INTERNATIONAL STANDARD

ISO 12151-5

First edition
2007-07-15

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

Part 5: Hose fittings with ISO 8434-2 37° flared ends

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

Partie 5: Flexibles avec embouts évasés à 37° conformes à l'ISO 8434-2

Reference number
ISO 12151-5:2007(E)

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Foreword

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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 12151-5 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 4, *Connectors and similar products and components*.

ISO 12151 consists of the following parts, under the general title *Connections for hydraulic fluid power and general use — Hose fittings*:

— *Part 1: Hose fittings with ISO 8434-3 O-ring face seal ends*

— *Part 2: Hose fittings with ISO 8434-1 and 8434-4 24° cone connector ends with O-rings*

— *Part 3: Hose fittings with ISO 6162-1 or ISO 6162-2 flange ends*

— *Part 4: Hose fittings with ISO 6149 metric stud ends*

— *Part 5: Hose fittings with ISO 8434-2 37° flared ends*

— *Part 6: Hose fittings with ISO 8434-6 60° cone ends*

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Introduction

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

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

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

Part 5: Hose fittings with ISO 8434-2 37° flared ends

1 Scope

This part of ISO 12151 specifies the general and dimensional requirements for the design and performance of 37° flared hose fittings in accordance with ISO 8434-2, made of carbon steel, for nominal hose sizes of 6,3 mm through 51 mm inclusive in accordance with ISO 4397.

NOTE 1 Other materials can be supplied as agreed between the manufacturer and user.

NOTE 2 See ISO 4038 and ISO 4039 for hose fittings used in hydraulic and pneumatic braking systems on road vehicles (as defined in the scope of ISO/TC 22).

These hose fittings (see Figure 1 for a typical example) are for use in hydraulic fluid power systems with hose that meets the requirements of the respective hose standards and in general applications with suitable hose.

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 68-2, *ISO general-purpose screw threads — Basic profile — Part 2: Inch screw threads*

ISO 263, *ISO inch screw threads — General plan and selection for screws, bolts and nuts — Diameter range 0.06 to 6 in*

ISO 4397, *Fluid power systems and components — Connectors and associated components — Nominal outside diameters of tubes and nominal inside diameters of hoses*

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 6149-1, *Connections for hydraulic fluid power and general use — Ports and stud ends with ISO 261 metric threads and O-ring sealing — Part 1: Ports with truncated housing for O-ring seal*

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

ISO 8434-2:—[1)], *Metallic tube connections for fluid power and general use — Part 2: 37° flared connectors*

1) To be published. Revision of ISO 8434-2:1994

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

ISO 19879, *Metallic tube connections for fluid power and general use — Test methods for hydraulic fluid power connections*

3 Terms and definitions

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

4 Performance requirements

Hose assemblies shall meet the performance requirements specified in the appropriate hose specification without leakage or failure when tested in accordance with ISO 6605.

The working pressure of the hose assembly shall be the lower of the pressures for that size given in ISO 8434-2 for the end connection or in the relevant hose specification.

The working pressure of the hose fitting shall be verified through testing conducted in accordance with ISO 19879, but the entire hose assembly shall be tested in accordance with ISO 6605. During the cyclic endurance test, the hose fitting shall be subjected to the number of cycles specified in the relevant hose specification.

5 Designation of hose fittings

5.1 Hose fittings shall be designated by an alphanumeric code to facilitate ordering. They shall be designated by the words “Hose fitting”, followed by “ISO 12151-5”, followed by a spaced hyphen, then the connection type and shape letter symbol, followed by another spaced hyphen, the 37° flared-end size (tube outside diameter in accordance with ISO 8434-2) and the hose size (nominal hose inside diameter in accordance with ISO 4397), each separated by a multiplication symbol (×).

