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A Handy & Harman Company
Global Brazing Solutions®

Technical Data Sheet

SILVALOY® 721
(BRAZE™ 721 VTG[1], SILVALOY® B72V)

NOMINAL COMPOSITION

	Silvaloy 721 Grade 1
Silver	72.0% ±1.0%
Copper	Remainder
Zinc	0.001% Max
Cadmium	0.001% Max
Lead	0.002% Max
Phosphorous	0.002% Max
Carbon	0.005% Max
Other high vapor pressure elements each [1]	0.001% Max
Total all high vapor pressure elements (Including zinc, cadmium, and lead)	0.010% Max
Total all other impurity elements	0.01% Max

[1] Vacuum Tube Grade
[2] Elements with a vapor pressure higher than 10^{-7} Torr (1.3×10^{-5} Pa) at 932ºF (500ºC)

PHYSICAL PROPERTIES

Color	White
Melting Point (Solidus)	1435ºF (780ºC)
Flow Point (Liquidus)	1435ºF (780ºC)
Brazing Temperature Range	1435ºF - 1700°F (780°C - 925°C)
Specific Gravity	10.01
Density (Troy oz/in^3)	5.28
Electrical Conductivity (%IACS) [3]	87.0
Electrical Resistivity (Microhm-cm)	2.00

[3] IACS = International Annealed Copper Standard

PRODUCT USES

Silvaloy 721 is generally used to join silver, copper and nickel base alloys in reducing or inert atmospheres or vacuum. It is also widely used to join metallized ceramics to metals in vacuum. Silvaloy 721 is designed for all types of moderate temperature vacuum systems and particularly where maximum precautions must be taken to insure the presence of only a minimum amount of detrimental volatile impurities.

BRAZING CHARACTERISTICS

Silvaloy 721 is the silver-copper eutectic composition alloy and in melting it acts like a metallic element, i.e. it melts completely at a single temperature, thus it will quickly flow into long narrow joints. On either silver base or copper base alloys, Silvaloy 721 exhibits a decreased fluidity and an increased re-melt temperature due to the solution of either silver or copper in the eutectic. Brazing time and temperature should be minimized to prevent excessive diffusion and erosion of the base metal.

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BRAZING CHARACTERISTICS (CONT.)

This filler metal has limited wetting ability on iron and/on nickel base alloys. The wetting ability it does have is derived from its copper content. Both iron and nickel have practically no solubility in silver, while nickel is readily soluble in copper and the solubility of iron in copper is sufficient to provide wetting. It is an observed fact that the wetting obtained in good hydrogen atmospheres is superior to that derived from flux protection.

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. Butt joints have been brazed and tested for tensile strength at room temperature, on the listed metals, with the following typical results:

	Tensile Strength (lbs/in^2)
Copper	30,000 - 35,000
Brass	35,000 - 50,000
Nickel-Silver	35,000 - 40,000

CORROSION RESISTANCE

The results of limited corrosion tests on Silvaloy 721 (VTG) are as follows:

Solution	Test Temp.	Conditions	Loss in Weight $Mgs/dcm^2/Day$
Wet Ammonia Gas	Room	Closed Container	0.28
Dry Ammonia Gas	Room	Closed Container	None

A potential interface corrosion problem exists in stainless steel joints brazed with flux.

AVAILABLE FORMS

Wire, strip, engineered preforms, specialty preforms per customer specification, powder and paste.

SPECIFICATIONS

Silvaloy 721 (VTG) Grade 1 alloy conforms to the following specifications:

- American Welding Society (AWS) A5.8M/A5.8 BVAg-8 Grade 1
- ASME Boiler & Pressure Vessel Code, Sec II-C, SFA-5.8 BVAg-8 Grade 1

APPLICABLE PRODUCT CODE(S)

The applicable Lucas-Milhaupt product code(s) for Silvaloy 721:

- Grade 1: A00000207, Legacy Code: 27-721 (Wire, Strip, Powder), A00000310

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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 Silvaloy 721.

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