



# **BS 1010 : Part 2 : 1973**

UDC 621.643.5 : 621.646.614 : 696.117

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## **Specification for Draw-off taps and stopvalves for water services (screw-down pattern)**

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### **Part 2. Draw-off taps and above-ground stopvalves**

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The following BSI references relate to the work on this standard:  
Committee reference SAB/2 Draft for approval 72/13017.

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*British Plastics Federation	Ministry of Defence, Air Force Department
*British Waterworks Association	*National Brassfoundry Association
*Council of British Ceramic Sanitaryware Manufacturers	National Federation of Building Trades Employers
*Department of the Environment	*National Federation of Builders' and Plumbers' Merchants
*Department of the Environment—Building Research Establishment	Royal Institute of British Architects
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*Institution of Municipal Engineers	*Water Companies Association

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Association of Waterworks Officers	Institute of British Foundrymen
British Non-ferrous Metals Research Association	Institution of Gas Engineers
Copper Ball Manufacturers' Association	Institution of Heating and Ventilating Engineers
Copper Development Association	Institution of Water Engineers
Copper Tube Fittings Manufacturers' Association	London Chamber of Commerce
Department of Trade and Industry	Metropolitan Water Board
Electricity Council, the Central Electricity Generating Board and the Area Boards in England and Wales	National Federation of Plumbers and Domestic Heating Engineers
Gas Council	Society of British Gas Industries



Amendment Slip No.1, published 30 April 1975  
to BS 1010 : Part 2 : 1973

Draw-off taps and stopvalves for water services (screw-down pattern)  
Part 2. Draw-off taps and above-ground stopvalves

### Revised text

AMD 1633  
April 1975

#### List of contents

Under 'Tables', in the titles of 5 and 6, after the word 'spindle' place 'rising type' in parentheses to be followed by a comma, thus '(rising type)',.

Under 'Figures', in the title of 10a place 'rising type' in parentheses.

AMD 1633  
April 1975

#### Foreword

In the first line of the fifth paragraph insert 'which are' after 'for screw threads'.

Delete the whole of the sixth paragraph and substitute the following:

'Basic pipe threads have been retained as they are standard for the purpose internationally (See ISO/R 228 'Pipe threads where pressure-tight joints are not made on the threads').

Designations remain in imperial units for the time being but tolerances are those of the current edition of BS 2779. All other screw threads are also unchanged physically.'

AMD 1633  
April 1975

#### Clause 1.1 Scope

Delete the second sentence from the first paragraph and substitute the following:

'Pillar taps of rising type are specified in  $\frac{1}{2}$  in,  $\frac{3}{4}$  in and 1 in nominal sizes and non-rising type in  $\frac{1}{2}$  in and  $\frac{3}{4}$  in nominal sizes only.'

AMD 1633  
April 1975

#### Clause 1.3 Illustrations

In the first line delete '3,'.

AMD 1633  
April 1975

#### Fig.1 Easy clean bib tap

On the right hand side of the illustration from the fifth line delete 'Spinde' and substitute 'Spindle'.

AMD 1633  
April 1975

#### Fig.3 Boss for lead pipe with internal BS pipe (parallel) thread

From each of the last five lines of the legend commencing 'Minimum length of plain tail, dimension *T*' delete the words 'up to and including'.

AMD 1633  
April 1975

#### Fig.4 Pillar tap sizes $\frac{1}{2}$ in to 1 in BSP

From the note at the bottom of the left hand side of illustration delete 'line Q', and substitute 'line 15'.

AMD 1633  
April 1975

#### Clause 1.7.2 Stopvalves and hose union taps

At the end of the clause add the following further paragraph:

'The stopvalve or hose union tap being tested shall show no sign of leakage during the tests.'



AMD 1633  
April 1975

## Clause 2.2 Composition

(4) Gunmetal (cast) for bodies and components:

Delete '-C' from both 'LGI-C' and 'LG2-C'.

(8) Phosphor bronze for circlips:

Delete 'BS 369' and substitute 'BS 2874 PB 102'.

(9) Stainless steel for circlips and components:

Delete 'BS 971 En 58' and substitute 'BS 1449 : Part 4, Grade 304 S 16 or Grade 302 S 17 or other grades not less suitable'.

AMD 1633  
April 1975

## Clause 4.3.3 Spindle thread

In the second line delete '70 %' and substitute '50 %'.

AMD 1633  
April 1975

## Clause 4.5.1.2

Delete the whole of 4.5.1.2 and substitute the following:

'The depth of shrouding, which in any case should not exceed the thickness of the washer when new, shall be such that the face of the washer plate can rest on the seating in accordance with 4.3.3.'

AMD 1633  
April 1975

## Clause 4.5.3.1

Delete the whole of 4.5.3.1 and substitute the following:

'The washer plate unit shall be made in accordance with the dimensions given in Table 9, fabricated units being joined as specified in 4.2.2(2). If it is a sand or shell casting, it shall be machined all over.'

AMD 1633  
April 1975

## Clause 4.7.3

(2) Delete '8.0 mm' and '9.0 mm' and substitute '5.5 mm' and '6.5 mm' respectively.

AMD 1633  
April 1975

## Clause 4.12 Hexagonal shoulders

Following '(2) bib taps of all sizes.' delete the full stop and add 'except plain end bib taps and flanged bib taps up to and including  $\frac{3}{4}$  in size having flanges not less than 75 mm diameter.'

AMD 1633  
April 1975

## Fig.7 Dimensions of tap bodies

Delete the information at the bottom of the drawing 'To Table 12, line 2, 4 or 20 and 4.11.3' and substitute 'For counterbore see clause 4.11.3 and Table 12, either lines 2 and 4 or line 20'.

AMD 1633  
April 1975

## Fig.8 Dimensions of stopvalve bodies

Change the lines indicating the minor diameter of the body thread engaging with the head from thin to thick and the lines indicating the major diameter from thick to thin.

AMD 1633  
April 1975

## Table 1 Dimensions of bodies ( $\frac{1}{4}$ in to $\frac{3}{4}$ in nominal sizes)

Delete from line 9, column 3 'Length to end of bore for' and substitute 'Length of end for'.

From line 14, column 3 after 'stopvalve' delete 'tails' and substitute 'ends'.

At the end of this line after 'only' add '(see 4.6.2.1)'.



AMD 1633  
April 1975

Table 2 Dimensions of bodies (1 in to 2 in nominal sizes)

Delete from line 9, column 3 'Length to end of bore for' and substitute 'Length of end for'.

From line 14, column 3 after 'stopvalve' delete 'tails' and substitute 'ends'. At the end of this line after 'only' add '(see 4.6.2.1)'.

AMD 1633  
April 1975

Table 3 Dimensions of heads and glands of rising spindle type taps and valves (¼ in to ¾ in nominal sizes)

In line 10, column 11, delete '9.0' and substitute '8.5'.

In line 11, column 7 and column 9, delete '3.0' and substitute '2.5'.

In line 12, column 7 and column 9, delete '3.0' and substitute '2.5'.

AMD 1633  
April 1975

Table 4 Dimensions of heads and glands of rising spindle type taps and valves (1 in to 2 in nominal sizes)

In line 12, column 5, delete '4.0' and substitute '3.5'.

AMD 1633  
April 1975

Fig. 10a Spindle rising type and crutch

In the caption put 'rising type' in parentheses. Add arrows from 'Top of head' and from 'Bottom edge of crutch when tap closed' to the extremes of dimension *F* at the spindle line.

AMD 1633  
April 1975

Table 5 Dimensions of spindle rising type, washer, washer plate and handle (¼ in to ¾ in nominal sizes)

Put 'rising type' in parentheses.

AMD 1633  
April 1975

Table 6 Dimensions of spindle rising type, washer, washer plate and handle (1 in to 2 in nominal sizes)

Put 'rising type' in parentheses.

AMD 1633  
April 1975

Fig. 11 Head of non-rising spindle type taps and valves

Add the following note above the caption:

'Alternative arrangements of seals and washer plate unit designs (see Figs. 2 and 13)'.

AMD 1633  
April 1975

Table 7 Dimensions of heads of non-rising spindle type taps and valves (½ in to ¾ in nominal sizes)

In line 10 of column 3 delete 'of threaded engagement' and substitute 'of full engagement of thread' and in columns 5 and 7 delete '8.0' and '9.0' and substitute '5.5' and '6.5' respectively.

AMD 1633  
April 1975

Table 8 Dimensions of spindles of non-rising spindle type taps and valves (½ in to ¾ in nominal sizes)

In line 1 of column 3 delete 'of spindle thread engagement' and substitute 'of full engagement of spindle thread' and in columns 5 to 7 delete '8.0' and '9.0' and substitute '5.5' and '6.5' respectively.

In line 2 of column 3 delete 'head' and substitute 'spindle'.

AMD 1633  
April 1975

Fig. 13 Washer plate unit for non-rising spindle type taps and valves

Delete dimension '*F*' and the dimension lines.





AMD 1633  
April 1975

**Table 9 Dimensions of washer plate units of non-rising spindle type taps and valves ( $\frac{1}{2}$  in to  $\frac{3}{4}$  in nominal sizes)**

In line 5 of column 3 delete 'of spindle thread engagement' and substitute 'of full engagement of spindle thread' and in columns 5 and 7 delete '8.0' and '9.0' and substitute '5.5' and '6.5' respectively.

Delete the whole of line 9.

AMD 1633  
April 1975

**Table 10 Dimensions of back nuts for pillar taps**

Reference letter *D*. In column 2 delete 'Size of hexagonal across (min.)' and substitute 'Width across flats of hexagon (min.)'.

AMD 1633  
April 1975

**Standard union ends, tail pipes and coupling nuts**

*Explanatory notes for Tables 11 and 12 and Fig.15.*

In the last paragraph of the explanatory notes after 'solid drawn copper tube' insert 'of not less than 1 mm thickness'.

AMD 1633  
April 1975

**Table 11 Key table for connecting ends**

From the 'Key table' delete the whole of the section referring to 'Stopvalves (for all purposes with full bore union tail pipes)' and figures in columns 2, 3 and 4 and substitute the following:

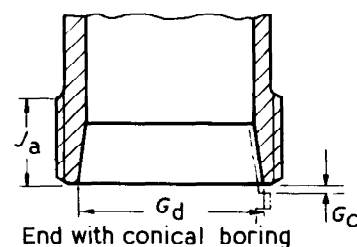
<i>Stopvalves</i> (for all purposes with full bore union tail pipes)	$\frac{1}{4}$	$\frac{3}{8}$	4 and 5
	$\frac{3}{8}$	$\frac{1}{2}$	6 and 7
	$\frac{1}{2}$	$\frac{5}{8}$	8 and 9
	$\frac{1}{2}$	$\frac{3}{4}$	10 and 11 (alternative)
	$\frac{3}{4}$	$\frac{7}{8}$	12 and 13
	$\frac{3}{4}$	1	14 and 15 (alternative)
	1	$1\frac{1}{4}$	16 and 17
	$1\frac{1}{4}$	$1\frac{1}{2}$	18 and 19
	$1\frac{1}{2}$	$1\frac{3}{4}$	20 and 21
	$1\frac{1}{2}$	2	22 and 23 (alternative)
	2	$2\frac{1}{4}$	24 and 25
	2	$2\frac{1}{2}$	26 and 27 (alternative)

Delete the asterisk and note at the bottom of the table.

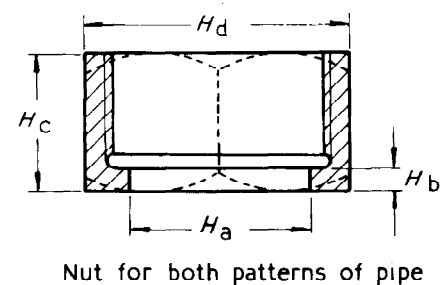
AMD 1633  
April 1975

**Fig.15 Reference diagrams for standard ends, tail pipes and nuts**

Delete the diagram of 'End with conical boring' and substitute the new diagram below.



Delete the diagram of 'Nut for both patterns of pipe' and substitute the new diagram below.





AMD 1633  
April 1975

**Table 12 Parallel spigot and cone end tail pipes for British Standard draw-off taps and stopvalves**

In line 3 of the footnotes at the base of the table delete '(see 4.11)' and substitute '(see 4.11.3)'.

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AMD 1633  
April 1975

**Table 13 Dimensions of sink columns**

In line 8 of column 4 ( $\frac{1}{2}$  in max.) delete '4' and substitute '6'.

In line 9 of column 7 ( $\frac{3}{4}$  in min.) delete '26' and substitute '26.2'.

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AMD 1633  
April 1975

**Inside back cover**

**BSI publications referred to in this standard**

BS 61. Delete the title 'Copper tubes (heavy gauge) for general purposes

Part 2. Threads for light gauge copper tubes and fittings' and substitute 'Threads for light gauge copper tubes and fittings'.

BS 369. Delete the reference to this standard.

BS 864. Delete 'Capillary and compression fittings of copper and copper alloy for use with copper tube complying with BS 659, BS 1386 and BS 3931' and substitute 'Capillary and compression tube fittings of copper and copper alloy'.

BS 971. Delete the reference to this standard.

BS 1400. Delete 'Copper alloy ingots and copper alloy castings' and substitute 'Copper alloy ingots and copper and copper alloy castings'.

Between BS 1400 and BS 1737 insert:

'BS 1449 Steel plate, sheet and strip

Part 4. Stainless and heat resisting plate, sheet and strip'.

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**Amendment Slip No.2, published 28 May 1976  
to BS 1010 : Part 2 : 1973**

**Draw-off taps and stopvalves for water services  
(screw-down pattern)**

**Part 2. Draw-off taps and above ground stopvalves**

**Revised text**

AMD 2003  
May 1976

**Clause 4.6.2.2**

Delete the existing text and substitute the following:

'Pillar taps from ½ in to 1 in size inclusive shall have screwed shanks not less than 50 mm long from the underside of the flange. The outlet nose of a pillar tap shall be not less than 13 mm above the level of the underside of the fixing flange, and for ½ in to 1 in sizes the centre of the nose shall project a minimum of 63 mm (see Fig. 4).

A locating feature may be provided below the flange at the manufacturer's option to facilitate production. Any such feature shall be coaxial with the centre line of the tail and shall be within a circumscribed circle of diameter  $Q$  (Tables 1 and 2, line 15) and shall have a maximum axial length as dimension  $S$  (Tables 1 and 2, line 17).

References to the 'square under the flange' in Figs. 4, 7, 16 and 19 shall be interpreted as a 'locating feature' as described in this clause. In order to prevent rotation of the fitting in the ware after installation, antirotational washers shall be provided.'

AMD 2003  
May 1976

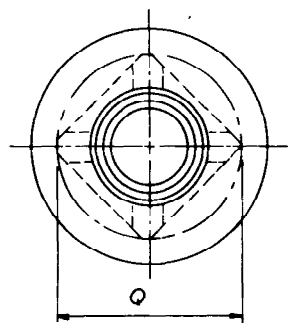
**Clause 4.15 Combination tap assemblies**

In item (2) delete 'Squares or lugs' and substitute 'Locating features'.

AMD 2003  
May 1976

**Fig. 7. Dimensions of tap bodies**

Delete the bottom left-hand diagram of this figure and substitute the following:



View under flange



Table 1. Dimensions of bodies ( $\frac{1}{4}$  in to  $\frac{3}{4}$  in nominal sizes)  
Delete lines 15, 17 and 19 and substitute the following:

1	2	3	4	5	6	7	8	9	10	11
Line No.	Ref letter on diagram	Dimension	Nominal size of tap in inches							
			$\frac{1}{4}$		$\frac{3}{8}$		$\frac{1}{2}$		$\frac{3}{4}$	
			max.	min.	max.	min.	max.	min.	max.	min.
15	Q	Circumscribed diameter of locating feature					29.0		34.0	
17	S	Depth of locating feature under flange of pillar tap					5.0		5.0	
19	U	Length of threaded tail (including locating feature)					50.0		50.0	50.0

Table 2. Dimensions of bodies (1 in to 2 in nominal sizes)  
Delete lines 15, 17 and 19 and substitute the following:

1	2	3	4	5	6	7	8	9	10	11
Line No.	Ref. letter on diagram	Dimension	Nominal size of tap in inches							
			1		$1\frac{1}{4}$		$1\frac{1}{2}$		2	
			max.	min.	max.	min.	max.	min.	max.	min.
15	Q	Circumscribed diameter of locating feature	44.0							
17	S	Depth of locating feature under flange of pillar tap	6.0							
19	U	Length of threaded tail (including locating feature)		50.0						





Table 3. Dimensions of heads and glands of rising spindle type taps and valves (1/4 in to 3/4 in nominal sizes)  
Delete line 5 and substitute the following:

1	2	3	4	5	6	7	8	9	10	11
Line No.	Ref. letter on diagram	Dimension	Nominal size of tap in inches							
			1/4		3/8		1/2		3/4	
			max.	min.	max.	min.	max.	min.	max.	min.
5	E	Length of internal thread for spindle including 'recess' (see also 4.3.3)		14.2		18.1		18.1		20.1

Table 4. Dimensions of heads and glands of rising spindle type taps and valves (1 in to 2 in nominal sizes)  
Delete line 5 and substitute the following:

1	2	3	4	5	6	7	8	9	10	11
Line No.	Ref. letter on diagram	Dimension	Nominal size of tap in inches							
			1		1 1/4		1 1/2		2	
			max.	min.	max.	min.	max.	min.	max.	min.
5	E	Length of internal thread for spindle including 'recess' (see also 4.3.3)		25.1		29.1		34.1		39.2

Table 5. Dimensions of spindle rising type, washer, washer plate and handle (1/4 in to 3/4 in nominal sizes)  
Delete line 7 and substitute the following:

1	2	3	4	5	6	7	8	9	10	11
Line No.	Ref. letter on diagram	Dimension	Nominal size of tap in inches							
			1/4		3/8		1/2		3/4	
			max.	min.	max.	min.	max.	min.	max.	min.
7	G	Length of external thread on spindle (see also 4.3.3)		15.0		19.0		19.0		21.0



Table 6. Dimensions of spindle rising type, washer, washer plate and handle (1 in to 2 in nominal sizes)

Delete line 7 and substitute the following:

1	2	3	4	5	6	7	8	9	10	11
Line No.	Ref. letter on diagram	Dimension	Nominal size of tap in inches							
7	G	Length of external thread on spindle (see also 4.3.3)	1	1 ¼		1 ½		2		
			max.	min.	max.	min.	max.	min.	max.	min.
				26.0		31.0		36.0		41.0



AMD 2003  
May 1976

Table 7. Dimensions of heads of non-rising spindle type taps and valves  
( $\frac{1}{2}$  in to  $\frac{3}{4}$  in nominal sizes)

At the end of the line 10 entry in column 3 insert '(see also 4.3.3)'.

AMD 2003  
May 1976

Table 8. Dimensions of spindles of non-rising spindle type taps and valves  
( $\frac{1}{2}$  in to  $\frac{3}{4}$  in nominal sizes)

At the end of the line 1 entry in column 3 insert '(see also 4.3.3)'.

AMD 2003  
May 1976

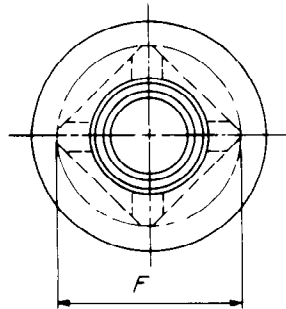
Table 9. Dimensions of washer plate units of non-rising spindle type taps  
and valves ( $\frac{1}{2}$  in and  $\frac{3}{4}$  in nominal sizes)

At the end of the line 5 and line 6 entries in column 3 insert '(see also 4.3.3)'.

AMD 2003  
May 1976

Fig. 16 Sink columns

Delete the small right-hand diagram of this figure and substitute the following:



View under flange

AMD 2003  
May 1976

Table 13. Dimensions of sink columns

Delete lines 6; 7 and 8 and substitute the following:

Line No.	Reference letter on Fig. 16	Dimension	Size			
			$\frac{1}{2}$ in		$\frac{3}{4}$ in	
			max.	min.	max.	min.
6	$F^*$	Circumscribed diameter of locating feature	29.0		34.0	
7	$G$	Length of threaded tail (including locating feature)		50.0		50.0
8	$H$	Depth of locating feature under flange	5.0		5.0	





**Amendment Slip No. 3,  
published and effective from 29 June 1979  
to BS 1010 : Part 2 : 1973**

**Draw-off taps and stopvalves for water services  
(screw-down pattern)  
Part 2. Draw-off taps and above-ground stopvalves**

### Revised text

**AMD 3024  
June 1979**

#### Contents

Under '2. Materials' insert the following new item:

'2.3 Water quality'.

**AMD 3024  
June 1979**

#### Clause 2.1 General

In the last line, after the word 'plates' insert the words 'and backnuts'.

Insert an additional sentence as follows.

'Backnuts may also be made of zinc alloy complying with the requirements of BS 1004/alloy A.'

**AMD 3024  
June 1979**

#### New clause 2.3

Insert the following new clause:

#### **'2.3 Water quality**

All materials that are used in the construction of draw-off taps and stopvalves, and that are in contact with the supply water, shall not constitute a toxic hazard and shall not foster microbiological growth nor give rise to taste, odour, cloudiness or discoloration of the water.'

**AMD 3024  
June 1979**

#### Clause 4.2.1 General

In line 4, delete the comma after the word 'it' and insert a full stop. Delete the remaining text.

