
**Pipework — Fittings for corrugated metal
hoses**

Tuyauteries — Raccords pour tuyaux métalliques flexibles onduleux

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

ISO 10806 was prepared by Technical Committee ISO/TC 5, *Ferrous metal pipes and metallic fittings*, Subcommittee SC 11, *Metal hoses and expansion joints*.

This second edition cancels and replaces the first edition (ISO 10806:1994), which has been technically revised.

Introduction

It was decided to produce a standard under the Vienna agreement on technical cooperation between ISO and the European Committee for Standardization (CEN) in order to maintain one standard. The opportunity was taken to add additional information not available for the first edition of ISO 10806.

The major changes are:

- addition of a clause on design;
- revision of the type descriptions and the symbols;
- addition of conical nipples and adaptors;
- addition of three series of fixed flanges;
- deletion of the PN 16 loose plate flange series.

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Pipework — Fittings for corrugated metal hoses

1 Scope

This International Standard specifies the characteristics of fittings for corrugated metal hose conforming with the requirements of ISO 10380.

This International Standard is also valid for other fittings provided they meet the material, design, assembly and test requirements specified herein.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

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

ISO 724, *ISO general-purpose metric screw threads — Basic dimensions*

ISO 4144, *Pipework — Stainless steel fittings threaded in accordance with ISO 7-1*

ISO 4145, *Non alloy steel fittings threaded to ISO 7-1*

ISO 4200:1991, *Plain end steel tubes, welded and seamless — General tables of dimensions and masses per unit length*

ISO 6761, *Steel tubes — Preparation of ends of tubes and fittings for welding*

ISO 7005-1:1992, *Metallic flanges — Part 1: Steel flanges*

ISO 7268, *Pipe components — Definition of nominal pressure*

ISO 7369, *Pipework — Metal hoses and hose assemblies — Vocabulary*

ISO 10380:2003, *Pipework — Corrugated metal hoses and hose assemblies*

EN 1092-1:2001, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 1: Steel flanges*

EN 1333, *Pipework components — Definition and selection of PN*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7369 apply.

4 Information to be supplied by the purchaser

4.1 The purchaser shall state the following in enquiries and orders:

- a) intended application;
- b) nominal size;
- c) maximum operating pressure;
- d) materials of construction;
- e) temperature range;
- f) type of fitting
 - 1) as specified in Table 1, or
 - 2) as specified by the purchaser.

4.2 Depending on the application, the purchaser shall provide

- a) product to be conveyed;
- b) any special information concerning choice of materials;
- c) requirements for test certificates;
- d) any special requirements for packaging

5 Requirements

5.1 Classification

Fittings are classified as follows:

- a) welded screwed,
- b) welded stub,
- c) welded flanged,
- d) adaptors, and
- e) those specified in Table 1.

5.2 Materials

Materials for the parts of end fittings that are welded or brazed shall be selected from those listed in ISO 10380:2003, Table 1. The use of materials other than these shall be subjected to agreement between the manufacturer and the user.

Materials for other parts of the fittings shall be selected from ISO standardized materials and on the basis of their suitability for the conditions under which the hose assemblies will be used.

5.3 Dimensions

Fitting dimensions shall be as given in Tables 3 to 13.

5.4 Design

5.4.1 Pressure

Welded screwed, welded stub and adaptor fittings shall be specified to be in accordance with the pressures given in ISO 10380:2003, 5.3.1.1.

Pressures for welded flanged fittings shall be as specified in Tables 11 to 15. These pressures are in accordance with ISO 7268 and EN 1333.

Where assemblies consist of fittings with different allowable or nominal pressures, the lower value shall be used for the assembly.

5.4.2 Temperature

For temperatures below -20°C or exceeding 50°C , reference shall be made to the derating factors in ISO 10380:2003, Table 3.

5.5 Method of assembly

The fittings shall be joined to the hose as specified in ISO 10380:2003, 5.8.

6 Type tests

6.1 General

All types of welded fitting listed in Table 1 shall be permanently joined to a tube or corrugated metal hose according to the method specified in ISO 10380. They are then assembled as a test assembly, as shown in Table 2.

The test medium shall be water unless otherwise agreed by the purchaser.

6.2 Leakage test

Subject a test assembly to an hydraulic pressure of 1,5 times the maximum allowable pressure for a minimum of 1 min. The sealing faces of the fittings shall show no signs of visible leakage.

6.3 Burst test

Subject a test assembly to an hydraulic pressure applied gradually in increments over a minimum period of 1 min until the assembly fails by leakage or rupture of any of the components, and note the pressure. The burst pressure of the fitting test assembly shall not be less than four times the maximum allowable pressure.

7 Designation

The fittings specified in this International Standard shall be designated, in the order indicated, by the following information:

- a) reference to this International Standard, i.e. ISO 10806;
- b) symbol (see Table 1);
- c) nominal size DN (see Tables 3 to 15);
- d) maximum allowable, nominal pressure (for flanges), PN;
- e) grade of material (S for non-alloyed steel or in conformity with ISO 10380 for stainless steel);
- f) for loose flange, the grade of material of the flanged connection piece shall be indicated after that of the flange material.

