BRITISH STANDARD

BS 5412:1996

Specification for

Low-resistance single taps and combination tap assemblies (nominal size $\frac{1}{2}$ and $\frac{3}{4}$) suitable for operation at PN 10 max. and a minimum flow pressure of 0.01 MPa (0.1 bar)

Product code 00610711

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee B/504, Water supply, upon which the following bodies were represented:

Association of Consulting Engineers
Association of Manufacturers of Domestic Unvented Supply Systems Equipment (MODUSSE)
British Bathroom Council
British Foundry Association
British Non-Ferrous Metals Federation
British Plastics Federation
British Plumbing Fittings Manufacturers' Association
Department of the Environment
Department of the Environment (Drinking Water Inspectorate)
Fibre Cement Manufacturers' Association Limited
Institute of Plumbing
Institution of Water and Environmental Management
Local Authority Organizations
Scottish Association of Directors of Water and Sewerage Services
Water Companies Association
Water Research Centre
Water Services Association of England and Wales

This British Standard, having been prepared under the direction of the Sector Board for Building and Civil Engineering, was published under the authority of the Standards Board and comes into effect on 15 January 1996

The following BSI references relate to the work on this standard:
Committee reference B/504
Draft for comment 91/16851 DC

ISBN 0 580 24753 8

Amendments issued since publication

Amd. No.	Date	Comments

Contents

Foreword

This British Standard has been prepared by Technical Committee B/504 and replaces BS 5412-1 to BS 5412-5:1976 and BS 5413-1 to BS 5413-5:1976 which are withdrawn.

For convenience and economy, the requirements of these two standards are being reissued together as BS 5412:1995.

In accordance with CEN Resolution BT 73/1987, this standard reflects, where appropriate, the requirements of BS EN 200:1992 and is presented in a similar format.

It should be noted, however, that the pressure range, outlet nozzle height and mechanical endurance characteristics differ from those covered by BS EN 200.

This revision continues to acknowledge the traditional UK installation which combines mains-fed and cistern-fed water supplies.

The water pressure that provides the minimum flow rates specified in this standard is that appropriate to the cistern-fed supply. This does not preclude the use of these taps on higher pressure or mains-fed supplies since the test criteria ensure the integrity of the taps at higher pressures.

There are no UK specifications governing the level of acoustic emissions from water installations. If individual supply pressures are such that excessive noise is generated it is recommended that pressure or flow regulators are fitted in the system or, where practical, taps conforming to an appropriate acoustical classification of BS EN 200 are employed.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 28, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

blank

1 Scope

This British Standard specifies:

a) the dimensional, watertightness, pressure resistance, hydraulic, mechanical strength and mechanical endurance characteristics of nominal size ½ and ¾ single and combination taps;

b) test methods to verify the characteristics.

This British Standard applies to sanitary draw-off taps of nominal size ½ and ¾ (PN 10) operating at the pressure and temperature conditions given in Table 1.

It does not cover mechanical mixing valves, thermostatic mixing valves, jet regulators, shower accessories and all taps adapted for special use (e.g. hose union taps).

2 Field of application

This British Standard applies to draw-off taps (single and combination) for use with sanitary appliances installed in rooms used for bodily hygiene (cloakrooms, bathrooms, etc.) and in kitchens, i.e. for use with baths, wash basins, bidets, showers and sinks. (Figure 1 shows the domestic water supply system used traditionally in the UK.)

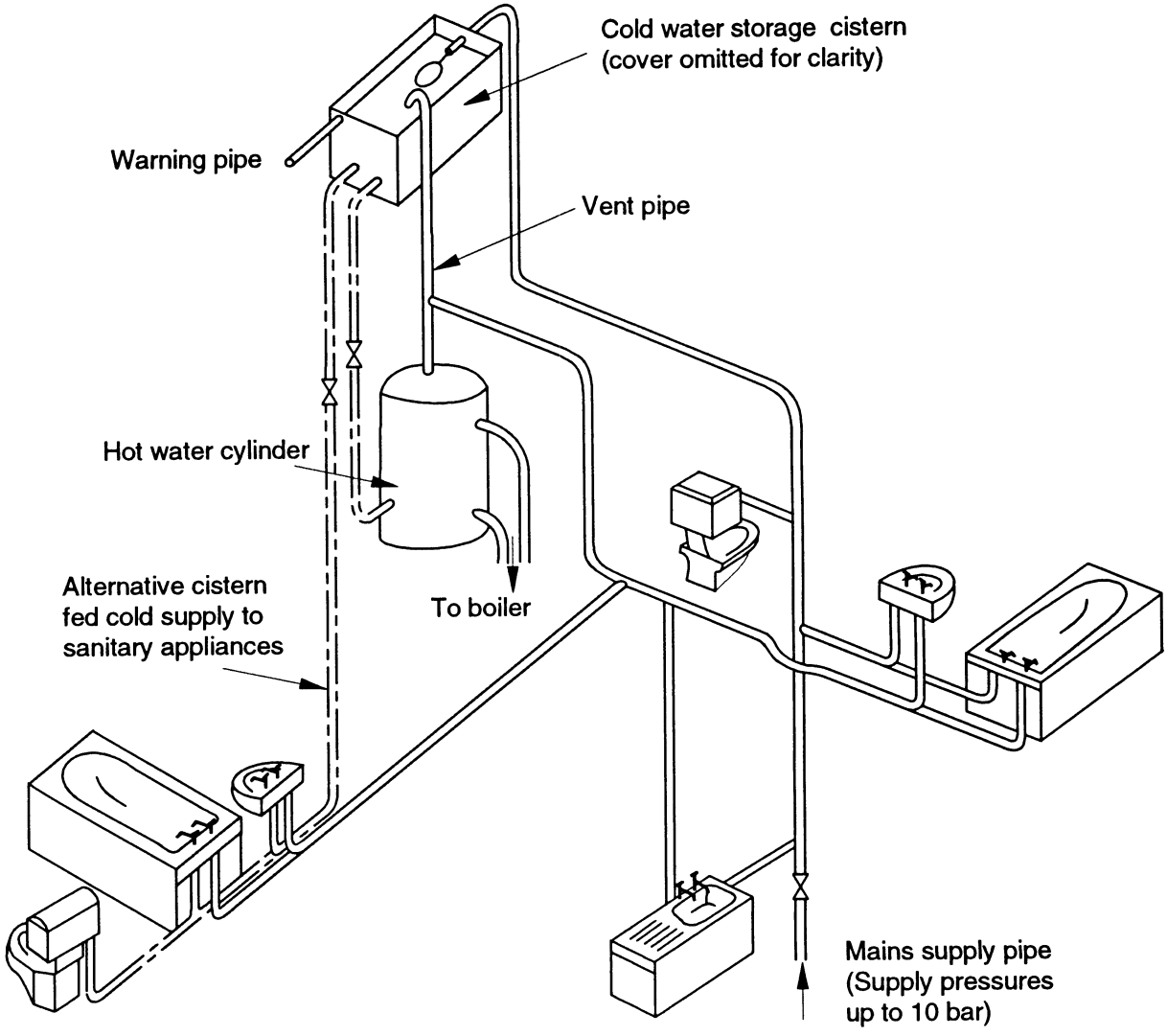


Figure 1 — Traditional UK vented domestic hot water and cold mains water supply system incorporating gravity hot water, mains cold water and alternative gravity cold water supply to sanitary appliances

Table 1 — Conditions of use of tapware

Parameter	Maximum limits of use	Recommended limits for correct operation
Pressure	Static: 1 Mpa (10 bar)	Flow: not less than 0.01 MPa (0.1 bar)
Temperature	90 °C	Max. 65 °C Lower limit: as for installations
NOTE The pressures given are flow pressures.		

3 Normative references

This British Standard incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on the inside back cover. Subsequent amendments to, or revisions of, any of these publications apply to this British Standard only when incorporated in it by updating or revision.

4 Designation

The taps covered by this specification are designated by reference to:

a) type;

b) nominal size ($\frac{1}{2}$ or $\frac{3}{4}$);

c) this standard.

Example

Combination tap with combined visible body, for mounting on horizontal surfaces, nominal size $\frac{1}{2}$, BS 5412.

5 Marking and identification

5.1 Marking

Taps shall be marked[1)] in a permanent and legible fashion as follows:

a) on the body, handle or headwork, with the manufacturer's name or identification;

b) on the body, handle or headwork, accessible after installation, with the number of this British Standard.

5.2 Identification

5.2.1 The control devices for the taps shall be identified by:

a) the colour blue, preferably, or the letter C for cold water;

b) the colour red, preferably, or the letter H for hot water.

5.2.2 The cold water control device shall be on the right and the hot water control device on the left, when viewed from the front.

5.2.3 In the case of divided outlet combination tap assemblies (mains fed on cold inlet) which give cold waterway flow rates at 0.1 bar[2)] of less than 7.5 l/m, the cold-water inlet shall be colour-coded blue, e.g. using coloured tape, disks or paint.

6 Materials

6.1 Chemical and hygiene requirements

All materials coming into contact with water intended for human consumption shall not present any health risk up to a temperature of 90 °C. They shall not cause any change to the drinking water in terms of quality, appearance, smell or taste. All non-metallic materials shall conform to BS 6920-1, BS 6920-2 and BS 6920-3.

Within the recommended limits for correct operation given in Table 1, the materials shall not undergo any change that would impair the performance of the tap. Parts subjected to pressure shall withstand the maximum operating pressures given in Table 1. Materials without adequate resistance to corrosion shall be protected against corrosion.

6.2 Exposed surface conditions

Tap components shall be supplied in one of the following conditions:

a) nickel and chromium plated;

b) as moulded (plastics);

c) finish ordered by the purchaser.

Where metal tap components are plated with nickel and chromium, the coatings shall conform to BS EN 248 and only materials impervious to the plating solution shall be allowed to come into contact with the solution during plating.

6.3 Finish

6.3.1 *Castings*

Unsound castings shall not be treated to eliminate porosity.

6.3.2 *Hot stampings*

Unsound stampings shall not be treated to eliminate faults.

[1)] Marking BS 5412:1995 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 solely the claimant's responsibility. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

[2)] 1 bar = 10^5 Pa.

6.3.3 *Plastics mouldings*

Unsound mouldings shall not be treated to eliminate faults.

7 Dimensional characteristics

7.1 Inlet connections

Where the inlet connection is a G ½ B or G ¾ B thread, it shall be machined at its entry to the dimensions shown in Figure 2 and given in Table 2 for type 1, 2 or 3.

7.2 Single taps

The dimensions of single taps for mounting on horizontal or vertical surfaces shall be in accordance with those given in Table 3.

7.3 Single-hole combination tap assemblies

The dimensions of single-hole combination tap assemblies with combined visible body for mounting on horizontal surfaces shall be in accordance with those given in Table 4.

7.4 Two-hole combination tap assemblies

The dimensions of two-hole combination taps with visible body for mounting on horizontal surfaces shall be in accordance with those given in Table 5.

