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400 Commonwealth Dr., Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 5082E

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Superseding AMS 5082D

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

UNS G10350

1. SCOPE:

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

1.2 Application: Primarily for parts requiring moderate strength.

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

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2253 - Tolerances, Carbon and Alloy Steel Tubing
MAM 2253 - Tolerances, Metric, 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 ASTM, 1916 Race Street, Philadelphia, PA 19103.

ASTM E8 - Tension Testing of Metallic Materials
ASTM E8M - Tension Testing of Metallic Materials (Metric)
ASTM E350 - Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

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

2.3.1 Military Standards:

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

3. TECHNICAL REOUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E350, by spectrochemical methods, or by other analytical methods acceptable to purchaser:

	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.

3.3 Properties: Tubing shall conform to the following requirements; tensile testing shall be performed in accordance with ASTM E8 or ASTM E8M:

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

TABLE I

Tensile Strength, minimum		90,000 psi
Yield Strength at 0.2% Offset, minimum		70,000 psi
Elongation in 2 Inches or 4D, minimum		
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%

(3.18 mm) and under shall have propertiesas specified in Tab

TABLE I (SI)

Tensile Strength, minimum			621 MPa
Yield Strength at 0.2% Offset, minimum			483 MPa
Elongation In 50.8 mm or 4D, minimum			
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 conforming to the following tensile properties:

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

3.4 Quality: Tubing, as received by purchaser, shall be uniform in quality and condition and shall have a finish conforming to the best practice for high quality aircraft tubing. It shall be smooth and free from heavy scale or oxide, burrs, seams, tears, grooves, laminations, slivers, pits, and other imperfections detrimental to usage of the tubing. 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 imperfections is not required. 0

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 feet (1.8 - 6.1 m) but not more than 10% of any shipment shall be supplied in lengths shorter than 10 feet (3 m).

3.6 Tolerances: Shall conform to all applicable requirements of AMS 2253 or MAM 2253.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of tubing shall supply all samples for vendor's tests 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 sample and to perform any confirmatory testing deemed necessary to ensure that the tubing conforms to the requirements of this specifiation.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each heat or lot as applicable. 0

4.3 Sampling: Shall be in accordance with AMS 2370.

4.4 Reports: The vendor of tubing shall furnish with each shipment a report showing the results of tests for chemical composition of each heat and for tensile properties of each lot. This report shall include the purchase order number, lot number, AMS 5082E, size, and quantity.

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

5. PREPARATION FOR DELIVERY:

5.1 Identification: Shall be as follows:

5.1.1 Straight Tubes 0.029 Inch (0.74 mm) and Over in Wall Thickness and 0.500 Inch (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 feet (914 mm) with AMS 5082E, manufacturer's identification, and wall thickness. The characters shall be of such size as to be 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.

5.1.2 Straight Tubes Under 0.029 Inch (0.74 mm) In Wall Thickness or Under 0.500 Inch (12.70 mm) In OD, Minor Axis, or Least Width of Flat Surface: Shall be securely bundled and identified by a durable tag marked with the information of 5.1.1 and the nominal OD and attached to each bundle or shall be boxed and the box marked with the same information.

5.1.3 Coiled Tubing: Shall be securely bundled and identified by a durable tag marked with the purchase order number, AMS 5082E, nominal OD and wall thickness, and manufacturer's identification and attached to each coil or shall be boxed and the box marked with the same information.

5.2 Protective Treatment: Tubing shall be coated with a suitable corrosion-preventive compound prior to shipment.

5.3 Packaging:

5.3.1 Tubing shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the tubing to ensure carrier acceptance and safe dellvery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.3.2 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-163, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.3.1 will be acceptable if it meets the requirements of Level C.

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