BRITISH STANDARD

BS ISO 3862:2009

Rubber hoses and hose assemblies — Rubber-covered spiral-wire-reinforced hydraulic types for oil-based or water-based fluids — Specification

ICS 23.100.40; 83.140.40

BSI
British Standards

National foreword

This British Standard is the UK implementation of ISO 3862:2009.

The UK participation in its preparation was entrusted to Technical Committee PRI/66/-/3, Hydraulic applications.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 June 2009.

ISBN 978 0 580 61348 7

Amendments/corrigenda issued since publication

Date	Comments

BS ISO 3862:2009

INTERNATIONAL STANDARD

ISO 3862

Third edition
2009-05-01

Rubber hoses and hose assemblies — Rubber-covered spiral-wire-reinforced hydraulic types for oil-based or water-based fluids — Specification

Tuyaux et flexibles en caoutchouc — Types hydrauliques avec armature hélicoïdale de fils métalliques pour fluides à base d'huile ou à base d'eau — Spécifications

Reference number
ISO 3862:2009(E)

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

Published in Switzerland

Contents

Page

Foreword ... **iv**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **2**

4 Classification ... **2**

5 Materials and construction ... **2**

6 Dimensions ... **2**

7 Performance requirements ... **5**

8 Marking ... **10**

Annex A (normative) **Type and routine testing of production hoses** ... **11**

Annex B (informative) **Production acceptance testing** ... **12**

Annex C (informative) **Recommendations for lengths of supplied hoses and tolerances on lengths of hose assemblies** ... **13**

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 3862 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Hoses (rubber and plastics)*.

This third edition of ISO 3862 cancels and replaces ISO 3862-1:2001 and ISO 3862-2:2005, which have been technically revised and combined in a single document. The main changes are as follows:

— pressures are now given in megapascals as the preferred unit;

— the requirement for an abrasion test has been deleted;

— ISO 4397 has been replaced by ISO 1307.

INTERNATIONAL STANDARD **ISO 3862:2009(E)**

Rubber hoses and hose assemblies — Rubber-covered spiral-wire-reinforced hydraulic types for oil-based or water-based fluids — Specification

1 Scope

This International Standard specifies requirements for five types of spiral-wire-reinforced hydraulic hose and hose assembly of nominal size from 6,3 to 51. They are suitable for use with water-based hydraulic fluids HFC, HFAE, HFAS and HFB as defined in ISO 6743-4 at temperatures ranging from −40 °C to +60 °C and oil-based hydraulic fluids HH, HL, HM, HR and HV as defined in ISO 6743-4 at temperatures ranging from −40 °C to +100 °C for types 4SP and 4SH and −40 °C to +120 °C for types R12, R13 and R15.

NOTE 1 This temperature rating is related to the water-based hydraulic fluids defined in ISO 6743-4.

This International Standard does not include requirements for end fittings. It is limited to requirements for hoses and hose assemblies.

NOTE 2 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 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 1817, *Rubber, vulcanized — 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 lengths of hose assemblies*

ISO 4672:1997, *Rubber and plastics hoses — Sub-ambient temperature flexibility tests*[1)]

ISO 6605, *Hydraulic fluid power — Hoses and hose assemblies — Test methods*

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*

1) Under revision as ISO 10619-2.

ISO 7326:2006, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*

ISO 8033:2006, *Rubber and plastics hoses — Determination of adhesion between components*

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

3 Terms and definitions

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

4 Classification

Five types of hose are specified, distinguished by their construction, working pressure and oil resistance:

— Type 4SP: medium-pressure hoses with four plies of steel wire spiral.

— Type 4SH: high-pressure hoses with four plies of steel wire spiral.

— Type R12: heavy-duty high-temperature hoses with a medium-pressure rating having four plies of steel wire spiral.

— Type R13: heavy-duty high-temperature hoses with a high-pressure rating having a multiple-steel-wire spiral.

