

Material Product Data Sheet

Amdry 805 High Temperature Braze Filler Metal

Products: Amdry 805

1 Introduction

Low cost alternative to nickel-based filler metals:

Amdry™ 805 is a unique, ferrous-chromium-based braze filler metal 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 is a good choice 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 (29% by weight) in Amdry 805 makes it an excellent choice for applications where the service conditions require high temperature oxidation and corrosion resistance at temperatures up to 980 °C (1800 °F)

Low viscosity: Amdry 805 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 is produced as a clean, dry powder with a precise and consistent particle size for repeatable processing results.

Process compatibility: Amdry 805 has excellent flow characteristics, brazes in the same temperature range as BNi-5 (NiCrSi) filler metals, so no process changes are required to use Amdry 805.

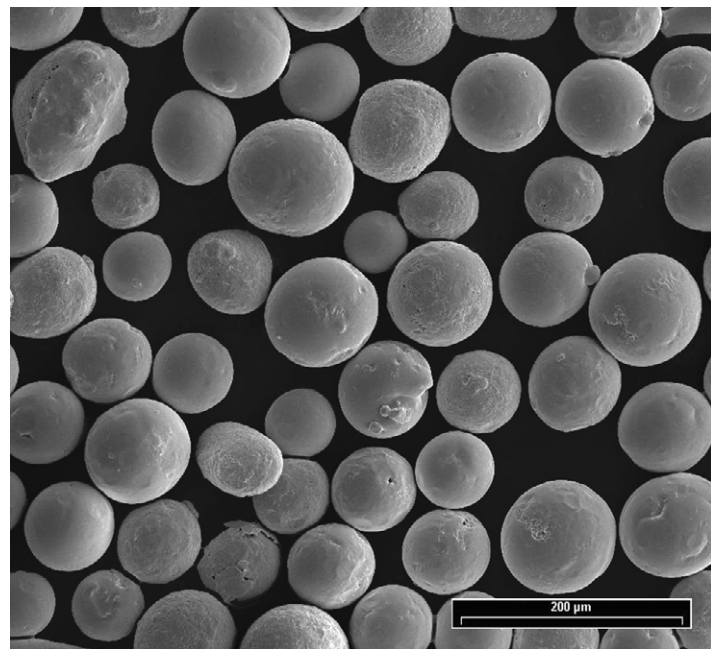
1.1 Typical Use and Applications

Amdry 805 is 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	Fe 29Cr 18Ni 7Si 6P 0.2RE
Manufacture	Gas Atomization
Morphology	Spheroidal
Apparent density	4 g/cm ³
Melting point	1104 °C (2020 °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	Rare Earths
Amdry 805	Balance	28 – 30	15 – 20	6 – 7	5.5 – 6.5	0.2

2.2 Particle Size Distribution

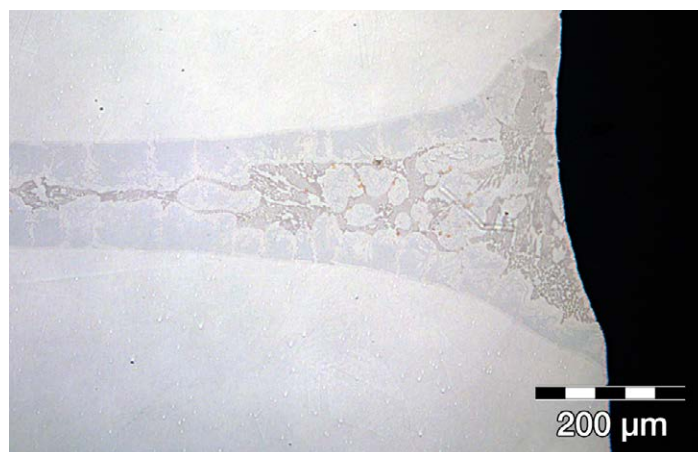
Product	Nominal Range micrometers (µm)	Mesh (ASTM)	AWS Grade
Amdry 805	-106 +45 µm	-140 +325 mesh	140F

2.3 Key Selection Criteria

- Amdry 805 is 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 is 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 Materials Product Datasheets DSMB-0001 (paste) or DSMB-0002 (tape and preforms) for additional information.

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.
- Oerlikon Metco 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.



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

3 Braze Processing and Joint Information

3.1 Key Processing Information

Amdry 805 contains 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.

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		Not Recommended	
Melting range	Solidus	1074 °C	1965 °F
	Liquidus	1104 °C	2020 °F
Braze range	Nominal	1149 °C – 1202 °C	2100 °F – 2195 °F
	Optimum	1163 °C – 1202 °C	2125 °F – 2195 °F
Viscosity		Medium flowing	
Recommended gap size		25.5 – 101.5 µm	0.001 – 0.004 in

3.2 Key Braze Joint Information

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

Joint ductility: Good.

Corrosion resistance: Brazed coupons of Amdry 805 tested for 150 h in 10% solutions of HCL, NaCl and H2SO4 indicated no corrosion damage whatsoever. The coupons were reviewed for stability, etching and strength of the braze joint before and after immersion.

High temperature oxidation resistance: Melted button specimens of Amdry 805 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.

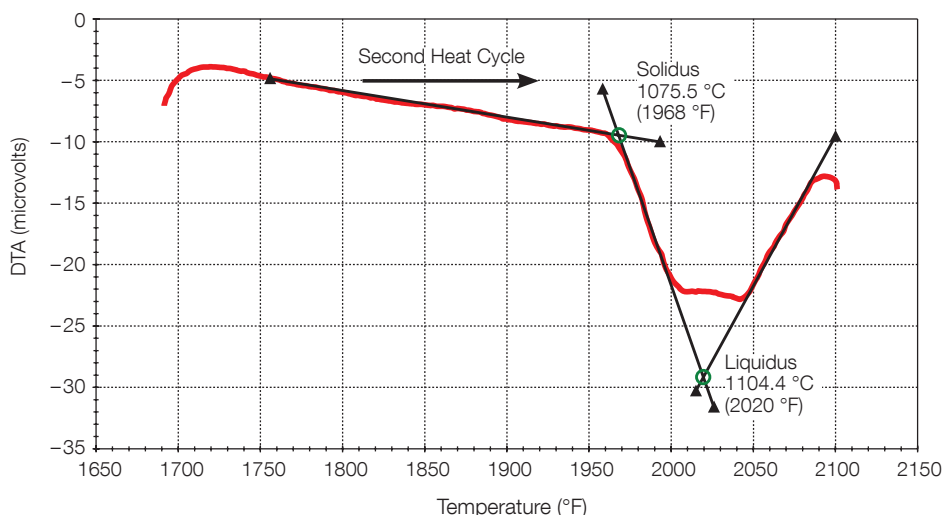
3.3 Differential Thermal Analysis

Two-cycle DTA in Argon

950 – 1180 °C @ 10 °C/min
(1742 – 2156 °F @ 18 °F/min).

3.4 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 re-braze 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 805	Powder	1059559	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 Oerlikon Metco 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 DSMB-0001 (paste) for additional information.
- Store tape in sealed bags to minimize drying of the tape. Refer to Materials Data Sheet DSMB-0002 (tape and preforms) for additional information.

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 Oerlikon web site at www.oerlikon.com/metco (Resources – Safety Data Sheets).