



IPC-4101D

# Specification for Base Materials for Rigid and Multilayer Printed Boards

Developed by the Laminate/Prepreg Materials Subcommittee (3-11) of  
the Printed Board Base Materials Committee (3-10) of IPC

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

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# Table of Contents

<b>1</b>	<b>SCOPE</b>	1	3.4	Qualification Testing	7
1.1	Classification	1	3.4.1	Qualification Testing of Laminate	11
1.1.1	Specification Sheet Description	1	3.4.2	Qualification Testing of Prepreg	11
1.1.2	Nominal Laminate Thickness	1	3.5	Verification of Manufacturer's Quality System	11
1.1.3	Metal Cladding Type and Nominal Weight/ Thickness	1	3.6	Conflict	11
1.1.3.1	Metal Cladding Type	2	3.7	Materials	11
1.1.3.2	Nominal Weight/Thickness	2	3.7.1	Metal Cladding	11
1.1.4	Thickness Tolerance (Laminate)	2	3.7.2	Reinforcement Fabric	11
1.1.5	Surface Quality Class	2	3.7.3	Resin Systems	11
1.1.6	Reinforcement Style	2	3.8	General Requirements	11
1.1.7	Prepreg Parameters	2	3.8.1	Fabricated Sheets and Panels	11
1.1.8	Color	4	3.8.1.1	Fabricated Laminate Sheet Material	11
1.1.8.1	Contrast Agents	4	3.8.1.2	Fabricated Laminate Panel Material	11
1.2	Dimensions and Tolerances	4	3.8.1.3	Fabricated Prepreg Panels	11
1.2.1	Metric and Imperial Measurements	4	3.8.1.4	Fabricated Prepreg Rolls	12
<b>2</b>	<b>APPLICABLE DOCUMENTS</b>	4	3.8.2	Inspection Lot	12
2.1	IPC	4	3.8.2.1	Inspection Lot for Laminate	12
2.2	National Conference of Standards Laboratories (NCSL)	6	3.8.2.2	Inspection Lot for Prepreg	12
2.3	International Standards	6	3.8.2.3	Preparation of Samples	12
2.4	Underwriters Laboratories (UL)	6	3.8.2.4	Etching Process and Etchant Removal for Copper Foil Specimens	12
2.5	European Union	6	3.8.2.5	Standard Laboratory Conditions	12
2.6	ASTM International	6	3.8.3	Visual Properties	12
<b>3</b>	<b>REQUIREMENTS</b>	6	3.8.3.1	Laminate Visual Properties	12
3.1	Terms and Definitions	6	3.8.3.1.1	Foil Indentations	12
3.1.1	Qualification Assessment	6	3.8.3.1.2	Wrinkles	12
3.1.2	Quality Conformance Testing	6	3.8.3.1.3	Scratches	13
3.1.3	Supplier's Quality System	6	3.8.3.1.4	Plastic Surface Finish of Metal-Clad Single-Sided Base Material	13
3.1.4	Process Control Testing	6	3.8.3.1.5	Surface Finish of Foil after Curing – Except Double Treat	13
3.1.5	Self Declaration	6	3.8.3.1.6	Surface and Subsurface Imperfections	13
3.1.6	Quality Assessment Data	7	3.8.3.2	Prepreg Visual Properties	13
3.1.7	Sample Qualification	7	3.8.3.2.1	Inclusions	13
3.1.8	Production Data	7	3.8.3.2.2	Impregnation Imperfections	13
3.1.9	Customer Test Data	7	3.8.4	Dimensional	14
3.1.10	Internal Assessment	7	3.8.4.1	Length and Width	14
3.1.11	Individual Customer Audit	7	3.8.4.1.1	Length and Width of Laminate	14
3.1.12	Independent Third Party Assessment	7	3.8.4.1.2	Length and Width of Prepreg	14
3.1.13	Epoxy, Multifunctional	7	3.8.4.1.3	Prepreg Roll Width	14
3.1.14	Epoxy, Difunctional	7	3.8.4.1.4	Prepreg Roll Length	14
3.1.15	AABUS	7	3.8.4.2	Thickness	14
3.2	Specification Sheets	7	3.8.4.2.1	Class A, B and C Laminate Materials	14
3.3	Manufacturer Quality Profile	7			