**AMD 3024  
June 1979**

#### Clause 4.10.2

In line 5, insert a full stop after the word 'manufacturers' and delete the remaining text.

**AMD 3024  
June 1979**

#### Clause 4.10.4

Delete this subclause entirely.

**AMD 3024  
June 1979**

#### Clause 4.13.1

Delete the second sentence entirely.







**Amendment No. 4**  
**published and effective from 28 September 1984**  
**to BS 1010 : Part 2 : 1973**

**Draw-off taps and stopvalves for water services**  
**(screw-down pattern)**  
**Part 2. Draw-off taps and above-ground stopvalves**

**Revised text**

**AMD 4590**  
**September 1984**

**Clause 2.1 General (as amended by Amendment No. 3)**

Delete the last sentence and substitute the following.

'In addition it is permissible to form backnuts and other components not in contact with the water, from zinc alloy (see 2.2 (11)).'

**AMD 4590**  
**September 1984**

**Clause 2.2 Composition**

After item (10) insert the following.

'(11) Zinc alloy: BS 1004: alloy A'.

**AMD 4590**  
**September 1984**

**New clause 4.5.1.4**

After 4.5.1.3 insert the following.

'4.5.1.4 An undercut used for securing the washer plate (to lift with the spindle) shall have a diameter of not less than 80 % of the minimum diameter of the washer plate stem.'



Table 5. Dimensions of spindle (rising type), washer, washer plate and handle ( $\frac{1}{4}$  in to  $\frac{3}{4}$  in nominal sizes)  
(as amended by Amendment No. 1)

Delete lines 13, 14, 15, 18, 21 and 22 and substitute the following.

1	2	3	4	5	6	7	8	9	10	11
Line No.	Ref. letter on diagram	Dimension	Nominal size of tap in inches							
			1/4		3/8		1/2		3/4	
			max.	min.	max.	min.	max.	min.	max.	min.
13	<i>N</i>	Outside diameter of washer plate (flat type)		14.2		15.9		18.5		25.4
14	<i>O</i>	Outside diameter of washer plate (shrouded type)	16.9	16.6	18.5	18.2	21.2	20.9	28.3	28.0
15	<i>P</i>	Inside diameter of washer plate (shrouded type)	14.8	14.5	16.4	16.1	19.1	18.8	25.8	25.5
18	<i>S</i>	Thickness of washer (when new)	2.7	2.4	4.4	4.0	4.4	4.0	4.4	4.0
21	<i>V</i>	Outside diameter of washer (when new)	14.4	14.0	16.0	15.6	18.7 <sup>‡</sup>	18.3	25.4	25.0
22	<i>W</i>	Diameter of hole in washer	3.9	3.6	3.9	3.6	5.0	4.7	6.4	6.0

After footnote “†” insert the following.

“<sup>‡</sup> It is permissible to use 19.2 until December 1985.”



Table 6. Dimensions of spindle (rising type), washer, washer plate and handle (1 in to 2 in nominal sizes) (as amended by Amendment No. 1)

Delete lines 14, 15, 18, 21 and 22 and substitute the following.

1	2	3	4	5	6	7	8	9	10	11
Line No.	Ref. letter on diagram	Dimension	Nominal size of tap in inches							
			1		1½		2			
			max.	min.	max.	min.	max.	min.		
14	<i>O</i>	Outside diameter of washer plate (shrouded type)	36.4	36.1	43.6	43.3	51.5	51.0	67.8	67.3
15	<i>P</i>	Inside diameter of washer plate (shrouded type)	33.8	33.5	41.0	40.6	48.3	47.8	64.3	63.8
18	<i>S</i>	Thickness of washer (when new)	5.4	5.0	5.4	5.0	6.4	6.0	6.4	6.0
21	<i>V</i>	Outside diameter of washer (when new)	33.4	33.0	40.5	40.0	47.6	47.0	63.6	63.0
22	<i>W</i>	Diameter of hole in washer	6.4	6.0	8.5	8.0	8.5	8.0	10.0	9.5





# BS 1010 : Part 2 : August 1973

UDC 621.643.5 : 621.646.614 : 696.117

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## Specification for Draw-off taps and stopvalves for water services (screw-down pattern)

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### Part 2. Draw-off taps and above-ground stopvalves

#### Amendments issued since publication

Amd. No.	Date of issue	Text affected



# BS 1010 : Part 2 : 1973

## Contents

	Page		Page
Co-operating organizations	Inside front cover	D. Properties of lubricating oil for tests for ' O ' ring material in Appendix A	53
Foreword	4	E. Method for the determination of surface condition of ' O ' ring material on bending after ageing in air	53
<b>Specification</b>		<b>Tables</b>	
<b>1. General</b>		1. Dimensions of bodies ( $\frac{1}{4}$ in to $\frac{3}{4}$ in nominal sizes)	20
1.1 Scope	5	2. Dimensions of bodies (1 in to 2 in nominal sizes)	21
1.2 Definitions	5	3. Dimensions of heads and glands of rising spindle type taps and valves ( $\frac{1}{4}$ in to $\frac{3}{4}$ in nominal sizes)	23
1.3 Illustrations	6	4. Dimensions of heads and glands of rising spindle type taps and valves (1 in to 2 in nominal sizes)	24
1.4 Nominal size	11	5. Dimensions of spindle rising type washer, washer plate and handle ( $\frac{1}{4}$ in to $\frac{3}{4}$ in nominal sizes)	26
1.5 Dimensions	11	6. Dimensions of spindle rising type washer, washer plate and handle (1 in to 2 in nominal sizes)	27
1.6 Colour coding	11	7. Dimensions of heads of non-rising spindle type taps and valves ( $\frac{1}{2}$ in to $\frac{3}{4}$ in nominal sizes)	29
1.7 Testing	11	8. Dimensions of spindles of non-rising spindle type taps and valves ( $\frac{1}{2}$ in to $\frac{3}{4}$ in nominal sizes)	31
1.8 Marking	11	9. Dimensions of washer-plate units of non-rising spindle type taps and valves ( $\frac{1}{2}$ in to $\frac{3}{4}$ in nominal sizes)	33
<b>2. Materials</b>		10. Dimensions of back nuts for pillar taps	34
2.1 General	11	11. Key table for connecting ends	35
2.2 Composition	11	12. Parallel spigot and cone end tail pipes for British Standard draw-off taps and stopvalves	37
<b>3. Workmanship</b>		13. Dimensions of sink columns	39
3.1 Castings	12	14. BS Whitworth form screw threads (internal) on bodies for engagement with head threads (external)	43
3.2 Hot pressings	12	15. BS Whitworth form screw threads (external) on heads for engagement with body threads (internal)	44
3.3 Machining	12	16. BS Whitworth form screw threads (internal) in stuffing box for engagement with gland threads (external)	45
3.4 Thickness of parts	12	17. BS Whitworth form screw threads (external) on glands for engagement with stuffing box threads (internal)	46
3.5 Chromium and nickel plating	12	18. BS Whitworth threads (internal) on heads for engagement with rising-type spindle threads (external)	47
<b>4. Design and construction</b>			
4.1 Waterway	12		
4.2 Seat	13		
4.3 Screw threads	13		
4.4 Head seal	14		
4.5 Washer plate and washer plate unit	14		
4.6 Body, head, cover, spindle and lockshield	14		
4.7 Method of attaching handle	15		
4.8 Clearance between handle and head	16		
4.9 Seat washer	16		
4.10 Gland packing	16		
4.11 Union connections	16		
4.12 Hexagonal shoulders	17		
4.13 Flow-straightening and acrating devices	17		
4.14 Interlock control	17		
4.15 Combination tap assemblies	17		
<b>Appendices</b>			
A. Requirements for ' O ' rings	51		
B. Method for the determination of low temperature flexibility of ' O ' rings	52		
C. Method for the determination of adhesion to, and corrosion of, metals by ' O ' rings	52		

# BS 1010 : Part 2 : 1973

	Page		Page
19. BS Whitworth threads (external) on rising-type spindles for engagement with head threads (internal)	48	7. Dimensions of tap bodies	18
20. BS Whitworth threads (internal) on washer plate units on non-rising spindles	49	8. Dimensions of stopvalve bodies	19
21. BS Whitworth threads (external) on non-rising spindles	50	9. Head and gland of rising spindle type taps and valves	22
		10a. Spindle rising type and crutch	25
		10b. Washer, washer plate and handle	25
		11. Head of non-rising spindle type taps and valves	28
		12. Spindle of non-rising spindle type taps and valves	30
		13. Washer plate unit for non-rising spindle type taps and valves	32
		14. Back nuts for pillar taps	34
		15. Reference diagrams for standard ends, tail pipes and nuts	36
		16. Sink columns	39
		17. Types of head seal	40
		18. One method of attaching a non-rising tap	41
		19. Alternative arrangement showing seating integral with shank and separate from, but brazed to, body	42
<b>Figures</b>			
1. Easy clean bib tap	6		
2. Alternative types of headwork for non-rising spindle type ( $\frac{1}{2}$ in and $\frac{3}{4}$ in draw-off taps and stopvalves)	7		
3. Boss for lead pipe with internal BS pipe (parallel) thread	8		
4. Pillar tap sizes $\frac{1}{2}$ in to 1 in BSP	9		
5. Stopvalve with BS pipe (parallel) external thread on inlet compression joint for copper tube on outlet	10		
6. Stopvalve with BS pipe (parallel) internal thread on inlet conical union joint on outlet	10		

# BS 1010 : Part 2 : 1973

## Foreword

This revised British Standard has been prepared under the authority of the Sanitary Appliances Industry Standards Committee and specifies screwdown pattern taps and above-ground stopvalves made by casting or hot pressing, essentially for use with water services.

The dimensions given are those considered essential to ensure the production of a sound article with a reasonably long life and for that reason may be applied to the component parts of a variety of designs, some features of which it is unnecessary to standardize.

This revision has been undertaken principally for the following reasons:

- (1) metrication,
- (2) inclusion in the text of the various amendments which have been issued to the 1959 edition,
- (3) simplification, and
- (4) review of the non-rising spindle design.

When the original non-rising spindle design was put forward in Amendment No. 7 to BS 1010 : 1959 as an alternative to the traditional rising spindle design, it was intended that the two alternative designs should be permitted for a period not greatly in excess of eighteen months, after which a decision should be made as to which design was preferable. As a result of the experience gained, it is felt that both types have merit and they have therefore both been included in this revised specification as permanent alternative forms of headwork. The non-rising spindle design is only intended for use on  $\frac{1}{2}$  in and  $\frac{3}{4}$  in taps and valves. In the revised non-rising headwork, basic features only have been specified, leaving manufacturers free to produce a variety of designs, but when toroidal sealing rings ('O' rings) are used for gland sealing it is now required that there shall be two.

The dimensions are now expressed in metric units except those for screw threads in imperial units. In making the conversion the dimensions have been rounded off to sensible metric numbers where possible, but in some cases strict conversions have been made in order to obviate expensive and unnecessary changes in tooling.

Pipe thread designations and connecting tail threads have remained unchanged because BSP threads are standard for the purpose internationally. (See ISO/R 228, 'Pipe threads where pressure-tight joints are not made on the threads ( $\frac{1}{8}$  inch to 6 inches)'.) Imperial designations are therefore acceptable in metric specifications. All other screw threads are also unchanged physically.

Some of the requirements in the 1959 edition of BS 1010 have now proved to be unnecessary or out of date and some adjustments have therefore been made in this edition. It is expected that these changes will make this standard easier to use whilst still producing articles of high quality and adequate interchangeability.

This standard does not deal with methods of fixing, nor does it deal with compliance with water byelaws, other than to prescribe the correct method of manufacture of the standard draw-off taps and stopvalves. The primary intention underlying its preparation was to secure an adequate standard of quality for ordinary screwdown taps and stopvalves, but it is not intended that it should preclude the production and use of types having special features. Such taps or stopvalves, if they comply with the requirements of this standard in all relevant respects, can be regarded as taps or stopvalves complying with the requirements of this British Standard and may be marked in accordance with **1.8**.

The Committee has again given consideration to the use of zinc alloys for such components as cross tops, easy-clean shields and backnuts and it was agreed that doubts regarding the satisfactory behaviour of this metal under all conditions were sufficient to justify its omission until such time as it is proved to be satisfactory. Owing to the growing importance of certain metals which are 'non-ferrous' but unsuitable for water taps, the use of this term has been changed in favour of 'copper alloy' as being more correctly indicative of the metals intended.

Dimensions for bent unions up to 1 only are given in Table 12 as there is little demand for larger sizes.

Underground stopvalves have been omitted from this Part 2 of this standard as a separate standard is being prepared, to be published in due course as Part 3, 'Underground stopvalves for waterworks purposes' of this standard. In the meantime, BS 1010 : 1959 is to be retained as BS 1010 'Draw-off taps and stopvalves for water services (screwdown pattern), Part 1. Imperial units'.

New British Standard specifications for spray taps and spray mixing taps are in course of preparation.

British Standard Specification for  
**Draw-off taps and stopvalves**  
 for water services  
 (screw-down pattern)

Part 2. Draw-off taps and above-ground stopvalves

**1. General**

**1.1 Scope**

This British Standard specifies requirements for screwdown pattern draw-off taps and stopvalves of  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$  and 2 in nominal sizes. Pillar taps are not specified in  $\frac{1}{4}$  in and  $\frac{3}{8}$  in nominal sizes.

The following patterns of taps and stopvalves are within the scope of this British Standard:

- (1) bib taps and pillar taps;
- (2) above-ground stopvalves with end connections in accordance with 4.3 or 4.11;
- (3) combination tap assemblies either of the single or double outlet type;
- (4) any type of bib, pillar, or globe\* tap or stopvalve including those combined with draining taps complying with the requirements of BS 2879 or combination tap, bidet tap, restrictor tap and the like or any combination of such taps and valves.

Taps and stopvalves may be of the 'easy-clean' or non 'easy-clean' pattern.

Outlets of taps and stopvalves may either be plain or threaded (see 4.1.3 and Table 11).

Sink columns are also included in this standard (see Table 13).

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

**1.2 Definitions**

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

(1) *Screw-down stopvalve*. A valve in which a plate or disk, which shuts against the water pressure, is moved, by the rotation of a spindle, at right angles to its plane to cover the valve aperture.

(2) *Screw-down tap*. A tap operated in the same manner as a screw-down stop-valve.

a. *Bib tap*. A tap with a horizontal inlet and a nozzle bent to discharge in a downward direction.

b. *Hose union tap*. A tap, the nozzle of which has a male thread for the attachment of a hose union.

c. *Pillar tap*. A tap, suitable for mounting on a horizontal surface, having a vertical inlet and a nozzle bent to discharge in a downward direction.

d. *Globe tap*. A tap with a horizontal inlet and a vertical free outlet.

The use of the word 'tap' shall be taken to refer to any of the above patterns.

(3) *Combination tap assembly*. A hot water tap and a cold water tap coupled together with a common nozzle which may be either fixed or swivelling, so as to discharge hot, cold or mixed hot and cold water.

a. *Single outlet type combination tap assembly*. A combination tap assembly in which the hot water and the cold water mix before they emerge from the nozzle and which requires the hot water and the cold water supplies to be at the same pressure.

b. *Double outlet type combination tap assembly*. A combination tap assembly in which the streams of hot water and cold water are kept separate and do not mix until they emerge from the nozzle and which does not require the hot water and the cold water supplies to be at the same pressure.

(4) *Handle*. The operating member whether it be crutch, crosstop, combined handle or any other method of operation.

\* The use of a globe tap may contravene the water byelaws.

# BS 1010 : Part 2 : 1973

## 1.3 Illustrations

Illustrations of typical draw-off taps and stopvalves showing the component parts are given in Figs. 1, 3, 4, 5, and 6. Fig. 2 illustrates several of the non-rising spindle types of headwork which may be incorporated in  $\frac{1}{2}$  in and  $\frac{3}{4}$  in pattern draw-off taps and stopvalves. The illustrations are not intended to indicate exterior design.

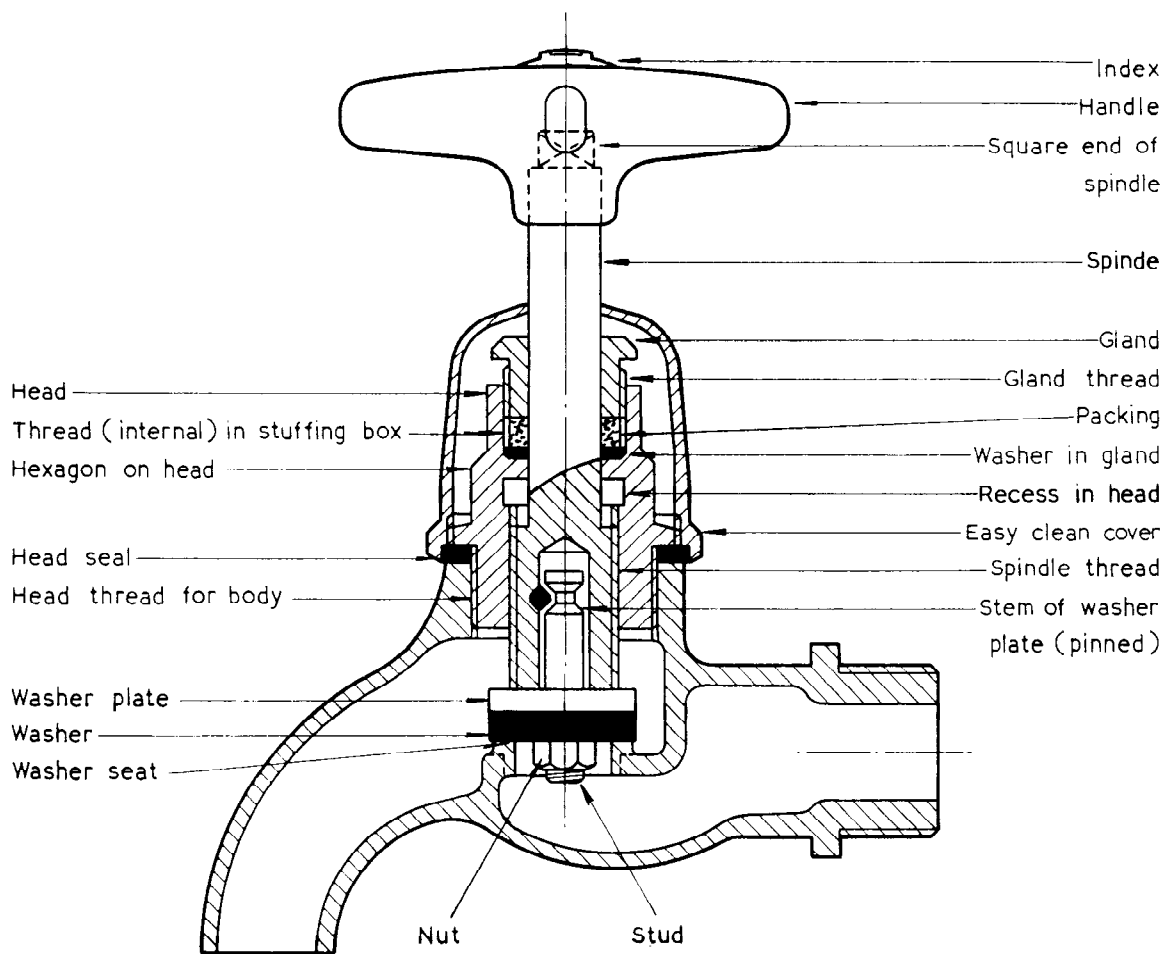


Fig. 1. Easy clean bib tap

Typical section of  $\frac{1}{2}$  in size. Full size (approximately)

NOTE. This illustration shows the names and relative positions of the various parts.