— Type R15: heavy-duty high-temperature hoses with an extra-high-pressure rating having a multiple-steel-wire spiral.

5 Materials and construction

5.1 Hoses

Hoses shall consist of a rubber lining resistant to oil- or water-based hydraulic fluids, spiral plies of steel wire wrapped in alternating directions, and an oil- and weather-resistant rubber cover. Each spiral wire ply shall be separated by an insulating layer.

5.2 Hose assemblies

Hose assemblies shall be manufactured using hoses conforming to the requirements of this International Standard.

Hose assemblies shall be manufactured only with those hose fittings whose correct functioning has been verified in accordance with Subclauses 7.2, 7.4, 7.5 and 7.6 of this International Standard. The manufacturer's instructions shall be followed for the preparation and fabrication of hose assemblies.

6 Dimensions

6.1 Hose diameters and hose concentricity

When measured in accordance with ISO 4671, the inside diameter of hoses shall conform to the values given in Table 1.

When measured in accordance with ISO 4671, the diameter over reinforcement and outside diameter of hoses shall conform to the values given in Table 2.

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

Table 1 — Inside diameters of hoses

Nominal size	Inside diameter mm									
	Type 4SP		Type 4SH		Type R12		Type R13		Type R15	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
6,3	6,2	7,0	—	—	—	—	—	—	—	—
10	9,3	10,1	—	—	9,3	10,1	—	—	9,3	10,1
12,5	12,3	13,5	—	—	12,3	13,5	—	—	12,3	13,5
16	15,5	16,7	—	—	15,5	16,7	—	—	—	—
19	18,6	19,8	18,6	19,8	18,6	19,8	18,6	19,8	18,6	19,8
25	25,0	26,4	25,0	26,4	25,0	26,4	25,0	26,4	25,0	26,4
31,5	31,4	33,0	31,4	33,0	31,4	33,0	31,4	33,0	31,4	33,0
38	37,7	39,3	37,7	39,3	37,7	39,3	37,7	39,3	37,7	39,3
51	50,4	52,0	50,4	52,0	50,4	52,0	50,4	52,0	—	—

Table 2 — Diameter over reinforcement and outside diameter

Nominal size[a]	Type 4SP				Type 4SH				Type R12				Type R13				Type R15			
	Diameter over reinforcement mm		Outside diameter of hose mm		Diameter over reinforcement mm		Outside diameter of hose mm		Diameter over reinforcement mm		Outside diameter of hose mm		Diameter over reinforcement mm		Outside diameter of hose mm		Diameter over reinforcement mm		Outside diameter of hose mm	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
6,3	14,1	15,3	17,1	18,7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10	16,9	18,1	20,6	22,2	—	—	—	—	16,6	17,8	19,5	21,0	—	—	—	—	—	20,3	—	23,3
12,5	19,4	21,0	23,8	25,4	—	—	—	—	19,9	21,5	23,0	24,6	—	—	—	—	—	24,0	—	26,8
16	23,0	24,6	27,4	29,0	—	—	—	—	23,8	25,4	26,6	28,2	—	—	—	—	—	—	—	—
19	27,4	29,0	31,4	33,0	27,6	29,2	31,4	33,0	26,9	28,7	29,9	31,7	28,2	29,8	31,0	33,2	—	32,9	—	36,1
25	34,5	36,1	38,5	40,9	34,4	36,0	37,5	39,9	34,1	36,0	36,8	39,4	34,9	36,4	37,6	39,8	—	38,9	—	42,9
31,5	45,0	47,0	49,2	52,4	40,9	42,9	43,9	47,1	42,7	45,1	45,4	48,6	45,6	48,0	48,3	51,3	—	48,4	—	51,5
38	51,4	53,4	55,6	58,8	47,8	49,8	51,9	55,1	49,2	51,6	51,9	55,0	53,1	55,5	55,8	58,8	—	56,3	—	59,6
51	64,3	66,3	68,2	71,4	62,2	64,2	66,5	69,7	62,5	64,8	65,1	68,3	66,9	69,3	69,5	72,7	—	—	—	—

[a] The nominal sizes correspond to those given in ISO 1307.

