IPC/WHMA A-620 Update and Future Direction

20 February 2015
WHMA 2015 Annual Conference

IPC History & Who We Serve

Founded in 1957

- Regional
- Printed circuit boards (PCB) focus
- 5 member companies

Today → expanded scope

- Global (Americas, Asia & EU)
- 3400+ member sites in 64 countries

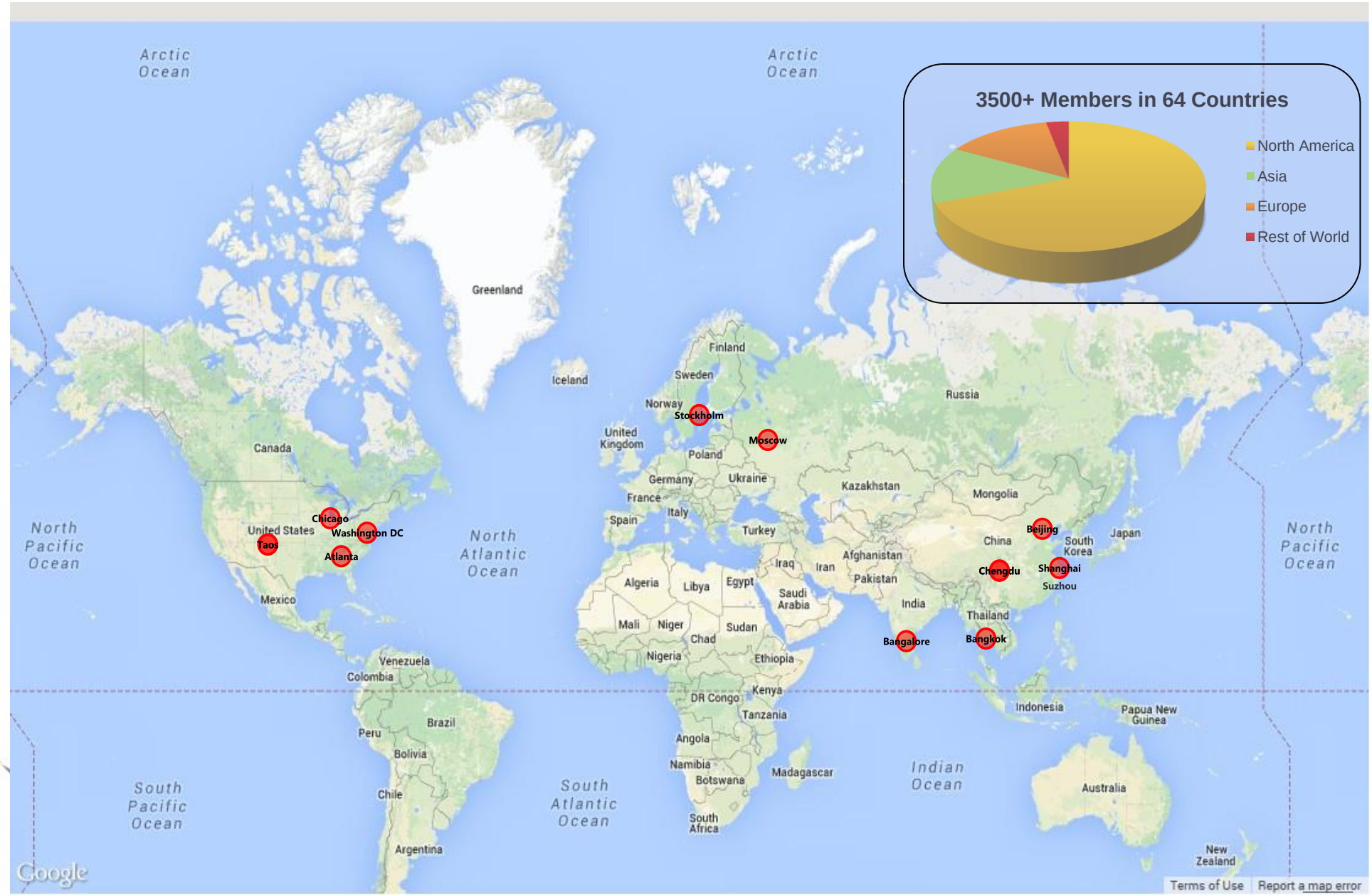
Markets that we serve are much more than PWB's

