भारतीय मानक
Indian Standard

IS 12585 : 2023
ISO 6224 : 2011

पानी के लिए थर्मोप्लास्टिक होज़ (वस्त्र प्रबलित) की विशिष्टि — सामान्य प्रयोजन

(पहला पुनरीक्षण)

Specification for Thermoplastic Hoses (Textile Reinforced) for Water — General Purpose

(First Revision)

ICS 23.040.70

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NATIONAL FOREWORD

This Indian Standard (First Revision) which is identical with ISO 6224 : 2011 'Thermoplastics hoses, textile-reinforced, for general-purpose water applications — Specification, issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on recommendation(s) of the Rubber and Rubber Products Sectional Committee and approval of the Petroleum, Coal and Related Products Division Council.

This Indian Standard was published in 1988 and assistance was derived from ISO 6224 : 1981 Plastics hoses — Textile — Reinforced thermoplastics type for water — Specification during the preparation of the standard.

Thermoplastics hoses are being used and manufactured not only in developed countries but even in India. Depending upon the usage, both rubber and plastics hoses had their comparative advantages and weak points. However, once the choice to use thermoplastic hose had been exercised, it was important to stipulate the parameters to be tested and also prescribe the most acceptable requirements. Taking cognizance of these changes and developments, this standard had been formulated.

IS 444 is also available which covers the requirements, methods of sampling and test for textile-reinforced rubber hoses for general-purpose water applications.

First revision of this standard is undertaken to align it with latest published ISO 6224 : 2011 Thermoplastics hoses, textile-reinforced, for general-purpose water applications — Specification under dual numbering system.

The standard also makes a reference to the BIS Certification Marking of the product. Details of which are given in National Annex A.

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 3 Preferred numbers — Series of preferred numbers	IS 1076 (Part 1) : 1985/ISO 3 : 1973 Preferred numbers: Part 1 Series of preferred numbers (*second revision*)	Identical
ISO 176 : 2005 Plastics — Determination of loss of plasticizers — Activated carbon method	IS 13360 (Part 8/ Sec 4) : 2018/ISO 176 : 2005 Plastics — Methods of testing: Part 8 Permanece/chemical properties, Section 4 Determination of loss of plasticizers — Activated carbon method (*first revision*)	Identical
ISO 188 : 2011 Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests	IS 3400 (Part 4) : 2012/ISO 188 : 2011 Methods of test for vulcanized rubber: Part 4 Accelerated ageing and heat resistance (*third revision*)	Identical

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SPECIFICATION FOR THERMOPLASTIC HOSES (TEXTILE REINFORCED) FOR WATER — GENERAL PURPOSE

(First Revision)

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This standard does not purport to address all the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate health and safety practices and to ensure compliance with any national regulatory conditions.

1 Scope

This International Standard specifies the requirements for general-purpose textile-reinforced thermoplastics water-discharge hoses.

Three types of hose are specified according to their operating duty requirements, i.e. their ambient and water temperature ranges:

— ambient temperatures: −10 °C to +60 °C;

— water temperature during operation: 0 °C to +60 °C.

NOTE At water temperatures above 23 °C and particularly above 40 °C, the maximum working pressure will be reduced.

These hoses are not intended to be used for conveyance of potable (drinking) water, for washing-machine inlets, as fire-fighting hoses, for special agricultural machines or as gardening hoses for the consumer market.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3, *Preferred numbers — Series of preferred numbers*

ISO 176:2005, *Plastics — Determination of loss of plasticizers — Activated carbon method*

ISO 188:2011, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*

ISO 1307, *Rubber and plastics hoses — Hose sizes, minimum and maximum inside diameters, and tolerances on cut-to-length hoses*

ISO 1402, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing*

ISO 4671, *Rubber and plastics hoses and hose assemblies — Methods of measurement of the dimensions of hoses and the lengths of hose assemblies*

ISO 8033, *Rubber and plastics hoses — Determination of adhesion between components*

ISO 8330, *Rubber and plastics hoses and hose assemblies — Vocabulary*

ISO 8331, *Rubber and plastics hoses and hose assemblies — Guidelines for selection, storage, use and maintenance*

ISO 10619-1:—[1)], *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 1: Bending tests at ambient temperature*

1) To be published. (Revision of ISO 1746:1998)

ISO 10619-2:—[2)], *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 2: Bending tests at sub-ambient temperatures*

ISO 30013:2011, *Rubber and plastics hoses — Methods of exposure to laboratory light sources — Determination of changes in colour, appearance and other physical properties*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8330 apply.

4 Classification

Hoses are designated as one of the following types, depending on their pressure rating:

Type 1: Low pressure — Designed for a maximum working pressure of 0,6 MPa (6 bar) at 23 °C and 0,36 MPa (3,6 bar) at 60 °C.

Type 2: Medium pressure — Designed for a maximum working pressure of 1,0 MPa (10 bar) at 23 °C and 0,65 MPa (6,5 bar) at 60 °C.

Type 3: High pressure — Designed for a maximum working pressure of 2,5 MPa (25 bar) at 23 °C and 1,6 MPa (16 bar) at 60 °C.

5 Materials and construction

The hose shall consist of:

— a flexible thermoplastic lining;

— a reinforcement of natural or synthetic textile, applied by any suitable technique;

— a flexible thermoplastic cover.

The lining and the cover shall be of uniform thickness, concentric, fully gelled and free from visible cracks, porosity, foreign inclusions and other defects. The cover may have a smooth or fluted finish.

6 Dimensions

6.1 Inside diameters and tolerances on inside diameter

When measured in accordance with ISO 4671, the inside diameter and its tolerances shall conform to the values specified in Table 1.

2) To be published. (Revision of ISO 4672:1997)

Table 1 — Inside diameters, tolerances and minimum wall thicknesses

Inside diameter	Tolerance on inside diameter	Minimum wall thickness		
		mm		
mm	mm	Type 1	Type 2	Type 3
4	±0,50	2,00	2,00	2,50
6	±0,50	2,00	2,00	2,50
8	±0,60	2,00	2,00	2,80
9	±0,60	2,00	2,00	2,80
10	±0,75	2,00	2,00	2,80
12,5	±0,75	2,00	2,50	3,00
16	±0,75	2,00	2,80	3,00
19	±0,75	2,20	3,00	3,50
25	±1,25	2,70	3,50	4,00
32	±1,25	3,40	4,00	—
38	±1,50	4,00	4,50	—
50	±1,50	5,00	5,50	—

NOTE 1 For smaller or larger diameters, it is recommended that values be chosen from the R10 series of preferred numbers (see ISO 3), with tolerances as specified in ISO 1307.

NOTE 2 For intermediate diameters, it is recommended that values be chosen from the R20 series of preferred numbers (see ISO 3).

6.2 Concentricity

When determined in accordance with ISO 4671, the concentricity, based on a total indicator reading between the inside diameter and the outside surface of the cover, shall be no greater than 1,0 mm.

6.3 Tolerance on length

When measured in accordance with ISO 4671, the tolerance on cut lengths shall be as specified in ISO 1307.

6.4 Minimum wall thickness

When measured in accordance with ISO 4671, the minimum wall thickness of the hose shall conform to the values specified in Table 1. If the cover is fluted, the depth of the flutes shall not be greater than 50 % of the cover thickness.

7 Physical properties

7.1 Thermoplastic materials

When measured by the methods listed in Table 2, the physical properties of the materials used for the lining and cover shall conform to the values specified in Table 2.

Tests shall be carried out on test pieces taken either from the hose or from separately gelled sheets, 2 mm in thickness.

Table 2 — Physical properties of thermoplastic materials

Property	Requirements		Test method
	Lining	Cover	
Minimum tensile strength	10,0 MPa	10,0 MPa	ISO 527-2 (dumb-bell test piece)
Minimum elongation at break	250 %	250 %	ISO 527-2 (dumb-bell test piece)
Resistance to ageing:			
Change in tensile strength from original value (max.)	±15 %	±15 %	ISO 188:2011 (3 days at 70 °C ± 1 °C), method A or B; ISO 527-2 (dumb-bell test piece)
Change in elongation at break from original value (max.)	±25 %	±25 %	
Loss in mass on heating (max.)	4 %	4 %	ISO 176:2005, method B

7.2 Finished hoses

When tested at 23 °C (standard laboratory temperature) and at 60 °C by the appropriate method specified in ISO 1402, the physical properties of finished hoses shall conform to the values specified in Table 3.

8 Type, routine and production testing

Type tests are those tests carried out to determine that the hose design and method of manufacture meet the full requirements of this International Standard.

Routine tests are those tests carried out on every manufactured length of finished hose.

The type tests and routine tests which shall be carried out are given in Annex A.

Production tests are those tests carried out on each batch. The tests recommended for production testing are given in Annex B, which is for guidance only.

9 Test certificate/report

When requested by the purchaser, the manufacturer or supplier shall provide a test certificate or test report with each length of hose or batch of hoses supplied to the purchaser.

Table 3 — Physical properties of finished hoses

Property	Requirements						Test method
	Type 1		Type 2		Type 3		
	MPa	bar	MPa	bar	MPa	bar	
Proof pressure at 23 °C	0,9	9	1,5	15	5,0	50	ISO 1402
Minimum burst pressure at 23 °C	1,8	18	3,0	30	10,0	100	ISO 1402
Proof pressure at 60 °C	0,55	5,5	0,975	9,75	2,5	25	ISO 1402
Minimum burst pressure at 60 °C	1,1	11	1,95	19,5	5,0	50	ISO 1402
Change in length at maximum working pressure at 23 °C	±8 %						ISO 1402
Adhesion between components	2,0 kN/m (min.)						ISO 8033
UV resistance (xenon-arc lamp)	The cover shall show no cracking or change in colour which would cause the hose to be unserviceable. When comparing the test pieces with the grey scale, the minimum acceptable degree of contrast shall be as determined between the interested parties.						ISO 30013:2011, method A
Flexibility at 23 °C	T/D not less than 0,8						ISO 10619-1:—, method A1
Low-temperature flexibility	No cracks shall be detected and the hose shall pass the proof pressure test specified above at 23 °C.						ISO 10619-2:—, method B, at −10 °C ± 2 °C

10 Marking

The hose shall be continuously and durably marked with the following minimum information:

a) the manufacturer's name or identification, e.g. MAN;

b) the number and year of publication of this International Standard, i.e. ISO 6224:2011;

c) the hose type, e.g. type 1;

d) the inside diameter, in millimetres, e.g. 25;

e) the maximum working pressure, in megapascals and in bars, or in either, with the units indicated, e.g. 0,6 MPa;

f) the quarter and the last two digits of the year of manufacture, e.g. 2Q11.

EXAMPLE MAN/ISO 6224:2011/type 1/25/0,6 MPa/2Q11.

11 Recommendations for packaging and storage

These are given in ISO 8331.

Annex A
(normative)

Type testing and routine testing

Table A.1 gives the tests to be carried out for type tests and routine tests as defined in Clause 8.

Table A.1 — Type tests and routine tests

Dimension/property under test (with reference to relevant subclause)	**Type testing**	**Routine testing**
Inside diameter and tolerances (6.1)	X[a]	X
Concentricity (6.2)	X	X
Tolerance on length (6.3)	X	X
Minimum wall thickness (6.4)	X	X
Minimum tensile strength and minimum elongation at break (7.1)	X	N.A.[b]
Resistance to ageing: Change in tensile strength from original value (max.) (7.1) Change in elongation at break from original value (max.) (7.1)	X	N.A.
Loss in mass on heating (max.) (7.1)	X	N.A.
Proof pressure at 23 °C (7.2)	X	X
Minimum burst pressure at 23 °C (7.2)	X	N.A.
Proof pressure at 60 °C (7.2)	X	N.A.
Minimum burst pressure at 60 °C (7.2)	X	N.A.
Change in length at maximum working pressure at 23 °C (7.2)	X	N.A.
Adhesion between components (7.2)	X	N.A.
UV resistance (xenon-arc lamp) (7.2)	X	N.A.
Flexibility at 23 °C (7.2)	X	N.A.
Low-temperature flexibility (7.2)	X	N.A.

[a] X = test required.

[b] N.A. = not applicable.

Annex B
(informative)

Recommended tests for production testing

Table B.1 gives the tests recommended for production testing. Production tests are carried out on a hose or a sample of hose from each batch manufactured.

A batch is defined as, at the most, either 30 000 m of hose or 10 000 kg of lining and/or cover compound (plastic).

Table B.1 — Recommended tests for production testing

Dimension/property under test (with reference to relevant subclause)	**Production testing**
Inside diameter and tolerances (6.1)	X[a]
Concentricity (6.2)	X
Tolerance on length (6.3)	X
Minimum wall thickness (6.4)	X
Minimum tensile strength and minimum elongation at break (7.1)	N.A.[b]
Resistance to ageing: Change in tensile strength from original value (max.) (7.1) Change in elongation at break from original value (max.) (7.1)	N.A.
Loss in mass on heating (max.) (7.1)	N.A.
Proof pressure at 23 °C (7.2)	X
Minimum burst pressure at 23 °C (7.2)	X
Proof pressure at 60 °C (7.2)	N.A.
Minimum burst pressure at 60 °C (7.2)	N.A.
Change in length at maximum working pressure at 23 °C (7.2)	N.A.
Adhesion between components (7.2)	X
UV resistance (xenon-arc lamp) (7.2)	N.A.
Flexibility at 23 °C (7.2)	N.A.
Low-temperature flexibility (7.2)	N.A.

[a] X = test required.

[b] N.A. = not applicable.

National Annex A
(*National Foreword*)

A-1 BIS CERTIFICATION MARKING — The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the standard mark.

(*Continued from second cover*)

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 1307 Rubber and plastics hoses — Hose sizes, minimum and maximum inside diameters, and tolerances on cut-to-length hoses	IS 15933 : 2011/ISO 1307 : 2006 Rubber and plastics hoses — Hose sizes, minimum and maximum inside diameters and tolerances on cut-to-length hoses	Identical
ISO 1402 Rubber and plastics hoses and hose assemblies — Hydrostatic testing	IS 443 (Part 3) : 2017/ISO 1402 : 2009 Methods of test for rubber and plastics hoses: Part 3 Hydrostatic testing (*third revision*)	Identical
ISO 4671 Rubber and plastics hoses and hose assemblies — Methods of measurement of the dimensions of hoses and the lengths of hose assemblies	IS 15913 : 2011/ISO 4671 : 2007 Rubber and plastics hoses and hose assemblies — Methods of measurement of the dimensions of hoses and the lengths of hose assemblies	Identical
ISO 8033 Rubber and plastics hoses — Determination of adhesion between components	IS 3400 (Part 24) : 2021/ISO 8033 : 2016 Methods of test for vulcanized rubber: Part 24 Rubber and plastics hose — Determination of adhesion between components (*second revision*)	Identical
ISO 8330 Rubber and plastics hoses and hose assemblies — Vocabulary	IS 16204 : 2014/ISO 8330 : 2007 Rubber and plastics hoses and hose assemblies — Vocabulary	Identical
ISO 8331 Rubber and plastics hoses and hose assemblies — Guidelines for selection, storage, use and maintenance	IS 16210 : 2018/ ISO 8331 : 2016 Rubber and plastics hoses and hose assemblies — Guidelines for selection, storage, use and maintenance (*first revision*)	Identical
ISO 10619-1 Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 1: Bending tests at ambient temperature	IS 12656 : 2014/ISO 10619-1 : 2011 Rubber or plastics hoses and tubing — Bending tests (*first revision*)	Identical
ISO 10619-2 : 2011 Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 2: Bending tests at sub-ambient temperatures	IS 12657 : 2014/ISO 10619-2 : 2011 Rubber and plastics hoses — Subambient temperature flexibility tests (*first revision*)	Identical

The technical committee has reviewed the provision of the following International Standard referred in this adopted standard and has decided it is acceptable for use in conjunction with this standard:

International Standard	*Title*
ISO 30013 : 2011	Rubber and plastics hoses — Methods of exposure to laboratory light sources — Determination of changes in colour, appearance and other physical properties

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 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Bureau of Indian Standards

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.

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Amendments Issued Since Publication

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