Table 3 — Concentricity of hoses

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

6.2 Length

The length of supplied hoses and hose assemblies shall be the subject of agreement between the manufacturer and the purchaser.

NOTE Recommendations for supplied lengths of hoses and hose assemblies are given in Annex C.

7 Performance requirements

7.1 General

The requirements for type and routine testing are given in Annex A and recommendations for production acceptance testing in Annex B.

7.2 Hydrostatic requirements

7.2.1 When tested in accordance with ISO 1402 or ISO 6605 at the relevant proof pressure given in Table 4 and the relevant minimum burst pressure given in Table 5, the hoses and hose assemblies shall not leak.

7.2.2 When determined in accordance with ISO 1402 or ISO 6605, the change in length of hoses at the maximum working pressure (see Table 6) shall not exceed +2 % or −4 % for types 4SP and 4SH, or +2 % or −2 % for types R12, R13 and R15.

Table 4 — Proof pressure

Nominal size	Type				
	4SP	4SH	R12	R13	R15
	MPa (bar)	MPa (bar)	MPa (bar)	MPa (bar)	MPa (bar)
6,3	90,0 (900)	—	—	—	—
10	89,0 (890)	—	56,0 (560)	—	84,0 (840)
12,5	83,0 (830)	—	56,0 (560)	—	84,0 (840)
16	70,0 (700)	—	56,0 (560)	—	—
19	70,0 (700)	84,0 (840)	56,0 (560)	70,0 (700)	84,0 (840)
25	56,0 (560)	76,0 (760)	56,0 (560)	70,0 (700)	84,0 (840)
31,5	42,0 (420)	65,0 (650)	42,0 (420)	70,0 (700)	84,0 (840)
38	37,0 (370)	58,0 (580)	35,0 (350)	70,0 (700)	84,0 (840)
51	33,0 (330)	50,0 (500)	35,0 (350)	70,0 (700)	—

Table 5 — Minimum burst pressure

Nominal size	Type				
	4SP	4SH	R12	R13	R15
	MPa (bar)	MPa (bar)	MPa (bar)	MPa (bar)	MPa (bar)
6,3	180,0 (1 800)	—	—	—	—
10	178,0 (1 780)	—	112,0 (1 120)	—	168,0 (1 680)
12,5	166,0 (1 660)	—	112,0 (1 120)	—	168,0 (1 680)
16	140,0 (1 400)	—	112,0 (1 120)	—	—
19	140,0 (1 400)	168,0 (1 680)	112,0 (1 120)	140,0 (1 400)	168,0 (1 680)
25	112,0 (1 120)	152,0 (1 520)	112,0 (1 120)	140,0 (1 400)	168,0 (1 680)
31,5	84,0 (840)	130,0 (1 300)	84,0 (840)	140,0 (1 400)	168,0 (1 680)
38	74,0 (740)	116,0 (1 160)	70,0 (700)	140,0 (1 400)	168,0 (1 680)
51	66,0 (660)	100,0 (1 000)	70,0 (700)	140,0 (1 400)	—

Table 6 — Maximum working pressure

Nominal size	Type				
	4SP	4SH	R12	R13	R15
	MPa (bar)	MPa (bar)	MPa (bar)	MPa (bar)	MPa (bar)
6,3	45,0 (450)	—	—	—	—
10	44,5 (445)	—	28,0 (280)	—	42,0 (420)
12,5	41,5 (415)	—	28,0 (280)	—	42,0 (420)
16	35,0 (350)	—	28,0 (280)	—	—
19	35,0 (350)	42,0 (420)	28,0 (280)	35,0 (350)	42,0 (420)
25	28,0 (280)	38,0 (380)	28,0 (280)	35,0 (350)	42,0 (420)
31,5	21,0 (210)	32,5 (325)	21,0 (210)	35,0 (350)	42,0 (420)
38	18,5 (185)	29,0 (290)	17,5 (175)	35,0 (350)	42,0 (420)
51	16,5 (165)	25,0 (250)	17,5 (175)	35,0 (350)	—

7.3 Minimum bend radius

Use a test piece having a length at least four times the minimum bend radius.

