INTERNATIONAL STANDARD

ISO 8434-6

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Metallic tube connections for fluid power and general use —

Part 6: 60° cone connectors with or without O-ring

Raccordements de tubes métalliques pour transmissions hydrauliques et pneumatiques et applications générales —

Partie 6: Connecteurs coniques à 60° avec ou sans joint torique

Reference number
ISO 8434-6:2009(E)

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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 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 8434-6 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 4, *Connectors and similar products and components*.

ISO 8434 consists of the following parts, under the general title *Metallic tube connections for fluid power and general use*:

— *Part 1: 24° cone connectors*

— *Part 2: 37° flared connectors*

— *Part 3: O-ring face seal connectors*

— *Part 6: 60° cone connectors with or without O-ring*

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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 can be conveyed under pressure.

Components can be connected through their ports by connections (connectors) and conductors (tubes and hoses). Tubes are rigid conductors; hoses are flexible conductors.

ISO/TC 131/SC 4 recommends that connectors that conform to ISO 8434-1 and ISO 8434-3 be used because these International Standards represent the state of the art. However, ISO 8434-6 has been developed because it specifies connectors that are currently used worldwide.

This part of ISO 8434 is based on British standard BS 5200. The threads for the 60° cone connection are pipe threads conforming to ISO 228-1.

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Metallic tube connections for fluid power and general use —

Part 6:
60° cone connectors with or without O-ring

1 Scope

This part of ISO 8434 specifies general and dimensional requirements for the design and performance of 60° cone connectors and braze-on nipples with or without O-ring sealing, made of steel for tube outside diameters of 6 mm through 50 mm, inclusive, or hose sizes 5 through 51, inclusive. These connectors are for use in fluid power and general applications within the limits of pressure and temperature specified in this part of ISO 8434.

They are intended for the connection of tubes and hose fittings to ports in accordance with ISO 6149-1 and ISO 1179-1. See ISO 12151-6 for related hose fitting specification.

These connectors provide full-flow connections in hydraulic systems operating to the working pressures shown in Table 1.

NOTE 1 For new designs in hydraulic fluid power applications, see the requirements given in 9.6. Where the requirements of the application allow for the use of elastomeric seals, connector designs that conform to International Standards and incorporate elastomeric sealing are preferred.

NOTE 2 For use under conditions outside the pressure and/or temperature limits specified, see 5.3

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

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

ISO 261, *ISO general purpose metric screw threads — General plan*

ISO 1179-1, *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, *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 1179-3, *Connections for general use and fluid power — Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing — Part 3: Light-duty (L series) stud ends with sealing by O-ring with retaining ring (types G and H)*

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

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

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ISO 3601-3, *Fluid power systems — O-rings — Part 3: Quality acceptance criteria*

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

ISO 5598:2008, *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 6149-3, *Connections for hydraulic fluid power and general use — Ports and stud ends with ISO 261 metric threads and O-ring sealing — Part 3: Dimensions, design, test methods and requirements for light duty (L series) stud ends*

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

ISO 10763, *Hydraulic fluid power — Plain-end, seamless and welded precision steel tubes — Dimensions and nominal working pressures*

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 and the following apply.

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

[ISO 5598:2008, 3.2.313]

3.2
connector
leakproof device to connect pipelines (conductors) to one another, or to equipment

[modified from ISO 5598:2008, 3.2.122]

3.3
fastening thread
terminal thread of a complete connector

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 a thread

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

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3.8
maximum working pressure
pressure at which a connector is designed to operate for a number of repetitions sufficient to assure adequate service life

NOTE This definition differs from that given for “maximum working pressure” in ISO 5598:2008, 3.2.429.

3.9
adjustable stud end
stud end connector that allows for connector orientation through final tightening of the locknut to complete the connection

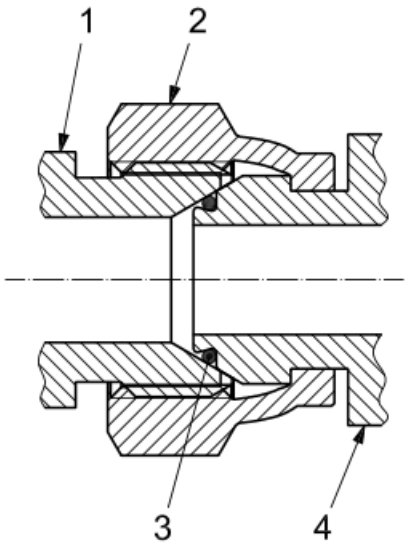
NOTE This type of stud end is typically used on shaped connectors (e.g. tees, crosses and elbows).

3.10
non-adjustable stud end
stud end connector that does not require specific orientation through final tightening of the connection because it is only used on straight connectors

4 Materials

4.1 General

Figure 1 shows the cross-section and component parts of a typical 60° cone connector with O-ring.



Key
1 male body
2 nut
3 O-ring
4 female connector

Figure 1 — Cross-section of typical 60° cone connector with O-ring

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4.2 Connector bodies

Bodies shall be manufactured from carbon steel or stainless steel that meets 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 provide an effective joint. Weld-on nipples shall be made of materials classified as suitable for welding.

4.3 Nuts

Nuts 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.

4.4 O-rings

Unless otherwise specified, O-rings for use with petroleum base hydraulic fluids at the pressure and temperature requirements in Clause 5 and Table 1 and O-rings for testing shall be made of NBR (nitrile) with a hardness of (90 ± 5) IRHD, measured in accordance with ISO 48, 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. In those cases where the pressure and temperature requirements of this part of ISO 8434 and/or the hydraulic fluid used in the system differ from those specified in Clause 5 and Table 1, the connector manufacturer shall be consulted to ensure that an appropriate O-ring material is selected.

5 Pressure/temperature requirements

5.1 60° cone connectors in conformance with this part of ISO 8434 made of carbon steel shall meet or exceed without leakage the requirements from a vacuum of 6,5 kPa (0,065 bar) absolute pressure to the maximum working pressures given in Table 1 when used at temperatures between –40 °C and +120 °C. For stud end connectors, the upper limit shall be the lower of the maximum working pressure given in Table 1 and the maximum working pressure for the relevant stud end, i.e. ISO 1179-2, ISO 1179-3 or ISO 6149-3.

IMPORTANT — Because many factors influence the pressure at which a system performs satisfactorily, these values shall not be taken as guaranteed minimums. For every application, it is recommended that sufficient testing be conducted and reviewed by both the user and manufacturer to ensure that required performance levels are met.

5.2 The connector assembly shall meet or exceed all applicable performance requirements given in Clause 15. Testing shall be conducted at room temperature.

5.3 For applications under conditions outside the temperature and/or pressure limits given in Table 1 and 5.1 and 5.2, the manufacturer shall be consulted.

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Table 1 — Maximum working pressures for 60° cone connector ends

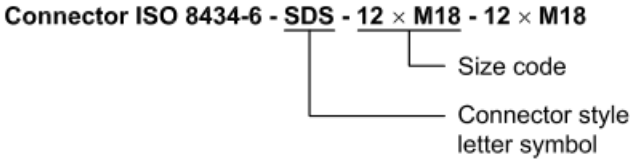
Tube outside diameter	Thread size	Maximum working pressure [a]			
		With O-ring		Without O-ring	
		MPa	(bar)	MPa	(bar)
6	G 1/8 A	—	—	35	(350)
8	G 1/4 A	40	(400)	35	(350)
10	G 3/8 A	40	(400)	35	(350)
12	G 1/2 A	35	(350)	31,5	(315)
16	G 5/8 A	35	(350)	31,5	(315)
20	G 3/4 A	31,5	(315)	25	(250)
25	G 1 A	25	(250)	20	(200)
32	G 1¼ A	20	(200)	16	(160)
38	G 1½ A	16	(160)	12,5	(125)
50	G 2 A	12,5	(125)	8	(80)

[a] See 5.1.

6 Designation of connectors

6.1 Connectors shall be designated by an alphanumeric code to facilitate ordering. They shall be designated by the word "Connector" followed by ISO 8434-6, followed by a spaced hyphen, then the connector style letter symbols (see 6.2), followed by a spaced hyphen and, for the ends, the outside diameter of the tube with which they are being connected, each separated by a multiplication symbol (×). For stud ends (connector ends), another spaced hyphen followed by the thread designation and the sealing type, separated by a multiplication symbol shall be added.

EXAMPLE A straight stud connector (SDS) for use with 12 mm OD tubing with a light-duty (L series) M18 × 1,5 stud end, in accordance with ISO 6149-3, is designated as follows:



6.2 The letter symbol designation of the connector style shall have two parts: the connection end type immediately followed by the shape of the connector. The letters "A" and "B" shall be used to distinguish different styles, where such options exist.

6.3 Tube ends are assumed 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 connectors and reducing elbows shall be designated by specifying the larger tube end first. For reducing swivel-type connectors, the swivel end shall be designated first.

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

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

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

6.8 The following letter symbols shall be used:

Connection end type	**Letter(s)**
Bulkhead	BH
Swivel	SW
Weld-on	WD
Braze-on	BR
Port	P
Stud	SD

Shape	**Letter(s)**
Straight	S
Elbow	E
45° elbow	E45
Tee	T
Run tee	RT
Branch tee	BT
Cross	K
Long	L

Component type	**Letter(s)**
Nut	N
Sleeve	SL
Locknut	LN
Plug	PL
Cap	CP
Nipple	NP
Metric	M
Inch (imperial)	I

7 Requirements for tubes

7.1 The connectors shall be suitable for use with tubes having an outside diameter in accordance with the limits given in Table 2. These limits include ovality.

7.2 Tubing shall comply with the relevant dimensions given in Table 2 and shall be selected in accordance with ISO 10763 for appropriate nominal working pressures.

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Table 2 — Tube sizes

Tube outside diameter	Limits of outside diameter	
	mm	
mm	min.	max.
6	5,9	6,1
8	7,9	8,1
10	9,9	10,1
12	11,9	12,1
16	15,9	16,1
20	19,9	20,1
25	24,9	25,1
30	29,85	30,15
38	37,85	38,15
50	49,8	50,2

7.3 Carbon steel tubes shall comply with delivery condition R37 NBK, as specified in ISO 3304 (cold-drawn and normalized) or ISO 3305 (cold-drawn and normalized).

8 Across-flats dimensions and tolerances

8.1 The dimensions across flats of elbow and tee connectors shall have a minus tolerance only. For sizes up to and including 24 mm, tolerances for across-flats dimensions for forgings shall be $^{-0,8}_{0}$ mm, and for sizes larger than 24 mm, they shall be $^{-1}_{0}$ mm. The basic forging size may be increased up to the maximum size shown for barstock, but the size selected shall be a metric across-flat size with minus tolerance only.

8.2 Hex tolerances across flats shall be in accordance with ISO 4759-1, 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. 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 $^{-0,4}_{0}$ mm.

