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

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

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# Table of Contents

## 1 SCOPE
1.1 Purpose ................................................................. 1
1.2 Classification System ............................................... 1
1.2.1 Designating Materials .......................................... 1
1.2.2 Adding Details When Designating Materials .......... 1
1.3 Surface Treatments .................................................. 3
1.4 Manufacturing Temperature Classification ................. 4
1.5 Quality Conformance ............................................. 4
1.6 Procurement Documentation ..................................... 4
1.7 Material Characteristics .......................................... 4
1.7.1 As Agreed Upon Between User and Supplier (AABUS) 4
1.8 New Materials ....................................................... 4
1.9 Interpretation of „Shall” .......................................... 5
1.10 Presentation of Dimensions and Tolerances ............... 5

## 2 APPLICABLE DOCUMENTS
2.1 IPC ............................................................................ 5
2.2 ASTM International ................................................. 5
2.3 UL .............................................................................. 7
2.4 NCSL International ................................................... 7
2.5 International Organization for Standardization (ISO) .... 7
2.6 American Society of Mechanical Engineers (ASME) .... 7
2.7 Technical Association of the Pulp and Paper Industry (TAPPI) .... 7
2.8 British Standards Institution (BSI) ............................ 7
2.9 International Electrotechnical Commission (IEC) ......... 8
2.10 Japanese Standards Assocation ................................. 8

## 3 GENERAL REQUIREMENTS
3.1 Terms and Definitions ............................................. 8
3.1.1 Coefficient of Hygroscopic Expansion (CHE) .... 8
3.1.2 Skew ................................................................. 8
3.1.3 Poisson’s Ratio .................................................... 8
3.1.4 Surface Gloss ..................................................... 8
3.1.5 Dielectric Constant (Dk) ..................................... 8
3.1.6 Thermal Conductivity ......................................... 8
3.2 Specification Sheets ............................................... 8
3.3 Conflict ................................................................. 8
3.4 Material Requirements ........................................... 8
3.4.1 Preferred Side for Printing ................................ 9
3.4.2 Sheet Material .................................................... 9
3.4.3 Roll Material ...................................................... 9
3.4.4 Storage Conditions ............................................ 9
3.4.5 Chemical Compliance ....................................... 9
3.5 Visual Requirements ............................................. 9
3.5.1 Marking ............................................................ 9
3.5.2 Wrinkles, Creases, Streaks and Scratches .......... 9
3.5.3 Inclusions ......................................................... 9
3.5.4 Voids ............................................................... 10
3.5.5 Holes, Tears and Delaminations ....................... 10
3.6 Dimensional Requirements .................................... 10
3.6.1 Sheet Width and Length .................................. 10
3.6.2 Roll Width ......................................................... 10
3.6.3 Roll Length ....................................................... 10
3.6.4 Thickness ......................................................... 10
3.7 Mechanical Requirements .................................... 10
3.7.1 Bend ............................................................... 10
3.7.2 Coefficient of Thermal Expansion (CTE) ........ 10
3.7.3 Coefficient of Hygroscopic Expansion (CHE) .. 10
3.7.4 Dimensional Stability ...................................... 10
3.7.5 Edge Strength .................................................. 10
3.7.6 Initiation Tear Strength ................................... 10
3.7.7 Propagation Tear Strength ............................... 10
3.7.8 Tensile Strength, Elongation and Modulus ........ 11
3.7.9 Density ............................................................ 11
3.7.10 Poisson’s Ratio ............................................... 11
3.8 Surface Requirements .......................................... 11
3.8.1 Coefficient of Friction ...................................... 11
3.8.2 Surface Energy ................................................ 11
3.8.3 Surface Hardness ............................................. 11
3.8.4 Surface Roughness ......................................... 11
3.8.5 Surface Gloss .................................................. 11
3.9 Optical Requirements .......................................... 11
3.9.1 Color ............................................................ 11
3.9.2 Luminous Transmittance and Haze ................. 11
3.9.3 Refractive Index ............................................. 11
3.9.4 Surface Resistance .......................................... 12
3.10 Chemical Requirements ..................................... 11
3.10.1 Chemical Resistance ...................................... 11
3.10.2 Oxygen Gas Transmission ......................... 11
3.10.3 Water Vapor Transmission ......................... 11
3.11 Electrical Requirements ...................................... 11
3.11.1 Permittivity (Dielectric Constant) ............... 11
3.11.2 Loss Tangent (Dissipation Factor) .................... 12
3.11.3 Volume Resistivity (Damp Heat) .................... 12
3.11.4 Surface Resistance (Damp Heat) .................... 12
3.11.5 Dielectric Strength ............................................. 12
3.12 Environmental Requirements ............................. 12
3.12.1 Fungus Resistance .............................................. 12
3.12.2 Moisture Absorption .......................................... 12
3.12.3 Flammability ...................................................... 12
3.12.4 Halogens ............................................................. 12
3.12.5 Relative Thermal Index (RTI) ........................... 12
3.12.6 Glass Transition (T_g) Temperature .................... 12
3.13 Workmanship Requirements .............................. 12
3.14 Special Requirements ......................................... 12
3.14.1 Outgassing .......................................................... 12
3.14.2 Organic Contamination ...................................... 12
3.15 Physical Requirements ....................................... 13
3.15.1 Thermal Conductivity ........................................ 13

4 QUALITY ASSURANCE PROVISIONS ....................... 13
4.1 Responsibility for Inspection ............................ 13
4.2 Test Equipment and Inspection Facilities .......... 13
4.3 Preparation of Samples ...................................... 13
4.4 Standard Laboratory Conditions ................ 13
4.5 Tolerances ........................................................... 13
4.6 Classification of Inspection .............................. 13
4.7 Material Inspection ............................................ 13
4.8 Qualification Inspection ..................................... 13
4.8.1 Characterization Testing ................................. 13
4.8.2 Frequency ............................................................ 14
4.9 Quality Conformance Inspection ....................... 14
4.9.1 Inspection of Product for Delivery ................... 15
4.9.2 Sample Unit ......................................................... 15
4.9.3 Group A Inspection ............................................ 15
4.9.4 Group B Inspection ............................................ 15
4.10 Statistical Process Control (SPC) ............ 16
4.10.1 Reduction of Quality Conformance Testing ...... 16

5 PREPARATION FOR DELIVERY ............................ 16
5.1 Packaging ........................................................... 16

6 NOTES ..................................................................... 16
6.1 Ordering Data ..................................................... 16
6.2 Chemical Resistance .......................................... 17

Tables
Table 1-1 Base Material Family Designation ........ 2
Table 1-2 Base Material Type Designation .......... 2
Table 1-3 Base Structure Designation .............. 3
Table 1-4 Base Reinforcement Type Designation 3
Table 1-5 Nominal Base Material Thickness Designation .... 3
Table 4-1 Test Method Frequency ...................... 14
Table 4-2 Sampling Plan for Group A Inspection for Sheet Goods .......... 15
Table 4-3 Lot Sampling Plan for Group A Inspection for Roll Goods .... 15
Requirements for Printed Electronics
Base Materials (Substrates)

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 Materials  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: