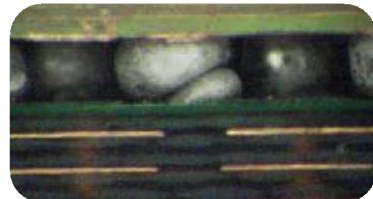


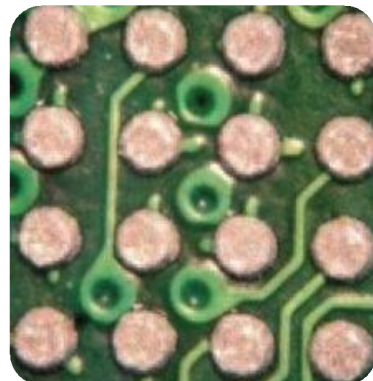
# BGA Head-on-Pillow

**Definition:** Head-on-pillow is an assembly defect in which the spheres from a BGA or CSP don't coalesce with the solder paste on the PCB pad. It is important to differentiate head-on-pillow from a defect caused simply by insufficient reflow temperature, which is characterized by distinct solder spheres from the paste that have not been properly melted on the pad and BGA solder sphere. With head-on-pillow the soldering temperature is sufficient to fully melt the solder sphere and paste deposit, but an impediment to the formation of a proper solder joint exists.



## Possible Causes: Screen Printer

Description	Recommendations
Irregular print definition across the pads may hinder some solder bump locations to be in contact with solder paste.	Verify print definition and measure print height consistency



## Possible Causes: PCB/Component

Description	Recommendations
Increase paste deposition volume to better compensate for substrate warpage.	Increase print volume by using square aperture vs. round opening, or enlarge overall deposition volume without jeopardizing bridging.
BGA coplanarity issue	Increase solder volume.
Oxidized BGA solder balls	<ul style="list-style-type: none"> <li>• Use higher activity paste.</li> <li>• Use nitrogen reflow.</li> </ul>



# BGA Head-on-Pillow

## Possible Causes: Reflow

Description	Recommendations
Board warpage especially for double reflow boards or thin PCBs (<1mm thick)	<ul style="list-style-type: none"> <li>• Critical to minimize time above T<sub>g</sub>, (typically 130°C for FR4 boards) with BGAs mounted. Target to maintain &lt; 2 min if possible.</li> <li>• For second reflow cycle, try to adopt lower preheat to reduce warpage occurrence.</li> </ul>
Variance in CTE between PCB and BGA	Ensure minimum delta temperature difference between the BGA component and the rest of the components on the board. Apply short soak if necessary.
Paste hot-slump effect will aggravate BGA open joints if there are coplanarity issues.	Minimize time from 150°C to liquidus temperature.
Long soak profile may exhaust the flux capacity before reflow.	If a long soak is mandatory for complex board, use nitrogen cushion the flux capacity in overcoming oxidation rate.

