4902P Technical Data Sheet
Sn42Bi57Ag1 Low Temperature Solder Paste

Description

The 4902P *Sn42Bi57Ag1 Low Temperature Solder Paste* is made for low temperature applications. It spreads and adheres well to a variety of materials and provides excellent soldering results and appearance. This uniform paste dispenses evenly and resists solder beading and bright spots.

Applications & Usages

The solder paste is designed to is used for LEDs and telecommunication assemblies.

Benefits and Features

- **Alloy exceeds J-STD-006C and meets ASTM B 32 purity requirements**
- **Flux meets J-STD-004B for ROM1**
- **Particle size Type 3 (with 80% min. between 25-45 µm)**
- **No-clean**
- **Excellent 12 mil (0.30 mm) fine pitch printing capability**
- **Long operational life—non-slumping**
- **Good wettability**
- **Halogen free**

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

Sn42Bi57Ag1 Alloy Typical Literature Properties

Physical Properties	***Value***
Color	Silvery-white metal
Density	8.6 g/cm^3

Electrical Properties	***Value***
Volume Resistivity	34.5 µΩ·cm
Electrical Conductivity [a)]	4.5% IACS

a) International Annealed Copper Standard: 100% give 5.8 × 10^7 S/m.

Thermal Properties	***Value***
Melting Point, Solidus	138 °C [280 °F]
Melting Point, Liquidus	138 °C [280 °F]
Tip Temperature Upper Limit	Do not exceed 425 °C [800 °F]

Solder Alloy Composition

Properties	*Value*	*Properties*	*J-STD-006C*
MAIN INGREDIENTS		*IMPURITIES* [a]	
Sn	41.5 to 42.5%	Sb	≤0.20% Max
Bi	57.5 to 58.5%	In	≤0.10% Max
Ag	0.9% to 1.1%	Cu	≤0.08% Max
		Pb	≤0.07% Max
		Au	≤0.03% Max
		As	≤0.05% 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.

Particle Size

The powder distribution complies with the J-STD-005 Type 3 (with 80% min. between 25-45 µm) particle sizes.

Storage and Shelf Life

Unopened Container 12 months from date of manufacture. Store syringes in an upright position with tip down to prevent flux separation and air entrapment.

Bring the paste to room temperature prior to use. To warm the refrigerated paste, let the unopened container stand for 4 hours at ambient temperature before use. For faster warm up, place the sealed container in a water bath at ambient temperature for 30 minutes.

Optional—Store refrigerated between 2–10 °C [35–50 °F] to minimize solvent evaporation, flux separation, and chemical activity.

Reusing Solder Paste

Reusing solder paste is not normally recommended because it typically generates more complications than it is worth. If you do decide to reuse solder paste, keep the following pointers in mind:

- Keep the paste tightly sealed and refrigerated when not in use.
- Store syringes upright position with tip down to prevent flux separation and air entrapment.
- Before reuse, check that the paste hasn't separated or thickened relative to its usual state.

Properties of Flux

Flux Properties	*Method*	*Value*
Flux Classification	J-STD-004B	ROM1
Flux Type		Rosin
Flux Activity		Moderate
Halides %(wt)	IPC-TM-650 2.3.28.1	≤0.15%
Acid Value (mgKOH/g sample)	IPC-TM-650 2.3.13	142
Copper Mirror	IPC-TM-650 2.3.32	No penetration
Electromigration @96 h	IPC-TM-650 2.6.14.1	$4 \times 10^9\ \Omega$
@596 h		$4 \times 10^9\ \Omega$
	JIS Z 3284	Pass
Corrosion Test	IPC-TM-650 2.6.15	Minor corrosion
Surface Insulation Resistance (SIR) @96 h	IPC-TM-650 2.6.3.7	$\geq 2 \times 10^9\ \Omega$
Surface Insulation Resistance (SIR) @168 h	JIS Z 3284	Pass

Paste Properties	*Method*	*Value*
Flux Content	IPC-TM-650 2.4.2.3	11%
Viscosity @10 rpm/min	IPC-TM-650 2.4.34.2	153 000 cP
Adhesive Force @8 h	IPC-TM-650 2.4.34.4	139 gf
	JIS Z 3284	131 gf
Collapsibility	IPC-TM-650 2.4.34.4	Pass

Note: The force in grams is denoted with the unit gf.

