

ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

TUBING, WELDED LOW CARBON STEEL
TUBING, BRAZED DOUBLE WALL LOW CARBON STEEL

WSA-M1A308-A1
WSA-M1A308-A2

1. SCOPE

These specifications define tubing manufactured by forming steel strip into a cylindrical form and copper brazing in a reduction atmosphere, or by electric welding steel strip.

2. APPLICATION

These specifications were originally released for hydraulic brake, fuel, vacuum, oil cooler, and air brake lines.

3. REQUIREMENTS

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.2 MATERIAL

The tubing shall be made from low carbon steel, such as UNS 10100, JIS G 3141, DIN CK10, BS 040A10, SAE J 403 1010 or a similar approved steel.

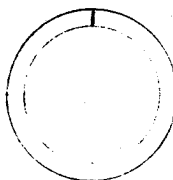
3.3 CONSTRUCTION OPTIONS

WSA-M1A308-A1
 WSA-M1A308-A2

Type 1
 Types 2 and 3

SINGLE WALL CONSTRUCTION

Type 1
 Butt welded

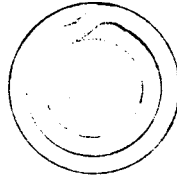


Date	Action	Revisions
2002 07 22	Revised	Updated and renumbered
1989 05 31	B/031524TC	Revised clause 3.3
1988 01 06	SM/ER1739TC	Released R.V. Lebeck K. Gribble NAAO. M Prasser EAO.

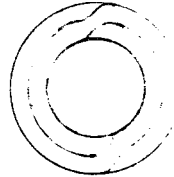
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DOUBLE WALL 360 DEGREE BRAZED CONSTRUCTION

Type 2
Single Strip



Type 3
Double Strip



3.4 HYDROSTATIC/PNEUMATIC PRESSURE TESTS

Each tube shall be capable of withstanding without bursting or leaking, an internal hydrostatic pressure sufficient to subject the material to a fiber stress of 140 MPa. The hydrostatic pressure is to be determined by the formula;

$$PD = 2St$$

Where

P = Hydrostatic pressure in MPa
t = Wall thickness of tubing in mm
D = Outside diameter of tubing in mm
S = Allowable fiber stress

In lieu of the hydrostatic test, welded tubing may be subjected to an air under water or air pressure decay test at 1.5 to 2.0 MPa pressure without leaking or bursting.

3.5 EDDY CURRENT TEST

All tubing manufactured to this specification shall be 100% nondestructive, eddy current tested to ensure uniform quality. If defects are noted, immediate action must be taken to identify and remove the irregularity.

In addition to the eddy current test, a prescribed program of physical tests and visual inspection is to be conducted at regular intervals for additional assurance that tubing is of uniform quality.

3.6 MECHANICAL PROPERTIES

Yield Strength (0.2% offset)	170 MPa min.
Tensile Strength	290 MPa min.
Elongation in 50 mm	14-40%
* Hardness, Rockwell 30T	68 max.

* NOTE The Rockwell hardness test shall be made on the inside surface of a specimen cut longitudinally from the tubing. Test shall be made at points away from the seams.