BS EN 14420-1:2013

BSI Standards Publication

Hose fittings with clamp units

Part 1: Requirements, types of fixing and connection, designation and testing

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National foreword

This British Standard is the UK implementation of EN 14420-1:2013. It supersedes BS EN 14420-1:2004 which is withdrawn.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.

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Hose fittings with clamp units - Part 1: Requirements, types of fixing and connection, designation and testing

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Schlaucharmaturen mit Klemmfassungen - Teil 1: Anforderungen, Arten der Befestigung und Verbindung, Bezeichnung und Prüfung

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Foreword

This document (EN 14420-1:2013) 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of an identical text or by endorsement, at the latest by January 2014, and conflicting national standards shall be withdrawn at the latest by January 2014.

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 14420-1:2004+A1:2007.

In comparison to EN 14420-1:2004+A1:2007, the following changes have been made:

— In Clause 1, a warning regarding operation has been added.

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

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

— In 4.2, requirements for electrical conductivity of plastic coated hose assemblies has been inserted.

— In 4.3, permissible working pressures for aluminium cast fittings in EN 14420-7 and hose fittings according to EN 14420-8 have been specified.

— Clause 5 "Survey" has been renamed "Types of fixing and connection".

— Clause 7 "Type testing and quality control" has been completely reviewed.

— The Bibliography has been revised.

— The standard has been revised editorially.

EN 14420, *Hose fittings with clamp units* consists of the following parts:

— *Part 1: Requirements, types of fixing and connection, designation and testing*

— *Part 2: Hose side parts of hose tail*

— *Part 3: Clamp units, bolted or pinned*

— *Part 4: Flange connections*

— *Part 5: Threaded connections*

— *Part 6: TW tank truck couplings*

— *Part 7: Cam locking couplings*

— *Part 8: Symmetrical half coupling (Guillemin system)*

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 requirements, types of fixing and connection, designation and testing for hose fittings with clamp units for hoses made of rubber/plastics or thermoplastics preferably for use with flammable and non-flammable products. It contains requirements for hose fittings to ensure that, when used appropriately, the user or third persons are not exposed to hazards from fire, explosions or acid burns, for example from mineral oils or chemicals, and that the environment is protected from pollution and other detritus.

For maximum working pressure (WP) and temperature see 4.3.

WARNING — Before decoupling of the quick coupling connections according to Parts 6, 7 and 8, the assembly should be at atmospheric pressure.

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 10204, *Metallic products — Types of inspection documents*

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 14420-4, *Hose fittings with clamp units — Part 4: Flange connections*

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

EN 14420-6, *Hose fittings with clamp units — Part 6: TW tank truck couplings*

EN 14420-7, *Hose fittings with clamp units — Part 7: Cam locking couplings*

EN 14420-8, *Hose fittings with clamp units — Part 8: Symmetrical half coupling (Guillemin system)*

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)*

EN ISO 8330:2008, *Rubber and plastics hoses and hose assemblies — Vocabulary (ISO 8330:2007)*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 8330:2008 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. It 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
PN
alphanumeric designation used for reference purposes related to a combination of mechanical and dimensional characteristics of a component of a hose fitting

Note 1 to entry: It comprises the letters PN followed by a dimensionless number.

Note 2 to entry: The number following the letters PN does not represent a measurable value and should not be used for calculation purposes except where specified in the relevant standard.

4 Requirements

4.1 General

Hose fittings shall withstand the mechanical, thermal and chemical stresses and shall be impermeable and resistant to flammable and non-flammable water-polluting fluids and their vapours except liquid natural gas and vapour.

Hose fittings shall be designed so that they comply with the requirements of this European Standard when attached correctly and establish a frictional and positive-locking tight connection on the hose.

Hose fittings together with the hoses shall be mounted in such a manner, when specified in a hose product standard (e.g. EN 12115), that any electrostatic charging is safely led off. Hose assemblies shall be fastened or removed to exclude the risk of sparking in explosion-endangered zones. This can be avoided by choice of materials, such as stainless steel or copper-zinc alloys.

