

DRAFT INTERNATIONAL STANDARD

ISO/DIS 16301.2

ISO/TC 45/SC 1

Secretariat: DSM

Voting begins on:
2013-08-05

Voting terminates on:
2013-10-05

Rubber and plastics hoses and hose assemblies, wire- or textile-reinforced, for hydraulic jacks and for hydraulic power units used in hydraulic tools — Specification

Tuyaux et flexibles en caoutchouc et en plastique, à armature textile ou métallique, pour des applications de vérin hydraulique — Spécifications

ICS: 83.140.40;23.040.70

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO/DIS 16301.2](#)

<https://standards.iteh.ai/catalog/standards/sist/816c2ee0-b216-4a4e-9c04-7d2debe4a8fc/iso-dis-16301-2>

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.



Reference number
ISO/DIS 16301:2013(E)

© ISO 2013

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/DIS 16301.2

<https://standards.iteh.ai/catalog/standards/sist/816c2ee0-b216-4a4e-9c04-7d2debe4a8fc/iso-dis-16301-2>

Copyright notice

This ISO document is a Draft International Standard and is copyright-protected by ISO. Except as permitted under the applicable laws of the user's country, neither this ISO draft nor any extract from it may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission being secured.

Requests for permission to reproduce should be addressed to either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Reproduction may be subject to royalty payments or a licensing agreement.

Violators may be prosecuted.

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Classification	2
5 Materials and construction	3
6 Dimensions and tolerances	3
7 Physical properties	4
8 Type tests	7
9 Marking	8
10 Test report	8
11 Recommendations for packaging and storage	8
Annex A (normative) Test frequency	9
Annex B (informative) Production tests	10
Annex C (informative) Recommendations for lengths of supplied hoses and hose assemblies	11
C.1 Hoses	11
C.2 Hose assemblies	11
Annex D (normative) Test method for electrical conductivity	12

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 16301 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Hoses (rubber and plastics)*.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO/DIS 16301.2](https://standards.iteh.ai/catalog/standards/sist/816c2ee0-b216-4a4e-9c04-7d2debe4a8fc/iso-dis-16301-2)

<https://standards.iteh.ai/catalog/standards/sist/816c2ee0-b216-4a4e-9c04-7d2debe4a8fc/iso-dis-16301-2>

Rubber and plastics hoses and hose assemblies, wire- or textile-reinforced, for hydraulic-jacks and hydraulic power units used in hydraulic tool applications — Specification

1 Scope

This **International Standard** specifies the requirements for three classes, two types and two grades of wire or textile reinforced hydraulic jack hose and hose assemblies of sizes ranging from 5 to 25. They are suitable for use with hydraulic fluids HH, HL, HM, HR and HV in accordance with ISO 6743-4 at temperature ranging from -40 to +70 °C.

The standard does not include requirements for the connection ends. It is limited to the performance of hoses and hose assemblies. The hose assembly maximum working pressure is regulated by the lowest maximum working pressure of the components.

NOTE It is the responsibility of the user, in consultation with the hose manufacturer, to establish the compatibility of the hose with the fluid to be used.

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

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

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

ISO 6743-4, *Lubricants, industrial oils and related products (class L) — Classification — Part 4: Family H (Hydraulic systems)*

ISO 6803, *Rubber or plastics hoses and hose assemblies — Hydraulic pressure impulse test without flexing*

ISO 7326, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*

ISO 8031, *Rubber and plastics hoses and hose assemblies — Determination of electrical resistance and conductivity*

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

3 Terms and definitions

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

4 Classification

4.1 Classes

Three classes of hose are specified, distinguished by their maximum working pressure and six sizes specified by Nominal size as shown in Table 1.

Table 1 — Classes and nominal size

Class	70	100	140
Maximum working pressure (MPa)	70	100	140
Maximum working pressure (bar)	700	1 000	1 400
Nominal size			
5	X	X	X
6,3	X	X	X
10	X		X
12,5	X	X	X
19	X	X	X
25	X	X	X
NOTE	X = Applicable, N/A = Not applicable		

4.2 Types

Each class of hose is divided into two types depending on usage as below.

- Type A: General jack system use — light service — with 2:1 burst to maximum working pressure ratio and impulse durability is specified in clause 7.2.4.
- Type B: Special hydraulic system use — Heavy duty service — with 4:1 burst to maximum working pressure ratio and impulse durability is specified in clause 7.2.5.

4.3 Grades

All types are classified on their electrical properties:

- a) Grade 1, no electrical requirements.
- b) Grade 2, “non-conductive”

NOTE Non-conductive means the current reading shall be no greater than 50 µA when tested in accordance with Annex D.

5 Materials and construction

5.1 Hoses

Hoses shall consist of a hydraulic fluid resistant rubber or plastic lining, one or multiple layers of steel wire or textile and an oil, abrasion and weather resistant rubber or plastic cover. A layer of other materials on the rubber cover are allowed for improved abrasion or other resistance. **Grade 2 hoses shall not be perforated on the cover.**

5.2 Hose assemblies

Hose assemblies shall only be manufactured with those hose fittings whose functionality conforms to the requirements of 7.2.1, 7.2.4 or 7.2.5 depending on type and 7.2.6 of this International Standard.

NOTE The manufacturer's instructions should be followed for proper preparation and fabrication of hose assemblies.

6 Dimensions and tolerances

6.1 Diameters

When measured in accordance with ISO 4671, the diameters of the hoses shall conform to the values given in Table 2.

Table 2 — Diameters of hoses

Nominal size	Inside diameter		Maximum outside diameter of hose		
	mm		mm		
	All classes		Class		
	Min.	Max.	70	100	140
			All types	All types	All types
5	4,6	5,4	17	18	15
6,3	6,1	7,0	20	21	22
10	9,3	10,1	24	28	23
12,5	12,3	13,5	28	32	27
19	18,6	19,8	35	35	35
25	25,0	26,4	43	38	40

6.2 Cover thickness

When measured in accordance with ISO 4671, the outer cover thickness of the hoses shall be between 0,5 mm and 1,5 mm.

6.3 Concentricity

When measured in accordance with ISO 4671, the concentricity of the hoses shall conform to the values given in Table 3.

Table 3 — Concentricity of hoses

Nominal size	Maximum variation in wall thickness	
	Between inside diameter and outside diameter	Between inside diameter and reinforcement diameter
	mm	mm
5 and 6,3	0,8	0,5
over 6,3 and including 19	1,2	0,7
over 19	1,3	0,9

7 Physical properties

7.1 Fluid resistance

7.1.1 Test pieces

For rubber hoses, the fluid resistance tests shall be carried out on moulded sheets of lining and cover compound having minimum thickness 2 mm and of equivalent cure state to that of the hose.

For plastic hoses, the fluid resistance tests shall be carried out on moulded sheets of lining and cover materials having minimum thickness 2 mm and of equivalent state to that of the hose.

7.1.2 Oil resistance

When tested in accordance with ISO 1817, by immersion in IRM 903 oil for 168 h at a temperature of 70 °C, the percentage change in volume of the lining ΔV shall be between -10 and +60 %.

When tested in accordance with ISO 1817, by immersion in IRM 903 oil for 168 h at a temperature of 70 °C, the percentage change in volume of the cover ΔV shall be between -10 and +100 %.

7.2 Performance requirements

7.2.1 Hydrostatic requirements

When tested in accordance with ISO 1402, the maximum working pressure, the proof pressure and minimum burst pressure of the hoses and hose assemblies shall conform to the values given in Table 4.

Table 4 — Maximum working pressure, proof pressure and minimum burst pressure

Type	Class	Maximum working pressure		Proof pressure		Minimum burst pressure	
		MPa	bar	MPa	bar	MPa	bar
A	70	70	700	105	1 050	140	1 400
	100	100	1 000	150	1 500	200	2 000
	140	140	1 400	210	2 100	280	2 800
B	70	70	700	140	1 400	280	2 800
	100	100	1 000	200	2 000	400	4 000
	140	140	1 400	280	2 800	560	5 600

It is recommended to subject all hose assemblies to proof test with a pressure hold time of one minute.

All deviations to that shall be agreed between hose assembly manufacture and purchaser.

7.2.2 Change in length

When tested in accordance with ISO 1402, the change in length of hose at the maximum working pressure shall not exceed + 2 % to – 4 % for rubber hoses, + 3 % to – 3 % for plastic hoses.

7.2.3 Minimum bend radius

Use a test piece having a length at least four times the minimum bend radius. Measure the hose outside diameter with callipers in the straight-lay position before bending the hose. Bend the hose through 180° to the minimum bend radius (see Table 5) and measure the flatness with the callipers.

When the hose is bent to the minimum bend radius given in Table 5, measured on the inside of the bend, the flatness shall not exceed 10 % of the original outside diameter.

Table 5 — Minimum bend radius

Nominal size	Minimum bend radius					
	mm					
	Class					
	70		100		140	
	Type A	Type B	Type A	Type B	Type A	Type B
5	90	70	90	90	-	110
6,3	120	70	130	100	-	130
10	150	100	170	150	-	170
12,5	180	180	180	200	-	220
19	200	240	-	260	-	280
25	280	300	-	320	-	340

7.2.4 Resistance to impulse for type A

7.2.4.1 When tested in accordance with ISO 6803 except rate of pressure rise and frequency, the test fluid temperature shall be 70 °C. The pressure rise shall be contained within the wave form envelope as shown in Figure 1.

7.2.4.2 When tested at impulse pressure equal to 100 % of the maximum working pressure, the hose shall withstand a minimum of 50 000 impulse cycles.