- PCBs, materials, assemblies, design
- Suppliers, EMS, OEM, Academia, Labs, …

3 main focus areas

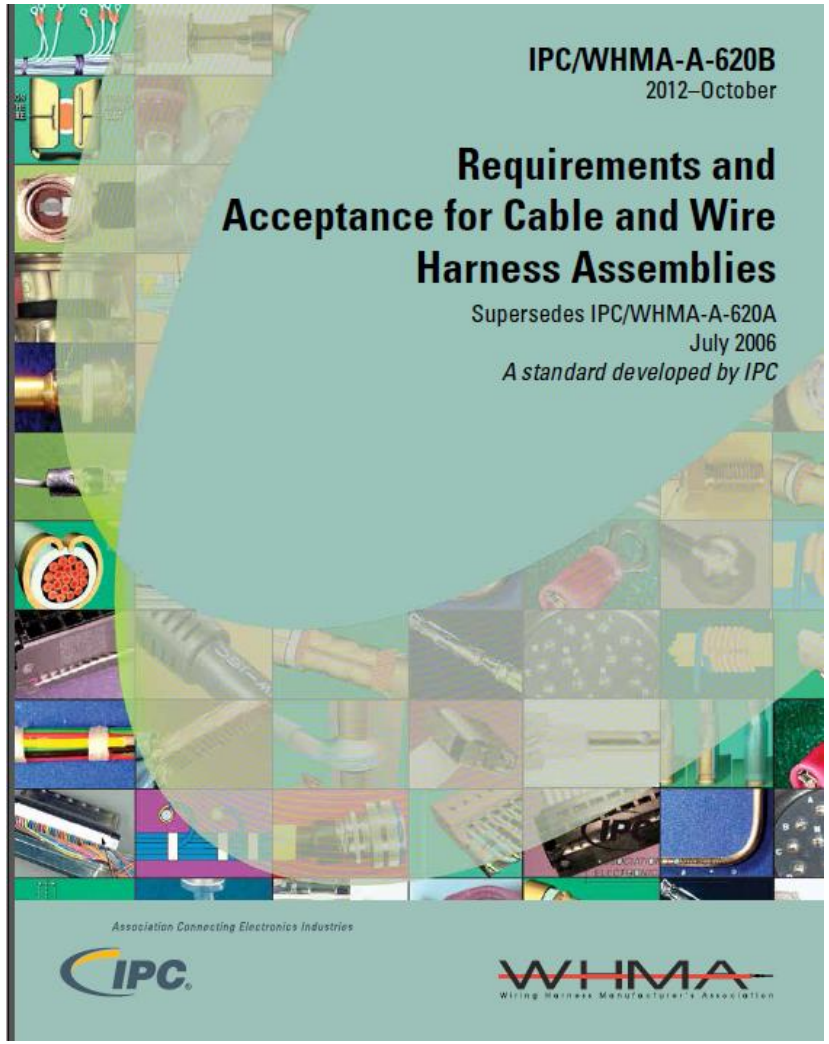
- Standards
- Conferences and trade shows
- Governmental relations

IPC Locations & Membership



Current Status

- **Revision B**



Current Status

- **Revision B**
- **Released October 2012**

5 Crimp Terminations (Contacts and Lugs)

Crimp Terminations (Contacts and Lugs)

For the purposes of this section, the term "terminal" includes both lugs and contacts.

A critical element of any wire termination is the connection between the wire and the terminal. Crimping of terminals is one method of achieving this connection.

The importance of a good termination ensures mechanical integrity and meets electrical requirements for the application.

In addition to the basic requirements outlined in this section, there should also be no damage to plating or finish, no contact deformation that would cause friction or increase force to insert or load the contact into the connector body, and no contact deformation that does not allow all contact locking tabs or wings to fully engage and lock into the connector body. Contact deformation **shall not [D1D2D3]** interfere with form, fit or function of the connector.

