

Material Product Data Sheet

Amdry Superalloy Powders for Braze Repair

Powder Products:
Amdry 718, Amdry 8670,
Amdry MM509, Amdry MM509-C, Amdry Rene 80,
Amdry Rene 142A

1 Introduction

Amdry™ nickel and cobalt superalloy powders were developed as complimentary additives for Metco ADB (Activated Diffusion Braze) filler metals, such as Amdry DF-3, DF-4B, DF-6A or BRB, for crack repair and surface restoration. These superalloy products are produced by a dry gas atomization process to assure consistency, purity and conformity to rigid industrial, aerospace and military specifications.

Regardless of the base material that required brazing or repair, the wide range of Metco superalloy powders ensures the right choice and availability.

Metco superalloy products are produced and available as powders. While blending is typically performed by the customer, any ratios desired can be pre-blended for you. The powders can be delivered pre-blended with braze alloy powders for use with cements or gels. The blends can also be converted to paste, braze tape or braze preforms for a more precise and cost-effective method of application.

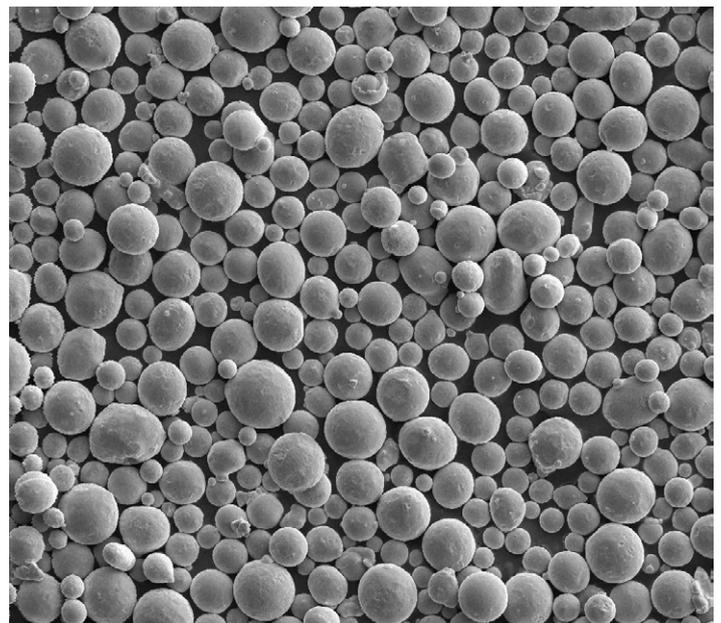
Amdry superalloy products do not contain temperature suppressants. Therefore, they are designed not to melt during the braze process, but to form a matrix within the braze joint that is metallurgically compatible with the substrate material.

1.1 Typical Use and Applications

- Blended in various ratios with ADB braze filler metals for
 - Crack repair and surface restoration on superalloy turbine airfoils and other turbine components.
 - General repair and restoration of superalloy-based components.
- Blended in various ratios with standard braze filler to form excellent wide-gap filler metals.

Quick Facts

Classification	Nickel and cobalt based superalloy powders
Chemical formula	Various
Manufacture	Gas Atomization
Morphology	Spheroidal
Purpose	Repair and restoration
Process	Braze
Gap Size	Wide-gap materials designed to increase gap size of braze filler metals



SEM of typical, gas atomized superalloy powder particles

2 Material Information

2.1 Nominal Chemistry and Particle Size Distribution

Product	Nominal Chemistry	Nominal Particle Size Distribution	
		Micrometers (µm)	Mesh (ASTM)
Amdry 718	Ni 19Cr 18Fe 3Mo 5(Nb+Ta) 0.5Al 1Ti 0.05C	-125 +45	-120 +325
Amdry 8670	Ni 10Co 10W 8.25Cr 5.5Al 1.4Hf 0.65Mo	-45 +5	-325 +5 µm
Amdry MM509	Co 24Cr 10Ni 7W 3.5Ta 0.6C	-45 +5	-325 +5 µm
Amdry MM509-C	Co 24Cr 10Ni 7W 3.5Ta 0.6C	-125 +45	-120 +325
Amdry Rene 80	Ni 14Cr 9.5Co 5Ti 4Mo 4W 3Al 0.17C	-125 +45	-120 +325
Amdry Rene 142A	Ni 12Co 7Cr 6Ta 6Al 5W 3Re 1.5Mo 1.5Hf 0.12C 0.015B	-90 +53	-170 +270

