



**PRODUCT MANUAL FOR
RUBBER HOSES AND HOSE ASSEMBLIES
FOR WATER SUCTION AND DISCHARGE
ACCORDING TO IS 3549: 2017/ISO 4641:2010**

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	Product	:	IS 3549: 2017/ISO 4641:2010
	Title	:	Rubber Hoses and Hose Assemblies for Water Suction and Discharge
	No. of Amendments	:	Nil
2.	Sampling Guidelines:		
a)	Raw material	:	Lining, reinforcement and cover shall be as per Cl. 6
b)	Grouping guidelines	:	Please refer ANNEX – <u>A</u>
c)	Sample Size	:	5m Hose + 02 No Slab 150x150x2mm
3.	List of Test Equipment	:	Please refer ANNEX – <u>B</u>
4.	Scheme of Inspection and Testing	:	Please refer ANNEX – <u>C</u>
5.	Possible tests in a day :		
	(i) Materials and construction (ii) Dimensions (iii) Tensile strength of rubber lining and cover (iv) Elongation at break of rubber lining and cover (v) Proof pressure test (vi) Burst test (vii) Adhesion (viii) Resistance to suction flattening		
6.	Scope of the Licence :		
	Licence is granted to use Standard Mark as per IS 3549 : 2017 with the following scope:-		
	Name of the product	Rubber Hoses and Hose Assemblies for Water Suction and Discharge	
	Type	Type 1 or/and Type 2 and/or Type 3	
	Sizes	Nominal size of Hose.....mm	

**ANNEX -A
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Grouping Guidelines

1. Rubber Hoses and Hose Assemblies for Water Suction and Discharge as per IS 3549 : 2017 are classified as follows: -

Type	Type 1, Type 2 and Type 3
Internal diameter	16,20,25,31.5,40,50, 63,80,100,125,150,160,200,250 & 315mm

2. To cover the various sizes & types in the scope of the licence, the following guidelines of grouping based on their operating duty requirements for grant of licence/inclusion of new variety in the licence :-

Two sizes, highest and lowest sizes from each type shall be tested for all the requirements of the specification in order to cover the complete range of size & type. It shall however be ensured and recorded that applicant/licensee has got complete manufacturing as well as testing facilities for the sizes & types required to be covered as per grouping.

3. During the operation of the Licence, BO shall ensure that all Sizes & types covered in the Licence are tested in rotation, to the extent possible.

ANNEX-B
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List of Test Equipment

Major test equipment required to test as per the Indian Standard

Sl. No.	Test Equipment	Tests used in with Clause Reference
1.	-Visual	Materials and construction, (Cl.6)
2.	-Air conditioner -Thermometer -Plug gauges -Tapered gauges -Micrometer -Vernier slide calipers or - internal calliper dial gauge with rounded feet -Go-No Go plugs -Steel scale -Measuring tape	Dimensions and tolerances,(Cl.7)
3.	-Tensile Testing machine - Dies and cutters -Thickness gauge -Cone gauge -Vernier Calipers	Tensile strength and elongation at break of rubber lining and cover, (Cl.8.1.2)
4.	-Hot air oven with count hour meter -Tensile Testing machine - Dies and cutters -Thickness gauge -Cone gauge -Vernier Calipers	Resistance to ageing, (Cl.8.1.3) (i) Change in tensile strength from original value (max.), (ii) Change in elongation at break from original value (max.)
5.	-Hydrostatic pressure testing apparatus with pressure measuring device -End plugs -Sliding Vernier Callipers or micrometer, -length measuring tape,	Hydrostatic-pressure requirements (proof pressure test), (Cl.8.2.1)

	-circumferential measuring tape (pi tape)	
6.	-Hydrostatic pressure testing apparatus with pressure measuring device	Burst test, (Cl. 8.2.2)
7.	-Adhesion Test machine capable of maintaining a substantially constant rate of traverse of the moving head during the test and fitted with an autographic recorder - Grips - Mandrel	
8.	-Vacuum pump -Smooth, solid ball, with a diameter equal to 0.9 times the bore of the hose	Resistance to suction flattening, (Cl. 8.2.4)
9	-Mandrel, having an outside diameter equal to twice the minimum bend radius -Conditioning chamber -Flexibility test equipment	Low-temperature flexibility, (Cl. 8.2.5)
10	-Adhesion Test machine capable of maintaining a substantially constant rate of traverse of the moving head during the test and fitted with an autographic recorder - Grips - Mandrel	Adhesion, (Cl. 8.2.6)

