

## Description

The 4900P5 Type 5 SAC305 Lead Free Solder Paste is an electronic grade solder paste that is lead free and halogen free, and which offers a robust flux activity. It meets and exceeds requirements for both the RoHS and J-STD-006 impurity level limits.

## Applications & Usages

The solder paste is designed to accommodate high speed printing. It can yield brick-like prints even when using an ultra-fine pitch stencils down to 0.3 mm.


## Benefits and Features

- Excellent wettability with uncoated copper or with copper coated with organic solderability preservatives
- Suitable for air or nitrogen atmosphere
- Long tack-time
- Medium soft, non-cracking residues

### COMPLIANCE

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

## Solder Allow Composition

| <i>Properties</i>  | <i>Value</i>  | <i>Properties</i> | <i>Value</i> |
|--|---------------|-------------------|--------------|
| <i>MAIN INGREDIENTS</i>  |               | <i>IMPURITIES</i> | a)           |
| Sn   | 96.8 to 95.7% | Pb                | ≤0.05% Max   |
| Ag   | 2.8 to 3.2%   | Sb                | ≤0.05% Max   |
| Cu   | 0.4 to 0.6%   | Bi                | ≤0.05% Max   |
|  |               | In                | ≤0.05% Max   |
|  |               | As                | ≤0.01% Max   |
|  |               | Fe                | ≤0.01% Max   |
|  |               | Ni                | ≤0.005% Max  |
|  |               | Au                | ≤0.002% Max  |
|  |               | Al                | ≤0.001% Max  |
|  |               | Cd                | ≤0.001% Max  |
|  |               | Zn                | ≤0.001% Max  |

a) Exceeds impurity requirements of J-STD-006

## Particle Size

The powder distribution complies with the J-STD-005 Type 5 (25-15 µm) particle sizes. Solder powder distribution is measured utilizing laser diffraction, optical analysis and sieve analysis. Careful control of solder powder manufacturing processes ensures the particles' shape are 95% spherical minimum (aspect ratio < 1.5) and that the alloy contains a typical maximum oxide level of 80 ppm.

## Properties of Type 5 SAC305 Lead Free Solder Paste

| <i>Flux Properties</i>              | <i>Method</i>              | <i>Value</i>                 |
|-------------------------------------|----------------------------|------------------------------|
| Flux Classification                 | J-STD-004                  | ROLO                         |
| Flux Type                           |                            | Rosin                        |
| Flux Activity                       |                            | Low                          |
| Halides %(wt)                       |                            | <0.05%                       |
| Acid Number (mgKOH/g sample)        | IPC-TM-650 2.3.13          | 117                          |
| Copper Mirror                       | IPC-TM-650 2.3.32          | No removal of copper film    |
| Corrosion Test                      | IPC-TM-650 2.6.15          | Pass                         |
| Surface Insulation Resistance (SIR) | IPC-TM-650 2.6.3.3         | $2.01 \times 10^{10} \Omega$ |
| Bellcore (Telecordia)               | Bellcore GR-78-CORE 13.1.3 | $5.25 \times 10^{11} \Omega$ |
| Electromigration                    | Bellcore GR-78-CORE 13.1.4 | Pass                         |
| Post Reflow Flux Residue            | TGA Analysis               | 5.5%                         |

| <i>Paste Properties</i>          | <i>Method</i>                | <i>Value</i>            |
|----------------------------------|------------------------------|-------------------------|
| Metal Loading                    | IPC-TM-650 2.2.20            | 88.5%                   |
| Viscosity                        |                              |                         |
| Malcom <sup>(2)</sup> , poise    | IPC-TM-650 2.4.34.3 modified | 1600-1900               |
| Thixotropic Index                |                              | 0.50-0.60               |
| Slump Test                       |                              |                         |
| 25 °C, 0.63 vertical/horizontal  | IPC-TM-650 2.4.35            | No bridges all spacings |
| 150 °C, 0.63 vertical/horizontal | "                            | "                       |
| 25 °C, 0.33 vertical/horizontal  | "                            | "                       |
| 150 °C, 0.33 vertical/horizontal | "                            | "                       |
| Solder Ball Test                 | IPC-TM-650 2.4.43            | Pass                    |
| Tack                             |                              |                         |
| Initial                          | JIS Z 3284                   | 124 gf                  |
| Tack retention @ 24 h            | "                            | 111 gf                  |
| Tack retention @ 72 h            | "                            | 98 gf                   |
| Stencil Life                     | QIT 3.44.5                   | >8 h                    |
| Abandon Time                     | QIT 3.44.6                   | 60 min                  |

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

## Pressure

The pressure applied in the syringe should be kept at a minimum, and the proper head pressure kept in the range of 0.6-1.5 lb/in (107-270 g/cm) according to the length of the blade. The external air pressure supply should be maintained constant.

