BS EN 14422:2013

BSI Standards Publication

Clamp type coupling assemblies for liquefied petroleum gas (LPG) transfer hoses

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National foreword

This British Standard is the UK implementation of EN 14422:2013. It supersedes BS EN 14422:2004 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/66, Rubber and plastics tubing, hoses and hose assemblies.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Supersedes EN 14422:2004

English Version

Clamp type coupling assemblies for liquefied petroleum gas (LPG) transfer hoses

Raccords avec collier de serrage pour flexibles de transvasement de gaz de pétrole liquéfié (GPL)

Schlaucharmaturen mit Klemmfassung für Schläuche zur Übergabe von Flüssiggas (LPG)

This European Standard was approved by CEN on 8 May 2013.

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Foreword

This document (EN 14422:2013) has been prepared by Technical Committee CEN/TC 218 “Rubber and plastics hoses and hose assemblies”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2013, and conflicting national standards shall be withdrawn at the latest by December 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14422:2004.

In comparison to EN 14422:2004, the following changes have been made:

— The Scope has been extended and the working temperature ranges have been defined for normal and low temperature operation.

— In Clause 2, the normative references have been updated.

— Clause 3 "Terms and definitions" has been amended.

— Clause 4 "Requirements" has been revised.

— In Clause 6, all material lists have been revised.

— In Clause 7, the requirements for marking have been revised.

— Clause 8 regarding type testing and quality control has been restructured and amended.

— The Bibliography has been reviewed.

— The standard has been revised editorially.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies the dimensions, designation, materials, marking and testing requirements for a range of hose fittings which may be used with rubber/plastic hoses for the transfer of liquefied petroleum gas, LPG, in liquid or vapour phase and natural gas.

The maximum working pressure is 25 bar[1)].

For normal operation the working temperature range is from –30 °C up to 70 °C and for low temperature operation (LT) it is from –50 °C up to 70 °C.

The nominal size for hose fittings with internal and external threads is from DN 15 to DN 75 and for hose fittings with flanges DN 15 to DN 200.

In addition to the fittings described in this European Standard, threaded connections according to EN 14420-5 as well as hose fittings with screwed ferrules according to EN 14424 up to DN 25 for LPG could be used.

2 Normative references

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

EN ISO 15614-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1)*

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

EN 1759-1, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, Class designated — Part 1: Steel flanges, NPS 1/2 to 24*

EN 10025-2, *Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels*

EN 10028-2, *Flat products made of steels for pressure purposes — Part 2: Non-alloy and alloy steels with specified elevated temperature properties*

EN 10087, *Free-cutting steels — Technical delivery conditions for semi-finished products, hot-rolled bars and rods*

EN 10088-1, *Stainless steels — Part 1: List of stainless steels*

EN 10216-1, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 1: Non-alloy steel tubes with specified room temperature properties*

EN 10283, *Corrosion resistant steel castings*

EN 12164, *Copper and copper alloys — Rod for free machining purposes*

EN 12168, *Copper and copper alloys — Hollow rod for free machining purposes*

EN 12420, *Copper and copper alloys — Forgings*

1) 1 bar = 0,1 MPa.

EN 14420-2, *Hose fittings with clamp units — Part 2: Hose side parts of hose tail*

EN 14420-3, *Hose fittings with clamp units — Part 3: Clamp units, bolted or pinned*

EN ISO 4042:1999, *Fasteners — Electroplated coatings (ISO 4042:1999)*

EN ISO 8330, *Rubber and plastics hoses and hose assemblies — Vocabulary (ISO 8330)*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality level (AQL) for lot-by-lot inspection*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 8330 and the following apply.

3.1
DN (nominal size)
alphanumeric designation of size for components of a pipework system, which is used for reference purposes, and which comprises the letters DN followed by a dimensionless whole number which is indirectly related to the physical size, in millimetres, of the bore or outside diameter of the end connections

Note 1 to entry: The number following the letters DN does not represent a measurable value and should not be used for calculation purposes except where specified in the relevant standard.

Note 2 to entry: In those standards which use the DN designation system, any relationship between DN and component dimensions should be given, e.g. DN/OD or DN/ID.

[SOURCE: EN ISO 6708:1995, 2.1]

3.2
liquefied petroleum gas
LPG
low pressure gas composed of one or more light hydrocarbons which are assigned to UN 1011, UN 1075, UN 1965, UN 1969 or UN 1978 only and which consists mainly of propane, propene, butane, butane isomers, butene with traces of other hydrocarbon gases

[SOURCE: EN 15202:2012, 3.1]

3.3
thread gasket
flat faced gasket for threads according to EN ISO 228-1

4 Requirements

4.1 General

Hose fittings shall withstand the mechanical and chemical loads and shall be impermeable and resistant to flammable liquefied petroleum gas (LPG) and natural gas.

Hose fittings shall be designed such that they establish a frictional and positive-locking tight connection on the hose.

Hose fittings shall be designed so that if an overstress occurs, the hose is destroyed first before being torn out from the fitting.

Only ductile metallic materials shall be used.

Hose side fitting components shall not cause any dangerous notch or shear stresses on the hose. The clamp units shall be widened at the end in order to obtain a flexing zone and shall be approximately 10 % longer than the connection pieces.

4.2 Resistance of the fitting materials to the fluid

The material of hose fittings and gaskets shall be selected regarding that the hose fittings and the gaskets used with them shall not be affected by the transferred medium.

The fitting components may be surface protected, e.g. nickel-plated, zinc-plated, chrome-plated or by elastic coating.

Details are to be agreed between purchaser and manufacturer.

4.3 Maximum working pressures and temperatures

Maximum working pressures and temperatures are limited by the hoses and gaskets used.

All hose fittings are applicable in the pressure range from at least -0,8 bar up to 25 bar.

A working temperature range from –30 °C up to 70 °C or for low temperature from –50 °C up to 70 °C shall apply.

4.4 Welding connections

The manufacturer shall have a welding procedure qualification for the welding procedure specification selected according to EN ISO 15614-1 (for steel).

Welding connections shall be non-destructively tested.

NOTE 1 Further details on the welding connections can be agreed.

NOTE 2 The weld-end preparation depends on the welding procedure and this can be agreed upon at the order stage.

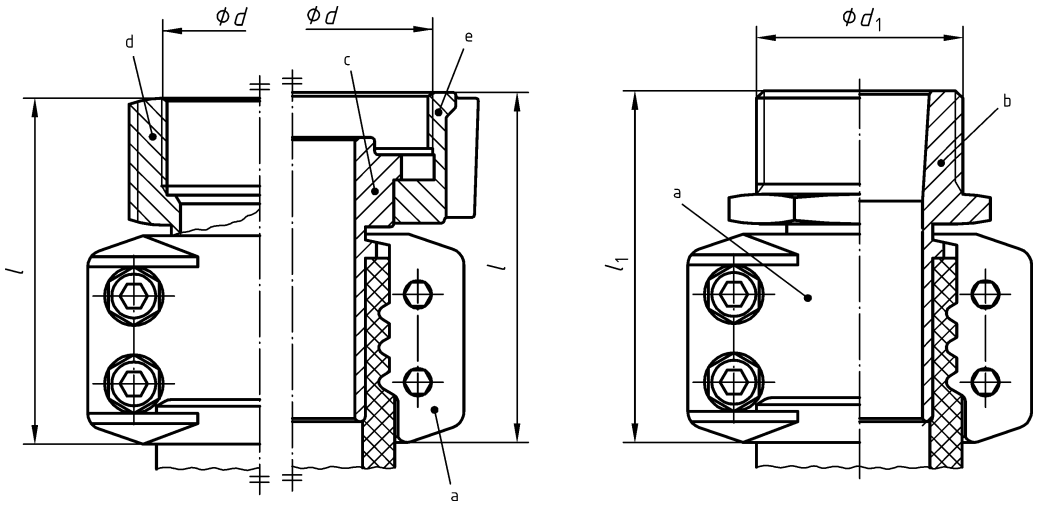
5 Dimensions and designation

5.1 Dimensions

Figure 1 to Figure 9 are shown as examples and are not intended to be conformed to; only the fixed dimensions in Table 1 to Table 9 shall be used.

Details which are not specified are to be chosen by the manufacturer.

Dimensions in millimetres



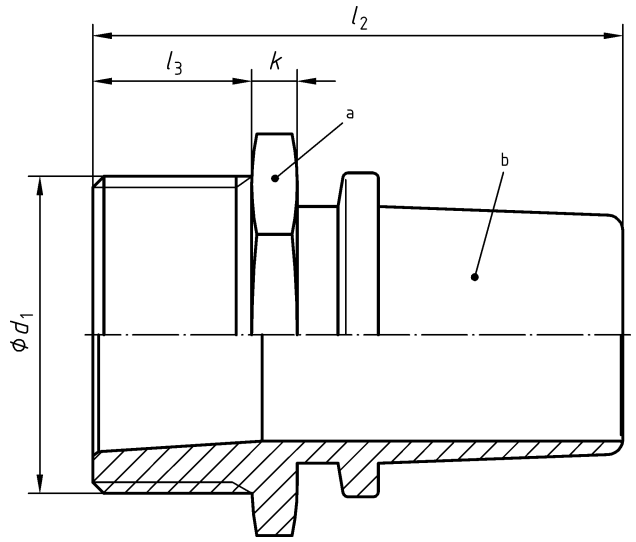
a Clamp unit shall be according to EN 14420-3.
b Male part hose fitting
c Female part hose fitting with collar for union nut
d Female part hose fitting with internal thread
e Union nut

Figure 1 — Hose fittings with internal and external thread

Table 1 — Dimensions for hose fitting with internal and external thread

Dimensions in millimetres

Nominal size DN	**Hose inside diameter**	d connecting thread	d_1 connecting thread	l ≈	l_1 ≈
15	13	½"NPT	½"NPT	73	74
		1¾"ACME	—	77	—
20	19	¾"NPT	¾"NPT	76	75
		1"NPT	1"NPT	79	79
		1¾"ACME	—	77	—
25	25	1"NPT	1"NPT	79	79
		1¾"ACME	1¼"NPT	77	
32	32	1"NPT	1"NPT	79	
		1¼"NPT	1¼"NPT		
		1¾"ACME	1½"NPT	77	80
		2¼"ACME	—	80	—
40	38	1½"NPT	1½"NPT		80
		2¼"ACME	—		—
50	50	1¼"NPT	1¼"NPT	85	85
		2"NPT	2"NPT	86	87
		3¼"ACME	—	96	—
75	75	3"NPT	2"NPT	1 360	1 200
		3¼"ACME	3"NPT	1 170	1 410



a s = hexagonal or octagonal width across flats, with grooves or cams at the discretion of the manufacturer
b Hose tail shall be according to EN 14420-2, with or without ribs at the discretion of the manufacturer.

