BS EN 14420-3:2013

BSI Standards Publication

Hose fittings with clamp units

Part 3: Clamp units, bolted or pinned

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National foreword

This British Standard is the UK implementation of EN 14420-3:2013. It supersedes BS EN 14420-3:2004 which is withdrawn.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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English Version

Hose fittings with clamp units - Part 3: Clamp units, bolted or pinned

Raccords pour flexibles avec demi-coquille - Partie 3: Colliers boulonnés ou goupillés

Schlaucharmaturen mit Klemmfassungen - Teil 3: Klemmfassungen, verschraubt oder verstiftet

This European Standard was approved by CEN on 15 May 2013.

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Foreword

This document (EN 14420-3:2013) 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of an identical text or by endorsement, at the latest by January 2014, and conflicting national standards shall be withdrawn at the latest by January 2014.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 14420-3:2004.

In comparison to EN 14420-3:2004, the following changes have been made:

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

— A new Clause 3 "Terms and definitions" has been added.

— In Clause 4, the note has been deleted.

— In 6.1.1.2, dimensions and tolerances of clamp unit K, bolted, have been revised (see Table 4).

— In 7.2, the requirements for aluminium alloys have been amended.

— In Clause 8, the note has been deleted.

— The Bibliography has been reviewed.

— 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)*

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1 Scope

This European Standard specifies requirements for clamp units for hose couplings according to EN 14420-1 for use with hose tails according to EN 14420-2.

Maximum working pressure is 25 bar; maximum working temperature is 65 °C.

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 586-2, *Aluminium and aluminium alloys — Forgings — Part 2: Mechanical properties and additional property requirements*

EN 1706, *Aluminium and aluminium alloys — Castings — Chemical composition and mechanical properties*

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

EN 10213, *Steel castings for pressure purposes*

EN 12420, *Copper and copper alloys — Forgings*

EN 14420-1:2013, *Hose fittings with clamp units — Part 1: Requirements, types of fixing and connection, designation and testing*

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

EN 22768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications (ISO 2768-1)*

EN 22768-2, *General tolerances — Part 2: Geometrical tolerances for features without individual tolerance indications (ISO 2768-2)*

EN ISO 3506-1, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs (ISO 3506-1)*

EN ISO 3506-2, EN ISO 3506-2, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 2: Nuts (ISO 3506-2)*

EN ISO 4032, *Hexagon regular nuts (style 1) — Product grades A and B (ISO 4032)*

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

EN ISO 4762, *Hexagon socket head cap screws (ISO 4762)*

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

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]

4 Fixing range of clamp units

The pinching range of the clamp units shall be according to Table 1.

Table 1 — Pinching range of clamp units

Dimensions in millimetres

Nominal size	**Hose inside diameter**		**Hose outside diameter range with shank inserted [a] (fixing range)**	
DN		Tolerances	Clamp unit K, bolted	Clamp unit S, pinned
15	13	± 0,5	22 to 24	—
20	19	± 0,5	30 to 33	—
25	25	± 0,5	36 to 39	36 to 38
32	32	± 0,5	43 to 46	43 to 45
40	38	± 0,5	50 to 53	50 to 52
50	50	± 0,7	63 to 67	63 to 67
65	63	± 0,8	78 to 82	78 to 81
80	75	± 0,8	89 to 93	89 to 92
100	100	± 0,8	114 to 119	115 to 118
150	150	$^{+1,5}_{-0,8}$	167 to 173	—
200	200	$^{+2}_{-0,8}$	222 to 229	—

[a] Hose shank shall be according to EN 14420-2.

5 Types of clamp units and designations

5.1 General

The different types are:

a) clamp unit K, bolted according to 5.2;

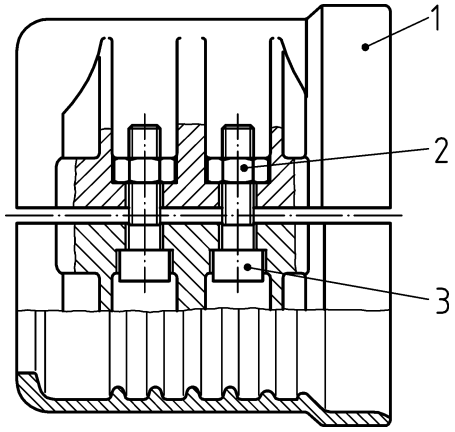
b) clamp unit S, pinned according to 5.3.

