

**Ministry of Defence
Defence Procurement Agency, ADRP2
Abbey Wood
Bristol
BS34 8JH**

OBSOLESCENCE NOTICE

All DTD specifications were declared obsolescent from 1st April 1999. All DTD 900 series approvals also lapsed at that time. The standards will no longer be updated but will be retained as obsolescent documents to provide for the servicing of existing equipment.

Further Guidance

The aim in declaring the specifications obsolescent is to recognise that the documents are not being updated and thus should be used with care by both purchaser and supplier. For example, a specification could contain valid technical information but may also contain type approval clauses that contradict procurement policy and/or use materials that do not comply with environmental legislation. The obsolescent specification can still be used as a basis for a purchase provided that the supplier and purchaser agree suitable changes to the specification within the purchase order/contract.

For the DTD 900 system, each specification has provided an MoD approved material and process. For these items, the declaration of obsolescence will constitute the termination of both the extant MoD approval and the continuing MoD assessment that had underpinned those approvals. Again, the technical content of the document remains valid and can be used by both purchaser and supplier as a basis for a contract but an acceptable (to the parties) approval/assessment procedure would be required.

Aircraft Material Specification
LOW PRESSURE FLEXIBLE OXYGEN
TUBING (MARK VI)

Clause 7. Para. 2(b).

Delete :
75 lb. per square inch.

and *Insert:*
65 lb per square inch.

Appendix VI.

Delete:
75 lb. per square inch.

and *Insert :*
65 lb. per square inch.

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Material Specification

LOW PRESSURE FLEXIBLE OXYGEN TUBING (MARK VI)

NOTE. — This specification is one of a series issued by the Ministry of Supply either to meet a limited requirement not covered by any existing British Standard Specification, or to serve as a basis for the inspection of materials the properties and uses of which are not sufficiently developed to warrant submission to the British Standards Institution for standardisation.

1. Description.—The material shall consist of tubing made from a natural rubber or G.R-S. mix without fabric reinforcement.

2. Freedom from Defects.—The material shall be free from defects.

3. Freedom of Bore from Foreign Matter.—The bore shall be free from all foreign matter, including chalk.

4. Freedom from Odour.—The material shall be substantially free from odour.

5. Colour.— The colour of the tubing shall be drab.

6. Dimensions.—The dimensions of the tubing shall be as follows :-

- (a) The mean external diameter shall be $\frac{3}{8}$ inch $\pm \frac{2}{1000}$ inch.
- (b) The mean internal diameter shall be $\frac{5}{32}$ inch $\pm \frac{2}{1000}$ inch.
- (c) The tubing shall be capable of being fitted over a rod $\frac{1}{4}$ inch in diameter.

7. Tests.— (1) The following tests shall be carried out to the satisfaction of the Inspector, on a sample taken from any one length of tubing in each batch made from a particular mix of rubber and vulcanised at one time :-

- (a) *Extensibility.* —The extensibility of the tubing, when determined under each of the following conditions by the methods described in Appendices I and II shall be not less than the figures given below :—
 - (i) At room temperature 25 per cent.
 - (ii) At room temperature after accelerated ageing 25 per cent.
- (b) *Resistance to Low Temperature.* —The tubing, when tested by the method described in Appendix III, shall not fracture or show signs of surface cracking.
- (c) *Freedom from Loose Particles.*—The amount of loose particles detachable by the method described in Appendix IV shall not exceed 0.01 per cent. by weight.

(2) The following tests shall be carried out to the satisfaction of the Inspector on each length of tubing :—

- (a) *Resistance of Kinking.* The resistance to kinking of the tubing shall be such that, when tested by the method described in Appendix V, the kink shall disappear immediately on release of the pressure.
- (b) *Resistance to Bursting* — The tubing shall not burst when tested under a pressure of 75 lb. per square inch, as described in Appendix VI, and there shall be no visible signs of ballooning.
- (c) *Freedom from Pinholes.*— No bubbles shall escape from the tubing when tested by the method described in Appendix VII.

8. Type Approval. Before any particular Manufacturer's Material is approved and acceptable as complying with this specification, a sample length of tubing shall be submitted to the Director of Aeronautical Inspection (I.N.M.I) for examination for compliance with the requirements specified in Clauses 4 and 5.

The sample shall be submitted initially and whenever a change in the composition of the mix is made. The Inspector may also at his discretion require that a sample be resubmitted for type approval at any time he may consider necessary.

9. Release Notes. —The Manufacturer must state on each Release Note that the material being released is identical in all respects with the material which has been approved previously in accordance with Clause 8.

