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IPC-4101B
with Amendments 1 & 2

Specification for Base Materials for Rigid and Multilayer Printed Boards

IPC-4101B with Amendments 1 & 2
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A standard developed by IPC

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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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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 English units, the four digits indicate the thickness in ten-thousandths of an inch (tenths of mils). In the example shown in 1.1, 1500 is designated for the English unit usage of 0600 for a laminate with thickness of 1.5 mm [59.1 mil].

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.

1.1.3.1 Metal Cladding Type The types of metallic cladding and the designators representing them are shown in Table 1-1. Table 1-1 is provided as a reference only. The referee document is the latest version of IPC-CF-148, IPC-4562, or IPC-CF-152 as appropriate. Cladding types C and R, and cladding types H and S, may be used interchangeably as agreed upon between user and supplier. Cladding type H can be used for type C and type S can be used for type R. Cladding type R may be substituted for type C, and cladding type S may be substituted for type H.

1.1.3.2 Nominal Weight/Thickness The weight or thickness of metallic cladding and the designators representing them are listed in Table 1-2. Table 1-2 is provided as a reference only. The referee document is the latest version of IPC-CF-148, IPC-4562, or IPC-CF-152 as appropriate.

1.1.4 Thickness Tolerance (Laminate) The class of thickness tolerance for laminate base material is identified by either A, B, C, D, K, L, M, or X (as agreed upon