

Specification for

Cast iron spigot and socket drain pipes and fittings

UDC 696.133:621.643.22:669.13

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

BSI
Documents

AVA

Document Sharing Hub

Cooperating organizations

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

- Aluminium Federation
- Association of Builders' Hardware Manufacturers
- Aluminium Window Association
- British Hardware Federation
- British Ironfounders' Association*
- British Lock Manufacturers' Association
- British Plastics Federation
- Copper Development Association
- Department of the Environment (Building Research Establishment)
- Department of the Environment (Housing and Construction)
- Greater London Council*
- Guild of Architectural Ironmongers
- Metropolitan Police
- Royal Institute of British Architects
- Royal Institution of Chartered Surveyors
- Steel Window Association
- Zinc Development Association

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

- British Cast Iron Research Association
- Department of the Environment (PSA)
- Ductile Iron Pipe Association
- Environmental Health Officers' Association
- Institute of Plumbing
- Institution of Municipal Engineers
- Institution of Public Health Engineers
- National Association of Plumbing, Heating and Mechanical Services Contractors
- National Federation of Builders' and Plumbers' Merchants

This British Standard, having been prepared under the direction of the Hardware and Ironmongery Standards Committee, was published under the authority of the Executive Board on 31 October 1978

© BSI 10-1999

First published February 1932
First revision June 1933
Second revision (as BS 437-1) November 1970
Third revision (as BS 437) October 1978

The following BSI references relate to the work on this standard:
Committee reference HIB/3
Draft for comment 77/12204

ISBN 0 580 10294 7

Amendments issued since publication

Amd. No.	Date of issue	Comments
5877	June 1988	Indicated by a sideline in the margin

Contents

	Page
Cooperating organizations	Inside front cover
Foreword	iii
1 Scope	1
2 References	1
3 Quality of material	1
4 Freedom from defects	1
5 Permissible deviations on dimensions and masses	1
6 Depth of seal	1
7 Hydrostatic requirement	1
8 Crushing requirement	1
9 Coating	2
10 Inspection	2
11 Marking	2
Appendix A Crushing test	50
Figure 1 — Drain pipe, socket and spigot, and fittings	3
Figure 2 — Drain bend	5
Figure 3 — Drain bend with access door on side	6
Figure 4 — Drain bend with rectangular access door on heel	7
Figure 5 — Drain branch	8
Figure 6 — Drain branch with rectangular access door on side	9
Figure 7 — Drain branch with rectangular access door at back	10
Figure 8 — Straight access piece	11
Figure 9 — Drain branch and straight access piece with rectangular door	12
Figure 10 — Diminishing piece	13
Figure 11 — Long tail drain bend	13
Figure 12 — Long tail drain branch	13
Figure 13 — Long drain bend	14
Figure 14 — Large radius long tail drain bend	14
Figure 15 — Large radius drain bend	15
Figure 16 — Long trapping bend	15
Figure 17 — Drain bend with socket for WC outlet	16
Figure 18 — Drain connector with socket for WC outlet	17
Figure 19 — Drain bend with large socket for clayware	17
Figure 20 — Drain connector with large socket for clayware	18
Figure 21 — Cast iron socket ferrule with brass screwed cap	18
Figure 22 — Disconnecting trap for clayware channel and clearing arm with or without plate, bridle and brass setscrew	19
Figure 23 — Disconnecting trap and clearing arm with or without plate, bridle and brass setscrew	20
Figure 24 — Disconnecting trap with reverse clearing arm fitted with plate, bridle and brass setscrew and 100 mm vent socket	20
Figure 25 — Gully trap	21
Figure 26 — Disconnecting trap and clearing arm	21
Figure 27 — Plain raising piece	22
Figure 28 — Raising piece: single inlet branch	22
Figure 29 — Raising piece: inlet branches at 180°	22
Figure 30 — Raising piece: inlet branches at 90°	22
Figure 31 — Plain tapered gully inlet	23
Figure 32 — Tapered gully inlet: single branch	23

	Page
Figure 33 — Tapered gully inlet: two branches at 180°	23
Figure 34 — Tapered gully inlet: two branches at 90°	23
Figure 35 — Gully grating	24
Figure 36 — Grease seal cover and frame	24
Figure 37 — Recessed cover and frame	24
Figure 38 — Gully trap	25
Figure 39 — Diminisher for use with gully branch	25
Figure 40 — Diminisher with 90° bend	26
Figure 41 — Trapless gully	26
Figure 42 — Trapless gully	27
Figure 43 — Gully trap	28
Figure 44 — Gully trap	29
Figure 45 — Garage gully and raising piece	30
Figure 46 — Garage gully and raising piece	31
Figure 47 — High invert gully trap	32
Figure 48 — Low invert gully trap	33
Figure 49 — Gully trap with surface access fitted with brass screws and washer	34
Figure 50 — Bellmouth gully inlet	34
Figure 50a — Loose grating	35
Figure 50b — Loose grating with notch for downpipe	35
Figure 50c — Hinged and locking grating and frame	35
Figure 50d — Solid plate	35
Figure 51 — Bellmouth gully inlets with single branch	36
Figure 52 — Bellmouth gully inlets with two branches at 180°	36
Figure 53 — Bellmouth gully inlets with two branches at 90°	36
Figure 54 — Bellmouth gully inlets with vertical branch	37
Figure 55 — Gully inlet and grating	38
Figure 56 — Rainwater shoe with horizontal inlet	38
Figure 56a — Rainwater shoe loose grating	39
Figure 56b — Solid cover screwed to shoe with brass setscrews and washer and closed keyway	39
Figure 57 — Socket reducer	39
Figure 58 — Loose collar	40
Figure 59 — Double socket connector	40
Figure 60 — Spigot cap for spigot end of drainpipe	41
Figure 61 — Socket plug for socket end of drainpipe	41
Figure 62 — Airtight inspection eye cover fitted with two brass setscrews having closed keyway in cover	42
Figure 63 — WC connector having 50 mm parallel branch tapped 2 in B.S.P.T.	43
Figure 64 — Flat grating to fit 100 mm and 150 mm drain sockets	43
Figure 65 — Inspection chambers	44
Figure 66 — Detail of inspection chamber and cover	49
Figure 67 — Crushing test apparatus	50
Publications referred to	Inside back cover

