



Standard Specification for Nickel-Clad and Nickel-Plated Steel Strip for Electron Tubes¹

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1. Scope

1.1 This specification covers steel strip, nickel-clad or nickel-plated on both sides, for use in electron tubes.

1.2 The values stated in inch-pound units are to be regarded as the standard. The metric equivalents of inch-pound units may be approximate.

2. Referenced Documents

2.1 ASTM Standards:²

B 487 Test Method for Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of a Cross Section

E 30 Test Methods for Chemical Analysis of Steel, Cast Iron, Open-Hearth Iron, and Wrought Iron³

E 39 Test Methods for Chemical Analysis of Nickel³

F 155 Test Method for Temper of Strip and Sheet Metals for Electronic Devices (Spring-Back Method)⁴

F 239 Specification for Nickel Alloy Cathode Sleeves for Electron Devices⁵

3. Chemical Analysis

3.1 The chemical analysis of the steel shall be in accordance with Methods E 30.

3.2 The chemical analysis of the nickel shall be made in accordance with Methods E 39.

4. Bonding of Cladding or Plating

4.1 The nickel cladding may be bonded to the steel base by any process that will permit conformance to the requirements of this specification, except that no other material shall be employed as a bonding agent. In the preparation of nickel-plated steel no underplate shall be applied and no brighteners shall be used in the electroplating bath.

4.2 The material when fully annealed shall be capable of being bent flat upon itself without cracking, chipping, or separating. This test shall be made with 0.5-in. (13-mm) wide samples taken both lengthwise and crosswise to the grain of the strip. Examination shall be made under 10× magnification.

5. Thickness of Cladding or Plating

5.1 *Nickel Cladding*—The nickel cladding on each side shall conform to one of the following thickness requirements:

5.1.1 *Type I*—A thickness of $10 \pm 1\%$ of the total thickness of the strip.

5.1.2 *Type II*—A thickness of $15 \pm 1\%$ of the total thickness of the strip.

5.2 *Nickel Plating*—The nickel plating on each side shall conform to one of the following thickness requirements:

5.2.1 *Type I*—A thickness of 0.00012 in. (0.0030 mm), min.

5.2.2 *Type II*—A thickness of 0.00025 in. (0.0064 mm), min.

5.3 The thickness of the plating or cladding shall be determined by metallographic examination of a transverse section as described in Test Method B 487, or by any method agreed upon by the producer and the consumer.

NOTE 1—A metallographic technique may be found in the Symposium on Methods of Metallographic Specimen Preparation.⁶

6. Temper

6.1 The temper of the strip shall conform to limits agreed upon by the producer and the consumer, and shall be determined in accordance with Test Method F 155.

7. Dimensions, Mass and Permissible Variations

7.1 *Thickness*—The thickness of the material shall conform to the following tolerances:

Thickness, in. (mm)	Thickness Tolerance, in. (mm)
Under 0.010 (0.25)	± 0.0005 (0.013)
0.010 to 0.020 (0.25 to 0.50), incl	± 0.0008 (0.0203)

The thickness shall be measured 0.375 in. (9.5 mm) from the edge on 1-in. (25.4-mm) or wider strip, or at any point on narrower strip.

¹ This specification is under the jurisdiction of ASTM Committee F01 on Electronics and is the direct responsibility of Subcommittee F01.03 on Metallic Materials.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Discontinued; see 1994 *Annual Book of ASTM Standards*, Vol 03.05.

⁴ Discontinued; see 1983 *Annual Book of ASTM Standards*, Vol 10.04.

⁵ Discontinued; see 1990 *Annual Book of ASTM Standards*, Vol 10.04.

⁶ H. S. Link, "Mechanical Polishing of Metallographic Specimens," *Symposium on Methods of Metallographic Specimen Preparation*, ASTM STP 285, ASTTA, ASTM, 1961, pp. 8–11.