PRODUCT DATA SHEET

RMA-155

Solder Paste

Introduction

RMA-155 is an air reflow, RMA solder paste formulated to accommodate a variety of alloys for electronics assembly. **RMA-155** has balanced performance to accommodate the widest variety of processes including: consistent stencil printing transfer, robust reflow window, and residue compatible with in-circuit testing.

Features

- RMA paste for SnPb and Pb-free alloys
- Halogen-free per EN14582 test method
- High-performance stencil printing characteristics
- Eliminates hot and cold slump
- Robust reflow performance to accommodate assembly of BGA and components with large ground planes
- High oxidation resistance
- Clear, probe-testable post-reflow residues
- Maintains very high resistance during SIR testing
- Ideal for mixed alloy SnPb and Pb-free processes
- Available with SACm® for high-reliability Pb-free performance with low Ag content

Alloys

Indium Corporation manufactures low-oxide spherical powder composed of a variety of Pb-free alloys that cover a broad range of melting temperatures. Types 4 and 3 powders are standard offerings with SAC alloys. The metal load is the weight percent of the solder powder in the solder paste and is dependent upon the powder type, alloy, and application.

Standard Product Specifications

Alloy	Powder Type	Printing Metal Load
SAC305	T3	89%
SAC305	T4	88.5%
Sn63Pb37	T3	90%
Sn63Pb37	T4	89.5%
SACm®	T4	88.5%
Sn3.5Ag	T3	89%

Packaging

RMA-155 is currently available in 500g jars or 600g cartridges. Packaging for enclosed print head systems is also readily available. Alternate packaging options may be available upon request.

Storage and Handling Procedures

Refrigerated storage will prolong the shelf life of solder paste. The shelf life of **RMA-155** is 6 months when stored at <10°C. Solder paste packaged in cartridges should be stored tip down.

Solder paste should be allowed to reach ambient working temperature prior to use. Generally, paste should be removed from refrigeration at least 2 hours before use. Actual time to reach thermal equilibrium will vary with container size. Paste temperature should be verified before use. Jars and cartridges should be labeled with date and time of opening.

Bellcore and J-STD Tests and Results

Test	Result
J-STD-004 (IPC-TM-650)	
Flux Type (per J-STD-004A)	ROL0
Flux-Induced Corrosion (Copper Mirror)	Type L
Presence of Halide Oxygen Bomb Followed by Ion Chromatography	<100ppm
SIR	Pass
QQ-S-571F	
RMA Paste	Meets/Exceeds
Rosin Content	≥51% of non-volatile flux components

Test	Result
J-STD-005 (IPC-TM-650)	
Typical Solder Paste Viscosity Malcolm (10rpm)	1,700 poise
Slump Test	Pass
Solder Ball Test	Pass
Typical Tackiness	35g
Wetting Test	Pass
BELLCORE GR-78	
SIR	Pass
Electromigration	Pass

All information is for reference only.
Not to be used as incoming product specifications.