EXAMPLE 1 A male fitting with a nominal size DN 50 designed for a pressure of 16 bar and of non-alloyed steel shall be designated as follows:

ISO 10806 - M - DN 50 - PN 16 - S

EXAMPLE 2 A loose flange with a nominal size DN 50 and a pressure of PN 16, having a weld-on plate collar of stainless steel grade type X 2 CrNi 18 10 and a non-alloyed steel flange, shall be designated as follows:

ISO 10806 - LF/02 - DN 50 - PN 16 - S - X 2 CrNi 18 10

Table 1 — Types of fittings, their symbols and dimensions

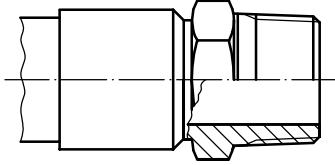
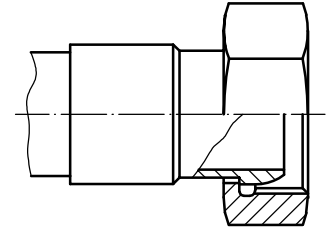
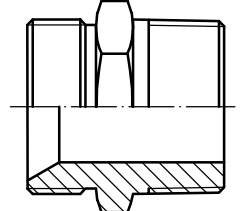
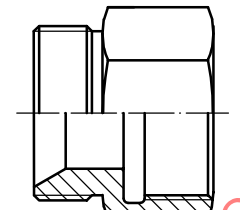
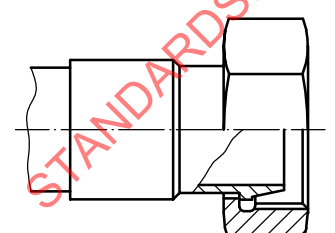
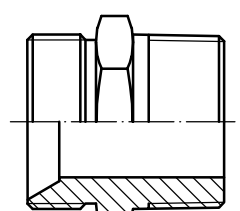
Diagram	Type	Symbol	Dimensions	
			Figure	Table
	Fixed male	M	1	3
	Fixed spherical nipple with swivel nut	FS	2	4
	Male adaptor for spherical nipple	MMS	3	5
	Female adaptor for spherical nipple	MFS	4	6
	Fixed conical nipple with swivel nut ^a	FC	5	7
	Male adaptor for conical nipple ^a	MMC	6	8

Table 1 (continued)

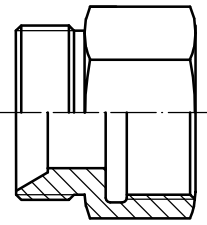
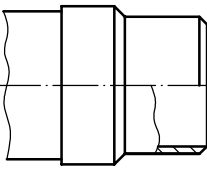
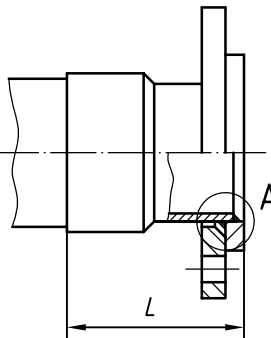
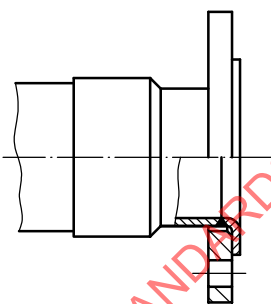
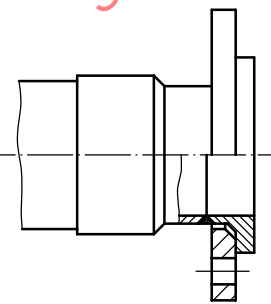
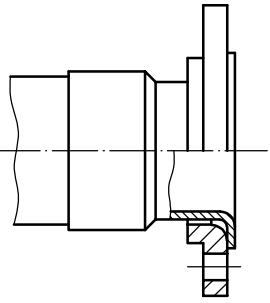
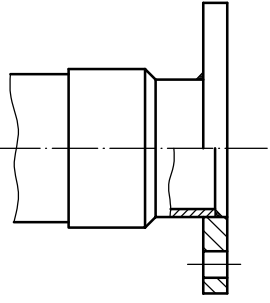
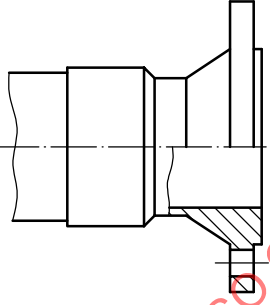
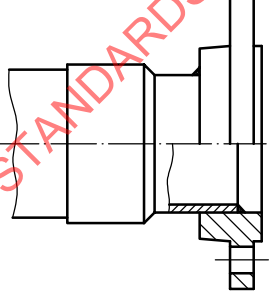
Diagram	Type	Symbol	Dimensions	
			Figure	Table
	Female adaptor for conical nipple ^a	MFC	7	9
	Tube end	T	8	10
	Loose flange with weld-on plate collar PN 6; PN 10; PN 16; PN 25; PN 40 (DIN series)	LF/02	9	11
	Loose flange with lapped tube end PN 6; PN 10; PN 16; PN 25; PN 40 (DIN series)	LF/03		
	Loose flange with welding neck collar PN 10; PN 16; PN 25; PN 40 (DIN series)	LF/04		

Table 1 (continued)

Diagram	Type	Symbol	Dimensions	
			Figure	Table
	Loose hubbed flange for lapped pipe end PN 20; PN 50; PN 110; PN 150; PN 260 (ANSI series)	LF/15	10	12
	Fixed plate flange for welding PN 6; PN 10; PN 16; PN 25; PN 40; PN 63; PN 100 (DIN series) PN 20 (ANSI series)	FF/01	11	13
	Fixed welding neck flange PN 6; PN 10; PN 16; PN 25; PN 40; PN 63; PN 100 (DIN series) PN 20; PN 50; PN 110; PN 150; PN 260 (ANSI series)	FF/11	12	14
	Fixed hubbed slip-on flange for welding PN 6; PN 10; PN 16; PN 25; PN 40; PN 63; PN 100 (DIN series) PN 20; PN 50; PN 110; PN 150; PN 260 (ANSI series)	FF/12	13	15

^a The combination of Figure 5, Table 7 fittings with those of Figure 6, Table 8 or those of Figure 7, Table 9 should only be supplied and used as complete assemblies, because these fittings are not necessarily interchangeable.