Foreword

This revision of this British Standard has been prepared under the direction of the Hardware and Ironmongery Standards Committee. In addition to pipes, it includes a range of bends, branches and other fittings, which were previously covered in BS 1130 “*Schedule of cast iron drain fittings*”. BS 437-1 and BS 1130 will be withdrawn on the publication of this revision. The socket and pipe dimensions given in Figure 1 render the pipes and fittings specified in this standard suitable for jointing with caulked joints to pipes complying with the requirements of BS 4622 (100 mm and 150 mm) and BS 1211.

The spigot and socket shown in Figure 1 are given as a guide. Leading dimensions are specified but details of the socket outside profile and the provision of a bead to the spigot are left to the individual manufacturer.

Double socket lengths of pipes have been included and these should comply with the requirements and tests laid down for the corresponding spigot and socket pipes.

The angles of bends and branches have been redesignated using the method agreed in the International Organization for Standardization (ISO), i.e. the angle quoted is the angle through which the flow is diverted. Angles previously designated $92\frac{1}{2}^\circ$, $112\frac{1}{2}^\circ$, 135° , $157\frac{1}{2}^\circ$ and 170° are therefore now designated $87\frac{1}{2}^\circ$, $67\frac{1}{2}^\circ$, 45° , $22\frac{1}{2}^\circ$ and 10° .

The pipes and fittings covered by this standard are for use buried in the ground or suspended, and are also suitable for drainage above ground when their use is considered necessary. Cast iron pipes and fittings complying with the requirements of BS 416 are generally used for drainage above ground.

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

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 50, an inside back cover and a back cover.

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

1 Scope

This British Standard specifies requirements for single and double socket cast iron pipes and fittings, manufactured by the sand cast or centrifugally cast (spun) processes, for drainage purposes, where the installations will not be subjected to pressures greater than those specified in clause 7.

Where pipes or fittings are ordered and supplied with some form of flexible joint, the requirements of this standard apply only to the body.

2 References

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

3 Quality of material

The metal used for the manufacture of pipes and fittings shall be suitable for the method of manufacture and shall be of a quality not less than that specified in BS 1452, grade 150.

Washers for access doors shall be at least 6.4 mm thick in a material complying with the requirements of BS 2494, type 2.

4 Freedom from defects

Castings shall be sound and free from defects that render them unsuitable for their purpose. Every casting shall ring clearly when tested for soundness by being struck with a light hammer.

5 Permissible deviations on dimensions and masses

Pipes and fittings, unless otherwise specified, shall conform to the appropriate dimensions shown in Figure 1 to Figure 66, and shall be subject to the following permissible deviations:

mass:	– 10 %
thickness:	the wall thickness of the barrel of the pipe or body of the fitting shall at no point be less than 87½ % of the thickness given in Figure 1
length:	± 12.5 mm

6 Depth of seal

The depth of seal in all fittings incorporating a water seal shall be 50 mm minimum unless otherwise shown in the relevant figure.

7 Hydrostatic requirement

Pipes and fittings, after coating, shall be capable of withstanding the following hydrostatic pressures:

pipes	345 kPa ^a
fittings	170 kPa

^a 1 kPa = 1 kN/m² = 10 mbar ≈ 100 mm water.

Pipes and fittings, when subjected to these test pressures, shall show no signs of leakage. The test pressure shall be applied internally and shall be maintained for not less than 15 s, or as much longer as may be required for proper proof and inspection, up to a maximum of 1 min.

8 Crushing requirement

Pipes and, where applicable, fittings, when tested in accordance with Appendix A, shall be capable of withstanding a test load of 150 kN per metre run.

9 Coating

Unless otherwise specified by the purchaser, castings shall be thoroughly cleaned and dried and then coated by either:

- a) cold applied coatings complying with the requirements of BS 3416; or
- b) hot applied coatings complying with the requirements of BS 4147 or BS 4164, at the manufacturer's option.

The coatings by either method shall be smooth and tenacious, sufficiently hard not to flow when exposed to a temperature of 63 °C and not so brittle at a temperature of 0 °C as to chip off when scribed lightly with the point of a penknife.

Any casting that, by either method, is imperfectly coated, or the coating of which does not set or conform to the quality specified, shall be recoated.

10 Inspection

The representative appointed by the purchaser shall have access to the works of the manufacturer at all reasonable times; he shall be at liberty to inspect the manufacture at any stage and to reject any material or finished casting that does not comply with the requirements of this standard.

The manufacturer shall, at his own cost, supply labour and appliances for such inspection as may be carried out on his premises.

Should the metal used in the manufacture of the castings not comply with the requirements specified, or should any of the products not conform to the dimensions or other requirements, the product or products so failing shall be deemed not to comply with the requirements of this British Standard, and any marking indicating compliance shall be obliterated.