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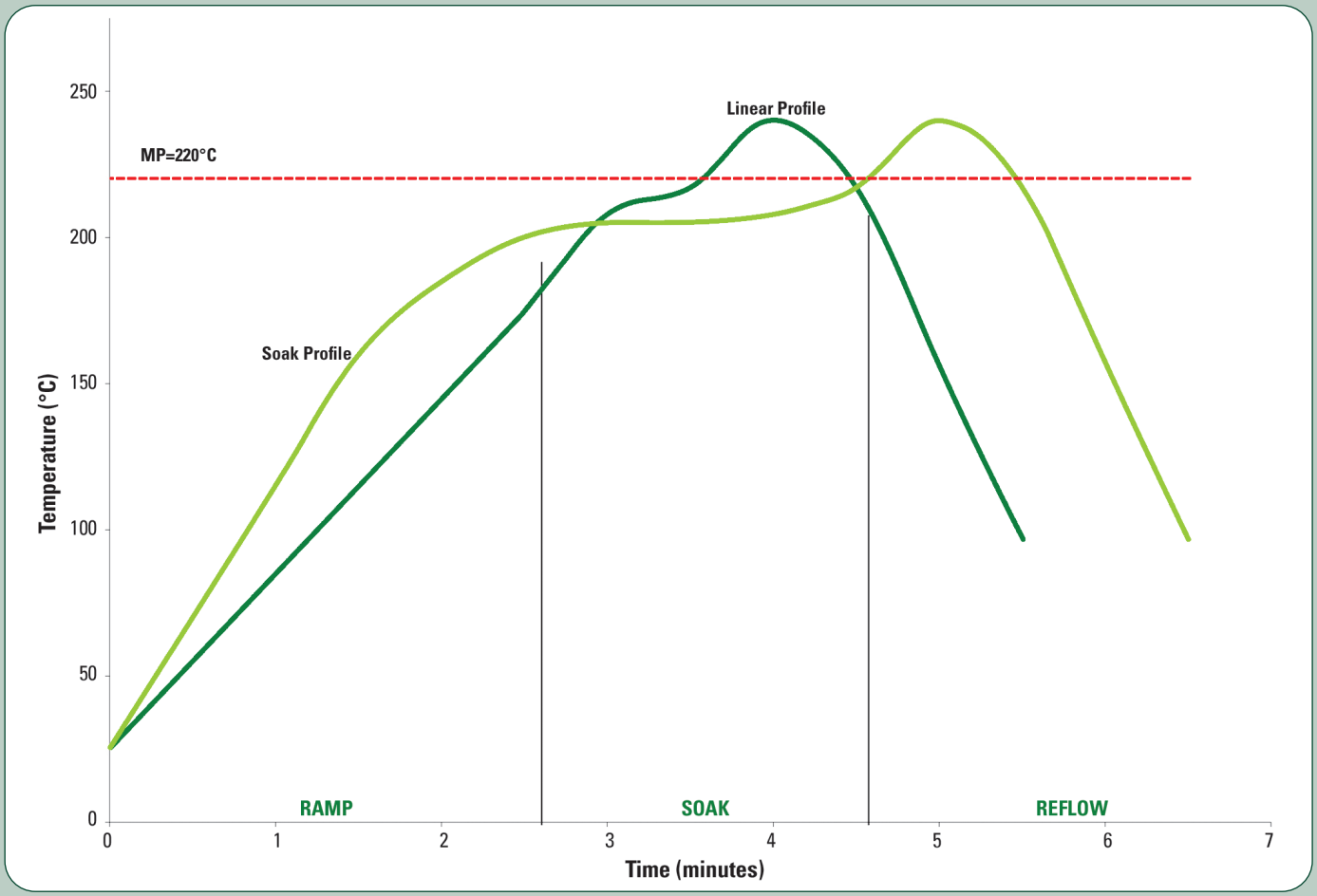
SAC Alloy Mixed Ramp Rate Reflow Profile Options



Start with the linear profile, then move to the optional soak profile, if needed.

Reflow Profile Details	SAC305		Comments
	Recommended	Acceptable	
Ramp Profile (Average Ambient to Peak)—Not the Same as Maximum Rising Slope	1.0–1.5°C/second	0.5–2.5°C/second	To minimize solder balling, beading, hot slump
Soak Zone Profile (optional)	20–60 seconds	30–120 seconds	May minimize BGA/CSP voiding Eliminating/reducing the soak zone may help to reduce HIP and graping
	140–160°C	140–170°C	
Time Above Liquidus (TAL)	45–60 seconds	30–100 seconds	Needed for good wetting/reliable solder joint As measured with thermocouple
Peak Temperature	230–260°C	230–262°C	
Cooling Ramp Rate	2–6°C/second	0.5–6°C/second	Rapid cooling promotes fine-grain structure
Reflow Atmosphere	Air or N_2		N_2 preferred for small components

All parameters are for reference only.
Modifications may be required to fit process and design.

