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

AEROSPACE MATERIAL SPECIFICATION

AMS 6535D
Superseding AMS 6535C
Issued 9-1-42
Revised 5-1-69

STEEL TUBING, SEAMLESS
0.50Cr - 0.55Ni - 0.25Mo (0.33 - 0.38C) (SAE 8735)

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 mechanical properties are required. Used where minimum tensile strength of 180,000 psi is required in sections up to 0.125 in. thick and proportionately lower strength is required in heavier thicknesses.

3. COMPOSITION:

	min	max
Carbon	0.33	0.38
Manganese	0.75	1.00
Silicon	0.20	0.35
Phosphorus	--	0.025
Sulfur	--	0.025
Chromium	0.40	0.60
Nickel	0.40	0.70
Molybdenum	0.20	0.30
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 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 = 30,000,000) psi, min	Extension Under Load In. in 2 In.	Elongation % in 2 In., min Full Tube	Strip
Up to 0.500, excl	Up to 0.188, incl	100,000	85,000	0.0097	8	--
Up to 0.500, excl	Over 0.188	95,000	80,000	0.0093	10	--
0.500 and over	Up to 0.188, incl	100,000	85,000	0.0097	12	7
0.500 and over	Over 0.188	95,000	80,000	0.0093	15	10

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

5.3 Decarburization:

5.3.1 Tubing ordered ground, turned, or polished shall be free from decarburization on the ground, turned, or polished surfaces.

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

5.3.3 Decarburization of tubing to which 5.3.1 or 5.3.2 is not applicable shall be not greater than the following:

Nominal Wall Thickness (T) Inch	Maximum Depth of Decarburization, Inch		
	Inside	Outside	Inside + Outside
Up to 0.040, incl	0.25T	0.25T	0.30T
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

5.3.4 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 in surface carbon content. Depth of decarburization, when measured by a hardness method, is defined as the perpendicular distance from the surface to the nondecarburized 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.

5.3.4.1 When determining the depth of decarburization, it is permissible to disregard local areas provided 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. The surface 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 the surfaces, shall be capable of passing magnetic particle inspection in accordance with AMS 2640. Standards for acceptance shall be as agreed upon by purchaser and vendor.

7. TOLERANCES: Unless otherwise specified, tolerances shall conform to all applicable requirements of the latest issue of AMS 2253.