CONFIRMED
DECEMBER 2007

Specification for

Spray mixing taps

UDC 621.646.72:621.647.3

Cooperating organizations

The Building Services Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

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Bath Manufacturers' Co-ordinating Committee
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British Valve Manufacturers' Association
Copper Tube Fittings Manufacturers' Association
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Institution of Municipal Engineers
Institution of Production Engineers
National Association of Plumbing, Heating and Mechanical Services Contractors
Plastics Bath Manufacturers' Association
South London Consortium
Thames Water Authority — Metropolitan Water Division
Water Research Centre

This British Standard, having been prepared under the direction of the Building Services Standards Committee, was published under the authority of the Executive Board and comes into effect on 31 October 1979

The following BSI references relate to the work on this standard:
Committee reference SEB/2
Draft for comment 78/11892 DC

ISBN 0 580 10881 3

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

Foreword

This standard, prepared under the direction of the Building Services Standards Committee, is linked with BS 1010-1 and BS 1010-2, BS 1415-1, BS 5388 and BS 5412 & BS 5413. Spray mixing taps, incorporating a mixing function operated by the user, possess characteristics similar to those of spray taps but are able to accept hot and cold water supplies and mix them for delivery at a temperature to suit the user. The factors governing the use of spray mixing taps and their associated plumbing systems are numerous and guidance is given in Appendix A on installation considerations. For ease of reference, a table linking the types of spray mixing taps with relevant clauses is given in Appendix B.

Spray taps should normally deliver between 0.03 litres and 0.06 litres of water per second. Spray mixing taps have therefore been designated "series 45", which refers to the average rate of flow, i.e. 45 ± 15 ml/s (mid-blend position). (See clause **7**.)

It is recognized that non-standard spray taps may be required for some apparatus and there may be some merit in requesting alternative series numbers to be used in these special cases.

Fixed flow restrictors, i.e. orifice discs, etc., have been omitted from this standard as not being compatible with the sophistication of spray mixing taps.

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 and ii, pages 1 to 14, 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.

Section 1. General

1 Scope

This British Standard specifies requirements for the materials, design, construction, dimensions, testing and installation of non-thermostatic, non-compensating spray mixing taps for ablutionary purposes. Details of information that shall be supplied by the purchaser are given in Appendix C.

2 References

The titles of the publications referred to in this standard are listed on the inside back cover.

3 Definitions

For the purposes of this British Standard the following definitions apply.

3.1
spray mixing tap

a tap supplied with hot and cold water and incorporating a mixing device operated by the user. The mixed water is delivered at a restricted rate of flow in the form of a spray

3.2
single sequential control spray mixing tap

a fitting into which supplies of hot and cold water enter, through separate valve ports, are mixed in a formed chamber and thence delivered through a spray outlet. The temperature of the mixed water is governed through a nominal range in a predetermined sequence by the manual operation of a single control which also has a shut-off feature

3.3
twin (or dual) control spray mixing tap

a fitting into which supplies of hot and cold water enter, through separate valve ports, are mixed in a formed chamber and thence delivered through a spray outlet. The temperature of the mixed water is governed independently by the manual operation of one control and the shut-off feature is independently governed by the manual operation of another control

3.4
single control, twin (or dual) function, spray mixing tap

a fitting into which supplies of hot and cold water enter, through separate valve ports, are mixed in a formed chamber and thence delivered through a spray outlet. The temperature of the mixed water is governed by the manual operation of the single control in one mode and the shut-off feature is independently governed by the manual operation of the same control in an alternative mode

3.5
combination spray mixing tap

a fitting into which supplies of hot and cold water enter, through separate valve ports, are mixed in a chamber and thence delivered through a spray outlet. The temperature of the mixed water and the shut-off feature of the hot and cold water is governed by the operation of two independently manually operated hot and cold controls

3.6
dead-leg

the length of hot water pipe leading to a draw-off point and not forming part of a flow and return hot water circuit

3.7
flow restrictor

that component of a spray mixing tap, not being the spray plate, which governs or restricts the rate of discharge

3.8
spray outlet

a fitting that is attached to the outlet of a tap and causes water passing through it to break up into a spray

NOTE Reference should be made to BS 4118 for other definitions.

4 Materials

The physio-chemical characteristics of spray mixing taps shall comply with the requirements of section 2 of BS 5412 & BS 5413-5:1976.

5 Marking

Spray mixing taps manufactured to the requirements of this standard shall be legibly and permanently marked with the following information:

a) the manufacturer's name or identification mark;

b) the number of this British Standard, i.e. BS 5779;

c) the character "H" on the hot water inlet and the character "C" on the cold water inlet. Alternatively, the inlets may be colour coded: red for hot water and blue for cold water.[1)]

Additional markings are not precluded, e.g. BS 1010-1 and BS 1010-2, BS 1415-1, BS 5412 or BS 5413.

Section 2. Dimensions, design and construction

6 General

The design and construction of spray mixing taps of either wall type (vertical mounting) or pillar type (horizontal mounting) shall be as specified in BS 1010-1 or BS 1010-2 or BS 5412 & BS 5413 or BS 1415-1 except for those features specified in section 2 of this standard. Pillar type (horizontal mounting) spray mixing taps shall be designed to suit and fit any British Standard basin tap hole and shall have an outside diameter shank of 29 mm max., except that for single hole combination tap assemblies this dimension may be increased to 33.5 mm diameter

Spray mixing taps shall have the dimensional features indicated in Figure 1.

7 Nominal size

The nominal size of spray mixing taps shall be designated as follows:

8 × 45
10 × 45
12 × 45
⅜ × 45
½ × 45

8 Inlets

Inlets may be any of the following:

a) 8 mm outside diameter copper tube;

b) 10 mm outside diameter copper tube;

c) 12 mm outside diameter copper tube;

d) G⅜;

e) G½.

