

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.

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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

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- British Iron and Steel Producers' Association
- Engineering Equipment and Materials Users' Association

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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.

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- 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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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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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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 EC/ISS/TC 29, Steel tubes and fittings for steel tubes, the Secretariat 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 bar¹⁾). 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 seating — 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 seating — 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*.

¹⁾ 1 bar = 0,1 MPa = 10⁵ Pa; 1 MPa = 1 N/mm².

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

³⁾ To be published.

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

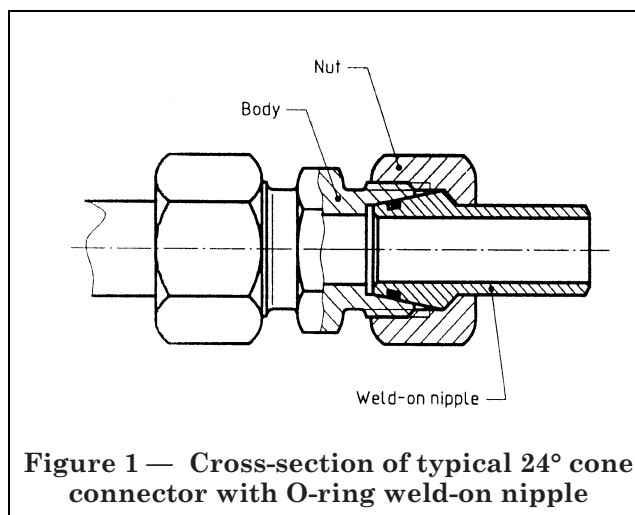
3.8

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.



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 $+100\text{ °C}$.

⁴⁾ To be published.

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 $-35\text{ }^{\circ}\text{C}$ and $+100\text{ }^{\circ}\text{C}$.

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 mm	Working pressure	
		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 ($\times$) 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 $M18 \times 1,5$ stud end in accordance with ISO 6149-2 (S series), is designated as follows:

ISO 8434-4 – SDS – S12 $\times$ 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