Pressure

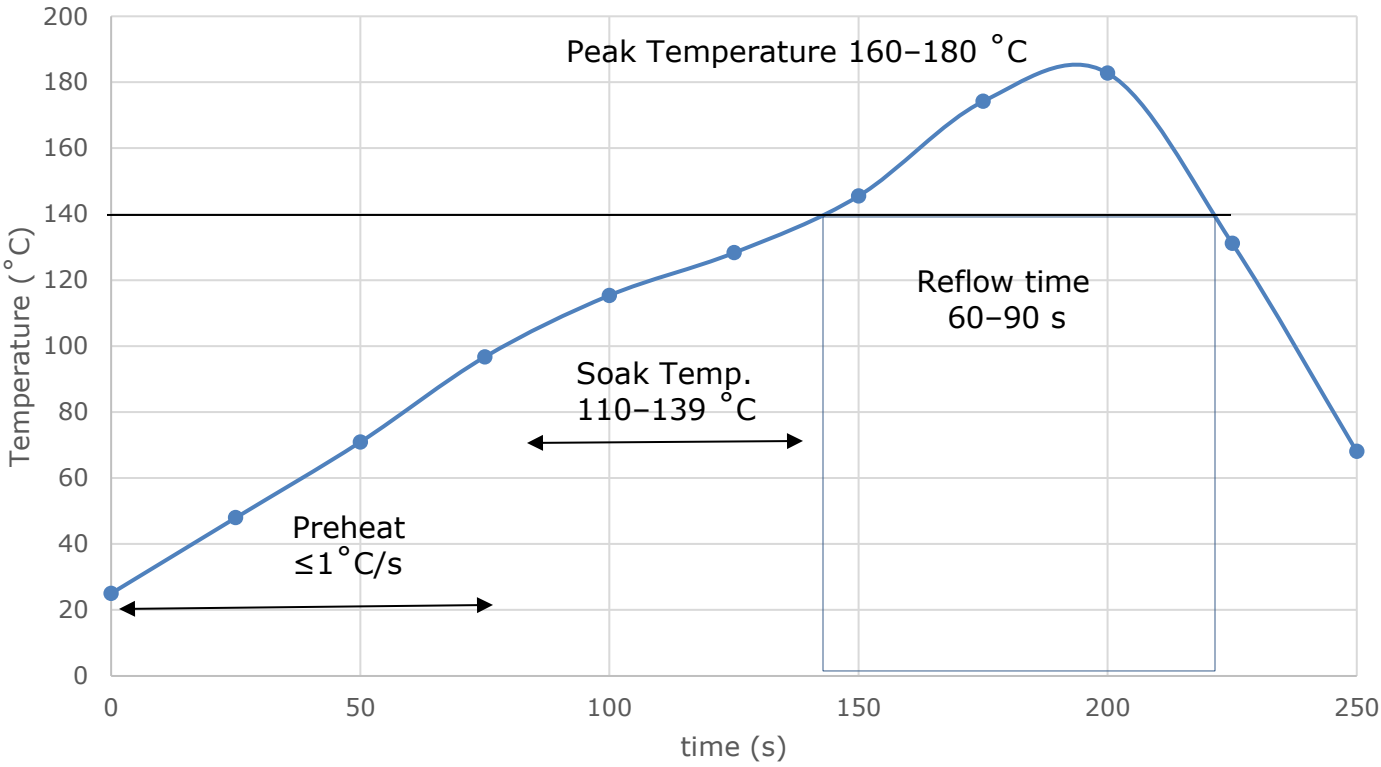
The pressure applied in the syringe should be kept at a minimum, with a dispensing pressure of 0.05–0.06 MPa (7 to 9 lb/in^2) and a dispensing frequency of 6 to a 120 times/min.

Solder Paste Application

Solder paste should be taken out of the refrigerator at least 3 to 6 hours prior to use. This will give the paste enough time to reach thermal equilibrium with the environment. The flow rate of paste in a dispensing application depends on viscosity, which can be altered by temperature change. If solder paste is purchased in syringes, pre-mixing is not necessary due to the shear action produced from the dispensing.

Reflow

The following is a recommended profile for a forced air convection reflow process. The melting temperature of the solder, the heat resistance of the components, and the characteristics of the PCB (i.e. density, thickness, etc.) determine the actual reflow profile.



The Preheat Zone, which is also referred to as the ramp zone, is used to elevate the temperature of the PCB to the desired soak temperature. In the preheat zone, the rate of temperature rise should not exceed 2.5 °C/s to avoid thermal chock stresses. The oven preheat zone normally occupies 25–33% of the heated tunnel length.

The Soak Zone normally occupies 33–50% of the heated tunnel length. It exposes the PCB to a relatively stable temperature that allows the components of different mass to reach a uniform temperature. The soak zone also allows the flux to concentrate and the volatiles to escape from the paste.

The Reflow Zone, or spike zone, elevates the temperature of the PCB assembly from the activation temperature to the recommended peak temperature. The activation temperature is always slightly below the alloy melting point, while the peak temperature is always above its melting point.

Cleaning

The 4902P is a no clean formulation; therefore, the residues do not need to be removed for typical applications. For spot residue removal, you may use MG 8241-T or 8241-W Isopropyl Alcohol Wipes.

Working Environment

Solder paste performs best when used in a controlled environment. Maintaining ambient temperature of between 22–28 °C [72-82 °F] at a relative humidity of 40–60% will ensure consistent performance and maximum life of paste. Do not let the print temperature exceed 32 °C [89 °F].

Cleaning Misprint Boards

In case of a misprinted board, the paste may be cleaned by hand using the MG 8241 Alcohol Wipes.

Stencil Cleaning

Periodic cleaning of the stencil during production is recommended to prevent unwanted deposits outside the print areas. Insufficient stencil cleaning increases solder balling. After printing 5 to 10 boards, we therefore recommend a dry wipe. And after every 15 to 25 boards, we recommend a wet wipe with MG 8241-T or 8241-W Alcohol Wipe. For fine pitch boards, the cleaning frequency generally needs to be increased.

Disposal

The 4902P should be stored in a sealed container and disposed of in accordance with state & local authority requirements.

Health and Safety

Please see the 4902P *Sn42Bi57Ag1 Low Temperature Solder Paste* **Safety Data Sheet** (SDS) for more details on transportation, storage, handling and other security guidelines.

Environmental Impact: Very toxic to aquatic life with long lasting effects.

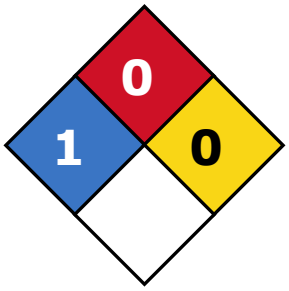
This product meets the European Directive 2011/65/EU Annex II (ROHS); recasting 2002/95/EC.

Health and Safety: This product may cause serious eye irritation. It is widely used in the packing and food industry.

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

Cat. No.	*Packaging*	*Net Weight*	
4902P-15G	Syringe	15 g	0.52 oz
4902P-25G	Syringe	25 g	0.88 oz

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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