Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 10000

AEROSPACE MATERIAL SPECIFICATION

AMS 6550E
Superseding AMS 6550D
Issued 4-1-43
Revised 5-1-69

STEEL TUBING, WELDED
0.50Cr - 0.55Ni - 0.20Mo (0.28 - 0.33C) (SAE 8630)

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

2. APPLICATION: Primarily for general use where welding and moderate tensile properties are required. Used where minimum tensile strength of 160,000 psi is required for light sections.

3. COMPOSITION:

	min	max
Carbon	0.28	0.33
Manganese	0.70	0.90
Silicon	0.20	0.35
ø Phosphorus	--	0.025
Sulfur	--	0.025
Chromium	0.40	0.60
Nickel	0.40	0.70
Molybdenum	0.15	0.25
Copper	--	0.35

3.1 Check Analysis: Composition variations shall meet the requirements of the latest issue of AMS 2259, paragraph titled "Low Alloy Steels".

4. CONDITION: Normalized and tempered, stress relieved, or otherwise heat treated after the last cold drawing operation.

5. TECHNICAL REQUIREMENTS: When ASTM methods are specified for determining conformance to the ø following requirements, tests shall be conducted in accordance with the issue of the ASTM method listed in the latest issue of AMS 2350.

5.1 Tensile Properties:

Nominal OD Inches	Nominal Wall Thickness Inch	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 29,000,000) psi, min	Extension Under Load in. in 2 in.	Elongation % in 2 In. min Full Tube	Elongation % in 2 In. min Strip
Up to 0.499, incl	Up to 0.188, incl	95,000	75,000	0.0092	10	--
Up to 0.499, incl	Over 0.188	90,000	70,000	0.0088	10	--
Over 0.499	Up to 0.188, incl	95,000	75,000	0.0092	12	7
Over 0.499	Over 0.188	90,000	70,000	0.0088	15	10

5.2 Crushing Test: One sample or more 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 under a gradually applied axial 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.

5.3 Grain Size: Predominantly 5 or finer with occasional grains as large as 3 permissible, ASTM E112, McQuaid-Ehn test.

5.4 Decarburization:

5.4.1 Tubing ordered ground, turned, or polished shall be free from decarburization on the ground, turned, or polished surfaces. Inside decarburization of such tubing shall not exceed the maximum depth specified in 5.4.3.

5.4.2 Allowable decarburization of tubing for redrawing or of tubing ordered to specified microstructural requirements shall be as agreed upon by purchaser and vendor.

5.4.3 Unless otherwise agreed upon between purchaser and vendor, tubing to which 5.4.1 or 5.4.2 is not applicable shall be free from complete decarburization. Partial decarburization shall not exceed the following:

Nominal Wall Thickness (T) Inch	Depth of Partial Decarburization, Inch		
	ID	OD	ID + OD
Up to 0.040, incl	0.25T	0.25T	0.30T
Ø Over 0.040 to 0.050, incl	0.009	0.009	0.012
Over 0.050 to 0.070, incl	0.010	0.010	0.014
Over 0.070 to 0.080, incl	0.012	0.012	0.016
Over 0.080 to 0.090, incl	0.014	0.014	0.018
Over 0.090 to 0.100, incl	0.015	0.015	0.020
Over 0.100 to 0.150, incl	0.017	0.017	0.022
Over 0.150 to 0.200, incl	0.020	0.020	0.026

5.4.4 Unless otherwise agreed upon by purchaser and vendor, decarburization shall be measured by the microscopic method or by Rockwell Superficial 30-N scale hardness method, or equivalent hardness testing method, on hardened but untempered specimens protected during heat treatment to prevent changes Ø in surface carbon content. Depth of decarburization, when measured by a hardness method, is defined as the perpendicular distance from the surface to the non-decarburized depth under that surface below which there is no further increase in hardness. Such measurements shall be far enough away from any adjacent surface to be uninfluenced by any decarburization or lack of decarburization thereon.

5.4.4.1 When determining the depth of decarburization, it is permissible to disregard local areas provided Ø the decarburization of such areas does not exceed the limits above by more than 0.005 in. and the width is 0.065 in. or less.

6. QUALITY: Steel shall be aircraft quality and shall conform to the latest issue of AMS 2301. 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 smooth, 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.

6.1 When specified, the tubing, either with or without machining of the surfaces, shall be capable of passing Ø magnetic particle inspection in accordance with AMS 2640. Standards for acceptance shall be as agreed upon by purchaser and vendor.