

# BBG Tech Tips

## Pin Holes, Blow Holes & Baking Boards

A **pin hole** is a small depression found in a solder connection after the connection has been cleaned. In the three to four seconds that a board passes over a solder wave, moisture from within the board material may find its way through a small plating void in the copper of the hole wall during the soldering process. Pin holes can also be caused by residual flux in the hole due to poor pre-heat control during the solder wave assembly operation.

As the board goes over the solder wave, the heat will form a small gas pocket from either moisture or residual flux. When the board starts to cool, the gas pocket will begin to contract, leaving a small and visible depression in the soldered connection.

Baking the boards prior to assembly will help if small plating voids are found to be the culprit. However, a prior baking cycle will have no effect when flux residue or entrapment is caused by the assembly process.



**Blow holes** are generally a wetting problem caused by either the board or the component. The presence of very large plating voids in the hole wall copper will create what some describe as “little volcanoes” after the soldering process. A large void will hinder the proper wicking of solder up through the hole. This hindering of the solder flow will cause the solder to be pushed back out of the hole, leaving a blow hole. Baking prior to assembly may not help the situation, depending upon the size and extent of the plating voids.

Sometimes, blow holes are caused by the actual component itself -- especially when the suspect boards show no signs of voiding or if it is only a particular component or components that display the problem.

Not too long ago, the **baking of boards** prior to component placement and soldering was an integral part of the assembly process. As PCB manufacturers have advanced in process controls for consistent hole-wall quality, as well as in control of raw material manufacture and its proper climate storage, baking is seldom used on standard Fr-4 material. However, not every hole will be plated perfectly, and not every customer’s stocking shelves are in climate-controlled rooms.

A baking cycle prior to assembly can reduce the chance for pin holes and blow holes in the solder connections, and it may also help prevent delamination. Boards should be assembled the same day as they are baked because the material will act like a sponge and absorb moisture again.

105° C at temperature for an hour bake should resolve most moisture issues for the bare board.

*Research for the above information may be from, but is not limited to, IPC reference manuals, the PCB Handbook, the Bare Board PWB Design Manual and consultation with industry professionals. Please consult a process engineer familiar with your company’s PCB assembly process before making any procedure changes.*