AEROSPACE
MATERIAL SPECIFICATIONS
SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

AMS 6277

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Revised

STEEL BARS, FORGINGS, AND TUBING
0.50Cr - 0.55Ni - 0.20Mo (0.18 - 0.23C) (SAE 8620)
Premium Quality

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

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

3. APPLICATION: Primarily for critical carburized parts requiring high core hardness and subject to very rigid magnetic particle inspection standards. The core may or may not be machinable after hardening.

4. COMPOSITION:

Carbon	0.18 - 0.23
Manganese	0.70 - 1.00
Silicon	0.20 - 0.35
Phosphorus	0.025 max
Sulfur	0.025 max
Chromium	0.40 - 0.60
Nickel	0.40 - 0.70
Molybdenum	0.15 - 0.25

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

5. CONDITION:

5.1 Bars: Unless otherwise ordered, 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 Forging Stock: As ordered by the forging manufacturer.

5.4 Tubing: In a machinable condition.

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: Material shall conform to the hardenability in 6.1.1, unless purchaser stipulates that the hardness in 6.1.2 shall apply.

6.1.1 The hardenability shall be J48 = 1 max and J32 = 3 min when determined by the standard end-quench test specimen in accordance with the SAE Method of Determining Hardenability published in the latest issue of the SAE Handbook except that the steel shall be normalized at 1700 F ± 10 (926.7 C ± 5.6) and the test specimen austenitized at 1550 F ± 10 (843.3 C ± 5.6). This 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 in this paragraph.

6.1.2 Specimens with section 0.125 in. and 0.375 in. in thickness and not greater than 2 sq in. in area shall be cut from the bar, forging, or tube after normalizing at 1700 F ± 10 (926.7 C ± 5.6). The specimens shall be ground and then protected by suitable means, or treated in an atmosphere, to minimize scaling and eliminate either carburization or decarburization during heat treatment. The specimens shall be placed in a furnace which is at 1500 F ± 10 (815.6 C ± 5.6), allowed to heat to 1500 F ± 10 (815.6 C ± 5.6), held 25 min., and quenched in commercial paraffin oil (100 SUS at 100 F (37.8 C)) at room temperature. Each specimen when tested shall have average hardness of Rockwell C 32 - 47.

6.2 Grain Size: Predominantly 5 or finer with occasional grains as large as 3 permissible, ASTM E112, Appendix III, Section A1, Treatment (1) (McQuaid-Ehn Test).

7. QUALITY: Steel shall be premium quality and shall conform to the requirements of the latest issue of AMS 2300. 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 cleanliness rating of each heat in the shipment. This report shall include the purchase order number, heat number, material specification number, 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.