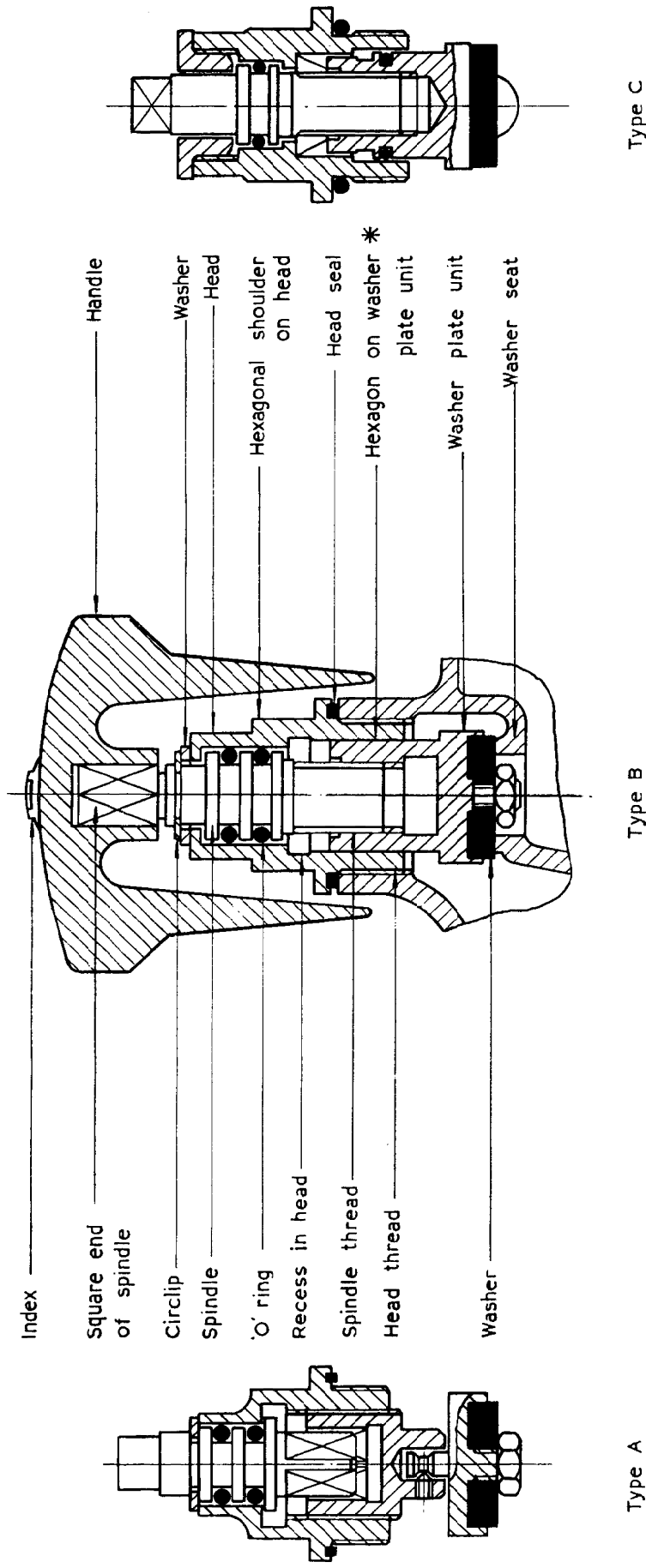
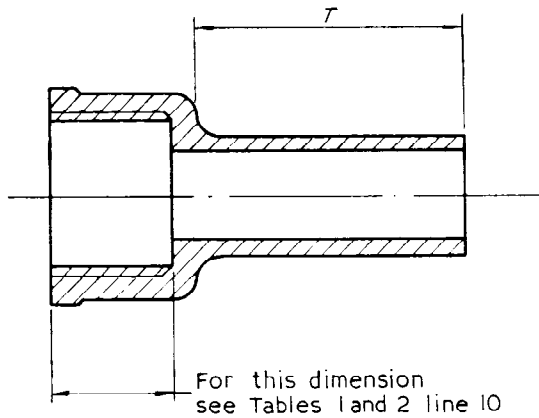


Fig. 2. Alternative types of headwork for non-rising spindle type  $\frac{1}{2}$  in and  $\frac{3}{4}$  in draw-off taps and stopvalves

# BS 1010 : Part 2 : 1973

NOTE. Shoulder end of threads may be undercut to depth of thread.

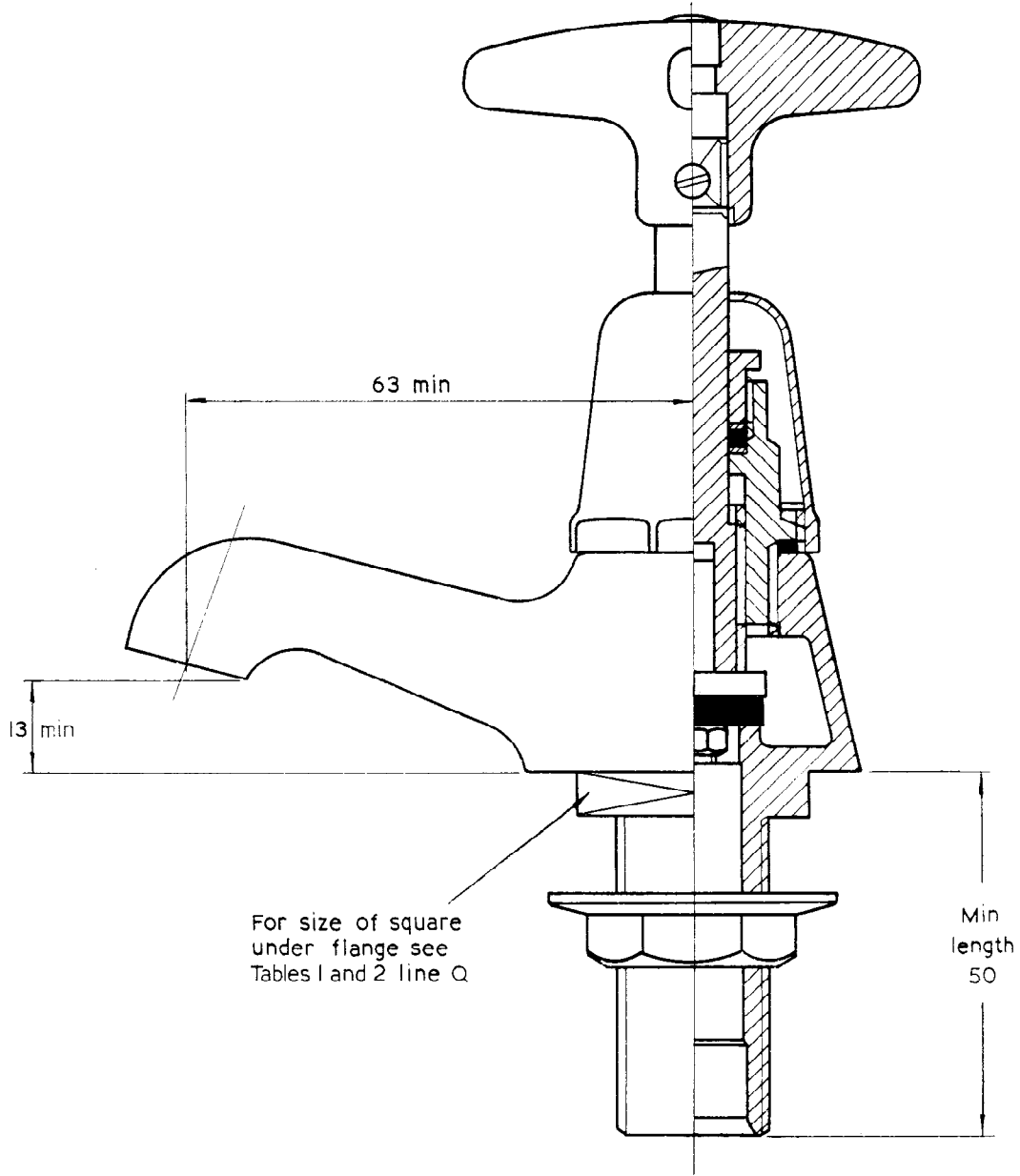


Minimum length of plain tail, dimension  $T$  :

- up to and including  $\frac{1}{2}$  in size : 25 mm
- up to and including  $\frac{3}{4}$  in size : 28 mm
- up to and including 1 in size : 31 mm
- up to and including  $1\frac{1}{4}$  in size : 34 mm
- up to and including  $1\frac{1}{2}$  in size : 38 mm
- up to and including 2 in size : 44 mm

Fig. 3. Boss for lead pipe with internal BS pipe (parallel) thread

BS 1010 : Part 2 : 1973



All dimensions in millimetres.

Fig. 4. Pillar tap sizes  $\frac{1}{2}$  in to 1 in BSP (see also 4.6.2.2)



# BS 1010 : Part 2 : 1973

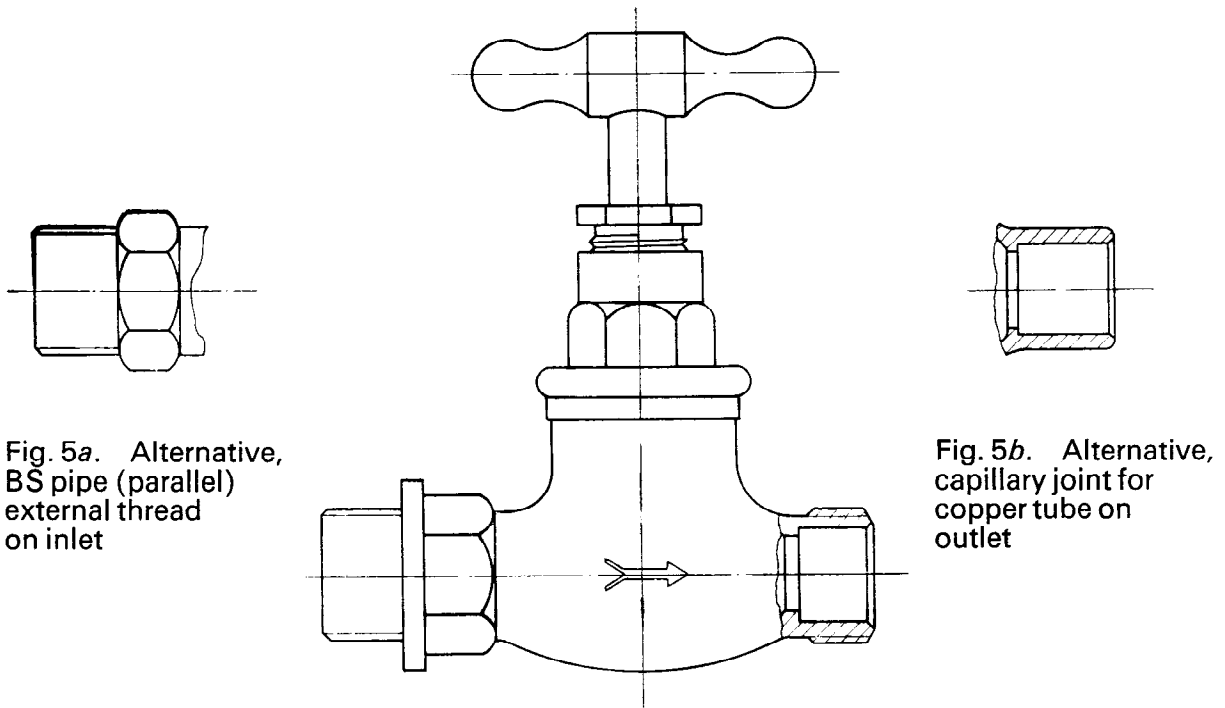


Fig. 5. Stopvalve with BS pipe (parallel) external thread on inlet, compression joint for copper tube on outlet

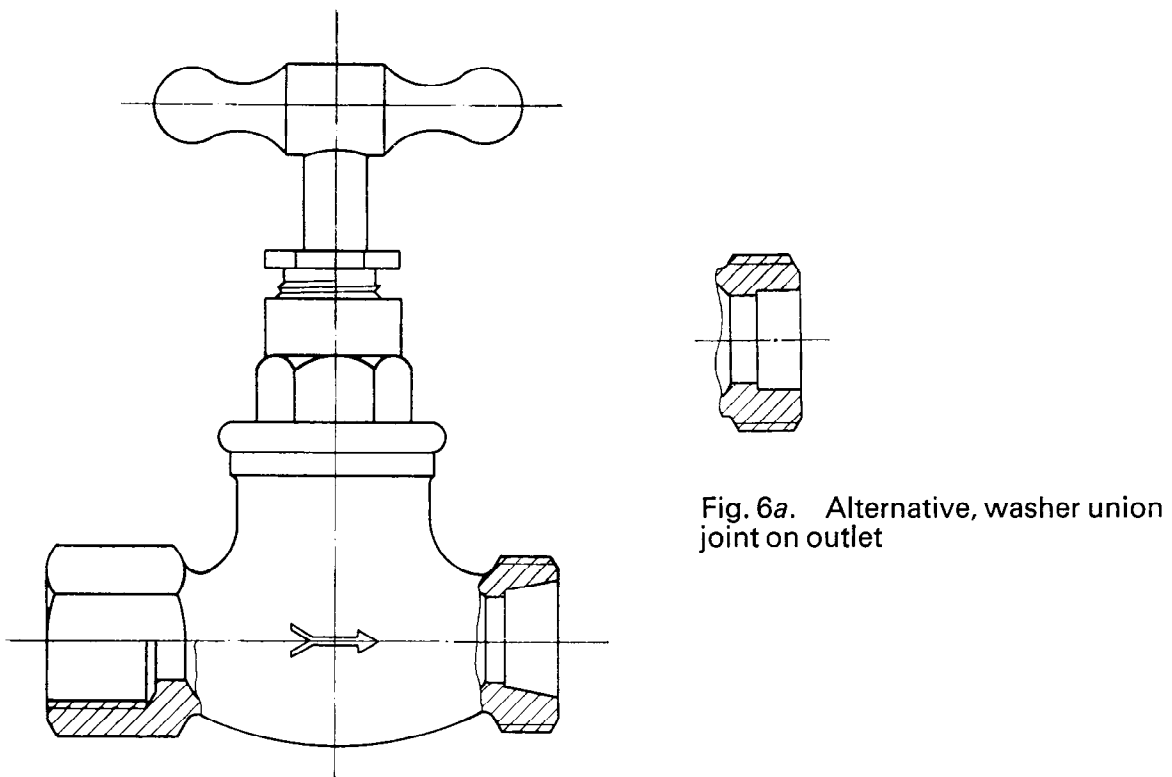


Fig. 6. Stopvalve with BS pipe (parallel) internal thread on inlet, conical union joint on outlet

# BS 1010 : Part 2 : 1973

## 1.4 Nominal size

Taps and stopvalves shall be designated by their nominal sizes and shall comply in all respects with the dimensions specified in Tables 1 and 2.

## 1.5 Dimensions

The design of the rising spindle headwork is fully dimensioned. The design of non-rising spindle headwork is at the discretion of the manufacturer provided that the basic features and minimum dimensions specified in Tables 7, 8 and 9 are maintained.

## 1.6 Colour coding

Where colours are used to indicate 'hot' and 'cold' it is recommended that they should be red for hot and blue for cold. In the case of combined assemblies it is further recommended that the hot tap should be on the left hand side and the cold tap on the right when viewed from the front.

## 1.7 Testing

**1.7.1 Taps.** Every tap when assembled and in the closed position shall show no leakage when subjected by the manufacturer to an underseat pressure test. This shall consist either of an internal hydraulic pressure of not less than 20 bar\* or an internal pneumatic pressure of not less than 5 bar while the tap is completely immersed in water.

In addition, every tap when assembled and in the open position and with the outlet sealed shall be capable of withstanding without leakage an internally applied hydraulic pressure of not less than 5 bar or an internally applied pneumatic pressure of not less than 1 bar while the tap is completely immersed in water.

**1.7.2 Stopvalves and hose union taps.** Every stopvalve and hose union tap shall be tested in the assembled condition both in the fully closed position (seat test) and in the fully opened position (body test). In both cases, the test shall consist of either an hydraulic test at not less than 20 bar, or a pneumatic test at not less than 5 bar while the tap is completely immersed in water.

Alternatively, the body test may be carried out with the valve reversed and in the closed position.

## 1.8 Marking

Taps and stopvalves shall be legibly marked with the following information:

- (1) manufacturer's name or mark;
- (2) the number of this British Standard, i.e. BS 1010/2;
- (3) on stopvalves only: the nominal size and direction of flow.

NOTE. Requirements (1) and (2) are covered by the BWA/BSI certification mark for licensed manufacturers.

Attention is drawn to the certification facilities offered by BSI and BWA; see the inside back cover of this standard.

## 2. Materials

### 2.1 General

Handles and 'easy-clean' covers may be of brass or other corrosion resistant materials. All other component parts of taps and valves, other than washers and seals, shall be of brass or gunmetal, except that seats, whether replaceable or permanently bonded, may also be made of stainless steel, agate or other not less suitable materials, and  $\frac{1}{2}$  in and  $\frac{3}{4}$  in washer plates may be moulded from acetal copolymer plastic.

### 2.2 Composition

The chemical compositions of the various alloys shall be not less suitable than those specified in the following British Standards:

- |   |                        |
|---|------------------------|
| (1) Brass (cast), excluding diecastings, for bodies and components: | BS 1400 SCB 1 or SCB 3 |
| (2) Brass gravity diecastings for bodies and components:            | BS 1400 DCB 3          |
| (3) Brass pressure diecastings for bodies and components:           | BS 1400 PCB 1          |
| (4) Gunmetal (cast) for bodies and components:                      | BS 1400 LG1-C or LG2-C |
| (5) Brass for hot pressings for bodies and components:              | BS 2872 CZ 122         |

\* 1 bar = 0.1 MPa =  $10^5$  N/m<sup>2</sup>

# BS 1010 : Part 2 : 1973

- |  |                           |
|--|---------------------------|
| (6) Brass rod for spindles, glands, crutches, washer plates, nuts, etc.: | BS 2874 CZ 121 or DD 18   |
| (7) Copper tube for tail pipes:  | BS 2871 : Part 1, Table Y |
| (8) Phosphor bronze for circlips:  | BS 369                    |
| (9) Stainless steel for circlips and components:                         | BS 971 En 58              |
| (10) Rubber for washers:   | BS 3457, Clause 6         |
- ' O ' rings shall conform with the requirements set out in Appendices A to E.

## 3. Workmanship

### 3.1 Castings

Castings shall be in all respects sound and good, free from laps, blow holes and pitting. The external surfaces shall be clean and smooth. The internal surfaces shall be clean, smooth and free from sand. No casting shall be burned, plugged, stopped or patched.

### 3.2 Hot pressings

All hot-pressed components shall be sound and solid, without laminations, and smooth and well finished and shall comply with the requirements of BS 3885.

### 3.3 Machining

The bodies, heads, spindles and other parts shall be concentric so that when assembled the parts are axial, parallel and cylindrical, with surfaces smoothly finished within the limits of size given in the tables applicable to the various components. The internal surfaces of the ' O ' ring housings shall comply with the requirements of BS 1806 or BS 4518.

### 3.4 Thickness of parts

Except where there are definite dimensions given which provide for a lesser thickness, no part of any component of a tap or valve shall be of less thickness than that shown in Tables 1 and 2, lines 4 and 4A, dimensions  $D_1$  and  $D_2$ . Minimum thicknesses for unions are given in Table 12, and see also 4.6 and 4.11.3.

### 3.5 Chromium and nickel plating

Before a tap or valve is plated, the washer plate and washer shall be removed from the fitting unless it is of a material that is unaffected by the plating process. The gland packing shall, so far as is practicable, be protected from the plating solution.

The plating when applied shall be capable of complying with the requirements of BS 1224 : 1970, Service condition number 2, Classification number Cu/Ni10b Cr r.

## 4. Design and construction

### 4.1 Waterway

4.1.1 Except where otherwise specified in this standard, the area of waterway throughout the body of a tap or valve shall be not less than the area through the seat of the tap or valve as specified in Tables 1 and 2.

4.1.2 The dimensions of the waterway through the unions of a tap or valve shall be not less than those stated in Tables 11 and 12 for the purpose specified in such tables, or alternatively, (1) if the union ends are for copper tube, the dimensions shall be not less than is specified for the appropriate size of union in BS 864 : Part 2 for use with copper tubes complying with the requirements of Tables X, Y and Z, BS 2871 : Part 1, or, (2) for plastics tube, not less than in BS 864 : Part 3\* for polythene pipe complying with the requirements of BS 1972 or BS 3284.

4.1.3 Where the tap has a specially formed nose for bottle filling, laboratory use, or a similar purpose, the waterway in the nose may be reduced to the extent necessary for the correct performance of its functions.

4.1.4 An integral restrictor device, which shall not be capable of stopping completely the flow through the tap or stopvalve, is permissible when such a device is necessary for the correct performance of the apparatus for which the restrictor is designed.

\* In course of preparation

## 4.2 Seat

**4.2.1 General.** The seat of a tap or stopvalve shall be machined in accordance with the dimensions shown in Figs. 7 and 8. Arrises shall be rounded to avoid cutting edges to a radius which shall be not less than 0.5 mm and not more than 0.8 mm. Seats need not be integral with the body. Seats that are not integral with the body shall be either screwed in or permanently bonded to it, and when so constructed the method and materials used for bonding shall neither impart any taste or colour to the water nor have any toxic effect nor foster growth of bacteria.

**4.2.2 Combined seat and shank.** In the case of pillar taps and combination tap assemblies, the seating and shank may be made as one part and subsequently brazed to the body (see Fig. 19). If this method is adopted, then the following requirements shall be met:

(1) The shank and seat shall be assembled from above and be provided with a shoulder for additional strength.

(2) A low temperature (but not less than 600 °C) brazing alloy shall be used, having flow characteristics suitable for the joint clearances employed. The brazing alloy shall be of a type which will not be subject to dezincification or electrolytic action.

(3) The thickness of the shoulder shall be not less than 2.0 mm.

(4) The width of the shoulder in engagement with the body shall be not less than 0.5 mm each side.

(5) The diametral clearance between the shank and the body shall be not more than 0.2 mm.

(6) The body shall be faced internally so that when the body and shank are assembled and secured in position they are co-axial and the faces of the seat and body are parallel (see 3.3). The machined thickness of the body below the shoulder of the shank, shall be not less than 2.0 mm.

**4.2.3 Thickness of metal supporting seating.** The minimum thicknesses are given in Tables 1 and 2, line 4, dimension  $D_1$ .

## 4.3 Screw threads

**4.3.1 General.** Unless otherwise specified herein, all threads shall be of Whitworth or metric form and right-handed subject to the provisions of 4.3.2 (4).

**4.3.2 Inlet and outlet.** Except where otherwise provided and subject to the provisions of (4) below, when an inlet or an outlet of a tap or valve is screwed, the thread, whether external or internal, shall be a BS pipe (parallel) thread of the same nominal size as the tap or valve, shall comply in all respects with the requirements of BS 2779, for internal threads and BS 2779, Class B for external threads. See also Table 11 for exceptions on union ends.