NOTE The design of clamp unit K allows for expert adjustment in certain cases.

The clamp unit shells need not comply with Figure 1 to Figure 4, only the dimensions specified need to be complied with.

5.2 Clamp unit K, bolted

A parts list of clamp unit K (Figure 1) is given in Table 2. The dimensions of clamp unit K shall be according to Figure 3 and Table 4.



Key
1 clamp unit shell
2 hexagon nut
3 hexagon socket head screw

Figure 1 — Clamp unit K

Example for an ordering designation of a complete clamp unit K bolted for nominal size DN 50 made of copper-zinc-alloy CW 614 N:

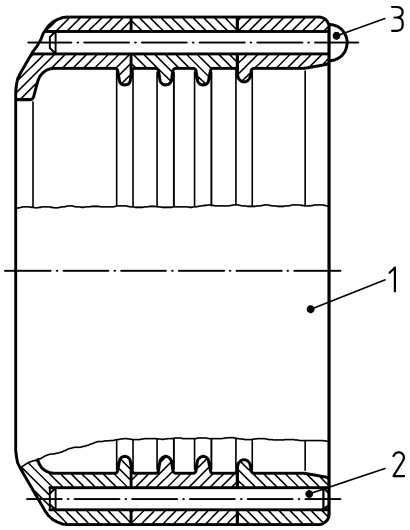
Clamp unit EN 14420-3 — K 50 — CW 614 N

Table 2 — Parts list of clamp unit K

Item No.	Designation	Nominal size DN	Number of parts
1	Clamp unit shell	15 to 200	2
2	Hexagon socket head screw	≤ 100	4
		150	6
		200	8
3	Hexagon nut	≤ 100	4
		150	6
		200	8

5.3 Clamp unit S, pinned

A parts list of clamp unit S (Figure 2) is given in Table 3. The dimensions of clamp unit S shall be according to Figure 4 and Table 5.



Key
1 clamp unit shell
2 hinge pin
3 locking pin

Figure 2 — Clamp unit S

Example for an ordering designation of a complete clamp unit S, pinned for nominal size DN 50 from aluminium alloy EN AC-42100:

Clamp unit EN 14420-3 — S 50 — EN AC-42100

Table 3 — Parts list of clamp unit S

Item No.	Designation	Nominal size DN	Number of parts
1	Clamp unit shell	25 to 100	2
2	Hinge pin		1
3	Locking pin		1

6 Dimensions and weights

6.1 Clamp units

6.1.1 Dimensions

6.1.1.1 General

Tolerances for dimensions without specified tolerances:

Dimensions for machined parts: general tolerances shall be according to EN 22768 — mK:

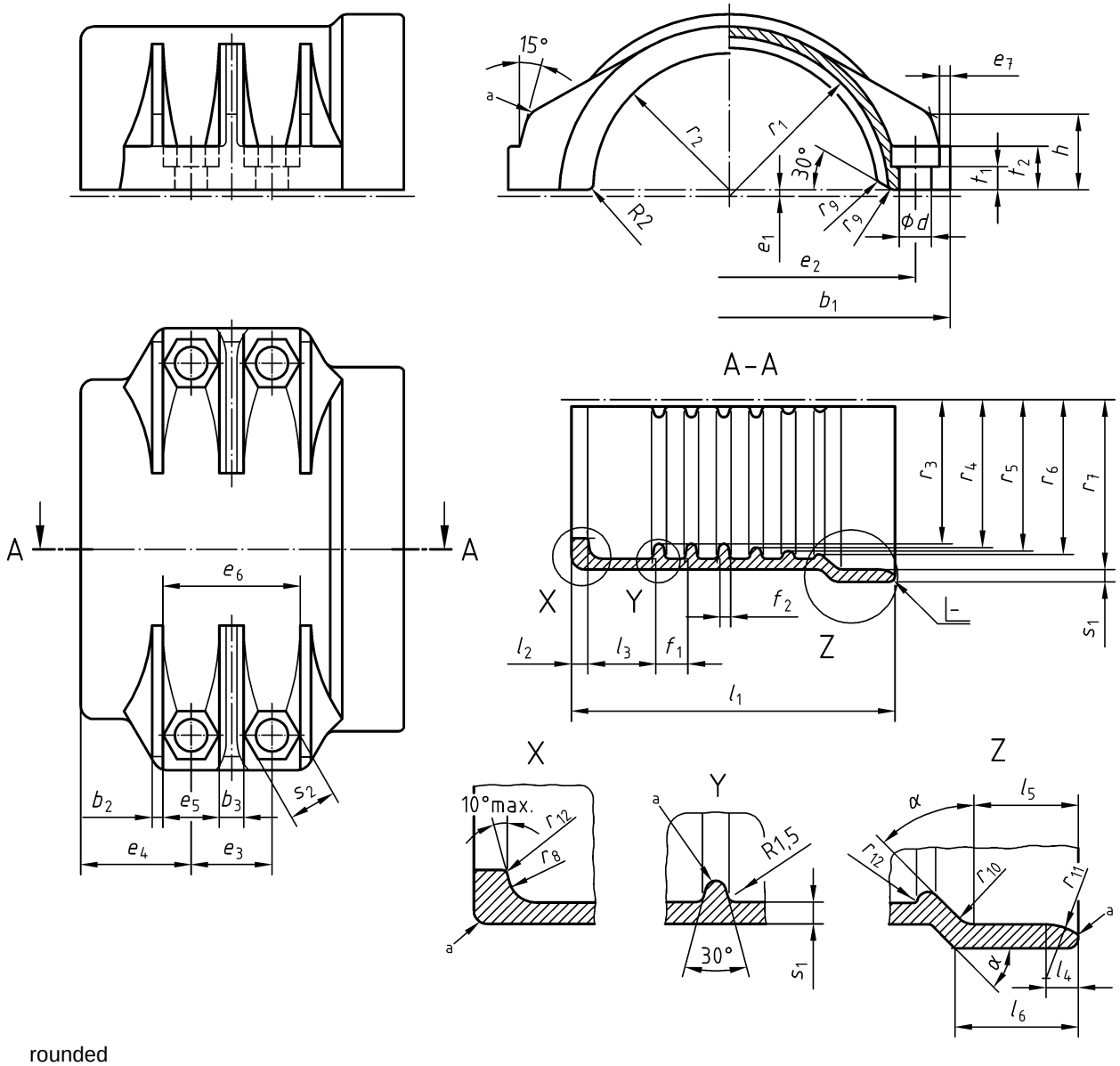
— die forging qualities made from wrought copper alloy shall be according to EN 12420;

— die forging qualities in aluminium and aluminium alloys shall be according to EN 586-2 and EN 1706.

NOTE Details not specified are at the discretion of the manufacturer.

6.1.1.2 Clamp unit K, bolted

DN 100 is shown.



a rounded

Figure 3 — Clamp unit K, bolted

Table 4 — Dimensions of clamp unit K, bolted

Dimensions in millimetres

Nominal size	b_1		b_2	Ribs b_3	Ribs Number	Bolt holes d	Bolt holes Number	e_1	e_2		e_3		e_4	e_5	e_6	e_7	f_1	f_2
DN		Tolerances						± 0,5		Tolerances		Tolerances						
15	51	± 2,0	3	—	—	7	4	1,5	35	± 0,5	16	± 0,5	17	—	30	—	9	3
20	63								45									
25	69								51									
32	76	+ 3,0 − 2,0						1,7	58									
40	83								65	± 0,8								
50	102					9,5		2	83		20	± 0,8	18		39		10	4
65	120	+ 4,0 − 2,0							98		22		24		41			
80	132							2,5	110									
100[b]	166		4	9	1	12			140		30		41	21	—	3,5	12	5
100[c]	166								141	± 0,4		± 0,2						
150	227	+ 6,0 − 2,0	5	12	2	14	6		198	± 1,0	45	± 1,0	45	32		5	15	6
200	284		6	14	3		8	4,5	255	± 1,6	46		41			—	24	