9 Spray outlet

The spray mixing tap shall be provided with a spray outlet capable of causing the water to assume the shape of a diverging spray. The cone shall not diverge to an extent greater than that shown in Figure 2 when the mixing valve is fully opened.

Every waterway in the spray outlet shall be capable of accepting a 1 mm nominal diameter probe manufactured from steel complying with the requirements of BS 1407.

The spray outlet device shall be capable of being removed for cleaning, but only by the use of a special tool.

10 Flow restrictor

A flow restrictor shall be provided in the spray mixing tap. The flow restrictor shall be either manually adjustable or of the self-adjusting type and shall satisfy the flow requirements specified in clause **12**, and Appendix D.

The manually adjustable type flow restrictor shall be in such a form that it can be adjusted or changed without removing the spray mixing tap from the wash basin or wall, but cannot be so adjusted without the use of a special tool.

Section 3. Type testing

11 General

Spray mixing taps shall be capable of passing the tests specified in BS 5412 & BS 5413-2 and BS 5413-4, except that the following types:

a) single sequential control spray mixing tap (see **3.2**);

b) twin (or dual) control spray mixing tap (see **3.3**);

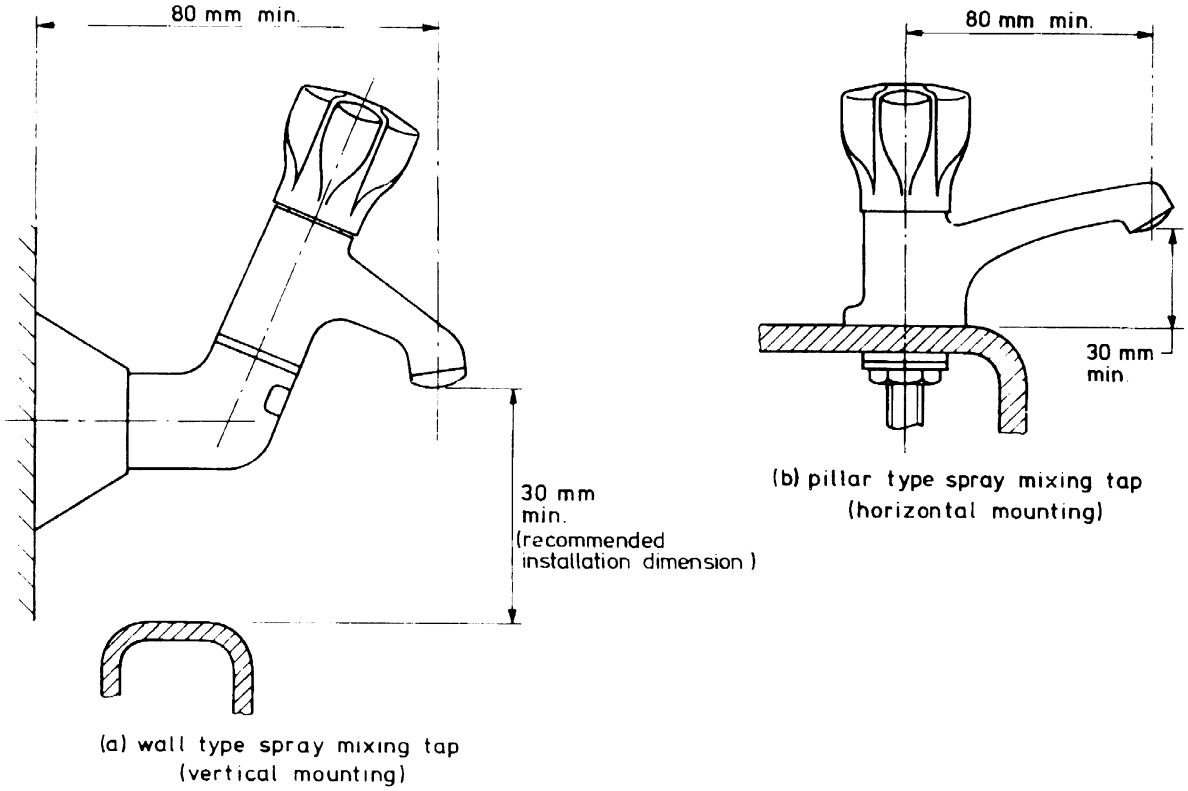
c) single control, twin (or dual) function, spray mixing tap (see **3.4**);

need not comply with the requirements of the endurance test in **10.1** of BS 5412 & BS 5413-4:1976.

In addition, spray mixing taps shall be capable of meeting the test requirements specified in section 3 of this standard.

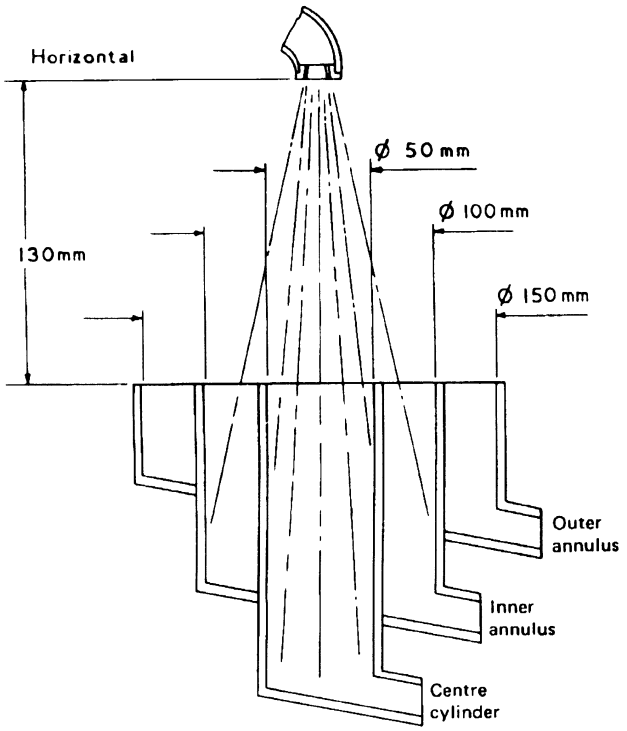
The pressures and flows specified in this standard shall be measured with gauges whose accuracies are in accordance with BS 1780.