Table 2 — Type test fittings

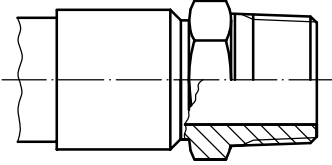
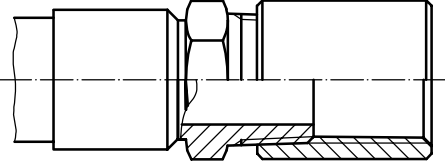
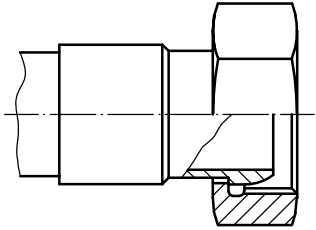
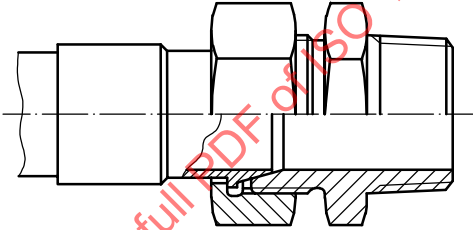
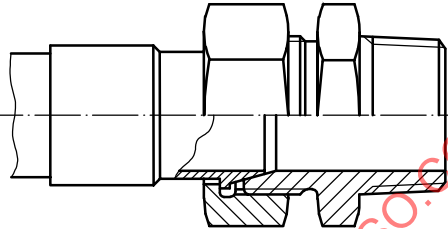
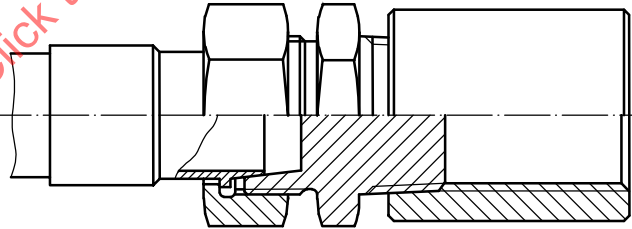
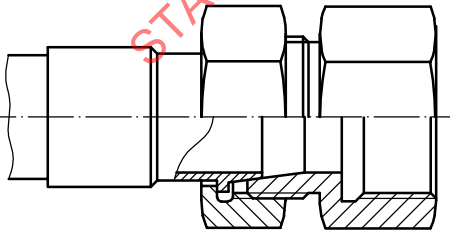
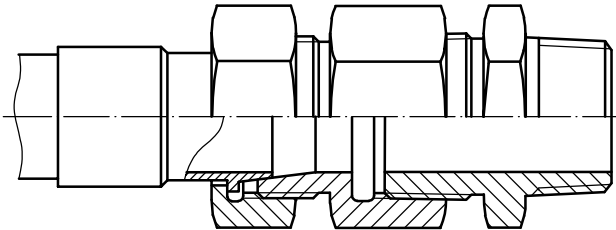
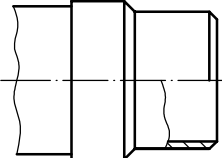
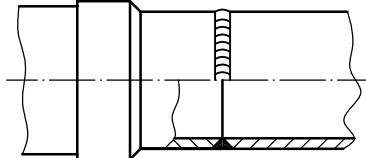
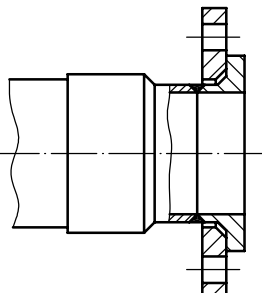
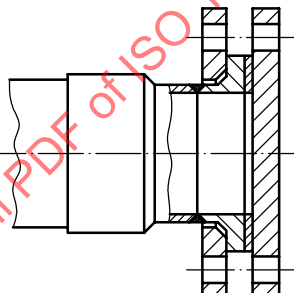
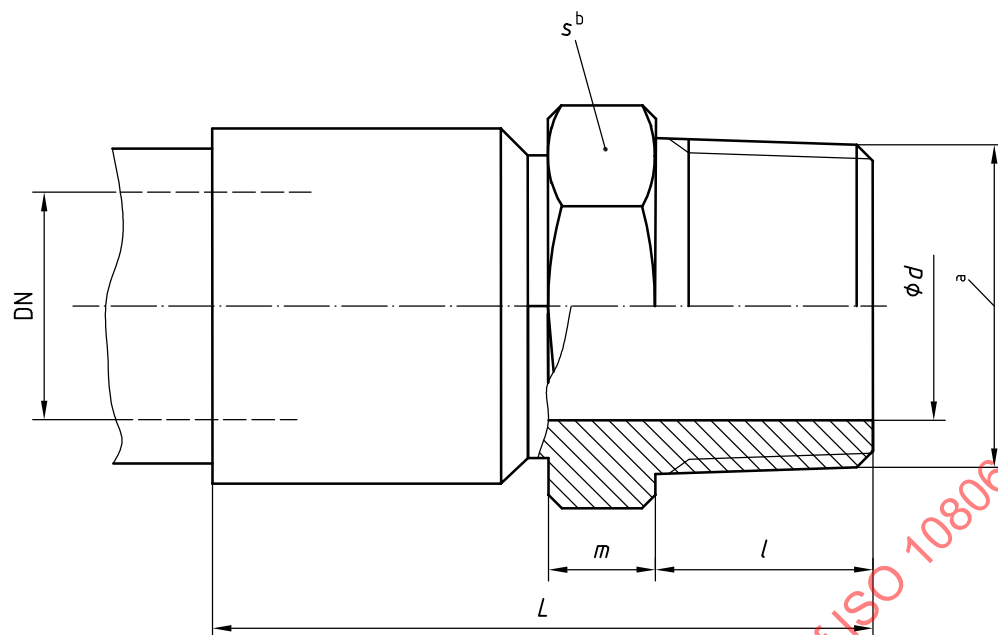
Fitting assembled	Test assembly
M 	Female fitting in accordance with ISO 4144 or ISO 4145 
FS or FC 	Fitting MMS or MFS – MMC or MFC 
MMS with FS or MMC with FC 	Female fitting in accordance with ISO 4144 or ISO 4145 
MFS with FS or MFC with FC 	Male fitting in accordance with ISO 4144 or ISO 4145 

