

Material Product Data Sheet

Nickel Aluminum for Sintered Abradable Honeycomb Fillers

Powder Products:
Metco 2101ZB, Metco 2110, Metco 2501

1 Introduction

Metco™ 2101ZB and Metco 2501 are used as abradable filler materials in the cells of honeycomb structures. The powder is sintered into the honeycomb to form part of a gas path seal.

Metco 2101ZB is comprised of an aluminum core, which is fully encapsulated in a nickel shell, forming a composite particle (see image). Metco 2501 contains a similar nickel aluminum composite powder that is blended with a fine nickel powder. Manufactured using the hydrometallurgy process, the composite particles in these materials demonstrate consistent chemistry and nickel shell thickness surrounding the aluminum core.

Metco 2110 is a blend of Metco 2101ZB and two additional material components in specific ratios.

When filled into honeycomb cells and sintered, the aluminum core of the composite diffuses into the nickel cladding. At the same time, a reaction occurs to form a nickel aluminide intermetallic compound, producing hollow NiAl spheres that help provide the necessary abradability of the filler. Sintering also causes the composite to expand in volume, which helps to secure the abradable within the honeycomb structure.

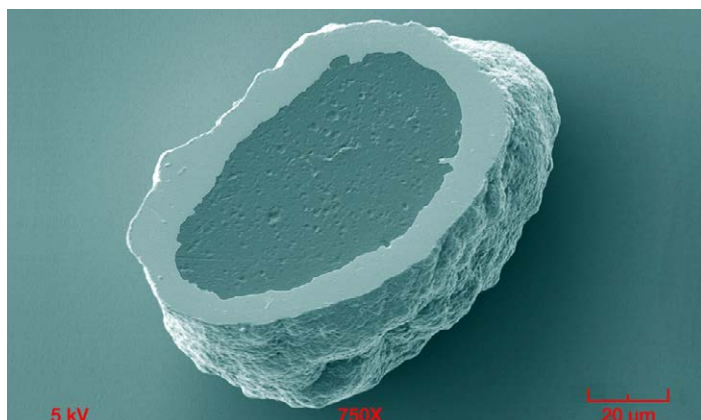
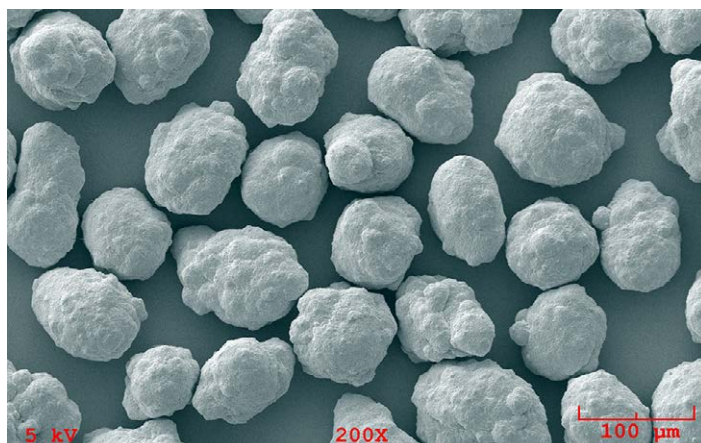
The sintered filler provides a thermal barrier in the honeycomb seal that protects the underlying carrier structure from hot gas oxidation, excessive thermal stress and distortion.

1.1 Typical Uses and Applications:

- Sintered abradable honeycomb filler for gas turbine engines.
- Nickel aluminide is oxidation resistant and can be used at operating temperatures up to 1050 °C (1920 °F).
- Metco 2101ZB may also be used as bond coat materials in thermal spray coating applications. Please see Thermal Spray Datasheet DSMTS-0029.

Quick Facts

Classification	Powder, nickel based
Chemistry	NiAl
Manufacture	Chemically clad composite orchemically clad composite blend
Morphology	Rounded
Apparent Density	3.2 – 3.5 g/cm ³
Service Temperature	≤ 1050 °C (1920 °F)
Purpose	Honeycomb filler
Process	Furnace sintering



SEM photomicrographs of Metco 2101ZB: Morphology (top), cross-section (bottom)

2 Material Information

2.1 Chemical Composition

	Weight Percent (nominal)				
	Ni	Al	C	Si	B
Metco 2101ZB	80	20	–	–	–
Metco 2110	81	14.53	3.75	0.14	0.26
Metco 2501	86	14	–	–	–

2.2 Manufacture, Size Distribution and Density

	Manufacture	Nominal Particle Size Distribution μm	Apparent Density g/cm^3
Metco 2101ZB	Chemically Clad Composite	–106 +45	3.2
Metco 2110	Chemically Clad Composite / Gas Atomized Blend	–45	Proprietary
Metco 2501	Chemically Clad Composite / Blend	–106 +45	3.5

Size analysis using sieve in accordance with ASTM B214

2.3 Key Selection Criteria

- Metco 2101ZB is specified for use in GE processes and applications to meet GE B50TF13, Class A and B.
- Metco 2110 is specified for use in GE processes and applications to meet the material blend of GE P5TF2, Bradelloy 607 (material blend only).
- Metco 2501 is specified for use in Rolls-Royce processes and applications and is a nickel aluminum composite blended with fine nickel powder.

2.4 Related Products

- Nickel Chrome Aluminum / Bentonite powders (Metco 312NS and Durabrade 2311) are used for honeycomb filler applications in the lower temperature regime up to 650 °C (1200 °F)
- When required by the process specifications, NiSiB braze filler metal Amdry 7903 and pure nickel powder Metco 56F-NS are available from Oerlikon Metco.
- Metco 2101ZB may be used as a bond coat material in thermal spray applications. Please refer to Thermal Spray Datasheet DSMTS-0029.

2.5 Customer Specifications

Metco 2101ZB	GE B50TF13, Class A and B
Metco 2110	GE P5TF2, Bradelloy 607 (material only; blend of GE B50TF13, GE B50TF26 and GE B50TF52)
Metco 2501	Rolls-Royce PLC MSRR 9570

3 Key Processing Information

Honeycomb abrasable sintered filler applications are proprietary to the specifying OEM. Please refer to OEM specifications and drawings for all processing information.

Detailed use of Metco 2101XX series products as a bond coat for thermal spray can be found on a separate datasheet.

4 Commercial Information

4.1 Ordering Information and Availability

	Order No.	Package Size	Availability	Distribution
Metco 2101ZB	1043511	10 lb (approx. 4.5 kg)	Special Order	Global
Metco 2110	1083394	40 lb (approx. 18 kg)	Special Order	Global
Metco 2501	1043570	5 kg (approx. 11 lb)	Stock	Global

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 the SDS (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).

	SDS No.
Metco 2101ZB	50-999
Metco 2110	50-1657
Metco 2501	50-1064