3.8.4.2.2	Class D Laminate Materials .....	14	3.10.1	Chemical Requirements of Laminate Materials .....	18
3.8.4.2.3	Class K, L and M Laminate Materials .....	15	3.10.1.1	Flammability .....	18
3.8.4.2.4	Thickness Tolerance of Laminate Materials .....	15	3.10.1.2	Thermal Stress .....	18
3.8.4.3	Bow and Twist of Laminate Materials .....	15	3.10.1.3	Solderability .....	18
3.8.4.3.1	Sheets and Panels with Both Dimensions ≥300 mm [11.81 in] .....	15	3.10.1.4	Chemical Resistance (Optional Test) .....	19
3.8.4.3.2	Panels with One or Both Dimensions <300 mm [11.81 in] .....	15	3.10.1.5	Metal Surfaces Cleanability .....	19
3.9	Physical Requirements .....	15	3.10.1.6	Glass Transition Temperature ( $T_g$ ) (Optional Test) .....	19
3.9.1	Physical Requirements of Laminate Materials .....	15	3.10.1.7	Delta $T_g$ (Optional Test) .....	19
3.9.1.1	Peel Strength .....	15	3.10.1.8	Decomposition Temperature (Optional Test) .....	19
3.9.1.1.1	Peel Strength after Thermal Stress .....	16	3.10.1.9	Time to Delaminate (TMA) (Optional Test) .....	19
3.9.1.1.2	Peel Strength at Elevated Temperature .....	16	3.10.2	Chemical Requirements of Prepreg Materials .....	20
3.9.1.1.3	Peel Strength after Process Chemicals (Optional Test) .....	16	3.10.2.1	Flammability .....	20
3.9.1.2	Dimensional Stability .....	16	3.10.2.2	Chemical Resistance (Optional Test) .....	20
3.9.1.3	Flexural Strength .....	16	3.10.2.3	Presence of Dicyandiamide (Dicy) (Optional Test) .....	20
3.9.1.4	Flexural Strength at Elevated Temperature .....	17	3.11	Electrical Requirements .....	20
3.9.1.5	Thermal Conductivity [=] w/(m <sup>2</sup> K) .....	17	3.11.1	Electrical Requirements of Laminate Materials .....	20
3.9.1.6	Coefficient of Thermal Expansion (CTE) (Optional Test) .....	17	3.11.1.1	Permittivity .....	20
3.9.1.7	Z-Axis CTE / Total Expansion (Optional Test) .....	17	3.11.1.2	Loss Tangent .....	20
3.9.1.8	Fracture Toughness (Optional Test) .....	17	3.11.1.3	Volume Resistivity .....	20
3.9.2	Physical Requirements of Prepreg Materials .....	17	3.11.1.4	Surface Resistivity .....	20
3.9.2.1	Resin Content .....	17	3.11.1.5	Arc Resistance .....	20
3.9.2.1.1	Resin Content Percent (RC) (by Treated Weight) .....	17	3.11.1.6	Dielectric Breakdown .....	20
3.9.2.1.2	Resin Content Percent (RC) (by Burn-Off) .....	17	3.11.1.7	Electric Strength .....	20
3.9.2.1.3	Treated Weight Total (TW) .....	17	3.11.2	Electrical Requirements of Prepreg Materials .....	20
3.9.2.1.4	Variation Within a Panel .....	17	3.11.2.1	Permittivity .....	20
3.9.2.2	Flow Parameter .....	17	3.11.2.2	Loss Tangent .....	20
3.9.2.2.1	Resin Flow Percent (MF) .....	18	3.11.2.3	Electric Strength .....	20
3.9.2.2.2	Scaled Flow Thickness (SC) .....	18	3.12	Environmental Requirements .....	20
3.9.2.2.3	No Flow (NF) .....	18	3.12.1	Environmental Requirements of Laminate Materials .....	20
3.9.2.2.4	Rheological Flow (RE) .....	18	3.12.1.1	Moisture Absorption .....	20
3.9.2.2.5	Delta H (DH) .....	18	3.12.1.2	Fungus Resistance .....	21
3.9.2.2.6	Percent Cure (PC) .....	18	3.12.1.3	Pressure Vessel (Optional Test) .....	21
3.9.2.2.7	Gel Time (GT) (Optional Test) .....	18	3.12.1.4	Total Halogen Content (Optional Test) .....	21
3.9.2.2.8	Volatile Content (VC) (Optional Test) .....	18	3.12.1.5	Conductive Anodic Filament (CAF) Growth (Optional Test) .....	21
3.9.2.2.9	Thermal Conductivity (Prepreg Reference) .....	18	3.12.2	Environmental Requirements of Prepreg Materials .....	21
3.10	Chemical Requirements .....	18	3.12.2.1	Fungus Resistance .....	21
			3.12.2.2	Conductive Anodic Filament (CAF) Growth (Optional Test) .....	21