When so required, the inlet or outlet of a tap or valve shall be:

(1) tapped or screwed (taper thread) according to the requirements of BS 21, or

(2) tapped or screwed according to the requirements of BS 61 : Part 2, or

(3) in compliance with the requirements of 4.11.3 of this standard, or

(4) tapped or screwed to the purchaser's special requirements. The inlet or outlet of a tap or stopvalve supplied for attaching to special apparatus may be machined and threaded to any diameter and thread required by the purchaser.

**4.3.3 Spindle thread.** The length of the spindle thread shall be such that when the washer plate is resting on the seating without any washer, a length of the thread equal to not less than 70% of the external diameter of the threaded portion of the spindle will be in full engagement with the internal thread either of the head or of the washer plate unit, whichever is applicable.

**4.3.4 Thread in head for rising spindles.** The spindle thread in the head (internal) shall be so formed that when the spindle is screwed into the head to its fully open position, the end of the spindle projects beyond the face of the head at least 0.8 mm in sizes up to 1 in and at least 1.6 mm in larger sizes. A recess shall be formed at the top of the thread with a minimum diameter equal to the major diameter of the thread and a length not greater than the dimension  $F$  given in line 6 of Tables 3 and 4.

# BS 1010 : Part 2 : 1973

## 4.4 Head seal

Five methods of head seal design are shown in Fig. 17. Any other method may be used at the manufacturer's discretion providing that:

(1) If there is brass surrounding the seal, the thickness of the surround shall be not less than 1.2 mm up to and including 1 in size. Larger sizes shall be not less than 2.0 mm thick.

(2) The minimum width of metal on the body and head in contact with a flat face seal of the type illustrated in Fig. 17(a), shall conform to Tables 1 and 2, line 8, dimension *H*. The depth of threads shall not be included in this width and dimensions are the minimum allowed after all finishings including polishing.

(3) Where 'O' rings are used, the dimensions shall be in accordance with the requirements of BS 1806 or BS 4518 and the rubber shall conform to the specification laid down in Appendix A of this standard.

(4) Flat head seals shall be made from specially selected fibre complying with the requirements of BS 1737 or BS 3964, or a no less suitable material.

(5) For  $\frac{1}{2}$  in and  $\frac{3}{4}$  in size taps of the enclosed rubber seal pattern, see Fig. 17b; rubber complying with the requirements of Clause 6 of BS 3457 shall be used, with a minimum width of seal of 1.3 mm.

## 4.5 Washer plate and washer plate unit

### 4.5.1 General requirements for washer plate

**4.5.1.1** The washer plate with its stem shall be made in one piece, true all over especially on the face on which the washer will be seated. If the washer plate is a sand or shell casting, it shall be machined all over.

**4.5.1.2** The washer plate of the shrouded type shall have outside diameters as set out in Tables 5 and 6, line 14, dimension *O*. The depth of the shrouding shall be in accordance with Table 9, line 9, dimension *F*.

**4.5.1.3** The washer plate shall have a stud for the attachment of the washer. The stud shall either be screwed and provided with a locknut which shall comply with the requirements of BS 57 or BS 1083 or, if not screwed, shall be of such shape and size as will prevent the washer from becoming detached under working conditions without reducing the area of waterway more than would be the case with a screwed stud and nut.

**4.5.2 Additional requirements for washer plate:** (usually employed with rising spindle design: see Fig. 10a and b).

**4.5.2.1** The washer plate in all taps and valves shall be free to rotate in the hole in the spindle and shall be so secured as to lift with the spindle.

**4.5.2.2** The top of the washer plate shall be clear of the bottom of the head when the tap is fully open (see 4.3.4).

**4.5.3 Additional requirements for washer plate unit:** (usually employed with non-rising spindle design: see Fig. 13).

**4.5.3.1** The washer plate unit shall be made from one piece and whatever design is used the minimum dimensions given in Table 9 shall apply. If it is a sand or shell casting, it shall be machined all over.

**4.5.3.2** The part of the washer plate unit that prevents turning shall be either two flats, a square or hexagon or any other shape that prevents turning, and shall conform to dimensions given in Table 9 where applicable. Any other dimension not specified shall conform to the equivalent requirements of the rising spindle type.

**4.5.3.3** Washer plate units of the Type A shown in Fig. 2 rotate when the tap is operated, and shall therefore be fitted with a separate washer plate which will be free to rotate in the hole in the washer plate unit and shall be so secured as to lift with it.

## 4.6 Body, head, cover, spindle and lockshield

**4.6.1 General.** The minimum solid thickness of wall left after threading for any screwed parts of a tap or valve not otherwise specified shall be not less than the thickness given in Tables 1 and 2, line 4A, dimension *D*<sub>2</sub> except that this requirement does not apply to 'easy-clean' covers or 'lockshields' not subject to water pressure (see also 3.4).

## 4.6.2 Body

**4.6.2.1** Except where the dimensions specified provide otherwise, the thickness of metal between the minor diameter of the thread and the bore of externally screwed ends shall be within the limits given in Tables 1 and 2, line 14, dimension  $O$ , and the thickness of metal on hexagon ends between the major diameter of the internal thread and faces of the hexagon shall be not less than dimension  $D_2$  of Tables 1 and 2, line 4A.

**4.6.2.2** Pillar taps from  $\frac{1}{2}$  in to 1 in size inclusive, shall have screwed shanks not less than 50 mm long from the underside of the flange. There shall be a locating arrangement under the flange as shown in Fig. 7 and as dimensioned in Tables 1 and 2, lines 15 and 17, dimensions  $Q$  and  $S$  respectively. Alternatively, two or four ribs or lugs may be arranged within the prescribed dimensions to serve the same purpose of preventing the tap rotating in the ware after attachment. The outlet nose of a pillar tap shall be not less than 13.0 mm above the level of the underside of the fixing flange, and for  $\frac{1}{2}$  in to 1 in sizes the centre of the nose shall project a minimum of 63 mm (see Fig. 4).

**4.6.2.3** The external diameter of the top of the body shall be such that the requirements of 4.4(2) regarding the minimum width of head seal are satisfied in addition to the requirements of Tables 1 and 2, line 8, dimension  $H$ .

## 4.6.3 Head

**4.6.3.1** The diameter of the head flange shall be such as to provide the minimum width of seal given in Tables 1 and 2, line 8, dimension  $H$ , and if the flange is threaded, the width of seal shall be exclusive of the fixing thread.

**4.6.3.2** When an easy-clean cover (formed with or without a lockshield) or a lockshield is secured on the outside diameter of the stuffing box, the minimum thickness of metal at the root of the thread shall be not less than 1 mm in the case of valves up to  $\frac{3}{4}$  in size and not less than 2 mm for valves of larger sizes.

**4.6.4 Cover.** Easy-clean covers shall be of sufficient thickness to give the required mechanical strength. They shall also be easily removable. They may be screwed to the head or body, in which case two or more flats on the bead are permissible.

## 4.6.5 Lockshield

**4.6.5.1** Every lockshield (not easy-clean cover) shall be secured to the head by means of a set screw.

**4.6.5.2** For lockshield taps and valves, the size of the square of the spindle shall be as given in Tables 5 and 6, line 3, dimension  $C$ , with a plus tolerance of 0.25 mm up to and including 1 in size and 0.4 mm for the larger sizes.

**4.6.5.3** The bore of the lockshield and diameter of the boss of the loose key shall be as follows:

Nominal size of tap in inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Bore of shield, mm min.	15	16	16	17	19	20	23	26
Diameter of boss, mm max.	14	15	15	16	18	19	22	24

**4.6.6 Lockshield spindle.** The spindle length may be reduced provided the lengths of spindle and lockshield are such that:

- (1) the top of the square on the spindle when in the fully open position is below the top of the lockshield;
- (2) the base of the square of the spindle when in the fully closed position with the stuffing box packed but with no washer on the washer plate, is above the top face of the gland.

## 4.7 Method of attaching handle

**4.7.1** Normally, a handle shall be fitted on a squared spindle manufactured in accordance with Tables 5 and 6. The handle may be secured on a serrated spindle or by the use of any other not less efficient device, provided that the minimum cross-sectional area of attachment is not less than the equivalent square for that size of spindle. All handles shall be a close fit on the spindle (without shake) and they shall be fixed by a screw, riveting or other equally efficient device in any suitable position. No handle shall be screwed on to the spindle.

**4.7.2** When an easy-clean cover is provided on a tap or valve the handle shall be secured by a set screw or by a not less convenient means so that the handle can be removed for repacking the gland.

# BS 1010 : Part 2 : 1973

**4.7.3** Where the spindle is required to rise and fall independently of the handle this is permissible for  $\frac{1}{2}$  in and  $\frac{3}{4}$  in sizes only provided that:

(1) All requirements in **4.7.1** are met except that the handle instead of being fixed shall be a good sliding fit on the spindle (without shake), and that the difference between the corresponding dimensions of the spindle and the handle shall not exceed 0.06 mm.

(2) The minimum length of the end of the spindle engaged in the handle when the tap is closed with the washer removed from the washer plate shall be not less than 8.0 mm for  $\frac{1}{2}$  in size and 9.0 mm for  $\frac{3}{4}$  in size.

(3) If the handle is attached to the head or body by means of a sleeve or easy-clean cover, the sleeve or easy-clean cover shall be of sufficient thickness to give the required mechanical strength and shall present a bearing surface of not less than 1.0 mm wide at the point of contact. Fig. 18 (which shows one method of attaching the top) illustrates the point of contact.

The sleeve or easy-clean cover shall be designed to allow the minimum of longitudinal (up and down) movement of the handle and shall be provided with spanner flats for re-washing purposes.

## 4.8 Clearance between handle and head

**4.8.1** The distance between the underside of the handle and the top of the head shall be measured when the tap, with washer fixed, is closed. The dimensions *F* given in Tables 5 and 6, line 6, are minimum dimensions intended to provide sufficient room for repacking the gland without removing the handle of a tap or valve which is not provided with an easy-clean cover or lockshield.

**4.8.2** To facilitate the removal of the head of a tap or valve fitted with an easy-clean cover it shall be possible, when the tap or valve is fully open, to raise the cover high enough to expose the full depth of the hexagon on the head.

**4.8.3** The above requirements may be varied and the dimensions *E* and *F* given in Tables 5 and 6, lines 5 and 6, may be adjusted accordingly provided that:

- (1) the handle is a sliding fit on the spindle and easily removable;
- (2) the handle is attached to the spindle by an axial screw, or equally effective method of preventing wobble or shake;
- (3) no other requirements in regard to the length of the plain portion of the spindle are nullified thereby.

**4.8.4** For non-rising spindle type taps and valves, the axial movement of the spindle in the head when assembled shall not exceed 0.5 mm when new.

## 4.9 Seat washer

Washers of taps and valves shall be of vulcanized synthetic rubber complying with the requirements of Clause 6 of BS 3457.

## 4.10 Gland packing

**4.10.1** Except as specified in **4.10.2**, the gland or stuffing box of a tap or valve shall be packed with a suitable asbestos packing or other not less efficient packing material suitable for both cold and hot water. A suitable washer shall be fitted in the bottom of the gland or stuffing box, but this may be omitted if the packing is in the form of a moulded composition packing ring.

**4.10.2** When 'O' rings are to be employed for the gland seal of a tap or valve, a minimum of two rings shall be employed and these shall be made of synthetic rubber as specified in Appendix A and the dimensions shall be in accordance with the requirements of BS 1806 or BS 4518. They shall be capable of being renewed. During the assembly of the 'O' rings into the water fitting, the 'O' rings shall be packed with a suitable lubricant that is recommended by the 'O' ring manufacturers and that shall not impart any taste or colour to water or have any toxic effect or foster growth of bacteria.

**4.10.3** The 'O' rings shall be not less than 1.6 mm in sectional diameter.

**4.10.4** No packing material used for gland packing shall impart any taste or colour to water or have any toxic effect or foster growth of bacteria.

## 4.11 Union connections

**4.11.1** Any tail pipe and nut fitted to a tap or valve or used in a plumbers' union shall comply with the

# BS 1010 : Part 2 : 1973

requirements of Tables 11 and 12 and shall be in accordance with the dimensions and tolerances set out in Table 12 for parallel spigot and cone end unions respectively.

**4.11.2** Unions of the cone end type shall have the cone end machined or ground to a watertight fit without the use of grommets, washers, plastics material or other jointing.

**4.11.3** When the end of a tap or stopvalve is required to be suitable for connecting to copper tube, that part of the end which forms the copper tube connection shall be in accordance with the requirements of BS 864 : Part 2. No departures from the requirements of this standard shall be made other than those essential to ensure compliance with the requirements given in BS 864 : Part 2 for the appropriate union.

## 4.12 Hexagonal shoulders

Hexagonal shoulders shall be provided on at least one end of:

(1) stopvalves screwed with BSP threads (see Tables 1 and 2, line 20, dimension  $V$ , and Figs. 5 and 6) unless required for compression joints;

(2) bib taps of all sizes.

Hexagonal shoulders shall also be provided on all heads except for stopvalves up to and including the  $\frac{3}{4}$  in size, on which the head may have a square shoulder.

## 4.13 Flow-straightening and aerating devices

**4.13.1** Taps may be fitted with these devices at the manufacturer's option. Materials shall not impart taste or colour to water or have any toxic effects or foster growth of bacteria.

**4.13.2** Flow straighteners of the corrugated sleeve type may be incorporated within the nose of the tap.

**4.13.3** Flow-straightening and aerating devices which incorporate a multiplicity of small orifices, e.g. those containing wire gauze or perforated plates, shall be of the screw-on type and be easily removable by hand for cleaning. In order to minimize the entry of dirt and foreign matter, the orifice through which air enters the device should preferably be in its lower face. It should be noted that the use of an aerating device reduces the flow of water through the tap.

**4.13.4** Where any tap is fitted with an aerating or flow-straightening device, the outlet of the device shall be not less than 13.0 mm above the level of the underside of the fixing flange (see **4.6.2.2**).

## 4.14 Interlock control

It is permissible to attach to the stem of stopvalves a cam or similar device with an interlocking fuel control device (e.g. on gas water heaters) provided that the normal function and use of the stopvalve is not interfered with.

## 4.15 Combination tap assemblies

When two or more taps are combined in one unit, the resulting combination tap assembly shall comply with the relevant requirements for single taps, except that:

(1) The length of the inlet shank or shanks shall be either that of a bib tap or that of a pillar tap according to the method of installation to be employed, or alternatively, an internally threaded inlet may be supplied.

(2) Squares or lugs on the shank under the flange of combination tap assemblies are an optional feature, preferably omitted.

(3) In any double outlet type combination tap assembly the areas of the waterways shall be throughout as specified in **4.1.1**.

(4) In any single outlet type combination tap assembly the areas of the waterways through the individual taps shall be as specified in **4.1.1** up to the junction of the two tap outlets with the combined outlet. The internal diameter of the combined outlet shall be not less than 15 mm for two  $\frac{1}{2}$  in and 25 mm for two  $\frac{3}{4}$  in taps. If the combined outlet is not circular it shall have an area of waterway not less than the area of a circle having the appropriate diameter specified in the foregoing sentence.

(5) An additional outlet for a shower on a combination tap assembly may be reduced below the bore specified in **4.15(3)** and **4.15(4)**.

(6) Where the outlet from a single outlet type combination tap assembly has a specially formed nose for bottle filling, laboratory use or a similar purpose, the waterway in the nose may be reduced to the extent necessary for the correct performance of its functions.



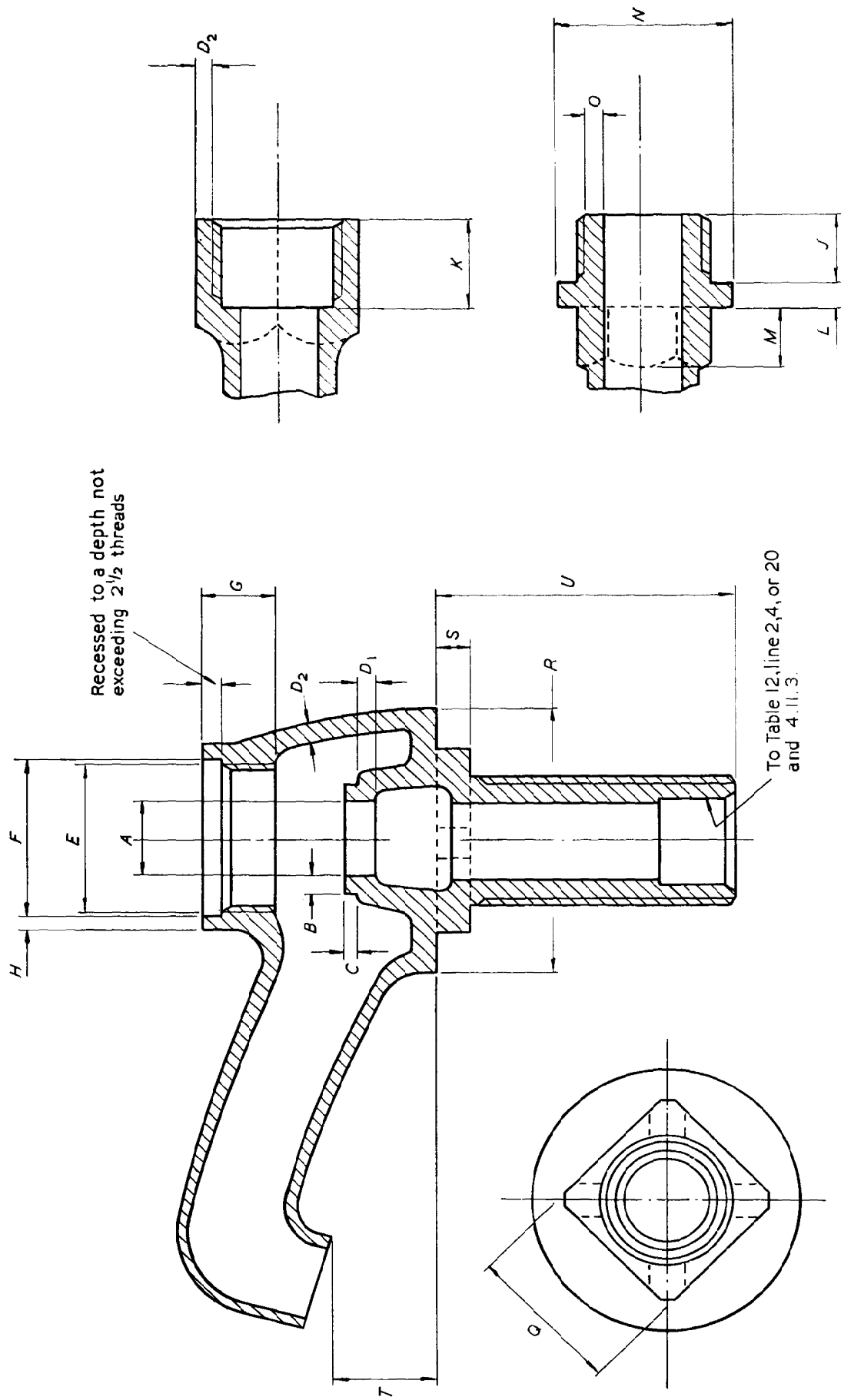


Fig. 7. Dimensions of tap bodies (see Tables 1 and 2)

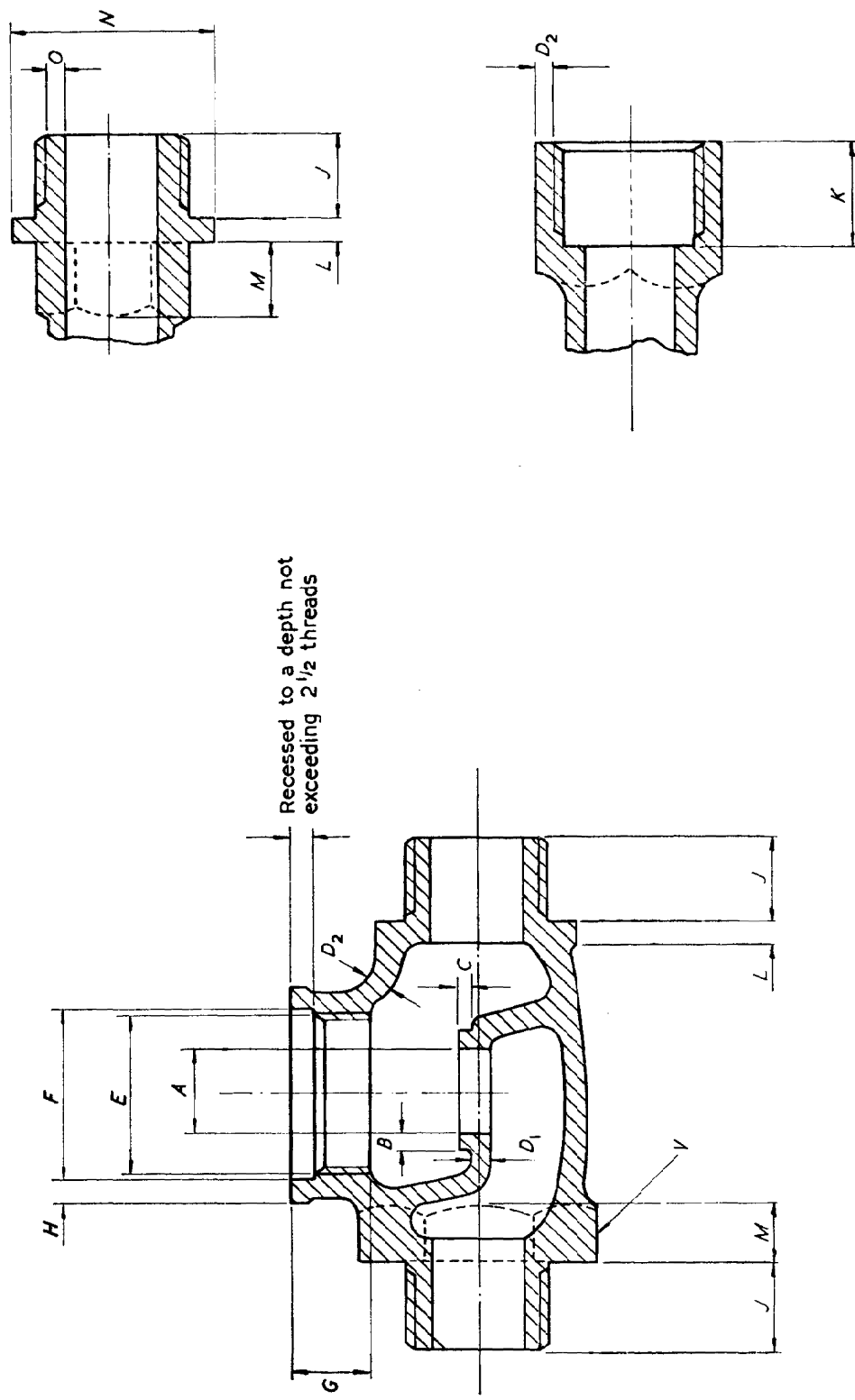


Fig. 8. Dimensions of stopvalve bodies (see Tables 1 and 2)