Nominal size	h	l_1	l_2	l_3	l_4	l_5	l_6	r_1		r_2		Ribs r_3			r_4	
DN	± 1,0	min.				min.	min.		Tolerances		Tolerances		Tolerances	Number		Tolerances
15	10	49	3	11,5	4	12	13	12	± 0,3	6,8	± 0,3	9	± 0,3	2	—	—
20	12							16		9,8		12,5				
25								19	± 0,4	12,8		15,5				
32								22,5		16,3		19,5	± 0,4			
40			3,5					26		19,3		22,5				
50	17	55		16				33,5		25,3		29,5				
65		73	4	16,5	5	20	20	41	± 0,5	31,8		37	± 0,5	3		
80		75		18,5			21	47		38	± 0,5	42,5				
100[b]	28	119	6	24	6	25	26	60	± 0,65	50,7	± 0,7	55	± 0,6		55,5	± 0,6
100[c]		120						60,5				56,5			57	
150	33	179	10	27	11	32	32	87	± 0,8	75,7		79,5		5	80	
200	29	239	13	37	15	40	47	114		101	± 1,0	107	± 0,8	4	108,5	± 0,8

Table 4 *(continued)*

Nominal size	Ribs																
	r_5		r_6		r_7		r_8	r_9	r_{10}	r_{11}	r_{12}	s_1	s_2		t_1	t_2	t_3
DN		Tolerances		Tolerances		Tolerances						min.		Tolerances	min.		≈
15	—	—	9,5	± 0,3	13	± 0,3	1	1,5	3	8	0,5	2,5	10,7	0 – 0,6	4,5	10	45°
20			14		17		1,5	2			0,75						
25			17		20	± 0,4											
32			20	± 0,4	23,5		2				1				5,5	12	
40			23,5		27												
50			30,5	± 0,5	35,5	± 0,5						3	13,8				
65			38		42,5				4			3,5					a
80			43,5		48												
100[b]	56,25	± 0,6	57	± 0,6	62	± 0,6	2,5	3		10	1,25	4,5	17,8		8	16	
100[c]	57,75		58,5		64,5					8	0,5	5,5		0 – 0,8			
150	81	± 0,8	82	± 0,8	90	± 0,8	3		5	14	1,5	6,5	20		10	20	
200	110		111,5		118				6	15					12	22	

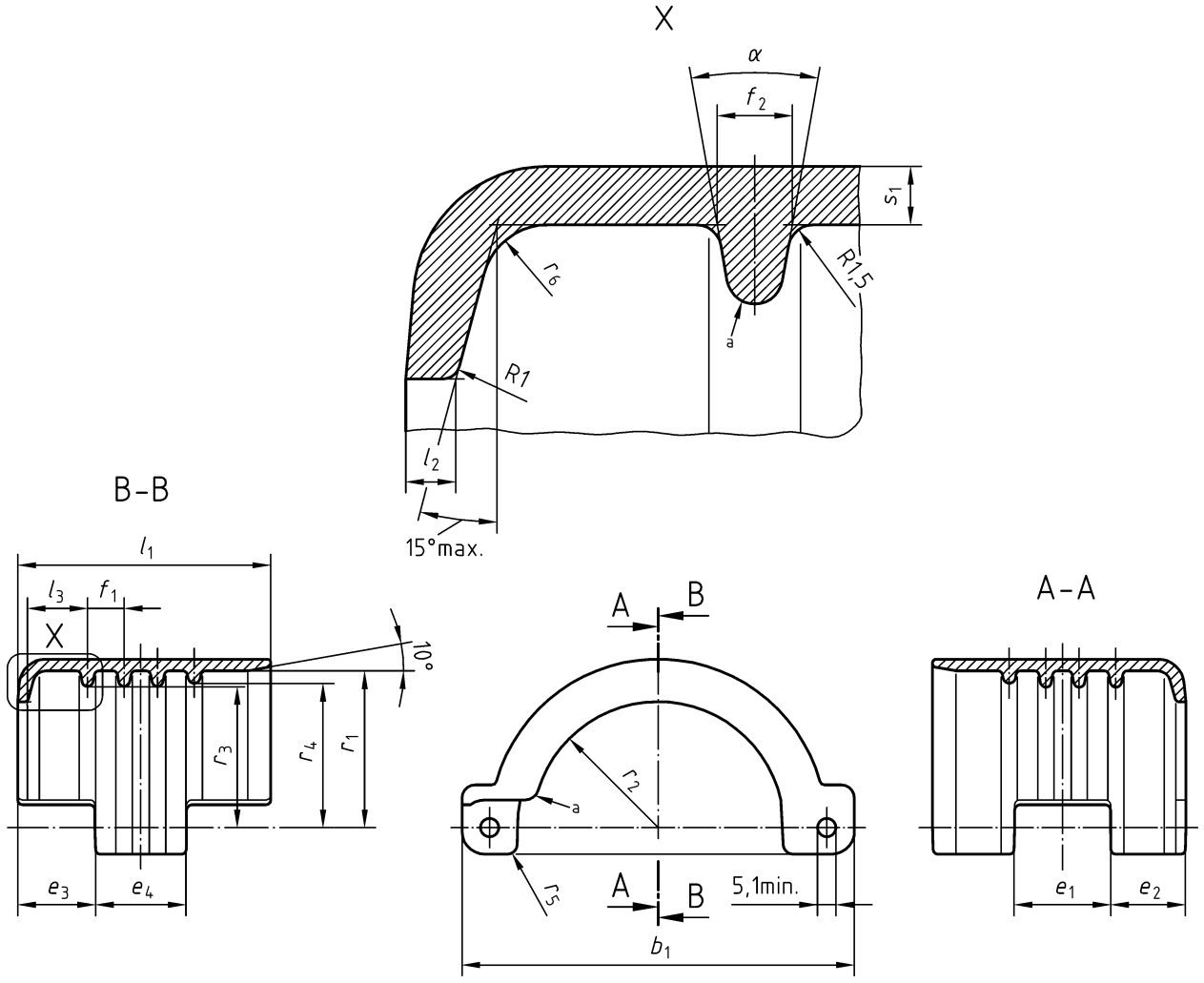
a At the discretion of the manufacturer.