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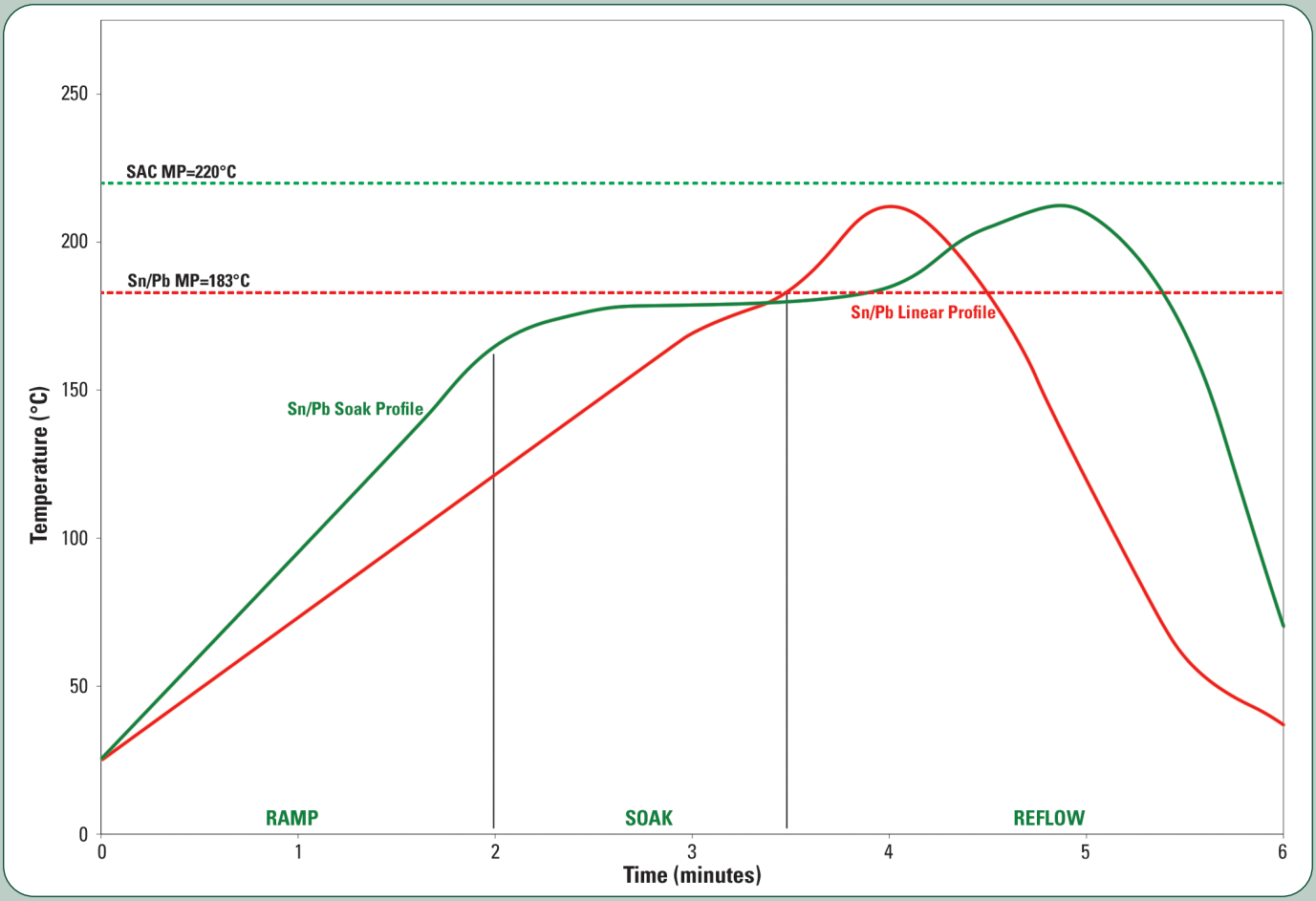
SnPb Reflow Profile Options



Start with the linear profile, then move to the optional soak profile, if needed.

Reflow Profile Details	SnPb		Comments
	Recommended	Acceptable	
Ramp Profile (Average Ambient to Peak)—Not the Same as Maximum Rising Slope	0.5–1°C/second	0.5–2.5°C/second	To minimize solder balling, beading, hot slump
Soak Zone Profile (Optional)	30–90 seconds	30–120 seconds	May minimize BGA/CSP voiding
	140–150°C	130–170°C	
Time Above Liquidus (TAL) Total Time and Temperature	45–60 seconds	30–100 seconds	Needed for good wetting/reliable solder joint
	198–213°C	195–233°C	
Cooling Ramp Rate	2–6°C/second	0.5–6°C/second	Rapid cooling promotes fine-grain structure
Peak Air Temperature	230°C		As measured with thermocouple
Reflow Atmosphere	Air or N_2		N_2 typically preferred

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Printing

Stencil Design:

Electroformed and laser cut/electropolished stencils produce the best printing characteristics among stencil types. Stencil aperture design is a crucial step in optimizing the print process. The following are a few general recommendations:

- Discrete components—A 10–20% reduction of stencil aperture has significantly reduced or eliminated the occurrence of mid-chip solder beads. The "home plate" design is a common method for achieving this reduction.
- Fine-pitch components—A surface area reduction is recommended for apertures of 20 mil pitch and finer. This reduction will help minimize solder balling and bridging that can lead to electrical shorts. The amount of reduction necessary is process-dependent (5–15% is common).
- For optimum transfer efficiency and release of the solder paste from the stencil apertures, industry standard aperture and aspect ratios should be adhered to.

Printer Operation

Solder Paste Bead Size	20–25mm in diameter
Print Speed	25–200mm/second
Squeegee Pressure	0.018–0.027kg/mm of blade length
Underside Stencil Wipe	Start at once per every 5 prints and decrease frequency until optimum value is reached
Squeegee Type/Angle	Metal with appropriate length/~45 degrees
Separation Speed	5–20mm/second or per equipment manufacturer's specifications
Solder Paste Stencil Life	Up to 12 hours (at 30–60% RH and 22–28°C)

Cleaning

RMA-155 is designed to be reliable without needing to be cleaned. However, the flux can be removed, if necessary, by using a commercially available flux residue remover (i.e., semi-aqueous, solvent based, or vapor degreaser).

Stencil cleaning is best performed using isopropyl alcohol (IPA) as a solvent. Most commercially available stencil cleaners also work well.

Compatible Products

- **Rework Flux**: TACFlux® 020B, TACFlux® 089HF
- **Cored Wire**: CW-807
- **Wave Flux**: WF-7745, WF-9945