Conductor strands **shall not [N1D2D3]** be cut or modified in any manner to reduce circular mil area (CMA) to fit a termination. Contacts **shall not [N1D2D3]** be altered to accept oversized wire or an excessive number of conductors. Conductors **shall not [D1D2D3]** be tinned prior to termination, unless otherwise specified. Solid wire **shall not [D1D2D3]** be crimped except as allowed in 13.2.1.

Terminals, electrical terminations or contacts **shall not [D1D2D3]** be re-crimped or double-crimped (see Appendix A), unless required as part of a documented process for the specific terminal.

Shrinkable sleeving **shall not [N1D2D3]** be applied as insulation diameter buildup unless required by the drawing.

CMA build up is required when the wire gauge CMA is outside the CMA range of the contact. The CMA build up **shall [N1D2D3]** be determined by design engineering and documented in the drawing or by manufacturing engineering and documented in the process. Any material used for CMA buildup **shall [N1D2D3]** be specified on the drawing.

All crimping needs to comply with the terminal manufacturer's published requirements, e.g., crimp height, pull test, etc., without regard to the specific tooling used. For complete understanding, refer to applicable connector or terminal manufacturer's requirements and instructions. The quality requirements of the manufacturer of the terminals supersede this document. All crimped terminations need to meet applicable industry requirements, such as EIA, IEC, NEMA, UL or other as designated.

The tooling identified on a terminal manufacturer's documentation **shall [D1D2D3]** be used.

If alternate tooling is used, there **shall [D1D2D3]** be objective evidence available to show validity of the alternate process.

As an exception, if a terminal is manufactured in accordance with an industry specification, e.g., military, medical, automotive, the tool called out in that specification **shall [N1N2D3]** be used to crimp the terminal.

Crimp tools may be either manually (hand) or automatically operated. All hand tools should employ some form of an integral mechanism to control the crimping operation to the extent that, once the crimping operation has been started, the crimp tool cannot be opened until the crimping cycle has been completed (full-cycle/ratcheting tools). Full-cycle tools **shall [N1N2D3]** be used for Class 3 crimping.

