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BSI Standards Publication

Specification for fire hose couplings and ancillary equipment

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Foreword

Publishing information

This British Standard is published by BSI and came into effect on 30 April 2010. It was prepared by Technical Committee FSH/17, *Fire brigade equipment*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

BS 336:2010 supersedes BS 336:1989, which is withdrawn.

Information about this document

Although dimensions are given in metric terms, screwed and instantaneous couplings and connectors manufactured in accordance with this specification are interchangeable with existing couplings.

The figures are included in the main body of the specification, so that reference may be made readily to a requirement in the text and to the relevant information in tables and figures.

A minimum bore for delivery hose couplings is specified to assist with the specification of hose repair tools which have to pass through the couplings.

Delivery hose components are suitable for use with layflat hose conforming to BS 6391, suction hose components are suitable for use with hose conforming to BS 3165 or BS EN ISO 14557, and hose reel fittings are suitable for use with hose conforming to BS EN 1947. Hand-controlled branchpipes are covered by BS EN 15182.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Where optional recommendations are included, they are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

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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Section 1: General

1 Scope

This British Standard specifies requirements for couplings, connectors and other components for use with delivery hose conforming to BS 6391 and suction hose conforming to BS 3165 or BS EN ISO 14557, suitable for firefighting purposes up to a working pressure not exceeding 16 bar. It also applies to other items of equipment associated with the use of firefighting hose.

Annex A to Annex E specify methods for testing various aspects of performance. Annex F lists the standards specifying the materials for components listed in Table 2a).

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.

BS 750:2006, *Specification for underground fire hydrants and surface box frames and covers*

BS 970-4, *Specification for wrought steels for mechanical and allied engineering purposes – Part 4: Valve steels*

BS 1134 (both parts), *Assessment of surface texture*

BS 1154, *Specification for natural rubber compounds*

BS 1473, *Specification for wrought aluminium and aluminium alloys for general engineering purposes – Rivet, bolt and screw stock*

BS 1474, *Specification for wrought aluminium and aluminium alloys for general engineering purposes – Bars, extruded round tubes*

BS 1580-1:2007, *Unified screw threads – Part 1: Screw threads with diameters $\frac{1}{4}$ in and larger – Requirements*

BS 2090:1954, *Aluminium alloy AL-P2024-T3 – Clad sheet and strip – $0,3 \text{ mm} \leq a \leq 6 \text{ mm}$*

BS 2752, *Specification for chloroprene rubber compounds*

BS 3102, *Specification for brass eyelets and washers for general purpose*

BS 3165, *Specification for rubber and plastics suction hoses and hose assemblies for fire-fighting purposes*

BS 3734-1, *Rubber – Tolerances for products – Part 1: Dimensional tolerances*

BS 4422, *Fire – Vocabulary*

BS 5163-2, *Valves for waterworks purposes – Part 2: Stem caps for use on isolating valves and associated water control apparatus – Specification*

BS 5599, *Specification for hard anodic oxide coatings on aluminium for engineering purposes*

BS 6017, *Specification for copper refinery shapes*

BS 6282, *Devices with moving parts for the prevention of contamination of water by backflow*

- BS 6391, *Specification for non-percolating layflat delivery hoses and hose assemblies for fire fighting purposes*
- BS EN 485 (all parts), *Aluminium and aluminium alloys – Sheet, strip and plate*
- BS EN 515, *Aluminium and aluminium alloys – Wrought products – Temper designations*
- BS EN 573-2, *Aluminium and aluminium alloys – Chemical composition and form of wrought products – Part 2: Chemical symbol based designation system*
- BS EN 573-3, *Aluminium and aluminium alloys – Chemical composition and form of wrought products – Part 3: Chemical composition*
- BS EN 573-4, *Aluminium and aluminium alloys – Chemical composition and form of wrought products – Part 4: Forms of products*
- BS EN 754-1, *Aluminium and aluminium alloys – Cold drawn rod/bar and tube – Part 1: Technical conditions for inspection and delivery*
- BS EN 754-2:1997, *Aluminium and aluminium alloys – Cold drawn rod/bar and tube – Part 2: Mechanical properties*
- BS EN 754-7:1997, *Aluminium and aluminium alloys – Cold drawn rod/bar and tube – Part 7: Seamless tubes, tolerances on dimensions and form*
- BS EN 754-8:1997, *Aluminium and aluminium alloys – Cold drawn rod/bar and tube – Part 8: Porthole tubes, tolerances on dimensions and form*
- BS EN 755, *Aluminium and aluminium alloys – Extruded rod/bar, tube and profiles (all parts)*
- BS EN 1011-4, *Welding – Recommendations for welding of metallic materials – Part 4: Arc welding of aluminium and aluminium alloys*
- BS EN 1057, *Copper and copper alloys – Seamless, round copper tubes for water and gas in sanitary and heating applications*
- BS EN 1473, *Installation and equipment for liquefied natural gas – Design of onshore installations*
- BS EN 1559-1, *Founding – Technical conditions of delivery – Part 1: General*
- BS EN 1559-4, *Founding – Technical conditions of delivery – Part 4: Additional requirements for aluminium alloy castings*
- BS EN 1562, *Founding – Malleable cast irons*
- BS EN 1652, *Copper and copper alloys – Plate, sheet, strip and circles for general purposes*
- BS EN 1676, *Aluminium and aluminium alloys – Alloyed ingots for remelting – Specifications*
- BS EN 1706, *Aluminium and aluminium alloys – Castings – Chemical composition and mechanical properties*
- BS EN 1947, *Fire-fighting hoses – Semi-rigid delivery hoses and hose assemblies for pumps and vehicles*
- BS EN 1976, *Copper and copper alloys – Cast unwrought copper products*
- BS EN 1978, *Copper and copper alloys – Copper cathodes*
- BS EN 1982, *Copper and copper alloys – Ingots and castings*

- BS EN 10090, *Valve steels and alloys for internal combustion engines*
- BS EN 10296 (both parts), *Welded circular steel tubes for mechanical and general engineering purposes – Technical delivery conditions*
- BS EN 10297-1, *Seamless circular steel tubes for mechanical and general engineering purposes – Technical delivery conditions – Part 1: Non-alloy and alloy steel tubes*
- BS EN 10305 (all parts), *Steel tubes for precision applications – Technical delivery conditions*
- BS EN 12020-1, *Aluminium and aluminium alloys – Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 – Part 1: Technical conditions for inspection and delivery*
- BS EN 12020-2, *Aluminium and aluminium alloys – Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 – Part 2: Tolerances on dimensions and form*
- BS EN 12163, *Copper and copper alloys – Rod for general purposes*
- BS EN 12164, *Copper and copper alloys – Rod for free machining purposes*
- BS EN 12165, *Copper and copper alloys – Wrought and unwrought forging stock*
- BS EN 12166, *Copper and copper alloys – Wire for general purposes*
- BS EN 12167, *Copper and copper alloys – Profiles and rectangular bar for general purposes*
- BS EN 12373-1, *Aluminium and aluminium alloys – Anodizing – Part 1: Method for specifying decorative and protective anodic oxidation coatings on aluminium*
- BS EN 12420, *Copper and copper alloys – Forgings*
- BS EN 12540, *Corrosion protection of metals – Electrodeposited coatings of nickel, nickel plus chromium, copper plus nickel and copper plus nickel plus chromium*
- BS EN ISO 14557, *Fire-fighting hoses – Rubber and plastics suction hoses and hose assemblies*
- BS EN 15182, *Hand-held branchpipes for fire service use*
- BS EN 27434, *Slotted set screws with cone point*
- BS EN 27435, *Slotted set screws with long dog point*
- BS EN 27436, *Slotted set screws with cup point*
- BS EN 24766, *Slotted set screws with flat point*
- BS EN ISO 228 (both parts), *Pipe threads where pressure-tight joints are not made on the threads*
- BS EN ISO 4026, *Hexagon socket set screws with flat point*
- BS EN ISO 4027, *Hexagon socket set screws with cone point*
- BS EN ISO 4028, *Hexagon socket set screws with dog point*
- BS EN ISO 4029, *Hexagon socket set screws with cup point*
- BS EN ISO 4762, *Hexagon socket head cap screws*
- BS EN ISO 7380, *Hexagon socket button head screws*
- BS EN ISO 10642, *Hexagon socket countersunk head screws*

BS EN ISO 14457, *Fire-fighting hoses – Rubber and plastics suction hoses and hose assemblies*

BS ISO 2936, *Assembly tools for screws and nuts – Hexagon socket screw keys*

3 Terms and definitions

For the purposes of this British Standard, the terms and definitions given in BS 4422 apply, together with the following.

3.1 blank cap

pressure-retaining component that fits on to a male delivery hose connector or suction connection

3.2 blank plug

pressure-retaining component that fits into a female delivery hose connector or suction connection

NOTE Dust covers, sometimes used to cover connectors, are not intended to be pressure-retaining components and might therefore not be capable of conforming to the pressure retention requirements.

4 Materials

The material for each product or component listed Table 1 shall be chosen from the list of permitted materials specified in Table 2 and the relevant clause (see Table 1).

NOTE 1 The choice of materials should be made with due regard to possible corrosion, particularly bi-metallic corrosion where different metals are in contact. Temporary, occasional contact of different metals in two products connected during use is not a problem, but where different metals are used in the same product severe corrosion can occur. In particular, aluminium and its alloys are liable to corrode when in contact with copper or its alloys, and where there is such contact suitable measures should be taken to prevent corrosion.

Particular care should be exercised in the selection of materials for use in marine environments where the water to be used in the fire hose might be seawater. Attention is drawn to BS MA 18.

NOTE 2 Materials should be free from toxic substances and should not give rise to taste, odour, cloudiness or discolouration of the water or foster any microbiological growth.

NOTE 3 It is acknowledged that materials other than those given in Table 2 may be used for couplings and that these could otherwise conform to the standard, but the use of these other materials is outside the scope of the standard.

NOTE 4 The purchaser should be advised that as far as possible the coupling of copper or copper alloy components to aluminium alloy should be avoided, particularly where contact is for long periods, as electrolytic action and consequent corrosion might result. They should also be advised that it is preferable to wash all products with fresh water after use or contact with sea water or brackish water.

Table 1 Clauses and tables relevant to each product and component

Component	Clause reference	Figure reference
Delivery hose couplings	8	1–4
Delivery hose connectors	9	5
Breechings	10	6
Branchpipes	11	7, 9
Nozzles for branchpipes	11	8
Blank caps and plugs	12	9
Chains and "S" hooks		
Standpipe shaft	13	9
Standpipe base and head		
Hydrant keys and bars	14	10
Hose reel couplings		
Suction hose couplings	15	11, 12
Suction collecting heads	16	13
Metal suction strainer	17.1	14
Basket suction strainer	17.2	15
Suction hose wrenches	18	16
Foam inlet adaptor	19	17
Springs and circlips	8.3, 9.3	—
Washers	8.4, 9.4, 11.1, 13.2, 15.2, 17.1.4	1, 2, 7, 9, 11, 12a)

Table 2a) Choice of materials: Aluminium alloys

Component	Material (see Note)									
	6082 T6 ^{A)}	6082 TF ^{A)}	LM6 M	LM16 TF	LM25 TF	5056A O or HZ	5154A ON HZ	5154A H2	5251 H4	
Delivery hose couplings	✓		✓ ^{B)}	✓	✓					
Delivery hose connectors										
Breechings			✓ ^{B)}	✓	✓					
Branchpipes										
Nozzles for branchpipes										
Blank caps and plugs			✓	✓	✓					
Chains and "5" hooks										
Standpipe shaft	✓	✓		✓	✓					
Standpipe base and head										
Hydrant keys and bars	✓	✓		✓	✓					
Suction hose couplings				✓	✓					
Suction collecting heads	✓			✓	✓	✓	✓	✓	✓	✓
Metal suction strainer				✓	✓	✓	✓	✓	✓	✓
Basket suction strainer										
Suction hose wrenches										
Foam inlet adaptor				✓ ^{C)}	✓ ^{C)}					

NOTE Table F.1 lists the standards specifying the various materials listed in Table 2a).

A) Of a gauge suitable for welding.

