IPC Standardization

Case Study of the Consensus Process

David W. Bergman, VP International Relations

Association Connecting Electronics Industries

IPC Overview

- Founded in 1957 as the Institute of Printed Circuits with 6 Member Companies
- Strong Foundation as Technical Organization Dedicated to Meeting Industry Needs
- Focus on Design, PCB Manufacturing and Electronics Assembly

IPC
Association Connecting Electronics Industries

IPC Membership
Type

2,771 Member Companies

•PCB Manufacturers	282	(10%)
•EMS Companies	645	(23%)
•Suppliers	707	(26%)
•OEMs	888	(32%)
•Government/Others	249	(9%)

IPC
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As of: December 31, 2010

Membership Location

Members located in 56 Countries

- 73% North America
- 12% Asia
- 13% Europe
- 2% Other

IPC Technical Committees

- 26 General Committees
- 200 Subcommittees and Task Groups
  - Consist of industry peers
  - Started writing standards in 1959
  - ANSI recognized since 1981
  - Managed by Technical Activities Executive Committee (TAEC)

IPC and ANSI

- IPC's procedures were reviewed by ANSI and approved in 1981
- IPC procedures are audited by ANSI every 5 years
- IPC's focus is NOT to write American standards but rather Global standards with best standards development practices

ANSI's key philosophy points

- Open, fair, equal, transparency
- Any individual can challenge the group
- Ensures a documented process, and that all comments receive response
- Documents successfully passed through this process represent an industry consensus

ANSI Requirements

- Documents must be supported
  - Reviewed or revised every 5 years
  - Official interpretation/clarification of intent
- IPC supports this with staff, chairmen, email forums and committee experts
- In China TgAsia@ipc.org is actively used for manufacturing support and standards questions

IPC Standards and Environmental Legislation

Association Connecting Electronics Industries

Maximum Concentration Values

- Maximum Concentration Values (MCVs) established by Technical Advisory Committee

Lead	0.1 %
Mercury	0.1 %
Cadmium	0.01%
Hexavalent Chromium	0.1 %
Penta-, Octa- and DecaBDE	0.1 %
PBBs	0.1 %

- De-minimis concentrations or maximum concentration value (MCV) defined at the homogeneous materials level

RoHS Additional Substances for Restriction

Commission

- Oko Institute hired to study need for additional substance restrictions
- Draft Oko report called for broad restriction of organo-halogens and many other compounds
- IPC workshop and lobbying

IPC Advocacy

- TBBPA has undergone a comprehensive EU risk assessment that determined it to be safe for the environment and human health
- Is not expected to be restricted under REACH
- Precedent of restricting a substance for political instead of scientific reasons
- Additional substance restriction under RoHS should be based on scientific methodology instead of continuing arbitrary substance restrictions
- Should Align RoHS and REACH methodologies

RoHS Additional Substances for Restriction

EU Commission

- No Substances proposed for immediate restriction
- Four REACH Substances of Very High Concern (SVHCs) recommended for “Priority Assessment”
  - HBCDD (Hexabromocyclododecane)
  - DEHP (Bis (2-ethylhexyl) phthalate)
  - BBP (Butyl benzyl phthalate)
  - DBP (Dibutyl phthalate)
- TBBPA not included as a result of IPC lobbying

Drivers for Removal of Halogens

- Concern by some stakeholders over environmental and human health impacts
- Certain BFRs are toxic (PBBs, PBDEs)
  - Structural similarities between many BFRs and Polychlorinated Biphenyls (PCBs),
  - Precautionary principle applied to all BFRs
- EOL combustion byproducts
  - Incomplete combustion of halogens creates dioxin
  - Prevalent in uncontrolled burning

Drivers for Removal of Halogens

- Strong Opposition to BFRs by Environmental Groups
- Marketing campaign targeting computer manufacturers
  - Computer Takeback
  - Silicon Valley Toxics
  - Greenpeace

Drivers for Removal of Halogens

- OEMs now seeking “halogen-free” solutions/ pushing down their supply chains
- Major OEMs announce elimination of bromine
  - Apple (PVC and BFR by the end of 2008)
  - Dell (BFR 2009)
  - HP (BFR and PVC 2009)

JEP-709 – A Guideline for Defining Low-Halogen Solid State Devices

Curtis Grosskopf
IBM Corp.
Chairman, JEDEC JC14.4

Impetus for a document

- Existing IPC 4101 and IEC 61249-2 documents, but their scope only covered PCB Laminates
- Possibility of legislation restricting use of brominated and chlorinated flame retardants (BFRs & CFRs) as well as polyvinyl chloride (PVC).
- Availability and growing use of ‘halogen free’ flame retardants and other materials in certain electronic products & components
- Diverging definitions of ‘halogen-free’ & ‘green’

