INTERNATIONAL STANDARD

ISO 12151-2

Second edition
2022-10

Connections for hydraulic fluid power and general use — Hose fittings —

Part 2: Hose fittings with ISO 8434-1 24° cone connector ends with O-rings

Raccordements pour transmissions hydrauliques et applications générales — Flexibles de raccordement —

Partie 2: Flexibles avec embouts à cône à 24 degrés et joints toriques conformes à l'ISO 8434-1

Reference number
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 4, *Connectors and similar products and components*.

This second edition cancels and replaces the first edition (ISO 12151-2:2003), which has been technically revised.

The main changes are as follows:

— all references to ISO 8434-4 have been removed as this International Standard has been withdrawn and replaced by ISO 8434-1;

— all references to ISO 8434-5 have been removed as this International Standard has been withdrawn and replaced by ISO 19879.

A list of all parts in the ISO 12151 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. In general applications, a fluid can be conveyed under pressure.

Components are connected through their ports by stud ends on fluid conductor fittings to tubes/pipes or to hose fittings and hoses.

Connections for hydraulic fluid power and general use — Hose fittings —

Part 2: Hose fittings with ISO 8434-1 24° cone connector ends with O-rings

1 Scope

This document specifies the general and dimensional requirements for the design and performance of hose fittings with 24° cone connector ends with O-rings according to ISO 8434-1. These hose fittings are made of carbon steel and are intended for use with hoses with nominal inside diameters from 5 mm through 38 mm (inclusive).

NOTE For hose fittings used in hydraulic and pneumatic braking systems on road vehicles, see ISO 4038, ISO 4039-1 and ISO 4039-2.

These hose fittings are for use in hydraulic fluid power systems with hoses that meet the requirements of respective hose standards and in general applications with suitable hoses.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1302, *Geometrical Product Specifications (GPS) — Indication of surface texture in technical product documentation*

ISO 4759-1:2000, *Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C*

ISO 5598, *Fluid power systems and components — Vocabulary*

ISO 8434-1, *Metallic tube connections for fluid power and general use — Part 1: 24° cone connectors*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5598 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Performance requirements

4.1 Hose assemblies shall meet the performance requirements specified in the appropriate hose specification without leakage or failure. Examples for related ISO standards are listed in the Bibliography.

4.2 The working pressure of the hose assembly shall be the lower of the pressures given for its size in ISO 8434-1 and in the relevant hose specification.

4.3 The hose-fitting connection end shall meet the performance requirements specified in ISO 8434-1.

5 Designation of hose fittings

5.1 Hose fittings shall be designated by an alphanumeric code to facilitate ordering. They shall be designated by "ISO 12151-2", followed by a spaced hyphen, then the connection end type, shape and style letter symbols (see 5.4), followed by another spaced hyphen and, for the ends, the letter symbol for the series directly followed by the 24° cone end size (nominal connection size) and the hose size (nominal hose inside diameter), each separated by a multiplication sign (×).

EXAMPLE A swivel straight light-duty series hose fitting for use with 22 mm OD tubing and 19 mm ID hose is designated as follows:

ISO 12151-2 - SWS - L22 × 19

5.2 The letter symbol designation of the hose fitting shall consist of the connection end type, immediately followed by the shape of the fitting and the nut style, where applicable.

