IPC-4101D-WAM1

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

Supersedes:

IPC-4101D - April 2014
IPC-4101C - August 2009
IPC-4101B with
Amendments 1 & 2 - April 2007
IPC-4101B with
Amendment 1 - February 2007
IPC-4101B - June 2006
IPC-4101A with
Amendment 1 - June 2002
IPC-4101A - December 2001
IPC-4101 - December 1997
IPC-L-108
IPC-L-109
IPC-L-112
IPC-L-115
IPC-AM-361

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

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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.

Specification sheets have no cancellation date. When no revision of IPC-4101 is called out, the latest revision of IPC-4101 shall apply. If previous revisions are used, then the specification sheet and revision **shall** be called out.

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.