IPC-L-125A

Specification for Plastic Substrates Clad or Unclad for High Speed/High Frequency Interconnections

A standard developed by the Institute for Interconnecting and Packaging Electronic Circuits

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Specification for Plastic Substrates, Clad or Unclad for High Speed/High Frequency Interconnections

1.0 GENERAL

1.1 Scope  This specification covers the requirements for high speed/high frequency performance plastic substrates to be used primarily for the fabrication of printed wiring boards for microstrip, stripline, and high-speed digital electrical and electronic circuits. This specification applies to substrate thickness defined in the specification sheets as measured over the dielectric only.

1.2 Type Designation  The following system identifies clad and unclad substrate materials.

Example:

<table>
<thead>
<tr>
<th>Specification number</th>
<th>Specification sheet #</th>
<th>Permittivity</th>
<th>Permittivity tolerance</th>
<th>Foil indentation grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>/01</td>
<td>C</td>
<td>1</td>
<td>A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal dielectric thickness</th>
<th>Thickness tolerance grade</th>
<th>Quality class</th>
<th>Metal cladding type and nominal weight/thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>(see 1.2.5)</td>
<td>(see 1.2.6)</td>
<td>(see 1.2.7)</td>
<td>(see 1.2.8)</td>
</tr>
</tbody>
</table>

0620  B 3 C1/DH

1.2.1 Specification Sheet Description  At the end of this document is a series of specification sheets. Each sheet outlines engineering and performance data for a substrate indicating reinforcement type and resin system. The sheets are provided with a number for ordering purposes. For example, if a user wished to order from specification sheet number 06, the number “06” would be substituted for the “01” in the above designation example (125/06).

1.2.2 Permittivity  The nominal permittivity is identified by A,B,C,D,E,F or X as indicated on the applicable specifications sheet.

1.2.3 Permittivity Tolerance  The permittivity tolerance is identified by 1, 2, 3, 4, 5 or 6 see paragraph 3.8.1.

1.2.4 Foil Indentations  The grade of foil indentations is identified by either grade A, B, or X see paragraph 3.5.2.1.1.

1.2.5 Nominal Dielectric Thickness  The nominal thickness is identified by four digits that indicate the thickness in ten-thousandths of an inch (tenths of mils). For all substrates covered by this document, thicknesses specified are measured over the dielectric only. For metric specifications, the first digit represents whole millimeters, the second represents tenths of millimeters, etc. In the example shown above, 0620 would be designated in metric at 1575.

1.2.6 Thickness Tolerance Grade  The thickness tolerance grade is identified by A, B, C, D, E, F, G, H and defined in 3.5.3.1 and Table 4.

1.2.7 Quality Classifications  This specification recognizes that substrates will be subjected to classifications by intended end item use. Toward this end, four general classes have been established to reflect progressive increases in sophistication, functional performance requirements and testing inspection frequency. It should also be recognized that there may be an overlap of equipment between classes. The user has the responsibility to determine the class into which his product belongs. The four classes are:

Class 1—Consumer products  Substrates in this class are suitable for applications where cosmetic defects are not important and the only requirement is functionality of the complete circuit. These substrates have a very low level of required inspection and testing.

Class 2—General industrial  Substrates in this class are suitable for sophisticated industrial circuit design where moderate levels of assurance are demonstrated via the use of testing and/or SPC/SQC techniques.

Class 3—High performance industrial  Substrates in this class are suitable for high reliability electronic applications where high levels of assurance are demonstrated via the use of end use testing and a published plan requiring the use of SPC/SQC techniques as defined in the IPC-PC-90.

Class 4—High reliability  Substrates in this class are suitable for equipment where continuous performance is critical and high levels of assurance demonstrated via the use of end use testing and a published plan requiring the use of SPC/SQC techniques as defined in the IPC-PC-90.

Note: Military applications shall use Class 4 certified substrates.

1.2.7.1 Requirements in this specification have been separated so that the performance of the metal clad base