



IPC-4202B

Flexible Base Dielectrics for Use in Flexible Printed Boards

Developed by the Flexible Circuits Base Materials Subcommittee (D-13)
of the Flexible Circuits Committee (D-10) of IPC

Supersedes:

IPC-4202A - April 2010
IPC-4202 - May 2002
IPC-FC-231C with
Amendment 1 - October 1995
IPC-FC-231C - April 1992
IPC-FC-231B - February 1986
IPC-FC-231A
IPC-FC-231

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

Contact:

IPC

Table of Contents

1	SCOPE	1			6
1.1	Classification System	1	3.8	Chemical Requirements	6
1.1.1	Nonspecific Designation	1	3.8.1	Chemical Resistance	6
1.1.2	Specific Designation	1	3.9	Electrical Requirements	6
1.1.2.1	Base Dielectric Material Type	2	3.9.1	Permittivity (Dielectric Constant)	6
1.1.2.2	Reinforcement Method	2	3.9.2	Loss Tangent (Dissipation Factor)	7
1.1.2.3	Reinforcement Type	2	3.9.3	Volume Resistivity (Damp Heat)	7
1.1.2.4	Base Dielectric Material Thickness	3	3.9.4	Surface Resistance (Damp Heat)	7
1.2	Qualification	3	3.9.5	Dielectric Strength	7
1.3	Quality Conformance	3	3.10	Environmental Requirements	7
1.4	Material Characteristics	3	3.10.1	Fungus Resistance	7
1.5	New Materials	3	3.10.2	Moisture Absorption	7
2	APPLICABLE DOCUMENTS	4	3.10.3	Flammability	7
2.1	IPC	4	3.10.4	Relative Thermal Index (RTI)	7
2.2	American Society for Testing and Materials (ASTM)	4	3.11	Workmanship Requirements	7
2.3	Underwriters Laboratories Standards	4	4	QUALITY ASSURANCE PROVISIONS	8
2.4	NCSL International	4	4.1	Responsibility for Inspection	8
2.5	ISO	4	4.2	Test Equipment and Inspection Facilities	8
3	REQUIREMENTS	5	4.3	Preparation of Samples	8
3.1	Terms and Definitions	5	4.4	Standard Laboratory Conditions	8
3.2	Specification Sheets	5	4.5	Tolerances	8
3.3	Conflict	5	4.6	Classification of Inspections	8
3.4	Materials Requirements	5	4.7	Materials Inspection	8
3.4.1	Sheet Material	5	4.8	Qualification Inspection	8
3.4.2	Roll Material	5	4.8.1	Characterization Testing	8
3.5	Visual Requirements	5	4.8.2	Frequency	8
3.5.1	Marking	5	4.9	Quality Conformance Inspection	8
3.5.2	Streaks and Scratches	5	4.9.1	Inspection of Product for Delivery	8
3.5.3	Inclusions	5	4.9.2	Sample Unit	9
3.5.4	Voids/Holes	6	4.9.3	Group A Inspection	9
3.6	Dimensional Requirements	6	4.9.3.1	Sampling Plan	9
3.6.1	Sheet Width and Length	6	4.9.3.2	Failures	10
3.6.2	Roll Width	6	4.9.3.3	User Sampling Plan	10
3.6.3	Roll Length	6	4.9.3.4	Rejected Lots	10
3.6.4	Thickness	6	4.9.4	Group B Inspection	10
3.7	Physical Requirements	6	4.9.5	Group C Inspection	10
3.7.1	Dimensional Stability	6	4.9.5.1	Sampling Plan	10
3.7.2	Tensile Strength and Elongation	6	4.9.5.2	Failures	10
3.7.3	Initiation Tear Strength	6	4.9.5.3	Noncompliance of Material	10
3.7.4	Propagation Tear Strength	6	4.10	Statistical Process Control (SPC)	10
			4.10.1	Reduction of Quality Conformance Testing	10

5	PREPARATION FOR DELIVERY	11
5.1	Packaging	11
6	NOTES	11
6.1	Ordering Data	11
6.2	Chemical Resistance	11
6.3	References	11

Tables

Table 1-1	Base Dielectric Type Designation	2
Table 1-2	Reinforcement Method Designation	2
Table 1-3	Reinforcement Type Designation	2
Table 1-4	Nominal Dielectric Thickness Designation	3
Table 3-1	Allowable Deviation from Nominal Thickness	6
Table 4-1	Test Method Frequency	9
Table 4-2	Sampling Plan for Group A Inspection for Sheet Goods	9
Table 4-3	Lot Sampling Plan for Group A Inspection for Roll Goods	9

Flexible Base Dielectrics for Use in Flexible Printed Boards

1 SCOPE

This standard establishes the classification system, the qualification and quality conformance requirements for flexible base dielectric materials to be used for the fabrication of flexible printed boards. This specification supersedes IPC-4202 which, in turn superseded IPC-FC-231C and the requirements herein meet or exceed the requirements for Class 3 in this superseded document. Note that conformance to Class 3 met or exceeded conformance to Classes 1 and 2. IPC-4202 no longer utilizes the 3-class system.

1.1 Classification System The system described in 1.1.1 through 1.1.2.4 identifies flexible base dielectrics.

1.1.1 Nonspecific Designation A nonspecific designation is intended for use by *designers* on master drawings to designate their material choice. At the end of this standard is a series of material specification sheets identified by specification sheet numbers. Each sheet outlines engineering and performance data for a flexible base dielectric, indicating base material type and method of reinforcement.

Example of nonspecific designation: *IPC-4202/1*, Where "1" refers to the specification sheet detailing unsupported polyimide flexible base dielectrics.

If further material specification details (such as dielectric thickness) are required, they should be highlighted in cross sectional views or notes on the master drawing.

1.1.2 Specific Designation The specific designation should be in the form shown in the following example, and is intended for use on material purchase orders by *fabricators* (see 6.1). The specific designation should not be used by designers on master drawings to indicate their material selection. Master drawings **shall** indicate the material design by designers on master drawings to indicate their material selection, as the designation is lengthy and requires fabricator level knowledge in making the detailed selections.

Example of specific designation:

IPC-4202/1 – E1E2

Where:

IPC-4202/1 – Nonspecific Designation (see 1.1.1), for unsupported polyimide flexible base dielectrics.

E – Base Dielectric Material Type Designation (see 1.1.2.1), specifying polyimide.

1 – Reinforcement Method Designation (see 1.1.2.2), specifying nonreinforced.

E – Reinforcement Type Designation (see 1.1.2.3), specifying nonreinforced film.

2 – Base Dielectric Material Thickness Designation (see 1.1.2.4), specifying 50 μm [1970 μin] thickness.