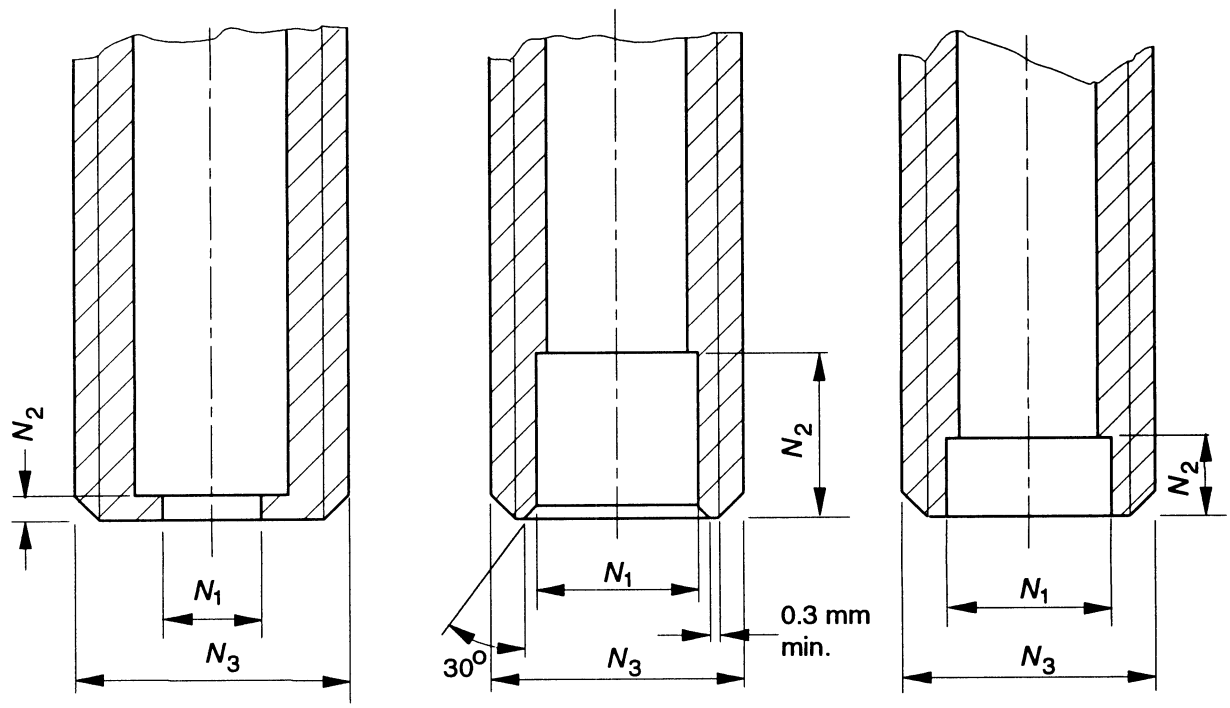


Figure 2 — Dimensions of inlet ends

Table 2 — Dimensions of inlet ends

Nominal size	Type 1		Type 2		Type 3	
N_3	N_1 + 0.2	N_2 min.	N_1 ± 0.05	N_2 min.	N_1 ± 0.3	N_2 min.
G ½ B	12.3	5.0	15.2	13.0	14.7	6.4
G ¾ B	—	—	—	—	19.9	6.4

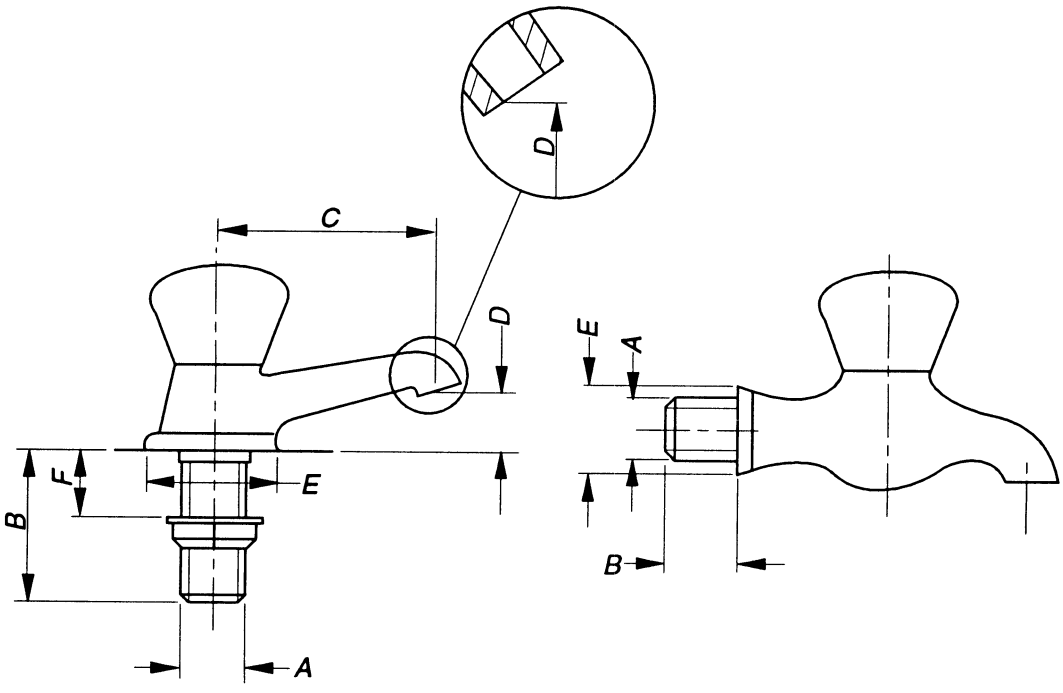
NOTE All dimensions are in millimetres.

Table 3 — Dimensions of pillar and bib taps

Dimension reference[a]		Nominal size		Comments
		$\frac{1}{2}$	$\frac{3}{4}$	
A	Bib and pillar taps	G $\frac{1}{2}$ B	G $\frac{1}{2}$ B	Conforming to BS 2779.
B min.	Pillar taps Bib taps	50.0 11.0	50.0 14.0	
C min.	—	67.0	80.0	Dimension measured from the centre of the outlet orifice including jet regulator or flow straightener, if fitted.
D min.	Basin taps Sink taps Bath taps	20.0[b] 95.0 —	— — 25.0	Dimension measured from the lowest point of the outlet orifice, above the mounting surface of the tap, including jet regulator or flow straightener if fitted.
E min.	Pillar taps Bib taps	42.0 29.0	50.0 36.0	Smallest dimension of base or flange.
F	—	A value that allows tightening of the tap onto a support with a minimum thickness of 5 mm.		Where the support thickness is less than 5 mm a spacing washer may be used.

NOTE 1 All dimensions are in millimetres unless otherwise stated.
NOTE 2 Details of inlets are given in Figure 2 and Table 2.
NOTE 3 Details of threads for jet regulators are given in Table 10 and Table 11 and Figure 9 and Figure 10.

[a] See Figure 3.
[b] This dimension differs from that given in BS EN 200 (i.e. 25 mm) where it is measured from the centre of the outlet orifice.



a) Pillar taps b) Bib taps

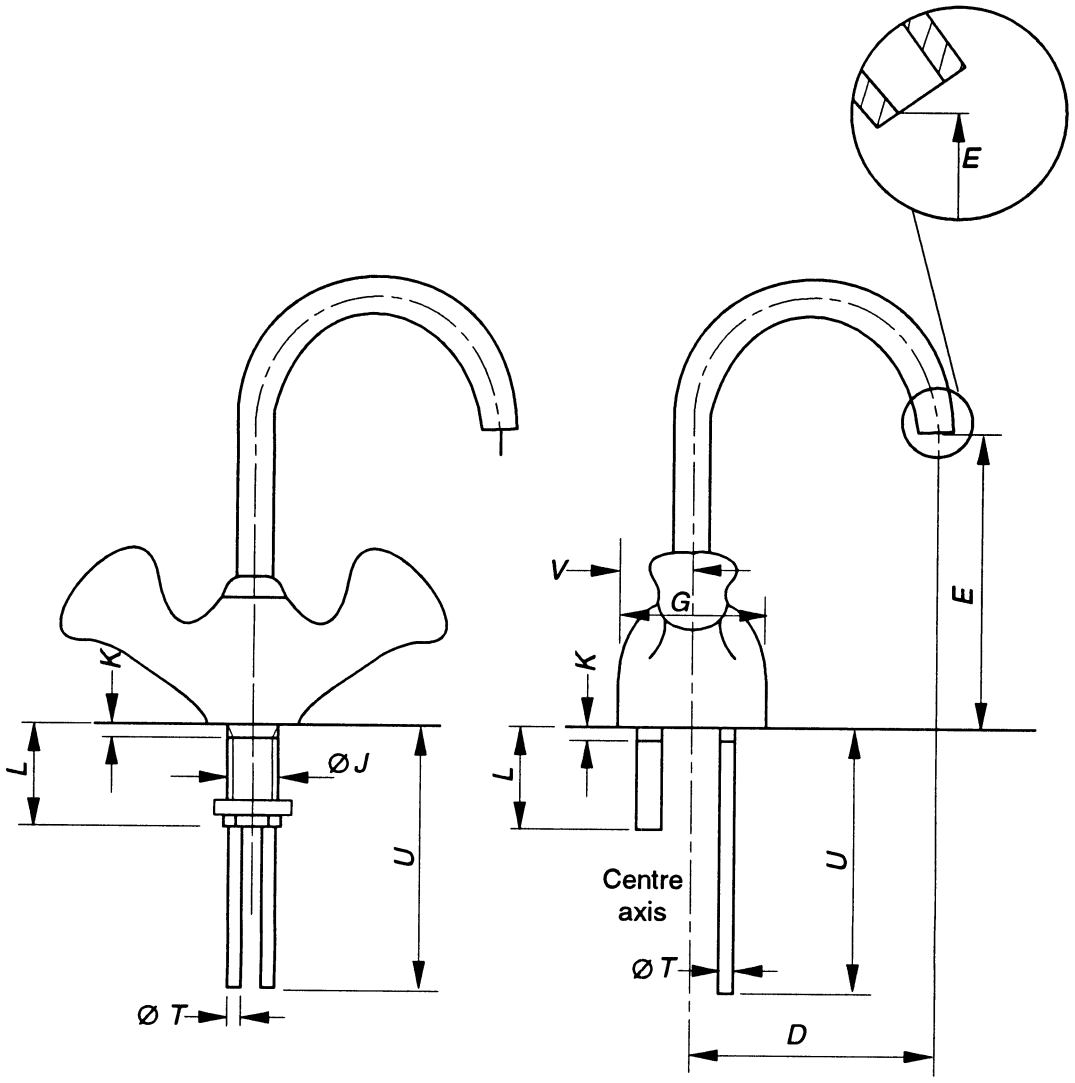
Figure 3 — Single taps

Table 4 — Dimensions of single-hole combination tap assemblies for mounting on horizontal surfaces

Dimension reference[a]	Dimensions	Comments
D min.	Fixed nozzle, 90 Moveable nozzle, 100	Horizontal distance from axis of diameter *J* to centre of outlet orifice, including jet regulator or flow straightener if fitted.
E min.	Fixed nozzle, 20[b] Moveable nozzle: — low outlet, 20[b] — high outlet, 125	Dimension measured from the lowest point of the outlet orifice above the mounting surface of the tap including jet regulator or flow straightener if fitted.
G min.	45	Minimum dimension of the base.
G_1	External diameter, 50 min.	Clamping washer or backnut flange diameter.
J max.	33.5 diameter	Diameter of inlet shank, or circumscribed diameter to clear the inlet pipes and retention stud.
K/*L*		Value that enables the product to be mounted on a support of 1 mm to 18 mm thickness.
T	10 or 12 copper tube or flexible pressure-resistant hose	Plain/swaged or fitted with G $\frac{3}{8}$ B or G $\frac{1}{2}$ B male or female threaded inlet.
U min.	Preferred size, 350[c]	
V max.	32	Maximum projection to rear measured from axis of dimension *J*.

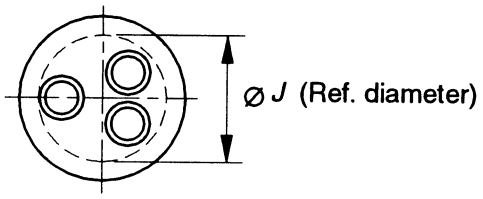
NOTE All dimensions are in millimetres unless otherwise stated.

[a] See Figure 4.
[b] This dimension differs from that given in BS EN 200:1992 (i.e. 25 mm) where it is measured from the centre of the outlet orifice.
[c] A size of 220 mm may be accepted if agreed between the manufacturer and the purchaser.



a) With threaded shank fixing

b) With stud fixing



c) View from underside of stud fixing type

Figure 4 — Single-hole combination tap assemblies

Table 5 — Dimensions of two-hole combination tap assemblies with visible body for mounting on horizontal surfaces

Dimension reference[a]		Nominal size		Comments
		$\frac{1}{2}$	$\frac{3}{4}$	
A		G $\frac{1}{2}$ B	G $\frac{3}{4}$ B	Conforming to BS 2779.
B min.		50.0	50.0	
C min.		90.0[b]	90.0	Dimension measured from the centre of the outlet orifice including jet regulator or flow straightener if fitted.
D min.	Low outlet High outlet	20.0[c] 125.0	25.0 —	Dimension measured from the lowest point of the outlet orifice, above the mounting surface of the tap, including jet regulator or flow straightener if fitted.
E min.		42.0	50.0	Smallest dimension of base or flange.
F		A value that allows tightening of the tap onto a support with a minimum thickness of 5.		Where the support thickness is less than 5 it is permissible to use a spacing washer.
G	Basins and bidets Sinks Bath	95/105 175/185 —	— — 175/185	To assemble into basins and bidets conforming to BS 1329, BS 5506 and BS 5505. To assemble into sinks conforming to BS 1244-1 and BS 1244-2. To assemble into baths conforming to BS 1390, BS 1189 and BS 4305.