When bent to the minimum bend radius given in Table 7, measured on the inside of the bend, the hose shall conform, in the bent state, to the impulse and cold flexibility requirements of 7.4 and 7.6.

Table 7 — Minimum bend radius

Nominal size	Minimum bend radius mm				
	Type 4SP	Type 4SH	Type R12	Type R13	Type R15
6,3	150	—	—	—	—
10	180	—	130	—	150
12,5	230	—	180	—	200
16	250	—	200	—	—
19	300	280	240	240	265
25	340	340	300	300	330
31,5	460	460	420	420	445
38	560	560	500	500	530
51	660	700	630	630	—

7.4 Resistance to impulse

7.4.1 Resistance to impulse with oil-based fluids

The impulse test shall be in accordance with ISO 6803 or ISO 6605. The test fluid temperature for type 4SP and 4SH hoses shall be 100 °C. The test fluid temperature for type R12, R13 and R15 hoses shall be 120 °C.

For type 4SP and 4SH hoses, when tested at an impulse pressure equal to 133 % of the maximum working pressure, the hose shall withstand a minimum of 400 000 impulse cycles.

For type R12 hoses, when tested at an impulse pressure equal to 133 % of the maximum working pressure, the hose shall withstand a minimum of 500 000 impulse cycles.

For type R13 and R15 hoses, when tested at an impulse pressure equal to 120 % of the maximum working pressure, the hose shall withstand a minimum of 500 000 impulse cycles.

There shall be no leakage or other evidence of failure before reaching the specified number of cycles.

This test shall be considered a destructive test, and the test piece shall be discarded after the test.

7.4.2 Resistance to impulse with water-based fluids

The impulse test shall be in accordance with ISO 6803 or ISO 6605. The test fluid temperature shall be 60 °C. The test fluid used shall be HFC, HFAE, HFAS or HFB as defined in ISO 6743-4.

For type 4SP and 4SH hoses, when tested at a pressure equal to 133 % of the maximum working pressure, the hose shall withstand a minimum of 400 000 impulse cycles.

For type R12 hoses, when tested at an impulse pressure equal to 133 % of the maximum working pressure, the hose shall withstand a minimum of 500 000 impulse cycles.

For type R13 and R15 hoses, when tested at an impulse pressure equal to 120 % of the maximum working pressure, the hose shall withstand a minimum of 500 000 impulse cycles.

There shall be no leakage or other evidence of failure before reaching the specified number of cycles.

This test shall be considered a destructive test, and the test piece shall be discarded after the test.

7.4.3 Optional impulse test

The following test may be used to maximize test efficiency and to qualify hoses for both fluids:

a) oven-age assemblies filled with one of the water-based fluids specified in 7.4.2 for 120 h at 60 °C;

b) impulse-test the aged assemblies using an oil-based hydraulic fluid as specified in ISO 6803 or ISO 6605 and the test conditions specified in ISO 6803 or ISO 6605.

For type 4SP and 4SH hoses, when tested at a pressure equal to 133 % of the maximum working pressure and a temperature of 100 °C, the hose shall withstand a minimum of 400 000 impulse cycles.

For type R12 hoses, when tested at an impulse pressure equal to 133 % of the maximum working pressure and a temperature of 120 °C, the hose shall withstand a minimum of 500 000 impulse cycles.

For type R13 and R15 hoses, when tested at an impulse pressure equal to 120 % of the maximum working pressure and a temperature of 120 °C, the hose shall withstand a minimum of 500 000 impulse cycles.

There shall be no leakage or other evidence of failure before reaching the specified number of cycles.

This test shall be considered a destructive test, and the test piece shall be discarded after the test.