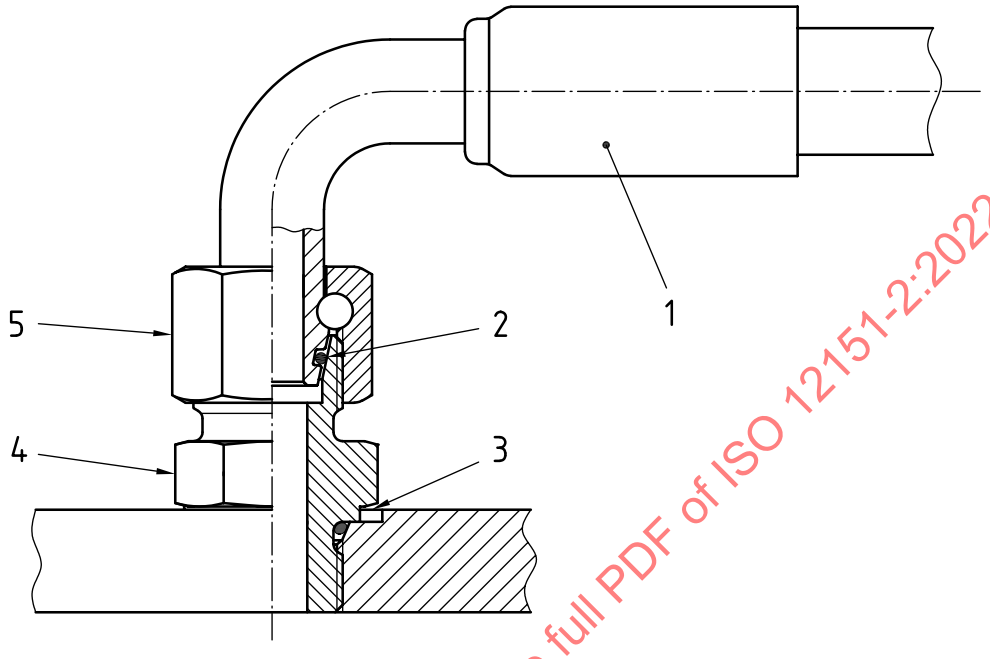
5.3 Tube ends are assumed to be rigid and thus do not need to be included in the code. However, if another end is involved, it shall be designated.

5.4 The following letter symbols shall be used:

Connection end type	Shape
Swivel / SW	Straight / S
	90° elbow / E
	45° elbow / E45
Series	**Symbol**
Light-duty	L
Heavy-duty	S

6 Design

6.1 Figure 1 shows a typical connection with a hose fitting connector in accordance with this document.



Key

1	hose fitting	4	adapter
2	O-ring seal	5	nut
3	port		

Figure 1 — Example of typical ISO 12151-2 hose fitting connection

6.2 Hose fitting dimensions shown in Figures 2 to 5 shall conform to the dimensions in Tables 1 to 4 and to the relevant dimensions in ISO 8434-1.

6.3 Hex tolerances across flats shall be in accordance with ISO 4759-1:2000, product grade C. Minimum across corner hex dimensions are 1,092 times the nominal width across flats. The minimum side flat is 0,43 times the nominal width across flats.

6.4 Angular tolerances on axes of ends of elbows shall be ±3° for all sizes.

6.5 Details of contour shall be as chosen by the manufacturer, provided that the dimensions given in Tables 1 to 4 are maintained.

7 Manufacture

7.1 Construction

Hose fittings may be made by forging or cold forming, machined from bar stock or manufactured from multiple components. Materials other than carbon steel may be supplied as agreed between the manufacturer and user.

7.2 Workmanship

Workmanship shall conform to the best commercial practice to produce high quality hose fittings. Hose fittings shall be free from visual contaminants, all hanging burrs, loose scale and slivers that can be dislodged in use, and any other defects that can affect the functioning of the parts. All machined surfaces shall have a surface roughness value of ISO 1302-MRR Ramax 6,3 µm, except where otherwise specified.

7.3 Finish

The external surface and threads of all carbon steel parts should be plated or coated with a suitable material that passes a 72-h neutral salt spray test in accordance with ISO 9227, unless otherwise agreed upon by the manufacturer and the user. Any appearance of red rust during the salt spray test on any area, except those noted below, shall be considered a failure:

— all internal fluid passages;

— edges, such as hex points, serrations and crests of threads, where there can be mechanical deformation of the plating or coating typical of mass-produced parts or shipping effects;

— areas where there is mechanical deformation of the plating or coating caused by crimping, flaring, bending and other post-plate metal forming operations;

— areas where the parts are suspended or affixed in the test chamber where condensate can accumulate.

Internal fluid passages shall be protected from corrosion during storage and shipping.

NOTE Changes in plating can affect assembly torques and require requalification, when applicable.

7.4 Fitting protection

By a method agreed between the supplier and purchaser, the face of the hose fittings and threads (both internal and external) shall be protected by the manufacturer from nicks and scratches that would be detrimental to the function of the hose fitting. Passages shall be securely covered to prevent the entrance of dirt or other contaminants. Covers that contribute to contamination shall not be used.

