AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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STEEL TUBING, SEAMLESS, CORROSION AND HEAT RESISTANT
18Cr - 11Ni - Cb (SAE 30347)

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

2. APPLICATION: Parts and assemblies requiring both corrosion and heat resistance and especially when such parts and assemblies are welded during fabrication. Parts and assemblies requiring oxidation resistance up to approximately 1500 F, but useful at that temperature only when stresses are low.

3. COMPOSITION:

		Check Analysis Under Min or Over Max	
Carbon	0.08 max	--	0.01
Manganese	2.00 max	--	0.04
Silicon	0.75 max	--	0.05
Phosphorus	0.030 max	--	0.005
Sulfur	0.030 max	--	0.005
Chromium	17.00 - 20.00	0.20	0.20
Nickel	9.00 - 13.00	0.15	0.15
Columbium	10xC - 1.00	0.05	0.05
Copper	0.50 max	--	0.03
Molybdenum	0.50 max	--	0.03

4. CONDITION: Solution heat treated and pickled, or as ordered.

4.1 Fabrication: Any surface finishing operation applied to remove objectionable pits and surface blemishes shall be performed prior to the last solution heat treatment. A light polish to improve surface appearance may be employed after solution heat treatment. Passivation treatment shall follow any polishing treatment.

5. TECHNICAL REQUIREMENTS:

5.1 Physical Properties:

Tensile Strength, psi		
OD:	Under 0.312 in.	105,000 max
	0.312 in. and over	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. The specimen and pin shall be clean and dry during test.

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: For tubing with nominal OD greater than 2.00 inches, 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, after being heated to 1200 F for two hours and air cooled, shall withstand immersion for 48 hours in a boiling aqueous solution containing 100 g of $CuSO_4 \cdot 5H_2O$ 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 immersion, full cross-sectional specimens of tubing 0.625 inch 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 inch 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.

6. QUALITY: 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 or other foreign matter, and from internal and external defects detrimental to fabrication or to performance of parts.

7. TOLERANCES: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2243 as applicable. Diameter tolerances shall conform to Table I, column headed "Annealed".