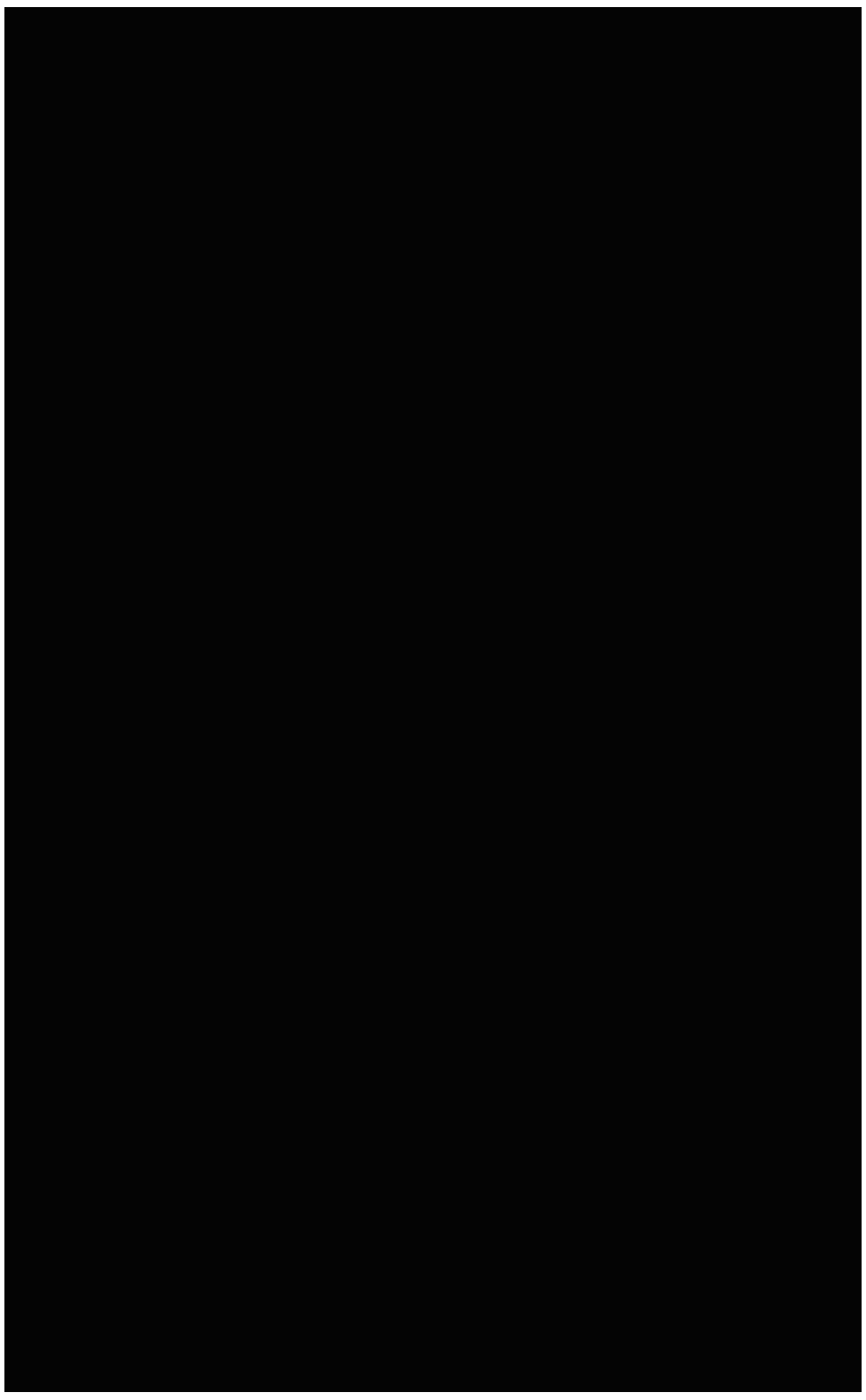

Indian Standard

SPECIFICATION FOR MATTRESS, AIR

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Indian Standard
SPECIFICATION FOR MATTRESS, AIR

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 29 April 1980, after the draft finalized by the Travel Requisites Sectional Committee had been approved by the Consumer Products and Medical Instruments Division Council.

0.2 This standard specifies three types of air mattresses namely Type 1, Type 2 and Type 3. First two types are generally intended for use of civilians for domestic or travel purposes. Type 3 air mattress is generally used by personnel patrolling in high altitudes.

0.3 With a view to making room for future development, this standard does not specify method of reinforcing ends of partition wall, fitting of plug-joint with the body and dimension of plug.

0.4 In the preparation of this standard, assistance has been derived from schedule No. TC-7/94(b) ' Schedule of particular for mattress, pneumatic ' issued by Ministry of Defence, Government of India.

0.5 This standard contains clauses which call for agreement between the purchaser and the supplier and which permit the purchaser to use his option for selection to suit his requirements. The relevant clauses are **3.1, 5, 6.2, 7.4, 7.7, 8.1, 8.5 and 10.1.**

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements, methods of test and sampling for air mattresses intended for the use of civilians for domestic or travel

*Rules for rounding off numerical values (*revised*).

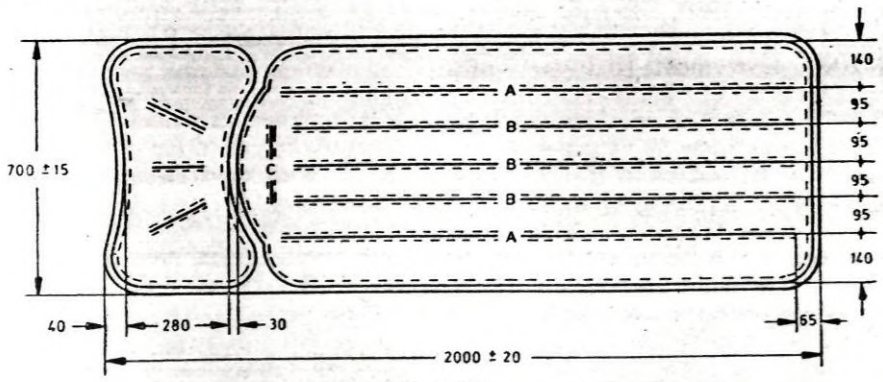
purposes as well as by military personnel patrolling in high altitudes or by mountaineers.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definition of terms given in IS : 2244-1972* shall apply.

3. SHAPE AND DIMENSIONS

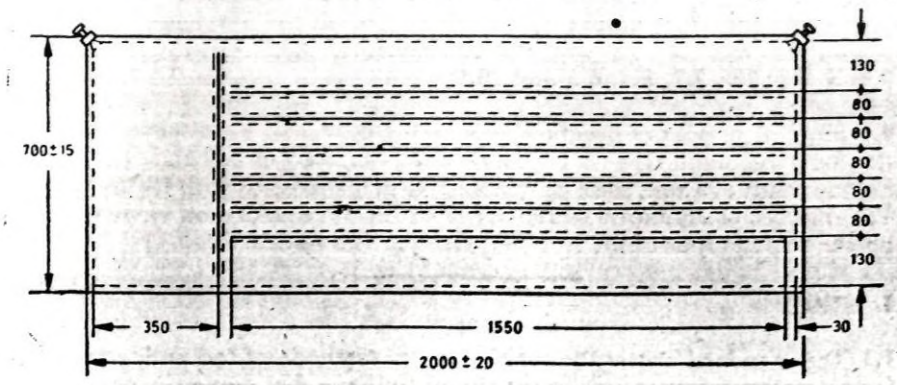
3.1 The air mattresses shall be made to any of the three different patterns, shapes and designs as shown in Fig. 1, 2 and 3. Any other pattern, shape or design shall be subject to agreement between the purchaser and the supplier.



A=1450, B=1200, C=220

All dimensions in millimetres.

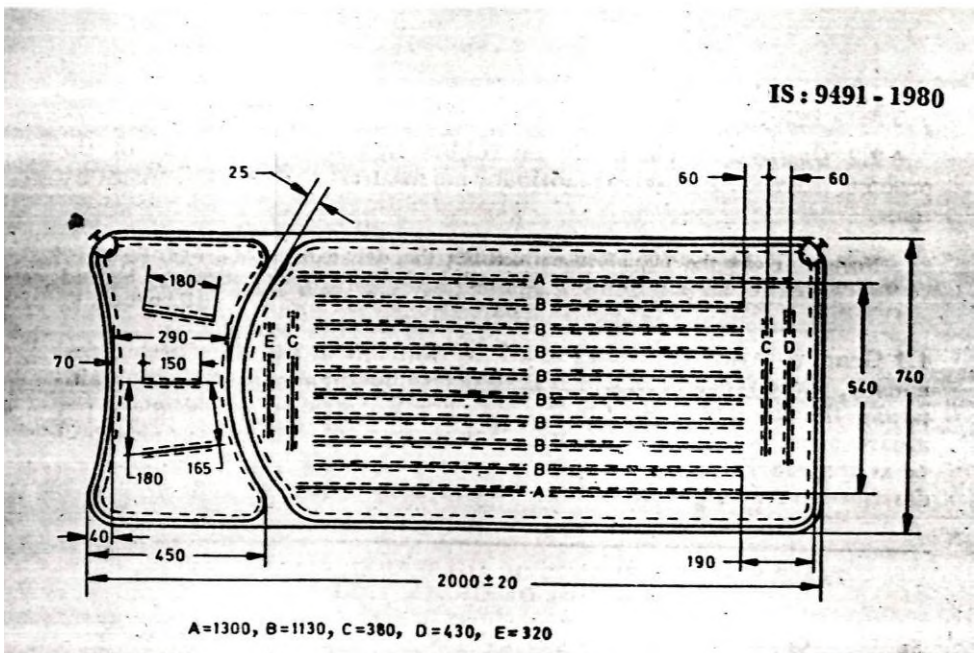
FIG. 1 MATTRESS, AIR



All dimensions in millimetres.

FIG. 2 MATTRESS, AIR

*Glossary of terms relating to treated fabrics (*first revision*).



All dimensions in millimetres.

FIG. 3 MATTRESS, AIR

4. TYPES, QUALITIES AND GRADES

4.1 Types — The air mattresses shall be of three types depending on the nature of the rubberised fabric used for the body.

4.1.1 *Type 1* — Air mattress shall be made from single faced material that is the proofing shall be applied on one side of the base fabric.

4.1.2 *Type 2* — Air mattress shall be made from double faced material where the proofing shall be applied on both sides of the base fabric.

4.1.3 *Type 3* — Air mattress shall be made from white single faced material for top panel with the rubberised side on the inside and double faced rubberised fabric for bottom panel with the olive green shade on the outside and the white shade inside.

4.2 Qualities — Each of the above types of air mattresses shall be made in two qualities depending on the minimum rubber hydrocarbon content of the proofing by mass.

4.2.1 *Quality 1* — The minimum rubber hydrocarbon content of the proofing from the rubberised fabric for air mattresses shall be 60 percent by mass.

4.2.2 *Quality 2* — The minimum rubber hydrocarbon content of the proofing from the rubberised fabric for air mattress shall be 35 percent by mass.

NOTE — In case the manufacturer certifies that only natural rubber has been used o proofing, the direct method of estimation of rubber hydrocarbon may be used, otherwise the test method as given in Appendix A of IS : 5915-1970* shall be used.

4.3 Grades — Air mattresses shall be available in two different grades, namely, Grade A and B, which shall determine their total mass by maintaining the proofing content of the rubberised fabric and the mass per square metre of the proofed fabric. The requirements of these grades shall be as given in Table 1. Method for determination of proofing content is described in Appendix A.

TABLE 1 REQUIREMENTS OF RUBBERISED FABRIC USED IN THE BODY OF AIR MATTRESS

SL No.	CHARACTERISTIC	GRADE		METHOD OF TEST, REF NO.
		Grade A	Grade B	
i)	Mass, g/m², *x*	300	675	IS : 1964-1970*
ii)	Proofing content, g/m², *Min*	175	450	Appendix A
iii)	Breaking load, N/50 mm width, *Min*			
	a) Warp	200	300	IS : 7016 (Part II)-1973†
	b) Weft	250	250	

*Method for determination of weight per square metre and weight per linear metre of fabrics (*first revision*).

