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Indian Standard

SPECIFICATION FOR OIL AND
SOLVENT RESISTANT HOSE OF RUBBER WITH
BRAIDED TEXTILE REINFORCEMENT

(First Revision)

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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Indian Standard

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SPECIFICATION FOR OIL AND
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(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 9 October 1968, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Chemical Division Council.

0.2 This standard was originally published in 1965. In the revised standard, outside diameters have been specified as recommendatory in Appendix A. The number of plies have been reduced wherever possible, lining and cover thicknesses have been lowered, accelerated ageing test and proof pressure test requirements have been included, and the specified load for testing the adhesion strength values have been reduced from 4 to 3.5 kg. The requirements for oil and solvent resistant hose of rubber with woven textile reinforcement are given in IS : 635-1968*.

0.3 In preparing this standard, considerable assistance has been derived from the Draft ISO Recommendation No. 1307 'Hose (bore sizes, test pressures and tolerances on length)' issued by the International Organization for Standardization.

0.4 This standard contains Table 1 (Note) and clauses **3.3.3** and **6.1** which call 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.

*Specification for oil and solvent resistant hose of rubber with woven textile reinforcement.

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

1. SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for oil and solvent resistant hose of rubber with braided textile reinforcement, manufactured either by mandrel or long length moulded process and suitable for conveying lubricating oils, transformer oils, vegetable oils (non-edible) and solvents having low aromatic content. The hose is designed for working pressure up to 7.0 kgf/cm².

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in 2 of IS : 443-1963* shall apply.

3. REQUIREMENTS

3.1 Materials

3.1.1 Lining — The lining shall consist of a rubber compound, resistant to oil and solvents.

3.1.2 Reinforcement — The textile reinforcement shall consist of yarn of natural or synthetic fibre.

3.1.3 Cover — The cover shall consist of a rubber compound, resistant to oils and solvents.

3.2 Construction

3.2.1 Lining — The lining shall be reasonably uniform in thickness, concentric and free from air blisters, porosity and splits. It shall be a seamless in the bore as is consistent with good manufacturing practice.

3.2.2 Reinforcement — The textile reinforcement shall be firmly and evenly braided over the lining. The plies of reinforcement shall be impregnated with a rubber compound.

3.2.3 Cover — The cover shall be reasonably uniform in thickness, concentric and free from air blister, porosity and splits. The cover of the moulded hose shall be smooth or fluted as required. The cover of the braided hose manufactured on mandrels may have a cloth marked finish and the whole shall be consolidated by wrapping and uniformly vulcanized.

3.3 Dimensions

3.3.1 Diameters and Reinforcement Plies — The bore size when measured according to the method prescribed in 9.2 of IS : 443-1963* and the number of reinforcement plies of the hose shall be as given in Table 1.

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

TABLE 1 BORE SIZE AND NUMBER OF REINFORCEMENT PLIES
(Clause 3.3.1)

NOMINAL BORE SIZE	TOLERANCE ON NOMINAL BORE SIZE	MINIMUM NUMBER OF REINFORCEMENT PLIES
(1)	(2)	(3)
mm	mm	
5	± 0.75	1
6.3	± 0.75	1
8	± 0.75	1
10	± 0.75	1
12.5	± 0.75	1
16	± 0.75	1
20	$\begin{cases} +0.75 \\ -1.25 \end{cases}$	1
25	± 1.25	2
31.5	± 1.25	2
38	± 1.50	2

NOTE — Other sizes within this range may be supplied by agreement. The tolerances should be those of the next smaller size.

3.3.2 Lining and Cover Thickness — The thickness of the lining and cover of the hose when determined according to 8 of IS : 443-1963* shall be not less than that specified in Table 2.

TABLE 2 LINING AND COVER THICKNESS

NOMINAL BORE SIZE	LINING THICKNESS	COVER THICKNESS
(1)	(2)	(3)
	mm	mm
Up to and including 20 mm	1.5	1.0
Over 20 mm	2.0	1.0

NOTE — In the case of fluted hose, the cover thickness shall correspond to the measurement made at a point where the thickness of fluting is included therein.

3.3.3 Length — The standard length of the wrapped type hose shall be 15 metres. The long length moulded hose shall be supplied in coils as agreed to between the purchaser and the supplier.

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

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

3.4 Requirements of Physical Tests on Finished Hose

3.4.1 Tensile Strength and Elongation at Break of Lining and Cover — The tensile strength and elongation at break of the rubber used for the lining and cover of the hose when tested according to 4 of IS : 443-1963* shall be as specified in Table 3.

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

CHARACTERISTIC	REQUIREMENTS FOR LINING AND COVER
(1)	(2)
Tensile strength, kgf/cm ² , <i>Min</i>	55
Elongation at break, percent, <i>Min</i>	250

3.4.2 Accelerated Ageing Test Requirement — After ageing at 100°C ± 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 ±25 percent for tensile strength and $\begin{smallmatrix} +10 \\ -45 \end{smallmatrix}$ percent for elongation at break of the corresponding values obtained before ageing when tested according to IS : 443-1963*.

3.4.3 Swelling Test Requirement — The lining and cover of the hose after immersion in the test liquid shall not change in volume by more than +100 percent, when tested according to 13 of IS : 443-1963*.

3.4.4 Adhesion Strength — The strength of adhesion shall be such that the rate of separation does not exceed 25 mm per minute under a load of 3.5 kg when tested according to 6 of IS : 443-1963*, for the following:

- Between reinforcement plies,
- Between lining and reinforcement plies, and
- Between cover and reinforcement plies.

3.4.5 Hydraulic Test Requirement — The minimum bursting pressure of the hose shall be not less than 21.0 kgf/cm², when tested according to 11 of IS : 443-1963*.

3.4.6 Proof Pressure Test Requirements — Samples of production length of hoses when subjected to internal hydraulic pressure of 1.5 times working pressure for one minute, should not show any rupture, leakage or porosity.

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

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

4. MARKING

4.1 Each length of the wrapped type hose shall be indelibly marked adjacent to each end with:

- a) the manufacturer's name or trade-mark, hose denomination; and
- b) month and year of manufacture, if required by the purchaser.

4.1.1 For long length, moulded type of hose, the above markings shall be made at intervals of 15 metres approximately.

4.1.2 Each length of 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. Presence of this 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 during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. 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 AND CRITERIA FOR CONFORMITY

5.1 For the purpose of ascertaining the conformity of the hose in a consignment to this specification, the scale of sampling and the criteria for conformity shall be as prescribed in 3 of IS : 443-1963*.

6. TESTS

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

APPENDIX A

(Clause 0.2)

RECOMMENDED MINIMUM OUTSIDE DIAMETER

A-1. OUTSIDE DIAMETER

A-1.1 Recommended minimum outside diameter for various bore sizes of the hose should be as given in Table 4.

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

TABLE 4 RECOMMENDED MINIMUM OUTSIDE DIAMETER

(Clause A-1.1)

NOMINAL BORE SIZE	RECOMMENDED MINIMUM OUTSIDE DIAMETER*
(1)	(2)
mm	mm
5	10.5
6.3	12.0
8	13.5
10	15.5
12.5	18.0
16	21.5
20 °	25.0
25	33.0
° 31.5	40.0
38	47.0

*In the case of fluted hose, this measurement shall be taken on the top of the flutes and the depth of flutes shall not exceed 0.5 mm.