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BRITISH STANDARD

BS EN ISO 8434-4:2000

Incorporating Amendment No. 1 to BS ISO 8434-4:1995 (renumbers the BS as BS EN ISO 8434-4:2000)

Metallic tube connections for fluid power and general use —

Part 4: 24° cone connectors with O-ring weld-on nipples

The European Standard EN ISO 8434-4:2000 has the status of a British Standard.

ICS 23.100.30

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee MCE/18, Fluid power systems and components, upon which the following bodies were represented:

Association of British Mining Equipment Companies

British Compressed Air Society

British Fluid Power Association

British Hydromechanics Research Association

British Steel Industry

Department of Trade and Industry (National Engineering Laboratory)

Ministry of Defence

University of Bath

The following bodies were also represented in the drafting of the standard through subcommittees and panels:

British Iron and Steel Producers' Association

Engineering Equipment and Materials Users' Association

This British Standard, having been prepared under the direction of the Engineering Sector Board, was published under the authority of the Standards Board and comes into effect on
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National foreword

This British Standard is the official English language version of EN ISO 8434-4:2000. It is identical with ISO 8434-4:1995.

This British Standard is published under the direction of the Engineering Sector Board whose Technical Committee MCE/18 has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international committee any enquiries on interpretation, or proposals for change, and keep UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

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Change of identifier

Whenever BS ISO 8434-4:1995 appears in this standard it should be read as BS EN ISO 8434-4:2000.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the Section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN ISO title page, pages 2 to 23 and a back cover.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 8434-4

May 2000

ICS 23.100.30

English version

Metallic tube connections for fluid power and general use — Part 4: 24° cone connectors with O-ring weld-on nipples

(ISO 8434-4:1995)

Raccords de tubes métalliques pour transmissions hydrauliques et pneumatiques et applications générales —
Partie 4: Raccords à cône à 24°, à embout à souder à joint torique
(ISO 8434-4:1995)

Metallische Rohrverschraubungen für Fluidtechnik und allgemeine Anwendung —
Teil 4: Schweißnippel mit Dichtkegel und O-Ring für 24° -Konusanschluß
(ISO 8434-4:1995)

This European Standard was approved by CEN on 8 April 2000.

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Foreword

The text of the International Standard from Technical Committee ISO/TC 5, Ferrous metal pipes and metallic fittings, and ISO/TC 131, Fluid power systems, of the International Organization for Standardization (ISO) has been taken over as a European Standard by Technical Committee ECISS/TC 29, Steel tubes and fittings for steel tubes, the Secreatariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2000, and conflicting national standards shall be withdrawn at the latest by November 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

In fluid power systems, power is transmitted and controlled through a fluid (liquid or gas) under pressure within an enclosed circuit. In general applications, a fluid may be conveyed under pressure. Components may be connected through their ports by connections (fittings) and conductors. Tubes are rigid conductors; hoses are flexible conductors.

1 Scope

This part of ISO 8434 specifies general and dimensional requirements for the design and performance of 24° cone connectors with O-ring weld-on nipples that are suitable for use with steel and stainless steel tubes with outside diameters from 6 mm to 42 mm, inclusive. These fittings are for use in fluid power and general applications where elastomeric seals can be used within the limits of pressure and temperature specified in this part of ISO 8434. S series fittings in accordance with this part of ISO 8434 may be used at working pressures up to 63 MPa (630 bar[1)]). L series fittings in accordance with this part of ISO 8434 may be used at working pressures up to 25 MPa (250 bar) (see Table 1).

They are intended for the connection of tubes and hose fittings to ports in accordance with ISO 6149-1, ISO 1179-1 and ISO 9974-1.

NOTE 1 For new designs in hydraulic fluid power applications, see the requirements given in **9.6**.

NOTE 2 For use under conditions outside the pressure and/or temperature limits specified, see **5.4**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8434. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8434 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 48:1994, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD).*

ISO 228-1:1994, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation.*

ISO 261:—[2)] , *ISO general-purpose metric screw threads — General plan.*

ISO 1127:1992, *Stainless steel tubes — Dimensions, tolerances and conventional masses per unit length.*

ISO 1179-1:—[3)], *Connections for general use and fluid power — Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing — Part 1: Threaded ports.*

ISO 1179-2:—[3)], *Connections for general use and fluid power — Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing — Part 2: Heavy-duty (S series) and light-duty (L series) stud ends with elastomeric sealing (type E).*

ISO 3304:1985, *Plain end seamless precision steel tubes — Technical conditions for delivery.*

ISO 3305:1985, *Plain end welded precision steel tubes — Technical conditions for delivery.*

ISO 3601-3:1987, *Fluid systems — Sealing devices — O-rings — Part 3: Quality acceptance criteria.*

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

ISO 4759-1:1978, *Tolerances for fasteners — Part 1: Bolts, screws and nuts with thread diameters between 1,6 (inclusive) and 150 mm (inclusive) and product grades A, B and C.*

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

ISO 6149-1:1993, *Connections for fluid power and general use — Ports and stud ends with ISO 261 threads and O-ring seating — Part 1: Ports with O-ring seal in truncated housing.*

ISO 6149-2:1993, *Connections for fluid power and general use — Ports and stud ends with ISO 261 threads and O-ring sealing — Part 2: Heavy-duty (S series) stud ends — Dimensions, design, test methods and requirements.*

ISO 6149-3:1993, *Connections for fluid power and general use — Ports and stud ends with ISO 261 threads and O-ring sealing — Part 3: Light-duty (L series) stud ends — Dimensions, design, test methods and requirements.*

ISO 8434-1:1994, *Metallic tube connections for fluid power and general use — Part 1: 24 degree compression fittings.*

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1) 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

2) To be published. (Revision of ISO 261:1973)

3) To be published.

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

ISO 9974-1:—[4], *Connections for general use and fluid power — Ports and stud ends with ISO 261 threads with elastomeric or metal-to-metal seating — Part 1: Threaded ports.*

ISO 9974-2:—[4], *Connections for general use and fluid power — Ports and stud ends with ISO 261 threads with elastomeric or metal-to-metal sealing — Part 2: Stud ends with elastomeric sealing (type E).*

3 Definitions

For the purposes of this part of ISO 8434, the definitions given in ISO 5598 and the following definitions apply.

3.1
fluid power
means whereby energy is transmitted, controlled and distributed using a pressurized fluid as the medium
[ISO 5598]

3.2
connection; fitting
leakproof device to connect pipelines (conductors) to one another, or to equipment
[ISO 5598]

3.3
fastening thread
terminal thread of a complete fitting

3.4
run
two principal, axially aligned outlets of a tee or cross

3.5
branch
side outlet(s) of a tee or cross

3.6
chamfer
removal of a conical portion at the entrance of a thread to assist assembly and prevent damage to the start of the thread

3.7
assembly torque
the torque to be applied in order to achieve a satisfactory final assembly

3.8
working pressure
pressure at which the apparatus is being operated in a given application
[ISO 5598]

4 Requirements for materials

Figure 1 shows the cross-section and component parts of a typical 24° cone connector with O-ring weld-on nipple.

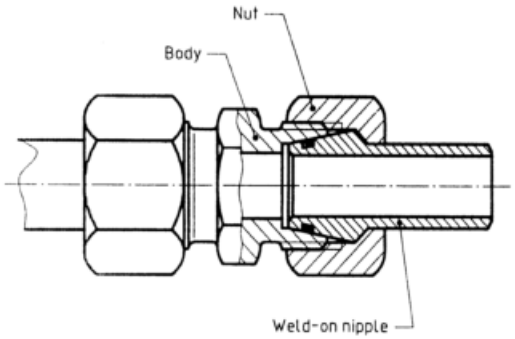


Figure 1 — Cross-section of typical 24° cone connector with O-ring weld-on nipple

4.1 Fitting bodies

Bodies shall be manufactured from carbon steel or stainless steel that will provide the minimum pressure/temperature requirements specified in clause **5**. They shall have characteristics that make them suitable for use with the fluid to be conveyed and that will provide an effective joint. Weld-on nipples shall be made of materials classified as suitable for welding.

4.2 Nuts

Nuts to be used with carbon steel bodies shall be made of carbon steel and those for use with stainless steel bodies shall be made of stainless steel unless otherwise specified.

4.3 O-rings

Unless otherwise specified, for use at the pressure and temperature requirements given in clause **5** and Table 1, O-rings for use with fittings in accordance with this part of ISO 8434 shall be made of NBR (nitrile) with a hardness of (90 ± 5) IRHD, measured in accordance with ISO 48, and shall conform to the dimensions given in Table 5 and shall meet or exceed the O-ring quality acceptance criteria for grade N of ISO 3601-3.

5 Pressure/temperature requirements

5.1 Fittings complying with this part of ISO 8434 made of carbon steel and stainless steel shall meet or exceed without leakage the requirements of a vacuum of 6,5 kPa (0,065 bar) absolute pressure up to the working pressures given in Table 1 when used at temperatures between –35 °C and +100 °C.

[4] To be published.

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5.2 Weld-on nipples in carbon and stainless steel with different wall thicknesses shall be suitable for use up to the working pressures given in Table 2 when used at temperatures between –35 °C and +100 °C.

5.3 Fittings in stainless steel shall be suitable for use at the working pressures given in Table 1 and Table 2. For pressure derating for fittings made of stainless steel that are to be used at temperatures outside the ranges given in **5.1** and **5.2**, see Table 3.

5.4 For applications under conditions outside the pressure and/or temperature limits given in Table 1 and in **5.1** to **5.3**, the manufacturer shall be consulted.

5.5 According to different applications and different pressure ratings, there are two series of fittings. The series are referred to as:

L: light duty

S: heavy duty

Ranges of the tube outside diameters and pressure requirements are shown in Table 1.

5.6 The fitting assembly shall not leak or fail when hydrostatically tested at four times the applicable recommended working pressure specified in Table 1. Testing shall be conducted at room temperature.

5.7 The pressure/temperature requirements given in Table 1 to Table 3 and in **5.1** to **5.6** are for weld-on nipples and fitting bodies only. For port and stud end pressure/temperature requirements, the values specified in the respective port and stud end standards and in annex A of this part of ISO 8434 shall apply.

Table 1 — Working pressures for carbon and stainless steel 24° cone connectors with O-ring weld-on nipples

Series	Tube outside diameter[a]	Working pressure	
	mm	MPa	(bar)
L	15	25	(250)
	18 to 22 incl.	16	(160)
	28 to 42 incl.	10	(100)
S	6 to 12 incl.	63	(630)
	16 to 25 incl.	40	(400)
	30 to 38 incl.	25	(250)

NOTE For higher pressure ratings and for dynamic conditions, the manufacturer shall be consulted.

[a] Tube outside diameters per ISO 4397.

6 Designation of fittings

6.1 Fittings shall be designated by an alphanumeric code to facilitate ordering. They shall be designated by ISO 8434-4, followed by a spaced hyphen, then the fitting style letter symbols (see **6.2**), followed by a spaced hyphen, then the series letter (see **5.5**) immediately followed by the outside diameter of the tube with which they are to be connected, followed by a multiplication sign (×) then the wall thickness. For stud ends (connector ends), another spaced hyphen followed by the thread designation of the stud end and the sealing type shall be added.

Example

A straight stud fitting (SDS) for use with tubing of 12 mm OD and 2 mm wall thickness, with an M18 × 1,5 stud end in accordance with ISO 6149-2 (S series), is designated as follows:

ISO 8434-4 – SDS – S12 × 2 – M18

6.2 The letter symbol designation of the fitting style shall have two parts: the connection end type, immediately followed by the shape of the fitting.

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

6.4 Reducing fittings and reducing elbows shall be designated by specifying the larger tube end first.

6.5 Stud fittings shall be designated by specifying the tube end first, then the thread size for the stud end.

6.6 For tee fittings, the order of designation of the connection ends shall be from larger to smaller on the run, followed by the branch end.

6.7 For cross fittings, the order of designation of the connection ends shall be from left to right, followed by top to bottom, with the larger ends on the left and at the top.

6.8 If the fitting has a tube union connection, it shall be designated first, then the designation shall proceed clockwise.

6.9 The following letter symbols shall be used:

Connection end type	Letter
Bulkhead	BH
Swivel	SW
Weld-on	WD
Weld-in	WI
Port	P
Stud	SD
Reducing	RE

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Shape	Letter	Component type	Letter
Straight	S	Nut	N
Elbow	E	Locknut	LN
Tee	T	Nipple	NP
Run tee	RT		
Branch tee	BT	Examples of compression fittings and designations are given in Figure 2 to Figure 7.	
Cross	K		

Table 2 — Working pressures for carbon and stainless steel weld-on nipples with various tube wall thicknesses

Dimensions in millimetres

Series	Tube OD[a]	Working pressure											
		10 MPa (100 bar)		16 MPa (160 bar)		25 MPa (250 bar)		31,5 MPa (315 bar)		40 MPa (400 bar)		63 MPa (630 bar)	
		d_2[b]	e[c]	d_2	e	d_2	e	d_2	e	d_2	e	d_2	e
L	15	10	2,5	10	2,5	10	2,5						
	18	13	2,5	13	2,5								
	22	17	2,5	17	2,5								
	28	23	2,5										
	35	29	3										
	42	36	3										
S	6	2,5	1,75	2,5	1,75	2,5	1,75	2,5	1,75	2,5	1,75	2,5	1,75
	8	4	2	4	2	4	2	4	2	4	2	4	2
	10	6	2	6	2	6	2	6	2	6	2	5	2,5
	12	8	2	8	2	8	2	8	2	7	2,5	6	3
	16	11	2,5	11	2,5	11	2,5	11	2,5	10	3		
	20	14	3	14	3	14	3	14	3	12	4		
	25	19	3	19	3	19	3	17	4	16	4,5		
	30	24	3	24	3	22	4						
	38	32	3	32	3	28	5						

NOTE For pressure and/or temperature applications outside those given in this part of ISO 8434, the manufacturer shall be consulted.

