LucasMilhaupt®
A Handy & Harman Company
Global Brazing Solutions®

Technical Data Sheet

HI-TEMP® 820

NOMINAL COMPOSITION

Nickel	Remainder
Chromium	7.0% ± 1.0%
Boron	2.75% - 3.50%
Silicon	4.5% ± 0.5%
Iron	3.0% ± 0.5%
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)	1780°F (971°C)
Flow Point (Liquidus)	1830°F (1000°C)
Brazing Temperature Range	1850°F - 2150°F (1010°C - 1177°C)
Specific Gravity	7.21
Density (Lbs/in^3)	0.260
Electrical Conductivity (%IACS) (1)	N/A
Electrical Resistivity (Microhm-cm)	N/A

(1) IACS = International Annealed Copper Standard

PRODUCT USES

Hi-Temp 820 is a nickel-chromium-silicon-boron-iron brazing alloy powder with low joining temperature. It provides high temperature joint strength plus oxidation, corrosion, and abrasion resistance on thick sections of stainless steel, ductile nickel, and cobalt base alloys. Typical applications would include structural members in jet engines, turbines, chemical processing and nuclear equipment (not exposed to radiation), requiring lower brazing/heat treatment temperatures.

BRAZING CHARACTERISTICS

Fast heating should be employed to avoid liquation (melting and flow of only part of the brazing alloy). Hi-Temp 820 will flow into long, narrow joints, particularly at the higher brazing temperature, in reducing atmospheres (-60°F dew point or lower) or inert atmospheres (-80°F dew point or lower). 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. Recommended joint clearance at brazing temperature for Hi-Temp 820 is 0.001 in. – 0.004 in. (0.03 mm – 0.10 mm).

Lucas-Milhaupt, Inc. • 5656 S. Pennsylvania Ave • Cudahy, WI 53110 • Phone: 414.769.6000 • Fax: 414.769.1093 • www.lucasmilhaupt.com

Technical Data Sheet

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. The hardness decreases, due to diffusion of the boron onto the base metal and greater brazing-alloy/base-metal alloying. Notch-sensitive materials such as Rene 41 and thin sections of alloys containing chromium, molybdenum or tungsten may be adversely affected. Oxidation tests on Inconel for 500 hours in still air at 1800°F (980°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 304 and 310 stainless steel.

AVAILABLE FORMS

Powder and paste.

Available mesh sizes for powder:

140F	325
+100 Mesh: 0.5% Max	+200 Mesh: 0.5% Max
+140 Mesh: 10% Max	+325 Mesh: 10% Max
-325 Mesh: 55% Max	-325 Mesh: 90% Min

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

SPECIFICATIONS

Hi-Temp 820 alloy conforms to the following specifications:

- American Welding Society (AWS) A5.8/A5.8M BNi-2
- Society of Automotive Engineers (SAE) / AMS 4777

APPLICABLE PRODUCT CODE(S)

The applicable Lucas-Milhaupt product code(s) for this technical data sheet: 77-820.

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 820.

WARRANTY CLAUSE

Lucas-Milhaupt, Inc. believes the information contained herein to be reliable. However, the information is given by Lucas-Milhaupt, Inc. without charge and the user shall use such information at its own discretion and risk. This information is provided on an "AS IS" AND "AS AVAILABLE" basis and Lucas-Milhaupt, Inc. specifically disclaims warranties of any kind, either express or implied, including, but not limited to, warranties of title or implied warranties of merchantability or fitness for a particular purpose. No oral advice or written or electronically delivered information given by Lucas-Milhaupt, Inc. or any of its officers, directors, employees, or agents shall create any warranty. Lucas-Milhaupt, Inc. assumes no responsibility for results obtained or damages incurred from the use of such information in whole or in part.

Lucas-Milhaupt, Inc. • 5656 S. Pennsylvania Ave • Cudahy, WI 53110 • Phone: 414.769.6000 • Fax: 414.769.1093 • www.lucasmilhaupt.com