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Table of Contents

Contents

1.0 PURPOSE 3

2.0 SCOPE 3

3.0 REFERENCE DOCUMENTS 3

4.0 DEFINITIONS/ACRONYMS 4

5.0 HIERARCHY OF DOCUMENTS 4

5.1 ORDER OF PRECEDENCE 4
5.2 CONFLICT/HIERARCHY OF DOCUMENTS 4
5.3 HOW TO USE THIS DOCUMENT 4

6.0 REQUIRMENTS 5

1.0 PURPOSE

To identify standards for ensuring consistency in general workmanship for electronic assemblies including, but not limited to, rework and repair, product cleanliness, potting/conformal coating, fasteners and torque, marking and labelling, as well as acceptability and qualification of rigid circuit boards and Flexible/Rigid-Flexible Printed Circuitry.

2.0 SCOPE

This document defines how Communications and Power Industries Canada Inc. (CPI) deems workmanship acceptable. The documents referenced herein shall represent the minimum workmanship standards for all fabricated printed circuit boards and electronic assemblies or sub-assemblies. The requirements are not only applicable to CPI Canada but all contracted product for which this standard would be imposed. This workmanship standard is required where called out on assembly drawings or manufacturing specifications. Refer to the hierarchy of documents to determine which requirement takes priority. Generally this document follows IPC standards already accepted by industry however more detailed explanations are made where CPI has set in house guidelines.

3.0 REFERENCE DOCUMENTS

IPC-A-610 - Acceptability of Electronics Assemblies
IPC/WHMA-A-620 - Requirements and Acceptance for Cable and Wire Harness Assemblies
IPC-6012 - Qualification and. Performance Specification for Rigid Printed Boards
IPC-A-600 - Acceptability of Printed Boards
IPC-6013 - Qualification and Performance Specification for Flexible/Rigid-Flexible Printed Boards
IPC-7711 - Rework, Modification and Repair of Electronic Assemblies
IPC-7721 - Repair and Modification of Printed Boards and Electronic Assemblies
IPC J-STD-001- Requirements for Soldered Electrical and Electronic Assemblies
IPC J-STD-001- Space and Military Applications Electronic Hardware Addendum to IPC J-STD-001
QA500M – Mechanical Workmanship Standards Manual

4.0 DEFINITIONS/ACRONYMS

CPI – Communications and Power Industries Canada Inc.
IPC – Institute for Printed Circuits
SMT – Surface-mount technology
EOS – Electrical Over-Stress
ESD – Electrostatic Discharge

5.0 HIERARCHY OF DOCUMENTS

5.1 Order of Precedence

The purchase order shall take precedence over the standard, reference standards and drawings

5.2 Conflict/Hierarchy of Documents

In the event of a conflict between the requirements of the standard and the applicable drawing(s) and documentation, the applicable, approved assembly drawing(s) and documentation take precedence.

5.3 How to Use This Document

For each of the specific sections, it is a requirement that the material provider refer to the current version of the identified IPC standard. It is the responsibility of the material provider to acquire and maintain the applicable IPC standards.
Unless otherwise stated in contracts, drawings, specifications or the purchase order, CPI Canada products will follow Class 2 requirements.

Some products may require the use of multiple standards in conjunction with each other (ie IPC-A-610 and IPC J-STD-001). This requirement will be noted on the product specific documentation.

CPI Canada shall specify, at the time of order placement, any deviation from the requirements established in this workmanship standard. If a conflict arises due to the specification of such requirements, refer to the Hierarchy of Documents Section.

This Workmanship Standards Manual will be revised periodically by Quality Assurance when sufficient revisions to the applicable requirements are necessary. When it is apparent that additional workmanship requirements should be established or that minimum requirements specified should be upgraded or downgraded, a written request should be directed to the Quality Assurance Department.

6.0 REQUIRMENTS

Handling of Electronic Assemblies

Reference: IPC-A-610

EOS/ESD Prevention

Reference: IPC-A-610

Installation of Hardware for use with Electronic Assemblies

Reference: IPC-A-610 and QA500M for Specification on threads and torque requirements Including Heatsinks, Insulators, Thermal compounds, Threaded Hardware, Jack posts, and Connector pins

Securing and Routing of Wires and Wire Bundles

Reference: IPC-A-610 and IPC/WHMA-A-620
Acceptability criteria for soldered connections of all types: SMT, Terminals, through-hole

Acceptability criteria for Terminal Connections for both wires and component leads

Reference: IPC-A-610
This includes mechanical connections, solder acceptance criteria, insulation requirements, conductor damage, and stress relief.

Criteria for acceptable mounting of Through-Hole Technology

Reference: IPC-A-610
This includes hardware, adhesive, forming, mounting, termination and soldering criteria.

Criteria for fabrication of Surface Mount Assemblies

Reference: IPC-A-610
This includes staking, attachment of jumper wires, soldering criteria, as well as soldered SMT connectors.

Component Damage

Reference: IPC-A-610
This includes, but is not limited to, SMT components, Through-hole components, Connectors, Press Fit pins, heatsink hardware, threaded hardware as outlined in IPC-A-610

Requirements for Non-Soldered Contact Areas

Reference: IPC-A-610

Rigid Printed Circuit Boards:

Acceptability of Rigid Printed Circuit boards related to assembly: IPC-A-610
Qualification and performance spec for Rigid Printed boards (bare board): IPC-6012
Acceptability of Rigid Printed Boards (bare board): IPC-A-600

Flexible/Rigid-Flexible Printed Circuitry:

Acceptability of Flexible/Rigid-Flexible Printed Circuitry related to assembly: IPC-A-610
Qualification and performance spec for Flexible/Rigid-Flexible Printed boards (bare board): IPC-6013
Acceptability of Flexible/Rigid-Flexible Printed Circuitry (bare board): IPC-A-600

Marking of Printed boards Electronic Assemblies

Reference: IPC-A-610
Marking provides product identification and traceability and requirement will be identified by the product specifications, and drawings.

Product Cleanliness

Reference: IPC-A-610
Specific cleanliness requirements are to be defined by the product specifications and/or drawings.

Solder Mask acceptability on electronic assemblies after assembly

Reference: IPC-A-610

Acceptability requirements for Conformal Coating and Encapsulation on Electronic Assemblies

Reference: IPC-A-610
Product Specifications, and drawings will identify requirements for conformal coating or encapsulation - including materials, thickness, keep outs, etc.

Rework, Repair and Modification

Reference: IPC-7711/7721 and IPC-A-610

Rework is the act of reprocessing noncomplying articles, through the use of original or equivalent processing, in a manner that assumes full compliance of the article with the applicable drawings or specifications. All reworks are to be done in compliance with IPC-7711 and IPC-A-610.
CPI Canada will define at the time of order placement or within the product procurement spec any restrictions to performing a rework action without prior approval from CPI.

Repair is the act of restoring the functional capability of a defective article in a manner that does not assure compliance of the article with the applicable drawings or specifications.
If a repair is required on an electronic assembly, please consult the CPI Canada factory prior to any repair action.

Modification is a revision of the functional capability of a product in order to satisfy new acceptance criteria. Modifications are usually required to incorporate design changes which can be controlled by drawings, change orders, or temporary modification documentation. Modifications should only be performed when specifically authorized and described in detail on controlled documentation approved by the CPI Canada Factory. When they are performed, the output shall comply with IPC-7711/7721 and IPC-A-610