B) For coupling release housings only.

C) Anodized. See 5.3.

Table 2b) Choice of materials: Copper and copper alloys

Component	Material and applicable British Standard(s)										
	CR024A BS EN 1652	CR024A BS EN 1057	CR024A BS EN 12166	CR024A BS EN 1976, 1978	CW507L BS EN 1652	CW507L BS EN 12166 ^{A)}	CW508L BS EN 1652	CW712R BS EN 12165, 12420	CW712R BS EN 12163, 12164, 12167	CW609N/ CW614N/ CW617N BS EN 12165, 12420	9N/ CW614N/ CW617N BS EN 12163, 12164, 12167
Delivery hose couplings								✓		✓	✓
Delivery hose connectors								✓		✓	✓
Blank caps and plugs											
Chains and "S" hooks						✓					
Standpipe shaft	✓										
Standpipe base and head								✓		✓	✓
Hydrant keys and bars											
Hose reel couplings										✓	✓
Suction hose couplings					✓					✓	✓
Suction collecting heads			✓							✓	
Metal suction strainer											
Basket suction strainer								✓		✓	
Suction hose wrenches											
Foam inlet adaptor								✓		✓	

A) Should not be used with aluminium products.

Table 2c) Choice of materials: Copper, copper alloys and other

Component	Material and applicable British Standard(s)					Other
	CC767S BS EN 1982	CC754S BS EN 1982	CC491K BS EN 1982	CW451K BS EN 12166 ^{A)}	CW452K BS EN 12166 ^{A)}	
Delivery hose couplings	✓	✓	✓			
Delivery hose connectors						
Breechings	✓	✓	✓			
Branchpipes						
Nozzles for branchpipes						
Blank caps and plugs Chains and "S" hooks			✓	✓	✓	B)
Standpipe shaft						
Standpipe base and head	✓	✓	✓			
Suction hose couplings	✓	✓	✓			
Suction collecting heads	✓	✓	✓			
Metal suction strainer	✓	✓	✓			
Foam inlet adaptor	✓	✓	✓			
Springs and circlips				✓	✓	Steel

A) Anodized. See 5.3.

B) Steel (chrome or cadmium plated).

5 Manufacture

5.1 Castings and mouldings

Castings shall be clean, sound and free from gross porosity, cracks and other surface imperfections. No filling or similar after-treatment of castings shall be carried out without the approval of the purchaser.

NOTE On die-cast fittings where a bore is shown as parallel, a reasonable taper should be allowed to facilitate core withdrawal. However, this taper should be kept to the minimum required for this purpose.

5.2 Welding

Welds shall be free from lack of fusion, cracks, non-metallic inclusions, porosity and cavities.

Welding of aluminium shall be in accordance with BS EN 1011-4.

5.3 Finish

Machined surfaces, unless otherwise specified by the purchaser, shall be of grade N7 as assessed in accordance with BS 1134.

NOTE 1 Assessment may be made using roughness comparison specimens calibrated in accordance with BS 1134 with the agreement of the purchaser.

Where anodizing is specified by the purchaser, this shall be in accordance with BS EN 12373-1 or BS 5599. Where chrome plating is specified, it shall be in accordance with BS EN 12540.

Parts that are not machined shall be finished clean as cast.

NOTE 2 All burrs and sharp edges should be removed. Waterways, particularly the bores of branchpipes and nozzles, should have a smooth finish. The exterior of all components should be sufficiently rounded and smooth to avoid injury during handling. Surfaces in contact with hoses should be particularly smooth so as to avoid damage to the hose. All assembled threads of aluminium alloy should be coated with suitable grease before assembly.

5.4 Tolerances

Unless otherwise specified, the tolerances for all work sizes of machined parts shall be ± 0.25 mm.

NOTE Tolerances have been specified where necessary to enable components to be interchangeable, but it does not necessarily follow that every work size and tolerance has been specified. Where these are omitted the manufacturer should use experience in determining what these should be and, if necessary, should consult the purchaser.

6 Pressure retention

When tested in accordance with Annex A, the pressure retaining parts of delivery hose couplings, suction hose couplings, delivery hose connectors, dividing and collecting breechings, branchpipes, nozzles, standpipes, blank caps and plugs, suction collecting heads and foam inlet adaptors shall not exhibit leakage or permanent deformation.

7 Marking

7.1 Each product shall be permanently marked with the following.

- a) The manufacturer's name, trade mark or code.
- b) The quarter and year of manufacture.

NOTE This may be by the use of a symbol or letter code, with a number to indicate the year, for example "A/10/Q2", "A" being the manufacturer's code letter; 10/Q2 indicating that the product was made in Quarter 2 of 2010.

7.2 The manufacturer shall either:

- a) mark the product with the number and date of this British Standard, i.e. BS 336:2010¹⁾; or
- b) alternatively, indicate by certificate, packaging or literature that the product conforms to BS 336:2010¹⁾.

¹⁾ Marking BS 336:2010 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

Section 2: Specific requirements

8 Delivery hose couplings

8.1 General

8.1.1 Delivery hose couplings shall be of instantaneous pattern as shown in Figure 1 and shall conform to the applicable figure(s) indicated in Table 3, except that the release mechanism may be of the twist-release type instead of the pull-release type shown in the figures.

Table 3 Applicable figures for delivery hose couplings

Coupling type	Arrangement		
	General	Female half-coupling and washers	Male half-coupling
Multi-serrated	1a)	2, 4a)	3, 4a)
Ribbed	1b)	2, 4b)	3, 4b)

NOTE These figures are drawn with tailpieces for 70 mm hose. Although tailpieces will vary as shown in Table 4, all other dimensions remain the same for all sizes of hose. When tailpieces are above or below 70 mm the change of bore should be gradual to prevent unnecessary pressure losses and the design should be at the manufacturer's discretion.

8.2 Locking of plungers

Nuts on plungers shall be of a self-locking type.

NOTE "Peening" over the end of the shank is not regarded as an efficient means of locking the plunger.

8.3 Plunger springs

Plunger springs shall be of such strength that they can be compressed to a length sufficient to free the plunger from engagement by a force of not less than 45 N and not greater than 65 N.

8.4 Washers

Coupling washers shall have the dimensions given in Figure 2a), with tolerances conforming to BS 3734-1, Class M3, and shall be of natural rubber (grades Y40, Z40) to BS 1154 or chloroprene (grade C40) to BS 2752.

8.5 Assembly of plungers

The assembled plungers shall protrude into the bore of the female instantaneous coupling by the amount shown in Figure 2b).

