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joining & cladding

Material Product Data Sheet
Amdry 80X Series Iron-Based High Temperature Braze Filler Metal

Products: Amdry 805, Amdry 806A

1 Introduction

Low cost alternative to nickel-based filler metals: Amdry™ 805 And Amdry 806A are a unique, ferrous-chromium-based braze filler metals for high temperature applications at a substantially lower cost than comparable nickel-base filler metals while yielding high quality braze joints.

Boron free: Amdry 805 and Amdry 806A are good choices for applications where boron cannot be tolerated and can be used for longer braze cycles with no risk of erosion.

High chromium content: The high chromium content make these filler metals excellent choices for applications where the service conditions require high temperature oxidation and corrosion resistance at temperatures up to 980 °C (1800 °F)

Low viscosity: These filler metals can be used in applications with deep, narrow gaps. It is suitable for use in joints with a typical gap size of 25.5 to 101.5 µm (0.001 to 0.004 in) that have been designed for nickel brazing.

Gas-atomized: Amdry 805 and Amdry 806A are produced as a clean, dry powders with a precise and consistent particle size for repeatable processing results.

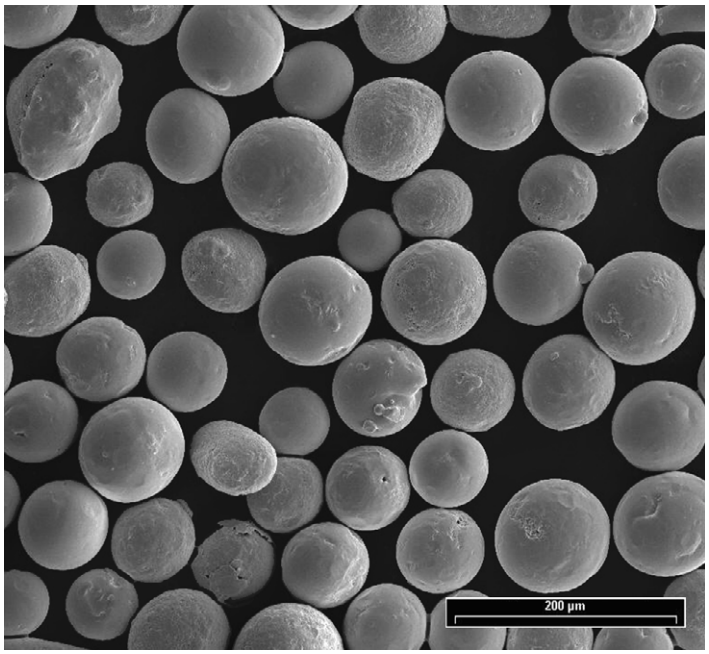
Process compatibility: Amdry 805 and Amdry 806A have excellent flow characteristics. Amdry 805 brazes in the same temperature range as BNi-5 (NiCrSi) filler metals, while Amdry 806A brazes in a temperature range very similar to BNI-2 (NiCrSiBFe). Therefore, little to no process changes are required to use these filler metals.

1.1 Typical Use and Applications

These filler metals are recommended for applications where the braze characteristics of nickel-based filler metals is desirable, but would be prohibitively expensive in components such as:

- Catalytic converters to replace BNi5.
- Large plate and fin type heat exchangers

Quick Facts		
Classification		Iron-based alloy
Chemical formula		FeCrNiSiP
Manufacture		Gas Atomization
Morphology		Spheroidal
Solidus	Amdry 805	1074 °C (1965 °F)
	Amdry 806A	995 °C (1823 °F)
Liquidus	Amdry 805	1104 °C (2020 °F)
	Amdry 806A	1021 °C (1870 °F)
Purpose		Joining
Process		Braze
Gap Size		0.025 – 0.10 mm (0.001 – 0.004 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

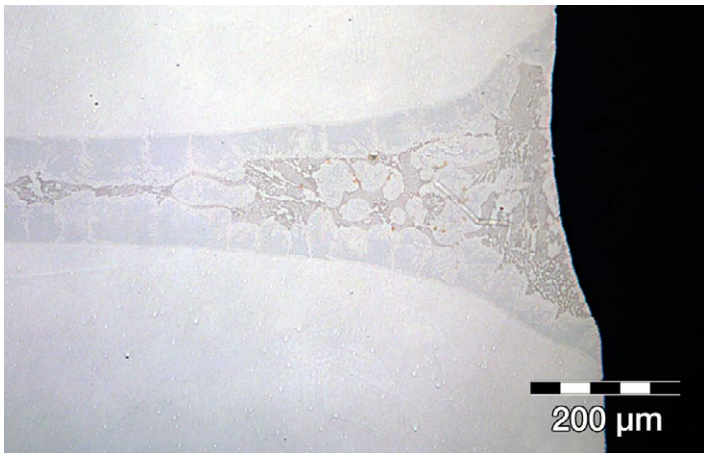
Product	Weight Percent					
	Fe	Cr	Ni	Si	P	Other
Amdry 805	Balance	28 – 30	15 – 20	6 – 7	5.5 – 6.5	0.2
Amdry 806A	Balance	20 – 22	30 – 33	5 – 6	9 – 10	0.2 - 0.4

