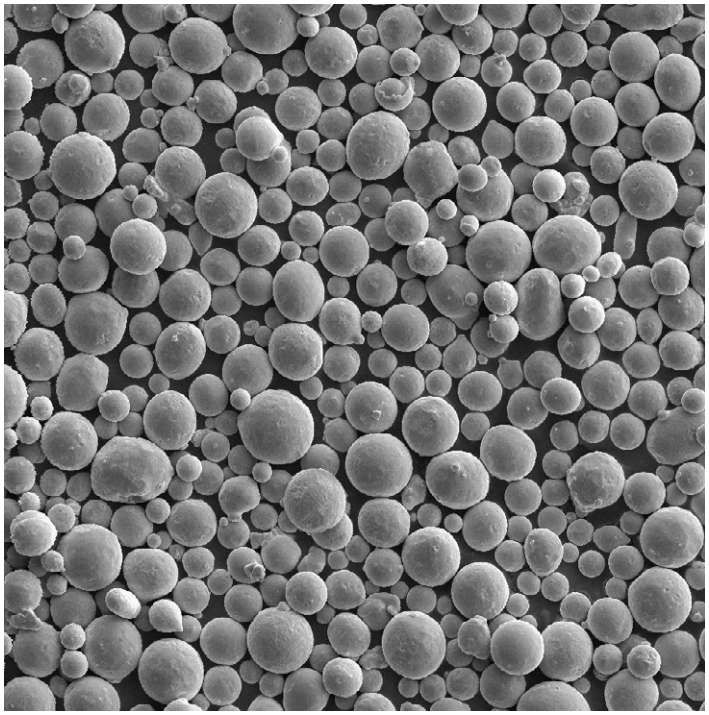
metco
joining & cladding

Material Product Data Sheet
Amdry Wide-Gap Braze and Filler Powders

Wide-Gap Braze Alloys:
Amdry 103, Amdry 718B, Amdry 790, Amdry 7901, Amdry 9150

Wide-Gap Filler Powders:
Metco 5640NS

Quick Facts	
Classification	Nickel-based
Chemical formula	Various
Manufacture	Gas Atomization or Precipitation
Morphology	Spheroidal
Melting point	Various
Purpose	Joining
Process	Braze
Gap Size	Larger joint gaps



SEM of typical, gas atomized wide-gap braze powder particles

1 Introduction

All braze alloys have recommended gap clearances that achieve the highest joint strength and the service conditions for which a part is designed. When joint gap size on components to be brazed exceeds the optimum joint clearance of the braze alloy, wide-gap brazing alloys or gap-filler powders can be used with excellent success. Use of these wide-gap materials will minimize voids, thus reducing or eliminating rework. Brazing oversized joint gaps with the wide-gap material can reduce costs and processing time. Development of wide-gap processes and procedures is recommended before introducing it into production.

Amdry™ wide-gap braze alloys, such as Amdry 103, have the ability to bridge wider gaps because of their retarded flow characteristics. These materials can be used in place of a more fluid alloy when the production specification allows.

For those applications where a change in alloys is not practical, a gap-filler powder, such as Metco 5640, can be blended with the braze the alloy. These materials act as a non-melting matrix that helps the braze alloy fill the joint.

Additional tips on wide-gap brazing are contained in the Metco paper, Wide-Gap Brazing: A Practical Approach to a Difficult Process.

1.1 Typical Use and Applications

- Brazing of any joint where the gap clearance is larger than can be filled with standard braze alloys without encountering voids or a reduction in joint strength.
- Wide-gap braze alloys are designed with a sluggish viscosity that can fill wider joint clearances.
- Wide-gap fillers are blended with standard braze alloys to increase the gap size of a successful braze joint.

2 Material Information

2.1 Nominal Chemistry, Particle Size Distribution and Alloy Type

Product	Nominal Chemistry	Nominal Particle Size Distribution		Type
		Micrometers (µm)	Mesh (ASTM)	
Amdry 103	Ni 19Cr 10Si 10(Ni 2.15Si 0.95B)	–106 +45	–140 +325	●
Amdry 718B	Ni 17.5Fe 18.5Cr 3Mo 5(Ta + Cb) 2B 1Ti	–125 +45	–120 +325	●
Amdry 790	Ni 2B 3.5Si	–106 +45	–140 +325	●
Amdry 7901	Ni 2B 3.5Si	–106 +45	–140 +325	●
Amdry 9150	Ni 14Cr 3B 4.5Si 4Fe	–106 +45	–140 +325	●
Metco 5640NS	Ni 20Cr	–125 +45	–120 +325	●

● Wide-gap braze alloy ● Wide-gap filler powder
For detailed chemistry information, please see the Materials data sheet for the individual product.

2.2 Key Selection Criteria

- Choose the Amdry wide-gap braze alloy that:
  - Meets the required customer material specification.
  - Is compatible with the substrate material.
- Choose the Amdry filler metal powder that:
  - Meets the required customer material specification.
  - Is compatible with the blended braze filler metal.
- Amdry 103 is blend of two gas atomized components. It is a good choice for thin-walled components and honeycomb applications where no erosion can be tolerated.
- Amdry 718B is highly suitable as a braze alloy for Inconel 718 and 713 components, with similar physical and metallurgical properties.
- Amdry 9150 exhibits outstanding oxidation and hot corrosion resistance and is suitable for brazing many types of stainless steels, steels and nickel-based alloys. Joints of Amdry 9150 have a high tolerance to stress during austenizing and quenching operations.
- Wide-gap braze alloys are available in powder, paste, customized tape and preforms. Please contact your Metco Joining & Cladding Account Manager for additional information.
- Metco Joining & Cladding offers custom blend braze alloys and wide-gap filler metals on a special order basis. Blend ratios are tightly controlled for highly consistent results. Please contact your Metco Joining & Cladding Account representative for more information.