9 Design

9.1 Connectors

The connectors shall conform to the requirements given in Figures 2 through 33 and Tables 3 through 21. They shall be designed so that resistance to flow is reduced to a minimum.

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.

9.3 Passage tolerances

Where passages in straight connectors 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.

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9.4 Angular tolerances

Angular tolerances on the end axis on elbows, tees and crosses shall be ± 2,5° for tube sizes up to and including 10 mm 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 Tables 5 to 21 are maintained. Wrench flats on elbows and tees shall conform to the dimensions 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

These connectors are intended for connection of plain end tubes and hose fittings to ports in accordance with ISO 6149-1 and ISO 1179-1. 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 shall not be used for new designs in hydraulic fluid power applications.

10 Screw threads

10.1 60° cone connection ends

The screw threads on the 60° cone connection ends shall be pipe threads in accordance with class A of ISO 228-1.

10.2 **Stud ends** (connection ends)

The screw threads for the stud ends of connectors shall be chosen from ISO 261 for ISO 6149-3 and ISO 228-1 (class A) for ISO 1179-2 and ISO 1179-3.

11 Manufacture

11.1 Construction

Carbon steel connectors made from multiple components shall be bonded together with materials having a melting point of not less than 1 000 °C.

11.2 Workmanship

Workmanship shall conform to the best commercial practice to produce high-quality connectors. Connectors 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 function of the parts. All machined surfaces shall have a maximum surface roughness value of $Ramax$ equal to 6,3 µm, except where otherwise specified.

11.3 Finish

The external surface and threads on all connectors, except braze-on type components and weld-on nipples, 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 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 can be mechanical deformation of the plating or coating typical of mass-produced parts or shipping effects;

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— areas where there is a 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.

Fluid passages shall be excluded from the plating and/or coating requirements but shall be protected from rust.

Braze-on type connectors, braze sleeves and weld nipples shall be protected from corrosion by an oil film or phosphate coating or by another method that does not negatively affect their ability to be welded or brazed.

Parts manufactured in accordance with this part of ISO 8434 shall not be cadmium plated. Changes in plating can affect assembly torques and require requalification, when applicable.

11.4 Connector protection

By a method agreed upon between manufacturer and user, the face of the connectors and threads (both internal and external) shall be protected by the manufacturer from nicks and scratches that can be detrimental to the function of the connector. Passages shall be securely covered to prevent the entrance of dirt or other contaminants. Covers that contribute to contamination shall not be used.

Braze-on type connectors require protection on the sealing face and threaded end only. Nuts and sleeves that are furnished separately from the connector shall be protected from rust but do not require capping.

11.5 Corners

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

12 Assembly instruction

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

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

— details relating to material and quality of suitable tubes;

— details concerning the preparation of the selected tube;

— details concerning the attachment of the braze sleeve and weld nipple to the tube;

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

— recommendations regarding the tools to be used for assembly.

13 Procurement information

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

— description of connector;

— material of connector;

— material and size of tube;

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— fluid to be conveyed;

— maximum working pressure;

— fluid working temperature range;

— ambient temperature range.

14 Marking of components

Connector bodies and nuts shall be permanently marked with the manufacturer's name, trademark or code identifier, unless otherwise agreed upon by the user and manufacturer.

15 Performance and qualification test

15.1 Performance requirements

15.1.1 Special requirements

The connectors shall be tested at the lower of the test pressures specified in Table 3 or in the standard for the relevant stud end, i.e. ISO 1179-2, ISO 1179-3 or ISO 6149-3. All components requiring copper brazing for assembly shall be processed through a 1 000 °C minimum annealing process before burst, cyclic endurance or overtightening testing.

Table 3 — Test pressures for 60° cone connectors

Nominal size	Thread size	Nipple style															
		With O-ring (Style A)								Without O-ring (Style B)							
		Maximum working pressure		Test pressures						Maximum working pressure		Test pressures					
				Proof		Burst		Impulse [a]				Proof		Burst		Impulse [a]	
mm		MPa	(bar)	MPa	(bar)	MPa	(bar)	MPa	(bar)	MPa	(bar)	MPa	(bar)	MPa	(bar)	MPa	(bar)
6	G 1/8 A	—		—		—		—		35	(350)	70	(700)	140	(1 400)	46,6	(466)
8	G 1/4 A	40	(400)	80	(800)	160	(1 600)	53,2	(532)	35	(350)	70	(700)	140	(1 400)	46,6	(466)
10	G 3/8 A	40	(400)	80	(800)	160	(1 600)	53,2	(532)	35	(350)	70	(700)	140	(1 400)	46,6	(466)
12	G 1/2 A	35	(350)	70	(700)	140	(1 400)	46,6	(466)	31,5	(315)	63	(630)	126	(1 260)	41,9	(419)
16	G 5/8 A	35	(350)	70	(700)	140	(1 400)	46,6	(466)	31,5	(315)	63	(630)	126	(1 260)	41,9	(419)
20	G 3/4 A	31,5	(315)	63	(630)	126	(1 260)	41,9	(419)	25	(250)	50	(500)	100	(1 000)	33,2	(332)
25	G 1 A	25	(250)	50	(500)	100	(1 000)	33,2	(332)	20	(200)	40	(400)	80	(800)	26,6	(266)
32	G 1¼ A	20	(200)	40	(400)	80	(800)	26,6	(266)	16	(160)	32	(320)	64	(640)	21,3	(213)
38	G 1½ A	16	(160)	32	(320)	64	(640)	21,3	(213)	12,5	(125)	25	(250)	50	(500)	16,6	(166)
50	G 2 A	12,5	(125)	25	(250)	50	(500)	16,6	(166)	8	(80)	16	(160)	32	(320)	10,6	(106)

[a] Cyclic endurance (impulse) test pressure.

15.1.2 Proof test

For each size and connector, nine test assemblies in accordance with ISO 19879 shall be subjected to the proof test procedure specified in ISO 19879, prior to burst and cyclic endurance tests. They shall not leak at the proof pressures given in Table 3.

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15.1.3 Burst test

Three of the test assemblies that have been subjected to the proof test in 15.1.2 shall be used for the burst test. The test shall be conducted in accordance with the burst test procedure specified in ISO 19879 and at the minimum torque values given in Table 4. The test assemblies shall meet or exceed the minimum required burst pressures given in Table 3.

Table 4 — Qualification test torque requirements

Tube size	Thread size	60° cone connector		
		Torque [a]		Overtorque styles A and B
		N·m, $^{+10}_{0}$ %		N·m, $^{+10}_{0}$ %
mm		Style A	Style B	
6	G 1/8 A	—	10	13
8	G 1/4 A	20	20	25
10	G 3/8 A	35	35	45
12	G 1/2 A	50	60	80
16	G 5/8 A	60	70	90
20	G 3/4 A	85	115	140
25	G 1 A	115	140	170
32	G 1¼ A	190	210	280
38	G 1½ A	240	290	370
50	G 2 A	300	400	500

[a] Refer to ISO 6149-3, ISO 1179-2 or ISO 1179-3 for stud end test torque values.

15.1.4 Cyclic endurance (impulse) test

The remaining six test assemblies that have been subjected to the proof test in 15.1.2 shall be subjected to the cyclic endurance test procedure specified in ISO 19879. The test shall be conducted at the minimum torque values given in Table 4. The test assemblies shall pass a cyclic endurance test for 1 000 000 cycles at the respective impulse pressures given in Table 3.

15.1.5 Vacuum test

For each size and connector style, two test assemblies in accordance with ISO 19879 shall be subjected to the vacuum test procedure specified in ISO 19879. Connectors shall be capable of withstanding a vacuum of 6,5 kPa (0,065 bar) absolute pressure for 5 min without leakage.

15.1.6 Overtightening test

For each size, connector style and swivel nut design, three samples shall be subjected to the overtightening test specified in ISO 19879. Connector swivel nuts shall be capable of withstanding the overtightening qualification test with no indication of failure when torqued to the overtorque values given in Table 4.

15.1.7 Reuse of test samples

Parts used for cyclic endurance, burst or overtightening test shall not be tested further, used or returned to stock.

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15.2 Test data form

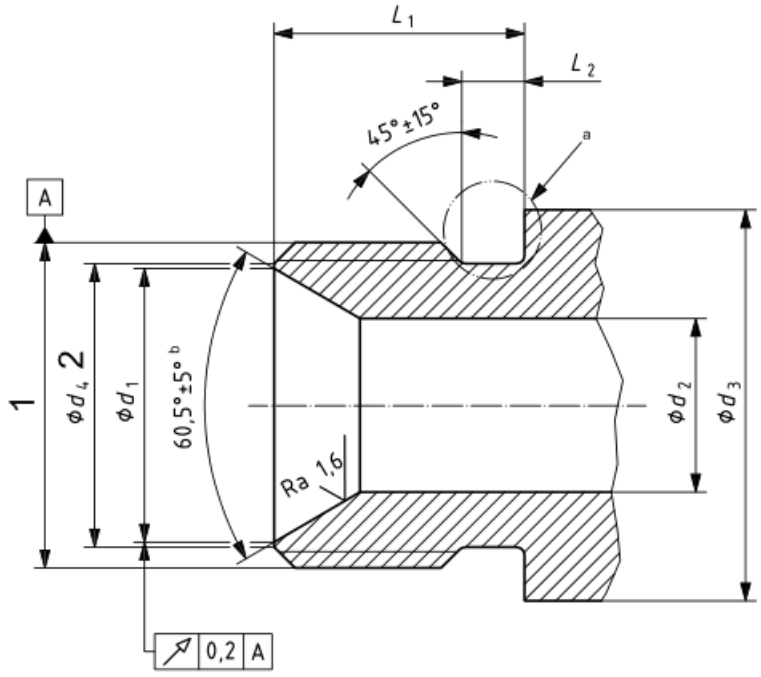
Test data shall be reported in accordance with ISO 19879.

16 Identification statement (reference to this part of ISO 8434)

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

"Dimensions and design for 60° cone connectors conform to ISO 8434-6:2009, *Metallic tube connections for fluid power and general use — Part 6: 60° cone connectors with or without O-ring*."