[1)] This item does not apply if the inlets are interchangeable.



NOTE Drawings are diagrammatic only.

Figure 1 — Installation and dimensional features of spray mixing taps



NOTE 1 Walls of annular gauge to be not more than 1 mm thick.

NOTE 2 Drawing is diagrammatic only.

Figure 2 — Sectional diagram of spray, spray outlet and annular gauge

12 Rate of flow test

When tested by the method given in Appendix E or Appendix F, spray mixing taps shall deliver water at a rate of not less than 0.03 litre/s and not more than 0.06 litre/s. Manually adjustable flow restrictors shall be capable of being adjusted to achieve these flow rates. (See Appendix E.) Self-adjustable flow restrictors shall be flow tested at running pressures of between 0.27 bar[2)] and 3 bar. In all cases, these minimum flows shall be achievable in the cold, mixed, and hot positions throughout the specified pressure range. In the case of two handed control mixers using conventional screw down (BS 1010 type) taps, the specified flow shall be reached when the handles have been turned through 180° maximum from the commencement of flow.

13 Test for divergence of the spray

When tested by the method given in Appendix G, for flow rates of 0.03 litre/s and 0.06 litre/s, spray taps shall produce a spray of water, the whole of which shall enter the gauge, as follows (see Figure 2):

a) no water shall enter the outer annulus;

b) not less than 10 % and not more than 90 % shall enter the inner annulus;

c) the remainder shall enter the centre cylinder.

The inner annulus shall be evenly divided into four sections each with its own separate take-off point. Each of the four inner annulus take-off points shall collect between 15 % and 30 % of the water flowing into the inner annulus.

This specific flow requirement shall not apply to spray mixing taps with self-adjusting restrictors.

14 Sensitivity of control of single control type spray mixing taps

This clause applies to single control type spray mixing taps only, i.e. excluding combination spray mixing taps.

Under the test conditions described in Appendix H (see also Figure 3) the range of regulation shall be such that a 1 °C temperature variation of the mixed water, in the mixed water temperature zone of 38 °C to 43 °C, shall be obtained, either

a) by a minimum linear movement of 1.5 mm at the end of the lever; or

b) by a minimum angular movement of 2° of the control handle.

The test shall be conducted with hot and cold inlet supply pressures set equally at 0.27 bar[2)] and with blended water set at a flow rate of between 0.03 litre/s and 0.06 litre/s, and with cold water temperature at 10 °C and hot water temperature at 70 °C.

If the incoming cold water temperature is different from the 10 °C specified, this difference shall be added to, or subtracted from, the blend temperature range (38 °C to 43 °C) as well as the hot water temperature of 70 °C. (See also Figure 3 and **K.3.1**.)

[2)] 1 bar = 10^5 N/m^2 = 100 kPa.

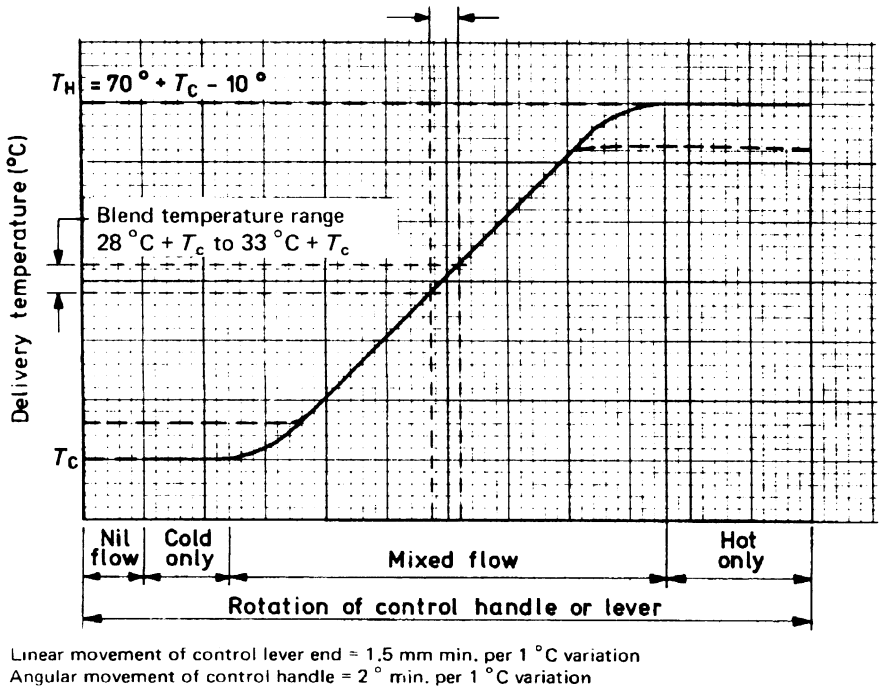


Figure 3 — Typical sensitivity curve for single control type spray mixing taps

15 Devices to prevent cross tracking intercommunication of supply systems

If the mixer is designed in such a way that the mixed water is shut off, as opposed to the hot water and cold water being shut off individually, then devices for preventing communication between hot and cold water (e.g. non-return valves) are obligatory.

If the mixer is designed in such a way that the hot and cold water supplies are totally shut off when the control handle is in the off position, then the above mentioned devices are not obligatory.

These devices shall either be incorporated in the mixers themselves, or be supplied with the mixers for fitting to the hot and cold supply pipes.

