

# AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.  
29 West 39th Street  
New York City

## AMS 5022F

Issued 1-22-40

Revised 2-15-53

STEEL, FREE CUTTING  
1.2Mn (0.14-0.20C) (SAE 1117)

1. ACKNOWLEDGMENT: A vendor shall mention this specification and its revision letter in all quotations and when acknowledging purchase orders.
2. FORM: Bars, forgings, forging stock, and mechanical tubing.
3. COMPOSITION:

		Check Analysis	
		Under	Over
Carbon	0.14 - 0.20	0.02	0.02
Manganese	1.00 - 1.30	0.06	0.06
Phosphorus	0.040 max	--	0.008
Sulfur	0.08 - 0.13	--	--

- 3.1 When agreed upon by purchaser and vendor, manganese up to 1.60 is permitted.

4. CONDITION:

- 4.1 Tubing 2.5 in. and Less in Diameter and all Bars: Cold finished and suitable for machining on high-speed automatic screw machines.
  - 4.2 Tubing over 2.5 in. and Forgings: May be normalized or otherwise heat treated to produce best machining qualities.
    - 4.2.1 Forgings: Shall not be supplied except when specified on the drawing or purchase order.
  - 4.3 Forging Stock: As ordered by the forging manufacturer.
5. TECHNICAL REQUIREMENTS:
    - 5.1 Hardness: The product shall have hardness as follows, or equivalent, when taken on the surface, except on rounds, where a flat as necessary for Brinell accuracy may be made:

Section 7C of the SAE Technical Board rules provides that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to any technical report, in formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

**5.1.1 Bars:**

Nominal Diameter or Distance Between Parallel Sides Inches	Hardness, Brinell
Under 1.0	156 - 207
1.0 to 2.5, incl	143 - 197
Over 2.5 to 3.0, excl	130 - 179
3.0 and over	110 - 179

**5.1.2 Tubing:**

Nominal OD Inches	Hardness, Brinell
Under 1.0	156 - 207
1.0 to 2.5, incl	143 - 197
Over 2.5	130 - 179

**5.1.3 Forgings: Brinell 130-179.**

6. **QUALITY:** Material shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external defects, consistent with the type of steel involved, detrimental to fabrication or to performance of parts.
7. **TOLERANCES:** Unless otherwise specified, tolerances shall conform to the following:
- 7.1 **Bars:** The latest issue of AMS 2231 as applicable. Diameter and thickness tolerances shall conform to Table I, column headed "0.28 and under".
- 7.2 **Tubing:** The latest issue of AMS 2253 as applicable to cold finished Mechanical Type. Diameter tolerance shall be as specified below:
- 7.2.1 Tubing 2.5 in. in diameter and under - Table III.
- 7.2.2 Tubing over 2.5 in. in Diameter - Table V.
8. **REPORTS:**
- 8.1 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. This report shall include the purchase order number, material specification number, size, and quantity. If forgings are supplied, the part number and size of stock used to make the forgings shall also be included.