Surface roughness in micrometres



Key

1 thread

2 thread chamfer

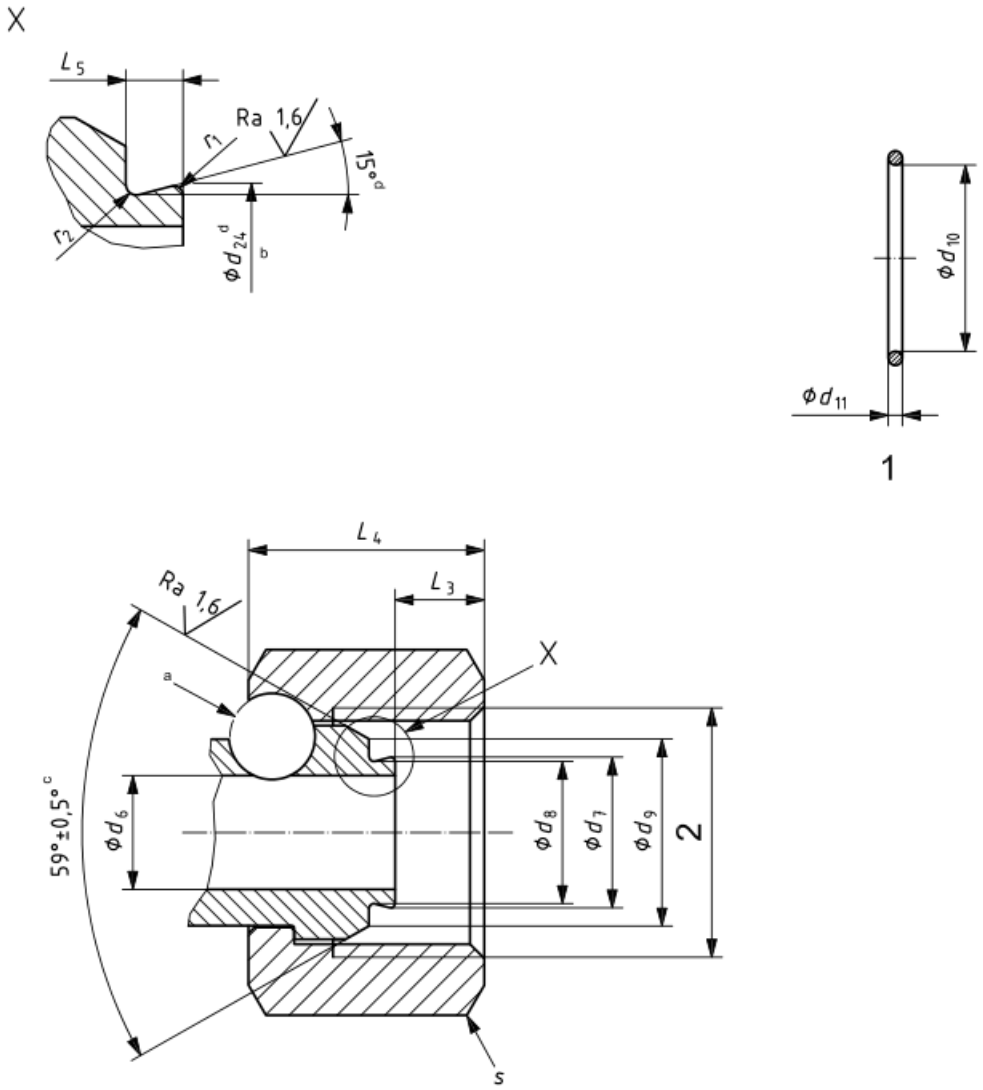
a Preferred undercut; see Figure A.1.

b Surface texture on 60° cone shall be annular.

Figure 2 — Details of end for male connector

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Surface roughness in micrometres



Key

1 O-ring

2 thread

a Method of attachment of the swivel nut is at the option of the manufacturer. Nuts shall be free to rotate.

b Point of intersection.

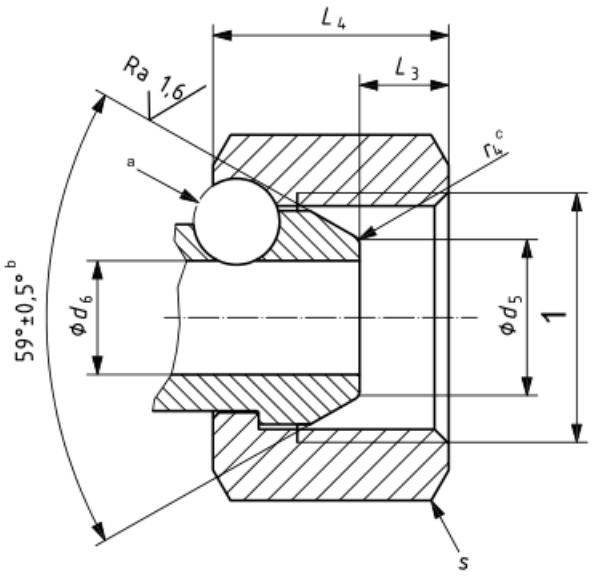
c Surface texture on cone shall be annular.

d Reference.

Figure 3 — Details of female swivel connector with O-ring (style A)

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Surface roughness in micrometres



Key

1 thread

a Method of attachment of the swivel nut is at the option of the manufacturer. Nuts shall be free to rotate.

b Surface texture on cone shall be annular.

c Optional.

Figure 4 — Details of female swivel connector without O-ring (style B)

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Table 5 — Interface dimensions of male and swivel female 60° cone connectors

Dimensions in millimetres

Thread size [a]	Tube size	Dimensions												
		d_1 ± 0,15	d_2 nom.	d_2 tol. ±	d_3 ± 0,15	d_4 ± 0,15	d_5 ± 0,15	d_6 max.	L_1 ± 0,25	L_2 ± 0,25	L_3 ± 0,50	L_4 min.	r_4 ± 0,10	s [b, c]
G 1/8 A	6	7,5	3,5	0,1	8,13	8,35	5,6	3,5	8	2	4,3	5,0	0,30	14
G 1/4 A	8	10,4	4,7	0,1	11,05	11,25	7,2	4,5	11	3	5,2	7,0	0,50	19
G 3/8 A	10	14,0	7,9	0,2	14,48	14,75	10,4	7,1	12	3	6,0	9,0	0,50	22
G 1/2 A	12	17,5	11,1	0,2	18,13	18,35	13,5	9,7	14	4	6,5	10,0	0,50	27
G 5/8 A	16	19,3	14,3	0,2	20,04	20,35	16,8	12,0	16	4	9,7	11,0	1,00	30
G 3/4 A	20	22,9	16,7	0,2	23,6	23,9	19,0	15,5	16	4	8,7	12,0	1,00	32
G 1 A	25	28,7	22,2	0,2	29,82	29,95	24,6	20,4	19	5	10,5	13,0	1,00	41
G 1 1/4 A	32	36,8	28,6	0,2	38,23	38,55	31,1	26,0	20	5	10,1	15,0	1,50	50
G 1 1/2 A	38	42,7	33,3	0,3	44,07	44,45	37,2	30,8	22	5	12,5	15,0	1,50	55
G 2 A	50	54,6	46,0	0,3	55,88	56,3	50,0	43,5	25	5	16,1	18,0	1,50	70

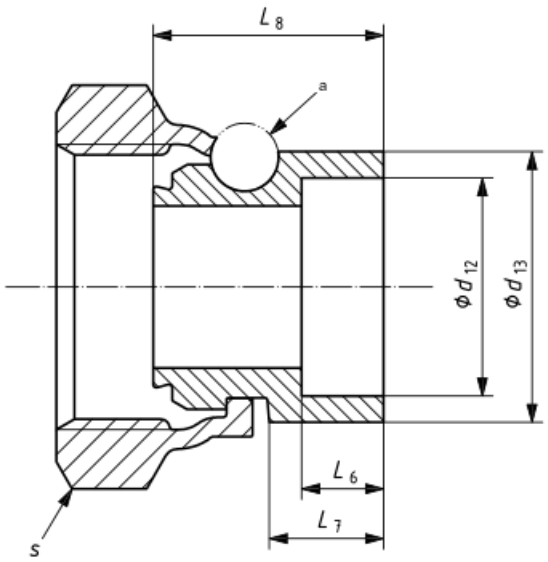
Thread size [a]	Tube size	O-ring groove dimensions							O-ring dimensions			
		d_7 ± 0,05	d_8 ± 0,05	d_9 ± 0,05	d_{24} P.O.I.	L_5 ± 0,05	r_1 ± 0,10	r_2 ± 0,10	d_{10} nom.	d_{10} tol.	d_{11} nom.	d_{11} tol.
G 1/8 A	6	—	—	—	—	—	—	—	—	—	—	—
G 1/4 A	8	6,72	6,23	8,70	6,84	1,37	0,20	0,2	6,11	± 0,15	1,0	± 0,08
G 3/8 A	10	9,80	9,07	12,90	10,02	2,23	0,36	0,41	8,1	± 0,15	1,6	± 0,08
G 1/2 A	12	12,85	12,13	15,95	13,07	2,23	0,36	0,41	12,1	± 0,20	1,6	± 0,08
G 5/8 A	16	14,90	14,17	18,00	15,12	2,23	0,36	0,41	13,1	± 0,20	1,6	± 0,08
G 3/4 A	20	18,44	17,72	21,55	18,66	2,23	0,36	0,41	17,1	± 0,20	1,6	± 0,08
G 1 A	25	23,59	22,86	26,70	23,81	2,23	0,36	0,41	22,1	± 0,25	1,6	± 0,08
G 1 1/4 A	32	30,51	29,78	33,60	30,73	2,23	0,36	0,41	29,1	± 0,25	1,6	± 0,08
G 1 1/2 A	38	36,68	35,95	39,75	36,90	2,23	0,36	0,41	35,1	± 0,30	1,6	± 0,08
G 2 A	50	49,20	48,47	52,30	49,42	2,23	0,36	0,41	47,37	± 0,30	1,78	± 0,08

[a] In accordance with ISO 228-1.

[b] In accordance with ISO 4759-1, grade C.

[c] Optional s across flats hex 36 for G 3/4 A.

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[a] Method of attachment of the swivel nut is at the option of the manufacturer. Nuts shall be free to rotate.

NOTE 1 For cone and nut detail, see Figure 3 or Figure 4 and Table 5.

NOTE 2 For style A, fit O-ring after brazing.