When tested in accordance with Appendix J, these devices shall be capable of withstanding a cross tracking pressure differential of 4.5 bar and shall be capable of preventing thermal cross circulation throughout the complete range of pressures, i.e. 0.27 bar to 3 bar.

16 Blended water temperature extremes

Under the test conditions described in Appendix K (see also Figure 4) the blended water shall be capable of being adjusted to within 6 °C of the incoming supply water temperature, e.g. with the inlet cold water supply temperature at 10 °C, the minimum achievable temperature of the blended water shall be not more than 16 °C and with the hot water supply temperature at 70 °C, the maximum achievable temperature of the blended water flow shall be at least 64 °C.

These requirements do not preclude the provision of a safety device which limits the mixed outlet temperature to an agreed maximum (e.g. 45 °C).

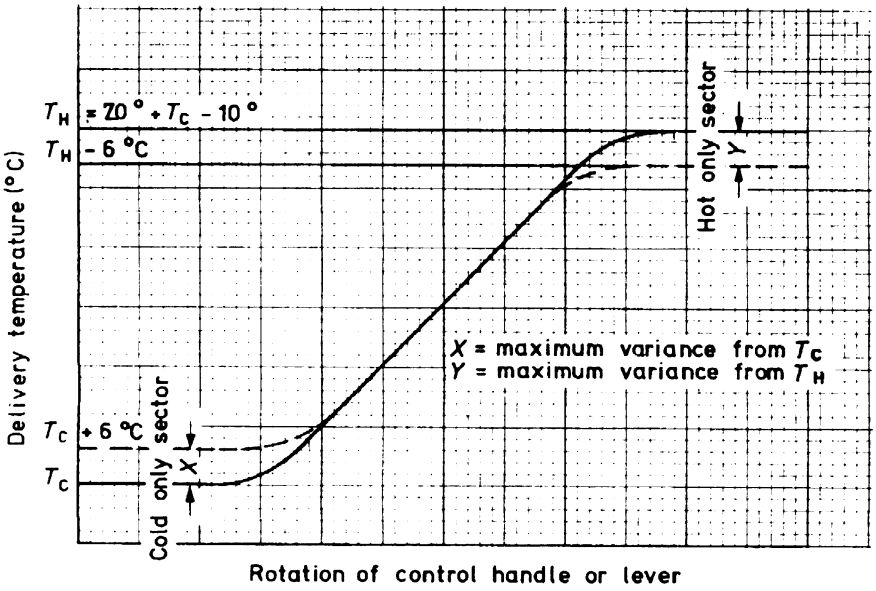


Figure 4 — Blended water temperature extremes

Appendix A Notes on the installation of spray mixing taps (see Figure 1)

A.1 Spray mixing taps should normally be fed with water at ambient temperature to the right hand connection and at between 60 °C and 65 °C to the left hand connection as recommended by CP 342.

A.2 It is desirable that an easily accessible strainer be installed in the supply pipes to each single mixing tap or group of taps.

A.3 It should be accepted that the spray outlet will need cleaning at intervals, the length of the intervals depending on the water supply.

A.4 The hot water circulating system should be taken close to the spray mixing tap, and the diameter and length of dead legs kept to an absolute minimum.

Appendix B Types of spray mixing taps with reference to relevant clauses

Definition clause number	**3.2**		**3.3**		**3.4**		**3.5**	
Type of spray mixer	**Single sequential control (temperature only)**		**Twin (or dual) control (flow and temperature)**		**Single control, twin (or dual) function (flow and temperature)**		**Combination**	
Pressure (bar)	0.27	3.00	0.27	3.00	0.27	3.00	0.27	3.00
Setting manually adjustable inlet restrictor	**D.2.1**	**D.2.1**	**D.3.1**	**D.3.1**	**D.3.1**	**D.3.1**	**D.4.1**	**D.4.1**
Measured rate of flow inlet and outlet test	**E.3.3** to **E.3.5**	**E.3.6**	**E.3.3** to **E.3.5**	**E.3.6**	**E.3.3** to **E.3.5**	**E.3.6**	**E.3.3** to **E.3.5**	**E.3.6**
Setting manually adjustable outlet restrictor	**D.2.2**	**D.2.2**	**D.3.2**	**D.3.2**	**D.3.2**	**D.3.2**	**D.4.2**	**D.4.2**

NOTE 1 The above table is reproduced for information and ease of reference only.
NOTE 2 The instruction to use pressure of 3 bar in **D.2.1** and **D.2.2**, etc., is given in **E.3.6**.
NOTE 3 Maximum cold position is assumed to be determined when hot is 10 % of total flow.

Appendix C Information to be supplied by the purchaser

The purchaser shall supply the following information when making an enquiry or placing an order:

a) the nominal size of the spray mixing tap, e.g. 10 × 45 or ⅜ × 45, etc.;

b) whether a vertical type mounting or a horizontal type mounting is required;

c) the type of flow restrictor, i.e. manually adjustable or self-adjusting.

Appendix D Method of setting manually adjustable restrictors

D.1 General

The setting procedure for manually adjustable restrictors described in this appendix shall be carried out before the restrictors are tested in accordance with Appendix E, Appendix F, Appendix H and Appendix K.

D.2 Setting procedure for mixing taps with single sequential control (see **3.2**)

D.2.1 *With inlet restrictor*. The procedure is as follows.

a) Open control to maximum hot flow position.

b) Isolate cold supply and adjust hot supply pressure to 0.27 bar.

c) Maintaining 0.27 bar, adjust hot restrictor to give flow of 0.045 litre/s.

d) Maintaining 0.27 bar, adjust control towards cold and identify the position where the flow is 0.004 litre/s [10 % of flow in c)].

e) At this position isolate hot supply, turn on cold supply and adjust to 0.27 bar.

f) Maintaining 0.27 bar, adjust cold restrictor to give flow of 0.045 litre/s [same as in c)].

g) The position of the control handle in f) represents the full cold position referred to in subsequent test procedures.

