IS : 8164 - 1976

Indian Standard

SPECIFICATION FOR HOSPITAL RUBBER SHEETING WITHOUT REINFORCING FABRIC

UDC 678·4-41 : 615·478·275

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 5·00 *December* 1976

IS : 8164 - 1976

Indian Standard

SPECIFICATION FOR HOSPITAL RUBBER SHEETING WITHOUT REINFORCING FABRIC

(*Continued on page* 2)

(*Continued from page* 1)

Members	*Representing*
SHRI S. C. NANDY	Bata India Ltd, Calcutta
SHRI SUNIL SARKAR (*Alternate*)	
SHRI M. M. PATEL	Synthetics & chemicals Ltd, Bombay
DR N. V. C. RAO	Directorate General of Technical Development, New Delhi
SHRI G. R. INAMDAR (*Alternate*)	
SHRI V. R. RAO	Sundaram Industries Pvt Ltd, Madurai
SHRI K. C. MADHUSUDHANAN (*Alternate*)	
SHRI R. C. SYED	Indian Rubber Manufacturers' Research Association, Bombay
SHRI D. D. TALWALKAR	All India Automobile & Ancillary Industries Association, Bombay
SHRI K. M. KHALADKAR (*Alternate*)	
DR G. M. SAXENA, Director (Chem)	Director General, ISI (*Ex-officio Member*)

Secretary

SHRI SATISH CHANDER
Deputy Director (Chem), ISI

Medical Rubber Goods Subcommittee, CDC 6 : 7

SHRI M. BANERJEE	National Rubber Manufacturers Ltd, Calcutta
SHRI J. CHATTERJEE (*Alternate*)	
SHRI A. BOSE	Bengal Water Proof Works (1940) Ltd, Calcutta
SHRI B. DUTTA (*Alternate*)	
SHRI S. K. BOSE	National Test House, Calcutta
SHRI S. P. MULLICK (*Alternate*)	
SHRI R. N. CHAKRAVARTY	Indian Oxygen Ltd, Calcutta
SHRI A. CHAUDHURI (*Alternate*)	
SHRI P. C. KAPUR	Directorate General of Health Services, New Delhi
DR K. V. KULKARNI	Haffkine Institute, Bombay
SHRI R. S. KARBHARI (*Alternate*)	
SHRI M. KUMARAN	Ministry of Defence (DGI)
SHRI B. C. SEN (*Alternate*)	
MAJ V. G. LAGHATE	Directorate General of Armed Forces Medical Services, New Delhi
LT-COL M. K. BAGCHI (*Alternate*)	
SHRI S. V. LATHIA	Lathia Rubber Manufacturing Co Pvt Ltd, Bombay
SHRI D. P. LATHIA (*Alternate*)	
SHRI M. M. PATEL	Synthetics & Chemicals Ltd, Bombay
SHRI N. M. REGE (*Alternate*)	
SHRI MANUBHAI M. PATEL	Rubberex Industries Pvt Ltd, Bombay
SHRI K. C. SHAH (*Alternate*)	
SHRI M. N. PATHAK	Associated Rubber Industries Ltd, Bhavnagar
SHRI V. D. PENDSE	Swastik Rubber Products Ltd, Pune
SHRI K. D. DIGHE (*Alternate*)	
DR N. V. C. RAO	Directorate General of Technical Development, New Delhi
SHRI G. R. INAMDAR (*Alternate*)	

Indian Standard
SPECIFICATION FOR HOSPITAL RUBBER SHEETING WITHOUT REINFORCING FABRIC

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 28 June 1976, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Chemical Division Council.

0.2 Rubber sheetings both with and without reinforcing fabric are commonly used in hospitals. Rubber sheetings having cotton or synthetic fabric coated on both sides with rubber are covered in IS : 4135-1974*. The present standard covers only the rubber sheeting without any reinforcing fabric.