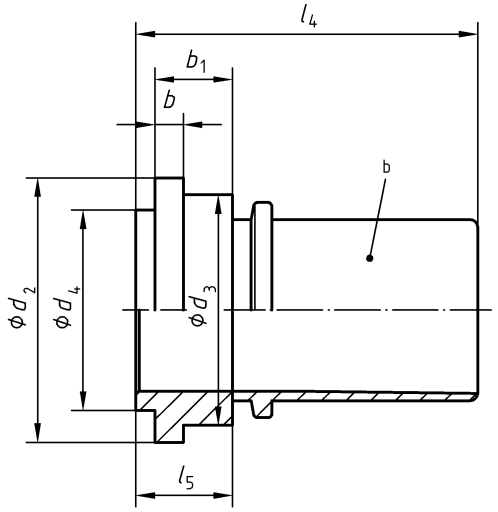
Figure 2 — Male part hose fitting

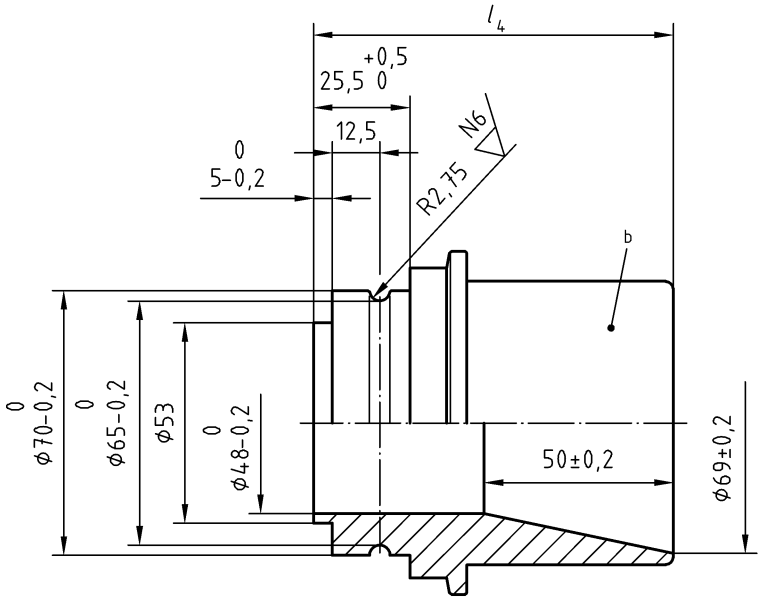
Table 2 — Dimensions for male part hose fitting

Dimensions in millimetres

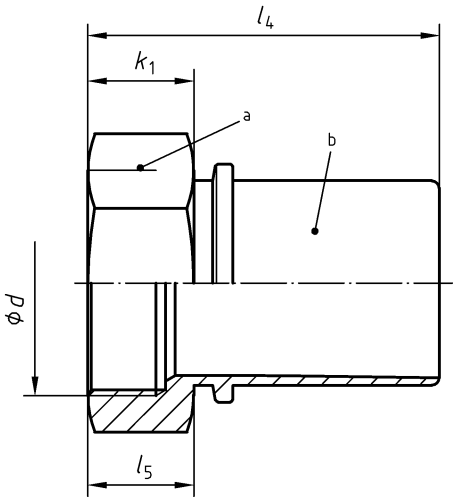
Nominal size DN	d_1	k minimum	l_2 minimum	l_3 minimum	s minimum
15	½"NPT	6,0	65,0	16	22
20	¾"NPT		66,0	17	27
	1"NPT		70,0	20	36
25	1"NPT				
	1¼"NPT			21	46
32	1"NPT				41
	1¼"NPT				46
	1½"NPT	6,5	71,5		50
40	1½"NPT		71,0		
50	1¼"NPT		77,5		60
	2"NPT		79,5	22	
75	2"NPT	7,5	110		85
	3"NPT		112	30	—
NOTE Threaded connections above nominal size DN 75 not in use. Above nominal size DN 75 flanges are the preferred connection type.					

Type A, with collar for union nut





Type B, with collar for union nut



Type C, with internal thread

a s = hexagonal or octagonal

b Hose tail shall be according to EN 14420-2, with or without ribs at the discretion of the manufacturer.

Figure 3 — Female part hose fitting

Table 3 — Dimensions for female part hose fitting

Dimensions in millimetres

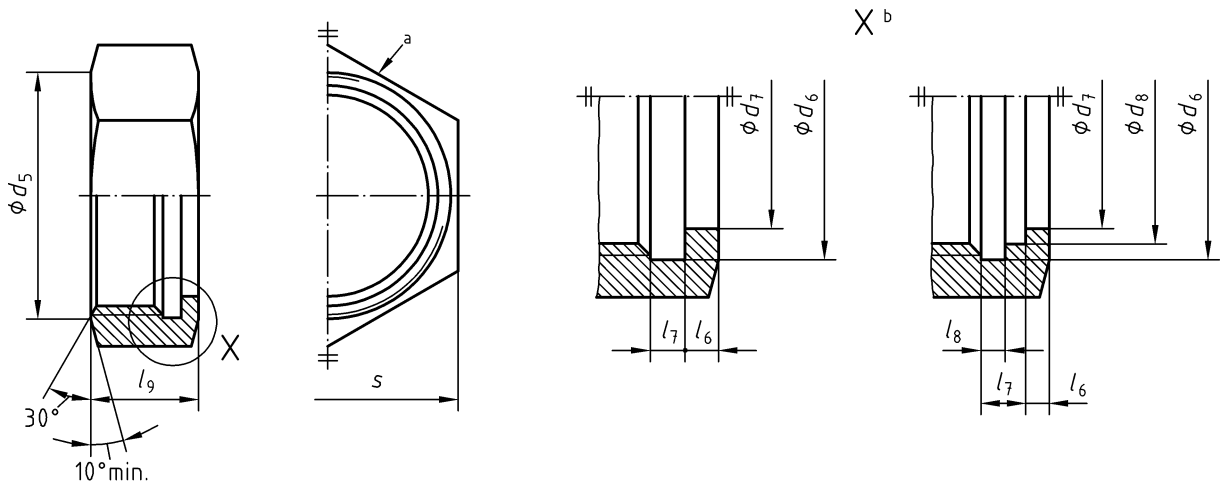
Nominal size DN	d [a]	d_2 ± 0,2	d_3 ± 0,2	d_4 ± 0,1	b min.	b_1 min.	k_1 min.	l_4 min.	l_5 ± 0,5	s min.
15	½"NPT	—	—	—	—	—	21,0	64,0	13,5	27
	1¾"ACME	39,6	35,5	32,3	4,0	10,0	—	61,0	19,0	—
20	¾"NPT	—	—	—	—	—	24,0	67,0	14,0	32
	1"NPT	—	—	—	—	—	27,0	70,0	17,0	41
	1¾"ACME	39,6	35,5	32,3	4,0	10,0	—	61,0	19,0	—
25	1"NPT	—	—	—	—	—	27,0	70,0	17,0	41
	1¾"ACME	39,6	35,5	32,3	4,0	10,0	—	61,0	19,0	—
32	1"NPT	—	—	—	—	—	27,0	70,0	17,0	41
	1¼"NPT	—	—	—	—	—	27,5	70,5	17,5	50
	1¾"ACME	39,6	35,5	32,3	4,0	10,0	—	61,0	19,0	—
	2¼"ACME	51,0	43,0	44,5	5,0	12,0	—	59,0	17,0	—
40	1½"NPT	—	—	—	—	—	27,5	70,5	17,5	55
	2¼"ACME	51,0	43,0	44,5	5,0	12,0	—	59,0	17,0	—
50	1¼"NPT	—	—	—	—	—	27,5	77,5	17,5	55
	2"NPT	—	—	—	—	—	28,0	78,0	18,0	70
	3¼"ACME	70,0	61,0	53,0	7,5	20,5	—	74,5	25,5	—
75	3"NPT	—	—	—	—	—	50,0	127,00	26,0	108 [b]
	3¼"ACME	—	—	—	—	—	—	92,5	—	—

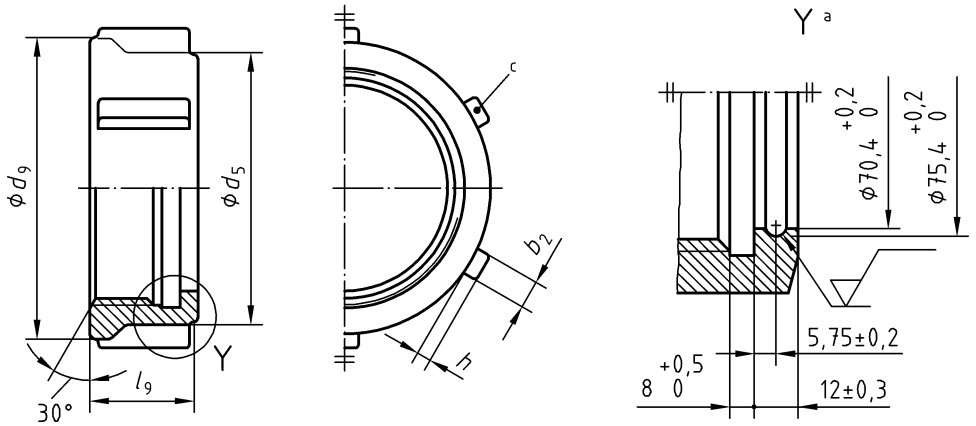
[a] Internal thread or collar for union nut.

[b] No width across flats, but diameter.

Dimensions in millimetres

Type A 1¾" ACME





Type B 2 ¼"ACME **Type B 3 ¼"ACME**

a Hexagonal or octagonal

b At the discretion of the manufacturer

c Cams

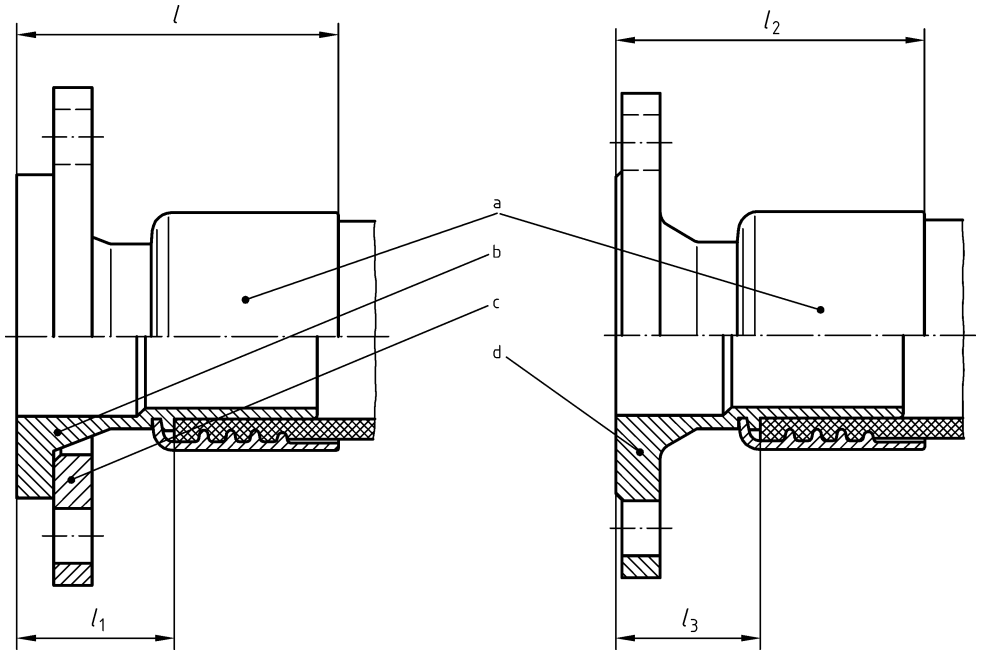
Figure 4 — Union nuts

Table 4 — Dimensions for union nuts Type A and Type B

Dimensions in millimetres

Internal thread	d_5 min.	d_6 ± 0,2	d_7 min.	d_8 + 0,2	d_9 min.	b_2 min.	h min.	l_6 min.	l_7 min.	l_8 + 0,2	l_9 ± 1	s min.
1¾"ACME	48	45,5	36	40,2	—	—	—	3,5	6,5	4	23	50
2¼"ACME	67	59	45	—	72	9,5	11	6	—	5	27	—
3¼"ACME	88	84	62	—	94	13,5	12	9	8	—	37	—

For assembly of fittings with nominal size DN 75 with union nuts 44 balls of 5 mm diameter shall be inserted into the ring groove. The assembly opening shall be closed at the discretion of the manufacturer.



a Clamp unit according to EN 14420-3
b Hose tail with weld collar
c Loose flange
d Hose tail with fixed flange

Figure 5 — Hose fitting with flanges

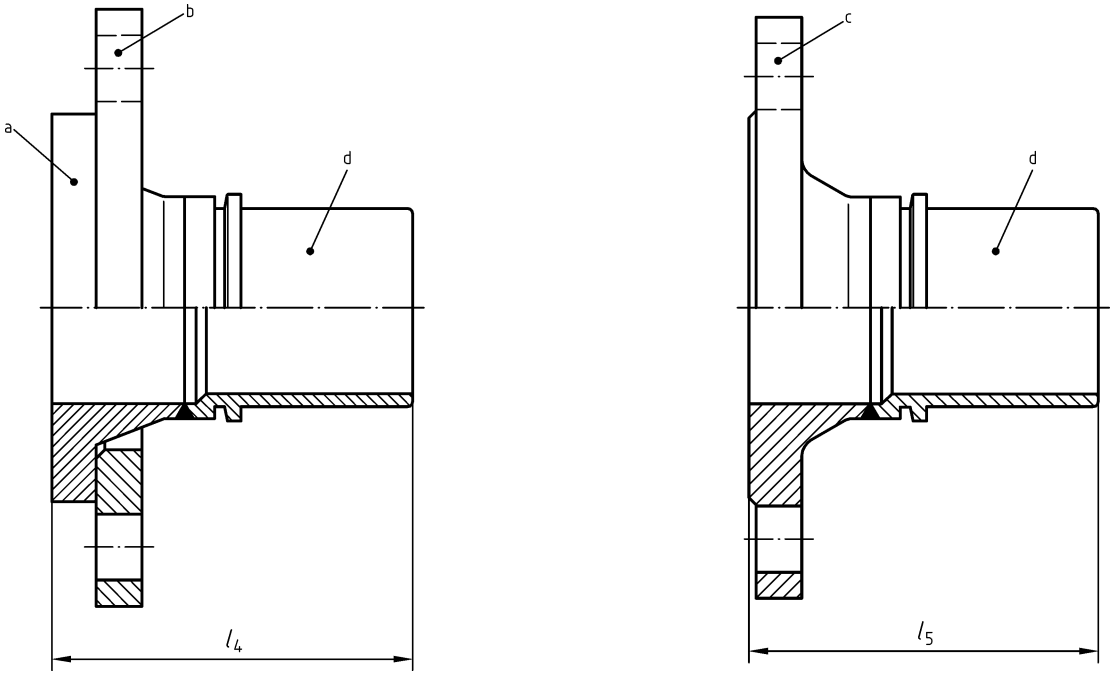
Table 5 — Dimensions for hose fittings with flanges

Dimensions in millimetres

Nominal size DN	l	l_1	l_2	l_3
15	94	51	106	63
20	99	56	111	68
25			114	71
32			115	72
40	100	58	121	
50	115	67	132	84
65	133	68	157	92
80	139	73	159	93
100	183	89	198	104
150	249		288	127
200	314	99	361	146

NOTE 1 Tails are equal to EN 14420-2.

NOTE 2 For clamps see EN 14420-3.



a Weld neck collar shall be according to EN 1092-1.

b Loose flanges shall be according to EN 1759-1, Class 150 (ASA 300 LBS).

c Fixed flange shall be according to EN 1759-1, Class 150 (ASA 300 LBS).

d Hose tail shall be according to EN 14420-2, with or without ribs at the discretion of the manufacturer.

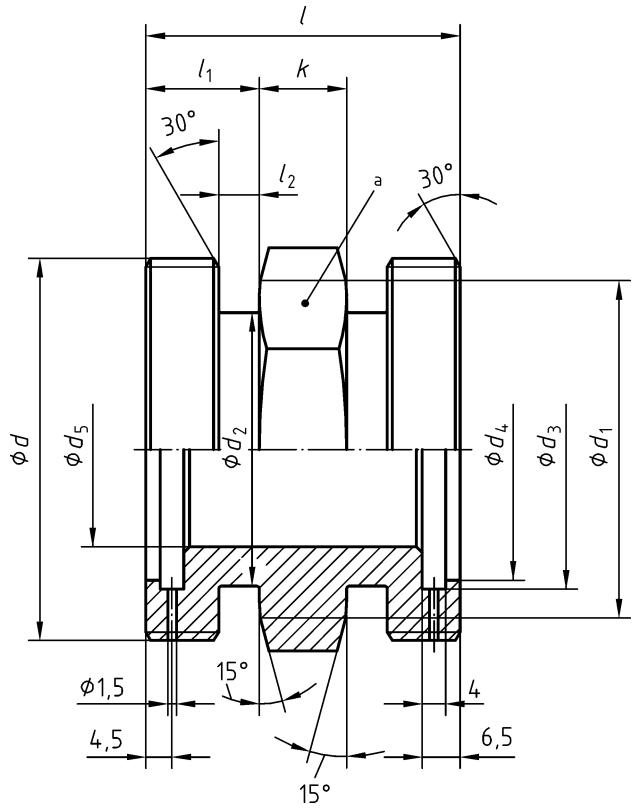
Figure 6 — Length of hose fitting with flange

Table 6 — Length of hose fitting with flange

Dimensions in millimetres

Nominal size DN	l_4 [a] min.	l_5 min.
15	91	106
20	93	110
25		115
32	95	118
40	96	120
50	109	131
65	127	152
80	137	160
100	184	205
150	256	280
200	333	356

[a] Reduced length in case of one-piece type (without welding).



[a] s = hexagonal or octagonal

Figure 7 — Doublenipple

Table 7 — Dimensions for doublenipple

Dimensions in millimetres

d	d_1	d_2	d_3	d_4	d_5 + 0	l + 1	l_1 + 0,5	l_2	k	s
1¾"ACME	44	34	34,7	33	24	40	16,5	4,5	7	46
2¼"ACME	58	47	48	45	33,5	54	19,5	7	15	60
3¼"ACME	83	72	73,5	70,5	54	70	25		20	85

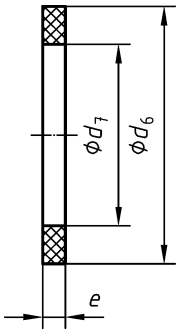
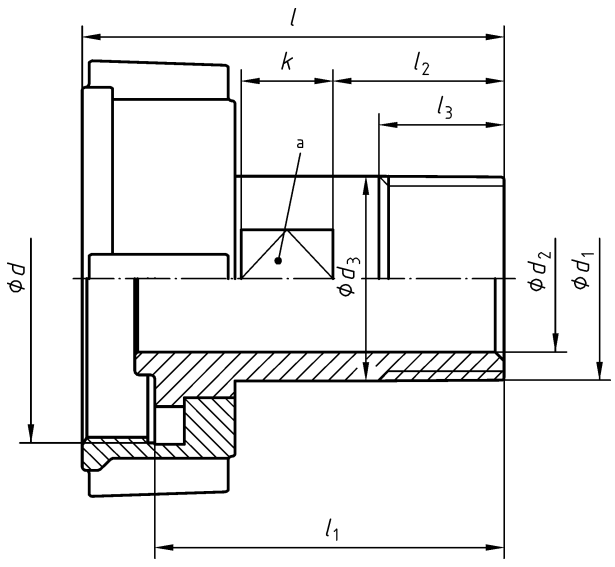


