Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 10000

AEROSPACE MATERIAL SPECIFICATION

AMS 6299A
Superseding AMS 6299

Issued 1-31-64
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STEEL BARS, FORGINGS, AND TUBING
0.50Cr - 1.8Ni - 0.25Mo (0.17 - 0.23C) (SAE 4320H)

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

2. FORM: Bars, forgings, mechanical tubing, and forging stock.

3. APPLICATION: Primarily for carburized parts which require high minimum core hardness and allow wide core hardness range in sections 3/8 in. and less in thickness. The core may or may or may not be machinable after hardening.

4. COMPOSITION:

	min	max
Carbon	0.17	0.23
Manganese	0.40	0.70
Silicon	0.20	0.35
Phosphorous	--	0.025
Sulfur	--	0.025
Chromium	0.35	0.65
Nickel	1.55	2.00
Molybdenum	0.20	0.30
Copper	--	0.35

4.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2259, paragraph titled "Low Alloy Steels".

5. CONDITION: Unless otherwise ordered, the product shall be supplied in the following condition:

5.1 Bars: In a machinable condition and hot finished having hardness not higher than Brinell 229 or equivalent, except that bars ordered cold finished may have hardness as high as Brinell 248 or equivalent.

5.2 Forgings: As ordered.

5.3 Mechanical Tubing: In a machinable condition and cold finished having hardness not higher than Rockwell C 25 or equivalent, except that tubing ordered hot finished shall have hardness not higher than Rockwell B 99 or equivalent.

5.4 Forging Stock: As ordered by the forging manufacturer.

6. TECHNICAL REQUIREMENTS: When ASTM methods are specified for determining conformance to the following requirements, tests shall be conducted in accordance with the issue of the ASTM method listed in the latest issue of AMS 2350.

6.1 Hardenability: Shall be J48=1 max and J32=4 min when determined on the standard end-quench test specimen in accordance with the Method of Determining Hardenability published in the latest issue of the SAE Handbook, except that the steel shall be normalized at 1675 F ± 10 (912.8 C ± 5.6) and the test specimen austenitized at 1500 F ± 10 (815.6 C ± 5.6). The hardenability test is not required on a product which will not yield a suitable specimen but the steel from which the product is made shall conform to the hardenability specified.

6.2 Grain Size: Predominantly 5 or finer with occasional grains as large as 3 permissible, ASTM E112, McQuaid-Ehn test.

7. QUALITY: Steel shall be aircraft quality and shall conform to the requirements of the latest issue of AMS 2301. The product shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.

8. TOLERANCES: Unless otherwise specified, tolerances shall conform to all applicable requirements of the following:

8.1 Bars: The latest issue of AMS 2251; for all hexagons, tolerances for cold finished shall apply.

8.2 Mechanical Tubing: The latest issue of AMS 2253.

9. REPORTS:

9.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report of the results of tests for chemical composition, hardenability, grain size, and AMS 2301 frequency-severity rating of each heat in the shipment. This report shall include the purchase order number, heat number, material specification number and its revision letter, size, and quantity from each heat. If forgings are supplied, the part number and size of stock used to make the forgings shall also be included.

9.2 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

10. IDENTIFICATION: Unless otherwise specified, the product shall be identified as follows:

10.1 Bars and Tubing:

10.1.1 Each straight bar and tube 0.500 in. and over in OD or least width of flat surface shall be marked in a row of characters recurring at intervals not greater than 3 ft with AMS 6299A, heat number, and manufacturer's identification. The characters shall be of such size as to be clearly legible, shall be applied using a suitable marking fluid, and shall be capable of being removed in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the material or its performance and shall be sufficiently stable to withstand normal handling.

10.1.2 Straight bars and tubes less than 0.500 in. in OD or least width of flat surface shall be securely bundled and identified by a metal or plastic tag embossed with the purchase order number, AMS 6299A, heat number, nominal size, and manufacturer's identification and attached to each bundle or shall be boxed and the box marked with the same information.

10.1.3 Coiled bars shall be securely bundled and identified by a metal or plastic tag embossed with the purchase order number, AMS 6299A, heat number, nominal size, and manufacturer's identification and attached to each coil or shall be boxed and the box marked with the same information.