

## Material Product Data Sheet

### High Yttria Percentage Stabilized Zirconia Agglomerated and Plasma-Densified Thermal Spray Powders

#### Thermal Spray Powder Products: Metco 207, Metco 208

##### 1 Introduction

Metco™ 207 and Metco 208 are yttrium-stabilized zirconium oxide materials with a high yttria content, manufactured by agglomeration and subsequent plasma densification.

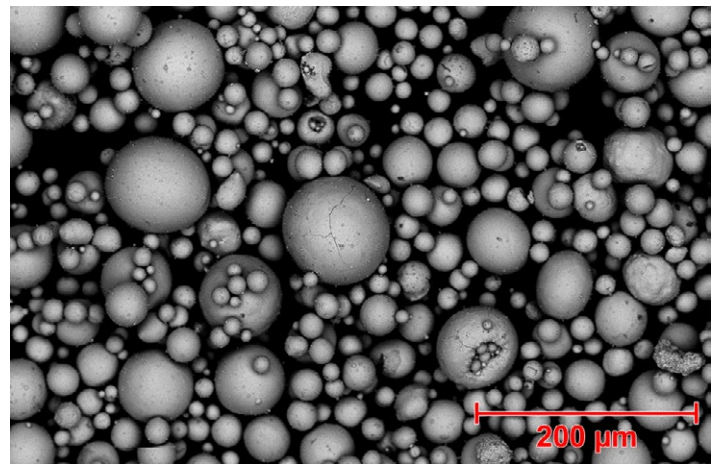
The main advantage of this material is its ability to chemically increase the resistance of a thermal barrier coating to degradation from CMAS (Calcium Magnesia Alumina Silicate) attack. Typically, thermal barrier coatings operating at surface temperatures above 1250 °C (2280 °F) are subject to deposits of erosive particles (sand, volcanic ash, etc.) onto the conventional 7 % to 8 wt.% YSZ (Yttria-Stabilized Zirconium) oxide ceramic, resulting in destabilization of the ceramic and/or cracking due to infiltration into the porous coating. When Metco 207 or Metco 208 is used as a top coat over a conventional thermal barrier coating system, it can reduce CMAS-related degradation of the coating.

##### 1.1 Typical Uses and Applications:

- Turbine blades and vanes, particularly those used in the high pressure turbine section
- Gas turbine combustion section components
- Augmenters

#### Quick Facts

Classification	Ceramic, zirconia-based
Chemistry	ZrO <sub>2</sub> 38Y <sub>2</sub> O <sub>3</sub> or ZrO <sub>2</sub> 56Y <sub>2</sub> O <sub>3</sub>
Manufacture	Agglomerated and plasma densified (HOSP)
Morphology	Spheroidal
Service Temperature	≤ 1425 °C (2600 °F)
Purpose	Thermal and environmental insulation
Process	Atmospheric plasma spray



SEM of Metco 207 showing outer morphology

## 2 Material Information

### 2.1 Chemical Composition

Product	Nominal Chemical Composition (wt. %)								
	ZrO <sub>2</sub>	Y <sub>2</sub> O <sub>3</sub>	HfO <sub>2</sub> max	Al <sub>2</sub> O <sub>3</sub> max	SiO <sub>2</sub> max	TiO <sub>2</sub> max	Fe <sub>2</sub> O <sub>3</sub> max	U & Th max	Other Oxides max
Metco 207	Bal.	36.0 – 42.0	2.5	0.1	0.5	0.3	0.3	0.05	1.0
Metco 208	Bal.	52.0 – 58.0	2.5	0.5	0.5	0.5	0.5	0.05	1.5

### 2.2 Particle Size Distribution

Product	Nominal Particle Size Distribution (µm)	D90 (µm)	D50 (µm)	D10 (µm)
Metco 207	-125 +11	90 – 109	49 – 59	20 – 28
Metco 208	-106 +11	60 – 75	35 – 45	20 – 28

Upper particle size via sieve analysis in accordance with ASTM B214; lower particle size analysis via laser diffraction (Microtrac). D10 - D50 - D90 by laser diffraction.

### 2.3 Key Selection Criteria

Metco 207 and Metco 208 produce coatings that have:

- Excellent high-temperature properties
- Lower thermal conductivity values than coatings produced from 7 – 8 wt. % YSZ materials
- Excellent thermal shock resistance when applied as a layer over a conventional 7 – 8 wt. % YSZ TBC coating system
- Resistant to CMAS attack
- Comparable thermal expansion coefficient to conventional TBC coating systems
- Sprayable using atmospheric plasma spray
- Metco 208 may be suitable for advanced structured TBC coatings

### 2.4 Related Products

- For a bond coat, a Oerlikon Metco MCrAlY material is recommended. Please see Material Data Sheets DSMTS-0092, DSMTS-0093 and DSMTS-0102 for choices. Amdry 962 (NiCrAlY) has been the bond coat material of choice for present applications.
- For intermediate ceramic layers, a Oerlikon Metco 7 – 8 wt. % YSZ material is recommended. Please refer to Material Data Sheets DSMTS-0001 and DSMTS-0047.
- Alternative materials that may be CMAS resistant are Metco 202NS (refer to Material Data Sheet DSMTS-0035) and other rare earth ceramics in our portfolio. Please contact your Oerlikon Metco account representative for more information.

### 2.5 Customer Specifications

Product	Customer Specifications
Metco 207	GE A50TF278 Cl. E
Metco 208	GE A50TF278 Cl. F

## 3 Coating Information

### 3.1 Key Thermal Spray Coating Information

Specification	Typical Data
Recommended Spray Process	Atmospheric Plasma Spray
Maximum Service Temperature	1425 °C 2600 °F

### 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

Metco F4 series

Metco 9MB series

TriplexPro series

SinplexPro series

## 4 Commercial Information

### 4.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
Metco 207	1086629	12.5 lb (approx. 5.7 kg)	Stock	Global
Metco 208	1096336	12.5 lb (approx. 5.7 kg)	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 The SDS 50-1602 (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](http://www.oerlikon.com/metco) (Resources – Safety Data Sheets).

Product	SDS No.
Metco 207	50-1602
Metco 208	50-1853

Information is subject to change without prior notice.