0.3 This standard contains clauses **2.1.2**, **2.4** and **3.1** 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.

---

1. SCOPE

1.1 This standard prescribes the requirements, and methods of sampling and test for plain rubber sheetings without any reinforcing fabric, for use in hospitals.

2. REQUIREMENTS

2.1 Materials — The sheeting shall be made from natural rubber or suitable synthetic rubber or combination thereof, compounded with necessary ingredients so that the rubber sheeting conforms to all the requirements of the specification.

---

*Specification for hospital rubber sheetings (*first revision*).

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

2.1.1 The rubber sheeting shall not contain any substances injurious to human body or having any deleterious effect on the rubber polymer.

2.1.2 The colour of the rubber sheeting shall be as agreed to between the purchaser and the supplier.

2.2 Workmanship and Finish — The rubber sheeting shall be smooth, soft and pliable. It shall be free from pinholes, cuts, embedded foreign matter, surface irregularities, objectionable stains or odour. The workmanship shall be consistent with good manufacturing practice.

2.3 The rubber sheeting shall also conform to the requirements given in Table 1.

TABLE 1 REQUIREMENTS FOR HOSPITAL RUBBER SHEETING WITHOUT REINFORCING FABRIC

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Appendix	Indian Standard
(1)	(2)	(3)	(4)	(5)
i)	Mass, g/m²	800 to 1000	—	IS : 7016 (Part I)-1973*
ii)	Tensile strength, MN/m² (approx kgf/cm²), *Min*	14 (140)	—	IS : 3400 (Part I)-1965†, The thickness of the test specimen shall be same as single thickness of the product
iii)	Elongation at break, percent, *Max*	350	—	do
iv)	Tension set at 250 percent elongation and 15 min recovery time, percent, *Max*	10	—	IS : 3400(Part XIII)-1972‡, Using strip test pieces with enlarged ends and of thickness same as single thickness of the product
v)	Accelerated ageing at 70°C for 168 hours in air oven:		—	IS : 3400(Part IV)-1965§
	a) Change in tensile strength from original, percent, *Max*	+10 −25		

*Methods of test for coated and treated fabrics: Part I Determination of roll characteristics.

†Methods of test for vulcanized rubbers: Part I Tensile stress-strain properties

‡Methods of test for vulcanized rubbers: Part XIII Tension set

§Methods of test for vulcanized rubbers: Part IV Accelerated ageing

(*Continued*)

TABLE 1 REQUIREMENTS FOR HOSPITAL RUBBER SHEETING WITHOUT REINFORCING FABRIC — *Contd*

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Appendix	Indian Standard
(1)	(2)	(3)	(4)	(5)
	b) Change in elongation at break from original, percent, *Max*	+ 0 —25		
vi)	Waterproofness under 300 mm head of water	There shall be no percolation or wet patches on the surface in contact with air	—	IS : 7016 (Part VII)-1973*
vii)	Colour fastness to washing	Rating shall not be less than 5	—	IS : 765-1966†
viii)	Colour fastness to light	Rating shall not be less than 3	—	IS : 2454-1967‡
ix)	Autoclaving test:		A	—
	a) Change in tensile strength from original, percent, *Max*	+10 —25		
	b) Change in elongation at break from original, percent, *Max*	+10 —15		
x)	Reaction of aqueous extract	The extract shall neither be acidic to methyl orange nor alkaline to phenolphthalein	B	—
xi)	Resistance to detergents and disinfectants	The test pieces shall not show any tackiness or other apparent deterioration	C	—

*Methods of test for coated and treated fabrics: Part VII Determination of waterproofness.

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

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

2.4 Length and Width — The length of the rubber sheeting shall not be less than 20 metres unless otherwise agreed to between the purchaser and the supplier. Similarly unless otherwise agreed to, the width of the sheeting shall be 90 ± 1 cm. The length and the width shall be determined in accordance with the method given in IS : 7016 (Part I)-1973*.

