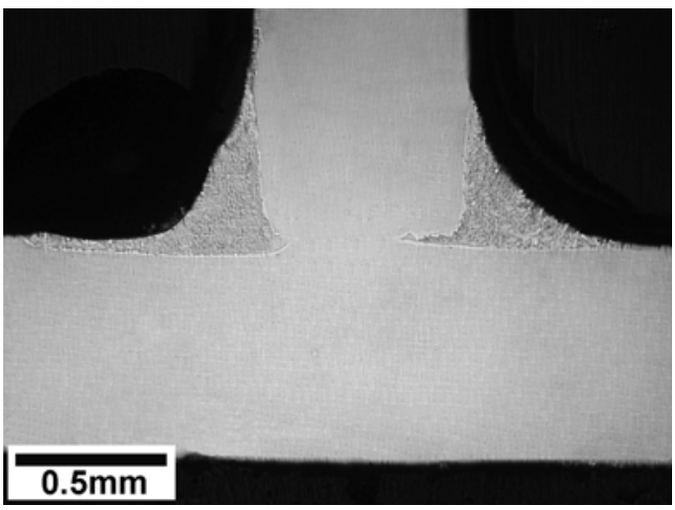
WALLCOLMONOY
HI TEMP BRAZING ALLOYS

WALLCOLMONOY LTD. (UK)
TECHNICAL DATA SHEET



*Photomicrograph of Niferobraz alloy on standard T-Specimen illustrates good flow and fill characteristics for Niferobraz 9080.*

# Niferobraz™

## Iron-Based Brazing Filler Metals for Applications Requiring High Strength and Ductility

## Description:

A range of cost effective iron-based Brazing Filler Metals, known as Niferobraz are available for evaluation as substitutes for nickel-based filler metals. They are available as powder, in a range of sieve sizes, or suspended in 'S' Binder™. Niferobraz filler metals, when supplied as specialized screen printing paste, produce excellent results.

## Forms Available:

**Powder:** -106 or -45 µm (-140 or -325 mesh)* atomised powder, special size distributions upon request.

**Paste:** Powder alloy premixed with proprietary binders to produce viscous paste suspensions.

**Upon request:** Also available as transfer tape, sheet and flux powder paste.

## Strength and Resistance:

Niferobraz Brazing Filler Metals have a high chromium content, which provides excellent oxidation resistance through 982°C (1800°F). Application specific tests are recommended.

| Niferobraz (iron-based) | Nominal Composition - % by weight | | | | | | | | Solidus | Liquidus |
|---|---|---|---|---|---|---|---|---|---|---|
| | Ni | Fe | Cr | P | Mo | Si | C | Cu | | |
| 9080 | 18 | Bal | 29 | 6 | - | 7 | >0.1 | - | 1015°C 1859°F | 1105°C 2021°F |
| EXP 379 | Bal | 28 | 25 | 6 | - | 6 | - | - | 1004°C 1839°F | 1041°C 1906°F |
| EXP 381 | Bal | 28 | 20 | 10 | - | - | - | - | 979°C 1794°F | 993°C 1819°F |
| EXP 382 | Bal | 27 | 25 | 6.5 | - | 5.5 | - | 1.5 | 998°C 1828°F | 1021°C 1870°F |
| EXP 388 | Bal | 25 | 26 | 10 | 0.7 | 2 | - | 1.5 | 1002°C 1836°F | 1038°C 1900°F |
| EXP 392 | Bal | 23 | 20 | 10 | - | 0.5 | - | 1.5 | 968°C 1774°F | 988°C 1810°F |

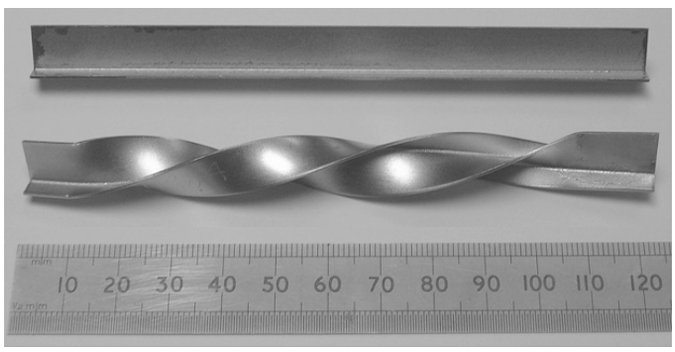
** AWS 5.8 Standards*

## Corrosion Resistance:

Tests in dilute sulphuric acid indicate comparable corrosion resistance to that of the nickel-based filler metals.

