

# Material Product Data Sheet

## Alumina/Nickel Aluminum Cermet Thermal Spray Powder

### Thermal Spray Powder Products: Metco 410NS

#### 1 Introduction

Metco™ 410NS is a cermet powder that is a metallic-ceramic blend. The metallic component is a chemically clad nickel aluminum (Ni 20%Al) powder and the ceramic is a fused and crushed gray aluminum oxide.

The main use of cermets is for thermal barrier or thick clearance control applications where thermal expansion mismatch between the substrate and the coating must be controlled. Metco 410NS is typically used as an intermediate coating in a three-part graded coating system between a nickel aluminum bond coat and an aluminum oxide ceramic top coat. However, Metco 410NS coatings can also be used as a single-layer coating for a number of applications.

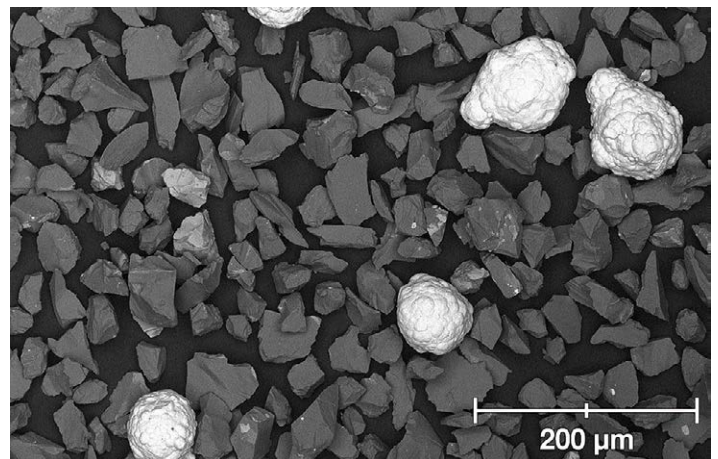
Coatings of Metco 410NS are denser, stronger, and more resistant to abrasion and shock than coatings of a pure ceramic. They are also very hard and smooth. They have a higher coefficient of thermal expansion, and are less susceptible to cracking than coatings of a pure ceramic. However, they are not as good heat or electrical insulators as pure ceramic coatings.

#### 1.1 Typical Uses and Applications

- As an abrasive coating, to cut against an abradable coating for dynamic clearance control applications
- As an intermediate layer in a three-part graded coating system applied as a thermal barrier to protect base metal against high temperature
- Potential applications also include oil seals, wear surfaces and the like

#### Quick Facts

Classification	Cermet
Chemistry	Al <sub>2</sub> O <sub>3</sub> 30(Ni 20Al)
Manufacture	Blended
Metallic	Chemically clad
Ceramic	Fused and crushed
Morphology	
Metallic	Spheroidal
Ceramic	Angular/blocky
Purpose	Thermal expansion compliant layer
Process	Atmospheric plasma spray or combustion powder Thermospray™



SEM Photomicrograph of Metco 410NS showing the morphology of this blended material.

## 2 Material Information

### 2.1 Chemical Composition

Product	Chemical Composition (wt. %)					
	Al <sub>2</sub> O <sub>3</sub>	Ni 20Al	TiO <sub>2</sub>	SiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	All Others
Metco 410NS	Balance	29 – 31	< 3	< 1.5	< 0.7	< 1

### 2.2 Particle Size Distribution and Other Characteristics

Product	Nominal Particle Size Distribution	Color	Morphology		Manufacturing Method (Blend)	
			Ceramic	Metal	Ceramic	Metal
Metco 410NS	-90 +10 µm	Brownish Grey	Angular/Blocky	Spheroidal	Fused and Crushed	Chemically Clad Composite

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

### 2.3 Key Selection Criteria

- Choose Metco 410NS when required by customer specifications.
- Select Metco 410NS when an intermediate layer is needed for thermal expansion compliance between a compatible bond coat and top coat.
- Select Metco 410NS when a cutting abrasive is needed in a compatible clearance control system.

### 2.4 Related Products

- Metco 410NS is used as an intermediate layer in graded coatings systems. Oerlikon Metco's product portfolio includes compatible top coat and bond coat materials for these coating systems:

- A number of aluminum oxide products can be used as the top coat for these systems. These products include Metco 105NS, Metco 105SFP, Metco 101NS, Metco 101SF and Amdry 187.
- Compatible nickel aluminum bond coat products include Metco 450NS, Metco 480NS, Amdry 956 and Metco 404NS.
- Other cermet materials offered by Oerlikon Metco include Metco 303NS-1 and Metco 441NS. These are blends of magnesium zirconate and nickel chromium. These cermets are used as intermediate layers in three-layer coating systems where magnesium zirconate is the ceramic top coat and nickel chromium is used as the bond coat. Unlike Metco 410NS, these cermets are not recommended for use in single-layer coating applications.

### 2.5 Customer Specifications

Product	Customer Specifications
Metco 410NS	GE B50A888 GE B50TF64, CI A GKN Aerospace PM 819-31 MTU MTS 1130 Snecma DMR 33.081

### 3 Coating Information

#### 3.1 Key Thermal Spray Coating Information

Specification	Typical Data
Recommended Spray Process	Atmospheric Plasma Spray or Combustion Powder Thermospray™
Processing	It is recommended that Metco 410NS be applied as soon as possible after the bond coat layer.
Finishing Method	Generally used as sprayed. Wet grind (silicon carbide wheels), if necessary

#### 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 6P-II series
Metco F4 series	
SimplexPro series	
TriplexPro series	

### 4 Commercial Information

#### 4.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
Metco 410NS	1000303	5 lb (approx. 2.25 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 50-162 (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).