



AEROSPACE MATERIAL SPECIFICATION

AMS7819™**REV. F**

Issued	1964-01
Reaffirmed	2013-10
Revised	2025-05

Superseding AMS7819E

Molybdenum Alloy Bars,
0.48Ti - 0.09Zr - 0.02C,
Arc Cast, Stress Relieved
(Composition similar to UNS R03640)

RATIONALE

AMS7819F results from a Five-Year Review and update of this specification with changes to correct errors in oxygen and nitrogen composition limits (see Table 1 and 8.4), update wording to prohibit unauthorized exceptions (see 3.4.1.1.1, 4.4.2, and 8.5), relocate Definitions (see 2.4), update Applicable Documents (see Section 2) and Ordering Information (see 8.6), and restrict use of prior revisions of the document without recertification by the producer or authorization by the cognizant engineering organization based on the errors in the oxygen and nitrogen levels (see 8.3 and 8.4).

1. SCOPE

1.1 Form

This specification covers an arc-cast molybdenum alloy in the form of round bars 0.125 to 4.5 inches (3.00 to 112.50 mm), inclusive (see 8.6).

1.2 Application

These bars have been used typically for parts requiring high modulus and uniform strength up to 2300 °F (1260 °C), but usage is not limited to such applications. This alloy is not recommended for use in oxidizing atmospheres above 1000 °F (540 °C) unless protected by a suitable coating.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AS7766 Terms Used in Aerospace Metals Specifications

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Documents

Standard, visit Sharing Hub

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM E8/E8M Tension Testing of Metallic Materials

ASTM E92 Vickers Hardness and Knoop Hardness of Metallic Materials

ASTM E350 Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

2.3 ASME Publications

Available from ASME, P.O. Box 2900, 22 Law Drive, Fairfield, NJ 07007-2900, Tel: 800-843-2763 (U.S./Canada), 001-800-843-2763 (Mexico), 973-882-1170 (outside North America), www.asme.org.

ASME B46.1 Surface Texture, Surface Roughness, Waviness, and Lay

2.4 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1; carbon shall be determined in accordance with ASTM E350, molybdenum by difference, gaseous elements by vacuum fusion, and other metallic elements by spectrographic or other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max	Check Analysis	
			Under Min or Over Max	
Molybdenum	99.25	--	--	--
Titanium	0.40	0.55	0.05	0.05 (500 ppm)
Zirconium	0.06	0.12	0.02	0.02 (200 ppm)
Carbon	0.010	0.030	0.005	0.005 (50 ppm)
Iron	--	0.020	--	0.002 (20 ppm)
Silicon	--	0.010	--	0.002 (20 ppm)
Nickel	--	0.010	--	0.001 (10 ppm)
Oxygen	--	0.0030 (30 ppm)	--	--
Nitrogen	--	0.0010 (10 ppm)	--	0.0005 (5 ppm)
Hydrogen	--	0.0005 (5 ppm)	--	--

3.2 Melting Practice

Alloy shall be carbon deoxidized and vacuum arc melted using consumable electrode practice.

3.3 Condition

Hot/cold worked, descaled, and stress relieved; when so specified, bars shall be centerless ground before being stress relieved. The surface texture of centerless ground bars shall be 90 microinches (2.3 µm) or smoother, determined in accordance with ASME B46.1 (see 8.5).

3.4 Properties

Bars 0.125 to 4.500 inches (3.00 to 112.50 mm), inclusive, in nominal diameter shall conform to the following requirements:

3.4.1 As Received

3.4.1.1 Tensile Properties

Shall be as specified in Table 2, determined in accordance with ASTM E8/E8M, with the rate of strain maintained at 0.002 to 0.005 in/in/min (0.002 to 0.005 mm/mm/min) through the 0.6% offset and 0.002 to 0.05 in/in/min (0.002 to 0.05 mm/mm/min) above the 0.6% offset to fracture.

Table 2A - Minimum tensile properties, inch/pound units

Nominal Diameter Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 4D %
0.125 to 0.875, incl	115	100	18
Over 0.875 to 1.875, incl	100	85	10
Over 1.875 to 2.875, incl	90	80	10
Over 2.875 to 3.500, incl	85	75	5
Over 3.500 to 4.500, incl	80	70	5

Table 2B - Minimum tensile properties, SI units

Nominal Diameter Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 4D %
3.00 to 22.00, incl	795	690	18
Over 22.00 to 47.00, incl	690	585	10
Over 47.00 to 72.00, incl	620	550	10
Over 72.00 to 87.50, incl	585	515	5
Over 87.50 to 112.50, incl	550	485	5

3.4.1.1.1 Mechanical property requirements for product outside of the range covered by 1.1 shall be agreed upon between the purchaser and producer and reported per 4.4.2 (see 8.6).

3.4.1.2 Hardness

Shall be as shown in Table 3, determined in accordance with ASTM E92.

Table 3 - Maximum hardness

Nominal Diameter Inches	Nominal Diameter Millimeters	Maximum Hardness HV10
0.125 to 0.875, incl	3.00 to 22.00, incl	320
Over 0.875 to 1.125, incl	Over 22.00 to 28.00, incl	310
Over 1.125 to 1.875, incl	Over 28.00 to 47.00, incl	300
Over 1.875 to 2.875, incl	Over 47.00 to 72.00, incl	290
Over 2.875 to 3.500, incl	Over 72.00 to 87.50, incl	285
Over 3.500 to 4.500, incl	Over 87.50 to 112.50, incl	280