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

Only ductile metallic materials shall be used for hose fittings and hose clamps.

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 to minimize shear stress to the hoses.

If plastic coatings are provided it shall be assured by appropriate measures that the required electric conductivity of the hose assembly is maintained.

Clamp units shall be attachable without special tools and be re-usable. Clamp units shall be replaced in sets.

The type of connection and the material shall be selected in consideration of the potential hazard caused by the medium and in view of the operating conditions.

In this series of European Standards gaskets in hose fittings shall be made of non-asbestos materials.

4.2 Resistance of the fitting materials to the medium

Consideration shall be given to the potential hazard caused by the medium and the operating conditions when selecting the type of connection.

In individual cases, other concentrations and additions to the medium as well as increase of temperature can reduce the resistance of the metallic materials. In these cases, details shall be agreed between purchaser and manufacturer.

The fitting components can be surface protected, e.g. nickel-plated, zinc-plated, chrome-plated or polymer coating. Details shall be agreed between purchaser and manufacturer.

If plastic coating is intended, it shall be ensured by measures that the prescribed electrical conductivity of the hose assembly is observed.

The pairing of fittings from different material groups shall be avoided, if the presence of electrolytes is expected (contact corrosion).

4.3 Permissible working pressures and temperatures

All hose fittings according to EN 14420-2, EN 14420-3, EN 14420-4 and EN 14420-5 shall be applicable to the working pressure range of –0,8 bar to 25 bar[1)].

All hose fittings according to EN 14420-6 and EN 14420-7 shall be applicable to the working pressure range from -0,8 bar to 16 bar. Exceptions hereof are the aluminium cast fittings in EN 14420-7, whose maximum working pressure is limited to 10 bar.

Only hose fittings according to EN 14420-8 having elongation values of more than 4 % are applicable to the working pressure range of –0,8 bar to 16 bar.

Unless otherwise specified, a working temperature range of –20 °C to +65 °C shall apply.

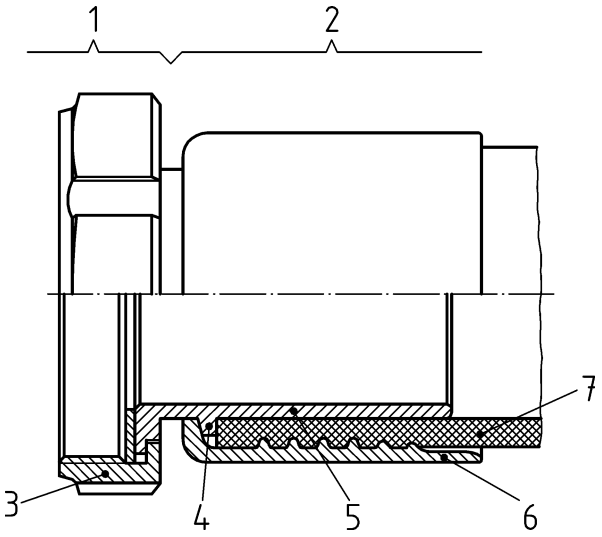
NOTE Permissible pressures and temperatures of hose assemblies are limited by the hoses and gaskets used.

1) 1 bar = 0,1 MPa.

5 Types of fixing and connection

5.1 General

An example of a complete hose fitting with clamp unit is given in Figure 1.

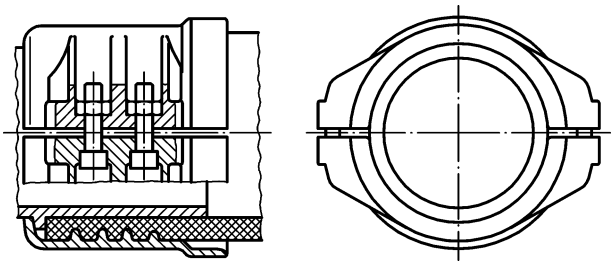
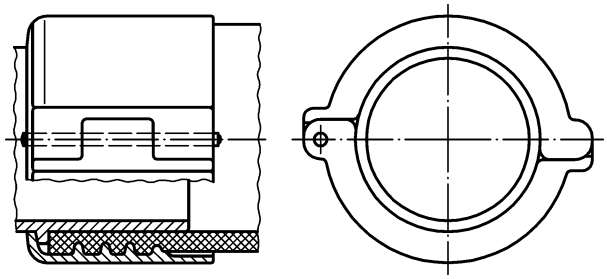


