

**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

RUBBER PARTS FOR USE WITH ETHYLENE GLYCOL

NOTE 1.-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 inspection of material the properties and uses of which are not sufficiently developed to warrant submission to the British Standards Institution for Standardisation.

NOTE 2.-Except where otherwise stated the methods of testing shall be as described in British Standard Methods of Testing Vulcanised Rubber, No. 903-1940.

NOTE 3.-This specification covers two grades of material, A and B, of different hardness ; Grade B being the harder. The grade required must, therefore, be stated on the Order.

SECTION 1

RUBBER MATERIAL

1. **Description.**-The material shall consist of uniformly compounded natural or synthetic rubber or rubberlike material which, after vulcanisation-if necessary-shall comply with the requirements specified below.

2. **Revision of Test Samples.**-From each lot or batch of compounded material the following test samples shall be produced, having the same composition and (if vulcanised) the same degree of cure as the main bulk of material :-

- (a) 1 sample 3 inch x 3 inch x $\frac{1}{4}$ inch for hardness tests,
- (b) 1 sample 12 inch x 12 inch x $\frac{1}{4}$ inch for remaining tests.

3. **Tests.**-The following tests shall be carried out to the satisfaction of the Inspector on test pieces cut from the sample specified in Clause 2 :-

(a) *Hardness.*-The hardness shall be :-

- Grade A.-B.S. Hardness No. not more than 60 or less than 40.
- Grade B.-B.S. Hardness No. not more than 40 or less than 10.

(b) *Tensile Properties.*-The tensile properties shall be :-

	Grade A.	Grade B.
Minimum Tensile Strength (Dumb-bell method *) (lb./sq. in.) ..	1,800	1,800
Minimum Elongation at Break (per cent.)	300	100
Maximum Permanent Set (per cent.)	10	10

(10 minutes stretch under load of 700 lb./sq. in. ; 10 minutes recovery).

(c) *Resistance to Accelerated Ageing.*-The resistance to the accelerated ageing treatment described in Appendix I shall be such that the tensile strength after ageing shall be :-

- Not less than 85 per cent. of that of the unaged material for Grade A,
- and not less than 95 per cent. of that of the unaged material for Grade B.

(d) *Resistance to Ethylene Glycol.*-The resistance to ethylene glycol shall be such that, when tested by the method described in Appendix II, the weight shall not increase by more than 15 per cent. or decrease by more than 2 per cent., and the material shall show no signs of disintegration. In addition the hardness number shall not change by more than the appropriate figure shown in the table below :-

Grade.	B.S. Hardness Range.	Permissible alteration in hardness (per cent.)
A	40-60	± 2 0
B	30-40	± 2 0
B	20-29	+40, - 20
B	10-19	+60, - 20

* (The Tensile Strength test may be carried out by the Ring method, provided that satisfactory evidence of tensile figures determined by the two methods is furnished to the Director General of Aeronautical Inspection, and his agreement to the correlation is obtained).

- (e) *Resistance to Low Temperature.*-The resistance to low temperature shall be such that, when tested by the method described in Appendix III, the test piece shall show no signs of failure.
- (f) *Freedom from Impurities.*-(i) Chloride and Sulphate content. The material shall contain not more than 0.1 per cent. by weight of chloride (calculated as Cl) or more than 0.2 per cent. by weight of sulphate (calculated as SO₄), when determined by the method described in Appendix IV.
- (ii) pH Value. The pH value of an aqueous extract of the material, prepared and tested by the method described in Appendix V, shall be not less than 6.0 or more than 8.5.

4. Retests.-If failure is experienced in any one of the tests specified in Clause 3, two further sets of samples shall be prepared as specified in Clause 2 from the same lot or batch of compounded material as that which failed, unless the lot or batch is withdrawn by the Manufacturer. Each of these further test samples must comply with the tests specified in Clause 3 ; otherwise the lot or batch of compounded material represented thereby will be rejected.

SECTION 2

MOULDINGS AND EXTRUSIONS

5. Material.-The mouldings or extrusions shall be made from compounded natural or synthetic rubber or rubberlike material, which has been inspected and passed as complying with Section 1 of this specification. The compounded material used may be reinforced with fabric or other fibrous material, at the option of the Manufacturer and with the approval of the Purchaser.

6. Freedom from Defects.-The mouldings or extrusions shall be free from defects, and any moulding or extrusion may be rejected at any time for faults in manufacture.

7. Selection of Test Samples.-One moulding or extrusion of each design made from each lot or batch of compounded material shall be selected to represent all the mouldings or extrusions of the same design made from the same lot or batch of compounded material. Should any moulding or extrusion be too large to test, a representative section of it of suitable size may be tested instead.

8. Tests.-The mouldings or extrusions selected as specified in Clause 7 shall comply with the following requirements, to the satisfaction of the Inspector. Section (a) is applicable to reinforced material only.

