

First edition
2009-08-15

Corrected version
2010-05-01

**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*

[ISO 8434-6:2009](https://standards.iteh.ai/catalog/standards/sist/25bd7e9c-f16e-4f3c-a531-4bd7d533b585/iso-8434-6-2009)

<https://standards.iteh.ai/catalog/standards/sist/25bd7e9c-f16e-4f3c-a531-4bd7d533b585/iso-8434-6-2009>



Reference number
ISO 8434-6:2009(E)

© ISO 2009

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 8434-6:2009

<https://standards.iteh.ai/catalog/standards/sist/25bd7e9c-f16e-4f3c-a531-4bd7d533b585/iso-8434-6-2009>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2009

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction.....	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Materials	3
4.1 General	3
4.2 Connector bodies	4
4.3 Nuts	4
4.4 O-rings	4
5 Pressure/temperature requirements	4
6 Designation of connectors	5
7 Requirements for tubes	6
8 Across-flats dimensions and tolerances	7
9 Design	7
9.1 Connectors	7
9.2 Dimensions	7
9.3 Passage tolerances	7
9.4 Angular tolerances	8
9.5 Contour details	8
9.6 Ports and stud ends	8
10 Screw threads	8
10.1 60° cone connection ends	8
10.2 Stud ends (connection ends).....	8
11 Manufacture	8
11.1 Construction	8
11.2 Workmanship	8
11.3 Finish	8
11.4 Connector protection	9
11.5 Corners	9
12 Assembly instruction	9
13 Procurement information.....	9
14 Marking of components	10
15 Performance and qualification test	10
15.1 Performance requirements	10
15.2 Test data form	12
16 Identification statement (reference to this part of ISO 8434)	12
Annex A (informative) Preferred thread undercut details when bonded washer type seal is used	38
Bibliography.....	40

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 8434-6:2009

<https://standards.iteh.ai/catalog/standards/sist/25bd7e9c-fl6e-4f3c-a531-4bd7d533b585/iso-8434-6-2009>

This corrected version of ISO 8434-6:2009 incorporates the following corrections:

— In Figure 2, the tolerance on the 60,5° angle has been corrected from “± 5°” to “± 0,5°”.

— In Figure 7, key item 1, “thread minor diameter” has been corrected to “thread major diameter”.

— In Table 13, a “ref.” tolerance has been added to dimension L_{30} and a “min.” tolerance has been added to dimension s_3 .

— In Table 16, the tolerances for four of the five dimensions have been corrected.

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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO 8434-6:2009](https://standards.iteh.ai/catalog/standards/sist/25bd7e9c-f16e-4f3c-a531-4bd7d533b585/iso-8434-6-2009)

<https://standards.iteh.ai/catalog/standards/sist/25bd7e9c-f16e-4f3c-a531-4bd7d533b585/iso-8434-6-2009>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 8434-6:2009

<https://standards.iteh.ai/catalog/standards/sist/25bd7e9c-f16e-4f3c-a531-4bd7d533b585/iso-8434-6-2009>

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

<https://standards.iteh.ai/catalog/standards/sist/25bd7e9c-f16e-4f3c-a531-4bd7d533b585/iso-8434-6-2009>

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*

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 8434-6:2009](https://standards.iteh.ai/catalog/standards/sist/25bd7e9c-f16e-4f3c-a531-4bd7d533b585/iso-8434-6-2009)

[ISO 5598:2008, 3.2.313] <https://standards.iteh.ai/catalog/standards/sist/25bd7e9c-f16e-4f3c-a531-4bd7d533b585/iso-8434-6-2009>

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

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).

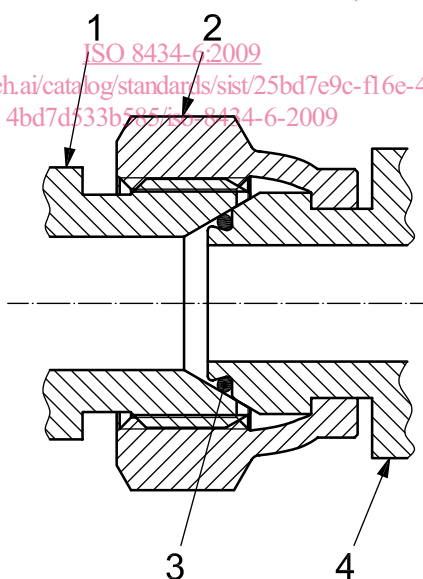
3.10**non-adjustable stud end**

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.

iteh STANDARD PREVIEW
(standards.iteh.ai)
ISO 8434-6:2009
<https://standards.iteh.ai/catalog/standards/sist/25bd7e9c-f16e-4f3c-a531-4bd7d533b785/iso-8434-6-2009>

**Key**

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

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

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.

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 1 1/4 A	20	(200)	16	(160)
38	G 1 1/2 A	16	(160)	12,5	(125)
50	G 2 A	12,5	(125)	8	(80)

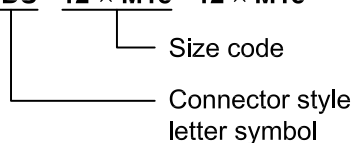
^a See 5.1.

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:

Connector ISO 8434-6 - SDS - 12 × M18 - 12 × M18



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.

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/25bd7e9c-f16e-4f3c-a531-4bd7d533b585/iso-8434-6-2009>

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.

Table 2 — Tube sizes

Tube outside diameter mm	Limits of outside diameter 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).

iTeh STANDARD PREVIEW (standards.iteh.ai)

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 $\pm 0,4$ 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.