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SPECIFICATION FOR HOSPITAL RUBBER SHEETINGS

(First Revision)

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(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 5 April 1974, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Chemical Division Council.

0.2 With the advancement of techniques in rubber manufacture, light varieties of sheetings are also popular in hospital use today. Besides, synthetic rubber is finding its way in the manufacture of sheetings. Consequently in this revision mass of the sheetings has been brought down without affecting the performance requirements. It has been felt that the grading should be done on the basis of mass of the sheetings instead of proofing content. Further, requirement for polymer content has also been included.

0.3 This standard contains clauses **3.1**, **3.3.2**, **3.3.3** and **3.3.11** which call for agreement between the purchaser and the supplier.

0.4 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 or analysis, 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.

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1. SCOPE

1.1 This standard prescribes the requirements, methods of sampling and test for hospital rubber sheetings (cotton or synthetic fabric coated on both sides with rubber).

2. GRADES AND QUALITIES

2.1 Grades — This standard covers two grades of sheetings, according to

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

the mass of the finished fabric as follows:

Grade	*Maximum Mass*, g/m^2
A	500
B	350

2.2 Qualities — Both grades A and B shall be of two qualities depending upon the rubber polymer content of the proofing which shall be 55 percent and 35 percent.

3. REQUIREMENTS

3.1 Base Fabric — The base fabric used for the hospital rubber sheetings shall be made of cotton, viscose staple or other suitable textile material as agreed to between the purchaser and the supplier. The mass of the base fabric shall be not more than 90 g/m^2 and its breaking strength in warp and weft directions shall be such that the proofed fabrics conform to the requirements stipulated in Table 1.

3.2 Proofing

3.2.1 The proofing (coating) shall be made from natural rubber or suitable vulcanizable synthetic rubber or a combination thereof, compounded with the necessary ingredients. It shall not contain any substances having deleterious action on the rubber or causing irritation or injury to human skin.

3.2.2 The proofing shall be applied on both sides of the base fabric in approximately equal amounts, and shall as far as possible completely cover the fabric along its entire width. The proofing shall be adequately vulcanized after its application on the base fabric so as to conform to the requirements of the specification.

3.2.3 The polymer content shall be determined as given in Appendix A of IS : 5915-1970*.

3.3 Finished Fabric

3.3.1 General — The finished material shall be soft, pliable, smooth and free from cuts, pinholes, embedded foreign matter, surface irregularities or other mechanical defects, objectionable stains and odour.

3.3.2 *Length* — The length of each piece of the finished sheeting shall not be less than 30 metres unless otherwise agreed to between the purchaser and the supplier. There shall be no joints in any single piece. The length shall be determined in accordance with the method in IS : 7016 (Part I)-1973†.

*Specification for single texture rubberized waterproof fabrics.
†Methods of test for treated fabrics: Part I Roll characteristics.

TABLE 1 REQUIREMENTS FOR PROOFED FABRIC

(*Clauses* 3.1 *and* 3.3.12)

Sl No.	Characteristic	Requirement for		Test Method, Ref to
		Grade A	Grade B	
(1)	(2)	(3)	(4)	(5)
i)	Mass in g/m², *Max* :			
	a) Finished fabric	500	350	IS : 7016 (Part I)-1973*
	b) Base fabric	90	90	
ii)	Proofing content in g/m², *Min*	350	200	A-3 of Appendix A
iii)	Breaking strength in N†/5 cm width, *Min*:			IS : 7016 (Part II)-1973‡
	a) Warp	200	200	
	b) Weft	150	150	

*Methods of test for treated fabrics : Part I Roll characteristics.
†1 Newton approximately equals 0·1 kgf.
‡Methods of test for treated fabrics : Part II Determination of breaking strength and extension at break.

3.3.3 *Width* — Unless otherwise agreed to between the supplier and the purchaser, the usable width shall be not less than 1 100 mm. The unproofed portion, if any, near either selvedge shall be not more than 10 mm in width. The width shall be determined in accordance with the method prescribed in IS : 7016 (Part I)-1973*.

3.3.4 *Waterproofness* — The finished material shall be such that when tested in accordance with the low pressure method prescribed in IS : 7016 (Part VII)-1973† it shall show no percolation of water or wet patches of water on the surface in contact with air when a constant head of water as indicated below is maintained for 60 minutes:

Grade of fabric	*Head of water*, mm
A	900
B	600

3.3.5 *Reaction of Aqueous Extract* — The aqueous extract as obtained by the method given in **A-4** shall not be acidic to methyl orange or alkaline to phenolphthalein.

3.3.6 *Resistance to Xylol* — The rubber coating shall not become tacky or separate from the base fabric when tested according to the method prescribed in **A-5**.

