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## Reasons for BGA insufficient solder & short

There are cases of insufficient solder and solder short in BGA soldering, but it is also possible. Because the PCB BGA board has too much gap due to heat shrinkage (CTE), the edge of the BGA board is upturned. The smile curve is formed, and the circuit board is too long due to TAL (Time Above Liquidus), and the temperature difference between the upper and lower furnaces of the reflow furnace is too large, and the two-phase interaction forms a circuit board to bend down, Caused the so-called cry curve.

If the cry curve, smile curve is severely deformed, short-circuit and air-welding of the BGA will be formed at the same time, which is usually the case when both occur at the same time. The picture shows that the BGA smile curve and the cry curve on the printed circuit board strongly squeeze the BGA solder balls, causing several short circuits. In general, consider reducing the slope of the reflow oven, either by preheating the BGA to eliminate thermal stress, or by requiring BGA manufacturers to

use higher  $T_g$  to overcome it.



### **Other reasons for BGA insufficient solder:**

1. Circuit board pads or BGA solder balls are oxidized. In addition, printed circuit boards or BGAs with improper moisture resistance will have similar problems.

2. Solder paste expired.

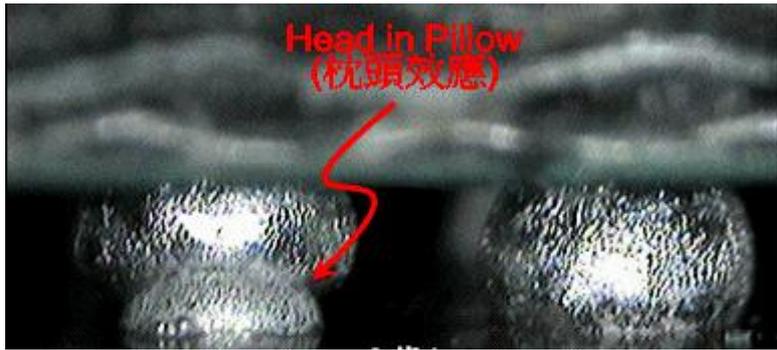
3. Insufficient solder paste printing.

4. The temperature profile is poorly set, and the furnace temperature should be measured at the insufficient solder.

In addition, when the temperature rises too fast, it is more likely to cause the above-mentioned cry curve, smile curve problems.

5. Design issues. For example, Via-in-pad will cause a decrease in solder paste, which may also cause the solder ball to be hollow and blow up the solder ball.

6. Head in Pillow. This phenomenon often occurs when the BGA board or printed circuit board is deformed by reflow. When the solder paste is melted, the BGA solder ball does not touch the solder paste. When cooling, the BGA carrier board and the board are deformed. Decrease, the solder ball falls back to the cured solder paste.



**In general, there are several methods for analyzing insufficient solder and solder short (for details, please refer:SMT BGA solder ball inspection method):**

1. Microscope.
2. X-Ray inspection machine. ( Tel/whatsapp/wechat +8618779975930 )
3. Red Dye Penetration.
4. Cross section.

### **Family of Industrial X-ray inspection machine & BGA rework station**

*Last Article: [SMT BGA solder ball inspection method](#)*

*Next Article: [Formation and prevention of SMT BGA voids](#)*

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