BS 3868:1995

Specification for

Prefabricated drainage stack units in galvanized steel

Confirmed
February 2012

UDC 696.12-034.14:669.58

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee B/505, Wastewater engineering, upon which the following bodies were represented:

Association of Consulting Engineers
British Plastics Federation
Clay Pipe Development Association Limited
Concrete Pipe Association
Department of the Environment
Department of the Environment (Property and Building Directorate)
Fibre Cement Manufacturers Association Limited
Institute of British Foundrymen
Institution of Civil Engineers
Institution of Water and Environmental Management
Local Authority Organizations
METCOM
Water Services Association of England and Wales

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

Association of Building Component Manufacturers
Brewers Society
British Bathroom Council
British Plumbing Fittings Manufacturers' Association
British Pump Manufacturers' Association
Consumer Policy Committee of BSI
Department of the Environment (Building Research Establishment)
Institute of Building Control
Institute of Clerks of Works of Great Britain Inc.
Institute of Plumbing
National Association of Plumbing, Heating and Mechanical Services Contractors
Scottish Office (Building Directorate)

This British Standard, having been prepared under the direction of the Building and Civil Engineering Sector Board, was published under the authority of the Standards Board and comes into effect on 15 April 1995

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Second edition (in metric) April 1973
Third edition April 1995

The following BSI references relate to the work on this standard:
Committee reference B/505
Draft for comment 93/105168 DC

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Amendments issued since publication

Amd. No.	Date	Comments

Contents

Foreword

This British Standard has been prepared under the direction of Technical Committee B/505, Wastewater engineering. It is a revision, taking into account current practice for sanitary pipework. On publication of this standard, BS 3868:1973 will be withdrawn.

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 14, an inside back cover and a back cover.

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

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1 Scope

This British Standard specifies requirements for prefabricated drainage stack units, manufactured from steel and galvanized after fabrication.

These units are for use above ground, in plumbing systems for wastewater and rainwater; to include pipework within or external to a building, including basements, but excluding pipework which enters the ground.

2 References

2.1 Normative references

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

2.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

For the purposes of this British Standard, the definitions given in BS 6100-1.3.2, BS 6100-1.3.6, BS 6100-1.5.1, and BS 6100-2.7 and BS 6100-3.3 apply.

4 Materials

Pipes and components used in prefabricated systems shall be manufactured from light or medium black steel tubes conforming to BS 1387.

Fittings intended for use with prefabricated systems shall be manufactured from mild steel of an equal quality and thickness as the steel pipes to which they are connected.

All fabricated components shall be finished free from burrs and sharp edges.

5 Dimensions and weights

Steel tubes and other components of the system shall conform to the dimensions and weights given in Table 1 to Table 18.

NOTE Dimensions are illustrated in Figure 1 to Figure 20.

6 Fabrication

All branch junctions shall have a weld free crotch radius (see Table 9 to Table 12).

Welding shall be carried out in accordance with BS 2971. The completed assembly shall be cleaned of all weld slag. The unit shall be airtight and capable of passing an air test at a pressure equivalent to 1.5 kN/m, over a period of 3 min.

Bends shall be supplied and fabricated to angle *A* of Figure 5 within $\pm 1°$.

Access doors shall comprise a galvanized steel cover plate and sealing gasket fixed to a welded backplate using non-ferrous setpins.

Cleaning eyes shall be formed by welding on a parallel threaded British Standard Pipe thread (BSP) female iron boss to either an extruded hole or pipe end.

Munsen brackets shall be fabricated from mild steel and galvanized or red oxide painted after manufacture.

Saddle connections shall be fabricated from mild steel and galvanized after manufacture.

7 Jointing

Units shall be joined together to form a complete stack, using one or more of the following connections.

a) *Push fit joint.* Push fit synthetic rubber gasket used with spigot and socket pipes, for galvanized to galvanized, or galvanized to PVC-u.

b) *Mechanical joint.* Bolted joint compressing a synthetic rubber gasket using spigot pipes, for use with galvanized to galvanized; galvanized to cast iron or PVC-u.

NOTE 1 The galvanized to galvanized joint contains a bond that, when fitted correctly, ensures electrical continuity.

c) *Push fit waste boss.* Push fit insert waste boss with synthetic rubber gasket for use with copper or PVC-u pipes.

d) *Screwed waste boss.* Screwed BSP waste boss for use with galvanized, copper, or PVC-u pipes.

NOTE 2 An insulating connector is required with copper pipes.

e) *Saddle connection.* Bolt on saddle connections, for upgrading existing systems.

f) *Flanged joints.* Flanged joints shall be in accordance with BS 4504.

g) *Caulked joints.* Socket and spigot pipes which may be caulked with yarn and blue lead.

h) *Weathering apron.* An inverted collar is welded on to pipe allowing approximately 20 mm gap for flashing in a lead, slate or asphalt roof finish.

Mechanical joints shall provide continuity of metal to metal contact in accordance with BS 7671 to ensure electrical earthing.