Figure 5 — Braze-on nipple (BRNP)

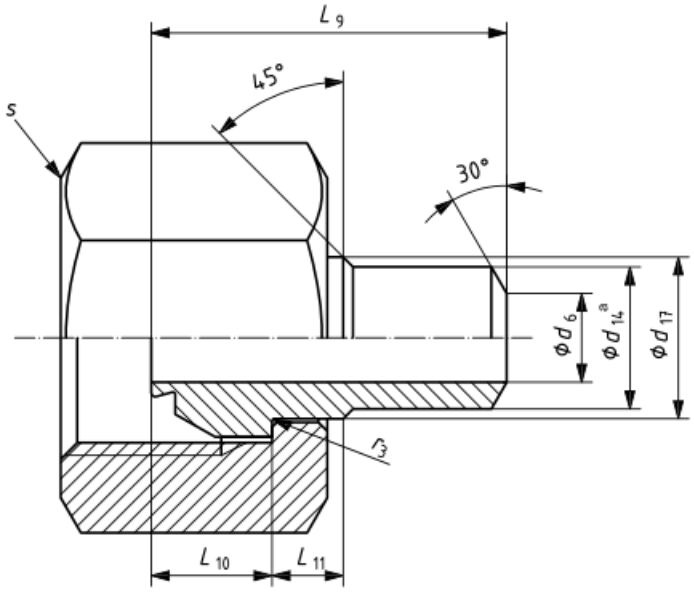
Table 6 — Dimensions of braze-on nipples (BRNP)

Dimensions in millimetres

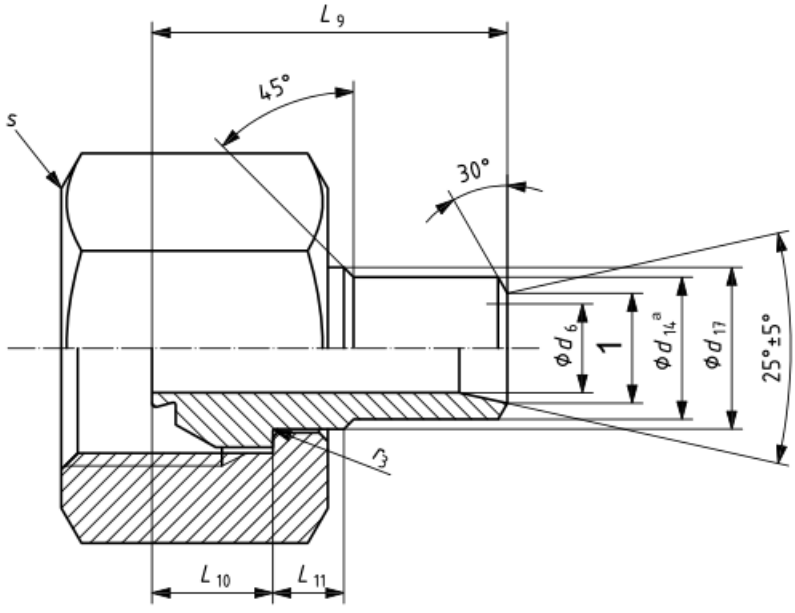
Nipple size	Tube OD	Dimensions [a]				
		d_{12} ± 0,05	d_{13} ± 0,15	L_6 ± 0,5	L_7 ± 0,80	L_8 max.
G 1/8 A	6	6,15	10	8,5	12,5	21,5
G 1/4 A	8	8,15	13	8,5	12,5	24,5
G 3/8 A	10	10,15	16	8,5	12,5	25,5
G 1/2 A	12	12,15	20	8,5	12,5	27,5
G 5/8 A	16	16,15	22	9,0	13,0	28,0
G 3/4 A	20	20,18	26	12,5	17,0	32,0
G 1 A	25	25,18	32	14,0	22,0	39,0
G 11/4 A	32	32,20	40	14,0	22,0	39,0
G 11/2 A	38	38,20	46	14,0	22,0	46,0
G 2 A	50	50,25	60	14,0	22,0	46,0

[a] Dimensions given are for silver brazing; other dimensions can apply for other joining methods.

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a) Type 1



b) Type 2

Key

1 tube inside diameter

[a] Diameter d_{14} is the outside diameter of the selected tube.

NOTE 1 For cone and nut detail, see Figure 3 or Figure 4 and Table 5.

NOTE 2 For style A, fit O-ring after welding.

Figure 6 — Weld-on nipple (WDNP)

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Table 7 — Dimensions of weld-on nipples (WDNP)

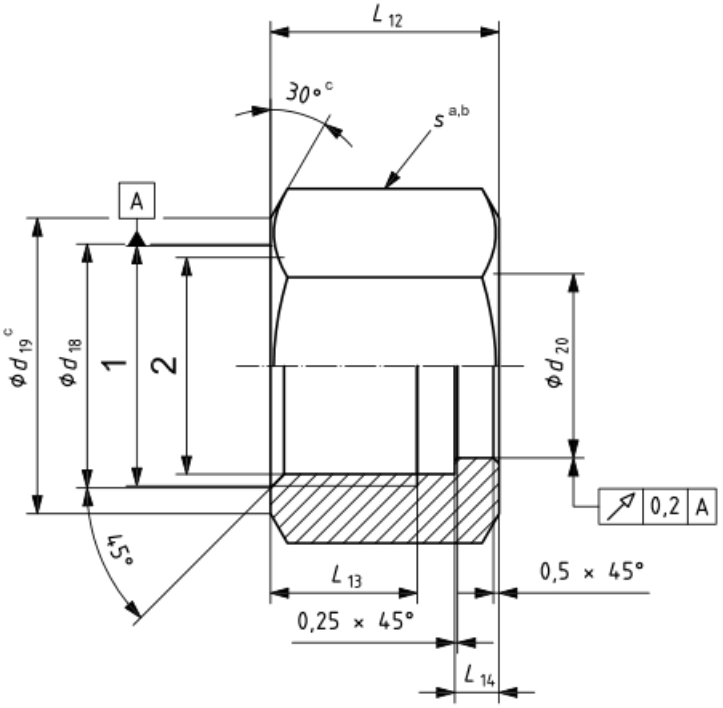
Dimensions in millimetres

Nipple size	Tube OD	Dimensions					
		d_{14} [a] ± 0,1	d_{17} ± 0,1	L_9 ± 0,3	L_{10} ± 0,1	L_{11} ± 0,5	r_3 ± 0,1
G 1/8 A	6	6	6,7	27	4,9	3,5	0,2
G 1/4 A	8	8	9,2	30	6,8	4,6	0,2
G 3/8 A	10	10	12,3	31	7,1	4,6	0,2
G 1/2 A	12	12	15,9	32	8,6	5,1	0,2
G 5/8 A	16	16	18,0	35	7,4	5,5	0,25
G 3/4 A	20	20	21,5	40	8,4	5,8	0,25
G 1 A	25	25	27,8	45	9,9	5,8	0,25
G 11/4 A	32	32	36,2	48	11,3	5,8	0,4
G 11/2 A	38	38	41,8	59	16,8	5,8	0,4
G 2 A	50	50	53,6	59	16,8	6,0	0,4

[a] Diameter d_{14} is the outside diameter of the selected tube.

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Dimensions in millimetres unless otherwise indicated



Key

1 thread minor diameter

2 thread

[a] Nut are assembled after brazing and protective finish.

[b] Across flats.

[c] Both sides.

Figure 7 — Loose style nut for weld-on nipple

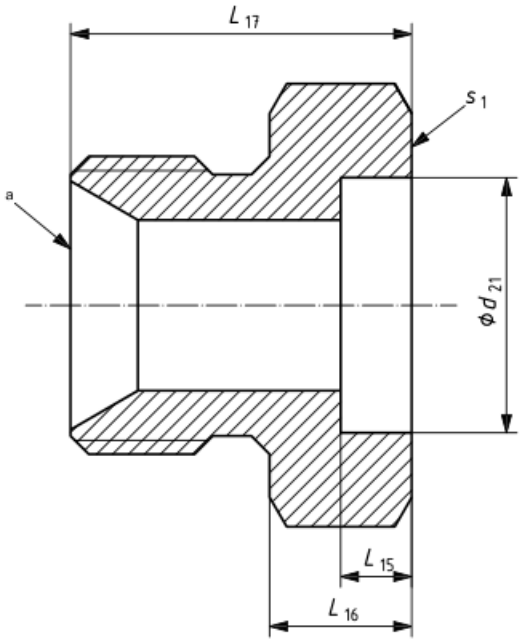
Table 8 — Dimensions of loose style nuts for weld-on nipples

Dimensions in millimetres

Thread size	Tube OD	Thread core diameter		Dimensions						
		nom.	tol.	d_{18} ± 0,15	d_{19} ± 0,30	d_{20} ± 0,10	L_{12} ± 0,25	L_{13} min.	L_{14} ± 0,1	s [a] across flats
G 1/8 A	6	8,8	± 0,1	10,24	13,0	7,0	12,1	6,9	2,6	14
G 1/4 A	8	11,8	± 0,1	13,66	18,0	9,5	15,0	9,2	3,1	19
G 3/8 A	10	15,25	± 0,2	17,17	21,0	12,6	17,0	10,7	3,5	22
G 1/2 A	12	19,05	± 0,2	21,46	26,0	16,2	20,1	12,9	3,9	27
G 5/8 A	16	21,03	± 0,2	23,42	29,0	18,3	21,8	14,2	4,2	30
G 3/4 A	20	24,6	± 0,2	27,20	31,0	21,8	22,6	14,2	4,6	32
G 1 A	25	30,9	± 0,3	33,76	39,5	28,2	27,6	14,2	4,6	41
G 1 1/4 A	32	39,6	± 0,3	42,42	48,5	36,6	27,6	16,5	4,6	50
G 1 1/2 A	38	45,5	± 0,3	48,80	53,5	42,2	35,0	19,4	4,6	55
G 2 A	50	57,15	± 0,3	60,96	68,5	54,1	37,5	21,3	4,9	70

[a] Optional s hex across flats 36 for G 3/4 A.

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[a] For details of each end, see Figure 2 and Table 5.

Figure 8 — Braze-on straight connector (BRS)

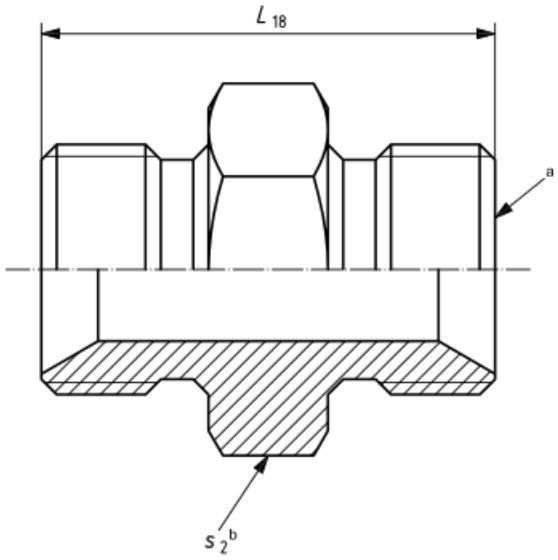
Table 9 — Dimensions of braze-on straight connectors (BRS)

Dimensions in millimetres

Nipple size	Tube OD	Dimensions [a]				
		d_{21} ± 0,05	L_{15} ± 0,5	L_{16} ± 0,80	L_{17} ref.	s_1 min.
G 1/8 A	6	6,15	8,5	12,5	20,5	10
G 1/4 A	8	8,15	8,5	12,5	23,5	14
G 3/8 A	10	10,15	8,5	12,5	24,5	17
G 1/2 A	12	12,15	8,5	12,5	26,5	22
G 5/8 A	16	16,15	9,0	13,0	29,0	24
G 3/4 A	20	20,18	12,5	17,0	33,0	27
G 1 A	25	25,18	14,0	22,0	41,0	36
G 11/4 A	32	32,20	14,0	22,0	42,0	46
G 11/2 A	38	38,20	14,0	22,0	44,0	50
G 2 A	50	50,25	14,0	22,0	47,0	60

[a] Dimensions given are for silver brazing; other dimensions may apply for other joining methods.