8 Assembly instructions

The assembly of the hose fittings to other connectors or tubes shall be carried out without external loads. The manufacturer shall draw up assembly instructions for the use of hose fittings. These instructions shall include at least the following:

— instructions regarding the assembly of the hose fittings, such as the number of wrenching turns or assembly torque;

— recommendations regarding the tools to be used for assembly.

When hose fittings are used with tubes, follow the instructions related to material, preparation and attachment given in ISO 8434-1, as appropriate.

9 Procurement information

The following minimum information should be supplied by the purchaser when making an inquiry or placing an order:

— description of hose fitting using designation in accordance with Clause 5;

— material of hose fitting if other than carbon steel;

— hose type and size;

— fluid being conveyed;

— working pressure;

— working temperature (ambient and of the fluid).

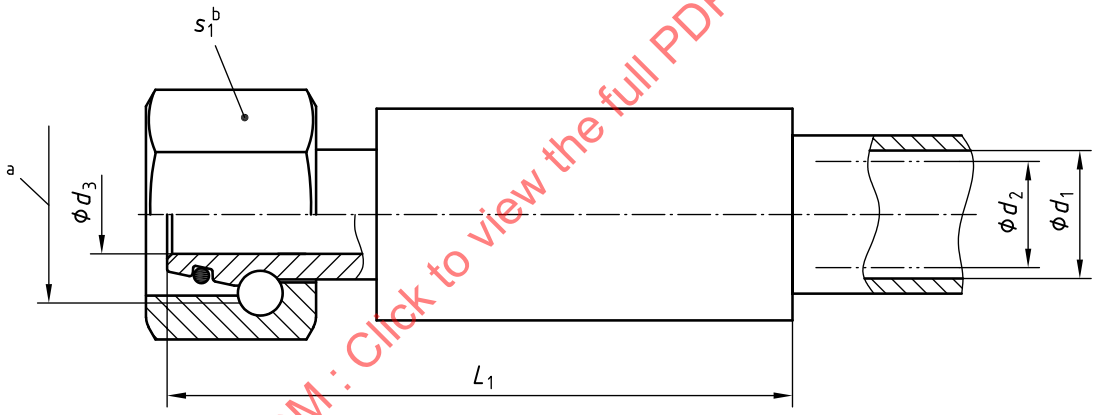
10 Marking

Hose fittings shall be permanently marked with the manufacturer's name or trademark. The nuts on swivel hose fittings shall be marked with the series (L or S) and connection end size.

11 Identification statement

Manufacturers who conform to this document should use the following statement in test reports, catalogues and sales literature.

"Hose fitting with 24° cone connector end with O-ring in conformance with ISO 12151-2, *Connections for hydraulic fluid power and general use — Hose fittings — Part 2: Hose fittings with ISO 8434-1 24° cone connector ends with O-rings*."



a Thread.

b Width across flats.

A free length of tube should be left so that, in the case of an O-ring change, the nut can be moved behind the O-ring groove.

NOTE 1 The method of attachment of hose fitting to hose is optional.

NOTE 2 Connection details in accordance with ISO 8434-1.

Figure 2 — Straight swivel hose fitting (SWS)

Table 1 — Dimensions of straight swivel hose fittings (SWS)

Dimensions in millimetres

Series	Hose fitting size	Thread	Nominal connection size	Nominal hose inside diameter d_1[a]	d_2[b] min.	d_3[c] max.	s_1[d]	L_1[e] max.
Light-duty series (L)	6 × 5	M12 × 1,5	6	5	2,5	3,2	14	59
	8 × 6,3	M14 × 1,5	8	6,3	3	5,2	17	59
	10 × 8	M16 × 1,5	10	8	5	7,2	19	61
	12 × 10	M18 × 1,5	12	10	6	8,2	22	65
	15 × 12,5	M22 × 1,5	15	12,5	8	10,2	27	68
	18 × 16	M26 × 1,5	18	16	11	13,2	32	68
	22 × 19	M30 × 2	22	19	14	17,2	36	74
	28 × 25	M36 × 2	28	25	19	23,2	41	85
	35 × 31,5	M45 × 2	35	31,5	25	29,2	50	110
	42 × 38	M52 × 2	42	38	31	34,3	60	105
Heavy-duty series (S)	8 × 5	M16 × 1,5	8	5	2,5	4,2	19	59
	10 × 6,3	M18 × 1,5	10	6,3	3	6,2	22	67
	12 × 8	M20 × 1,5	12	8	5	8,2	24	68
	12 × 10	M20 × 1,5	12	10	6	8,2	24	72
	16 × 12,5	M24 × 1,5	16	12,5	8	11,2	30	80
	20 × 16	M30 × 2	20	16	11	14,2	36	93
	25 × 19	M36 × 2	25	19	14	18,2	46	102
	30 × 25	M42 × 2	30	25	19	23,2	50	112
	38 × 31,5	M52 × 2	38	31,5	25	30,3	60	126

