SLOVENSKI STANDARD
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Kovinski cevni priključki za fluidno tehniko in splošno uporabo - 1. del: 24° z zareznim obročkom

Metallic tube connections for fluid power and general use -- Part 1: 24 degree compression fittings

Raccords de tubes métalliques pour transmissions hydrauliques et pneumatiques et applications générales -- Partie 1: Raccords à compression à 24 degrés

Ta slovenski standard je istoveten z: **ISO 8434-1:1994**

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INTERNATIONAL STANDARD

ISO 8434-1

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Metallic tube connections for fluid power and general use —

Part 1:
24° compression fittings

Raccords de tubes métalliques pour transmissions hydrauliques et pneumatiques et applications générales —
Partie 1: Raccords à compression à 24°

Reference number
ISO 8434-1:1994(E)

Contents

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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 8434-1 was prepared jointly by Technical Committees ISO/TC 5, *Ferrous metal pipes and metallic fittings* and ISO/TC 131, *Fluid power systems*, Subcommittee SC 4, *Connectors and similar products and components*.

This first edition, together with ISO 8432-2, cancels and replaces ISO 8434:1986, which has been technically revised.

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 connectors*

Annex A forms an integral part of this part of ISO 8434. Annex B is for information only.

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), tubes and hoses. Tubes are rigid conductors; hoses are flexible conductors.

Metallic tube connections for fluid power and general use —

Part 1:
24° compression fittings

1 Scope

This part of ISO 8434 specifies general and dimensional requirements for the design and performance of 24° compression fittings which are suitable for use with ferrous and non-ferrous tubes with outside diameters from 4 mm to 42 mm, inclusive. These fittings 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 plain end tubes and hose fittings to ports in accordance with ISO 6149-1, ISO 1179-1 and ISO 9974-1.

NOTES

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

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

ISO 261:—[1], *ISO general-purpose metric screw threads — General plan.*

ISO 274:1975, *Copper tubes of circular section — Dimensions.*

ISO 286-2:1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts.*

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

ISO 1179-1:—[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 1: Threaded ports.*

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

2) To be published.

ISO 1179-2:—[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:—[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 3: Light-duty (L series) stud ends with sealing by O-ring with retaining ring (types G and H).*

ISO 1179-4:—[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 4: Stud ends for general use only with metal-to-metal sealing (type B).*

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

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

ISO 9974-1:—[2], *Connections for general use and fluid power — Ports and stud ends with ISO 261 threads with elastomeric or metal-to-metal sealing — Part 1: Threaded ports.*

ISO 9974-2:—[2], *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).*

ISO 9974-3:—[2], *Connections for general use and fluid power — Ports and stud ends with ISO 261 threads with elastomeric or metal-to-metal sealing — Part 3: Stud ends with metal-to-metal sealing (type B).*

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.

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 face-to-face dimension: Distance between the two parallel faces of axially aligned outlets of a fitting.

3.8 face-to-centre dimension: Distance from the face of an outlet to the central axis of an angularly disposed outlet.

3.9 assembly torque: The torque to be applied in order to achieve a satisfactory final assembly.

3.10 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° compression fitting.

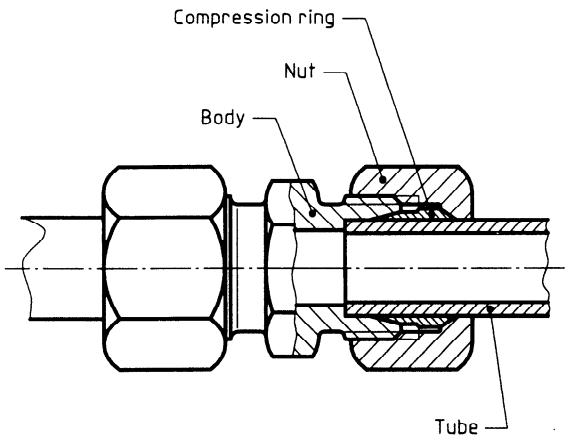


Figure 1 — Cross-section of a typical compression fitting

4.1 Fitting bodies

Bodies shall be manufactured from carbon steel, stainless steels or copper alloys which will provide the minimum requirements for the pressure/temperature ratings specified in clause 5. They shall have characteristics which make them suitable for use with the fluid to be conveyed and to provide an effective joint. Weld fitting types 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. Nuts to be used with copper alloy bodies shall be made of a material similar to the bodies.

4.3 Compression rings

The material of compression rings shall be similar to that of the body and shall be selected by the manufacturer to suit the design and method of manufacture, unless otherwise specified. The ring material shall be compatible with the fluid to be conveyed and provide an effective joint.

5 Pressure/temperature requirements

5.1 Fittings made of carbon steel complying with this part of ISO 8434 shall be suitable for use at the working pressures given in table 1 when used at fluid temperatures between − 20 °C and + 120 °C.

5.2 Fittings made of stainless steel complying with this part of ISO 8434 shall be suitable for use at the working pressures given in table 1 when used at temperatures between − 60 °C and + 200 °C. See table 2 for pressure deratings of fittings made from stainless steel and used at temperatures of + 50 °C and higher.

5.3 Copper alloy fittings shall be suitable for use at the working pressures given in table 1 when used at temperatures between − 40 °C and + 175 °C.

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 three series of fittings. The series are referred to as

LL: extra-light duty

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 and in 5.1 to 5.6 are for tube and hose connections 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 pressure ratings for 24° compression fittings

Series	Tube outside diameter	Working pressure			
		Carbon and stainless steel		Copper alloy	
	mm	MPa	(bar[1)])	MPa	(bar)
LL	4 to 8 incl.	10	(100)	6,3	(63)
L	6 to 15 incl.	25	(250)	16	(160)
	18 to 22 incl.	16	(160)	10	(100)
	28 to 42 incl.	10	(100)	6,3	(63)
S	6 to 12 incl.	63	(630)	40	(400)
	16 to 25 incl.	40	(400)	25	(250)
	30 to 38 incl.	25	(250)	16	(160)

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

1) 1 bar = 10^5 N/m^2 = 10^5 Pa = 0,1 MPa

Table 2 — Pressure deratings for fittings made from stainless steel and used at temperatures outside the range given in 5.2

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

NOTE — Intermediate values may be interpolated.

6 Designation of fittings

6.1 Fittings shall be designated by an alphanumeric code to facilitate ordering. They shall be designated by ISO 8434-1, 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, preceded by a series letter (see 5.5). For stud ends (connector ends), a multiplication sign followed by the thread designation of the stud end and the sealing type shall be added.

EXAMPLE

A fitting with a heavy-duty stud connection end with a G 3/8 A thread in accordance with ISO 1179-4 to be connected to a 12 mm OD tube is designated as follows:

ISO 8434-1 - SDS - S12 × G 3/8 A, type B

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 (figure 2) and reducing elbows (figure 3) shall be designated by specifying the larger tube end first.

6.5 Stud fittings (figure 4) shall be designated by specifying the tube end first, then the thread size for the stud end.

6.6 For tee fittings (figures 5 and 6), 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.

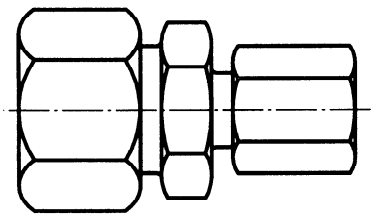
6.9 The following letter symbols shall be used:

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

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

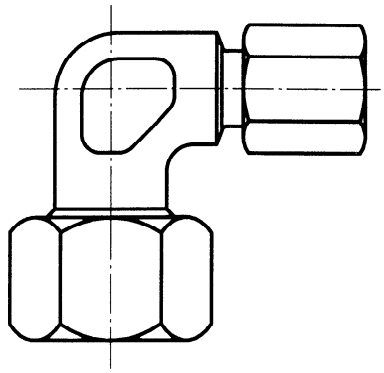
Component type	**Letter**
Nut	N
Sleeve	SL
Cutting ring	CR
Locknut	LN

Examples of compression fittings and designations are given in figures 2 to 6.



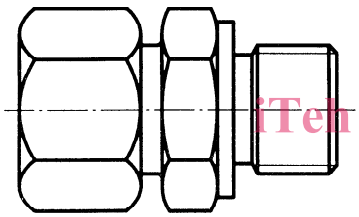
ISO 8434-1 - RES - S20 × S12

Figure 2 — Reducing fitting



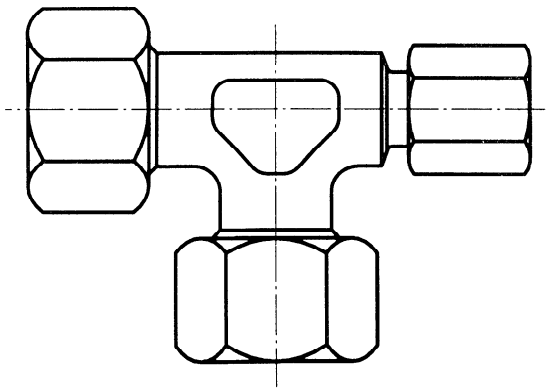
ISO 8434-1 - REE - S20 × S12

Figure 3 — Reducing elbow



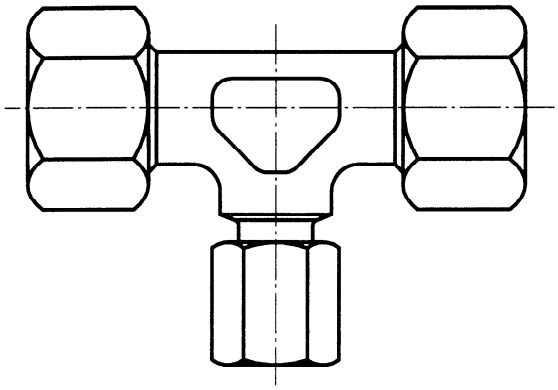
ISO 8434-1 - SDS - S20 × G 3/4 A

Figure 4 — Stud fitting



ISO 8434-1 - RERT - L22 × L12 × L22

Figure 5 — Reducing run tee



ISO 8434-1 - REBT - L22 × L22 × L12

Figure 6 — Reducing branch tee

7 Requirements for tubes

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). Stainless steel tubes shall comply with ISO 1127 (annealed). Copper alloy tubes shall comply with ISO 274 (as-drawn and half-hard).

8 Across-flats dimensions

8.1 The dimensions across flats for nuts and on the bodies of the fittings shall be those given in tables 4 to 11 and tables 13 to 17. For sizes up to and including 24 mm, tolerances for across-flats dimensions shall be $^{0}_{-0,8}$ mm, and for sizes larger than 24 mm they shall be $^{0}_{-1}$ mm.

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

9 Design

9.1 Fittings

The fittings shall conform to the requirements given in figures 7 to 21 and tables 3 to 17. They shall be designed so that resistance to flow is reduced to a minimum.