Key
1 connection side
2 hose side
3 connecting part shown here with internal pipe thread
4 securing collar
5 hose side part of tail
6 clamp unit
7 hose

Figure 1 — Example of a complete hose fitting with clamp unit

5.2 Types of fixing on hose side

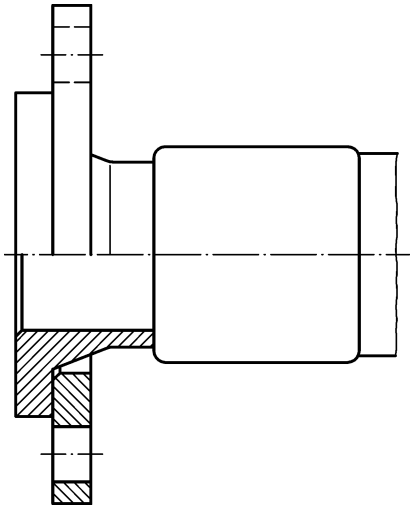
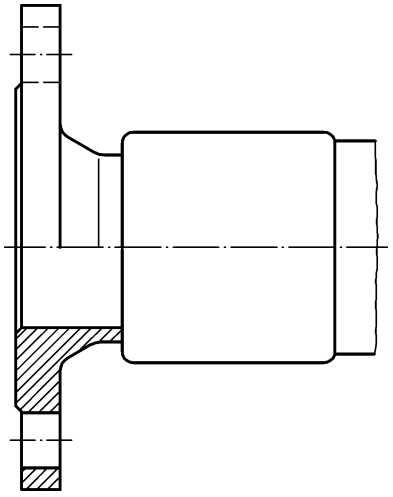
Table 1 — Types of fixing on hose side

Type of fixing	Type	Nominal size DN [a]	Material groups of fitting parts not in contact with the medium
Clamp unit, bolted, according to EN 14420-3 	K	15	Aluminium alloys, stainless steels, copper-zinc alloys
		20	
		25	
		32	
		40	
		50	
		65	
		80	
		100	
		150	
		200	
Clamp unit, pinned, according to EN 14420-3 	S	25	Aluminium alloys, stainless steels
		32	
		40	
		50	
		65	
		80	
		100	
NOTE For details see EN 14420-2 and EN 14420-3.			
[a] For inside diameter of hoses see EN 14420-2.			

5.3 Types of connection

5.3.1 Hose fittings with flange connection

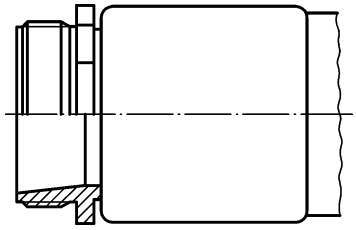
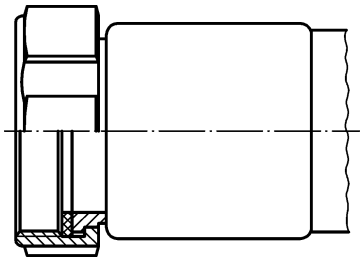
Table 2 — Hose fittings with flange connection

Connection type [a]	Type	Nominal size DN	Connection	Material groups of fitting parts in contact with the medium
Loose flange Hose fitting according to EN 14420-4 	FL	15 20 25 32 40 50 65 80 100 150 200	Dimensions of flange connection for PN 10 [a]	Non-alloyed steels, stainless steels
Fixed flange Hose fitting according to EN 14420-4 	FV	15 20 25 32 40 50 65 80 100 150 200		

[a] Flange type to be agreed between manufacturer and purchaser (other types according to EN 1092-1 may be agreed).