The above list is indicative only and may not be treated as exhaustive

ANNEX-C
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(SCHEME OF INSPECTION AND TESTING)

1. **LABORATORY** - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.
 - 1.1 The manufacturer shall prepare a calibration plan for the test equipments.
2. **TEST RECORDS** – The manufacturer shall maintain test records for the tests carried out to establish conformity.
3. **PACKING AND MARKING** – The Standard Mark, as given in the Schedule of the licence, shall be marked on each piece of Rubber hose, provided always that the products marked conforms to every requirements of the specification.
 - 3.1 Packing and marking on hoses and hose assemblies shall be done as per the provision of IS 3549:2017. In addition, the following details shall be marked on each hose/hose assembly:-
 - a) BIS Licence No. CM/L-----.
 - b) BIS website details i.e. –“For details of BIS certification please visit www.bis.go
4. **CONTROL UNIT** – For the purpose of the Scheme, the control unit shall be as follows:-
 - 4.1 **Rubber Hose** – For the purpose of this Scheme, Rubber hose of the same type manufactured under similar condition of production and from the same type of rubber compound masticated and vulcanized at a time, produced in one shift shall constitute a control unit. The size of one control unit shall not be more than 500 meters of hose.
 - 4.2 **Rubber Compound** – Rubber compound from mixing made in one cycle of mixing. The Size of one control unit shall not be more than 10000kg of lining and/or cover compound.
5. **LEVELS OF CONTROL** - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.
6. **REJECTIONS** – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

**Table 1 LEVELS OF CONTROL
(Scheme of Inspection and Testing)**

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Clause	Requirement	Test Method			No. of Sample	Frequency	Remarks
		Clause	Reference				
6	Materials and Construction						
6.1 6.2 6.3	Lining Reinforcement and Cover	6.1 6.2 6.3	IS 3549:2017	R	5	Each Control Unit	
7	Dimension and tolerances			R	5	-do-	
7.1 Table 3	Bore (Inside diameter)	7.1	IS 3549:2017	R	5	-do-	
7.2	Enlarged ends	7.2	IS 3549:2017	R	5	-do-	
7.3	Unit lengths	-	ISO 1307:2006 Table 2	R	5	-do-	
7.4	Lining	-	ISO 4671 Table 4	R	5	-do-	
7.5	Cover	-	-do-	R	5	-do-	
8.1	Rubber Compounds	-		R			
8.1.1 Table 1	General	-	ISO 2393	R	2	Every fifth control unit	In case any of the samples fail to meet the relevant requirements the entire material in the control unit shall be considered unfit for the purpose of

							marking. In case of any failure each control unit shall be tested till 5 consecutive control units are found to be satisfactory and only then frequency suggested in this table may be followed.
8.1.2 Table 1	Tensile strength of rubber lining and cover	-	ISO 37	R	2	Each Control Unit	
8.1.2 Table 1	Elongation at break of rubber lining and cover	-	ISO 37	R	2	-do-	
8.1.3	Resistance to ageing-change in tensile strength from change in elongation from original value	-	ISO 188 ISO 37	R	2	Every tenth control unit	
8.2	Performance requirements for hoses and hose assemblies	-		R			
8.2.1 Table 2 & Table 4	Hydrostatic-pressure requirements (proof pressure test) -Variation in length at max. working pressure -variation in O.D. at max. working pressure	-	ISO 1402	R	1	Each Control Unit	
8.2.2	Burst test	-	-do-	R	1	Every tenth control unit	
8.2.3 Table 3	Resistance to bending (minimum bend radius	-	ISO 1746	R	1	Every tenth control unit	

	as a function of nominal size)						
8.2.4	Resistance to suction flattening	-	ISO 7233:2006	R	1	Each Control Unit	
8.2.5	Low-temperature flexibility	Method B	ISO 4672:1997	R	1	Every tenth control unit	
8.2.6 Table 4	Adhesion	-	ISO 8033	R	1	Each Control Unit	
8.2.7 Table 4	Ozone resistance of the cover	Method 2	ISO 7326:2006	S	1	Every tenth control unit	

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.