EXAMPLE A female swivel 45° elbow for 12 mm OD tubing and 12,5 mm nominal ID hose, is designated as follows:

Hose fitting ISO 12151-5 - SWE45 - 12 × 12,5

5.2 The following letter symbols shall be used:

Connection end type	Symbol
Swivel	SW

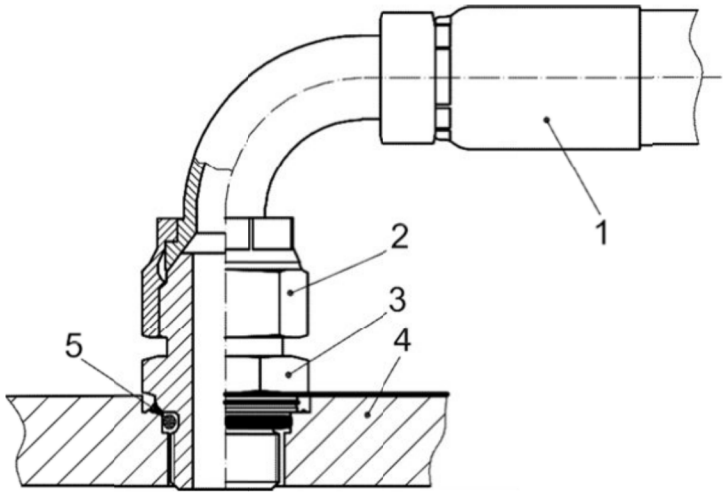
Shape	Symbol
Straight	S
45° elbow	E45
90° elbow — short	ES
90° elbow — medium	EM
90° elbow — long	EL

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

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6 Design

6.1 Figure 1 shows a typical example of a hose fitting with 37° flared end.



Key

1 hose fitting
2 nut
3 straight stud connector (ISO 8434-2)
4 port (ISO 6149-1)
5 O-ring seal

Figure 1 — Typical example of hose fitting connection with 37° flared end

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

6.3 Hex tolerances across flats shall be in accordance with ISO 4759-1:2000, product grade C.

6.4 The angular tolerance on axis 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 through 4 are maintained.

6.6 The screw threads on the flare connection ends of the hose fittings shall be inch screw threads in accordance with ISO 263 and ISO 68-2.

7 Manufacture

7.1 Construction

Hose fittings may be forged, cold-formed, machined from barstock or manufactured from multiple components.

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 might affect the function of the parts. All machined surfaces shall have a surface roughness value, *Ramax*, of 6,3 µm, except where otherwise specified.

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7.3 Finish

The external surface and threads of all carbon steel parts shall 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 render that part a failure:

— all internal fluid passages;

— edges, such as hex points, serrations and crests of threads where there may 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.

NOTE Cadmium plating is not preferred due to environmental concerns. Changes in plating can affect assembly torques and require requalification, when applicable.

7.4 Protection

By a method agreed upon between manufacturer and user, the sealing surfaces of the hose fittings 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 contamination by dirt or other polluants.

8 Procurement information

The following 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 to be conveyed;

— working pressure;

— working temperatures (both ambient and fluid).

9 Marking

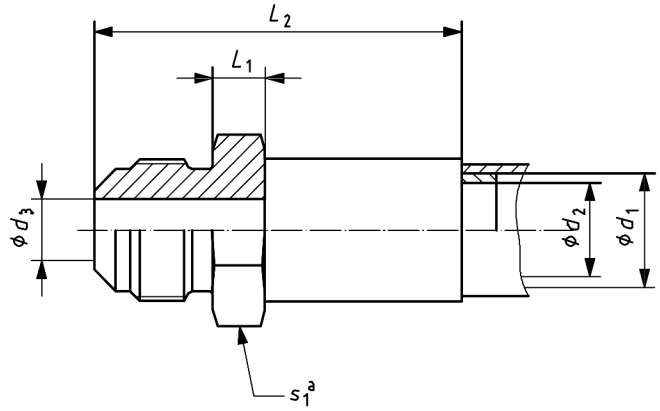
Hose fittings shall be permanently marked with the manufacturer's name or trademark.

10 Identification statement (reference to this part of ISO 12151)

It is strongly recommended to manufacturers who have chosen to conform to this part of ISO 12151 that the following statement be used in test reports, catalogues and sales literature:

"Hose fittings with 37° flared ends in accordance with ISO 12151-5:2007, *Connections for hydraulic fluid power and general use — Hose fittings — Part 5: Hose fittings with ISO 8434-2 37° flared ends*."

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

NOTE 2 Method of attachment of fitting to hose is optional.

a Across flats.