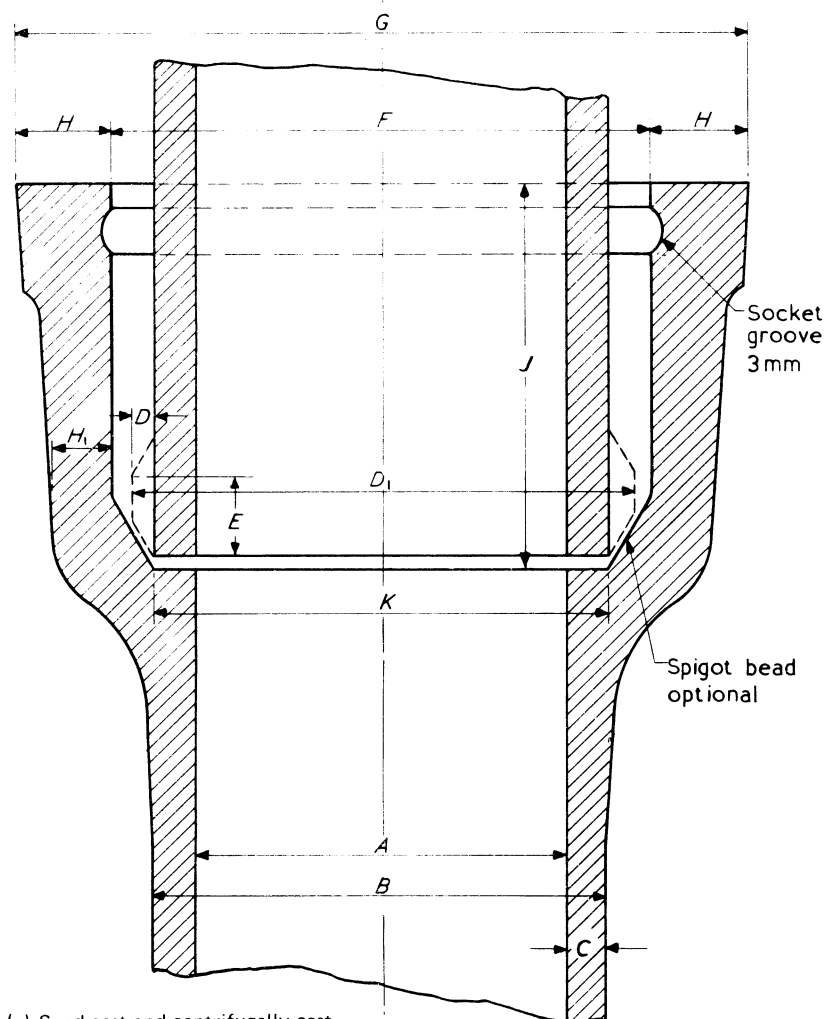
11 Marking

11.1 Every casting shall, where practicable, have cast upon it in a legible manner a figure indicating the nominal size, together with the manufacturer's name or trade mark and the number of this British Standard, e.g.

100
manufacturer's name or trade mark
BS 437

11.2 Every centrifugally cast pipe shall be marked as required in 11.1, except that the letter "S" shall be added to the marking.

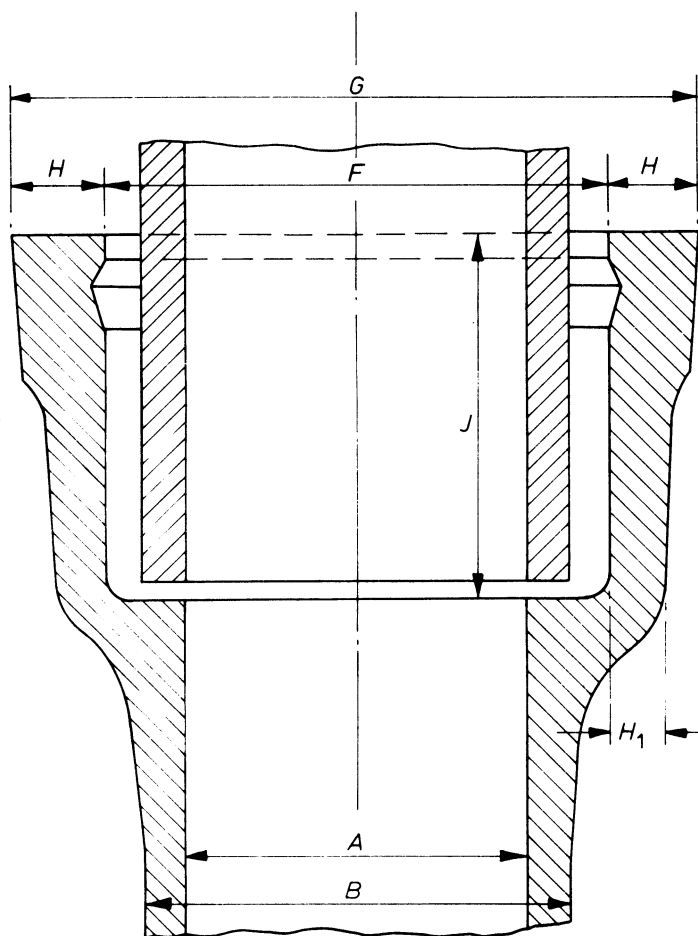
Pipes manufactured by this process shall be deemed to comply with the marking requirements if the particulars required in this clause are legibly marked on each pipe instead of being cast on.



