO 5832-12 and ASTM F1537 for wrought CoCrMo implants alloys except remaining elongation. The remaining elongation can be increased to fulfill even this standard by hot isostatic pressing (HIP). This material is ideal for many applications such as functional metal prototypes, small series products, individualised products or spare parts. Parts can be machined, spark-eroded, welded, micro shot-peened, polished and coated if required.

Typical applications:

- Biomedical implants, e.g. spinal, knee, hip bone, toe etc.
- Parts requiring high mechanical properties in elevated temperatures (500-1000 °C) and with good corrosion resistance, e.g. turbines, parts for engines
- Parts having very small features such as thin walls, pins, etc., which require particularly high strength and/or stiffness

Physical and Chemical Properties:			
Relative Density with Standard Parameters		approx. 100% (8.3 g/cm ³)	
Material composition	Co	60-65 wt%	Si ≤ 1.0 w%
	Cr	26-30 wt%	Mn ≤ 1.0 wt%
	Mo	5-7 wt%	Fe ≤ 0.75 wt%
			C ≤ 0.16 wt%
			Ni ≤ 0.10 wt%
Mechanical Properties:			
		After standard heat treatment cycle CC28_6_C	
Tensile Strength	- horizontal direction (XY)	typ. 1100 ± 100 MPa	
	- vertical direction (Z)	typ. 1100 ± 100 MPa	
Yield strength (Rp 0.2%)	- horizontal direction (XY)	typ. 600 ± 50 MPa	
	- vertical direction (Z)	typ. 600 ± 50 MPa	
Elongation at break	- horizontal direction (XY)	typ. min 20%	
	- vertical direction (Z)	typ. min 20%	
Modulus of elasticity	- horizontal direction (XY)	typ. 200 ± 20 GPa	
	- vertical direction (Z)	typ. 200 ± 20 GPa	
Fatigue life	- max. stress to reach 10 million cycles	typ. 560 MPa	
	- max. stress to reach 1 million cycles	typ. 660 MPa	
Hardness		typ. 35 - 45 HRC	
Thermal Properties:			
		As built	
Coefficient of Thermal Expansion	over 20-500°C	typ. 13.6 x 10 ⁻⁶ m/m°C	
	over 500-1000°C	typ. 15.1 x 10 ⁻⁶ m/m°C	
Thermal conductivity	at 20°C	typ. 13 W/m°C	at 500°C
	at 300°C	typ. 18 W/m°C	at 1000°C
			typ. 22 W/m°C
			typ. 33 W/m°C
Maximum operating temperature	approx. 1150°C		
Melting range	typ. 1350-1430°C		

For further technical information or to obtain a quotation for your parts, please contact us on +44 (0)1635 580284 or email your 3D CAD data to enquiries@3trpd.co.uk

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