2.3 Related Products

- Metco Joining & Cladding offers activated diffusion braze alloys (ADB) used for brazing larger gap sizes, voids and for surface restoration on critical, high service temperature components, particularly when blended with superalloy filler materials. ADB alloys include:

Amdry BRB	Amdry DF-3
Amdry DF-3-325	Amdry DF-4B
Amdry DF-6A	Amdry D-15

Please refer to the applicable material data sheet for more information on these products.

- Metco Joining & Cladding superalloy filler powders include:

Amdry 8670	Amdry MM509
Amdry MM509-C	Amdry Rene 80
Amdry X40	

Please see DSM-0239 Amdry Superalloy Filler Powders for more information.

2.4 Customer Specifications

Amdry 103	GE B50TF142, Class A Rolls-Royce plc 9500/730
Amdry 718B	GE B50TF203, Class A Turbine Airfoil Repair MS 1089
Amdry 790	AWS A5.8-04 BNi-4, 140F National Oilwell Varco FCMS-041 Rolls-Royce plc MSRR 9500/700 Rolls-Royce plc MSRR 9500/700T (Tape) SAE International AMS 4779, 140F
Amdry 7901	GE B50TF206 Class A Honeywell Allied Signal EMS 54752 Type X SAE International AMS 4779, 140C
Amdry 9150	American Welding Society AWS BNi-1 a Honeywell EMS 54752, Type XIII SAE International AMS 4776, 140F Tulsa Airfoil Repair MS 1062
Metco 5640NS	GE B50TF40, Class A

3 Processing and Braze Joint Information

3.1 Brazing Specifications for Wide-Gap Braze Alloys

Product	Recommended Gap Size	Solidus	Liquidus	Recommend Braze Range	Joint Strength	Ductility
Amdry 103	0.1 mm – 0.255 mm 0.004 in – 0.010 in	1080 °C 1975 °F	1135 °C 2075 °F	1165 °C – 1205 °C 2125 °F – 2200 °F	Good	Good
Amdry 718B	0.05 mm – 0.255 mm 0.002 in – 0.010 in	1105 °C 2020 °F	1230 °C 2250 °F	1230 °C – 1275 °C 2250 °F – 2325 °F	Excellent	Good
Amdry 790 Amdry 7901	0.05 mm – 0.3 mm 0.002 in – 0.012 in	980 °C 1800 °F	1065 °C 1950 °F	1065 °C – 1175 °C 1950 °F – 2150 °F	Good	Excellent
Amdry 9150	0.05 mm – 0.5 mm 0.002 in – 0.020 in	977 °C 1790 °F	1077 °C 1970 °F	1077 °C – 1204 °C 1970 °F – 2200 °F	Excellent	Good

3.2 Key Braze Joint Information

- Wide-gap filler powders do not melt during brazing. This is readily apparent in joint microsections.
- Filler powders are generally blended with standard braze alloys in a ratio of 10 to 30 % by weight of filler powder to braze alloy. Blend thoroughly before using.
- As an alternative, the gap-filler powder can be placed directly into the joint and the braze alloy applied on the top of the gap-filler powder to braze the filler in place.
- Braze tests are recommended to achieve optimum results.

3.3 Key Braze Processing Information

- Apply wide-gap braze alloy or wide-gap filler powder blended with an appropriate braze alloy to thoroughly clean components.
- Vacuum brazing is recommended. Please refer to the applicable braze filler metal product data sheet for more detailed braze processing information.

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
Amdry 718B	Powder	1001415	5 lb (approx. 2.25 kg)	Stock	Global
Amdry 790	Powder	1001429	5 lb (approx. 2.25 kg)	Stock	Global
	CNT Paste	1001428	3.5 oz (approx. 100 g) syringe	Special Order	Global
	CNT Paste	1020715	8 oz (approx. 227 g) cartridge	Special Order	Global
Amdry 7901	Powder	1001430	5 lb (approx. 2.25 kg)	Special Order	Global
Amdry 9150	Powder	1006416	10 lb (approx. 4.5 kg)	Stock	Global
Metco 5640NS	Powder	1030107	5 lb (approx. 2.25 kg)	Stock	Global

Other packaging combinations, customized braze tape and preforms are available to meet specific customer requirements.
Please contact your local Metco Joining & Cladding 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 (paste) for additional information.
- Store tape in sealed bags to minimize drying of the tape. Refer to Materials Data Sheet (tape and preforms) 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 Metco Joining & Cladding web site at www.metcojoiningcladding.com (Resources – Safety Data Sheets).

Product	Product Form	SDS No.
Amdry 103	Powder	50-1043
	CNG Paste	50-1103
	CNT Paste	50-1094
	Tape	50-1116
Amdry 718B	Powder	50-952
Amdry 790	Powder	50-1039
	CNG Paste	50-1108
	CNT Paste	50-1099
	Tape	50-1121
Amdry 7901	Powder	50-1039
Amdry 9150	Powder	50-777
	CNG Paste	50-1109
	CNT Paste	50-1100
	Tape	50-1122
Metco 5640NS	Powder	50-112