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AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 5053G

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Superseding AMS 5053F

STEEL TUBING, WELDED
0.13 Carbon, Maximum
Annealed

UNS G10100

1. SCOPE:

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

1.2 Application: Primarily for oil lines and other parts requiring high-quality tubing suitable for severe forming and for welding or brazing.

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 publications 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 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

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 REQUIREMENTS:

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

	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: Normallzed 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 follows, determined in accordance with ASTM E 8 or ASTM E 8M:

Nominal OD		Elongation in 2 Inches (50.8 mm), %, minimum	
Inches	Millimetres	Full Tube	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 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 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 below. 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 %
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 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.

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