Table 2 (continued)

Fitting assembled	Test assembly
T 	Butt welded tube with equal dimensions 
See Figures 9 to 13 	Loose or swivel flange with equal dimensions 



^a External tapered thread in accordance with ISO 7-1.

^b Width across flats (hexagonal flats up to DN 50, hexagonal or octagonal from DN 65 to DN 100).

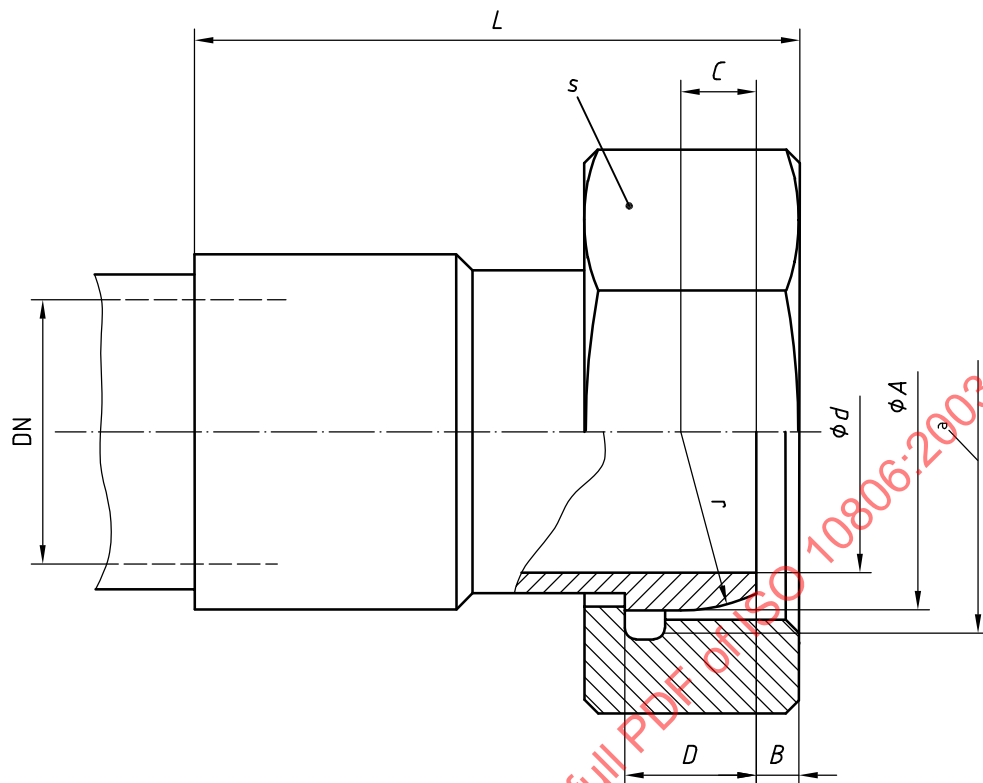
Figure 1 — Fixed male fitting (M)

Table 3 — Dimensions of fixed male fittings (M)

Dimensions in millimetres

DN	Thread ISO 7-1	d max.	s	m min.	l min.	L max.
6	R 1/8	6	12	4	9	40
8	R 1/4	8	14	4	13	45
10	R 3/8	10	17 ^a	5	13	50
12	R 1/2	12	22	5	17	55
15	R 1/2	15	22	5	17,5	60
20	R 3/4	20	27	5,5	18,5	65
25	R 1	25	36	6	21,5	75
32	R 1 1/4	32	46	6,5	23,5	85
40	R 1 1/2	40	50	6,5	24,5	95
50	R 2	50	65	7	29	100
65	R 2 1/2	65	80	7	35	105
80	R 3	80	90	8,5	39	110
100	R 4	100	115	8	48	120

^a Width across flats value of 19 may be used.