5.3.2 Hose fittings with threaded connection

Table 3 — Hose fittings with threaded connection

Connection type [a]	Type	Nominal size DN	Connection	Material groups of fitting parts in contact with the medium
Pipe thread according to EN ISO 228-1 with external thread Hose fitting according to EN 14420-5 Hose tail according to EN 14420-2 Clamp units according to EN 14420-3 	GA	15	G ½ A	Aluminium alloys, non-alloyed steels, copper-zinc alloys, copper-tin alloys, stainless steels
		20	G ¾ A	
		25	G 1 A	
		32	G 1 ¼ A	
		40	G 1 ½ A	
			G 2 A	
		50	G 2 A	
		65	G 2 ½ A	
			G 3 A	
		80	G 3 A	
		100	G 4 A	
Pipe thread according to EN ISO 228-1 with union nut and thread gasket Hose fitting according to EN 14420-5 Hose tail according to EN 14420-2 Clamp units according to EN 14420-3 	G	15	G ½	
			G ¾	
		20	G ¾	
			G 1	
		25	G 1	
			G 1 ¼	
		32	G 1 ¼	
			G 1 ½	
		40	G 1 ½	
			G 2	
		50	G 2	
			G 2 ½	
		65	G 2 ½	
			G 3	
		80	G 3	
		100	G 4	

[a] Other types of threads are to be agreed between manufacturer and purchaser.

5.3.3 Hose fittings with quick coupling connection

When separating the quick coupling connections given in Table 4, the line pressure shall be relieved to atmospheric pressure, before disconnection.

Table 4 — Hose fittings with quick coupling connection

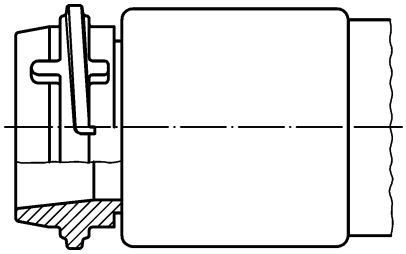
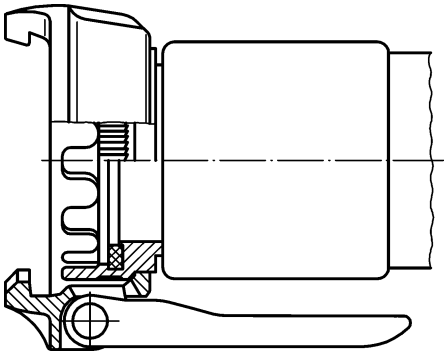
Connection type	Type	Nominal size DN	Connection	Material groups of fitting parts in contact with the medium
TW tank truck couplings Male coupling with hose tail, one-piece, see EN 14420-6 Hose tail according to EN 14420-2 Clamp unit according to EN 14420-3 	VKS [a]	40	VK 50	Aluminium alloys, copper-zinc alloys, stainless steels
		50	VK 50	
		65	VK 80	
		80	VK 80	
		100	VK 100	
TW tank truck couplings Female coupling with hose tail, one-piece with main gasket, see EN 14420-6 Hose tail according to EN 14420-2 Clamp unit according to EN 14420-3 	MKS [a]	40	MK 50	
		50	MK 50	
		65	MK 80	
		80	MK 80	
		100	MK 100	

Table 4 (*continued*)