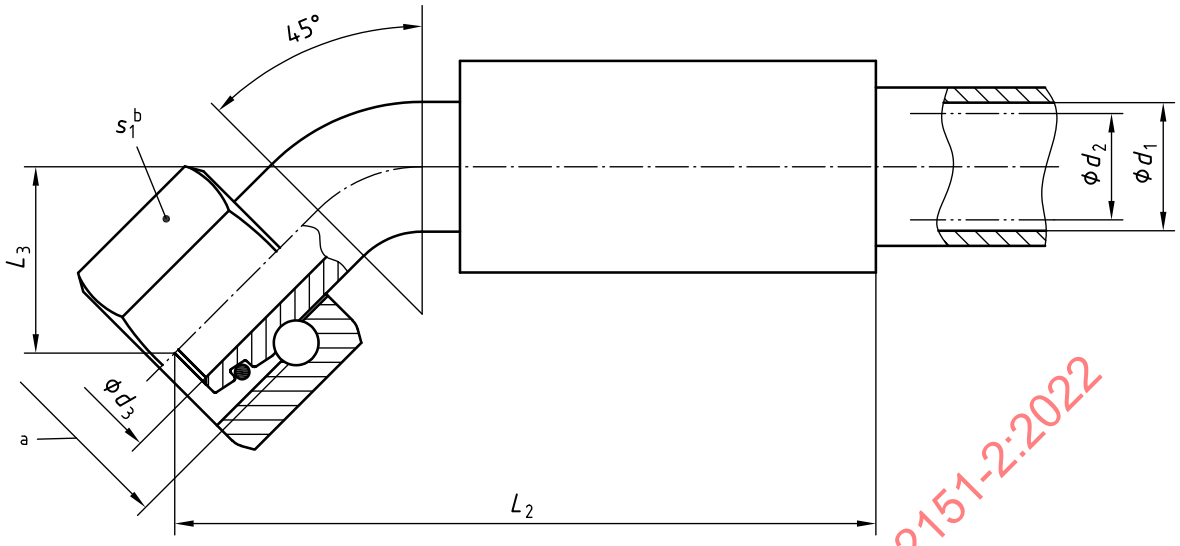
[a] The values of d_1 are in accordance with ISO 4397.

[b] Minimum diameter at any point through the hose fitting prior to assembly to the hose. The diameter after assembly shall not be reduced by more than 10 %.

[c] Dimensions d_3 are in accordance with ISO 8434-1, except that the minimum diameter for d_3 shall not be less than d_2. Transition between diameters d_2 (hose nipple through diameter) and d_3 (through diameter of the connector end) shall be located to minimize stress concentration.

[d] Stem hex optional on straight swivels (SWS).

[e] Dimension L_1 is measured to the end of the crimped ferrule.



a Thread.

b Width across flats.

A free length of tube should be left so that, in the case of an O-ring change, the nut can be moved behind the O-ring groove.

NOTE 1 The method of attachment of hose fitting to hose is optional.

NOTE 2 Connection details in accordance with ISO 8434-1.

