AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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New York City

AMS 6360D

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STEEL TUBING, SEAMLESS
0.95Cr - 0.2Mo (0.28-0.33C) (SAE 4130)

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

2. APPLICATION: General use where welding and moderate physical properties are required. Tubing is extensively used where minimum tensile strength of 160,000 psi is required.

3. COMPOSITION:

		Check Analysis Under Min	Check Analysis Over Max
Carbon	0.28 - 0.33	0.02	0.02
Manganese	0.40 - 0.60	0.03	0.03
Silicon	0.20 - 0.35	0.02	0.02
Phosphorus	0.040 max	--	0.005
Sulfur	0.040 max	--	0.005
Chromium	0.80 - 1.10	0.05	0.05
Molybdenum	0.15 - 0.25	0.02	0.02

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

5. TECHNICAL REQUIREMENTS:

5.1 Tensile Properties:

Nominal Outside Diameter Inch	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
Under 0.500	0.188 & under	95,000	75,000	0.0092	10	--
Under 0.500	Over 0.188	90,000	70,000	0.0088	10	--
0.500 & over	0.188 & under	95,000	75,000	0.0092	12	7
0.500 & over	Over 0.188	90,000	70,000	0.0088	15	10

5.2 Grain Size: Five or finer as determined on the billet, ASTM E19-46, method a. A heat of steel predominantly five or finer with grains as large as three is permissible.

5.3 Decarburization:

5.3.1 Tubing ordered ground, turned, or polished shall be free from decarburization on such 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 Inch	Depth of Decarburization, Inch		
	Inside	Outside	Inside + Outside
0.040 and under	0.008	0.008	0.010
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 Decarburization shall be measured by the microscopic method.

6. QUALITY:

6.1 Tubing shall be suitable for use in aircraft, shall be uniform in condition, and shall not reveal defects during fabrication processes.

6.2 Tubing shall have a good workmanlike finish conforming to the best practice for high quality aircraft material. It shall be smooth, clean, and free from heavy scale or oxide, burrs, seams, tears, grooves, laminations, slivers, pits, and other injurious defects. Surface imperfections such as handling marks, straightening marks, light mandrel and die marks, shallow pits, and scale pattern will not be considered as injurious defects, provided the imperfections are removable within the tolerances specified for diameter and wall thickness. The removal of surface imperfections is not required.

6.3 Steel used for manufacture of tubing shall be of a quality satisfactory for fabrication of parts which may be subjected to a method of inspection which will disclose injurious tubing defects as defined in 6.2.

7. TOLERANCES: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2253 as applicable to Aircraft Type - Seamless. Diameter and straightness tolerances shall be as specified below:

7.1 Diameter: Table I, column headed "Annealed, Normalized or Stress Relieved".

7.2 Straightness: Table VIII.

8. REPORTS:

8.1 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 and grain size of each heat in the shipment and for tensile properties of each size from each heat. This report shall include the purchase order number, heat number, material specification number, size, and quantity from each heat.