†Method of test for coated and treated fabrics : Part II Determination of breaking strength and extension at break.

5. MATERIAL

5.1 Body — The body of the air mattress shall be made from rubberised fabrics which may be of three types as described in **4.1.1**, **4.1.2** and **4.1.3**. Depending on the rubber hydrocarbon content these three types shall be of two qualities, namely, Quality 1 and Quality 2 according to **4.2.1** and **4.2.2**. All these types and qualities shall be available in two grades according to **4.3**.

*Specification for single texture rubberised waterproof fabric.

5.2 Base Fabric — The base fabric shall be made of cotton of viscose staple or any other suitable textile material.

5.3 Nozzle for Inflation and Plug for Nozzle — These shall be made from rubber or from any other suitable polymeric material. These may be of any of the two different designs shown in Fig. 4.

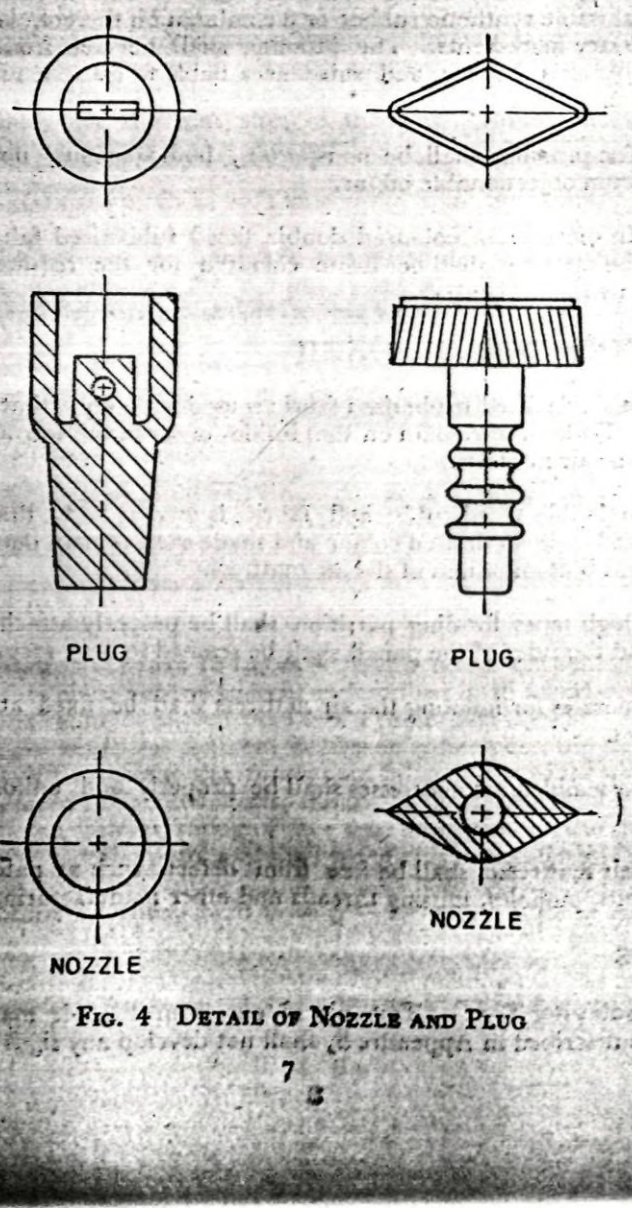


FIG. 4 DETAIL OF NOZZLE AND PLUG

5.4 Cord for Tying Nozzle Plug with the Mattress — The thread shall be made from cotton or any suitable synthetic textile material having breaking strength not less than 2 kgf.

5.5 Eyelet for Fastening — These shall be made of aluminium alloy.

5.6 Proofing — The proofing shall be made from natural rubber or suitable vulcanisable synthetic rubber or a combination thereof, compounded with necessary ingredients. The proofing shall be free from vulcanized waste, reclaimed rubber and substances liable to cause tendering of the bas fabric.

