

Material Product Data Sheet

Aluminum Silicon Hexagonal Boron Nitride Abradable

Powder Products: Metco 320NS

1 Introduction

Metco™ 320NS is an aluminum silicon alloy powders composited with hexagonal boron nitride. They are designed for use as abradable coating materials in clearance control systems. They have been approved as a high temperature compressor abradable for various engines, replacing other abradable materials for service temperatures up to 450 °C (842 °F). Coatings of Metco 320NS offer improved corrosion resistance, particularly in marine environments. They employ hexagonal boron nitride as a lubricant, which is more inert than other abradable lubricants such as graphite.

Clearance control coatings are used in applications where rotating components may come into contact with the coating as a result of design intent or operational surges. The coatings are designed to minimize the wear to the rotating components while maximizing gas path efficiency by providing clearance control in seal areas.

The AlSi matrix is used in many abradable coating systems because of its good combination of erosion resistance and abradability against various blade materials, including titanium alloys.

Hexagonal boron nitride (hBN) is a very inert lubricant that improves abradability by reducing frictional heating on contact with the blade at high translational speeds. It also helps weaken the interparticle bond strength within the aluminum silicon matrix for better friability.

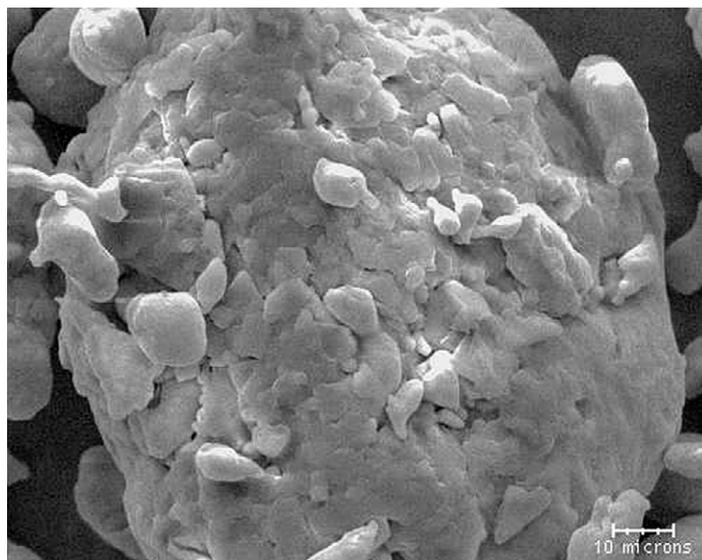
1.1 Typical Uses and Applications:

Clearance control coatings for:

- High pressure compressor seal applications with service temperatures up to 450 °C (842 °F)
- Gas turbine engine labyrinth air seals, axial and radial compressor seals, turbocharger housing throat areas
- Depending on the application, coatings are run against untipped titanium, steel or nickel blades

Quick Facts

Classification	Abradable, aluminum based
Chemistry	AlSi/hBN
Manufacture	Mechanically clad
Morphology	Spheroidal
Service Temperature	≤ 450 °C (840 °F)
Purpose	Clearance control
Process	Atmospheric Plasma Spray



2 Material Information

2.1 Chemical Composition

Product	Weight Percent (nominal)			
	Al	Si	Boron Nitride	Organic Binder
Metco 320NS	Balance	8	20	8

2.2 Additional Powder Characteristics

Product	Particle Size Distribution		Color	Morphology
	Nominal Range	D50		
Metco 320NS	-212 +22 µm	63 µm	Grey	Spheroidal

Particle size analysis for upper particle size using sieve in accordance with ASTM B214; lower size analysis and D50 determined using laser diffraction (Microtrac).

2.3 Key Selection Criteria

- Metco 320NS offers an excellent combination of erosion resistance, corrosion resistance and abrasability.
- Coatings of Metco 320NS are compatible to run against untipped titanium, nickel alloy and steel blades and seal fins.

2.4 Related Products

- At comparable erosion resistance and abrasability, coatings of Metco 320NS exhibit better corrosion resistance than Metco 313NS and similar AlSi-graphite materials. Therefore, Metco 320NS is the material of choice for new compressor designs in the temperature regime up to 450 °C (840 °F).
- Use Metco 2042 for applications against untipped titanium blades and seal fins, if the application temperature exceeds the Metco 320NS capability.
- At application temperatures up to 325 °C (620 °F), Metco 601NS or Amdry 2010 may be a better selection than Metco 320NS, if improved abrasability and reduced abrasable transfer to the contact partner is required.

2.5 Customer Specifications

Product	Customer Specification
Metco 320NS	GE B50TF331 Industria de Turbo Propulsores SMM-905 MTU MTS 1544 Pratt and Whitney PMCS 5128-1 Rolls-Royce OMAT 3/252 Rolls-Royce plc MSRR 9507/66 Rolls-Royce plc RRMS 40023 Snecma DMR 33.100

3 Coating Information

3.1 Key Thermal Spray Coating Information ^a

Specification	Typical Data	
Recommended Process	Atmospheric Plasma Spray	
Bond Coat	A high temperature bond coat is required, Metco 450NS, Amdry 956, Metco 443NS or Amdry 960 are recommended choices	
Macrohardness HR15Y	45 – 70	
GE Erosion Number ^b	3 – 5 s/mil	
Bond Strength (nominal)	10 – 17 MPa	1500 – 2500 psi
Coating Density	1.7 g/cm ³	
Maximum Service Temperature	450 °C	842 °F
Thermal Conductivity	25 W/m·K	
Thermal Expansion	26 x 10 ⁻⁶ /K	

^a For comprehensive information to achieve correct Metco 320NS coating characteristics, please refer to Metco Solutions Flash SF-0011.

^b GE test procedure E50TF121

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 Atmospheric Plasma Spray Guns

TriplexPro™ series	Metco 9MB series
SinplexPro™ series	Metco F4MB-XL series

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
Metco 320NS	1001587	5 lb (approx. 2.25 kg)	Stock	Global
	1304665 ^a	2.5 kg (approx. 5.5 lb)	Stock	Global

^a Required to meet GE specification

4.2 Handling Recommendations

- Store in the original container in a dry location.
- Tumble contents 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 50-375 (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 (Resources – Safety Data Sheets).

Information is subject to change without prior notice.