

Material Product Data Sheet

7–8% Yttria Stabilized Zirconia Spray-Dried Powder

Thermal Spray Powder Products: Metco 6700

1 Introduction

Metco™ 6700 powder is a fine, spray-dried yttria-zirconia composite powder specifically designed as a thermal barrier coating (TBC) material sprayed using a Oerlikon Metco ChamPro™ PS-PVD (Plasma Sprayed Physical Vapor Deposition) coating process.

This material has been designed to produce thermal barrier coatings for thermal insulation on gas turbine components. The spray-dried structure stabilizes in flight, during the coating process, to form high-temperature, yttria-stabilized zirconia coatings.

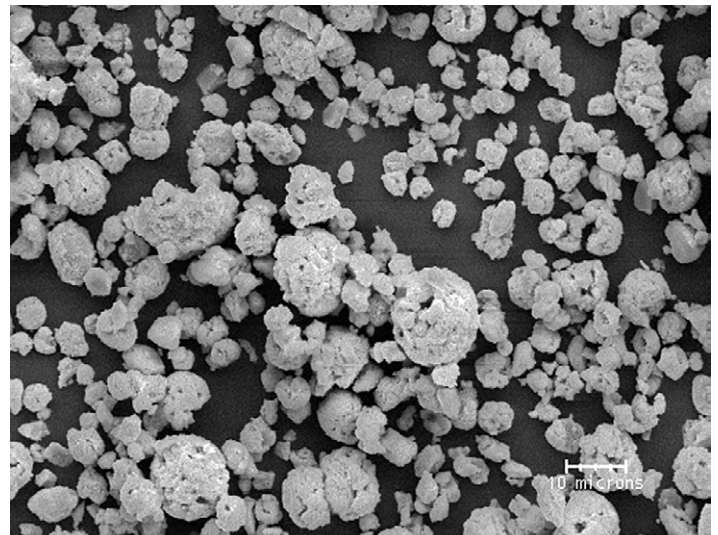
Under the correct PS-PVD process conditions, Metco 6700 coatings can exhibit EB-PVD type microstructures, but at significantly lower application and capital costs. Process conditions can also be modified to create dense, conventional TBC microstructures.

1.1 Typical Uses and Applications

- Aerospace and industrial gas turbine components as a thermal barrier coating for heat insulation
- Service temperatures up to 1200 °C (2190 °F)
- Typically used on rotating and stationary blades, vanes, buckets, stators, diaphragms and combustion components

Quick Facts

Classification	Ceramic, zirconia based
Chemistry	7.5Y ₂ O ₃ -ZrO ₂
Manufacture	Agglomerated
Morphology	Spheroidal
Purpose	Thermal protection
Service Temperature	1200 °C (2190 °F)
Process	ChamPro™ PS-PVD



2 Material Information

2.1 Chemical Composition

	Weight Percent (nominal)					Monoclinic Phase (vol. %) *
	ZrO ₂	Y ₂ O ₃	HfO ₂	Binder	Impurities	
Metco 6700	Balance	7.5	2.5 max	1	< 0.1	> 80

* Metco 6700 spray parameters are designed for in-flight stabilization; therefore, vaporization can occur during spraying.

2.2 Additional Powder Characteristics

	Particle Size Distribution		Color	Morphology
	Nominal Range	D50		
Metco 6700	-30 +1 µm	10 µm	Off-white	Spheroidal

Particle size analysis by laser diffraction (Microtrac)

2.3 Key Selection Criteria

- Metco 6700 is designed for use with the Oerlikon Metco ChamPro PS-PVD coating process.
- Choose Metco 6700 for applications when a dense, conventional TBC structure is desirable and in-flight stabilization of the material can occur, or to produce dense, EB-PVD type structures using ChamPro PS-PVD.

2.4 Related Products

- Metco 6700 has a particle size distribution much finer than other Oerlikon Metco yttria-zirconia based materials that gives rise to dense coating structures, including segmented structures.
- Metco 6700 relies on stabilization during the spray process, within the plasma spray plume, similar to that of Metco 202NS and Metco 203NS.

- Metco 204F is the finest 7% – 8% HOSP™ YSZ product in the Oerlikon Metco portfolio that can be applied using conventional plasma spray equipment. Metco 204F can produce dense or dense, vertically cracked coatings with smooth surface finishes. It is not designed for use with the ChamPro PS-PVD process.
- Oerlikon Metco has a comprehensive portfolio of 7% – 8% yttria-stabilized zirconia products produced by our HOSP™ (spray-dried, plasma-densified) manufacturing process. These products are well known for their excellent flowability and consistency for thermal barrier coatings applied using plasma spray. In addition, XCL-designated HOSP™ products have exceptionally high purity for extended coating life.

3 Coating Information

3.1 Key Thermal Spray Coating Information

Specification	Typical Data
Recommended Spray Process	ChamPro™ PS-PVD
Recommended Bond Coat	High temperature MCrAlY, such as Amdry 995C, Amdry 9951, Amdry 9624 or Amdry 997
Non Line-of-Sight Coatings	Using PS-PVD, non line-of-sight coatings are possible
Coating Thickness	150 – 300 µm
GE Erosion Number ^a	≤ 20 s/mil
Thermal Conductivity	0.3 – 1.0 W/m·K
Thermal Cycling ^b	> 500 cycles
Maximum Service Temperature	1200 °C 2190 °F

^a GE test procedure E50TF121

^b 150 µm coating thickness cycled from room temperature to 1135 °C (2075 °F) with forced cooling

3.3 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 ChamPro Spray Guns

Metco O3CP

4 Commercial Information

4.1 Ordering Information and Availability

	Order No.	Package Size	Availability	Distribution
Metco 6700	1065963	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 SDS 50-1284 (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).