5.6.1 The proofing shall be non-porous, homogeneous, non-blooming and free from objectionable odour.

5.6.2 In the case of coloured double faced rubberised fabrics, that is Type 2, the proofing shall be made coloured for the required shade as specified by the purchaser.

6. WORKMANSHIP AND FINISH

6.1 When single faced rubberised fabric is used as body, that is Type 1, the proofed side shall remain on the inside of both the top and bottom panel of the air mattress.

6.2 When double faced rubberised fabric is used as body, that is Type 2, the proofed side of desired colour and shade shall remain outside of both the top and bottom panels of the air mattress.

6.3 The high tapes forming partition shall be properly attached to either panels and the sides of the panels shall be seamed to have secured joints.

6.4 The nozzles for inflating the air mattress shall be fixed at the appropriate sites.

6.5 The assembled air mattresses shall be properly and uniformly vulcanised.

6.6 The air mattresses shall be free from defects such as patches, stains, crosses, cuts, pinholes, missing threads and other manufacturing defects.

7. TESTS

7.1 Autoclaving Test — Test pieces cut from the air mattress when tested, as described in Appendix B, shall not develop any signs of tackiness

or brittleness and shall show no other apparent deterioration likely to impair its usefulness.

7.2 Air Leak-Proofness Test — When the air mattress is fully inflated to 6·9 kN/m² (0·07 kgf/cm²) and kept for a period of 16 hours at room temperature, it shall not show any sign of leakage.

7.3 Water Immersion Test — Inflate the air mattress to 6·9 kN/m² (0·07 kgf/cm²) and immerse in water. The trapped air on the fabric surface may be removed by a soft camel-hair brush during the test. The leakage rate shall not exceed a total of 15 bubbles in 5 minutes from not more than five different sites of the body. No leakage/air bubbles are permissible from the seams and nozzle.

7.4 Resistance to Cold — The sample from the body portion of the mattress after an exposure of 5 hours to a temperature $-35 \pm 1°C$ or as agreed to between the purchaser and the supplier, shall withstand a bending test around a steel pin of 6 mm diameter without cracking. The purchaser shall specify his option for this test.

7.5 Resistance to Xylol — Test pieces about 40×40 mm will be immersed in xylol for 2 hours at $27 \pm 2°C$ (mean boiling range 140°C) and gently shaken for 1 minute. The rubber coating shall not become tacky nor shall it separate from the base fabric.

7.6 Adhesion Test — The adhesion between fabric and rubber of the body portion, shall be such that when tested in accordance with Method B of IS : 3400 (Part V)-1965*, the rate of separation does not exceed 25 mm per minute under a load of 14·7N (1·5 kgf) for a test piece of width 25 mm.

7.7 Colour Fastness to Light — Single faced rubberised fabric, when tested for colour fastness to light as described in IS : 2454-1967† shall show a fastness rating of not less than No. 2 prescribed therein. In case of air mattresses made in different shades on either sides, the test shall be conducted with respect to the fabric used in each side of the air mattress. For double faced rubberised fabric, the colour of proofing of the proofed fabric shall show a fastness, rating of not less than No. 3 when tested as in IS : 2454-1967†. The purchaser shall specify his option for this test.

7.8 Colour Fastness to Washing — When the fabric is tested for colour

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*Method of test for vulcanised rubbers : Part V Adhesion of rubber to textile fabrics.
†Method for determination of colour fastness of textile materials to artificial light (xenon lamp).

fastness to washing in accordance with IS : 764-1966* the fastness rating in respect of change in shade of the material and the degree of staining of the attached undyed pieces of cotton, evaluated according to IS : 768-1956† and IS : 769-1956‡ respectively shall be not less than 3.

8. SAMPLING

8.1 Unless otherwise agreed to between the purchaser and the supplier, the procedure given in IS : 2500 (Part I)-1973§ shall be followed for sampling.