3.13 Substitutability ..... 21

3.13.1 Substitutability of Specification Sheet Materials ..... 21

3.13.2 Substitutability of Classes of Pits and Dents ..... 21

3.13.3 Substitutability of Classes of Thickness Tolerance ..... 21

3.13.4 Remarking of Substituted Laminates ..... 21

3.14 Marking ..... 21

3.14.1 Marking Laminate Materials ..... 21

3.14.2 Marking Prepreg Materials ..... 22

3.14.3 Marking of Shipping Containers ..... 22

3.15 Workmanship ..... 22

3.16 Material Safety ..... 22

3.17 Prepreg Shelf Life ..... 22

**4 QUALITY ASSURANCE PROVISIONS ..... 22**

4.1 Quality System ..... 22

4.2 Responsibility for Inspection ..... 22

4.2.1 Test Equipment and Inspection Facilities ..... 22

4.3 Qualification Testing ..... 22

4.3.1 Samples ..... 22

4.3.2 Frequency ..... 23

4.3.3 Laminator Qualification Profile ..... 23

4.3.4 Changes in Composition ..... 23

4.3.5 Qualification Data Retention ..... 23

4.4 Quality Conformance Inspection ..... 23

4.4.1 Frequency ..... 23

4.4.2 Acceptance Criteria ..... 23

4.4.3 Rejected Lots ..... 23

4.4.4 Conformance Data Retention ..... 23

4.4.5 Certificate of Conformance ..... 24

4.5 Statistical Process Control (SPC) ..... 24

**5 PREPARATION FOR DELIVERY ..... 24**

5.1 Packaging Materials ..... 24

5.2 Authorized Distributors ..... 24

**6 NOTES ..... 25**

6.1 Ordering Information ..... 25

6.1.1 Ordering Data for Laminate Materials ..... 25

6.1.2 Ordering Data for Prepreg Materials ..... 25

6.2 New Materials ..... 25

**7 KEYWORDS ..... 26**

7.1 Keyword Search Terms (Electronic/Soft Copy Searches) ..... 26

7.2 Segmented Keyword Search Terms and All Specification Sheets that Use the Specific Keywords for Searching

7.3 Keyword Search Terms for All Specification Sheets ..... 26

**Figures**

Figure 3-1 Thickness Measurements for Laminates ..... 15

**Tables**

Table 1-1 Metal Cladding Types..... 2

Table 1-2 Copper Foil Weight and Thickness..... 3

Table 3-1 Reference Information and Test Frequency of Laminate..... 8

Table 3-2 Reference Information and Test Frequency of Prepreg..... 10

Table 3-3 Point Value for Longest Dimensions of Indentation..... 12

Table 3-4 Surface Quality Classification ..... 13

Table 3-5 Permissible Variation in Length and Width of Laminates..... 14

Table 3-6 Permissible Variation in Length and Width of Prepregs..... 14

Table 3-7 Thickness and Tolerances for Laminates ..... 16

Table 3-8 Permissible Bow and Twist for Laminates, %.... 16

Table 3-9 Flammability Requirements..... 19

Table 4-1 Quality Conformance Plan for Monthly, Quarterly and Annual Tests – Laminate..... 23

Table 4-2 Quality Conformance Plan for Monthly, Quarterly and Annual Tests – Prepreg..... 23

# Specification for Base Materials for Rigid and Multilayer Printed Boards

## 1 SCOPE

This specification covers the requirements for base materials, herein referred to as laminate or prepreg, to be used primarily for rigid or multilayer printed boards for electrical and electronic circuits.

**1.1 Classification** The system shown below identifies clad and unclad laminate or prepreg base materials. The specification sheets serve as a cross-reference connecting the outlined callout system in this document to previously used systems.

Example for laminate base materials where this specification is referenced:

L	Material Designator (see 1.1.1)
25	Specification Sheet Number (see 1.1.1)
1500	Nominal Laminate Thickness (see 1.1.2)
C1/C1	Metal Cladding Type and Nominal Weight/Thickness (see 1.1.3)
A	Thickness Tolerance Class (see 1.1.4)
A	Surface Quality Class (see 1.1.5)

Example for prepreg base materials where this specification is referenced:

P	Material Designator (see 1.1.1)
25	Specification Sheet Number (see 1.1.1)
E7628	Reinforcement Style (see 1.1.6)
TW	Resin Content Method (see 1.1.7)
RE	Flow Parameter Method (see 1.1.7)
VC	Optional Prepreg Method (see 1.1.7)

**1.1.1 Specification Sheet Description** At the end of this document is a series of specification sheets. Each specification sheet outlines requirements for both laminate and prepreg for each product grade. The specification sheets are organized by a specific reinforcement type, resin system, and/or construction and are provided with a specification sheet number for ordering purposes. For convenience, the laminate and prepreg requirements for materials of the like composition are on the same specification sheet. Material Designator “L” indicates laminate material and Material Designator “P” indicates prepreg material as shown in designation examples in 1.1. When certifying to multiple specification sheets, the strongest performance requirements **shall** apply.

The headings for each specification sheet include reference definitions for the material, which cover the reinforcements, resin systems, flame retardants, and fillers used, as well as its other known identifications and glass transition temperature,  $T_g$ . The specific line items within the specification sheets are the requirements that material **shall** meet in order to be certified to this specification.

**1.1.2 Nominal Laminate Thickness** The nominal thickness is identified by four digits. For all substrates covered by this document, thicknesses may be specified or measured either over the cladding or over the dielectric (see 1.1.4 and 3.8.4.2). For metric specification, the first digit represents whole millimeters, the second represents tenths of millimeters, etc. For orders requiring Imperial units, the four digits indicate the thickness in ten-thousandths of an inch. In the example shown in 1.1, 1500 designates a laminate with thickness of 1.5 mm [0.0591 in], which would be specified as 0591 when using Imperial units.

**1.1.3 Metal Cladding Type and Nominal Weight/Thickness** The type and nominal weight or thickness of the metallic cladding for laminate base material is identified by five designators. The first and fourth designators indicate the type of cladding; the third designator is a slash mark that differentiates sides of the base material; the second and fifth designators indicate the nominal weight or thickness of the metallic cladding.