

# Material Product Data Sheet

## Chromia–Silica Thermal Spray Powders

### Thermal Spray Powder Products: Metco™ 136CP, Metco 136F, Amdry™ 6462

#### 1 Introduction

Oerlikon Metco's Chromia–Silica composite powders are designed to produce thermal spray coatings that are hard, dense and extremely wear resistant. The coatings made with these powders exhibit a degree of impact resistance not normally associated with sprayed ceramic coatings. The silicon dioxide acts as a dampening medium that absorbs impact loading and prevents grain loosening, which enhances the wear resistance of the coating.

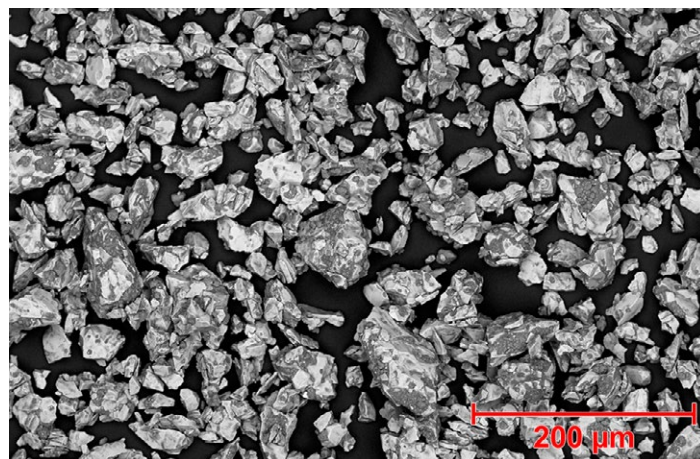
In addition, the powders spray with higher deposit efficiencies and better finishing characteristics compared to powders of pure chromium oxide. Depending upon the powder particle size, coating of thicknesses up to 2.5 mm (0.1 in) can be sprayed successfully. Furthermore, coatings made from of these powders are insoluble in most acids, alkalis and alcohol and, when properly sealed, can be utilized in corrosive chemical environments at temperatures up to 200 °C (400 °F).

#### 1.1 Typical Uses and Applications

- Pump impellers, reciprocating pump compressor rods, air and gas cylinder internals, centrifugal pump seals, wear rings, casing rings and down-hole plungers in petrochemical industry
- Mechanical seal applications
- Machine elements used for textile manufacturing

#### Quick Facts

Classification	Oxide ceramic, chromia-based
Chemistry	$\text{Cr}_2\text{O}_3\text{-xSiO}_2\text{-yTiO}_2$
Manufacture	Mechanically clad or fused and crushed
Morphology	Irregular or angular/blocky
Purpose	Wear and corrosion protection
Service Temperature	$\leq 540$ °C (1000 °F)
Process	Atmospheric plasma spray or combustion powder Thermospray™



Morphology of Metco 136CP, a mechanically clad powder

## 2 Material Information

### 2.1 Chemical Composition

Product	Chemical Composition (nominal wt. %)					
	Cr <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	TiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	Others (max)	Organics (max)
Metco 136CP	Bal.	2.5 – 4.5	< 4.5	< 0.5	2.0	2.0
Metco 136F	Bal.	3.0 – 4.5	< 4.0	< 0.5	2.0	2.5
Amdry 6462	Bal.	4.0 – 6.0	2.0 – 4.0	< 0.3	1.0	–

### 2.2 Particle Size Distribution and Other Characteristics

Product	Nominal Particle Size Distribution (µm)	Morphology	Manufacturing Method
Metco 136CP	-90 +16	Irregular	Mechanically Clad
Metco 136F	-63 +5	Irregular	Mechanically Clad
Amdry 6462	-45 +10	Angular / Blocky	Fused and Crushed

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

### 2.3 Key Selection Criteria

- In general, the mechanically clad materials, Metco 136CP and Metco 136F should spray with somewhat higher deposition efficiencies than the Amdry 6462 fused and crushed material. The coatings made from the mechanically clad products should also be more stress tolerant.
- Metco 136CP is a mechanically clad powder with a relatively coarse size distribution. It is best used for efficiently applying thicker coatings (e.g., for repair of deep damage). The powder was designed for use with Metco plasma spray guns.
- Metco 136F is a mechanically clad powder with a relatively fine size distribution. It is most suitable for application using Metco Thermospray™ (combustion) guns in addition to Metco plasma spray guns. Thermospray™ coatings of Metco 136F are the most wear resistant of the Thermospray ceramic coatings.
- Amdry 6462 is a fused & crushed powder with somewhat higher purity and chemical homogeneity. Its fine particle size distribution is tightly controlled that results in coatings with smooth as-sprayed surface finishes.

### 2.4 Related Products

- Oerlikon Metco product line offers a number of other product compositions that can be used in a range of applications. For example:
  - Cr<sub>2</sub>O<sub>3</sub> 2%TiO<sub>2</sub> powders (Metco 106 and Metco 106F) can be used for similar applications but the coatings will have somewhat lower wear and mechanical shock resistance than the Cr<sub>2</sub>O<sub>3</sub> SiO<sub>2</sub> TiO<sub>2</sub> powders (Metco 136CP, Metco 136F and Amdry 6462).
  - Pure chrome oxide materials (Amdry 6415, Amdry 6420, Metco 6156 and Metco 106NS) can be used for making hard, wear and corrosion resistant coatings for aggressive environment up to 815 °C (1500 °F).
  - Pure aluminum oxide or alumina titania coatings can also be used for similar mechanical applications. However, these coatings may not be as hard and corrosion resistant as those made from Cr<sub>2</sub>O<sub>3</sub> SiO<sub>2</sub> TiO<sub>2</sub> powders.

### 2.5 Customer Specifications

Product	Customer Specification
Metco 136F	Haynes Corporation PS5-2005

### 3 Coating Information

#### 3.1 Key Thermal Spray Coating Information

Specification	Typical Data
Recommended Process	Atmospheric plasma spray or combustion powder Thermospray™
Maximum Service Temperature	540 °C 1000 °F
Finishing Method	Wet grind, diamond wheel

#### 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 9MB series	Metco 5P-II
Metco F4 series	Metco 6P-II series
TriplexPro series	
SimplexPro series	

### 4 Commercial Information

#### 4.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
Metco 136CP	1004631	5 lb (approx. 2.25 kg)	Stock	Global
Metco 136F	1000369	5 lb (approx. 2.25 kg)	Stock	Global
	1000417	12.5 lb (approx 5.5 kg)	Stock	Global
Amdry 6462	1002833	10 kg (approx. 22 lb)	Stock	Europe

#### 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.
- Remove desiccant prior to use, if applicable.

#### 4.3 Safety Recommendations

See the SDS 50-144 (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).