Figure 1 Delivery hose couplings – general arrangement

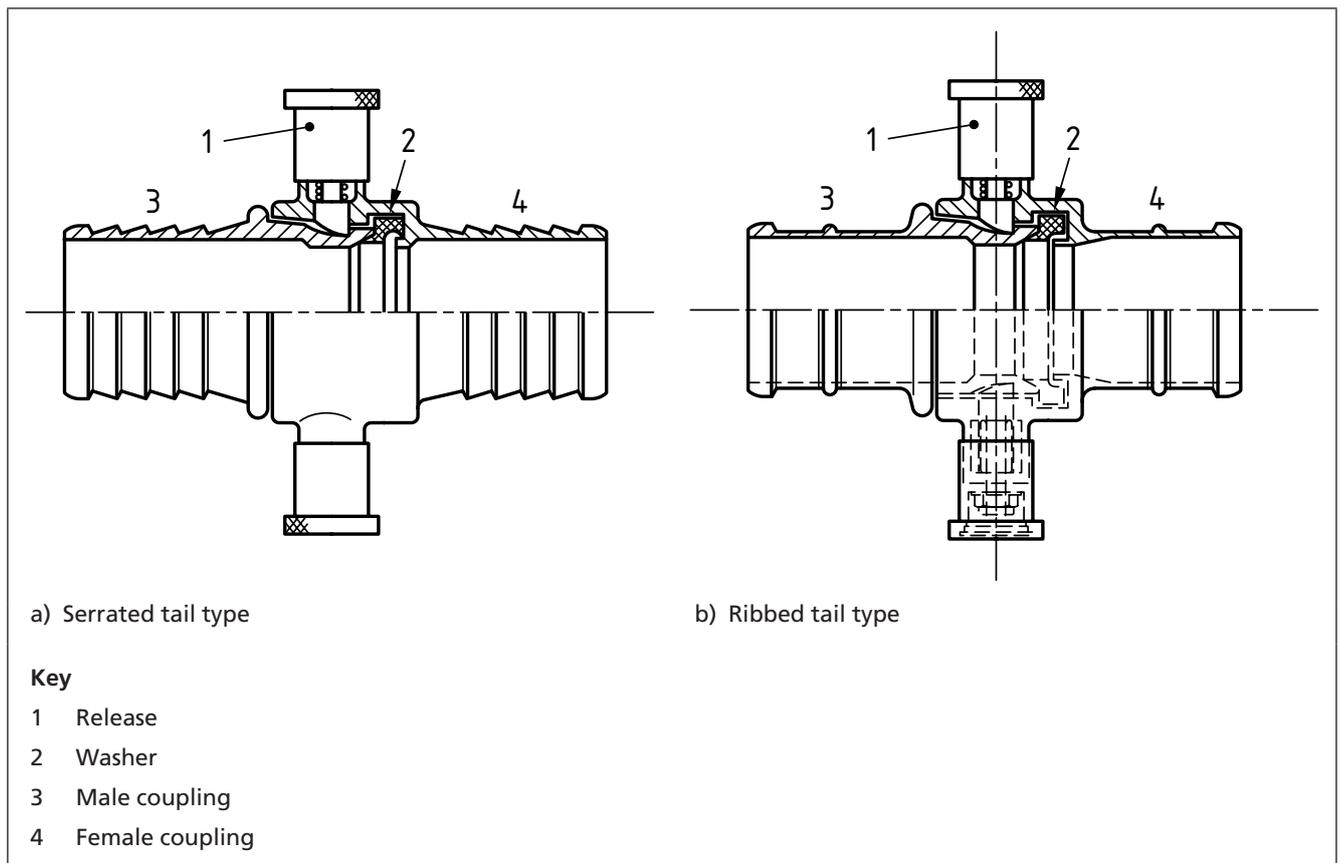


Figure 2 Female delivery hose couplings

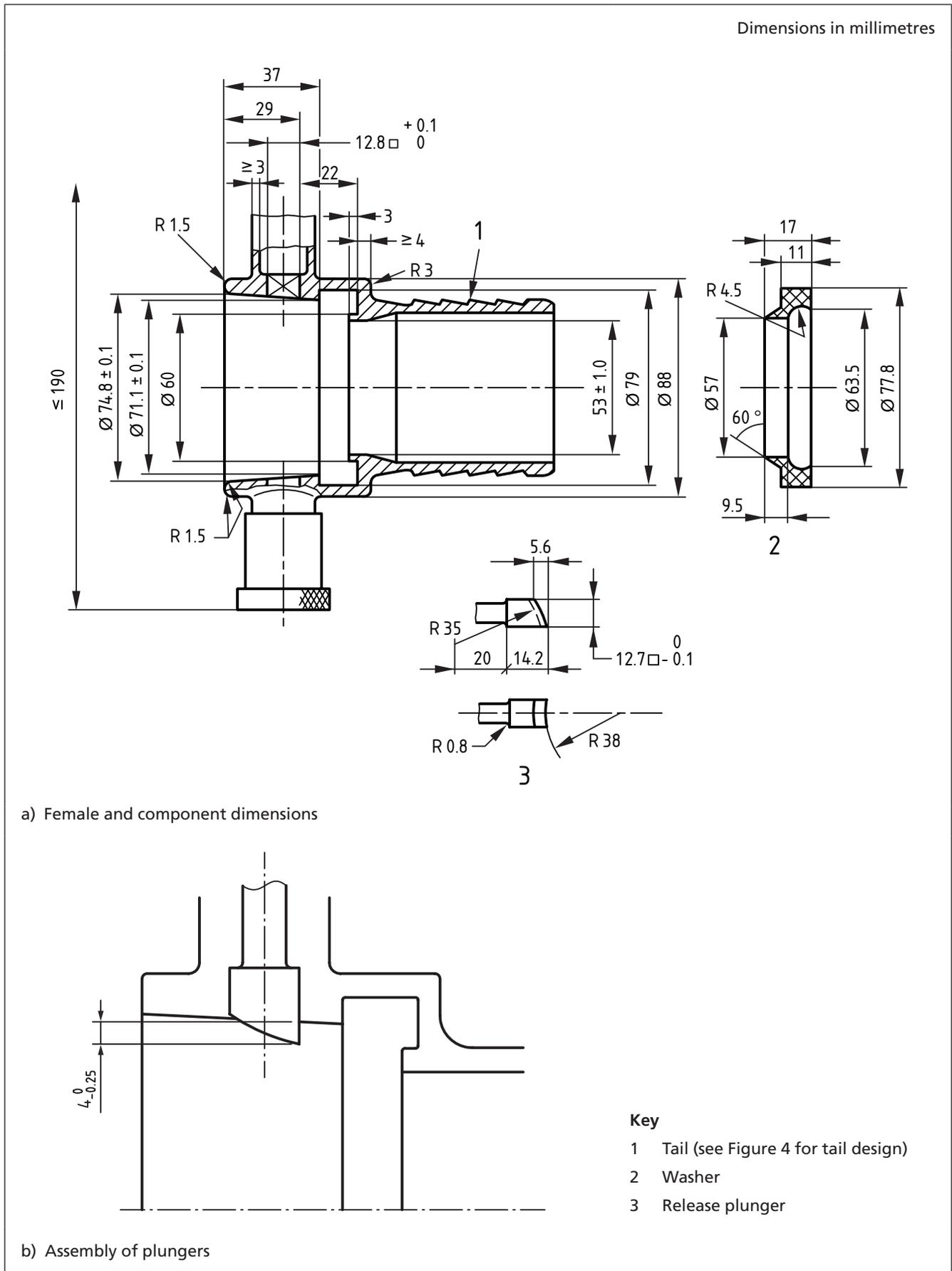


Figure 3 Male delivery hose couplings

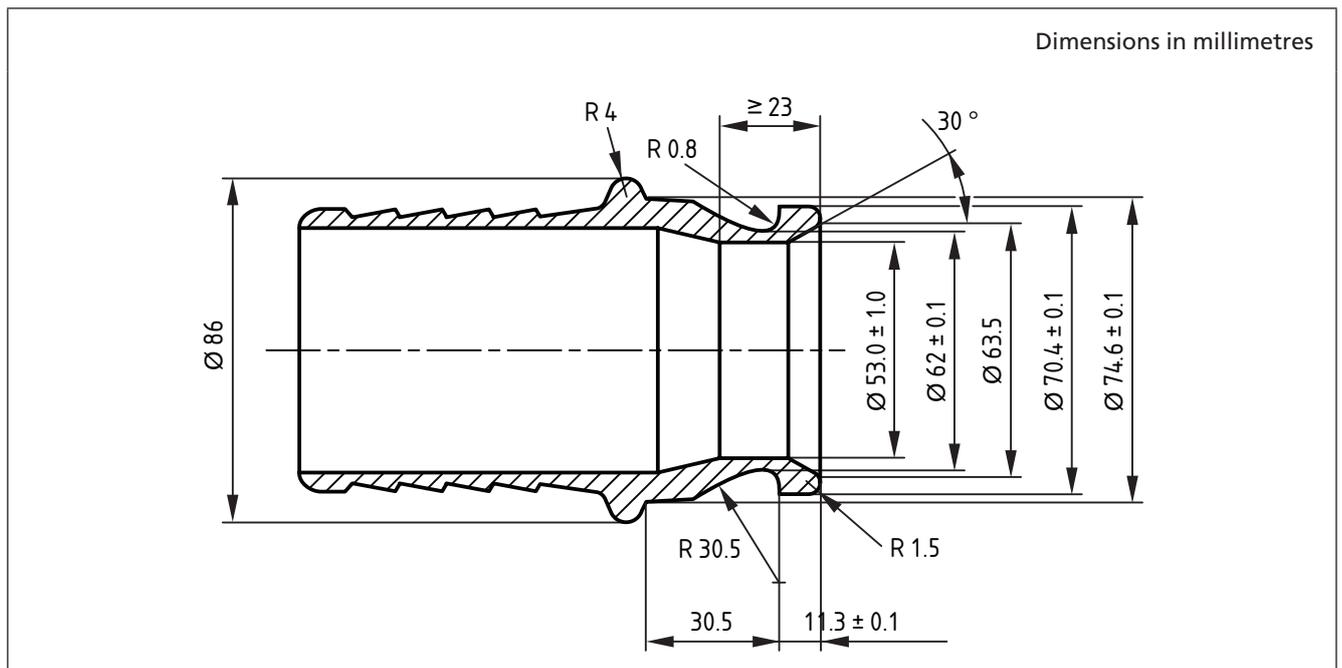
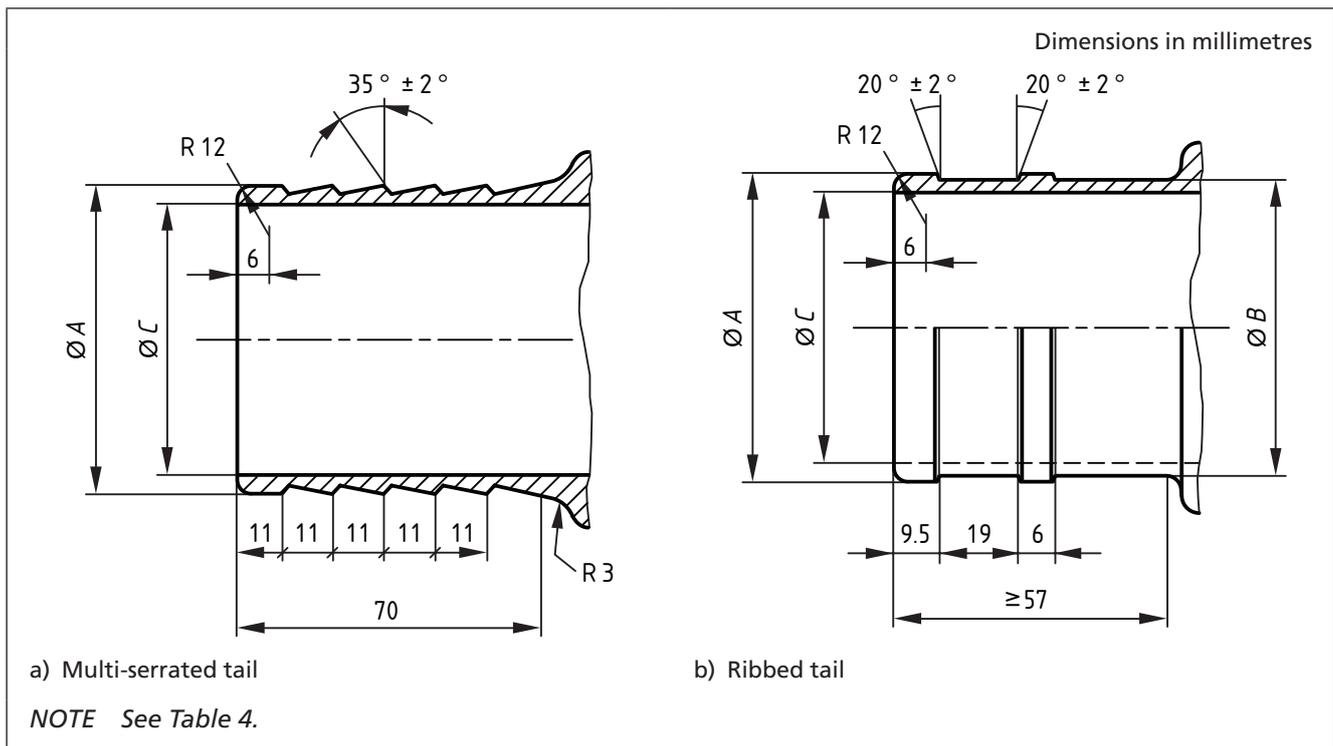


Table 4 Dimensions of delivery hose coupling tails (Figure 4)

Nominal size	Hose diameter in BS 6391	Tail external diameter A	External diameter between ribs	Internal diameter, multi-serrated and ribbed C
			B	
in	mm	mm	mm	mm
1.5	38	38.1	35.7	26.6
1.75	45	44.5	42.0	32.9
2	51	50.8	47.6	38.5
2.5	64	63.5	60.3	51.2
2.75	70	69.9	65.9	56.8
3	76	76.2	72.2	63.1
3.5	89	88.9	84.9	75.8
Tolerance		+0.8	+0.25	+3.0
		0	-0.25	0

Figure 4 Delivery hose couplings – tail details



9 Delivery hose connectors

9.1 General

Unless otherwise specified by the purchaser delivery hose connectors shall be of the single lug twist-release instantaneous pattern as shown in Figure 5a) and shall have the dimensions given in Figure 5.

9.2 Locking of plungers

Nuts on plungers shall be of a self-locking type.

NOTE "Peening" over the end of the shank is not regarded as an efficient means of locking the plunger.

9.3 Plunger springs

Plunger springs shall be of such strength that they can be compressed to a length sufficient to free the plunger from engagement by a force of not less than 55 N and not greater than 110 N.

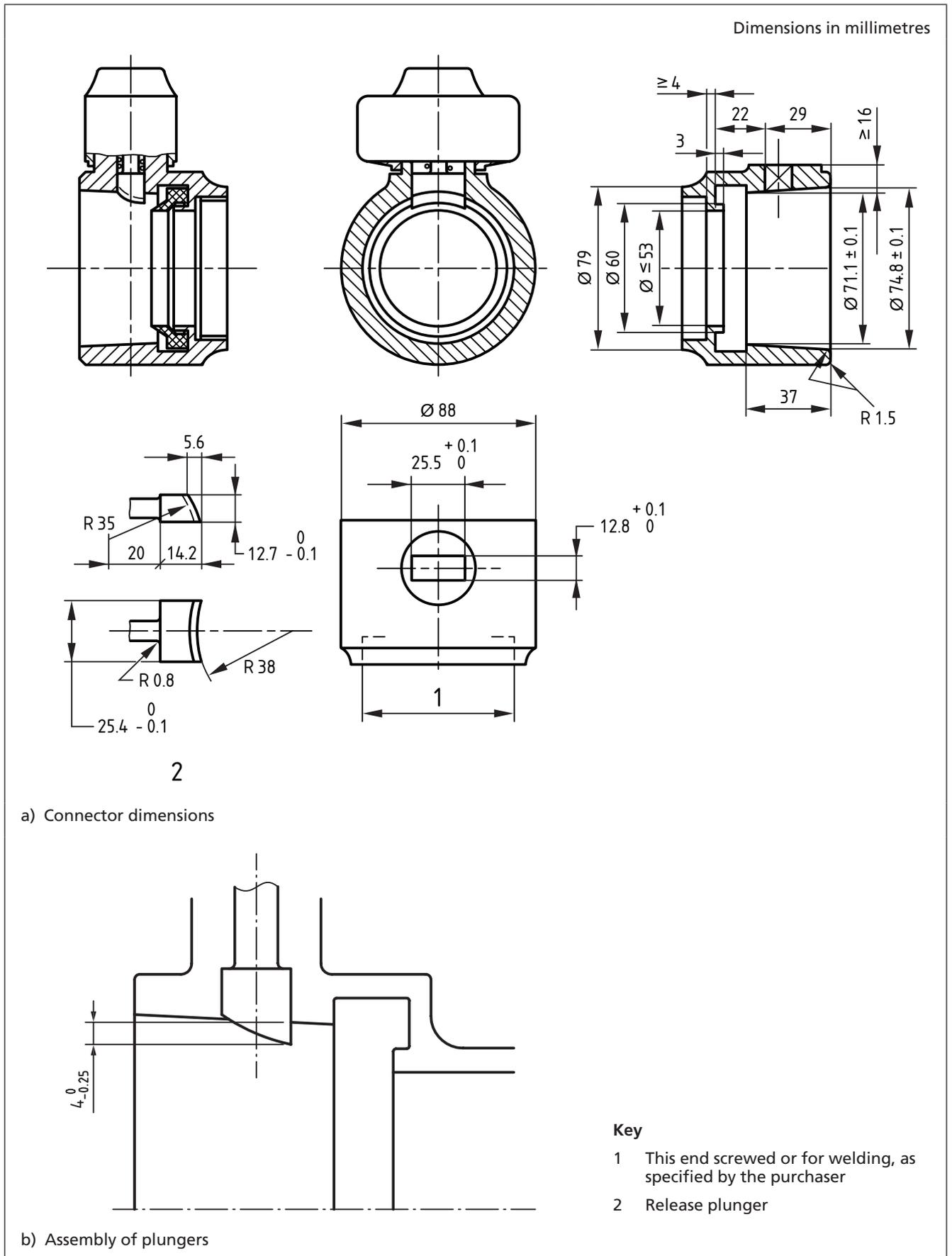
9.4 Washers

Coupling washers shall have the dimensions given in Figure 2, with tolerances conforming to BS 3734-1, Class M3, and shall be of natural rubber (grades Y40, Z40) to BS 1154 or chloroprene (grade C40) to BS 2752.

