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p.18

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p.24

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IPC Certification Program's Space Hardware Addendums Training and Certification

by **Sharon Montana-Beard**
BLACKFOX

Program Benefits

Space Hardware Addendums are developed by the IPC Committee Membership in addition to the base certification programs to include the extended requirements for products that must survive the vibration and thermal cyclic environments of getting to and operating in space. The aerospace industry, when specified, recognizes the Space Hardware Addendums in addition to the base standards as meeting many of the requirements for workmanship and specification acceptability.

The Space Hardware Addendums are included as modules for the J-STD-001, IPC/WHMA-A-620 and IPC-6012 Certified IPC Trainers and Certified IPC Specialist programs.

The IPC training and certification programs have two tiers of instruction. Certified IPC trainer candidates are sent to an official IPC certification center by their parent companies to receive intensive training and are then certified to provide application specialist or certified IPC

specialist training. The term for certification is two years.

J-STD-001 Requirements for Soldered Electrical and Electronic Assemblies with Space Hardware Addendum

The IPC J-STD-001 Requirements for Soldered Electrical and Electronic Assemblies has emerged as the preeminent authority for electronics assembly manufacturing. The standard describes materials, methods and verification criteria for producing high quality soldered interconnections. The standard emphasizes process control and sets industry-consensus requirements for a broad range of electronic products.

Certified IPC trainer candidates who successfully complete the soldering workmanship portions of the course and the certification examination are given the instructional materials needed for training application specialists. The application specialists training is modularized, meaning that training on the entire document is not required. Application specialists must be trained on the introductory section, and then

may be trained on other modules covering: wires and terminals, through hole technology, surface mount technology and inspection.

J-STD-001 Space Hardware Addendum

An optional module for those wishing to understand the extended requirements for products that **MUST** survive the vibration and thermal cyclic environments of getting to and operating in space in addition to or in place of the NASA 8739 .2 and .3 as detailed in the NASA 8739.6. Hands on skills are included in this course.

Topics Covered in the Training Courses:

- General requirements, such as safety, tools and electrostatic discharge (ESD)
- Wire and terminal assembly requirements, demonstrations and laboratory
- Through hole technology requirements, demonstrations and laboratory
- Surface mount technology requirements, demonstrations and laboratory
- General soldered connection acceptance requirements (including lead free)
- Machine and reflow soldering process requirements
- Test methods and related standards
- Using statistical process control methodology

Who Should Become an IPC J-STD-001 Certified IPC Trainer or Certified IPC Specialist?

The requirements for soldered electrical and electronic assemblies has emerged as the preeminent authority for electronic assembly manufacturing. This standard defines the materials, methods and verification criteria for producing high quality soldered interconnections. This standard emphasizes process control and gives companies the tools they need to increase employee skills and performance. J-STD-001 sends a strong message to customers that your company is serious about implementing company-wide quality assurance initiatives. Anyone responsible for quality and reliability of soldered electronic assemblies should attend this hands-on soldering course. Assembly process engineers, quality assurance supervisors, training managers and others responsible for the quality

and reliability of soldered electronic assemblies are excellent candidates for the program. Optional Space Hardware Addendum is available and the training is offered in many languages.

IPC/WHMA-A-620 Requirements and Acceptance for Cable and Harness Assemblies with Space Hardware Addendum

This standard describes acceptability criteria for crimped, mechanically secured and soldered interconnection and the corresponding lacing/restraining criteria associated with cable and harness assemblies.

IPC/WHMA-A-620 Space Hardware Addendum

The students will demonstrate the ability to build and install in a unit three complete cables. This will involve soldering, cup terminals, crimping, machine contacts, insulated lugs, IDC connections, wire splices, coaxial connectors, shield terminations, including routing using ty-raps/lacing cord, shielding braid and shrink tubing and testing of the final product.

IPC/WHMA-A-620 Training Course Topics:

- Cable and wire dimensioning, tolerances and preparation
- Crimp terminations:
 - Stamped and formed contacts
 - Machined contacts
- Insulation displacement connections
- Ultrasonic welding
- Soldered terminations
- Splices
- Connectorization
- Molding and potting
- Marking and labeling
- Co-axial and twin-axial assembly
- Wire bundle securing
- Shielding
- Installation
- Wire wrap (solderless)
- Testing of cable/wire harness assemblies

Who Should Become an IPC/WHMA-A-620 Certified IPC Trainer or Certified IPC Specialist?

IPC/WHMA-A-620 is the industry's first standard for cable and wire harness fabrication

and installation. IPC/WHMA-A-620 describes acceptability criteria for crimped, mechanically secured and soldered interconnection and the corresponding lacing or restraining criteria associated with wire and cable harness industry. This certification will demonstrate your commitment to customer requirements and greatly facilitates other quality assurance initiatives. Anyone responsible for quality, reliability and integrity of end use cable or wire harness assemblies should attend this in-depth program. Optional Space Hardware Addendum available. Assembly process engineers, quality assurance supervisors, training managers and others responsible for the quality and reliability of soldered electronic assemblies are excellent candidates for the program. Optional Space Hardware Addendum is available and the training is offered in many languages.

IPC-6012 Qualification and Performance Specification for Rigid Boards with Space Hardware Addendum

IPC-6012 Qualification and Performance Specification for Rigid Boards

This specification covers qualification and performance of rigid printed boards, including single-sided, double-sided, with or without plated-through holes, multilayer with or without blind/buried vias and metal core boards. It addresses final finish and surface plating coating requirements, conductors, holes/vias, frequency of acceptance testing and quality conformance as well as electrical, mechanical and environmental requirements. Revision C incorporates many new requirements in areas such as selection for procurement, new surface finishes, hole plating thickness, measling, weave exposure, copper cap plating of filled holes, laminate cracks and voids, etch back, blind and buried via fill, acceptance testing and frequency, and requirements for thermal stress testing. This revision synchronizes to the IPC-A-600. For use with IPC-6011.

IPC 6012 Space Hardware Addendum

The Space Hardware Addendum is included as a required module for the IPC 6012 Certified IPC Trainer and as an optional module for the

Certified IPC Specialist programs for those wishing to understand the extended requirements for products that MUST survive the vibration and thermal cyclic environments of getting to and operating in space.

Topics covered in the training courses:

- IPC-6012 Scope/Applicable Documents
- Material requirements
- Visual requirements
- Dimensional and conductor requirements
- Structural integrity requirements
- Solder mask, electrical and cleanliness
- Special requirements
- Quality assurance provisions
- Appendix A—supplemental requirements

Who Should Become an IPC-6012 Certified IPC Trainer or Certified IPC Specialist?

IPC-6012—A must-have certification for board fabrication technicians and engineers, the IPC-6012 thoroughly defines the standard requirements for rigid bare board fabrication. This course covers qualification and performance of rigid printed boards, including single-sided, double-sided, with or without plated-through holes, multilayer with or without blind/buried vias and metal core boards. It addresses final finish and surface plating coating requirements, conductors, holes/vias, frequency of acceptance testing and quality conformance as well as electrical, mechanical and environmental requirements. This class also addresses the separate requirements for space and military avionics hardware. Assembly process engineers, quality assurance supervisors, training managers and others responsible for the quality and reliability of soldered electronic assemblies are excellent candidates for the program.

Optional Space Hardware Addendum is available and the training is offered in many languages. **SMT**



Sharon Montana-Beard is the vice president of sales and operations for Blackfox.