D.T.D.891B

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.

MINISTRY OF AVIATION

D.T.D. 89lB

Superseding D. T. D. 891A

February, 1962

Aircraft Material Specification

SINGLE PLY RUBBER PROOFED FABRIC AND TAPE

NOTE 1. —This specification is one of a series issued by the Ministry of Aviation either to meet a limited requirement not covered by any existing British Standard 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. —This specification stipulates the requirements for materials normally intendedfor use in the manufacture of aircrew equipment.

SECTION l — GENERAL

1. Description

This specification defines the essential requirements for single ply fabric proofed with natural rubber on one face only, and for rubber coated tape. It is important that the proofed fabric should have good airtightness at low pressure, good adhesion between the rubber proofing and the underlying textile, and a proofed surface such that good face-to-face adhesion can be obtained by application of self-vulcanising rubber solution.

It is essential that the rubber coating on tape should vulcanise on contact at normal temperatures with self-vulcanising rubber solution.

The make-up of the proofed fabric and tape shall be in accordance with Table I.

Table I

Proofed Fabric Type Designation	Normal use	Textile	Proofing Code	Minimum Weight of Proofing (g. per sq. m.)	Maximum Weight of Proofed Fabric (g. per sq. m.)	Minimum Width (inch)
1	Inflated suit	Cotton RX	RX90	85 (Nominal 90)	160	41
2	Cushion	Cotton B	B90	85 (Nominal 90)	220	41
3	Stole	Cotton RX	RX150	145 (Nominal 150)	220	41
3A	Airborne Stole	Cotton B	B200	195 (Nominal 200)	325	41
4	Pressure Waistcoat	Linen	L150	145 (Nominal 150)	330	35
Tape 1		Cotton or linen as ordered	T30+ 60 U.V.	85 (Nominal 90)		As ordered
Tape 2			T90 U.V.	85 (Nominal 90)		
			(U.V. indicates unvulcanised rubber)			

2. Fabric

(a) The following fabrics shall be used:—

Type 1 .. .. Cotton fabric to D.T.D. 524B, Grade RX.
Type 2 .. .. Cotton fabric to D.T.D. 524B, Grade B.
Type 3 .. .. Cotton fabric to D.T.D. 524B, Grade RX.
Type 3A .. .. Cotton fabric to D.T.D. 524B, Grade B.
Type 4 .. .. Linen fabric to British Standard 7F1, dyed and finished in accordance with Clause 5e.
Tape .. .. Cotton fabric to D.T.D. 524B, Grade RX; or linen fabric to British Standard. 7F1, dyed and finished in accordance with Clause 5e; or other approved cotton fabric if so stipulated in the contract or order.

(b) (i) When cotton fabric is required in dyed condition, this and the colour required shall be stipulated in the contract or order.

(ii) For the dyeing of the cotton fabric, a Sulphur dye shall not be used: the fastness to light of the dyed fabric shall be not less than Standard 6 when tested by the method described in British Standard 1006, and the fastness to water shall be not less than rating 4 when tested by the method described in British Standard 2681. The frequency of testing for fastness to light and water shall be as defined in Clause 2c of British Standard F.100.

3. Proofing

(a) Subject to the requirements of Section 2, the quality of rubber, choice of ingredients and methods of compounding are left to the discretion of the proofer, except that (i) sulphur chloride shall not be used, (ii) a copper-inhibiting antioxidant shall be included in the proofings and (iii) Type 1 fabric shall be self-vulcanised and Types 1 to 4 fabrics shall be adequately vulcanised before delivery.

(b) Except in the event that the cotton or linen fabric has been rot-proofed, 2.0-2.1 per cent of penta-chlorophenyl laurate shall be included in the proofing compound.

4. Tapes

(a) Tapes shall be cut with straight edges to the required width from fabric having a bias at 45°. Bias joins shall be neatly and cleanly made with self-vulcanising solution, with overlaps not less than 10 mm. wide.

(b) Tapes when measured on the roll shall be not narrower than the width ordered.

5. Marking

Both ends of each piece of proofed fabric shall be clearly marked with the proofing code, proofer's identity letter (which will be allotted by the Director of Aeronautical Inspection), and the piece number. These markings shall be applied across one flat face of each roll of tape.

SECTION 2 —TYPE APPROVAL

6. Type Approval

(a) Before any material is accepted as complying with the requirements of this specification, the manufacturer must obtain type approval.

(b) Applications for type approval shall be submitted to the Director of Aeronautical Inspection (INM2), Harefield House, Harefield, Middlesex, accompanied by:-

(i) details of the proofing formulation and vulcanising process.

(ii) evidence that the material complies with the requirements of Section I and the undernoted requirements of Section 3, Clause 8, of this specification:

Type 1 fabric	(a), (b) and (d)
Type 2 fabric	(a), (c) and (d)
Type 3 fabric	(a, (c) and (d)
Type 4 fabric	(a), (c) and (d)
Tape fabric	(e)

(iii) two samples, each one yard long and the full width of the fabric, taken at least 30 yards apart from one piece of proofed fabric.

(c) The material shall also pass such other tests as may from time to time after discussion with the proofer be deemed necessary by the Director of Aeronautical Inspection.

(d) After type approval has been granted no major change in composition or method of processing shall be made until formal approval for the change has been sought and given.

(e) Separate applications for type approval must be submitted in respect of each of the types of fabric listed in this specification.

SECTION 3 — NORMAL INSPECTION

7. *(a)* Each piece of proofed fabric shall be examined visually for freedom from proofing defects and fabric damage. A suitable sample shall be taken by the Inspector from each piece of proofed fabric, well away from the ends, for tests as follows :-

Suit fabric : as required by Clause 8*(a)* and *(b)*
Cushion fabric: as required by Clause 8*(a)* and *(c)*
Stole fabric: as required by Clause 8*(a)* and *(c)*
Pressure Waistcoat fabric : as required by Clause 8*(a)*, *(c)* and *(d)*
Tape fabric: as required by Clause 8*(e)*.

(b) The Director of Aeronautical Inspection may, at his option, call for the complete range of tests appropriate to any fabric to be repeated at any time.

8. Test requirements

(a) The weight and variation of weight across width shall be such that the weight requirements of Table I are complied with on both test pieces, and the difference in weight of proofing on the side and centre test pieces is not greater than 10 g. per sq. m.

(b) The adhesion of the proofing to the fabric base and the air permeability of the proofing shall be such that when a test " cushion " is made and treated as described in Appendix I there are no signs of detachment, and the internal air pressure does not decrease by more than 10 cm. water.

(c) When tested by the high pressure air permeability test, with the proofed face downward, at a pressure of 2 in. mercury (Types 2 cushion and 3 and 3A stole fabrics) or 5 in. mercury (Type 4 waistcoat fabric) not more than 20 bubbles shall break the water surface in five minutes.

(d) The face to face adhesion shall be such that when determined as described in Appendix II the rate of separation is not more than 5 mm. in five minutes.

(e) The tape adhesion to fabric shall be such that the rate of separation is not more than 5 mm. in five minutes under a load of 1.7 kg. for each 50 mm. of width.

(f) The methods of test for weight and variation of weight across width, high pressure air permeability and tape adhesion shall be in accordance with British Standard F. 100.

9. Release

The manufacturer shall certify on each Release Note that the material released is similar in all respects to that previously type approved in accordance with Clause 6.

APPENDIX I

Determination of air permeability and adhesion of proofing

Two rectangles 2A and 2B in Fig. 1 each approximately 15 in. x 12 in. shall be cut from the sample and marked on the proofed side with 1 in. diameter circles on 3 in. centres as shown at Fig. 2. One rectangle shall have a circular hole $\frac{3}{8}$ in. diameter punched in it as indicated on Fig. 2. The proofed surface of the fabric at each circle and edge shall be cleaned with petroleum rubber solvent. The edges (for a width of $\frac{3}{4}$ in.) and the circles shall then be thoroughly smeared with self-vulcanising rubber solution. The two rectangles shall be joined at the circles and edges, care being taken that these coincide. After joining, the whole unit shall be thoroughly rolled and a flanged rubber tube for inflation purposes affixed over the site of the punched hole.

After standing for 48 hours, the resulting test " cushion " shall be inflated with air to an internal air pressure equal to 30 cm. of water and maintained at this pressure for five minutes.

The air pressure of the test " cushion " shall then be sealed off at a pressure of 30 cm. of water, and the pressure determined after an interval of five minutes.

This test shall be made at constant temperature and in a place free from draughts.

If at any time during the test any of the circles fail at the solution/solution interface, the result may be disregarded and the test repeated.

APPENDIX II

Determination of face to face adhesion

Using strips 1A and 1B in Fig. 1 pin them by their edges, proofed face upward, on a table, and mark on each a central area 25 x 6 cm. Soak a cotton-wool swab in petroleum rubber solvent and squeeze until liquid no longer drips off. Using firm finger pressure rub the marked areas of proofing in a zig-zag motion, taking three or four seconds to work from one end of a 25 cm. length to the other end. Then using ,a clean similarly damp swab, or the clean (reverse) side of the original swab, wipe the disturbed surface in four of five straight strokes in one direction only.*

Without further delay apply to each proofed face a good coat of self-vulcanising rubber solution over, and slightly beyond, the marked areas; then follow with two more good coats of the same solution on each specimen, taking care that each coat reaches the tacky stage before the next is applied. When the last coats are tacky remove the retaining pins from one strip and lay this evenly, solutioned face down, over the solutioned face of the other strip, starting at one end and applying hand tension lengthway as the surfaces are brought together. Next roll two or three times with a 4 lb. roller, using no additional pressure, and press the solutioned faces into good contact without squeezing out solution or causing ripples.

