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Material Product Data Sheet
C300 Series Maraging Steel Powder for Additive Manufacturing

Powder Products:
MetcoAdd C300-A

1 Introduction

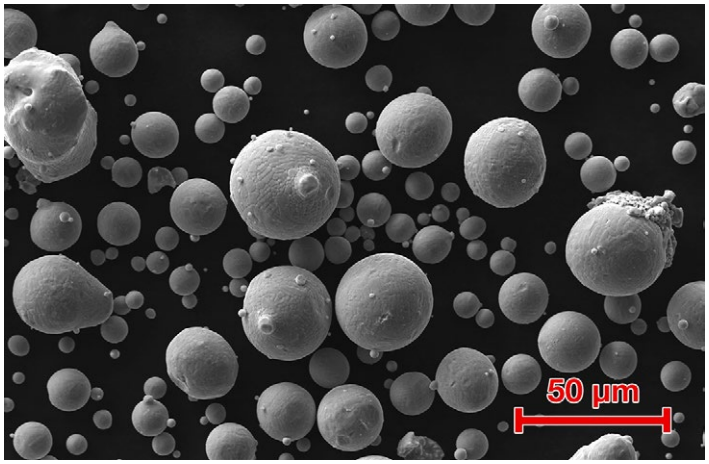
MetcoAdd™ C300-A is an FeNiCo-based powder similar to 18 Ni maraging steel (M300 type). The chemical composition is similar to that of AMS 6514, Werkstoff Nr. 1.2709 / X3NiCoMoTi 18-9-5 and UNS K93120. The material is optimized for producing additive manufactured components using Laser Powder Bed Fusion (PBF-LB).

Components manufactured using MetcoAdd C300-A and properly post-processing heat treatment exhibit ultra high strength in combination with toughness and resistance to cracking.

Room temperature static properties of PBF-LB processed and heat treated material coupons have been shown to be comparable to those of AMS 6514.

For reference purposes, Oerlikon has processed MetcoAdd C300-A using fixed parameters and 40 µm layer thickness to provide data in Section 3.1 of this document. Additional testing has been performed by an extensive network of consortia and customer partners on a broader range of machine types. Properties may be optimized based on application specific requirements.

Quick Facts	
Classification	Alloy, Fe-based
Chemistry	Fe 18Ni 9Co 5Mo 1Ti
Manufacture	Gas atomized (Argon)
Morphology	Spheroidal
Apparent Density	4 to 4.2 g/cm^3 (typical)
Solidus	1450 ± 10 °C (2641 ± 18 °F)
Liquidus	1490 ±10 °C (2691 ± 18 °F)
Purpose	Additive Manufacturing
Process	Laser Powder Bed Fusion (PBF-LB)



Typical morphology of MetcoAdd C300-A gas atomized powder for additive manufacturing.

1.1 Typical Uses and Applications:

- Tools and dies
- Plastic injection molds
- Light metal and pressure die casting
- Cold extrusion tooling

2 Material Information

2.1 Chemical Composition

Product	Weight Percent (nominal)					
	Fe	Ni	Co	Mo	Ti	C
MetcoAdd C300-A	Balance	17.0 – 19.0	8.0 – 10.0	4.5 – 5.5	0.8 – 1.2	< 0.03

2.2 Particle Size Distribution and Hall Flow

Product	Nominal Range [µm]	D90 [µm]	D50 [µm]	D10 [µm]	Hall Flow [s/50 g]
MetcoAdd C300-A	-45 +15	42 – 54	30 – 38	18 – 25	< 18

For the nominal range, particle size analysis 45 µm or above measured by sieve (ASTM B214), analysis below 45 µm by laser diffraction (ASTM C 1070, Microtrac). Fractional analysis (D90, D50, D10) are nominal values by laser diffraction. Hall flow (ASTM B213).

2.3 Key Selection Criteria

- MetcoAdd C300-A is designed for the manufacture of components using L-PBF and offers optimized spreadability and dense packing.
- MetcoAdd C300-A powder is stable and designed to prevent undesirable agglomeration during powder-bed fusion processing.
- Choose MetcoAdd C300-A for applications where very high strength, toughness and crack resistance is required.

