



# AEROSPACE MATERIAL SPECIFICATION

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## AMS 5053C

Superseding AMS 5053B

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### STEEL TUBING, WELDED Low Carbon, Annealed

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **TYPE:** Electric-resistance-welded, shielded-arc-welded, or gas-welded.
3. **APPLICATION:** Primarily for parts requiring superior quality welded tubing suitable for severe forming and for welding and brazing.

4. **COMPOSITION:**

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

- 4.1 **Check Analysis:** Composition variations shall meet the requirements of the latest issue of AMS 2259, paragraph titled "Carbon Steels, Welded Tubing."

5. **CONDITION:** Normalized or annealed.

- 5.1 **Fabrication:** 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.

6. **TECHNICAL REQUIREMENTS:**

6.1 **Tensile Properties:**

Nominal OD Inches	Elongation	
	% in 2 in., min	
	Full Tube	Strip
Up to 0.50, incl	32	--
Over 0.50 to 5.50, incl	35	25

- 6.2 **Crushing Test:** At least one sample shall be selected from each 1000 ft or less from each lot of tubing in the shipment. Test specimens shall have a length equal to 1-1/2 times the nominal OD and shall withstand crushing lengthwise 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 2/3 of the original length, without failure of the weld.

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- 6.3 **Flarability:** Tubing shall be capable of being flared without formation of cracks or other visible defects. Specimens for flaring may be cut from any portion of the tube, or an entire tube may be used as a specimen. The end of the specimen to be flared shall be cut square with the cut end smooth and free from burrs, but not rounded. The specimen shall, at room temperature, be forced axially with a steady pressure over a hardened and polished tapered steel pin having a 74 deg included angle, to produce a flare having the permanent percentage OD increase specified in the following table. After flaring, the inside surface of the tubing shall be smooth and shall show no evidence of a bead that might prevent the assembly of pressure tight joints.

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

- 6.4 **Nondestructive Test:** Each length of tubing shall be subjected to a nondestructive 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, having a length greater than 1/16 in. and a total depth equivalent to half the nominal wall thickness of the tube.
7. **QUALITY:** Tubing shall be uniform in quality and condition and shall have a good workmanlike finish conforming to the best practice for high quality material. It shall be clean and free from heavy scale or oxide, burrs, seams, 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 diameter and wall thickness. The removal of surface imperfections is not required.
8. **TOLERANCES:** Unless otherwise specified, tolerances shall conform to all applicable requirements of the latest issue of AMS 2253.
- 8.1 The outside surface shall be free from welding flash and the maximum height of the inside flash shall not exceed 0.007 inch.
9. **REPORTS:**
- 9.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report of the results of tests for chemical composition of each heat in the shipment and containing a statement that the tubing was tested and accepted under the nondestructive test. This report shall include the purchase order number, heat number, material specification number and its revision letter, size, and quantity from each heat.
- 9.2 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.
10. **IDENTIFICATION:** Unless otherwise specified, tubing shall be identified as follows:
- 10.1 **Straight Tubes 0.029 In. and Over in Wall Thickness and 0.500 In. 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 with AMS 5053C, 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 capable of being removed in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the material or its performance and shall be sufficiently stable to withstand normal handling.