

# Material Product Data Sheet

## Iron Chromium Aluminum Yttrium (FeCrAlY) Thermal Spray Powder

### Thermal Spray Powder Products: Amdry™ 9700

#### 1 Introduction

Amdry 9700 is a gas atomized powder specifically designed to produce thermal sprayed coatings for surface protection against the corrosive effects of oxidation and sulfidation at high temperatures. The outstanding performance of this cost-effective FeCrAlY material is an attribute of its ability to generate a protective oxide scale that helps to combat chemical attack in aggressive environments. In addition, post-coating heat-treatment and/or high-temperature service conditions will promote the formation of corrosion-resistant intermetallic phases and further densify the coating, thereby enhancing its protective barrier characteristics. Coatings of Amdry 9700 can be used as bond coats for ceramic top coats or by themselves to resist corrosion at temperatures up to 800 °C (1475 °F).

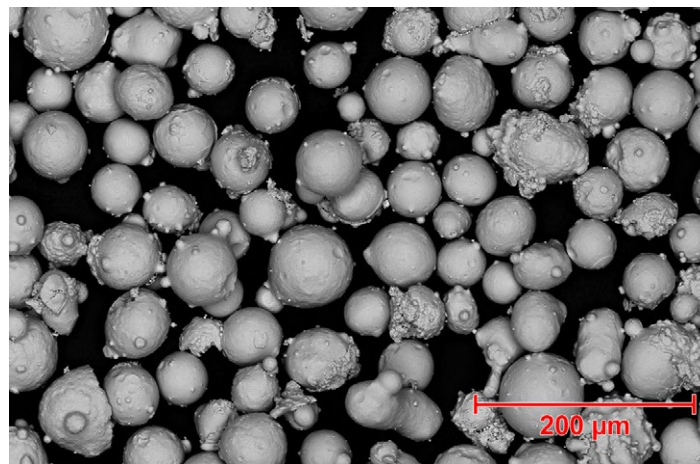
The chromium and aluminum in this product contribute to in-situ the formation of a protective oxide layer. The addition of yttrium enhances the stability and adhesion of the oxide layer. This dense, well-adhered oxide scale is critical for the prolonged life of high temperature ceramic coating systems such as TBC coatings and ceramic abrasion systems. The alumina layer acts as an oxygen diffusion barrier that helps to minimize oxidation of the coating and the substrate. Depending on the application, chromium oxide scale and/or mixed-specie oxide scale are beneficial to combat hot corrosion and sulfidation. In these applications, higher ratios of chromium to aluminum typically promote better chromium oxide formation.

#### 1.1 Typical Uses and Applications

- Oxidation and hot corrosion resistance of industrial gas turbines (IGT) components such turbine buckets, blades, shrouds etc.
- Corrosion-resistant bond coat layer for thermal barrier coatings (TBCs), ceramic clearance control (abrasion) coatings and ceramic dielectric layer coatings.
- Exhaust manifolds, ducts and components use in flue gas and fly ash industrial systems.

#### Quick Facts

Classification	Alloy, iron-based
Chemistry	Fe 24Cr 8Al 0.5Y
Manufacture	Gas atomized
Morphology	Spheroidal
Service Temperature	Turbine applications: ≤ 800 °C (1475 °F) Heater coil applications: 1000 °C (1830 °F)
Purpose	High temperature oxidation and corrosion resistance
Process	Atmospheric plasma spray or HVOF



SEM Photomicrograph of Amdry 9700 showing the morphology of this gas atomized product

- Restore mismatched and worn parts that are subjected to high temperature oxidizing atmospheres.
- Protect heat-treating fixtures.
- Alternative material to Kanthal-type materials for thermo-electric heater coils.
- Erosion and corrosion resistant coating for boiler tubes used in waste-to-energy or digester applications.

## 2 Material Information

### 2.1 Chemical Composition

Product	Nominal Chemistry	Nominal Chemical Composition (wt. %)			
		Fe	Cr	Al	Y
Amdry 9700	Fe 24Cr 8Al 0.5Y	Bal.	24	8	0.5

### 2.2 Particle Size Distribution and Other Physical Properties

Product	Nominal Particle Size Distribution (µm)	Manufacturing Method	Morphology
Amdry 9700	-45 +11	Inert Gas Atomized	Spheroidal

Particle sizes 45 µm and above analyzed via sieve analysis in accordance with ASTM B214; particle sizes below 45 µm analyzed via laser diffraction (Microtrac).

### 2.3 Key Selection Criteria

- Amdry 9700 is a general-purpose and cost-effective MCrAlY product that is used for many applications requiring high-temperature oxidation and sulfidation resistance.
- Iron-based Amdry 9700 has lower aluminum and higher chromium content than many of Oerlikon Metco's Ni- and Co- based MCrAlY products. As a result, Amdry 9700 may be better suited to service environments where hot corrosion or sulfidation is an issue.
- Amdry 9700 should be the first choice for any ferrous-based superalloy components to minimize thermal expansion mismatch between the substrate and the coating.
- When used as a material for electrical heater elements, Amdry 9700 exhibits excellent stability, with little change in resistivity over time and minimal ageing, even at higher temperatures.

### 2.4 Related Products

- Oerlikon Metco is a well-known supplier of MCrAlY materials for thermal spray. Our portfolio includes NiCrAlY, CoCrAlY, NiCoCrAlY and CoNiCrAlY products. We are also a trusted supplier to many OEM and manufacture a portfolio of MCrAlY materials on a proprietary basis.
- Nickel-based MCrAlY powders in Oerlikon Metco's portfolio provide superior high temperature oxidation resistance, while coatings of cobalt-based MCrAlY powders provide excellent hot corrosion protection (See datasheet DSMTS-0102).
- The CoNiCrAlY and NiCoCrAlY products in our portfolio combine the benefits of both NiCrAlYs and CoCrAlYs in a single product with a balanced combination of high temperature oxidation resistance and hot corrosion resistance (See datasheets DSMTS-0092 and 0093).

## 3 Coating Information

### 3.1 Key Thermal Spray Coating Information

Specification	Typical Data		
Recommended Spray Process	Atmospheric plasma spray or HVOF		
Microhardness	As-sprayed	350 – 450 DPH	
	Heat treated	1000 – 1200 DPH	
Maximum Service Temperature	Turbine applications	800 °C	1475 °F
	Heating element applications	1000 °C	1830 °F

Data provided is typical, but will vary significantly depending on the product chosen, the spray process, spray parameters and spray gun used. Heat-treated hardness will vary depending on heat treatment cycle and furnace atmosphere 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

HVOF	Atmospheric Plasma
DiamondJet series	Metco 9MB series
WokaJet series	Metco F4 series
	TriplexPro series
	SinplexPro series

## 4 Commercial Information

### 4.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
Amdry 9700	1082038	10 lb (approx. 4.5 kg)	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.
- Remove desiccant prior to use, if applicable

### 4.3 Safety Recommendations

See SDS 50-1557 (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).

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