Figure 3 — 45° elbow swivel hose fitting (SWE45)

Table 2 — Dimensions of 45° elbow swivel hose fittings (SWE45)

Dimensions in millimetres

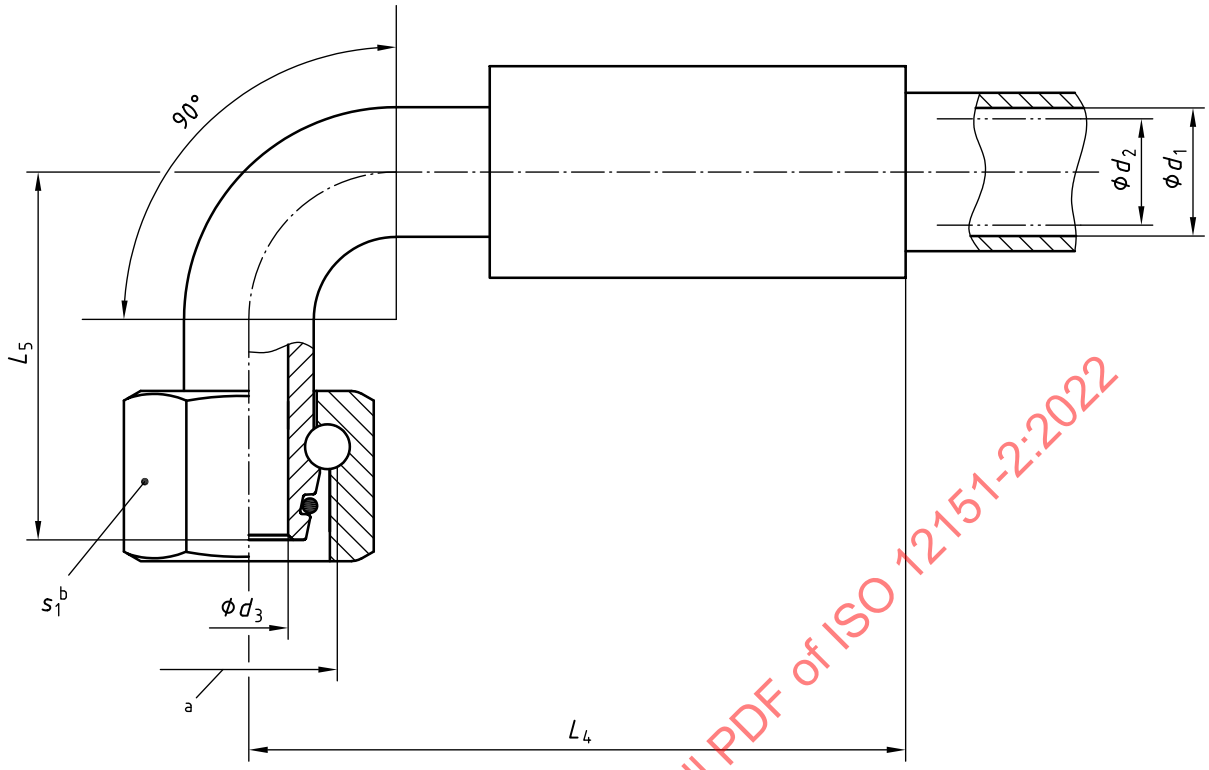
Series	Hose fitting size	Thread	Nominal connection size	Nominal hose inside diameter d_1[a]	d_2[b] min.	d_3[c] max.	s_1	L_2[d] max.	L_3 nom.	L_3 tol.
Light-duty series (L)	6 × 5	M12 × 1,5	6	5	2,5	3,2	14	80	15	±3
	8 × 6,3	M14 × 1,5	8	6,3	3	5,2	17	80	16	±4
	10 × 8	M16 × 1,5	10	8	5	7,2	19	80	17	±4
	12 × 10	M18 × 1,5	12	10	6	8,2	22	90	18,5	±4
	15 × 12,5	M22 × 1,5	15	12,5	8	10,2	27	100	19,5	±4
	18 × 16	M26 × 1,5	18	16	11	13,2	32	110	23,5	±6
	22 × 19	M30 × 2	22	19	14	17,2	36	130	25,5	±6
	28 × 25	M36 × 2	28	25	19	23,2	41	133	32	±6
	35 × 31,5	M45 × 2	35	31,5	25	29,2	50	165	38	±7
	42 × 38	M52 × 2	42	38	31	34,3	60	185	44,5	±10
Heavy-duty series (S)	8 × 5	M16 × 1,5	8	5	2,5	4,2	19	75	17	±3
	10 × 6,3	M18 × 1,5	10	6,3	3	6,2	22	75	17	±3
	12 × 8	M20 × 1,5	12	8	5	8,2	24	85	18	±3
	12 × 10	M20 × 1,5	12	10	6	8,2	24	90	18,5	±3
	16 × 12,5	M24 × 1,5	16	12,5	8	11,2	30	110	21	±4
	20 × 16	M30 × 2	20	16	11	14,2	36	115	25	±4
	25 × 19	M36 × 2	25	19	14	18,2	46	135	30,5	±4
	30 × 25	M42 × 2	30	25	19	23,2	50	145	35,5	±5
	38 × 31,5	M52 × 2	38	31,5	25	30,3	60	195	42	±6

