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SPECIFICATION FOR WATER SUCTION AND DISCHARGE HOSE OF RUBBER, HEAVY DUTY

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SPECIFICATION FOR WATER SUCTION AND DISCHARGE HOSE OF RUBBER, HEAVY DUTY

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 8 October 1965, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Chemical Division Council.

0.2 An important difference between suction hose and other types is the need to prevent collapse of the walls under vacuum. This is achieved by the introduction of internal spiral wire centre and also an external spiral wire reinforcement. If the liquids are non-corrosive and do not carry solids in suspension, as is the case with water, rough bore hose is available, having the internal spiral wire submerged partly in a thick rubber lining. The present standard is recommended as suitable for discharge pressures up to 7 kg/cm^2. Thin wire and woven fabric employed for reinforcing purposes used in the construction of these types of hoses provide extra strength.

0.3 Taking into consideration the views of producers, consumers and technologists, the Rubber Products Sectional Committee felt that this standard should be related to the prevailing manufacturing and trade practices followed in the country in this field and also consulted other overseas standards on the subject. Bore sizes, tolerances on internal and external diameters and the length of the hoses in this standard have also been brought in line with the draft proposal on hoses of the International Organization for Standardization.

0.4 The clauses **4.1** and **4.2** contained in this standard permit the purchaser to use his option regarding marking and packing. Further, clause **6.1** calls for agreement between the purchaser and the supplier, if tests are to be carried out on samples beyond three months from the date of supply.

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.

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

1. SCOPE

1.1 This standard prescribes the requirements and methods of test for rough bore (and semi-embedded wire) water suction and discharge rubber hose, heavy duty, with woven fabric and wire reinforcement.

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 Construction — The hose shall be constructed from the following materials given in order:

a) Spiral wire,
b) One ply of rubber impregnated fabric,
c) Rubber lining,
d) One or more plies of rubber impregnated fabric,
e) Spiral wire,
f) Rubber filler,
g) One or more plies of rubber impregnated fabric, and
h) Rubber cover.

3.1.1 *Reinforcement* — The reinforcement shall be of woven fabric applied on bias at approximately 45° angle. The woven fabric shall be well frictioned or suitably spread on both sides with a rubber compound.

NOTE — Fabrics of cotton, rayon, polyamide, polyester or other equivalent fabrics may be used for reinforcement provided that it complies with the test requirements specified in this standard.

3.1.1.1 For cotton fabrics, a weight of 340 g/m² and a minimum breaking load strength of 16 kg/cm width of strip in warp and weft are recommended.

3.1.2 *Rubber Cover* — The outer rubber cover shall be abrasion resistant, free from air blisters, porosity and other surface defects.

3.1.3 The spiral wire shall be of mild steel. The mild steel wire shall be galvanized and shall conform to IS : 280-1962†, with an ultimate tensile strength of not less than 55 kg/mm².

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

†Specification for mild steel wire for general engineering purposes.

3.2 Dimensions and Tolerances

3.2.1 The internal diameters and the minimum number of fabric plies shall be as specified in Table 1.

TABLE 1 INTERNAL DIAMETERS AND MINIMUM NUMBER OF PLIES FOR WATER SUCTION AND DISCHARGE HOSE OF RUBBER, HEAVY DUTY

Sl No.	Internal Diameter	Tolerance on Internal Diameter	Minimum Number of Plies
(1)	(2)	(3)	(4)
	mm	mm	
i)	25·00	± 1·25	3
ii)	31·50		3
iii)	38·0	± 1·5	3
iv)	45·0		3
v)	50·0		3
vi)	56·0		3
vii)	63·0		4
viii)	75·0	± 2·0	4
ix)	100·0		5
x)	125·0		6
xi)	150·0		7

3.2.2 *Thickness of Lining, Filler and Cover* — The thickness of the lining, filler and cover shall be not less than that specified in Table 2.

TABLE 2 MINIMUM THICKNESS OF LINING, FILLER AND COVER OF WATER SUCTION AND DISCHARGE HOSE OF RUBBER, HEAVY DUTY

Sl No.	Internal Diameter	Lining	Filler	Cover
(1)	(2)	(3)	(4)	(5)
	mm	mm	mm	mm
i)	25·0	2·0	1·0	1·5
ii)	31·5	2·0	1·0	1·5
iii)	38·0	2·0	1·0	1·5
iv)	45·0	2·0	1·0	1·5
v)	50·0	2·5	1·0	1·5
vi)	56·0	2·5	1·0	1·5
vii)	63·0	2·5	1·0	1·5
viii)	75·0	2·5	1·0	1·5
ix)	100·0	3·0	1·5	2·0
x)	125·0	3·0	1·5	2·0
xi)	150·0	3·0	1·5	2·0

3.2.3 *Thickness and Pitch of Wire* — The thickness and pitch of mild steel wire shall be as specified in Table 3.

