

AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 6550c

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STEEL TUBING, WELDED
0.55Ni - 0.5Cr - 0.2Mo (0.27-0.33C) (SAE 8630)

- ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
- TYPE:** Electric-resistance-welded or gas-welded tubing.
- APPLICATION:** General use where welding and moderate physical properties are required. Tubing is extensively used where minimum tensile strength of 160,000 psi is required.
- COMPOSITION:**

Check Analysis
Under Min or Over Max

| | | Under | Over |
|------------|-------------|-------|-------|
| Carbon | 0.27 - 0.33 | 0.02 | 0.00 |
| Manganese | 0.70 - 0.90 | 0.03 | 0.03 |
| Silicon | 0.20 - 0.35 | 0.02 | 0.02 |
| Phosphorus | 0.040 max | -- | 0.005 |
| Sulfur | 0.040 max | -- | 0.005 |
| Chromium | 0.40 - 0.60 | 0.03 | 0.03 |
| Nickel | 0.40 - 0.70 | 0.03 | 0.03 |
| Molybdenum | 0.15 - 0.25 | 0.02 | 0.02 |

- CONDITION:** Normalized and tempered, stress relieved, or otherwise heat treated, after the last cold drawing operation.
- TECHNICAL REQUIREMENTS:**

6.1 Tensile Properties:

| Nominal Outside Diameter | Nominal Wall Thickness | Tensile Strength | Yield Strength at 0.2% offset or at extension indicated | | Elongation in 2 in. | |
|--------------------------------|------------------------------|---------------------|---|--|---------------------|-------|
| | | | psi, min | psi, min | Full Tube | Strip |
| Inch | Inch | psi, min | psi, min | Extension Under Load inch in 2 in. | % min | % min |
| Up to 0.500 | 0.188 & under | 95,000 | 75,000 | 0.0090 | 10 | -- |
| Up to 0.500 | Over 0.188 | 90,000 | 70,000 | 0.0087 | 10 | -- |
| 0.500 & Over | 0.188 & under | 95,000 | 75,000 | 0.0090 | 12 | 7 |
| 0.500 & over | Over 0.188 | 90,000 | 70,000 | 0.0087 | 15 | 10 |

- Crushing Test:** One sample or more shall be selected from each 1000 feet or less from each lot of tubing in the shipment. Test specimens shall have a length equal to 1-1/2 times the nominal outside diameter and shall withstand crushing under a gradually applied load until the cross sectional dimension is increased in one zone by 20 percent, or until one complete fold is formed, or until the specimen is reduced in length to 2/3 of the original length, without failure of the weld occurring.

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- 6.3 **Grain Size:** Five or finer as determined on the rerolling slab, ASTM E19-46, method a. A heat of steel predominantly five or finer with grains as large as three is permissible.
- 6.4 **Non-destructive Test:** Each length of tubing shall be subjected to a non-destructive test by the tube manufacturer for the detection of injurious imperfections. The method of testing shall be capable of detecting all imperfections, interior and exterior, with a length greater than 1/16 inch and a total depth equivalent to half the nominal wall thickness of the tube.

6.5 **Decarburization:**

- 6.5.1 Tubing ordered ground, turned, or polished shall be free from decarburization on such ground, turned, or polished surfaces.
- 6.5.2 Allowable decarburization of tubing for redrawing, or of tubing ordered to specified microstructural requirements, shall be as agreed upon by purchaser and vendor.
- 6.5.3 Decarburization of tubing to which 6.5.1 or 6.5.2 is not applicable shall be not greater than the following:

| Nominal Wall Thickness Inch | Maximum Depth of Decarburization, Inch | | |
|--------------------------------|--|---------|------------------|
| | Inside | Outside | Inside + Outside |
| 0.040 and under | 0.008 | 0.008 | 0.010 |
| Over 0.040 to 0.050, incl | 0.009 | 0.009 | 0.012 |
| Over 0.050 to 0.070, incl | 0.010 | 0.010 | 0.014 |
| Over 0.070 to 0.080, incl | 0.012 | 0.012 | 0.016 |
| Over 0.080 to 0.090, incl | 0.014 | 0.014 | 0.018 |
| Over 0.090 to 0.100, incl | 0.015 | 0.015 | 0.020 |
| Over 0.100 to 0.150, incl | 0.017 | 0.017 | 0.022 |
| Over 0.150 to 0.200, incl | 0.020 | 0.020 | 0.026 |

- 6.5.4 Decarburization shall be measured by the microscopic method.

7. **QUALITY:**

- 7.1 Tubing shall be suitable for use in aircraft, shall be uniform in condition, and shall not reveal defects during fabrication processes.
- 7.2 Tubing shall have a good workmanlike finish conforming to the best practice for high quality aircraft material. It shall be smooth, clean, and free from heavy scale or oxide, burrs, seams, tears, grooves, laminations, slivers, pits, and other injurious defects. Surface imperfections such as handling marks, straightening marks, light mandrel and die marks, shallow pits, and scale pattern will not be considered as injurious defects, provided the imperfections are removable within the tolerances specified for diameter and wall thickness. The removal of surface imperfections is not required.
- 7.3 Steel used for manufacture of tubing shall be of a quality satisfactory for fabrication of parts which may be subjected to a method of inspection which will disclose injurious tubing defects as defined in 7.2.