



Standard Specification for Molybdenum and Molybdenum Alloy Bar, Rod, and Wire¹

This standard is issued under the fixed designation B 387; 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 unalloyed molybdenum and molybdenum alloy bar, rod, and wire as follows:

1.1.1 *Molybdenum 360*—Unalloyed vacuum arc-cast molybdenum.

1.1.2 *Molybdenum 361*—Unalloyed powder metallurgy molybdenum.

1.1.3 *Molybdenum Alloy 363*—Vacuum arc-cast molybdenum–0.5 % titanium–0.1 % zirconium (TZM) alloy.

1.1.4 *Molybdenum Alloy 364*—Powder metallurgy molybdenum–0.5 % titanium–0.1 % zirconium (TZM) alloy.

1.1.5 *Molybdenum 365*—Unalloyed vacuum arc-cast molybdenum, low carbon.

1.1.6 *Molybdenum Alloy 366*—Vacuum arc-cast molybdenum, 30 % tungsten alloy.

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

2. Referenced Documents

2.1 *ASTM Standards*:

E 8 Test Methods for Tension Testing of Metallic Materials²

F 289 Specification for Molybdenum Wire and Rod for Electronic Applications³

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*:

3.1.1 *bar and rod*—any straight product with a round, rectangular, hexagonal, or octagonal solid cross section, 4 in. (101.6 mm) in diameter or less, or of equivalent cross-sectional area.

3.1.2 *wire*—any product furnished in coils or on spools or reels.

NOTE 1—This specification covers wire no smaller than 0.020 in. (0.51 mm) in diameter or of equivalent cross-sectional area. Specification F 289 covers diameters up to 0.020 in.

¹ This specification is under the jurisdiction of ASTM Committee B10 on Reactive and Refractory Metals and Alloys and is the direct responsibility of Subcommittee B10.04 on Molybdenum and Tungsten.

Current edition approved Sept. 28, 1990. Published January 1991. Originally published as B 387 – 62 T. Last previous edition B 387 – 85.

² *Annual Book of ASTM Standards*, Vol 03.01.

³ *Annual Book of ASTM Standards*, Vol 10.04.

4. Ordering Information

4.1 Orders for material under this specification shall include the following information as applicable:

4.1.1 Material number and temper designation (Section 1 and Table 3),

4.1.2 Product form (Section 3),

4.1.3 Chemical requirements (Table 1 and Table 2),

4.1.4 Mechanical requirements (Section 7),

4.1.5 Softening temperature (Section 8),

4.1.6 Tolerances (Section 9 and Table 4),

4.1.7 Workmanship and quality level requirements (Section 10),

4.1.8 Packaging (Section 16),

4.1.9 Marking (Section 15),

4.1.10 Certification and reports (Section 14), and

4.1.11 Disposition of rejected material (Section 13).

5. Materials and Manufacture

5.1 The various molybdenum mill products covered by this specification shall be manufactured with the conventional extrusion, forging, swaging, rolling, and drawing equipment normally found in primary ferrous and nonferrous plants. The ingot metal for Molybdenum 360 and 365 and Molybdenum Alloys 363 and 366 is vacuum arc-melted in furnaces of a type suitable for reactive, refractory metals, and for Molybdenum 361 and 364 the metal is consolidated by powder metallurgy methods.

6. Chemical Composition

6.1 The molybdenum and molybdenum alloy ingots and billets for conversion to finished products covered by this specification shall conform to the requirements of the chemical composition prescribed in Table 1.

6.2 *Check Analysis*:

6.2.1 Check analysis is an analysis made by the purchaser or the manufacturer of the metal after it has been processed into finished mill forms, and is either for the purpose of verifying the composition of a heat or lot or to determine variations in the composition within a heat or lot.

6.2.2 Check analysis tolerances do not broaden the specified heat analysis requirements but cover variations between laboratories in the measurement of chemical content.

6.2.3 The manufacturer shall not ship material that is outside the limits specified in Table 1 for the applicable type,