*Methods of test for treated fabrics: Part I Roll Characteristics.
†Methods of test for treated fabrics: Part VII Determination of waterproofness

3.3.7 *Resistance to Phenol* — The test pieces shall show no softening of the coating or any other change which might adversely affect the serviceability of the sheeting, when tested according to the method prescribed in **A-6.**

3.3.8 *Resistance to Disinfectants and Detergents* — The test pieces after immersion in test liquids for specified periods prescribed in **A-7** shall show no softening of the coating or any other change which might adversely affect the serviceability of the sheeting.

3.3.9 *Resistance to Ageing* — When the sheeting is subjected to accelerated ageing at a temperature of 100 ± 1°C for 168 hours in an air-oven in accordance with the method described in IS : 3400 (Part IV)-1965*, the rubber coating shall not become stiff or tacky nor shall it show appreciable discoloration or be easily detachable from the base fabric.

3.3.10 *Autoclaving Test* — On completion of the test in accordance with **A-8** the test pieces shall not be tacky or show any other change which might adversely affect the serviceability of the sheeting.

3.3.11 *Colour* — Unless otherwise agreed to between the purchaser and the supplier, the colour of the finished material shall be pinkish red. The colour shall not bleed or cause staining by contact. The finished material shall not stain cotton wool swab when rubbed dry or wet on it. The colour fastness shall comply with the following requirements.

3.3.11.1 *Fastness to washing* — The material when tested for colour fastness to mechanical washing in accordance with IS : 765-1966† shall show a fastness rating of not less than 5.

3.3.11.2 *Fastness to light* — The material when tested for colour fastness as prescribed in IS : 2454-1967‡ shall show a fastness rating of not less than 3.

3.3.12 The finished fabric shall also comply with the requirements given in Table 1.

4. PACKING AND MARKING

4.1 Packing — The hospital rubber sheetings shall be packed as agreed to between the purchaser and the supplier.

4.2 The sheeting shall be marked with the following information:

a) Manufacturer's name or trade-mark, if any;

b) Grade and polymer content of sheeting; and

c) Date of manufacture and batch number.

*Methods of test for vulcanized rubber: Part IV Accelerated ageing.

†Method for determination of colour fastness of textile materials to washing: test 4 (*revised*).

‡Methods for determination of colour fastness of textile materials to artificial light (xenon lamp).

4.2.1 The sheeting 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.

5. SAMPLING

5.1 For the purpose of ascertaining conformity of the sheeting in a consignment, the scale of sampling and criterion for conformity shall be as prescribed in Appendix B.

APPENDIX A

[*Table* 1, *Sl No.* (ii), *Clauses* 3.3.5, 3.3.6, 3.3.7, 3.3.8 *and* 3.3.10]

METHODS OF TESTS FOR HOSPITAL SHEETINGS

A-1. QUALITY OF REAGENTS

A-1.1 Unless otherwise specified, ' pure chemicals ' and distilled water (*see* IS : 1070-1960*) shall be employed in tests.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the results of analysis.

A-2. TEST SAMPLE

A-2.1 Take out a full width strip of the sheet having a minimum length of 450 mm.

A-3. DETERMINATION OF PROOFING CONTENT

A-3.1 Outline of the Method — The proofing content is determined on the sheeting by deproofing the sheeting and weighing the deproofed fabric. There are slight errors in this method because of variations in the moisture content before and after proofing and in the thickness of coating at the extreme ends of pieces. These variations are of smaller magnitude than the accuracy implied in the expression of results.

*Specification for water, distilled quality (*revised*).

A-3.2 Procedure — From the test sample take out 3 test pieces each 100 mm square along the diagonal line of the test sample. Determine the mass of each test piece. Deproof the test piece and again measure its mass. The difference between the two results represents the mass of proofing applied. Report the mass per unit area of proofing on the cloth to the nearest 5 g/m^2.

A-4. PREPARATION OF AQUEOUS EXTRACT

A-4.1 Weigh 10 g of the sample, cut into small pieces, approximately 3 mm^2 in area into a chemically resistant glass flask and add 300 ml of water. Fit the flask with a water-cooled reflux condenser with ground-glass connection and heat the water to boiling point. Continue boiling for one hour. Detach the flask from the condenser and cover immediately to prevent any possible contamination and cool the contents to room temperature.

A-5. TEST FOR RESISTANCE TO XYLOL

A-5.1 Reagent

A-5.1.1 Xylol — conforming to IS : 359-1965*.

A-5.2 Procedure — Immerse a 40 mm^2 piece of the sheeting in xylol in a beaker covered with watch glass for two hours and then gently shake in it for one minute. Take out the sample and examine it for tackiness or separation of the basic fabric.