Background on effort for joint document

- Joint IPC/JEDEC document: J-STD-709
  - IPC Task Group 4-33a
  - JEDEC JC14.4 committee
- Joint working group formed 2007,
  - Co-chairs:
    - Stephen Tisdale – Intel
    - Scott O'Connell – (formerly) Dell
  - Very large participation from all areas of the electronics industry

Background on effort for joint document

- Original scope of document
  - Covered all uses of chlorine (Cl) and bromine (Br)
  - Applied at a homogeneous material level
  - ‘All materials and parts’ used in electronic equipment
    - Mechanical plastics
    - Cables
    - Printed circuit boards
    - Electronic components
    - Connectors
    - Films, adhesives, tapes
    - Vibration dampening parts
    - Solder fluxes
  - Same threshold definitions (900ppm) as used by IPC 4101, IEC 61249-2, and JPCA-ES-01-1999.

Main points of debate within working group

- What is the threshold limit applied to?
  - Homogenous material
    - Alignment with EU RoHS
  - Article
    - Alignment with EU REACH
  - Component
    - Alignment with IPC terms and definitions
- Final decision was to apply threshold to all plastic materials in the product.

Main points of debate within working group

- Proposed multiple tier approach
  - Elemental
    - Ease of verification
  - BFRs, CFRs, and PVC
    - Alignment with environmental and health concerns
    - Alignment with possible legislation
- Final decision was single tier approach and only cover BFRs, CFRs, and PVC.

End of joint working group

- IPC membership divided on document
  - No IPC ballot ever had enough ‘Yes’ votes to pass
  - A group of IPC voting members did not believe in the need of this document, and stated they would always vote ‘No’ on every ballot
  - Co-chairs agreed to step down, but no volunteers
- JEDEC membership had approved all ballots
- IPC agreed to allow JEDEC to release the document as a ‘JEDEC only’ publication.
- Sept. 2009, JC14.4 agreed to solely own JEP-709

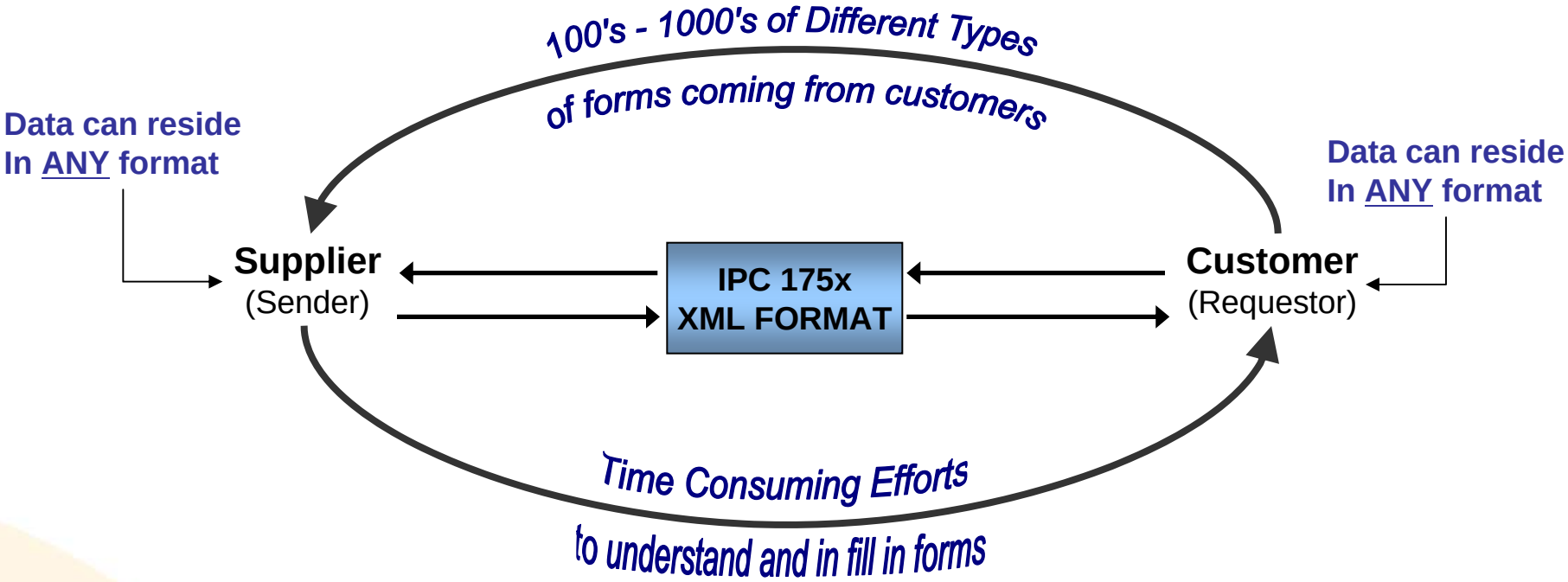
IPC 175x Standard
V1.1 and V2.0 comparisons

