

## Description

The 4900 Lead Free Solder Sn96 (SAC 305) is an electronic grade solder alloy wire made of tin, silver, and copper (Sn/Ag/Cu). It meets and exceeds both the RoHS and J-STD-006 impurity level limits. The 4900 lead free wire maintains a consistent solder and flux percentage through a state of the art extrusion and wire drawing machine. This machine continually monitors the wire to prevent voids and ensure consistency.

This solder is a great alternative to leaded tin (Sn/Pb) solder.

## Benefits & Features

- **Lead Free**
- **Exceeds impurity requirements (J-STD-006) and RoHS compliant**
- **No clean flux**
- **Hard non-conductive residue**
- **One lb of lead free solder has 27% more length than leaded solder**

## Wire and Flux Parameters

<i>Properties</i>	<i>Value</i>	
Diameter	<i>millimeters</i> 0.81 mm	<i>inches</i> 0.032"
Tolerance	±0.03 mm	±0.002"
Std. Wire Gauge	21	
Flux Percentage	2 to 4%	
Flux feature	Excellent wettability, non-tacky residue	
Shelf life	indefinite	

## Solder Alloy Composition

<i>Properties</i>	<i>Value</i>	<i>Properties</i>	<i>Value</i>
<i>MAIN INGREDIENTS</i>		<i>IMPURITIES</i>	a)
Sn	96.8 to 95.7%	Pb	≤ 0.05% Max
Ag	2.8 to 3.2%	Sb	≤ 0.05% Max
Cu	0.4 to 0.6%	Bi	≤ 0.05% Max
		In	≤ 0.05% Max
		As	≤ 0.01% Max
		Fe	≤ 0.01% Max
		Ni	≤ 0.005% Max
		Au	≤ 0.002% Max
		Al	≤ 0.001% Max
		Cd	≤ 0.001% Max
		Zn	≤ 0.001% Max

a) Exceeds impurity requirements of J-STD-006

## Alloy Properties

<b>Physical Properties</b>	<b>Value</b> <sup>a)</sup>
Color	Silvery-white metal
Density (at 26 °C)	7.49 g/cm <sup>3</sup>
Hardness	15 HB
Tensile Strength	29.73 N/mm <sup>2</sup> [4,312 lb/in <sup>2</sup> ]
Yield Strength	25.68 N/mm <sup>2</sup> [3,724 lb/in <sup>2</sup> ]
Elongation	27%
Joint Shear Strength	
@20 °C and 0.1 mm/min	27 N/mm <sup>2</sup> [3,916 lb/in <sup>2</sup> ]
@100 °C and 0.1 mm/min	17 N/mm <sup>2</sup> [2,466 lb/in <sup>2</sup> ]
Creep Strength	
@20 °C and 0.1 mm/min	13.0 N/mm <sup>2</sup> [1890 lb/in <sup>2</sup> ]
@100 °C and 0.1 mm/min	5.0 N/mm <sup>2</sup> [725 lb/in <sup>2</sup> ]
<b>Electric Properties</b>	
<b>Value</b>	
Volume Resistivity	13 μΩ·cm
Electrical Conductivity <sup>b)</sup>	16.6% IACS
<b>Thermal Properties</b>	
<b>Value</b>	
Melting Point	217 to 221 °C [423 to 430 °F]
Tip temperature upper limit	Do not exceed 350 °C [662 °F]
Coefficient of Thermal Expansion (CTE) <sup>c)</sup>	23.5 ppm
Thermal Conductivity	58.7 W/(m·K)

a) N/mm<sup>2</sup> = mPa; lb/in<sup>2</sup> = psi;

b) International Annealed Copper Standard: 100% give  $5.8 \times 10^7$  S/m.

c) CTE for pure tin; units conversions: ppm/°C = μm/(m·K) = in/in/°C × 10<sup>-6</sup> = unit/unit/°C × 10<sup>-6</sup>

## Flux Core Properties

High temperature flux core designed for the 4900 lead free alloy. The flux uses synthetically refined resin and activator that wets and spreads like an RA type, without spattering.

