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Indian Standard

SPECIFICATION FOR RUBBER HOSE FOR CHEMICALS

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Indian Standard

SPECIFICATION FOR RUBBER HOSE FOR CHEMICALS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 25 April 1975, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Chemical Division Council.

0.2 The type of the rubber compound to be used for the lining and the cover of the hose shall depend on the nature of the liquids for which the hose is to be employed. Consequently the purchaser, while placing order shall specify the chemicals for which the hose is required. However, in general, the rubber lining and the cover should not contain any materials capable of being leached out by immersion in such liquids. The hoses covered by this specification are suitable for only discharge of the chemicals and not suction.

0.3 This standard contains clause **7.1** which calls 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 and methods of sampling and test for hose of rubber meant for discharging chemicals, such as, mineral acids, alkalis and aqueous solutions of inorganic salts for working pressures not exceeding 0·8 MN/m^2 (approx 8 kgf/cm^2).

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 7503 (Part I)-1974† shall apply.

*Rules for rounding off numerical values (*revised*).
†Glossary of terms used in the rubber industry, Part I.

3. TYPES

3.1 The hoses shall be of two types:

Type 1 — for conveying dilute chemicals, and

Type 2 — for conveying concentrated chemicals.

4. REQUIREMENTS

4.1 Materials

4.1.1 *Lining* — Tke lining shall consist of suitable rubber compound resistant to chemicals for which the hose is to be used.

4.1.2 *Reinforcement* — The textile reinforcement shall be provided by natural or man-made fibre, fabric or yarn.

4.1.3 *Cover* — The cover shall consist of suitable rubber compound.

4.2 Construction

4.2.1 *Lining* — The lining shall be reasonably uniform in thickness, smooth in bore, concentric and free from air blisters, porosity and other visible defects.

4.2.2 *Reinforcement* — The textile reinforcement shall be provided by woven spirally-wound or braided construction. For Type 2 hoses, the minimum number of plies shall be 2 for all construction. The reinforcement shall be treated with rubber compound to ensure satisfactory adhesion.

4.2.3 *Cover* — The cover shall be reasonably uniform in thickness, concentric and free from air blisters, porosity and splits. The cover of the hose shall be smooth, fluted, cloth marked or with a pattern finish.

4.2.4 *Ends* — The ends of the hose in each length shall be securely sealed with rubber, 1·5 mm minimum in thickness, to prevent liquids coming into contact with fabric reinforcement.

4.3 Dimensions and Tolerances

4.3.1 *Bore Size* — The nominal bore sizes of the hoses with tolerances when measured according to the method prescribed in **4.2.1** of IS : 443-1975* shall be as specified in Table 1.

*Methods of sampling and test for rubber hoses (*second revision*).

TABLE 1 BORE SIZES AND TOLERANCES ON BORE SIZES

(*Clause* 4.3.1)

Sl No.	Nominal Bore Size	Tolerance on Nominal Bore Size
(1)	(2)	(3)
	mm	*mm*
i)	10	± 0·75
ii)	12·5	± 0·75
iii)	16	± 0·75
iv)	20	+ 0·75 − 1·25
v)	25	± 1·25
vi)	31·5	± 1·25
vii)	38	± 1·50
viii)	45	± 1·50
ix)	50	± 1·50

4.3.2 The thickness of the lining and cover shall not be less than that specified in Table 2, when tested according to **4.2.2** of IS : 443-1975*.

TABLE 2 LINING AND COVER THICKNESSES

(*Clause* 4.3.2)

Sl No.	Nominal Bore	Lining Thickness For Both Types	Cover Thickness	
			Type 1	Type 2
(1)	(2)	(3)	(4)	(5)
	mm	mm	mm	mm
i)	Up to and including 20	1·5	1·0	1·0
ii)	Over 20 but up to and including 38	2·0	1·0	1·5
iii)	Over 38	2·5	1·0	1·5

4.3.3 The tolerance on any specified hose length shall be ± 1 percent.

4.4 Requirements for Physical Characteristics on Finished Hoses

4.4.1 *Tensile Strength and Elongation at Break of Lining and Cover* — The tensile strength and elongation at break of the rubber used for lining and cover of the hose shall be as specified in Table 3 when tested according to the method prescribed in **5** of IS : 443-1975*.

*Methods of sampling and test for rubber hoses (*second revision*).

TABLE 3 TENSILE STRENGTH AND ELONGATION AT BREAK OF LINING AND COVER

(*Clause* 4.4.1)

Sl No.	Characteristic	For Both Type 1 and Type 2
(1)	(2)	(3)
i)	Tensile strength, MN/m^2*, *Min*	7
ii)	Elongation at break, percent, *Min*	300

* 1 MN/m^2 = approx 10 kgf/cm^2.

4.4.2 *Accelerated Ageing*

4.4.2.1 *Type 1* — After ageing at 70 ± 1°C for a period of 72 hours, the rubber used for the lining and cover of the hose shall not vary by more than ± 15 percent for tensile strength and $\pm \frac{10}{15}$ percent for elongation at break of the corresponding values obtained before ageing, when tested according to the method prescribed in **5** of IS : 443-1975*

4.4.2.2 *Type 2* — After ageing at 100 ± 1°C for 72 hours the rubber used for lining and cover of the hose shall not vary by more than ± 25 percent for tensile strength and $\pm \frac{10}{45}$ percent for elongation at break of the corresponding values obtained before ageing, when tested according to the method prescribed in **5** of IS : 443-1975*.

4.4.3 *Chemical Resistance Test* — When tested according to the method specified in Appendix A, the rubber lining of the hose shall not vary by more than ± 25 percent for both the tensile strength and elongation at break of the corresponding values obtained before the chemical resistance test.

4.4.4 *Adhesion* — The adhesion shall be such that the rate of separation does not exceed 25 mm per minute under a load of 4 kg for a test piece 25 mm wide for the following when tested according to the method prescribed in **7** of IS : 443-1975*:

a) Between plies,

b) Between lining and ply, and

c) Between cover and ply.

4.4.5 *Hydrostatic Burst Pressure* — The hose when tested according to the method prescribed in **8.2** of IS : 443-1975* shall withstand a minimum bursting pressure of 3 MN/m^2 (approx 30 kgf/cm^2) in case of Type 1 and 4 MN/m^2 (approx 40 kgf/cm^2) in case of Type 2 hoses.

*Methods of sampling and test for rubber hoses (*second revision*).

4.4.6 *Hydrostatic Proof Pressure* — Samples of production lengths of hose shall be subjected to internal hydraulic pressure of 1·5 times the working pressure for one minute. The hose shall not show any rupture, leakage or porosity when tested according to the method prescribed in **8.3** of IS : 443-1975*.

NOTE — This test shall be carried out at the factory. If the hose is offered at places other than the factory, manufacturer's certificate may be accepted.

5. MARKING

5.1 Each length of hose shall be indelibly marked adjacent to each end with the following:

a) Manufacturer's name or trade-mark;

b) Nominal diameter and type of hose; and

c) Month and year of manufacture, if required by the purchaser.

5.1.1 Each length of the hose 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.

6. SAMPLING AND CRITERIA FOR CONFORMITY

6.1 For the purpose of ascertaining the conformity of the hose in a consignment to this specification, the scale of sampling and criteria for conformity shall be as prescribed in **3** of IS : 443-1975*.

7. TESTS

7.1 Unless otherwise agreed to between the purchaser and the supplier, all tests shall be carried out within three months of the date of receipt of the material by the purchaser.

*Methods of sampling and test for rubber hose (*second revision*).

APPENDIX A

(*Clause* 4.4.3)

CHEMICAL RESISTANCE TEST

A-1. Take a piece of hose 300 to 350 mm long excluding hose connections. Set up the test specimen as shown in Fig. 1 and fill with chemical for which the hose is to be used. Seal both ends of the test specimen and allow to stand at 27 ± 2°C and 65 ± 5 percent relative humidity for 24 hours. Drain the hose, wash thoroughly with water and immediately subject it for determination of tensile strength and elongation at break.

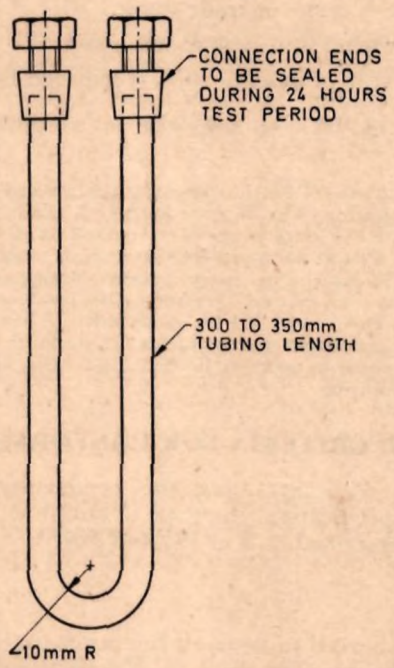

FIG. 1 ARRANGEMENT FOR CARRYING OUT CHEMICAL RESISTANCE TEST

(*Continued from page 2*)

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INDIAN STANDARDS

ON

RUBBER HOSES

IS :

443-1975	Methods of sampling and test for rubber hoses (*second revision*)
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*)
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*)
2396-1968	Rubber hose for petrol and diesel fuels with braided textile reinforcement (*first revision*)
2410-1963	Suction hose of rubber for fire services
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
3572-1968	Welding hose of rubber with braided textile reinforcement (*first revision*)
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
6417-1971	Rubber sand blast hose with woven textile reinforcement
7651-1975	Wire reinforced, rubber covered hydraulic hose
7654-1975	Rubber hose for chemicals