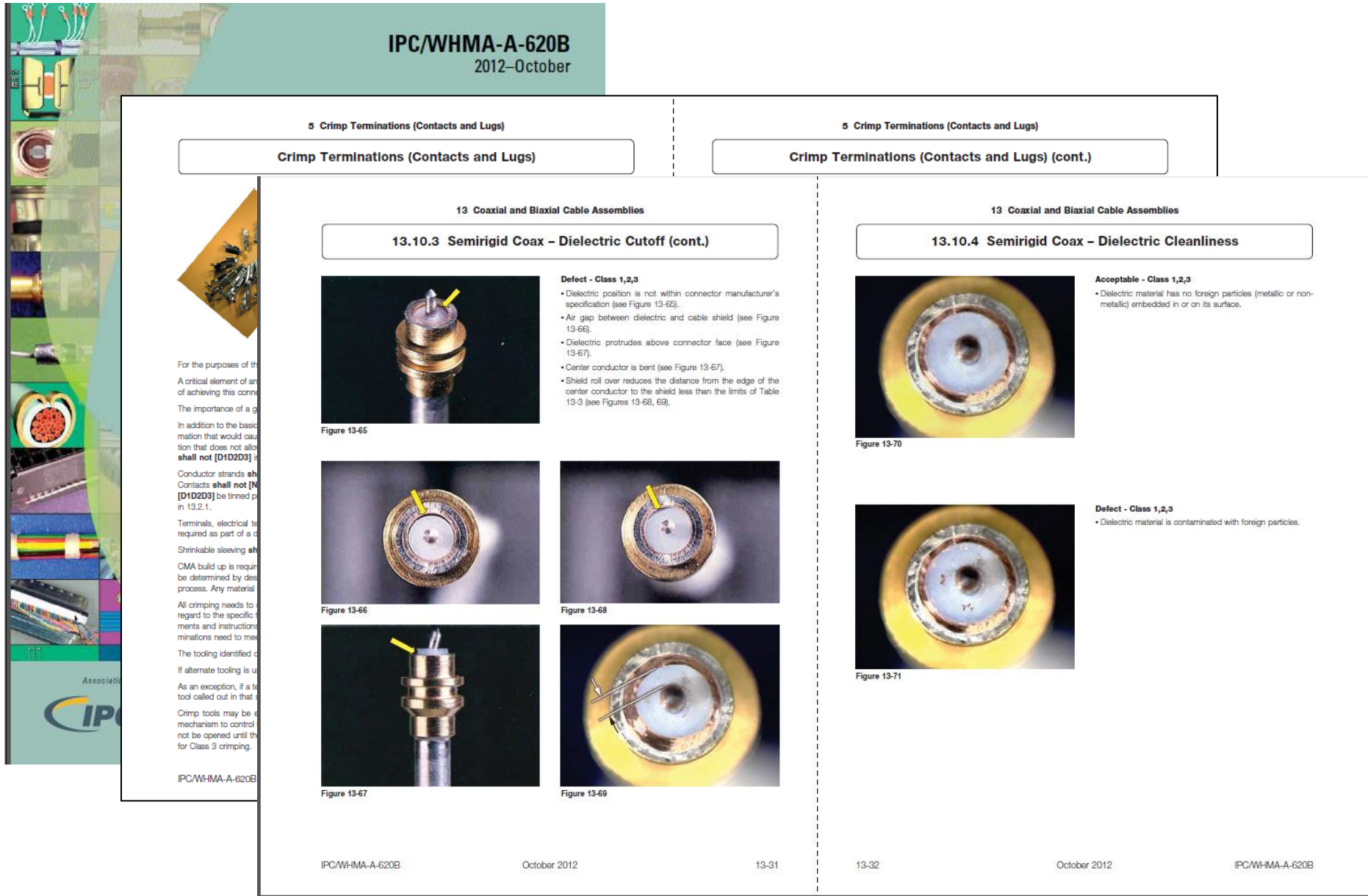
5 Crimp Terminations (Contacts and Lugs)

Crimp Terminations (Contacts and Lugs) (cont.)

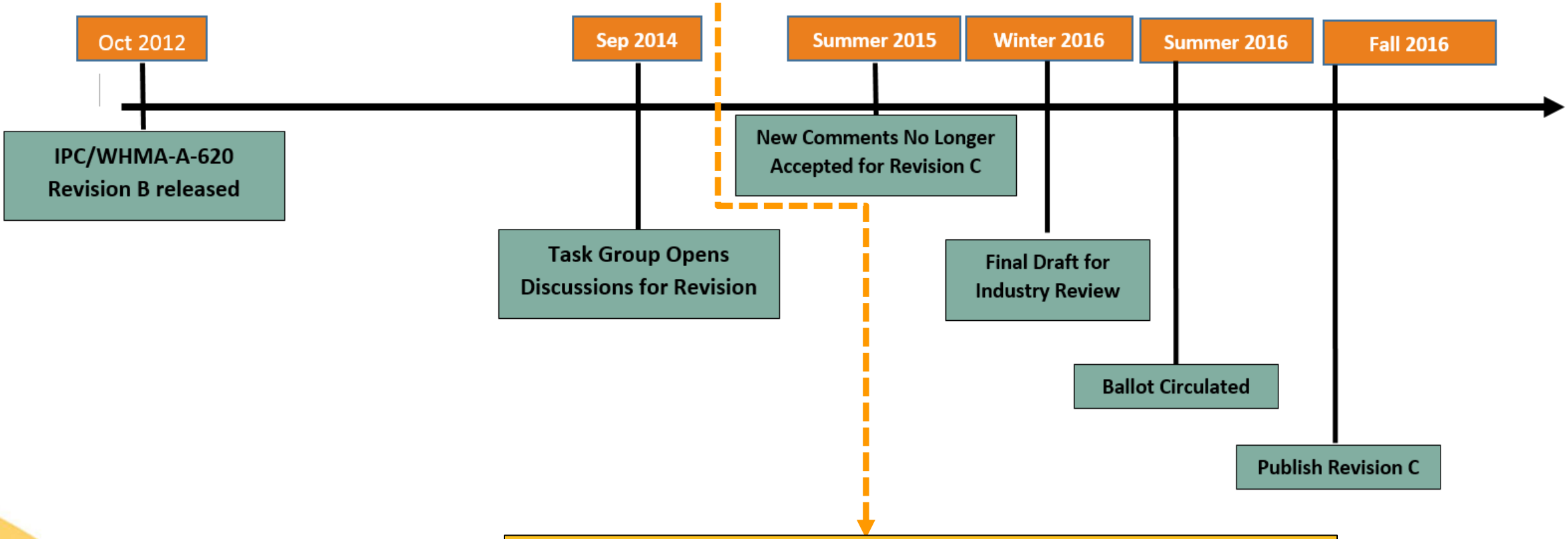
The following topics are addressed in this section:

Current Status

- **Revision B**
- **Released October 2012**
- **159 members of the developing Task Group representing 112 organizations across OEMs, EMS, Training, and DoD**
- **Space Addendum released June 2013**



Revision Timeline



Current Status:

- **Resolution of Submitted Comments**
- **Accepting New Comments**
- **Working Action Items to Gather Data**
- **Preparing New and Revised Figures as needed**

Progression of Document Revision

New Criteria*

- Wire Braid Crimping
- Shrink Sleeving
- Cable Seals
- Raceways and Grommets

*submitted as of Feb 15

Clarification of Requirements

- Criteria
- Figures

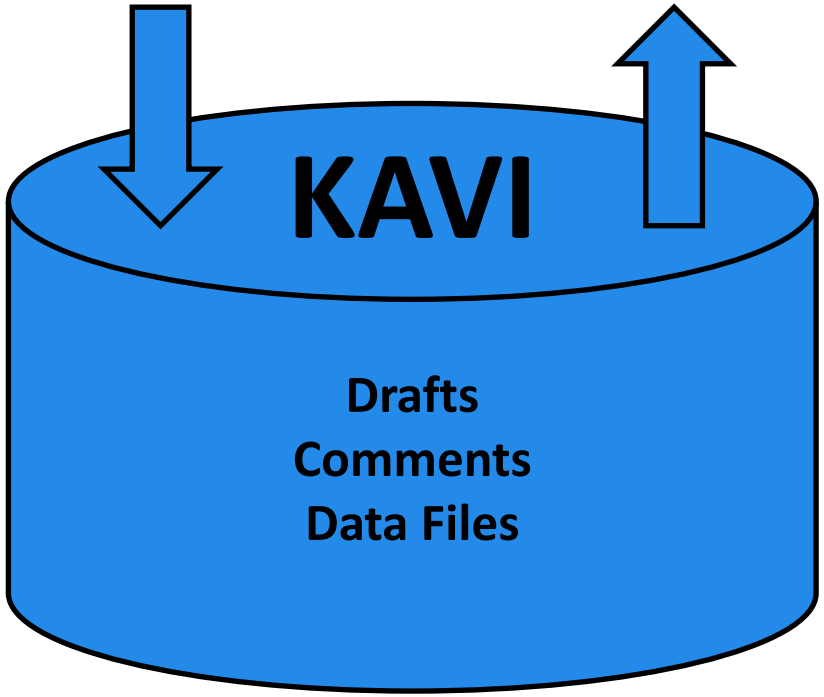
Synergy

- J-STD-001F
- IPC-A-610F

New Revision

New Task Group Initiatives for Document Revision

- **Increased Team Collaboration**
  - **Idea / Data Sharing**
- **Small Working Groups / Action Items**
  - **More Efficient Use of Committee Time**
- **File Sharing Using KAVI**
- **One Vote / Site Represented at Meetings**