D.2.2 *With outlet restrictor.* The procedure is as follows.

a) Open control to maximum hot flow position.

b) Isolate cold supply, and adjust hot supply pressure to 0.27 bar.

c) Maintain 0.27 bar, adjust restrictor to give flow of 0.045 litre/s.

d) Open cold supply, isolate hot supply.

e) Maintaining 0.27 bar on cold inlet, adjust the control to check that the tap is capable of delivering a cold flow of 0.045 litre/s ± 20 %.

D.3 Setting procedure for mixing taps with twin (or dual) control for flow and temperature, (see **3.3**) **and mixing taps with single control, twin (or dual) function, for flow and temperature** (see **3.4**)

D.3.1 *With inlet restrictor.* The procedure is as follows.

a) Open flow control fully.

b) Adjust temperature control to full cold, and with hot supply isolated, adjust cold supply to 0.27 bar.

c) Maintaining pressure of 0.27 bar, adjust cold restrictor to give a flow of 0.045 litre/s.

d) Isolate cold supply and adjust temperature control to full hot.

e) Turn on hot supply and adjust to 0.27 bar.

Maintaining this pressure, adjust hot restrictor to give a flow of 0.045 litre/s.

D.3.2 *With outlet restrictor.* The procedure is as follows.

a) Open flow control fully.

b) Adjust temperature control to full cold and with hot supply isolated, adjust cold supply to 0.27 bar.

c) Maintaining 0.27 bar, adjust restrictor to give a flow of 0.045 litre/s.

d) Isolate cold supply and adjust temperature control to full hot.

e) Turn on hot supply and adjust to 0.27 bar. Measure the flow rate, which shall be between 0.03 litre/s and 0.054 litre/s.

D.4 Setting procedure for combination spray mixing taps with separate controls for hot and cold water (see **3.5**)

D.4.1 *With inlet restrictor.* The procedure is as follows.

a) Open cold fully and close hot fully.

b) Adjust cold supply to 0.27 bar.

c) Maintaining 0.27 bar, adjust cold restrictor to give 0.045 litre/s.

d) Close cold control fully and open hot control fully.

e) Adjust hot supply to 0.27 bar.

f) Maintaining 0.27 bar, adjust hot restrictor to give 0.045 litre/s.

D.4.2 *With outlet restrictor.* The procedure is as follows.

a) Open cold control fully and close hot control fully.

b) Adjust cold supply to 0.27 bar.

c) Maintaining 0.27 bar, adjust restrictor to 0.045 litre/s.

d) Close cold control fully and open hot control fully.

e) Adjust hot supply to 0.27 bar and check that the hot flow rate is 0.045 litre/s ± 10 %.

Appendix E Method of measuring the rate of flow through spray mixing taps fitted with manually adjustable flow restrictors

E.1 Object

The flow rate test is for the purpose of ensuring that the spray mixing tap under test is capable of being adjusted to deliver water at the specified rates.

E.2 Apparatus

The following apparatus is required.

E.2.1 *A cold water supply system* consisting of a water supply having a minimum pressure of 4.5 bar and a minimum rate of flow when the supply pipes are open to atmosphere of 0.2 litre/s (0.1 litre/s each side).

E.2.2 *Two pressure gauges,* graduated with a suitable scale and having an accuracy of ± 2 %, at the test pressure. A suitable scale is one indicating one hundredths of a bar.

E.2.3 *Two flow meters* (or other means of measuring flow) graduated with a suitable scale and having an accuracy of ± 2 % of the test flow rate. A suitable scale is one indicating one hundredths of a litre per second.

E.2.4 *Two pressure take-off tees* suitable for 15 mm tube (see Figure 5 and Table 1).

E.2.5 *Two* 15 mm *control valves* capable of fine regulation.

E.2.6 *Two lengths of copper tube,* in accordance with Table X of BS 2871-1:1971, to be connected to the inlets of the mixing valve under test, having the following features:

a) the length dimensions as shown in Figure 6;

b) external diameter and thickness 15 mm × 0.7 mm;

c) radius of pipe bends (R) to the centreline equal to 60 ± 10 mm.

E.3 Procedure

E.3.1 Connect test apparatus as shown in Figure 6 to the cold water supply.

E.3.2 Connect the mixing tap to be tested to the test apparatus as shown in Figure 6.

E.3.3 Open the spray mixing tap under test and adjust the control handle(s) ensuring that flows and pressures on both sides are within 10 % of each other. Adjustable restrictors shall have been set in accordance with the requirements of Appendix D.

E.3.4 Adjust the control handle(s) of the spray mixing tap to obtain full flow through the cold water port, i.e. minimum, or no hot water flow. Adjust the water supply so that the pressure gauge indicates the required minimum test pressure (0.27 bar).

Record rate of flow in litres per second on the cold side, which shall be between 0.03 litre/s and 0.06 litre/s.

E.3.5 Open the mixing tap to obtain full flow through the hot water port, i.e. minimum, or no cold water flow. Adjust the water supply so that the pressure gauge indicates the required minimum test pressure (0.27 bar).

Record the rate of flow in litres per second on the hot side, which shall be between 0.03 litre/s and 0.06 litre/s.

E.3.6 Reset restrictors as specified in Appendix D but use a test pressure of 3 bar.