b For clamp unit, bolted 100 x 8.

c For clamp unit, bolted 100 x 10.

6.1.1.3 Clamp unit S, pinned

DN 50 is shown as chosen example.



a rounded
α 20° to 30°

Figure 4 — Clamp unit S, pinned

Table 5 — Dimensions for clamp unit S, pinned

Dimensions in millimetres

Nominal size	b_1		e_1	e_2	e_3	e_4	$e_1 - e_4$[a]	f_1		f_2	l_1	l_2	l_3
DN		Tolerances	max.	min.	min.	min.		± 1,0	Number	$^{0}_{-0,5}$	min.	± 1,0	± 1,0
25	58	± 2	22,5	12,5	13	18,5	$1^{+0,6}_{-0,2}$	9	3	**4**	**46**	**3**	13,25
32	66	$^{+3}_{-2}$		13,5	14						**48**		
40	73		24,5	13,5	14	22,5	$1^{+0,6}_{-0,3}$	10			**52**		
50	89			15,5	16						**56**		17
65	107	$^{+4}_{-2}$	29	22,5	23	26			4	**5**	**74**	**3,5**	18
80	118			23,5	24						**76**		20
100	149		32	30,5	31	28,5		11			**92**	**5**	27

a e_1 to e_4 applies for each set of pinned clamp shells.

Nominal size	r_1		r_2		r_3		r_4		r_5	r_6	s_1
DN		Tolerances		Tolerances		Tolerances		Tolerances	min.	max.	min.
25	19	± 0,4	12,8	± 0,3	15,5	± 0,4	16,5	± 0,4	2	4	2,5
32	22,5		16,3		19,5		20				
40	26,5		19,3		22,5		23,5				3
50	34,5	± 0,5	25,3		29	± 0,5	30,5	± 0,5			
65	41,5		31,8		36,5		37,5		2,5	5	
80	47		38	± 0,5	42		43				
100	60		50,5		54,5		56				4

6.1.2 Weights

The weights for complete clamp units according to their nominal sizes (DN) are given in Table 6.

Table 6 — Weights for complete clamp units

Nominal size	**Clamp unit K, bolted weight (mass)** kg ≈			**Clamp unit S, pinned weight (mass)** kg ≈	
DN	aluminium	brass	stainless steel	aluminium	stainless steel
15	0,1	0,3	0,25	—	—
20	0,1	0,3	0,3	—	—
25	0,15	0,4	0,4	0,1	0,3
32	0,15	0,4	0,4	0,1	0,3
40	0,15	0,45	0,45	0,15	0,45

Table 6 *(continued)*

Nominal size	**Clamp unit K, bolted weight (mass)** kg ≈			**Clamp unit S, pinned weight (mass)** kg ≈	
DN	aluminium	brass	stainless steel	aluminium	stainless steel
50	0,3	0,8	0,8	0,2	0,6
65	0,45	1,1	1,1	0,35	1
80	0,5	1,3	1,3	0,4	1,1
100	1	2,5	2,5	0,7	2,1
150	3,4	9,3	[a]	—	—
200	6,5	[a]	[a]	—	—

[a] Weight not specified.

