AEROSPACE MATERIAL SPECIFICATION

AMS-T-5066™	REV. B

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Stabilized 2020-07

Superseding AMS-T-5066A

Tubing, Carbon Steel (1025) (Aircraft Quality)

RATIONALE

AMS-T-5066B has been declared stabilized based on the results of a survey of aerospace users and producers.

STABILIZED NOTICE

AMS-T-5066B has been declared "STABILIZED" by AMS Committee E. This document will no longer be updated and may no longer represent standard industry practice. This document was stabilized because this document is no longer state of the art and other documents contain similar, but not necessarily equivalent, requirements. Previously, this document was reaffirmed non-current. The last technical update of this document occurred in June 1999. Users of this document should refer to the cognizant engineering organization for disposition of any issues with reports/certifications to this specification, including exceptions listed on the certification.

NOTE: In many cases, the purchaser may represent a sub-tier supplier and not the cognizant engineering organization.

AMS Committee E recommends that the following similar, but not identical, specifications may be considered for future procurement. This listing does not constitute authority to substitute these specifications for the “STABILIZED” specification.

ASTM A513/A513M Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing (SAE 1025)

ASTM A519/A519M Standard Specification for Seamless Carbon and Alloy Steel Mechanical Tubing (SAE 1025)

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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For more information on this standard, visit
https://www.sae.org/standards/content/AMST5066B/

NOTICE

This document has been taken directly from U.S. Military Specification MIL-T-5066B, Amendment 1, Notice 2 and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards. The initial release of this document is intended to replace MIL-T-5066B, Amendment 1, Notice 2. Any part numbers established by the original specification remain unchanged.

The original Military Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, and (b) the use of the existing government specification or standard format.

Under Department of Defense policies and procedures, any qualification requirements and associated qualified products lists are mandatory for DOD contracts. Any requirement relating to qualified products lists (QPL's) has not been adopted by SAE and is not part of this SAE technical document.

1. SCOPE:

1.1 Scope:

This specification covers carbon steel (1025) tubing of aircraft quality.

1.2 Classification:

1.2.1 Condition: Tubing shall be supplied in the following conditions, as specified (see 6.2):

(A) Normalized
(B) Cold drawn and stress relieved

2. APPLICABLE DOCUMENTS:

The following publications, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2301	Aircraft Quality Steel Cleanliness, Magnetic Particle Inspection Procedure
AMS 2253	Tolerances, Carbon and Alloy Steel Tubing
AMS 2640	Magnetic Particle Inspection

2.2 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-I-6868	Inspection Process, Magnetic Particle
MIL-C-22235	Corrosion Preventive Oil, Nonstaining
FED-STD-151	Metals; Test Methods
FED-STD-183	Continuous Identification Marking of Iron and Steel Products
MIL-STD-163	Steel Mill Products, Preparation for Shipment and Storage
MS33532	Square and Rectangular Tubing - Carbon Steel and Alloy Steel .35 Carbon, Maximum
MS33534	Standard Dimensions for Streamlined and Oval Tubular Shapes
AND10102	Tubing - Standard Dimensions for Round Alloy Steel

3. REQUIREMENTS:

3.1 Material:

The tubing shall be of aircraft quality. The material shall be magnetically inspected in accordance with the procedures of AMS 2301, and shall not exceed the size and frequency rating limits indicated in the paragraph entitled “Disposition” of AMS 2301 (see 4.4).

3.1.1 Welded tubing: Welded tubing shall be made from flat rolled steel by a continuous welding process and shall be reduced by subsequent drawing to refine the microstructure of the weld zone and produce uniform grain size throughout.

3.1.2 Either welded or seamless tubing may be furnished at the option of the vendor.

3.2 Test data:

Test data shall be submitted in accordance with 4.1.1.

3.3 Chemical composition:

The chemical composition of the steel shall be as specified in Table I.

Table I. Chemical composition 1/

Element	Composition limits (percent)	Check analysis tolerance (percent)
Silicon	0.30 (max.)	+ 0.02
Carbon	0.22 – 0.28	± 0.02
Manganese	0.30 – 0.60	± 0.03
Phosphorus	0.025 (max.)	+ 0.008
Sulfur	0.025 (max.)	+ 0.008
Other elements, total	0.75 (max.)	+ 0.02

[1]The average of all separate determinations shall be within the limits specified in the composition column. Individual determinations may vary to the extent shown by the tolerance column, except that several determinations of a single element in the samples from a single inspection lot shall not vary both above and below the specified range.

3.4 Mechanical properties:

The mechanical properties of the tubing as received shall conform to the requirements of table II.

