

This is an abstract of the SYMPOSIUM KEYNOTE II that was originally presented at
Pan Pacific Microelectronics Symposium
14 - 16 February 2012
Sheraton Poipu Resort
Kauai, Hawaii, USA

Pushing the Limits of Lead-Free Soldering

Tetsuro Nishimura
Nihon Superior Co., Ltd.
Osaka, Japan

ABSTRACT

Over the past 12 years I have had first-hand experience of the challenges of implementing lead-free assembly in many countries. While I have seen failures as well as successes I believe passionately that lead-free is the right course for the industry and am personally committed to its universal implementation. I have come to realize, however, that while there is still much to be done in the formulation of lead-free solder alloys the challenge extends beyond the solders themselves to solder joint design, flux formulations, component design and materials, circuit board design and materials, component and board finishes, process equipment. And the challenges go beyond the materials and equipment to the people involved in every part of the process of producing lead-free electronics. There is a need for education on the issues that arise from lead-free implementation and for standards that define best practice.

While it is not appropriate to make comparisons with assembly technologies based around tin-lead solder it has to be acknowledged that lead-free implementation has created a mood of uncertainty as we move out of the "comfort zone" of established knowhow. That uncertainty is understandable as we consider how lead-free materials are going to behave as joints in semiconductor packages get smaller and conditions in terms of current densities and temperatures get more severe. In this presentation I hope that by sharing my experience with you I will be able to give you more confidence that lead-free technologies can successfully deliver the productivity and reliability the industry requires.

While the conversion of the electronics manufacturing to lead-free technologies seems to many to be a forbidding challenge we can be encouraged by the fact that much of what we have learned from our experience of lead-containing technologies in the past can provide a basis for dealing with the implementation of lead-free technologies in the future.