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

ANSI/IPC-FA-251

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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