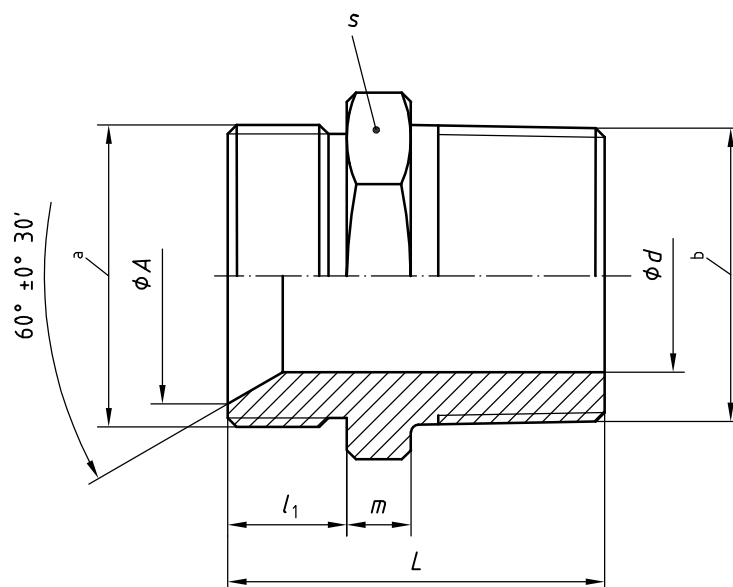
^a Internal cylindrical thread in accordance with ISO 228-1.

Figure 2 — Fixed spherical nipple with swivel nut (FS)

Table 4 — Dimensions of fixed spherical nipples with swivel nuts (FS)

Dimensions in millimetres

DN	Thread ISO 228-1	<i>A</i>	<i>B</i>	<i>d</i> max.	<i>C</i>	<i>D</i>	<i>r</i>	<i>s</i>	<i>L</i> max.
6	G 1/8	8,4	3	4	3	4	4,2	14	45
8	G 1/4	11,2	4,2	7	3,5	3,8	5,6	19	50
10	G 3/8	14,8	6	9	5	5	7,4	22	50
12	G 1/2	18,4	6,5	12	6	6	9,2	27	60
15/1	G 1/2	18,4	6,5	14	6	6	9,2	27	60
15/2	G 3/4	23,8	8,7	15	7,3	7,8	11,9	32	65
20	G 3/4	23,8	8,7	17	7,3	7,8	11,9	32	65
25	G 1	30	10,5	22	9	9	15	41	75
32	G 1 1/4	38,8	10,1	29	11,4	11,4	19,4	50	80
40	G 1 1/2	44,4	12,2	34	13,4	13,8	22,2	55	95
50	G 2	56,4	16,1	44	16,4	16,9	28,2	70	105



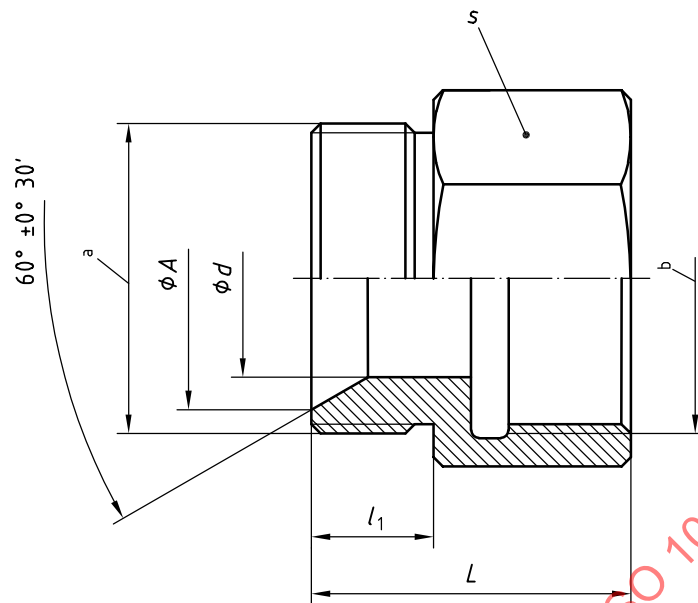
- a External cylindrical thread in accordance with ISO 228-1.
 b External tapered thread in accordance with ISO 7-1.

Figure 3 — Male adaptor for spherical nipple (MMS)

Table 5 — Dimensions of male adaptors for spherical nipples (MMS)

Dimensions in millimetres

DN	Thread ISO 228-1	Thread ISO 7-1	<i>A</i>	<i>d</i> max.	<i>l</i> ₁	<i>m</i> min.	<i>L</i> min.	<i>s</i>
6	G 1/8B	R 1/8	7,8	5	8	4	20,5	12
8	G 1/4B	R 1/4	10,4	7	10	4	26,5	14
10	G 3/8B	R 3/8	13,9	9	12	5	30	17
12	G 1/2B	R 1/2	17,5	12	14	5	36	22
15/1	G 1/2B	R 1/2	17,5	12	14	5	36	22
15/2	G 3/4B	R 3/4	22,8	18	16	5,5	40	27
20	G 3/4B	R 3/4	22,8	18	16	5,5	40	27
25	G 1B	R 1	28,7	23	18	6	45,5	36
32	G 1 1/4B	R 1 1/4	36,8	30	20	6,5	50,5	46
40	G 1 1/2B	R 1 1/2	42,7	35	22	6,5	52,5	50
50	G 2B	R 2	54,6	45	27	7	63,5	65