6.2 Nuts, bolts and pins

Nuts, bolts and pins to be used for clamp units shall be as given in Table 7.

Table 7 — Nuts, bolts and pins

Nominal size	**Clamp unit K, bolted**		**Clamp unit S, pinned**	
DN	Socket head screw according to EN ISO 4762	Hexagonal nut according to EN ISO 4032	hinge pin	locking pin
15	M6 × 20	M6	—	—
20				
25			Minimum diameter 5 mm	Minimum diameter 5 mm
32				
40				
50	M8 × 25	M8		
65				
80				
100	M10 × 40	M10		
150	M12 × 50	M12	—	—
200	M12 × 60			

7 Materials

7.1 General

Whatever the kind of manufacturing procedure is, the minimum mechanical characteristics shall be equivalent to the mechanical characteristics of forgings (in case of aluminium and brass) and investment casting (in case of stainless steel), using the materials specified in this document.

7.2 Clamp shells

Clamp shells shall be made of the following materials:

a) stainless steels

X5CrNiMo17-12-2	material number 1.4401 according to EN 10088-1
X2CrNiMo17-12-2	material number 1.4404 according to EN 10088-1
GX5CrNiMo19-11-2	material number 1.4408 according to EN 10213
GX5CrNiMoNb19-11-12	material number 1.4581 according to EN 10213

b) aluminium alloys

EN AC Si7Mg0,3	material number EN AC-42100 according to EN 1706
EN AC Si7Mg0,6	material number EN AC-42200 according to EN 1706

These grades shall be heat treated according to manufacturer's specification and shall have a breaking elongation of at least 5 %.

EN AW-AlSi1MgMn	material number EN AW-6082 according to EN 586-2

c) copper-zinc-alloys

Parts forged from extruded materials:

CuZn39Pb3-H080	material number CW 614 N according to EN 12420
CuZn40Pb2-H080	material number CW 617 N according to EN 12420

7.3 Bolts and nuts

Tensile strength classes for bolts and nuts are given in Table 8.

For clamp shells K made of aluminium alloys or copper-zinc-alloy, bolts and nuts shall be made from un-alloyed steel.

Table 8 — Tensile strength class for bolts and nuts

Nominal size	**Tensile strength class according to**	
	EN ISO 898-1	**EN ISO 898-2**
DN	Bolts	Nuts
15 to 40	10.9	10
50 to 150	8.8	8
200	10.9	10

Bolts and nuts shall have electroplated coating A2C or A3C according to EN ISO 4042.

For clamp unit K made of stainless steel:

Bolts shall be of steel group A4 with tensile strength class 70 and nuts shall be of steel group A4 with tensile strength class 50 according to EN ISO 3506-1 and EN ISO 3506-2.

7.4 Pins

Pins shall be made of the following materials:

— At clamp unit S:

X4CrNi18-12	material number 1.4303 according to EN 10088-1
X10CrNi18-8	material number 1.4310 according to EN 10088-1

Minimum tensile strength shall be 600 N/mm^2 for each material.
Other stainless steels meeting the same performance requirements are permitted.

8 Marking

The clamp units shall be clearly and durably marked on the clamp shells, at least with the following information:

a) outside:

   1) EN 14420-3;

   2) manufacturers name or trademark;

   3) material number;

b) inside:

   1) nominal size (DN);

   2) hose inside diameter and range of hose outside diameter (e.g. 50/63-67) or hose inside diameter and hose wall thickness or range of hose wall thickness respectively (e.g. 50 × 8 or 50 × 7-9 respectively).

For clamp units with mounted hinge pin it is permitted to do the marking either on one clamp shell only or to split the marking on both shells.

9 Type testing and quality control

Type testing and quality control shall be done according to EN 14420-1:2013, Clause 7.

Bibliography

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

[2] EN ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs (ISO 898-1)*

[3] EN ISO 898-2, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 2: Nuts with specified property classes — Coarse thread and fine pitch thread (ISO 898-2)*

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