SLOVENSKI STANDARD
SIST ISO 8434-2:1997

01-februar-1997

Kovinski cevni priključki za fluidno tehniko in splošno uporabo - 2. del: 37° s porobljeno cevjo

Metallic tube connections for fluid power and general use -- Part 2: 37 degree flared fittings

Raccords de tubes métalliques pour transmissions hydrauliques et pneumatiques et applications générales -- Partie 2: Raccords évasés à 37 degrés

Ta slovenski standard je istoveten z: **ISO 8434-2:1994**

ICS:

23.100.40 Cevna napeljava in sklopke Piping and couplings

SIST ISO 8434-2:1997 **en**

INTERNATIONAL STANDARD

ISO 8434-2

First edition
1994-08-15

Metallic tube connections for fluid power and general use —

Part 2:
37° flared fittings

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

Partie 2: Raccords évasés à 37°

ISO

Contents

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

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 8434-2 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 8434-1, 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 of this part of ISO 8434 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 2:
37° flared fittings

1 Scope

This part of ISO 8434 specifies general and dimensional requirements for the design and performance of 37° flared fittings which are suitable for use with ferrous and non-ferrous tubes with outside diameters from 6 mm to 50 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 tubes and hose fittings to ports in accordance with ISO 6149-1, ISO 1179-1 and ISO 11926-1.

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 263:1973, *ISO inch screw threads — General plan and selection for screws, bolts and nuts — Diameter range 0.06 to 6 in.*

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

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

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

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.*

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 3304:1985, *Plain end seamless 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 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 6149-3:1993, *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 6508:1986, *Metallic materials — Hardness test — Rockwell test (scales A - B - C - D - E - F - G - H - K).*

ISO 8434-1:1994, *Metallic tube connections for fluid power and general use — Part 1: 24 degree compression fittings.*

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

ISO 11926-1:—[2], *Connections for general use and fluid power — Ports and stud ends with ISO 725 threads and O-ring sealing — Part 1: Threaded ports.*

ISO 11926-3:—[2], *Connections for general use and fluid power — Ports and stud ends with ISO 725 threads and O-ring sealing — Part 3: Light-duty (L series) stud ends.*

2) To be published.

3 Definitions

For the purposes of this part of ISO 8434, the definitions given in ISO 8434-1 and ISO 5598 and the following definitions apply.

3.1 adjustable stud end: Stud end connector that allows for fitting orientation through 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).

3.2 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 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.

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 Sleeves

Sleeves shall be manufactured from a material similar to the bodies.

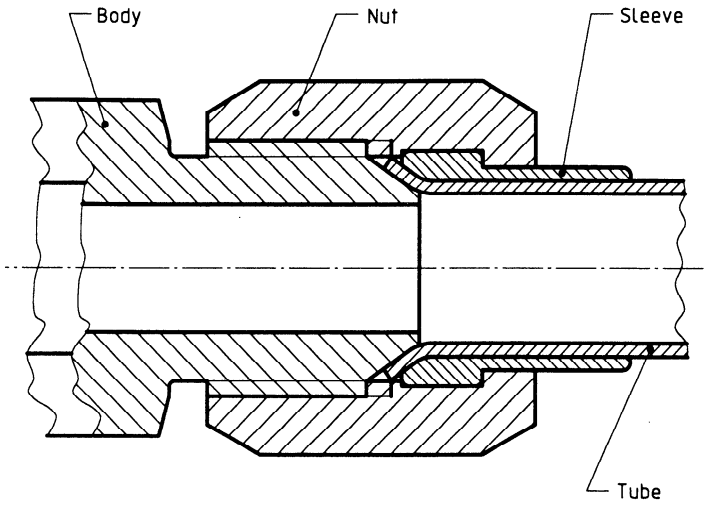


Figure 1 — Cross-section of a typical 37° flared fitting

5 Pressure/temperature requirements

5.1 Flared 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. Such fittings shall be suitable for use in hydraulic systems at temperatures from − 40 °C to + 150 °C.

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

4 % at + 50 °C,

11 % at + 100 °C, and

20 % at + 200 °C.

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 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.

5.6 The pressure/temperature requirements given in table 1 and in 5.1 to 5.5 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 shall apply.

5.7 To achieve these maximum working pressures with a 4:1 design factor, the maximum tubing wall thickness shown in table 1 shall be used.

Table 1 — Working pressures for 37° flared fittings and tubes

Tube outside diameter (OD)			Wall thickness of tube for flaring[1]		Working pressure			
Metric[2]	Inch		Metric tube	Inch tube	Carbon steel and stainless steel		Copper alloy[3]	
mm	in	mm[4]	mm	mm	MPa	(bar)[5]	MPa	(bar)
6	1/4	6,35	1,5	1,65	35	(350)	20	(200)
8	5/16	7,94	1,5	1,65	35	(350)	20	(200)
10	3/8	9,52	1,5	1,65	25	(250)	16	(160)
12	1/2	12,7	2	2,1	25	(250)	16	(160)
16	5/8	15,88	2,5	2,41	20	(200)	12,5	(125)
20	3/4	19,05	3	2,76	20	(200)	12,5	(125)
25	1	25,4	3	3,05	16	(160)	10	(100)
32	1 1/4	31,75	3	3,05	12,5	(125)	8	(80)
38	1 1/2	38,1	3	3,05	10	(100)	6,3	(63)
50	2	50,8	3,5	3,4	8	(80)	5	(50)

NOTE — For dynamic conditions or working pressure applications higher than those given in table 1, the manufacturer shall be consulted.

1) Maximum wall thickness which can be flared, due to fitting design.

2) Metric tubing shall be used for new and future designs.

3) The pressure values for copper alloy fittings and tubes were produced using brass fittings with phosphorized soft annealed copper tubing.

4) Equivalent dimensions in millimetres.

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

6 Designation of fittings

6.1 Fittings shall be designated by an alphanumeric code to facilitate ordering. They shall be designated by ISO 8434-2, 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, each separated by a multiplication sign (×). For stud ends (connector ends), the thread designation of the stud end shall be added.

EXAMPLE

A straight stud fitting with an M16 thread, in accordance with ISO 6149-3, to be connected to a 12 mm OD tube is designated as follows:

ISO 8434-2 - SDS - 12 × M16

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.

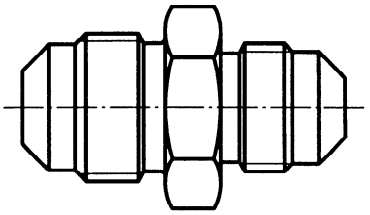
6.8 The following letter symbols shall be used:

Connection end type	Letter
Bulkhead	BH
Swivel	SW
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

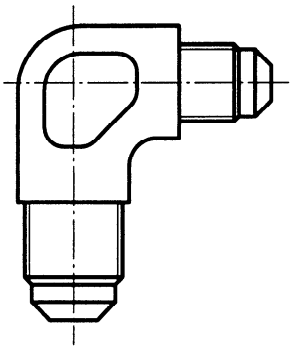
Component type	Letter
Nut	N
Sleeve	SL
Locknut	LN
Plug	PL
Cap	CP
Nipple	NP
Metric	M
Inch	I

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



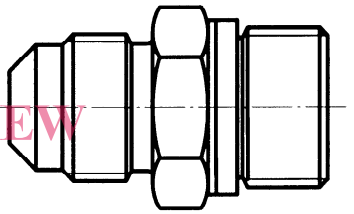
ISO 8434-2 - RES - 20 × 12

Figure 2 — Reducing fitting



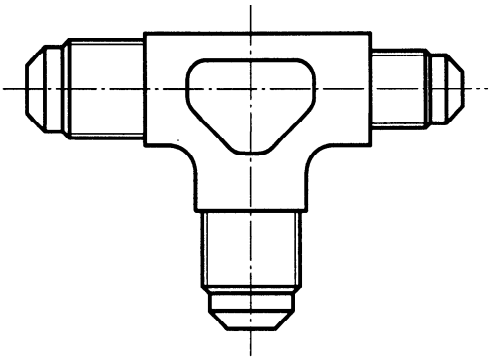
ISO 8434-2 - REE - 20 × 12

Figure 3 — Reducing elbow



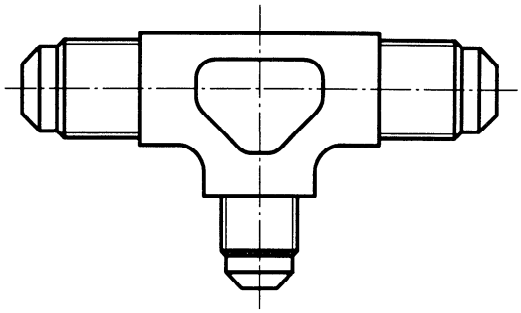
ISO 8434-2 - SDS - 20 × G 3/4 A

Figure 4 — Stud fitting



ISO 8434-2 - RERT - 20 × 12 × 20

Figure 5 — Reducing run tee



ISO 8434-2 - REBT - 20 × 20 × 12

Figure 6 — Reducing branch tee

7 Requirements for tubes

The fittings shall be suitable for use with tubes with limits of outside diameter as given in tables 2 and 3. These limits include ovality.

Metric tubing shall be preferred. Metric and inch tubing shall comply with the relevant dimensions given in tables 1 and 3. All steel tubing to be flared shall comply with delivery condition R37 NBK as specified in ISO 3304 and shall have a minimum elongation of 35 % in 50 mm and a maximum hardness of 65 HRB (see ISO 6508).

Carbon steel tubes shall (except for dimensions of inch tubes) comply with ISO 3304 (cold-drawn and annealed or normalized). Stainless steel tubes shall (except for dimensions of inch tubes) comply with ISO 1127 (cold-drawn and annealed or normalized). Copper alloy tubes shall (except for dimensions of inch tubes) comply with ISO 274 (as-drawn or half-hard).

Table 2 — Metric tube sizes

Tube OD	Limits of OD	
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
32	31,85	32,15
38	37,85	38,15
50	49,8	50,2

NOTE — Metric tubing shall be preferred.

Table 3 — Inch tube sizes

Tube OD		Limits of OD	
in	mm[1)]	mm	
		min.	max.
1/4	6,35	6,25	6,45
5/16	7,94	7,84	8,04
3/8	9,52	9,42	9,62
1/2	12,7	12,60	12,80
5/8	15,88	15,78	15,98
3/4	19,05	18,95	19,15
1	25,4	25,30	25,50
1 1/4	31,75	31,60	31,90
1 1/2	38,1	37,95	38,25
2	50,8	50,60	51,00

1) Equivalent dimensions in millimetres.

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 7 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 20 and tables 4 to 17.

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. The sealing seats of fittings shall be concentric with straight thread pitch diameters within 0,25 mm full indicator movement (FIM).

9.3 Passage tolerances

Where passages in straight fittings are machined from opposite ends, the offset at the meeting point shall