Figure 2 — Straight male hose fitting (S)

Table 1 — Dimensions of straight male hose fitting (S)

Dimensions in millimetres

Hose fitting size	Thread [a]	Nominal connection size	d_1 Hose size nom.	d_2 [b] min.	d_3 [c] max.	L_1 min.	L_2 [d] max.	s_1 hex
6 × 6,3	7/16-20 UNF	6	6,3	3	4,6	5,5	75	12
8 × 8	1/2-20 UNF	8	8	5	6,2	6	80	14
10 × 10	9/16-18 UNF	10	10	6	7,7	6,5	85	17
12 × 12,5	3/4-16 UNF	12	12,5	8	10,1	7,5	100	19
16 × 16	7/8-14 UNF	16	16	11	12,6	9,5	110	24
20 × 19	1 1/16-12 UN	20	19	14	15,8	10,5	120	27
25 × 25	1 5/16-12 UN	25	25	19	21,8	13,5	135	36
32 × 31,5	1 5/8-12 UN	32	31,5	25	27,8	16	145	46
38 × 38	1 7/8-12 UN	38	38	31	33,4	17	160	50
50 × 51	2 1/2-12 UN	50	51	42	45,4	20	225	65

[a] For the general plan of threads, see ISO 263; also see provisions for screw threads in ISO 68-2 and ISO 5864:1993, class 2A.

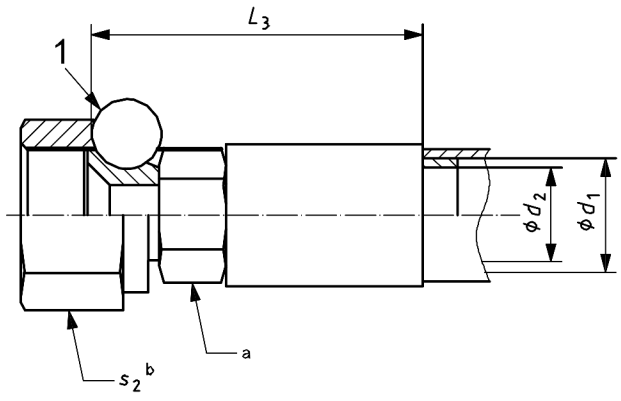
[b] Minimum diameter at any point through the hose fitting prior to assembly to the hose. The diameter after assembly shall not be less than $0{,}9d_2$.

[c] Dimension d_3 is in accordance with ISO 8434-2, except 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 37° flared end) shall be located to minimize stress concentration.

[d] Dimension L_2 is measured after assembly.

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

NOTE 2 Method of attachment of fitting to hose is optional.

NOTE 3 Method of attachment of swivel nut is as chosen by the manufacturer.

Key

1 swivel nut

a Hex optional.

b Across flats.

Figure 3 — Straight female swivel hose fitting (SWS)

Table 2 — Dimensions of straight female swivel hose fitting (SWS)

Dimensions in millimetres

Hose fitting size	Thread [a]	Nominal connection size	Hose size d_1 nom.	d_2 [b] min.	L_3 [c] max.	s_2 [d] hex
6 × 6,3	7/16-20 UNF	6	6,3	3	75	14
8 × 8	1/2-20 UNF	8	8	5	80	17
10 × 10	9/16-18 UNF	10	10	6	85	19
12 × 12,5	3/4-16 UNF	12	12,5	8	100	22
16 × 16	7/8-14 UNF	16	16	11	110	27
20 × 19	1 1/16-12 UN	20	19	14	115	32
25 × 25	1 5/16-12 UN	25	25	19	140	41
32 × 31,5	1 5/8-12 UN	32	31,5	25	160	50
38 × 38	1 7/8-12 UN	38	38	31	175	60
50 × 51	2 1/2-12 UN	50	51	42	210	75

[a] For the general plan of threads, see ISO 263; also see provisions for screw threads in ISO 68-2 and ISO 5864:1993, class 2A.

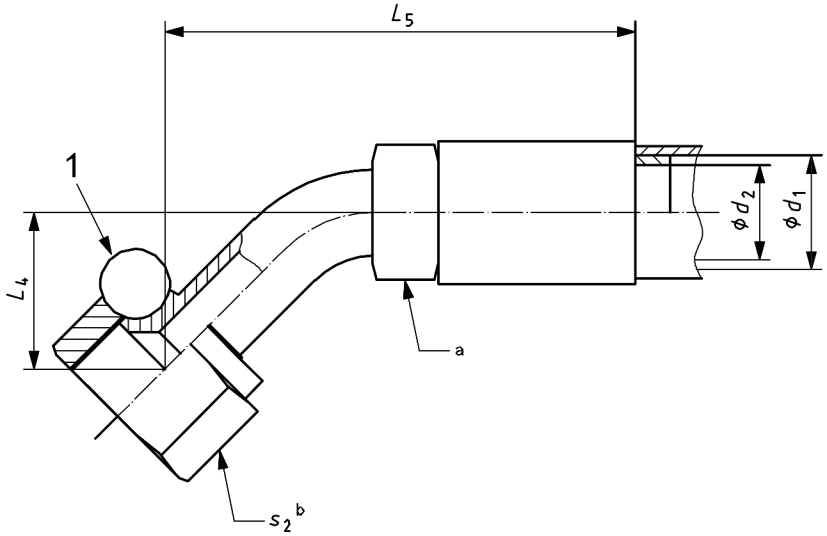
[b] Minimum diameter at any point through the hose fitting prior to assembly to the hose. The diameter after assembly shall not be less than $0{,}9d_2$.

[c] Dimension L_3 is measured after assembly.

[d] In accordance with ISO 4759-1:2000, product grade C.

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

NOTE 2 Method of attachment of fitting to hose is optional.

NOTE 3 Method of attachment of swivel nut is as chosen by the manufacturer.

Key

1 swivel nut

[a] Hex optional.

[b] Across flats.

Figure 4 — 45° elbow female swivel hose fitting (SWE45)

Table 3 — Dimensions of 45° elbow female swivel hose fitting (SWE45)

Dimensions in millimetres

Hose fitting size	Thread [a]	Nominal connection size	Hose size d_1 nom.	d_2 [b] min.	L_4 SWE45S ± 1,5	L_4 SWE45M ± 1,5	L_5 [c] max.	s_2 [d] hex min.
6 × 6,3	7/16-20 UNF	6	6,3	3	10	—	90	14
8 × 8	1/2-20 UNF	8	8	5	10	—	90	17
10 × 10	9/16-18 UNF	10	10	6	11	—	95	19
12 × 12,5	3/4-16 UNF	12	12,5	8	15	—	110	22
16 × 16	7/8-14 UNF	16	16	11	16	—	120	27
20 × 19	11/16-12 UN	20	19	14	21	—	145	32
25 × 25	15/16-12 UN	25	25	19	24	—	175	41
32 × 31,5	15/8-12 UN	32	31,5	25	25 [e]	32	200	50
38 × 38	17/8-12 UN	38	38	31	27 [e]	42	240	60
50 × 51	21/2-12 UN	50	51	42	34	—	290	75

[a] For the general plan of threads, see ISO 263; also see provisions for screw threads in ISO 68-2 and ISO 5864:1993, class 2A.

[b] Minimum diameter at any point through the hose fitting prior to bending and/or assembly to the hose. The diameter after bending and/or assembly shall not be less than $0{,}9d_2$.

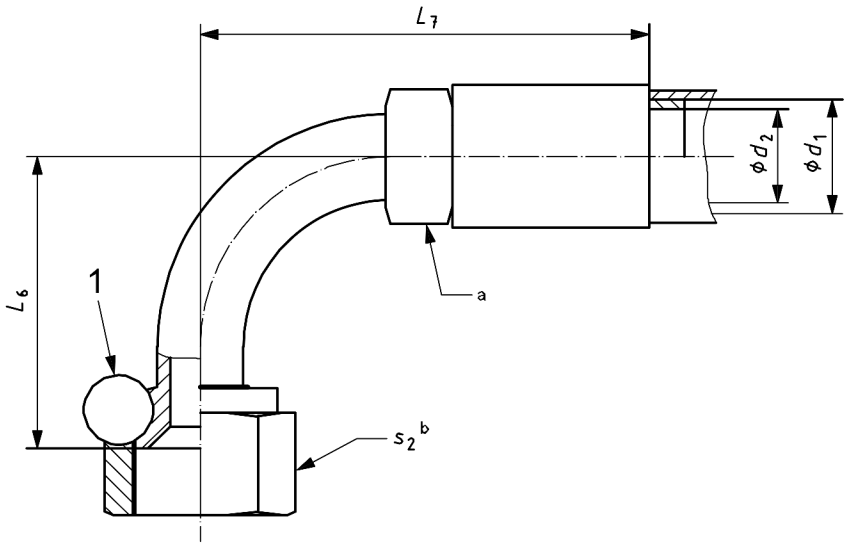
[c] Dimension L_4 is measured after assembly.