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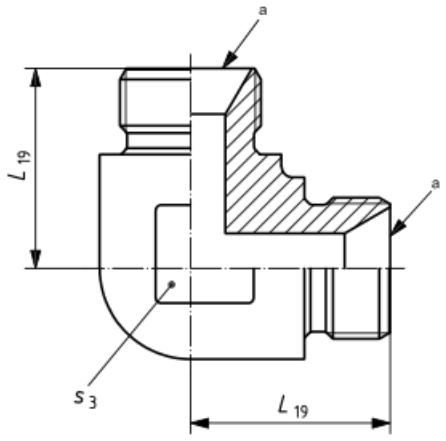
a For details of each end, see Figure 2 and Table 5.

b s_2 is an optional hex size not suitable for use with bonded washer type seals.

NOTE 1 This connector can also be used as a stud connector in association with bonded washer type seals. For maximum working pressure, consult the manufacturer.

NOTE 2 The undercut shown in Figure A.1 and Table A.1 is preferred for bonded washer type seals.

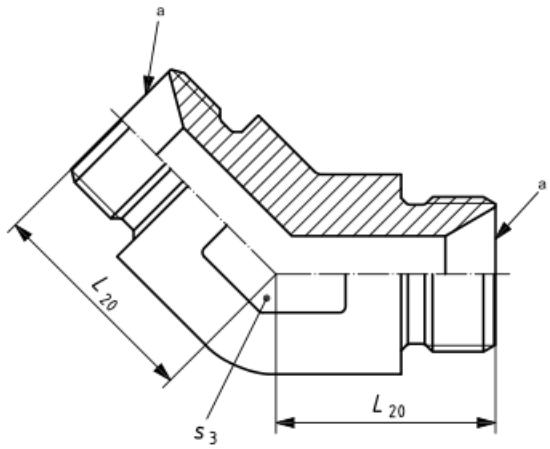
Figure 9 — Straight connector (S)



a For details of each end, see Figure 2 and Table 5.

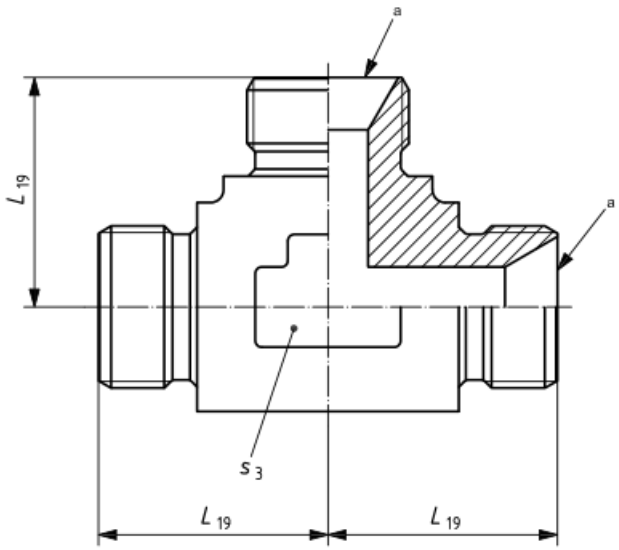
Figure 10 — 90° elbow connector (E)

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a For details of each end, see Figure 2 and Table 5.

Figure 11 — 45° elbow connector (E45)



a For details of each end, see Figure 2 and Table 5.

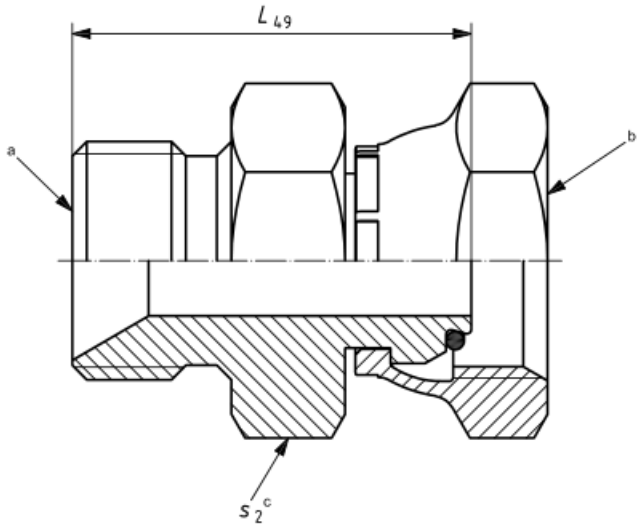
Figure 12 — Male tee connector (T)

Table 10 — Dimensions of straight, elbow and tee connectors

Dimensions in millimetres

Thread	Tube OD	Dimensions					
		L_{18} ± 0,5	L_{19} ± 2	L_{20} ± 2	s_1	s_2	s_3 min.
G 1/8 A	6	21	20	16	14	12	10
G 1/4 A	8	30	26	21	19	17	14
G 3/8 A	10	35	30	24	22	19	17
G 1/2 A	12	42	35	27	27	22	22
G 5/8 A	16	43	38	30	30	24	24
G 3/4 A	20	47	42	32	32	30	27
G 1 A	25	53	47	35	41	36	36
G 11/4 A	32	58	52	37	50	46	46
G 11/2 A	38	62	60	46	55	50	50
G 2 A	50	70	70	57	70	65	60

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a For details, see Figure 2 and Table 5.

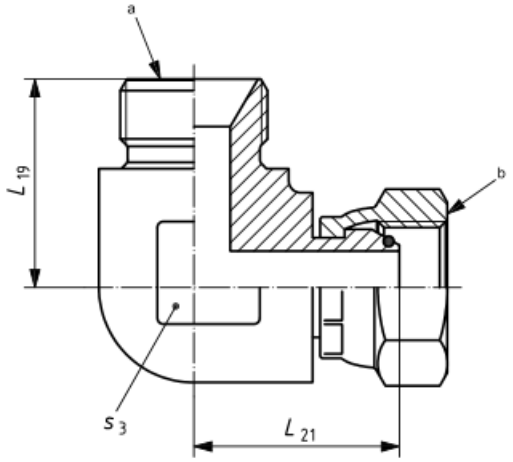
b For details, see Figure 3 or Figure 4 and Table 5.

c s_2 is an optional hex size suitable for bonded washer type seals.

NOTE 1 This connector can also be used as a stud connector in association with bonded washer type seals. For maximum working pressure, consult the manufacturer.

NOTE 2 The undercut shown in Figure A.1 and Table A.1 is preferred for bonded washer type seals.

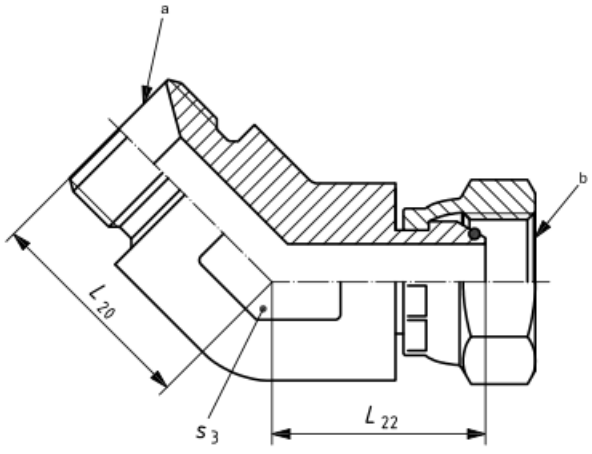
Figure 13 — Straight swivel connector (SWS)



a For details, see Figure 2 and Table 5.

b For details, see Figure 3 or Figure 4 and Table 5.

Figure 14 — 90° swivel elbow connector (SWE)



a For details, see Figure 2 and Table 5.

b For details, see Figure 3 or Figure 4 and Table 5.

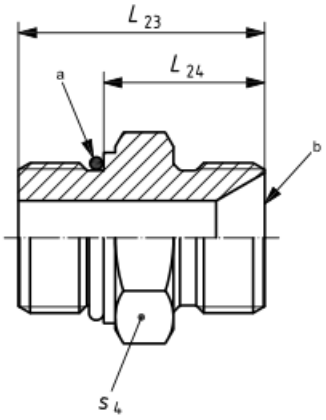
Figure 15 — 45° swivel elbow connector (SWE45)

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Table 11 — Dimensions of swivel connectors

Dimensions in millimetres

Thread	Tube OD	Dimensions							
		L_{19} ± 2	L_{20} ± 2	L_{21} ± 2	L_{22} ± 2	L_{49} ± 0,50	s_1	s_2	s_3 min.
G 1/8 A	6	20	16	20	16	22	14	12	10
G 1/4 A	8	26	21	26	21	31	19	17	14
G 3/8 A	10	30	24	30	25	35	22	19	17
G 1/2 A	12	35	27	35	29	41	27	22	22
G 5/8 A	16	38	30	38	30	42	30	24	24
G 3/4 A	20	42	32	42	30	45	32	30	27
G 1 A	25	47	35	44	32	51	41	36	36
G 1¼ A	32	52	37	49	34	55	50	46	46
G 1½ A	38	60	46	61	47	64	55	50	50
G 2 A	50	70	57	68	55	69	70	65	60

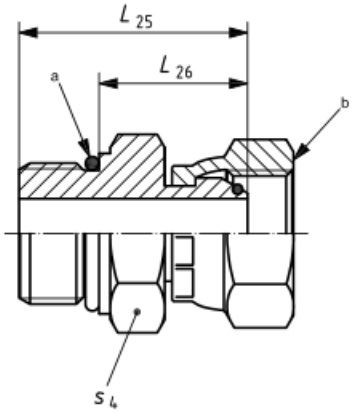


a For details of stud end and undercut for O-ring, see ISO 6149-3.

b For details, see Figure 2 and Table 5.

Figure 16 — Straight stud connector (SDS)

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[a] For details of stud end and undercut for O-ring, see ISO 6149-3.

[b] For details, see Figure 3 or Figure 4 and Table 5.