**Table 1. Dimensions of bodies ( $\frac{1}{4}$  in to  $\frac{3}{4}$  in nominal sizes) (see Figs. 7 and 8)**

1	2	3	4						7	8	9	10	11
			Nominal size of tap in inches										
			$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$					
Line No.	Ref. letter on diagram	Dimension	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	
1	A	Bore of seating	8.2	7.8	9.8	9.4	13.0	12.5	19.3	18.9			
2	B	Minimum width of seating		2.5		2.5		2.5		2.5		2.5	
3	C	Height of seating		1.0		1.0		1.0		1.0		1.0	
4	D <sub>1</sub>	Thickness of metal supporting the seat		1.6		1.6		2.0		2.0		2.0	
4A*	D <sub>2</sub>	Thickness of wall not threaded also net thickness after threading		2.0 1.6		2.0 1.6		2.0 1.6		2.0 1.6		2.0 1.6	
5	E	Major diameter of internal thread on body (see Table 14) in inches		0.7500		0.8125		0.9531		1.2187		1.2187	
6	F	Diameter of recess for head thread		19.15		20.74		24.31		31.06		31.06	
7†	G	Length of internal thread on body		7.0		9.0		11.0		12.0		12.0	
8	H	Width of seal on face of body for joint washer		1.6		2.0		2.0		2.5		2.5	
9	J	Length to end of bore for external thread BS pipe (parallel)		9.0		11.0		12.0		15.0		15.0	
10	K	Depth of bore for internal thread BS pipe (parallel)		11.0		13.0		15.0		19.0		19.0	
11	L	Flange thickness (including chamfer)		2.3		2.7		3.2		3.6		3.6	
12	M	Axial length of hexagon (back of flange)		5.0		8.0		9.0		10.0		10.0	
13	N	Diameter of flange		19.0		24.0		29.0		36.0		36.0	
14‡	O	Thickness of wall of externally threaded end (minor dia. to bore). Bib tap tails and stopvalve tails only	2.8	1.6	2.9	2.0	3.0	2.3*	3.2	2.3		2.3	
15	Q	Size over flats of square under flange (see 4.6.2.2)					26.0					32.0	
16	R	Diameter of flange of pillar tap						44.0				50.0	
17	S	Depth of square under flange of pillar tap					6.0	4.0	6.0	4.0		4.0	
18	T	Height of outlet above fixing flange of pillar tap						13.0		13.0		13.0	
19	U	Length of threaded tail (including square)						50.0		50.0		50.0	
20	V	Width across flats of unflanged hexagon on stopvalve ends (see Fig. 5a)		16.6		21.0		25.0		31.5		31.5	

\* Line 4A. The minimum may, in the case of outlets of bib and pillar taps, be reduced by 0.4 mm for castings only.

† Line 7. Where the outlet hole of any type of fitting intersects the internal thread of the body the dimension G may be reduced above the outlet hole to 8 mm minimum. Where the outlet hole of a bib tap or stop tap enters the body at an angle of 30° or more this dimension may be further reduced to 5 mm minimum above the hole.

‡ Line 14. The minimum thickness applies only to hot pressings. For castings, the maximum and minimum thicknesses shall be increased by 0.3 mm.

**Table 2. Dimensions of bodies (1 in to 2 in nominal sizes) (see Figs. 7 and 8)**

1	2	3	Nominal size of tap in inches						10	11
			4	5	6	7	8	9		
Line No.	Ref. letter on diagram	Dimension	1		1½		2		2	
			max.	min.	max.	min.	max.	min.	max.	min.
1	A	Bore of seating	25.8	25.2	32.3	31.5	38.6	37.8	51.3	50.4
2	B	Minimum width of seating		3.2		3.3		3.8		5.1
3	C	Height of seating		2.0		2.0		2.0		2.0
4	D <sub>1</sub>	Thickness of metal supporting the seat		2.7		3.2		3.2		4.0
4A*	D <sub>2</sub>	Thickness of wall not threaded also nett thickness after threading		2.7		3.2		3.2		4.0
5	E	Major diameter of internal thread on body (see Table 14) in inches		1.5937		1.8594		2.1562		2.8125
6	F	Diameter of recess for head thread		40.58		47.33		54.87		71.54
7	G	Length of internal thread on body		15.0		15.0		17.0		17.0
8	H	Width of seal on face of body for joint washer		3.0		3.5		5.0		5.0
9	J	Length to end of bore for external thread BS pipe (parallel)		19.0		22.0		22.0		25.0
10	K	Depth of bore for internal thread BS pipe (parallel)		22.0		25.0		25.0		28.0
11	L	Flange thickness (including chamfer)		3.9		3.9		4.7		4.7
12	M	Axial length of hexagon (back of flange)		11.0		12.0		14.0		16.0
13	N	Diameter of flange		46.0		57.0		65.0		82.0
14†	O	Thickness of wall of externally threaded end (minor dia. to bore). Bib tap tails and stopvalve tails only	3.4	2.7	4.0	3.2	4.0	3.2	4.8	3.9
15	Q	Size over flats of square under flange (see 4.6.2.2)	38.0							
16	R	Diameter of flange of pillar tap		58.0						
17	S	Depth of square under flange of pillar tap	6.0	4.0						
18	T	Height of outlet above fixing flange of pillar tap		13.0						
19	U	Length of threaded tail (including square)		50.0						
20	V	Width across flats of unflanged hexagon on stopvalve ends (see Fig. 5a)		46.0		50.0		58.0		72.0

\* Line 4A. The minimum may, in the case of open end outlets of bib and pillar taps, be reduced by 0.4 mm for 1 in taps and by 0.8 mm for the larger sizes for either hot pressed or cast bodies.

† Line 14. The minimum thickness applies only to hot pressings. For castings of the 1 in size the minimum figures shall be increased by 0.4 mm; for castings of larger sizes the maximum and minimum figures shall be increased by 0.8 mm.

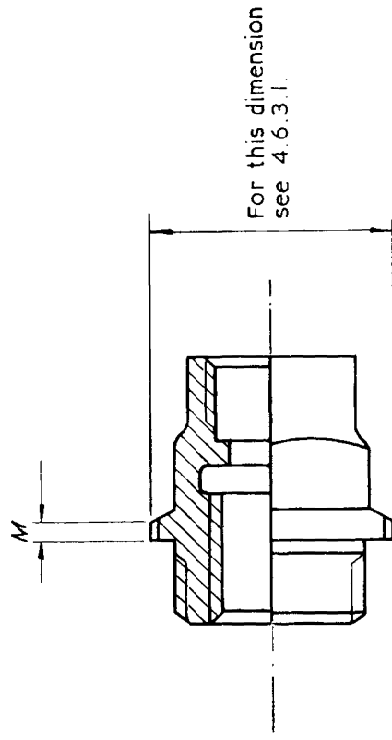
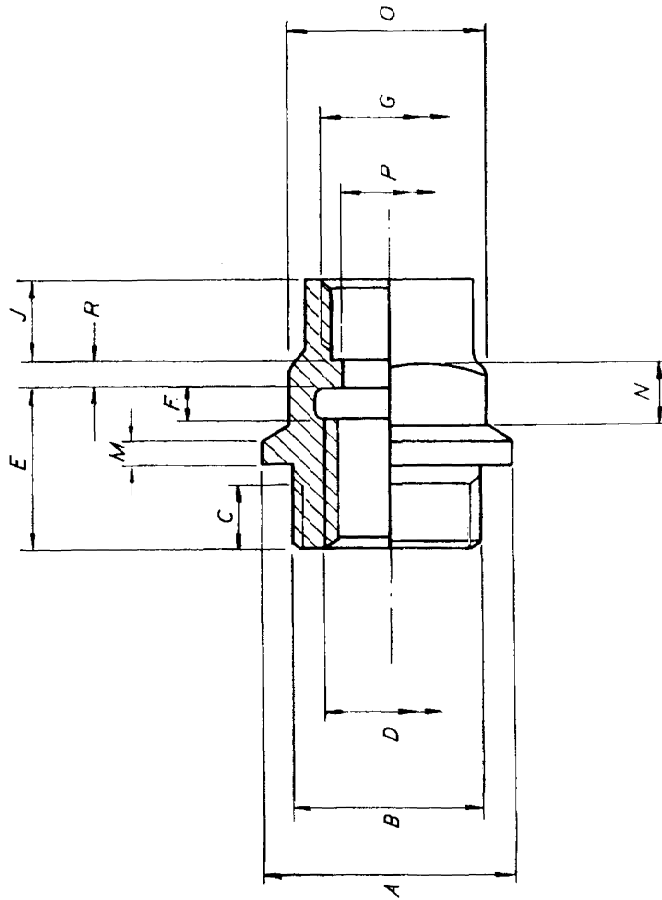
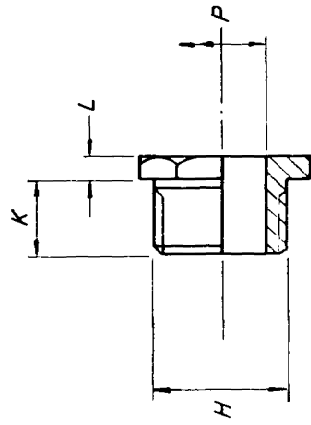


Fig. 9. Head and gland of rising spindle type taps and valves (see Tables 3 and 4)

**Table 3. Dimensions of heads and glands of rising spindle type taps and valves ( $\frac{1}{4}$  in to  $\frac{3}{4}$  in nominal sizes) (see Fig. 9)**

All dimensions in mm unless otherwise stated.

1	2	3	4	5	6	7	8	9	10	11
Line No.	Ref. letter on diagram	Dimension	Nominal size of tap in inches							
			$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$1$	$1\frac{1}{4}$	$1\frac{1}{2}$	$2$	$2\frac{1}{2}$
1	A	Diameter of face of flange for head seal								
2	B	Major diameter of external thread on head (see Table 15) in inches	0.7500		0.8125		0.9531		1.2187	
3	C	Minimum number of threads in full engagement with body with head seal fitted	3			3		4		4
4	D	Major diameter of internal thread for spindle (see Table 18) in inches		0.4375		0.5625		0.5625		0.6250
5	E	Length of internal thread for spindle including 'recess'		15.0		20.0		20.0		21.0
6	F	Axial length of recess	5.0		7.0		7.0		7.0	
7	G	Major diameter of internal thread in stuffing box (see Table 16) in inches		0.5625		0.6250		0.6250		0.6875
8	H	Major diameter of external thread on gland (see Table 17) in inches	0.5625		0.6250		0.6250		0.6875	
9	J	Axial length of stuffing box (min. length of thread = K)		8.0		9.0		9.0		11.0
10	K	Length of external thread on gland		6.0		7.0		7.0		9.0
11	L	Thickness of flange of gland		2.0		3.0		3.0		3.0
12	M	Thickness of flange of head		2.0		3.0		3.0		3.0
13	N	Axial length of hexagon		6.0		9.0		9.0		9.0
14	O	Size of hexagon over flats		18.2		20.6		20.6		22.2
15	P	Diameter of hole through head and gland (for spindle)	8.2	8.05	9.93	9.65	9.93	9.65	11.51	11.22
16	R	Axial length of collar, bottom of stuffing box		2.0		2.0		2.0		2.0

**Table 4. Dimensions of heads and glands of rising spindle type taps and valves ( 1 in to 2 in nominal sizes) (see Fig. 9)**

All dimensions in mm unless otherwise stated.

1	2	3	4	5	6	7	8	9	10	11
Line No.	Ref. letter on diagram	Dimension	Nominal size of tap in inches							
			1	1½	2	2½	3	4	5	6
			max.	min.	max.	min.	max.	min.	max.	min.
			See 4.6.3.1							
1	A	Diameter of face of flange for head seal	1.5937		1.8594		2.1562		2.8125	
2	B	Major diameter of external thread on head (see Table 15) in inches		4		4		5		5
3	C	Minimum number of threads in full engagement with body with head seal fitted		0.7500		0.8750		1.000		1.125
4	D	Major diameter of internal thread for spindle (see Table 18) in inches		26.0		32.0		36.0		43.0
5	E	Length of internal thread for spindle, including 'recess'					12.0		15.0	
6	F	Axial length of recess	8.0		10.0					
7	G	Major diameter of internal thread in stuffing box (see Table 16) in inches		0.7500		0.9375		1.0625		1.1250
8	H	Major diameter of external thread on gland (see Table 17) in inches	0.7500		0.9375		1.0625		1.1250	
9	J	Axial length of stuffing box (min. length of thread = K)		12.0		14.0		15.0		17.0
10	K	Length of external thread on gland		10.0		11.0		12.0		14.0
11	L	Thickness of flange of gland		3.0		4.0		4.0		4.0
12	M	Thickness of flange of head		4.0		4.0		4.0		4.0
13	N	Axial length of hexagon		11.0		11.0		13.0		15.0
14	O	Size of hexagon over flats		27.0		31.7		34.9		38.1
15	P	Diameter of hole through head and gland (for spindle)	13.11	12.82	14.73	14.42	16.36	16.02	17.98	17.63
16	R	Axial length of collar, bottom of stuffing box		3.0		3.0		4.0		4.0

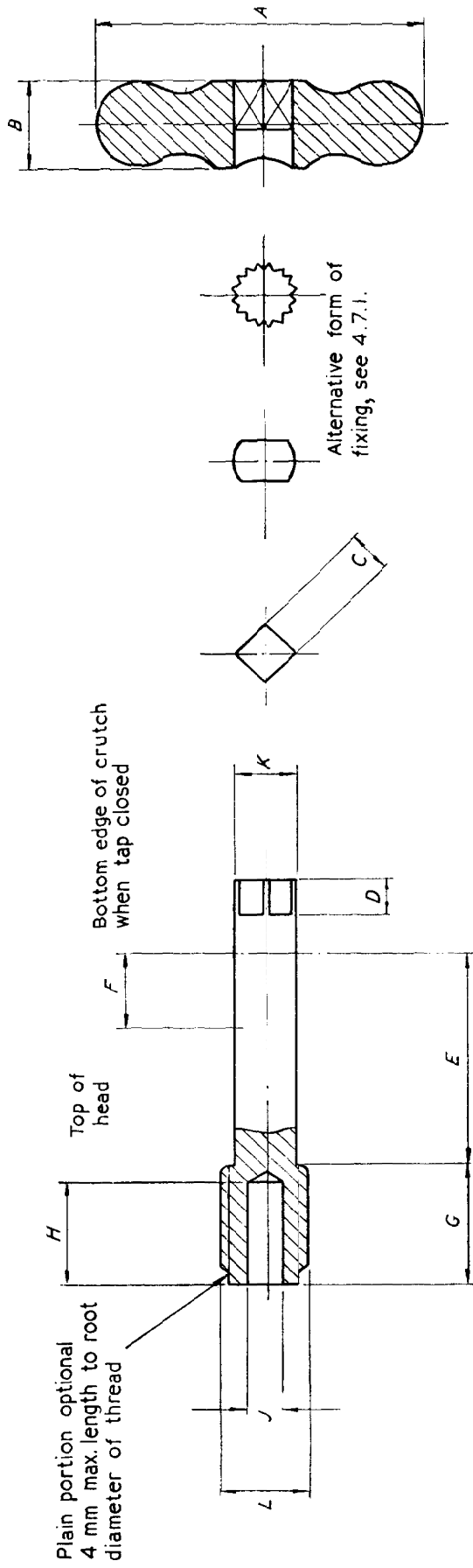


Fig. 10a. Spindle rising type and crutch (see Tables 5 and 6)

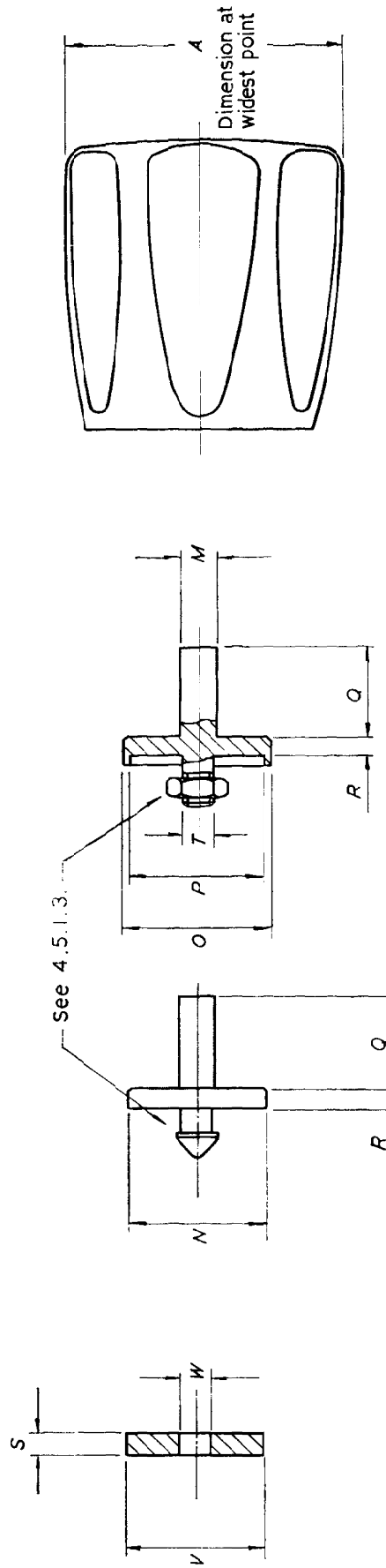


Fig. 10b. Washer, washer plate and handle (see Tables 5 and 6)



**Table 5. Dimensions of spindle rising type, washer, washer plate and handle ( $\frac{1}{4}$  in to  $\frac{3}{4}$  in nominal sizes) (see Fig. 10a and b)**  
 All dimensions in mm unless otherwise stated.

1	2	3	4	5	6	7	8	9	10	11
Line No.	Ref. letter on diagram	Dimension	Nominal size of tap in inches							
			$\frac{1}{4}$ max.	$\frac{1}{4}$ min.	$\frac{3}{8}$ max.	$\frac{3}{8}$ min.	$\frac{1}{2}$ max.	$\frac{1}{2}$ min.	$\frac{3}{4}$ max.	$\frac{3}{4}$ min.
1*	A	Diameter of circumscribing circle of handle or crutch		45.0		50.0		50.0		55.0
2	B†	Bar stock size for forming crutch		13.0		14.0		14.0		16.0
3	C	Size across flats of square end of spindle (see 4.7)		5.5		6.7		6.7		7.9
4	D	Length of square end of spindle		4.7		4.7		4.7		6.3
5	E	Length under crutch of plain portion of spindle		30.0		35.0		35.0		40.0
6	F	Distance (when closed) underside of crutch to top of stuffing box		16.0		19.0		19.0		20.0
7	G	Length of external thread on spindle		16.0		21.0		21.0		22.0
8	H	Depth of parallel hole in spindle (for stem of washer plate)	14.8	13.7	18.8	17.2	18.8	17.2	20.4	18.8
9	J	Diameter of parallel hole in spindle (for stem of washer plate)	4.22	4.01	5.13	4.93	5.94	5.74	6.73	6.53
10	K	Diameter of plain portion of spindle	7.93	7.82	9.53	9.37	9.53	9.37	11.10	10.95
11	L	Major diameter of external thread on spindle (see Table 19) in inches	0.4360		0.5609		0.5609		0.6233	
12	M	Diameter of stem of washer plate	3.96	3.81	4.88	4.70	5.69	5.51	6.48	6.30
13	N	Outside diameter of washer plate (flat type)		14.2		15.9		19.0		25.4
14	O	Outside diameter of washer plate (shrouded type)	16.6	16.3	18.2	17.9	21.4	21.1	28.0	27.7
15	P	Inside diameter of washer plate (shrouded type)	14.5	14.2	16.1	15.8	19.3	19.0	25.7	25.4
16	Q	Length of washer plate stem	13.2	11.5	17.0	15.0	17.0	15.0	18.0	16.0
17	R	Thickness of washer plate		3.0		3.0		3.0		4.0
18	S	Thickness of washer (when new)		3.0		4.0		4.0		4.0
19	T	Size of stud and nut (for fixing washer)	4 BA		B 4-A		2 BA		0 BA	
20	U	Lift of washer plate (with washer in position)		3.0		4.0		4.0		5.0
21	V	Outside diameter of washer (when new)		14.0		15.6		19.0		25.0
22	W	Diameter of hole in washer		3.6		3.6		4.7		6.0

NOTE. When a lockshield is fitted the length of the spindle may be reduced, subject to compliance with 4.6.6.  
 \* Line 1. In the case of combined handles these dimensions may be reduced by 5 mm.  
 † These sizes are the boss sizes which may be reduced by 0.4 mm in polishing and finishing.



