

Material Product Data Sheet

8 % Ytria Stabilized Zirconia Fused and Crushed Thermal Spray Powders

Powder Products: Metco 214A

1 Introduction

Metco™ 214A is a fused and crushed 7.5 wt. % yttria-stabilized zirconia ($7.5Y_2O_3 ZrO_2$). Metco 214A is specifically designed for thermal barrier applications requiring dense or dense, segmented microstructures using atmospheric plasma spray technology.

The primary advantage of this material over conventional 7 % to 8 % YSZ, agglomerated and sintered or plasma densified, powders is that the individual particles are of homogeneous chemistry and have higher density. These characteristics help achieve sprayed coatings with very low porosity levels, improved erosion resistance and high inter-particle cohesion. Typical purity levels are also higher than many other 7 % to 8 % YSZ powders resulting in improved sintering properties, with coatings that are white in color. Metco 214A is designed to produce dense, segmented coating microstructures that are known to have high strain tolerances at the elevated temperatures realized during gas turbine engine operations.

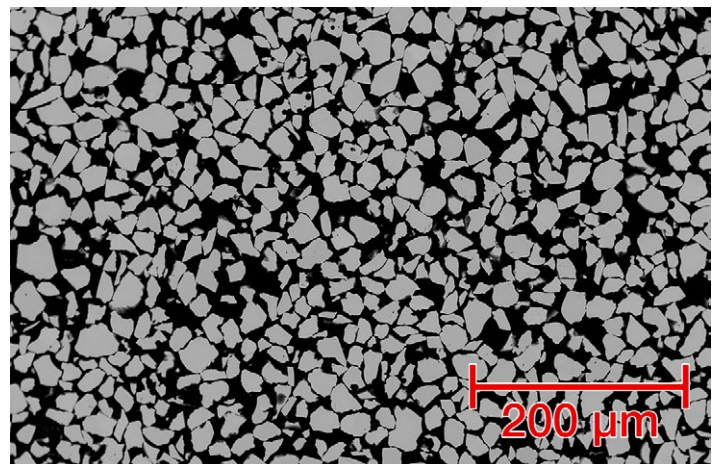
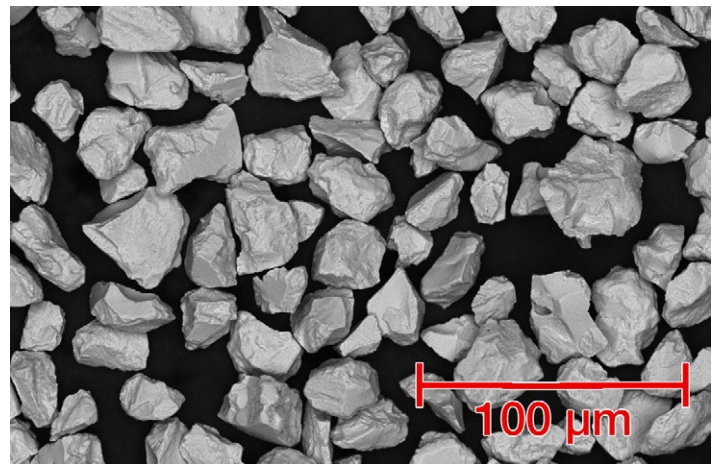
1.1 Typical Uses and Applications:

Hot section components of gas turbines, such as:

- Turbine blades and vanes
- Combustion section components
- Transition liners
- Augmenters

Quick Facts

Classification	Ceramic, zirconia-based
Chemical Formula	$ZrO_2 7.5Y_2O_3$
Manufacture	Fused and crushed
Morphology	Irregular
Apparent Density	2.3 to 2.9 g/cm ³
Melting Point (typical)	2700 °C (5072 °F)
Purpose	Thermal insulation
Process	Atmospheric plasma spray



Metco 214A morphology. Top: outer morphology. Bottom: inner morphology showing dense structure.

2 Material Information

2.1 Chemical Composition

Product	Weight Percent (typical)									Monoclinic ZrO ₂ (vol. % max)
	ZrO ₂	HfO ₂ (max)	Y ₂ O ₃	Al ₂ O ₃ (max)	SiO ₂ (max)	Fe ₂ O ₃ (max)	TiO ₂ (max)	Other Oxides (max)	U + Th (max)	
Metco 214A	Balance	2.5	7 – 8	1.0	1.0	0.5	0.5	1.0	0.1	< 6

2.2 Particle Size Distribution and other physical characteristics

Product	Nominal Particle Size Distribution (µm)	D90 (µm)	D50 (µm)	D10 (µm)	Color
Metco 214A	-45 +11 µm	36 – 45	20 – 30	10 – 20	White

Particle size analysis via laser diffraction (Microtrac) in accordance with ASTM B822.

2.3 Key Selection Criteria

- Choose Metco 214A for applications where high temperature insulation (thermal barrier) coating is needed. Also select this powder when the application calls for:
 - Dense TBC coatings with a segmented structure
 - Dense TBC coatings where improved erosion resistance is needed
 - A material for TBC coatings that has a high deposition efficiency for application cost savings
 - TBC coating thickness up to 1 mm (0.40 in)

2.4 Related Products

- Choose agglomerated and plasma-densified Metco 204C-NS or agglomerated and sintered Metco 233A or Metco 233C to produce high porosity TBC coatings.
- Choose agglomerated and plasma-densified Metco 204NS-G Premium or Metco 204C Premium when a high purity premium material is needed that produces coatings with improved sintering resistance.
- Products such as Amdry 204NS, Metco 204NS and Metco 204NS-G are approved for and certified to meet numerous IGT and aerospace OEM specifications.

- Agglomerated and plasma-densified Metco 204F and agglomerated and sintered Metco 233B materials can be considered when a dense thermal barrier coating of lower purity is sufficient. These materials produce coatings that are yellow to off-white in color
- Oerlikon Metco has a large portfolio of thermal barrier ceramic materials that are:
 - Produced using a variety of manufacturing techniques
 - Available in different particle size distributions
 - Manufactured in different chemical compositions, including complex, rare-earth chemistries
 Please contact your Oerlikon Metco Account Representative for more information.
- In addition, Oerlikon Metco manufactures and markets a full portfolio of standard and proprietary MCrAlY bond coat materials for thermal barrier systems. Ask your Oerlikon Metco Account Representative for more information.

2.5 Recommended Spray Processes

Product	Atmospheric Plasma Spray
Metco 214A	✓

3 Coating Information

3.1 Coating Parameters

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

3.2 Key Thermal Spray Coating Information

Recommended Atmospheric Plasma Spray Guns	
Standard Microstructures	Dense Segmented Microstructures
TriplexPro series	TriplexPro series
SinplexPro series	SinplexPro series
F4MB-XL series	
9MB series	

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
Metco 214A	1302469	5 kg (approx. 11 lb)	Stock	Global

4.2 Handling Recommendations

- Store in the original container in a dry location.
- Tumble contents gently prior to use to prevent segregation.
- Open containers should be stored in a drying oven to prevent moisture pickup.

4.3 Safety Recommendations

See SDS 50-2300 (Safety Data Sheet) in the localized version applicable to the product and 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).