LucasMilhaupt®
A Handy & Harman Company
Global Brazing Solutions®

Technical Data Sheet

SILVALOY® 650, SILVALOY® 700 & SILVALOY® 750

(BRAZE™ 650 (Easy), BRAZE™ 700 (Medium) & BRAZE™ 750 (Hard))

NOMINAL COMPOSITION

	Silvaloy 650	Silvaloy 700	Silvaloy 750
Silver	65.0% ± 1.0%	70.0% ± 1.0%	75.0% ± 1.0%
Copper	20.0 ± 1.0%	20.0% ± 1.0%	22.0% ± 1.0%
Zinc	15.0% ± 2.0%	10.0% ± 1.0%	3.0% ± 1.0%
Other Elements (Total)	0.15% Max	0.15% Max	0.15% Max

PHYSICAL PROPERTIES

Color	White	White	White
Melting Point (Solidus)	1240°F (670°C)	1275°F (690°C)	1365°F (740°C)
Flow Point (Liquidus)	1325°F (720°C)	1360°F (740°C)	1450°F (790°C)
Specific Gravity	9.60	9.77	9.95
Density (Troy oz/in^3)	5.06	5.15	5.24
Electrical Conductivity (%IACS) (1)	21.3	26.7	53.4
Electrical Resistivity (Microhm-cm)	8.10	6.45	3.23

(1) IACS = International Annealed Copper Standard

PRODUCT USES

These brazing filler metals are commonly used in the silver-smithing trade and other applications where their silver-white color is advantageous in color matching, and the corrosion resistance of high-silver, low-zinc alloy is desired. These filler metals are often used in combination to perform sequential or step brazing of adjacent joints, to avoid re-melting the previously made joints. Because of their zinc content, these filler metals can be used to join iron and nickel-base alloys. The low-zinc content of Silvaloy 750 minimizes zinc fuming when furnace brazing, particularly in a controlled atmosphere without flux. The low-zinc content also causes very little change in the brilliance of the enamel, when enameling after brazing.

BRAZING CHARACTERISTICS

These alloys are intermediate silver brazing filler metals with a slight tendency to liquate (i.e. separate into low and high melting constituents) if heated slowly through their melting ranges. When these filler metals are used for brazing silver base alloys, the re-melt temperature is raised by solution of silver in the brazing alloy. Conversely, the re-melt temperature of this brazing alloy is lowered by solution of copper when brazing copper base alloys. Handy® Flux is generally used with these alloys.

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:

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

PROPERTIES OF BRAZED JOINTS (CONT.)

Silvaloy 650	Tensile Strength (lbs/in^2)	Elongation (% in 2 in.)
Copper	25,000 - 30,000	21.0 - 27.0
Brass	35,000 - 45,000	13.0 - 19.0
Nickel-Silver	55,000 - 60,000	20.0 - 25.0

Silvaloy 700	Tensile Strength (lbs/in^2)	Elongation (% in 2 in.)
Copper	30,000 - 33,000	5.00 - 7.00
Brass	25,000 - 30,000	16.0 - 27.0
Nickel-Silver	40,000 - 50,000	9.00 - 12.0

Silvaloy 750	Tensile Strength (lbs/in^2)	Elongation (% in 2 in.)
Copper	25,000 - 30,000	13.0 - 19.0
Brass	25,000 - 35,000	5.00 - 7.00
Nickel-Silver	40,000 - 50,000	8.00 - 13.0

CORROSION RESISTANCE

The following results were obtained from corrosion tests on the brazing alloys:

Solution	Test Temp	Conditions	Loss in Weight ($Mgs/dcm^2/Day$)		
			Silvaloy 650	Silvaloy 700	Silvaloy 750
1% Sulphuric Acid	203°F (95°C)	In vapors	None	-	-
10% Sulphuric Acid	203°F (95°C)	In vapors	40.3	-	-
5% Sulphuric Acid	Room	Constant Immerison	21.2	-	-
5% Sulphuric Acid	158°F (70°C)	Constant Immerison	61.9	-	-
10% Sulphuric Acid	Room	Constant Immerison	17.9	-	-
10% Sulphuric Acid	158°F (70°C)	Constant Immerison	93	-	-
20% Sulphuric Acid	Room	Constant Immerison	10.4	-	-
20% Sulphuric Acid	158°F (70°C)	Constant Immerison	63.9	-	-
1% Acetic Acid	203°F (95°C)	In vapors	-	10.9	10.9
10% Acetic Acid	203°F (95°C)	In vapors	-	34	37.2
Chlorine Water	Room	Partly Immersed	-	621	-

In addition to the tests above, brazed joints of copper, brass and nickel-silver have been subjected to corrosion tests. The loss in weight obtained with these tests is not given as it is not indicative of the resistance of the brazing alloy to corrosion because the area of the braze is small when compared to the total area of the specimen. At the conclusion of such tests the brazed joints in general showed less corrosion than the base metal and the brazing alloy stood up in relief where the base metal had dissolved faster than the joint. A potential corrosion problem exits if these alloys are used with flux to braze stainless steels.

AVAILABLE FORMS

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

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

SPECIFICATIONS

Silvaloy 650 alloy conforms to the following specifications:

- American Welding Society (AWS) A5.8/A5.8M BAg-9
- ASME Boiler & Pressure Vessel Code, Sec II-C, SFA-5.8 BAg-9
- Federal Specification QQ-B-654 BAg-9

Silvaloy 700 alloy conforms to the following specifications:

- American Welding Society (AWS) A5.8/A5.8M BAg-10
- ASME Boiler & Pressure Vessel Code, Sec II-C, SFA-5.8 BAg-10
- Federal Specification QQ-B-654 BAg-10

Silvaloy 750 alloy conforms to the following specifications: N/A

APPLICABLE PRODUCT CODE(S)

The applicable Lucas-Milhaupt product code(s) for Silvaloy 650: 32-650, 6379.

The applicable Lucas-Milhaupt product code(s) for Silvaloy 700: 32-700, 7708.

The applicable Lucas-Milhaupt product code(s) for Silvaloy 750: 32-750, 6767.

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 Silvaloy 650, Silvaloy 700 and 750.

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