AMP One Ultra Low Voiding No-Clean Pb-Free Solder Paste

Introduction

AMP One solder paste is redefining the voiding standard for PCB assembly. Combining industry low levels of voiding performance with excellent activity allows AMP One to deliver an unmatched ability for assemblers to amplify their process window while achieving higher yields. When coupled with SN100CV or LF-C2 alloys, AMP One provides a high reliability solution for harsh environments.

Attributes

- Best in class voiding performance.
- Excellent printability and activity.
- Ideal reflow performance with excellent wetting, very low solder balling and graping.
- Halide and halogen free which may improve long term reliability.

Solder Alloy	Solder Powder Size Availability (IPC J-STD-005B)	Melting Range (°C)
SAC305	Type 3 or 4	217 - 220
Sn/Ag 3.5%	Type 3	221
SN100C* (Sn/0.7Cu/Ni/Ge)	Type 3 or 4	227
SN100CV* (Sn/1.5Bi/0.7Cu/Ni/Ge)	Type 3 or 4	221 - 225
LF-C2* (Sn/3.5Ag/3Bi/1Cu)	Type 3 or 4	205 - 213
Anti-tombstoning mixtures	Type 3 or 4	Range depends on the mixture

- Other sizes of solder powder are available upon request.
- *Alloy from Nihon Superior.

Solder Paste Packaging	Net Weight (grams)
Jars	500
Cartridges	500-600 (6 oz), 700 (8 oz), 1200-1300 (12 oz)
Syringes	30 (10 cc), 100 (30 cc)

- Other packaging may be available upon request.

Compatible Products

NC120, NC160, NC165 liquid fluxes.
AMP One gel flux.

Storage and Handling

Best practices for storage and handling of solder paste are listed below. Additional details can be found in the Solder paste storage and handling guide.

- Shelf life is 12 months when stored at 0 to 10 °C (32 to 50 °F).
- Warm the solder paste to room temperature (18 to 29 °C / 65 to 85 °F) before use. Do not force warming by heating the solder paste. Keep the solder paste sealed while warming, which typically takes 3 to 4 hours at room temperature. Warming overnight is acceptable.
- Ideally solder paste should be mixed before use to bring it to a normal working consistency. This can be done by hand-stirring in a jar, or using a knead cycle on the printer.
- Best practice is to keep the solder paste at room temperature until completely used. Remaining fresh solder paste should be sealed in the original container along with all inserts, lids, etc.
- If solder paste is removed from the printer and stored, it is recommended to store it in a separate container from the fresh solder paste. The container should be sealed with all inserts, lids, etc.
- Once solder paste is applied to the circuit board, the best practice is to reflow the solder paste as soon as possible. It is acceptable to reflow within approximately 8 hours.

Process Parameters

The print and reflow process parameters shown below are simply guidelines. The optimal parameters may be different based upon your equipment, circuit boards, components, and process.