2.2 Particle Size Distribution

Product	Nominal Range		
	micrometers (µm)	Mesh (ASTM)	AWS Grade
Amdry 805	–106 +45 µm	–140 +325 mesh	140F
Amdry 806A	–106 +45 µm	–140 +325 mesh	140F

2.3 Key Selection Criteria

- Amdry 80X series filler metals are designed for use on most steels, including most types of stainless steel. It will work equally well on nickel or cobalt superalloy components because of its high chromium content.
- Choose the powder that meets the required customer material specification, and/or the particle size distribution suitable to the application method to be used.
- Amdry 805 and Amdry 806A are available in powder form. Paste, tape or preforms can be supplied on a special order basis. Please see the Commercial Section of this document and the Metco Joining & Cladding Braze Paste Datasheet or Tape and Preforms Datasheet for additional information.



A typical joint brazed with cost-effective Amdry 805 exhibits excellent braze characteristics.

2.4 Related Products

- Before considering an alternative product, customers should also review product compliance with required specifications.
- Amdry 105 can be used for applications where a lower braze temperature is required.
- Amdry 100, which has a similar melting temperature for brazing, is more free-flowing and is a good choice for very tight, narrow gaps.
- Metco Joining & Cladding has 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.

3 Braze Processing and Joint Information

3.1 Key Processing Information

Amdry 80X series filler metals contain silicon and phosphorus as temperature suppressants, which enhances wetting during brazing. The narrow melting range of the filler metal minimizes liquation and enhances flow and capillary action. Amdry 805 wets very well to stainless steel and other nickel-based substrate materials.

		Amdry 805	Amdry 806A
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	None
Recommended atmospheres		Vacuum	Vacuum
Other atmospheres		Not Recommended	Not Recommended
Melting range	Solidus Liquidus	1074 °C (1965 °F) 1104 °C (2020 °F)	995 °C (1823 °F) 1021 °C (1870 °F)
Braze range	Nominal Optimum	1149 °C – 1202 °C (2100 °F – 2195 °F) 1163 °C – 1202 °C (2125 °F – 2195 °F)	1050 °C – 1100 °C (1922 °F – 2012 °F) 1070 °C – 1100 °C (1958 °F – 2012 °F)
Viscosity		Medium flowing	Medium flowing
Recommended gap size		25.5 – 101.5 µm (0.001 – 0.004 in)	25.5 – 101.5 µm (0.001 – 0.004 in)

3.2 Key Braze Joint Information

3.2.1 Joint strength

Comparable to standard nickel braze alloys such as BNi-5 and BNi-2.

3.2.2 Joint ductility

Good.

3.2.3 Corrosion resistance

Brazed coupons of these filler metals were tested for 150 h in 10 % solutions of HCL, NaCl and H_2SO_4 indicated no corrosion damage whatsoever. The coupons were reviewed for stability, etching and strength of the braze joint before and after immersion.

3.2.4 High temperature oxidation resistance

Melted button specimens of these filler metals were exposed to an air atmosphere for 24 h at 815 °C (1500 °F). Specimen weight changed insignificantly, demonstrating that Amdry 805 can withstand oxidation at higher service conditions.

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.

Amdry 806A Patent Applications:
US: 62/929,370
WIPO: WO/2021/096581

4 Commercial Information

4.1 Ordering Information and Availability

Product	Form	Order No.	Package Size	Availability	Distribution
Amdry 805	Powder	1059559	10 lb (approx. 4.5 kg)	Stock	Global
Amdry 806A	Powder	2303657	10 lb (approx. 4.5 kg)	Stock	Global

Other product forms and packaging combinations are available on a special order basis. 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.

4.3 Safety Recommendations

See SDS 50-1189 (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).

Product	SDS No.
Amdry 805	50-1189
Amdry 806A	50-2857

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