

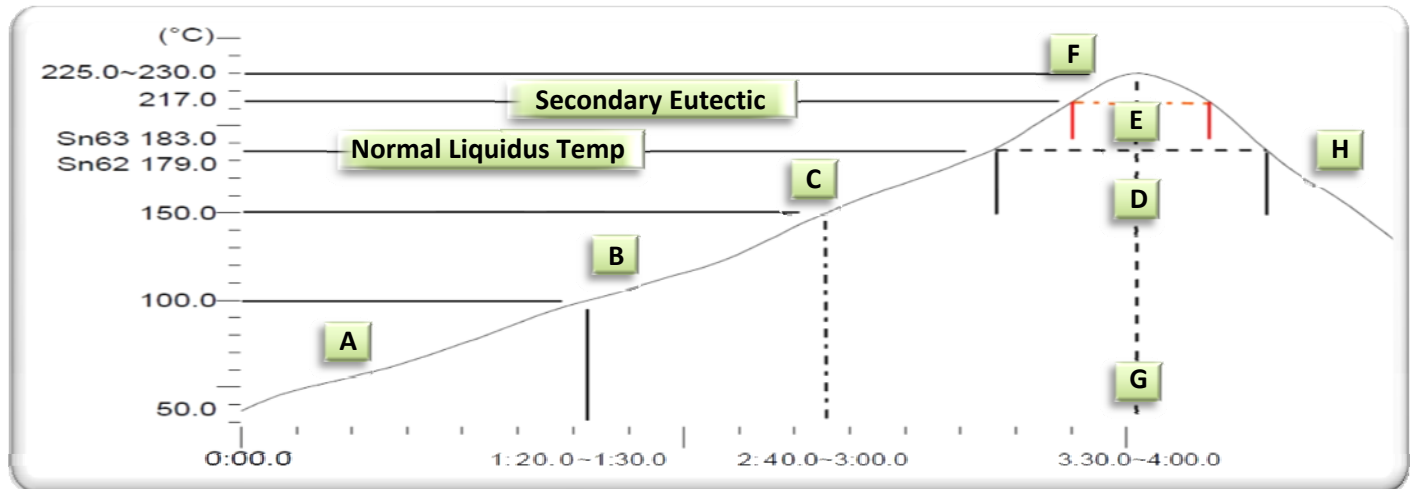
# Linear Profile Process Guidelines

## Soldering to High-Temperature Alloys

■ Sn62 & Sn63 Solder Pastes

### APPLICATION

Solder Paste	Board Surface Finish	Component Plating
No-Clean and Water Soluble Chemistries Sn62 and Sn63 Solder Pastes	Au, Ag, Sn/Pb HASL and similar OSP Organic Surface Preservative	Standard plating, Au, Pt, Pd, Pd/Ag, Ag, Alloy 42



<b>A</b>	<b>PREHEAT</b>	<ul style="list-style-type: none"> <li>Ramp from 45°C to 100°C in 80 ~ 90 seconds.</li> <li>Maintain a straight-line ramp for the first 90~120 seconds of this profile, triggered from 45°C.</li> </ul>
	<b>RATE of RISE</b>	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 ~ 2.0°C/second MAX.
<b>B</b>	<b>SOAK</b>	<ul style="list-style-type: none"> <li>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.</li> </ul>
<b>C</b>	<b>TRANSITION TO REFLOW</b>	<ul style="list-style-type: none"> <li>While a linear profile does not typically produce tombstoning, transition times and temperatures should always be monitored to ensure a robust process.</li> <li>Keeping ramp-rates and the ΔT between soak and liquidus temperatures to a minimum will help eliminate tombstoning if experienced.</li> </ul>
<b>D</b>	<b>TIME AT LIQUIDUS</b>	<ul style="list-style-type: none"> <li>Target 60 seconds with a window of 45 ~ 75 seconds.</li> <li>When soldering hard-to-wet alloys, and alloys with low dissolution rates, including Au, Pt, Pd, and Pd/Ag it may become necessary to extend time at liquidus to accommodate the slower dissolution rates associated with these alloys.</li> </ul>
	<b>Sn62 MP=179 °C</b>	
	<b>Sn63 MP=183 °C</b>	
<b>E</b>	<b>SECONDARY EUTECTIC</b>	<ul style="list-style-type: none"> <li>During the eutectic stage of the reflow process, Au from components and PWB pads readily dissolves into and dilutes the solder joints of lower melting point alloys resulting in the formation of a secondary eutectic, or melting point. At this point, if peak reflow temperatures are insufficient, the component junction temperature will no longer be hot enough to sustain reflow, wetting or spread.</li> </ul>
	<b>Time at 217 °C</b>	
	<b>15 +/- 5 Seconds</b>	
		<ul style="list-style-type: none"> <li>To correct this, you must also target and <b>overcome the secondary melting point of 217 °C</b></li> <li><b>Target a time of 60 seconds above liquidus for Sn62-179 °C and Sn63-183 °C</b></li> <li><b>Target a time above 217 °C of 15 seconds, with a window of 10 to 20 seconds</b></li> </ul>
<b>F</b>	<b>PEAK TEMPERATURE</b>	<ul style="list-style-type: none"> <li>Target a peak temperature of 225 °C</li> <li>When soldering high-temperature and low dissolution rate alloys, peak temperature process window of 225°C to 230°C is recommended.</li> </ul>
<b>G</b>	<b>OVERALL PROFILE LENGTH</b>	<ul style="list-style-type: none"> <li>Total Profile Length from 45°C to PEAK should be 3 ½ ~ 4 Minutes nominal.</li> </ul>
<b>H</b>	<b>COOLING</b>	<ul style="list-style-type: none"> <li>Cooling rates should be maintained between 2°C ~ 3°C /second to insure a fine grain solder structure and minimal IMC layer</li> </ul>