



Designation: F 3 – 02a

Standard Specification for Nickel Strip for Electron Tubes¹

This standard is issued under the fixed designation F 3; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This specification covers nickel strip for use as cathodes or other elements 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:

- B 162 Specification for Nickel Plate, Sheet, and Strip²
- E 39 Test Methods for Chemical Analysis of Nickel³
- E 107 Test Methods for Chemical Analysis of Electronic Nickel⁴
- E 129 Test Method for Spectrographic Analysis of Thermionic Nickel Alloys by the Powder Technique⁴
- F 1 Specification for Nickel-Clad and Nickel-Plated Steel Strip for Electron Tubes⁵
- F 16 Test Methods for Measuring Diameter or Thickness of Wire and Ribbon for Electronic Devices and Lamps⁵
- F 155 Test Method for Temper of Strip and Sheet Metals for Electronic Devices (Spring-Back Method)⁶
- F 239 Specification for Nickel Alloy Cathode Sleeves for Electron Devices⁷

3. Physical Requirements

3.1 *Temper*—The temper shall conform to limits agreed upon by the producer and consumer when determined in accordance with Test Method F 155.

3.2 *Finish*—The surface shall be as smooth and free of oxide, pits, scratches, seams, slivers, streaks, stains, scale, blisters, edge cracks, trimming burrs, and other defects or contaminants, as best commercial practice will permit when examined under 10 \times magnification.

4. Dimensions, Mass and Permissible Variations

4.1 Strip up to and including 0.020 in. (0.51 mm) is covered by this specification.

4.2 Strip over 0.020 in. (0.51 mm) is covered by Specification B 162.

4.3 *Thickness*—The thickness shall conform to the tolerances of Table 1.

4.4 *Width*—The width, as slit, shall conform to the tolerances of Table 2.

4.5 *Edgewise Bow*—The edgewise bow shall be no more than 0.5 in (13 mm) in 8 ft (2.4 m).

4.6 *Edge*—The edge shall be such as would result from a standard slitting operation.

4.7 *Burr*—The burr shall not exceed one half the strip thickness or 0.0025 in. (0.064 mm), whichever is smaller.

5. Chemical Requirements

5.1 The chemical composition of nickel strip used for cathodes shall be as prescribed in Specification F 239. For approved test methods, see 7.5.

5.2 Nickel strip used for elements other than cathodes shall conform to the requirements of Table 3 as to chemical composition, or as specified in Specification F 239, if desired.

5.3 The choice of grade for specific applications shall be agreed upon between the producer and consumer.

6. Sampling

6.1 Unwind required sample strip from each coil selected for inspection in such a manner that bending, twisting, and any other distortion is prevented.

6.2 If coil construction will permit, it is recommended that samples from coils of material be taken from both ends.

7. Test Methods

7.1 *Thickness*—On material 0.004 in. (0.10 mm) and under in thickness, make six measurements at least 1 m apart in accordance with Test Methods F 16 or with any equivalent method directly readable and accurate to $\pm 0.5\%$ of strip thickness. On 1-in. (25-mm) or wider strip, or at any point on narrower strip, make all measurements about 0.4 in. (10 mm) from the edge.

NOTE 1—An alternative method of determining strip thickness by weighing is suggested in Appendix X1.

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 *Annual Book of ASTM Standards*, Vol 02.04.

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

⁴ *Annual Book of ASTM Standards*, Vol 03.05.

⁵ *Annual Book of ASTM Standards*, Vol 10.04.

⁶ Discontinued 1985, see 1983 *Annual Book of ASTM Standards*, Vol 10.04.

⁷ Discontinued 1992, see 1991 *Annual Book of ASTM Standards*, Vol 10.04.