Figure 17 — Straight stud swivel connector with ISO 6149-3 stud end (SWSDS)

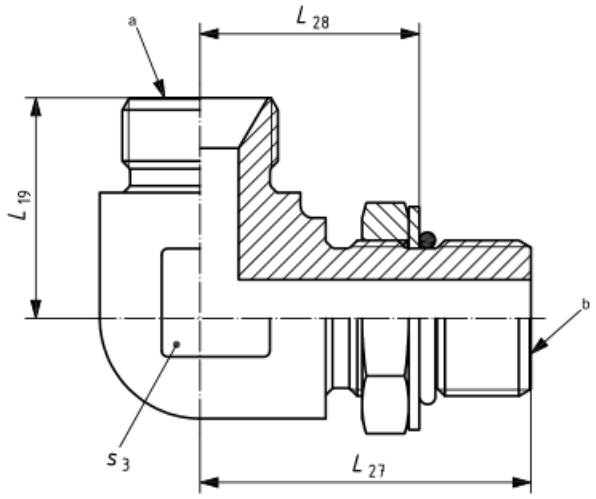
Table 12 — Dimensions of straight stud swivel connectors with ISO 6149-3 stud ends

Dimensions in millimetres

Thread		Tube OD	Dimensions				
60° cone end	ISO 6149-3 end		L_{23} ref.	L_{24} ± 0,5	L_{25} ref.	L_{26} min.	s_4
G 1/8 A	M10 × 1	6	24,0	15,5	24,5	16,0	14
G 1/4 A	M14 × 1,5	8	31,5	20,5	31,9	20,9	19
G 3/8 A	M16 × 1,5	10	34,0	22,5	33,8	22,3	22
G 1/2 A	M18 × 1,5	12	38,0	25,5	37,7	25,2	24
G 5/8 A	M22 × 1,5	16	41,5	28,5	38,3	25,3	27
G 3/4 A	M27 × 2	20	44,5	28,5	42,7	26,7	32
G 1 A	M33 × 2	25	52,0	36,0	48,7	32,7	41
G 1¼ A	M42 × 2	32	55,0	39,0	52,1	36,1	50
G 1½ A	M48 × 2	38	59,5	42,0	60,1	42,6	55
G 2 A	M60 × 2	50	63,5	46,0	61,4	43,9	65

NOTE These connectors are suitable for assembly with ports in accordance with ISO 6149-1.

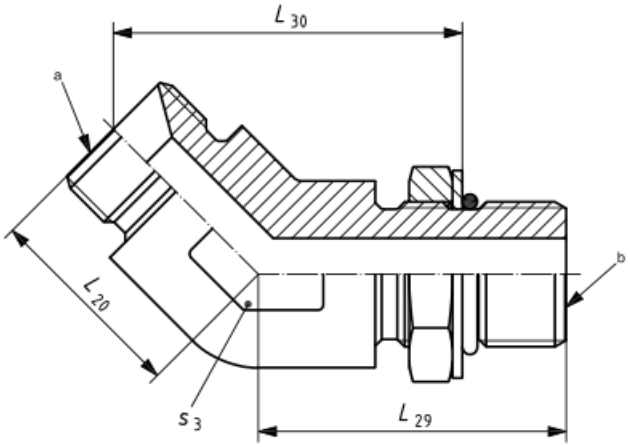
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a For details, see Figure 2 and Table 5.

b For details of adjustable end, see ISO 6149-3.

Figure 18 — 90° adjustable stud elbow connector (SDE)



a For details, see Figure 2 and Table 5.

b For details of adjustable end, see ISO 6149-3.

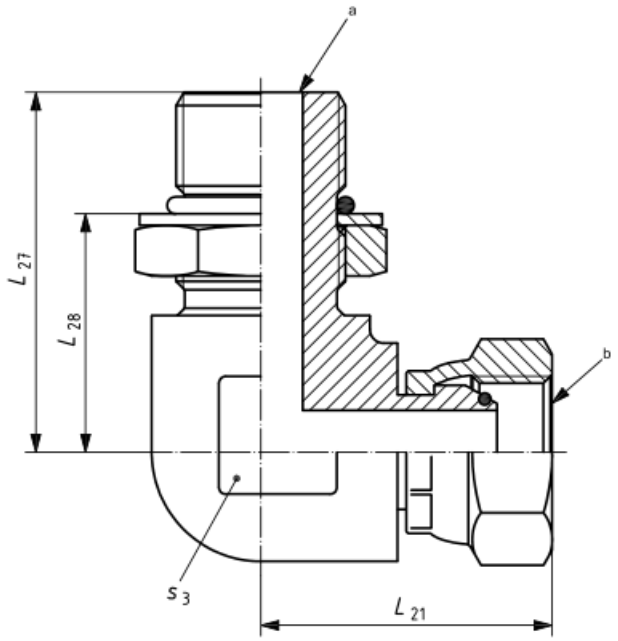
Figure 19 — 45° adjustable stud elbow connector with ISO 6149-3 adjustable stud end (SDE45)

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Table 13 — Dimensions of stud elbow connectors with ISO 6149-3 adjustable stud ends

Dimensions in millimetres

Thread		Tube OD	Dimensions						
60°cone end	ISO 6149-3 end		L_{19} ± 0,2	L_{20} ref.	L_{27} ± 0,2	L_{28} ref.	L_{29} min.	L_{30}	s_3
G 1/8 A	M10 × 1	6	20	16	30	17,4	26	28,7	10
G 1/4 A	M14 × 1,5	8	26	21	37	23,9	32	35,7	14
G 3/8 A	M16 × 1,5	10	30	24	40	24,4	34	39,4	17
G 1/2 A	M18 × 1,5	12	35	27	42	27,2	36	42,5	22
G 5/8 A	M22 × 1,5	16	38	30	46	30,2	38	46,4	24
G 3/4 A	M27 × 2	20	42	32	55	31,7	45	51,8	27
G 1 A	M33 × 2	25	47	35	57	36,2	45	53,9	36
G 1¼ A	M42 × 2	32	52	37	61	40,2	46	56,4	46
G 1½ A	M48 × 2	38	60	46	69	50,7	55	70,2	50
G 2 A	M60 × 2	50	70	57	76	58,7	63	86,0	60
NOTE These connectors are suitable for assembly with ports in accordance with ISO 6149-1.									

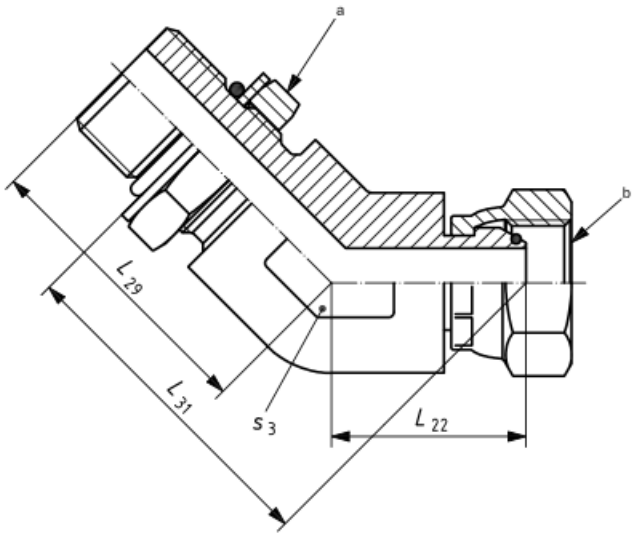


a For details of adjustable end, see ISO 6149-3.

b For details, see Figure 3 or Figure 4 and Table 5.

Figure 20 — 90° swivel adjustable stud elbow connector with ISO 6149-3 adjustable stud end (SWSDE)

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[a] For details of adjustable end, see ISO 6149-3.

[b] For details, see Figure 3 or Figure 4 and Table 5.

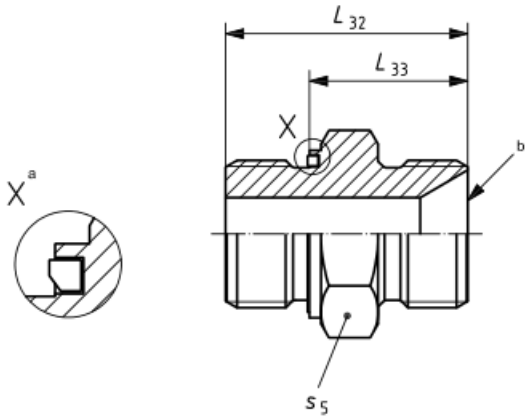
Figure 21 — 45° swivel adjustable stud elbow connector with ISO 6149-3 adjustable stud end (SWSDE45)

Table 14 — Dimensions of swivel elbow connectors with ISO 6149-3 adjustable stud ends

Dimensions in millimetres

Thread		Tube OD	Dimensions						
60° cone end	ISO 6149-3 end		L_{21} ± 0,2	L_{22} ± 0,2	L_{27} ref.	L_{28} ref.	L_{29} ref.	L_{31} ref.	s_3 min.
G 1/8 A	M10 × 1	6	20	16	30	17,4	26	28,7	10
G 1/4 A	M14 × 1,5	8	26	21	37	23,9	32	35,7	14
G 3/8 A	M16 × 1,5	10	30	25	40	24,4	34	40,1	17
G 1/2 A	M18 × 1,5	12	35	29	42	27,2	36	43,9	22
G 5/8 A	M22 × 1,5	16	38	30	46	30,2	38	46,4	24
G 3/4 A	M27 × 2	20	42	30	55	31,7	45	50,4	27
G 1 A	M33 × 2	25	44	32	57	36,2	45	51,8	36
G 11/4 A	M42 × 2	32	49	34	61	40,2	46	54,2	46
G 11/2 A	M48 × 2	38	61	47	69	50,7	55	70,9	50
G 2 A	M60 × 2	50	68	55	76	58,7	63	84,6	60
NOTE These connectors are suitable for assembly with ports in accordance with ISO 6149-1.									

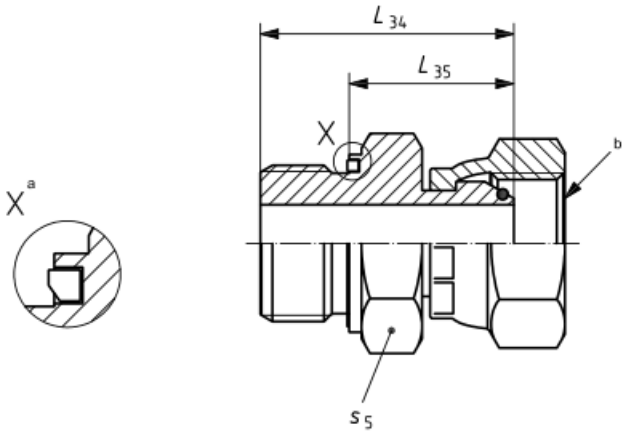
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[a] For details of stud end and undercut for seal, see ISO 1179-2.

[b] For details, see Figure 2 and Table 5.

Figure 22 — Straight stud connector with ISO 1179-2 type E stud end (L series) (SDS)



[a] For details of stud end and undercut for seal, see ISO 1179-2.

[b] For details, see Figure 3 or Figure 4 and Table 5.