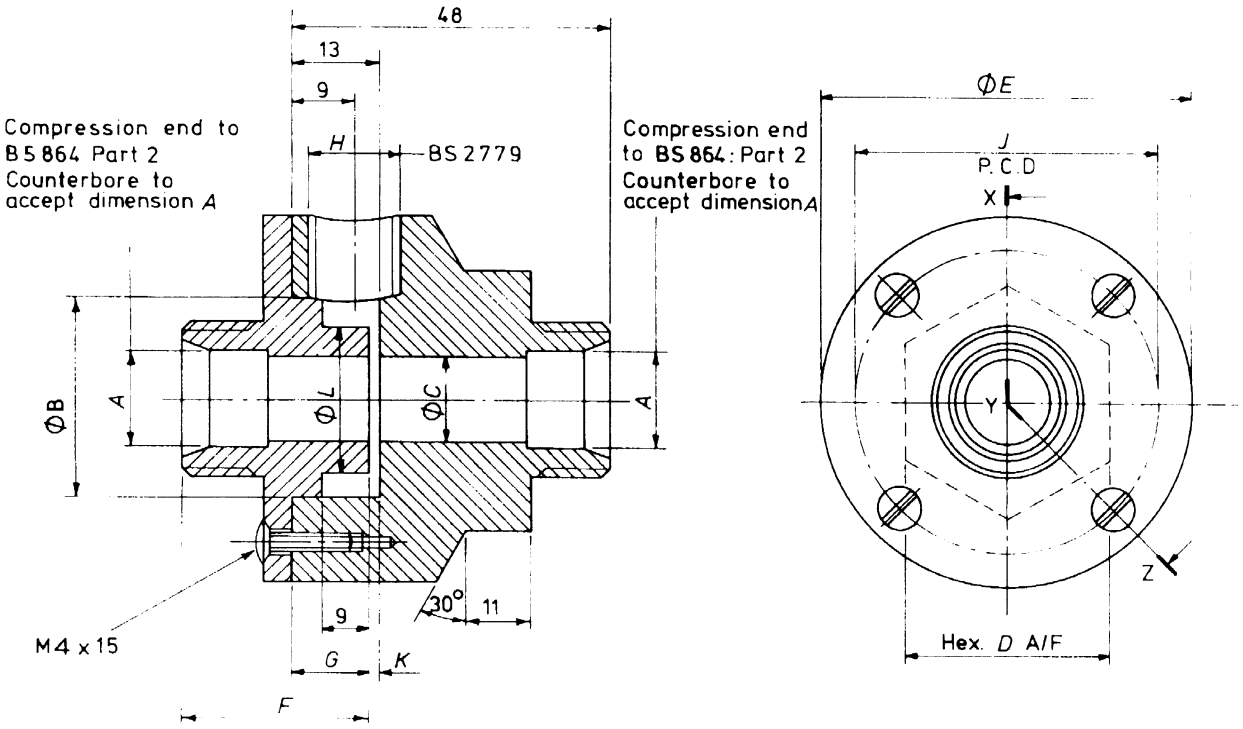
E.3.7 Repeat **E.3.3** at a test pressure of 3 bar.

E.3.8 Repeat **E.3.4** at a test pressure of 3 bar.

E.3.9 Repeat **E.3.5** at a test pressure of 3 bar.

E.4 Recording

Record whether or not the spray mixing tap, with the manually adjustable flow restrictor, will deliver water at the specified rates.



Dimensions are in millimetres.

NOTE Drawings are diagrammatic only.

Figure 5 — Details of pressure take-off tee

Table 1 — Dimensions of pressure take-off tee

Size	*A* (BS 864-2)	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*J*	*K*	*L*
½	15	31	12.7	33	55	27	12.5	G¼	43	0.5	21
NOTE All dimensions are in millimetres except where otherwise indicated.											

Appendix F Method of measuring the rate of flow through spray mixing taps fitted with self-adjusting restrictors

F.1 Object

The object of the test is to determine whether or not the specimen spray mixing tap will deliver water at the specified rates.

F.2 Apparatus

The apparatus is as specified in **E.2**.

F.3 Procedure

F.3.1 Connect test apparatus as shown in Figure 6 to the water supply.

F.3.2 Connect spray mixing tap to be tested to the test apparatus as shown in Figure 6.

F.3.3 Adjust the supply pressure to 0.27 bar. Open the spray mixing tap by rotating the handle(s) to the cold position and record the rate of flow in litres per second.