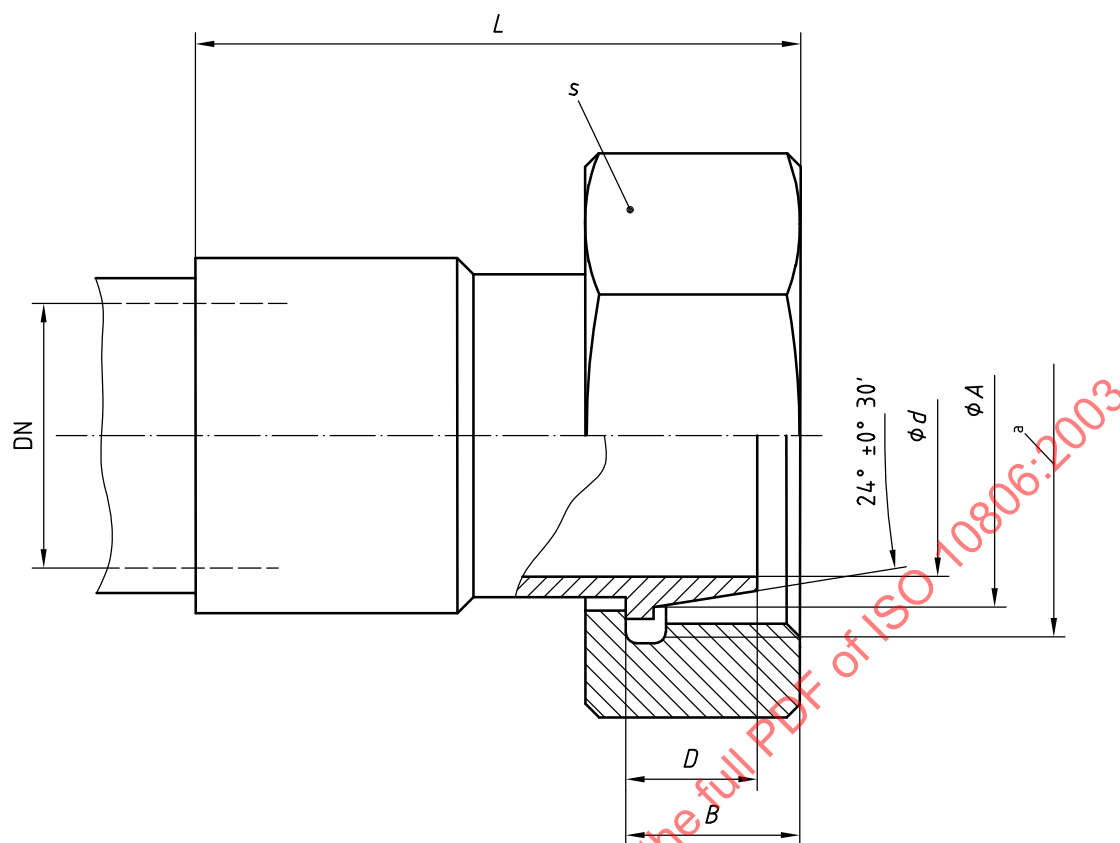
- a External cylindrical thread in accordance with ISO 228-1.
 b Internal cylindrical thread in accordance with ISO 7-1.

Figure 4 — Female adaptor for spherical nipple (MFS)

Table 6 — Dimensions of female adaptors for spherical nipples (MFS)

Dimensions in millimetres

DN	Thread ISO 228-1	Thread ISO 7-1	<i>A</i>	<i>d</i> max.	<i>L</i>	<i>l</i> ₁	<i>s</i>
6	G 1/8B	Rp 1/8	7,8	5	20	8	14
8	G 1/4B	Rp 1/4	10,4	7	26	10	19
10	G 3/8B	Rp 3/8	13,9	9	29,5	12	22
12	G 1/2B	Rp 1/2	17,5	12	35,5	14	27
15/1	G 1/2B	Rp 1/2	17,5	12	35,5	14	27
15/2	G 3/4B	Rp 3/4	22,8	18	40,5	16	32
20	G 3/4B	Rp 3/4	22,8	18	40,5	16	32
25	G 1B	Rp 1	28,7	23	45,5	18	41
32	G 1 1/4B	Rp 1 1/4	36,8	30	49	20	50
40	G 1 1/2B	Rp 1 1/2	42,7	35	51,5	22	55
50	G 2B	Rp 2	54,6	45	61	27	70



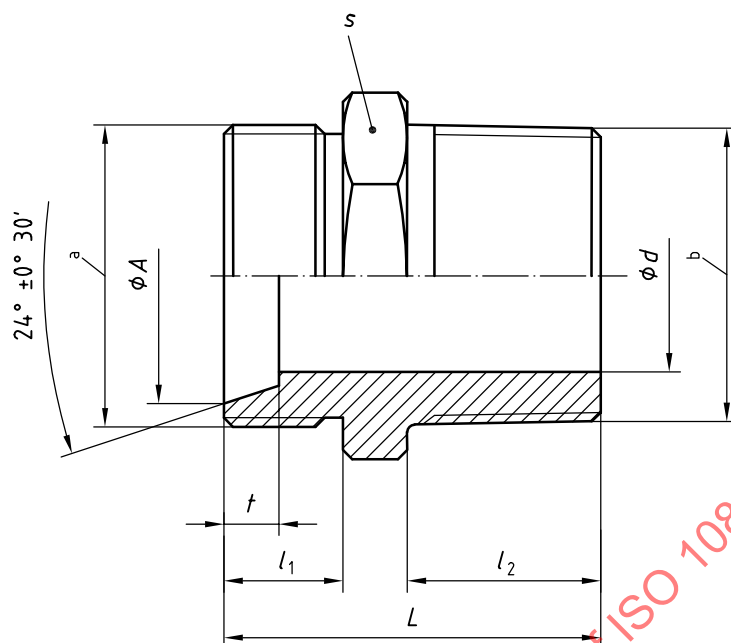
^a Internal cylindrical thread in accordance with ISO 724.

