



Standard Specification for Copper-Clad Thermosetting Laminates for Printed Wiring¹

This standard is issued under the fixed designation D 1867; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers twelve grades of thermosetting laminate with copper foil bonded to one or both surfaces. These combination forms are intended primarily for use in fabrication of printed (etched) wiring or circuit boards.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 709 Specification for Laminated Thermosetting Materials²

D 1711 Terminology Relating to Electrical Insulation²

D 3636 Practice for Sampling and Judging Quality of Solid Electrical Insulating Materials³

D 5109 Test Methods for Copper-Clad Thermosetting Laminates for Printed Wiring Boards³

2.2 Other Standards:

MIL-P-13949 Plastic Sheet, Laminated, Metal Clad (for Printed Wiring Boards)⁴

NEMA Publication Number LI-1⁵

¹ This specification is under the jurisdiction of the ASTM Committee D09 on Electrical and Electronic Insulating Materials and is the direct responsibility of Subcommittee D09.07 on Flexible and Rigid Insulating Materials.

Current edition approved Sept. 10, 2001. Published November 2001. Originally published as D 1867 – 61 T. Last previous edition D 1867 – 96.

² *Annual Book of ASTM Standards*, Vol 10.01.

³ *Annual Book of ASTM Standards*, Vol 10.02.

⁴ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

⁵ Available from National Electrical Manufacturers Association, 2101 L St., N.W., Washington, DC 20037.

3. Terminology

3.1 For definitions of terms used in this standard, refer to Terminology D 1711.

4. Classification

4.1 *Base Laminate Grades*—Where applicable, the dielectric material forming the base of the copper-clad laminate of the types listed in Table 1 and Table 2 shall conform to the property requirements of that specific grade shown in Specification D 709.

4.2 *Copper Foil Surfaces*—The surfaces shall be copper foil, either rolled or electrodeposited, having a minimum purity of 99.50 % (silver considered as equal to copper). The thickness tolerances of the copper foil shall conform to the requirements of Table 3.

4.3 *Thickness Tolerance Classes*—Copper-clad laminates are available in two classes of thickness tolerance. Class I represents those tolerances of standard manufacturing practice. Class II represents a closer tolerance product than Class I. Any specified class shall conform to the requirements shown in Table 4.

4.3.1 For sheets of laminate equal to or greater than 18 by 18 in. (approximately 2.3 ft²) at least 90 % of all thickness test measurements made upon any sheet of laminate shall be within the limits specified in Table 4. For metric size sheets this 90 % requirement shall apply to sheet sizes of 0.5 by 0.5 m or 0.25 m² area.

4.3.2 The deviation of any single thickness test measurement value (see Practice D 3636) from the nominal overall thickness listed in Table 4 shall not exceed 125 % of the tolerance listed in Table 4.

4.3.3 Any overall laminate thickness not listed in Table 4 shall meet the tolerance requirements of the next highest nominal thickness listed in Table 4.

4.3.4 For cut panels (for example, laminate sheets cut to area less than 2.3 ft² or less than 0.25 m²) at least 98 % of all thickness test measurements shall be within the specified overall laminate thickness tolerance values of Table 4.