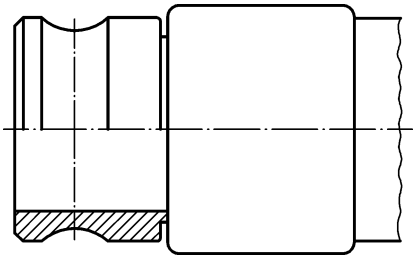
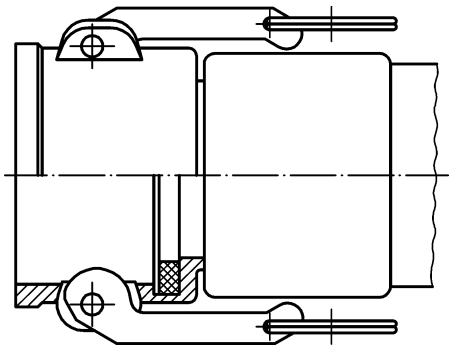
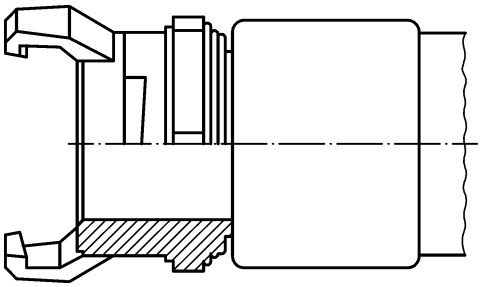
Connection type	Type	Nominal size DN	Connection	Material groups of fitting parts in contact with the medium
Cam locking coupling Male coupling according to EN 14420-7 Hose tail according to EN 14420-2 Clamp unit according to EN 14420-3 	EC [b]	20	EC 20	Copper-zinc alloys, copper-tin alloys, stainless steels
		25	EC 25	
		32	EC 32	
		40	EC 40	
		50	EC 50	
		65	EC 65	
		80	EC 80	
		100	EC 100	
Cam locking coupling Female coupling with main gasket according to EN 14420-7 Hose tail according to EN 14420-2 Clamp unit according to EN 14420-3 	CC [b]	20	CC 20	
		25	CC 25	
		32	CC 32	
		40	CC 40	
		50	CC 50	
		65	CC 65	
		80	CC 80	
		100	CC 100	

Table 4 (*continued*)

Connection type	Type	Nominal size DN	Connection	Material groups of fitting parts in contact with the medium
Symmetrical half couplings (Guillemin system) according to EN 14420-8 Hose tail according to EN 14420-2 Clamp unit according to EN 14420-3 	SGD [c]	20	GS 20	Aluminium alloys, copper-tin alloys, stainless steels
		25	GS 25	
		32	GS 32	
		40	GS 40	
		50	GS 50	
		65	GS 65	
		80	GS 80	
		100	GS 100	

[a] Forms VKS and MKS can also be obtained by screwing together a hose tail form GA according to EN 14420-5 with a male coupling for tank trucks form VK or a female coupling for tank trucks form MK, respectively.