TABLE 3 THICKNESS AND PITCH OF WIRE

Sl No.	Internal Diameter	Thickness of First Wire	Thickness of Second Wire	Pitch	Tolerance on Pitch
(1)	(2)	(3)	(4)	(5)	(6)
	mm	mm	mm	mm	mm
i)	25·0	2·50	2·00	15·0	±1·0
ii)	31·5	2·50	2·00	15·0	±1·0
iii)	38·0	2·50	2·00	15·0	±1·0
iv)	45·0	2·50	2·00	15·0	±1·0
v)	50·0	2·50	2·00	15·0	±1·0
vi)	56·0	2·50	2·00	15·0	±1·0
vii)	63·0	2·50	2·50	18·0	±1·5
viii)	75·0	2·50	2·50	18·0	±1·5
ix)	100·0	3·15	2·50	18·0	±1·5
x)	125·0	3·15	3·15	18·0	±2·0
xi)	150·0	4·00	3·15	21·0	±3·0

3.3 Length

3.3.1 Unless otherwise specified, the hose shall be supplied in following lengths which shall be in multiples of 1·5 m:

Internal Diameter of Hose	*Length of Hose*
mm	
Up to 75·0	6 m to 15 m
Above 75·0	3 m to 6 m

3.3.2 The length of soft ends (ends free of wire) shall be as follows:

Internal Diameter of Hose	*Length of Soft Ends*
mm	mm
Up to and including 75·0	80 ± 5
100	105 ± 5
125 and 150	145 ± 5

3.4 Tensile Strength and Elongation at Break — The tensile strength and elongation at break of the rubber used for lining, filler and cover of the hose shall be not less than 70 kg/cm² and 300 percent respectively.

3.5 Accelerated Ageing — After ageing at 70° ± 1°C for 168 h the tensile strength and elongation at break of the rubber used for the lining, filler and cover shall not vary by more than +10 or −35 percent of the corresponding values obtained before ageing.

3.6 Hydraulic Proof Test Requirement — The hose, subjected to a pressure of 25 percent in excess of the recommended discharge pressure of the hose (**3.7**), shall show no defect or failure at the end of the test.

3.6.1 The elongation of the hose under maximum test pressure, that is, difference between the length under pressure and original length shall not exceed 7·5 percent of the latter.

3.6.2 The hose shall be capable of withstanding a pressure equal to twice the recommended discharge pressure (**3.7**) without failure.

3.7 Recommended Discharge Pressure — Recommended discharge pressure and vacuum of the hose are as follows:

Internal Diameter	*Discharge Pressure, Max*	*Vacuum, Max*
mm	kg/cm²	mm Hg
25·0	7	600
31·5	7	,,
38·0	7	,,
45·0	7	,,
50·0	7	,,
56·0	7	,,
63·0	7	,,
75·0	7	,,
100·0	5	,,
125·0	5	,,
150·0	5	,,

4. MARKING AND PACKING

4.1 Each length of the hose shall be indelibly marked with the following:

a) The manufacturer's name or his trade-mark, or both; type of hose; and

b) Month and year of manufacture, if specified by the purchaser.

4.1.1 Each length of the hose may also be suitably 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.

4.2 The material shall be packed as agreed to between the purchaser and the supplier.

5. SAMPLING AND CRITERIA FOR ACCEPTANCE

5.1 For the purpose of ascertaining the conformity of the hose in a consignment of 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, carry out all tests within three months of the date of receipt of the material by the purchaser.

6.2 Carry out tests regarding diameter, thickness, tensile strength, elongation at break, accelerated ageing, hydraulic test and proof pressure test in accordance with the methods prescribed in IS : 443-1963*.

6.3 Proof Pressure Test — Subject each hose to a pressure of 25 percent in excess of the specified working pressure. Immerse the hose completely in water, maintaining the applied pressure for ten minutes. Keep the hose straight during testing. Examine for any rupture, leakage or porosity.

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