



Designation: F 96 – 77 (Reapproved 1999)

Standard Specification for Electronic Grade Alloys of Copper and Nickel in Wrought Forms¹

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1. Scope

1.1 This specification covers alloys of copper and nickel in a variety of wrought shapes suitable for external and internal use in electron devices.

1.2 The following safety hazards caveat applies to Test Methods Section 8 only: *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:

A 342 Test Methods for Permeability of Feebly Magnetic Materials²

B 122/B122M Specification for Copper-Nickel-Tin Alloy, Copper-Nickel-Zinc Alloy (Nickel Silver) and Copper-Nickel Alloy Plate, Sheet, Strip, and Rolled Bar³

B 127 Specification for Nickel-Copper Alloy (UNS N04400) Plate, Sheet, and Strip⁴

B 164 Specification for Nickel-Copper Alloy Rod, Bar, and Wire⁴

B 165 Specification for Nickel-Copper Alloy (UNS N04400) Seamless Pipe and Tube⁴

E 75 Test Method for Chemical Analysis of Copper-Nickel and Copper-Nickel-Zinc Alloys⁵

3. Ordering Information

3.1 Orders for material to this specification shall include the following information:

3.1.1 Alloy (see 9.1),

3.1.2 Shape,

3.1.3 Condition (cold-rolled, hot-rolled, etc.),

3.1.4 Dimensions,

3.1.5 Weight,

3.1.6 Packaging (see 10.2), and

3.1.7 Special requirements (see 11.1).

4. Manufacture and Workmanship

4.1 The material shall be handled in such a manner that oxide contamination and foreign material such as metal chips and dirt shall be minimized on the surfaces.

4.2 Sheet and strip intended for deep drawing shall be substantially free from directional properties which can cause excessive tearing in the deep drawn product.

5. Chemical Composition

5.1 This material shall conform to the chemical composition shown in Table 1.

5.2 When specifically requested, a certificate of chemical analysis shall be supplied by the manufacturer. Sample for chemical analysis is to be taken from a ladle sample at the time the melt is cast. Each sample shall be individually analyzed to the requirements of 5.1 and the numerical results of analysis reported in the certification.

5.3 In case of disagreement, the analysis shall be made in accordance with Test Method E 75 for the respective materials when such methods of analysis are available. When ASTM methods are not available, the analytical procedures shall be agreed upon by the manufacturer and the purchaser.

6. Physical Properties

6.1 *Alloy 1*—The properties shall be as shown in the applicable basic product specification referenced in 5.1 except for grain size which shall conform to the requirements in Table 2.

6.2 *Alloys 2 and 3*—The mechanical properties shall be as agreed upon between manufacturer and purchaser. The grain size shall conform to the requirements in Table 2.

6.3 *Alloy 4*:

6.3.1 The mechanical properties shall be as agreed upon between manufacturer and purchaser.

6.3.2 Grain size and hardness for deep drawing quality sheet and strip shall conform to the requirements shown in Specification B 127.

¹ This specification is under the jurisdiction of ASTM Committee F-1 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 03.04.

³ *Annual Book of ASTM Standards*, Vol 02.01.

⁴ *Annual Book of ASTM Standards*, Vol 02.04.

⁵ *Annual Book of ASTM Standards*, Vol 03.05.