NOTE 1 All dimensions are in millimetres unless otherwise stated.
NOTE 2 Details of inlets are given in Figure 2 and Table 2.
NOTE 3 Details of threads for jet regulators are given in Table 10 and Table 11 and Figure 9 and Figure 10.

[a] See Figure 5.
[b] This dimension may be 67.0 min. when used with a value of 95/105 for dimension *G*.
[c] This dimension differs from that given in BS EN 200 (i.e. 25 mm) where it is measured from the centre of the outlet orifice.

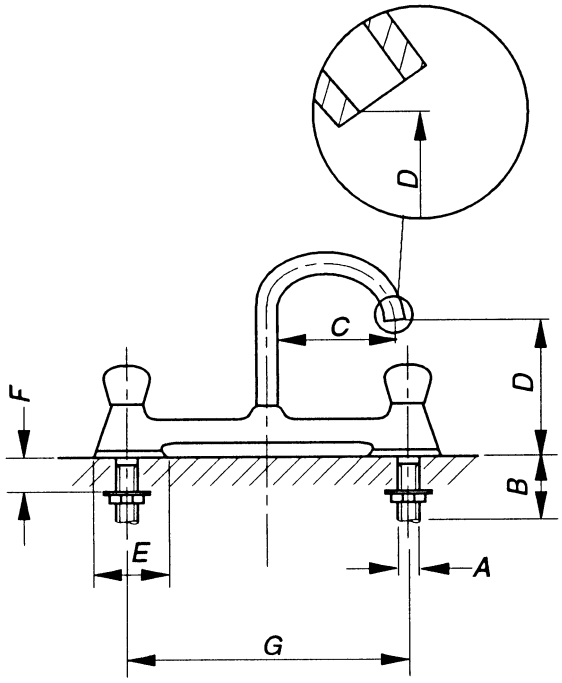


Figure 5 — Two-hole combination tap assembly with visible body for mounting on horizontal surfaces

7.5 Three-hole combination tap assemblies

The dimensions of three-hole combination tap assemblies with concealed body for mounting on horizontal surfaces shall be in accordance with the dimensions given in Table 6.

7.6 Combination tap assemblies with visible cross-connected body for mounting on vertical surfaces

NOTE 1 With the exception of connecting dimensions and those given in Table 9, this standard does not cover general dimensions for combination tap assemblies for mounting on a vertical surface.
NOTE 2 The dimensions of the outlet connections of the unions and inlet connections of the body are not covered by this standard.

7.6.1 The threads of the outlet connections of the unions and of the inlet connections of the body shall conform to BS 2779.

7.6.2 The inlets of combination tap assemblies with a visible cross-connected body for mounting on vertical surfaces shall be designed to accommodate either straight or eccentric unions selected from Table 7 and shall have centre dimensions in accordance with Table 8.

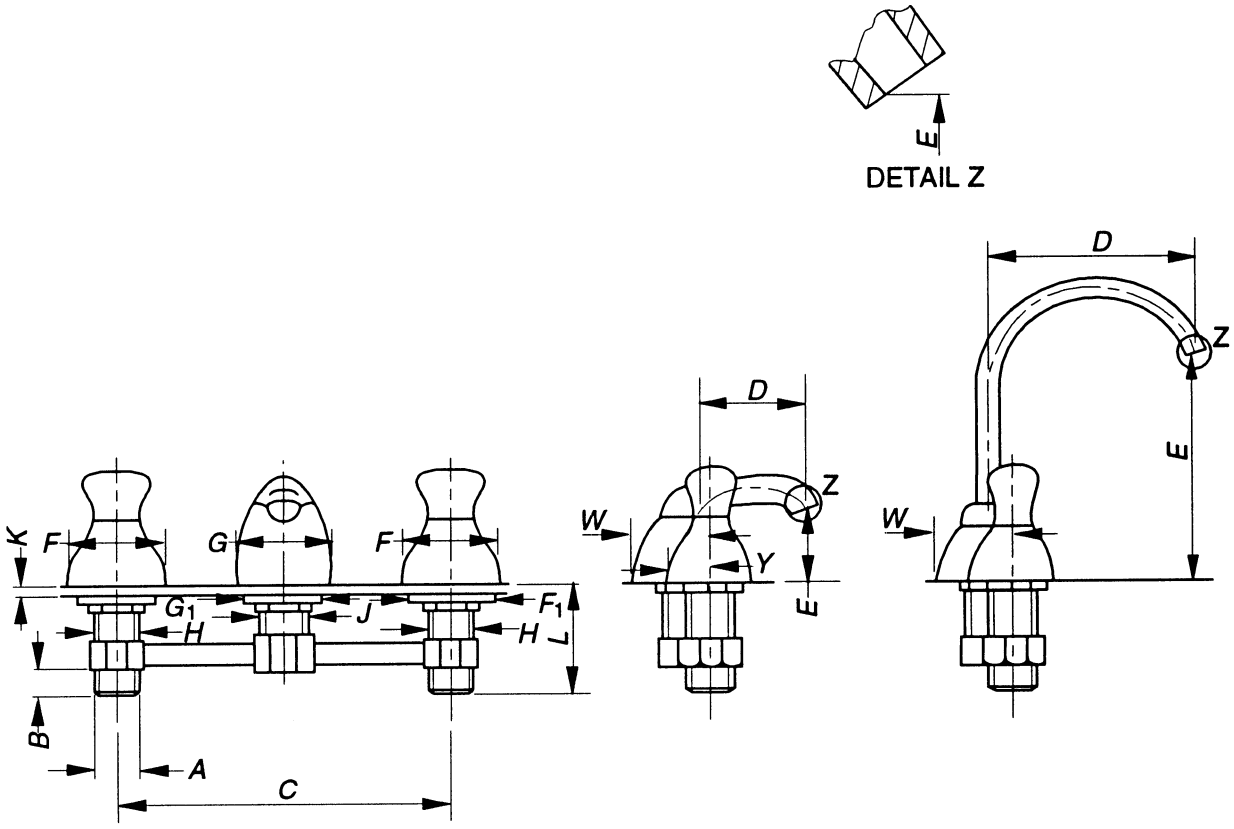
7.6.3 The dimensions of bath/shower combination taps with a visible cross-connected body shall be in accordance with Table 9.

Table 6 — Dimensions of three-hole combination tap assemblies with concealed body for mounting on horizontal surfaces

Dimension reference[a]	Dimensions	Comments
A	G $\frac{1}{2}$ B	Conforming to BS 2779
B	8 min.	
C	200 ± 1 200 $^{+10}_{-5}$	In the case of fixed centre taps In the case of adjustable centre taps
D	90 min.	Horizontal distance from axis of diameter *J* to centre of outlet orifice including jet regulator or flow straightener, if fitted
E	Low outlet, 20[b] min. High outlet, 125 min.	Dimension measured from the lowest point of the outlet orifice above the mounting surface of the tap including jet regulator or flow straightener if fitted
F	42 min.	Minimum dimension of the base
F_1	38 min.	Clamping washer or backnut flange diameter
G	45 min.	Minimum dimension of the base
G_1	42 to 50	Clamping washer or backnut flange diameter
H	29 max. 24 max.	For taps with adjustable centres For taps with fixed centres
J	33.5 max.	Diameter
K/*L*		Value which enables the product to be mounted on a support of 1 mm to 18 mm thickness
V	32 max.	Maximum projection to rear
W	47 max.	

NOTE All dimensions are in millimetres.

[a] See Figure 6.
[b] This dimension differs from that given in BS EN 200 (i.e 25 mm) where it is measured from the centre of the outlet orifice.



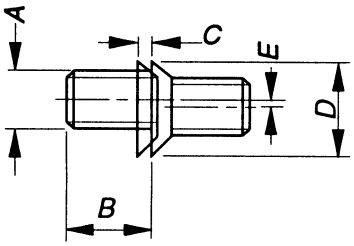
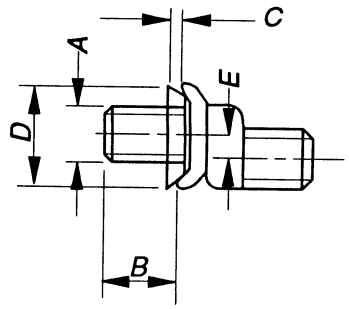
a) Fixed outlet front view

a) Fixed outlet side view

a) Moveable outlet side view

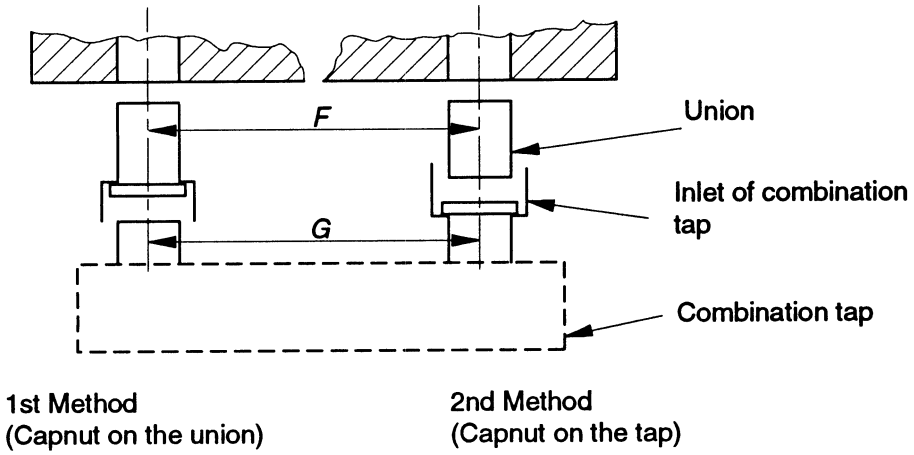
Figure 6 — Three-hole combination tap assemblies with concealed body for mounting on horizontal surfaces

Table 7 — Dimensions of eccentric unions

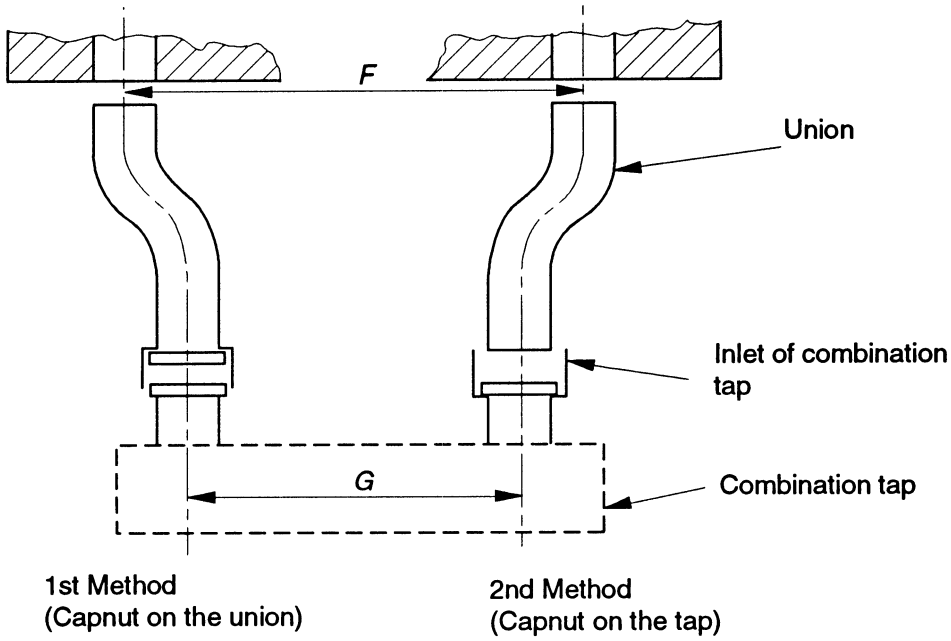
Type	Dimensions[a]	
a) Concealed eccentric union and cover plate 	A *B*[b] *C* *D* *E* *F*	Thread conforming to BS 2779 G ½ B 25 min. 5 min. Diameter 60 min. 5 min. Thread conforming to BS 2779
b) Visible eccentric union and cover plate 	A *B*[b] *C* *D* *E* *F*	Thread conforming to BS 2779 G ½ B 25 min. 5 min. Diameter 50 min. 5 min. Thread conforming to BS 2779

NOTE All dimensions are in millimetres.