[a] OD = outside diameter
[b] d_2 = tube inside diameter
[c] e = tube wall thickness

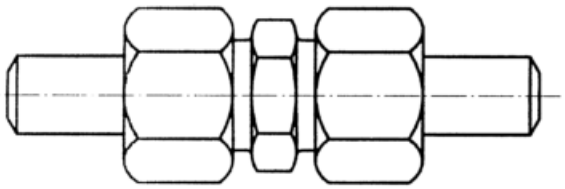
Table 3 — Pressure deratings for fittings made from stainless steel and used at temperatures outside the ranges given in 5.1 and 5.2

Working pressure for temperature range					
–35 °C to +50 °C		+100 °C		+200 °C	
MPa	(bar)	MPa	(bar)	MPa	(bar)
63	(630)	56,1	(561)	50,4	(504)
40	(400)	35,6	(356)	32	(320)
31,5	(315)	28	(280)	25	(250)
25	(250)	22,3	(223)	20	(200)
16	(160)	14,2	(142)	12,8	(128)
10	(100)	8,9	(89)	8	(80)

NOTE Intermediate values may be interpolated.

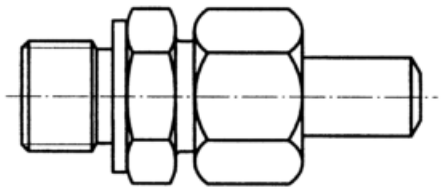
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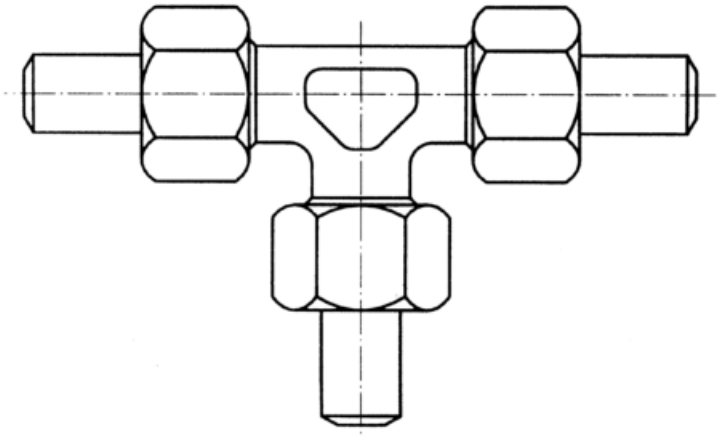
ISO 8434-4 - S - S20 × 3

Figure 2 — Straight fitting



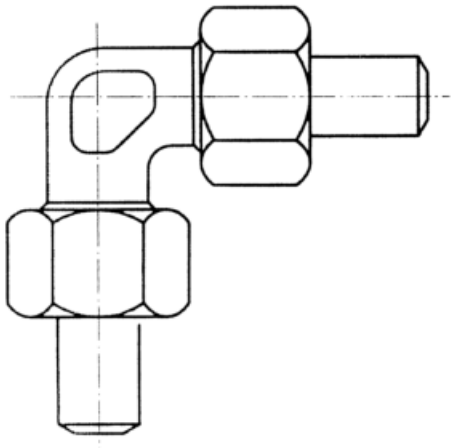
ISO 8434-4 - SDS - S20 × 3 - M18

Figure 3 — Straight stud fitting



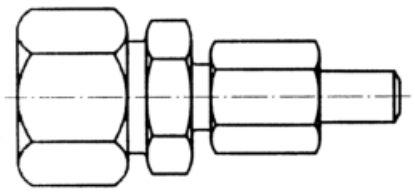
ISO 8434-4 - S - L22 × 2,5

Figure 4 — Tee



ISO 8434-4 - E - S20 × 3

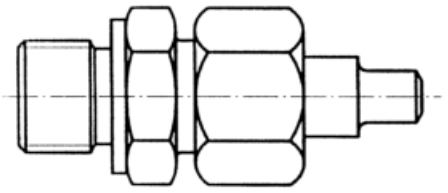
Figure 5 — Elbow



ISO 8434-4 - RESW - S20 × 3 - S12 × 2

Figure 6 — Reducing swivel adaptor

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ISO 8434-4 - RESD - S20 × 3 - S12 × 2 - G 3/8 A - E

Figure 7 — Reducing stud fitting

7 Requirements for tubes

Carbon steel tubes shall comply with ISO 3304 or ISO 3305 (cold-drawn and annealed or normalized). Stainless steel tubes shall comply with ISO 1127 (cold-drawn and annealed or normalized).

8 Across-flats dimensions

8.1 The dimensions across flats for nuts and on the bodies of the fittings shall be as given in Table 6 to Table 9. For sizes up to and including 24 mm, tolerances for across-flats dimensions for forgings shall be $^{0}_{-0,8}$ mm. For sizes larger than 24 mm they shall be $^{0}_{-1}$ mm

8.2 Hex tolerances across flats shall be in accordance with ISO 4759-1:1978, product grade C. Minimum across-corner hex dimensions are 1,092 times the width across flats. The minimum side flat is 0,43 times the nominal width across flats. Unless otherwise specified or shown, hex corners shall be chamfered 15° to 30° to a diameter equal to the width across flats, with a tolerance of $^{0}_{-0,4}$ mm.

9 Design

9.1 Fittings

The fittings shall conform to the requirements given in Figure 8 to Figure 17 and Table 4 to Table 10.

9.2 Dimensions

Dimensions specified apply to finished parts, including any plating or other treatments. The tolerance value for all dimensions not otherwise limited shall be ±0,4 mm. The sealing seats of fittings shall be concentric with straight thread pitch diameters within 0,25 mm full indicator movement (FIM).

9.3 Passage tolerances

Where passages in straight fittings are machined from opposite ends, the offset at the meeting point shall not exceed 0,4 mm. No cross-sectional area at a junction of passages shall be less than that of the smallest passage.

9.4 Angular tolerances

Angular tolerances on axis of ends of elbows, tees and crosses shall be ±2,5° for tube sizes 10 mm and less, and ±1,5° for all larger sizes.

9.5 Contour details

Details of contour shall be chosen by the manufacturer provided the dimensions given in Table 4 to Table 10 are maintained. Wrench flats on elbows and tees shall conform to the dimensions given in the relevant tables. Abrupt reduction of a section shall be avoided. Junctions of small external sections and adjoining sections that are relatively heavy shall be blended by means of ample fillets.

9.6 Ports and stud ends

The dimensions of stud ends shall conform to those given in ISO 6149-2, ISO 1179-2 or ISO 9974-2 for the S series, and ISO 6149-3, ISO 1179-2 or ISO 9974-2 for the L series. For new designs in hydraulic fluid power applications, only ports and stud ends in accordance with the relevant parts of ISO 6149 shall be used. Ports and stud ends in accordance with the relevant parts of ISO 1179 and ISO 9974 shall not be used for new designs in hydraulic fluid power applications.

10 Screw threads

10.1 Compression ends

The screw threads on the compression ends of the fittings shall be ISO metric in accordance with ISO 261.

Threads shall be chamfered at the face of the fitting to an included angle of 45°. The diameter of the chamfer shall be equal to the minor diameter of the thread, with a tolerance of $^{0}_{-0,4}$ mm.

10.2 Stud ends (connection ends)

The thread for stud ends (connection ends) of fittings shall be chosen from ISO 261 (for ISO 6149 or ISO 9974 stud ends) or ISO 228-1 (Class A) (for ISO 1179 stud ends).

NOTE 3 Parallel threads require an undercut with a sealing washer, O-ring or similar device to ensure a leakproof joint.

10.3 Thread undercuts and recesses

These shall be in accordance with the relevant stud end standard.