9.5 Assembly of plungers

The assembled plungers shall protrude into the bore of the female instantaneous coupling by the amount shown in Figure 5b).

Figure 5 Delivery hose connector



10 Dividing and collecting breechings

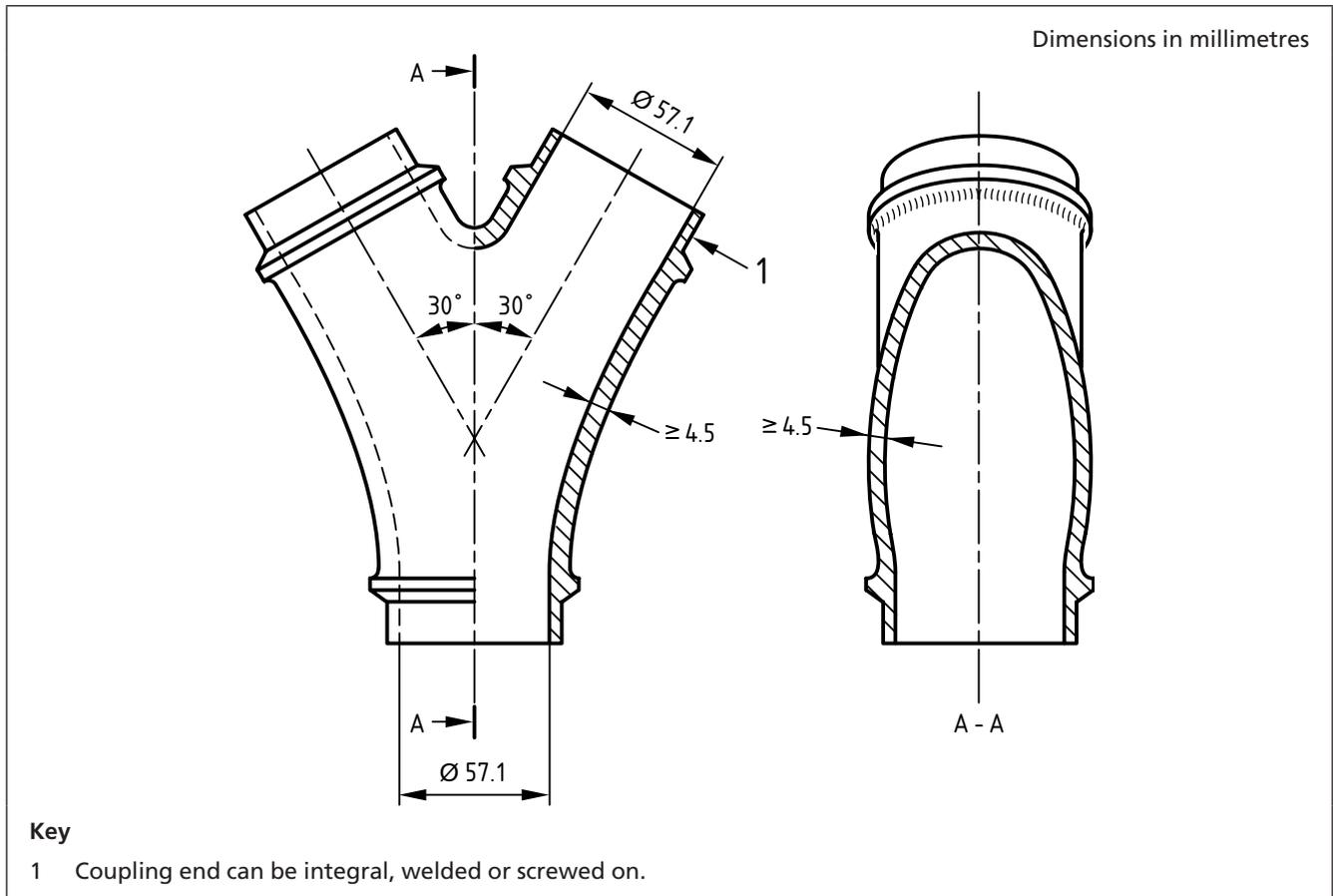
Dividing and collecting breechings shall be constructed as shown in Figure 6.

NOTE The purchaser may require the breeching to incorporate control devices.

Dividing breechings shall be provided with two female outlets of the single lug twist-release type conforming to Clause 9 and Figure 5 and a single male inlet having the dimensions specified in Figure 3.

Collecting breechings shall be provided with one female outlet of the single lug twist-release type conforming to Clause 9 and Figure 5 and two male inlets having the dimensions specified in Figure 3.

Figure 6 Dividing and collecting breeching



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11 Standard branchpipes

11.1 Standard branchpipes shall be made of metal and shall be constructed as shown in Figure 7. The washers shall be natural rubber (grade Z70) to BS 1154 or chloroprene rubber (grade C70) to BS 2752.

11.2 Unless otherwise specified by the purchaser, nozzles for use with standard branchpipes shall be of the form, finish and size shown in Figure 8 and detailed in Table 5. Nozzles shall be indelibly marked with the size (dimension A) in numerals of a height not less than 6 mm.

NOTE Alternative profiles to the type shown in Figure 8 are available. The purchaser may require the nearest metricated equivalent of an imperial size to be supplied.

Figure 7 Branchpipe

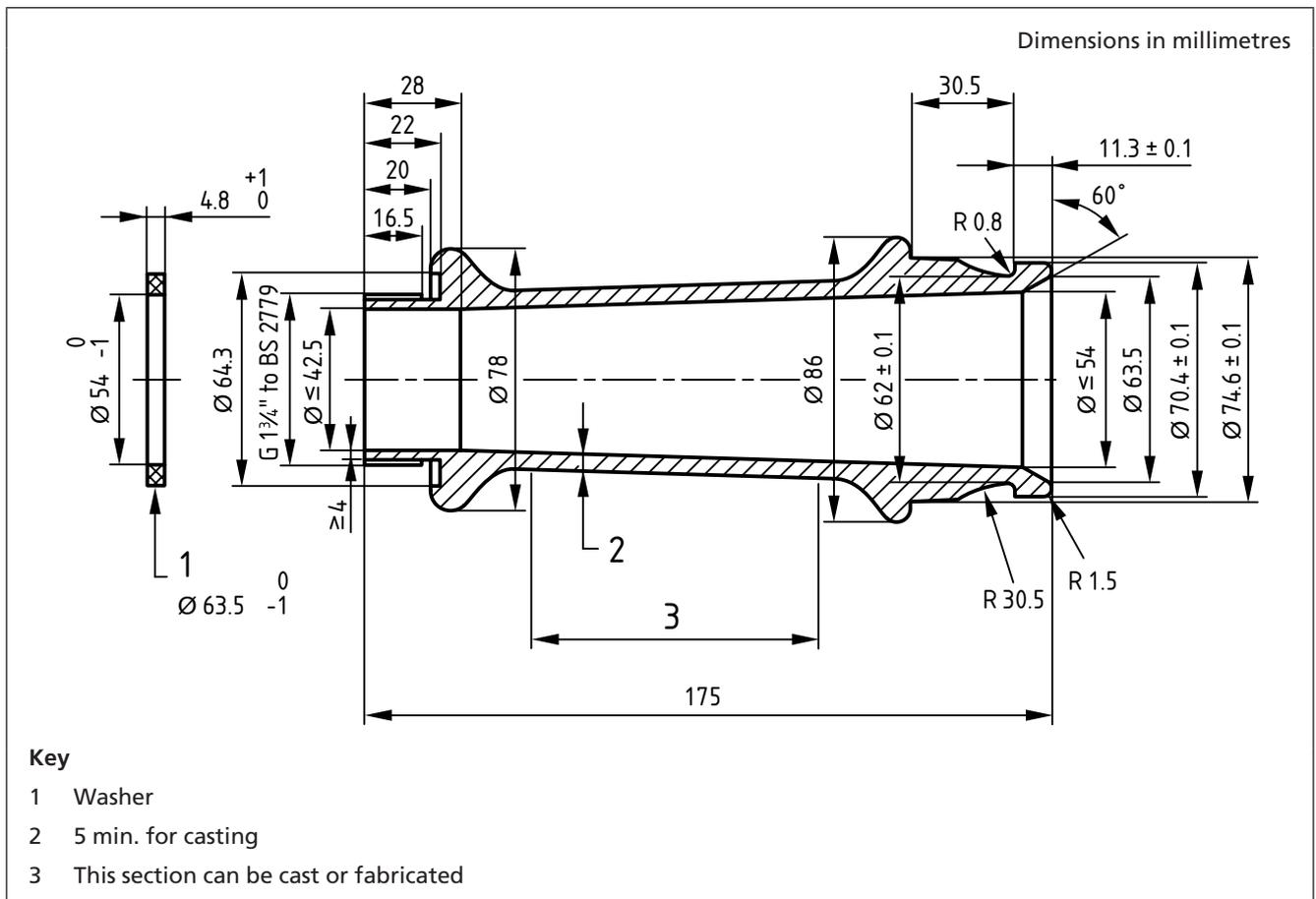
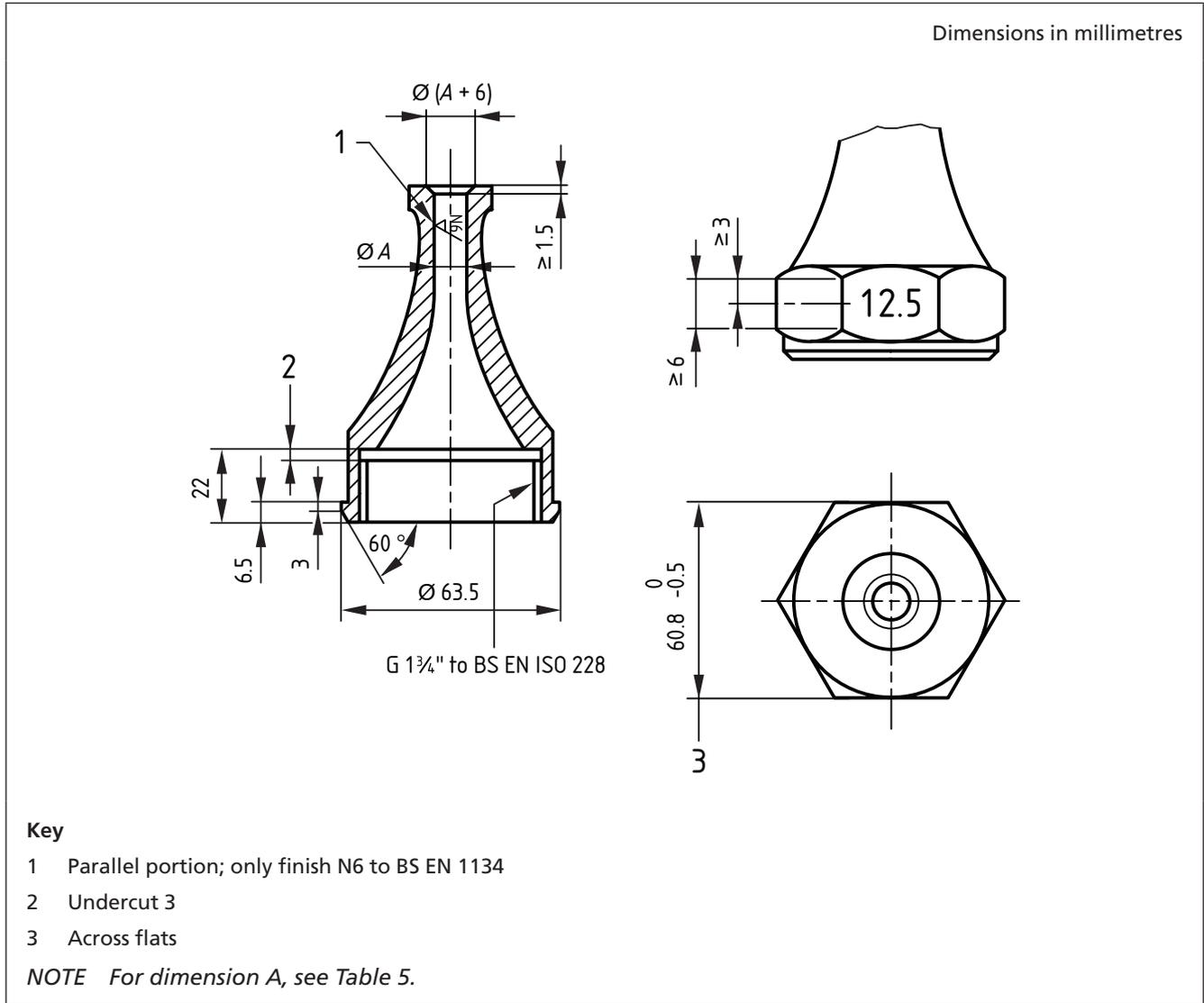


Table 5 Nominal alternative sizes of nozzles for branchpipes

Dimension from Figure 8	Tolerance	Nominal alternative sizes
	mm	mm
A	±0.4	12.5, 15, 20, 25, 30

Figure 8 Nozzle for branchpipe



12 Blank caps, plugs and chain

Blank caps and plugs shall be attached to the equipment with which they are to be used by an "S" hook and chain with brazed, welded or integrally cast joints (see Figure 9).

NOTE Unless otherwise specified by the purchaser, blank plugs for standpipes (see 13.4) are non-vented. If venting is required it should be in accordance with BS 5041-1 and BS 5041-2.

13 Standpipes

13.1 General

A standpipe shall comprise:

- a) a shaft; and
- b) a swivel head,

and shall conform to Figure 9.

13.2 Standpipe shaft

The standpipe shaft shall be fitted with a base having the dimensions given in Figure 9 and capable of engagement with a fire hydrant conforming to BS 750. The shaft shall also be fitted with a means of attachment to the swivel head. The washer shall be natural rubber (grade Z70) to BS 1154 or chloroprene leather (C70) to BS 2752. Where an anti-siphon facility is necessary, a double-check valve conforming to BS 6282 shall be incorporated.

13.3 Swivel head

The swivel head shall have one or two outlets and be attached to the shaft by one of the following means:

- a) an instantaneous delivery hose coupling with the female coupling on the standpipe shaft, conforming to Clause 8, except that a tailpiece is not required; or
- b) a gland that will allow continuous rotation of the head through 360°.

Each outlet shall be fitted with an instantaneous female connector conforming to Clause 9. The bend in the swivel head shall have a radius at the centre of the bend of not less than 75 mm.

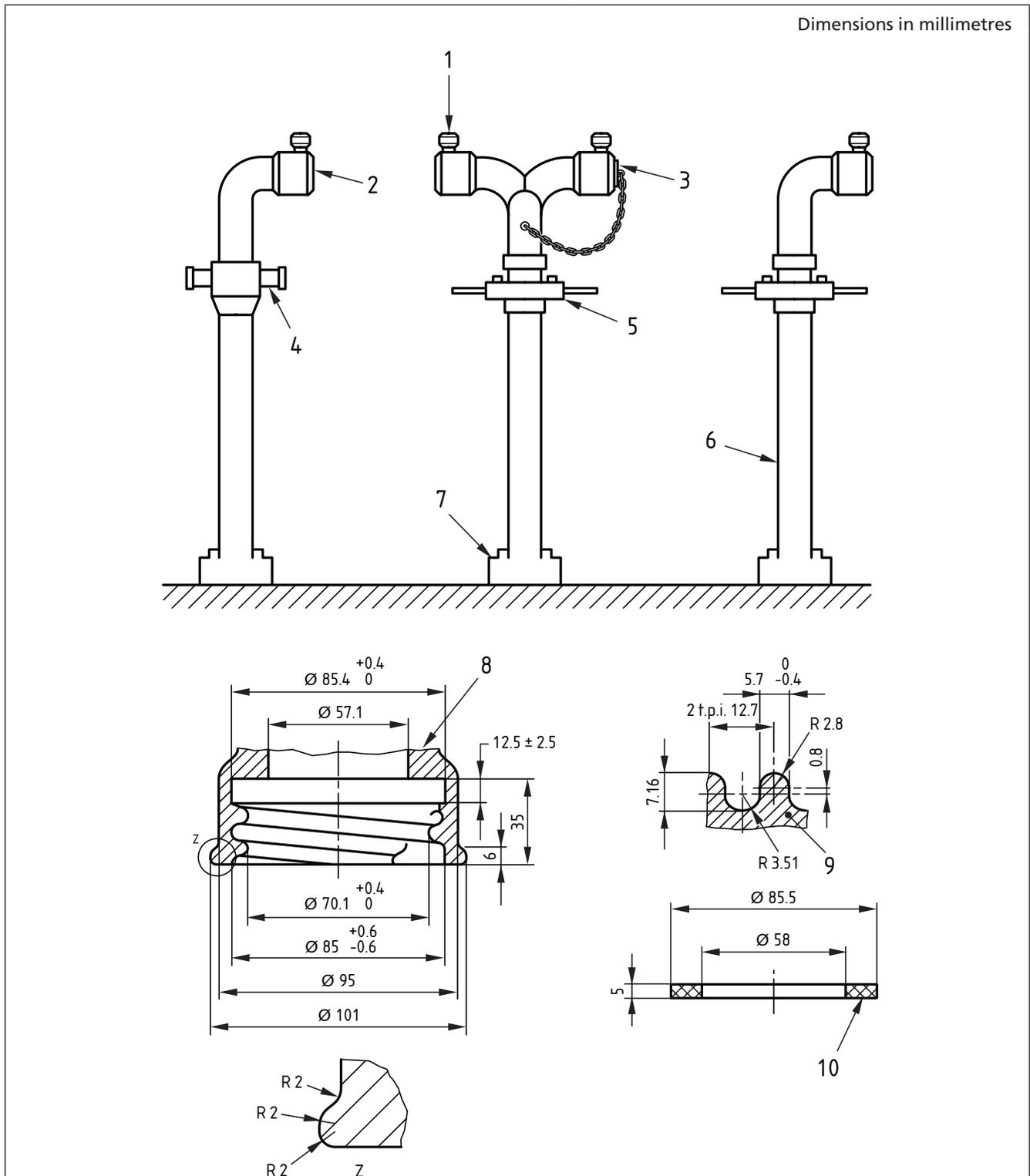
13.4 Blank plug

A double outlet head shall be provided with a single blank plug (see Clause 12).

13.5 Strength

When tested in accordance with Annex B, the standpipe shall show no damage or permanent deflection.

Figure 9 Standpipes



NOTE Leading and trailing edge feathers to be cut back to $\frac{2}{3}$ thread thickness.

Key

- | | |
|--|---|
| 1 Connector (see Figure 5 and Clause 9) | 6 Standpipe shaft |
| 2 Head | 7 Standpipe base (see detail) |
| 3 Blank plug | 8 End to suit method of assembly to shaft |
| 4 Instantaneous coupling | 9 Metal |
| 5 Bolt or screw jointed coupling, incorporating gland to permit swivelling | 10 Washer |

14 Hydrant key and bar

14.1 General

The dimensions of the hydrant key socket shall be in accordance with Figure 10.

NOTE The key is intended for use on hydrant valves conforming to BS 750; adaptors may be supplied for use on other hydrant valves. The length of the key should be sufficient to allow the bar to clear adjacent standpipes or other obstructions. The bar should fit easily into the key eye.

14.2 Materials

The hydrant key and bar shall be made from one of the following materials:

a) aluminium alloy, as detailed in Table 2;

NOTE These keys and bars may include some steel components.

b) stainless steel to BS 970-4 and as follows:

- key end 18/8 Cr, casting
- shaft tube 321 S22 or 321 S20
- bar 431 S29;

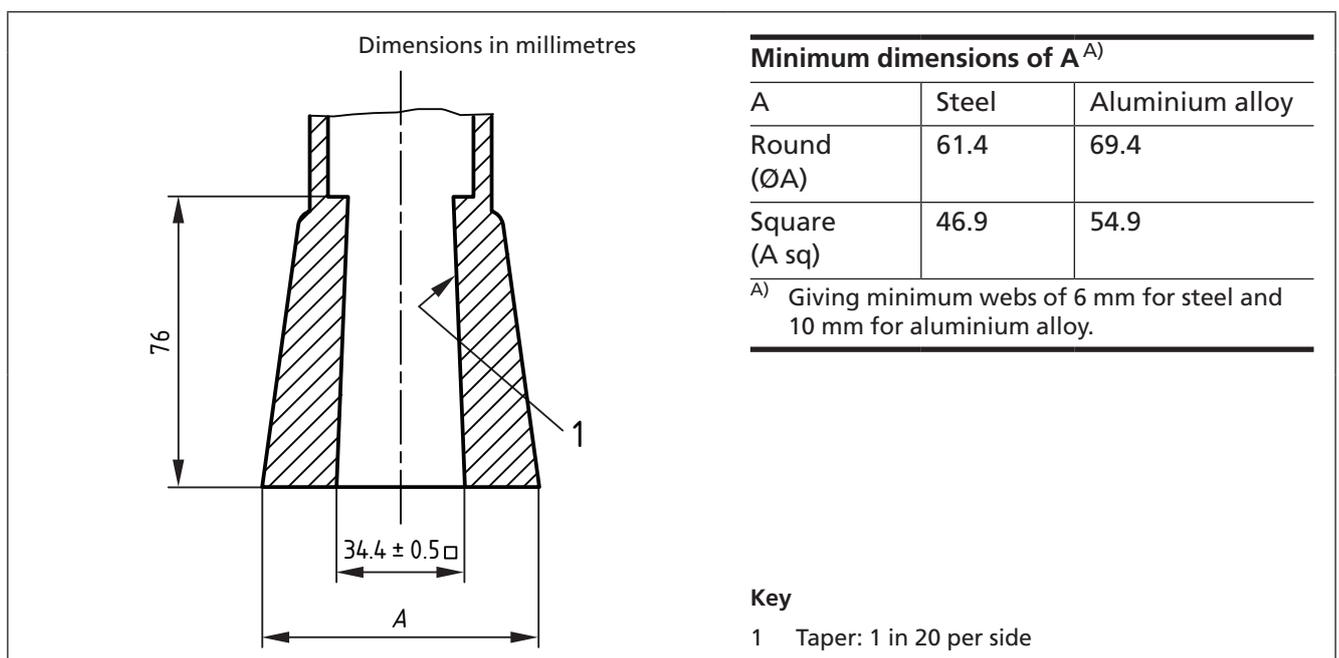
c) iron and steel as follows:

- key end malleable iron casting to BS EN 1562
- shaft tube CD S2 to BS EN 10296 (both parts), BS EN 10297-1 and BS EN 10305 (all parts)
- bar 605 M36 condition T to BS EN 10090.

14.3 Resistance to torsion and bending

When tested in accordance with Annex C, the key shall not sustain any damage or permanent deformation exceeding 2°.

Figure 10 Hydrant key socket



15 Suction hose couplings

15.1 General

Suction hose couplings shall be of the locking ring pattern as shown in Figure 11 and shall be in accordance with the details in Figure 12 and Figure 13c). Dimensions variable with hose size shall be in accordance with Table 6 and Table 7.

