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Superseding AS1182A

**Standard Machining Allowance
Aircraft-Quality and Premium Aircraft-Quality Steel
Bars and Mechanical Tubing**

FOREWORD

Changes in the revision are format/editorial only.

1. SCOPE:

The purpose of this document is to provide the aerospace industry with standards for minimum stock removal allowances for bars and mechanical tubing to provide surfaces which are free from decarburization, seams, laps, tears, cracks, pits, and other injurious surface imperfections.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2241	Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
MAM 2241	Tolerances, Metric, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
AMS 2243	Tolerances, Corrosion and Heat Resistant Steel Tubing
MAM 2243	Tolerances, Metric, Corrosion and Heat Resistant Steel Tubing
AMS 2251	Tolerances, Low-Alloy Steel Bars

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SAE WEB ADDRESS:

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2.1 (Continued):

MAM 2251	Tolerances, Metric, Low-Alloy Steel Bars
AMS 2253	Tolerances, Carbon and Alloy Steel Tubing
MAM 2253	Tolerances, Metric, Carbon and Alloy Steel Tubing

2.2 AISI Publications:

Available from American Iron and Steel Institute, 1000 16th Street N.W., Washington, DC 20036.

2.2.1 Steel Products Manual:

Steel Specialty Tubular Products Section.

3. REQUIREMENTS:

3.1 Hot Rolled or Cold Drawn Low-Alloy and Martensitic Corrosion-Resistant Steel Bars (See 4.1):

TABLE 1

Hot Rolled Size Inches	Minimum Stock Removal From Surface, Inch	Cold Drawn Size Inches
Up to 0.500, incl	0.030	Up to 0.4375, incl
Over 0.500 to 0.750, incl	0.045	Over 0.4375 to 0.6875, incl
Over 0.750 to 1.000, incl	0.060	Over 0.6875 to 0.9375, incl
Over 1.000 to 1.500, incl	0.075	Over 0.9375 to 1.4375, incl
Over 1.500 to 2.000, incl	0.090	Over 1.4375 to 1.9375, incl
Over 2.000 to 2.500, incl	0.125	Over 1.9375 to 2.4375, incl
Over 2.500 to 3.500, incl	0.156	Over 2.4375 to 3.3750, incl
Over 3.500 to 4.500, incl	0.187	Over 3.3750 to 4.3750, incl
Over 4.500 to 6.000, incl	0.250	

TABLE 1 (SI)

Hot Rolled Size Millimeters	Minimum Stock Removal From Surface Millimeters	Cold Drawn Size Millimeters
Up to 12.70, incl	0.76	Up to 11.113, incl
Over 12.70 to 19.05, incl	1.14	Over 11.113 to 17.463, incl
Over 19.05 to 25.40, incl	1.52	Over 17.463 to 23.813, incl
Over 25.40 to 38.10, incl	1.91	Over 23.813 to 36.512, incl
Over 38.10 to 50.80, incl	2.29	Over 36.512 to 49.213, incl
Over 50.80 to 63.50, incl	3.18	Over 49.213 to 61.913, incl
Over 63.50 to 88.90, incl	3.96	Over 61.913 to 85.725, incl
Over 88.90 to 114.30, incl	4.75	Over 85.725 to 111.125, incl
Over 114.30 to 152.40, incl	6.35	

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3.2 Round, Seamless, Hot and Cold Drawn Low-Alloy and Martensitic Corrosion-Resistant Steel Mechanical Tubing (See 4.2 and 4.3):

TABLE 2

Outside Diameter Inches	Minimum Stock Removal Inch Per Side Outside and Inside
Up to 2.500, incl	0.044
Over 2.500 to 3.500, incl	0.046
Over 3.500 to 4.500, incl	0.052
Over 4.500 to 5.500, incl	0.057
Over 5.500 to 6.500, incl	0.064
Over 6.500 to 8.000, incl	0.074
Over 8.000 to 10.000, incl	0.087

TABLE 2 (SI)

Outside Diameter Millimeters	Minimum Stock Removal Millimeters Per Side Outside and Inside
Up to 63.50, incl	1.12
Over 63.50 to 88.90, incl	1.17
Over 88.90 to 114.30, incl	1.32
Over 114.30 to 139.70, incl	1.45
Over 139.70 to 165.10, incl	1.63
Over 165.10 to 203.20, incl	1.88
Over 203.20 to 254.00, incl	2.21

3.3 Turned, Ground, or Polished Low-Alloy and Martensitic Corrosion-Resistant Steel Bars (See 4.1):

- 3.3.1** For product supplied turned, ground, or polished, Table 1 and Table 2 do not apply. Some shallow surface imperfections may be present due to the inability of non-destructive testing to effectively detect shallow defects, as a result of insufficient instrument sensitivity, surface finish, product straightness, etc.
- 3.3.2** Product supplied to the ordered size, also sometimes called smooth turned, shall, after additional stock has been removed as in Table 3, be free from decarburization, seams, laps, tears, cracks, pits, and other imperfections detrimental to usage of the product.
- 3.3.3** Product supplied to a diameter larger than the ordered size, also sometimes called rough-turned, shall be free from decarburization, seams, laps, tears, cracks, pits, and other imperfections detrimental to usage of the product after stock has been removed to reach the ordered size and stock has been removed as in Table 3.

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TABLE 3

Ordered Size Inches	Minimum Stock Removal From Surface, Inch
Up to 0.500, incl	0.004
Over 0.500 to 1.500, incl	0.006
Over 1.500 to 3.000, incl	0.008
Over 3.000	0.010

TABLE 3 (SI)

Ordered Size Millimeters	Minimum Stock Removal From Surface, Millimeters
Up to 12.70, incl	0.10
Over 12.70 to 38.10, incl	0.15
Over 38.10 to 76.20, incl	0.20
Over 76.20	0.25

3.4 Round, Seamless, Ground, Smooth or Rough Turned, or Polished Low-Alloy and Martensitic Corrosion-Resistant Steel Mechanical Tubing (See 4):

3.4.1 Outside Diameter: Regardless of size, the machining allowance shall be 0.015 inch (0.38 mm).

3.4.2 Inside Diameter: The machining allowance shall be in accordance with Table 2.

4. ADDITIONAL ALLOWANCE FOR LONG BARS AND TUBES:

4.1 When bars over 6 inches (152 mm) in length are produced, additional stock allowances must be provided in accordance with straightness tolerances of AMS 2241, MAM 2241, AMS 2251, or MAM 2251, as applicable.

4.2 When tubing over 6 inches (152 mm) in length are produced, additional stock allowances must be provided in accordance with straightness tolerances of AMS 2243, MAM 2243, AMS 2253, or MAM 2253, as applicable.

4.2.1 When tubing over 6 inches (152 mm) in length is produced and both inside and outside diameters are machined, the standard AISI eccentricity tolerances, shown in Steel Products Manual, Steel Specialty Tubular Products Section, for tubing must be considered in addition to the cited machining allowances.