LucasMilhaupt®
A Handy & Harman Company
Global Brazing Solutions®

Technical Data Sheet

HI-TEMP® 914

NOMINAL COMPOSITION

Nickel	Remainder
Cobalt	18.00% - 22.00%
Silicon	4.00% - 5.00%
Boron	2.75% - 3.15%
Iron	1.50% Max
Carbon	0.06% Max
Other Elements (Total)	0.50% Max

PHYSICAL PROPERTIES

Color	N/A
Melting Point (Solidus)	1780°F (971°C)
Flow Point (Liquidus)	1940°F (1060°C)
Brazing Temperature Range	1950°F - 2100°F (1066°C - 1149°C)
Specific Gravity	7.36
Density (Lbs/in^3)	.266
Electrical Conductivity (%IACS) [(1)]	N/A
Electrical Resistivity (Microhm-cm)	N/A

[(1)] IACS = International Annealed Copper Standard

PRODUCT USES

Hi-Temp 914 is a nickel-cobalt-silicon-boron brazing alloy powder with low joining temperature. The high cobalt promotes surface wetting of thin wall nickel and cobalt base materials, and limits the base metal erosion which is common with other boron and silicon bearing alloys. It provides high temperature joint strength plus oxidation, corrosion, and abrasion resistance even in service temperature ranging from 1600°F - 2200°F (871°C - 1205°C). Typical applications would include thin wall honeycomb assemblies, 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 914 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 914 is 0.001 in. – 0.004 in. (0.03 mm – 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. The hardness decreases, due to diffusion of the boron into 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.

AVAILABLE FORMS

Powder and paste.

SPECIFICATIONS

Hi-Temp 914 alloy does not correspond to any industry standard specifications, but does conform to the following specifications:

- The Boeing Company BTS1025-1
- Garrett Turbine Engine Company EMS 54752, Type IX

APPLICABLE PRODUCT CODE(S)

The applicable Lucas-Milhaupt product code(s) for this technical data sheet: 77-914.

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 Safety Data Sheet for Hi-Temp 914.

WARRANTY CLAUSE

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