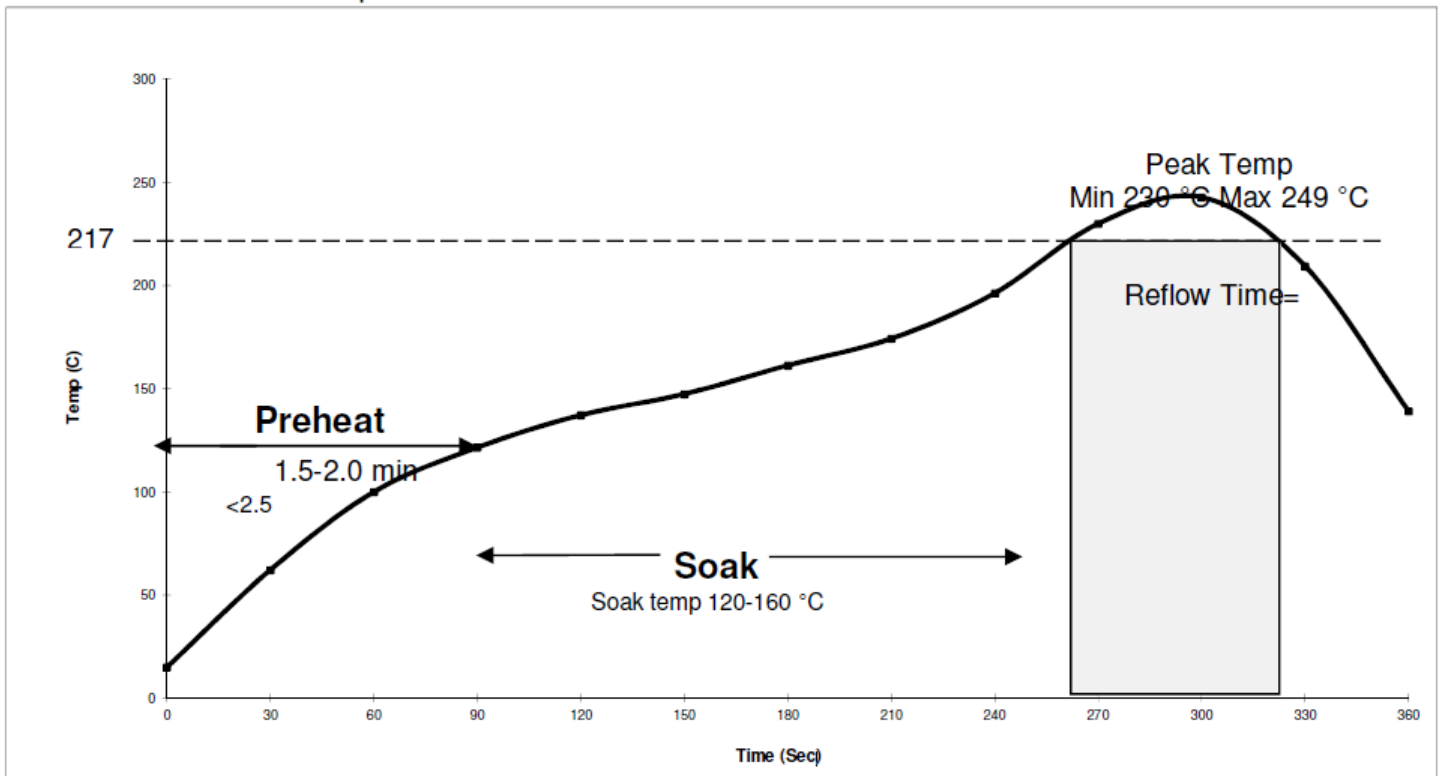
## Solder Paste Application

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 come to 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

Best results have been achieved when DSP 825HF is reflowed in a forced air convection oven with a minimum of 7 zones (top and bottom).

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.



**Preheat Zone**—The preheat zone, is also referred to as the ramp zone, and is used to elevate the temperature of the PCB to the desired soak temperature. In the preheat zone the temperature of the PCB is constantly rising, at a rate that should not exceed 2.5 C/sec. The oven’s preheat zone should normally occupy 25-33% of the total heated tunnel length.

