



Standard Specification for Molybdenum Wire and Rod for Electronic Applications ¹

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1. Scope

1.1 This specification covers two grades of molybdenum wire less than 0.050 in. (1.27 mm) in diameter and one grade of molybdenum rod 1.00 in. (25.4 mm) or less in diameter as follows:

1.1.1 *Grade 1*—Commercially pure molybdenum wire suitable for leads, hooks, supports, heaters, and metal-to-glass seals.

1.1.2 *Grade 2*—Commercially pure molybdenum wire suitable for mandrel either black or cleaned.

1.1.3 *Grade 3*—Commercially pure molybdenum rod suitable for leads, hooks, supports, and metal-to-glass seals.

1.2 The term wire applies to all spooled or coiled material and 0.050 in. (1.3 mm) or less in diameter and to short cut lengths 0.020 in. (0.51 mm) or less in diameter.

1.3 The term rod applies to all material over 0.020 in. (0.51 mm) in diameter, supplied in straight lengths.

1.4 The values stated in inch-pound units are to be regarded as the standard. The metric equivalents of inch-pound units may be approximate, except for the size of the wire expressed in milligrams per 200 mm.

1.5 *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 374 Test Methods for Thickness of Solid Electrical Insulation ²

E 8 Test Methods of Tension Testing of Metallic Materials ³

E 315 Test Methods for Chemical Analysis of Molybdenum ⁴

F 16 Test Methods for Measuring Diameter or Thickness of

Wire and Ribbon for Electronic Devices and Lamps ⁵

F 205 Test Method for Measuring Diameter of Fine Wire by Weighing ⁵

F 219 Test Methods of Testing Fine Round and Flat Wire for Electron Devices and Lamps ⁵

2.2 Federal Standard:

Fed. Std. No. 123 Marking for Shipment (Civil Agencies) ⁶

2.3 Military Standard:

MIL-STD-129 Marking for Shipment and Storage (Military Agencies) ⁶

3. Chemical Composition

3.1 All grades of wire and rod shall be 99.90 % minimum pure molybdenum. The maximum allowable oxygen content shall be 0.007 weight% , while the maximum carbon content shall be 0.03 weight %.

4. Mechanical Properties

4.1 Tensile Properties:

4.1.1 The tension test specimens and procedures shall conform to Methods F 219 for wire diameter up to and including 0.010 in. (0.25 mm), and Test Methods E 8 for all other wire and rod diameters.

4.1.2 The tensile requirements of wire in sizes up to and including 0.020 in. (0.51 mm) in diameter shall conform to the requirements of Table 1 and shall be calculated by dividing the breaking load in grams-force by the size of the wire expressed in milligrams per 200 mm.

4.1.3 The tensile requirements of wire in sizes over 0.020 in. (0.51 mm) up to 0.050 in. (1.3 mm) in diameter shall conform to the requirements of Table 2.

4.1.4 The tensile requirements of rod shall be as agreed upon between the purchaser and the supplier.

4.2 Ductility Properties:

4.2.1 Wire up to 0.003 in. (0.08 mm) in diameter shall not break when subjected to the test prescribed in 11.4.1.

4.2.2 Wire over 0.003 in. (0.08 mm) up to 0.020 in. (0.51 mm) in diameter shall not break or show cracks under observation through a binocular microscope at 30 \times when subjected to the test prescribed in 11.4.2.

4.2.3 Wire over 0.020 in. (0.51 mm) in diameter shall not break or show cracks under unaided visual observation when

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 10.01.

³ Annual Book of ASTM Standards, Vol 03.01.

⁴ Annual Book of ASTM Standards, Vol 03.05.

⁵ Annual Book of ASTM Standards, Vol 10.04.

⁶ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.