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Description

The 49500WS *Sn100e Water Soluble Solder* is an electronic grade solder wire. It uses a high-purity, eutectic 99.5% tin, 0.5% copper, and cobalt alloy, which is complemented with a water soluble flux core. The 49500WS solder meets J-STD-004 and exceeds J-STD-006 specifications.

This solder is a great lead-free alternative to leaded solders. It generally provides better wetting, contact angle, flow, and visual appearance than typical Sn63/Pb37 no clean solders, while still delivering excellent performance characteristics. It offers superior solder penetration into plated through holes and surface mount interconnects. Further, it is a suitable replacement for SAC305 solder since the 49500WS forms brighter, shinier, and less grainy joints. Furthermore, it is less expensive.

The 49500WS solders achieve a consistent solder and flux percentage through a state-of-the-art, extrusion, wire-drawing machine. This machine continually monitors the wire to prevent voids and ensure consistency, providing a top-grade solder wire.

Benefits & Features

- **Eutectic alloy** (liquidus = solidus temperature)
- **Water soluble flux**
- **Fast wetting**
- **Fast flowing**
- **Low VOC**

COMPLIANCE

- ✓ Dobb Frank ([DRC conflict free](#))
- ✓ REACH ([compliant](#))
- ✓ RoHS ([compliant](#))

Wire Sizes Availability

<i>Cat No.</i>	<i>Std. Wire Gauge</i>	<i>Diameter</i>		<i>Packaging</i>	<i>Sizes</i>
49500WS	21	0.81 mm	0.032 in	Spool	1 lb

General Flux Parameters

<i>Properties</i>	<i>Value</i>
Residue Removal Flux Percentage Flux feature Shelf life	Required ^{a)} 3.3% Fast wetting, fast flowing, low VOC 5 y

a) Use DI water at 54-66 °C [130-150 °F]

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Flux Core Properties

The rosin activated flux wets rapidly and is fast flowing. It will not decompose and carbonize under prolonged heat. It is compatible with other water soluble organic fluxes.

Physical Properties	Method	Value
Flux Classification	J-STD-004	ORH1
Flux Type		Organic
Flux Activity		High
%Halides		>2%
Color	—	Opaque solid
Softening Point of Flux Extract		60 °C [140 °F]
Acid Number (mgKOH/g sample)	IPC-TM-650 2.3.13	180–200
Silver Chromate—Chlorides + Bromides	IPC-TM-650 2.3.33	Detection
Surface Insulation Resistance (SIR)	IPC-TM-650 2.6.3.3	>1.0 × 10 ⁹ Ω (cleaned)
Cleaning Requirements	—	Required ^{a)}

a) Use DI water at 54-66 °C [130-150 °F]

Sn100e Alloy Typical Literature Properties

Physical Properties	Value ^{a)}
Color	Silvery-white metal
Density @26 °C [78 °F]	7.4 g/cm ³
Tensile Strength	28 N/mm ² [4 100 lb/in ²]
Elongation	27%
Shear Strength	~20 N/mm ² [~2 900 lb/in ²]
Electrical Properties	Value
Volume Resistivity	12.3 μΩ·cm
Electrical Conductivity ^{b)}	15% IACS

a) N/mm² = mPa; lb/in² = psi;

b) International Annealed Copper Standard: 100% give 5.8 × 10⁷ S/m.

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Thermal Properties	Value
Melting Point, Solidus	228 °C [442 °F]
Melting Point, Liquidus	228 °C [442 °F]
Tip Temperature Upper Limit	Do not exceed 425 °C [800 °F]
Coefficient of Thermal Expansion (CTE) ^{c)}	23.5 ppm/°C
Thermal Conductivity	82 W/(m·K)
Specific Heat Capacity	294 J/(kg·K)

NOTE: This table present typical literature values for Sn99.5/Cu0.5/Co alloys.

c) CTE for pure tin; unit conversions: ppm/°C = $\mu\text{m}/(\text{m}\cdot\text{K}) = \text{in}/\text{in}/\text{°C} \times 10^{-6} = \text{unit}/\text{unit}/\text{°C} \times 10^{-6}$

Solder Alloy Composition

Properties	Value	Properties	J-STD-006	49500WS Values
MAIN INGREDIENTS	COMPOSITION	IMPURITIES ^{a)}	REQUIREMENTS	SPECIFICATIONS
Sn	99.3 to 99.7%	Sb	≤0.20% Max	≤0.025% Max
Cu	0.49 to 0.51%	Ag	≤0.10% Max	≤0.001% Max
Co	<0.1%	Bi	≤0.10% Max	≤0.01% Max
		In	≤0.10% Max	≤0.01% Max
		Pb	≤0.10% Max	≤0.05% Max
		Au	≤0.05% Max	≤0.0002% Max
		As	≤0.03% Max	≤0.0035% Max
		Fe	≤0.02% Max	≤0.005% Max
		Ni	≤0.01% Max	≤0.006% Max
		Al	≤0.005% Max	≤0.001% Max
		Zn	≤0.003% Max	≤0.001% Max
		Cd	≤0.002% Max	≤0.001% Max

a) Meets the requirements of J-STD-006

Storage

Protect from direct heat or sunlight. Keep at around between 18 to 27 °C [65 to 80 °F].

Cleaning

The flux residue must be removed for typical applications. Use de-ionized (DI) water at 54-66 °C [130-150 °F].

Health and Safety

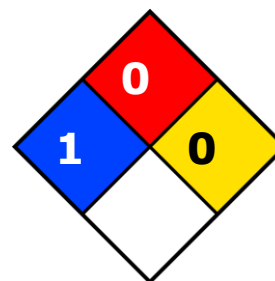
Please see the 49500WS **Safety Data Sheet** (SDS) for more details on transportation, storage, handling and other security guidelines.

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

HMIS® RATING

HEALTH:	* 1
FLAMMABILITY:	0
PHYSICAL HAZARD:	0
PERSONAL PROTECTION:	

NFPA® 704 CODES



Approximate HMIS and NFPA Risk Ratings Legend:

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

Soldering Instructions

To achieve best hand-soldering results

1. Set the tip temperature between 370–425 °C [700–800 °F].
2. Place the solder tip in contact with the joint connection (lead/pad surface) at an angle of around 50° to heat the parts to be soldered.
3. While the soldering tip is applied, touch the solder wire to the opposite side of the soldering joint, not to the soldering tip.
4. Immediately after the solder has flowed around the whole heated connection, remove the solder wire and remove soldering tip from connection.

TIP! Do not move the connection while the solder is cooling.

WARNING! Avoid putting too much or too little solder.

ATTENTION! To avoid damage, do not overheat electrical component.

Packaging and Supporting Products

<i>Cat. No.</i>	<i>Form</i>	<i>Packaging</i>	<i>Net Weight</i>
49500WS-454G	Solid wire	Spool	454 g 1.0 lb



ISO 9001 Registered Quality System.
Burlington, Ontario, Canada QMI File # 004008

Sn100e Water Soluble Solder 49500WS Technical Data Sheet

49500WS

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.

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Warranty

M.G. Chemicals Ltd. warranties 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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