

Implementation of
ISO 8434-3:1995

Metallic tube connections for fluid power and general use —

Part 3: O-ring face seal fittings

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- Association of British Mining Equipment Companies
- British Compressed Air Society
- British Fluid Power Association
- British Hydromechanics Research Association
- British Steel Industry
- Department of Trade and Industry (National Engineering Laboratory)
- Ministry of Defence
- University of Bath

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

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

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National foreword

This British Standard reproduces verbatim ISO 8434-3:1995 and implements it as the UK national standard.

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

- aid enquirers to understand the text;
- present to the responsible international committee any enquiries on interpretation, or proposals for change, and keep UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the ISO title page, pages ii to iv, pages 1 to 26 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

INTERNATIONAL STANDARD

ISO
8434-3

First edition
1995-02-15

Metallic tube connections for fluid power and general use —

Part 3: O-ring face seal fittings

*Raccords de tubes métalliques pour transmissions hydrauliques et
pneumatiques et applications générales —*

Partie 3: Raccords à joints faciaux toriques



Reference number
ISO 8434-3:1995(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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 8434-3 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 degree compression fittings;
- Part 2: 37 degree flared fittings;
- Part 3: O-ring face seal fittings;
- Part 4: 24 degree cone connectors with O-ring weld-on nipples;
- Part 5: Test methods for threaded hydraulic fluid power connections.

This part of ISO 8434 is based on the USA standard ANSI/SAE J1453. The threads for the O-ring face seal connection are unified inch threads conforming to ISO 725. The inch threads were not changed to metric threads conforming to ISO 261 to allow fittings complying with this part of ISO 8434 to be used in existing applications without requiring a change to tube or hose assemblies. Also, the thread-to-nut overtorque and seal performance have been extensively tested; to change to metric threads would require an extensive test programme at considerable cost without providing any functional improvement. The threads are integral to themselves, fittings of this type match only to themselves, and other than having metric threads, no value in changing could be found. Major international companies that have used these fittings have adopted the design without noting any problems. All wrench flats are dimensioned to be used with ISO standard metric wrenches.

Annex A and Annex B form an integral part of this part of ISO 8434. Annex C and Annex D are for information only.

Descriptors: Hydraulic fluid power, pneumatic fluid power, fluid circuits, pipes (tubes), metal tubes, hoses, pipe joints, pipe fittings, O-ring unions, specifications, materials specifications, manufacturing requirements, dimensions, tests, performance tests, designation, marking

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 O-ring face seal fittings made of steel for tube outside diameters or hose inside diameters of 6 mm to 38 mm, inclusive. These fittings are for use in fluid power and general applications where elastomeric seals can be used to prevent fluid leakage, including leakage caused by variations in assembly procedures.

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

These fittings provide leakproof, full-flow connections in hydraulic systems operating from a vacuum of 6,5 kPa (0,065 bar¹⁾) absolute pressure to the working pressures shown in Table 1. Because many factors influence the pressure at which a system performs satisfactorily, these values should not be understood 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.

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 5.3.

Both metric and inch tubing can be accommodated by changing the sleeve (see Annex C). In the past, these fittings have been used predominantly with inch tubing. For new and future designs, the use of metric tubing is preferred.

This part of ISO 8434 also specifies a performance and qualification test for O-ring face seal fittings.

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

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

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

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 3448:1992, *Industrial liquid lubricants — ISO viscosity classification*.

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

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

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

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

ISO 6508:1986, *Metallic materials — Hardness test — Rockwell test (scales A – B – C – D – E – F – G – H – K)*.

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

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

ISO 6803:1994, *Rubber or plastics hoses and hose assemblies — Hydraulic-pressure impulse test without flexing*.

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

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

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]

3.9 adjustable stud end

stud end connector that allows for fitting orientation before final tightening of the locknut to complete the connection. This type of stud end is typically used on shaped fittings (e.g. tees, crosses and elbows)

3.10 non-adjustable stud end

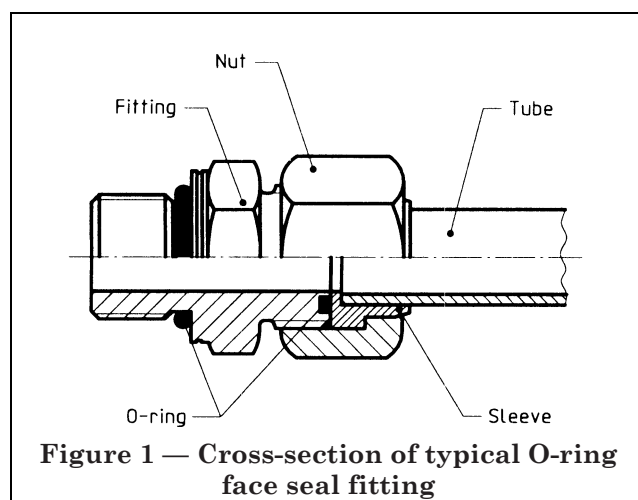
stud end connector that does not require specific orientation before final tightening of the connection because it is only used on straight fittings

4 Requirements for materials

Figure 1 shows the cross-section and component parts of a typical O-ring face seal fitting.

4.1 Fitting bodies

Bodies shall be manufactured from carbon steel or stainless steels that will provide the minimum pressure/temperature requirements specified in clause 5, when tested in accordance with clause 15. 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 sleeves shall be made of materials classified as suitable for welding.



³⁾ To be published.

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. In tube assemblies where sleeves are copper brazed, nuts become annealed, reducing their strength. Nuts for copper brazed assemblies shall be made from suitable, higher-strength material to meet the performance requirements given in 15.1.1. High-strength nuts (style B nuts) shall be identified by a turned diameter, d_{14} , as shown in Figure 4.

4.3 O-rings

Unless otherwise specified, for use at the pressure and temperature requirements given in clause 5 and Table 1 and for testing, the O-rings 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 6 and shall meet or exceed the O-ring quality acceptance criteria for grade N of ISO 3601-3.

5 Pressure/temperature requirements

5.1 O-ring face seal fittings complying with this part of ISO 8434 made of carbon steel or 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 $-20\text{ }^{\circ}\text{C}$ and $+100\text{ }^{\circ}\text{C}$.

5.2 The fitting 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.

6 Designation of fittings

6.1 Fittings shall be designated by an alphanumeric code to facilitate ordering. They shall be designated by ISO 8434-3, followed by a spaced hyphen, then the fitting 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 to be connected. For stud ends (connector ends), a multiplication sign ($\times$) followed by the thread designation of the stud end shall be added.

EXAMPLE

A straight stud fitting (SDS) for use with 12 mm OD tubing with a heavy duty (S series) M18 $\times$ 1,5 stud end, in accordance with ISO 6149-2 is designated as follows:

ISO 8434-3 – SDS – 12 $\times$ 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 The following letter symbols shall be used:

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

Shape	Letter
Straight	S
Elbow	E
45° elbow	E45
Tee	T
Run tee	RT
Branch tee	BT
Cross	K

Component type	Letter
Nut	N
Sleeve	SL
Locknut	LN
Plug	PL
Cap	CP
Nipple	NP
Metric	M
Inch	I