

Material Product Data Sheet

Aluminum Oxide Thermal Spray Powders

Thermal Spray Powder Products:

Amdry™ 6060, Amdry 6062, Metco™ 105NS, Metco 105SFP, Metco 6051

1 Introduction

Aluminum oxide (alumina) is one of the most widely used engineering ceramics. It is a hard, wear resistant material that is chemically inert and stable at high temperatures. In addition, the high purity grades (i.e., white alumina) exhibit excellent electrical insulation (dielectric characteristics) and thermal conductivity. As a result of these excellent properties and its low cost, alumina finds its use in a number of engineering applications.

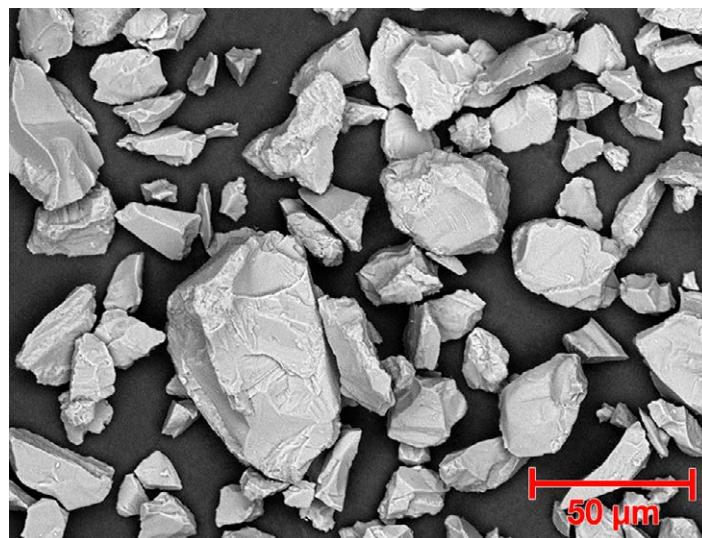
The materials are available in powder form in a range of size distributions and chemistries. Typically applied by atmospheric plasma spray, this material has been used in many applications requiring abrasive, sliding and erosive wear resistance such as wear pads, seal rings, liners etc. High purity alumina is used for electrical, thermal and biomedical applications such as high tension and high temperature insulation, as a substrate for electronic components and for medical implants.

1.1 Typical Uses and Applications

- Furnace linings
- Rocket nozzles
- Pump seals
- Wear pads
- Vacuum chamber liners
- Electrical insulators
- Electrostatic chucks and capacitors
- Corona rolls
- Hip and knee implants

Quick Facts

Classification	Oxide ceramic, alumina-based
Chemical formula	Al_2O_3
Manufacture	Fused and crushed
Morphology	Angular / blocky
Purpose	Electrical insulation, wear/abrasion resistance, refractory linings, biomedical implants
Service Temperature	≤ 1650 °C (3000 °F)
Melting point	2054 °C (3729 °F)
Process	Atmospheric Plasma Spray or Combustion Powder Thermospray™



SEM Photomicrograph showing morphology of Metco 105NS

2 Material Information

2.1 Chemical Composition

	Weight Percent (nominal)				
	Al ₂ O ₃	Fe ₂ O ₃ (max)	Na ₂ O (max)	SiO ₂ (max)	CaO (max)
Amdry 6060	99.5 +	0.05	0.30	0.02	0.05
Amdry 6062	99.5 +	0.05	0.30	0.02	0.05
Metco 105NS	98.0 +	–	0.75	2.0	–
Metco 105SFP	99.5 +	0.03	0.15	0.01	0.01
Metco 6051	99.5 +	0.05	0.30	0.02	–

2.2 Particle Size Distribution and Other Physical Characteristics

	Nominal Range µm	Color	Morphology
Amdry 6060	-45 +5	White	Angular / Blocky
Amdry 6062	-45 +22	White	Angular / Blocky
Metco 105NS	-45 +15	White	Angular / Blocky
Metco 105SFP	-31 +3.9	White	Angular / Blocky
Metco 6051	-31 +5.5	White	Angular / Blocky

Particle size analysis using laser diffraction (Microtrac)

2.3 Key Selection Criteria

- Metco 105SFP and Metco 6051 produce hard, dense coatings for wear resistance against abrasive grains, hard surfaces, particle erosion and cavitation. These materials can be used for electrical and electronic applications.
- Metco 105NS produces dense coatings that resist wear by abrasive fibers and threads and also resists erosion.
- Coatings of Metco 6060 and Metco 6062 provide good resistance against abrasion, sliding wear, friction and oxidation and are suitable for electronic and electrical applications.
- Aluminum oxide based coatings should not be used where impact or shock loading occurs.

2.4 Related Products

- Metco 6103, an agglomerated and sintered white alumina with a minimum purity level of 99.95 %, is recommended when exceptionally high purity is required for electronics manufacturing tooling or biomedical applications.
- Alumina-titania materials produce coatings having a higher toughness and grindability than pure alumina products. However, they are not as hard, erosion resistant and insulating as pure alumina.
- Please see the appropriate data sheet for Oerlikon Metco alumina-titania products, with titania contents of 3 %, 13 % and 40 %.

2.5 Customer Specifications

Product	Customer Specification
Metco 105NS	Canada Pratt & Whitney CPW 210 Pratt & Whitney PWA 1310 Rolls-Royce Corporation EMS 56758 Rolls-Royce Corporation PMI 1147 Rolls-Royce plc MSRR 9507/9 Rolls-Royce plc RRMS 40020 Sneema DMR 33.080 U. S. Military A-A 59315/34 Type II, Class I Williams CWIMS 765

3 Coating Information

3.1 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

Metco 3MB

Metco 9MB

Metco F4MB-XL

SinplexPro

TriplexPro

Combustion Powder

Metco 5P-II

Metco 6P-II

4 Commercial Information

4.1 Ordering Information and Availability

	Order No.	Package Size	Availability	Distribution
Amdry 6060	1002818	10 kg (approx. 22 lb)	Special Order	Europe
Amdry 6062	1002819	10 kg (approx. 22 lb)	Special Order	Europe
Metco 105NS	1000603	12.5 lb (approx. 5.7 kg)	Stock	Global
Metco 105SFP	1000441	5 lb (approx. 2.25 kg)	Stock	Global
Metco 6051	1002535	5 kg (approx. 11 lb)	Stock	Europe

4.2 Handling Recommendations

Store in the original container in a dry location.
Tumble contents prior to use to prevent segregation.

4.3 Safety Recommendations

See SDS 50-137 (Safety Data Sheet) in the localized version applicable 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).