8.2 The scale of sampling shall be in accordance with that specified in Appendix C.

8.3 The main samples of air mattresses selected according to col 2 of Appendix C, shall be examined for shape and design requirements (*see* 3) and for air-proofness (*see* 7.2) and water immersion test (*see* 7.3).

8.4 If the main samples are found to be satisfactory the sub-samples as specified in col 3 of Appendix C shall be drawn and tested for resistance to xylol, resistance to autoclaving, adhesion, resistance to wash-fastness, and rubber hydrocarbon content.

8.5 If so desired by the purchaser, the sub-sample shall also be tested for resistance to cold and light-fastness.

8.6 The lot shall be declared conforming to the requirements of this specification if all the tests are satisfied.

9. MARKING

9.1 The air mattresses shall be indelibly and legibly marked with the following:

a) Design number, type, quality and grade; and

b) Manufacturer's name or registered trade-mark.

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*Method for determination of colour fastness of textile materials to washing: Test 3 (*first revision*).

†Method for evaluating change in colour.

‡Method of evaluating staining.

§Sampling inspection table: Part I Inspection by attributes and by count of defects (*first revision*).

9.2 The air mattress may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

10. PACKING

10.1 The inner side of mattresses shall be dusted with French chalk and each mattress shall be packed in polyethylene bag of 150 gauze film and five such packets shall be tied to form a bundle. Four such bundles shall then be packed in wooden case or as agreed to between the purchaser and the supplier.

APPENDIX A

(*Clause* 4.3)

DETERMINATION OF PROOFING CONTENT

A-1. REAGENT

A-1.1 Solvent capable of swelling or dissolving cured polymer present in the sample; suitable solvent may be selected depending upon the nature of the polymer and upon the properties of the textile base.

A-2. PROCEDURE

A-2.1 Cut four test pieces of 100 × 100 mm (approximately) each equally spaced across the width of the fabric with two test pieces centred 150 mm from the selvedges. After conditioning at 27 ± 2°C and 65 ± 2 percent relative humidity immerse each test piece in the solvent and heat under the reflux until the proofing is dissolved or swollen thoroughly (generally for 1 hour) taking care not to allow the temperature to exceed 160°C. Remove the test piece from the solvent and carefully scrape off any swollen proofing with a spatula. Repeat the treatment using fresh solvent on each occasion until the fabric is free from rubber squeeze the fabric to remove solvent and rinse with light petroleum hydrocarbon solvent until the fabric is free from the original solvent. Dry it for one hour at 105 to 110°C and then condition for 24 hours. Transfer it to a weighing bottle and determine the weight of the fabric.

APPENDIX B

(*Table* 1)

DETERMINATION OF PROOFING CONTENT

B-1. REAGENT

B-1.1 Solvent Capable of Swelling or Dissolving Cured Polymer Present in the Sample — Suitable solvent may be selected depending upon the nature of the polymer and upon the properties of the textile base.

B-2. PROCEDURE

B-2.1 Cut four test pieces of 100 × 100 mm (approximately) each, equally spaced across the width of the fabric with two test pieces centered 150 mm from the selvedges. After conditioning at 27 ± 2°C and 65 ± 2 percent relative humidity immerse each test piece in the solvent and heat under the reflux until the proofing is dissolved or swollen thoroughly (generally for 1 hour) taking care not to allow the temperature to exceed 160°C. Remove the test piece from the solvent and carefully scrape off any swollen proofing with a spatula. Repeat the treatment using fresh solvent on each occasion until the fabric is free from rubber. Squeeze the fabric to remove solvent and rinse with light petroleum hydrocarbon solvent until the fabric is free from the original solvent. Dry it for one hour at 105 to 110°C and then condition for 24 hours. Transfer it to a weighing bottle and determine the weight of the fabric.

B-2.2 Ash the fabric at a low temperature in a previously ignited and weighed silica crucible and determine the weight of the ash.

B-3. EXPRESSION OF RESULTS

B-3.1 The proofing content, g/m²

(as determined on a test piece of 100 × 100 mm² area)

$$= 100 (a - b + c)$$

where

a = weight in g of original test piece,

b = weight in g of fabric after removal of proofing, and

c = weight in g of ash of fabric.