# BS 1010 : Part 2 : 1973

Heads using gland packings other than O rings shall conform to gland and stuffing-box details of rising spindle type (see Tables 3 and 4). In such cases the closing thrust shall be independent of the packing.

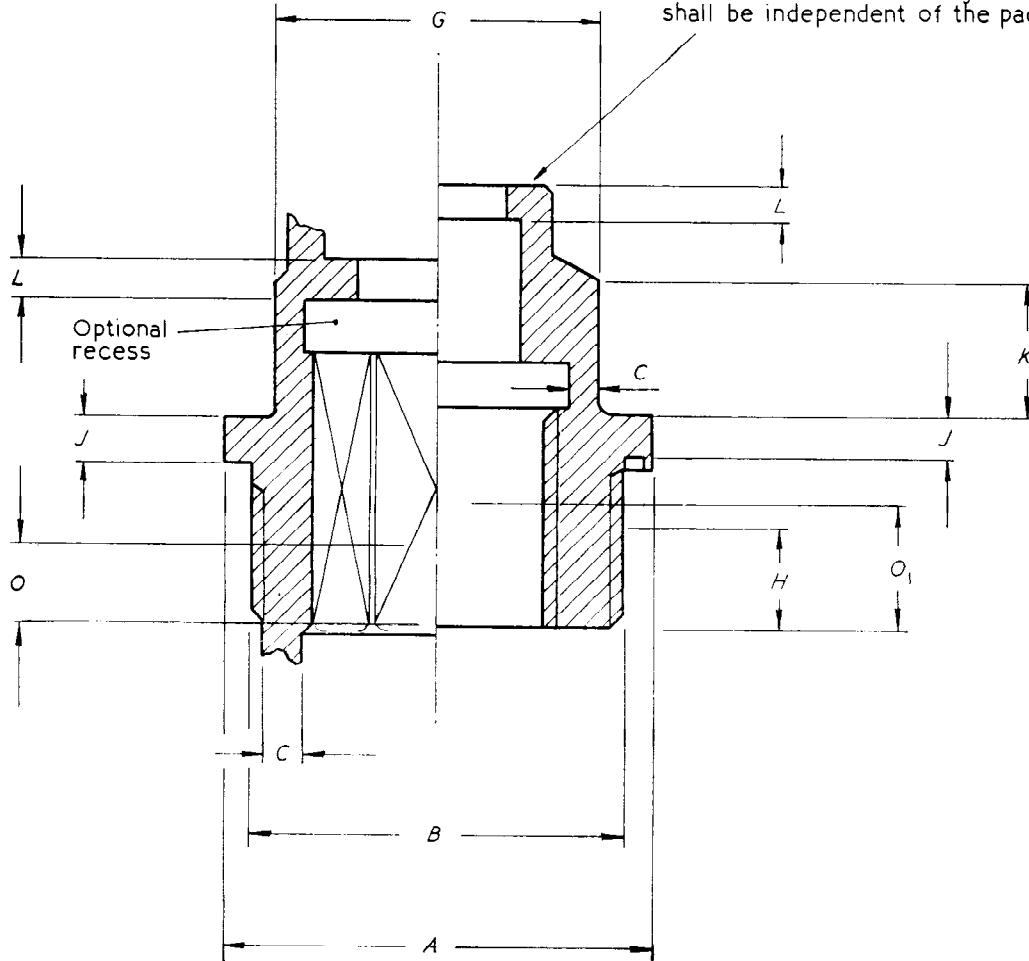


Fig. 11. Head of non-rising spindle type taps and valves (see Table 7)

# BS 1010 : Part 2 : 1973

**Table 7. Dimensions of heads of non-rising spindle type taps and valves**  
( $\frac{1}{2}$  in to  $\frac{3}{4}$  in nominal sizes) (see Fig. 11)

All dimensions in mm unless otherwise stated.

1	2	3	4	5	6	7
Line No.	Reference letter on Fig. 11	Dimension	Nominal size of fitting in inches			
			$\frac{1}{2}$		$\frac{3}{4}$	
			Max.	Min.	Max.	Min.
1	<i>A</i>	Dia. of face of flange	See 4.6.3.1			
2	<i>B</i>	Major dia. of external thread in inches	0.9531	—	1.2187	—
3	<i>C</i>	Wall thickness at any point	—	1.6	—	1.6
4	<i>G</i>	Size of external hexagon over flats	—	20.6	—	22.2
5	<i>H</i>	Minimum number of threads in full engagement with body, with head-seal fitted	—	4	—	4
6	<i>J</i>	Thickness of flange	—	3.0	—	3.0
7	<i>K</i>	Axial length of external hexagon	—	9.0	—	9.0
8	<i>I</i>	Length of closing thrust collar	—	2.5	—	3.0
9	<i>O</i>	Axial length of non-circular engagement between washer-plate unit and head, in any position between fully open and closed, with washer removed	—	3.0	—	3.0
10	<i>O</i> <sub>1</sub>	Axial length of threaded engagement between head and washer-plate unit in closed position with washer removed	—	8.0	—	9.0
11	<i>P</i>	Pitch of internal thread	1.5		2.0	

BS 1010 : Part 2 : 1973

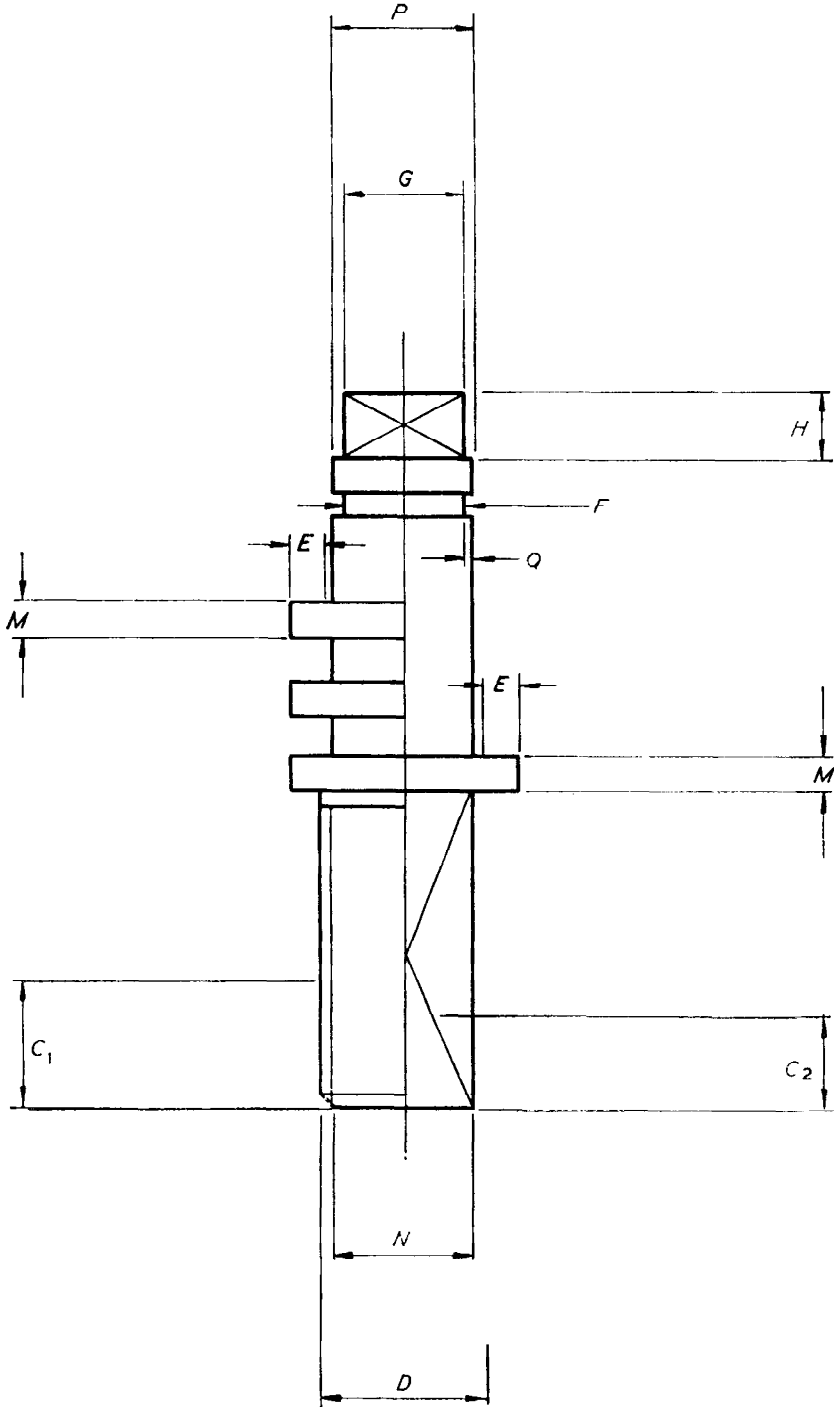


Fig. 12. Spindle of non-rising spindle type taps and valves (see Tables 8 and 21)

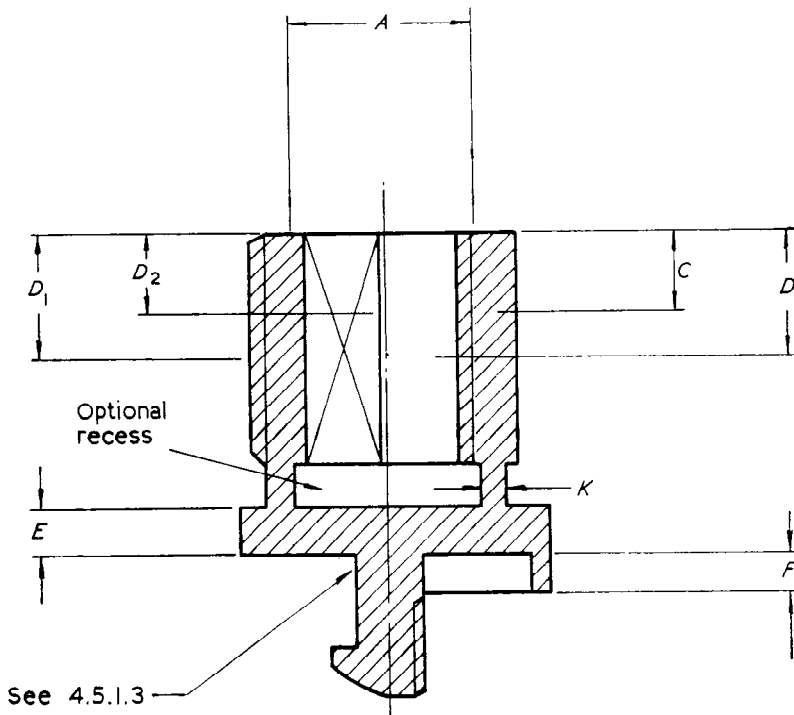
# BS 1010 : Part 2 : 1973

**Table 8. Dimensions of spindles of non-rising spindle type taps and valves**  
 ( $\frac{1}{2}$  in to  $\frac{3}{4}$  in nominal sizes) (see Fig. 12 and Table 21)

All dimensions in mm unless otherwise stated.

1	2	3	4	5	6	7
Line No.	Reference letter on Fig. 12	Dimension	Nominal size of fitting in inches			
			$\frac{1}{2}$		$\frac{3}{4}$	
			Max.	Min.	Max.	Min.
1	$C_1$	Axial length of spindle thread engagement with washer-plate unit in closed position with washer removed	—	8.0	—	9.0
2	$C_2$	Axial length of non-circular engagement between washer-plate unit and head, in any position between fully open and closed, with washer removed	—	5.0	—	6.0
3	$D$	Major dia. of spindle thread (left hand) in inches	0.437	—	0.500	—
4	—	Pitch of thread	14 TPI		12 TPI	
5	$E$	Area of closing thrust contact with mating surface	—	50 sq mm	—	60 sq mm
6	$F$	Minimum dia. of groove for circlip	—	8.5	—	10.0
7	$G$	Size across flats of square end of spindle (see 4.7)	—	6.7	—	7.9
8	$H$	Axial length of flats	—	4.7	—	6.3
9	$N$	Size across flats of non-circular portion of spindle	—	7.9	—	8.7
10	$M$	Minimum thickness of collar	—	2.0	—	2.0
11	$P$	Minimum dia. of plain portion of spindle	—	9.37	—	10.95
12	$Q$	Minimum depth of recess where used for circlips	—	0.40	—	0.40

# BS 1010 : Part 2 : 1973



NOTE. For dimensions common to washer plate, see Table 5 and Fig. 10.

Fig. 13. Washer plate unit for non-rising spindle type taps and valves (see Tables 9 and 20)

# BS 1010 : Part 2 : 1973

**Table 9. Dimensions of washer plate units of non-rising spindle type taps and valves ( $\frac{1}{2}$  in and  $\frac{3}{4}$  in nominal sizes) (see Fig. 13 and Table 20)**

All dimensions in mm unless otherwise stated.

1	2	3	4	5	6	7
Line No.	Reference letter on Fig. 13	Dimension	Nominal size of fitting in inches			
			$\frac{1}{2}$		$\frac{3}{4}$	
			Max.	Min.	Max.	Min.
1	<i>A</i>	Nominal dia. of internal thread (left hand) in inches	—	0.437	—	0.500
2	—	Pitch of internal thread	14 TPI		12 TPI	
3	—	Pitch of external thread	1.5		2.0	
4	<i>C</i>	Axial length of non-circular engagement between washer plate unit and head, in any position between fully open and closed with washer removed	—	3.0	—	3.0
5	<i>D</i>	Axial length of spindle thread engagement, in closed position with washer removed	—	8.0	—	9.0
6	<i>D</i> <sub>1</sub>	Axial length of threaded engagement between washer plate unit and head, in closed position with washer removed	—	8.0	—	9.0
7	<i>D</i> <sub>2</sub>	Axial length of non-circular engagement with spindle, in closed position with washer removed	—	5.0	—	6.0
8	<i>E</i>	Thickness of washer plate	—	3.0	—	4.0
9	<i>F</i>	Internal depth of shroud	2.0	—	2.0	—
10	<i>K</i>	Thickness at any point (unless otherwise stated)	—	1.6	—	1.6



# BS 1010 : Part 2 : 1973

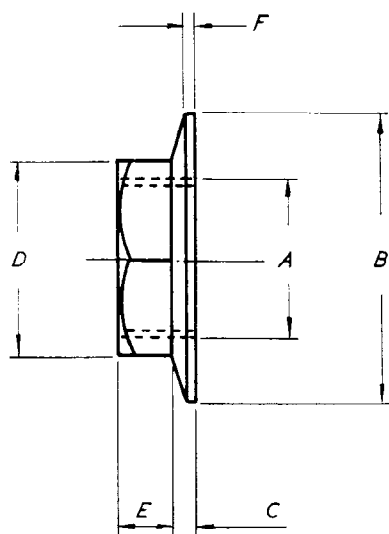


Fig. 14. Back nuts for pillar taps (see Table 10)

**Table 10. Dimensions of back nuts for pillar taps (see Fig. 14)**

All dimensions in mm unless otherwise stated.

Reference letter on Fig. 14	Detail	Dimensions			
		$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
<i>A</i>	Size of BS pipe (parallel) thread to BS 2779 normal fit in inches				
<i>B</i>	Diameter of flange (min.)	28.0	38.0	44.0	50.0
<i>C</i>	Thickness of flange (min.)	2.5	2.5	3.0	3.8
<i>D</i>	Size of hexagonal across (min.)	20.0	25.0	31.0	38.0
<i>E</i>	Depth of hexagon (min.)	7.0	7.0	7.0	7.8
<i>F</i>	Thickness outside edge of flange (min.)	1.2	1.2	1.5	1.9

# BS 1010 : Part 2 : 1973

## Standard union ends, tail pipes and coupling nuts

*Explanatory notes for Tables 11 and 12 and Fig. 15*

Dimensions of parallel spigot and cone end tail pipes are given for various sizes between  $\frac{3}{8}$  in and  $2\frac{1}{2}$  in BS pipe (parallel) threads. These are primarily intended for use with lead pipes. Under the appropriate BSP size, the fittings affected are indicated.

The unions of pillar taps and ballvalves are normally of the same nominal size. Full bore through the tail pipe of lead connections is not attained.

Stopvalves, in which full area of waterway is important, are screwed a larger size, giving full bore through all sizes of hot pressed tail pipes and most of the cast pipes.

The size of the union end and the size of the tap or valve are related in Table 11.

For special ends to suit copper tube, etc., refer to 4.3 and 4.11.

Tail pipes for  $\frac{1}{2}$  in and  $\frac{3}{4}$  in size may be made by pressing or rolling the collar on to solid drawn copper tube, provided that they comply with the dimensional requirements of Table 12 in other respects.

**Table 11. Key table for connecting ends**

	Nominal size of tap or valve	Size of thread on inlet or outlet or both, BS pipe (parallel)	Columns of Table 12 in which dimensions are given
<i>Pillar taps (and similar fittings)</i>	$\frac{1}{2}$ $\frac{3}{4}$ 1	$\frac{1}{2}$ $\frac{3}{4}$ 1	6 and 7 10 and 11 14 and 15
<i>Stopvalves (for all purposes with full bore union tail pipes)</i>	$\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$ $\frac{3}{4}$ 1 $1\frac{1}{4}$ $1\frac{1}{2}$ 2 2	$\frac{3}{8}$ $\frac{1}{2}$ $\frac{5}{8}$ * $\frac{7}{8}$ * $1\frac{1}{4}$ $1\frac{1}{2}$ $1\frac{3}{4}$ * $2\frac{1}{4}$ $2\frac{1}{2}$	4 and 5 6 and 7 8 and 9 12 and 13 16 and 17 18 and 19 20 and 21 24 and 25 26 and 27 (alternative)
<i>Hose taps (outlet nose threading)</i>	$\frac{1}{2}$ — $\frac{3}{4}$ —	$\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{4}$ $\frac{7}{8}$	6 and 7 8 and 9 10 and 11 12 and 13

\* It is permissible for the size of thread of the unions for the nominal sizes  $\frac{1}{2}$  in,  $\frac{3}{4}$  in, and  $1\frac{1}{2}$  in to be either  $\frac{5}{8}$  in or  $\frac{7}{8}$  in,  $\frac{7}{8}$  in or  $1$  in,  $1\frac{1}{4}$  in or  $2$  in respectively, at the option of the purchaser.

