

Material Product Data Sheet

Amdry D-15 Diffusion Braze Alloy

Products:

Amdry D-15 (Powder, Paste and Tape)

1 Introduction

Amdry™ D-15 is a spheroidal, inert gas-atomized nickel braze alloy containing boron as melt suppressant. This braze alloy will readily diffuse into the parent material during brazing or during a diffusion thermal cycle.

As an activated diffusion braze alloy, Amdry D-15 can be used for restoration or repair work when blended with a filler powder. Alternatively, it can be used as a high temperature braze alloy for applications where service conditions are at quite high temperature.

A diffusion cycle of 2 to 4 hours is typical for Amdry D-15. This is usually done at the end of the braze cycle or as a separate heat treatment. The additional time at this temperature promotes formation of a diffusion zone where the braze alloy and the base metal interface.

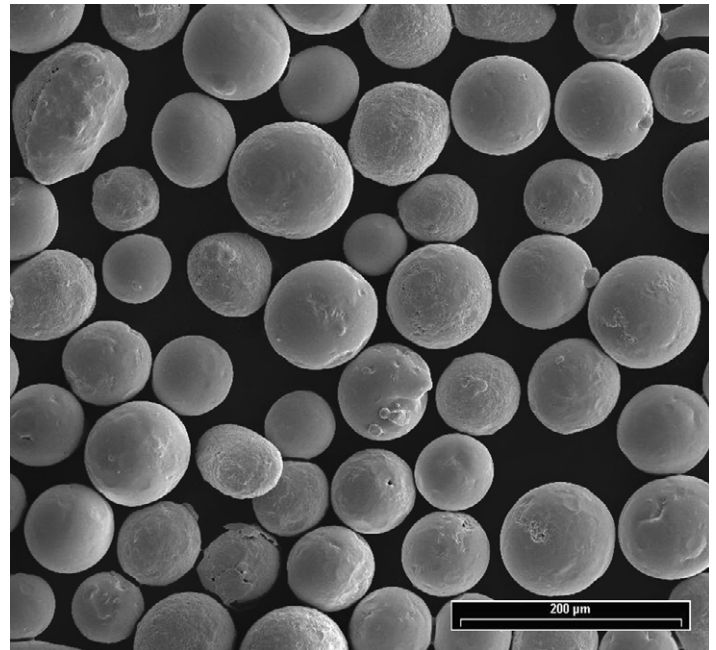
1.1 Typical Use and Applications

Usually used as a brazing filler metal for:

- Joining or repair of superalloy components such as Rene 80, IN 738, MM247 or Rene N4.
- Repair of cracks or damaged parts when Amdry D-15 mixed with a compatible superalloy or filler powder.
- Applications with service temperatures up to 1040 °C (1900 °F).

Quick Facts

Classification	Nickel-based diffusion braze alloy
Chemical formula	Ni 15Cr 10.25Co 3.5Ta 3.5Al 2.3B
Manufacture	Gas Atomization
Morphology	Spheroidal
Melting point	1163 °C (2125 °F)
Purpose	Joining, repair and restoration
Process	Brazing, diffusion brazing
Gap size	0.05 – 0.25 mm (0.002 – 0.010 in)
Viscosity	Medium flow
Joint strength	Excellent
Ductility	Good



SEM of typical gas atomized braze filler metal powder particles

2 Material Information

2.1 Chemical Composition

Product	Weight Percent					
	Ni	Cr	Co	Al	Ta	B
Amdry D-15	Bal.	14.8–15.8	9.5–11.0	3.2–3.7	3.0–3.8	2.1–2.5

2.2 Particle Size Distribution

Product	Nominal Range	
	Micrometers (µm)	Mesh (ASTM)
Amdry D-15	–125 +45	–120 +325

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

2.3 Key Selection Criteria

- Choose Amdry D-15 when it meets the required customer material specification, and/or the particle size distribution suitable to the application method to be used.
- Amdry D-15 is available as a powder. Paste and tape are available on a special order basis.
- Amdry D-15 can also be special ordered pre-blended in pre-defined ratios with a specified filler powder.

2.4 Related Products

- Before considering an alternative product, customers should also review product compliance with required specifications.
- Amdry DF-4B is another diffusion braze alloy with a chemistry similar to Amdry D-15. Amdry DF-4B contains

a small amount of yttrium that helps resolve wetting issues during brazing as a result of braze alloy or base metal oxide formation.

- Amdry DF-3, which has a higher chrome content, is a viable alternative to D-15 when corrosion resistance is a critical factor for the brazed component.
- A lower temperature alternative for braze repair is Amdry BRB. The chemistry of this diffusion braze alloy is quite similar to D-15, but can be successfully brazed at 1150 °C (2100 °F).
- Metco Joining & Cladding offers a broad portfolio of nickel-based braze filler metals that cover a wide variety of applications and service conditions. Please consult with us on your specific needs.

2.5 Customer Specifications

Amdry D-15	GE B50A942, Class A GE B50TF173 Class A Tulsa Airfoil Repair MS 1085
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3 Braze Processing and Joint Information

3.1 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		None	
Melting range	Solidus	1093 °C	2000 °F
	Liquidus	1163 °C	2125 °F
Braze range		1175 °C – 1220 °C	2150 °F – 2230 °F
Recommended diffusion cycle	2 – 4 h @	1080 °C	1975 °F
Viscosity		Medium flow	
Recommended gap size		0.05 – 0.25 mm	0.002 – 0.010 in

3.2 Key Braze Joint Information

Joint strength	Excellent
Joint ductility	Very Good
Corrosion resistance	Excellent
Oxidation resistance	Excellent

3.3 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 D-15	Powder	1001791	5 lb (approx. 2.25 kg)	Stock	Global

Other product forms and packaging combinations are available on a special order basis. Braze paste, 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 in the original, closed container in a dry location.
- Tumble contents prior to use to prevent segregation.

4.3 Safety Recommendations

See SDS 50-800 (Safety Data Sheet) for the product form and in the localized version applicable to 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).

Information is subject to change without prior notice.