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11 Manufacture

11.1 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 that 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 $R_a \leq 6{,}3$ µm, except where otherwise specified.

11.2 Finish

The external surfaces and threads on all fittings, nuts and adaptors, except weld-on fittings and nipples, shall be protected with an appropriate coating to pass a minimum 18-h neutral salt spray test in accordance with ISO 9227, unless otherwise agreed upon by the manufacturer and user. Any appearance of red rust during the salt spray test shall be considered failure. Fluid passages shall be excluded from the plating or coating requirements but shall be protected from rust. Weld-on fittings and nipples shall be protected from corrosion by an oil film or phosphate coating.

11.3 Shaped fittings

Shaped fittings up to and including size 12 mm tube outside diameter may be machined from forgings or barstock. Shaped fittings larger than size 12 mm tube outside diameter shall be made from forgings.

11.4 Corners

Unless otherwise noted, all sharp corners shall be broken to 0,15 mm max.

12 Assembly instruction

The assembly of the fittings with the connecting tubes shall be carried out without external loads.

The manufacturer shall draw up assembly instructions for the use of the fittings. These instructions shall include at least the following:

— details relating to the material and quality of suitable tubes;

— details concerning the preparation of the selected tube;

— instructions regarding the assembly of the fitting, such as the number of wrenching turns or assembly torque.

13 Procurement information

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

— description of fitting;

— material of fitting;

— material, outside diameter and wall thickness of tube;

— fluid to be conveyed;

— working pressure;

— working temperature.

14 Marking of components

Fitting bodies, weld-on nipples and nuts shall be permanently marked with the manufacturer's name, trademark or code identifier, unless otherwise agreed upon by the user and manufacturer. Nuts shall also be marked with the tube outside diameter and fitting series.

15 Identification statement (Reference to this part of ISO 8434)

Use the following statement in test reports, catalogues and sales literature when electing to comply with this part of ISO 8434:

"Dimensions and design for 24° cone connectors with O-ring weld-on nipples in accordance with ISO 8434-4:1995, *Metallic tube connections for fluid power and general use — Part 4: 24° cone connectors with O-ring weld-on nipples.*"

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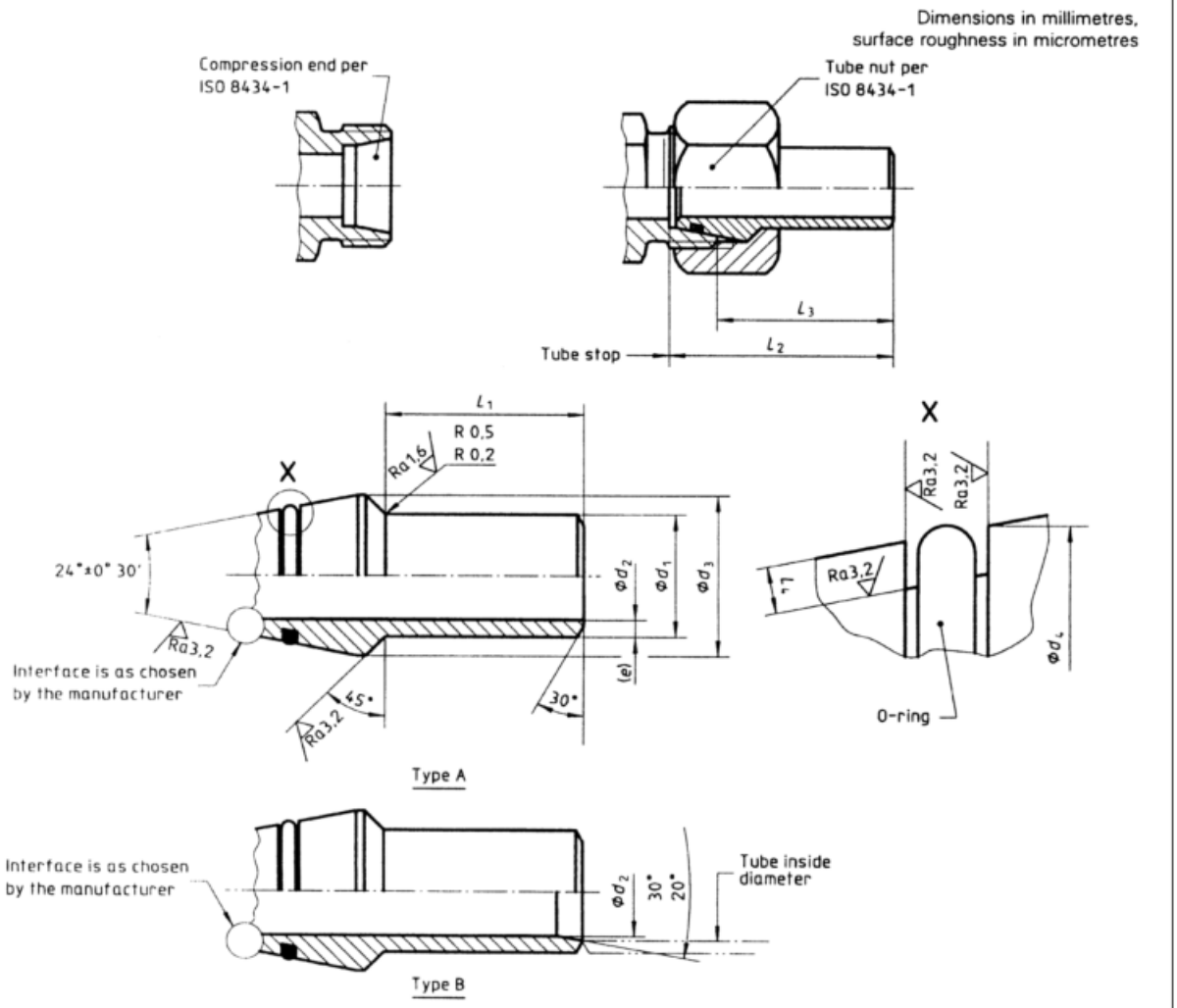


Figure 8 — Compression end and weld-on nipple details

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Table 4 — Dimensions of weld-on nipples

Dimensions in millimetres

Series	Tube OD	d_1	d_2[a]	d_3		d_4	L_1	L_2	L_3	L_4
		±0,1	$^{+0,20}_{-0,05}$	min.	max.	max.	±0,2	±1	±1	±0,1
L	15	15	10	18	20	17	22	35	28	1,5
	18	18	13	21	24	20	23	37	29,5	1,5
	22	22	17	25	27	24	24,5	39,5	32	1,5
	28	28	23	31	33	30	27,5	42,5	35	1,5
	35	35	29	40	42	37,7	30,5	49,5	39	1,9
	42	42	36	47	49	44,7	30,5	50	39	1,9
S	6	6	2,5	9	11	7,8	19	32	25	1,1
	8	8	4	11	13	9,8	19	32	25	1,1
	10	10	6	14	16	12	20	33,5	26	1,1
	12	12	8	16	18	14	20	33,5	26	1,1
	16	16	11	20	22	18	26	40,5	32	1,5
	20	20	14	24	27	22,6	28,5	47	36,5	1,8
	25	25	19	29	33	27,6	33,5	53,5	41,5	1,8
	30	30	24	35	39	32,7	35,5	57,5	44	1,8
	38	38	32	43	49	40,7	39,5	64,5	48,5	1,8

NOTE The dimensions given in this table are for the lowest working pressures given in Table 2. Refer to Table 2 for tube inside diameters and wall thicknesses required for other working pressures.

