LucasMilhaupt®
A Handy & Harman Company
Global Brazing Solutions®

Technical Data Sheet

HI-TEMP® 095

NOMINAL COMPOSITION

Copper	52.5% ± 1.0%
Nickel	9.5% ± 1.0%
Manganese	Remainder
Other Elements (Total)	0.50% Max

PHYSICAL PROPERTIES

Color	Red Gray
Melting Point (Solidus)	1615°F (880°C)
Flow Point (Liquidus)	1700°F (925°C)
Brazing Temperature Range	1700°F - 2000°F (925°C - 1095°C)
Specific Gravity	8.35
Density (lbs/in^3)	0.302
Electrical Conductivity (%IACS) (1)	14.7
Electrical Resistivity (Microhm-cm)	11.7

(1) IACS = International Annealed Copper Standard

PRODUCT USES

Hi-Temp 095 is a ductile copper-nickel-manganese filler metal designed for intermediate temperature brazing of carbides, cast irons, steel, stainless steels and nickel base heat-resistant alloys. This filler metal is ideally suited for combined brazing/heat-treating. It is useful in the brazing of materials that may be harmed by the higher temperatures used in copper brazing. It also may be used to advantage in the brazing of materials that are subject to erosion and grain-boundary penetration associated with high boron (2% to 5%) brazing filler metals.

BRAZING CHARACTERISTICS

This filler metal is relatively free flowing and will flow into long, narrow joints, except when solution of excessive amounts of nickel raises the liquidus temperature. Fluxless brazing may be accomplished in dry hydrogen or argon of at least -80°F (-62°C) dew point or by vacuum at 10^{-3} torr or better where preferred joint clearances are in the range of 0.001 in. to 0.003 in. (.03 mm to .08 mm). Induction or torch brazing with Handy Hi-Temp® Boron Modified flux can be accomplished with joint clearances of 0.002 in. to 0.005 in. (.05 mm to .127 mm).

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.

	Shear Strength (lbs/in^2)
Tungsten Carbide/SAE 8740	28,000 - 37,000

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PROPERTIES OF BRAZED JOINTS (CONT.)

Table 1. Tensile Strength Data For Torch Brazed Butt Joint Assemblies

Base Metal Type	Test Temp. °F	Test Temp. °C	Test Bar Diameter (in.)	Average Tensile Strength (lbs/in^2)	Maximum Tensile Strength (lbs/in^2)	Minimum Tensile Strength (lbs/in^2)	Average Joint Gap (in.)
304 Stainless Steel	Room		0.250	54,600	59,700	51,300	0.0069
304 Stainless Steel	800	425	0.250	46,000	57,000	32,700	0.0022

Table 2. Tensile Strength Data For Atmosphere Brazed Joint Assemblies
(100% Hydrogen Atmosphere, 1 Min. At 1900°F (1040°C))

Base Metal Type	Test Temp. °F	Test Temp. °C	Test Bar Diameter (in.)	Average Tensile Strength (lbs/in^2)	Minimum Tensile Strength (lbs/in^2)	Maximum Tensile Strength (lbs/in^2)	Average Joint Gap (in.)
304 Stainless Steel	Room		0.250	73,300	85,400	58,400	0.0013
304 Stainless Steel	800	425	0.250	55,600	58,600	47,200	0.0015

CORROSION RESISTANCE

Brazed joints showed no interface corrosion after two-month exposure to aerated tap water. Salt-spray test showed slight fillet-edge interface corrosion. For chemical applications, corrosion test under contemplated service conditions should be made to determine the suitability of the filler metal.

AVAILABLE FORMS/STORAGE REQUIREMENTS

Wire, strip, engineered preforms, specialty preforms per customer specification.

While the bulk alloy is only slightly corroded by water, the formation of manganese oxide in wet or humid environments is a concern. When stored in an atmosphere with high levels of moisture, the manganese oxide formation causes the bulk braze alloy to becomes very brittle which could lead to fracture during handling. To avoid this issue, Hi-Temp 095 should always be stored in a cool, dry environment (65°F (18°C)-75°F(24°C)).

SPECIFICATIONS

Hi-Temp 095 alloy conforms to the following specifications:

- Society of Automotive Engineers (SAE) / AMS 4764

APPLICABLE PRODUCT CODE(S)

The applicable Lucas-Milhaupt product code(s) for this technical data sheet: 77-095.

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 095.

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