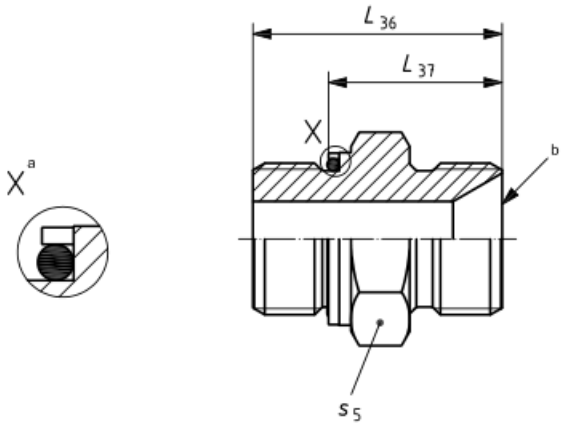
Figure 23 — Straight stud swivel connector with ISO 1179-2 type E stud end (L series) (SWSDS)

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Table 15 — Dimensions of stud connectors with ISO 1179-2 type E stud ends (L series)

Dimensions in millimetres

Thread		Tube OD	Dimensions				
60° cone end	ISO 1179-2 end		L_{32} ± 0,5	L_{33} ref.	L_{34} ± 0,5	L_{35} ref.	s_5
G 1/8 A	G 1/8 A	6	22,5	14,5	23,0	15,0	14
G 1/4 A	G 1/4 A	8	32,0	20,0	32,4	20,4	19
G 3/8 A	G 3/8 A	10	34,5	22,5	34,3	22,3	22
G 1/2 A	G 1/2 A	12	41,0	27,0	40,7	26,7	27
G 3/4 A	G 3/4 A	20	47,0	31,0	45,2	29,2	32
G 1 A	G 1 A	25	54,0	36,0	50,7	32,7	41
G 11/4 A	G 11/4 A	32	59,0	39,0	56,1	36,1	50
G 11/2 A	G 11/2 A	38	64,0	42,0	64,6	42,6	55
NOTE These connectors are suitable for assembly with ports in accordance with ISO 1179-1.							

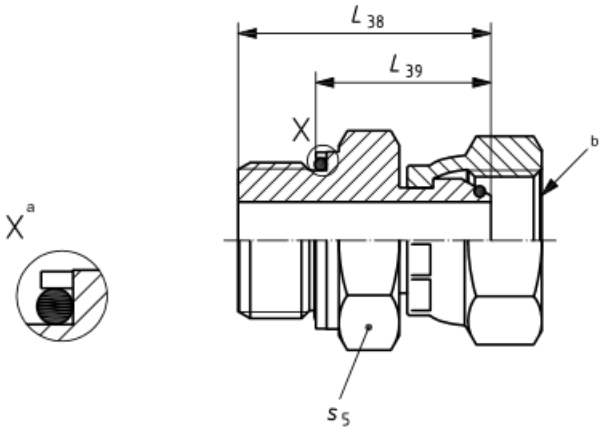


a For details of stud end and undercut for O-ring, see ISO 1179-3.

b For details, see Figure 2 and Table 5.

Figure 24 — Straight stud connector with ISO 1179-3 type G stud end (SDS)

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[a] For details of stud end and undercut for O-ring, see ISO 1179-3.

[b] For details, see Figure 3 or Figure 4 and Table 5.

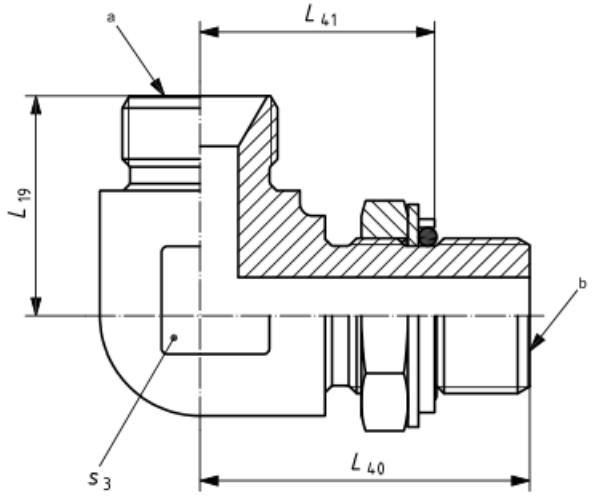
Figure 25 — Straight stud swivel connector with ISO 1179-3 type G stud end (SWSDS)

Table 16 — Dimensions of stud connectors with ISO 1179-3 type G stud ends

Dimensions in millimetres

Thread		Tube OD	Dimensions				
60° cone end	ISO 1179-3 end		L_{36} ref.	L_{37} ± 0,5	L_{38} ref.	L_{39}	s_5
G 1/8 A	G 1/8 A	6	20,6	14,4	21,1	14,9	14
G 1/4 A	G 1/4 A	8	29,2	19,9	29,6	20,3	19
G 3/8 A	G 3/8 A	10	31,2	21,9	31,0	21,7	22
G 1/2 A	G 1/2 A	12	38,4	25,9	38,1	25,6	27
G 3/4 A	G 3/4 A	20	42,4	29,9	40,6	28,1	32
G 1 A	G 1 A	25	51,5	35,6	48,2	32,3	41
G 11/4 A	G 11/4 A	32	54,5	38,6	51,6	35,7	50
G 11/2 A	G 11/2 A	38	57,5	41,6	58,1	42,2	55
NOTE These connectors are suitable for assembly with ports in accordance with ISO 1179-1.							

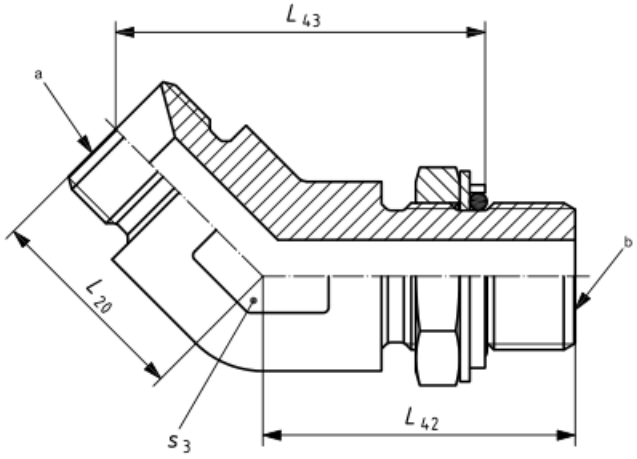
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a For details, see Figure 2 and Table 5.

b For details of adjustable end, see ISO 1179-3.

Figure 26 — 90° adjustable stud elbow connector with ISO 1179-3 type H stud end (SDE)



a For details, see Figure 2 and Table 5.

b For details of adjustable end, see ISO 1179-3.

Figure 27 — 45° adjustable stud elbow connector with ISO 1179-3 type H stud end (SDE45)

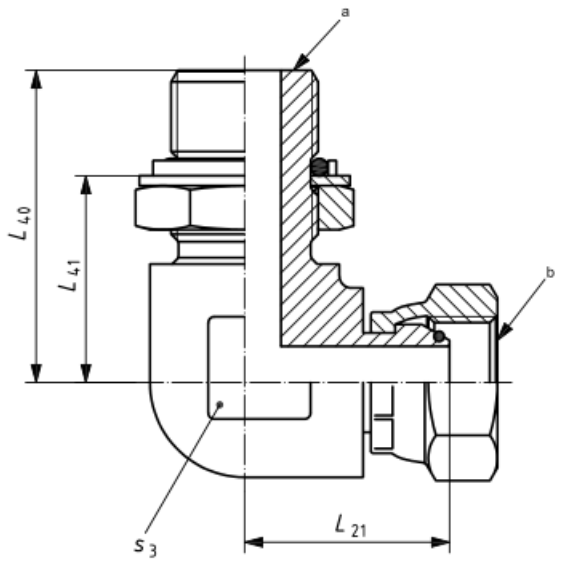
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Table 17 — Dimensions of adjustable stud elbow connectors with ISO 1179-3 type H stud ends

Dimensions in millimetres

Thread		Tube OD	Dimensions						
60° cone end	ISO 1179-3 end		L_{19} ± 2	L_{20} ± 2	L_{40} ± 2	L_{41} ref.	L_{42} ± 2	L_{43} ref.	s_3 min.
G 1/8 A	G 1/8 A	6	20	16	26	17,5	26	28,8	10
G 1/4 A	G 1/4 A	8	26	21	35	23,8	32	35,4	14
G 3/8 A	G 3/8 A	10	30	24	36	24,9	34	39,9	17
G 1/2 A	G 1/2 A	12	35	27	43	28,2	41	45,2	22
G 3/4 A	G 3/4 A	20	42	32	47	31,6	44	51,7	27
G 1 A	G 1 A	25	47	35	54	36,2	48	55,4	36
G 11/4 A	G 11/4 A	32	52	37	59	41,7	49	57,9	46
G 11/2 A	G 11/2 A	38	60	46	70	51,9	56	71,2	50

NOTE These connectors are suitable for assembly with ports in accordance with ISO 1179-1.

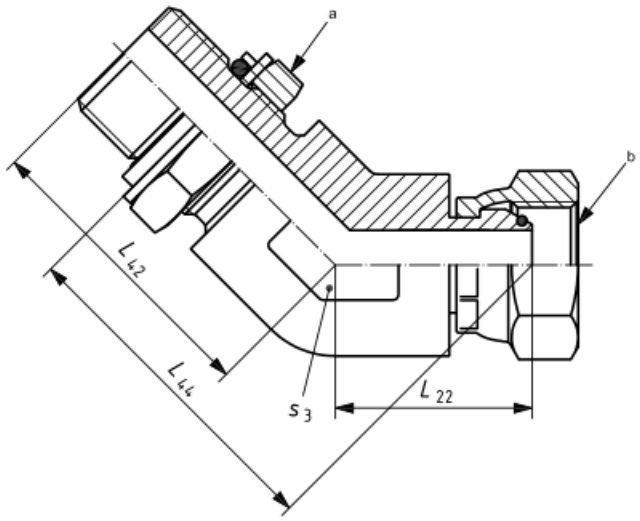


[a] For details of adjustable end, see ISO 1179-3.

[b] For details, see Figure 3 or Figure 4 and Table 5.

Figure 28 — 90° swivel adjustable stud elbow connector with ISO 1179-3 type H stud end (SWSDE)

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[a] For details of adjustable end, see ISO 1179-3.

[b] For details, see Figure 3 or Figure 4 and Table 5.