# BS 1010 : Part 2 : 1973

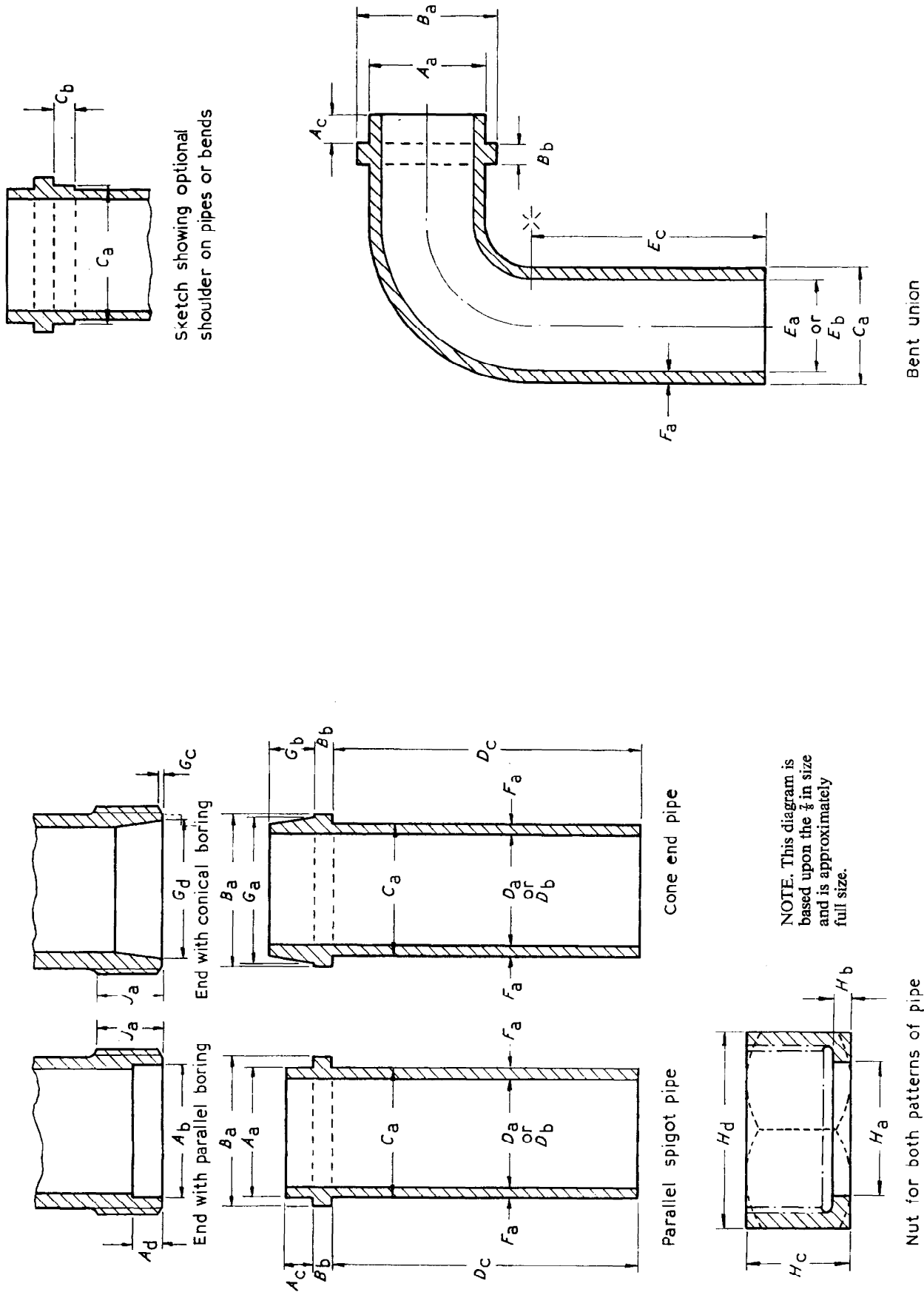


Fig. 15. Reference diagrams for standard ends, tail pipes and nuts

Table 12. Parallel spigot and cone end tail pipes for British Standard draw-off taps and stopvalves (see Fig. 15)

1	2	3	4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22		23		24		25		26																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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		Dimensioned part		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.		max. min.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
1	A <sub>1</sub>	Parallel spigot tail pipes: Parallel spigot diameter	11.10	11.10	14.60	14.60	16.40	16.40	19.80	19.80	23.40	23.40	25.70	25.70	34.00	34.00	39.60	39.60	45.30	45.30	50.80	50.80	56.60	56.60	56.60	56.60	45.30	45.30	43.30	43.30	44.70	44.70	36.40	36.40	35.70	35.70	5.30	5.30	50.80	50.80	50.80	50.80	55.60	55.60	55.60	55.60	5.80	5.80	62.00	62.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
2	A <sub>2</sub>	Parallel bore for spigot in end of tap, or valve, diameter	11.50	11.2	15.00	14.70	16.80	16.50	20.20	19.90	23.80	23.50	26.10	25.80	34.60	34.10	40.30	39.70	45.90	45.40	51.40	50.90	56.70	56.20	56.70	56.20	45.90	45.40	43.30	42.60	44.70	44.20	36.40	35.70	5.30	5.0	50.80	50.80	50.80	50.80	55.60	55.60	55.60	55.60	5.80	5.80	62.00	62.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
3	A <sub>3</sub>	Parallel spigot, axial length	6.40	4.70	6.40	4.70	6.40	4.70	6.40	4.70	6.40	4.70	6.40	4.70	8.00	6.30	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90	9.60	7.90																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
4	A <sub>4</sub>	Parallel bore in end of tap, or valve, axial length	7.20	6.40	7.20	6.40	7.20	6.40	7.20	6.40	7.20	6.40	7.20	6.40	8.80	8.00	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60	10.40	9.60																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
5	B <sub>1</sub>	Collar diameter	14.80	14.30	18.50	18.00	20.50	20.00	24.00	23.50	27.80	27.20	30.20	29.40	38.90	38.00	44.80	43.90	50.70	49.60	56.60	55.40	62.70	61.50	62.70	61.50	50.70	49.60	47.00	46.10	44.70	43.80	42.90	42.00	41.10	40.20	39.30	38.40	37.50	36.60	35.70	34.80	33.90	33.00	32.10	31.20	30.30	29.40	28.50	27.60	26.70	25.80	24.90	24.00	23.10	22.20	21.30	20.40	19.50	18.60	17.70	16.80	15.90	15.00	14.10	13.20	12.30	11.40	10.50	9.60	8.70	7.80	6.90	6.00	5.10	4.20	3.30	2.40	1.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80	3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90	5.00	5.10	5.20	5.30	5.40	5.50	5.60	5.70	5.80	5.90	6.00	6.10	6.20	6.30	6.40	6.50	6.60	6.70	6.80	6.90	7.00	7.10	7.20	7.30	7.40	7.50	7.60	7.70	7.80	7.90	8.00	8.10	8.20	8.30	8.40	8.50	8.60	8.70	8.80	8.90	9.00	9.10	9.20	9.30	9.40	9.50	9.60	9.70	9.80	9.90	10.00	10.10	10.20	10.30	10.40	10.50	10.60	10.70	10.80	10.90	11.00	11.10	11.20	11.30	11.40	11.50	11.60	11.70	11.80	11.90	12.00	12.10	12.20	12.30	12.40	12.50	12.60	12.70	12.80	12.90	13.00	13.10	13.20	13.30	13.40	13.50	13.60	13.70	13.80	13.90	14.00	14.10	14.20	14.30	14.40	14.50	14.60	14.70	14.80	14.90	15.00	15.10	15.20	15.30	15.40	15.50	15.60	15.70	15.80	15.90	16.00	16.10	16.20	16.30	16.40	16.50	16.60	16.70	16.80	16.90	17.00	17.10	17.20	17.30	17.40	17.50	17.60	17.70	17.80	17.90	18.00	18.10	18.20	18.30	18.40	18.50	18.60	18.70	18.80	18.90	19.00	19.10	19.20	19.30	19.40	19.50	19.60	19.70	19.80	19.90	20.00	20.10	20.20	20.30	20.40	20.50	20.60	20.70	20.80	20.90	21.00	21.10	21.20	21.30	21.40	21.50	21.60	21.70	21.80	21.90	22.00	22.10	22.20	22.30	22.40	22.50	22.60	22.70	22.80	22.90	23.00	23.10	23.20	23.30	23.40	23.50	23.60	23.70	23.80	23.90	24.00	24.10	24.20	24.30	24.40	24.50	24.60	24.70	24.80	24.90	25.00	25.10	25.20	25.30	25.40	25.50	25.60	25.70	25.80	25.90	26.00	26.10	26.20	26.30	26.40	26.50	26.60	26.70	26.80	26.90	27.00	27.10	27.20	27.30	27.40	27.50	27.60	27.70	27.80	27.90	28.00	28.10	28.20	28.30	28.40	28.50	28.60	28.70	28.80	28.90	29.00	29.10	29.20	29.30	29.40	29.50	29.60	29.70	29.80	29.90	30.00	30.10	30.20	30.30	30.40	30.50	30.60	30.70	30.80	30.90	31.00	31.10	31.20	31.30	31.40	31.50	31.60	31.70	31.80	31.90	32.00	32.10	32.20	32.30	32.40	32.50	32.60	32.70	32.80	32.90	33.00	33.10	33.20	33.30	33.40	33.50	33.60	33.70	33.80	33.90	34.00	34.10	34.20	34.30	34.40	34.50	34.60	34.70	34.80	34.90	35.00	35.10	35.20	35.30	35.40	35.50	35.60	35.70	35.80	35.90	36.00	36.10	36.20	36.30	36.40	36.50	36.60	36.70	36.80	36.90	37.00	37.10	37.20	37.30	37.40	37.50	37.60	37.70	37.80	37.90	38.00	38.10	38.20	38.30	38.40	38.50	38.60	38.70	38.80	38.90	39.00	39.10	39.20	39.30	39.40	39.50	39.60	39.70	39.80	39.90	40.00	40.10	40.20	40.30	40.40	40.50	40.60	40.70	40.80	40.90	41.00	41.10	41.20	41.30	41.40	41.50	41.60	41.70	41.80	41.90	42.00	42.10	42.20	42.30	42.40	42.50	42.60	42.70	42.80	42.90	43.00	43.10	43.20	43.30	43.40	43.50	43.60	43.70	43.80	43.90	44.00	44.10	44.20	44.30	44.40	44.50	44.60	44.70	44.80	44.90	45.00	45.10	45.20	45.30	45.40	45.50	45.60	45.70	45.80	45.90	46.00	46.10	46.20	46.30	46.40	46.50	46.60	46.70	46.80	46.90	47.00	47.10	47.20	47.30	47.40	47.50	47.60	47.70	47.80	47.90	48.00	48.10	48.20	48.30	48.40	48.50	48.60	48.70	48.80	48.90	49.00	49.10	49.20	49.30	49.40	49.50	49.60	49.70	49.80	49.90	50.00	50.10	50.20	50.30	50.40	50.50	50.60	50.70	50.80	50.90	51.00	51.10	51.20	51.30	51.40	51.50	51.60	51.70	51.80	51.90	52.00	52.10	52.20	52.30	52.40	52.50	52.60	52.70	52.80	52.90	53.00	53.10	53.20	53.30	53.40	53.50	53.60	53.70	53.80	53.90	54.00	54.10	54.20	54.30	54.40	54.50	54.60	54.70	54.80	54.90	55.00	55.10	55.20	55.30	55.40	55.50	55.60	55.70	55.80	55.90	56.00	56.10	56.20	56.30	56.40	56.50	56.60	56.70	56.80	56.90	57.00	57.10	57.20	57.30	57.40	57.50	57.60	57.70	57.80	57.90	58.00	58.10	58.20	58.30	58.40	58.50	58.60	58.70	58.80	58.90	59.00	59.10	59.20	59.30	59.40	59.50	59.60	59.70	59.80	59.90	60.00	60.10	60.20	60.30	60.40	60.50	60.60	60.70	60.80	60.90	61.00	61.10	61.20	61.30	61.40	61.50	61.60	61.70	61.80	61.90	62.00	62.10	62.20	62.30	62.40	62.50	62.60	62.70	62.80	62.90	63.00	63.10	63.20	63.30	63.40	63.50	63.60	63.70	63.80	63.90	64.00	64.10	64.20	64.30	64.40	64.50	64.60	64.70	64.80	64.90	65.00	65.10	65.20	65.30	65.40	65.50	65.60	65.70	65.80	65.90	66.00	66.10	66.20	66.30	66.40	66.50	66.60	66.70	66.80	66.90	67.00	67.10	67.20	67.30	67.40	67.50	67.60	67.70	67.80	67.90	68.00	68.10	68.20	68.30	68.40	68.50	68.60	68.70	68.80	68.90	69.00	69.10	69.20	69.30	69.40	69.50	69.60	69.70	69.80	69.90	70.00	70.10	70.20	70.30	70.40	70.50	70.60	70.70	70.80	70.90	71.00	71.10	71.20	71.30	71.40	71.50	71.60	71.70	71.80	71.90	72.00	72.10	72.20	72.30	72.40	72.50	72.60	72.70	72.80	72.90	73.00	73.10	73.20	73.30	73.40	73.50	73.60	73.70	73.80	73.90	74.00	74.10	74.20	74.30	74.40	74.50	74.60	74.70	74.80	74.90	75.00	75.10	75.20	75.30	75.40	75.50	75.60</



# BS 1010 : Part 2 : 1973

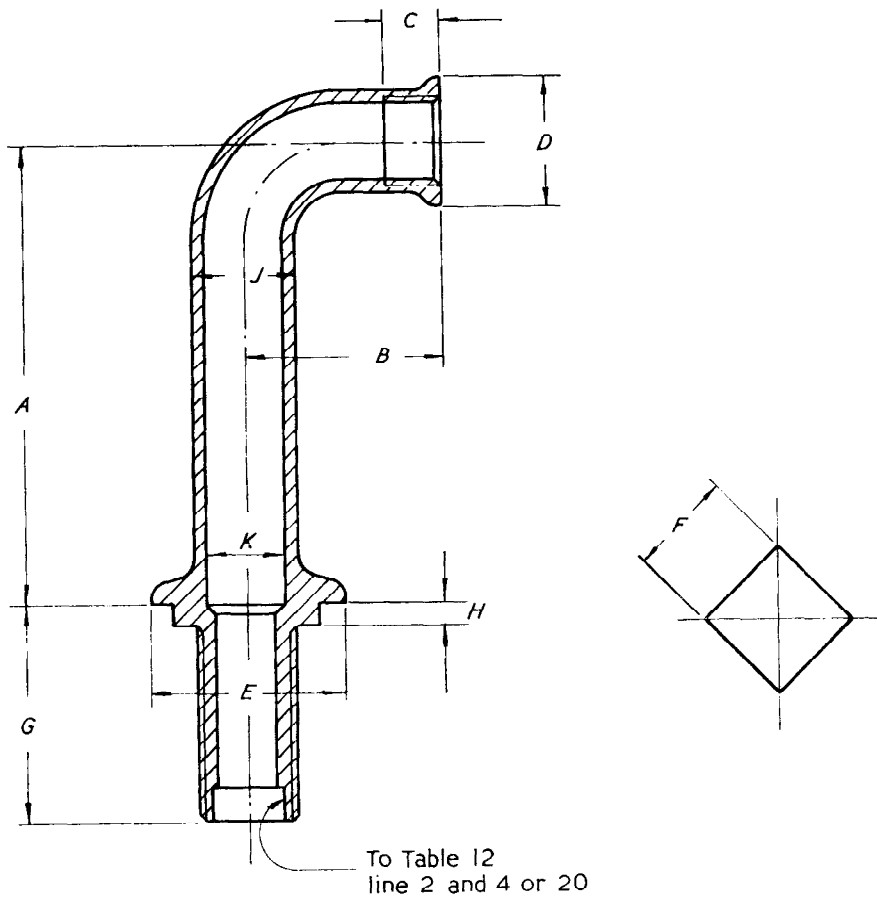


Fig. 16. Sink columns (see Table 13)

**Table 13. Dimensions of sink columns (see Fig. 16)**

All dimensions in mm unless otherwise stated.

Line No.	Reference letter on Fig. 16	Dimension	Size			
			$\frac{1}{2}$ in		$\frac{3}{4}$ in	
			max.	min.	max.	min.
1	A	Height, face of flange to centre of outlet		150 †		150 †
2	B	Projection, centre of column to face of outlet	44	30	44	38
3	C	Axial length of internal thread in outlet BSP		16		20
4	D	Diameter of bead on outlet face		29		36
5	E	Diameter of flange		44		50
6	F*	Size across flats of square under flange	26		32	
7	G	Length of screwed tail under flange		50		50
8	H	Depth of square	4	4	6	4
9	J †	Diameter of column		21		26
10	K †	Bore solid drawn tube	14		19	

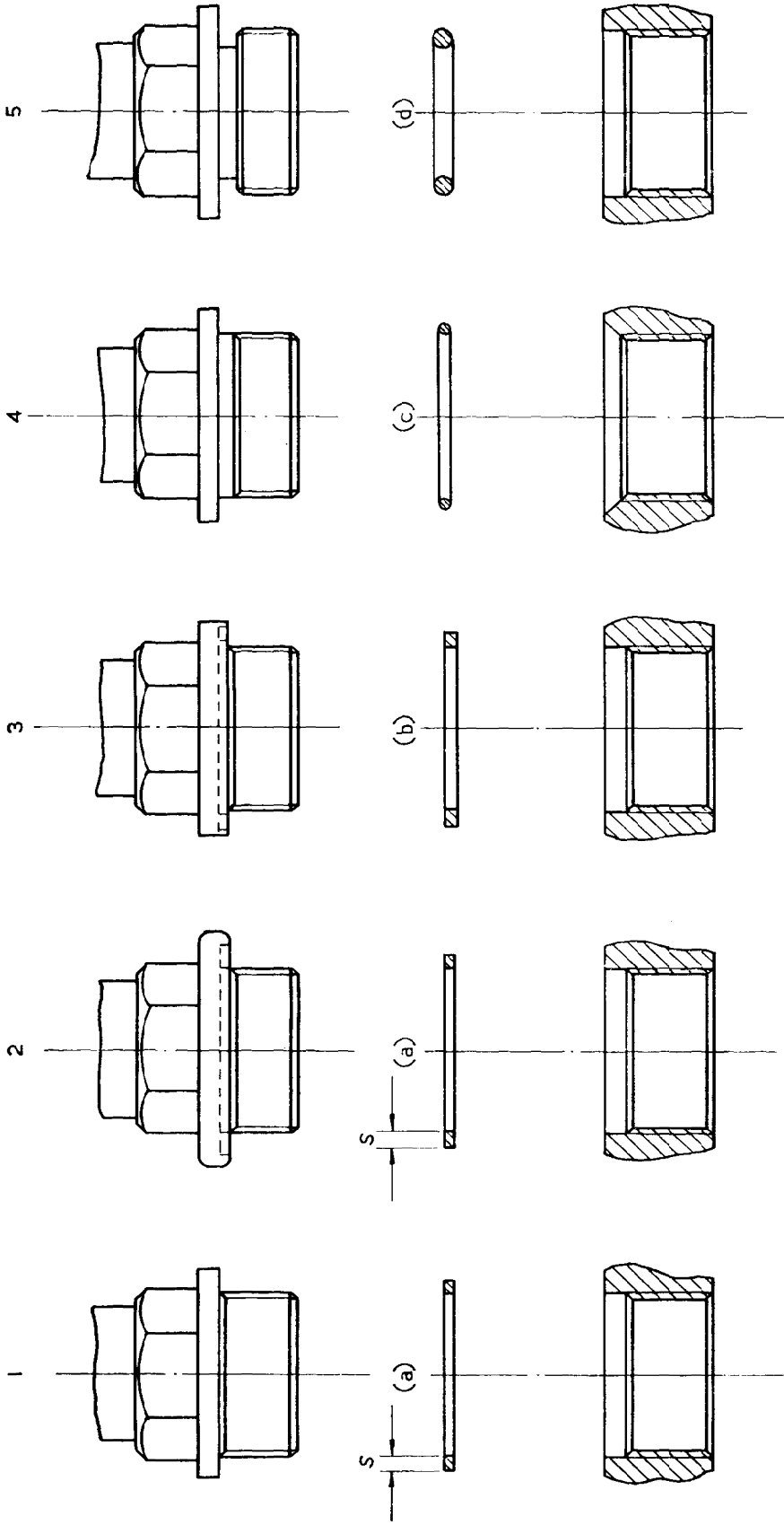
NOTE. The requirements of Sections 1 to 4 shall, so far as they are applicable to sink columns, be complied with.

If desired by the manufacturer, the threaded tail may be made separately and low temperature brazed or screwed and soldered into the column.

\* See also 4.6.2.2.

† Alternatively, the tail and vertical section of the column may be formed integrally of solid drawn brass tube with separate flange and square fixed to the tube. The outlet-bend to have a fine thread 12 mm long to receive the tube which shall be soldered or brazed into the bend. The outside diameter and bore of the tubes shall be as given in lines 9 and 10 of the table.

‡ May be 100 mm when so ordered.



Fibre joint washer to BS 1737 or BS 3964

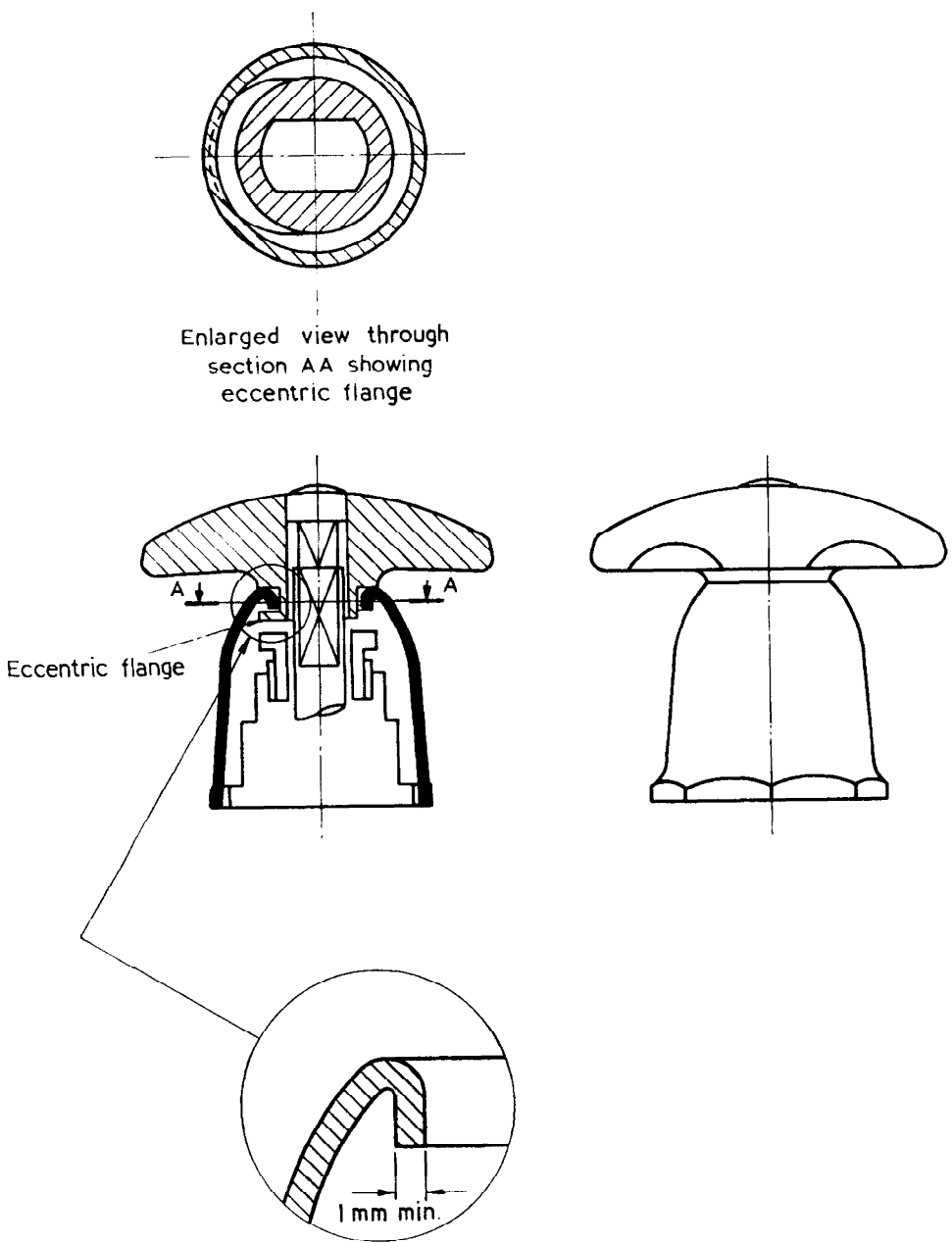
Rubber joint washer to clause 6 of BS 3457

In these two cases dimensions to be to BS 4518 or BS 1806 'O' rings to rubber specification in Appendix A.

