LucasMilhaupt®
A Handy & Harman Company
Global Brazing Solutions®

Technical Data Sheet

HI-TEMP® 850

NOMINAL COMPOSITION

Nickel	Remainder
Chromium	19.0% ± 0.5%
Boron	0.03% Max
Silicon	9.75% - 10.50%
Phosphorous	0.02% Max
Carbon	0.06% Max
Sulfur	0.02% Max
Titanium	0.05% Max
Aluminum	0.05% Max
Zirconium	0.05% Max
Cobalt	0.10% Max
Selenium	0.005% Max
Other Elements (Total)	0.50% Max

PHYSICAL PROPERTIES

Color	Iron Gray
Melting Point (Solidus)	1975°F (1080°C)
Flow Point (Liquidus)	2075°F (1135°C)
Brazing Temperature Range	2100°F - 2200°F (1149°C - 1204°C)
Specific Gravity	6.24
Density (Lbs/in^3)	0.226
Electrical Conductivity (%IACS) [(1)]	N/A
Electrical Resistivity (Microhm-cm)	N/A

[(1)] IACS = International Annealed Copper Standard

PRODUCT USES

Hi-Temp 850 is a nickel-chromium-silicon brazing alloy powder used in high temperature strength and oxidation applications. Typically, this alloy is used for joining super alloys, corrosion and heat resistant steels, and alloys requiring good joint strength at high temperatures while maintaining good corrosion and oxidation resistant characteristics. Typical applications would include structural members in jet engines, turbines, thin walled heat exchangers, and automotive components.

BRAZING CHARACTERISTICS

Hi-Temp 850 has a wide melting range between its flow point and melting point, thus fast heating should be employed to avoid liquation. To achieve maximum flow, strength and joint ductility in furnace brazing, it is recommended to maintain a brazing temperature closer to 2200°F(1204°C). To avoid diffusion and erosion, brazing temperatures closer to 2100°F (1149°C) are preferred. In atmosphere brazing, base metals containing more than 0.5% aluminum and/or titanium (i.e. Inconel X and A286) are often nickel-plated (0.0005 in. to 0.0015 in. thick depending upon brazing temperature and cycle), if difficulties in wetting and bonding are encountered. On thinner sections or less ductile base metals, brazing should be done at the low end of the brazing range with small clearances, fast heating/cooling cycles, and a minimum quantity of brazing alloy to minimize erosion. The recommended joint clearance at brazing temperature ranges from 0.001 in. to 0.004 in. (0.03 mm to 0.10 mm).

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PROPERTIES OF BRAZED JOINTS

The properties of a brazed joint are dependent upon numerous factors including base metal properties, joint design, metallurgical interaction between the base metal and the filler metal. Joint ductility, strength and high temperature properties, and alloy re-melt temperature increase with increasing temperature and heating cycles, and decreasing joint clearances. Oxidation tests on Inconel for 500 hours in still air at 2200°F (1204°C) showed no deteriorations of fillet. Satisfactory corrosion resistance to liquid alkali metals (Na, K) and high temperature water were obtained in independent tests on Inconel and stainless steel.

AVAILABLE FORMS

Powder and paste.

Available mesh sizes for powder:

<u>325</u>
+200 Mesh: 0.5% Max
+325 Mesh: 10% Max
-325 Mesh: 90% Min

**Mesh sizes per AWS A5.8M/A5.8*

SPECIFICATIONS

Hi-Temp 850 alloy conforms to the following specifications:

- American Welding Society (AWS) A5.8/A5.8M BNi-5
- ASME Boiler & Pressure Vessel Code, Sec II-C, SFA-5.8 BNi-5
- International Organization for Standardization (ISO) 17672 Ni 650
- British Standard (BS) EN 1044 Ni 105
- Deutsches Institut für Normung (DIN) 8513 Part 5 L-Ni5
- Society of Automotive Engineers (SAE) / AMS 4782

APPLICABLE PRODUCT CODE(S)

The applicable Lucas-Milhaupt product code(s) for this technical data sheet: A00000474, Legacy Code: 77-850.

SAFETY INFORMATION

The operation and maintenance of brazing equipment or facility should conform to the provisions of American National Standard (ANSI) Z49.1, "Safety in Welding and Cutting". For more complete information refer to the Material Safety Data Sheet for Hi-Temp 850.

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