



AEROSPACE MATERIAL SPECIFICATION

AMS2241™

REV. T

Issued 1945-05
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Superseding AMS2241S

(R) Tolerances, Corrosion- and Heat-Resistant Steel,
Iron Alloy, Titanium, and Titanium Alloy Bars and Wire

RATIONALE

AMS2241T is the result of a Five-Year Review and update of the specification. The revision included several editorial updates that reorganized the document. The following technical changes were made; additional sizes added (3.1.4.1), requirements for forging stock added (3.2.3), straightness allowances clarified and added (Section 5, 5.2).

1. SCOPE

This specification covers established manufacturing tolerances applicable to corrosion- and heat-resistant steel, iron alloy, titanium, and titanium alloy bars and wire. These tolerances apply to all conditions, unless otherwise noted. The term “excl” is used to apply only to the higher figure of the specified range.

2. APPLICABLE DOCUMENTS

The issue of the following document 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

2.2 Definitions

Terms used in AMS are defined in AS7766.

3. DIAMETER, THICKNESS, AND WIDTH

Specified dimensions apply to diameter of rounds, to distance between parallel sides of hexagons and squares, and separately to width and thickness of rectangles. Out-of-round is the difference between the maximum and minimum diameters of the bar, measured at the same cross section. Out-of-square is the difference in the two dimensions at the same cross section of a square bar, each dimension being the distance between opposite faces.

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3.1 Cold Finished Bars

3.1.1 Cold Worked -Round, Square, Hexagon, and Octagon Bars (see 3.1.3)

Shall be as shown in Table 1.

Table 1A - Tolerances, diameter or thickness, inch/pound units

Specified Diameter or Thickness Inches	Tolerance, Inches Plus and Minus (see 3.1.1) Rounds	Tolerance, Inches Minus Only Squares, Hexagons, and Octagons (see 3.1.2)
Over 0.500 to 1.000, excl	0.002	0.004
1.000	0.0025	0.004
Over 1.000 to 1.500, excl	0.0025	0.006
1.500 to 2.000, incl	0.003	0.006
Over 2.000 to 3.000, incl	0.003	0.008
Over 3.000 to 4.000, incl	0.003	0.010

Table 1B - Tolerances, diameter or thickness, SI units

Specified Diameter or Thickness Millimeters	Tolerance, Millimeters Plus and Minus (see 3.1.1) Rounds	Tolerance, Millimeters Minus Only Squares, Hexagons, and Octagons (see 3.1.2)
Over 12.50 to 25.00, excl	0.05	0.10
25.00	0.062	0.10
Over 25.00 to 37.50, excl	0.062	0.15
37.50 to 50.00, incl	0.08	0.15
Over 50.00 to 75.00, incl	0.08	0.20
Over 75.00 to 100.00, incl	0.08	0.25

3.1.1.1 Size tolerances for round bars are plus and minus as shown in Table 1. When required, however, they may be specified all plus and nothing minus, or all minus and nothing plus, or any combination of plus and minus, if the total spread in size tolerance for a specified size is not less than the total spread shown in Table 1.

3.1.1.2 For titanium and titanium alloys, the difference among the three measurements of the distance between opposite faces of hexagons shall be not greater than one-half the size tolerance and the difference between the measurements of the distance between opposite faces of octagons shall be not greater than the size tolerance.

3.1.2 Cold Worked - Flat/Rectangular Bars (see 3.1.3)

Shall be as shown in Table 2.

Table 2A - Tolerances, thickness and width, inch/pound units

Specified Width Inches	Thickness Tolerance, Inches Plus and Minus	Width Tolerance, Inches Plus and Minus
0.125 to 0.250, incl	0.002	0.004
Over 0.250 to 1.000, incl	0.002	0.002
Over 1.000 to 2.000, incl	0.003	0.003
Over 2.000 to 3.000, incl	0.004	0.004
Over 3.000 to 4.500, incl	0.005	0.005

Table 2B - Tolerances, thickness and width, SI units

Specified Width Millimeters	Thickness	Width
	Tolerance, Millimeters Plus and Minus	Tolerance, Millimeters Plus and Minus
3.00 to 6.00, incl	0.05	0.10
Over 6.00 to 25.00, incl	0.05	0.05
Over 25.00 to 50.00, incl	0.08	0.08
Over 50.00 to 75.00, incl	0.10	0.10
Over 75.00 to 115.00, incl	0.12	0.12

3.1.3 If cold worked bars are ordered heat treated or heat treated and pickled after cold finishing, tolerances shall be double those of Tables 1 or 2 as applicable.

3.1.4 Machined or Turned Bars

3.1.4.1 Machined or Turned - Round Bars

Tolerances for machined or turned round bars 0.375 inch (9.53 mm) and over in specified diameter or thickness are shown in Table 3. Bars up to 0.375 inch (9.53 mm), exclusive, in specified diameter or thickness are commonly supplied centerless ground.

Table 3A - Tolerances, machined or turned bars, inch/pound units

Specified Diameter or Thickness Inches	Tolerance	Out-of-Round
	Plus Only Inches	Inches
0.375 to 2.000, incl	0.016	0.023
Over 2.000 to 2.500, incl	0.031	0.023
Over 2.500 to 3.500, incl	0.047	0.035
Over 3.500 to 4.500, incl	0.062	0.046
Over 4.500 to 5.500, incl	0.078	0.058
Over 5.500 to 6.500, incl	0.125	0.070
Over 6.500 to 8.000, incl	0.156	0.085
Over 8.000 to 12.000, incl	0.187	0.094
Over 12.000 to 15.000, incl	0.219	0.109
Over 15.000 to 25.000, incl	0.250	0.125

Table 3B - Tolerances, machined or turned bars, SI units

Specified Diameter or Thickness Millimeters	Tolerance	Out-of-Round
	Plus Only Millimeters	Millimeters
9.525 to 50.80, incl	0.406	0.584
Over 50.80 to 63.50, incl	0.787	0.584
Over 63.50 to 88.90, incl	1.200	0.889
Over 88.90 to 115.0, incl	1.600	1.200
Over 115.0 to 140.0, incl	2.000	1.500
Over 140.0 to 165.0, incl	3.000	1.800
Over 165.0 to 200.0, incl	4.000	2.200
Over 200.0 to 300.0, incl	4.800	2.400
Over 300.0 to 400.0, incl	5.500	2.800
Over 400.0 to 625.0, incl	6.500	3.200

3.1.4.2 Machined - Flat/Rectangular Bars

Tolerances for machined flat/rectangular bars shall be as agreed upon by purchaser and producer.