IPC/WHMA-A-620 Committee Leadership

TAEC
Technical Activities Executive Council

7-30 Product Assurance Subcommittee
Chairman: Mel Parrish, STI Electronics

IPC/WHMA-A-620 Task Group
Co-Chairman: Brett Miller, USA Harness Inc.
Co-Chairman: Richard Rumas, Honeywell Canada
Vice Chairman: *Open Position (vacated by Dave Scidmore, Unlimited Services, Inc.*

Global reach – 11 Languages

A-620B-CN 线缆及线束组件的要求与验收 (Chinese Language)

A-620B-DE Anforderungen und Abnahmekriterien für Kabel- und Kabelbaum-Baugruppen (German Language)

A-620B-DK Godkendelseskrav for kabler og for produkter med wire harness (Danish language)

A-620B-EE Juhtme- ja kaablikoostude vastavusnõuded (Estonian language)

A-620B-FR Exigences et critères d'acceptabilité pour l'interconnexion des faisceaux de fils et de câbles (French Language)

A-620B-HU IPC/WHMA-A-620B módosításokat tartalmazó változat (Hungarian Language)

A-620B-IL-HEBREW Requirements and Acceptance for Cable and Wire Harness Assemblies-Hebrew language

A-620 KR 케이블과 와이어 하네스 어셈블리들에 대한 요건들과 수용 (Korean language)

A-620B-PL Wymagania i akceptacje dla montażu kabli i wiązek przewodów (Polish language)

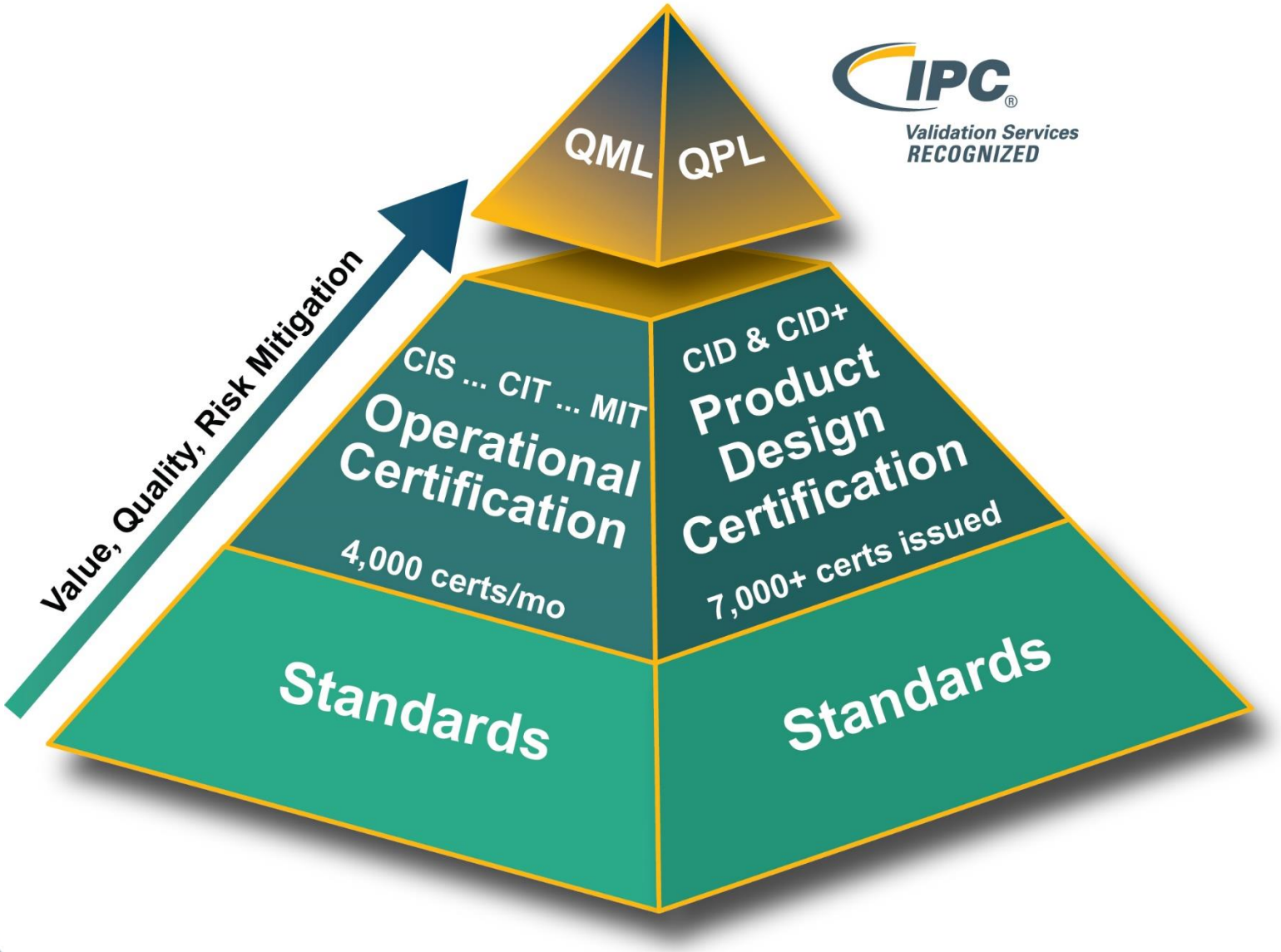
A-620B-SP Requisitos y Aceptabilidad de Cables y Mazos de Cables (Spanish Language)