[d] In accordance with ISO 4759-1:2000, product grade C.

[e] Short-drop (SWES) hose fittings in hose fitting sizes (32 × 31,5) mm and (38 × 38) mm are not suitable for use with flexible spiral wire hose (flexible aviation type) at high pressures (which typically are designed for working pressures of 21 MPa or 17,5 MPa and higher in sizes 31,5 mm and 38 mm respectively) manufactured by preferred methods. Use preferred medium-drop hose fittings (SWEM) or consult manufacturer for availability.

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

NOTE 2 Method of attachment of fitting to hose is optional.

NOTE 3 Method of attachment of swivel nut is as chosen by the manufacturer.

Key

1 swivel nut

a Hex optional.

b Across flats.

Figure 5 — 90° elbow female swivel hose fittings [short (SWES), medium (SWEM) and long (SWEL)]

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Table 4 — Dimensions of 90° elbow female swivel hose fittings [short (SWES), medium (SWEM) and long (SWEL)]

Dimensions in millimetre

Hose fitting size	Thread [a]	Nominal connection size	Hose size d_1 nom.	d_2 [b] min.	L_6 SWES [c] ± 1,5	L_6 SWEM [d] ± 1,5	L_6 SWEL [e] ± 1,5	L_7 [f] max.	s_2 [g] hex
6 × 6,3	7/16-20 UNF	6	6,3	3	21	32	46	85	14
8 × 8	1/2-20 UNF	8	8	5	21	32	46	85	17
10 × 10	9/16-18 UNF	10	10	6	23	38	54	90	19
12 × 12,5	3/4-16 UNF	12	12,5	8	29	41	64	100	22
16 × 16	7/8-14 UNF	16	16	11	32	47	70	110	27
20 × 19	11/16-12 UN	20	19	14	48	58	96	140	32
25 × 25	15/16-12 UN	25	25	19	56	71	114	170	41
32 × 31,5	15/8-12 UN	32	31,5	25	64 [h]	78	129	200	50
38 × 38	17/8-12 UN	38	38	31	69 [h]	86	141	230	60
50 × 51	21/2-12 UN	50	51	42	88	140	222	280	75

[a] For the general plan of threads, see ISO 263; also see provisions for screw threads in ISO 68-2 and ISO 5864:1993, class 2A.

[b] Minimum diameter at any point through the hose fitting prior to bending and/or assembly to the hose. The diameter after bending and/or assembly shall not be less than $0{,}9d_2$.

[c] Short-drop (SWES) dimensions. See Annex A.

[d] Medium-drop (SWEM) dimensions. Medium-drop hose fittings will clear 90° adjustable stud elbow (SDE) per ISO 8434-2:—, Figure 15. See Annex A.

[e] Long-drop (SWEL) dimensions. Long-drop hose fittings will clear short-drop (SWES) hose fittings. See Annex A.

[f] Dimension L_7 is measured after assembly.

[g] In accordance with ISO 4759-1:2000, product grade C.

[h] Short-drop (SWES) hose fittings in hose fitting sizes (32 × 31,5) mm and (38 × 38) mm are not suitable for use with flexible spiral wire hose (flexible aviation type) at high pressures (which typically are designed for working pressures of 21 MPa or 17,5 MPa and higher in sizes, 31,5 mm and 38 mm respectively) manufactured by preferred methods. Use preferred medium-drop hose fittings (SWEM) or consult manufacturer for availability.