(a) Sand cast and centrifugally cast

			Nominal bore				
			50	75	100	150	225
			mm	mm	mm	mm	mm
Pipe	Minimum bore	A	48	74	99	150	225
	External diameter (max.)	B	65	92	119	173	256
	Thickness (nominal)	C	6	7	8	9	13
	Projection of spigot bead	D	5	5	5	5	5
	Spigot bead diameter (max.)	D ₁	75	102	129	183	265
	Width of spigot bead (nominal)	E	15	15	15	20	20
Socket	Minimum bore	F	81	108	136	190	276
	External diameter (nominal)	G	115	150	185	240	335
	Thickness (min.)	H	16	19	22	22	27
	Thickness (min.)	H ₁	9	13	14	14	17
	Internal depth (min.)	J	75	75	75	90	115
	Diameter at bottom	K	65	92	119	173	256
Caulking clearance (min.)			8	8	9	9	10
Nominal mass of pipe:			kg	kg	kg	kg	kg
per 1.83 m length (single socket)			17.7	28.6	40.8	71.2	143.8
per 1.83 m length (double socket)			—	33.1	46.7	80.3	162.8
per 2.74 m length (single socket)			—	40.8	58.5	102.1	206.4
per 3.66 m length (single socket)			—	52.6	76.2	132.9	268.5

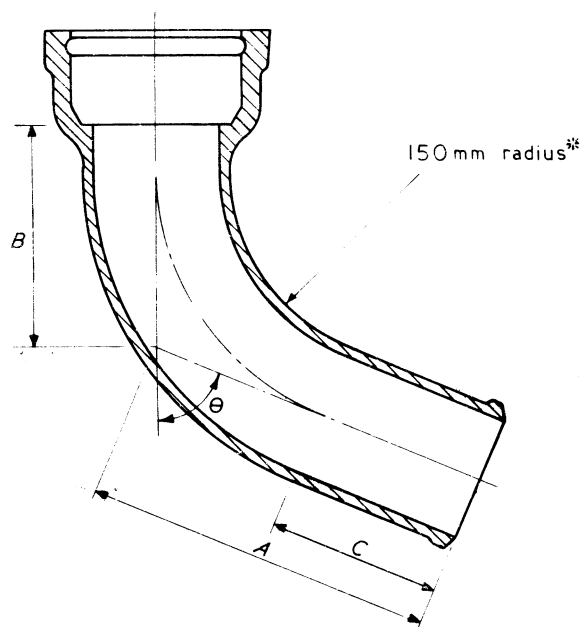
Figure 1 — Drain pipe, socket and spigot, and fittings (continued)



(b) Centrifugally cast only: alternative dimensions

			Nominal bore			
			75	100	150	225
			mm	mm	mm	mm
Pipe	Minimum bore	A	74	99	150	225
	External diameter (max.)	B	97	119	171	261
	Thickness (nominal)	C	7.4	7.5	8.3	9.4
Socket	Minimum bore	F	113	135	187	277
	External diameter (nominal)	G	160	185	240	340
	Thickness (min.)	H	19	22	22	27
	Thickness (min.)	H ₁	10	10.5	12	16
	Internal depth (min.)	J	76	76	89	102
Caulking clearance (min.)			8	8	8	8
Nominal mass of pipe:			kg	kg	kg	kg
per 3.60 m length (single socket)			60	75	122	214
per 5.50 m length (single socket)			86	109	177	310

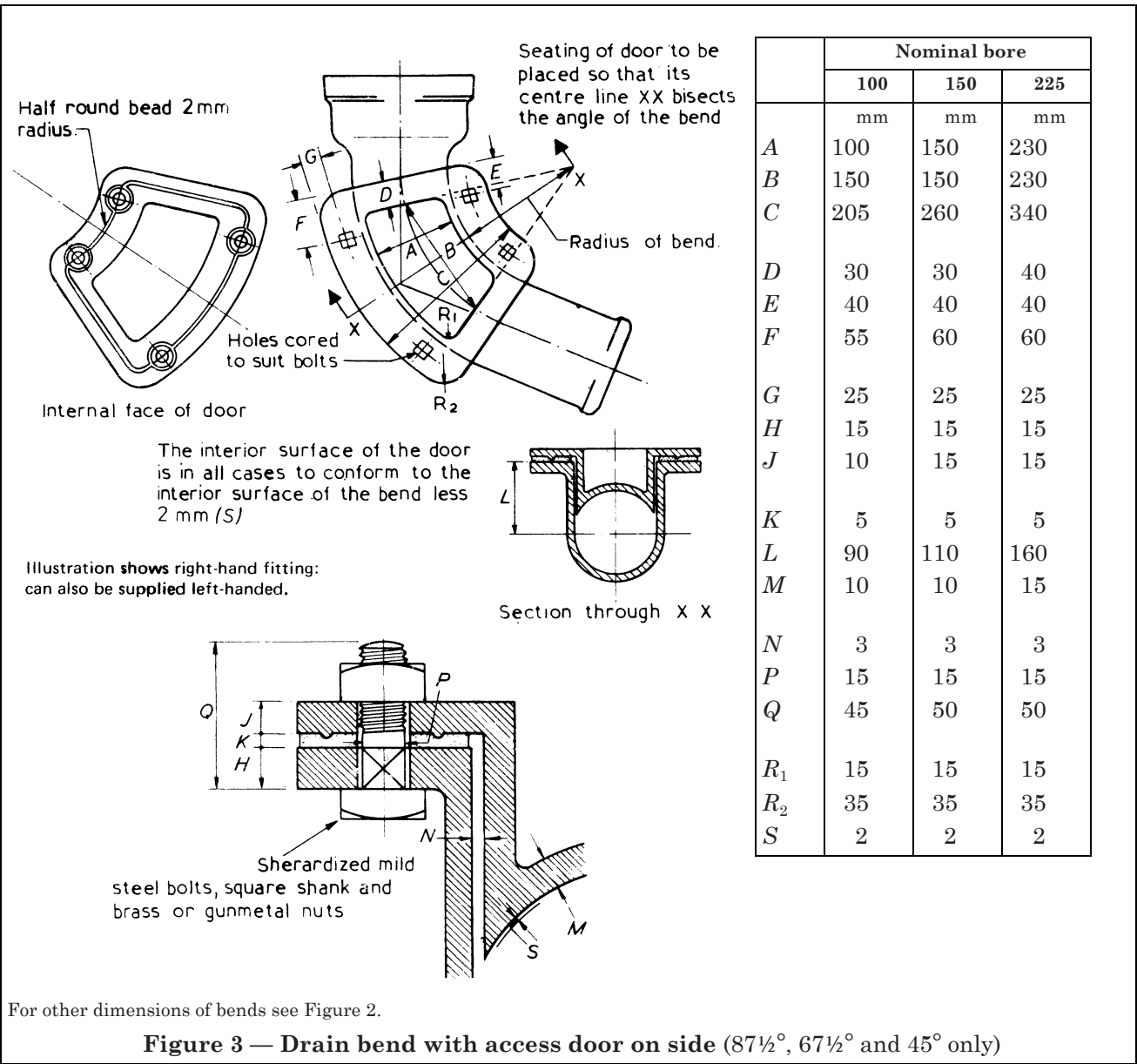
Figure 1 — Drain pipe, socket and spigot, and fittings (concluded)

