



# Cobalt Chrome

## DIRECT METAL LASER MELTING MATERIAL SPECIFICATIONS

### Highlights

- High tensile strength and hardness, biocompatible, corrosion and wear resistance, and low ductility.

### Applications

- Applications would include medical devices/implants, turbine engines, industrial/mechanical components, and oil and gas.

## TYPICAL PHYSICAL PROPERTIES

MECHANICAL PROPERTIES	DMLM (AS BUILT)	STRESS RELIEVING @ 750°C FOR 1 HR & FIRING @ 880°C FOR 5 MIN
Ultimate tensile strength	Min.: 800 MPa, 116 ksi (typical: 1050 ± 100 MPa, 152 ± 15 ksi)	Min.: 900 MPa, 131 ksi (typical: 1100 ± 100 MPa, 160 ± 15 ksi)
Proof strength (Rp 0.2 %)	Min.: 600 MPa, 87 ksi (typical: 750 ± 80 MPa, 109 ± 12 ksi)	Min.: 700 MPa, 102 ksi (typical: 900 ± 80 MPa, 131 ± 12 ksi)
Elongation at break, A5	Min.: 10 % (typical: 14 % ± 2 %)	Min.: 2 % (typical: 10 % ± 2 %)
Young's Modulus	Min.: 170 GPa (typical: 200 ± 20 GPa)	Min.: 180 GPa (typical: 200 ± 10 GPa)
Hardness HV10	Min.: 320 HV (typical: 360 ± 20 HV)	Min.: 350 HV (typical: 420 ± 30 HV)
Coefficient of thermal expansion (25 - 500°C)	-	14.0 – 14.5 x 10 <sup>-6</sup> m/m°C 7.78 – 8.06 x 10 <sup>-6</sup> in/in°F
Coefficient of thermal expansion (20 - 600°C)	-	14.2 – 14.6 x 10 <sup>-6</sup> m/m°C 7.89 – 8.11 x 10 <sup>-6</sup> in/in°F
Melting interval	-	1380 - 1440°C, 2516 – 2624°F

## COBALT CHROME COMPOSITION

ELEMENT	TYPICAL PERCENTAGE
Cobalt (Co)	61.8 – 65.8 wt-%
Chromium (Cr)	23.7 – 25.7 wt-%
Molybdenum (Mo)	4.6 – 5.6 wt-%
Tungsten (W)	4.9 – 5.9 wt-%
Silicon (Si)	0.8 – 1.2 wt-%
Iron (Fe)	max. 0.50 wt-%
Manganese (Mn)	max. 0.10 wt-%

The information presented represents typical values intended for reference and comparison purposes only. It should not be used for design specifications or quality control purposes. End-use material performance can be impacted (+/-) by, but not limited to, part design, end-use conditions, test conditions, color etc. Actual values will vary with build conditions. Product specifications are subject to change without notice. \*Chemical analysis for specific lots available upon request.

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