8 Galvanizing

After fabrication the assemblies shall be galvanized internally and externally so that the coating meets the requirements of BS 729.

NOTE If pipes are cut on site the ends should be painted immediately with zinc rich paint.

9 Dimensions of components

The dimensions of components shall conform to the relevant tables in this standard.

10 Tolerances in completed units

Dimensions of completed units shall have a permissible deviation of ± 1.5 mm.

Angles to branches and bends shall have a permissible deviation of ± 1°.

11 Inspection

The purchaser or his representative shall have access, by appointment, to those parts of the manufacturer's works in which the production of assemblies is being carried out. He shall be at liberty to inspect the manufacture of assemblies at any stage and to reject any material which does not conform to the requirements of this standard.

12 Supplier's certificate

The manufacturer shall supply a certificate, on request, stating that the prefabricated assemblies are manufactured in accordance with the requirements of this British Standard.

13 Marking

Each component or unit shall have a distinguishing mark of the manufacturer, a job number and date of manufacture.

NOTE Marking may be by stencilling or on an attached metal label.

14 Assembly of units

Prefabricated units specifically assembled for the drainage of wastewater from buildings shall conform to BS 5572.

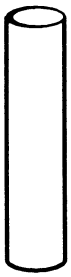


Figure 1 — Pipe

Table 1 — Dimensions and weights of pipe

Nominal size (mm)	32	40	50	80	100	125	150
Class (BS 1387)	Light	Light	Light	Light	Light	Medium	Medium
Mean outside diameter (mm)	45.5	48.4	60.3	88.9	114.2	139.7	165.1
Wall thickness swg (mm)	12 g 2.6	11 g 2.9	11 g 2.9	10 g 3.2	9 g 3.7	6 g 4.9	6 g 4.9
Mean inside diameter (mm)	37.3	42.6	54.5	82.5	106.5	129.9	155.3
Area of bore (mm^2)	1 090	1 425	2 330	5 345	10 960	13 255	18 945
Average weight (galvanized) (kg/m)	2.81	3.6	4.5	7.6	11.0	17.9	21.0

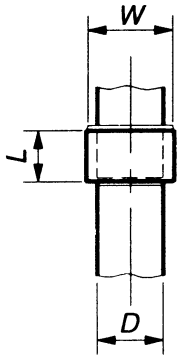


Figure 2 — Push fit joint

Table 2 — Galvanized to galvanized push fit joint

Dimensions in millimetres

Nominal size	*D*	50	80	100	150
Collar diameter	*W*	89	115	140	192
Collar length	*L*	60	80	80	95

Table 3 — Galvanized to PVC-u push fit joint

Dimensions in millimetres

Nominal size	*D*	50	80	100
Collar diameter	*W*	89	115	140
Collar length	*L*	60	80	80

NOTE A push fit gasket should be made from synthetic rubber conforming to BS 2494.

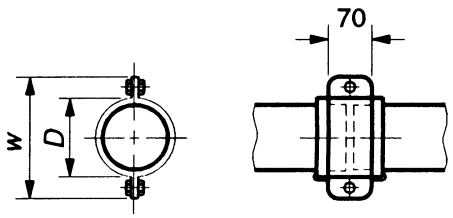


Figure 3 — Mechanical joint

Table 4 — Galvanized to galvanized mechanical joint

Dimensions in millimetres

Nominal size	*D*	50	80	100	125	150
A/C flanges	*W*	120	150	180	210	235

NOTE A mechanical joint gasket should be made from synthetic rubber conforming to BS 2494.

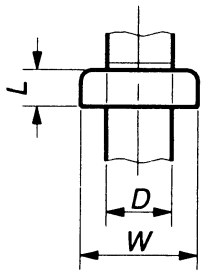


Figure 4 — Weathering apron

Table 5 — Dimensions for weathering apron

Dimensions in millimetres

Nominal size	*D*	50	80	100	125	150
Apron size (i/d)	*W*	106	129	155	181	207
Apron length	*L*	60	65	65	75	75

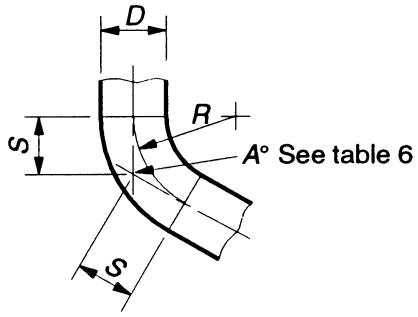


Figure 5 — Short radius bends

Table 6 — Dimensional examples of short radius bends

Linear dimensions in millimetres

Nominal size *D*	32	40	50	80	100	125	150
Radius *R*	48	57	76	114	152	190	228
A = 165° length *S*	6	8	10	15	20	25	30
150°	13	15	20	30	41	51	61
135°	19	24	32	48	64	80	95
120°	28	33	44	66	88	110	132
105°	27	44	58	88	117	147	165
95°	43	52	70	105	135	175	210
90°	48	57	76	114	152	190	228

NOTE Short radius bends are a radius to the centre line of one and a half times the nominal size, i.e. 100 mm diameter = 152 clr (centre line radius).

