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# International Standard



# 8434

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Hydraulic fluid power — Connection for tubes and hoses — Dimensions and designs for 37° flare and 24° flareless fittings

*Transmissions hydrauliques — Raccordements des tubes et tuyaux — Dimensions et types de raccords à évasement à 37° et à cône à 24°*

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**Descriptors:** hydraulic fluid power, pipes (tubes), hoses, pipe fittings, pipe joints, dimensions, designation.

## Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8434 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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# Hydraulic fluid power — Connection for tubes and hoses — Dimensions and designs for 37° flare and 24° flareless fittings

## 0 Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. Components are connected through their ports by fluid conductor fittings and tubes and by hose fittings. Tubes are rigid conductors; hoses are flexible conductors.

## 1 Scope and field of application

1.1 This International Standard lays down general and dimensional specifications for sealing connections to be applied to fluid power tubes. Two types of connection are dealt with in this International Standard:

- 24° flareless (bite) type fitting;
- 37° flare type fitting.

1.2 This International Standard details only the female half of the 24° flareless (bite) type fitting, leaving each manufacturer to qualify his own mating ferrule that will bite into the tubing outside diameter when tightened with an appropriate mating nut.

1.3 This International Standard also details all the components of the 37° flare fitting type, including the shape and size of the tubing flare. Both metric and inch outside diameter tubing is accommodated by merely changing the most economical component, the sleeve (see annex A). In the past fittings have been predominantly used with inch tubing.

1.4 Both the 24° flareless (bite) and 37° flare fittings can be used on tubular ends of hose fittings as well.

1.5 The 24° flareless (bite) fittings may be attached to heavier wall tubing than can be accommodated by flaring, thus accounting for the higher nominal pressure ratings.

1.6 This International Standard also specifies methods, whereby the flare type can be adapted to machined flare ends that may be welded or brazed onto tubing or hose couplings. By doing this, heavier wall tubing, like the 24° cone type, can be accommodated and higher nominal pressures can be used.

## 2 References

- ISO 286, *ISO systems of limits and fits*.<sup>1)</sup>
- ISO 724, *ISO metric screw threads — Basic dimensions*.
- ISO 725, *ISO inch screw threads — Basic dimensions*.
- ISO 3040, *Technical drawings — Dimensioning and tolerancing cones*.
- ISO 4397, *Fluid power systems and components — Connectors and associated components — Outside diameters of tubes and inside diameters of hoses*.
- ISO 4399, *Fluid power systems and components — Connectors and associated components — Nominal pressures*.
- ISO 5598, *Fluid power systems and components — Vocabulary*.
- ISO 6508, *Metallic metals — Hardness test — Rockwell test (scales A — B — C — E — F — G — H — K)*.

## 3 Definitions

For the purposes of this International Standard, the definitions given in ISO 5598 apply.

## 4 Specification of materials

All fitting components shall be made of steel with a minimum yield strength of 170 MPa and a minimum ultimate strength of 310 MPa. If tubing is to be flared, it shall have a minimum elongation of 35 % in 50 mm and a maximum Rockwell hardness of 65 HRB (see ISO 6508).

## 5 General specifications

5.1 Either the 24° flareless (bite) type or the 37° flare type connection shall be selected.

5.2 When specifying the 37° flare type, it shall also be specified whether metric or inch tubing is to be used.

1) At present at the stage of draft. (Revision of ISO/R 286-1962.)

## 6 Dimensions and tolerances

- 6.1 Dimensions shall be selected from tables 1 to 4.
- 6.2 Dimensions given in the tables apply to the finished parts, including any plating or other treatments.
- 6.3 The tolerance value for all dimensions, not otherwise limited, shall be  $\pm 0,4$  mm. The sealing seats of fittings shall be concentric with straight thread pitch diameters within 0,25 mm full indicator movement (FIM).

## 7 Sizes and identification

Connector sizes shall be identified with tube sizes listed in the tables.

## 8 Finish

Unless otherwise specified, carbon steel fittings, ferrules, sleeves and nuts shall be protected against corrosion.

