

Material Product Data Sheet

Alumina 3% Titania Thermal Spray Powders

Thermal Spray Powder Products:
Amdry™ 6200, Amdry 6204, Amdry 6208,
Metco™ 101B-NS, Metco 101NS, Metco 101SF,
Metco 6203

1 Introduction

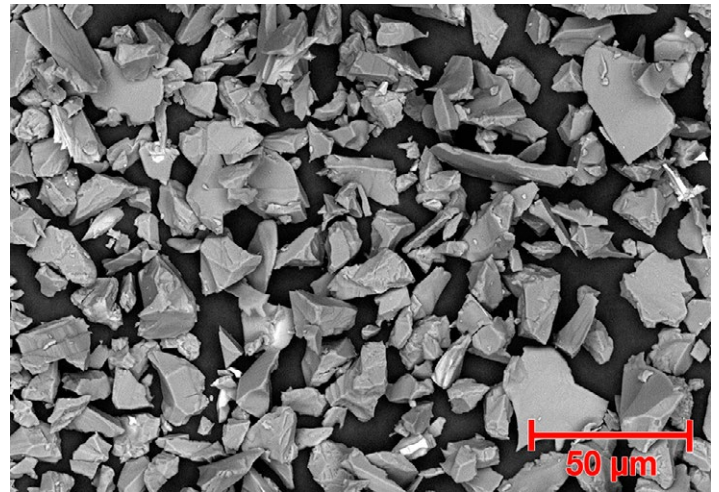
Alumina 3% titania powders are designed to increase the toughness of hard, abrasion and erosion resistant aluminum oxide materials by adding a small amount (2 to 4%) of titania. These materials produce dense, smooth coatings for applications requiring both wear resistance and toughness.

1.1 Typical Uses and Applications

- Butterfly valves in hydraulic systems
- Textile / fabric manufacturing industry tooling
- Electrical insulation
- Dielectric applications

Quick Facts

Classification	Ceramic, metallic oxide
Chemical formula	$\text{Al}_2\text{O}_3 \cdot 3\text{TiO}_2$
Manufacture	Fused and crushed
Morphology	Angular / blocky
Purpose	Wear / abrasion resistance, electrical insulation
Service Temperature	$\leq 1100 \text{ }^\circ\text{C}$ (2010 °F)
Melting point	2040 °C (3700 °F)
Process	Atmospheric Plasma Spray or Combustion Powder Thermospray™



SEM Photomicrograph showing morphology of Metco 101SF

2 Material Information

2.1 Chemical Composition

	Weight Percent (nominal)						
	Al ₂ O ₃	TiO ₂	SiO ₂	Fe ₂ O ₃	MgO	CaO	Others
Amdry 6200	Balance	2.5 – 3.5	< 0.5	< 0.1	< 0.2	< 0.1	---
Amdry 6204	Balance	2.5 – 3.5	< 0.5	< 0.15	< 0.2	< 0.1	---
Amdry 6208	Balance	2.5 – 3.5	< 0.5	< 0.15	< 0.2	< 0.1	---
Metco 101B-NS	94.0	2.5	2.0	1.0	---	---	---
Metco 101NS	94.0	2.5	2.0	1.0	---	---	---
Metco101SF	96.0	2.0	0.5	0.5	---	---	1.0
Metco 6203	Balance	2.0 – 3.5	< 0.6	< 0.2	---	---	---

2.2 Particle Size Distribution

	Nominal Range μm	Color	Morphology
Amdry 6200	-22 +5	Grey	Angular / Blocky
Amdry 6204	-45 +5	Grey	Angular / Blocky
Amdry 6208	-90 +45	Grey	Angular / Blocky
Metco 101B-NS	-75 +30	Grey	Angular / Blocky
Metco 101NS	-45 +11	Grey	Angular / Blocky
Metco 101SF	-22 +5	Grey	Angular / Blocky
Metco 6203	-35 +15	Grey	Angular / Blocky

Particle size analysis using sieve analysis and laser diffraction (Microtrac)

