

## **SILVALOY® 403** **(BRAZE™ 403, SILVALOY® A40N2)**

### ***NOMINAL COMPOSITION***

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Silver	40.0% ± 1.0%
Copper	30.0% ± 1.0%
Zinc	28.0% ± 2.0%
Nickel	2.0% ± 0.5%
Other Elements (Total)	0.15% Max

### ***PHYSICAL PROPERTIES***

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Color	Light Yellow
Melting Point (Solidus)	1220°F (660°C)
Flow Point (Liquidus)	1435°F (780°C)
Brazing Temperature Range	1435°F - 1535°F (780°C - 835°C)
Specific Gravity	8.84
Density (Troy oz/in <sup>3</sup> )	4.66
Electrical Conductivity (%IACS) <sup>(1)</sup>	16.8
Electrical Resistivity (Microhm-cm)	10.3

<sup>(1)</sup> IACS = International Annealed Copper Standard

### ***PRODUCT USES***

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Silvaloy 403 is an intermediate temperature brazing alloy for use on stainless steels, mild steels, cast and malleable irons and various non-ferrous alloys. This alloy is particularly useful for brazing stainless steel food containers and food handling equipment where a cadmium-free brazing alloy is specified.

### ***BRAZING CHARACTERISTICS***

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Silvaloy 403 is an intermediate temperature silver brazing filler metal with a fairly long (215°F/120°C) melting range. It has a tendency to liquate (i.e. separate into low and high melting constituents) and therefore it is preferable to use this filler metal where the assembly can be heated rapidly through the filler metal melting range, or where the assembly can be preheated before the filler metal is applied. Handy® Flux is normally used with Silvaloy 403 but where extra fluxing action is indicated, such as on some types of stainless steel or carbides, it may be found beneficial to use Handy® Flux Type B-1.

### ***PROPERTIES OF BRAZED JOINTS***

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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. Tensile strength of joints in butt joint configuration for stainless steels has ranged from 72,000 to 110,000 lbs/in<sup>2</sup> [PSI]. Data for shear strengths tested at room temperature included values in a range of 35,000 to 40,000 PSI.

## ***PROPERTIES OF BRAZED JOINTS (CONT.)***

The effect of temperature on the strength of 18-8 stainless steel butt joints has also been determined and the average of test results at each temperature is given below:

Tensile Strength (lbs/in <sup>2</sup> )	Test Temp.	Elongation (% in 2 in.)
80,500	Room	1.6
65,600	200°F (95°C)	2.4
51,700	400°F (205°C)	1.5
38,000	600°F (315°C)	0.0
13,600	800°F (425°C)	0.0
7,700	1000°F (540°C)	0.0

## ***CORROSION RESISTANCE***

A common corrosion test for stainless steel joints is the 20% salt spray test. During a 10-day exposure, joints in 18-8 stainless lost up to 50% of their original strength. Silvaloy 403 retards interface corrosion in brazed joints on stainless steels of the 300 and 400 series. Even so, joints in the 400 series remain more susceptible than those in the 300 series. Similar tests on copper and brass joints showed substantially no strength loss; joint in nickel-silver and Monel showed up to 25% loss of strength.

## ***AVAILABLE FORMS***

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

## ***SPECIFICATIONS***

Silvaloy 403 alloy conforms to the following specifications:

- American Welding Society (AWS) A5.8/A5.8M BAg-4
- ASME Boiler & Pressure Vessel Code, Sec II-C, SFA-5.8 BAg-4
- Federal Specification QQ-B-654 BAg-4

## ***APPLICABLE PRODUCT CODE(S)***

The applicable Lucas-Milhaupt product code(s) for this technical data sheet: 32-403, 2501.

## ***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 403.

## ***WARRANTY CLAUSE***

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