## 9 Identification statement (Reference to this International Standard)

Use the following statement in test reports, catalogues and sales literature when electing to comply with this International Standard:

"Dimensions and design for 37° flare and 24° flareless fittings in accordance with ISO 8434, *Hydraulic fluid power — Connection for tubes and hoses — Dimensions and designs for 37° flare and 24° flareless fittings.*

## 10 Bibliography

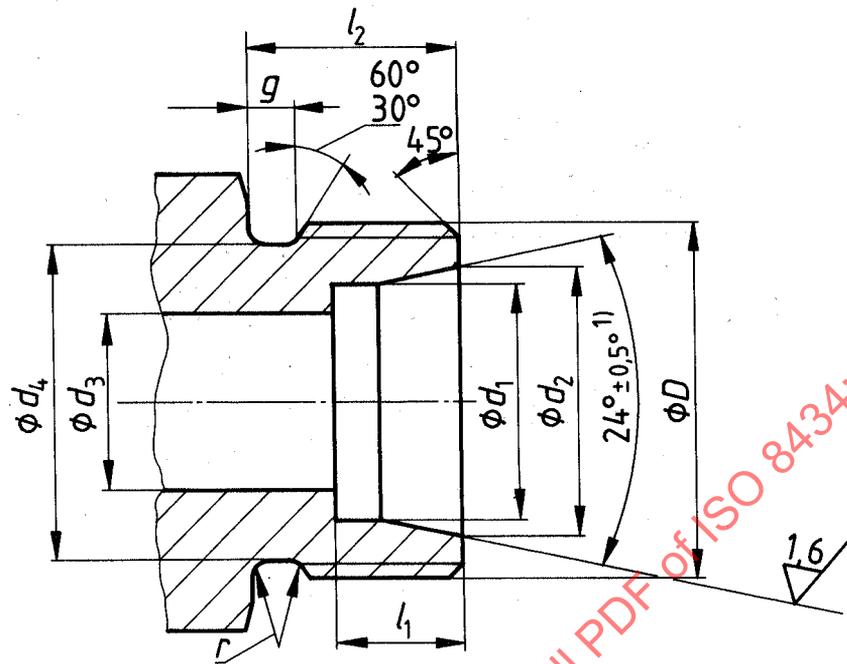
The following document served as a reference in the preparation of this International Standard and will be helpful for those using this International Standard:

ISO 261, *ISO general purpose metric screw threads — General plan.*

See also annex B.

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Surface roughness value in micrometres



\* Figure 1 – 24° flareless (bite) fitting

Table 1 – Dimensions of 24° flareless fittings

Dimensions in millimetres

Nominal outside diameter of tube <sup>2)</sup>	$d_1$		$d_2$ +0,1 0	Nominal bore $d_3$	Thread <sup>3)</sup> $D \times P$	$d_4$ 0 -0,2	$g$ +0,2 0	$l_1$ +0,3 0	$l_2$ $\pm 0,2$	$r$	Maximum rated pressure <sup>4)</sup>	
	tol.										bar <sup>5)</sup>	MPa
6	6	B11 <sup>6)</sup>	8,1	4	M14 × 1,5	11,7	3	7	12	1	630	63
8	8		10,1	5	M16 × 1,5	13,7						
10	10		12,3	7	M18 × 1,5	15,7		7,5				
12	12		14,3	8	M20 × 1,5	17,7						
16	16		18,3	12	M24 × 1,5	21,7	8,5	14	1,2	400	40	
20	20		22,9	16	M30 × 2	27	10,5	16				
25	25		27,9	20	M36 × 2	33	12	18				
30	30		33	25	M42 × 2	39	13,5	20		250	25	
32	32,3	35	26	M45 × 2	42	4	16	22				
38	38,3	41	32	M52 × 2	49							
40	40,3	43		M56 × 2	52							

1) See ISO 3040.

2) See ISO 4397.

3) See ISO 724.

4) See ISO 4399.

5) 1 bar = 100 kPa = 0,1 MPa; 1 Pa = 1 N/m<sup>2</sup>

6) See ISO 286.