15.2 Washer

Washers shall be of natural rubber (grade Z70) to BS 1154 or chloroprene leather (C70) to BS 2752 and shall have the dimensions given in Figure 12a).

15.3 Screw threads

15.3.1 Round thread. The basic form of the round thread shall be as shown in Figure 13c) and the major and minor diameter sizes shall be in accordance with Figure 12d), Figure 13c) and Table 7.

15.3.2 "V" thread. The sizes and screw threads of the locking ring and nut for the female half coupling shall be in accordance with Table 6. The applicable tables and tolerances as defined in BS 1580-1:2007 are as follows.

Component	Table (BS 1580-1:2007)	Limit and tolerance
Locking ring	30	Class 1A
Nut for female half coupling	33	Class 1B

Table 6 Suction hose coupling dimensions (see Figure 12)

Dimension	Diameter of hose			Tolerance
	75 mm mm	100 mm mm	140 mm mm	
E	77.8	103.2	141.3	±0.4
F	71.4	96.8	134.9	±0.8
G	89.0	114.0	152.0	±0.8
H	25.0	38.0	57.0	±0.8
J	92.0	117.4	155.5	-0.8
J ₁	68.2	93.6	131.8	+0.8
K	92.0	117.4	155.5	-0.4
K ₁	93.7	119.1	157.2	-0.4
L	68.2	93.6	131.8	-0.4
L ₁	69.9	95.3	133.4	+0.4
M	95.0	121.0	159.0	±0.8
N	110.0	137.0	175.0	±0.8
P	171.0	197.0	235.0	±0.8
P ₁	140.0	165.0	203.0	±0.8
Q	80.2	105.7	143.7	+0.4
R	19.0	24.0	24.0	±0.8
S	114.3	142.9	181.0	±0.8
S ₁	114.3	142.9	181.0	±0.8
t _{min}	4.0	4.0	4.0	+0.8
Thread ^{A)}	3.90 in	4.90 in	6.50 in	—
Thread ^{B)}	3.90 in	4.90 in	6.50 in	—

A) 8UNS-1A to BS 1580-1:2007, Table 37.

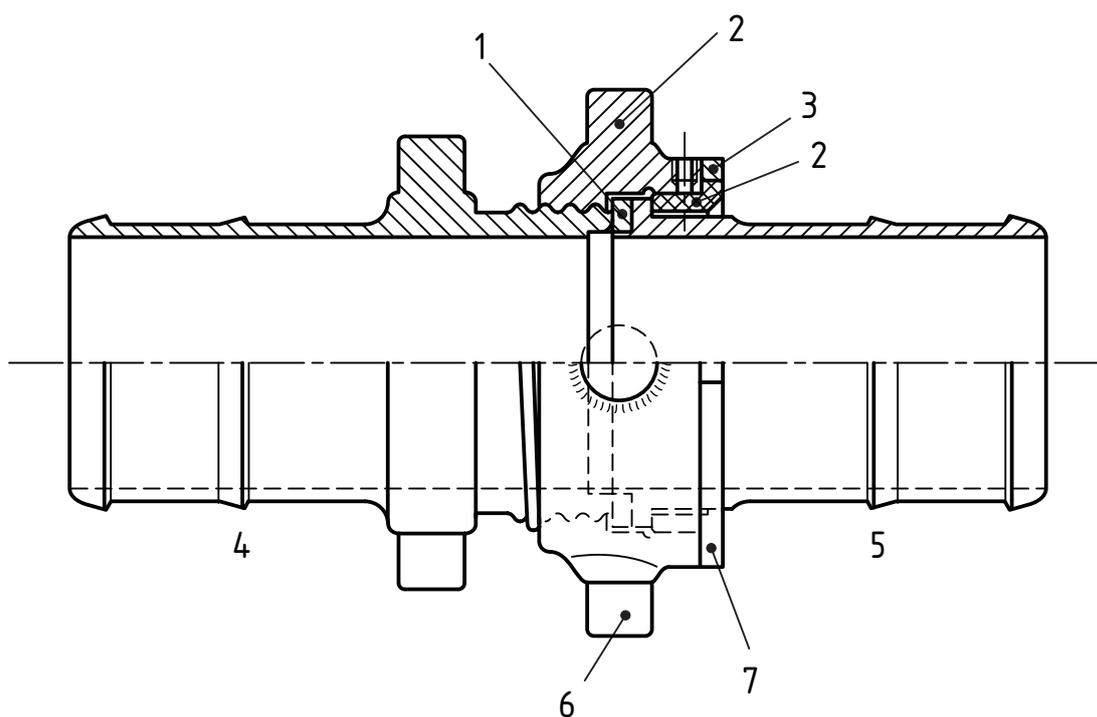
B) 8UNS-1B to BS 1580-1:2007, Table 37.

NOTE See also 15.3.2.

Table 7 Diameters of round form screw threads for suction hose couplings

Diameters of hose		Male thread [see Figure 12d)]		Female thread [see Figure 12e)]			
		A Major diameter		B Minor diameter	D Major diameter		C Minor diameter
in	mm (nominal)	max. mm	min. mm	max. mm	min. mm	max. mm	min. mm
3	75	92.0	91.6	81.4	93.2	83.0	82.6
4	100	117.4	117.0	106.8	118.6	108.4	108.0
5½	140	155.5	155.1	144.9	156.7	146.5	146.1

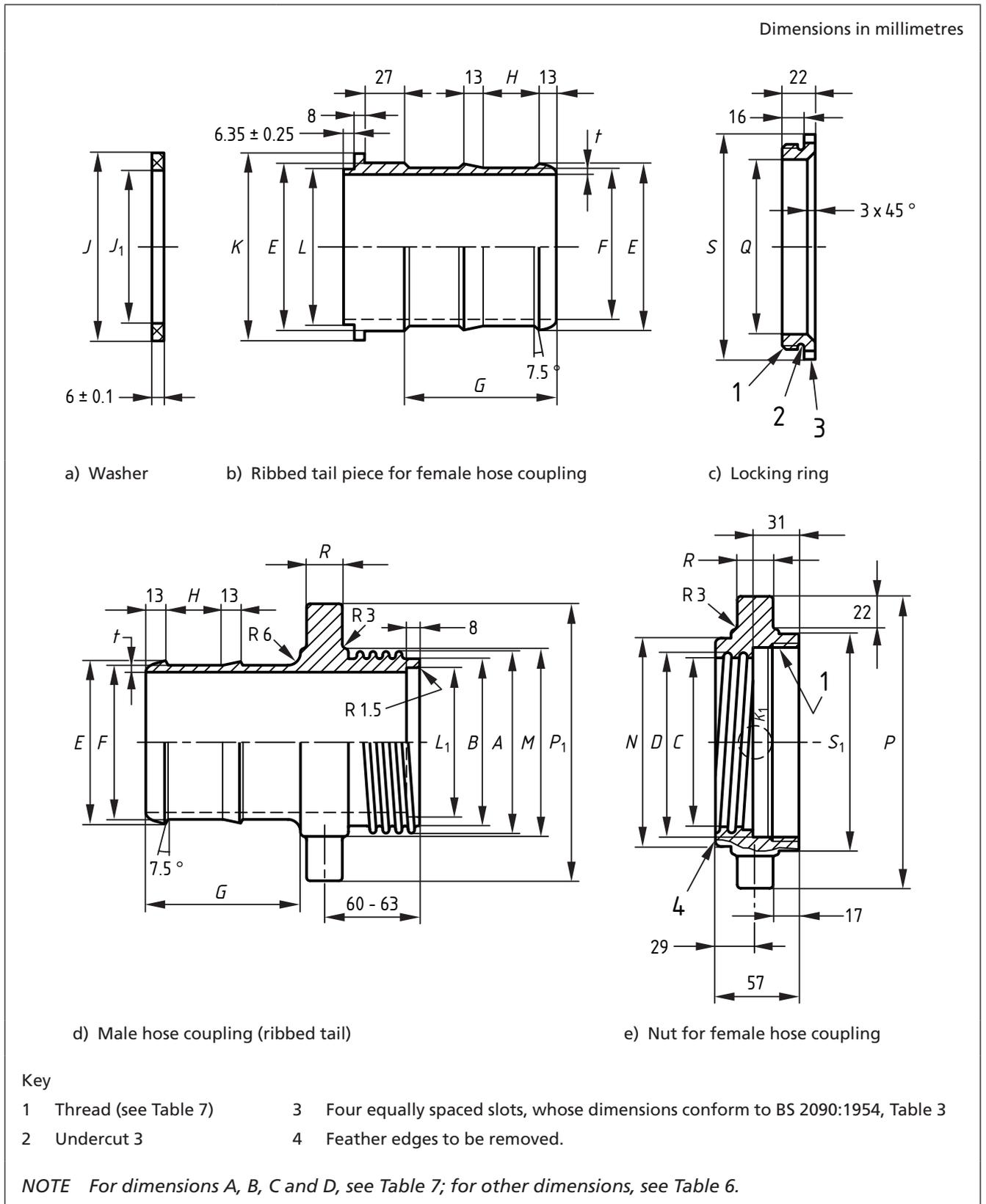
Figure 11 Suction hose coupling – general arrangement

**Key**

- | | | | |
|---|--|---|--------------|
| 1 | Washer | 4 | Male half |
| 2 | See Figure 12 | 5 | Female half |
| 3 | Secured by a screw, M6 in accordance with BS EN 27434, BS EN 27435, BS EN 27436, BS EN 24766, BS EN ISO 4026, BS EN ISO 4027, BS EN ISO 4028, BS EN ISO 4029, BS EN ISO 4762, BS EN ISO 7380, BS EN ISO 10642 or BS ISO 2936, as applicable. | 6 | Nut |
| | | 7 | Locking ring |

Screw to be flush or recessed when fitted.

Figure 12 Suction hose coupling – details



16 Suction collecting heads

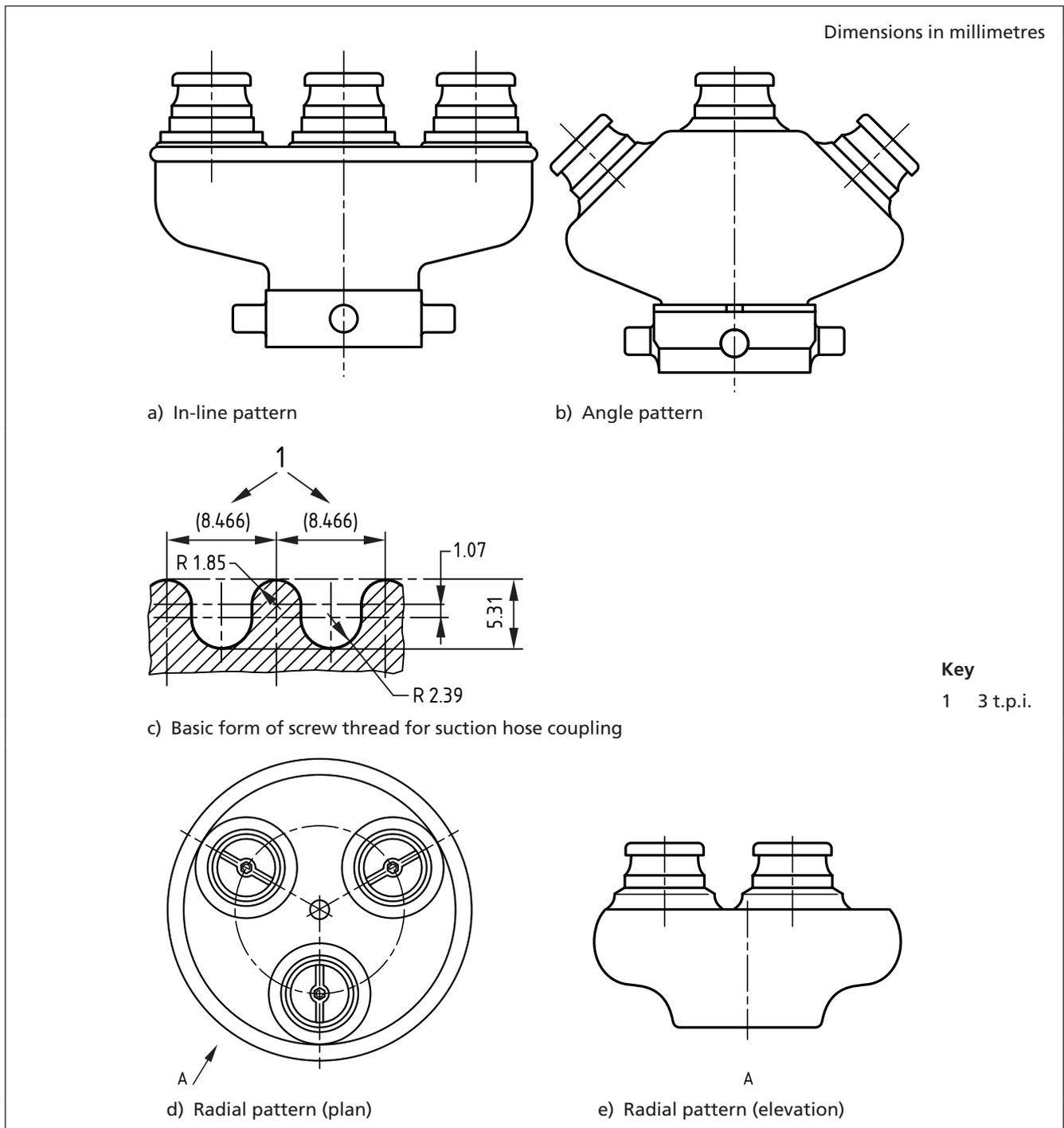
16.1 General

Suction collecting heads shall be of one of the following types:

- a) in-line pattern [see Figure 13a)] fitted with a swivel outlet;
- b) angle pattern [see Figure 13b)] fitted with a swivel outlet;
- c) radial pattern [see Figure 13d) and Figure 13e)] fitted with a fixed outlet.

NOTE The design should be such as to minimize restriction to water flow.

Figure 13 Suction collecting heads



16.2 Outlet connections

Outlet connections shall be female screw thread for suction hose in accordance with Table 7 and Figure 12e) and Figure 13c).

NOTE The recommended nominal sizes of outlets are as follows.

Number of inlets	Nominal size outlet
2	75 mm
2 or 3	100 mm
3 or 4 or 5 or 6	140 mm

16.3 Inlet connections

Inlet connections shall be male instantaneous in accordance with Figure 3 and shall be attached to the collecting head by screwed ends, flanges or by welding.

The spacing between centres of inlet connections shall be not less than:

- 1) 115 mm for in-line pattern;
- 2) 134 mm for radial pattern.

16.4 Non-return valves

Each inlet connection shall be fitted with a non-return valve, which, when tested in accordance with Annex D, shall show no sign of visible water leakage.

The non-return valve shall be either of:

- a) the spring-loaded mushroom type; or
- b) the flap valve type for in-line and angle pattern collecting heads only, which shall open to not less than 60° and shall not open to any position where it could jam; the collecting head shall be marked "TOP" in letters of not less than 20 mm in height on the side of the body at which the flap valve is hinged.

17 Suction strainers

17.1 Metal strainers

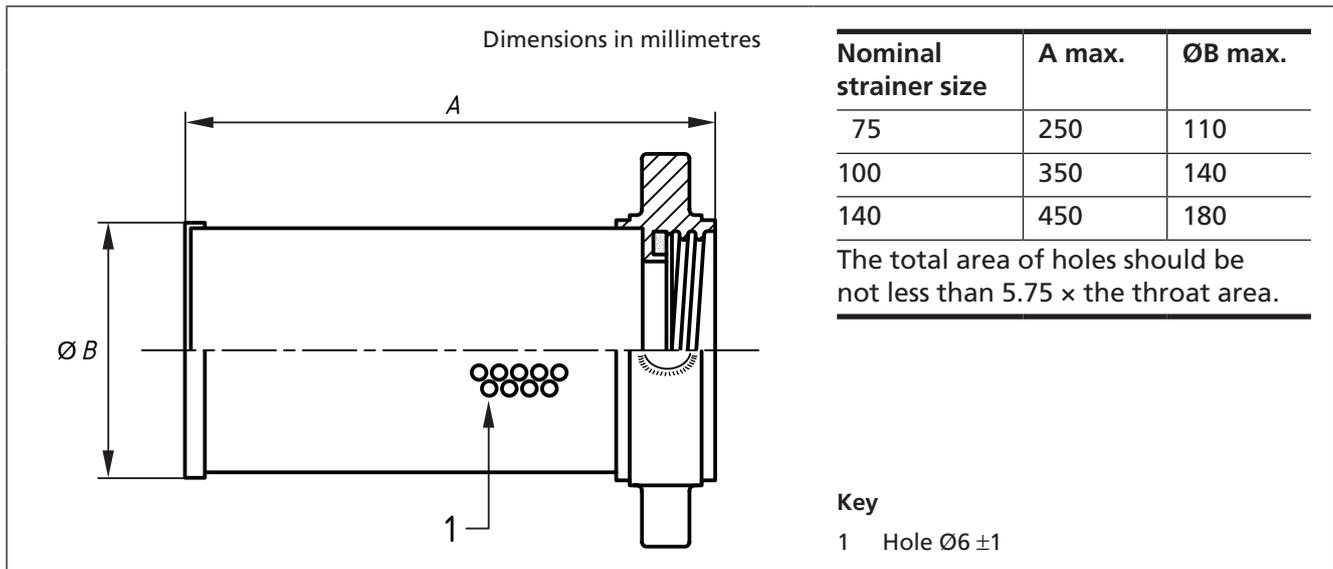
17.1.1 Materials shall be selected from those given in Table 2.

17.1.2 Metal strainers shall have the dimensions shown in Figure 14, and shall be provided with a fixed outlet having a female screw thread in accordance with Table 7 and Figure 12e) and Figure 13c).

17.1.3 The cylindrical perforated sheet shall have brazed or welded seams dressed smooth on both surfaces, and shall be not less than 1.50 mm thick. The end shall be not less than 2.00 mm thick. The joints to the outlet and to the end shall be riveted, welded or brazed.

17.1.4 The washer shall be of natural rubber (grade Z70) to BS 1154 or chloroprene rubber (C70) to BS 2752, and shall have the dimensions given in Figure 12a).

Figure 14 Metal suction strainer



17.2 Basket strainers

17.2.1 General. Basket strainers shall conform to Figure 15 and Table 8, including the method of connection.

17.2.2 Basket. The strainer basket shall be of cane and shall have six bottom sticks. The 75 mm size shall have 19 stakes, the 100 mm size 21 stakes, and the 140 mm size 23 stakes with three rod borders. There shall be three rounds of upsetting, the first round having four rods. There shall be two double-body wales at the centre of the 75 mm and 100 mm sizes and four rounds of three rod waling at the centre of the 140 mm size. There shall be two rounds of waling under the border on each size, with four runner forming stakes.

NOTE 1 Upsetting is the foundations in the side of a basket formed, in the first round, by the manipulation of four strands of cane, each worked alternately in front of three stakes and behind one stake. In the second and subsequent rounds, three strands are used, in front of two stakes and behind one stake. A stake is an upright in the side or end of a basket, which has one end driven into or otherwise secured to the bottom of the basket, and the other worked into the border. A wale is a reinforcement around the girth of a basket.

NOTE 2 Suitable types of cane include Palmbang, Kooboo.

17.2.3 Sleeve. The sleeve shall be constructed as shown in Figure 15. Brass sail eyelets and rings of one of the types specified in BS 3102 shall be fixed in the centre of each hem and shall be equally spaced as follows:

- 6 eyelets each end for the 75 mm size;
- 8 eyelets each end for the 100 mm size;
- 10 eyelets each end for the 140 mm size.

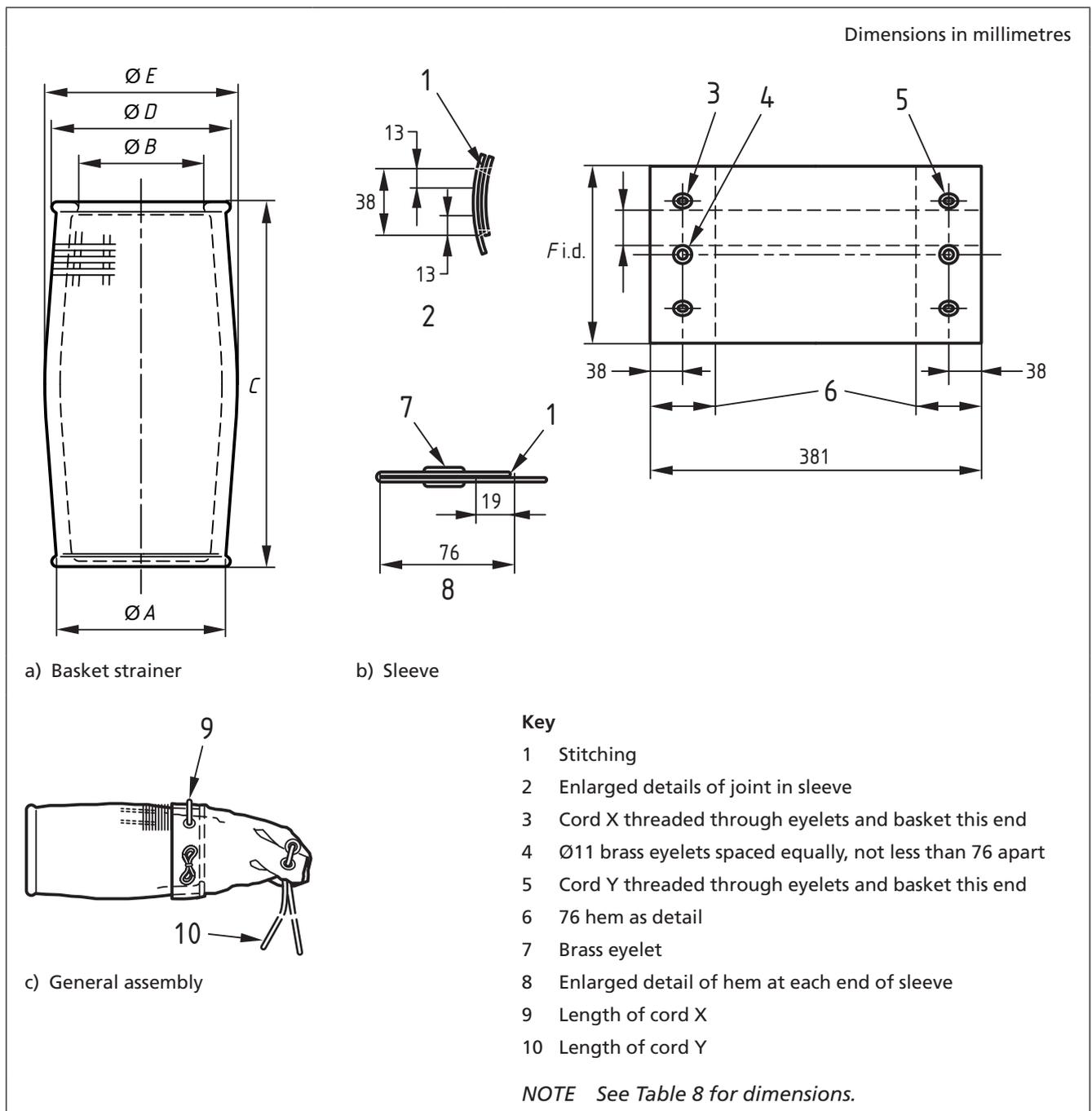
The ends of all cords shall be whipped and stitched to prevent fraying.

17.2.4 Cord. One long and one short cord of the lengths given in Table 8 shall be inserted in the eyelets of each sleeve and loosely tied to prevent detachment.

