



AEROSPACE MATERIAL SPECIFICATION	AMS2241™	REV. S
	Issued 1945-05 Reaffirmed 2012-10 Revised 2016-01 Superseding AMS2241R	
Tolerances, Corrosion and Heat-Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire		

RATIONALE

AMS2241S revises tolerances for machined bars (2.1.4, Table 3), clarifies the intent of precision ground or precision polished rounds (2.1.6, Table 5), and is a Five Year Review and update of this specification.

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. 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.

2.1 Cold Finished

2.1.1 Cold Drawn Rounds, Squares, Hexagons, and Octagons (see 2.1.3)

Shall be as shown in Table 1.

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

Specified Diameter or Thickness Inches		Tolerance, Inch Plus and Minus (see 2.1.1.1) Rounds	Tolerance, Inch Minus Only Squares, Hexagons, and Octagons (see 2.1.1.2)
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, Millimeter Plus and Minus (see 2.1.1.1) Rounds	Tolerance, Millimeter Minus Only Squares, Hexagons, and Octagons (see 2.1.1.2)
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

2.1.1.1 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.

2.1.1.2 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.

2.1.2 Cold Drawn Flats (see 2.1.3)

Shall be as shown in Table 2.

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

Specified Width Inches		Thickness Tolerance, Inch Plus and Minus	Width Tolerance, Inch 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 Tolerance, Millimeter Plus and Minus	Width Tolerance, Millimeter 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

If cold drawn bars are ordered heat treated or heat treated and pickled after cold finishing, tolerances shall be double those of Table 1 and Table 2.

2.1.3 Machined or Turned Bars

2.1.3.1 Rounds

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 plus only Inch	Out of Round Inch
0.375 to 2.000, incl	0.016	0.008
Over 2.000 to 4.000, incl	0.031	0.016
Over 4.000 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 plus only Millimeter	Out of Round Millimeter
9.525 to 50.80, incl	0.406	0.203
Over 50.80 to 101.6, incl	0.787	0.406
Over 101.6 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