2.2 Chemical Composition (by weight %)

	Amdry 718	Amdry 8670	Amdry MM509	Amdry MM509-C	Amdry Rene 80	Amdry Rene 142A
Al	0.3 – 0.7	5.3 – 5.7			2.8 – 3.2	5.9 – 6.3
B		0.01 – 0.02			0.01 – 0.02	0.01 – 0.02
C	0.02 – 0.08	0.13 – 0.17	0.55 – 0.65	0.55 – 0.65	0.15 – 0.19	0.10 – 0.14
Co		9.0 – 11.0	Bal.	Bal.	9.0 – 10.0	11.4 – 12.0
Cr	17.0 – 21.0	8.0 – 8.8	22.5 – 24.25	22.5 – 24.25	13.7 – 14.3	6.6 – 7.0
Fe	15.0 – 21.0					0.2 (max)
Hf		1.2 – 1.6				1.3 – 1.7
Mo	2.8 – 3.0	0.5 – 0.8			3.7 – 4.3	1.3 – 1.7
Nb + Ta	4.75 – 5.50					
Ni	50.0 – 55.0	Bal.	9.0 – 11.0	9.0 – 11.0	Bal.	Bal.
Re						2.6 – 3.0
Ti	0.75 – 1.15	0.9 – 1.2	0.15 – 0.30	0.15 – 0.30	4.8 – 5.2	0.02 (max)
Ta		2.8 – 3.3	3.0 – 4.0	3.0 – 4.0		6.2 – 6.5
W		9.5 – 10.5	6.5 – 7.5	6.5 – 7.5	3.7 – 4.3	4.7 – 5.1
Zr		0.03 – 0.08	0.3 – 0.6	0.3 – 0.6		0.03 (max)
Other (max.)	2.12	0.83	0.52	0.52	3.43	0.91
Similar to	Inconel 718	Mar M 247	Mar M 509	Mar M 509	Rene 80	Rene 142

Inconel is a registered trademark of Huntington Alloys Corp.; Rene is a registered trademark of Teledyne Industries, Inc.; Stellite is a registered trademark of Deloro Stellite Holdings Corp.

2.3 Key Selection Criteria

- Choose the Amdry superalloy powder material that:
 - Meets the required customer material specification.
 - Is compatible with the substrate material.
 - Is compatible with the blended braze filler metal.
- Amdry MM509-C may be preferred to MM509 when brazing larger cracks or gap sizes.
- Typical blend ratios of braze alloy to superalloy are 50/50, 60/40 and 40/60; however, excellent results can be obtained with other ratios. Braze tests are recommended to achieve optimal results.
- Metco Joining & Cladding can offer these products pre-blended with the braze filler metal in powder, paste, tape or preforms. Please see the Commercial Section of this document and the data sheets for braze paste and braze tape/preforms for additional information.
- Proprietary blends are available to meet Pratt & Whitney specifications. Please refer Section 2.5.

2.4 Related Products

- Amdry superalloy materials are often blended with ADB braze alloys. Please review the data sheet for Amdry ADB braze alloys for more information. These include:

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

- For wide-gap applications on steels and stainless steels, Metco Joining & Cladding offers a variety of wide-gap braze alloys and filler powders. Please see the data sheet for Amdry Wide-Gap Powders for more information.

2.5 Customer Specifications

Superalloy Product	Customer Specification
Amdry 718	GE B50TF202, Class A MTU MTS 1376 SAE International AMS 5832 Tulsa Airfoil Repair MS 1088
Amdry 8670 ^a	Pratt Whitney PWA 36117-2
Amdry MM509	Canada Pratt & Whitney CPW 549-2 GE B50A988, Class B Pratt Whitney PWA 1185-2 Tulsa Airfoil Repair MS 1068
Amdry MM509-C	GE B50A988, Class A
Amdry Rene 80	GE B50TF183, Class A Tulsa Airfoil Repair MS 1086
Amdry Rene 142A	Chromalloy MODS 210289

Blended Products	Customer Specification
Amdry 485/509 ^a	Pratt Whitney PWA 1185
Amdry 8249 ^a	Pratt Whitney PWA 36117, Blend 2
Amdry 8626 ^a	Pratt Whitney PWA 36119 (specify Blend Ratio 1, 2, 3 or 4 when ordering)

^a Proprietary product that is only available to users approved by Pratt Whitney.

3 Key Braze Processing Information

- After cleaning the components to be brazed thoroughly, the braze filler / superalloy blend is applied.
- Superalloy material does not melt during brazing. This is readily apparent in joint microsections.
- 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 718	Powder	1001047	5 lb (approx. 2.25 kg)	Stock	Global
Amdry 8670	Powder	1002393	5 lb (approx. 2.25 kg)	Special Order	Global
Amdry MM509	Powder	1002099	5 lb (approx. 2.25 kg)	Stock	Global
Amdry MM509-C	Powder	1059330	10 lb (approx. 4.5 kg)	Stock	Global
Amdry Rene 80	Powder	1005578	5 lb (approx. 2.25 kg)	Stock	Global
Amdry Rene 142A	Powder	1099033	5 lb (approx. 2.25 kg)	Stock	Global

4.2 Proprietary and Customized Blends

For commercial information on proprietary blends, please see the applicable data sheet for the braze filler metal. Customized braze filler metal / superalloy blends in the form of powder, paste 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.

4.3 Handling Recommendations

Store in the original, closed container in a dry location and Tumble contents prior to use to prevent segregation.

4.4 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 Metco Joining & Cladding web site at www.metcojoiningcladding.com (Resources – Safety Data Sheets).

Product	SDS No.
Amdry 718	50-789
Amdry 8670	50-826
Amdry MM509	50-1023
Amdry MM509-C	50-1023
Amdry Rene 80	50-775
Amdry Rene 142A	50-803