



*THE INSTITUTE FOR
INTERCONNECTING
AND PACKAGING
ELECTRONIC CIRCUITS*

IPC-FA-251

Assembly Guidelines for Single-Sided and Double-Sided Flexible Printed Circuits

ANSI/IPC-FA-251

Original Publication
February 1992

A standard developed by the Institute for Interconnecting
and Packaging Electronic Circuits

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1.0 INTRODUCTION

This document is intended to provide the designer and manufacturing engineer the key issues related to Flexible Printed Circuit (FPC) assembly techniques; and where appropriate, sections from other IPC documents have been excerpted in order to highlight the concerns and design principles. These guidelines provide information on what type of parts are available, the techniques and processes necessary for their proper use, possible advantages, disadvantages or problems, how to start implementation, and where to find additional information.

1.1 Scope This document provides guidelines for the assembly of components and mounting hardware to single- and double-sided flexible printed wiring. In addition, the guidelines describe the type of materials and processes that may be used to accomplish the proper electronic assembly.

1.2 Purpose The purpose of this document is to guide the user by seeking answers to questions related to accepted, effective methods of assembly processes to FPC. The methods described herein are not standards, since state of the art is constantly changing such that applications and requirements may vary beyond the scope of this publication.

1.3 Classification Three classifications are assigned, based on increasing difficulty and sophistication of assembly. These are,

1. *Class A:* Simple assembly, employing through the board component mounting;
2. *Class B:* Surface mounting, employing all the techniques to make that assembly choice reliable;
3. *Class C:* An intermixing of through the board (through hole) and surface mount methods.

In addition to the three classes of assembly, there are two types of assembly. They are:

1. *Type 1:* Assemblies with components mounted to one side of the finished flexible board.
2. *Type 2:* Components mounted to both sides of a finished flexible board.

Note: These classes and types are not to be confused with the classes and types of IPC-FC-250 which refer to end-item use. All classes of IPC-FA-251 assemblies may apply to any class of IPC-FC-250 circuit.

1.4 Dimensions/Tolerances All dimensions and tolerances are expressed in ISO units with English system equivalents shown in brackets []. Users are cautioned to employ this system and not intermix ISO and English system units. Reference information is shown in parenthesis (). Dimensions and tolerances shall be interpreted in accordance with ANSI Y14.5M.

2.0 APPLICABLE DOCUMENTS

2.1 IPC

IPC-T-50 Terms and Definitions for Interconnecting and Packaging Electronic Circuits.

IPC-SC-60 Post Solder Solvent Cleaning Handbook

IPC-AC-62 Post Solder Aqueous Cleaning Handbook

IPC-CM-78 Guidelines for Surface Mounting and Interconnecting Chip Carriers

IPC-PC-85 Certification of IPC Defined Products Under the NECQ System

IPC-CI-86 Printed Board Manufacturing Capability Identification

IPC-PC-90 General Requirements for Implementation of Statistical Process Control

IPC-MF-150 Metal Foil for Printed Wiring Applications

IPC-FC-231 Flexible Bare Dielectrics for Use in Flexible Printed Wiring

IPC-FC-232 Adhesive Coated Dielectric Films for Use as Cover Sheets for Flexible Printed Wiring

IPC-FC-233 Flexible Adhesive Bonding Films

IPC-FC-241 Flexible Metal-Clad Dielectrics for Use in Fabrication of Flexible Printed Wiring

IPC-D-249 Design Standard for Flexible Single- and Double-Sided Printed Boards

IPC-FC-250 Specification for Single- and Double-Sided Flexible Printed Wiring

IPC-A-600 Acceptability of Printed Boards

IPC-A-610 Acceptability of Printed Board Assemblies