AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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STEEL TUBING, WELDED, CORROSION RESISTANT
19Cr - 9Ni (SAE 30304)

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 parts and assemblies, such as fluid lines not subjected to high pressure, requiring corrosion resistance. Welding, brazing or other ø exposure to temperatures over 800 F during fabrication may impair corrosion resistance.

3. COMPOSITION:

		Check Analysis Under Min	Check Analysis Over Max
Carbon	0.08 max	--	0.01
Manganese	2.00 max	--	0.04
Silicon	1.00 max	--	0.05
Phosphorus	0.040 max	--	0.005
Sulfur	0.030 max	--	0.005
ø Chromium	18.00 - 20.00	0.20	0.20
Nickel	8.00 - 11.00	0.15	0.15
Molybdenum	0.50 max	--	0.03
Copper	0.50 max	--	0.03

4. CONDITION: Solution heat treated and descaled.

5. TECHNICAL REQUIREMENTS:

5.1 Tensile Properties:

Tensile Strength, psi	100,000 max
Elongation, % in 2 in.	
Strip	35 min
Full Section	40 min

5.2 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 steady pressure over a hardened and polished tapered steel pin having a 74-degree included angle, to produce a flare having the permanent expanded OD specified in the following table.

5.2 Continued

Nominal OD Inch	Expanded OD Inch, min	Nominal OD Inch	Expanded OD Inch, min
0.188	0.290	0.750	0.937
0.250	0.359	1.000	1.187
0.312	0.421	1.250	1.500
0.375	0.484	1.500	1.721
0.500	0.656	1.750	2.106
0.625	0.781	2.000	2.356

Note 1. Tubing with intermediate nominal OD shall take the same percentage flare as that for the next larger OD.

Note 2. Tubing with nominal OD greater than 2.00 in. and less than 0.188 in. flarability shall be as agreed upon by purchaser and vendor.

5.3 Embrittlement: Tubing shall be capable of meeting the following test:

5.3.1 Test specimens shall withstand immersion for 48 hr in a boiling aqueous solution containing 100 g of $CuSO_4.5H_2O$ and 100 ml of H_2SO_4 (sp gr 1.84) per liter of solution under a reflux condenser, without evidence of intercrystalline surface attack. After such immerson, full cross-sectional specimens of tubing 0.625 in. or less in diameter shall then be flattened to a total thickness under load of three times the wall thickness of the tubing, and one-inch-long specimens of tubing over 0.625 in. in diameter shall be split and bent 180 degrees with outside surface of tube on inside of bend, around a diameter equal to the wall thickness, without showing evidence of cracks or defects. In either flattening or bending, the fold shall be made parallel to the axis of the tube.

5.4 Pressure Test: Tubing shall show no bulges, leaks, or other defects when subjected to an internal hydrostatic pressure, based on nominal dimensions, sufficient to cause a tensile stress of 20,000 psi in the tubing wall.

5.5 Seamless tubing may be supplied provided it meets all the requirements of this specification.

6. QUALITY:

6.1 Tubing shall have a good workmanlike finish conforming to the best practice for high quality aircraft material. Tubing shall be uniform in quality and condition, clean, sound, and free from grease and other foreign matter, and from internal and external defects detrimental to fabrication or to performance of parts.

6.2 When tubing is fabricated by welding, it shall be so processed as to completely remove the bead and any dimensional indication of the presence of welds.

7. TOLERANCES: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2243 as applicable. Diameter tolerances shall conform to Table III.