[a] See Figure 7.
[b] Dimension *B* represents the distance between the free end of the thread and the rear face of the cover plate. This dimension is not the useful length of the thread.



a) Inlet centres: straight union



b) Inlet centres: eccentric unions

Figure 7 — Inlet centres of unions

Table 8 — Inlet centres of unions

Dimension reference[a]	Straight unions		Eccentric unions
	Dimensions	Comments	Dimensions
F	Dimension between the centres of the union for pipes with centres of 150 ± 1	Combination tap assemblies with straight unions shall be mounted on pipes having corresponding centre lines	Dimension between the centres of the unions for pipes with centres of 140 to 160
G	Distance between the centres of the body inlets (150 nominal)	The manufacturing dimensions shall allow mounting on pipes having corresponding nominal centre lines with an installation tolerance of ± 1	Distance between centres of the body inlets (150 nominal)

NOTE All dimensions are in millimetres.

[a] See Figure 7.

Table 9 — Dimensions of bath/shower combination tap assemblies with cross-connected body mounted on vertical surfaces

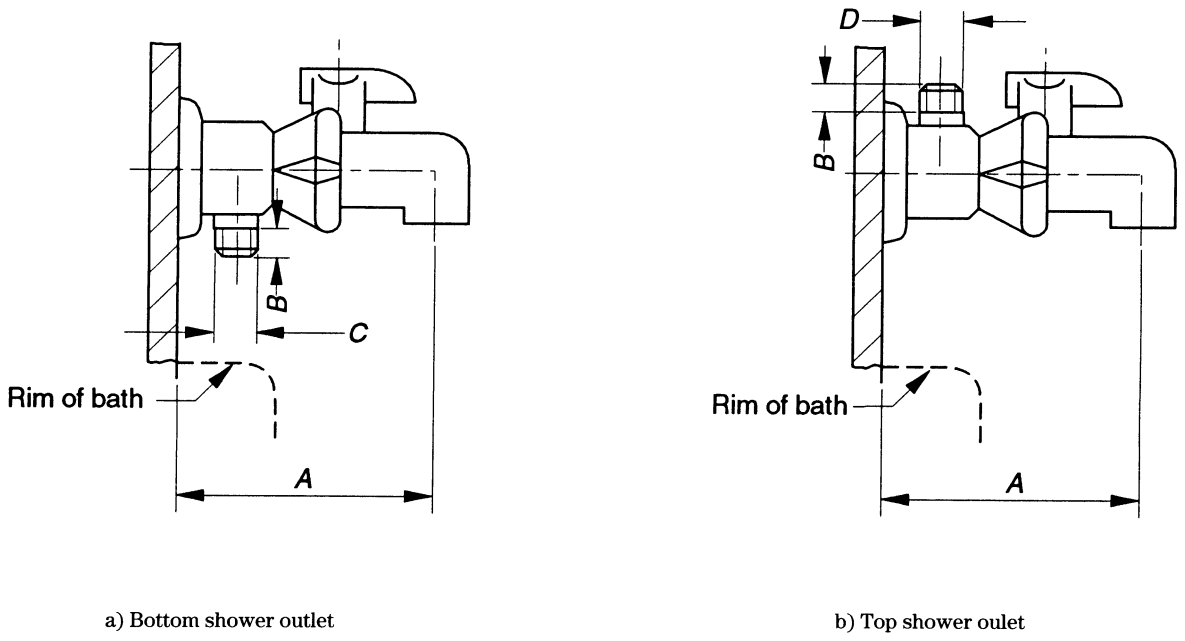
Dimension reference[a]	Dimensions	Comments
A	115 min.	The minimum horizontal project to prevent splashing on the rim of a bath. For baths having a wide rim surface or baths installed away from the mounting surface of the combination tap, it is necessary to increase the length or use an adaptor.
B	8.5 min.	Length of connecting thread.
C	G ½ B[b] or G ¾ B	Connecting thread to shower hose.
D	G ½ B[b] or G ¾ B	Connecting thread to shower hose.

NOTE 1 All dimensions are in millimetres.

NOTE 2 The clearance between the wall and the shower connection shall be sufficient to allow the tightening, release and any appropriate adjustment of the shower connection.

[a] See Figure 8.

[b] Preferred size



a) Bottom shower outlet

b) Top shower oulet

Figure 8 — Combination tap assemblies with a visible cross-connected body mounted on a vertical surface for baths and showers, with a diverter

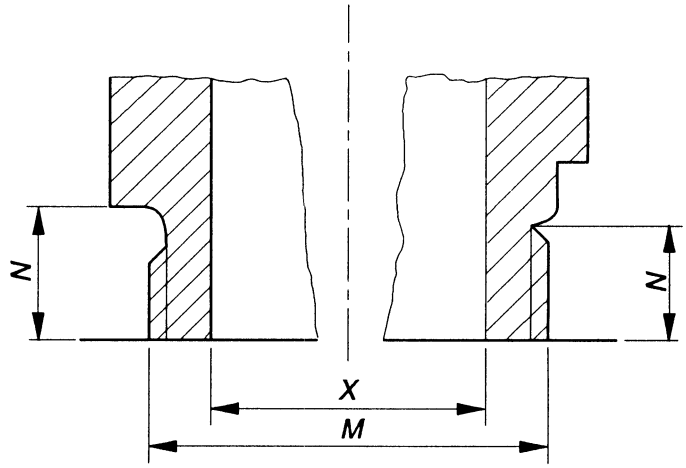


Figure 9 — Nozzle outlets designed to accept female threaded jet regulators

7.7 Nozzle outlets to accept jet regulators

The dimensions of the nozzle outlets designed to accept jet regulators conforming to BS EN 246 shall be in accordance with Table 10 and Table 11.

Table 10 — Nozzle outlets designed to accept female threaded jet regulators

Dimensions in millimetres

Dimension reference[a]	Dimensions
M	M22 × 1 – 6g conforming to ISO 965/1
X	14 min. to 17 max.
N	4.5 min.

[a] See Figure 9.

7.8 Replacement seating washers

When a resilient washer is employed its dimension shall be determined by the manufacturer, however, for replacement purposes, the tap shall be capable of accepting one of the washer types shown in Figure 11.

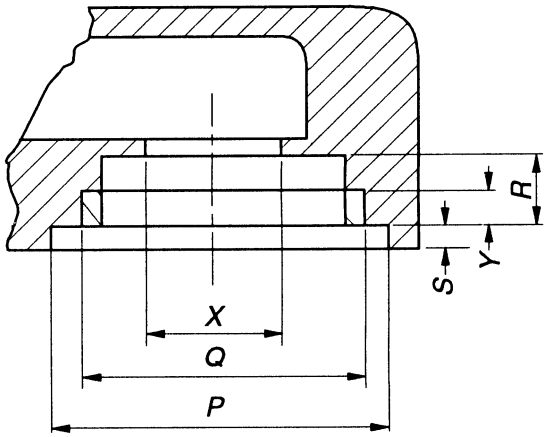


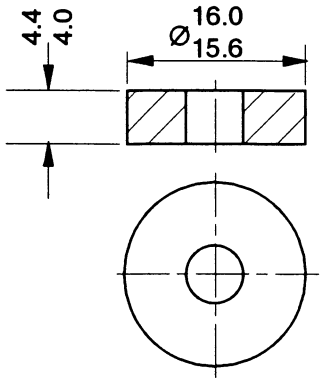
Figure 10 — Nozzle outlets designed to accept male threaded jet regulators

Table 11 — Nozzle outlets designed to accept male threaded jet regulators

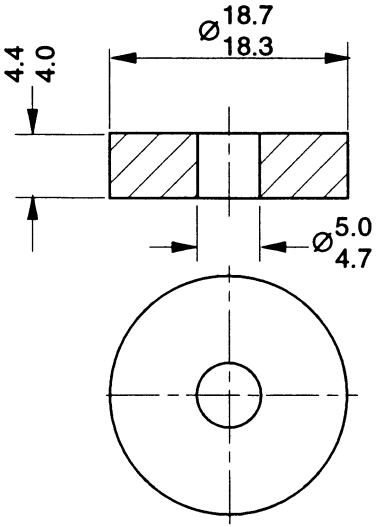
Dimensions in millimetres

Dimension reference[a]	Dimensions	
Q	M24 × 1 – 6H conforming to ISO 965	M28 × 1 – 6H conforming to ISO 965
P	24.2 min.	28.3 min.
R	4.5 ± 0.2	6 ± 0.2
S	1.5 to 4.5	3.9 to 9.5
X	14 min. to 17 max.	15 min. to 19 max.
Y	3 min.	4.5 min.

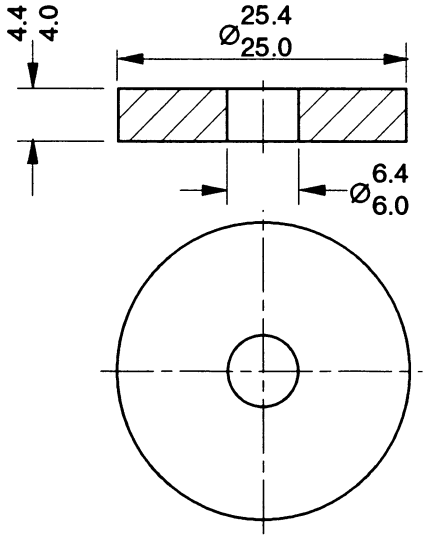
[a] See Figure 10.



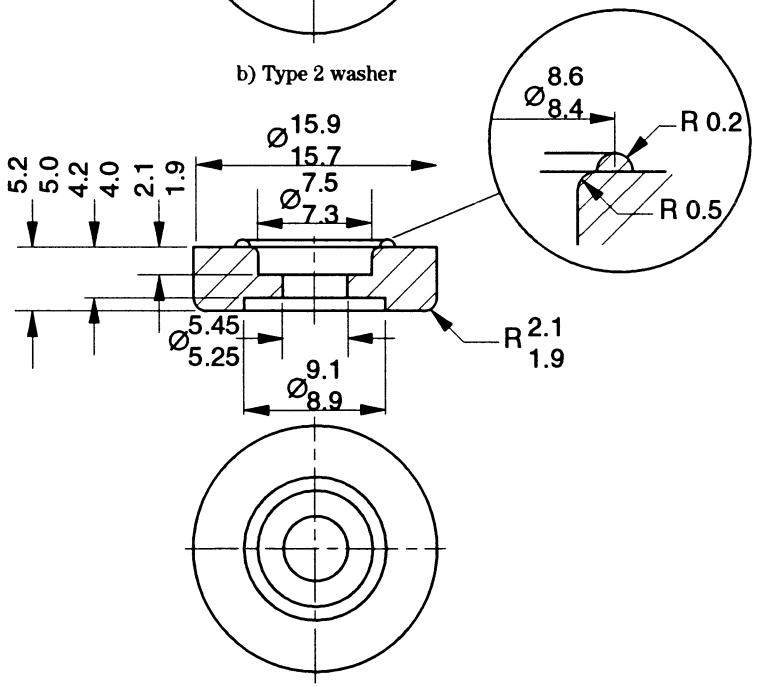
a) Type 1 washer



b) Type 2 washer



c) Type 3 washer



d) Type 4 washer

All dimensions are in millimetres.

Figure 11 — Replacement washers

8 Watertightness characteristics

8.1 General

This clause describes test methods (see Table 12) to verify the watertightness of the complete tap and specifies the corresponding requirements.

8.2 Watertightness tests

8.2.1 *Test methods*

8.2.1.1 *Principle*

The principle of the test consists in checking either under cold water pressure or under air pressure:

a) the watertightness of the obturator;

b) the watertightness of the tap;

c) the watertightness of the bath/shower diverters (either manual or with automatic return).

Where diverters with automatic return are considered to have a backflow prevention function, they shall conform to clause **13** when checked before and after the endurance test specified in **12.2**.

8.2.1.2 *Test equipment*

8.2.1.2.1 *Water test*

Hydraulic test circuit, capable of producing the static and flow pressures required and of maintaining them for the duration of the test.

8.2.1.2.2 *Air test under water*

Tank of water.

Pneumatic circuit, capable of producing the required pressure and of maintaining it for the duration of the test.

8.2.2 *Checking the watertightness of the obturator on the seat and the watertightness of the tap upstream of the obturator*

8.2.2.1 *Water test*

8.2.2.1.1 *Procedure*

Connect the tap to the test circuit.

With the outlet orifice open and generally turned downwards, close the obturator using a torque of 1.5 N·m for nominal size $\frac{1}{2}$ and 2.5 N·m for nominal size $\frac{3}{4}$. If a stuffing box is used to ensure watertightness of the headwork, the packing gland shall be loosened.

Apply to the tap a water pressure of 1.6 MPa ± 0.15 MPa (16 bar ± 1.5 bar) for 60 s ± 5 s.

8.2.2.1.2 *Test criteria*

a) Watertightness of the obturator: throughout the duration of the test, there shall be no leakage past the obturator.

b) Watertightness upstream: throughout the duration of the test, there shall be no leakage or seepage through the walls.

8.2.2.2 *Air test under water*

8.2.2.2.1 *Procedure*

Connect the tap to the test circuit.

With the outlet orifice open and generally turned upwards, close the obturator using a torque of 1.5 N·m for nominal size $\frac{1}{2}$ and 2.5 N·m for nominal size $\frac{3}{4}$. If a stuffing box is used to ensure the watertightness of the headwork, the packing gland shall be loosened.

Completely immerse the tap in the water contained in the tank.

Apply an air pressure of 0.6 MPa ± 0.05 MPa (6 bar ± 0.5 bar) to the tap for 20 s ± 2 s.

8.2.2.2.2 *Test criteria*

Throughout the duration of the test there shall be no escape of air bubbles.

8.2.3 *Checking the watertightness of the tap downstream of the obturator*

8.2.3.1 *Water test*

8.2.3.1.1 *Procedure*

Connect the tap to the test circuit.

With the outlet orifice(s) artificially closed and generally turned downwards, open the obturator(s).

Apply to the tap for 60 s ± 5 s a water pressure of 0.4 MPa ± 0.05 MPa (4 bar ± 0.5 bar), then gradually reduce the pressure to 0.02 MPa ± 0.002 MPa (0.2 bar ± 0.02 bar) and maintain it there for 20 s ± 2 s.

8.2.3.1.2 *Test criteria*

Throughout the duration of the test there shall be no leakage, or seepage through the seals.

8.2.3.2 *Air test under water*

8.2.3.2.1 *Procedure*

Connect the tap to the test circuit.

With the outlet orifice(s) closed artificially and generally turned upwards, open the obturator(s).

Completely immerse the tap in the water contained in the tank.

Apply an air pressure of 0.2 MPa ± 0.02 MPa (2 bar ± 0.2 bar) for 20 s ± 2 s then gradually reduce the pressure to 0.02 MPa ± 0.002 MPa (0.2 bar ± 0.02 bar) and maintain it there for 20 s ± 2 s.

8.2.3.2.2 *Test criteria*

Throughout the duration of the test there shall be no escape of air bubbles.

Table 12 — Summary of watertightness tests

Tightness of:		Position of obturator(s) or diverter	Condition of outlet orifice(s)	Cold water test			Air test with cold water		
				Test conditions		Characteristics required	Test conditions		Characteristics required
				Pressure bar	Duration s		Pressure bar	Duration s	
Tap assembly	Obturator on seat and upstream of obturator[a]	Obturators closed. Closing torque: 1.5 N m for nominal size ½; 2.5 N m for nominal size ¾	Open	16	60	No leakage past obturator or through walls upstream of obturator	6	20	No escape of air bubbles
	Downstream of obturator	Obturators open	Closed	4	60	No leakage past any seal	2	20	No escape of air bubbles
				0.2	20		0.2	20	
Manually operated diverter	In flow-to-bath mode	Diverter in flow-to-bath mode; obturators open	Artificially close outlet to bath	4	60	No leakage at outlet to shower	2	20	No escape of air bubbles at outlet to shower
			Outlet to shower open	0.2	60		0.2	20	
	In flow-to-shower mode	Diverter in flow-to-shower mode; obturators open	Artificially close outlet to shower	4	60	No leakage at outlet to bath	2	20	No escape of air bubbles at outlet to bath
			Outlet to bath open	0.2	20		0.2	20	
Diverter with automatic return	In flow-to-bath mode	Diverter in flow-to-bath mode; obturators open	Both outlets open	Pressure to provide 0.75 l/s	60	No leakage at hose attachment point			
	In flow-to-shower mode	Diverter in flow-to-shower mode; obturators open	Both outlets open	—[b]	60	No leakage at outlet to bath			
	In flow-to-shower mode	Diverter in flow-to-shower mode	Both outlets open	0.2	60	No reversion of diverter; no leakage at outlet to bath			
		Obturators closed		0		Diverter reverts to flow-to-bath mode			
	In flow-to-shower mode	Diverter in flow-to-bath mode; obturators open	Both outlets open	0.2	60	No leakage at hose attachment point			

[a] If a stuffing box is used to ensure the watertightness of the spindle, loosen the packing gland.

[b] Flow pressure through the hydraulic resistance generated by a 0.2 bar flow pressure (i.e. pressure generated by the previous step) through the outlet to the bath.

8.2.4 ***Checking the watertightness of manually operated diverters***

8.2.4.1 *Water test*

8.2.4.1.1 *Procedure: flow to bath*

Connect the tap, in its normal position of use, to the test circuit.

Put the diverter in the flow-to-bath mode, the outlet to bath being artificially closed and the outlet to shower open.

Apply a static water pressure of 0.4 MPa ± 0.05 MPa (4 bar ± 0.5 bar) for 60 s ± 5 s then gradually reduce the pressure to 0.02 MPa ± 0.002 MPa (0.2 bar ± 0.02 bar) and maintain it there for 20 s ± 2 s.

8.2.4.1.2 *Test criterion: flow to bath*

Check that watertightness is maintained on the outlet to shower.

8.2.4.1.3 *Procedure: flow to shower*

Put the diverter in the flow-to-shower mode, the outlet to shower being artificially closed and the outlet to bath open and generally turned downwards.

Apply a static water pressure of 0.4 MPa ± 0.04 MPa (4 bar ± 0.4 bar) for 60 s ± 5 s then gradually reduce the pressure to 0.02 MPa ± 0.002 MPa (0.2 bar ± 0.02 bar) and maintain it there for 20 s ± 2 s.

8.2.4.1.4 *Test criterion: flow to shower*

Check that watertightness is maintained on the outlet to bath.

8.2.4.2 *Air test under water*

8.2.4.2.1 *Procedure: flow to bath*

Connect the tap to the test circuit.

Put the diverter in the flow-to-bath mode, the outlet to bath being artificially closed and the outlet to shower open and generally turned upwards.

Immerse the tap in the water contained in the tank.

Apply a static air pressure of 0.2 MPa ± 0.02 MPa (2 bar ± 0.2 bar) for 20 s ± 2 s then gradually reduce the pressure to 0.02 MPa ± 0.002 MPa (0.2 bar ± 0.02 bar) and maintain it there for 20 s ± 2 s.

8.2.4.2.2 *Test criterion: flow to bath*

Check that airtightness is maintained (i.e. there is no production of air bubbles) on the outlet to shower.

8.2.4.2.3 *Procedure: flow to shower*

Put the diverter in the outlet-to-shower mode, the outlet to shower being artificially closed and the outlet to bath open and generally turned upwards.

Immerse the tap in the water contained in the tank.

Apply a static air pressure of 0.2 MPa ± 0.02 MPa (2 bar ± 0.2 bar) for 20 s ± 2 s then gradually reduce the pressure to 0.02 MPa ± 0.002 MPa (0.2 bar ± 0.02 bar) and maintain it there for 20 s ± 2 s.

8.2.4.2.4 *Test criterion: flow to shower*

Check that airtightness is maintained (i.e. there is no production of air bubbles) on the outlet to bath.

8.2.5 ***Checking the watertightness and operation of diverters with automatic return***

NOTE The test is carried out with cold water only.

8.2.5.1 *Procedure*

8.2.5.1.1 Connect the tap without its shower outlet and hose to the test apparatus shown in Figure 12. The rig shall be capable of maintaining and measuring the flow pressures and flow rates required. All rig control valves shall be closed.

8.2.5.1.2 With the tap in the flow-to-bath mode, fully open both tap obturators. Open the control valve to supply a combined flow rate of 0.75 l/s.

8.2.5.1.3 Observe the hose attachment point for 60 s ± 5 s and note any leakage.

8.2.5.1.4 Regulate the supply to produce a flow pressure of 0.02 MPa ± 0.002 MPa (0.2 bar ± 0.02 bar) and close the isolating valve.

8.2.5.1.5 With the hydraulic resistance (valve plus associated pipework) shown in Figure 12 calibrated to 0.15 l/s at 0.1 bar and fitted to the hose attachment point, put the diverter into the flow-to-shower mode without any adjustment of the test rig controls.

8.2.5.1.6 Observe the outlet to bath for 60 s ± 5 s and note any leakage.

8.2.5.1.7 Using the control valve, reduce the dynamic pressure at the fittings inlet to 0.02 MPa ± 0.002 MPa (0.2 bar ± 0.02 bar) measured from the outlet to the bath datum, opening the manometer isolating valve to check the pressure.

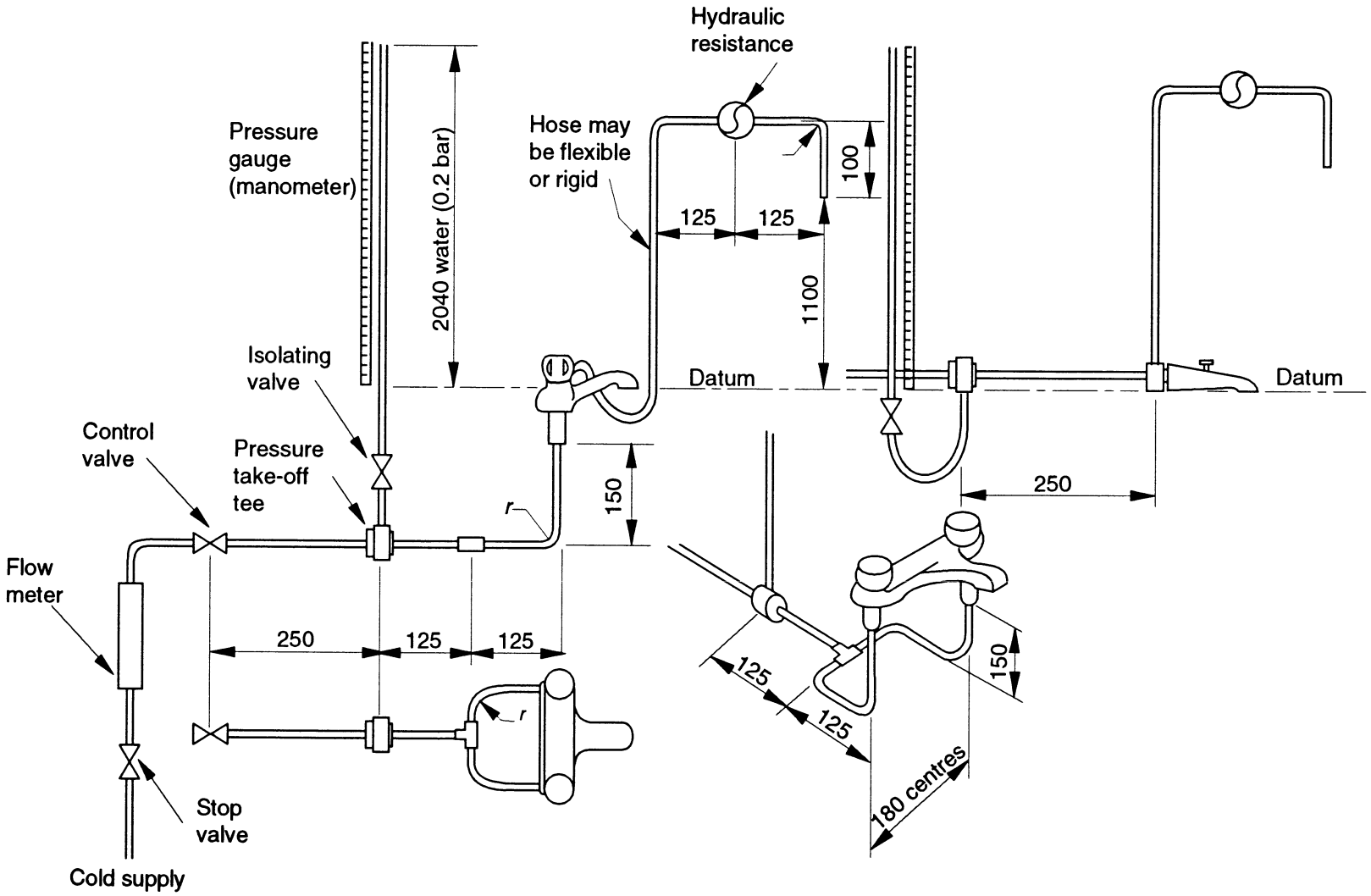
8.2.5.1.8 Check that the diverter has not reverted and observe the outlet to the bath for 60 s ± 5 s and note any leakage.