[a] Maximum permissible inside diameter of type A weld-on nipples. If the inside diameter of a tube is larger than $d_2 + 0,5$ mm, use of type B weld-on nipples is recommended.



Figure 9 — O-ring

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Table 5 — Dimensions of O-rings

Dimensions in millimetres

Series	Tube OD	Inside diameter d_5		Cross-section d_6	
		nom.	tol.	nom.	tol.
L	15	12	±0,18	2	±0,09
	18	15	±0,18	2	±0,09
	22	20	±0,22	2	±0,09
	28	26	±0,22	2	±0,09
	35	32	±0,31	2,5	±0,09
	42	38	±0,31	2,5	±0,09
S	6	4	±0,14	1,5	±0,08
	8	6	±0,14	1,5	±0,08
	10	7,5	±0,16	1,5	±0,08
	12	9	±0,16	1,5	±0,08
	16	12	±0,18	2	±0,09
	20	16,3	±0,18	2,4	±0,09
	25	20,3	±0,22	2,4	±0,09
	30	25,3	±0,22	2,4	±0,09
	38	33,3	±0,31	2,4	±0,09

NOTE All designs shall meet the performance requirements of this part of ISO 8434 using O-rings to these dimensions. O-rings of other sizes may be used as long as the sealing function is ensured.

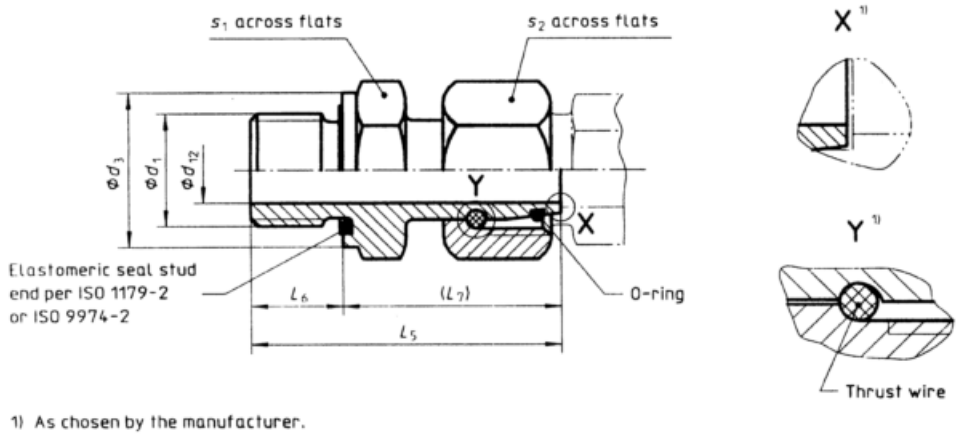


Figure 10 — S and L series swivel stud straight adaptor (SWSDS) with stud end per ISO 1179-2 or ISO 9974-2

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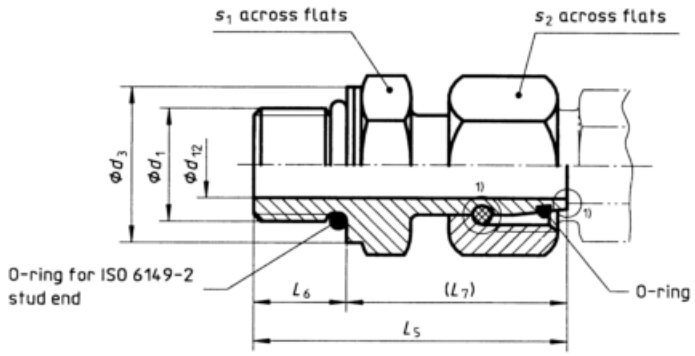
Table 6 — Dimensions of S and L series swivel stud straight adaptors with stud ends per ISO 1179-2 or ISO 9974-2

Dimensions in millimetres

Series	Tube OD	s_2	ISO 1179-2 stud end							ISO 9974-2 stud end						
			d_1 (ISO 228-1 thread)	d_3 $^{0}_{-0,2}$	d_{12}	L_5 ±0,5	L_6 ±0,2	L_7	s_1	d_1 (ISO 261 thread)[a]	d_1 $^{0}_{-0,2}$	d_{12}	L_5 ±0,5	L_6 ±0,2	L_7	s_1
L	15	27	G 1/2 A	26,9	10	46	14	32	27	M18 × 1,5	23,9	10	43,5	12	31,5	24
	18	32	G 1/2 A	26,9	13	45,5	14	31,5	27	M22 × 1,5	26,9	13	45,5	14	31,5	27
	22	36	G 3/4 A	31,9	17	48,5	16	32,5	32	M26 × 1,5	31,9	17	48,5	16	32,5	32
	28	41[b]	G 1 A	39,9	22	53	18	35	41	M33 × 2	39,9	22	53	18	35	41
	35	50	G 1 1/4 A	49,9	28	62,5	20	42,5	50	M42 × 2	49,9	28	62,5	20	42,5	50
	42	60	G 1 1/2 A	54,9	34	68,5	22	46,5	55	M48 × 2	54,9	34	68,5	22	46,5	55
S	6	17	G 1/4 A	18,9	2,5	39	12	27	19	M12 × 1,5	16,9	2,5	39	12	27	17
	8	19	G 1/4 A	18,9	4	41,5	12	29,5	19	M14 × 1,5	18,9	4	41,5	12	29,5	19
	10	22	G 3/8 A	21,9	6	44	12	32	22	M16 × 1,5	21,9	6	44	12	32	22
	12	24	G 3/8 A	21,9	8	46	12	34	22	M18 × 1,5	23,9	8	46	12	34	24
	12	24	G 1/2 A	26,9	8	48,5	14	34,5	27							
	16	30	G 1/2 A	26,9	11	51	14	37	27	M22 × 1,5	26,9	11	51	14	37	27
	16	30	G 3/4 A	31,9	11	55	16	39	32							
	20	36	G 3/4 A	31,9	14	59	16	43	32	M27 × 2	31,9	14	59	16	43	32
	25	46	G 1 A	39,9	18	66	18	48	41	M33 × 2	39,9	18	66	18	48	41
	30	50	G 1 1/4 A	49,9	23	71	20	51	50	M42 × 2	49,9	23	71	20	51	50
	38	60	G 1 1/2 A	54,9	30	82	22	60	55	M48 × 2	54,9	30	82	22	60	55

[a] For ISO 261 threads, fittings complying with Figure 11 and Table 7 (ISO 6149-2 and ISO 6149-3 stud ends) are preferred.
[b] Alternative hex size: 46 mm.

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1) As chosen by the manufacturer; see figure 10.

