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# Material Product Data Sheet
## Amdry 790 Series Braze Filler Metals

**Products:**
**Amdry 790, Amdry 7901**

### 1 Introduction

Amdry™ 790 products are inert gas atomized, nickel braze alloys that contain boron and silicon as the temperature suppressants. When fully melted during brazing, Amdry 790 is viscous with a sluggish flow that is capable of filling larger braze joints. This material is the alloy of choice for components where large fillets are desirable or where the joint will be machined after brazing. Its low diffusion characteristics make it very appropriate for brazing thin wall components.

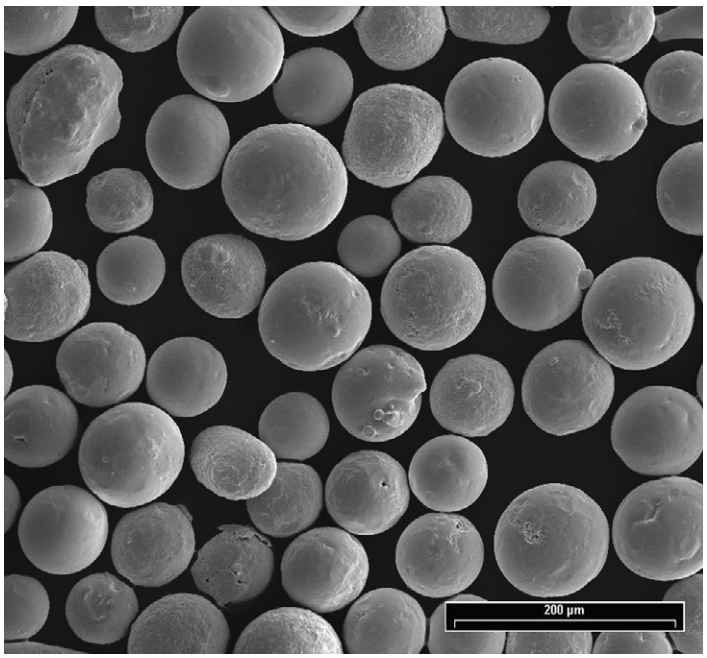
Gas atomization ensures homogeneity of the elements in Amdry 790 and delivers high purity powders for consistent processing results.

### 1.1 Typical Use and Applications

Usually used as a brazed filler metal for:

- Joining steels, stainless steels and nickel-based superalloy components
- Large joints and fillets that are easily machined
- Aerospace or industrial applications where the joints are under stress in service
- Joint gaps of 0.05 – 0.3 mm (0.002 – 0.012 in)
- Honeycomb brazing
- Joining thin-walled components
- Aircraft engine components

| Quick Facts | |
|---|---|
| Classification | Nickel-based alloy |
| Chemical formula | Ni 3.5Si 2B |
| Manufacture | Gas Atomization |
| Morphology | Spheroidal |
| Apparent density | 7.65 g/cm$^3$ |
| Melting point | 1065 °C (1950 °F) |
| Purpose | Joining |
| Process | Braze |
| Gap Size | 0.05 – 0.3 mm (0.002 – 0.012 in) |
| Viscosity | Medium |
| Joint Strength | Good |
| Ductillity | 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 790 | Balance | 3.0 – 4.0 | 1.50 – 2.20 |
| Amdry 7901 | Balance | 3.0 – 4.0 | 1.50 – 2.20 |

### 2.2 Particle Size Distribution

| Product | Nominal Range | | |
|---|---|---|---|
| | Micrometers (µm) | Mesh (ASTM) | AWS Grade |
| Amdry 790 | –106 +45 | –140 +325 | 140F |
| Amdry 7901 | –106 +45 | –140 +325 | 140C |

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.
- Amdry 7901 is required when the material must meet the General Electric specification.
- 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 780, like Amdry 790, is a chrome-free braze alloy suitable for applications where chrome is not desirable. Amdry 780 is less viscous, filling gaps smaller than Amdry 790.
- Amdry 770 is a good alternative when lower braze cycles are required.
- For applications where higher joint strength is required, Amdry 9150 can be used.
- 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 790 | AWS A5.8-04 BNi-4, 140F<br>National Oilwell Varco FCMS-041<br>Rolls-Royce plc MSRR 9500/700<br>Rolls-Royce plc MSRR 9500/700T (Tape)<br>SAE International AMS 4779, 140F |
| Amdry 7901 | GE B50TF206 Class A<br>Honeywell Allied Signal EMS 54752 Type X<br>Rolls-Royce plc MSRR 9500/700<br>Rolls-Royce plc MSRR 9500/700T (Tape)<br>SAE International AMS 4779, 140C |

## 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<br>Dew point | Ar or pure dry $H_2$<br>≤ –52 °C | <br>≤ –60 °F |
| Melting range | Solidus<br>Liquidus | 980 °C<br>1065 °C | 1800 °F<br>1950 °F |
| Braze range | | 1065 °C – 1175 °C | 1950 °F – 2150 °F |
| Viscosity | | Medium | |
| Recommended gap size | | 0.05 – 0.3 mm | 0.002 – 0.12 in |

### 3.2 Key Braze Joint Information

| | |
|---|---|
| Joint strength | 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 790 | Powder | 1001429 | 5 lb (approx. 2.25 kg) | Stock | Global |
| | CNT Paste | 1001428 | 3.5 oz (approx. 100 g) syringe | Special Order | Global |
| | CNT Paste | 1020715 | 8 oz (approx. 227 g) cartridge | Special Order | Global |
| | CNT Paste | 1032403 | 4 lb (approx. 1.8 kg) jar | Special Order | Global |
| Amdry 7901 | Powder | 1001430 | 5 lb (approx. 2.25 kg) | Special Order | 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 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 790, Amdry 7901 | Powder | 50-1039 |
| | Paste, CNT | 50-1099 |
| | Paste, CNG | 50-1108 |
| | Tape | 50-1121 |



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