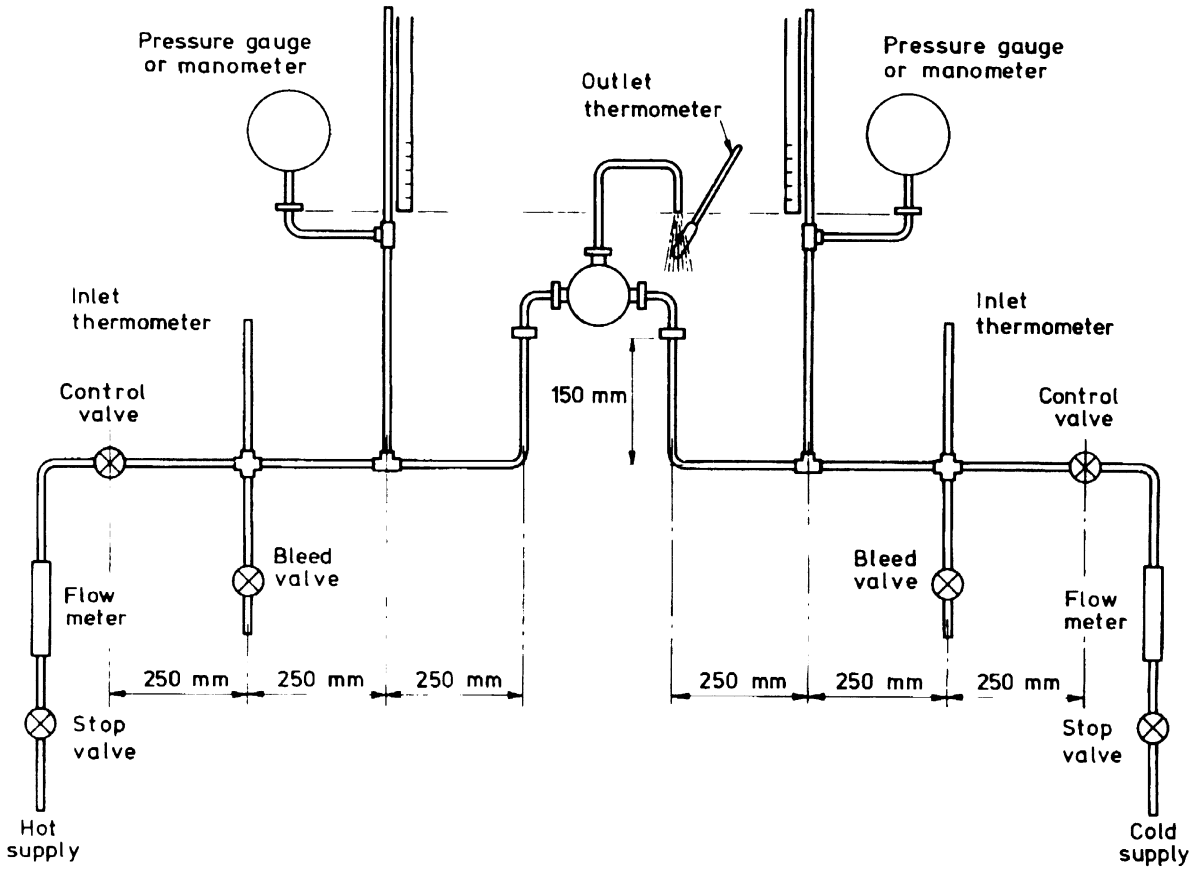
F.3.4 Adjust the handle(s) to the mid position and adjust the supply pressures to 0.27 bar and record the rate of flow in litres per second.

F.3.5 Adjust the handle(s) to the fully open position. Adjust the supply pressure to 0.27 bar and record the rate of flow in litres per second.

F.3.6 Repeat the above procedure using a supply pressure of 3 bar.

F.4 Recording

Record whether or not the spray mixing tap with self-adjusting flow restrictor will deliver water at the specified rates.



NOTE Drawing is diagrammatic only.

Figure 6 — Blended water temperature test apparatus

Appendix G Method of measuring the divergence of the spray

G.1 Object

The object of the test is to determine whether or not the specimen spray mixing tap will deliver a spray of specified requirements.

G.2 Apparatus

The apparatus is as specified in **E.2**, together with a gauge as shown in Figure 2.

G.3 Procedure

Connect the rate of flow test apparatus to the water supply. Connect the spray mixing tap to the rate of flow test apparatus.

Open the spray mixing tap by rotating the handle(s) to the mid position and adjust the flow to give a steady rate of flew of 0.03 litre/s. Place the gauge as shown in Figure 2, and centralize under the tap as required. Allow the water to flow for a minimum of 60 s before commencing observations. Repeat the procedure using a rate of flow of 0.06 litre/s.

Appendix H Method for the determination of sensitivity of control (see Figure 3)

H.1 Object

The sensitivity test is for the purpose of ensuring that the spray mixing tap under test is capable of being adjusted for temperature within the specified parameters.

H.2 Apparatus

The following apparatus is required.

H.2.1 *A hot and cold water supply system* consisting of a water supply having a minimum rate of flow when the supply pipes are open to atmosphere of 0.2 litre/s (0.1 litre/s each side).

H.2.2 *Two flow meters* (or other means of measuring flow) graduated with a suitable scale and having an accuracy of ± 2 % of the test flow rate. A suitable scale is one indicating one hundredths of a litre per second.

H.2.3 *Two pressure take-off* tees suitable for 15 mm tube. See Figure 5 and Table 1.

H.2.4 *Two* 15 mm *control valves* capable of fine regulation.

H.2.5 *Two lengths of copper tube,* in accordance with Table X of BS 2871-1:1971, to be connected to the inlets of the mixing valve under test, having the following features:

a) the length dimensions as shown in Figure 6;

b) external diameter and thickness 15 mm × 0.7 mm;

c) radius of pipe bends (R) to the centre line equal to 60 ± 10 mm.

H.3 Procedure

H.3.1 Connect test apparatus as shown in Figure 6 to the cold and hot water supply.

H.3.2 Connect the spray mixing tap to the test apparatus as shown in Figure 6.

H.3.3 Measure the temperature of the incoming cold water supply T_c. Adjust the hot water supply to 60 °C + T_c. Open the spray mixing tap under test and adjust the control handle(s) to ensure a pressure between 0.27 bar and 0.3 bar on both sides with a flow rate of 0.045 litre/s over the range of temperatures 28 °C + T_c to 33 °C + T_c.

Record the amount of movement of the control handle in degrees, or the lever linearly.

Appendix J Method for the determination of resistance to cross tracking

J.1 Object

The anti-cross tracking test is for the purpose of ensuring that when the water is not flowing there shall be no flow from hot to cold, or cold to hot, neither shall there be any thermal circulation.

J.2 Apparatus

The apparatus is as specified in **G.2**.

J.3 Procedure

J.3.1 Connect test apparatus as shown in Figure 6 to the cold and hot water supply.

J.3.2 Connect the cold inlet of the spray mixing tap to the test apparatus as shown in Figure 6 including non-return valves when supplied.

J.3.3 Close the spray mixing tap control handle(s) and apply a pressure 4.5 bar to the cold inlet. No water shall emerge from the hot inlet.

J.3.4 Repeat **J.3.3** but with the spray mixing tap connected to the hot side only.

