

### Description

The 4860–4867 *Sn63Pb37 No Clean Solder Wire* is an electronic grade solder wire. It uses the eutectic tin-to-lead alloy ratio, which is complemented with a no clean, synthetically refined, splatter-proof, resin flux core. The solder wires meet J-STD-004B, ASTM B 32, and exceeds J-STD-006C specifications. It is one of the easiest solders to work with because it offers a low-melting temperature with a sharp melting/solidification point, which results in robust and reliable joints that are highly resistant to whisker formation.

The leaded 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 residue**
- **Halide free**

#### COMPLIANCE

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

### Wire Sizes Availability

<i>Cat No.</i>	<i>Std. Wire Gauge</i>	<i>Diameter</i>		<i>Packaging</i>	<i>Sizes</i>
4860	21	0.81 mm	0.032 in	Pocket Pack	0.6 oz
4865	21	0.81 mm	0.032 in	Spool	½ or 1 lb
4866	19	1.01 mm	0.040 in	Spool	½ 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.

<b>Physical Properties</b>	<b>Method</b>	<b>Value</b>
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 <sup>2</sup>
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	$2.3 \times 10^{11} \Omega$
Bellcore (Telecordia)	Bellcore GR-78-CORE 13.1.3	$6.1 \times 10^{11} \Omega$
Electromigration	Bellcore GR-78-CORE 13.1.4	Pass
Post Reflow Residue	TGA Analysis	55%
Cleaning Requirements	—	Optional

### Sn63/Pb37 Alloy Typical Literature Properties

<b>Physical Properties</b>	<b>Value</b> <sup>a)</sup>
Color	Silvery-white metal
Density @26 °C [78 °F]	8.40 g/cm <sup>3</sup>
Tensile Strength	54 N/mm <sup>2</sup> [7 800 lb/in <sup>2</sup> ]
Elongation	37%
Hardness	14 HB
Shear Strength	37 N/mm <sup>2</sup> [5 400 lb/in <sup>2</sup> ]
<b>Electrical Properties</b>	<b>Value</b>
Volume Resistivity	14.5 μΩ·cm
Electrical Conductivity <sup>b)</sup>	11.9% IACS

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.

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<b>Thermal Properties</b>	<b>Value</b>
Melting Point, Solidus	183 °C [361 °F]
Melting Point, Liquidus	183 °C [361 °F]
Tip Temperature Upper Limit	Do not exceed 260 °C [500 °F]
Coefficient of Thermal Expansion (CTE) <sup>c)</sup>	24.7 ppm/°C
Thermal Conductivity	50 W/(m·K)

NOTE: This table present typical literature values for 63/37 alloys.

c) Units 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

<b>Properties</b>	<b>Value</b>	<b>Properties</b>	<b>Value</b>
<i>MAIN INGREDIENTS</i>		<i>IMPURITIES</i> <sup>a)</sup>	
Sn	63.5 to 63.5%	Sb	≤0.20% Max
Pb	36.5 to 37.5%	Ag	≤0.10% Max
		Bi	≤0.10% Max
		In	≤0.10% Max
		Cu	≤0.08% 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) Exceeds the requirements of J-STD-006C and meets ASTM B 32.

## Storage

Protect from direct heat or sunlight.

## 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].

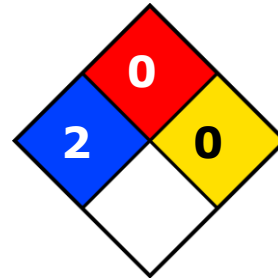
### Health and Safety

Please see the 4860–4867 **Safety Data Sheet** (SDS) for more details on transportation, storage, handling and other security guidelines.

#### HMIS® RATING

<b>HEALTH:</b>	* 2
<b>FLAMMABILITY:</b>	0
<b>PHYSICAL HAZARD:</b>	0
<b>PERSONAL PROTECTION:</b>	

#### NFPA® 704 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

<i>Cat. No.</i>	<i>Form</i>	<i>Packaging</i>	<i>Net Weight</i>	
<b>4860-18G</b>	Solid wire	Pocket Pack <sup>a)</sup>	18 g	0.6 oz
<b>4865-227G</b>	Solid wire	Spool	227 g	0.5 lb
<b>4865-454G</b>	Solid wire	Spool	454 g	1.0 lb
<b>4866-227G</b>	Solid wire	Spool	227 g	0.5 lb

a) Box of 25 pocket packs



# Sn63Pb37 No Clean Solder Wire 4860–4867 Technical Data Sheet

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

4860–4867

## 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).

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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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