A-620B-TR Kablo ve Kablo Takımları için Kabul Gereklilikleri (Turkish language)

Training Program Success

- **Number of training Centers – 56**
  - 620 Space Centers - 8
- **Number of trainers (CIT) - 1845**
  - 620 Space trainers - 48
- **Number of specialists (CIS) 13559**
  - 620 Space specialists - 81

IPC QPL/QML … Filling the Gap



Validation Services Program Overview

- **3 year certification**
- **Process focused audit program!**
  - It is not an ISO (paper-based) audit
- **Audits conducted by trained IPC personnel**
  - Global audit team … Randy Cherry Program Director (US)
    - 20+ years of auditing experience w/in OEM & EMS domain
  - IPC China team … 7 MIT's, 10+ years of auditing experience
- **Process:**
  - Pre-audit assessment → organizational/internal (NDA's)
  - On-site audit → 2 to 3 days
  - Product testing → performed by IPC approved test labs
    - QPL: utilize IPC TM for J-STD 004, 005 and 006 (as applicable)
    - QML: assembly evaluations conducted during audit using J-STD 001 / A-610
      - Cable and Wire Harness (620) testing completed during the audit

Process Based Audits

Requirement	Documentation Required	Example	Deemed not Applicable	Explanation	Self Score	Auditor Score

Scoring System:

0 = No Evidence. Corrective action required.
1 = Rarely comply. Corrective actions are planned or required.
2 = Some noncompliance's noted. Corrective actions are planned or required.
3 = Meet the minimum requirements.
4 = Exceed the minimum requirements.

Average score is tallied to determine class of manufacturing.

All Requirements with defect codes (D1D2D3 N1N2D3)
must achieve score of 3 or 4 for class 3 certification

IPC – WHMA - 620

Requirement	Documentation Required	Examples of Evidence
Procedures and processes, including continual review of test and inspection data and/or standards accreditations, are in place to ensure test and measurement equipment are properly calibrated and functional.	Records	GR&R (Gauge R&R: Repeatability and Reproducibility) studies, reports. Accepted limit for GR&R studies is under 10%. GR&R limits between 10% and 30% are only acceptable for some conditions and must have customer approval. GR&R limits above 30% are unacceptable.
Rework for Classes 1 and 2 should be documented. Rework for Class 3 shall be documented. [N1N2D3]	Procedures and Work Instructions	Defect data collection reports. Rework / Repair work instruction.
In the event a rework or repair action takes place, any tests/inspections that were previously performed shall be repeated in their entirely for the portion of the product that was affected by the rework or repair. [D1D2D3]	Procedures and Work Instructions	Work Instructions, visual aids, interviews with operators who understand the process, and review assemblies on the assembly line.

Questions about IPC/WHMA-A-620

Please Submit
Questions / Comments /
Suggestions
to
answers@ipc.org