AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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STEEL
0.55Ni - 0.5Cr - 0.2Mo (0.18 - 0.23C) (SAE 8620)

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

2. FORM: Bars, billets, forgings, and mechanical tubing.

3. APPLICATION: Carburized parts which require high minimum core hardness and allow wide hardness range in sections 3/8 in. and less in thickness and in which the core is not always machinable after hardening.

4. COMPOSITION:

		Check Analysis Under Min or Over Max	
Carbon	0.18 - 0.23	0.01	0.01
Manganese	0.75 - 1.00	0.04	0.04
Silicon	0.20 - 0.35	0.02	0.02
Phosphorus	0.040 max	--	0.005
Sulfur	0.040 max	--	0.005
Nickel	0.40 - 0.70	0.03	0.03
Chromium	0.40 - 0.60	0.03	0.03
Molybdenum	0.15 - 0.25	0.02	0.02

5. CONDITION:

5.1 Bars: In a machinable condition having hardness not higher than Brinell 229 or equivalent.

5.2 Tubing: In a machinable condition.

5.3 Forgings: As ordered.

5.4 Forging Stock: As ordered by the forging manufacturer.

6. TECHNICAL REQUIREMENTS:

6.1 Hardenability: Steel 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 max and J29=4 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 and the test specimen austenitized at 1550 F ± 10. 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 in this paragraph.

6.1.2 Specimens with sections 1/8 in. and 3/8 in. in thickness and not greater than 2 sq. in. in area shall be cut from the bar or forging after normalizing at 1700 F ± 10. 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, allowed to heat to 1500 F ± 10, held 25 minutes and quenched in commercial paraffin oil (100 SUS at 100 F) at room temperature. Each specimen when tested shall have average hardness of Rockwell C 32-47.

6.2 Grain Size: Five or finer, ASTM E19-46, method a. A heat of steel predominantly five or finer with grains as large as three is permissible.

7. QUALITY: Steel shall be aircraft quality. It shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts.

8. TOLERANCES: Unless otherwise specified, tolerances shall conform to the following:

8.1 Bars: Shall conform to the latest issue of AMS 2251 as applicable. Diameter or thickness tolerances for cold finished bars and all hexagons shall conform to Table I, column headed "Mean of Carbon 0.45% and less".

8.2 Tubing: Shall conform to the latest issue of AMS 2253 as applicable to Mechanical Type.

9. REPORTS:

9.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a notarized report of the results of tests for chemical composition, hardenability, and grain size 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.

9.2 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a notarized report showing the purchase order number, material specification number, 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 certification that the material conforms, or shall include copies of laboratory reports showing the results of test to determine conformance.

10. SHIPMENTS: More than one heat of steel shall not be supplied on a purchase order without permission of purchaser, unless the order is for more than 5 tons, in which case not more than one additional heat shall be supplied for each additional 5 tons.