



# CERTIFICATE

## By Authority Of THE UNITED STATES OF AMERICA Legally Binding Document

By the Authority Vested By Part 5 of the United States Code § 552(a) and Part 1 of the Code of Regulations § 51 the attached document has been duly **INCORPORATED BY REFERENCE** and shall be considered legally binding upon all citizens and residents of the United States of America. ***HEED THIS NOTICE:*** Criminal penalties may apply for noncompliance.



**Document Name:** SAE J527: Brazed Double Wall Low Carbon Steel Tubing

**CFR Section(s):** 49 CFR 571.116 S6.13.3(b)

**Standards Body:** Society of Automotive Engineers



*Official Incorporator:*

THE EXECUTIVE DIRECTOR  
OFFICE OF THE FEDERAL REGISTER  
WASHINGTON, D.C.



## BRAZED DOUBLE WALL LOW CARBON STEEL TUBING — SAE J527<sup>a</sup>

### SAE Standard

Report of Tube, Pipe, Hose, and Lubrication Committee approved January 1952 and last revised May 1967. Editorial change October 1967.

**Scope**—This standard covers brazed double wall low carbon steel tubing intended for general automotive applications and other similar uses.

**Manufacture**—The tubing shall be made from a single or double strip of steel shaped into the form of a double wall tubing, the seams of which are secured and sealed by copper brazing in a controlled atmosphere. The braze shall be uniform with no evidence of a bead on either the inside or outside of the tubing. The tubing shall be processed in such a manner as to produce a finished product which will meet all requirements of this standard.

**Dimensions and Tolerances**—The standard nominal diameters and the applicable dimensions and tolerances are shown in Table 1.

**Quality**—Finished tubing shall be clean, smooth, and round, both inside and outside; and shall be free from scale and injurious defects. Surface imperfections such as handling marks, die marks, or shallow pits shall not be considered injurious defects provided such imperfections are within the tolerances specified for diameter and wall thickness.

The inside of tubing shall be clean and free from any contamination which will impair the processing or serviceability of the tubing.

**Material**—Tubing shall be made from low carbon steel, such as SAE 1010.

**Mechanical Properties**—The finished tubing shall have mechanical properties as tabulated below:

Yield Strength, psi, min (0.2% offset)	25,000
Tensile Strength, psi, min	42,000
Elongation in 2 in., %	14-40
Hardness (Rockwell 30 T scale), max	65

**Performance Requirements**—The finished tubing shall satisfactorily meet the following performance tests. Test specimens shall be taken from tubing which has not been subjected to cold working after the final processing of the finished sized tubing.

**Flaring Test**—A test section cut from the finished tubing, having squared and deburred ends, shall withstand being double flared at one end to the dimensions shown in SAE J533 without evidence of splitting or flaws. The test section shall be held firmly and squarely in the die and the punch, while being forced down gradually, shall be guided parallel to the axis of the tubing.

**Bending Test**—The finished tubing shall withstand bending on a centerline radius equal to three times the tubing outside diameter without undue reduction of area or flattening where proper bending

fixtures are used.

**Pressure Proof Test**—Unless otherwise specified, the finished tubing shall withstand a hydrostatic proof test, with no evidence of failure, at a pressure which will subject the material to a yield stress of 20,000 psi. Test pressures shall be as determined by Barlow's formula for thin hollow cylinders under tension:

$$P = \frac{2TS}{D}$$

where: D = outside diameter of tubing, in.

P = hydrostatic pressure, psi

S = allowable unit stress of material = 20,000 psi

T = minimum wall thickness of tubing, in.

No tube shall be tested beyond a hydrostatic pressure of 5000 psi, unless so specified.

**Nondestructive Electric Test**—In lieu of the hydrostatic test, where mutually agreed upon by the purchaser and manufacturer, all tubing shall be tested by passing it through an electric eddy current tester which is capable of detecting defects that would prevent the tubing from passing the hydrostatic pressure proof test.

**Corrosion Protection**—The inside and outside of the finished tubing shall be protected against corrosion during shipment and normal storage. If a corrosion preventive compound is applied, it shall be such that after normal storage periods it can readily be removed by cleaning agents normally used in manufacturing.

TABLE 1—TUBING DIMENSIONS AND TOLERANCES, IN.<sup>c</sup>

Nominal Tubing OD	Outside Diameter <sup>a</sup>		Wall Thickness	
	Basic	Tolerance ±	Basic	Tolerance <sup>b</sup> ±
1/8	0.125	0.002	0.025	0.005
3/16	0.188	0.003	0.028	0.003
1/4	0.250	0.003	0.028	0.003
5/16	0.312	0.003	0.028	0.003
3/8	0.375	0.003	0.028	0.003
7/16	0.437	0.004	0.030	0.003
1/2	0.500	0.004	0.035	0.0035
9/16	0.562	0.004	0.035	0.0035
5/8	0.625	0.004	0.035	0.0035

<sup>a</sup> The actual outside diameter shall be the average of the maximum and minimum outside diameters as determined at any one cross section through the tubing.

<sup>b</sup> The tolerances listed represent the maximum permissible deviation at any point.

<sup>c</sup> Other sizes may be specified by agreement of the supplier and user.