

## HI-TEMP<sup>®</sup> 810

### ***NOMINAL COMPOSITION***

Nickel	18.0 % ± 1.0%
Chromium	29.0 % ± 1.0%
Phosphorus	6.0 % ± 0.5%
Silicon	7.0 % ± 0.5%
Iron	Remainder
Other Elements (Total)	0.50% Max

### ***PHYSICAL PROPERTIES***

Color	Iron Gray
Melting Point (Solidus)	1965°F (1074°C)
Flow Point (Liquidus)	2020°F (1104°C)
Brazing Temperature Range	2125°F - 2195°F (1163°C - 1202°C)
Specific Gravity	5.73
Density (Lbs/in <sup>3</sup> )	0.207
Electrical Conductivity (%IACS) <sup>(1)</sup>	N/A
Electrical Resistivity (Microhm-cm)	N/A

<sup>(1)</sup> IACS = International Annealed Copper Standard

### ***PRODUCT USES***

Hi-Temp 810 is a new and unique gas-atomized, iron-chromium-base braze alloy for high temperature applications where the braze characteristics of nickel based filler metals is desirable, but would be prohibitively expensive in high volume production of automotive components such as; catalytic converters and large heat exchangers. This boron-free braze filler metal is an excellent choice in applications where the effects of boron are not acceptable. Hi-Temp 810, with 29% chromium (Cr) by weight, is an excellent choice for applications where the service conditions require high temperature oxidation and corrosion resistance.

### ***BRAZING CHARACTERISTICS***

Hi-Temp 810 melts and flows at a temperature of 2020°F (1104°C) and can be used with deep, narrow gaps, due to its lower viscosity. Suggested joint clearances at brazing temperature for Hi-Temp 810 are 0.000 in. – 0.002 in. (0.00 mm – 0.12 mm). It contains silicon and phosphorus as melt depressants, which enhances its wetting capability during brazing. The narrow melting range of the filler metal minimizes liquation and enhances flow and capillary action. It wets very well to various grades of stainless steels and nickel based substrate materials. Vacuum furnace brazing is the most common method for brazing Hi-Temp 810. A good vacuum pressure of 10<sup>-3</sup> Torr or better is desired when brazing with Hi-Temp 810, due to high chromium content in the braze filler metal. Other atmospheres of argon, nitrogen and pure, dry hydrogen, or a combination thereof, can also be used. To facilitate wetting and alloy diffusion in atmospheres other than vacuum, the dew point must be -60°F or better. No flux is required with any of the protected atmospheres listed. In atmosphere brazing, base metals containing more than 0.4% 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.

### ***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

## ***PROPERTIES OF BRAZED JOINTS (CONT.)***

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temperature properties, and alloy re-melt temperature increase with increasing temperature and heating cycles, and decreasing joint clearances. Hi-Temp 810 is comparable to standard nickel braze alloys such as AWS A5.8/A5.8M BNi-2 and BNi-5 in joint strength. High chromium in Hi-Temp 810 is expected to provide oxidation resistance at temperatures up to 1800°F (980°C). Braze coupon tests of Hi-Temp 810 immersed 150 hours in a solution of 10% hydrochloric acid, saline and 10% sulfuric acid have indicated no significant corrosion damage whatsoever. These braze coupons were reviewed for stability, etching of the braze joint and strength before and after the immersion.

## ***AVAILABLE FORMS***

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Powder and paste.

## ***SPECIFICATIONS***

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Hi-Temp 810 alloy conforms to the following specifications: N/A

## ***APPLICABLE PRODUCT CODE(S)***

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The applicable Lucas-Milhaupt product code(s) for this technical data sheet: 77-810.

## ***SAFETY INFORMATION***

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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 810.

## ***WARRANTY CLAUSE***

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