



INEMI[®]

International Electronics Manufacturing Initiative

Board Flexure Standardization Project: Phase 2

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Advancing manufacturing technology

Project Background

- **Damage can be induced in printed circuit assemblies (PCAs) by flexing during manufacturing and box assembly**
- **Evaluation of PCA risk caused by bend-induced stress is needed**
- **Printed circuit board (PCB) surface strain is an indirect indicator of the stresses that solder joints experience**
- **Due to strain gradients across bent PCB surfaces, it is critical that the placement of strain gages is consistent in order to properly evaluate stress conditions and risk levels**
- **IPC/JEDEC-9704 should encompass the impact of changing to Pb-free electronics and to incorporate industry best practices in strain gage placement**
- **Consistent strain measurement techniques are needed to reduce confusion and error**

Project Purpose

The purpose of this project is to update IPC/JEDEC-9704 to:

- Address the importance of using a consistent strain gage placement (along package diagonal) to properly assess risk
- Update the document to reflect new PWB strain guidance related to Pb-free technology
- Discuss and incorporate best practices from experienced IPC/JEDEC-9704 users
- Update Appendix A (Strain Limits) of IPC/JEDEC-9704 to align with IPC/JEDEC-9707 test methodology
- Update Appendices A&B (Strain Limits & Reference for Rate Limited Guidance) of IPC/JEDEC-9704 such that they are acceptable for Pb-free solders

Project Purpose

- **Update Appendix B (Reference for Rate Limited Guidance) to clarify when these strain limits are and are not applicable (e.g., not for use in shock)**
- **Develop criteria for differentiating between qualitative & quantitative assessment methods (typical manufacturing environment vs. deliberately mishandling boards), such as when absolute limits can be used and when relative measurements need to be used**
- **Identify key parameters to document during manufacturing evaluation:**
 - **PCA properties: pad size, board thickness, PCB laminate type, etc.**
 - **Factory conditions: equipment, equipment conditions, etc.**
- **Determine appropriate Failure Analysis methods as an alternative for not being able to monitor strains**

Scope of Work

- **Update IPC/JEDEC-9704 to reflect current best practices in strain gage technologies and measurement techniques**
- **Present views of companies regarding the present state and future focus of strain gage placement will be gathered and consolidated**
- **These proposed changes will be presented to the IPC/JEDEC committee, and feedback will demonstrate what should be done to update standard IPC/JEDEC-9704 to reflect the current industry trends**

Key Project Milestones

Task 1: Determine areas where modifications are needed in IPC/JEDEC-9704

Task 2:

- a) Develop consensus on standard gage placement**
- b) Decide what needs to be updated in IPC/JEDEC-9704 related to Pb-free technology, and how to implement updates**
- c) Consolidate best practices in using IPC/JEDEC-9704 (using strain limits, qualitative vs. quantitative assessment methods, key parameters during mfg evaluation, and alternate methods (such as FA))**

Task 3: Develop and approve proposal with recommendations to the IPC/JEDEC Committee

Task 4: Present recommendations to the IPC/JEDEC Committee

Task 5: iNEMI Membership Report – Webinar

Task 6: Industry Report Presentation at IPC/APEX 2011



Dependency

- **This work is predicated on the assumption that there is sufficient data available in the industry to make the decisions required within the scope of this project**
- **If it is found during the course of this project that additional data is required, this Statement of Work would be modified to include a test phase.**
- **The modified SOW would be submitted to the iNEMI Technical Committee for approval prior to committing the project team to the tasks identified in new SOW.**

Project Plan Schedule with Milestones

Project Tasks	May 2010	June 2010	July 2010	Aug 2010	Sep 2010	Oct 2010	Nov 2010	Dec 2010	Jan 2011	Feb 2011	Mar 2010	Apr 2011
Task 1 – Determine areas for modifications IPC/JEDEC-9704	X	X										
Task 2a – Develop consensus on standard gage placement			X	X	X	X						
Task 2b – Update IPC/JEDEC-9704 related to Pb-free technology			X	X	X	X						
Task 2c Consolidate best practices in using IPC/JEDEC-9704			X	X	X	X						
Task 3 – Develop and approve proposal with recommendations to the IPC/JEDEC Committee							X					
Task 4 – Present recommendations to the IPC/JEDEC Committee								X				
Task 5 – iNEMI Membership Report - Webinar									X			
Task 6 – Industry Report Presentation – APEX 2011												X



Open Questions

- **Are you interested in joining this team?**
- **Does the proposal address your needs as a user of the IPC/JEDEC-9704 standard?**
- **Is there any additional content within the current standard that you would like to see addressed by this team?**