AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
29 West 39th Street
New York City

AMS 5591B

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STEEL TUBING, SEAMLESS, CORROSION RESISTANT 12.5Cr (SAE 51410)

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 oil lines and air passages, requiring oxidation resistance up to 1000 F, but useful at the higher temperatures only when stresses are low.

3. COMPOSITION:

			Check Analysis Under Min or Over Max	
	Carbon	0.15 max	--	0.01
	Manganese	1.00 max	--	0.03
	Silicon	1.00 max	--	0.05
ø	Phosphorus	0.040 max	--	0.005
	Sulfur	0.030 max	--	0.005
	Chromium	11.50 - 13.50	0.15	0.15
	Nickel	0.75 max	--	0.03
	Molybdenum	0.60 max	--	0.03
	Aluminum	0.05 max	--	--
	Copper	0.50 max	--	0.03
	Tin	0.05 max	--	--

4. CONDITION: Cold drawn and annealed, unless otherwise specified.

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

5. TECHNICAL REQUIREMENTS:

5.1 Tensile Properties:

Tensile Strength, psi	100,000 max
Elongation, % in 2 in.	
Strip	20 min
Full Section	25 min

5.2 Hardenability: Tubing shall be capable of meeting the following test:

5.2.1 Specimens shall be heated to 1750 F ± 10, held for 30 min. and cooled in still air. Tensile strength of such specimens shall be not lower than 150,000 psi.

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5.3 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 cut end smooth and free from burrs, but not rounded. The specimens shall, at room temperature, be forced axially with steady pressure over a hardened and polished tapered steel pin having a 74 deg included angle, to produce a flare having a permanent expanded OD not less than 1.35 times the nominal diameter.

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 foreign materials 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, columns headed "Annealed or Solution Heat Treated".

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 hardenability 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.

8.2 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

9. IDENTIFICATION:

9.1 Unless otherwise specified, each tube 0.50 in. and over in outside diameter shall be marked with AMS 5591B and the manufacturer's identification, the characters recurring at intervals not greater than 2 feet. The heat number shall be marked near one end. The characters shall be not less than 1/4 in. in height, shall be applied using a suitable marking fluid, and shall be capable of being removed in hot alkaline cleaning solution without rubbing. The markings shall have no deleterious effect on the material or its performance. The characters shall be sufficiently stable to withstand ordinary handling.