

Material Product Data Sheet

Amdry 780 Series Braze Filler Metals

Products:

Amdry 780, Amdry 7801, Amdry 7804

1 Introduction

The Amdry™ 780 series products are chrome-free, nickel braze alloys. Both silicon and boron are used as temperature suppressants. The alloy has a low melting temperature, which makes it an ideal candidate for brazing processes where the braze temperature has to be kept low. Joints of Amdry 780 exhibit excellent ductility, making Amdry 780 a very good choice for applications that undergo stress and/or strain in service.

Gas atomization ensures homogeneity of the elements in Amdry 780 series and delivers high purity powders for consistent processing results.

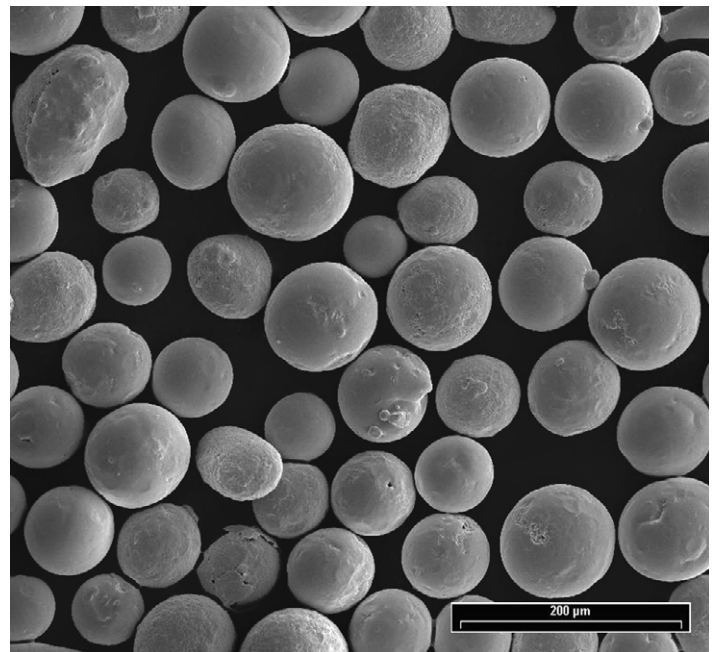
1.1 Typical Use and Applications

Usually used as a brazed filler metal for:

- Joining steels, stainless steels and nickel-based superalloy components.
- Braze applications requiring good joint strength combined with oxidation and corrosion resistance.
- Aerospace or industrial applications where the joints are under stress in service.
- Joint gaps of 0.012 – 0.1 mm (0.0005 – 0.004 in).
- Automotive heat exchangers, turbine engine struts, blades, nozzles and flanges are examples of parts typically brazed with Amdry 780.

Quick Facts

Classification	Nickel-based alloy
Chemical formula	Ni 4.5Si 3.2B
Manufacture	Gas Atomization
Morphology	Spheroidal
Melting point	1038 °C (1900 °F)
Purpose	Joining
Process	Braze
Gap Size	0.012 – 0.1 mm (0.0005 – 0.004 in)
Viscosity	Medium flow
Joint Strength	Very good
Ductility	Excellent



SEM of typical gas atomized braze filler metal powder particles

2 Material Information

2.1 Chemical Composition

Product	Weight Percent		
	Ni	Si	B
Amdry 780	Balance	4.0 – 5.0	2.75 – 3.5
Amdry 7801	Balance	4.0 – 5.0	2.75 – 3.5
Amdry 7804	Balance	4.35 – 4.65	2.75 – 3.10

2.2 Particle Size Distribution

Product	Nominal Range		
	Micrometers (µm)	Mesh (ASTM)	AWS Grade
Amdry 780	-106 +45	-140 +325	140F
Amdry 7801	-106 +45	-140 +325	140C
Amdry 7804	-106	-140	140F

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

2.3 Key Selection Criteria

- Choose the powder that meets the required customer material specification, and/or the particle size distribution suitable to the application method to be used.
- These filler metal materials are available in powder, paste, tape or preforms. 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, review product compliance with required specifications.
- Amdry 790, like Amdry 780, is a chrome-free braze alloy suitable for applications where chrome is not desirable. Amdry 790 has a sluggish viscosity, filling gaps larger than Amdry 780.
- Amdry 770 produces joints with higher corrosion and oxidation resistance while brazing within the same temperature range as Amdry 780.
- 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.

2.5 Customer Specifications

Amdry 780	AWS A5.8 BNi 3, 140F Honeywell Allied Signal EMS 54752 Type I National Oilwell Varco FCMS-040 NOV Wellbore Technologies DMS 5505 Rolls-Royce plc MSRR 9500/114 Rolls-Royce plc MSRR 9500/114T (Tape) SAE International AMS 4778, 140F
Amdry 7801	AWS A5.8 BNi 3, 140C GE B50TF205 Class A Honeywell Allied Signal EMS 54752 Type IX Rolls-Royce plc MSRR 9500/114 SAE International AMS 4778, 140C
Amdry 7804	AWS A5.8 BNi 3, 140F GE B50TF205, Class A Honeywell Allied Signal EMS 54752 Type I National Oilwell Varco FCMS-040 NOV Wellbore Technologies DMS 5505 Rolls-Royce plc MSRR 9500/114 SAE International AMS 4778, 140F Snecma PrEN 3927 Snecma PrEN 3928 (Tape)

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	Ar or pure dry H ₂	
	Dew point	≤ -52 °C	≤ -60 °F
Melting range	Solidus	982 °C	1800 °F
	Liquidus	1038 °C	1900 °F
Braze range	1010 °C – 1177 °C		1850 °F – 2150 °F
Viscosity	Medium		
Recommended gap size	0.012 – 0.1 mm		0.0005 – 0.004 in

3.2 Key Braze Joint Information

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

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 780	Powder	1001425	5 lb (approx. 2.25 kg)	Stock	Global
	CNT Paste	1001424	3.5 oz (approx. 100 g) syringe	Special Order	Global
	CNT Paste	1032397	8 oz (approx. 227 g) cartridge	Special Order	Global
Amdry 7801	Powder	1001426	5 lb (approx. 2.25 kg)	Stock	Global
Amdry 7804	Powder	1096746	5 lb (approx. 2.25 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 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 the SDS (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).

Product	Product Form	SDS No.
Amdry 780,	Powder	50-1039
Amdry 7801,	Paste, CNT	50-1097
Amdry 7804	Paste, CNG	50-1106
	Tape	50-1119