8.2.5.1.9 Isolate the manometer and close the tap obturators.

8.2.5.1.10 Check that the diverter has reverted to the flow-to-bath mode.

8.2.5.1.11 Disconnect the hydraulic resistance.

8.2.5.1.12 Fully re-open the tap obturators for 60 s ± 5 s and record any leakage from the hose attachment point.



All dimensions are in millimetres.

Figure 12 — Apparatus for testing the watertightness of automatic diverters

8.2.5.2 *Acceptance criteria*

8.2.5.2.1 There shall be no leakage from the hose attachment point during the procedures given in **8.2.5.1.2** and **8.2.5.1.12**.

8.2.5.2.2 There shall be no leakage from the bath outlet during the procedures given in **8.2.5.1.5** and **8.2.5.1.7**.

8.2.5.2.3 The diverter shall not revert during the procedure given in **8.2.5.1.7**.

8.2.5.2.4 The diverter shall revert during the procedure given in **8.2.5.1.9**.

NOTE In assessing leakage, natural drainage should be discounted.

9 Pressure resistance characteristics

9.1 General

This clause describes a test method of checking the mechanical behaviour with cold water of the body of the tap and specifies the test criteria.

9.2 Checking of mechanical behaviour under pressure

9.2.1 ***Test method***

9.2.1.1 *Principle*

Any deformation in the tap that may result under the action of cold water at a high pressure is revealed. The test is carried out upstream and downstream of the obturator.

9.2.1.2 *Equipment*

Hydraulic test circuit, capable of producing the static and flow pressures required and of maintaining them for the test duration.

9.2.2 ***Checking of mechanical behaviour upstream — Obturator in the shut position***

9.2.2.1 *Procedure*

Apply for 60 s ± 5 s a static water pressure of 2.5 MPa ± 0.05 MPa (25 bar ± 0.5 bar).

9.2.2.2 *Test criterion*

There shall be no deformation or leakage.

9.2.3 ***Checking of mechanical behaviour downstream — Obturator in the open position***

9.2.3.1 *Procedure*

9.2.3.1.1 For taps without jet regulators, apply for 60 s ± 5 s a flow rate of 0.4 l/s ± 0.04 l/s for nominal size ½ or 0.8 l/s ± 0.08 l/s for nominal size ¾.

9.2.3.1.2 For taps with jet regulators, apply for 60 s ± 5 s a flow pressure of 0.4 MPa ± 0.04 MPa (4 bar ± 0.4 bar) measured at the inlet of the tap.

9.2.3.2 *Test criterion*

No permanent deformation shall be produced in that part of the tap situated downstream of the obturator.

10 Hydraulic characteristics

10.1 General

This clause describes a test method of measuring for a given pressure the flow rate of single and combination taps having any detachable check valve element and jet regulator removed and specifies the corresponding requirements.

The test is not applicable to combination taps for ascending spray bidets or when the customer requires special design outlets e.g. bottle filling.

10.2 Test criteria

With the test conditions specified in **10.3** the flow rate measured under 0.01 MPa (0.1 bar) shall be not less than that given in Table 13.

Table 13 — Flow rates

Fitting	Flow rate at a test pressure of 0.1 bar l/min
Single taps	
½	7.5
¾	15.0
Combination tap assemblies. Divided-outlet spouts (mains fed on cold inlet[a])	
½: hot waterway	7.5
½: cold waterway	4.2
Combination tap assemblies. Divided outlet tap (each side tested separately)	
½	7.5
¾	15.0
Combination tap assemblies. Single-outlet mixer	
a) Each side tested separately	
½	7.5
¾	15.0
b) Both taps fully open	
½	10.8
¾	22.5

[a] Installation requirement. It is essential that such taps are connected to a mains water supply capable of maintaining a minimum flow pressure of 0.4 bar through the cold side.

10.3 Test method

10.3.1 *Principle*

The value of the flow rate corresponding to a reference pressure equal to 0.01 MPa (0.1 bar) is determined. The measurement is carried out with the tap fully open.

For the purposes of this test, any detachable check valve element and jet regulator shall be removed.

10.3.2 *Apparatus*

Cold water system, of temperature between 10 °C and 25 °C, capable of providing a flow pressure of 0.1 bar through the tap under test.

Test rig(s) (see Figure 13) consisting of the following.

a) *Two pressure gauges (manometers)*, having an accuracy of 2 % at the test pressure with a maximum graduation of 0.01 bar.

b) *Two flow meters* (or other means of measuring flow), having an accuracy of 2 % at the test flow rate with a maximum graduation of 0.01 l/s.

c) *Two pressure take-off tees* (see Figure 14 and Table 14), suitable for 15 mm pipe for nominal size ½ taps or combination tap assemblies, or two pressure take-off tees suitable for 22 mm pipe for nominal size ¾ taps or combination tap assemblies.

d) *Two* 15 mm *control valves*, capable of fine regulation for nominal size ½ taps or combination tap assemblies or *two* 22 mm *control valves*, capable of fine regulation for nominal size ¾ taps or combination tap assemblies.

e) *Copper pipe(s)*, conforming to BS 2871-1. These shall be connected to the inlet(s) of the tap or combination tap assemblies under test and shall have the following features:

1) 15 mm outside diameter for nominal size ½ taps;

2) 22 mm outside diameter for nominal size ¾ taps;

3) lengths, in millimetres, as shown in Figure 13;

4) radius of curve in bends (r) to the centre line of 60 mm ± 10 mm for nominal size ½ taps or combination tap assemblies
and 85 mm ± 10 mm for nominal size ¾ taps or combination tap assemblies.

10.3.3 *Procedure*

10.3.3.1 Fit the tap to be tested onto the test apparatus (see Figure 13).

For the purpose of testing single-hole combination taps the length of the inlet tubes shall be $220\ ^{+10}_{0}$ mm (see dimension reference *U* in Table 4).

10.3.3.2 Open the tap to its maximum.

Connect the water supply to the test apparatus and adjust the flow pressure to 0.1 MPa (0.1 bar).

When a stable, continuous flow has been established, measure and record the corresponding flow rate.

11 Mechanical strength characteristics

11.1 General

This test shall be carried out before the mechanical endurance test.

NOTE This clause describes a test method to verify the torsional strength of the operating mechanisms of single taps and combination taps and specifies the test criteria.

11.2 Test method

11.2.1 *Principle*

The principle of the test consists in submitting the operating mechanism to a given torque to verify its strength.

11.2.2 *Apparatus*

This consists of either a torque wrench having an accuracy of 10 % fitted to the operating member or a lever arm and a device for measuring the force applied.

11.2.3 *Procedure*

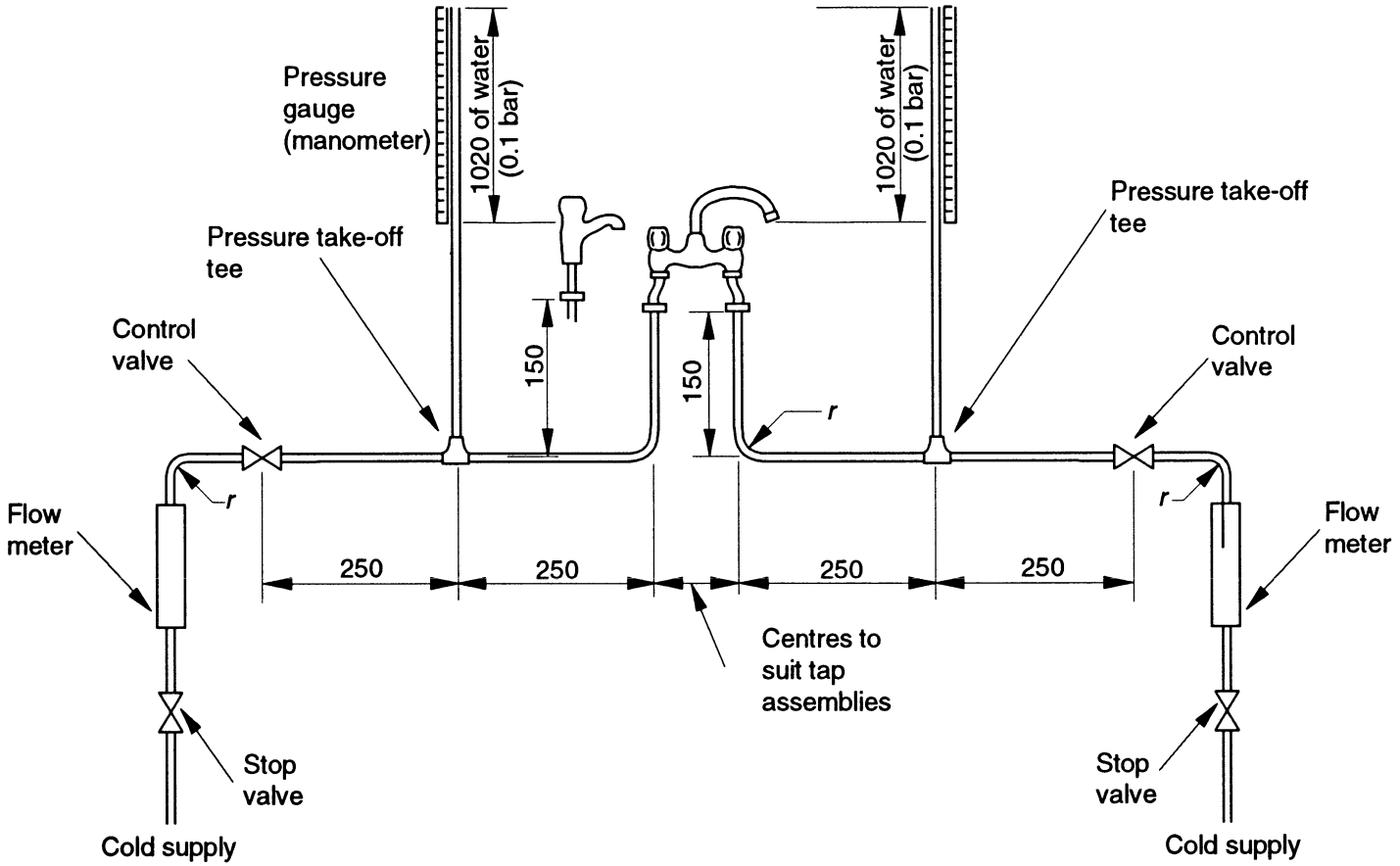
The tap with its operating mechanism, but with the seat washer removed, shall not be supplied with water during the test.

The test shall be carried out at ambient temperature.

Apply, for a period of $5\ ^{+0.25}_{0}$ min, a torque of $6\ ^{0}_{-0.5}$ N·m to the operating mechanism in both opening and closing positions.

11.2.4 *Test criterion*

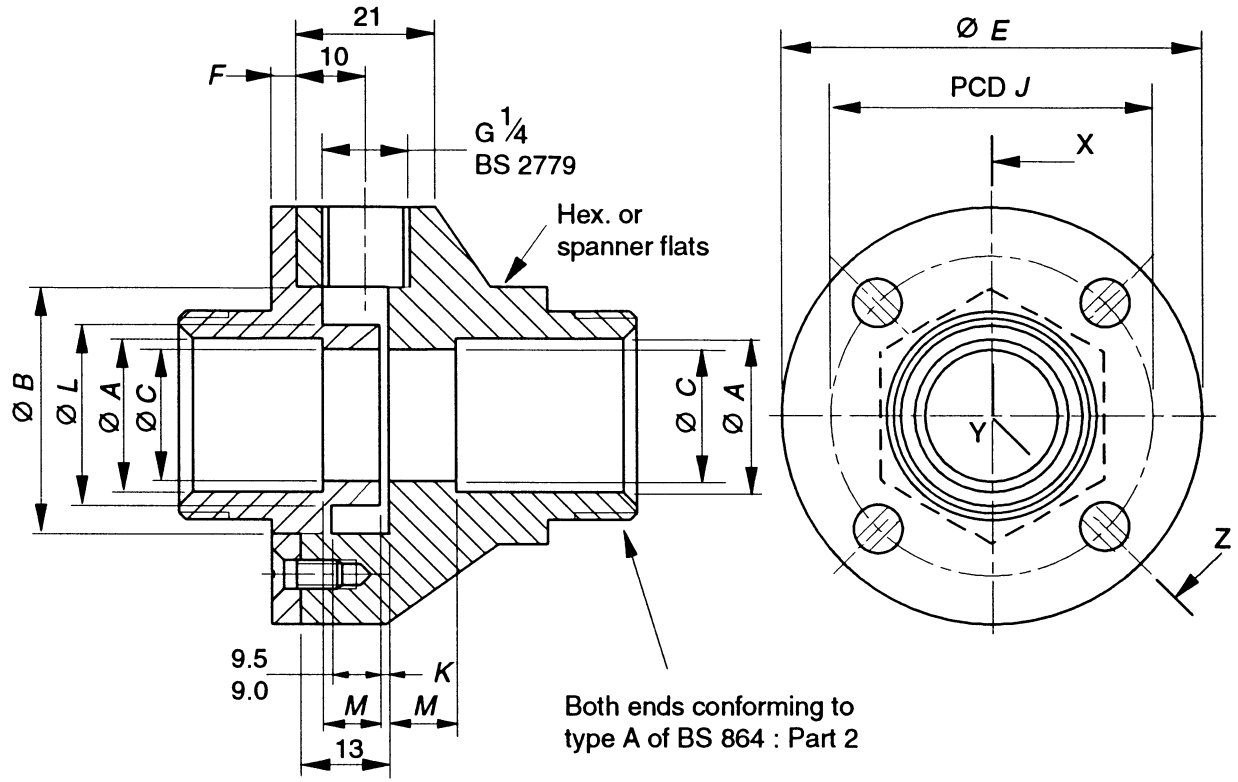
Throughout the duration of the test and at the end of the test, there shall be no permanent deformation or loosening of any part of the valve.



All dimensions are in millimetres.

NOTE The tube ends are square, without burrs and inserted to the full depth of dimension *A* in the pressure take-off tee (see Figure 14).

Figure 13 — Flow rate test apparatus



All dimensions im millimetres.

NOTE Unspecified tolerance is ± 1.

Figure 14 — Detail of the pressure take-off tee

Table 14 — Dimensions of the pressure take-off tee (see Figure 14)

Nominal size of tap	*A*		*B*		*C*		*E*	*F*	*J*	*K*		*L*		*M*	Screws	
	max.	min.	max.	min.	max.	min.				max.	min.	max.	min.		No.	Size
$\frac{1}{2}$	15.25	15.15	26	25	13.95	13.80	49	4	37	0.7	0.5	19	18	5.5	4	M4 × 15
$\frac{3}{4}$	22.30	22.20	36	35	20.75	20.50	59	4	47	0.8	0.6	26	25	9.0		

12 Mechanical endurance characteristics

12.1 Mechanical endurance characteristics of the operating mechanism

12.1.1 *General*

This clause describes a test method to verify the mechanical endurance of the operating mechanisms (headwork) of single and combination taps of nominal sizes $\frac{1}{2}$ and $\frac{3}{4}$ and specifies the test criteria. Taps shall first satisfy the watertightness tests described in clause **8**.

12.1.2 *Test method*

12.1.2.1 *Principle*

The capability of the obturator to remain serviceable for an acceptable period of time is assured. Durability is established by continuous repetition of an opening and closing cycle. No replacement of parts is permitted during the test.

12.1.2.2 *Apparatus*

Automatic test rig, providing means of:

a) rotating the tap spindle in the opening and closing directions;

b) applying a constant closing torque irrespective of wear on the sealing washer or sealing member of $1.5\ ^{0}_{-0.15}$ N·m throughout the test;

c) applying a speed of rotation to the spindle of (30 ± 5) r/min;

d) opening the tap between 80 % to 95 % from the closed position;

e) supplying water at a minimum static pressure of 0.02 MPa (0.2 bar) arranged so that it can be supplied either at a temperature less than 30 °C or at $60\ ^{+5}_{0}$ °C measured immediately upstream of the tap inlet connection;

NOTE If the water is supplied via a circulatory system it is essential that the water is free from grease, debris, etc. and that its quality does not change throughout the duration of the test.

f) achieving a) to d) without generating abnormal wear caused by eccentricity or axial/radial forces that would not occur in normal use.

12.1.3 *Procedure*

The mechanism may be tested with or without the supplied operating member attached.

Fit the tap onto the automatic test rig and connect the water supply. The water supply shall be arranged and regulated so that the flow rate through the tap is 0.25 litres per cycle to 0.5 litres per cycle.

Commence the opening and closing operations as follows:

a) open the tap to 80 % to 95 % of full obturator lift or movement from the closed position;

b) fully close the tap with an applied closing torque of $1.5\ ^{0}_{-0.15}$ N·m;

c) allow the tap to remain in the closed position for 4 s to 6 s.

NOTE Items a) to c) constitute one cycle.

The tap shall be tested for 200 000 cycles using hot and cold water alternatively for periods of 15 min ± 1 min each.

Inspect the tap under test at intervals of 50 000 cycles to check for leaks and/or malfunctioning.

NOTE At these intervals only, any compressible gland packing may be adjusted to maintain a watertight seal.

12.1.4 *Test criteria*

After testing, the tap shall again satisfy the watertightness criteria given in clause **8**, and there shall be no permanent deflection or failure of any component part.

12.2 Mechanical endurance of diverters

12.2.1 *General*

This clause describes two methods, one for manual diverters and one for automatic diverters, of evaluating the mechanical endurance of diverters of combination taps, and specifies the test criteria.

12.2.2 *Test criteria*

During the test, there shall be:

— no rupture of the elements;

— no blockage of the mechanism;

— no leakage on the nozzle or shower side;

— no leakage at the diverter control joint.

At the end of the test, check the watertightness:

— for manual diverters, under the conditions described in **8.2.4**;

— for automatic diverters, under the conditions described in **8.2.5**.

12.2.3 *Test method*

12.2.3.1 *Principle*

The diverter is subjected to a specified number of operations, with the system being fed alternatively with cold water and hot water in order to test its behaviour over a period of time, taking into account temperature.

12.2.3.2 *Apparatus*

12.2.3.2.1 *Manual diverter*, consisting of an automatic machine that ensures alternate operations at the rate of $15\ ^{0}_{-1}$ cycles per minute and supply circuits with a pump or similar device to supply the required cold water static pressure at a temperature of ≤ 30 °C and hot water static pressure at 65 °C ± 2 °C.

12.2.3.2.2 *Diverter with automatic return*, consisting of a mechanism for moving the diverter to the shower position under the conditions specified in **8.2.5** and supply circuits identical to those specified in **12.2.3.2.1** with, in addition, a quick-acting valve coupled to the diverter-operating member.

12.2.3.3 *Procedure*

12.2.3.3.1 *Manual diverter*

Install the tap, as supplied, on the test rig and connect both inlets to both supply circuits.

Connect the drive device to the diverter-operating member by means of a flexible drive. Adjust the static water pressure of both hot and cold circuits to at least 0.02 MPa ± 0.002 MPa (0.2 bar ± 0.02 bar).

In the flow-to-bath mode, adjust the flow rate to 0.1 l/s to 0.15 l/s (6 l/min to 9 l/min) by restricting the nozzle outlet. In the flow-to-shower mode, if the flow rate exceeds 0.1 l/s (6 l/min) adjust the flow rate to 0.066 l/s to 0.1 l/s (4 l/min to 6 l/min) by restricting the diverter outlet.

Subject the diverter to a fatigue test of 30 000 cycles, each cycle comprising a radial or reciprocating movement between the end positions.

Throughout the test, supply the tap alternatively with cold water for 15 min ± 1 min, then hot water for 15 min ± 1 min, and so on.

Throughout the test, record any incidents (leaks, ruptures etc.).

After 30 000 cycles, check the watertightness of the assembly (see **8.2.4**).

12.2.3.3.2 *Diverter with automatic return*

Install the tap, as supplied, on the test rig and connect it to the supply circuit.

Connect the drive device to the diverter-operating member by means of a flexible drive. Adjust the static water pressure of both hot and cold circuits to at least 0.02 MPa (0.2 bar).

In the flow-to-bath mode, restrict the flow to the diverter to the minimum that permits proper functioning of the diverter. In the flow-to-shower mode, if the flow rate exceeds 0.1 l/s (6 l/min) adjust the flow rate to 0.066 l/s to 0.1 l/s (4 l/min to 6 l/min) by restricting the diverter outlet.

Subject the diverter to a fatigue test of 30 000 cycles, 1 cycle being defined as follows:

— with the diverter in the bath position, allow the water to flow through the nozzle for $5\,^{+1}_{0}$ s;

— change the diverter to the shower position;

— allow the water to flow through the shower outlet for $5\,^{+1}_{0}$ s;

— use the quick-acting valve to cut off the supply, allowing the diverter to return to the bath position, and reopen the supply.

Throughout the test, supply the tap alternatively with cold water for 15 min ± 1 min and then hot water for 15 min ± 1 min and so on.

Throughout the test, record any incidents (leaks, failure of the diverter to reset, blockage etc.).

After 30 000 cycles, check the watertightness of the assembly (see **8.2.5**).

12.3 Mechanical endurance of swivel nozzles (single-outlet type)

12.3.1 *General*

This clause describes a method of testing the mechanical endurance of swivel nozzles (single-outlet type) of taps and specifies the corresponding test criteria.

12.3.2 *Test method*

12.3.2.1 *Principle*

The behaviour of the nozzle of the tap fed with cold water is tested over a period of time by swivelling the nozzle for a specified number of cycles.

12.3.2.2 *Apparatus*

Automatic machine, capable of swivelling the nozzle as described in **12.3.2.3** at the rate of 15 cycles per minute.

Cold water supply circuit (≤ 30 °C) *with pump or similar device*, for supplying the required static pressure.

Weight, of $1\,^{0}_{-0.1}$ kg (for a nozzle reach ≤ 200 mm).

Weight, of bending moment $2\,^{0}_{-0.25}$ N·m (for a nozzle reach > 200 mm).

12.3.2.3 *Procedure*

Mount the tap on the machine and connect it to the supply circuit. If the nozzle has a jet regulator, leave it on and ensure that it does not obstruct the test path.

Securely fix the appropriate weight (see **12.3.2.2**) at the end of the swivel nozzle (see Figure 15).

Connect the driving device to the swivel nozzle.

With the tap closed, adjust the static water pressure of the supply circuit to between 0.2 MPa and 0.4 MPa (2 bar and 4 bar).

Open the tap fully and adjust the flow rate to between 0.066 l/s and 0.1 l/s (4 l/min and 6 l/min) by restricting the nozzle outlet.

Subject the swivel nozzle to a test of 80 000 cycles, each cycle comprising a movement of the nozzle through an arc of approximately 110° in both directions.

NOTE If there is a stop, the arc constitutes over 90 % of the available travel.

During the test, move the nozzle smoothly at as steady a speed as possible at a rate of 15 cycles per minute.

12.3.2.4 *Test criteria*

During the test, there shall be:

— no rupture of the swivel nozzle;

— no rupture of the device connecting the nozzle to the body;

— no leakage of the assembly.

At the end of the test, check the watertightness under the conditions given in **8.2.3**.

12.4 Mechanical endurance of swivel nozzles (divided-outlet types)

12.4.1 ***General***

This subclause describes a method of testing the mechanical endurance of swivel nozzles (divided-outlet type) of taps and specifies the corresponding test criteria.

12.4.2 ***Test method***

12.4.2.1 *Principle*

The behaviour of the nozzle of the tap fed with cold water is tested over a period of time by swivelling the nozzle for a specified number of cycles.

12.4.2.2 *Apparatus*

Automatic machine, capable of swivelling the nozzle alternatively backwards and forwards as described in **12.4.2.3** at the rate of 15 cycles per minute.

Cold water supply circuit (≤ 30 °C) *with pump or similar device*, for supplying the required static pressure.

Weight, of $1^{\ 0}_{-0.1}$ kg (for a nozzle reach ≤ 200 mm).

Weight, of bending moment $2^{\ 0}_{-0.25}$ N·m (for a nozzle reach > 200 mm).

Sight glass, arranged as shown in Figure 15.

12.4.2.3 *Procedure*

Mount the tap on the machine and connect the hot inlet to the supply circuit. Attach the sight glass to the cold inlet.

Securely fix the appropriate weight (see **12.4.2.2**) at the end of the swivel nozzle.

Connect the driving device to the swivel nozzle.

With the hot tap closed, adjust the static water pressure of the supply circuit to between 0.02 MPa and 0.04 MPa (0.2 bar and 0.4 bar). Open the hot tap until a pressure of between 0.066 l/s and 0.1 l/s (4 l/min and 6 l/min) is obtained.

Pipework, for connecting the water trap to the tap under test, of 22 mm copper pipe in accordance with Table x of BS 2871-1:1971 of length 0.6 m to 1.0 m.

Container of water.

Open the cold tap, manually fill the sight glass to a recorded level $15^{\ 0}_{-1}$ mm above the topmost seal of the swivel nozzle. Maintain the recorded level if evaporation takes place during the test.

Subject the swivel nozzle to a test of 80 000 cycles, each cycle comprising a movement of the nozzle through an arc of approximately 110° in both directions.

NOTE If there is a stop, the arc constitutes over 90 % of the available travel.

During the test, move the nozzle smoothly at as steady a speed as possible at a rate of 15 cycles per minute.

12.4.2.4 *Test criteria*

During the test, there shall be:

— no rupture of the swivel nozzle;

— no rupture of the device connecting the nozzle to the body;

— no leakage of the assembly;

— no increase in the water level in the sight tube.

At the end of the test, check the watertightness under the conditions given in **8.2.3**.

13 Backflow prevention

NOTE The test given in this clause determines the ability of automatic diverters to prevent backflow. Conformance to this test constitutes one element of the two-element backflow prevention requirements of UK Water Bye-laws.

13.1 Apparatus

NOTE See Figure 16.

Pump, injector or other device, capable of producing and maintaining an absolute pressure within the vacuum vessel of 0.5 bar.

Galvanized mild steel cylinder, of type reference Y58 in accordance with BS 417-2 and with modified connection on the side to take G2 (British Standard pipe (BSP) conforming to BS 21) pipe with other connections for the vacuum line, pressure gauge and drain valve (if fitted).

Transparent sight tube, either flexible or rigid, of bore diameter 8 mm ± 2 mm.

Bourdon tube vacuum gauge, 0 bar to 1.0 bar (0 mmHg to 782 mmHg), conforming to BS 1780.

Full-way quick-acting opening valve, to fit a 50 mm bore pipe.

Water trap with drain facility.

Pipework, for connecting the vacuum vessel, full-way valve and water trap, of 50 mm nominal bore and not exceeding 2 m in total length.

Nylon thread, of 0.75 mm nominal diameter.

13.2 Procedure

13.2.1 Remove any check valve fitted at the cold inlet or the hose outlet connection or, if not designed to be removed, foul with 0.75 mm nylon thread. Do not remove any jet regulator or flow-straightening device fitted.

13.2.2 Connect the cold inlet of the test tap to the test apparatus.

13.2.3 Fit the transparent sight tube of suitable length to the hose outlet connection (avoiding kinking) and submerge the other open end in water, the surface of which is 150 mm to 200 mm below the bath outlet of the tap under test.

13.2.4 Close the hot water inlet valve, remove any "loose jumper" type washer units from the cold water inlet valve and ensure that the cold water inlet valve is fully open and that the diverter is in the flow-to-bath position.

13.2.5 Close the full-way quick-acting opening valve.

13.2.6 Evacuate the vacuum vessel to an absolute pressure of 0.5 bar maximum, as indicated by vacuum gauge A in Figure 16.

13.2.7 Ensure that the drain tap on the water trap is closed. Open the full-way quick-acting opening valve.

13.2.8 Maintain the vacuum for 5 s minimum at an

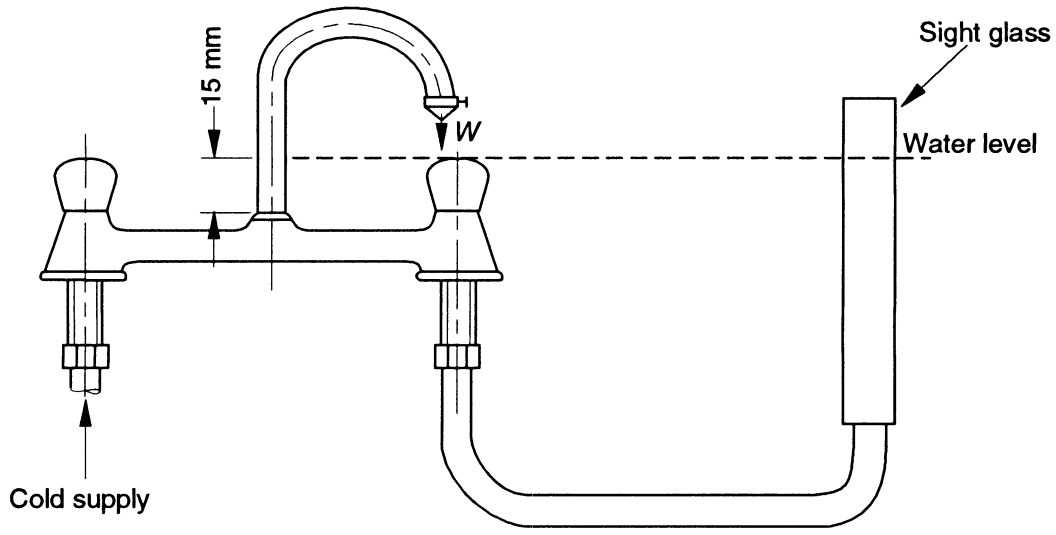


Figure 15 — Endurance test rig for divided-outlet swivel nozzle

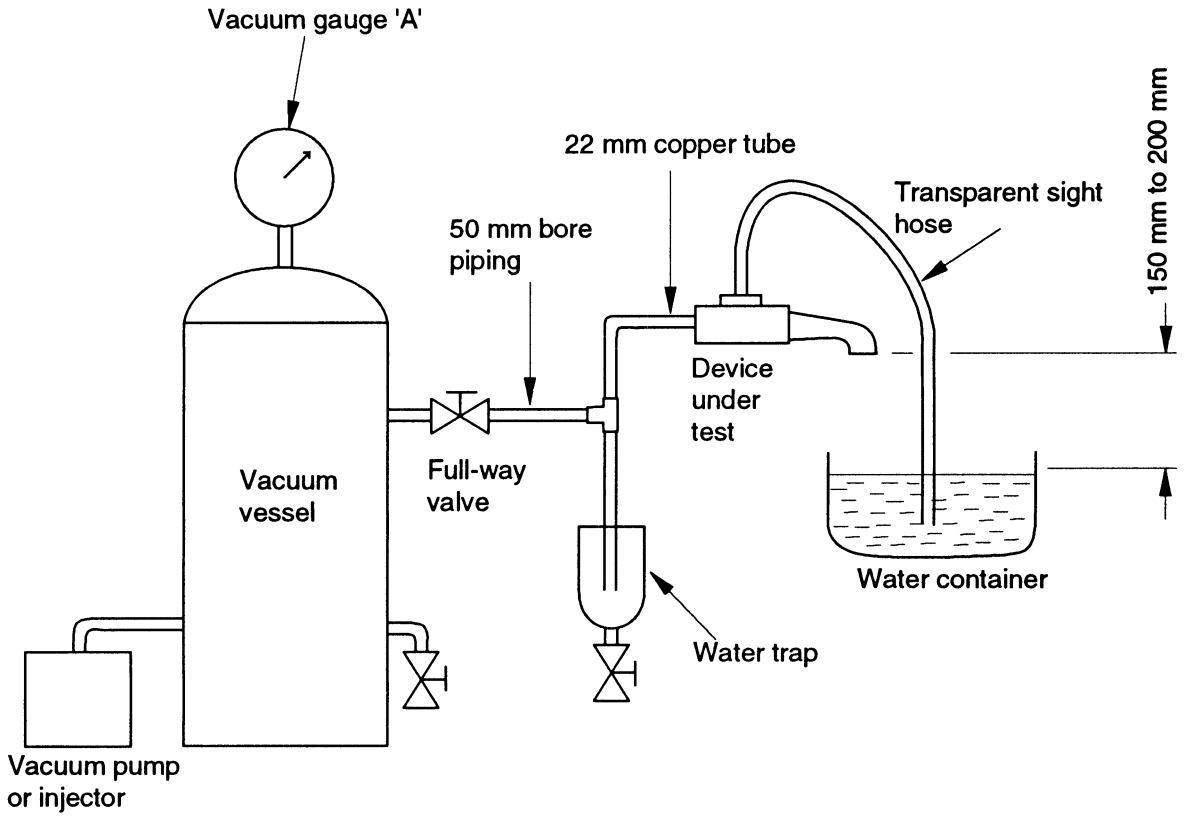


Figure 16 — Backflow test apparatus

blank

List of references

Normative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS 21:1985, *Specification for pipe threads for tubes and fittings where pressure-tight joints are made on the threads (metric dimensions).*

BS 417, *Specification for galvanized low carbon steel cisterns, cistern lids, tanks and cylinders.*

BS 417-2:1987, *Metric units.*

BS 864, *Capillary and compression tube fittings of copper and copper alloy.*

BS 864-2:1983, *Specification for capillary and compression fittings for copper tubes.*

BS 1189:1986, *Specification for baths made from porcelain enamelled cast iron.*

BS 1244, *Metal sinks for domestic purposes.*

BS 1244-1:1956, *Imperial units with metric equivalents.*

BS 1244-2:1988, *Specification for sit-on and inset sinks.*

BS 1329:1974, *Specification for metal hand rinse basins.*

BS 1390:1990, *Specification for baths made from vitreous enamelled sheet steel.*

BS 1780:1985, *Specification for bourdon tube pressure and vacuum gauges.*

BS 2779:1986, *Specification for pipe threads for tubes and fittings where pressure-tight joints are not made on the threads (metric dimensions).*

BS 2871, *Specification for copper and copper alloys. Tubes.*

BS 2871-1:1971, *Copper tubes for water, gas and sanitation.*

BS 4305, *Baths for domestic purposes made of acrylic material.*

BS 5505, *Specification for bidets.*

BS 5506, *Specification for wash basins.*

BS 6920, *Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water.*

BS 6920-1:1990, *Specification.*

BS 6920-2, *Methods of test.*

BS 6920-3:1990, *High temperature tests.*

BS EN 200:1992, *Sanitary tapware. General technical specifications for single taps and mixer taps (nominal size ½) PN 10. Minimum flow pressure of 0.05 MPa (0.5 bar).*

BS EN 246:1992, *Sanitary tapware. General specifications for flow rate regulators.*

BS EN 248:1992, *Sanitary taps: general technical specifications for electrodeposited nickel chrome coatings.*

ISO publications

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO), Geneva. (All publications are available from BSI Customer Services.)

ISO 965, *ISO general purpose metric screw threads — Tolerances.*

ISO 965/1:1980, *Principles and basic data.*

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL