



AEROSPACE MATERIAL SPECIFICATION

AMS2231™**REV. L**

Issued 1945-05
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Revised 2024-12

Superseding AMS2231K

(R) Tolerances
Carbon Steel Bars

RATIONALE

AMS2231L is the result of a Five-Year Review and update. SI units have been added for information throughout.

1. SCOPE

This specification covers established inch/pound manufacturing tolerances applicable to carbon steel bars ordered to inch/pound dimensions. These tolerances apply to all conditions, unless otherwise noted. The term “excl” applies only to the higher figure of the specified range.

- 1.1 No clear-cut demarcation is available to differentiate between bar and wire products; therefore, definitions of wire products are not included.

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

2.2 Definitions

Terms used in AMS are defined in AS7766.

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3. DIAMETER OR THICKNESS

3.1 Cold Finished

3.1.1 Cold Drawn

Table 1 includes tolerances for bars that have been annealed, spheroidize annealed, normalized, normalized and tempered, or quenched and tempered before cold finishing. This table does not include tolerances for bars that, after cold finishing, are spheroidize annealed, normalized, normalized and tempered, or quenched and tempered.

- 3.1.1.1 Width governs the tolerances for both width and thickness of flats. For example, when the maximum carbon range is up to 0.28%, inclusive, for a flat 2.000 inch (50.80 mm) wide and 1.000 inch (25.40 mm) thick, the width tolerance is 0.005 inch (0.13 mm) and the thickness tolerance is the same, namely, 0.005 inch (0.13 mm).

Table 1 - Cold drawn, diameter, thickness, or width tolerances, minus only

Table 1A - Rounds, inch/pound units

Specified Diameter Inches	Up to 0.28 Carbon Incl Inches	Over 0.28 to 0.55 Carbon Incl Inches	Up to 0.55 Carbon Incl Stress Relieved or Annealed After Cold Finishing Inches	Over 0.55 Carbon, With or Without Stress Relieving or Annealing After Cold Finishing, and All Carbons Quenched and Tempered or Normalized and Tempered Before Cold Finishing Inches
Up to 1.500, incl	0.002	0.003	0.004	0.005
Over 1.500 to 2.500, incl	0.003	0.004	0.005	0.006
Over 2.500 to 4.000, incl	0.004	0.005	0.006	0.007

Table 1B - Rounds, SI units

Specified Diameter Millimeters	Up to 0.28 Carbon Incl Millimeters	Over 0.28 to 0.55 Carbon Incl Millimeters	Up to 0.55 Carbon Incl Stress Relieved or Annealed After Cold Finishing Millimeters	Over 0.55 Carbon, With or Without Stress Relieving or Annealing After Cold Finishing, and All Carbons Quenched and Tempered or Normalized and Tempered Before Cold Finishing Millimeters
Up to 38.10, incl	0.05	0.08	0.10	0.13
Over 38.10 to 63.50, incl	0.08	0.10	0.13	0.15
Over 63.50 to 101.60, incl	0.10	0.13	0.15	0.18

Table 1C - Hexagons, inch/pound units

Specified Thickness Inches	Up to 0.28 Carbon Incl Inches	Over 0.28 to 0.55 Carbon Incl Inches	Up to 0.55 Carbon Incl Stress Relieved or Annealed After Cold Finishing Inches	Over 0.55 Carbon, With or Without Stress Relieving or Annealing After Cold Finishing, and All Carbons Quenched and Tempered or Normalized and Tempered Before Cold Finishing Inches
Up to 0.750, incl	0.002	0.003	0.004	0.006
Over 0.750 to 1.500, incl	0.003	0.004	0.005	0.007
Over 1.500 to 2.500, incl	0.004	0.005	0.006	0.008
Over 2.500 to 3.125, incl	0.005	0.006	0.007	0.009
Over 3.125 to 4.000, incl	0.005	0.008	--	--

Table 1D - Hexagons, SI units

Specified Thickness Millimeters	Up to 0.28 Carbon Incl Millimeters	Over 0.28 to 0.55 Carbon Incl Millimeters	Up to 0.55 Carbon Incl Stress Relieved or Annealed After Cold Finishing Millimeters	Over 0.55 Carbon, With or Without Stress Relieving or Annealing After Cold Finishing, and All Carbons Quenched and Tempered or Normalized and Tempered Before Cold Finishing Millimeters
Up to 19.05, incl	0.05	0.08	0.10	0.15
Over 19.05 to 38.10, incl	0.08	0.10	0.13	0.18
Over 38.10 to 63.50, incl	0.10	0.13	0.15	0.20
Over 63.50 to 79.38, incl	0.13	0.15	0.18	0.23
Over 79.38 to 101.60, incl	0.13	0.20	--	--