ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES®

IPC-5702

Guidelines for OEMs in Determining Acceptable Levels of Cleanliness of Unpopulated Printed Boards

Developed by the Bare Board Cleanliness Assessment Task Group (5-32c) of the Cleaning and Coating Committee (5-30) of IPC

Users of this publication are encouraged to participate in the development of future revisions.

Contact:

IPC
3000 Lakeside Drive, Suite 309S
Bannockburn, Illinois
60015-1249
Tel 847 615.7100
Fax 847 615.7105

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1 SCOPE

Every electronics manufacturer, whether an original equipment manufacturer (OEM) or contract manufacturer (CM), will be faced with determining if the unpopulated printed boards used in the finished assembly have an adequate level of cleanliness. The question of ''how clean is clean enough'' has been asked repeatedly in the last decade in many IPC committees. This is a very complex topic, with many critical considerations, and so a single methodology to determine acceptability does not exist. This document was developed as guidance for the individual(s) responsible for determining these criteria for their company.

IPC-5701 covers many aspects of how cleanliness is measured on printed boards, as well as many critical factors to consider when specifying board cleanliness in purchasing documents. This reference, and associated technical papers, show the many inadequacies of current test methodologies, as well as explains why there are no ''golden numbers'' for cleanliness. What is acceptably clean for one segment of the industry may be unacceptable for more demanding segments of the industry (e.g., medical or aerospace). The reader should be familiar with that document before reading this document. Appendix A of this document covers a history of the ROSE test, as well as many uses, abuses, and fallacies of that test.

This document will *not* provide individuals with a silver bullet, nor a golden number that guarantees reliability. The only thing that will give a consistently reliable product is process control, consistent materials, a thorough understanding of the process windows, and trained personnel.

2 APPLICABLE DOCUMENTS

2.1 IPC[1]

IPC-A-52 Cleanliness and Residue Evaluation Test Board[2]

IPC-TR-476A Electrochemical Migration: Electrically Induced Failures in Printed Wiring Assemblies

IPC-TR-583 An In-Depth Look at Ionic Cleanliness Testing

IPC-TM-650 Test Methods Manual[3]

2.3.28 Ionic Analysis of Circuit Boards, Ion Chromatography Method

2.6.3.3 Surface Insulation Resistance, Fluxes

2.6.14.1 Electrochemical Migration Resistance Test

IPC-HDBK-001 Handbook and Guide to Supplement J-STD-001

IPC-HDBK-830 Guidelines for Design, Selection and Application of Conformal Coatings

IPC-HDBK-840 Solder Mask Handbook

IPC-5701 Users Guide for Cleanliness of Unpopulated Printed Boards

IPC-9201 SIR Handbook

IPC-9691 User Guide for the IPC-TM-650, Method 2.6.25, Conductive Anodic Filament (CAF) Resistance Test (Electrochemical Migration Testing)

2.2 Joint Industry Standards[4]

IPC-J-STD-004 Requirements for Soldering Fluxes

2.3 Telcordia[5]

Bellcore GR-78 CORE Generic Requirements for the Physical Design and Manufacture of Telecommunications Products and Equipment

2.4 Radio Technical Commission for Aeronautics[6]

D0-160 Environment Conditions and Test Procedures for Airborne Equipment

2.5 MIL Standards[7]

MIL-STD-810 Environmental Engineering Considerations and Laboratory Tests

MIL-STD-883 Test Method Standard Microcircuits

1. www.ipc.org
2. This is the electronic artwork package for fabricating the IPC-B-52 test board referenced in this document.
3. Current and revised IPC Test Methods are available on the IPC Web site (www.ipc.org/html/testmethods.htm)
4. www.ipc.org
5. www.telcordia.com (This document is no longer available as a stand alone document and exists as an enterprise license purchase through Telcordia.)
6. www.rtca.org
7. dscc.dla.mil