

**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
for
POLYTETRAFLUOROETHYLENE
GRANULAR POLYMER

NOTE 1.-This specification is one of a series issued by the Ministry of Aviation either to meet a limited requirement not covered by an existing British Standard 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.

NOTE 2.-The intended applications of this material are for the manufacture of mouldings required to possess good electrical properties and/or chemical resistance over a wide range of temperatures (sub-zero to 250°C).

NOTE 3.-The requirements of this specification relate to granular polymer only and do not necessarily apply to finished products.

1. Composition

1.1. The material shall consist of a stable polymer of tetrafluoroethylene.

2. Impurities in the Material

2.1. The material shall be of uniform composition and shall be reasonably free from additives and foreign material.

3. Particle Size

3.1. When determined by the method described in Appendix I, the median particle size shall be less than 780 microns with a minimum of 10 per cent passing 60 B.S. sieve, (See B.S.410 "Test Sieves").

4. Moisture Content

4.1. When determined by the method described in Appendix II the moisture content shall not exceed 0.1 per cent.

5. Tensile Strength and Elongation at break

5.1. The tensile strength when determined by the method described in Appendix III shall be not less than 2,000 lb. per square inch and the elongation at break shall be not less than 250 per cent.

6. Visual appearance of moulded specimens

- 6.1. The tensile specimen moulded as described in Appendix III shall be of uniform appearance and shall not have any surface blisters or cracks when examined by unaided visual means.
- 6.2. A slice cut from a tensile specimen shall be of uniform appearance and shall contain no cracks or voids when viewed against a light by normal visual means.

7. Power Factor

7.1. When determined by the method described in Appendix IV the power factor shall not exceed 0.00025.

8. Permittivity

8.1. When determined by the method described in Appendix IV the permittivity shall not exceed 2.12.

9. Frequency of testing

- 9.1. Every batch of material shall meet the requirements of Clauses 1-6 and 10.
- 9.1.1. A batch of material shall be a quantity of material so designated by the manufacturer and substantially uniform in quality.
- 9.2. The material shall be tested for compliance with the requirements of Clauses 7 and 8 at least once every three months.
- 9.3. The Director of Chemical Inspection may require the manufacturer to test the material for compliance with any of the requirements at any time.

10. Marking

10.1. Each container of material shall be marked with :-

- (a) The specification number.
- (b) The batch identity number.
- (c) The weight of material in the container.
- (d) The year of manufacture.
- (e) The contract number-where applicable.
- (f) The manufacturers name and recognised trademark.

APPENDIX I

Method for the determination of Particle Size

(a) Preparation of test sample

The material shall be thoroughly mixed before sampling and a 50 g sample taken.

(b) Procedure

The powder shall be sieved through a nest of sieves as follows :-

B.S.10; B.S.22; B.S.30; B.S.44; B.S.60.

The sieves and tray shall be cleaned and weighed to within 0.1 g before the sieving operations.

The sieves with powder and cover shall be shaken and rotated mechanically for 30 minutes after which the sieves with retained powder shall be weighed to within 0.1 g.

The weight of powder retained on each sieve and the weight of powder passing the 60 B.S. sieve shall be calculated as a percentage of the total weight of powder retained on the sieves and passing the 60 B.S. sieve and the median particle size derived.

APPENDIX II

Method for the Determination of Moisture Content

10 g approximately of granular polymer shall be weighed accurately into a tared flat-bottomed glass dish having a diameter of 2 in. approximately. The polymer shall be spread evenly over the base of the dish which shall then be placed in an oven and heated at $110^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 2 hours. The dish and contents shall then be removed from the oven, quickly placed over anhydrous calcium chloride in a desiccator and allowed to cool to room temperature when they shall be reweighed.

The percentage moisture content shall be calculated using the equation:-

$$\text{Percentage moisture content} = \frac{\text{loss in weight} \times 100}{\text{Original sample weight}}$$

APPENDIX III

Method for the Determination of Tensile Strength and Elongation

(a) Preparation and form of Specimen

The specimen shall be moulded from powder which has been passed through a B.S.10 sieve in order to break up aggregates. It shall be pressed in a positive mould as shown in Fig. 1.

The mould and powder shall be heated 100°C , the mould shall be filled with powder and struck off level using a straight edge. A pressure of $1\frac{1}{2}$ tons/sq. in. shall be applied over 45 sec. and maintained for 15 sec. The specimen shall be pressed from the tool and placed on a wire tray in an oven heated to $380 \pm 5^{\circ}\text{C}$ for 90 min. It shall then be removed from the oven and immediately quenched between flat steel plates 9 in. x 9 in. x $\frac{3}{4}$ in. at room temperature for 15 min. after which it shall be removed from the plates and allowed to attain room temperature.

(b) Procedure

The cross sectional area of the gauge length of the specimen shall be measured, and the specimen shall then be conditioned at $35 \pm 1^{\circ}\text{C}$ for 15 minutes and maintained at this temperature while under test.

The equipment used shall be maintained at a temperature of $35 \pm 1^{\circ}\text{C}$.

A suitable tensile testing machine and grips shall be used.

The rate of extension shall be $1\frac{1}{4}$ in./min.

Elongation shall be calculated from the extension at break over the 1 in. gauge length of the specimen.

3 determinations of tensile strength shall be made and the average recorded as the result.

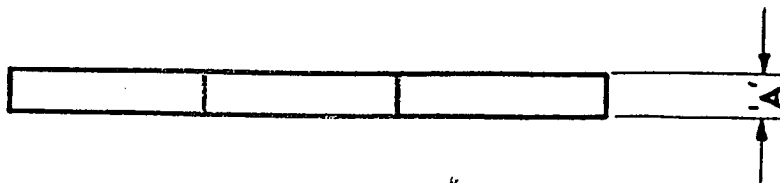
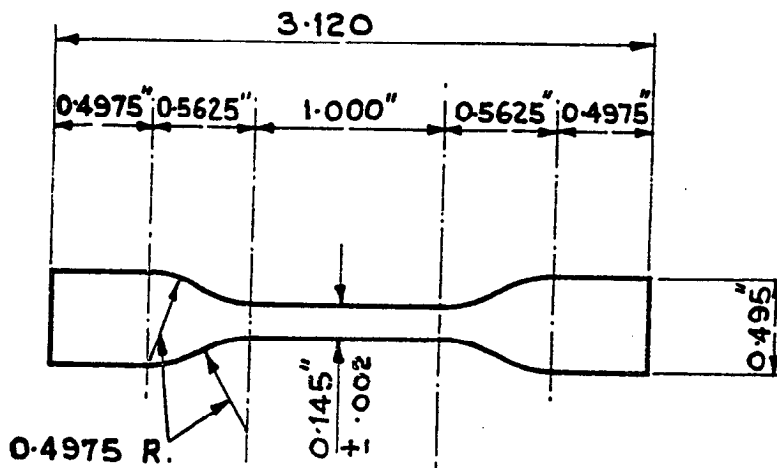
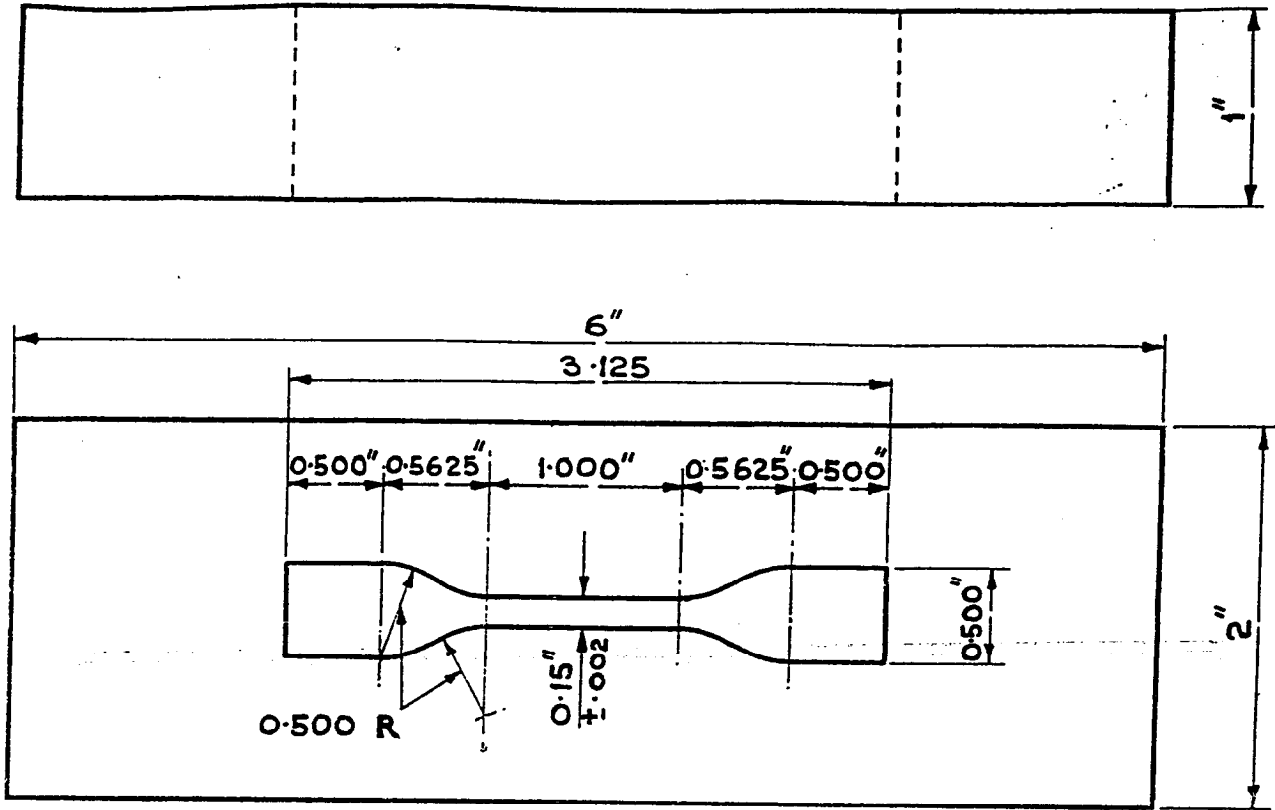
APPENDIX IV

Method for the Determination of Power Factor and Permittivity

(a) Preparation and form of specimen

The specimen shall be prepared from powder which has passed through a B.S.10 sieve. It shall be pressed in a positive mould.

The mould and powder shall be heated to 100°C the mould shall be filled with powder and struck off level using a straight edge. A pressure of $1\frac{1}{2}$ tons/sq. in. shall be applied in 45 sec. and maintained for 15 sec. The preform shall be not less than 2 mm thick. It shall be placed in an oven heated to $380^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 90 minutes after which it shall be slowly cooled at a rate not exceeding 15° per hour.



1 OFF. DIMENSION 'A' = $\frac{1}{4}$ "

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MATERIAL :- TOOL STEEL. TOUGHENED.

FIG. 1—MOULD FOR TENSILE SPECIMEN

The specimen shall be machined on both faces so that they are flat and parallel. It shall then be left at room temperature for not less than 14 days after which it shall be machined finished.

(b) Procedure

The power factor and permittivity of the specimen shall be measured at a frequency in the range of 1-20 Mc/sec. by the method described in B.S.2067: 1955, "Determination of Power Factor and Permittivity of Insulating Materials (Hartshorn and Ward method)" or by any other method which can be shown to give the same results.

Approved for Issue,

N. J. L. MEGSON,
Director of Materials Research and Development (Air).

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