IS : 7450 - 1974

Indian Standard

SPECIFICATION FOR VULCANIZED STYRENE-BUTADIENE RUBBER (SBR) BASED COMPOUNDS

UDC 678·746·22-136·22

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110001

Price Rs 3·00 *December* 1974

IS : 7450 - 1974

Indian Standard

SPECIFICATION FOR VULCANIZED STYRENE-BUTADIENE RUBBER (SBR) BASED COMPOUNDS

Rubber Products Sectional Committee, CDC 6

Chairman	*Representing*
Dr D. Banerjee	Escon Consultants Pvt Ltd, Calcutta
Members	
Shri A. T. Basak	Directorate General of Supplies & Disposals, New Delhi
Shri S. K. Bose	National Test House, Calcutta
Shri A. Ghosh (*Alternate*)	
Shri D. K. Chatterjee	Alkali & Chemical Corporation of India Ltd, Calcutta
Dr S. K. Ray (*Alternate*)	
Shri S. S. Chopra	Export Inspection Council of India, Calcutta
Shri K. M. Bijli (*Alternate*)	
Shri B. H. Dalal	Ministry of Defence (DGI)
Shri M. Kumaran (*Alternate*)	
Shri S. L. Gandhi	Ministry of Defence (R & D)
Shri M. G. Bhargava (*Alternate*)	
Shri G. C. Jain	Hindustan Steel Ltd, Ranchi
Shri O. N. Kohli	Railway Board
Shri Lalit Mohan Jamnadas	Cosmos India Rubber Works Pvt Ltd, Bombay
Shri Pulin L. Kinariwala (*Alternate*)	
Shri S. V. Lathia	Lathia Rubber Manufacturing Co Pvt Ltd, Bombay
Shri D. P. Lathia (*Alternate*)	
Shri S. K. Matthan	Madras Rubber Factory Ltd, Madras
Shri K. J. Abraham (*Alternate*)	
Dr K. N. Modak	All India Rubber Industries Association, Bombay
Shri K. R. Sengupta (*Alternate*)	
Shri S. Mukherjee	Dunlop India Ltd, Calcutta
Shri P. N. S. Myer (*Alternate*)	
Dr C. K. N. Nair	Rubber Board, Kottayam
Shri K. C. Ananth (*Alternate*)	
Shri S. C. Nandy	Bata India Ltd, Calcutta
Shri R. R. Pandit	Bayer (India) Ltd, Bombay
Shri M. M. Patel	Synthetics & Chemicals Ltd, Bombay
Shri K. Rajgopaul	Indian Oil Corporation Ltd, Bombay
Dr N. V. C. Rao	Directorate General of Technical Development, New Delhi
Shri G. R. Inamdar (*Alternate*)	

(*Continued on page* 2)

(*Continued from page* 1)

Members	*Representing*
SHRI B. ROY	National Rubber Manufacturers Ltd, Calcutta
SHRI AMITABHA SEN (*Alternate*)	
SHRI R. C. SYED	Indian Rubber Manufacturers' Research Association, Bombay
SHRI S. K. GHOSH (*Alternate*)	
SHRI D. D. TALWALKAR	All India Automobile & Ancillary Industries Association, Bombay
SHRI R. M. KHALADKAR (*Alternate*)	
SHRI D. DAS GUPTA, Deputy Director General	Director General, ISI (*Ex-officio Member*)

Secretary

SHRI SATISH CHANDER
Deputy Director (Chem), ISI

General Rubber Products Subcommittee, CDC 6 : 4

Convener	
DR K. N. MODAK	All India Rubber Industries Association, Bombay
Members	
SHRI S. V. LATHIA (*Alternate* to Dr K. N. Modak)	
SHRI A. BOSE	Bengal Waterproof Works (1940) Ltd, Calcutta
SHRI R. S. ROY (*Alternate*)	
SHRI S. K. BOSE	National Test House, Calcutta
SHRI A. GHOSH (*Alternate*)	
SHRI D. K. CHATTERJEE	Alkali & Chemical Corporation of India Ltd, Calcutta
SHRI K. R. SESHADRI (*Alternate*)	
SHRI B. H. DALAL	Ministry of Defence (DGI)
SHRI G. C. CHAKRAVARTI (*Alternate*)	
DR A. P. DESHMUKH	Dairy Development Commissioner, Maharashtra State, Bombay
SHRI G. R. INAMDAR	Directorate General of Technical Development, New Delhi
SHRI J. M. GARG (*Alternate*)	
DR K. A. JOSE	Common Facility Service Centre, Government of Kerala, Changanachery
SHRI S. V. LATHIA	Lathia Rubber Manufacturing Co Pvt Ltd, Bombay
SHRI D. P. LATHIA (*Alternate*)	
SHRI V. N. MAKAR	Orient Rubber Industries Pvt Ltd, Bombay
SHRI C. T. PATEL (*Alternate*)	
DR S. P. MANIK	Railway Board
SHRI G. DORAISWAMY (*Alternate*)	
SHRI S. L. MUKHERJEE	Escon Consultants Pvt Ltd, Calcutta
SHRI A. K. SEN CHAUDHURI (*Alternate*)	
SHRI M. M. PATEL	Rubberex Industries Pvt Ltd, Bombay
SHRI K. C. SHASH (*Alternate*)	
SHRI M. M. PATEL	Synthetics & Chemicals Ltd, Bombay
SHRI N. M. REGE (*Alternate*)	

(*Continued on page* 7)

Indian Standard

SPECIFICATION FOR VULCANIZED STYRENE-BUTADIENE RUBBER (SBR) BASED COMPOUNDS

0. FOREWORD

0.1 This Indian Standard 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 This standard covers vulcanized rubber compounds based on styrene-butadiene rubber (SBR) for the production of general-purpose items such as sheets, washers, strips, gaskets, moulded articles and wrapped tubings based on SBR. IS : 5192-1969* which at present covers vulcanized rubber compounds based on natural and general-purpose synthetic rubbers is being revised to cover only natural rubber compounds.

0.3 This standard covers only black rubber vulcanizates. Non-black rubber vulcanizates would be included in the standard later.

0.4 This standard contains clause **3.4** which calls for agreement between the purchaser and the supplier.

0.5 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 requirements and methods of test for five grades of prominently styrene-butadiene rubber based vulcanizates intended for the manufacture of general-purpose rubber articles.

---

*Specification for vulcanized rubber compounds.

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

2. GRADES

2.1 The styrene-butadiene rubber based vulcanizates shall be of five grades depending on their hardness as follows:

	International Rubber Hardness Degrees (IRHD)
Grade 1	41 to 50
Grade 2	51 „ 60
Grade 3	61 „ 70
Grade 4	71 „ 80
Grade 5	81 „ 90

3. REQUIREMENTS

3.1 The rubber shall be styrene-butadiene rubber (SBR) or oil extended grade of it or a blend of these two. The use of natural rubber, factice, reclaimed rubber or vulcanized waste is not permitted. All constituents of the mix shall be free from grit and other foreign matter.

3.2 Softeners — Stearic acid or some other fatty acid, paraffin wax, pine tar and mineral oil are recommended as softeners.

3.3 Surface Finish — The vulcanizates shall be free from surface imperfections like blisters and porosity, and shall not develop excessive bloom.

3.4 Composition of the Mix — If agreed to between the purchaser and the supplier, the supplier shall declare the constituents of the rubber mix in the vulcanizates.

3.5 Physical Requirements — The material shall comply with the physical requirements given in Tables 1 and 2, when tested in accordance with **4.1** to **4.5**.

4. TEST METHODS

4.1 Test Piece — Whenever possible, the specified test pieces shall be cut from the finished article. Where this is impracticable, the manufacturer shall supply five sheets of vulcanizate, four approximately 150 × 150 × 2·5 mm each and one approximately 150 × 150 × 6·5 mm, prepared from the same batch and vulcanized to the same degree and in the same manner as the consignment concerned.

TABLE 1 PHYSICAL REQUIREMENTS BEFORE AGEING

(*Clause* 3.5)

Sl No.	Characteristic	Requirement				
		Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Hardness, IRHD	41 to 50	51 to 60	61 to 70	71 to 80	81 to 90
ii)	Tensile strength, MN/m^2*, *Min*	10	14	15	17	14
iii)	Elongation at break, percent, *Min*	500	450	400	300	200
iv)	Compression set at 70°C, percent, *Max*	30	30	30	30	30

*1 MN/m^2 = 10·2 kgf/cm^2.

TABLE 2 LIMITS FOR VARIATION IN PHYSICAL REQUIREMENTS AFTER AGEING

(*Clause* 3.5)

Sl No.	Characteristic	Limits for Variation from the Values Before Ageing (For all Grades)
(1)	(2)	(3)
i)	Hardness change from original, IRHD	+ 7 − 0
ii)	Tensile strength, percent change from original	±15
iii)	Elongation at break, percent change from original	+ 5 −30

4.2 Hardness — Determine the hardness in terms of international rubber hardness degrees according to the method prescribed in IS : 3400 (Part II)-1965*.

4.3 Tensile Strength and Elongation at Break — Determine the tensile strength and elongation at break by the method prescribed in IS : 3400 (Part I)-1965†.

*Methods of test for vulcanized rubbers: Part II Hardness.

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

4.4 Compression Set — Determine the compression set at 70 ± 1°C by the method prescribed in IS : 3400 (Part X)-1969*.

4.5 Accelerated Ageing — Age the test pieces in an air-oven as prescribed in IS : 3400 (Part IV)-1965† at a temperature of 70 ± 1°C for a period of 168 hours and determine hardness, tensile strength and elongation at break of the aged test pieces as in **4.2** and **4.3** respectively.

*Methods of test for vulcanized rubbers: Part X Compression set at constant strain.
†Methods of test for vulcanized rubbers: Part IV Accelerated ageing.

(*Continued from page 2*)

Members	*Representing*
SHRI V. D. PENDSE	Swastik Rubber Products Ltd, Poona
SHRI K. D. DIGHE (*Alternate*)	
SHRI V. R. RAO	Sundaram Industries Pvt Ltd, Madurai
SHRI K. C. MADHUSUDHANAN (*Alternate*)	
SHRI B. N. RAY	Dunlop India Ltd, Calcutta
SHRI R. K. DAS (*Alternate*)	
SHRI B. ROY	National Rubber Manufacturers Ltd, Calcutta
SHRI AMITABHA SEN (*Alternate*)	

INDIAN STANDARDS
ON
RUBBER PRODUCTS

IS:

444-1968 Water hose of rubber with woven textile reinforcement (*second revision*)
446-1968 Air hose of rubber with woven textile reinforcement (*second revision*)
447-1968 Welding hose of rubber with woven textile reinforcement (*second revision*)
635-1968 Oil and solvent resistant hose of rubber with woven textile reinforcement (*second revision*)
636-1962 Fire fighting hose (rubber lined woven-jacketed) (*revised*)
637-1965 Rubber tubings for general purposes (*revised*)
638-1965 Sheet rubber jointing and rubber insertion jointing (*revised*)
911-1968 Air hose of rubber with braided textile reinforcement (*second revision*)
913-1968 Water hose of rubber with braided textile reinforcement (*second revision*)
1677-1968 Agricultural spray hose of rubber with braided textile reinforcement (*second revision*)
1741-1960 Latex foam rubber products
1867-1961 Rubber hot-water bottles
2396-1968 Rubber hose for petrol and diesel fuels with braided textile reinforcement (*first revision*)
2410-1963 Suction hose of rubber for fire services
2414-1969 Cycle tyres (*first revision*)
2415-1969 Cycle rubber tubes (*first revision*)
2482-1963 Water suction hose of rubber, light duty
2765-1964 Radiator hose
3418-1968 Oil and solvent resistant hose of rubber with braided textile reinforcement (*first revision*)
3549-1965 Water suction and discharge hose of rubber, heavy duty
3565-1966 Rubber teats for feeding bottles
3572-1968 Welding hose of rubber with braided textile reinforcement (*first revision*)
3692-1965 Rubber closures (pharmaceutical)
3701-1966 Rubber protective sheaths (condoms)
3867-1966 Rubber ice bags
4135-1967 Hospital rubber sheetings
4148-1967 Surgical rubber gloves
4149-1967 Post-mortem rubber gloves
4770-1968 Rubber gloves for electrical purposes
5079-1969 Rubber valve-tubing for cycle tube valves
5137-1969 Cement grouting hose of rubber with woven textile reinforcement
5166-1969 Cement grouting hose of rubber with braided textile reinforcement
5192-1969 Vulcanized rubber compounds
5193-1969 Rubber sealing rings for domestic fruit and vegetable preserving jars
5270-1969 Rubber grommets for general purposes
5382-1969 Rubber sealing rings for gas mains, water mains and sewers
5424-1969 Rubber mats for electrical purposes
5680-1969 Rubber tubing for medical use
5783-1970 Rubber ward-dressing and porter's gloves
5797-1970 Electrically bonded aircraft fuelling rubber hose
5821-1970 Hot-water hose of rubber with woven textile reinforcement
5894-1970 Rubber sand blast hose with braided textile reinforcement
5937-1970 Hot-water hose of rubber with braided textile reinforcement
6058-1970 Rubber components for transfusion fluid bottles
6407-1971 Rubber aprons for hospital use
6417-1971 Rubber sand blast hose with woven textile reinforcement
6450-1971 Rubbers for the dairy industry
7079-1973 Automotive hydraulic brake hose