



Material Data Sheet: EOS Cobalt Chrome MP1

Properties: 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 such as dental and medical implants and also for high-temperature engineering applications such as in aero engines.

Physical and chemical properties of laser-sintered parts

Material composition	Co (60-65 wt-%), Cr (26-30 wt-%), Mo (5-7 wt-%), Si, Mn, Fe (each ≤ 1 wt-%), Ni max. 0.1 %
Relative density with standard parameters	approx. 100 %
Density with standard parameters	8.29 g/cm ³ 0.300 lb/cu. inch

Mechanical properties of laser-sintered parts at 20 °C

Ultimate tensile strength (MPIF 10)	
- in horizontal direction (XY)	1400 MPa, ± 40 MPa 203 ksi, ± 6 ksi
- in vertical direction (Z)	1150 MPa, ± 50 MPa 167 ksi, ± 7 ksi
Yield strength (Rp 0.2%)	
- in horizontal direction (XY)	980 MPa, ± 30 MPa 142 ksi, ± 4 ksi
- in vertical direction (Z)	880 MPa, ± 40 MPa 128 ksi, ± 6 ksi
Elongation at break	
- in horizontal direction (XY)	10 %, ± 2%
- in vertical direction (Z)	9 %, ± 1%
- after hot isostatic pressing (HIP)	21-24 %
Young's Modulus	
- in horizontal direction (XY)	210 GPa, ± 10 GPa 30 msi, ± 1.5 msi
- in vertical direction (Z)	200 GPa, ± 20 GPa 29 msi, ± 3 msi

Hardness (DIN EN ISO 6508-1)	40 - 45 HRC
Surface roughness (μm)	
- as laser-sintered	approx. R_a 10 μm , R_z 40-50 μm R_a 0.39, R_z 1.6-2.0 mil
- after polishing	R_z up to < 1 μm < 0.04 mil

Thermal properties of laser-sintered parts

Coefficient of thermal expansion (20-500 °C)	11.5 x 10 ⁻⁶ m/m°C 11.5 x 10 ⁻⁶ in./in.°C
Coefficient of thermal expansion (500-1000 °C)	12.5 x 10 ⁻⁶ m/m°C 12.5 x 10 ⁻⁶ in./in.°C
Thermal conductivity (at 20 °C)	11 W/mK 76 Btu/(h.ft ² .°F/in)
Thermal conductivity (at 300 °C)	16 W/mK 111 Btu/(h.ft ² .°F/in)
Thermal conductivity (at 500 °C)	20 W/mK 139 Btu/(h.ft ² .°F/in)
Maximum operating temperature	1150 °C 2100 °F