Figure 29 — 45° swivel adjustable stud elbow connector with ISO 1179-3 type H stud end (SWSDE45)

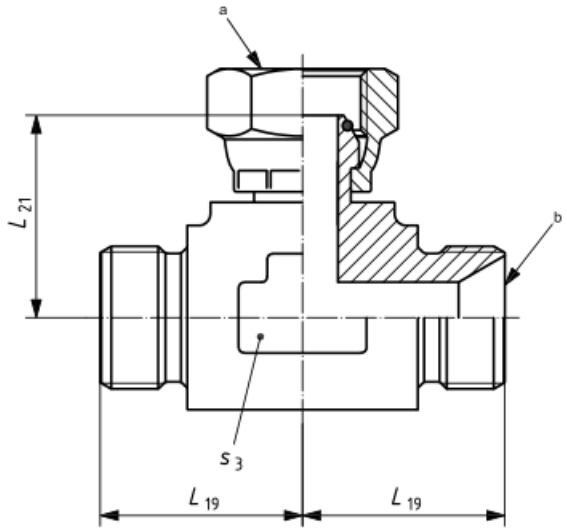
Table 18 — Dimensions of swivel adjustable elbow connectors with ISO 1179-3 type G stud ends

Dimensions in millimetres

Thread		Tube OD	Dimensions						
60° cone end	ISO 1179-3 end		L_{21} ± 2	L_{22} ± 2	L_{40} ref.	L_{41} ref.	L_{42} ref.	L_{44} ref.	s_3 min.
G 1/8 A	G 1/8 A	6	20	21,0	26	17,5	26	34,0	10
G 1/4 A	G 1/4 A	8	26	22,0	35	23,8	32	36,5	14
G 3/8 A	G 3/8 A	10	30	25,5	36	24,9	34	40,5	17
G 1/2 A	G 1/2 A	12	35	29,0	43	28,2	41	46,0	22
G 3/4 A	G 3/4 A	20	42	34,5	47	31,6	44	53,5	27
G 1 A	G 1 A	25	44	38,0	54	36,2	48	58,0	36
G 11/4 A	G 11/4 A	32	49	39,0	59	41,7	49	59,5	46
G 11/2 A	G 11/2 A	38	61	44,0	70	51,9	56	70,5	50

NOTE These connectors are suitable for assembly with ports in accordance with ISO 1179-1.

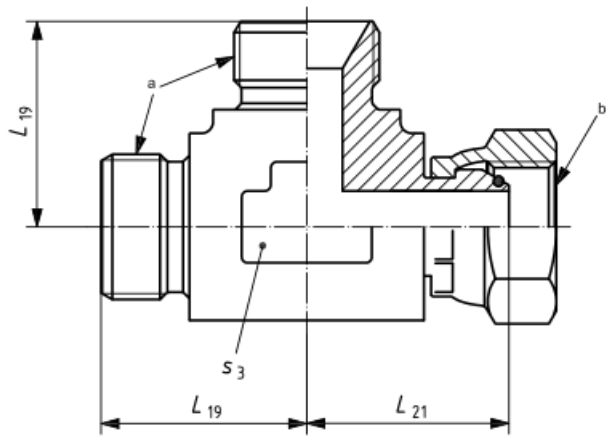
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a For details, see Figure 3 or Figure 4 and Table 5.

b For details, see Figure 2 and Table 5.

Figure 30 — Swivel branch tee connector (SWBT)



a For details, see Figure 2 and Table 5.

b For details, see Figure 3 or Figure 4 and Table 5.

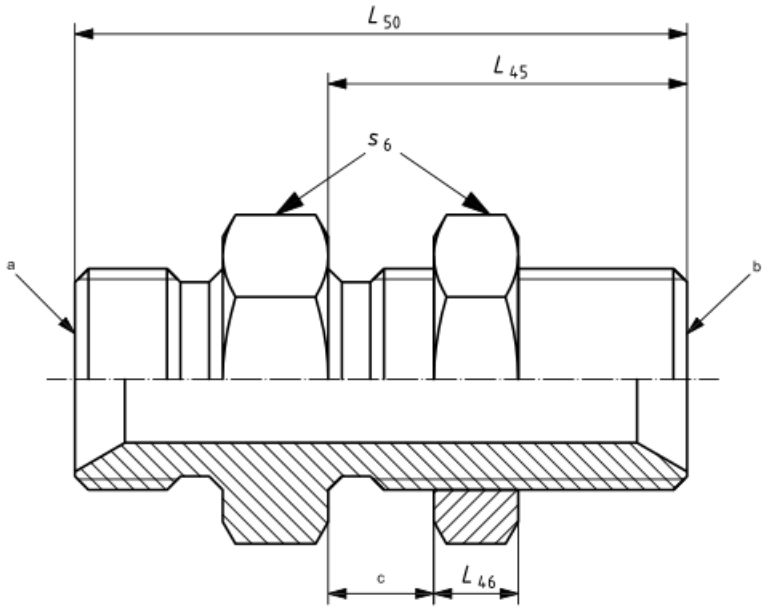
Figure 31 — Swivel run tee connector (SWRT)

Table 19 — Dimensions of swivel tee connectors

Dimensions in millimetres

Thread	Tube OD	Dimensions		
		L_{19} ± 2	L_{21} ± 2	s_3 min.
G 1/8 A	6	20	20	10
G 1/4 A	8	26	20	14
G 3/8 A	10	30	30	17
G 1/2 A	12	35	35	22
G 5/8 A	16	38	38	24
G 3/4 A	20	42	44	27
G 1 A	25	47	49	36
G 1¼ A	32	52	54	46
G 1½ A	38	60	58	50
G 2 A	50	64	62	60

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a For details, see Figure 2 and Table 5.

b For details, see Figure 2, except for thread length, and Table 5.

c 12 mm maximum bulkhead thickness.

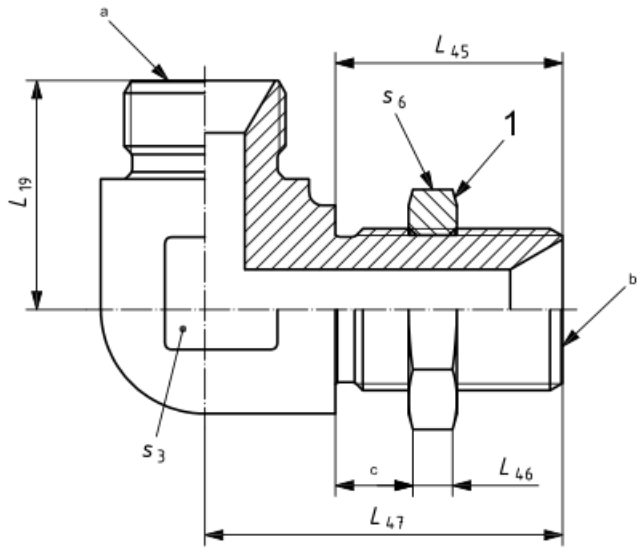
Figure 32 — Straight bulkhead connector (BHS)

Table 20 — Dimensions of straight bulkhead connectors

Dimensions in millimetres

Thread	Tube OD	Dimensions			
		L_{45} ± 0,25	L_{46} ± 0,25	L_{50} ± 0,5	s_6 min.
G 1/8 A	6	25	5	38	14
G 1/4 A	8	29	6	47	19
G 3/8 A	10	31	7	52	22
G 1/2 A	12	34	8	60	27
G 5/8 A	16	37	9	64	30
G 3/4 A	20	37	9	66	32
G 1 A	25	41	10	74	41
G 11/4 A	32	45	13	81	50
G 11/2 A	38	49	15	88	55
G 2 A	50	52	15	95	70

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Key

1 locknut

a For details, see Figure 2 and Table 5.

b For details, see Figure 2, except for thread length, and Table 5.

c 12 mm maximum bulkhead thickness.

Figure 33 — 90° bulkhead elbow connector (BHE)

Table 21 — Dimensions of 90° bulkhead elbow connectors

Dimensions in millimetres

Thread	Tube OD	Dimensions					
		L_{19} ± 2	L_{45} ref.	L_{46} ref.	L_{47} ± 2	s_3 min.	s_6
G 1/8 A	6	20	25	5	37	10	14
G 1/4 A	8	26	29	6	44	14	19
G 3/8 A	10	30	31	7	49	17	22
G 1/2 A	12	35	34	8	55	22	27
G 5/8 A	16	38	37	9	59	24	30
G 3/4 A	20	42	37	9	63	27	32
G 1 A	25	47	41	10	69	36	41
G 11/4 A	32	52	45	13	77	46	50
G 11/2 A	38	60	49	15	87	50	55
G 2 A	50	64	52	15	97	60	70

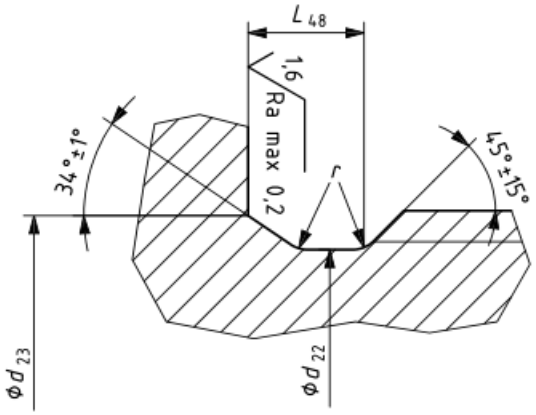
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Annex A
(informative)

Preferred thread undercut details when bonded washer type seal is used

Figure A.1 and Table A.1 provide information about the details of preferred thread undercut when a bonded washer type seal that conforms to this part of ISO 8434 is used instead of an O-ring with connectors.

Dimensions in millimetres unless otherwise indicated



Key

d_{23} major diameter of thread

Figure A.1 — Preferred thread undercut details when a bonded, washer-type seal is used

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Table A.1 — Dimensions of preferred thread undercuts for 60° cone male connectors when used as stud connectors with bonded washer type seals

Dimensions in millimetres

Thread	Tube OD	Dimensions			
		d_{22}	d_{23} ± 0,15	L_{48} ± 0,25	r ± 0,1
G 1/8 A	6	8,25 8,00	9,0	2,54	0,50
G 1/4 A	8	11,18 10,92	13,0	3,81	0,76
G 3/8 A	10	14,60 14,30	16,5	3,81	0,76
G 1/2 A	12	18,29 17,98	20,8	4,82	1,0
G 5/8 A	16	20,19 19,89	22,7	4,82	1,0
G 3/4 A	20	23,75 23,42	26,2	4,82	1,0
G 1 A	25	29,97 29,59	33,0	5,84	1,0
G 1¼ A	32	38,61 38,23	41,7	5,84	1,0
G 1½ A	38	44,45 44,07	47,6	5,84	1,0
G 2 A	50	56,26 55,88	59,4	5,84	1,0

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[2] ISO 286-1, *Geometrical product specifications (GPS) — ISO code system for tolerances of linear sizes — Part 1: Basis of tolerances, deviations and fits* [1)]

[3] ISO 286-2, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*

[4] ISO 1179-4, *Connections for general use and fluid power — Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing — Part 4: Stud ends for general use only with metal-to-metal sealing (type B)*

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[7] ISO 8434-1, *Metallic tube connections for fluid power and general use — Part 1: 24° compression fittings*

[8] ISO 8434-3, *Metallic tube connections for fluid power and general use — Part 3: O-ring face seal connectors*

[9] ISO 12151-6, *Connections for hydraulic fluid power and general use — Hose fittings — Part 6: Hose fittings with ISO 8434-6 60° cone ends* [2)]

1) To be published. (Revision of ISO 286-1:1988)

2) To be published.

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