Sn100e No Clean Solder Wire 4933–4935 Technical Data Sheet

Description

The 4933–4935 *Sn100e No Clean Solder Wire* is an electronic grade solder wire. It uses a high-purity, eutectic tin/copper/cobalt alloy that is complemented with a no clean, synthetically refined, splatter-proof, resin flux core. The 4933–4935 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 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 493x forms brighter, shinier, and less grainy joints. Furthermore, it is less expensive than SAC305.

The 4933–4935 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**
- **Spreads like rosin-activated flux**
- **Virtually non-splattering**
- **Non-corrosive**
- **Non-conductive**
- **Halide free**

COMPLIANCE
✓ Dobb Frank (DRC conflict free)
✓ REACH (compliant)
✓ RoHS (compliant)

Wire Sizes Availability

Cat No.	*Std. Wire Gauge*	*Diameter*		*Packaging*	*Sizes*
4935	21	0.81 mm	0.032 in	Spool	¼ or 1 lb
4933	25	0.51 mm	0.020 in	Spool	¼ or 1 lb

General Flux Parameters

Properties	*Value*
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

Flux Core Properties

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

Physical Properties	*Method*	*Value*
Flux Classification	J-STD-004B EN29454-1	REL0 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 Value (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

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/mm^2 = mPa; lb/in^2 = psi;
b) International Annealed Copper Standard: 100% give 5.8×10^7 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 = μm/(m·K) = in/in/°C × 10^{-6} = unit/unit/°C × 10^{-6}

Solder Alloy Composition

Properties	*Value*
MAIN INGREDIENTS	*COMPOSITION*
Sn	99.3 to 99.7%
Cu	0.49 to 0.51%
Co	<0.1%

Properties	*J-STD-006C*	*4933–4935*
IMPURITIES a)	*REQUIREMENTS*	*SPECIFICATIONS*
Sb	≤0.20% Max	≤0.025% Max
Ag	≤0.10% Max	≤0.001% Max
Bi	≤0.10% Max	≤0.01% Max
In	≤0.10% Max	≤0.01% Max
Pb	≤0.07% Max	≤0.05% Max
Au	≤0.05% Max	≤0.0002% Max
As	≤0.05% 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) Exceeds the requirements of J-STD-006C and meets ASTM B 32.

Storage

Protect from direct heat or sunlight. Keep at around 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

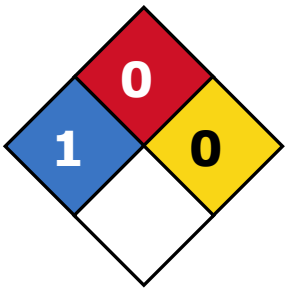
Please see the 4933-4935 **Safety Data Sheet** (SDS) for more details on transportation, storage, handling and other security guidelines.

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

Cat. No.	*Form*	*Packaging*	*Net Weight*	
4933-112G	Solid wire	Spool	112 g	0.25 lb
4933-454G	Solid wire	Spool	454 g	1.0 lb
4935-112G	Solid wire	Spool	112 g	0.25 lb
4935-454G	Solid wire	Spool	454 g	1.0 lb

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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