

Abstract

Solder joints are critical to the reliability of circuit boards. If gold is introduced to the solder joint, brittle AuSn_4 intermetallic compounds develop which affect reliability of that solder joint. To determine the effects of gold when dissolved into a non-lead solder joint, a process was developed in order to apply gold content onto SAC305 solder paste. The gold was transferred as a paste from a micropipette onto each individual solder bump. This process was designed to apply a range of gold content from 1.0 wt. % to 10 wt. % to each individual solder joint. The test board vehicle designed for the gold paste application integrated three different types of components; SOP-14, chip resistors and QFN packages.

Four trial runs were conducted to assess the quality and determine viability of this process. The first runs failed because the paste was not viscous enough. The second run attempted to test the process at 1.0 wt. % Au but failed because the components floated off their pads. The third and fourth tests attempted to apply gold paste at 1.0 wt. % Au and then at 10 wt. % Au, this resulted in the correct component positioning on the test board. The Au wt. % was not verified and needs further inspection to determine whether the process was successful or not.

The results from the 1.0 wt. % Au solder joints indicated that the gold paste was successfully applied to leads spaced far apart. The components placed on a 10 wt. % Au solder joint, drifted off center shorting leads together resulting in unknown gold concentrations.