

# Material Product Data Sheet

## Chromium Oxide – Titanium Oxide Powders

### Thermal Spray Powder Products: Metco 6483, Metco 6485

#### 1 Introduction

Thermal spray coatings of pure chromia (chromium oxide,  $\text{Cr}_2\text{O}_3$ ) possess high hardness, abrasion and corrosion resistance. However, these coatings are also often associated with high brittleness. The addition of  $\text{TiO}_2$  (titanium dioxide) provides ductility and promotes coatings that are denser and smoother than those of pure chromia.

Metco™ 6483 is a  $\text{Cr}_2\text{O}_3$  40 wt.%  $\text{TiO}_2$  powder that produces coatings characterized by very good resistance against abrasion, heat and corrosion combined with very good fracture toughness for a ceramic coating.

Metco 6485 is a  $\text{Cr}_2\text{O}_3$  25 wt.%  $\text{TiO}_2$  powder. Coatings of Metco 6485 are harder and more wear resistant than those of Metco 6483, and exhibit good fracture toughness, but not as tough as coatings of Metco 6483.

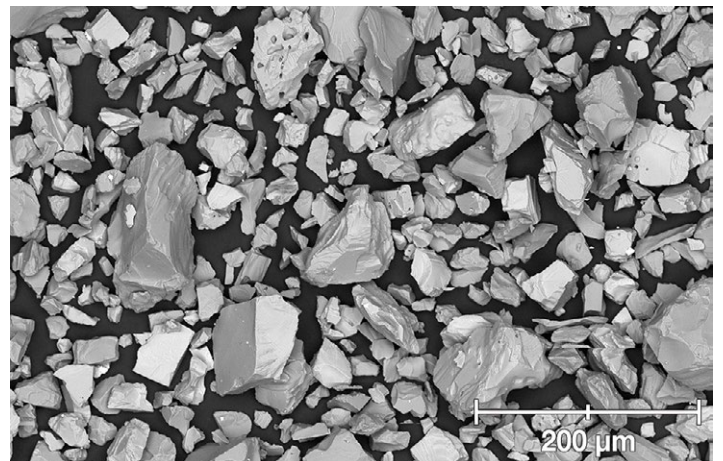
Truly excellent corrosion resistance can be obtained when Metco 6483 or Metco 6485 is applied over a corrosion resistant bond coat, such as nickel chromium, and subsequently sealed.

#### 1.1 Typical Uses and Applications

- Resistance to abrasive grains at low temperatures in applications such as mandrels for dry cell battery cores and oil industry sucker rod couplings
- Resistant to hard surfaces at low temperatures in applications such as drum doctor blades and machine tool chip breakers

#### Quick Facts

Classification	Oxide ceramic, chromia based
Chemistry	$\text{Cr}_2\text{O}_3$ $\text{TiO}_2$
Manufacture	Fused and crushed or Blended
Morphology	Angular, blocky
Purpose	Wear, heat and corrosion resistance
Service Temperature	$\leq 540$ °C (1000 °F)
Process	Atmospheric plasma spray or combustion powder Thermospray™



SEM photomicrograph showing the typical morphology of Metco 6483

## 2 Material Information

### 2.1 Chemical Composition

Product	Chemical Composition (wt. %)				
	Nominal	Cr <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>
Metco 6483	Cr <sub>2</sub> O <sub>3</sub> 40TiO <sub>2</sub>	Balance	38.0 – 42.0	< 0.2	< 0.2
Metco 6485	Cr <sub>2</sub> O <sub>3</sub> 25TiO <sub>2</sub>	Balance	23.0 – 27.0	< 0.2	< 0.2

### 2.2 Particle Size Distribution and Other Characteristics

Product	Nominal Particle Size Distribution	Color	Morphology	Manufacturing Method
Metco 6483	-90 +16 µm	Dark Grey	Angular / Blocky	Blend
Metco 6485	-45 +20 µm	Dark Grey	Angular / Blocky	Fused and Crushed

Upper particle size determined by sieve analysis, lower particle size analysis by laser diffraction (Microtrac).

### 2.3 Key Selection Criteria

- Choose Metco 6483 or Metco 6485 when a coating having a good combination of wear, corrosion resistance and fracture toughness is needed.
- Choose Metco 6483 or Metco 6485 when a coating that is less brittle than a coating of pure chromia is needed.
- Coatings of Metco 6483 exhibit higher fracture toughness than coatings of Metco 6485.
- Coatings of Metco 6485 exhibit higher hardness and wear resistance than coatings of Metco 6483.

### 2.4 Related Products

Oerlikon Metco offers a variety of chromium oxide and titanium oxide materials, as well as various chromium oxide-titanium oxide compositions that can be used in a range of applications:

- For applications where hardness, wear and corrosion resistance are of primary importance, pure chromium oxide materials or materials with high chromium oxide content can be applied. However, coatings of these materials will exhibit lower impact resistance and fracture toughness than Metco 6483. These products include:
  - Cr<sub>2</sub>O<sub>3</sub>: Amdry 6415, Amdry 6420, Metco 6156 and Metco 106NS
  - Cr<sub>2</sub>O<sub>3</sub> 5SiO<sub>2</sub> 3TiO<sub>2</sub>: Metco 136CP, Metco 136F and Amdry 6462
  - Cr<sub>2</sub>O<sub>3</sub> 2TiO<sub>2</sub>: Metco 106 and Metco 106F
- Metco 111 [TiO<sub>2</sub> 45Cr<sub>2</sub>O<sub>3</sub>] can be used for applications similar to those of Metco 6483. Coatings of Metco 111 exhibit somewhat higher fracture toughness but lower hardness than coatings Metco 6483.
- For applications requiring dense, smooth coatings with moderate hardness and abrasive wear resistance, pure TiO<sub>2</sub> powders such as Metco 102, Amdry 6505 and Amdry 6510 can be used. Coatings of these materials also have moderate electrical conductivity that eliminates issues with static charge buildup. However, these coatings have lower hardness than coatings of Metco 6483.

## 3 Coating Information

### 3.1 Key Thermal Spray Coating Information

Specification	Typical Data
Recommended Spray Process	Atmospheric Plasma Spray or Combustion Powder Thermospray™
Maximum Service Temperature	540 °C 1000 °F
Finishing Method	Wet grind (aluminum oxide or silicon carbide wheels)

### 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

Atmospheric Plasma	Combustion Powder
Metco 3MB series	Metco 6P-II series
Metco 9MB series	
Metco F4MB-XL series	
TriplexPro-210	
SimplexPro series	

## 4 Commercial Information

### 4.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
Metco 6483	1002534	5 kg (approx. 11 lb)	Special Order	Global
Metco 6485	1069629	10 kg (approx. 22 lb)	Special Order	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 (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](http://www.oerlikon.com/metco) (Resources – Safety Data Sheets).

Product	SDS No.
Metco 6483	50-842
Metco 6485	50-1185

Information is subject to change without prior notice.