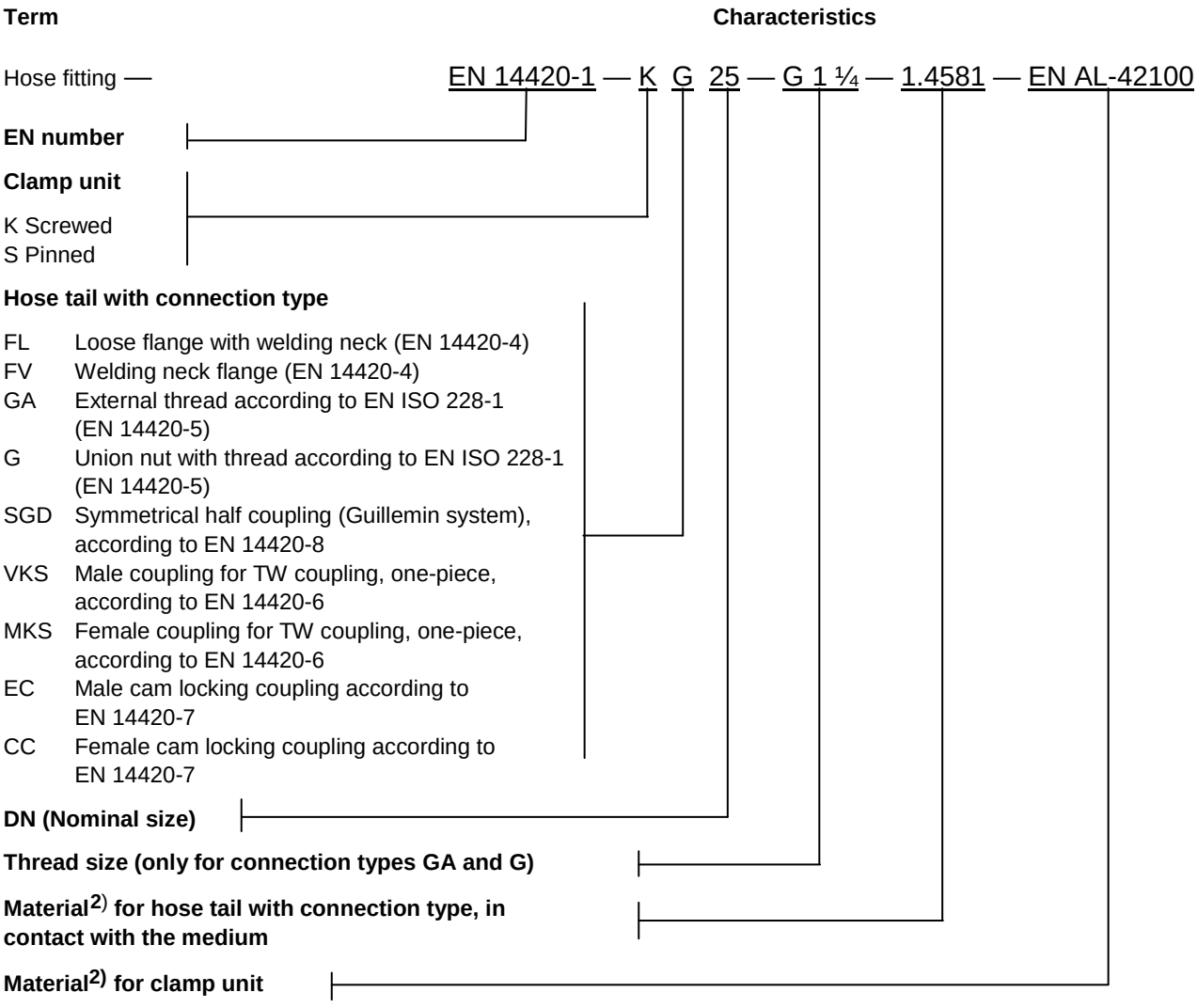
[b] Forms EC and CC can also be obtained by screwing together a hose tail form GA according to EN 14420-5 with a male cam locking coupling AF or a female cam locking coupling DF according to EN 14420-7, respectively.

[c] Form SGD can also be obtained by screwing together a hose tail form GA according to EN 14420-5 with form SGF according to EN 14420-8.

6 Ordering designation system

The material of fitting parts not in contact with the medium (e.g. union nut, loose flange) shall be included in the ordering designation.

EXAMPLE 1 For an ordering designation:



EXAMPLE 2 For the designation of a complete hose fitting:

Designation of a complete hose fitting consisting of a screwed clamp unit (K) and a hose tail with grooved union nut (G) for nominal size DN 25, union nut G 1 ¼, hose tail made of stainless steel (1.4581) and clamping jaws made of aluminium alloy (EN AL-42100):

Hose fitting EN 14420-1 — K G 25 — G 1 ¼ — 1.4581 — EN AL-42100

2) For materials, see respective part of this series of standards EN 14420.

7 Type testing and quality control

7.1 General

As defined by the quality control processes to be carried out at the plant the manufacturer shall verify on test samples from serial production that hose fittings safely withstand the operating stresses.

The same applies for separately delivered parts of a coupling.

The requirements for testing the complete hose assembly is detailed in the product EN hose standard (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.

The concept of the quality management system has to be presented if requested by the purchaser. Details may be agreed upon between purchaser and supplier.

Upon request of the purchaser the manufacturer or supplier confirms by the means of a test report 2.2 according to EN 10204 that the hose fittings comply with all requirements of this European Standard.