[a] The values of d_1 are in accordance with ISO 4397.

[b] Minimum diameter at any point through the hose fitting prior to assembly to the hose. The diameter after assembly shall not be reduced by more than 10 %. This definition does not apply to the bend.

[c] Dimensions d_3 are in accordance with ISO 8434-1, except that the minimum diameter for d_3 shall not be less than d_2. Transition between diameters d_2 (hose nipple through diameter) and d_3 (through diameter of the connector end) shall be located to minimize stress concentration.

[d] Dimension L_2 is measured to the end of the crimped ferrule.



a Thread.

b Width across flats.

A free length of tube should be left so that, in the case of an O-ring change, the nut can be moved behind the O-ring groove.

NOTE 1 The method of attachment of hose fitting to hose is optional.

NOTE 2 Connection details in accordance with ISO 8434-1.

Figure 4 — 90° elbow swivel hose fitting (SWE)

Table 3 — Dimensions of 90° elbow swivel hose fittings (SWE)

Dimensions in millimetres

Series	Hose fitting size	Thread	Nominal connection size	Nominal hose inside diameter d_1[a]	d_2[b] min.	d_3[c] max.	s_1	L_4[d] max.	L_5 nom.	L_5 tol.
Light-duty series (L)	6 × 5	M12 × 1,5	6	5	2,5	3,2	14	65	30	±5
	8 × 6,3	M14 × 1,5	8	6,3	3	5,2	17	65	30,5	±5
	10 × 8	M16 × 1,5	10	8	5	7,2	19	75	33	±5
	12 × 10	M18 × 1,5	12	10	6	8,2	22	85	36	±5
	15 × 12,5	M22 × 1,5	15	12,5	8	10,2	27	90	40,5	±6
	18 × 16	M26 × 1,5	18	16	11	13,2	32	95	51,5	±10
	22 × 19	M30 × 2	22	19	14	17,2	36	100	56	±10
	28 × 25	M36 × 2	28	25	19	23,2	41	120	68,5	±10
	35 × 31,5	M45 × 2	35	31,5	25	29,2	50	147	78,5	±10
	42 × 38	M52 × 2	42	38	31	36,2	60	170	95	±13
Heavy-duty series (S)	8 × 5	M16 × 1,5	8	5	2,5	4,2	19	65	32	±4
	10 × 6,3	M18 × 1,5	10	6,3	3	6,2	22	65	32	±6
	12 × 8	M20 × 1,5	12	8	5	8,2	24	70	34	±6
	12 × 10	M20 × 1,5	12	10	6	8,2	24	85	35,5	±6
	16 × 12,5	M24 × 1,5	16	12,5	8	11,2	30	100	43	±8
	20 × 16	M30 × 2	20	16	11	14,2	36	100	49,5	±8
	25 × 19	M36 × 2	25	19	14	19,2	46	120	59	±8
	30 × 25	M42 × 2	30	25	19	24,2	50	135	70	±8
	38 × 31,5	M52 × 2	38	31,5	25	32,2	60	180	87	±11

[a] The values of d_1 are in accordance with ISO 4397.

[b] Minimum diameter at any point through the hose fitting prior to assembly to the hose. The diameter after assembly shall not be reduced by more than 10 %. This definition does not apply to the bend.

[c] Dimensions d_3 are in accordance with ISO 8434-1, except that the minimum diameter for d_3 shall not be less than d_2. Transition between diameters d_2 (hose nipple through diameter) and d_3 (through diameter of the connector end) shall be located to minimize stress concentration.

[d] Dimension L_4 is measured to the end of the crimped ferrule.