Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 5082C
Superseding AMS 5082B

Issued 11-1-44
Revised 1-15-77

UNS G10350

STEEL TUBING, SEAMLESS
0.31 - 0.38C (SAE 1035)

1. SCOPE:

1.1 Form: This specification covers a carbon steel in the form of seamless tubing.

1.2 Application: Primarily for parts requiring a material of moderate strength.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2253 - Tolerances, Carbon and Alloy Steel Tubing
AMS 2259 - Chemical Check Analysis Limits, Wrought Low-Alloy and Carbon Steels
AMS 2350 - Standards and Test Methods
AMS 2370 - Quality Assurance Sampling of Carbon and Low-Alloy Steels, Wrought Products Except Forgings and Forging Stock

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM E8 - Tension Testing of Metallic Materials
ASTM E350 - Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Standards:

MIL-STD-163 - Steel Mill Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

Printed in U.S.A.

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E350, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, of by other approved analytical methods:

	min	max
Carbon	0.31	0.38
Manganese	0.60	0.90
Silicon	0.10	0.30
Phosphorous	--	0.040
Sulfur	--	0.050

3.1.1 Check Analysis: Composition variations shall meet the applicable requirements of AMS 2259.

3.2 Condition: Cold drawn and stress relieved, having a uniform, fine grain in all areas of the tubing.

3.3 Properties: Tubing shall conform to the following requirements; tensile testing shall be performed in accordance with ASTM E8:

3.3.1 Tensile Properties: Except as specified in 3.3.1.2, tubing 1.500 in. (38.10 mm) and under in nominal OD with wall thickness of 0.125 in. (3.18 mm) and under shall have properties as specified in Table I.

TABLE I

Tensile Strength, min		90,000 psi
Yield Strength at 0.2% Offset, min		70,000 psi
Elongation in 2 in. or 4D, min		
Nominal OD Inches	Wall Thickness Inch	
Up to 0.500, incl	Up to 0.035, incl	8%
Over 0.500 to 1.500, incl	Over 0.035 to 0.125, incl	10%

TABLE I (SI)

Tensile Strength, min		621 MPa
Yield Strength at 0.2% Offset, min		483 MPa
Elongation in 50.8 mm or 4D, min		
Nominal OD Millimetres	Wall Thickness Millimetres	
Up to 12.70, incl	Up to 0.89, incl	8%
Over 12.70 to 38.10, incl	Over 0.89 to 3.18, incl	10%

3.3.1.1 Tubing with dimensions other than shown in 3.3.1 shall have tensile properties as agreed upon by purchaser and vendor.

3.3.1.2 When so ordered, tubing shall be supplied having the following tensile properties:

Tensile Strength, min	105,000 psi (724 MPa)
Yield Strength at 0.2% Offset, min	85,000 psi (586 MPa)
Elongation in 2 in. (50.8 mm) or 4D, min	8%

3.4 Quality: Tubing shall be uniform in quality and condition and shall have a finish conforming to the best practice for high quality tubing. It shall be smooth and free from heavy scale or oxide, burrs, seams, Ø tears, grooves, laminations, slivers, pits, and other injurious conditions. Surface imperfections such as handling marks, straightening marks, light mandrel and die marks, shallow pits, and scale pattern will not be considered injurious if the imperfections are removable within the tolerances specified for wall thickness but removal of such surface imperfections is not required.

3.5 Sizes: Except when exact lengths or multiples of exact lengths are ordered, straight tubing will be acceptable in mill lengths of 6 - 20 ft (1.8 - 6.1 m) but not more than 10% of any shipment shall be supplied in lengths shorter than 10 ft (3 m).

3.6 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2253.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of tubing shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the tubing conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests.

4.3 Sampling: Shall be in accordance with AMS 2370.

4.4 Reports:

4.4.1 The vendor of tubing shall furnish with each shipment three copies of a report showing the results of tests for chemical composition of each heat and for tensile properties of each size from each heat. This report shall include the purchase order number, heat number, material specification number and its revision letter, size, and quantity from each heat.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specifications number and its revision letter, contractor or other direct supplier of tubing, part number, and quantity. When tubing for making parts is produced or purchased by the vendor, that vendor shall inspect each lot of tubing to determine conformance to the requirements of this specification, and shall include in the report a statement that the tubing conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: Shall be in accordance with AMS 2370.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Tubing shall be identified as follows:

5.1.1 Straight Tubes 0.029 In. (0.74 mm) and Over In Wall Thickness and 0.500 In. (12.70 mm) and Over In OD, Minor Axis, or Least Width of Flat Surface: Shall be marked in a row of characters recurring at intervals not greater than 3 ft (914 mm) with AMS 5082C, manufacturer's identification and nominal wall thickness. The characters shall be of such size as to be clearly legible, shall be applied using a suitable marking fluid, and shall be removable in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the tubing or its performance and shall be sufficiently stable to withstand normal handling.