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Qualification and Performance Specification for Flexible/ Rigid-Flexible Printed Boards

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Developed by the Flexible Circuits Performance Specifications Subcommittee (D-12) of the Flexible Circuits Committee (D-10) of IPC

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Contact:

IPC
3000 Lakeside Drive, Suite 105N
Bannockburn, Illinois
60015-1219
Tel 847 615.7100
Fax 847 615.7105

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Flexible Circuits Committee	Flexible Circuits Performance Specifications Subcommittee	Technical Liaison of the IPC Board of Directors
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Buechner Mark, BAE Systems	Fuentes Laura, Summit Interconnect - Anaheim	Ly Jennifer, TTM Technologies
Buss Jeremy, Naval Air Warfare Center Weapons Division	Gardenour Tom, Amphenol Printed Circuits, Inc.	MacFadden Todd, Bose Corporation
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Chevalier Denise, Amphenol Printed Circuits, Inc.	Gragg Ty, Unicircuit Inc.	McQueen Matthew, NSW Crane
Clark James, Multek Flexible Circuits, Inc.	Griffith Russell, Flexible Circuits Inc.	Meath Jonas, All Flex
Cockcroft Duane, Cirexx International, Inc.	Grinvalds Rachel, Rockwell Collins	Menuet Peter, L-3 Communications - Cincinnati
	Hammill Vicka, Honeywell Inc. Air Transport S	Miedico Roger, Raytheon Company
		Miyasato Keita, Taiyo Industrial Co., Ltd.
		Monarchio James, TTM Technologies, Inc.

Murray Steven, Northrop Grumman Corporation	Romont Thomas, IFTEC	Stevens Brian, Rockwell Collins
Musante Steve, Raytheon Missile Systems	Russo Mitch, TTM Technologies	Takahara Kunio, Japan Electronics Packaging an
Nakajima Yoji, Asahi Glass Co., Ltd.	Sam Chan, Minco Products, Inc.	Takahashi Mamoru, Asahi Glass Co., Ltd.
Nargi-Toth Kathleen, NCAB Group USA, Inc.	Sanchez Enrique, Cirexx International, Inc.	Takeuchi Hiroki, JX Nippon Mining and Metals
Neves Robert, Microtek (Changzhou) Laborator	Sandor Edward, Taconic Advanced Dielectric Division	Taylor Jamin, ALL Flex LLC
Nguyen Thi, Lockheed Martin Missile & Fire	Savage Rolland, Savage Consulting	Toone Bradley, L-3 Communications
Oliver Glenn, Raytheon Missile Systems	Schmitt Jeff, Coast to Coast Circuits, Inc.	Vanderpan Crystal, UL LLC
Ortloff William, Raytheon Company	Shelby Gilbert, Raytheon Systems Company	Vargas Carlos, TTM Technologies
Pedersen Jan, Elmatica AS	Sheldon Robert, Pioneer Circuits Inc.	Wasserzug Alex, Cirexx International, Inc.
Pfingston William, Miraco, Inc.	Shepherd Russell, National Technical Systems Anaheim	Weatherford David, Teledyne Advanced Electronic Solutions
Rios Nef, Summit Interconnect - Anaheim	Shepler Terry, Electro-Materials, Inc.	Webster Clark, ALL Flex LLC
	Stark Herb, Flexible Circuits Inc.	Yoshimura Ryoichi, Nippon Mektron Ltd.
	Steinbauer Rebecca, ALL Flex LLC	

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Qualification and Performance Specification for Flexible/Rigid-Flexible Printed Boards

1 SCOPE

1.1 Statement of Scope This specification covers qualification and performance requirements of flexible printed boards. The flexible printed board may be single-sided, double-sided, multilayer, or rigid-flex multilayer. All of these constructions may or may not include stiffeners, plated-through holes (PTHs), and blind/buried vias.

The flexible or rigid-flex printed board may contain build up High Density Interconnect (HDI) layers. The printed board may contain embedded active or passive circuitry with distributive capacitive planes, capacitive or resistive components conforming to IPC-6017.

The rigid section of the printed board may contain a metal core or external metal heat frame, which may be active or non-active.

Revision level changes are described in 1.7.

1.2 Purpose The purpose of this specification is to provide requirements for qualification and performance of flexible printed boards designed to IPC-2221 and IPC-2223.

1.3 Performance Classification, Board Type, and Installation Usage

1.3.1 Classification This specification recognizes that flexible printed boards will be subject to variations in performance requirements based on end-use. These performance classes (Class 1, Class 2, and Class 3) are defined in IPC-6011.

1.3.2 Printed Board Type Performance requirements are established for the different types of flexible printed boards, classified as follows:

Type 1 – Single-sided flexible printed boards containing one conductive layer, with or without stiffeners.

Type 2 – Double-sided flexible printed boards containing two conductive layers with PTHs, with or without stiffeners.

Type 3 – Multilayer flexible printed boards containing three or more conductive layers with PTHs, with or without stiffeners.

Type 4 – Multilayer rigid and flexible material combinations containing three or more conductive layers with PTHs.

Type 5 – Flexible or rigid-flex printed boards containing two or more conductive layers without PTHs.

1.3.3 Installation Uses

Use A – Capable of withstanding flex during installation.

Use B – Capable of withstanding continuous flexing for the number of cycles as specified on the procurement documentation.

Use C – High temperature environment (over 105 °C [221 °F]).

Use D UL – Recognition. See UL 94 and UL 796F.

1.3.4 Selection for Procurement For procurement purposes, performance class and installation usage **shall** be specified in the procurement documentation.

The documentation **shall** provide sufficient information to the supplier so that the supplier can fabricate the flexible printed boards and ensure that the user receives the desired product. **Information that should be included in the procurement documentation is to be in accordance with IPC-2611 and IPC-2614.**

Note: If the drawing specifies the requirement in words, designators are not required.

The procurement documentation **shall** specify the thermal stress test method and the number of cycles (in relation to reflow profiles in IPC-TM-650, Method 2.6.27) to be used to meet the requirement of 3.6.1. Selection **shall** be from those depicted in 3.6.1.1, 3.6.1.2, 3.6.1.3 and 3.6.1.4. If not specified (see 5.1), the default **shall** be per Table 1-1.