Figure 8 — Thread gasket

Table 8 — Dimensions for thread gasket

Dimensions in millimetres

d	d_6	d_7	e
1¾"ACME	34	24	3
2¼"ACME	47,5	37,5	3
3¼"ACME	73	63	3



[a] Two flats

Figure 9 — Reducing fitting

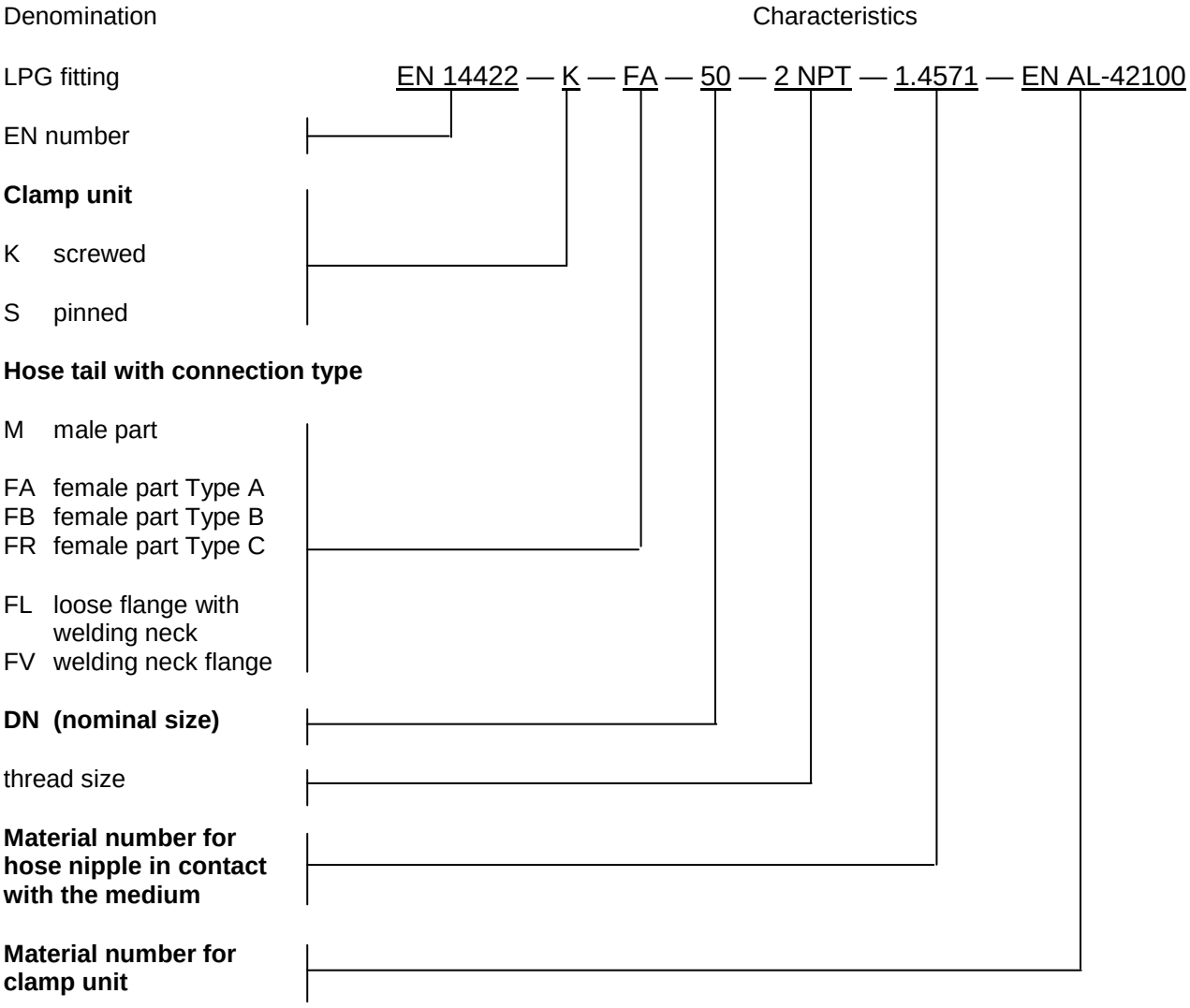
Table 9 — Dimensions for reducing fittings

Dimensions in millimetres

d	d_1	d_2 ± 0,5	d_3 ± 0,5	l min.	l_1 min.	l_2 min.	l_3 ± 0,5	k ± 1	**width across flats**
1¾"ACME	1"NPT	24	33,5	69	54	28	20,5	16	30
2¼"ACME	1¼"NPT	29	43	81	65	31	24	22	36
3¼"ACME	2"NPT	48	60,5	93	77	31,5	25	24,5	55
NOTE Dimensions for collar see Table 3; dimensions for union nut see Table 4.									

5.2 Ordering designation system

Example for an ordering designation of a complete LPG fitting:



The materials of fitting parts not in contact with the medium (e.g. union nut, loose flange) shall be given additionally in the order.

6 Materials

6.1 General

Other materials having at least equivalent mechanical characteristics may be agreed as they are defined in the particular material standard of the stated materials under 6.2 to 6.4.