After maturing for seven days in a well ventilated place at ordinary temperature (i.e. about 65 to 70°F ‡) cut the test specimen to 25 x 5 cm. and separate the two strips by hand until the line of separation is approximately straight, and normal to the longer direction, and until the mode of stripping is either :-

(a) Wholly from one of the textile faces.

(b) Wholly parting at the solutioned face.

Hang the back strip in a vertical position, and to the free end of the peeling strip secure a clamp loaded to a total of :-

For Type l fabric..	.. 5kg.
For Type 2 fabric..	.. 2kg.
For Type 3 fabric..	.. 2kg.
For Type 4 fabric..	.. 3kg.

Continue hand peeling for about 1 mm. and then let the proof load determine subsequent movement. Mark the line of separation of the plies, e.g. with ink, and five minutes later, measure the distance between the new line of separation and that portion of the previous mark that is on the face from which clean stripping has occurred.

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*The purpose of the test is to predict whether the adhesion properties are such that with cleaning methods. usable in suit manufacturing practice good seam and spot adhesion can be obtained. Cleaning with abrasives or by much more stringent methods with solvents, would defeat the purpose of this test and is not permitted.

‡ For routine test the assembled test specimen may be cured at 70°C for half-an-hour and then tested for adhesion when cooled to room temperature.

Approved for Issue,

N. J. L. MEGSON,

Director of Materials Research and Development (Air)

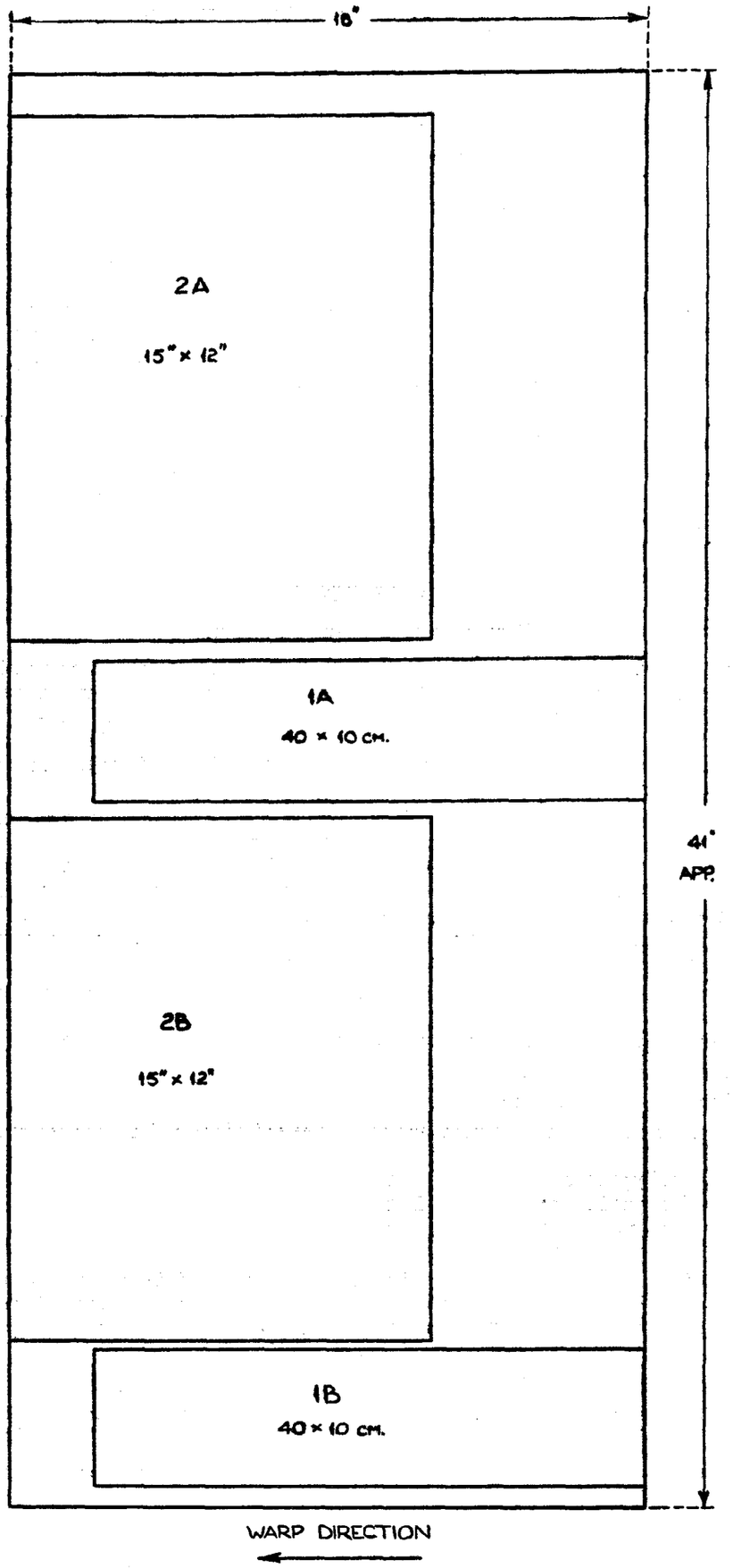

FIG. 1.

