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**Special Announcement
To All iNEMI Members
Call for Participation in the
iNEMI Characterization of Pb-Free Alloy Alternatives Project**

This new effort is a follow-on project to the Pb-Free Alloy Alternatives Project. The Statement of Work (SOW) and Project Statement (PS), which were developed by the project team, were approved by the iNEMI Technical Committee (TC) on Monday, June 15, thus beginning the corporate sign-up period for this project. iNEMI membership is required to participate in the Characterization of Pb-Free Alloy Alternatives Project, and companies have until Friday, July 24, 2009, to join as founding members. The project will officially begin as soon as two signed Project Statements are received from iNEMI member companies and approved by iNEMI. The Statement of Work and Project Statement are posted at http://www.inemi.org/cms/projects/ba/Char_Pb-Free_Alloys.html.

The leadership for this project is:

Project Chair: Greg Henshall, Hewlett-Packard Company (greg.henshall@hp.com)
Project Co-chair: Stephen Tisdale, Intel Corporation (stephen.tisdale@intel.com)
iNEMI Coach: Jim Arnold, iNEMI (jim.arnold@rissastudios.com)

Background and Motivation:

Although Sn-Ag-Cu (SAC) 305/405 alloys have been the most commonly used Pb-free alloys to date, they do not meet all of industry's needs for all applications, and new alloy solutions continue to be introduced. iNEMI recommends the following to help manufacturers manage the use of multiple solder alloys:

- Develop an industry-standard alloy assessment methodology
- Assess the impact of alloy composition on thermal fatigue behavior
- Update standards affected by alloy alternatives

Purpose of Project:

Significant innovations in Pb-free solder alloy compositions are being driven by volume manufacturing and field experiences. As a result, the industry has seen an increase in the number of Pb-free solder alloy choices beyond the common near-eutectic ternary SAC alloys. The

increasing number of Pb-free alloys provides opportunities to address shortcomings of near-eutectic SAC alloys, such as:

- Poor mechanical shock performance
- Alloy cost
- Copper dissolution
- Poor mechanical behavior of joints in bending

At the same time, the increase in alloy choice presents challenges in managing the supply chain and introduces a variety of logistical and technical risks, such as a potential decrease in thermal fatigue resistance.

The lack of information on the thermal fatigue performance for many new Pb-free alloys has motivated the Alloy Alternatives team to plan accelerated thermal cycle experiments. The original iNEMI Pb-Free Alloy Alternatives Project considered many possible sets of experiments in order to answer a variety of questions. In the end, the team decided to:

- Validate the impact of Ag concentration in the range of 0 to 4% on thermal fatigue resistance
- Evaluate the impact of commercially common dopants, such as Ni, on thermal fatigue performance
- Assess how alloy composition affects the acceleration behavior
- Provide basic thermal fatigue data for several of the most common alternate alloys on the market today, benchmarking them against eutectic Sn-Pb and SAC305
- Depending on the availability of cells in the DoE, provide an opportunity to assess the performance of some new commercial and experimental alloys

Goals of the Program:

The major goals of the project include continuation of some Phase 1 goals and the addition of several follow-on objectives. Overall, goals for this project include the following.

- Continue to provide guidance to the industry that will help make Pb-free alloy choice easier to manage
- Provide technical information to the industry to reduce the complexity in selecting Pb-free alloys
- Develop a set of material test requirements for new Pb-free solder alloys
 - Work with IPC and the IPC Solder Products Value Council to establish standard test methods for alloy properties and reliability evaluations
 - Identify test methods to reduce impact on manufacturing processes
- Provide thermal cycle reliability data on a variety of commercially and scientifically important alloys
- Provide data from which thermal fatigue acceleration models can be derived for a range of alloys

Steps for Joining the Program:

- **For iNEMI Members**
 - Complete and sign the Project Statement
 - Fax the completed PS to +1 (703) 834-2735 or scan and email to infohelp@inemi.org.
- **For Non-iNEMI Members**
 - Discuss Annual Membership Fees with Jim McElroy in North America (jmcelroy@inemi.org), Haley Fu in Asia (haley.fu@inemi.org), or Grace O'Malley in Europe (gomalley@inemi.org)
 - Complete the iNEMI Membership Documents <http://www.inemi.org/cms/join/memag.html>
 - Fax the completed documents to +1 (703) 834-2735 or scan and email to infohelp@inemi.org.
 - Complete and sign the Project Statement
 - Fax the completed PS to +1 (703) 834-2735 or scan and email to infohelp@inemi.org.