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Material Product Data Sheet
Amdry DF-6A Diffusion Braze Alloy

Products: Amdry DF-6A

1 Introduction

Amdry™ DF-6A is an inert gas-atomized nickel diffusion braze alloy offered by Metco Joining & Cladding for braze repair of turbine engine components. The gas atomization process ensures chemical homogeneity and high purity for consistent processing results.

The high chrome content of Amdry DF-6A provides excellent oxidation and corrosion resistance in braze joints or repair sites. This braze alloy works well in any high temperature brazing application, especially those applications where silicon cannot be tolerated.

Amdry DF-6A contains boron as a readily diffusible melt suppressant. The diffusion of the boron works to raise the remelt temperature of the braze deposit, which allows for the higher service temperatures that make Amdry DF-6A a good choice for repairs on turbine components. In addition, since Amdry DF-6A does not contain titanium or aluminum, it flows well, creates smooth deposits and is suitable for use with water-based binders.
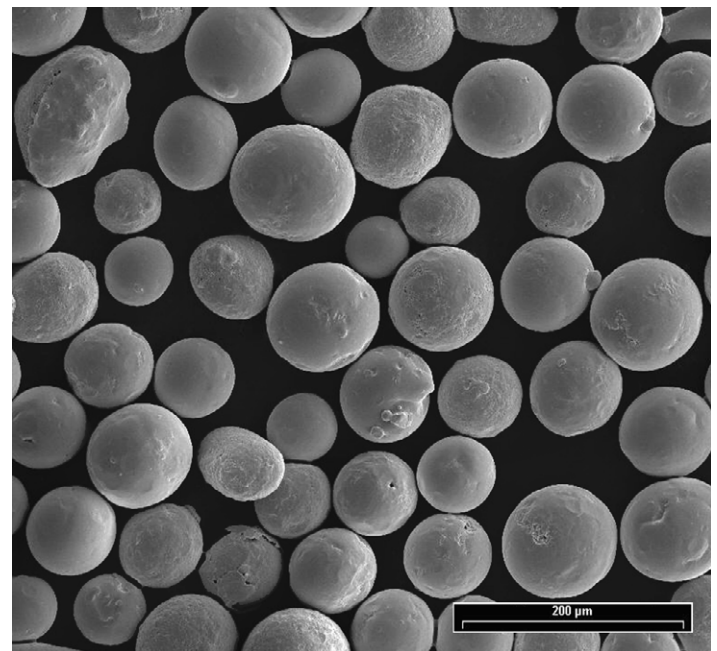
1.1 Typical Use and Applications

Usually used as a brazing filler metal for:

- Repair and restoration of superalloy components such as IN625, Hastelloy X, MA-754 and MM247
- Diffusion brazing where it is desirable to homogenize the braze joint to improve joint properties
- Crack repair of turbine engine components using Amdry DF-6A plus a non-melting powder such as a compatible superalloy or pure nickel
- Dimensional restoration of worn or damaged parts using Amdry DF-6A mixed with a superalloy powder

Quick Facts

Classification	Nickel-based diffusion braze alloy
Chemical formula	Ni 20Cr 3Ta 3.2B 0.03Y
Manufacture	Gas Atomization
Morphology	Spheroidal
Density	7.65 g/cm^3
Melting point	1160 °C (2120 °F)
Purpose	Joining, repair and restoration
Process	Diffusion brazing
Gap size	0.05 – 0.25 mm (0.002 – 0.01 in)
Viscosity	Medium
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	Ta	B	Y
Amdry DF-6A	Balance	19.0 – 21.0	2.5 – 3.5	2.8 – 3.5	0.01 – 0.05

2.2   Particle Size Distribution

Product	Nominal Range		
	micrometers (µm)	Mesh (ASTM)	AWS Grade
Amdry DF-6A	-106 +45	-140 +325	140C

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

2.3   Key Selection Criteria
■ Amdry DF-6A is available as a powder. Paste, tape or preforms to aid in application of DF-6A are available on a special order basis.
■ Amdry DF-6A can also be special ordered pre-blended to specific ratios with a filler metal appropriate to the specific application.

2.4   Related Products
■ Before considering an alternative product, customers should also review product compliance with required specifications.

■ Amdry BRB is another nickel-based diffusion brazing alloy that can be used for repair or restoration of superalloy components when additional ductility is required.
■ Amdry 775 can be substituted for many applications where a lower brazing temperature range is a necessity.
■ Metco Joining & Cladding offers a number of products appropriate for diffusion brazing joining and repair applications. Please refer to the Product Data Sheet for more information on these products and contact Metco Joining & Cladding with your specific requirements.

2.5   Customer Specifications

Amdry DF-6A	Honeywell EMS 54752, Type XIV
	Honeywell EMS 54752, Type XV

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	Type	pure dry H_2	
	Dew point	≤ -52 °C	≤ -60 °F
Melting range	Solidus	1052 °C	1925 °F
	Liquidus	1157 °C	2115 °F
Braze range		1170 °C – 1218 °C	2140 °F – 2225 °F
Recommended diffusion cycle	2 – 4 h @	1080 °C	1975 °F
Viscosity		Medium	
Recommended gap size		0.05 – 0.25 mm	0.002 – 0.01 in

3.2 Key Braze Joint Information

Joint strength	Excellent
Joint ductility	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 DF-6A	Powder	1018627	10 lb (approx. 4.5 kg)	Special Order	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 50-824 (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).

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