Table 8 Sizes of basket strainers and lengths of cord

Strainer (nominal size)	Dimension from Figure 15						Length of cord (see Figure 15)	
	Basket strainer					Sleeve	Cord X	Cord Y
	A	B	C	D	E	F		
mm	mm	mm	mm	mm	mm	mm	mm	mm
75	178	127	305	185	203	197	1070	1830
100	203	159	406	216	229	229	1140	1900
140	241	197	508	254	267	267	1240	2000

Figure 15 Basket strainer for suction strainer



18 Suction hose coupling wrench

18.1 Form and length

A suction hose coupling wrench shall have a fixed jaw, with an open yoke and a slotted pivoted jaw adjustable to fit 75 mm, 100 mm and 140 mm suction hose couplings (see Clause 15). The overall length of the wrench shall be not less than 500 mm.

NOTE Typical wrenches are shown in Figure 16. The purchaser may require the end of the bar to be formed.

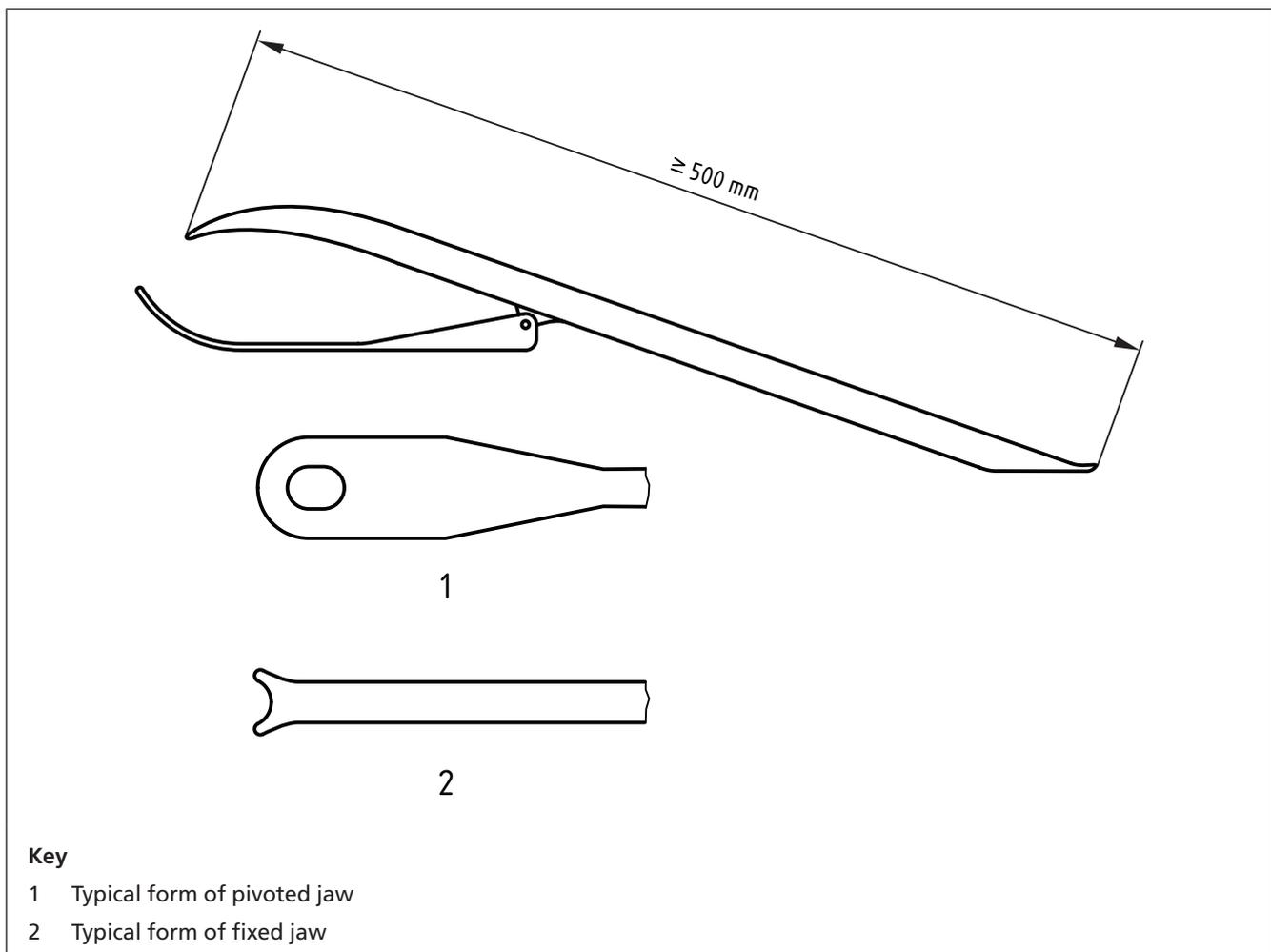
18.2 Strength

When tested in accordance with Annex E, a suction hose coupling wrench shall not break or suffer any permanent visible distortion.

18.3 Material

Suction hose coupling wrenches shall be made of galvanized mild steel (see Table 2).

Figure 16 Suction hose coupling wrench



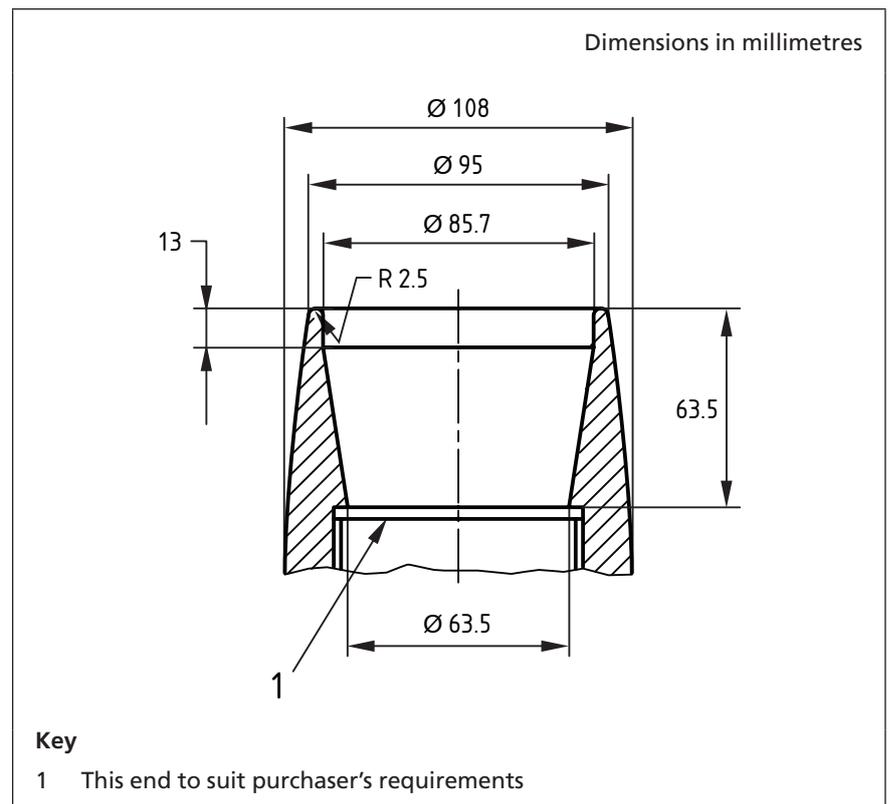
19 Foam inlet adaptors

Materials for foam inlet adaptors shall be selected from the relevant column in Table 2. Where aluminium alloys are used they shall be anodized in accordance with 5.3 because of their higher susceptibility to atmospheric corrosion.

The adaptor end shall be in accordance with Figure 17, with tolerances of ± 0.8 mm.

NOTE Details of requirements for the other end of the adaptor should be obtained from the purchaser.

Figure 17 Foam inlet adaptor



Annex A (normative) Hydrostatic test for pressure retention

A.1 Apparatus

A.1.1 *Either an air-powered hydraulic pump system or a hand-operated direct hydraulic pump.*

NOTE The hydraulic pressure in an air-powered system is controlled by the air pressure and by individual direct reading pressure gauges. The pressure in a hand operated pump is controlled by direct reading pressure gauges only.

A.2 Procedure

Locate the product or component in position on the appropriate fixture. Pump water into the product or the component until it is full, at the same time venting the air from the system which includes the product.

Close the air vent passage, and pump the water to a test pressure of 24 bar.

Control the pressure as described in the note to **A.1.1**. Remove all surplus water from the external surfaces of the fixture by applying blasts of air and by wiping.

Maintain the test pressure for 2 min. During the test, inspect the product for water leakage by visual observation and via mirrors.

NOTE Because of internal leakage through the circuit valves, a greater emphasis is placed on the visual checks than on the gauge readings.

Reduce the pressure in the fixture by exhausting the pressurized supply of water to a tank. Remove the product or component from the fixture.

A.3 Pressure testing of alternative methods of attaching hose to couplings

Where alternative methods of attaching hose to couplings (which are not detailed in this standard) are used, pressure-test the hose/coupling assemblies at 100% in accordance with BS 6391.

Annex B (normative) Strength test for standpipes

B.1 Specimen

B.1.1 *Standpipe.*

B.1.2 Procedure

Assemble the standpipe on a fixed mounting provided with a screwed outlet conforming to BS 750:2006, Clause 6. Apply a pulling force of 1.1 kN at an outlet at right angles to the axis of the shaft for a period of 60 ± 10 s. Examine for damage or deformation.

Annex C (normative) Torque and bending test for hydrant keys**C.1 Specimen**

C.1.1 *Hydrant key.*

C.2 Procedure**C.2.1 Torque test**

Support the key, either vertically or horizontally, between a spindle cap in accordance with BS 5163-2 and a suitable restraint for the bar. Apply a torque of 800 N·m without introducing any bending stress in the key.

C.2.2 Bending test

Locate the key on a fixed spindle or fixed spindle cap. Apply a force of 1375 N, at right angles to the axis of the key, at a distance of 940 mm from the base.

Annex D (normative) Reverse flow test for collecting heads**D.1 Specimen**

D.1.1 *Collecting head.*

D.2 Procedure

Apply internal water pressure to the head and vent air from the head and test rig. Adjust the pressure to 1.7 bar with the reverse of the valve exposed to atmosphere. Visually examine for leakage of water.

Annex E (normative) Strength test for suction hose coupling wrench**E.1 Apparatus**

E.1.1 *Test rig comprising a suction hose coupling, or a simulated coupling, rigidly fixed to a rotatable mounting*

E.2 Specimen

E.2.1 *Wrench*

E.3 Procedure

Locate the wrench on the coupling and apply a static load at a distance of (75 ± 25) mm from the end such as to apply a torque of 170 N·m to the mounting. Examine the bar for breakage and for any permanent deformation.

Annex F (normative) Standards for component materials in Table 2a)

Figure F.1 Standards for component materials in Table 2a)

Alloy	Temper designation	Chemical composition	Forms of product	Tech conditions for inspection and/or delivery	Mechanical properties	Tolerances on shape/form and dimensions
6082 T6	BS EN 515	BS EN 573-3	BS EN 573-4	BS EN 755-1 (extruded rod/bar & tube) BS EN 12020-1 (extruded precision profiles)	BS EN 755-2	BS EN 755-3 (round bars) BS EN 755-4 (square bars) BS EN 755-5 (rectangular bars) BS EN 755-6 (hexagonal bars) BS EN 755-7 (seamless tubes) BS EN 755-8 (porthole tubes) BS EN 755-9 (profile) BS EN 12020-2 (extruded precision profiles)
6082 TF	BS EN 515	BS EN 573-3	BS EN 573-4	BS EN 754-1	BS EN 754-2	BS EN 754-7 (seamless tubes) BS EN 754-8 (porthole tubes)
LM6 M LM16 TF LM25 TF	—	BS EN 1706	—	BS EN 1559-1 & BS EN 1559-4	BS EN 1706	—
5056 A O or HZ 5154A ON H2	BS 1473	BS 1473	BS 1473	BS 1473	BS 1473	BS 1473
5154A H2 & 5251 H4	BS EN 515	BS EN 573-3	BS EN 573-4	BS EN 485-1	BS EN 485-2	BS EN 485-3 (hot rolled) BS EN 485-4 (cold rolled)

Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 5041, *Fire hydrant systems equipment* (both parts)

BS MA 18, *Specification for salt water piping systems in ships*

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