In Case You Missed It

As of January, Circuits Assembly provides abstracts of papers from recent industry conferences and company white papers. With the amount of information increasing our goal is to provide an added opportunity for readers to keep abreast of technology and business trends.

Lead-Free Processing

Lead-Free FAQs

Author: Cookson Electronics

Abstract: A series of FAQs (frequently asked questions) on lead-free solders and processing.

RoHS and WEEE Decision Trees

Author: Design Chain Associates

Abstract: Decision trees to help determine whether RoHS and WEEE impact your products, as consolidated from the UK Department of Trade and Industry.

"Lead-Free Soldering Booklet"

Author: AIM Solder

Abstract: This downloadable document provides information on pending legislation, patents, available services, alloy information and data, the latest technical articles and more.

Lead-Free FAQs

Authors: Kester Solder

Abstract: Offers information on legislation and timing goals, alloy selection, component and PCBs, SMT, wave soldering, hand soldering and flux selection.

"Intrusive Reflow Using a Lead-Free Process"

Authors: Frank Grano and Felix Bruno, frank.grano@sanmina-sci.com

Abstract: Intrusive reflow is a method of soldering a limited quantity of PTH components using the SMT process. Solder paste is applied to the PCB, the PTH component is inserted into the board and then reflowed along with SMT components. This paper looks into the criteria needed to use the intrusive process with lead-free solders, namely the SAC alloy, to determine if the rules for tin-lead soldering apply for lead-free soldering. (SMTAI, September 2004)

Process Management

"Effect Of Lead-Free Alloy Composition on Tombstoning"

Authors: Benlih Huang, Ph.D. and Ning-Cheng Lee, Ph.D., askus@indium.com

Abstract: Effect of solder alloy composition and properties on tombstoning of SnAgCu has been investigated. Both wetting force and wetting time at a temperature well above the melting point have no correlation with the tombstoning behavior observed at vapor-phase soldering. Since tombstoning is caused by unbalanced wetting force, this unbalanced wetting force may occur at the onset of melting. DSC study indicates that the tombstoning rate decreases with increasing pasty temperature range and increasing mass fraction of solid in solder at onset of melting. Both are expected to result in a slower wetting speed at the onset of solder melting. This slower wetting in turn results in a more balanced wetting force and accordingly reduces the tombstoning. The mass fraction of solid may be the more essential factor. Also, lower surface tension correlates with a higher tombstoning rate. Tombstoning of SnAgCu can be regulated by the solder composition. A maximal tombstoning rate is observed at 95.5Sn3.5Ag1Cu. The tombstoning rate decreases with increasing deviation in Ag content from this composition, particularly toward the end of lower Ag content. SnAgCu composition with a Ag content lower than 3.5%, such as 2.5Ag, is more favorable in terms of reducing tombstoning rate with minimal risk of forming Ag3Sn intermetallic platelet. (SMTAI, September 2004)

Solder Joint Reliability

"Conformal Coat Impact on Area Array Package Solder Joint Reliability"

Authors: Keith Kirchner and David Nelson, k-kirchner1@raytheon.com

Abstract: The study investigates the impact of silicone and Parylene conformal coatings, epoxy underfill materials and a silicone sealant on a variety of area array packages while being subjected to thermal cycling. Test vehicles, created specifically for the investigation, were exposed to 2000 thermal cycles from -40° to 95°C with 10 min. dwell periods at each temperature extreme and a maximum temperature ramp rate of 10°C per min. The TVs were subsequently exposed to 500 additional cycles from -55° to 125°C. Continuous electrical monitoring, visual inspection and cross section techniques were used to analyze the TVs. (SMTAI, September 2004)

"Impact Of Underfill and Solder Joint Alloy Selection On Flip Chip Solder Joint Reliability"

Authors: Dave Hillman and Ross Wilcoxon, ddhillma@rockwellcollins.com

Abstract: Thermal cycle testing of underfilled flip-chip devices mounted to a BT circuit board. Daisy-chained components with either eutectic (Sn63) or lead-free solder joints were evaluated with one of three underfill materials. Testing revealed that Pb-free joints failed much earlier than those with eutectic solder. The results indicate that the evaluated Pb-free solder would not be suitable for Rockwell Collins' applications, using present materials and process parameters. On the other hand, this flip-chip device with eutectic solder joints and the reworkable novel underfill completed more than 1000 thermal cycles without failure and therefore is considered to be suitable for ground-based military and commercial avionics systems. (SMTAI, September 2004) ■