Figure 11 — Swivel stud straight adaptor (SWSDS) with stud end per ISO 6149-2 (S series) or ISO 6149-3 (L series)

Table 7 — Dimensions of swivel stud straight adaptors with stud ends per ISO 6149-2 (S series) or ISO 6149-3 (L series)

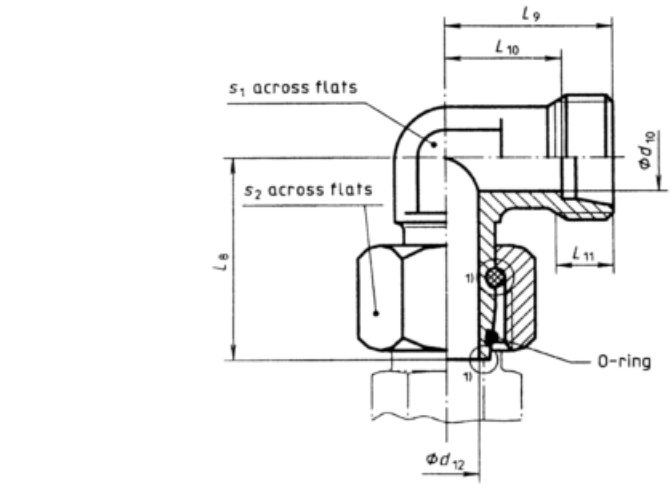
Dimensions in millimetres

Series	Tube OD	d_1	d_3 ±0,1	d_{12}	L_5 ±0,5	L_6 ±0,2	L_7	s_1	s_2
L	15	M18 × 1,5	23,8	10	44	12,5	31,5	24	27
	18	M22 × 1,5	26,8	13	44,5	13	31,5	27	32
	22	M27 × 2	31,8	17	48,5	16	32,5	32	36
	28	M33 × 2	40,8	22	51	16	35	41	41[a]
	35	M42 × 2	49,8	28	58,5	16	42,5	50	50
	42	M48 × 2	54,8	34	64	17,5	46,5	55	60
S	6	M12 × 1,5	16,8	2,5	38	11	27	17	17
	8	M14 × 1,5	18,8	4	40,5	11	29,5	19	19
	10	M16 × 1,5	21,8	6	44,5	12,5	32	22	22
	12	M18 × 1,5	23,8	8	48	14	34	24	24
	16	M22 × 1,5	26,8	11	52	15	37	27	30
	20	M27 × 2	31,8	14	61,5	18,5	43	32	36
	25	M33 × 2	40,8	18	66,5	18,5	48	41	46
	30	M42 × 2	49,8	23	70	19	51	50	50
	38	M48 × 2	54,8	30	81,5	21,5	60	55	60

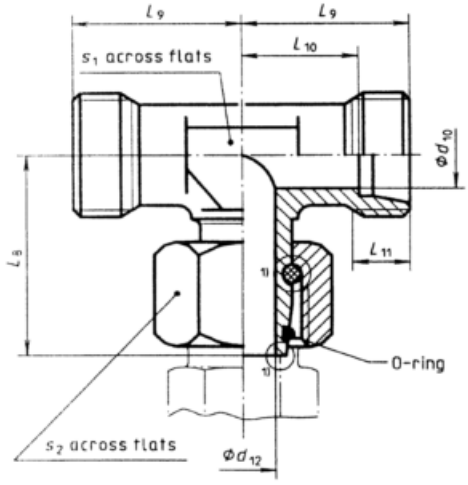
[a] Alternative hex size: 46 mm.

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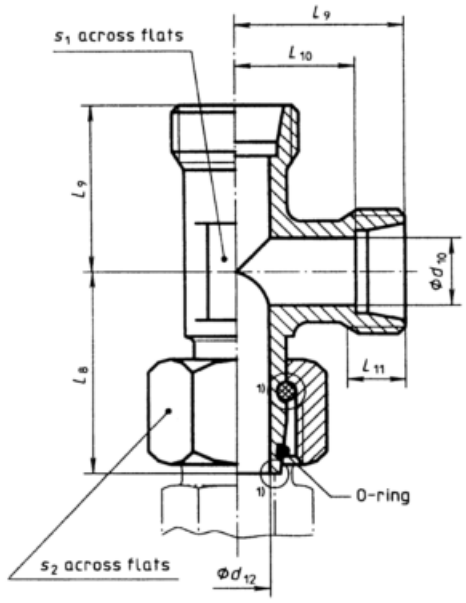
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a) Swivel elbow (SWE)



b) Swivel branch tee (SWBT)



c) Swivel run tee (SWRT)

1) As chosen by the manufacturer; see figure 10.

Figure 12 — Swivel elbow (SWE), swivel branch tee (SWBT) and swivel run tee (SWRT)

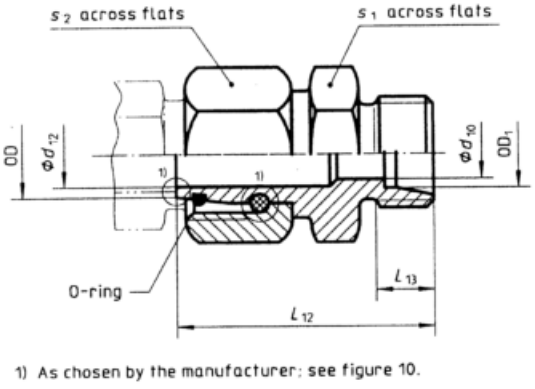
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Table 8 — Dimensions of swivel elbows, swivel branch tees and swivel run tees

Dimensions in millimetres

Series	Tube OD	d_{10}	d_{12}	L_8 ±0,5	L_9 ±0,3	L_{10}	L_{11} min.	s_1[a]	s_2
L	15	12	10	32,5	28	21	9	19	27
	18	15	13	35,5	31	23,5	9	24	32
	22	19	17	38,5	35	27,5	10	27	36
	28	24	22	41,5	38	30,5	10	36	41[b]
	35	30	28	51	45	34,5	12	41	50
	42	36	34	56	51	40	12	50	60
S	6	4	2,5	27	23	16	9	12 (14)	17
	8	5	4	27,5	24	17	9	14 (17)	19
	10	7	6	30	25	17,5	9	17 (19)	22
	12	8	8	31	29	21,5	9	17 (22)	24
	16	12	11	36,5	33	24,5	11	24	30
	20	16	14	44,5	37	26,5	12	27	36
	25	20	18	50	42	30	14	36	46
	30	25	23	55	49	35,5	16	41	50
	38	32	30	63	57	41	18	50	60

[a] Dimensions in parentheses are for fittings manufactured from barstock.
[b] Alternative hex size: 46 mm.



1) As chosen by the manufacturer: see figure 10.

Figure 13 — Reducing swivel straight adaptor (RESWS)

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Table 9 — Dimensions of L and S series reducing swivel straight adaptors

Dimensions in millimetres

Series	Working pressure		Tube OD		d_{10}	d_{12}	L_{12}	L_{13}	s_1[a]	s_2[a]
	MPa	(bar)	OD	OD_1			±0,5			
L	16	(160)	18	15	12	12	37	9	24	32
			22	15	12	17	41	9	27	36
				18	15	15	41	9		
	10	(100)	28	15	12	22	43	9	32 (36)	41 (46)
				18	15	22	43	9		
				22	19	19	45	10		
			35	15	12	28	46	9	41 (46)	50
				18	15	28	46	9		
				22	19	28	48	10		
				28	24	28	48	10		
			42	15	12	34	49,5	9	50	60
				18	15	34	49,5	9		
				22	19	34	51,5	10		
				28	24	34	51,5	10		
				35	30	34	53,5	12		
S	63	(630)	8	6	4	4	34	9	14	19
			10	6	4	6	34,5	9	17	22
				8	5	5	34,5	9		
			12	6	4	8	37	9	19	24
				8	5	8	37	9		
				10	7	7	37	9		
	40	(400)	16	6	4	11	39	9	22	30
				8	5	11	39	9		
				10	7	11	39	9		
				12	8	11	39	9		
			20	6	4	14	43	9	27	36
				8	5	14	43	9		
				10	7	14	43	9		
				12	8	14	43	9		
				16	12	12	45	11		
			25	6	4	18	45,5	9	32 (36)	46
				8	5	18	45,5	9		
				10	7	18	45,5	9		
				12	8	18	45,5	9		
				16	12	18	47,5	11		
				20	16	16	49,5	12		
	25	(250)	30	6	4	23	51	9	41	50
				8	5	23	51	9		
				10	7	23	51	9		
				12	8	23	51	9		
				16	12	23	53	11		
				20	16	23	55	12		
				25	20	20	57	14		
			38	6	4	30	54,5	9	50	60
				8	5	30	54,5	9		
				10	7	30	54,5	9		
				12	8	30	54,5	9		
				16	12	30	56,5	11		
				20	16	30	58,5	12		
				25	20	30	60,5	14		
				30	25	30	62,5	16		

[a] Alternative hex size in parentheses.

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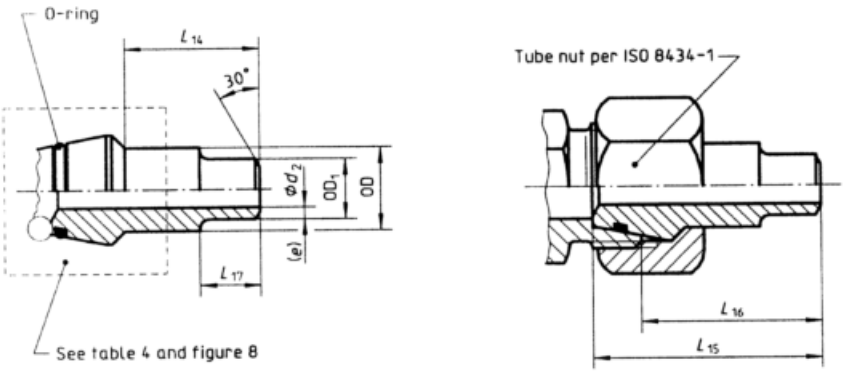


Figure 14 — Weld-on reducing nipple (WDRE)

Table 10 — Dimensions of L and S series weld-on reducing nipples

Dimensions in millimetres

Series	Working pressure		Tube OD		d_2	e	L_{14}	L_{15}	L_{16}	L_{17}
	MPa	(bar)	OD	OD_1			±0,2	±1	±1	
L	16	(160)	18	15	12	1,5	23	37	29,5	16
			22	18	15	1,5	24,5	39,5	32	18
				15	12	1,5				
	10	(100)		22	18	2				
			28	18	15	1,5	27,5	42,5	35	21
				15	12	1,5				
			35	28	24	2	30,5	49,5	39	25
				22	18	2				
				18	15	1,5				
				15	12	1,5				
				35	31	2				
				28	24	2				
			42	22	18	2	30,5	50	39	28
				18	15	1,5				
				15	12	1,5				

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Table 10 — Dimensions of L and S series weld-on reducing nipples *(continued)*

Series	Working pressure		Tube OD		d_2	e	L_{14}	L_{15}	L_{16}	L_1
	MPa	(bar)	OD	OD_1			±0,2	±1	±1	
S	63	(630)	8	6	2	2	19	32	25	11
			10	8	3	2,5	20	33,5	26	12
				6	2	2				
			12	10	4	3	20	33,5	26	13
				8	3	2,5				
				6	2	2				
	40	(400)	16	12	8	2	26	40,5	32	15
				10	6	2				
				8	5	1,5				
				6	3	1,5				
			20	16	10	3	28,5	47	36,5	17
				12	8	2				
				10	6	2				
				8	5	1,5				
				6	3	1,5				
			25	20	13	3,5	33,5	53,5	41,5	20
				16	10	3				
				12	8	2				
				10	6	2				
				8	5	1,5				
				6	3	1,5				
	25	(250)	30	25	20	2,5	35,5	57,5	44	22
				20	16	2				
				16	12	2				
				12	9	1,5				
				10	7	1,5				
				8	5	1,5				
				6	4	1				
			38	30	24	3	39,5	64,5	48,5	26
				25	20	2,5				
				20	16	2				
				16	12	2				
				12	9	1,5				
				10	7	1,5				
				8	5	1,5				
				6	4	1				

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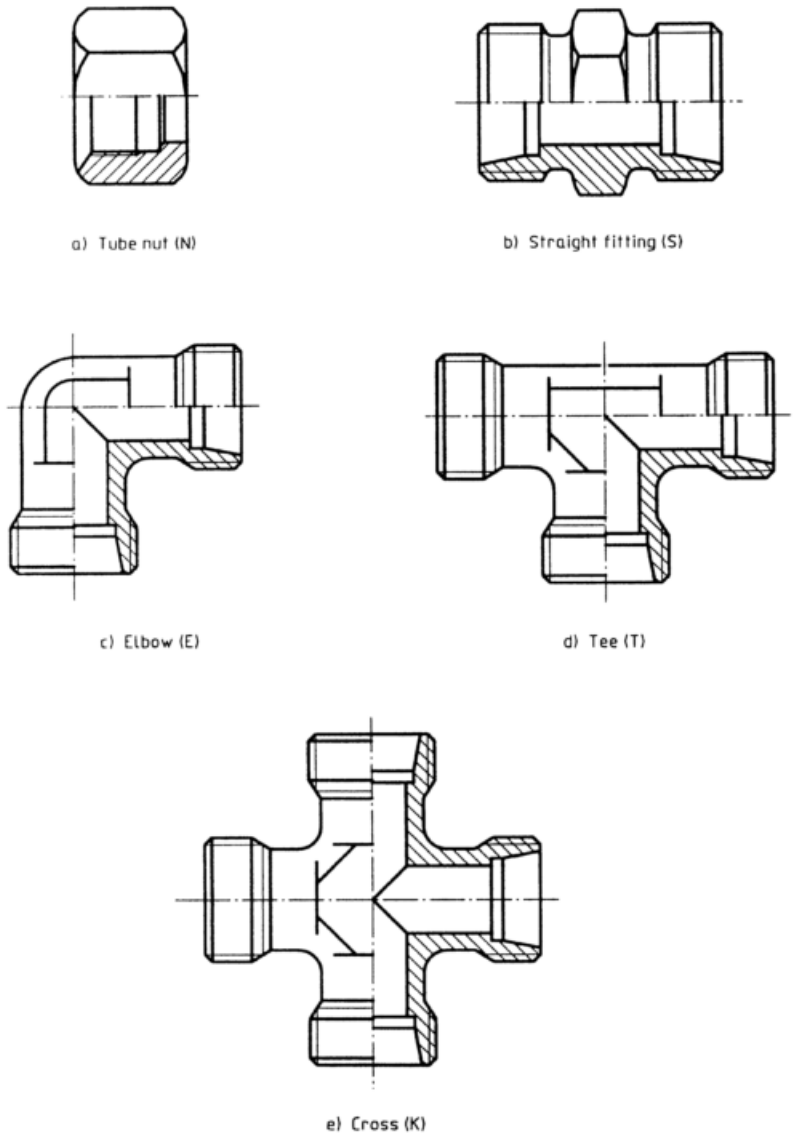


Figure 15 — Components for use with weld-on nipples and swivel nut fittings (see ISO 8434-1 for dimensions)

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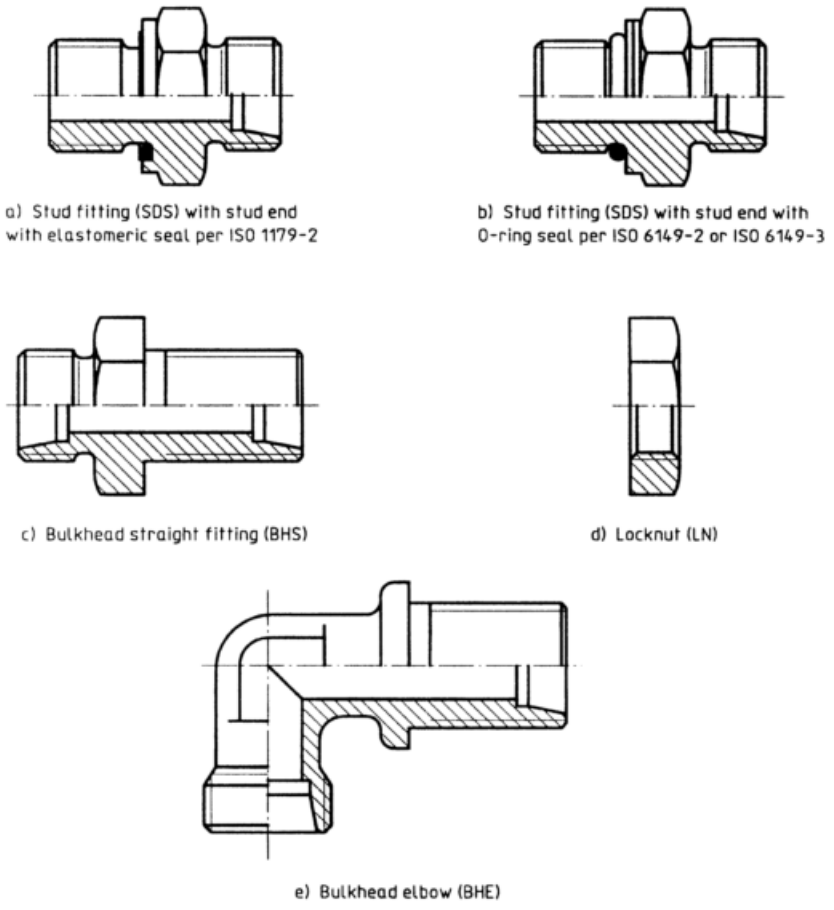


Figure 16 — Components for use with weld-on nipples and swivel nut fittings (see ISO 8434-1 for dimensions)

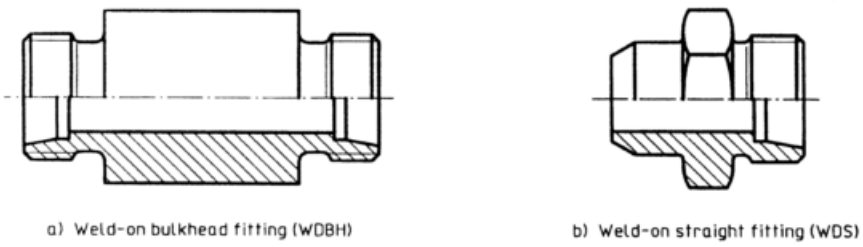


Figure 17 — Components for use with weld-on nipples and swivel nut fittings (see ISO 8434-1 for dimensions)

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Annex A (normative)
Port and stud end working pressures and combinations of tube outside diameters and port and stud end thread sizes

See Table A.1 for values for fluid power applications and general use, and Table A.2 for values for general use only.

Table A.1 — Values for fluid power and general use

Series	Tube OD	d_2	ISO 6149-2 (S series) or ISO 6149-3 (L series) with non-adjustable stud ends			ISO 1179-2[a]		
			Thread	Working pressure[b]		Thread	Working pressure[b]	
	mm	mm		MPa	(bar)		MPa	(bar)
L	15	10	M18 × 1,5	25	(250)	G 1/2 A	25	(250)
	18	13	M22 × 1,5	16	(160)	G 1/2 A	16	(160)
	22	17	M27 × 2	16	(160)	G 3/4 A	16	(160)
	28	23	M33 × 2	10	(100)	G 1 A	10	(100)
	35	29	M42 × 2	10	(100)	G 1 1/4 A	10	(100)
	42	36	M48 × 2	10	(100)	G 1 1/2 A	10	(100)
S	6	2,5	M12 × 1,5	63	(630)	G 1/4 A	63	(630)
	8	4	M14 × 1,5	63	(630)	G 1/4 A	63	(630)
	10	5	M16 × 1,5	63	(630)	G 3/8 A	63	(630)
	12	6	M18 × 1,5	63	(630)	G 3/8 A	63	(630)
	16	10	M22 × 1,5	40	(400)	G 1/2 A	40	(400)
	20	12	M27 × 2	40	(400)	G 3/4 A	40	(400)
	25	16	M33 × 2	40	(400)	G 1 A	40	(400)
	30	22	M42 × 2	25	(250)	G 1 1/4 A	25	(250)
	38	28	M48 × 2	25	(250)	G 1 1/2 A	25	(250)

NOTE Working pressures are for those fittings where the smallest d_2 (inside diameter) is used. See Table 2 for working pressures for fittings with larger d_2 dimensions.

[a] Type E with elastomeric sealing.
[b] With a design factor of 4 to 1.

Table A.2 — Values for general use only

Series	Tube OD	d_2	ISO 9974-2[a]		
			Thread	Working pressure[b]	
	mm	mm		MPa	(bar)
L	15	10	M18 × 1,5	25	(250)
	18	13	M22 × 1,5	16	(160)
	22	17	M26 × 1,5	16	(160)
	28	23	M33 × 2	10	(100)
	35	29	M42 × 2	10	(100)
	42	36	M48 × 2	10	(100)
S	6	2,5	M12 × 1,5	63	(630)
	8	4	M14 × 1,5	63	(630)
	10	5	M16 × 1,5	63	(630)
	12	6	M18 × 1,5	63	(630)
	16	10	M22 × 1,5	40	(400)
	20	12	M27 × 2	40	(400)
	25	16	M33 × 2	40	(400)
	30	22	M42 × 2	25	(250)
	38	28	M48 × 2	25	(250)

NOTE Working pressures are for those fittings where the smallest d_2 (inside diameter) is used. See Table 2 for working pressures for fittings with larger d_2 dimensions.

[a] Type E with elastomeric sealing.
[b] With a design factor of 4 to 1.

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Annex ZA (normative)
Normative references to International publications with their relevant European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

Publication	Year	Publication	EN	Year
ISO 1127	1992	*Stainless steel tubes — Dimensions, tolerances and conventional masses per unit length*	EN ISO 1127	1996
ISO 8434-1	1994	*Metallic tube connections for fluid power and general use — Part 1: 24° compression fittings*	EN ISO 8434-1	1997