- (a) *Resistance to Separation.*-The resistance to separation shall be such that the moulding or extrusion shall show no visual evidence of separation between the compounded material and the reinforcement, when tested by the method described in Appendix VI.
- (b) *Resistance to Ethylene Glycol.*-The resistance to ethylene glycol shall be such that, after subjection to the conditions described in Appendix VI, the weight shall not increase by more than 15 per cent. or decrease by more than 2 per cent., and the material shall show no signs of disintegration or change of shape.

9. Retests.-If any moulding or extrusion fails to comply with any of the tests specified in Clause 8, two further mouldings or extrusions of the same design and made from the same lot or batch of compounded material as that which failed shall be submitted to, and must comply with, the requirements specified in Clause 8 ; otherwise the mouldings or extrusions represented thereby will be rejected.

APPENDIX I

Method for the Determination of Resistance to Accelerated Ageing

A test piece shall be aged in an oven for 150 hours as described in B.S. 903-1940. At the conclusion of the ageing period the specimen shall be removed from the oven and suspended for 24 hours at a temperature of 15° C. to 20° C. shielded from direct sunlight. The tensile strength of the sample shall then be determined.

APPENDIX II

Method for the Determination of Resistance to Ethylene Glycol

A test piece, 6 inches in length, 1 inch in width, and of known weight and hardness, shall be immersed for three successive days in Ethylene Glycol (Specification No. D.T.D. 344A), maintained at a temperature of 150° C. ± 5° C. for eight hours each day, followed by 16 hours cooling each day. At the end of this period the sample shall be removed from the vessel, the adherent liquid removed by careful wiping with a soft clean cloth, and the weight and hardness again determined.

APPENDIX III

Method for the Determination of Resistance to Low Temperature

After completion of the test described in Appendix II, the ends of the test piece, cut to 6 inches x 1 inch if swollen, shall be fixed in two grips so that the specimen lies in one plane with 5 inches exposed between the grips.

The clamped specimen shall be placed vertically in a vessel of about 3 inches in diameter containing alcohol maintained continuously at a temperature of $-40^{\circ}\text{C.} \pm 1^{\circ}\text{C.}$ by means of added solid carbon dioxide, so that the sample is completely immersed. After remaining for 30 minutes in the liquid the distance between the grips shall be reduced by one inch in 20 seconds, by moving one grip directly towards the other, and in the same plane. The test piece shall then be examined visually.

A suitable apparatus is shown in Figure 1. It consists of a back plate carrying two clamps fixed to an end stop and a sliding plunger respectively. The plunger carries a head with a bevelled edge moving over a scale graduated in inches, which is fixed to the back plate so that the bevel is at zero when the undistorted sample is clamped in position.

APPENDIX IV

Method for the Determination of Chloride and Sulphate Content

Five grams of the material, cut into pieces about 1 cubic millimetre in size, shall be boiled for two hours in 100 ml. of distilled water in a chemically resistant glass flask. After cooling, the original volume shall be made up with distilled water, and the chloride and sulphate contents determined by the usual methods.

APPENDIX V

Method for the Determination of pH Value

Five grams of the material, cut into pieces about 1 cubic millimetre in size, shall be boiled for two hours in 100 ml. of unbuffered, carbon dioxide free distilled water in a chemically resistant glass flask. After cooling, the original volume shall be made up with unbuffered, carbon dioxide free distilled water, and the pH value determined.

In case of dispute, the pH value shall be determined electrometrically, using a glass electrode.

APPENDIX VI

Method for the Determination of Resistance to Separation

Each selected moulding or extrusion shall be examined visually after having been subjected to the following conditions in the order given :-

- (i) Exposure to -40°C. in air for not less than one hour.
- (ii) Exposure to $+40^{\circ}\text{C.}$ in air for not less than one hour.
- (iii) Immersion for three successive days in ethylene glycol (Specification No. D.T.D. 344A), maintained at a temperature of $150^{\circ}\text{C.} \pm 5^{\circ}\text{C.}$ for eight hours each day, followed by 16 hours cooling each day.

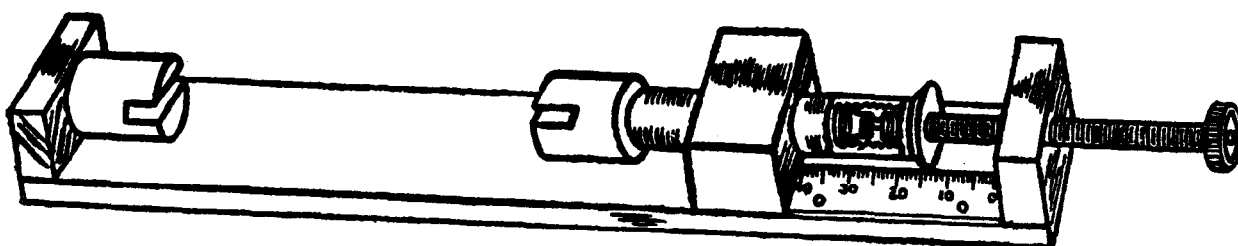


Fig. 1.

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