

Introduction

PowderRange metal Additive Manufacturing powders from Carpenter Additive are developed with the needs of the busy AM facility in mind.

- ▶ Easy ordering
- ▶ Standard specifications
- ▶ 24-hour shipment
- ▶ Sold in easy-to-handle multiples of 10 kgs
- ▶ Easy repeat orders to optimize inventory management

This leaves you free to concentrate on the design and build of your AM parts, confident that PowderRange metal AM powders from Carpenter Additive will add reliability and consistency to your AM built parts.

Characteristics

PowderRange CCM is a cobalt-based alloy with a chromium of mass fraction up to 30% and molybdenum up to 7%. The material displays excellent wear resistance, a high level of corrosion resistance and excellent biocompatibility. CoCr also has a high melting point making it stable at high temperatures.

The composition of CCM powder meets the ASTM F75 standard for CoCrMo casting alloy for surgical implants. ASTM F75 specifically applies to cast material and as such, PowderRange CCM has a lower maximum allowable oxygen content to deliver the final processed material properties.

Applications

The excellent biocompatibility of PowderRange CCM combined with the corrosion and wear resistance make it ideal for use in the medical and dental implants industries, and its high temperature properties make it suitable for some aerospace applications.



For worldwide contact details please visit www.carpenteradditive.com

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Chemical composition

Element		Minimum wt%	Maximum wt%
Al	Aluminum		0.10
B	Boron		0.010
C	Carbon		0.16
Co	Cobalt	Balance	
Cr	Chromium	27.0	30.0
Fe	Iron		0.75
Mn	Manganese		1.00
Mo	Molybdenum	5.00	7.00
N	Nitrogen		0.25
Ni	Nickel		0.50
O	Oxygen		0.10
P	Phosphorus		0.020
S	Sulfur		0.010
Si	Silicon		1.00
Ti	Titanium		0.10
W	Tungsten		0.20

Particle size distribution – CT PowderRange CCM F

Size	Value	Method
-15 µm	5 Volume %	Laser Size Diffraction
+45 µm	3 Weight %	Sieve Analysis
D10	18-24 µm	Laser Size Diffraction
D50	32.5-34.4 µm	Laser Size Diffraction

Mechanical properties (indicative only)

Property		As built
Tensile Strength [1]	Horizontal Direction (XY)	1100 - 1350 MPa 161- 196 ksi
	Vertical Direction (Z)	1050 - 1250 MPa 152-181 ksi
Yield Strength [1]	Horizontal Direction (XY)	700 - 1000 MPa 102-145 ksi
	Vertical Direction (Z)	600 - 800 MPa 87-116 ksi
Young's Modulus [1]	Horizontal Direction (XY)	200 - 220 GPa 29-32 msi
	Vertical Direction (Z)	190 - 220 GPa 28-32 msi
Elongation [1]	Horizontal Direction (XY)	11 - 17 %
	Vertical Direction (Z)	20 - 25 %
Hardness [2]	390 - 420 HV0.5	
Coefficient of Thermal Expansion [3]	13 X 10 ⁻⁶ m/mK	
Thermal Conductivity [3]	13 - 15 W/mK	

1. Range encompasses as built and solution treated. Mechanical strength tested as per ISO 6892
 2. Range encompasses as built and solution treated. Hardness test in accordance with ASTM E384-11
 3. In the range of 20°C (68°F) to 100°C (212°F)
- Range of mechanical properties encompasses expected values across multiple machine platforms



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Ordering information

PowderRange CCM is available from stock and dispatched within 24 hours of receipt of order. Our PowderRange metal AM powders are sold in multiples of 10 kgs giving you the flexibility to order just the volume you need to maintain efficient material stock levels.

All our PowderRange materials are supplied with a full metal powder certification to Carpenter Additive's standard material specification, reporting size distribution, flow, chemistry and morphology.

Code	Description	Unit volumes
CT PowderRange CCM F	Flexible material developed to be suitable for a wide range of powder bed fusion machines and applications	10 kgs

Further information

To make an enquiry, please contact powderrange@carpenteradditive.com. Alternatively, call +44 (0)1928 240 530. You can visit us at www.carpenteradditive.com.