2.3 Recommended Spray Process

	Atmospheric Plasma Spray	Combustion Powder Thermospray
Amdry 6200	✓	✓
Amdry 6204	✓	✓
Amdry 6208	✓	✗
Metco 101B-NS	✓	✗
Metco 101NS	✓	✓
Metco 101SF	✓	✓
Metco 6203	✓	✓

2.4 Key Selection Criteria

- Coatings of Metco 101NS have good resistance to abrasive wear, sliding wear, friction and oxidation up to approximately 1100 °C (2040 °F). Coatings are tougher than those produced by high purity alumina (white) powders. Can be used in many environments including most acids and alkalis.
- Metco 101SF is similar to Metco 101NS but with a finer particle size distribution. Coatings are suitable for applications in the textile or synthetic fiber manufacturing industries where surface resistance is required on parts used for guiding and handling of thread. Coatings are also used on butterfly valves in oil and water hydraulic systems for erosion resistance.
- Metco 101B-NS has a coarser size distribution than Metco 101NS and Metco 101SF and can be used where thicker coatings are required. The coating properties are very similar for all three powders.

- Metco 6203, Amdry 6200, Amdry 6204 and Amdry 6208 all have very similar properties to the other powders in this group and the respective coatings have similar applications.

2.5 Related Products

- Pure alumina materials produce coatings that exhibit higher hardness, erosion resistance, insulative properties and dielectric strength, however, they are more brittle less grindable than coatings of alumina 3% titania.
- Coatings produced from materials with increasingly higher percentages of titania (e.g., 13% or 40%), have lower hardness and chemical resistance than those of 3% titania; however they have higher toughness, grindability and exhibit low wetting characteristics.
- Please see the appropriate data sheet for Oerlikon Metco pure alumina products, and Oerlikon Metco alumina-titania products, with titania content of 13% and 40%.

2.6 Customer Specifications

Product	Customer Specifications
Metco 101SF	GE A50TF87, Class C MTU MTS 1382
Metco 101NS	Boeing BMS 10-67, Type III CFM International CP 6030 GE A50A565 Class B GE A50TF87, Class A GKN Aerospace PM 819-11 MTU MTS 1059 Rolls-Royce plc MSRR 9507/36 Snecma DMR 33.020 U. S. Military A-A-59315/35 Type II, Class I
Metco 101B-NS	Avio 4800M/4 Canada Pratt & Whitney CPW 281 CFM International CP 6009 GE A50TF87, Class B GE A50A565, Class A GKN Aerospace PM 819-12 Industria de Turbo Propulsores SMM-939 MTU MTS 1061 Pratt & Whitney PWA 1311 Rolls-Royce plc MSRR 9507/50 Snecma DMR 33.013

3 Coating Information

3.1 Key Thermal Spray Coating Information

Specification	Data
Recommended Process	Atmospheric Plasma Spray or Combustion Powder Thermospray™ (see section 2.3)
Surface Roughness As Sprayed (Ra)	2.5 – 17.8 µm 100 – 700 µin
Macrohardness (HR15N)	86 – 94

Note: Results will vary significantly based on the product, spray equipment and spray parameters used.

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 5P-II
Metco 9MBM	Metco 6P-II
F4MB-XL series	
SinplexPro Series	
TriplexPro series	

4 Commercial Information

4.1 Ordering Information and Availability

	Order No.	Package Size	Availability	Distribution
Amdry 6200	1002820	10 kg (approx. 22 lb)	Special Order	Europe
Amdry 6204	1002822	10 kg (approx. 22 lb)	Stock	Europe
Amdry 6208	1002823	10 kg (approx. 22 lb)	Special Order	Europe
Metco 101B-NS	1000087	12.5 lb (approx. 5.7 kg)	Stock	Global
Metco 101NS	1000062	5 lb (approx. 2.25 kg)	Stock	Global
Metco101SF	1000329	5 lb (approx. 2.25 kg)	Special Order	Global
Metco 6203	1039040	10 kg (approx. 22 lb)	Stock	Europe

4.2 Handling Recommendations

- Store in the original container in a dry location.
- Open containers should be stored in a drying oven to prevent moisture pickup.

4.3 Safety Recommendations

See SDS 50-134 (Materials Safety Data Sheet) in the version localized for 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).