7.2 Type-test

Hose fittings according to this part and with hose tails in accordance with EN 14420-2 and matching clamp units in accordance with EN 14420-3, EN 14420-4 and EN 14420-5, and complete couplings as detailed in EN 14420-6, EN 14420-7 shall be coupled together. Then, after a period of 10 min holding at ambient temperature with one and half time of the respective maximum working pressure no leaks shall be observed at the interface of the hose fittings. The hose fittings shall withstand 3 times the respective maximum working pressure, using water as the test medium.

Hose fittings according to EN 14420-8 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 no leaks shall be observed at the interface of the hose fittings and shall withstand 5 times the respective maximum working 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 size, e.g. DN 50, of each construction type of the product range of the manufacturer.

7.3 Sampling

Hose fittings shall undergo a sampling test for dimensional stability and shall be examined for defects, e.g. cracks or lappings according to ISO 2859-1, inspection level II, AQL 25.

8 Mounting of hose fittings

The coupling shall be safely secured to the hose.

Careful selection of the hose fittings should 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 tails and clamps detailed in the relevant Parts of this European Standard. It should also be ensured that the materials have been tested for the products and medium being conveyed.

9 Marking

For marking of the single parts of the fittings see respective part of this series of European Standards EN 14420.

Bibliography

[1] EN 853, *Rubber hoses and hose assemblies — Wire braid reinforced hydraulic type — Specification*

[2] EN 854, *Rubber hoses and hose assemblies — Textile reinforced hydraulic type — Specification*

[3] EN 855, *Plastics hoses and hose assemblies — Thermoplastics textile reinforced hydraulic type — Specification*

[4] EN 856, *Rubber hoses and hose assemblies — Rubber-covered spiral wire reinforced hydraulic type — Specification*

[5] EN 857, *Rubber hoses and hose assemblies — Wire braid reinforced compact type for hydraulic applications — Specification*

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

[7] EN 1360, *Rubber and plastic hoses and hose assemblies for measured fuel dispensing — Specification*

[8] EN 1761, *Rubber hoses and hose assemblies for fuel truck delivery — Specification*

[9] EN 1762, *Rubber hoses and hose assemblies for liquefied petroleum gas, LPG (liquid or gaseous phase), and natural gas up to 25 bar (2,5 MPa) — Specification*

[10] EN 1765, *Rubber hose assemblies for oil suction and discharge services — Specification for the assemblies*

[11] EN 12115, *Rubber and thermoplastics hoses and hose assemblies for liquid or gaseous chemicals — Specification*

[12] EN 13482, *Rubber hoses and hose assemblies for asphalt and bitumen — Specification*

[13] EN 13483, *Rubber and plastic hoses and hose assemblies with internal vapour recovery for measured fuel dispensing systems — Specification*

[14] EN 13765, *Thermoplastic multi-layer (non-vulcanized) hoses and hose assemblies for the transfer of hydrocarbons, solvents and chemicals — Specification*

[15] EN 13766, *Thermoplastic multi-layer (non-vulcanized) hoses and hose assemblies for the transfer of liquid petroleum gas and liquefied natural gas — Specification*

[16] EN 26801, *Rubber or plastics hoses — Determination of volumetric expansion*

[17] EN ISO 1825, *Rubber hoses and hose assemblies for aircraft ground fuelling and defuelling — Specification (ISO 1825)*

[18] EN ISO 4641, *Rubber hoses and hose assemblies for water suction and discharge — Specification (ISO 4641)*

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

[20] EN ISO 6802, *Rubber and plastics hoses and hose assemblies with wire reinforcements — Hydraulic impulse test with flexing (ISO 6802)*

[21] EN ISO 7326, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions (ISO 7326)*

[22] EN ISO 8029, *Plastics hose — General-purpose collapsible water hose, textile-reinforced — Specification (ISO 8029)*

[23] EN ISO 8033, *Rubber and plastics hoses — Determination of adhesion between components (ISO 8033)*

[24] EN ISO 9000, *Quality management systems — Fundamentals and vocabulary (ISO 9000)*

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

[26] EN ISO 9004, *Managing for the sustained success of an organization - A quality management approach (ISO 9004)*

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