10. Method of Marking.— (i) Each length of tubing shall be marked round the circumference with one or more rings of coloured self-adhesive tape or coloured paint (of a type which will not harm the tubing) to indicate the date of manufacture. The colours shall be as follows :—

Year	Colour
1946	Blue
1947	Red
1948	Green
1949	Heliotrope
1950	Yellow

After 1950 the colours shall be repeated in the same sequence as above for each following group of five years. The number of rings shall be as follows :—

January 1st to March 31st inclusive	1 ring
April 1st to June 30th inclusive	2 rings
July 1st to September 30th inclusive	3 rings
October 1st to December 31st inclusive	4 rings

(ii) Each length of tubing shall also be marked in a manner agreed with the Director of Aeronautical Inspection (I.N.M.I), to indicate the Manufacturer, the batch number, and the type of rubber used in its manufacture.

APPENDIX I

Method for the Determination of Extensibility at Ordinary Temperature

A load of 15 lb. shall be applied to a sample of the tubing, and after 1 minute the extension shall be measured on a length of not less than 5 inches. The temperature of the sample shall be maintained at $20^{\circ} \pm 5^{\circ}$ C. for half an hour prior to, and during the test.

A suitable apparatus is illustrated in Fig. 1, the description being as follows :—

The test sample, 6 inches long, is wired at one end to a grooved piece of $\frac{1}{4}$ inch diameter steel tubing 1 inch long (sliding holder "A") to which a graduated scale is attached.

The other end of the sample is then wired to a grooved section $\frac{1}{4}$ inch diameter (holder "B"), at the end of a $\frac{1}{8}$ inch diameter steel rod which passes through the bore of the test sample, through sliding holder "A", and is long enough to act as a pointer on the graduated scale.

The distance between the wiring is 5 inches.

The above arrangement is then placed inside a $1\frac{1}{4}$ inch diameter steel tube, flanged at one end and closed at the other. The steel tube carries a slotted plate 1 inch from the closed end, and the cross bar at the end of holder "B", is passed through the slot and then rotated through 90° . A cord is attached, as shown, to the top of the scale and to the weight and passes over two pulleys, the flanged end of the tube bearing meanwhile against an angle iron bracket conveniently placed.

APPENDIX II

Method of Accelerated Ageing

A sample of the tubing, 6 inches long, shall be suspended vertically in an oven and aged by the method described in B.S. 903-1940 for 216 hours.

At the conclusion of the ageing period, the sample shall be removed from the oven and suspended for 24 hours, at a temperature of 21° C. $\pm 3^{\circ}$ C., shielded from direct sunlight.

The extensibility of the sample under a load of 15 lb. shall then be determined as described in Appendix I

APPENDIX III

Method for the Determination of Resistance to Low Temperature

A sample of the tubing, 12 inches long, shall be cooled in a refrigerator at minus 40° C. $\pm 2^{\circ}$ C. for at least one hour, the centre 6-inch section, which is to be bent, being maintained in a straight position. A mandrel, 1 inch in diameter, shall be placed in the refrigerator for the same time. At the end of that period the tubing shall be bent tightly round the mandrel, whilst still at a temperature of minus 40° C., the time of bending being not more than 2 seconds, and the plane of the bent tubing being at right angles to the longitudinal axis of the mandrel. When bending the tubing, care shall be taken that no part of it more than 2 inches from the ends is subjected to a temperature above minus 38° C.

The tubing shall then be examined for surface cracks.

APPENDIX IV

Method for the Determination of Freedom from Loose Particles

A sample of the tubing, 6 inches long, shall be aged as specified in Appendix II.

It shall then be rolled for 1 minute on a flat surface with a 10 lb. cylindrical weight of $1\frac{3}{4}$ inches diameter, after which the internal surface shall be washed thoroughly with alcohol to B.S.S.— 3D.9, and the washings passed through a tared filter paper or Gooch crucible. The paper or crucible and residue shall be dried at 100° C. and then weighed.

APPENDIX V

Method for the Determination of Resistance to Kinking

A sample of the tubing, 12 inches long, shall be plugged at each end to a depth of 1 inch by means of metal rods which shall be $\frac{1}{4}$ inch in diameter. The two portions of the tubing containing the rods shall then be held firmly together for 15 seconds parallel to each other, in such a direction that a loop and not a ring, is formed. The inner line of the loop shall lie on a smooth curve. A kink shall then be formed by pressing the sides of the loop together and the pressure then released.

In the case of tubing vulcanised in the coil, resulting in a permanent set, the kinking test shall be carried out when the kink is made in the direction of the permanent set, against the direction of the permanent set, and after rotating the tube 90° in either direction from the permanent set.

APPENDIX VI

Method for the Determination of Resistance to Bursting

Each length of tubing shall be subjected under water to an internal air pressure of 75 lb. per square inch.

APPENDIX VII

Method for the Determination of Freedom from Pinholes

Each length of tubing after subjection to the test described in Appendix VI, shall be subjected to an internal air pressure of 20 lb. per square inch.

APPARATUS FOR MEASURING EXTENSIBILITY OF RUBBER TUBING. DETAILS.

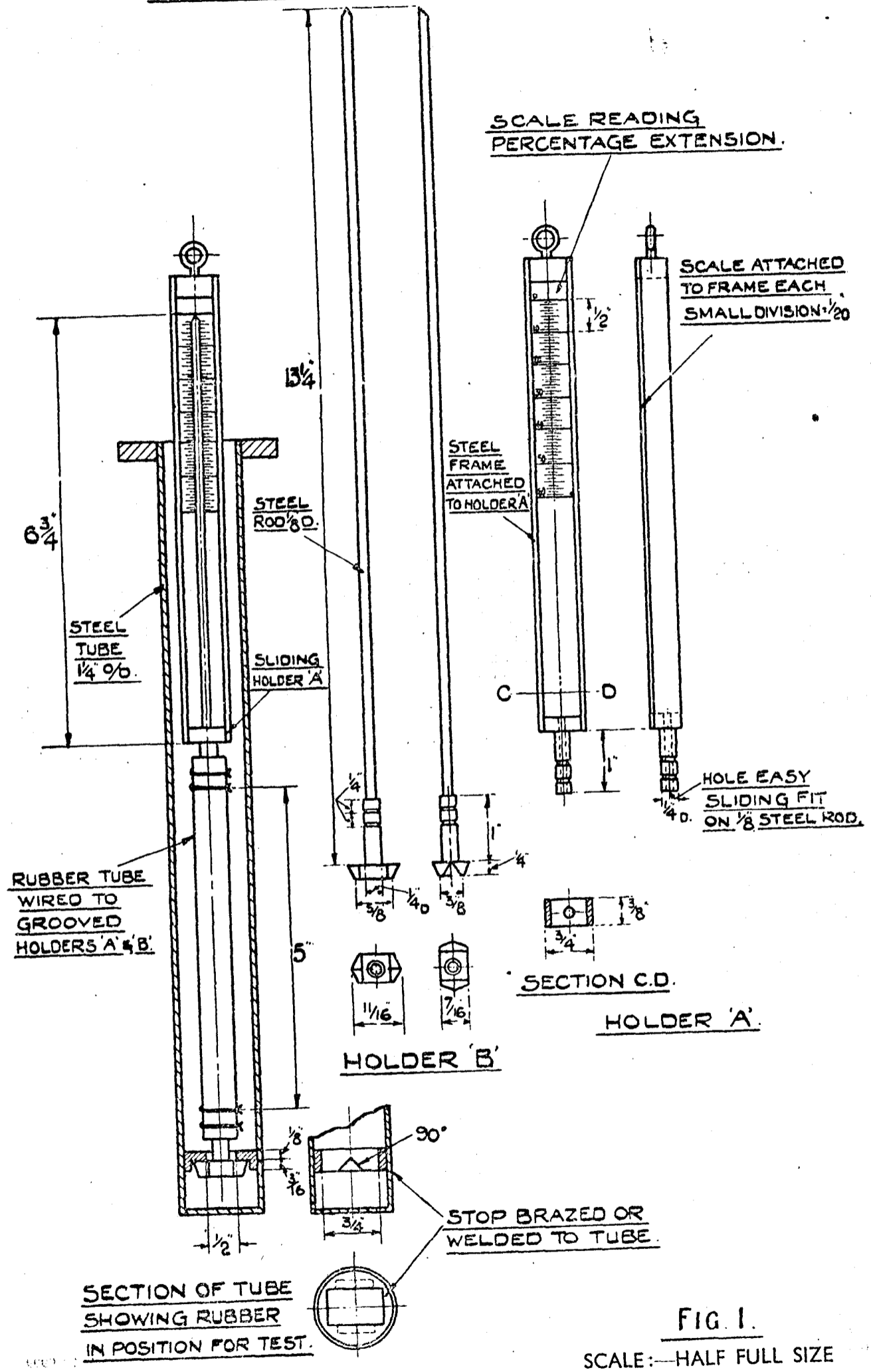


FIG. I.

SCALE:—HALF FULL SIZE