Figure 5 — Fixed conical nipple with swivel nut (FC)

Table 7 — Dimensions of fixed conical nipples with swivel nuts (FC)

Dimensions in millimetres

DN	Thread ISO 724	A	d max.	s	B	D	L max.
6	M14 × 1,5	11,1	6	17	8,5	7	45
8	M16 × 1,5	13,3	8	19	9,5	7	50
10	M18 × 1,5	15,3	9	22	9,5	7	50
12	M22 × 1,5	18,3	12	27	10	7	60
15	M26 × 1,5	21,3	15	32	10,5	7,5	60
20	M30 × 2	25,3	19	36	12	7,5	65
25	M36 × 2	31,3	24	41	12,5	7,5	75
32	M45 × 2	39	32	50	14	10,5	80
40	M52 × 2	46	39	60	14	11	95
50	M64 × 2	58	50	70	17	12	105



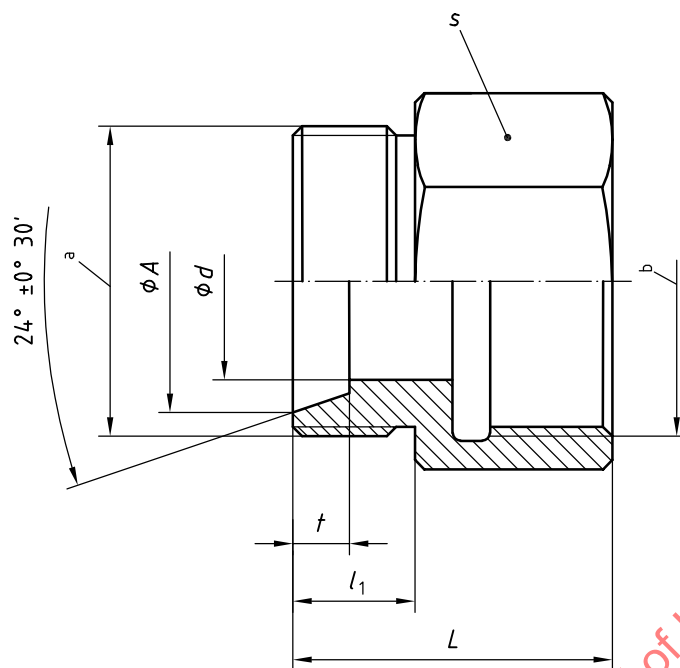
- a External cylindrical thread in accordance with ISO 724.
 b External tapered thread in accordance with ISO 7-1.

Figure 6 — Male adaptor for conical nipple (MMC)

Table 8 — Dimensions of male adaptors for conical nipples (MMC)

Dimensions in millimetres

DN	Thread ISO 724	Thread ISO 7-1	A	d max.	l_1	l_2 min.	t min.	L min.	s
6	M14 × 1,5	R 1/8	10,1	5	10	9	7	24	14
8	M16 × 1,5	R 1/4	12,3	8	11	13	7	29	17
10	M18 × 1,5	R 3/8	14,3	9	11	13	7	29	19
12	M22 × 1,5	R 1/2	17,3	12	12	17	7	34	24
15	M26 × 1,5	R 1/2	20,3	15	12	17,5	7,5	35	27
20	M30 × 2	R 3/4	24,3	19	14	18,5	7,5	38	32
25	M36 × 2	R 1	30,3	25	14	21,5	7,5	41	41
32	M45 × 2	R 1 1/4	38	32	16	23,5	10,5	46	46
40	M52 × 2	R 1 1/2	45	39	16	24,5	11	47	55
50	M64 × 2	R 2	57	50	18	29	12	54	65



- a External cylindrical thread in accordance with ISO 724.
 b Internal cylindrical thread in accordance with ISO 7-1.

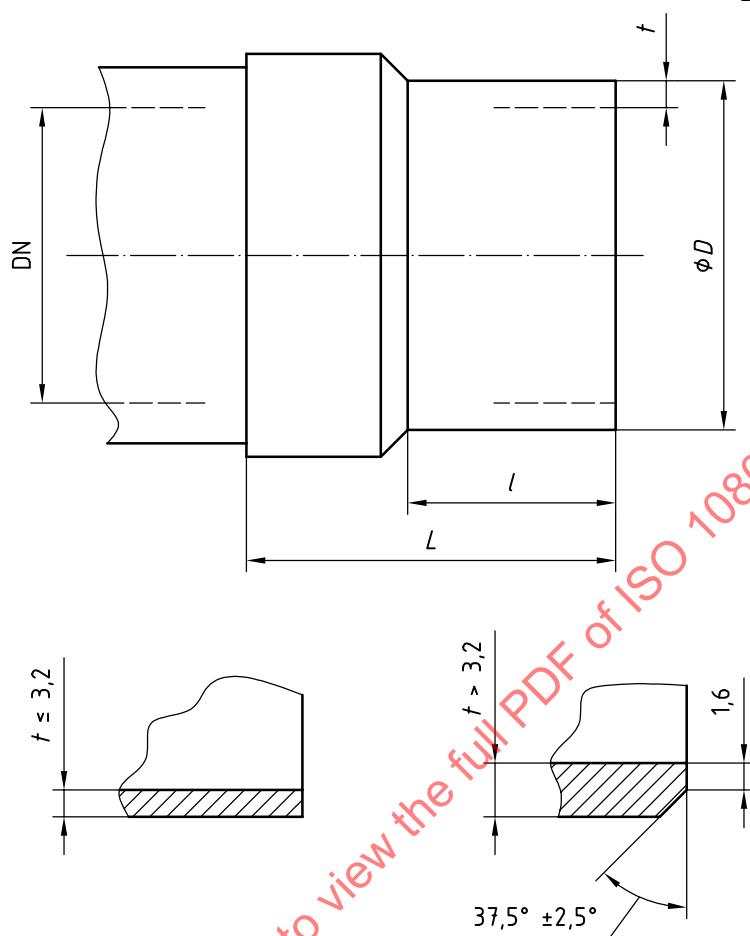
Figure 7 — Female adaptor for conical nipple (MFC)

