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Indian Standard
SPECIFICATION FOR
WELDING 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

SPECIFICATION FOR

WELDING HOSE OF RUBBER WITH BRAIDED TEXTILE REINFORCEMENT

(First Revision)

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Indian Standard
SPECIFICATION FOR
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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 1966. The hoses prescribed in this standard may be manufactured by mandrel or moulded constructional techniques. In the revised standard, outside diameters have been specified as recommendatory in Appendix A. The thickness requirement for the lining has been brought down. The tensile strength requirement for the lining has also been lowered so as to make provision for the use of synthetic rubbers in rubber blends. The limit for increase in diameter has been specified at working pressure instead of at a specified pressure of 25 kgf/cm². These changes have been necessitated by the present line of thinking at the level of ISO/TC 45 'Rubber' of International Organization for Standardization and the current trade practices. Contrary to the line of thinking at ISO/TC 45 level, the Committee felt that there should be two separate specifications, one for braided reinforcement and the other for woven reinforcement, even though both are put to the same end-use, in view of the distinct marketing practices in this country. The requirements for welding hose of rubber with woven textile reinforcement are given in IS : 447-1968*.

0.3 The Committee while approving the draft for wide circulation felt the need for including ignition test requirements for lining and cover. Significant data is not presently available and therefore the requirement for this characteristic will be added later.

0.4 In preparing this standard, considerable assistance has been derived from the following publications:

ISO/DR 1307 Hose (bore sizes, test pressures and tolerances on length). International Organization for Standardization.

*Specification for welding hose of rubber with woven textile reinforcement (*second revision*).

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Doc : ISO/TC 45 (Secretariat — 837) 1119 Draft ISO proposals for rubber welding hose. International Organization for Standardization.

0.5 This standard contains clauses **3.2.3.2**, **3.3.3** and **6.1** which call for agreement between the purchaser and the supplier.

0.6 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, methods of sampling and test for welding hose of rubber with braided textile reinforcement, manufactured by either the mandrel or long length moulded process. The hoses are designed for a working pressure up to 12.5 kgf/cm² in bore sizes up to and including 12.5 mm.

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.

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.

3.2 Construction

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

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

*Rules for rounding off numerical values (revised).

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

3.2.3 Cover — The cover shall be reasonably uniform in thickness, concentric and free from air blisters, 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.

3.2.3.1 The colour of the cover shall be as follows:

RED for hose for fuel gases, and

BLACK for hose for oxygen, air and other non-combustible gases.

3.2.3.2 Subject to agreement between the purchaser and the supplier, hoses intended for oxygen may have a cover of blue.

NOTE—ISO/TC 45 'Rubber' of International Organization for Standardization has adopted blue colour instead of black for welding hoses intended for oxygen.

3.3 Dimensions

3.3.1 Diameter 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.

TABLE 1 BORE SIZE AND NUMBER OF REINFORCEMENT PLIES

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	2

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.

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

TABLE 2 LINING AND COVER THICKNESS

(Clause 3.3.2)

NOMINAL BORE SIZE	LINING THICKNESS	COVER THICKNESS
(1)	(2)	(3)
mm	mm	mm
Up to and including 10	1.5	1.0
Over 10	1.5	1.5

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. 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.

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	Cover
(1)	(2)	(3)
Tensile strength, kgf/cm ² , Min	50	70
Elongation at break, percent, Min	250	300

3.4.2 Accelerated Ageing Test Requirements — After ageing at $70^{\circ} \pm 1^{\circ}\text{C}$ for a period of 72 hours, the rubber used for the lining and cover shall not vary by more than ± 25 percent for tensile strength and $+\frac{10}{-30}$ percent for elongation at break of the corresponding values obtained before ageing, when tested according to 4 of IS : 443 - 1963*.

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

3.4.3 Adhesion Strength — The strength of adhesion when tested according to 6 of IS : 443 - 1963* shall be such that the rate of separation does not exceed 25 mm per minute under a load of 4 kg for the following:

- a) Between reinforcement plies,
- b) Between lining and reinforcement plies, and
- c) Between cover and reinforcement plies.

3.4.4 Hydraulic Test Requirement — The hose shall comply with the requirements specified in Table 4, when tested according to 11 of IS : 443-1963*.

TABLE 4 REQUIREMENTS OF HYDRAULIC TEST

NOMINAL BORE SIZE	MINIMUM BURSTING PRESSURE	MAXIMUM INCREASE IN OUTSIDE DIAMETER AT WORKING PRESSURE
(1)	(2)	(3)
All sizes specified in Table 1	50 kgf/cm ²	7 percent

3.4.5 Proof Pressure Test Requirement — Samples of production length of hoses when subjected to internal hydraulic pressure 1.5 times that of 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.

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, if any, 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.

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

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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 The recommended minimum outside diameter for the various hose sizes should be as given in Table 5.

TABLE 5 RECOMMENDED MINIMUM OUTSIDE DIAMETER

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	21.0

*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.

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