



# IPC-4110

## Specification and Characterization Methods for Nonwoven Cellulose Based Paper for Printed Boards

**ANSI/IPC-4110**

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A standard developed by IPC

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# Specification and Characterization Methods for Nonwoven Cellulose Based Paper for Printed Boards

## 1 SCOPE

This specification covers paper made from cellulosic fibers intended as a reinforcing material in laminated plastics for electrical and electronic use.

**1.1 Purpose** This specification determines the nomenclature, definitions, and general, chemical, and physical requirements for paper made from cellulosic fibers.

**1.2 Classification** This specification provides physical and chemical characteristics of the paper required to meet the design and performance requirements of PWBs.

## 2 APPLICABLE DOCUMENTS

### 2.1 IPC<sup>1</sup>

**IPC-T-50** Terms and Definitions for Interconnecting and Packaging Electronic Circuits

### 2.2 TAPPI<sup>2</sup>

**T 400 sp-95** Sampling and Inspecting a Single Lot of Paper, Paperboard, Containerboard, or Related Product

**T 402 om-93** Standard Conditioning and Testing Atmosphere for Paper, Board, Pulp Handsheets, and Related Products

**T 404 om-92** Tensile Breaking Strength and Elongation of Paper and Paperboard (Using Pendulum-Type Tester)

**T 410 om-93** Grammage of Paper and Paperboard (Weight per Unit Area)

**T 411 om-89** Thickness (Caliper) of Paper, Paperboard, and Combined Board

**T 412 om-94** Moisture in Paper and Paperboard

**T 413 om-93** Ash in Paper and Paperboard

**T 456 om-87** Wet Tensile Strength

**T 460 om-96** Air Resistance of Paper (Gurley Method)

**T 509 om-96** Hydrogen Ion Concentration (pH) of Paper Extracts (Cold Extraction Method)

## 3 REQUIREMENTS

**3.1 Terms and Definitions** Other than the terms listed in 3.1.1 through 3.1.17, the definition of terms **shall** be in accordance with IPC-T-50 and TAPPI documents.

**3.1.1 Absorptivity** The rate of resin saturant pick-up into the paper.

**3.1.2 Air Holes** Small circular areas containing less fibers, which are caused by air bubbles.

**3.1.3 Bagginess** Material that is distorted, stretched, or deformed in the middle or along the edges of the sheet.

**3.1.4 Caliper Variation (MD and CD)** A sheet that is of uneven thickness in the width and length.

**3.1.5 Cellulose Fibers** Fibers derived from trees by pulping processes, cotton linter fibers, and mixtures of the two fiber types. These fibers may be bleached to a high brightness.

**3.1.6 Conducting Particles** Small foreign particles capable of conducting current.

**3.1.7 Dents** Indentations in the surface of the paper or in the edge of the roll.

**3.1.8 Dirt** Small dark particles of foreign origin (i.e., bark pieces, floor dirt, seed particles, or any other visible contaminants).

**3.1.9 Edge Tear** Tears in the edge of the paper.

**3.1.10 Folds** A permanent fold or crease in the paper, generally in the machine direction, occurring during processing or rewinding.

**3.1.11 Holes** An area in the paper where few or no fibers are present.

**3.1.12 Poor Formation** Very uneven distribution of fibers in the sheet, resulting in a mottled appearance.

**3.1.13 Rough Surface** Extreme uneven caliper, generally caused by poor formation.

1. IPC, 2215 Sanders Road, Northbrook, IL 60062, 847-509-9700, <http://www.ipc.org>

2. TAPPI, 1-800-322-8686 (U.S.), 1-800-446-9431 (Canada), +1-770-209-7303 (International), or visit <http://www.tappi.org> for a list of local TAPPI divisions