

# Material Product Data Sheet

## Amdry 103 Wide Gap Braze Filler Metal

### Products: Amdry 103

#### 1 Introduction

The Amdry™ 103 is a custom-blended powder of Amdry 100C (NiCrSi) and a non-melting filler material. It is designed for use in braze joints with inconsistent gaps or clearances too large to be successfully brazed with Amdry 100, Amdry 100C or Amdry 100F.

The silicon acts as a temperature depressant while the high chrome content provides improved joint strength and excellent oxidation and corrosion resistance. The very low amount of boron in Amdry 103 permits its use in many applications where boron would normally have a detrimental effect.

Gas atomization ensures excellent chemical homogeneity and high purity for consistent processing results.

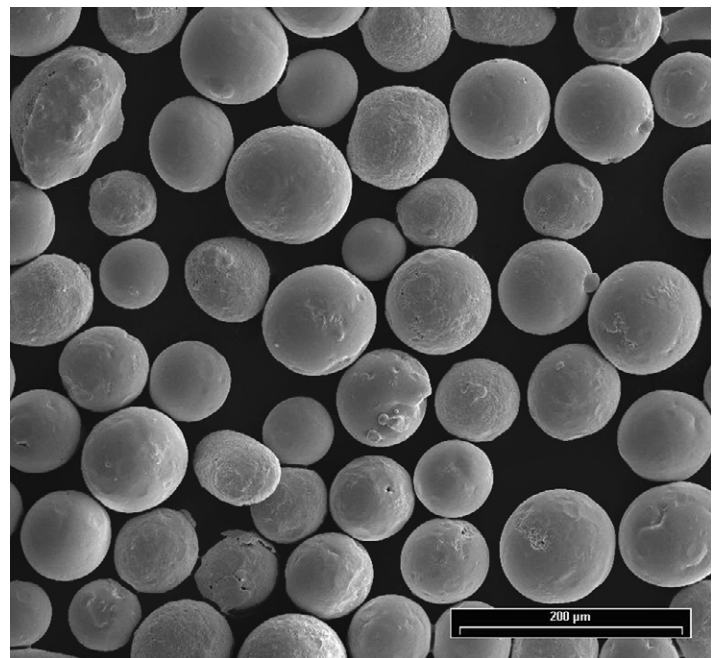
#### 1.1 Typical Use and Applications

Usually used as a brazed filler metal for:

- Joining superalloys and stainless steels where oxidation and corrosion resistance is required.
- Service conditions up to 1038 °C (1900 °F).
- Applications where boron cannot be tolerated.
- Thin-walled components such as honeycomb seals, heat exchangers and catalytic converters, where no erosion can be tolerated.
- Applications where excellent joint strength is required at elevated service temperatures.
- Applications with typical joint clearances of 0.10 to 0.255 mm (0.004 to 0.010 in) per side.
- Applications where small machining defects have left some areas of a joint wider than normal or uneven.

#### Quick Facts

Classification	Nickel-based alloy
Chemical formula	Ni 19Cr 10Si 10(Ni 2.15Si 0.95B)
Manufacture	Gas Atomization / Blended
Morphology	Spheroidal
Apparent density	7.65 g/cm <sup>3</sup>
Melting point	1135 °C (2075 °F)
Purpose	Joining
Process	Braze
Gap Size	0.1 – 0.255 mm (0.004 – 0.010 in)
Viscosity	Sluggish
Joint Strength	Good
Ductility	Good



SEM of typical gas atomized braze filler metal powder particles

## 2 Material Information

### 2.1 Nominal Chemistry

Product	Weight Percent							
	90% Braze Alloy Filler Metal				10% Non-Melting Filler			
	Ni	Cr	Si	Fe (max.)	Ni	Si	B	Fe (max.)
Amdry 103	Balance	18.5 – 19.5	9.8 – 10.3	0.2	Balance	1.8 – 2.5	0.7 – 1.2	0.5

### 2.2 Particle Size Distribution and Manufacturing Method

Product	Nominal Particle Size Range		Morphology	Manufacturing Method
	micrometers (µm)	Mesh (ASTM)		
Amdry 103	-106 +45 µm	-140 +325 mesh	Spheroidal	Blend of Two Gas Atomized Components

Other particle size distributions may be available on request. Please contact your Oerlikon Metco Account Manager.

### 2.3 Key Selection Criteria

- Amdry 103 is an excellent choice as a wide-gap braze filler metal, especially for applications where the gap is too wide for Amdry 100, Amdry 100C or Amdry 100F, or for applications where a more sluggish flow is desirable.
- Amdry 103 is available in powder, paste, tape or preforms. Please see the Commercial Section of this document and Materials Product Datasheets DSMB-0001 (paste) or DSMB-0002 (tape and preforms) for additional information.

### 2.4 Related Products

- Before considering an alternative product, customers should also review product compliance with required specifications.
- Amdry 100, Amdry 100C or Amdry 100F is recommended for narrow gap applications.

- Boron-free Amdry 105 and Amdry 108 can be considered for narrow gap applications where a reduced brazing temperature is desirable.
- Amdry 718B may be used for wide-gap applications on Inconel 718 and 713 components where higher amounts of boron can be tolerated.
- Amdry 9150 can be used as a wide-gap filler metal on stainless steel components when both boron and silicon can be tolerated. Amdry 9150 exhibits outstanding oxidation and hot corrosion resistance and joints of Amdry 9150 have a high tolerance to stress during austenizing and quenching operations.
- For more information on braze products appropriate for wide-gap applications, please see DSMB-0003 (Amdry Wide-Gap Braze and Filler Powders).

### 2.5 Customer Specifications

Amdry 103	GE B50TF142, Class A Rolls-Royce plc MSRR 9500/730
-----------	---

## 3 Braze Processing and Joint Information

### 3.1 Application

Amdry 103 is available as a dry gas atomized, low oxide, free-flowing powder. In the powder form, the alloy can be co-sprayed with a suitable binder, applied dry by sprinkling onto a prepared surface, or mixed with a high temperature braze cement. Once combined with cement, the material can be

sprayed on parts or applied by brush or syringe. For more efficient application, Oerlikon Metco also supplies Amdry 103 in paste, custom tape and custom preforms. Please see the the Commercial Information section for more information.

### 3.2 Key Processing Information

Substrate preparation	Clean and dry, free of oxides and organic contaminants. Nickel flash substrates rich in titanium or aluminum to improve flow through the joint.		
Flux requirements	None		
Recommended atmospheres	Vacuum		
Other atmospheres	Type	pure dry H <sub>2</sub>	
	Dew point	≤ -52 °C	≤ -60 °F
Melting range	Solidus	1080 °C	1975 °F
	Liquidus	1135 °C	2075 °F
Braze range	1165 °C – 1205 °C		2125 °F – 2200 °F
Viscosity	Sluggish		
Recommended gap size	0.1 – 0.255 mm		0.004 – 0.010 in

### 3.3 Key Braze Joint Information

Joint strength	Good
Joint ductility	Good
Corrosion resistance	Excellent
Oxidation resistance	Excellent
Appearance	Braze joint may not be as smooth as a typical joint. If a smooth, cosmetically pleasing joint is required, additional filler metal may be applied prior to brazing, or in subsequent furnace cycles.

### 3.4 Rebrazing

During the braze cycle, the braze filler metal interacts metallurgically with the substrate to alter the braze alloy's chemical composition, resulting in an increased remelt temperature. The new melting temperature cannot be accurately predicted; therefore, each particular application must be investigated for variation. If a rebraze operation is designed as part of

the original manufacturing process, or as a repair operation, it is important to determine the rebraze temperature. To ensure minimal effects on the original braze joint, it is best to braze at the upper limit of the braze range for the maximum time the part can withstand. It is then recommended that subsequent cycles be performed below the original braze temperature.

## 4 Commercial Information

### 4.1 Ordering Information and Availability

Product	Form	Order No.	Package Size	Availability	Distribution
Amdry 103	Powder	1000076	5 lb (approx. 2.25 kg)	Stock	Global

Braze paste is available on a special order basis, which can be formulated with various binders and delivered in bulk packaging, cartridges or syringes. Customized braze tape and preforms are available to meet specific customer requirements. Please contact your local Oerlikon Metco sales office or account representative for additional information.

## 4.2 Handling Recommendations

- Store powder in the original, closed container in a dry location. Tumble contents prior to use to prevent segregation.
- Paste should be stored tip down in the original packing container. See Materials Data Sheet DSMB-0001 (paste) for additional information.
- Store tape in sealed bags to minimize drying of the tape. Refer to Materials Data Sheet DSMB-0002 (tape and pre-forms) for additional information.

## 4.3 Safety Recommendations

See the SDS (Safety Data Sheet) for the product form and 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](http://www.oerlikon.com/metco) (Resources – Safety Data Sheets).

<b>Product</b>	<b>Product Form</b>	<b>SDS No.</b>
Amdry 103	Powder	50-1043
	Paste, CNT	50-1094
	Paste, CNG	50-1103
	Tape	50-1116