<i>Physical Properties</i>	<i>Method</i>	<i>Value</i>
Flux Classification	J-STD-004	ORL0
Copper Mirror	IPC-TM-650 2.3.32	No removal of copper film
Silver Chromate	IPC-TM-650 2.3.33	Pass
Corrosion	IPC-TM-650 2.6.15	Pass
Acid Value	IPC-TM-650 2.3.13	190 to 210
Flux Residue Dryness	IPC-TM-650 2.4.47	Pass
Spitting of Flux-Core Solder	IPC-TM-650 2.4.48	0.3%
Solder Spread	IPC-TM-650 2.4.46	140 mm <sup>2</sup>
Post Reflow Residue	TGA Analysis	55%
SIR		
J-STD-004, Pattern Down	IPC-TM-650 2.6.3.3	$2.33 \times 10^{11} \Omega$
Bellcore (Telecordia)	Bellcore GR-78-CORE 13.1.3	$6.12 \times 10^{11} \Omega$
Electromigration	Bellcore GR-78-CORE 13.1.4	Pass

## Storage

Store between 18 to 26 °C [65 to 80 °F]. Protect from direct heat or sunlight.

## Cleaning

The no-clean residue does not need to be removed for typical applications. If removal is desired, a solvent system like the *MG 4140* can be used. For best results, warm the cleaning solution to about 40 °C [104 °F].

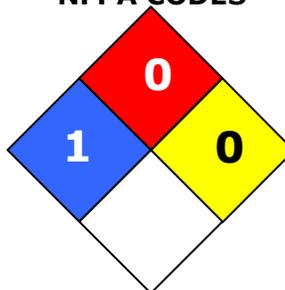
## Health and Safety

Please see the 4900 **Material Safety Data Sheet** (MSDS) for more details on transportation, storage, handling and other security guidelines.

### HMIS RATING

<b>HEALTH:</b>	<b>1</b>
<b>FLAMMABILITY:</b>	<b>0</b>
<b>PHYSICAL HAZARD:</b>	<b>0</b>
<b>PERSONAL PROTECTION:</b>	

### NFPA CODES



*Approximate HMIS and NFPA Risk Ratings Legend:*

0 (Low or none); 1 (Slight); 2 (Moderate); 3 (Serious); 4 (Severe)

**Health and Safety:** Avoid breathing fumes. Wash hands thoroughly after use. Do not ingest.

## Packaging and Supporting Products

### Product Availability

<i>Cat. No.</i>	<i>Form</i>	<i>Package</i>	<i>Net Weight</i>	
<b>4900-35G</b>	Solid	Pocket Pack <sup>a)</sup>	17 g	0.6 oz
<b>4900-112G</b>	Solid	Spool	113 g	0.25 lb
<b>4900-227G</b>	Solid	Spool	227 g	0.5 lb
<b>4900-454G</b>	Solid	Spool	454 g	1.0 lb

a) box of 25 pocket packs

## Technical Support

Contact us regarding any questions, improvement suggestions, or problems with this product. Application notes, instructions, and FAQs are located at [www.mgchemicals.com](http://www.mgchemicals.com).

Email: [support@mgchemicals.com](mailto:support@mgchemicals.com)

Phone: 1-800-201-8822 Ext. 128 (Canada, Mexico & USA)  
1-604-888-3084 Ext. 128 (International)

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Surrey, British Columbia, Canada  
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## Warranty

M.G. Chemicals Ltd. warrants this product for 12 months from the date of purchase by the end user. M.G. Chemicals Ltd. makes no claims as to shelf life of this product for the warranty. The liability of M.G. Chemicals Ltd. whether based on its warranty, contracts, or otherwise shall in no case include incidental or consequential damage.

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