7.5 Leakage of hose assemblies

When tested in accordance with ISO 1402 or ISO 6605, there shall be no leakage or other evidence of failure. This test shall be considered a destructive test, and the test piece shall be discarded after the test.

7.6 Cold flexibility

When tested in accordance with method B of ISO 4672:1997 at a temperature of −40 °C, there shall be no cracking of the lining or cover. The test piece shall not leak or crack when subjected to a proof pressure test in accordance with ISO 1402 or ISO 6605 after regaining ambient temperature.

7.7 Adhesion between components

When determined in accordance with ISO 8033, the adhesion between lining and reinforcement and between cover and reinforcement shall be no less than 2,5 kN/m for type 4SP and 4SH hoses and no less than 1,4 kN/m for type R12, R13 and R15 hoses.

Test pieces shall be type 5 for lining and reinforcement and type 2 or type 6 for cover and reinforcement as described in Subclauses 5.1 and 5.3 of ISO 8033:2006.

7.8 Fluid resistance

7.8.1 General

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

7.8.2 Oil resistance

When determined in accordance with ISO 1817 by immersion in IRM 903 oil for 168 h at a temperature of 100 °C, the percentage change in volume of the lining of type 4SP and type 4SH hoses shall be between 0 % and +60 % (i.e. shrinkage is not permissible).

When determined 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 of type 4SP and type 4SH hoses shall be between 0 % and +100 % (i.e. shrinkage is not permissible).

When determined in accordance with ISO 1817 by immersion in IRM 903 oil for 168 h at a temperature of 121 °C, the percentage change in volume of type R12, R13 and R15 hoses shall be between 0 % and +100 % for the lining and between 0 % and +125 % for the cover (i.e. shrinkage is not permissible).

7.8.3 Water resistance

For all types of hose, when tested in accordance with ISO 1817 by immersion in distilled water for 168 h at a temperature of 60 °C, the percentage change in volume of the lining shall be between 0 % and +30 % (i.e. shrinkage is not permissible).

7.9 Ozone resistance

When tested in accordance with method 1 or 2 of ISO 7326:2006, depending on the nominal bore of the hose, no cracking or other deterioration of the cover shall be visible under × 2 magnification.

7.10 Visual examination

Hoses shall be examined for visible defects in the outer cover and to verify that the hose identification is correct and has been properly marked. Hose assemblies shall, in addition, be inspected to verify that the correct fittings are fitted.

8 Marking

8.1 Hoses

Hoses meeting the requirements of this International Standard shall be marked at least once every 760 mm with at least the following information:

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

b) a reference to this International Standard, i.e. ISO 3862:2009;

c) the type, e.g. 4SP;

d) the nominal size, e.g. 10;

e) the maximum working pressure, in megapascals, with the unit indicated, e.g. 44,5 MPa;

f) the quarter and the last two digits of the year of manufacture, e.g. 2Q09 (other date-coding methods indicating, for instance, the month or day of manufacture are allowed as long as they are clear to the user).

EXAMPLE MAN/ISO 3862:2009/4SP/10/44,5 MPa/2Q09

8.2 Hose assemblies

Hose assemblies meeting the requirements of this International Standard shall be marked with at least the following information:

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

b) the maximum working pressure of the assembly, in megapascals, with the unit indicated, e.g. 44,5 MPa[2)];

c) two digits indicating the month of assembly followed by a slash and the last two digits of the year of assembly, e.g. 02/09 (monthly, daily and other code dating methods are allowed as long as they are clear to the user).

EXAMPLE MAN/44,5 MPa/02/09

2) The maximum working pressure of a hose assembly is equal to the maximum working pressure of the component having the lowest maximum working pressure.

Annex A
(normative)

Type and routine testing of production hoses

Property	Type tests Frequency (for each hose type and size): at initial product qualification, in the event of product changes after initial qualification and after 5 years	Routine tests Performed on each length of finished hose prior to warehousing or sale
Dimensions		
Measurement of inside diameter	X	X
Measurement of outside diameter	X	X
Measurement of concentricity	X	N/A
Hose tests		
Proof test	X	X
Burst test	X	N/A
Minimum bend radius test	X	N/A
Change in length test (see 7.2)	X	X
Impulse test	X	N/A
Leakage test (hose assemblies)	X	N/A
Cold flexibility test	X	N/A
Adhesion (cover)	X	N/A
Adhesion (lining)	X	N/A
Fluid resistance test for cover	X	N/A
Fluid resistance test for lining	X	N/A
Ozone resistance test	X	N/A
Visual examination	X	X
X Test shall be carried out. N/A Test not applicable.		

Annex B
(informative)

Production acceptance testing

Property	Production tests	
	Frequency: every 3 000 m produced of each hose type and size	Frequency: every 12 months of production for each hose type and size
Dimensions		
Measurement of inside diameter	X	X
Measurement of outside diameter	X	X
Measurement of concentricity	X	X
Hose tests		
Proof test	X	X
Burst test	X	X
Minimum bend radius test	N/A	X
Change in length test (see 7.2)	X	X
Impulse test	N/A	X
Leakage test (hose assemblies)	N/A	X
Cold flexibility test	N/A	X
Adhesion (cover)	N/A	X
Adhesion (lining)	N/A	X
Fluid resistance test for cover	N/A	X
Fluid resistance test for lining	N/A	X
Ozone resistance test	N/A	X
Visual examination	X	X

X Test shall be carried out.

N/A Test not applicable.

Annex C
(informative)

Recommendations for lengths of supplied hoses and tolerances on lengths of hose assemblies

C.1 Hoses

The lengths of hoses in the manufacturer's standard pack, with the lengths marked, should preferably be within ± 2 % of the lengths indicated.

When no specific hose lengths have been ordered, the percentages of different lengths in any given delivery or pack of at least 500 m should preferably be as indicated in Table C.1.

Table C.1 — Hose lengths in delivery when no lengths specified

Length of hose	Percentage of total length
Greater than or equal to 1 m but less than or equal to 10 m	5 % max.
Greater than 10 m but less than or equal to 15 m	25 % max.
Greater than 15 m	75 % min.

C.2 Hose assemblies

The tolerances on the lengths of hose assemblies should preferably conform to the values given in Table C.2.

Table C.2 — Tolerances on lengths of hose assemblies

Length of hose assembly mm	Nominal size		
	Up to and including 25	Over 25 and up to and including 50	Over 50
Up to and including 630	$^{+7}_{-3}$ mm	$^{+12}_{-4}$ mm	$^{+25}_{-6}$ mm
Over 630 and up to and including 1 250	$^{+12}_{-4}$ mm	$^{+20}_{-6}$ mm	
Over 1 250 and up to and including 2 500	$^{+20}_{-6}$ mm	$^{+25}_{-6}$ mm	
Over 2 500 and up to and including 8 000	$^{+1,5}_{-0,5}$ %		
Over 8 000	$^{+3}_{-1}$ %		

ICS 23.100.40; 83.140.40

Price based on 13 pages

This page has been intentionally left blank

BSI - British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001 Email: orders@bsigroup.com You may also buy directly using a debit/credit card from the BSI Shop on the Website http://www.bsigroup.com/shop

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact Information Centre. Tel: +44 (0)20 8996 7111 Fax: +44 (0)20 8996 7048 Email: info@bsigroup.com

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002 Fax: +44 (0)20 8996 7001 Email: membership@bsigroup.com

Information regarding online access to British Standards via British Standards Online can be found at http://www.bsigroup.com/BSOL

Further information about BSI is available on the BSI website at http://www.bsigroup.com

Copyright

BSI Group
Headquarters 389
Chiswick High Road,
London, W4 4AL, UK
Tel +44 (0)20 8996 9001
Fax +44 (0)20 8996 7001
www.bsigroup.com/
standards