SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS5053 REV. J

Issued 1942-06
Reaffirmed 2006-02
Cancelled 2009-09

Superseding AMS5053H

Steel Tubing, Welded
0.13 Carbon, Maximum
Annealed

(Composition similar to UNS G10100)

RATIONALE

AMS5053J has been designated Cancelled based on results of a survey to aerospace users and producers.

CANCELLATION NOTICE

This specification has been declared “CANCELLED” by the Aerospace Materials Division, SAE, as of September 2009. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Material Specifications indicating that it has been “CANCELLED”.

Cancelled specifications are available from SAE.

Similar but not necessarily identical product is covered in the following specification. However, this listing is provided for information only and does not constitute authority to substitute this specification for the “CANCELLED” specification.

ASTM A513 ELECTRIC-RESISTANCE-WELDED CARBON AND ALLOY STEEL MECHANICAL TUBING - GRADE 1010

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS5053J

1. SCOPE:

1.1 Form:

This specification covers a low-carbon steel in the form of welded tubing.

1.2 Application:

This tubing has been used typically for oil lines and other parts requiring high-quality tubing suitable for severe forming and for welding or brazing, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

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

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 2370	Quality Assurance Sampling and Testing, Carbon and Low-Alloy Steel Wrought Products and Forging Stock
AMS 2807	Identification, Carbon and Low-Alloy Steels, Corrosion and Heat Resistant Steels and Alloys, Sheet, Strip, Plate, and Aircraft Tubing

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM E 8 Tension Testing of Metallic Materials
ASTM E 8M Tension Testing of Metallic Materials (Metric)
ASTM E 350 Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 350, by spectrochemical methods, or by other analytical methods acceptable to purchaser:

TABLE 1 - Composition

Element	min	max
Carbon	--	0.13
Manganese	0.30	0.60
Phosphorus	--	0.04
Sulfur	--	0.05

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

3.2 Condition:

Normalized or annealed.

3.2.1 Fabrication:

3.2.1.1 Tubing shall be produced by electrical-resistance, shielded-metal-arc, or gas welding the edges of formed sheet or strip.

3.2.1.2 Any surface finishing operation applied to remove objectionable pits and surface blemishes shall be performed prior to the last annealing. A light polish to improve surface appearance may be employed after annealing.

3.3 Properties:

Tubing shall conform to the following requirements:

3.3.1 Tensile Properties: Shall be as shown in Table 2, determined in accordance with ASTM E 8 or ASTM E 8M:

TABLE 2 - Minimum Tensile Properties

Nominal OD Inches	Nominal OD Millimeters	Elongation in 2 Inches (50.8 mm) % Full Tube	Elongation in 2 Inches (50.8 mm) % Strip
Up to 0.50, incl	Up to 12.7, incl	32	--
Over 0.50 to 5.50, incl	Over 12.7 to 139.7, incl	35	25

3.3.2 Crushing Test: Specimens as in 4.3.1 shall withstand, without failure of the weld, crushing axially under a gradually applied load until the cross-sectional dimension is increased in one zone by 20%, or until one complete fold is formed, or until the specimen is reduced in length to two-thirds of the original length.

3.3.3 Flarability: Specimens as in 4.3.2 shall withstand flaring at room temperature, without formation of cracks or other visible defects, by being forced axially with steady pressure over a hardened and polished tapered steel pin having a 74 degree included angle, to produce a flare having a permanent expanded OD not less than shown in Table 3. After flaring, the inside surface of the tubing shall be smooth and shall show no evidence of weld reinforcement that might prevent the assembly of pressure tight joints.

TABLE 3 - Minimum OD Increase, Percent

Nominal Wall Thickness % of OD	OD Increase %
Up to 7, incl	35
Over 7	45

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.

3.4.1 Each length of tubing shall be subjected to a nondestructive test by the tube manufacturer for detection of injurious imperfections. Internal or external imperfections, determined by such nondestructive test, having a length greater than 1/16 inch (1.6 mm) and a total depth equivalent to, or greater than, one-half the nominal wall thickness of the tubing, are not acceptable.

3.5 Tolerances:

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

3.5.1 The outside surface shall be free from welding reinforcement and the height of the inside weld reinforcement shall not exceed 0.007 inch (0.18 mm).

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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the tubing conforms to specified requirements.

4.2 Classification of Tests:

All technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2370 and the following:

4.3.1 At least one sample for crushing tests (3.3.2) shall be selected from each 1000 feet (305 m) or less from each lot of tubing in the shipment. Specimens shall be full cross-section of the tube with the length equal to approximately 1-1/2 times the nominal OD; the ends of the specimen shall be perpendicular to the axis.

4.3.2 Specimens for flarability (3.3.3) test shall be full tubes or sections cut from a tube. The end of the specimen to be flared shall be cut square, with the cut end smooth and free from burrs, but not rounded. One or more specimens from each lot shall be tested.

4.4 Reports:

The vendor of the product shall furnish with each shipment a report showing the results of chemical composition for each heat, and for tensile properties, crushing, flarability, and method and results of nondestructive testing of each lot, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, heat and lot numbers, AMS 5053H, size and quantity.