## Ductility:

Mechanical testing has shown that a 120mm. long brazed T-Specimen can be twisted through a 360 degree rotation without cracking or failure.




*A standard T-Specimen brazed with Niferobraz 9080 and twisted through 360°.*

Nominal Density

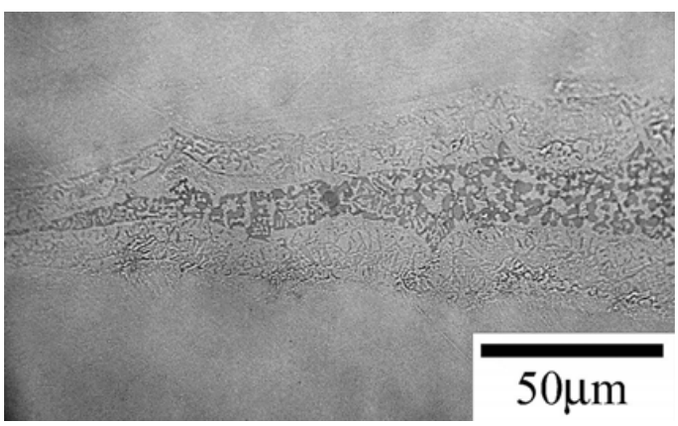
Theoretical = 7.4g/cm$^3$

Apparent density (-45 µm (325 mesh) powder) = 4.6g/cm$^3$

Apparent density (-106 µm (140 mesh) powder) = 4.5g/cm$^3$

Capillary Flow Characteristics

Niferobraz filler metals exhibit good flow characteristics in 0.025 - 0.1mm (0.001 - 0.004") clearance joints. Use close fit and apply a minimum amount of brazing filler material, to achieve optimum joint properties.




*A photomicrograph showing a brazed joint using Niferobraz 9080 on 304 steel.*

## How to Braze:

Application Methods

Niferobraz is manufactured in powder form. It can be mixed with Nicrobraz® 'S' Binder™, or purchased as premixed paste for application with a syringe or automatic dispensing system. It can also be mixed with Nicrobraz Cement, a liquid plastic binder, and applied as slurry by brush, eyedropper, or other appropriate means. For screen printing, stencil or roller coating application, a custom designed binder (contact Technical Services) may be required. The material can also be sprayed over large surface areas using the NicroSpray® System.

Furnace Brazing

Brazing temperatures of Niferobraz powders range between 1095 - 1232°C (2000 - 2250°F). For maximum flow, joint strength and ductility, braze at the high end of the range, with low joint clearance and hold for one hour.

Atmospheres of vacuum 1.33x10$^{-3}$ - 1.33x10$^{-5}$ mbar (10$^{-3}$ to 10$^{-5}$ Torr), or pure-dry hydrogen, nitrogen, inert gases, or blends of these gases with a dew point of -51°C (-60°F) or drier, are recommended. These provide good wetting and flow, promoting good diffusion.

## Applications:

Heat Exchangers, EGR Coolers, Catalytic Converters, Fuel Cells, Batteries, Potable Water Systems, and other assemblies that incorporate large surface areas with multiple braze joints.

## Industries:

Automotive, Heavy Equipment, Food and Beverage, Medical Equipment, Power Engineering, Marine, Aerospace and Military.

*EGR Cooler*

*Heat Exchanger/ Recuperator*

## Safety:

When handling metal powder alloys, avoid inhalation or contact with the skin or eyes. Conduct application operations in a properly ventilated area. For more information, consult, OSHA Safety and Health Standards available from U. S. Government Printing Office, Superintendent of Documents, P. O. Box 371054, Pittsburgh, PA 15250, and the manufacturer's Material Safety Data Sheet (MSDS). Read and understand the manufacturer's material safety data sheet before use.

## Storage Requirements:

Keep powders in a closed container and protect against moisture pick-up. The containers should be tumbled before using the powder. If moisture is adsorbed from the atmosphere, it can be removed and flowability can be restored by drying the powder, with the seal removed and lid loosened, at 66 - 93°C (150 - 200°F) for two hours prior to use.

*The information provided herein is given as a guideline to follow. It is the responsibility of the end user to establish the process information most suitable for their specific application(s). Wall Colmonoy Ltd (UK) assumes no responsibility for failure due to misuse or improper application of this product, or for any incidental damages arising out of the use of this material.*

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