Table II. Mechanical properties

Tensile strength (minimum)	Yield strength at 0.2 percent offset or at extension indicated		Elongation in 2 inches	
	Minimum	Extension under load	Full tube (minimum)	Strip (minimum)
PSI	PSI	Inch in 2 inches	Percent	Percent
55,000	36,000	0.0064	1/ 22	1/ 13

1/ For each 2,000 pounds per square inch in excess of 55,000 pounds per square inch tensile strength, a reduction in elongation of 1 percent to a minimum elongation as follows will be allowed: full tube specimen - 10 percent; strip specimen - 8 percent.

3.4.1 The tubing shall be capable of developing the properties specified in table II when normalized by heating to 1625° to 1675 °F and cooling in still air.

3.4.2 Crushing: Tubing shall withstand crushing without cracking or indicating any defect when subjected to the crushing test (see 4.8).

3.5 Dimensions:

The dimensions of round tubing shall conform to the standard dimensions shown on AND10102. The dimensions for streamline and oval tubing shall be as specified in MS33534. The dimensions for rectangular or square tubing shall be as specified in the contract or purchase order.

3.6 Length:

3.6.1 Exact lengths: Tubing may be ordered to exact lengths or as a multiple of a definite unit, with tolerances as specified in the contract or order (see 6.2).

3.6.2 Mill lengths: When exact or multiple lengths are not specified (see 6.2), tubing will be accepted in mill lengths of 5 to 20 feet, but not more than 10 percent of any order will be accepted in lengths of less than 12 feet.

3.7 Tolerances:

3.7.1 Round tubing: The permissible variations in dimensions shall conform to AMS 2253.

3.7.2 Shapes other than round: The permissible variations in dimensions of tubing other than round shall be as shown on MS33532.

3.8 Identification of product:

Each length of tube 1/2-inch O.D. and over shall be marked in accordance with FED-STD-183, and in addition, shall include the type and number of this specification. Secured lifts, bundles, and containers of sizes not required to be marked shall be tagged in two places with the required identification markings.

3.9 Workmanship:

The tubing shall have a finish conforming to the best practice for aircraft quality material. It shall be smooth, clean, and free from heavy scale or oxide on the interior and exterior surfaces, and shall be free from burrs, 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. Tubing may be pickled or otherwise cleaned, as necessary, to meet the surface conditions specified herein.

3.9.1 Defects greater than 1/16-inch in greatest dimension, or of a depth which exceeds wall thickness minimum tolerances, shall be cause for rejection. Discontinuities of depth which do not exceed thickness tolerances shall be removed by polishing or grinding.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for inspection:

Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Test report: The material supplier shall furnish with each shipment a report of the results of the tests for chemical composition, magnetic particle inspection rating, crushing test and mechanical properties. This report shall also include:

(a) Purchase order number
(b) Heat number
(c) Material specification number
(d) Size
(e) Quantity from heat

4.2 Classification of inspections:

All the examinations and tests specified herein for the testing of tubing are classified as quality conformance inspections.

4.3 Lot:

A lot shall consist of tubing produced from the same heat, in the same condition, of the same type, size, and wall thickness offered for delivery at the same time.

4.4 Examination of product:

Each length of tubing shall be visually examined for compliance with surface condition and workmanship requirements. Samples selected in accordance with table III shall be examined to assure compliance with the specified dimensions and tolerances, identification marking, and preparation for delivery requirements.

Table III. Sampling plan

Lot size	Sample size	Acceptance number rejectable
1 to 15	All	0
16 to 180	15	0
181 to 300	35	0
301 to 500	50	1
Over 500	75	2

4.5 Magnetic inspection:

Specimens shall be selected and rated in accordance with the procedures of AMS 2301. Inspection shall be in accordance with MIL-I-6868 or AMS 2640.

4.6 Chemical analysis:

4.6.1 Sampling: At least one sample, consisting of not less than 2 ounces, shall be selected for check chemical analysis in accordance with Method 111 or Method 112 of FED-STD-151.

4.6.2 Method: Specimens shall be prepared in accordance with Method 111 or Method 112 of FED-STD-151 and analysis made by wet chemical, spectrochemical, or other analytic methods. In the event of dispute, analysis shall be by wet chemical methods.

4.6.3 Waiver: Samples for check of chemical analysis may be waived provided that all of the material in the lot can be identified as being made from a heat previously analyzed and found to conform to the chemical composition specified herein.

4.7 Mechanical properties:

4.7.1 Sampling: At least one sample shall be selected from each 1,000 feet or less of tubing from each lot for determination of mechanical properties.

4.7.2 Preparation of specimens: Tensile test specimens shall consist of full sections of tubing whenever practicable. When not practicable, specimens conforming to types T1 and T2 of Method 211, FED-STD-151 shall be used, and when the tubing is welded, the test section shall include the weld.