



ASSOCIATION CONNECTING  
ELECTRONICS INDUSTRIES

***NEMI RoHS Pb-Free Summit  
Status of RoHS Standards  
October 2004***

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Director of Environmental Policy***



# About IPC

- Founded in 1957 - 6 Companies
- Over 2200 Members Worldwide
  - PCB/IMS ➤ Suppliers
  - Assembly/EMS ➤ OEMs
- Global Membership
  - 76% in North America
  - Members in 47 Countries
- Strong Foundation as Technical Organization to Meet Industry Needs
- Focus on Design, PCB Manufacturing & Electronics Assembly




# *IPC Mission Statement*

IPC is a United States-based trade association dedicated to furthering the competitive excellence and financial success of its members worldwide, who are participants in the electronic interconnect industry.

In pursuit of these objectives, IPC will devote resources to **management improvement and technology enhancement programs, the creation of relevant standards, protection of the environment, and pertinent government relations.**

IPC encourages the active participation of all its members in these activities and commits to full cooperation with all related national and international organizations.

# IPC Lead-Free Position



The US electronic interconnection industry, represented by the IPC, **uses less than 2% of the world's annual lead** consumption. Furthermore, all available scientific evidence and US government reports indicate that the **lead** used in US **printed wiring board** (PWB) manufacturing and electronic assembly **produces no significant environmental or health hazards.**

Nonetheless, in the opinion of IPC, the pressure to eliminate lead in electronic interconnections will continue in the future from both the **legislative** and **competitive** sides. IPC encourages and supports research and development of lead-free materials and technologies. These new technologies should provide product integrity, performance and reliability equivalent to lead-containing products without introducing new environmental risks or health hazards. IPC prefers global rather than regional solutions to this issue, and is **encouraging a coordinated approach to the voluntary reduction or elimination of lead** by the electronic interconnection industry.



# *Lead Free Solder LCA*

- IPC and EIA partnering with the US EPA
- Project Goals
  - Evaluate the relative environmental impacts of Sn/Pb solder and Pb-free solders
  - Evaluate the effects of lead-free solders on recycling and reclamation at EOL
  - Assess the leachability of Pb-free solders and their potential environmental effects
- Draft report will be posted for public review at [www.cleanproducts.org](http://www.cleanproducts.org)

# Preliminary LCA Results

Impact category	SnPb	SnAgCu	SnAgBi	SnAgBiCu
Nonrenew able resource use	Low est	<b>Highest</b>		
Renew able resource use		<b>Highest</b>	Low est	
Energy use		<b>Highest</b>	Low est	
Landfill space	Low est	<b>Highest</b>		
Global w arming		<b>Highest</b>	Low est	
Ozone depletion		<b>Highest</b>	Low est	
Photochemical smog	Low est	<b>Highest</b>		
Acidification	Low est	<b>Highest</b>		
Particulate matter	Low est			
Eutrophication	<b>Highest</b>		Low est	
Water quality		<b>Highest</b>	Low est	
Public chronic non-cancer	<b>Highest</b>		Low est	
Public cancer	<b>Highest</b>		Low est	
Occupational chonic non-cancer	<b>Highest</b>		Low est	
Occupational cancer	<b>Highest</b>		Low est	
Aquatic toxicity	<b>Highest</b>		Low est	

**These results are currently undergoing final review**



# *IPC RoHS Supply Chain Readiness*

- Solder Value Products Council
- Materials Declaration Handbook (IPC 1065)
- Standard for lead free labeling materials (IPC 1066)
- Updated IPC standards for LF manufacturing
- Lead free technical conferences & educational seminars
- New lead free website [www.leadfree.org](http://www.leadfree.org)
- Lead free peer-to-peer list serve



# *IPC Solder Products Value Council*

- Performance and reliability testing of
  - Sn/3Ag/.5Cu
  - Sn/3.8Ag/.7Cu
  - Sn/4Ag/.5Cu
  - multi vendor analysis
- Initial Testing
  - DSC melting point, spread testing, wetting balance
  - Results show no Significant difference
  - White Paper published for industry  
<http://leadfree.ipc.org/LeadFreeWP006.asp>
- Reliability testing results available soon



# ***Supply Chain: Materials Declaration Handbook***

- Support Joint-Industry standard being developed by EIA/JEITA/EICTA
- IPC handbook walks users through process and calculations needed to complete JIG Materials Declaration
- Draft available on IPC website
- Final to be published Nov 2004



# *IPC 1066: Labeling for Materials of Concern*

- Labels for bare boards and assemblies
  - Objective: Communicate materials of concern within the supply chain
  - Support manufacturing, repair, and recycling
  - Adopts RoHS definition of lead free
  - Not intended for RoHS border compliance
- Working with JEDEC (JESD97) on joint-standard for component labeling



# *Lead-Free Labeling*

- Indicate Solder family
- Tin-lead boards and components have no required label (default)
- Uses RoHS Maximum Concentration Values
- Lead Free label (May not be used for items containing RoHS exempt lead).
- Optional additional board markings
  - ✎ Halide-free base resin
  - ✎ Conformal coating used after assembly



# ***IPC Lead Free Standards***

**IPC-J-STD-001 Soldering Standard I**

**IPC-J-STD-002 Component Solderability**

**IPC-J-STD-003 PCB Solderability**

**IPC-J-STD-004 Flux materials**

**IPC-J-STD-005 Solder paste**

**IPC-J-STD-006 Alloy wire and bar**

**IPC-A-610 Assembly Workmanship**

**IPC/JEDEC J-STD-020C Moisture/Reflow Sensitivity  
Classification for Non-Hermetic Components**

**IPC/JEDEC J-STD-033C Handling, Packing, Shipping  
and Use of Moisture/Reflow Sensitive Surface Mount  
Devices**

**Circulating NEMI Tin Whiskers Test Method for  
Consideration as an IPC Test Method**

# IPC Lead Free

## Conferences

### IPC/JEDEC

Frankfurt, Germany October 20-22

Boston, CA December 1-3

San Jose, CA April 18-20, 2005

### IPC/ CEAC/SMT China

Shanghai, China November 15-17

### APEX

Anaheim February 22 – 24

## Education

### Lead Free Implementation & Production, Reliability & Manufacturing

October 29, 2004 —Dallas, TX

November 1, 2004 — Chicago, IL



# *Data Exchange*

- NEMI/IPC PDX 2.0 development team
- Goal: Develop international data dictionaries with interoperability using XML