A-5.3 Test Temperature — Maintain the temperature of xylol throughout the test at 27 $\pm$ 2°C.

A-6. TEST FOR RESISTANCE TO PHENOL

A-6.1 Reagent

A-6.1.1 *Phenol* — 5 percent aqueous solution (*m/v*) of phenol conforming to IS : 538-1968†.

A-6.2 Procedure — Immerse a test piece, 100 mm^2 in size, in phenol at 27 $\pm$ 2°C for 18 hours in a beaker covered with watch glass. Remove from the solution, wash thoroughly in water, dry in air at room temperature and examine for softening of the coating.

A-7. IMMERSION TEST

A-7.1 Reagents

A-7.1.1 *Phenol* — saturated aqueous solution of phenol conforming to IS : 538-1968†.

*Specification for xylol, industrial solvent grade (*revised*).
†Specification for phenol (carbolic acid) (*first revision*).

A-7.1.2 *Ammonia Solution* — relative density 0·880 (*see* IS : 799-1955*).

A-7.1.3 *Soap Solution* — 5 percent aqueous solution of soap (*m/v*) conforming to type 1 of IS : 285-1964†.

A-7.2 Procedure — Take three test pieces 100 mm² each from the sample. Immerse one in each of the specified reagents for the length of time and temperature stated below. After immersion, examine the pieces visually:

Immersion Medium	*Time*	*Temperature*
	min	
Phenol solution	15	27 ± 2°C
Ammonia solution	30	27 ± 2°C
Soap solution	10	Boiling temperature

A-8. AUTOCLAVING TEST

A-8.1 Procedure — Keep test pieces 100 mm² in size inside autoclave maintaining a steam pressure of 1 kgf/cm² for 20 minutes. Remove and allow the sample to cool. Repeat the autoclaving process after two hours. Cool and dry the sample in air.

APPENDIX B

(*Clause* 5.1)

SAMPLING OF HOSPITAL SHEETINGS

B-1. SCALE OF SAMPLING

B-1.1 Lot — All the hospital sheetings of the same type in a single consignment belonging to a single batch of manufacture shall be grouped together to constitute a lot.

B-1.2 Samples shall be tested separately for each lot for ascertaining the conformity of the lot to the requirements of this specification. The number of samples to be selected for this purpose shall be in accordance with col 1 and 2 of Table 2.

B-1.3 The selection of rolls from a lot shall be done at random. To ensure randomness of selection, random number table shall be used. In case

*Specification for ammonia liquor (technical).
†Specification for laundry soaps (*revised*).

random number tables are not available the following procedure may be adopted:

Starting from any roll in the lot, count them in one order as 1, 2, 3, ... up to r and so on, where r is the integral part of N/n (N being the number of rolls in the lot and n the number of rolls to be selected). Every rth roll shall be taken to constitute the sample.

TABLE 2 SCALE OF SAMPLING

(*Clause* B-1.2)

Number of Rolls in a Lot	Number of Rolls to be Selected
(1)	(2)
2 to 8	2
9 ,, 25	3
26 ,, 100	5
101 ,, 300	8
301 ,, 1 000	13
1 001 and above	20

B-2. NUMBER OF TESTS AND CRITERION FOR CONFORMITY

B-2.1 Each of the roll selected in **B-1.2** shall be examined for all the requirements of this specification individually. For this purpose, from each roll a full width piece of 1·5 m length shall be cut leaving at least half a metre from the end. The test piece for all the tests shall be taken from this piece.

B-2.2 The lot shall be considered to satisfy the requirements of this specification if none of the rolls selected and tested fails in any of the requirements of this specification.

(*Continued from page 2*)

Members	*Representing*
SHRI V. D. PENDSE	Swastik Rubber Products Ltd, Poona
SHRI K. D. DIGHE (*Alternate*)	
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INDIAN STANDARDS

ON

MEDICAL RUBBER PRODUCTS

IS:

1867-1961	Rubber hot-water bottles
3565-1966	Rubber tests for feeding bottles
3692-1965	Rubber closures (pharmaceutical)
3701-1966	Rubber protective sheaths (condoms)
3867-1966	Rubber ice bags
4135-1974	Hospital rubber sheetings (*first revision*)
4148-1967	Surgical rubber gloves
4149-1967	Post-mortem rubber gloves
5680-1969	Rubber tubing for medical use
5783-1970	Rubber ward-dressing and porter's gloves
6058-1970	Rubber components for transfusion fluid bottles
6407-1971	Rubber aprons for hospital use
7352-1974	X-ray lead-rubber protective aprons