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Material Product Data Sheet
Cobalt Alloy H188 for Additive Manufacturing

Powder Products:
MetcoAdd H188-A

1 Introduction

MetcoAdd™ H188-A is a cobalt-based powder product with a chemistry similar to AMS 5772 bar stock and AMS 5608 sheet or plate material.

Room temperature static properties of Laser Powder Bed Fusion (PBF-LB) processed and heat treated material coupons have been shown to be comparable to those of AMS 5608.

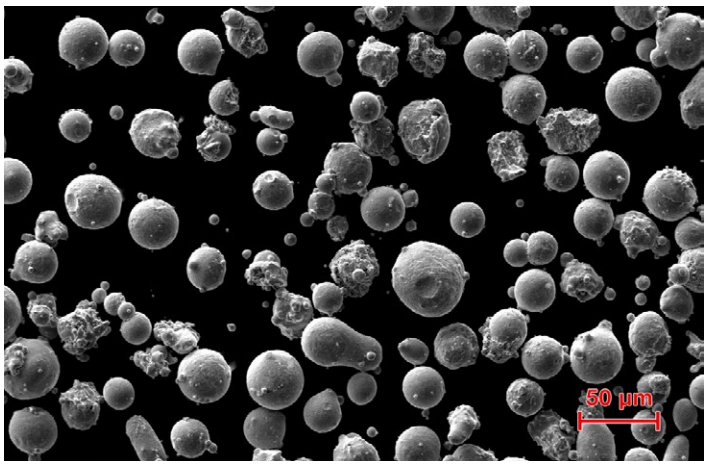
For reference purposes, Oerlikon Metco has processed MetcoAdd H188-A using a 20 µm layer thickness to provide data below. Properties such as horizontal elongation may be optimized based on application specific requirements if desired..

1.1 Typical Uses and Applications

Aerospace and power generation gas turbines:

- Transition ducts
- Combustion liners
- Spray bars
- Flame holders
- Other hot section components

Quick Facts	
Classification	Alloy, cobalt-based
Chemistry	Co 22Cr 22Nii 15.5W
Manufacture	Inert gas atomized (Argon)
Morphology	Spherical
Apparent Density	4 to 5 g/cm^3 (typical)
Process	Laser Powder Bed Fusion (PBF-LB)



Typical spherical morphology of MetcoAdd 188-A

2 Material Information

2.1 Chemical Composition

Product	Weight Percent (nominal unless noted)					
	Co	**Ni**	**Cr**	**W**	**Fe**	**Mn**
	Balance	22	22	14.5	3 max	1.25 max
MetcoAdd H188-A	**Si**	**La**	**C**	**P**	**Si**	**B**
	0.35	0.075	0.1	0.02 max	0.015 max	0.015 max

2.2 Particle Size Distribution and Hall Flow

Product	Nominal Range [µm]	D90 [µm]	D50 [µm]	D10 [µm]	Hall Flow (s/50 g)
MetcoAdd H188-A	-45 +15	49	32	20	< 20 (typical)

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, Hall flow by ASTM B213.

2.3 Key Selection Criteria

- Choose MetcoAdd H188-A when a high-temperature cobalt alloy is needed that has good oxidation resistance and retains its strength, fatigue-resistance and ductility even at higher service temperatures.
- MetcoAdd H188-A is recommended for continuous service temperatures up to 982 °C (1800 °F).
- MetcoAdd H188-A is designed to allow for high PBF-LB build rates where application and process permit.

2.4 Related Products

- Oerlikon Metco offers other cobalt-based powders, as well as 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 MetcoAdd H188-A in different particle size distributions on request for large volume users.

2.5 Specifications

Product	Specifications (similar to)
MetcoAdd H188-A	UNS R30188

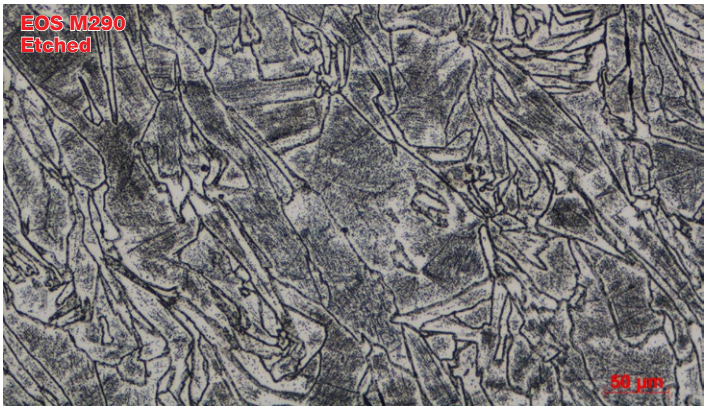
3 Key Processing Information

3.1 Typical Post Heat Treatment Properties (MetcoAdd H188-A) [a, b, c]

Specification		EOS M290
Ultimate Tensile Strength (MPa), XY/Z	ASTM E8	1081 ± 4 / 987 ± 3
Yield Strength (MPa), XY/Z		621 ± 4 / 588 ± 2
Elongation at break %, XY/Z		34 ± 3 / 46 ± 1
Hardness (HRB)	ASTM E18	293 ± 8
Relative Density %	ASTM E1245	> 998%

[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 seven to ten samples per orientation. Test specimens were 6.35 mm diameter round bars machined from coupons 130 x 130 x 13 mm (5 x 5 x 0.5 in). Direction XY data is an average of both X and Y horizontal build orientations.
[c] Heat treatment was performed in accordance with AMS 5772. Solutionize coupons at 2150°F (1177°C). Hold for 45 minutes. Rapid Air cool.

3.2 Post Heat Treatment Microstructure, Vertical Build Direction (MetcoAdd H188-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 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 H188-A	1300051	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 SDS 50-1993 (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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