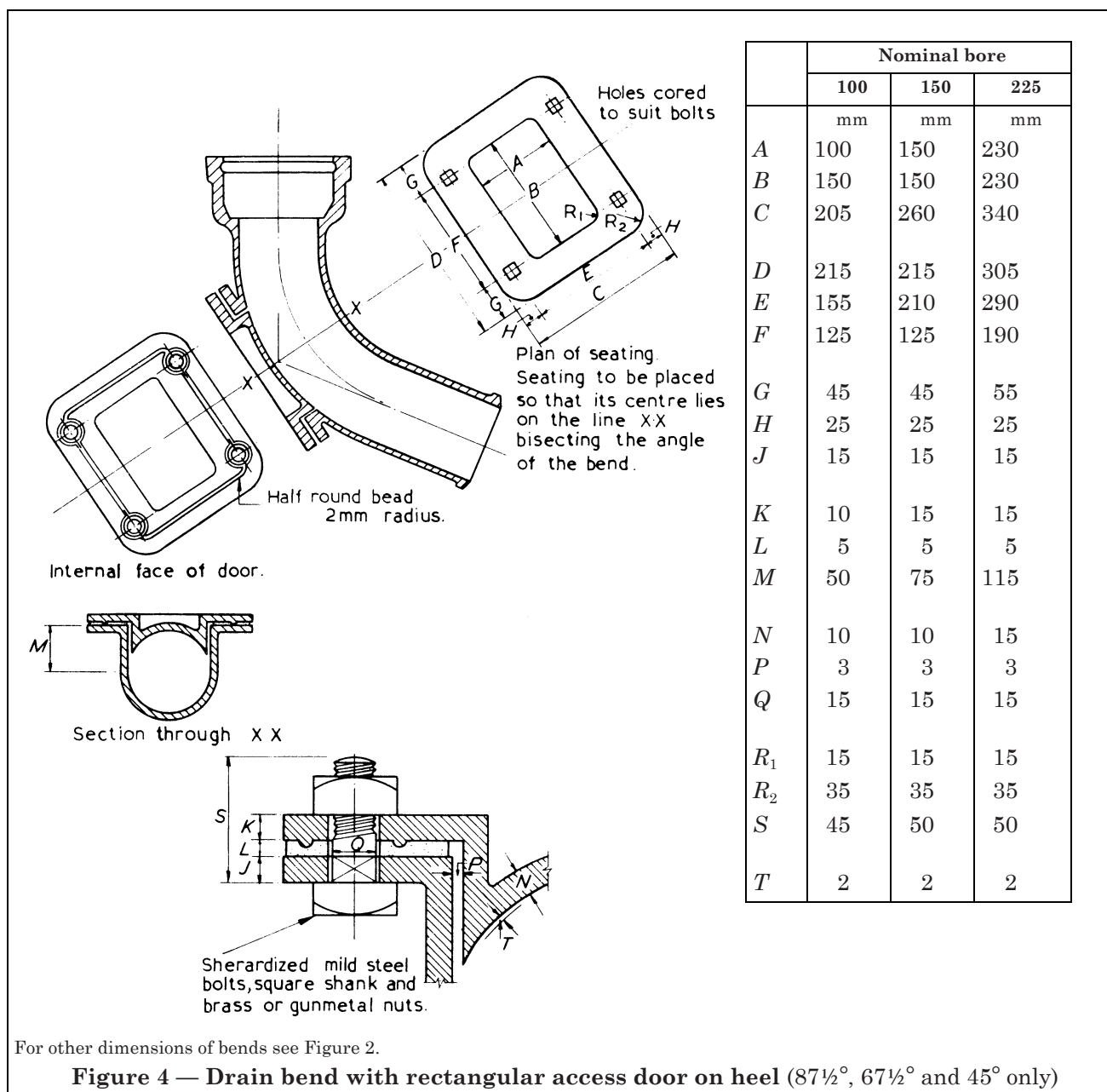


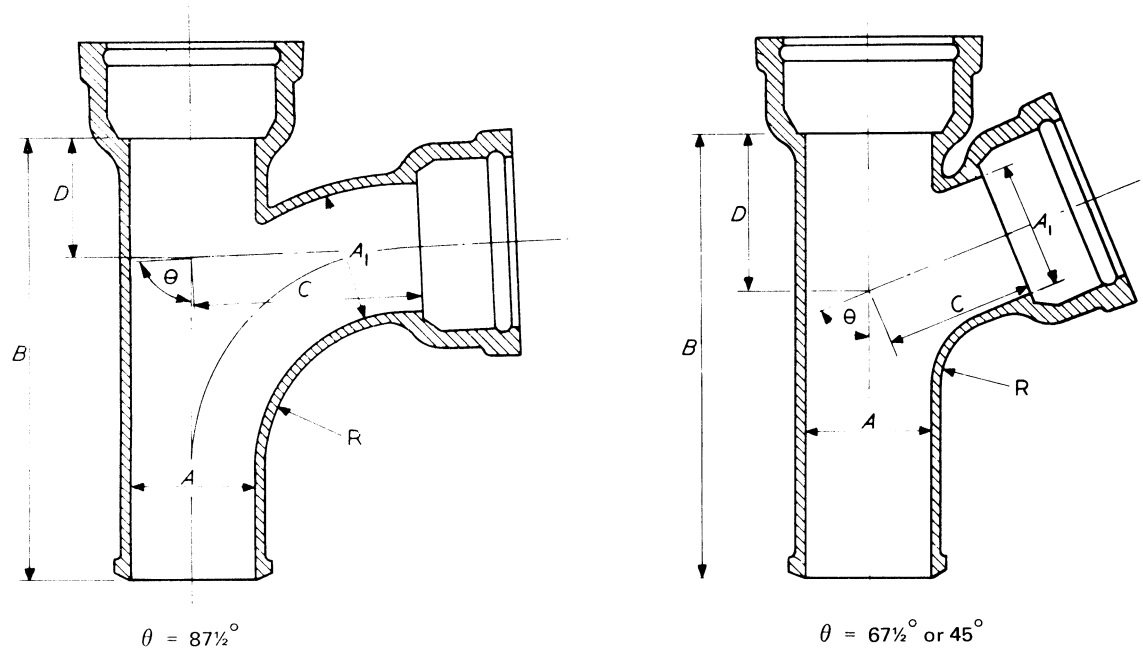
Dimensions		Nominal bore				
		50 ^a	75	100	150	225
		mm	mm	mm	mm	mm
$\theta = 87\frac{1}{2}^\circ$	A	210	290	310	350	405
	B	130	230	240	265	315
	C	110	100	110	120	135
$\theta = 67\frac{1}{2}^\circ$	A	180	255	280	290	355
	B	100	165	180	205	230
	C	110	120	140	135	170
$\theta = 45^\circ$	A	150	240	265	280	345
	B	75	115	140	140	180
	C	110	165	180	185	230
$\theta = 22\frac{1}{2}^\circ$	A	—	—	150	170	215
	B	—	—	75	90	100
	C	—	—	110	120	135
$\theta = 10^\circ$	A	—	—	130	140	160
	B	—	—	50	65	65
	C	—	—	110	120	135

^a For the 50 mm size bend, the throat radius shall be 75 mm.

Figure 2 — Drain bends







		mm	mm	mm	mm	mm	mm	mm
Nominal bore $\theta = 87\frac{1}{2}^\circ$	A	75	100	150	150	225	225	225
	A_1	75	100	100	150	100	150	225
	B	305	355	355	430	405	455	585
	C	110	125	180	190	230	230	255
	D	80	100	95	125	100	125	165
	R	50	50	115	135	115	135	185
Nominal bore $\theta = 67\frac{1}{2}^\circ$	A	75	100	150	150	225	225	225
	A_1	75	100	100	150	100	150	225
	B	305	355	355	430	405	455	585
	C	100	120	150	170	215	215	240
	D	100	125	135	185	170	195	240
	R	50	50	50	50	50	50	50
Nominal bore $\theta = 45^\circ$	A	75	100	150	150	225	225	225
	A_1	75	100	100	150	100	150	225
	B	305	355	355	430	405	455	585
	C	150	185	220	260	280	310	370
	D	155	190	220	255	265	310	375
	R	50	50	50	50	50	50	50

