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

**Part 1:**

Hose fittings with ISO 8434-3 O-ring face seal  
ends

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

*Partie 1: Flexibles avec embouts à joints faciaux toriques conformes  
à l'ISO 8434-3*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

International Standard ISO 12151-1 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 flange ends*
- Part 4: *Hose fittings with ISO 6149 stud ends*
- Part 5: *Hose fittings with ISO 8434-2 37° flared ends*

Annex A of this part of ISO 12151 is for information only.

## 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 may 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.

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

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

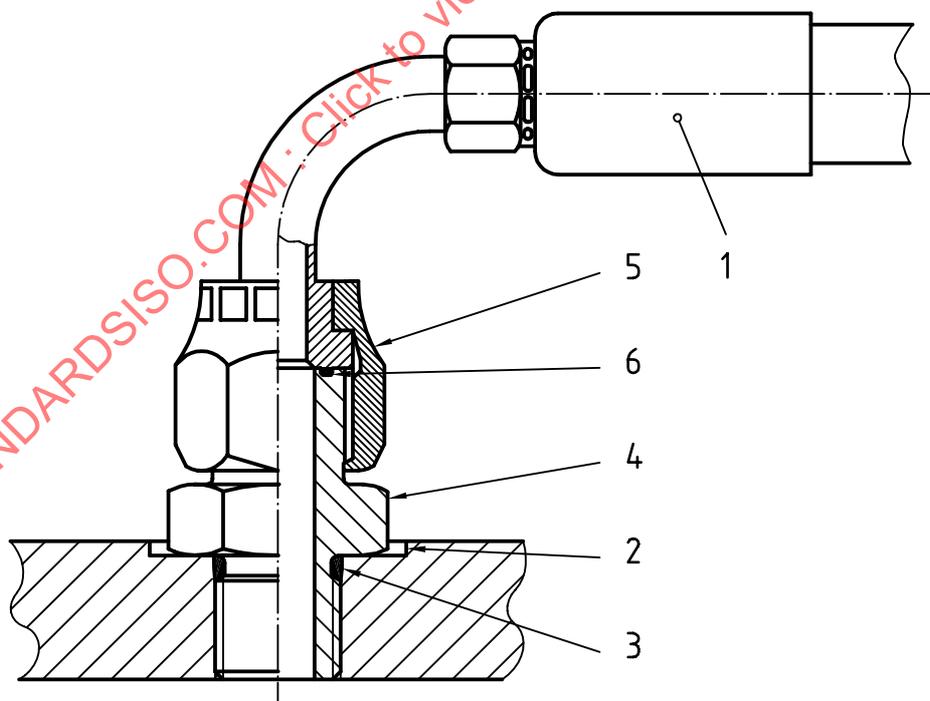
### 1 Scope

This part of ISO 12151 specifies the general and dimensional requirements for the design and performance of hose fittings with O-ring face seal ends in accordance with ISO 8434-3, made of carbon steel, for nominal hose inside diameters of 6,3 mm to 38 mm inclusive, in accordance with ISO 4397.

NOTE 1 Materials other than carbon steel may be supplied as agreed between the manufacturer and user.

NOTE 2 For hose fittings used in hydraulic braking systems on road vehicles (as defined in the scope of ISO/TC 22), see ISO 4038.

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.



#### Key

- |   |                                    |   |                                       |
|---|------------------------------------|---|---------------------------------------|
| 1 | Hose fitting                       | 4 | Adapter in accordance with ISO 8434-3 |
| 2 | Port in accordance with ISO 6149-1 | 5 | Nut                                   |
| 3 | O-ring seal                        | 6 | O-ring seal                           |

Figure 1 — Typical example of hose fitting connection with O-ring face seal fitting end

## 2 Normative references

The following normative documents contain certain provisions which, through reference in this text, constitute provisions of this part of ISO 12151. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 12151 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 725:1978, *ISO inch screw threads — Basic dimensions*.

ISO 4397:1993, *Fluid power systems and components — Connectors and associated components — Nominal outside diameters of tubes and nominal inside diameters of hoses*.

ISO 4759-1:—<sup>1)</sup>, *Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C*.

ISO 5598:1985, *Fluid power systems and components — Vocabulary*.

ISO 5864:1993, *ISO inch screw threads — Allowances and tolerances*.

ISO 6149-1:—<sup>2)</sup>, *Connections for fluid power and general use — Ports and stud ends with ISO 261 threads and O-ring sealing — Part 1: Ports with O-ring seal in truncated housing*.

ISO 8434-3:1995, *Metallic tube connections for fluid power and general use — Part 3: O-ring face seal fittings*

ISO 8434-5:1995, *Metallic tube connections for fluid power and general use — Part 5: Test methods for threaded hydraulic fluid power connections*.

ISO 9227:1990, *Corrosion tests in artificial atmospheres — Salt spray tests*.

## 3 Terms and definitions

For the purposes of this part of ISO 12151, 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.

The working pressure of the hose assembly shall be the lower of the pressures given for its size in ISO 8434-3 and in the relevant hose specification.

Tests on hose fittings shall be conducted in accordance with ISO 8434-5 for the working pressure of the hose assembly. The hose assembly shall undergo a cyclic endurance test and meet or exceed 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 ISO 12151-1, followed by a spaced hyphen, then the connection end type, shape and style letter symbols (see 5.4), followed by another spaced hyphen, the O-ring face seal end size (nominal tube outside diameter in accordance

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1) To be published. (Revision of ISO 4759-1:1978)

2) To be published. (Revision of ISO 6149-1:1993)

with ISO 8434-3) and the hose size (nominal hose inside diameter in accordance with ISO 4397), each separated by a multiplication symbol (×).

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

**ISO 12151-1 - SWE45 - 12 × 12,5**

**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 male 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	Symbol
Swivel	SW
<b>Shape</b>	
Straight	S
90° elbow, short	ES
90° elbow, medium	EM
90° elbow, long	EL
45° elbow	E45
<b>Sealing surface</b>	
Sealing surface not exposed	A
Sealing surface exposed	B

## 6 Design

**6.1** Hose fitting dimensions shown in Figures 2 through 5 shall conform to those given in Tables 1 to 4 and to the relevant dimensions in ISO 8434-3.

**6.2** Hexagonal tolerances across flats shall be in accordance with ISO 4759-1:—, grade C. Minimum across-corner hexagonal dimensions are 1,092 times the nominal width across flats. The minimum side flat is 0,43 times the nominal width across flats.

**6.3** Angular tolerances on axes of ends of elbows shall be  $\pm 3^\circ$  for all sizes.

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

**6.5** The screw threads on the connection ends of the hose fittings shall be inch screw threads in accordance with ISO 725, except for 1-14 UNS threads, which are given in ISO 8434-3:1995, annex A.

## 7 Manufacture

### 7.1 Construction

Fittings may be made by forging or cold-forming, machined from barstock or manufactured from multiple components.

## 7.2 Workmanship

Workmanship shall conform to the best commercial practice to produce high-quality fittings. Fittings shall be free from visual contaminants, all hanging burrs, loose scale and slivers which might 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 of  $Ra \leq 6,3 \mu\text{m}$ , except where otherwise specified.

## 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 be considered 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 may 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 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 fitting. Passages shall be securely covered to prevent the entrance of dirt or other contaminants.

## 8 Assembly instructions

The assembly of the hose fittings to other fittings 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 fitting, 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 8434-3, 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 fitting (using the designation in accordance with clause 5);
- material of fitting (if other than carbon steel);
- hose type and size;
- fluid to be conveyed;

- working pressure;
- working temperature (ambient and of the fluid).

## 10 Marking

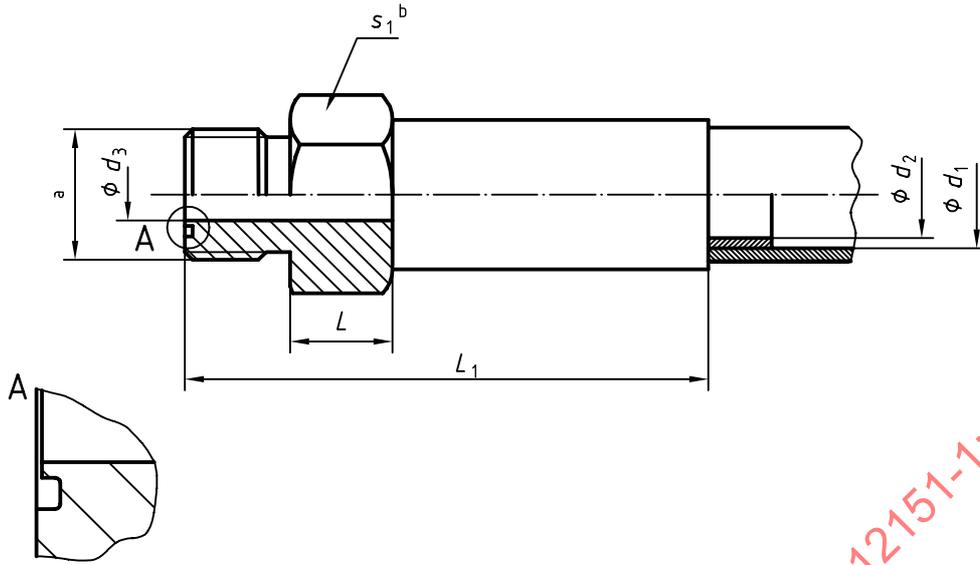
Hose fittings shall be permanently marked with the manufacturer's name or trademark.

## 11 Identification statement (reference to this part of ISO 12151)

Use the following statement in test reports, catalogues and sales literature when electing to comply with ISO 12151-1:

"Hose fittings with O-ring face seal end in conformance to ISO 12151-1:1999, *Connections for hydraulic fluid power and general use — Hose fittings — Part 1: Hose fittings with ISO 8434-3 O-ring face seal ends.*"

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NOTE 1 Connection details and O-rings in accordance with ISO 8434-3.

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

- a Thread.
- b Width across flats.

Figure 2 — Male fitting, straight (S)

Table 1 — Dimensions of male fittings, straight (S)

Dimensions in millimetres

Fitting size	Thread <sup>a</sup>	Nominal connection size	$d_1$ (nominal inside diameter of hose)	$d_2^b$		$d_3^c$	$L$		$L_1^d$	$s_1$
				min.	max.		min.	max.		
6 × 6,3	9/16-18 UNF	6	6,3	3	5,18	10	60	17		
6 × 8	9/16-18 UNF	6	8	5	5,18	10	65	17		
10 × 10	11/16-16 UNF	10	10	6	6,72	10	70	19		
12 × 12,5	13/16-16 UN	12	12,5	8	9,72	11	80	22		
16 × 16	1-14 UNS	16	16	11	12,77	13	90	27		
20 × 19	1-3/16-12 UN	20	19	14	15,77	15	95	32		
25 × 25	1 7/16-12 UN	25	25	19	20,83	19	100	41		
30 × 31,5	1 11/16-12 UN	30	31,5	25	26,33	21	120	46		
38 × 38	2-12 UN	38	38	31	32,39	25	150	55		

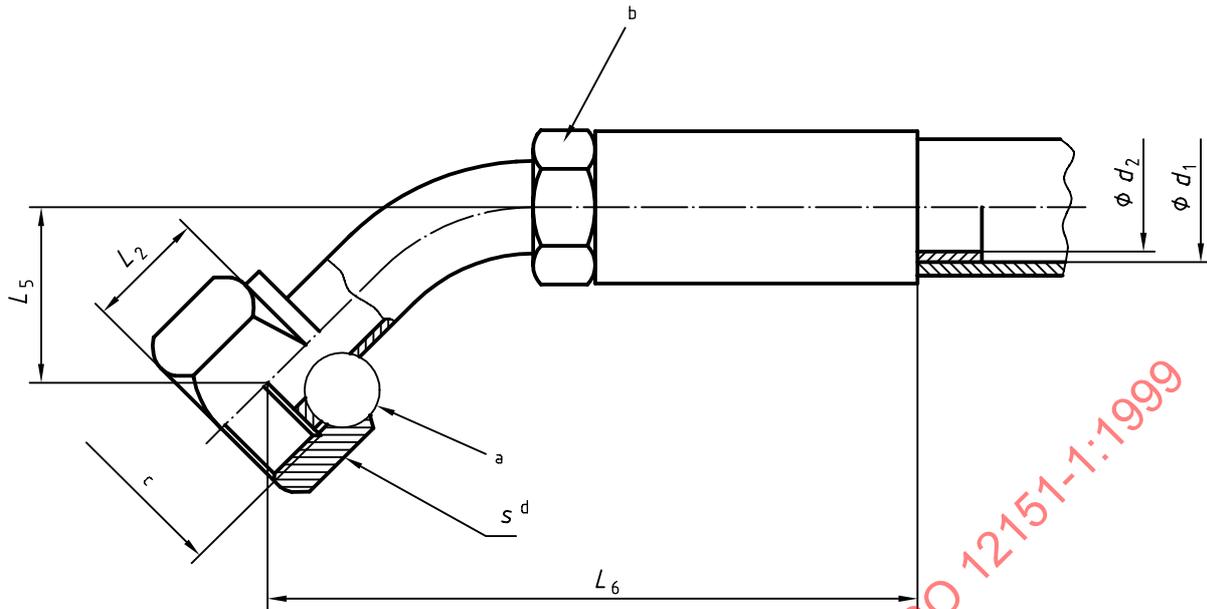
<sup>a</sup> In accordance with ISO 725 and ISO 5864:1993, class 2A (except for 1-14 UNS-2A thread, the dimensions of which are given in ISO 8434-3:1995, annex A).

<sup>b</sup> Minimum diameter at any point through the fitting prior to assembly to the hose. The diameter after assembly to the hose shall not be less than  $0,9d_2$ .

<sup>c</sup> Dimensions  $d_3$  are in accordance with ISO 8434-3, 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 face seal end) shall be located to minimize stress concentration.

<sup>d</sup> Dimension  $L_1$  is measured after assembly.





NOTE 1 Connection details in accordance with ISO 8434-3 for NA or NB nut and WDNP nipple.

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

- a Method of attachment of swivel nut is as chosen by the manufacturer.
- b Hexagonal head optional.
- c Thread.
- d Width across flats.

Figure 4 — Female swivel fitting — 45° elbow (SWE45)

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

Dimensions in millimetres

Fitting size	Thread <sup>a</sup>	Nominal connection size	$d_1$ (nominal inside diameter of hose)	$d_2^b$	$L_2^c$	$L_5$	$L_6^d$	$s^e$
				min.	min.	±1,5	max.	
6 × 6,3	9/16-18 UNF	6	6,3	3	6,5	10	90	17
6 × 8	9/16-18 UNF	6	8	5	6,5	10	95	17
10 × 10	11/16-16 UNF	10	10	6	6,5	11	100	22
12 × 12,5	13/16-16 UN	12	12,5	8	8	15	110	24
16 × 16	1-14 UNS	16	16	11	9,5	16	120	30
20 × 19	1 3/16-12 UN	20	19	14	9,5	21	125	36
25 × 25	1 7/16-12 UN	25	25	19	11	24	130	41
30 × 31,5	1 11/16-12 UN	30	31,5	25	12,5	25	170	50
38 × 38	2-12 UN	38	38	31	15,5	27	190	60

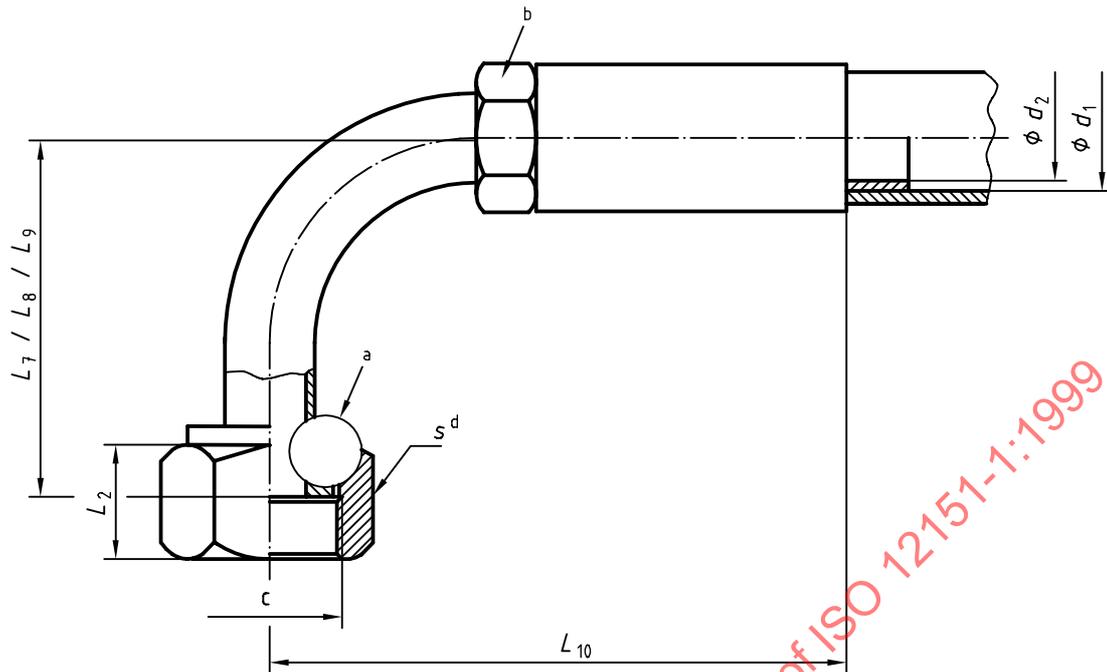
a In accordance with ISO 725 and ISO 5864:1993, class 2B (except for 1-14 UNS-2B thread, the dimensions of which are given in ISO 8434-3:1995, annex A).

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

c Crimp style nut is permissible, but width of hexagonal head shall meet  $L_2$  min.

d Dimension  $L_6$  is measured after assembly.

e In accordance with ISO 4759-1:—, grade C.



NOTE 1 Connection details in accordance with ISO 8434-3 for NA or NB nut and WDNP nipple.

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

- a Method of attachment to swivel nut is as chosen by the manufacturer.
- b Hexagonal head optional.
- c Thread.
- d Width across flats.

**Figure 5 — Female swivel fitting — 90° elbow [short (SWES), medium (SWEM), long (SWEL)]**

Table 4 — Dimensions of female swivel fittings — 90° elbow (SWES, SWEM, SWEL)

Dimensions in millimetres

Fitting size	Thread <sup>a</sup>	Nominal connection size	$d_1$ (nominal inside diameter of hose)	$d_2^b$ min.	$L_2^c$ min.	$L_7^d$	$L_8^e$	$L_9^f$	$L_{10}^g$ max.	$s^h$
						±1,5 SWES	±1,5 SWEM	±1,5 SWEL		
6 × 6,3	9/16-18 UNF	6	6,3	3	6,5	21	32	46	90	17
6 × 8	9/16-18 UNF	6	8	5	6,5	21	32	46	95	17
10 × 10	11/16-16 UNF	10	10	6	6,5	23	38	54	100	22
12 × 12,5	13/16-16 UN	12	12,5	8	8	29	41	64	110	24
16 × 16	1-14 UNS	16	16	11	9,5	32	47	70	120	30
20 × 19	1 3/16-12 UN	20	19	14	9,5	48	58	96	125	36
25 × 25	1 7/16-12 UN	25	25	19	11	56	71	114	130	41
30 × 31,5	1 11/16-12 UN	30	31,5	25	12,5	64	78	129	170	50
38 × 38	2-12 UN	38	38	31	15,5	69	86	141	190	60

<sup>a</sup> In accordance with ISO 725 and ISO 5864:1993, class 2B (except for 1-14 UNS-2B thread, the dimensions of which are given in ISO 8434-3:1995, annex A).

<sup>b</sup> Minimum diameter at any point through the fitting prior to assembly to the hose. The diameter after bending or assembly to the hose shall not be less than  $0,9d_2$ .

<sup>c</sup> Crimp style nut is permissible, but width of hexagonal head shall meet  $L_2$  min.

<sup>d</sup> Short-drop (SWES) dimensions. See annex A.

<sup>e</sup> Medium-drop (SWEM) dimensions. Medium-drop hose fittings will clear 90° adjustable stud elbow (SDE) in accordance with ISO 8434-3:1995, Figure 9 b). See annex A.

<sup>f</sup> Long-drop (SWEL) dimensions. Long-drop hose fittings will clear short-drop (SWES) hose fittings. See annex A.

<sup>g</sup> Dimension  $L_{10}$  is measured after assembly.

<sup>h</sup> In accordance with ISO 4759-1:—, grade C.