Table 9 — Dimensions of female adaptors for conical nipples (MFC)

Dimensions in millimetres

DN	Thread ISO 724	Thread ISO 7-1	A	d max.	L	l_1	t	s
6	M14 × 1,5	Rp 1/8	10,1	6	24	10	7	17
8	M16 × 1,5	Rp 1/4	12,3	8	25	11	7	19
10	M18 × 1,5	Rp 3/8	14,3	9	26	11	7	22
12	M22 × 1,5	Rp 1/2	17,3	12	30	12	7	27
15	M26 × 1,5	Rp 1/2	20,3	15	30	12	7,5	27
20	M30 × 2	Rp 3/4	24,3	19	34	14	7,5	32
25	M36 × 2	Rp 1	30,3	25	37	14	7,5	41
32	M45 × 2	Rp 1 1/4	38	32	42	16	10,5	46
40	M52 × 2	Rp 1 1/2	45	39	44	16	11	55
50	M64 × 2	Rp 2	57	50	50	18	12	65

Dimensions in millimetres



Preparation for welding as specified in ISO 6761.

Figure 8 — Tube end (T)

Table 10 — Dimensions of tube ends (T)

Dimensions in millimetres

DN	D	t^a min.	l min.	L max.
6	10,2	1,6	25	60
8	13,5	2	25	60
10	17,2	2	25	70
15	21,3	2	25	70
20	26,9	2	30	70
25	33,7	2,3	30	70
32	42,4	2,6	30	75
40	48,3	2,6	30	75
50	60,3	2,9	40	90
65	76,1	2,9	40	95
80	88,9	3,2	40	100
100	114,3	3,6	50	105
125	139,7	4	50	120
150	168,3	4,5	70	130
200	219,1	6,3	70	140
250	273	6,3	70	145
300	323,9	7,1	70	150

^a Thickness in accordance with ISO 4200:1991, series E, to be used up to a design pressure of 16 bar; for higher pressures refer to ISO 7005-1:1992 or EN 1092-1.

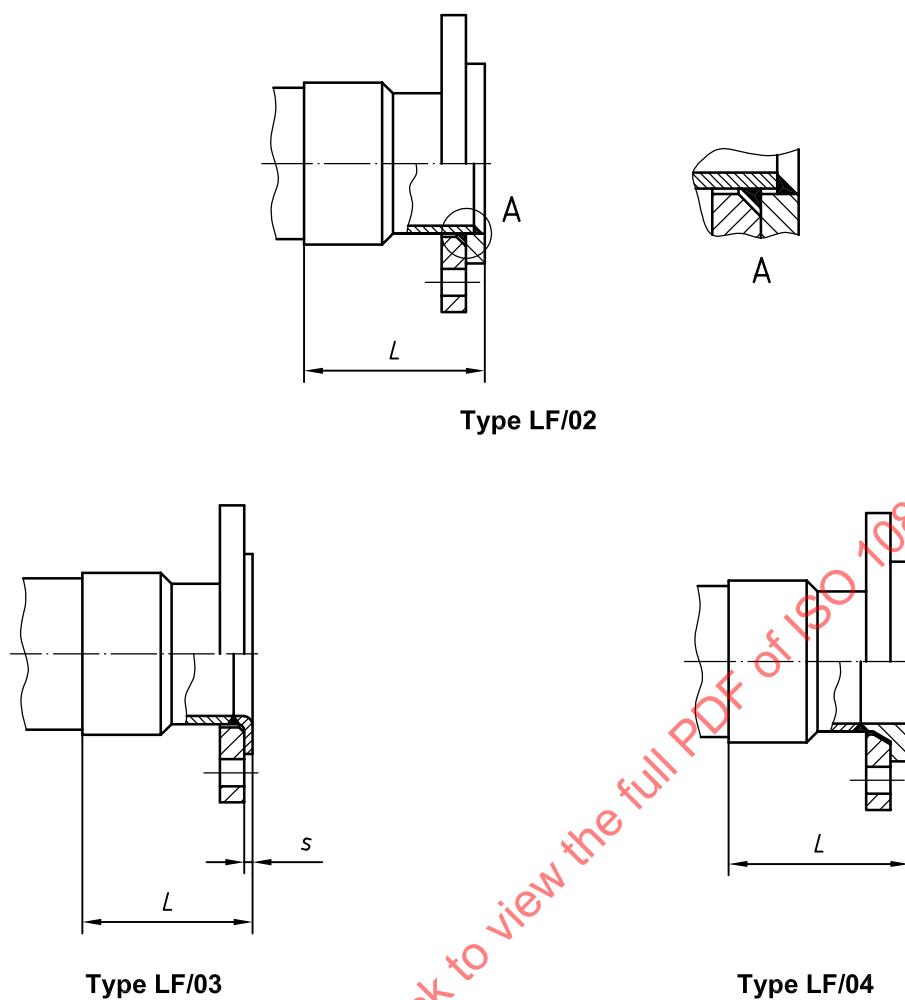


Figure 9 — Loose flange with weld-on plate collar (LF/02), with lapped tube end (LF/03) and with welding neck collar (LF/04) (DIN series)