

AERONAUTICAL MATERIAL SPECIFICATIONS

AMS 6443

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

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Revised

STEEL, PREMIUM BEARING QUALITY
1.05Cr (0.95 - 1.10) (SAE 51100)
Consumable Electrode Vacuum Melted

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. FORM: Wire, bars, forgings, and forging stock.
3. APPLICATION: Primarily for bearing components of small cross section where rigid inspection standards are utilized in final inspection. Parts which require a through-hardening steel usually with hardness of approximately Rockwell C 60.
4. COMPOSITION:

| | | Check Analysis | |
|------------|-------------|----------------|-------------|
| | | Under Min | or Over Max |
| Carbon | 0.95 - 1.10 | 0.03 | 0.03 |
| Manganese | 0.25 - 0.45 | 0.03 | 0.03 |
| Silicon | 0.20 - 0.35 | 0.02 | 0.02 |
| Phosphorus | 0.025 max | --- | 0.005 |
| Sulfur | 0.025 max | --- | 0.005 |
| Chromium | 0.90 - 1.15 | 0.05 | 0.05 |
| Nickel | 0.25 max | --- | 0.03 |
| Molybdenum | 0.10 max | --- | 0.01 |
| Copper | 0.25 max | --- | 0.02 |

5. CONDITION:
 - 5.1 Wire and Bars: Unless otherwise specified, wire and bars shall be supplied in a machinable condition, with microstructure of spheroidized cementite in ferrite matrix, and having hardness not higher than Brinell 207 or equivalent except that, if ordered cold finished, hardness may be as high as Brinell 248 or equivalent.
 - 5.2 Forgings: As ordered.
 - 5.3 Forging Stock: As ordered by the forging manufacturer.
6. TECHNICAL REQUIREMENTS:
 - 6.1 Decarburization:
 - 6.1.1 Bars or wire ordered ground, turned, or polished shall be free from decarburization on such ground, turned, or polished surfaces.

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 intent to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by 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."

6.1.2 Allowable decarburization of wire or bars ordered for redrawing or forging, or to specified microstructural requirements, shall be as agreed upon by purchaser and vendor.

6.1.3 Decarburization of wire or bars to which 6.1.1 or 6.1.2 is not applicable shall be not greater than the following:

| Nominal Diameter or Distance Between Parallel Sides Inches | Depth of Decarburization Inch |
|--|-------------------------------------|
| 0.50 and under | 0.015 |
| Over 0.50 to 1.00, incl | 0.020 |
| Over 1.00 to 1.50, incl | 0.025 |
| Over 1.50 to 2.00, incl | 0.030 |
| Over 2.00 to 2.50, incl | 0.035 |
| Over 2.50 to 3.00, incl | 0.040 |

6.1.4 Unless otherwise agreed upon by purchaser and vendor, decarburization shall be measured by the microscopic method, or by Rockwell superficial 30-N Scale hardness method, or equivalent hardness testing method, on hardened specimens. Depth of decarburization is defined as the distance measured from the nearest original surface to the point at which no increase in hardness is found.

6.1.5 When determining the depth of decarburization, it is permissible to disregard local areas provided the decarburization of such areas does not exceed the above limits by more than 0.005 in. and the width is 0.065 in. or less.

6.2 Inclusion Rating:

6.2.1 Material shall be subject to step-down bar method of magnetic particle inspection in accordance with AMS 2300, unless such inspection be waived.

6.2.2 The manufacturer of the material shall prepare specimens approximately 3/8 in. in thickness cut from and representing the cross section of forging stock from the top and bottom of at least the first ingot, middle ingot and last useable ingot in each heat. These specimens shall be normalized, annealed, hardened, and fractured. The fractured specimens shall show freedom from pipe, porosity, excessive segregation, and injurious inclusions. The fractured surfaces shall show no non-metallic streaks over 1/16 in. in length and not more than one non-metallic streak 1/32 - 1/16 in. in length shall be permitted for each 10 sq in. or fraction thereof of such surfaces.

6.2.3 The manufacturer of the material shall prepare radial specimens, approximately 7/8 in. long, cut midway between center and surface of hardened fracture samples. The specimens shall be polished, on a face longitudinal to the direction of rolling, for micro inclusion rating in accordance with the Jernkontoret chart in ASTM E45-51. No sample shall exceed the following limits:

| Series | Type | | | |
|--------|------|-----|-----|-----|
| | A | B | C | D |
| Thin | 2.0 | 1.5 | 1.5 | 1.5 |
| Heavy | 1.0 | 1.0 | 1.0 | 1.0 |