

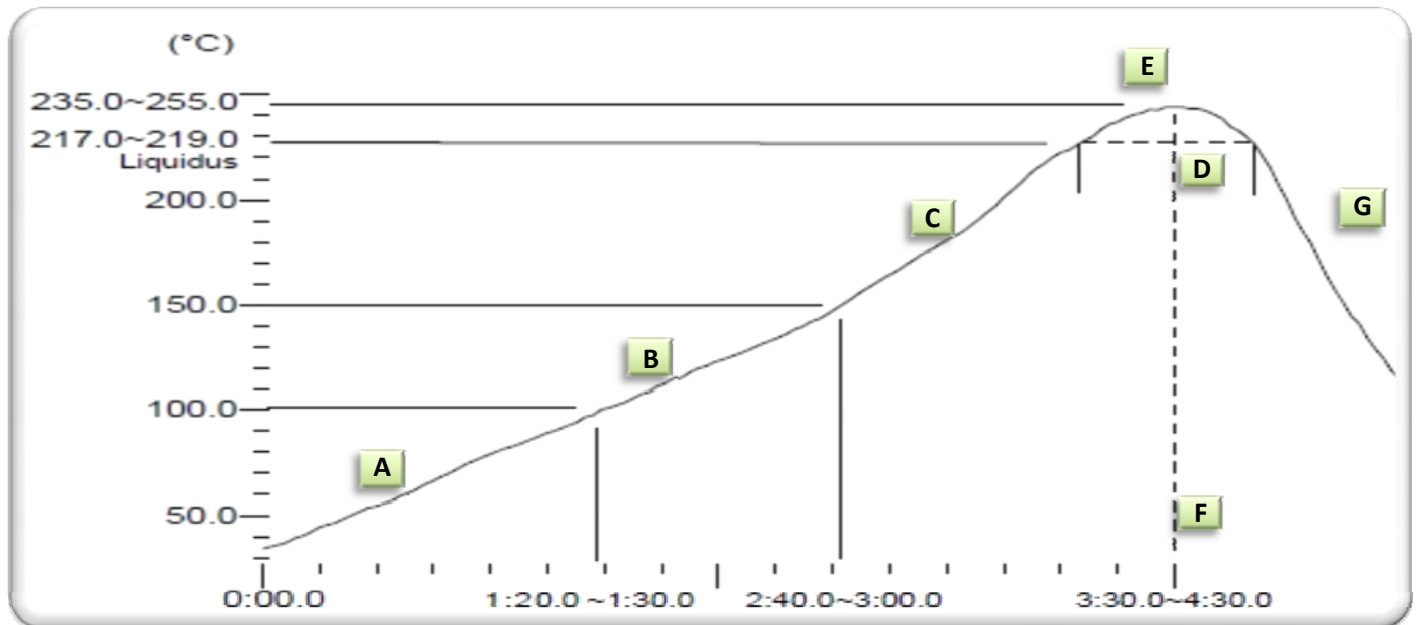
Linear Profile Process Guidelines

■ SAC 305
Solder Pastes

SAC Linear Profile Guide

APPLICATION

Solder Paste	Board Surface Finish	Component Plating
No-Clean and Water Soluble Chemistries SAC Solder Pastes	Au, Sn, Ag, SN100C HASL and similar OSP Organic Surface Preservative	Standard plating, Au, Pt, Pd, Pd/Ag, Ag, Alloy 42



A	PREHEAT RATE of RISE	<ul style="list-style-type: none"> Ramp from 45°C to 100°C in 80 ~ 90 seconds. Maintain a straight-line ramp for the first 90~120 seconds of this profile, triggered from 45°C. <p>Note: Linear profile ramp rates are naturally lower than those in a Ramp-Soak style profile. Linear preheat ramp rates should be maintained between 0.7°C/second MAX. Too low of a ramp rate will promote hot slump, solder balls and solder beading.</p>
B	SOAK	<ul style="list-style-type: none"> Low, gradual ramp rates inherent to linear profiles provide virtual equilibrium throughout the reflow process, resulting in the near elimination of the typical soak zone. Maintain a linear thermal transition through this area.
C	TRANSITION TO REFLOW	<ul style="list-style-type: none"> While a linear profile does not typically produce tombstoning, transition times and temperatures should always be monitored to ensure a robust process. Keeping ramp-rates and the ΔT between soak and liquidus temperatures to a minimum will help eliminate tombstoning if experienced.
D	TIME AT LIQUIDUS MP=217°~219°C Sn/Ag 3.0/Cu 0.5	<ul style="list-style-type: none"> The published melting point for SAC305 varies from supplier to supplier; however a window of 217°C ~219°C is widely accepted as standard. Target a time above 217°C ~219°C of 50 ~ 55 seconds, with a window of 45 ~ 75 seconds.
E	PEAK TEMPERATURE	<ul style="list-style-type: none"> Target peak temperature should be 240°C The recommended peak temperature range for SAC305 is 235°C~255°C
F	OVERALL PROFILE LENGTH	<ul style="list-style-type: none"> Total Profile Length from 45°C to PEAK should be 3 ½ ~ 4 ½ Minutes nominal.
G	COOLING	<p>Cool down is a critical part of the reflow process for lead-free solders, and should be monitored closely. Too low (or slow), of a cool-down rate can allow or promote micro-cracking of the solder joints, an inherent problem to some lead-free alloys. It also permits the formation of larger grain structures, promoting a dull / grainy appearance. (Not necessarily a defect)</p> <ul style="list-style-type: none"> Cool-down for lead-free alloys should typically be controlled between 3° ~ 4°C/second. Target 4°C to start to insure a fine grain solder structure and minimal IMC layer

