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Material Product Data Sheet
Cobalt – Chromium – Molybdenum Alloy Powders for Additive Manufacturing

Powder Products:
MetcoAdd 75A, MetcoAdd 76A-1

1 Introduction

MetcoAdd™ 75A and MetcoAdd 76A-1 are cobalt-chromium-based, gas atomized alloy powders similar to ASTM F75, ISO 5832-4 and UNS R31538. They have been designed for use in laser powder bed fusion (LPBF) additive manufacturing processes..

The processes used to manufacture these materials are tightly controlled to ensure repeatable and consistent powder quality to ensure consistent printing performance when used with defined parameters and equipment.

Room temperature static properties of LPBF-processed and heat treated material coupons have been shown to be comparable to those of ASTM F75.

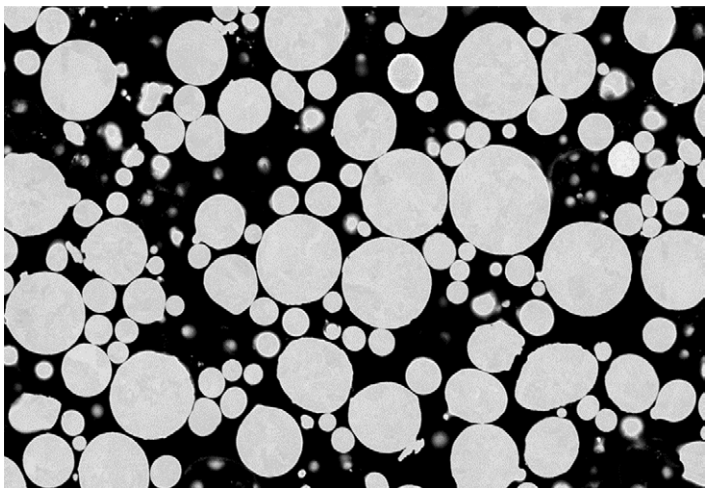
For reference purposes Oerlikon Metco has processed MetcoAdd 76A-1 using fixed parameters and 40 µm (0.0016 in) layer thickness to provide the typical as-built properties shown in Section 3 of this document. Additional testing has been performed by an extensive network of consortia and customer partners on a broader range of machine types. Properties may be optimized based on application specific requirements.

MetcoAdd 75A and MetcoAdd 76A-1 are proven in the market to produce dense parts with mechanical properties comparable or better than cast or wrought alloys.

1.1 Typical Uses and Applications:

- Aerospace: Gas turbine components
- Power Generation: Gas turbine components
- Medical: Orthopedic and dental implants
- Industrial: Various

Quick Facts	
Classification	Alloy, cobalt-based
Chemistry	CoCrMoC
Similar To	ASTM F75; ISO 5832-4; UNS R31538
Manufacture	Gas atomized (nitrogen)
Morphology	Spheroidal
Apparent Density	> 4.0 g/cm^3 (typical)
Solidus	1378.5 ± 10 °C (2513.3 ± 18 °F)
Liquidus	1419.2 ± 10 °C (2586.6 ± 18 °F)
Purpose	Additive Manufacturing
Process	Laser Powder Bed Fusion (LPBF)



Typical cross-section of MetcoAdd 75A gas-atomized powder.

2 Material Information

2.1 Chemical Composition

Product	Weight Percent (nominal)				
	Co	Cr	Mo	C	Other
MetcoAdd 75A	Balance	28	6	< 0.2	< 1.0
MetcoAdd 76A-1	Balance	29	6	< 0.12	≤ 0.1

2.2 Particle Size Distribution

Product	Nominal Range [µm]	D90 [µm]	D50 [µm]	D10 [µm]
MetcoAdd 75A	-45 +10	43	25	12
MetcoAdd 76A-1	-45 +15	51	33	19

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) by laser diffraction.

2.3 Key Selection Criteria

- MetcoAdd 75A and MetcoAdd 76A-1 have been engineered for the manufacture of gas turbine components using LPBF. The chemistries is optimized so that the required component mechanical properties can be obtained after post heat-treatment processing.
- MetcoAdd 75A and MetcoAdd 76A-1 are field-proven to repeatedly and reliably produce dense printed parts when used in powder bed manufacturing processes.

2.4 Related Products

- Oerlikon Metco offers other nickel-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 can produce powders with chemistries similar to MetcoAdd 75A and MetcoAdd 76A-1, but with particle size distributions optimized for powder fed additive manufacturing. Please contact us for more information.

2.5 Specifications

Product	Specification (similar to)
MetcoAdd 75A	ISO 5832-4 UNS R31538
MetcoAdd 76A-1	ISO 5832-4 UNS R31538

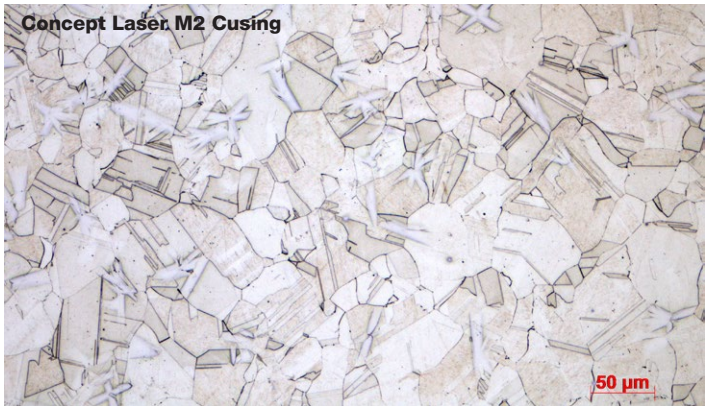
3 Key Processing Information

3.1 Typical Post Heat Treatment Properties (MetcoAdd 76A-1) [a, b, c]

Specification		Concept Laser M2 Cusing	EOS M290
Ultimate Tensile Strength (MPa), XY/Z	ASTM E8	1209 ±15 / 1206 ± 17	1225 ± 10 / 1215 ± 7
Yield Strength (MPa), XY/Z		598 ± 6 / 591 ± 7	604 ± 4 / 598 ± 2
Elongation at break %, XY/Z		41±3 / 44±3	42 ± 2 / 46 ± 3
Hardness (VHN_{300g})	ASTM E384-17	338 ± 16	339 ± 15
Relative Density %	Internal Spec.	> 99.9%	> 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 of 75 x 75 x 13 mm (3 x 3 x 0.5 in) coupons. Direction XY data is an average of both X and Y horizontal build orientations.
[c] Stress Relieve at 1150 °C (2100 °F) for 6 hr in vacuum and rapid air cooled (RAC).

3.2 Post Heat Treatment Microstructure, Vertical Build Direction (MetcoAdd 76A-1)



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 Orlikon 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 75A	1089475	10 lb (approx. 4.5 kg)	Stock	Global
MetcoAdd 76A-1	2353789	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 (Safety Data Sheet) 50-1881 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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