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Annex A
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Application illustrations for short, medium and long elbows

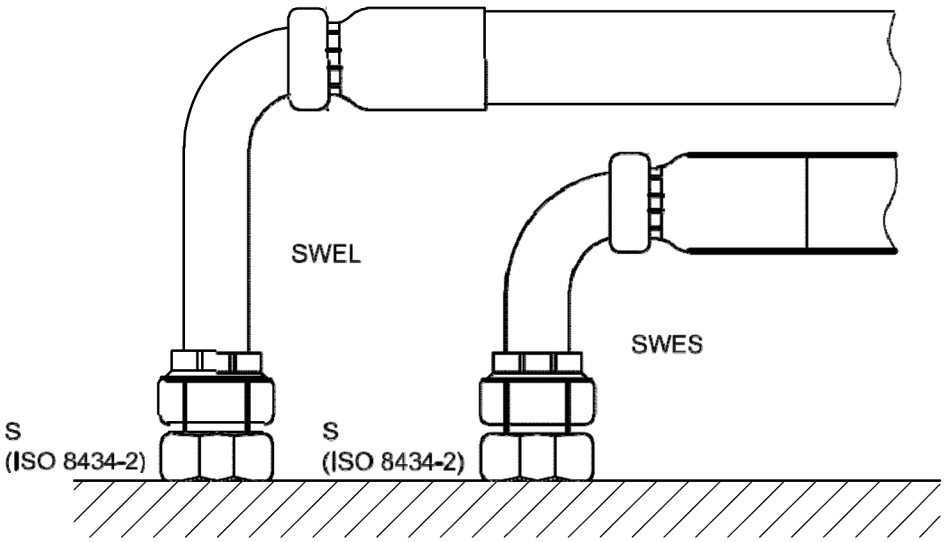


Figure A.1 — Installation of a short swivel elbow hose fitting next to a long swivel elbow hose fitting

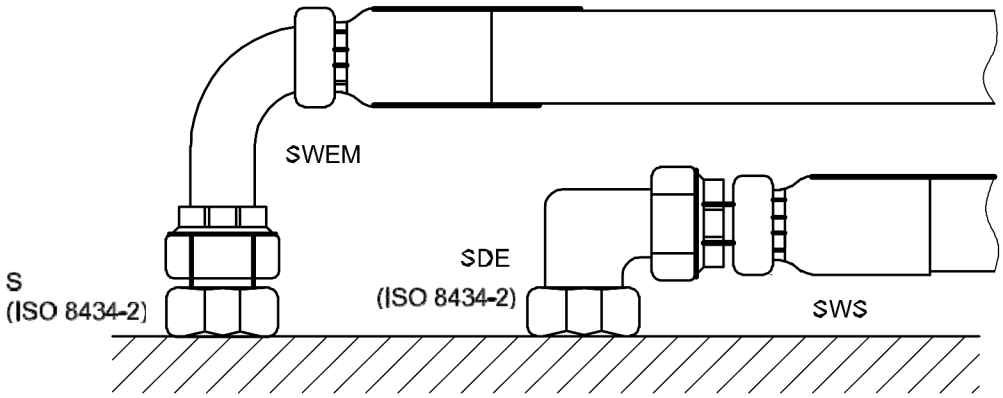


Figure A.2 — Installation of a combination of a stud elbow connector with swivel straight hose fitting next to a medium swivel elbow hose fitting

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[1] ISO 1436-1, *Rubber hoses and hose assemblies — Wire-braid-reinforced hydraulic types — Specification — Part 1: Oil-based fluid applications*

[2] ISO 3862-1, *Rubber hoses and hose assemblies — Rubber-covered spiral-wire-reinforced hydraulic types — Specification — Part 1: Oil-based fluid applications*

[3] ISO 3949, *Plastics hoses and hose assemblies — Textile-reinforced types for hydraulic applications — Specification*

[4] ISO 4038, *Road vehicles — Hydraulic braking systems — Simple flare pipes, tapped holes, male fittings and hose end fittings*

[5] ISO 4039-1, *Road vehicles — Pneumatic braking systems — Part 1: Pipes, male fittings and tapped holes with facial sealing surface*

[6] ISO 4039-2, *Road vehicles — Pneumatic braking systems — Part 2: Pipes, male fittings and holes with conical sealing surface*

[7] ISO 4079-1, *Rubber hoses and hose assemblies — Textile-reinforced hydraulic types — Specification — Part 1: Oil-based fluid applications*

[8] ISO 5864:1993, *ISO inch screw threads — Allowances and tolerances*

[9] ISO 6149-1, *Connections for hydraulic fluid power and general use — Ports and stud ends with ISO 261 metric threads and O-ring sealing — Part 1: Ports with truncated housing for O-ring seal*

[10] ISO 11237-1, *Rubber hoses and hose assemblies — Wire-braid-reinforced compact types for hydraulic applications — Specification — Part 1: Oil-based fluid applications*

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