**The Soak Zone**—normally occupies 33-50% of the total heated tunnel length exposes the PCB to a relatively steady temperature that will allow the components of different mass to be uniform in temperature. The soak zone also allows the flux to concentrate and the volatiles to escape from the paste.



**The Reflow Zone**—or spike zone is to elevate the temperature of the PCB assembly from the activation temperature to the recommended peak temperature. The activation temperature is always somewhat below the melting point of the alloy, while the peak temperature is always above the melting point.

## Cleaning

The 4900P5 is a no clean formulation therefore the residues do not need to be removed for typical applications. If residue removal is desired, use MG 8241-T or 8241-W Isopropyl Alcohol Wipes.

## Storage and Shelf Life

Store refrigerated between 2-10°C [35-50°F] to minimize solvent evaporation, flux separation, and chemical activity. Storage of syringes is preferred in an upright position with tip down to prevent flux separation and air entrapment. Use at room temperature, warm up can be achieved by removing from refrigerator 3 hours before use, faster warm up can also be achieved by placing in a sealed container in a water bath at near ambient temperature for 30 minutes.

Unopened Container (35-50 °F/2-10 °C) 12 months (from DOM)

Unopened Container (68-77 °F/20-25 °C) 6 months (from DOM)

## Reusing Solder Paste

This is not normally recommended, because it typically generates more problems than it is worth. If you do decide to reuse solder paste, these pointers may be helpful. This paste should be tightly sealed and refrigerated. Then, the paste may be reused at a later date, provided that the paste has not separated or thickened significantly compared to its original properties. Storage of syringes is preferred in an upright position with tip down to prevent flux separation and air entrapment.

## Working Environment

Solder paste performs best when used in a controlled environment. Maintaining ambient temperature of between 68-77 °F (20-25 °C) at a relative humidity of 40-65% will ensure consistent performance and maximum life of paste.

## Cleaning Misprint Boards

If you should have a misprinted board, the paste may be cleaned off manually with MG 8241 Alcohol Wipes.

## Stencil Cleaning

Periodic cleaning of the stencil during production is recommended to prevent any paste from being deposited in unwanted areas of the board. Without stencil cleaning, solder balling will increase. We recommend a periodic dry wipe (every 5 to 10 boards) with an occasional MG 8241-T or 8241-W Alcohol Wipe (every 15 to 25 boards). When running fine pitch boards, the cleaning may need to become more frequent.

## Disposal

The 4900P5 should be stored in a sealed container and disposed of in accordance with state & local authority requirements.

## Health and Safety

Please see the *4900P5 Type 5 SAC305 Lead Free Solder Paste Safety Data Sheet* (SDS) for more details on transportation, storage, handling and other security guidelines.

**Environmental Impact:** This product doesn't have any known environmental toxicity.



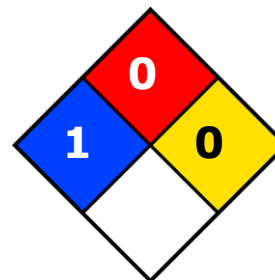
This product meets the European Directive 2011/65/EU Annex II (ROHS); recasting 2002/95/EC.

**Health and Safety:** This product is not considered to be hazardous for human health under normal use. It is widely used in the packing and food industry.

### HMIS® RATING

|                             |          |          |
|-----------------------------|----------|----------|
| <b>HEALTH:</b>              | <b>*</b> | <b>1</b> |
| <b>FLAMMABILITY:</b>        |          | <b>0</b> |
| <b>PHYSICAL HAZARD:</b>     |          | <b>0</b> |
| <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)



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

## Type 5 SAC305 Lead Free Solder Paste

4900P5

### 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).

Email: [support@mgchemicals.com](mailto:support@mgchemicals.com)

Phone: +1-800-340-0772 (Canada, Mexico & USA)  
+1-905-331-1396 (International)

Fax: +1-905-331-2862 or +1-800-340-0773

Mailing address: **Manufacturing & Support**  
1210 Corporate Drive  
Burlington, Ontario, Canada  
L7L 5R6

**Head Office**  
9347-193rd Street  
Surrey, British Columbia, Canada  
V4N 4E7

### 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.

### Disclaimer

This information is believed to be accurate. It is intended for professional end users having the skills to evaluate and use the data properly. *M.G. Chemicals Ltd.* does not guarantee the accuracy of the data and assumes no liability in connection with damages incurred while using it.