Appendix K Method of measuring the achievable blend of water temperature extremes (see Figure 4)

K.1 Object

The blended water temperature extreme test is for the purpose of ensuring that the spray mixing tap under test can deliver blended water at specified minimum and maximum temperatures. (See clause **16**.)

K.2 Apparatus

The following apparatus is required.

K.2.1 *A hot and cold water supply system* capable of maintaining a pressure of 0.5 bar at a flow rate of 0.1 litre/s.

K.2.2 *Two pressure measuring devices,* graduated with a suitable scale having an accuracy of ± 2 %, at the test pressure. A suitable scale is one indicating one hundredths of a bar.

K.2.3 *Two flow meters* (or other means of measuring flow) graduated with a suitable scale and having an accuracy of ± 2 % of the test flow rate. A suitable scale is one indicating one thousandths of a litre per second.

K.2.4 *Two pressure take-off tees* suitable for 15 mm tube. (See Figure 5.)

K.2.5 *Two* 15 mm *control valves* capable of fine regulation.

K.2.6 *Two lengths of copper tube,* in accordance with Table X of BS 2871-1:1971, to be connected to the inlets of the mixing tap under test, having the following features:

a) the length dimensions as shown in Figure 6:

b) external diameter and thickness 15 mm × 0.7 mm;

c) radius of pipe bends (R) to the centre line equal to 60 ± 10 mm.

K.2.7 *Three mercury-in-glass thermometers* to BS 5074 STC/1/– 30/+ 120 type A, or equivalent.

K.3 Procedure

K.3.1 Connect the test apparatus as shown in Figure 6.

Inlet thermometers shall be mounted in suitable holders to ensure the necessary immersion. The outlet thermometer shall be immersed in the blended water as shown in Figure 6.

In order to eliminate, as far as possible, any inherent inaccuracies in the thermometers, the following procedure is necessary.

a) Isolate the hot water supply.

b) Turn the cold water supply on, and turn the flow control to the fully open position and the temperature control to the full cold position.

c) Taking the blended water reading as a datum, note the difference between it and the cold inlet thermometer.

d) Correct all measured cold water inlet temperatures by the difference on all subsequent tests.

Example. Inlet cold water temperature 10 °C indicated on thermometer. Blended water temperature 11 °C indicated on thermometer. Taking the blended water thermometer as a datum, the difference is – 1 °C and hence all cold inlet temperature readings should be increased by 1 °C to compensate.

e) Repeat the above procedure for the hot inlet and blended water thermometers.

K.3.2 Connect the mixing tap to be tested to the test apparatus as shown in Figure 6.

K.3.3 Before commencing any of the following tests it may be necessary to bleed water through the test rig in order to stabilize the temperatures of the inlet supplies, i.e. 10 °C cold supply and 70 °C hot supply. (See also **H.3.3**.)

K.3.4 For the mixing taps with one dual function control for flow and temperature and also the mixing taps with two separate controls for flow and temperature and with restrictors set as in Appendix D, proceed as specified in **K.3.4.1** to **K.3.4.7**.

K.3.4.1 Open flow control fully.

K.3.4.2 Adjust temperature control to full cold.

K.3.4.3 Adjust supply pressures to 0.27 bar.

K.3.4.4 Measure temperatures of blended water which shall be within 6 °C of cold inlet supply.

K.3.4.5 Adjust temperature control to full hot.

K.3.4.6 Adjust supply pressures to 0.27 bar.

K.3.4.7 Measure temperatures of blended water which shall be within 6 °C of hot inlet supply.

K.3.5 For mixing taps with sequential control and with restrictors set as in Appendix D proceed as specified in **K.3.5.1** to **K.3.5.6**.

K.3.5.1 Turn the control handle to the maximum hot position (fully open).

K.3.5.2 Adjust supply pressures to 0.27 bar.

K.3.5.3 Measure blended water temperature which shall be within 6 °C of hot inlet supply.

K.3.5.4 Turn flow control to the "full cold" position.

K.3.5.5 Adjust supply pressures to 0.27 bar.

K.3.5.6 Measure blended water temperature which shall be within 6 °C of cold inlet supply.

K.4 Recording

Record whether or not the spray mixing tap will deliver blended water to within the specified temperatures.

Publications referred to

BS 864, *Capillary and compression tube fittings of copper and copper alloy.*
BS 864-2, *Metric units.*
BS 1010, *Draw-off taps and stopvalves for water services (screwdown pattern).*
BS 1010-1, *Imperial units.*
BS 1010-2, *Draw-off taps and above-ground stopvalves.*
BS 1407, *High carbon bright steel (silver steel).*
BS 1415, *Mixing valves.*
BS 1415-1, *Non-thermostatic, non-compensating mixing valves.*
BS 1780, *Bourdon tube pressure and vacuum gauges.*
BS 2779, *Pipe threads where pressure-tight joints are not made on the threads.*
BS 2871, *Copper and copper alloys. Tubes.*
BS 2871-1, *Copper tubes for water, gas and sanitation.*
BS 4118, *Glossary of sanitation terms.*
BS 5388, *Specification for spray taps*[3)].
BS 5412, *Specification for the performance of draw-off taps with metal bodies for water services.*
BS 5413, *Specification for the performance of draw-off taps with plastics bodies for water services.*
BS 5413-1, *Dimensional and design characteristics.*
BS 5413-2, *Water tightness and pressure resistance characteristics.*
BS 5413-3, *Hydraulic characteristics.*
BS 5413-4, *Mechanical and endurance characteristics.*
BS 5413-5, *Physio-chemical characteristics: materials, coatings.*
CP 342, *Centralized hot water supply.*
CP 342-1, *Individual dwellings.*
CP 342-2, *Buildings other than individual dwellings.*
BS 5074, *Short- and long-stem thermometers for precision use.*

[3)] Referred to in foreword only.

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