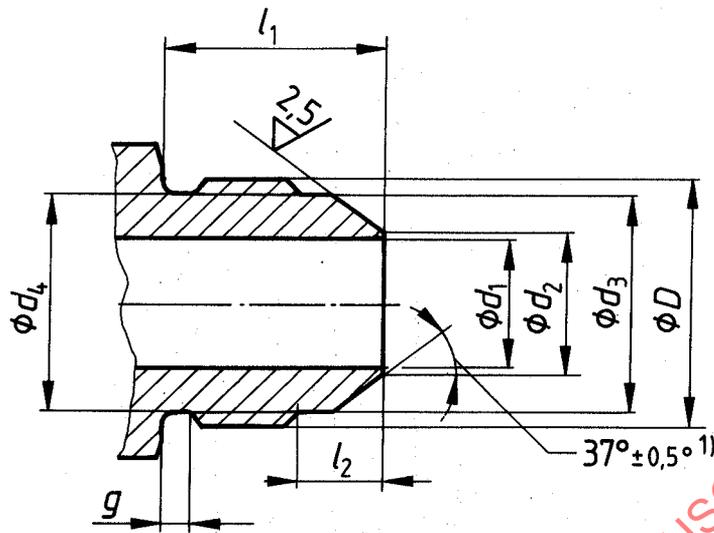


Figure 2 – 37° flare fitting

Table 2 – Dimensions of 37° flare fittings

Nominal outside diameter of tube			Thread <sup>3)</sup> D	Flow diameter d <sub>1</sub>	d <sub>2</sub> ±0,08	d <sub>3</sub> 0 -0,13	d <sub>4</sub> +0,05 -0,25	g +0,4 0	l <sub>1</sub> ±0,4	l <sub>2</sub> +0,4 0
Metric tubing	Inch tubing									
mm	in	2)	mm							
6	1/4	6,35	7/16 – 20	4,4	4,90	9,12	9,25	1,9	14,0	4,9
8	5/16	7,9	1/2 – 20	6,0	6,48	10,69	10,85	1,9	14,0	4,9
10	3/8	9,5	9/16 – 18	7,5	8,08	12,09	12,24	2,1	14,1	5,0
12	1/2	12,7	3/4 – 16	9,9	10,82	16,61	16,76	2,4	16,7	6,4
16	5/8	15,9	7/8 – 14	12,3	13,69	19,48	19,63	2,7	19,3	6,8
20	3/4	19,05	1 1/16 – 12	15,5	16,87	23,82	24,00	3,2	21,9	8,0
25	1	25,4	1 5/16 – 12	21,5	23,19	30,18	30,35	3,2	23,1	8,0
32	1 1/4	31,75	1 5/8 – 12	27,5	29,13	38,12	38,28	3,2	24,3	9,3
38	1 1/2	38,1	1 7/8 – 12	33,0	35,08	44,45	44,60	3,2	27,5	9,6
50	2	50,8	2 1/2 – 12	45,0	47,75	60,32	60,48	3,2	33,9	11,7

1) See ISO 3040.

2) Equivalent dimensions in millimetres.

3) See ISO 725.

Surface roughness value in micrometres

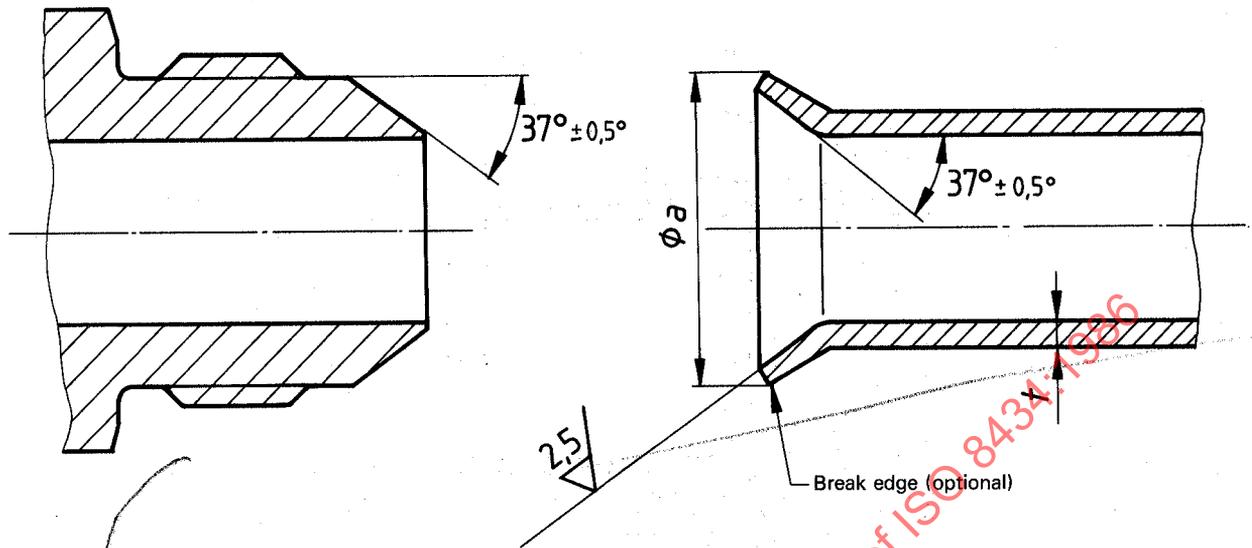


Figure 3 — 37° flare type tube

Table 3 — Dimensions of 37° flare type tubes

Nominal outside diameter of tube			<i>a</i>		Wall thickness <i>t</i> max.	Maximum rated pressure <sup>2)</sup>	
Metric tubing	Inch tubing <sup>1)</sup>		max.	min.		bar	MPa
mm	in	mm	mm	mm	mm		
6	1/4	6,35	9,1	8,6	1,65	250	25
8	5/16	7,9	10,9	10,2			
10	3/8	9,5	12,4	11,7			
12	1/2	12,7	16,8	16,0			
16	5/8	15,9	20,1	19,3	2,41	180	18
20	3/4	19,05	24,1	23,4	2,76		
25	1	25,4	30,5	29,7	3,04		
32	1 1/4	31,75	38,35	37,6			
38	1 1/2	38,1	43,9	43,2	145	14,5	
50	2	50,8	59,9	59,2	3,40	120	12

1) Equivalent dimensions in millimetres.

2) To obtain maximum rated pressure with a 4 : 1 design factor, the maximum tubing wall thickness, *t*, shown in this table should be used.

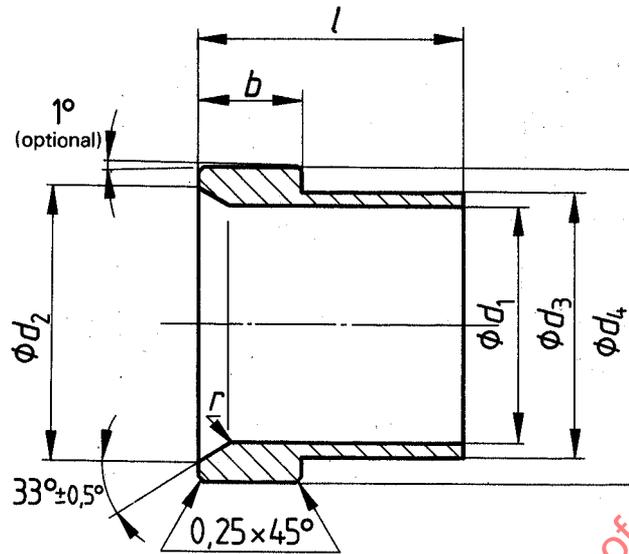


Figure 4 — 37° sleeve

Table 4 — Dimensions of sleeves for metric and inch tubing

Nominal outside diameter of tube for metric tubing	$d_1$ +0,1 0	Nominal outside diameter of tube for inch tubing		$d_1$ +0,1 0	$d_2$ ±0,1	$d_3$ 0 -0,1	$d_4$ 0 -0,1	$b$ ±0,5	$l$ ±0,5	$r$ ±0,3
		in	1) mm							
6	6,1	1/4	6,35	6,5	8	7,55	9,7	3,6	10,4	0,8
8	8,1	5/16	7,9	8,1	9,5	9,3	11,3	4,1	11,2	
10	10,1	3/8	9,5	9,7	11,2	11	12,8	4,3	12,7	1,2
12	12,1	1/2	12,7	12,8	15	14,3	17,3	5,6	14,2	1,6
16	16,2	5/8	15,9	16	17,9	17,5	20,25	6,1	16,8	
20	20,2	3/4	19,05	19,2	22,4	21,0	24,7	6,6	17,3	2,0
25	25,4	1	25,4	25,6	28,7	27,5	31	7,1	19,8	2,4
32	32,2	1 1/4	31,75	32	35,9	34	39	7,9	23,1	
38	38,4	1 1/2	38,1	38,4	41,4	40,9	45,3	8,6	28,4	2,8
50	50,4	2	50,8	51,2	55,8	54,8	61,2	10,4	30,2	

1) Equivalent dimensions in millimetres.