2.4 Related Products

- Oerlikon Metco offers various stainless steels, tool steels as well as nickel-, titanium- and cobalt-based powders designed for additive manufacturing that have been optimized for either powder-fed or powder-bed processes. Please contact your Oerlikon Metco Account Representative for more information.
- In addition, should protective coatings be required for your application, we offer a wide range of thermal spray options. Your Oerlikon Metco Account Representative can provide you with further details.

2.5 Specifications

Product	Specifications (similar to)
MetcoAdd C300-A	UNS K93120 AMS 6514 Werkstoff Nr. 1.2709 / X3NiCoMoTi 18-9-5 M300 type steel

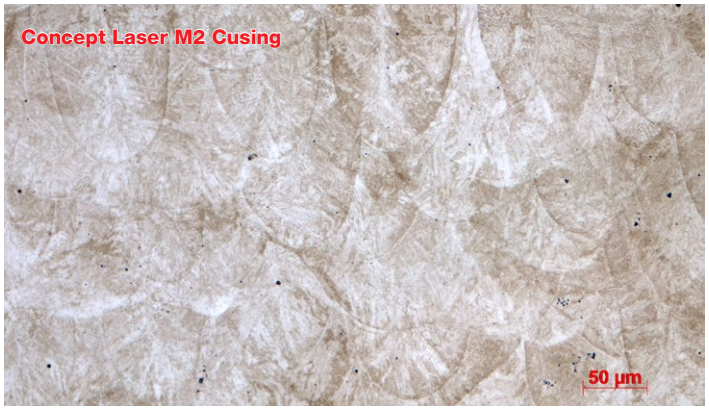
3 Key Processing Information

3.1 Typical Post Heat Treatment Properties (MetcoAdd C300-A) [a, b, c]

Specification		Concept Laser M2 Cusing	EOS M290
Ultimate Tensile Strength (MPa), XY/Z	ASTM E8	2064 ± 25 / 2104 ± 15	2050 ± 17 / 2027 ± 9
Yield Strength (MPa), XY/Z		1982 ± 30 / 2023 ± 15	1996 ± 18 / 1980 ± 7
Elongation at break %, XY/Z		5 ± 2 / 5 ± 3	9 ± 1 / 8 ± 1
Hardness (VHN_{300})	ASTM E384-17	594 ± 15	599 ± 10
Relative Density %	Internal Specification	> 99.9	> 99.8

[a] Disclaimer: All data published in this datasheet has been shared for reference purposes only and is not sufficient to design or certify parts. No warranty or guarantee is made against these results.
[b] Bounds are based on one standard deviation of each population with ten samples per orientation and machine. Test specimens were 6.35 mm (0.25 in) diameter round bars machined from coupons 75 x 75 x 13 mm (3 x 3 x 0.5 in). Direction XY data is an average of both X and Y horizontal build orientations.
[c] Age at 490 °C (914 °F) for 6 hours. Air cool.

3.2 Post Heat Treatment Microstructure, Vertical Build Direction (MetcoAdd C300-A)



3.3 Additive Manufacturing Services

Oerlikon AM is an excellent source for pilot and production run additive manufacturing services and is ready to serve your needs. Please contact your Oerlikon Metco account manager for more information or contact Oerlikon AM directly through their web site at www.oerlikon.com/am.

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
MetcoAdd C300-A	1099972	5 kg (approx. 11 lb)	Stock	Global

4.2 Handling Recommendations

- Blend contents prior to use to prevent segregation
- Keep in the original container, or an approved alternative, tightly closed when not in use
- Powder from previously opened containers should be stored in a humidity-controlled environment

4.3 Safety Recommendations

See the SDS 50-2105 (Safety Data Sheet) in the version localized for the country where the material will be used. SDS are available from the Oerlikon web site at www.oerlikon.com/metco (Resources – Safety Data Sheets).

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