

Material Product Data Sheet

99 % Nickel Powders for Thermal Spray

Thermal Spray Powder Products: Metco 56VC, Metco 56C-NS

1 Introduction

Metco™ 56VC and Metco 56C-NS are pure nickel powders that can be thermal sprayed to salvage and build up surfaces of worn or mis-machined nickel and nickel alloy parts. The produced coatings are hard, dense and readily machinable.

These products can be used instead of Monel for applications which require corrosion-resistant coatings that are slightly harder than Monel coatings, but with good machinability. They can be applied using either atmospheric plasma spray or combustion powder Thermospray™.

Metco 56VC is a coarser grade material of higher purity that can be used for speciality applications where a coarser particle size distribution is desired.

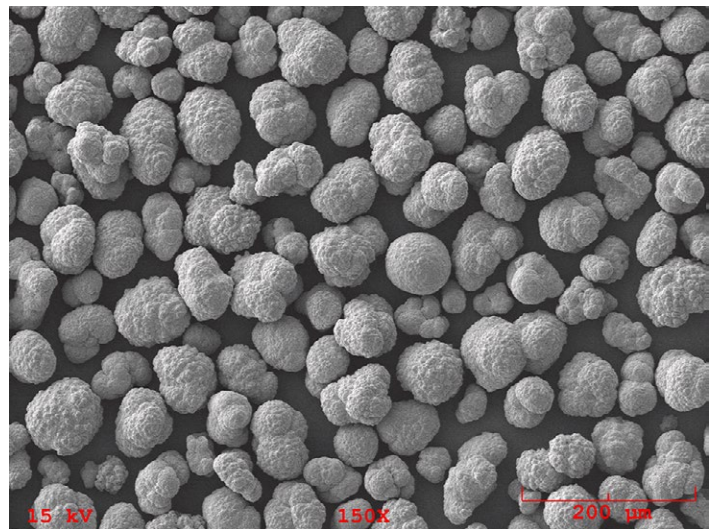
1.1 Typical Uses and Applications:

Typically used for:

- Salvage and buildup of worn or mis-machined components made of nickel or nickel alloys

Quick Facts

Classification	Powder, pure nickel
Chemistry	99.3%+ Ni (typical)
Manufacture	Precipitated
Morphology	Globular
Apparent Density	approx. 3.4 g/cm ³
Purpose	Salvage and restoration
Melting Point	1453 °C (2647 °F)
Process	Atmospheric Plasma Spray or Combustion Powder Thermospray™



SEM photomicrographs of Metco 56C-NS, showing morphology that is typical for these products.

2 Material Information

2.1 Chemical Composition, Particle Size Distribution and Manufacturing Method

Product	Chemical Composition (wt. %)	Nominal Particle Size Distribution (µm)	Manufacturing Method
	Ni (min)		
Metco 56VC	99.8	-150 +45	Precipitated
Metco 56C-NS	99.3	-75 +45	Precipitated

Particle size measured by sieve analysis.
Other particle sizes are available on request.

2.2 Key Selection Criteria

- These products produce coatings that bond well to nickel and nickel alloy substrates, and are readily machined with carbide tools.
- Choose Metco 56VC when a coarser particle size is desirable or the somewhat higher purity of the material will enhance coating properties for the application.
- Coatings applied using the combustion powder Thermo-spray™ process have very high deposition efficiencies that can exceed 90 % whereas plasma sprayed coatings are typically in the range of 65 % – 80 %.
- Always choose the material that meets the customer material and process specifications.

2.3 Related Products

- Other products can also be used for salvage and build-up of nickel-based alloys such as Diamalloy 1005, Diamalloy 1006, Amdry 1718 and Diamalloy 4004NS.
 - These products are applied using the HVOF spray process and have different coating properties from those of Metco 56C-NS. The HVOF coatings generally have higher bond strengths (>69 MPa / 10000 psi), high corrosion resistance and high temperature capability.
 - They are appropriate for use on superalloy components such as substrates of Inconel 625, 717, 718 and Rene 80. They should be used when higher service temperatures (≤ 800 °C / 1470 °F), better corrosion resistance and stronger coatings are required that cannot be achieved using pure nickel coatings.
- Amdry 1718 can be applied using liquid-fuel HVOF, gas-fuel HVOF or atmospheric plasma spray.

2.4 Customer Specifications

Product	Customer Specification
Metco 56C-NS	Rolls-Royce OMAT 3/144 Rolls-Royce plc MSRR 9513

3 Coating Information

3.1 Key Thermal Spray Coating Information

Specification		Atmospheric Plasma Spray	Combustion Powder Thermo-spray™
Macrohardness	HRB	60	45 – 50
Microhardness	HVO.1	125 – 170	125 – 150
Density	g/cm ³	7.2	7.2
Porosity	vol. %	< 1	< 1
Bond Strength	MPa	14 – 31	N.R.
	psi	2000 – 4500	N.R.
Recommended Machining		Easily machined using carbide tools, light cuts and high work speeds	

N.R. = Not Reported

Note: Coating data is given for Metco 56C-NS. While specific coating data is not available for Metco 56VC, many properties will be similar. However, coating density should be somewhat lower and porosity higher.

3.2 Coating Parameters

Please contact your Oerlikon Metco Account Representative for parameter availability. For specific coating application requirements, the services of Oerlikon Metco's Coating Solution Centers are available.

Recommended Spray Guns

Combustion Powder	Atmospheric Plasma
Metco 6P-II series	Metco 3MB series
Metco 5P-II	Metco 9MB series

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
Metco 56VC	1074921	25 kg (approx. 55 lb)	Special Order	Global
Metco 56C-NS	1000364	5 lb (approx. 2.25 kg)	Stock	Global

4.2 Handling Recommendations

- Store in the original container in a dry location.
- Tumble contents prior to use to prevent segregation.
- Open containers should be stored in a drying oven at temperatures below 38 °C (100 °F) to prevent moisture pickup.

4.3 Safety Recommendations

See SDS 50-120 (Safety Data Sheet) in the localized version applicable to 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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