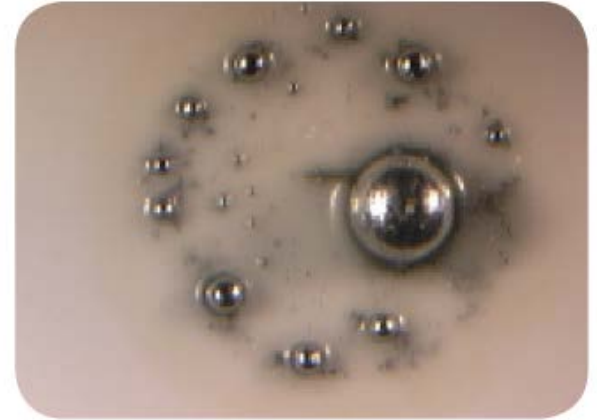


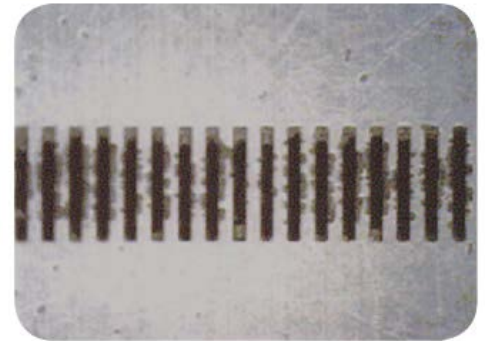
## How to Prevent the Formation of Solder Balls

**Challenge:** Solder ball formation during reflow or wave soldering is the result of uneven solder particle melt due to an oxide layer or un-wettable surfaces. Whether the defect is random, non-random, or a result of splash back, Alpha offers on-site expertise to combat these problems. From conveyor speed to contamination, Alpha will meticulously analyze each step of your process to identify defect causes and recommend cost-effective solutions.

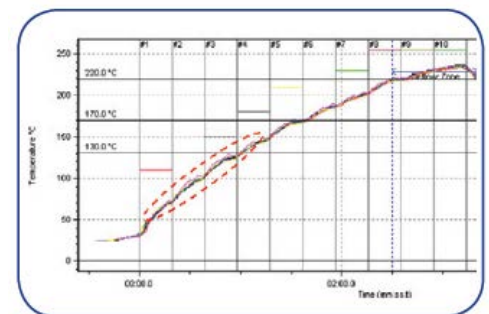
**Solution:** There are several possible causes for this common problem during SMT assembly. Alpha recommends the following to prevent the formation of solder balls.



Possible Causes: Stencil	
DESCRIPTION	RECOMMENDATIONS
Paste stuck under the stencil will be transferred onto the solder mask of the next PCB.	<ul style="list-style-type: none"> <li>• Verify zero print gap set up.</li> <li>• Check minimum print pressure used.</li> <li>• Check cleaning efficiency such as wet/dry/vacuum.</li> <li>• Check wipe frequency.</li> </ul>



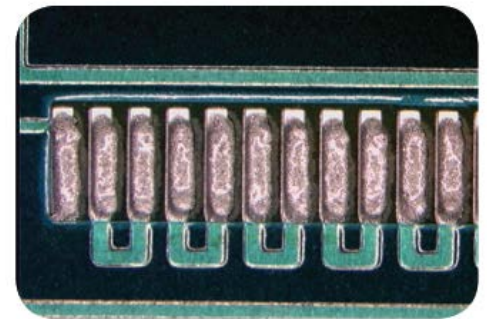
Possible Causes: Reflow Profile	
DESCRIPTION	RECOMMENDATIONS
Fast ramp-up rate or preheat rate will not allow sufficient time for the solvent to vaporize off gradually.	<ul style="list-style-type: none"> <li>• Slow preheat rate is recommended, typically &lt;math&gt;&lt;1.5^{\circ}\text{C}/\text{sec}&lt;/math&gt; from room temperature to 150°C.</li> </ul>



## How to Prevent the Formation of Solder Balls

Possible Causes: PCB Moisture	
DESCRIPTION	RECOMMENDATIONS
Trapped moisture may result in explosive vaporization.	<ul style="list-style-type: none"> <li>• Especially for lower grade PCBs such as FR2, CEM1, tends to absorb moisture. Bake 120°C for 4 hours if necessary.</li> </ul>

Possible Causes: Solder Paste	
DESCRIPTION	RECOMMENDATIONS
Especially for water soluble solder paste which is hygroscopic, it tends to have limited stencil life because of moisture absorption.	<ul style="list-style-type: none"> <li>• Minimize exposure time</li> <li>• Printer temperature and humidity to be within recommendation</li> <li>• Try new lot of solder paste to verify paste integrity.</li> <li>• Use coarser powder size if possible as fine powder size has more oxides and tends to slump more readily.</li> </ul>



For a list of [ALPHA® Products](#) that can help prevent the formation of solder balls or for more helpful information, visit the [Reliability Solutions](#) section of our website.

Having other SMT Assembly issues? Download the [Alpha SMT Troubleshooting Guide](#) for more advice.

