

Description

The 4901 *Sn99 No Clean Solder Wire* is an electronic grade solder wire. It uses a high-purity, eutectic Sn99.3/Cu0.7 alloy, which is complemented with a no clean, synthetically refined, splatter-proof resin flux core. The 4901 solder meets J-STD-004B, ASTM B 32, and exceeds J-STD-006C specifications.

This solder is a great lead-free alternative to leaded solders. It is suitable, less costly replacement for SAC305.

The 4901 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)
- **Alloy exceeds J-STD-006C and meets ASTM B 32 purity requirements**
- **Flux meets J-STD-004B**
- **The resin spreads like rosin-activated flux**
- **Virtually non-splattering**
- **Non-corrosive**
- **Non-conductive residue**
- **Halide free**
- **Suitable for Use in Food Facilities as a Non-Food Chemical**—Canadian and NFS recognition letters available on request

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> |
|----------------|------------------------|-----------------|----------|------------------|---------------------|
| 4901 | 21 | 0.81 mm | 0.032 in | Spool | ¼, ½, 1 lb, or 2 lb |

General Flux Parameters

| <i>Properties</i> | <i>Value</i> |
|-------------------|---|
| Residue Removal | Not required |
| Flux Percentage | 2.2% |
| Flux feature | Wets and spreads like a RA type flux and virtually non-splattering. |
| Shelf life | 5 y |

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Flux Core Properties

The synthetically refined resin wets and spreads like a RA flux. This no clean flux is virtually non-spattering. It gives rise to a hard, non-conductive and non-corrosive residue.

| Physical Properties | Method | Value |
|--------------------------------------|----------------------------|--------------------------|
| Flux Classification | J-STD-004B EN29454-1 | RELO Type 1.1.3 |
| Flux Type | | Resin |
| Flux Activity | | Low |
| Halides %(wt) | | <0.05% |
| Solid Flux Color | Visual | Lightly opaque |
| Softening Point of Flux Extract | | 24 °C [75 °F] |
| Acid Number (mgKOH/g sample) | IPC-TM-650 2.3.13 | 190–210 |
| Copper Mirror | IPC-TM-650 2.3.32 | No removal |
| Silver Chromate—Chlorides + Bromides | IPC-TM-650 2.3.33 | Pass |
| Solder Spread | IPC-TM-650 2.4.46 | 130 mm ² |
| Flux Residue Dryness | IPC-TM-650 2.4.47 | Pass |
| Spitting of Flux-Cored Wire Solder | IPC-TM-650 2.4.48 | 0.30% |
| Corrosion Test | IPC-TM-650 2.6.15 | Non-corrosive |
| Surface Insulation Resistance (SIR) | IPC-TM-650 2.6.3.3 | 2.3 × 10 ¹¹ Ω |
| Bellcore (Telecordia) | Bellcore GR-78-CORE 13.1.3 | 6.1 × 10 ¹¹ Ω |
| Electromigration | Bellcore GR-78-CORE 13.1.4 | Pass |
| Post Reflow Residue | TGA Analysis | 55% |
| Cleaning Requirements | — | Optional |

Sn99.3/Cu0.7/Co Alloy Typical Literature Properties

| Physical Properties | Value ^{a)} |
|---------------------------------------|--|
| Color | Silvery-white metal |
| Density @26 °C [78 °F] | 7.4 g/cm ³ |
| Tensile Strength | 22 N/mm ² [3 100 lb/in ²] |
| Elongation | 41% |
| Shear Strength | ~23 N/mm ² [~3 300 lb/in ²] |
| Hardness, Brinell | 9HB |
| Electrical Properties | Value |
| Volume Resistivity | 12.3 μΩ·cm |
| Electrical Conductivity ^{b)} | 13% 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 | 227 °C [442 °F] |
| Melting Point, Liquidus | 227 °C [442 °F] |
| Tip Temperature Upper Limit | Do not exceed 400 °C [752 °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 Sn99.3/Cu0.7 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-006C |
|--|--------------------|---------------------------------|---------------------|
| <i>MAIN INGREDIENTS</i> | <i>COMPOSITION</i> | <i>IMPURITIES</i> ^{a)} | <i>REQUIREMENTS</i> |
| Sn | 99.3% | Sb | ≤0.20% Max |
| Cu | 0.7% | Ag | ≤0.10% Max |
|  | | Bi | ≤0.10% Max |
| | | In | ≤0.10% Max |
| | | Pb | ≤0.10% Max |
| | | Au | ≤0.05% Max |
| | | As | ≤0.03% Max |
| | | Fe | ≤0.02% Max |
| | | Ni | ≤0.01% Max |
| | | Al | ≤0.005% Max |
| | | Zn | ≤0.003% Max |
| | | Cd | ≤0.002% Max |

a) Meets the requirements of J-STD-006C and meets ASTM B 32.

Storage

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

Cleaning

The flux 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

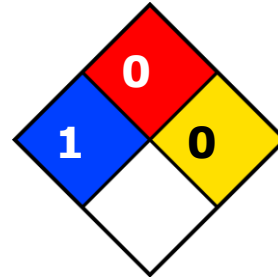
Please see the 4901 **Safety Data Sheet** (SDS) for more details on transportation, storage, handling and other security guidelines.

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)

Packaging and Supporting Products

| <i>Cat. No.</i> | <i>Form</i> | <i>Packaging</i> | <i>Net Weight</i> | |
|------------------|-------------|------------------|-------------------|---------|
| 4901-112G | Solid wire | Pack of 25 | 113 g | 0.25 lb |
| 4901-227G | Solid wire | Pack of 3 | 227 g | 0.5 lb |
| 4901-454G | Solid wire | Spool | 454 g | 1.0 lb |
| 4901-2LB | Bar | Bar | 908 g | 2.0 lb |



Sn99 No Clean Solder Wire 4901 Technical Data Sheet

ISO 9001:2008 Registered Quality System. Burlington, Ontario, CANADA SAI Global File: 004008

4901

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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