ARRANGEMENT OF TEST PIECES FOR TYPE 1 FABRIC

1" CIRCLES ON 3" CENTRES

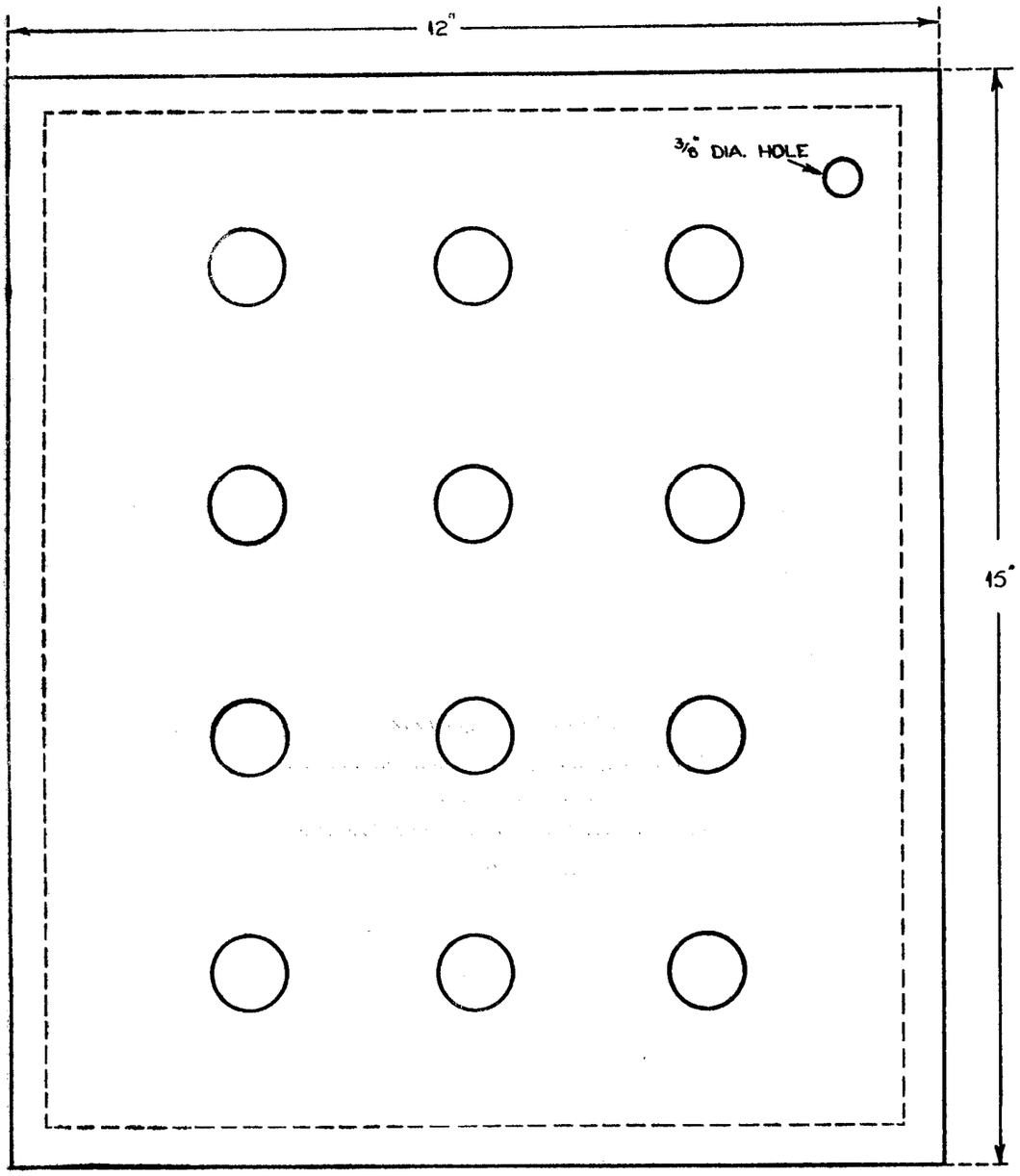

Fig. 2

TEST PIECE FOR " CUSHION " TEST: APPENDIX I

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