3. PACKING AND MARKING

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

3.2 Marking — Each piece of rubber sheeting shall be indelibly and clearly marked at one end with:

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

b) Month and year of manufacture and batch number; and

c) Length and width.

3.2.1 The rubber 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.

4. SAMPLING

4.1 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 D.

APPENDIX A

[*Table* 1, *Item* (ix)]

AUTOCLAVING TEST

A-1. PROCEDURE

A-1.1 Subject dumbbell test pieces cut from the sample to steam pressure of 0·1 MN/m² (approx 1 kgf/cm²) for 20 minutes in an autoclave after

*Methods of test for coated and treated fabrics: Part I Determination of roll characteristics.

removal of air. Take out the test pieces from the autoclave and expose them to air at room temperature for 2 hours. Repeat the autoclaving process after which blot out the adhering water from the test pieces and condition them for 24 hours in air at 27 ± 2° C and 65 ± 5 percent relative humidity. The test pieces are then subjected to tensile and elongation at break test according to IS : 3400 (Part I)-1965*.

APPENDIX B

[*Table* 1, *Item* (x)]

REACTION OF AQUEOUS EXTRACT

B-1. PROCEDURE

B-1.1 Weigh 10 g of the sample, cut into small pieces appoximately 3 mm² 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 half an hour. Detach the flask from the condenser, cover immediately to prevent any possible contamination and cool the contents to room temperature. Check the reaction of aqueous extract to methyl orange and phenolphthalein.

APPENDIX C

[*Table* 1, *Item* (xi)]

TEST FOR RESISTANCE TO DETERGENTS AND DISINFECTANTS

C-1. REAGENTS

C-1.1 Phenol — saturated aqueous solution of phenol (*see* IS : 538-1968†).

C-1.2 Anmonia Solution — relative density 0·9 (*see* IS : 799-1955‡).

C-1.3 Soap Solution — 5 percent aqueous solution of soap (m/v) conforming to Type 1 of IS : 285-1974§.

C-2. PROCEDURE

C-2.1 Take three samples of the finished sheeting. Immerse one in each of the specified reagents for the length of time and temperature stated

*Methods of test for vulcanized rubbers: Part I Tensile stress-strain properties.
†Specification for phenol (carbolic acid) (*first revision*).
‡Specification for ammonia, liquor, technical.
§Specification for laundry soaps (*second revision*).

below. After immersion, examine the pieces visually.

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

APPENDIX D

(*Clause* 4.1)

SAMPLING OF HOSPITAL RUBBER SHEETING WITHOUT REINFORCING FABRIC

D-1. SCALE OF SAMPLING

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

D-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 Table 2.

TABLE 2 SCALE OF SAMPLING

No. of Rolls in a Lot	No. 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

D-1.3 The selection of rolls from a lot shall be done at random. To ensure the randomness of selection, random number tables (*see* IS : 4905-1968*) shall be used. In case 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, ..., etc, 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.

*Methods for random sampling.

D-2. NUMBER OF TESTS AND CRITERION FOR CONFORMITY

D-2.1 Every one of the rolls selected in **D-1.2** shall be examined for all the requirements of this specification individually. For this purpose, from each roll a full width piece of 450 mm in length shall be cut leaving at least half a metre from the end. The test pieces for all the tests shall be taken from this piece.

D-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.

INDIAN STANDARDS
ON
MEDICAL RUBBER PRODUCTS

IS :

1867-1975 Rubber hot water bottles (*first revision*)
3565-1966 Rubber teats for feeding bottles
3692-1975 Rubber closures (pharmaceutical) (*first revision*)
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 porters' gloves
6058-1970 Rubber components for transfusion fluid bottles
6407-1971 Rubber aprons for hospital use
7352-1974 X-ray lead-rubber protective aprons
7523-1974 Rubber catheter (urinary)
8164-1976 Hospital rubber sheeting without reinforcing fabric