Date: 20 Jul 2010

Co-Chairs:
Eric Simmon - NIST
Mark Frimann – Texas Instruments

Association Connecting Electronics Industries

IPC 175x Advantages Over Current Data Request Formats



- *Current methods for data requests*
  - There are almost as many different types of forms as there are customers needing data
- *Using the IPC 175x format allows 2 ways to exchange data*
  - Customer sending the form and Supplier fills in data (return form or XML data)
  - Automation possible by using it as a data translator from Supplier database to Customer database
    - Supplier uploads data being requested - Customer down loads information into their database

1752-1 Class 4 – V1.x, page

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Material Composition Declaration

This document is a declaration of the substances within the manufacturer listed item. Note: if the item is an assembly with lower level parts, the declaration encompasses all lower level materials for which the manufacturer has engineering responsibility.

Adobe Reader version 7.0.5 is required to complete this declaration.

1752-1 1.1	IPC Web Site for Information on IPC-1752 Standard http://www.ipc.org/IPC-175x	Form Type *	Declaration Class *
		Request/Reply	Class 4 - RoHS Yes/No, JIG Format Substances, Mfg Info

Requester Information

Lock Requester Fields

Company Name *	Company Unique ID	Unique ID Authority	Request Date *	Request Document ID	Respond By Date
ABC Industries			2006-07-31		2006-08-07
Contact Name *	**Contact Title**	**Contact Phone ***	**Contact Email ***	**Requester Comments or URL for Additional Information**	
Alan B. Company	ESH Coordinator	999-888-7777	alan.b.company@abci.org		
My supplier ID	The File Type and Destination fields control how the form is submitted by the supplier. Consult your IT staff for configuration.		File Type	Destination - URL or Email Address	
			PDF		

Item Number *	Item Name	Mfr Item Number *	Mfr Item Name	Mfr Item Version	Manufacturing Site
	IC				

Supplier Information

Company Name *	Company Unique ID	Unique ID Authority	Response Date *	Response Document ID	
Texas Instruments			2006-07-31		
Contact Name *	**Title - Contact**	**Phone - Contact ***	**Email - Contact ***	Duplicate Contact -> Authorized Representative	
Mark Frimann	SLL CQE Manager	903-868-7291	m-frimann@ti.com		
Authorized Representative *	**Title - Representative**	**Phone - Representative ***	**Email - Representative ***	Supplier Comments or URL for Additional Information	
Mark Frimann	SLL CQE Manager	903-868-7291	m-frimann@ti.com		

Requester Item Number	Mfr Item Number	Mfr Item Name	Effective Date	Version	Manufacturing Site	Weight	UOM	Unit Type
1111-1111	SN74HC04DR	Logic IC	2003-08-01			122.69	mg	Each
Alternate Recommendation				Alternate Item Comments				

Manufacturing Process Information

Terminal Plating / Grid Array Material	Terminal Base Alloy	J-STD-020 MSL Rating	Peak Process Body Temperature	Max Time at Peak Temperature	Number of Reflow Cycles
Nickel/Palladium/Gold (Ni/Pd/Au)	CU Alloy	1	260 C	40 seconds	3

Comments

Per J-STD-020C

175x V2.0 Updates – major change

- Move from Adobe solution to 3rd party solutions
  - XML schema supported by 3rd party suppliers
- Full System Approach
  - Move from one form/expression (1752) to sectional solutions
    - 1751: Business information and Basic Declaration Requirements
      - Supplier / Requestor info
      - Legal statements and “signature”
      - Component name(s) & weight(s)
        - » Support multiple parts
      - Modules available (1752 – A, B, C and/or D, 1756, etc.)
    - 1752: Material Declaration
      - Level A = Yes/No ===> was Class 1 & 2
        - » Type of declaration (EU, China, REACH and/or others)
      - Level B = Material Group Level (NEW)
      - Level C = Product Level (JIG-101) ===> was Class 3 & 4
      - Level D = Material Level (Substances) ===> was Class 5 & 6
    - 1756: Manufacturing information (in approval cycle)
      - Was a part of Class 2, Class 4 & Class 6
    - Additional modules can easily be added

Conclusion

- IPC1752 v1 provided industry with the much needed ability to report material composition data at a critical time
- IPC1752 v2 is the next generation declaration and provides more flexible approach including
  - Multiple parts
  - Tool independent data exchange
  - Electronic signature
  - More regulations (not EU RoHS centric)
- V2.0 released 24 Mar 2010

Thank you

David W. Bergman IPC

bergda@ipc.org

001-847-597-2840