IPC-4921A

2017 - May

Requirements for Printed Electronics Base Materials (Substrates)

An international standard developed by IPC

Association Connecting Electronics Industries

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- Show relationship to Design for Manufacturability (DFM) and Design for the Environment (DFE)
- Minimize time to market
- Contain simple (simplified) language
- Just include spec information
- Focus on end product performance
- Include a feedback system on use and problems for future improvement

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- Increase time-to-market
- Keep people out
- Increase cycle time
- Tell you how to make something
- Contain anything that cannot be defended with data

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Requirements for Printed Electronics Base Materials (Substrates)

Developed by the Printed Electronics Base Material/Substrates Subcommittee (D-62) of the Printed Electronics Committee (D-60) of IPC

Supersedes:
IPC-4921 - June 2012

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

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Acknowledgment

Any document involving a complex technology draws material from a vast number of sources across many continents. While the principal members of the Printed Electronics Base Material/Substrates Subcommittee (D-62) of the Printed Electronics Committee (D-60) are shown below, it is not possible to include all of those who assisted in the evolution of this standard. To each of them, the members of IPC extend their gratitude.

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1 SCOPE

This standard establishes the classification system, qualification and quality conformance requirements for printed electronics base materials (substrates).

The standard defines the base material only and should not be used for substrates that have been postprocessed and comprise defined features or structures (e.g., conductive traces).

1.1 Purpose The purpose of this standard is to provide and define key characteristics and test methods used for procuring printed electronics base materials (substrates).

1.2 Classification System The system described in 1.2.1 through 1.2.2.5 identifies printed electronics base materials (substrates).

1.2.1 Designating Materials A materials designation is intended for use by designers on master drawings to designate their base material choice. At the end of this standard is a series of material specification sheets, which are identified by specification sheet numbers. Each specification sheet outlines engineering and performance data for a printed electronics base material type. The designer should select the appropriate base material specification sheet as required to meet the operational specifications of the end product application (e.g., consumer, automotive, aerospace, etc.).

An example base material designation would be IPC-4921/2, for which "/2" refers to the specification sheet detailing Polyester Naphthalate (PEN)/Biaxially Oriented Polyethylene Naphthalate (BOPEN).

If the designer requires further material specification details (e.g., thickness), the designer should highlight those details in cross-sectional views or notes on the master drawing.

If the designer is using a material which is not in one of the approved IPC-4921 specification sheets, the designer **shall** select the material type from 1.2.2.2. Users and suppliers should consider submitting new specification sheets for consideration in this standard (see 1.8).

1.2.2 Adding Details When Designating Material Designers may add details to the procurement documentation for substrate materials.

The additional details designation **shall** follow this format:

Standard designation / Specification sheet number or Base Material Type / Base Structure / Base Reinforcement Type / Base Material Thickness

Where:

- Standard designation is IPC-4921.
- Specification Sheet number is an approved IPC-4921 specification sheet.
- If no specification sheet exists, the designer **shall** select a Base Material Type designation from 1.2.2.2. If the material type is not included in 1.2.2.2, the designer **shall** create a designator for the material.
- Base Structure is selected from 1.2.2.3.
- Base Reinforcement Type is selected from 1.2.2.4.
- Base Material Thickness is selected from 1.2.2.5.

The following is an example of a detailed designation using an IPC-4921 Specification Sheet as the Base Material Type:

IPC-4921 / 2 / 2 / F / 7 would be PEN/BOPEN in sheet form, nonreinforced, with a thickness range of ≥ 0.250 mm to < 0.400 mm.

The following is an example of a detailed designation using a material which is not represented in an IPC-4921 specification sheet: