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Material Product Data Sheet
Nickel – Chromium – Molybdenum Powder for Additive Manufacturing

Powder Products:
MetcoAdd 625A

1 Introduction

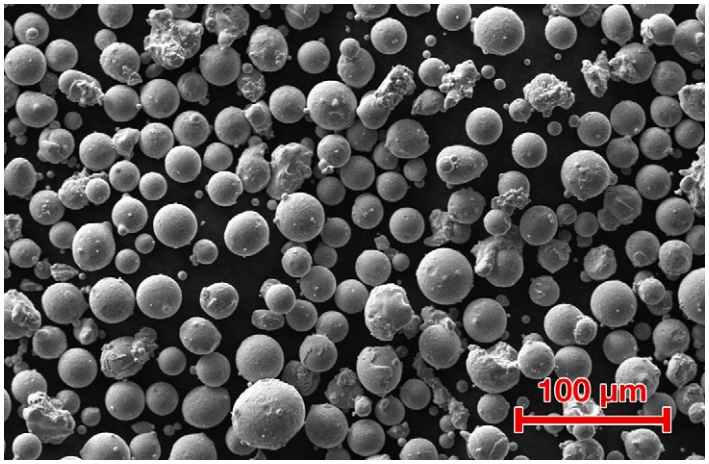
MetcoAdd™ 625A is a nickel-based superalloy powder product with chemistry similar to AMS 5666 and Inconel 625 bar material. The material is optimized for producing additive manufactured components using Laser Powder Bed Fusion (PBF-LB).

Components manufactured using MetcoAdd 625A and properly post-processing heat treatment exhibit resistance to oxidation and hot corrosion at elevated temperatures. Such components are resistant to a wide range of corrosive media and resist intercrystalline, pitting and crevice corrosion. When heated, components manufactured using MetcoAdd 625A may form a stable, passive film that provides further resistance to chemical attack.

Room temperature static properties of PBF-LB processed and heat treated material coupons have been shown to be comparable to those of AMS 5666.

For reference purposes, Oerlikon has processed MetcoAdd 625A 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, Ni-based
Chemistry	Ni 21Cr 9Mo 5Fe 4(Nb+Ta)
Manufacture	Gas atomized (Argon)
Morphology	Spheroidal
Apparent Density	4 to 5 g/cm^3 (typical)
Solidus	1270 ± 10 °C (2318 ± 18 °F)
Liquidus	1345 ±10 °C (2453 ± 18 °F)
Purpose	Additive Manufacturing
Process	Laser Powder Bed Fusion (PBF-LB)



Typical morphology of MetcoAdd 625A gas atomized powder for additive manufacturing.

1.1 Typical Uses and Applications:

- Aerospace: Engine components
- Power Generation: Gas turbine components
- Industrial: Various

2 Material Information

2.1 Chemical Composition

Product	Weight Percent (nominal)							
	Ni	Cr	Mo	Nb+Ta	Fe	Al	Ti	Other
MetcoAdd 625A	Balance	21	9	4	< 5	0.4	0.4	< 0.5

2.2 Particle Size Distribution and Hall Flow

Product	Nominal Range [µm]	D90 [µm]	D50 [µm]	D10 [µm]	Hall Flow [s/50 g]
MetcoAdd 625A	-45 +15	45	29	17	< 15

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 625A is designed for the manufacture of components using L-PBF and offers optimized spreadability and dense packing.
- MetcoAdd 625A powder is stable and designed to prevent undesirable agglomeration during powder-bed fusion processing.
- Choose MetcoAdd 625A for applications where resistance to hot corrosion and oxidation is required at elevated temperatures, or for other corrosive media.

2.4 Related Products

- Oerlikon Metco offers various stainless steel, nickel-based, cobalt-based and iron-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.
- Oerlikon Metco also offers other superalloy materials for applications where corrosion is a concern such as materials that are similar to Inconel 718 as well as titanium. Your Oerlikon Metco Account Representative can provide you with further details.

2.5 Specifications

Product	Specifications (similar to)
MetcoAdd 625A	UNS N06625 AMS 5666 Inconel 625

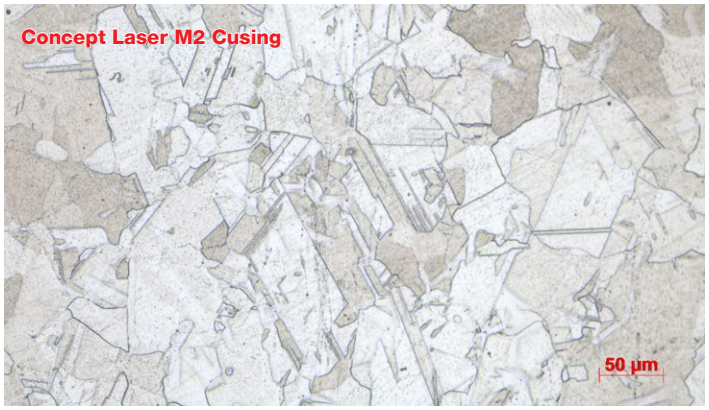
3 Key Processing Information

3.1 Typical Post Heat Treatment Properties (MetcoAdd 625A) [a, b, c]

Specification		Concept Laser M2 Cusing	EOS M290
Ultimate Tensile Strength (MPa), XY/Z	ASTM E8	926 ± 11 / 889 ± 5	914 ± 6 / 891 ± 3
Yield Strength (MPa), XY/Z		462 ± 3 / 445 ± 5	419 ± 9 / 409 ± 3
Elongation at break %, XY/Z		54 ± 1 / 60 ± 2	58 ± 1 / 61 ± 2
Hardness (VHN_{300})	ASTM E384-17	242 ± 13	226 ± 10
Relative Density %	Internal Specification	> 99.8	> 99.9

[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] Stress relieve at 1900°F (1038°C) for 1 hour and Rapid Air Cool (RAC).

3.2 Post Heat Treatment Microstructure, Vertical Build Direction (MetcoAdd 625A)



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 625A	1093343	10 lb (approx. 4.5 kg)	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 50-1983 (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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