Minimum width of seal 'S' to be as Tables 1 and 2, line 8, dimension H

Fig. 17. Types of head seal

BS 1010 : Part 2 : 1973



Enlarged view through section AA showing eccentric flange

Eccentric flange

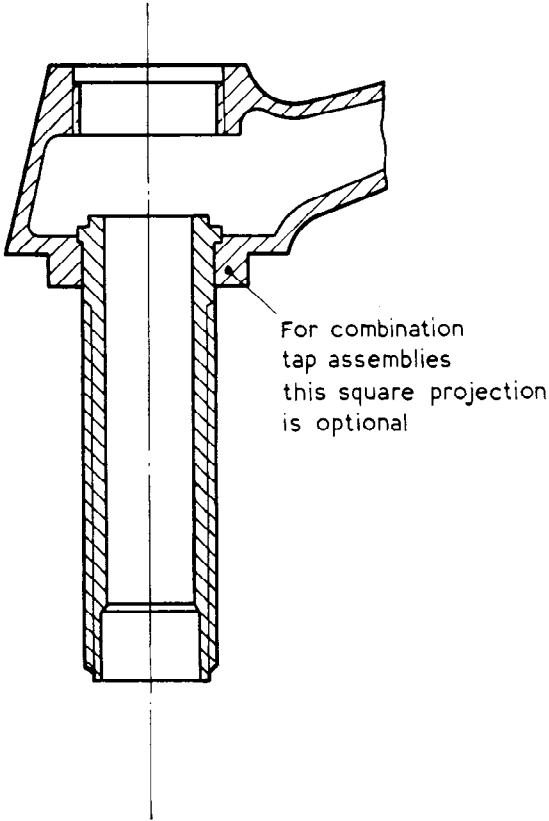
1 mm min.

NOTE. This drawing is intended to show the bearing surface dimension referred to in 4.7.3(3) and is not a working drawing.

Fig. 18. One method of attaching a non-rising tap



BS 1010 : Part 2 : 1973



NOTE. This drawing shows a cross section through the body and shank, of a typical combination tap assembly.

Fig. 19. Alternative arrangement showing seating integral with shank and separate from, but brazed to, body (see 4.2.2)

**Table 14. BS Whitworth form screw threads (internal) on bodies for engagement with head threads (external)**

**Limits and tolerances: medium class**

1	2	3	4	5	6	7	8	9	10
1	in $\frac{1}{4}$	18	in 0.7500	in 0.7197	in 0.0053	in 0.7144	in 0.6983	in 0.0195	in 0.6788
2	$\frac{3}{8}$	18	0.8125	0.7825	0.0056	0.7769	0.7608	0.0195	0.7413
3	$\frac{1}{2}$	18	0.9531	0.9231	0.0056	0.9175	0.9014	0.0195	0.8819
4	$\frac{3}{4}$	18	1.2187	1.1887	0.0056	1.1831	1.1670	0.0195	1.1475
5	1	14	1.5937	1.5546	0.0066	1.5480	1.5260	0.0237	1.5023
6	1 $\frac{1}{4}$	14	1.8594	1.8203	0.0066	1.8137	1.7917	0.0237	1.7680
7	1 $\frac{1}{2}$	14	2.1562	2.1175	0.0070	2.1105	2.0885	0.0237	2.0648
8	2	14	2.8125	2.7738	0.0070	2.7668	2.7448	0.0237	2.7211

NOTE. The tolerances given above are based on values given in BS 84.

**Table 15. BS Whitworth form screw threads (external) on heads for engagement with body threads (internal)  
Limits and tolerances : medium class**

Line No.	Size of valve	Number of threads per inch	Major diameter		Effective diameter		Minor diameter		10	11	12
			Max.	Min.	Max.	Min.	Max.	Min.			
1	in $\frac{1}{4}$	18	in 0.7500	in 0.7422	in 0.7144	in 0.7091	in 0.6788	in 0.6685			
2	$\frac{3}{8}$	18	0.8125	0.8044	0.7769	0.7713	0.7413	0.7307			
3	$\frac{1}{2}$	18	0.9531	0.9450	0.9175	0.9119	0.8819	0.8713			
4	$\frac{3}{4}$	18	1.2187	1.2106	1.1831	1.1775	1.1475	1.1369			
5	1	14	1.5937	1.5842	1.5480	1.5414	1.5023	1.4899			
6	1 $\frac{1}{2}$	14	1.8594	1.8499	1.8137	1.8071	1.7680	1.7556			
7	1 $\frac{3}{4}$	14	2.1562	2.1463	2.1105	2.1035	2.0648	2.0520			
8	2	14	2.8125	2.8026	2.7668	2.7598	2.7211	2.7083			

NOTE. The tolerances given above are based on values given in BS 84.

**Table 16. BS Whitworth form screw threads (internal) in stuffing box for engagement with gland threads (external)****Limits and tolerances : medium class**

1	2	3	4	5	6		7	8		9	10
					Effective diameter			Minor diameter			
Line No.	Size of valve	Number of threads per inch	Major diameter (min.)	Max.	in	Tolerance	Min.	Max.	Tolerance	Min.	Max.
1	in $\frac{1}{4}$	18	in 0.5625	in 0.5322	in 0.0053	in 0.5269	in 0.5108	in 0.0195	in 0.4913		
2	$\frac{3}{8}$	18	0.6250	0.5947	0.0053	0.5894	0.5733	0.0195	0.5538		
3	$\frac{1}{2}$	18	0.6250	0.5947	0.0053	0.5894	0.5733	0.0195	0.5538		
4	$\frac{3}{4}$	18	0.6875	0.6572	0.0053	0.6519	0.6358	0.0195	0.6163		
5	1	18	0.7500	0.7197	0.0053	0.7144	0.6983	0.0195	0.6788		
6	1 $\frac{1}{4}$	18	0.9370	0.9070	0.0056	0.9014	0.8853	0.0195	0.8658		
7	1 $\frac{1}{2}$	18	1.0625	1.0325	0.0056	1.0269	1.0108	0.0195	0.9913		
8	2	14	1.1250	1.0855	0.0062	1.0793	1.0573	0.0237	1.0336		

NOTE. The tolerances given above are based on values given in BS 84.

**Table 17. BS Whitworth form screw threads (external) on glands for engagement with stuffing box threads (internal)  
Limits and tolerances: medium class**

Line No.	Size of valve	Number of threads per inch	Major diameter		Effective diameter		Minor diameter		10	11	12
			Max.	in	Min.	in	Max.	in			
1	$\frac{1}{4}$	18	0.5625	0.5269	0.5547	0.5269	0.0078	0.0053	0.4913	0.0103	0.4810
2	$\frac{3}{8}$	18	0.6250	0.5894	0.6172	0.5894	0.0078	0.0053	0.5538	0.0103	0.5435
3	$\frac{1}{2}$	18	0.6250	0.5894	0.6172	0.5894	0.0078	0.0053	0.5538	0.0103	0.5435
4	$\frac{3}{4}$	18	0.6875	0.6519	0.6797	0.6519	0.0078	0.0053	0.6163	0.0103	0.6060
5	1	18	0.7500	0.7144	0.7422	0.7144	0.0078	0.0053	0.6788	0.0103	0.6685
6	$1\frac{1}{4}$	18	0.9370	0.9014	0.9289	0.9014	0.0081	0.0056	0.8658	0.0106	0.8552
7	$1\frac{1}{2}$	18	1.0625	1.0269	1.0544	1.0269	0.0081	0.0056	0.9913	0.0106	0.9807
8	2	14	1.1250	1.0793	1.1159	1.0793	0.0091	0.0062	1.0336	0.0120	1.0216

NOTE. The tolerances given above are based on values given in BS 84.

**Table 18. BS Whitworth threads (internal) on heads for engagement with rising type spindle threads (external)  
Limits and tolerances: normal class**

Line No.	2	3	4	5	6	7	8	9	10	11
	in	in		in	in	in	in	in	in	in
	$\frac{1}{4}$	$\frac{7}{16}$	14	0.4375	0.3991	0.0073	0.3918	0.3674	0.0213	0.3461
	$\frac{3}{8}$	$\frac{9}{16}$	12	0.5625	0.5171	0.0080	0.5091	0.4794	0.0237	0.4557
	$\frac{1}{2}$	$\frac{13}{16}$	12	0.5625	0.5171	0.0080	0.5091	0.4794	0.0237	0.4557
	$\frac{3}{4}$	$\frac{5}{8}$	11	0.6250	0.5752	0.0084	0.5668	0.5338	0.0252	0.5086
	1	$\frac{3}{4}$	10	0.7500	0.6950	0.0090	0.6860	0.6490	0.0270	0.6220
	$1\frac{1}{4}$	$\frac{7}{8}$	9	0.8750	0.8135	0.0096	0.8039	0.7620	0.0292	0.7328
	$1\frac{1}{2}$	1	8	1.0000	0.9302	0.0102	0.9200	0.8720	0.0320	0.8400
	2	$1\frac{1}{2}$	7	1.1250	1.0442	0.0107	1.0335	0.9776	0.0356	0.9420

NOTE. The sizes given above are BS Whitworth 'nut' sizes, (see Table 1 of BS 84); the limits and tolerances for the various sizes correspond to those in Table 5 of BS 84.

**Table 19. BS Whitworth threads (external) on rising type spindles for engagement with head threads (internal)  
Limits and tolerances: free class**

1	2	3	4	5	6	7	8	9	10	11	12	13
	in $\frac{1}{4}$	in $\frac{7}{16}$	14	in $\frac{0.4360$	in $\frac{0.0100$	in $\frac{0.4260$	in $\frac{0.3903$	in $\frac{0.0073$	in $\frac{0.3830$	in $\frac{0.3446$	in $\frac{0.0126$	in $\frac{0.3320$
1	$\frac{3}{8}$	$\frac{9}{16}$	12	0.5609	0.0109	0.5500	0.5075	0.0080	0.4995	0.4541	0.0138	0.4403
2	$\frac{1}{2}$	$\frac{13}{16}$	12	0.5609	0.0109	0.5500	0.5075	0.0080	0.4995	0.4541	0.0138	0.4403
3	$\frac{3}{4}$	$\frac{1 1}{8}$	11	0.6233	0.0114	0.6119	0.5651	0.0084	0.5567	0.5069	0.0144	0.4925
4	1	$\frac{3}{4}$	10	0.7482	0.0122	0.7360	0.6842	0.0090	0.6752	0.6202	0.0153	0.6049
5	$1 \frac{1}{4}$	$\frac{7}{8}$	9	0.8750	0.0129	0.8621	0.8039	0.0096	0.7943	0.7328	0.0163	0.7165
6	$1 \frac{1}{2}$	1	8	1.0000	0.0137	0.9863	0.9200	0.0102	0.9098	0.8400	0.0173	0.8227
7	2	$1 \frac{1}{8}$	7	1.1250	0.0145	1.1105	1.0335	0.0107	1.0228	0.9420	0.0183	0.9237

NOTE. The sizes given above are BS Whitworth 'bolt' sizes (see Table 1 of BS 84); the limits and tolerances for the various sizes correspond to those in Table 6 of BS 84.

**Table 20. BS Whitworth threads (internal) on washer plate units on non-rising spindles (see Table 15)  
Limits and tolerances: normal class**

1	2	3	4	5	6	7	8	9	10	11
1	in $\frac{1}{2}$	in $\frac{7}{16}$ Left hand	14	in 0.4375	in 0.3991	in 0.0073	in 0.3918	in 0.3674	in 0.0213	in 0.3461
2	$\frac{3}{4}$	$\frac{1}{2}$ Left hand	12	0.5000	0.4543	0.0077	0.4466	0.4169	0.0237	0.3932

NOTE. The sizes given above are BS Whitworth 'nut' sizes (see Table 1 of BS 84); the limits and tolerances for the various sizes correspond to those in Table 5 of BS 84.



**Table 21. BS Whitworth threads (external) on non-rising spindles (see Table 14)**  
**Limits and tolerances : free class**

1	2	3	4	5	6	7	8	9	10	11	12	13
Line No.	Size of valve	Nominal diameter of thread	Number of threads per inch	Major diameter		Effective diameter		Minor diameter				
				Max.	Tolerance	Min.	Max.	Tolerance	Min.	Max.	Tolerance	Min.
1	in $\frac{1}{2}$	in $\frac{7}{16}$ Left hand	14	in 0.4360	in 0.0100	in 0.4260	in 0.3903	in 0.0073	in 0.3830	in 0.3446	in 0.0126	in 0.3320
2	$\frac{3}{4}$	$\frac{1}{2}$ Left hand	12	0.4985	0.0106	0.4879	0.4451	0.0077	0.4374	0.3917	0.0135	0.3782

# BS 1010 : Part 2 : 1973

## Appendix A

### Requirements for 'O' rings

**A.1 Material.** 'O' rings shall be made of synthetic rubber, based on a butadiene acrylonitrile copolymer and meet the following requirements.

**A.2 Effect on water.** No material used for 'O' rings shall impart any taste to water or have any toxic effects or foster growth of bacteria; nor shall one 'O' ring impart colour when immersed for a second time in normal potable water for 24 hours in a glass containing 250 ml water at between 10–16 °C.

**A.3 Effect on metals.** The material of the 'O' ring shall not corrode adjacent metal parts sufficiently to impair the performance and life of the tap or valve.

**A.4 Dimensions.** 'O' rings shall comply with requirements of BS 1806 or BS 4518.

**A.5 Test requirements.** 'O' ring materials shall be capable of complying with the requirements in the following table when tested by the methods described in column 5 of the table.

1	2	3	4	5
Number of test	Name of test	Unit	Requirement	Method of test
1	Hardness	IRHD	65 ± 5	BS 903 : Part A26
2	Tensile strength	MN/m <sup>2</sup> (MPa)	7 min.	BS 903 : Part A2
3	Elongation at break	Percentage	200 min.	BS 903 : Part A2
4	Compression set	Percentage	25 max.	BS 903 : Part A6. 24 hours at 100 °C at 25 % compression (Type 1 test pieces, standing deflection)
5	Low temperature flexibility	—	Shall be flexible, and free from cracking at -40 °C	Appendix B of this standard
6	Effect of fluids a. Distilled water (i) Volume (ii) Hardness change b. Lubricating oil (i) Volume change (ii) Hardness change	Percentage change after 24 hours at 100 °C Change in IRHD after 24 hours at 100 °C — Percentage change after 24 hours at 100 °C Change in IRHD after 24 hours at 100 °C	± 5 ± 5 — 0 to -5 0 to + 5	BS 903 : Part A16 BS 903 : Part A26 The lubricating oil for the tests in 6b shall have the properties specified in Appendix D of this standard BS 903 : Part A16 BS 903 : Part A26

# BS 1010 : Part 2 : 1973

1	2	3	4	5
Number of test	Name of test	Unit	Requirement	Method of test
7	Adhesion to brass	—	No adhesion	Appendix C of this standard
8	Corrosion of metals	—	No corrosion or pitting	Appendix C of this standard
9	Ageing in air a. Tensile strength b. Elongation at break c. Hardness d. Surface condition on flexing	Percentage change after 70 hours at 100 °C Percentage change after 70 hours at 100 °C Change in IRHD after 70 hours at 100 °C —	—10 max. —30 max. 0 to +8 No cracking	BS 903 : Part A2 BS 903 : Part A2 BS 903 : Part A26 Appendix E of this standard

## Appendix B

### Method for the determination of low temperature flexibility of 'O' rings

Fix a test piece of rubber, 150 mm × 25 mm × 3 mm, in two grips so that it lies in one plane with 125 mm exposed between the grips, and then reduce the distance between the grips by 1 mm.

Place the clamped test piece vertically in a vessel about 75 mm in diameter containing industrial methylated spirit\*, maintained within  $\pm 1$  °C of the nominal test temperature by means of solid carbon dioxide, so that the test piece is completely immersed. After 30 minutes in the vessel at the test temperature reduce the distance between the grips by 25 mm in 20 seconds, by moving one grip directly towards the other and in the same plane. Then examine the test piece visually for cracks.

A suitable apparatus consists of a back plate carrying two clamps fixed to an end stop and a sliding plunger respectively. The jaws of the clamps are fitted with guide quadrants, of 12.5 mm radius, to prevent kinking of the test piece at these points. The plunger carries a head, and a pointer moving over a scale graduated in millimetres, which is fixed to the back plate so that the pointer is at zero when the undistorted test piece is clamped in position.

## Appendix C

### Method for the determination of adhesion to, and corrosion of, metals by 'O' rings

Place a test piece of rubber approximately 25 mm square on a clean, smooth, finely ground surface of a mild steel plate approximately 50 mm square and 3 mm thick. Place a copper plate, similar to the steel plate in dimensions and surface finish, over the test piece in line with the steel plate and with the prepared

\* It should be noted that the use of industrial methylated spirits is governed by The Methylated Spirits Regulations 1952 (SI 1952, No. 2230).

# BS 1010 : Part 2 : 1973

surface against the test piece. Place the assembly in a vice, apply sufficient pressure to bring the metal and rubber surfaces into intimate contact, secure by means of wire or a clamp and place in an oven at  $70 \pm 1$  °C for 168 hours. After removal from the oven and cooling to room temperature dismantle the assembly and examine the metal plates for corrosion or pitting and for adhesion of the compound to either metal. Consider adhesion to have occurred if, on separation from the metal, particles of the compound remain affixed to either plate.

## Appendix D

### Properties of lubricating oil for tests for 'O' ring material in Appendix A

The lubricating oil used for the No. 6b tests in the table in A.5 shall have the following properties:

Property	Unit	Requirement
(1) Aniline point	°C	$123.9 \pm 1$
(2) Saybolt universal viscosity	seconds	$98 \pm 5$
(3) Flash point	°C	243 min.

NOTE. The lubricating oil is generally known as 'ASTM No. 1 test oil'.

## Appendix E

### Method for the determination of surface condition of 'O' ring material on bending after ageing in air

Heat a test piece of rubber, in the form of a Type D dumb bell in accordance with BS 903 : Part A2 at a temperature of 100 °C for seven days after which remove it from the oven and, after conditioning at room temperature for half an hour, bend through 180° symmetrically round a 12.5 mm diameter steel mandrel. Examine the outer surface of the bent portion visually for cracks.



## BSI publications referred to in this standard

This standard makes reference to the following British Standards and special publications:

- BS 21 Pipe threads for tubes and fittings where pressure-tight joints are made on the threads
- BS 57 BA screws, bolts and nuts
- BS 61 Copper tubes (heavy gauge) for general purposes  
Part 2. Threads for light gauge copper tubes and fittings
- BS 84 Parallel screw threads of Whitworth form
- BS 369 5 per cent phosphor bronze (copper-tin-phosphorous) rods and sections (other than forging stock)
- BS 864 Capillary and compression fittings of copper and copper alloy for use with copper tube complying with BS 659, BS 1386 and BS 3931  
Part 2. Metric units  
\*Part 3. Copper and copper alloy fittings for polythene pipe
- BS 903 Methods of testing vulcanized rubber  
Part A2. Determination of stress/strain properties  
Part A6. Determination of compression set  
Part A16. The resistance of vulcanized rubber to liquids  
Part A26. Determination of hardness
- BS 971 Commentary on BS wrought steels (En series)
- BS 1083 Precision hexagon bolts, screws and nuts (BSW and BSF threads)
- BS 1224 Electroplated coatings of nickel and chromium
- BS 1400 Copper alloy ingots and copper alloy castings
- BS 1737 Jointing materials and compounds for water, town gas and low-pressure steam installations
- BS 1806 Dimensions of toroidal sealing rings ('O' seals and their housings)
- BS 1972 Polythene pipe (Type 32) for cold water services
- BS 2779 Pipe threads where pressure-tight joints are not made on the threads
- BS 2871 Copper and copper alloys, tubes  
Part 1. Copper tubes for water, gas and sanitation
- BS 2872 Copper and copper alloys. Forging stock and forgings
- BS 2874 Copper and copper alloys. Rods and sections (other than forging stock)
- BS 2879 Draining taps (screw-down pattern)
- BS 3284 Polythene pipe (Type 50) for cold water services
- BS 3457 Materials for water tap washers
- BS 3885 Tolerances for hot brass stampings
- BS 3964 Flexible vulcanized fibre sheets
- BS 4518 Metric dimensions of toroidal sealing rings and their housings (O-rings)
- DD 18 Modified brass containing 56.0% to 59.0% copper and 2.5% to 4.5% lead intended for free machining applications

\* in course of preparation

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