6.2 Hose tails and union nuts

Hose tails and union nuts shall be made of the following materials:

a) non-alloyed steels

11SMnPb30	material number 1.0718	according to EN 10087
S235JR	material number 1.0038	according to EN 10025-2

S355J0	material number 1.0553	according to EN 10025-2
S355J0+N	material number 1.0553+N	according to EN 10025-2
P235TR1	material number 1.0254	according to EN 10216-1

b) stainless steels

GX5CrNiMo19-11-2	material number 1.4408	according to EN 10283
X5CrNi18-10 (not suitable for welding connections)	material number 1.4301	according to EN 10088-1
X6CrNiTi18-10	material number 1.4541	according to EN 10088-1
X6CrNiMoTi17-12-2	material number 1.4571	according to EN 10088-1

c) copper-zinc alloys (up to nominal size DN 75)

Forgings made from extruded products

CuZn39Pb3-H080	material number CW614N	according to EN 12420
CuZn40Pb2-H080	material number CW617N	according to EN 12420

Bars

CuZn39Pb3 – R360 min	material number CW614N	according to EN 12164
CuZn40Pb2 – R360 min	material number CW617N	according to EN 12164

Pipes

CuZn39Pb3 – H090 min	material number CW614N	according to EN 12168
CuZn40Pb2 – H090 min	material number CW617N	according to EN 12168

6.3 Weld-neck collars and weld-neck flanges

Weld-neck collars and weld-neck flanges shall be made of the following materials:

a) non-alloyed steels

S235JR	material number 1.0038	according to EN 10025-2
S355J0	material number 1.0553	according to EN 10025-2
S355J0+N	material number 1.0553+N	according to EN 10025-2
C22.8	material number 1.0460	according to EN 1092-1
P265GH(HII)	material number 1.0425	according to EN 10028-2

b) stainless steels

GX5CrNiMo19-11-2	material number 1.4408	according to EN 10283
X6CrNiTi18-10	material number 1.4541	according to EN 10088-1
X6CrNiMoTi17-12-2	material number 1.4571	according to EN 10088-1

Further materials according to EN 1092-1 are permitted as well.

6.4 Loose flanges

Loose flanges shall be made of the following materials:

a) unalloyed steels

S235JR	material number 1.0038	according to EN 10025-2
S355J0	material number 1.0553	according to EN 10025-2
S355J0+N	material number 1.0553+N	according to EN 10025-2

b) stainless steels

GX5CrNiMo19-11-2	material number 1.4408	according to EN 10283

X5CrNi18-10	material number 1.4301	according to EN 10088-1
X6CrNiTi18-10	material number 1.4541	according to EN 10088-1
X6CrNiMoTi17-12-2	material number 1.4571	according to EN 10088-1

Materials according to EN 1092-1 are permitted as well.

6.5 Clamp shells

For materials for clamp shells, see EN 14420-3.

6.6 Surface finish

Hose fittings and metallic components according to this document made from non-alloyed steel shall be electric galvanised and chromated with coatings A2C or A3C according to EN ISO 4042:1999, Annex E.

Other surface finishes should be agreed between the manufacturer and the customer.

6.7 Thread gasket

Materials shall be selected to be resistant to the fluid/product/liquid being conveyed.

The materials shall be preferably selected from the following:

a) Polyurethane (PUR);

b) Polytetrafluoroethylene (PTFE);

c) Nitrile butadiene rubber (NBR);

d) Fluoro rubber (FPM).

Thread gaskets shall be made from non-asbestos materials.

7 Marking

If appropriate surface area is available, hose tails and union nuts for thread connections and hose tails for welding connections shall be clearly and durably marked with the following information:

a) EN 14422;

b) manufacturer's name or trademark;

c) nominal size;

d) material number (at least for stainless steels).

The marking of standardised weld-neck collars, loose flanges and fixed flanges shall be as given in EN 1092-1.

8 Type testing and quality control

8.1 General

Within the framework of the quality control to be performed in-plant, the manufacturer shall provide evidence regarding the specimens from the series production that hose fittings withstand the stresses safely to be expected during operation.

The requirements for the testing of the whole hose fitting are specified in detail in the EN-product standards for hoses (e.g. EN 12115) within the framework of hose assembly testing.

A quality management system (QMS) is recommended, e.g. according to EN ISO 9001.

8.2 Type-test

Hose fittings shall be coupled together and then after a period of 10 min holding at ambient temperature with 3 times of the respective maximum working pressure (proof pressure) no leaks shall be observed at the interface of the hose fittings. The hose fittings shall withstand 5 times the respective maximum working pressure (burst pressure), using water as the test medium.

Type-tests shall be carried out at least after 5 years or always in case of a technical change. This also includes changes in the manufacturing process.

Type-tests shall be carried out at least at one reference nominal diameter, e.g. NW 50, of each construction type of the product range of the manufacturer.

8.3 Sampling

Couplings shall be submitted to random testing and checked for imperfections, such as cracks or moulding defects, in accordance with inspection level II, AQL 25, as specified in ISO 2859-1.

9 Mounting of hose fittings

Careful selection of the hose fitting shall be made to ensure that the inner diameter (ID), outer diameter (OD), and maximum working pressure (WP) of the hose are within the limits and tolerances of the couplings detailed in this document. The materials shall be tested for the products and medium being transferred.

NOTE Any mismatch could lead to a safety issue.

Bibliography

[1] EN 14420-5, *Hose fittings with clamp units — Part 5: Threaded connections*

[2] EN 14424, *Hose fittings with screwed ferrules*

[3] EN 15202:2012, *LPG equipment and accessories — Essential operational dimensions for LPG cylinder valve outlet and associated equipment connections*

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

[5] EN ISO 6708:1995, *Pipework components — Definition and selection of DN (nominal size) (ISO 6708:1995)*

[6] EN ISO 9001, *Quality management systems — Requirements (ISO 9001)*

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