Figure 5 — Drain branch

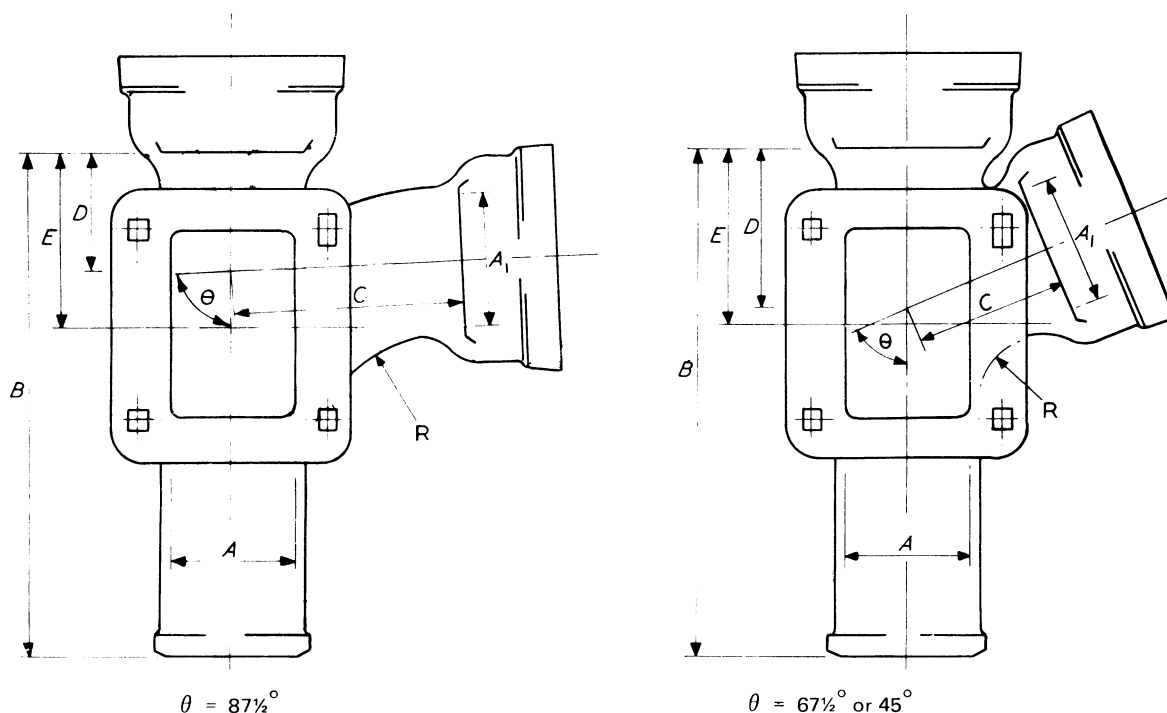
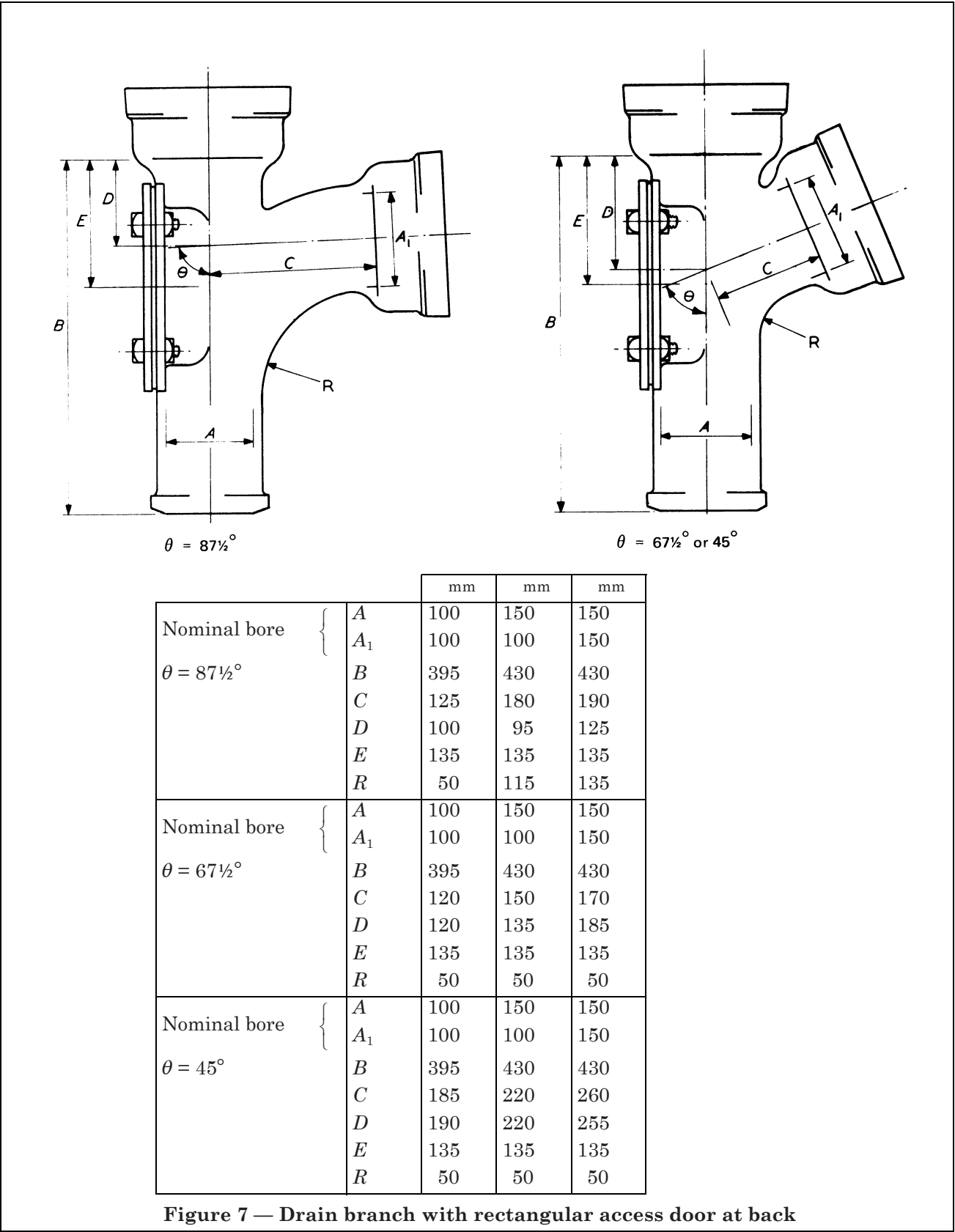
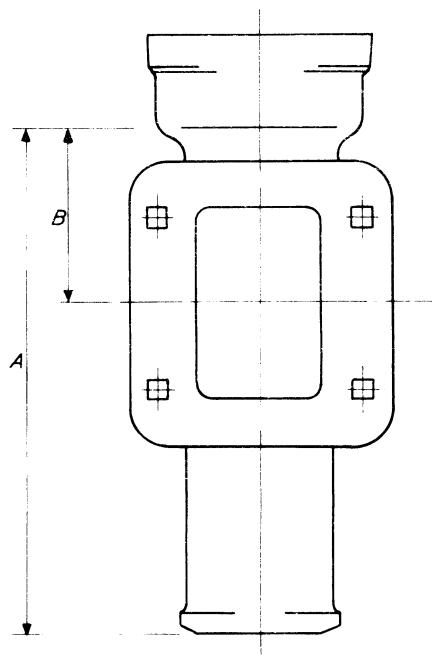