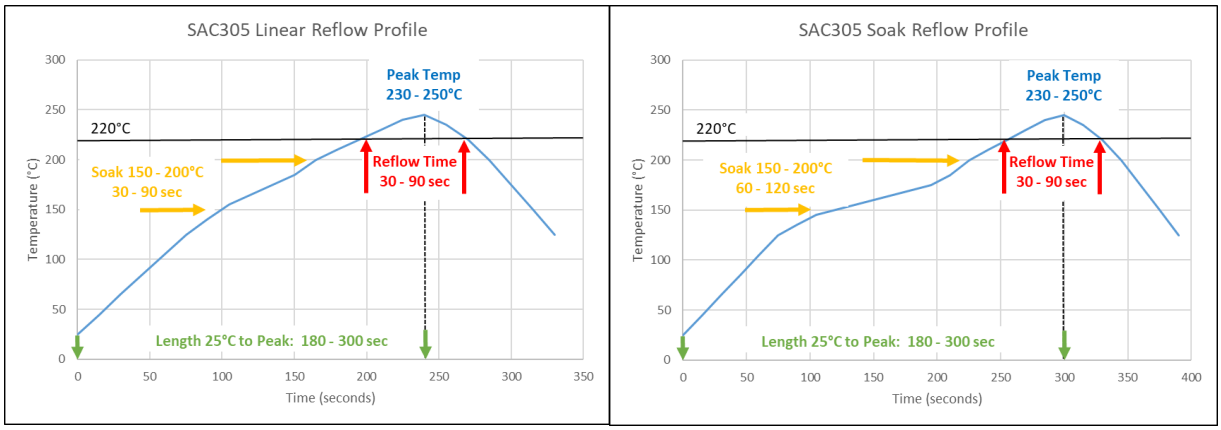
Print Parameter	Guideline	Notes
Solder paste bead size	1.0 to 2.5 cm (0.40 to 1.0 in)	Add solder paste regularly to maintain the bead size.
Squeegee blade	Stainless steel. 60° from horizontal. 45° for pin in paste.	Other blade angles and materials are usable.
Stencils	Fine grain laser cut stainless steel	All types of commercially available stencils are usable.
Print speed	20 to 200 mm/sec (0.8 to 8.0 in/sec)	Increased speeds may require higher blade pressures.
Pressure / blade length (increase with increasing speed)	0.18 to 0.54 kg/cm (1.0 to 3.0 lbs/in)	Set to the minimum required to scrape the stencil clean.
Separation speed	0.5 to 10.0 mm/sec	Higher separation speeds may improve solder paste release.
Underside stencil cleaning	Wet / vacuum / vacuum cycle every 1-20 prints	Clean more frequently to reduce the risk of bridging.
Stencil life	8 hours at 18-29 °C (65-85 °F) and 30-70% RH.	Stencil life may be shorter outside of these conditions.

- Higher blade pressures will increase stencil and blade wear and can lead to “scooping” and other print defects.
- Underside stencil cleaning is best accomplished with commercial cleaners and high-quality wipe materials. Nano-coated stencils can be used to reduce the frequency of underside cleaning.

Reflow Parameter	Guideline	Notes
Profile length (25 °C to peak)	3.0 to 5.0 min (180 to 300 sec)	Profile length is dependent upon the PCBA and process.

Heating ramp rate	1.0 to 3.0 °C/sec	Lower ramp rates tend to equalize reflow temperatures.
Preheat / soak time (150 - 200 °C)	30 to 120 sec	Linear profiles are a good starting place but may not work for all PCBAs.
Peak temperature	230 to 250 °C for SAC alloys	15 to 30 °C above liquidus for other solder alloys.
Reflow time (time above liquidus)	30 to 90 sec	Time above the liquidus point of the solder alloy used.
Cooling ramp rate	1.0 to 6.0 °C/sec	Higher cooling rates may refine the grain structure.

Examples of reflow profile graphs are shown below.



Cleaning

Raw solder paste can be removed from the stencil, squeegee blades, and circuit boards using a variety of commercial cleaners. Isopropyl alcohol (IPA) can also be used.

After reflow, no-clean solder paste residues are designed to be “safe” and do not need to be removed from the circuit board. If removal of the flux residues is desired, then a commercial cleaning agent should be used. Several common cleaning agents have been tested and found to be effective. Please contact your cleaning chemical supplier for details.

Safety

Wear chemically resistant gloves when handling solder paste. Avoid breathing fumes, especially during reflow of the solder paste. Follow the guidelines detailed in the Safety Data Sheet (SDS).

J-STD-004D Flux Standard	Test Method	Result
J-STD-004 classification	J-STD-004 methods	ROL0
Halide ion content (Br^-, Cl^-, F^-, I^-)	IPC 2.3.28.1	0.0 % wt
Halogen content (Br and Cl)	EN 14582, IPC 2.3.28.1	0.0 % wt

Halide by silver chromate	IPC 2.3.33	No halides detected
Fluoride by spot test	IPC 2.3.35.1	None detected
Copper mirror	IPC 2.3.32	Low activity
Copper corrosion	IPC 2.6.15	No corrosion
Surface Insulation Resistance (SIR)	IPC 2.6.3.7	Pass > 1.00E+10 ohms
Electro Chemical Migration (ECM)	IPC 2.6.14.1	Pass, increase of 0.3 Log_{10} ohms
J-STD-005B Solder Paste Standard	**Test Method**	**Result**
Viscosity - Brookfield	IPC 2.4.34	Refer to the C of A
Slump - frosted glass	IPC 2.4.35	Pass
Solder balling - frosted glass	IPC 2.4.43	Preferred
Wetting - copper	IPC 2.4.45	Pass