Illustration shows right-handed fitting: can also be supplied left-handed.

		mm	mm	mm	mm	mm	mm
Nominal bore $\theta = 87\frac{1}{2}^{\circ}$	$\left\{ \begin{array}{l} A \\ A_1 \end{array} \right.$	100	150	150	225	225	225
		100	100	150	100	150	225
	B	395	430	430	535	535	585
	C	125	180	190	230	230	255
	D	100	95	125	100	125	165
	E	135	135	135	185	185	185
	R	50	110	135	115	135	185
Nominal bore $\theta = 67\frac{1}{2}^{\circ}$	$\left\{ \begin{array}{l} A \\ A_1 \end{array} \right.$	100	150	150	225	225	225
		100	100	150	100	100	225
	B	395	430	430	535	535	585
	C	110	150	170	215	215	240
	D	125	135	185	170	195	240
	E	135	135	135	185	185	185
	R	50	50	50	50	50	50
Nominal bore $\theta = 45^{\circ}$	$\left\{ \begin{array}{l} A \\ A_1 \end{array} \right.$	100	150	150	225	225	225
		100	100	150	100	150	225
	B	395	430	430	520	520	585
	C	185	220	260	280	310	370
	D	190	220	255	265	310	375
	E	135	135	135	185	185	155
	R	50	50	50	50	50	50

Figure 6 — Drain branch with rectangular access door on side





	Nominal bore			
	75	100	150	225
	mm	mm	mm	mm
<i>A</i>	355	405	430	535
<i>B</i>	110	140	140	185

Figure 8 — Straight access piece

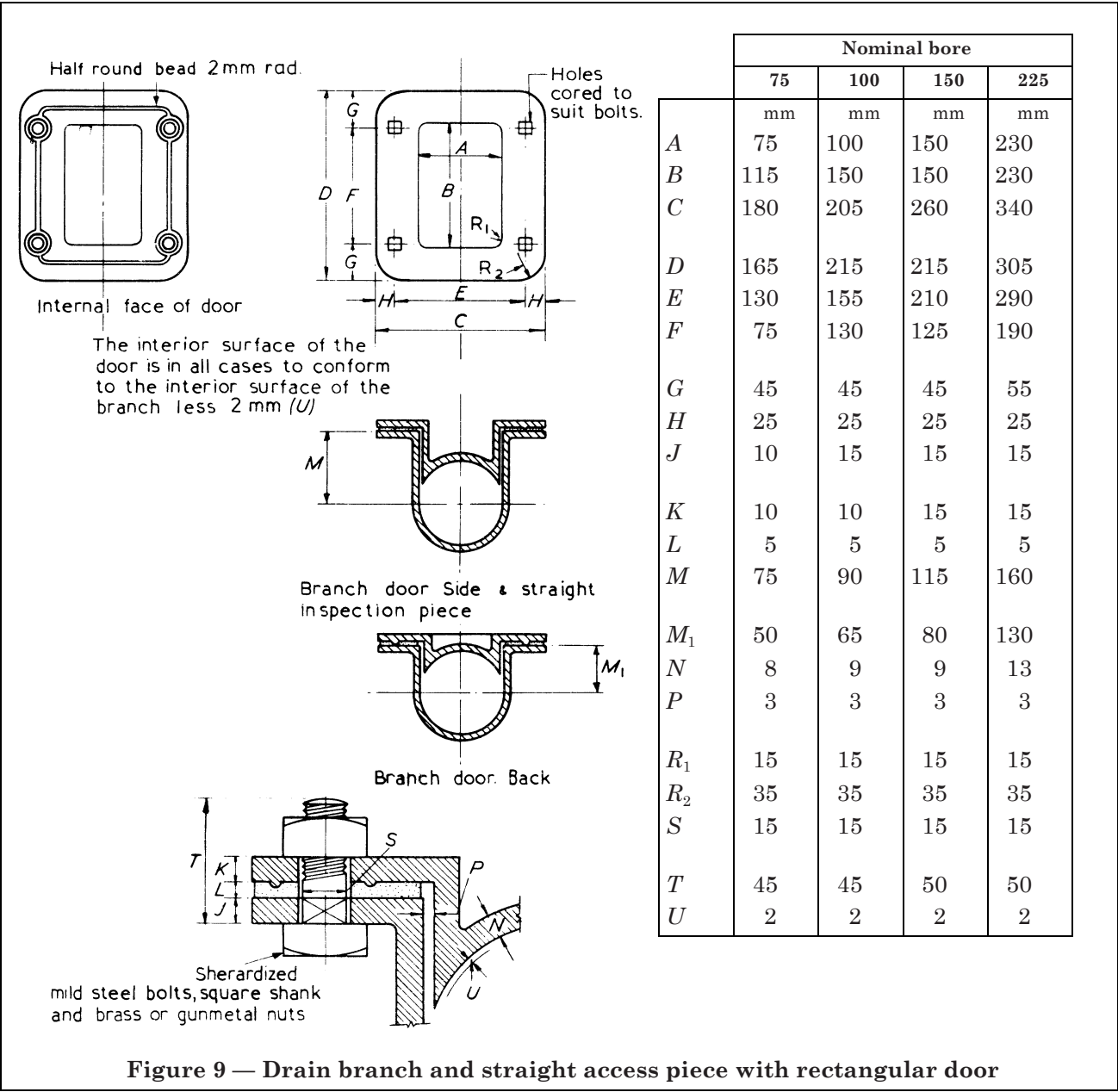


Figure 9 — Drain branch and straight access piece with rectangular door