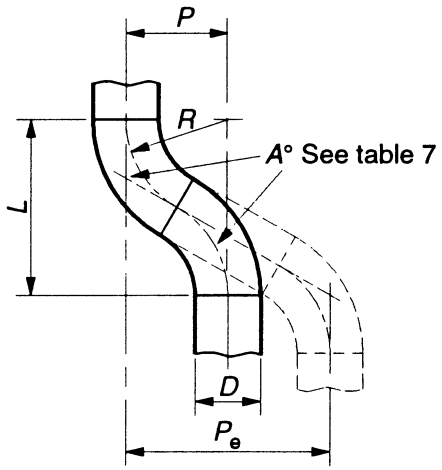


Figure 6 — Offset joints

Table 7 — Dimensional examples of offset joints

Linear dimensions in millimetres

Nominal size *D*	50	80	100	125	150
Radius *R*	76	114	152	190	228
A = 165° gives projection *P*	5(40)	8(60)	10(80)	13(100)	15(220)
150° length *L*	20 (77)	30(115)	40(154)	50(192)	60(230)
135°	44(80)	66(161)	88(125)	110(268)	132(322)
120°	76(132)	114(198)	152(265)	190(330)	228(396)
105°	112(147)	169(221)	225(295)	200(369)	337(442)
95°	140(152)	210(228)	270(295)	350(380)	420(457)
90°	152(152)	228(228)	305(305)	380(380)	456(456)
NOTE Offset may be formed from short radius bends.					

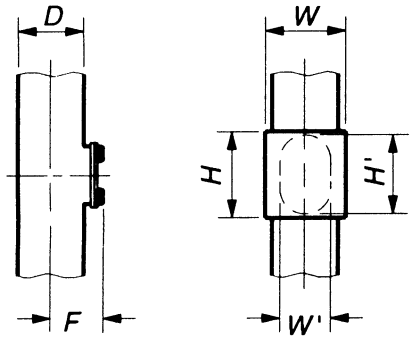


Figure 7 — Access door

Table 8 — Dimensions of access door

Dimensions in millimetres

Nominal pipe	80	100	125	150
Panel size *H* × *W*	140 × 110		185 × 160	
Aperture *H′* × *W′*	100 × 80		125 × 100	
Projection *F*	75	90	105	120

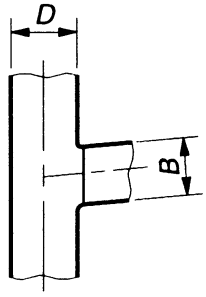


Figure 8 — Standard branch connection

Table 9 — Variations of standard branch connection

Linear dimensions in millimetres

Angle of entry	From 0 up to 45° in 0.5° intervals						
Branch options $D \times B$	32 × 32	40 × 32	50 × 32	80 × 32	100 × 32	125 × 35	150 × 32
		40 × 40	50 × 40	80 × 40	100 × 40	125 × 40	150 × 40
			50 × 50	80 × 50	100 × 50	125 × 50	150 × 50
				80 × 80	100 × 80	125 × 80	150 × 80
					100 × 100	125 × 100	150 × 100
						125 × 125	150 × 125
							150 × 150

NOTE A standard branch may be formed via an extruded hole with weld free crotch radius without intrusion into the bore of the main pipe.

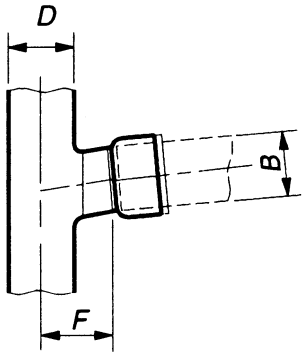


Figure 9 — Stub branch with collar connection

Table 10 — Variations of stub branch with collar connection

Linear dimensions in millimetres

Angle of branch	Up to 45° in 0.5° intervals				
Branch options $D \times B$	50 × 50	80 × 50	100 × 150	125 × 50	150 × 50
		80 × 80	100 × 80	125 × 80	150 × 80
			100 × 100	125 × 100	150 × 100

NOTE Stub branch projection F may be nominally equivalent to pipe diameter D but may also be extended as required.

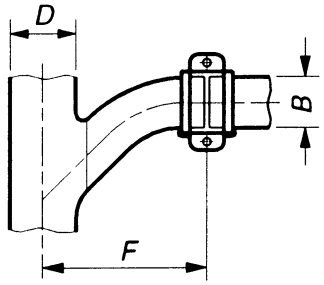


Figure 10 — 45° swept branch connection

Table 11 — Variations of 45° swept branch connection

Linear dimensions in millimetres

Angle of branch	Normally 90°				
Branch options $D \times B$	50 × 50	80 × 50	100 × 50	125 × 50	150 × 50
		80 × 80	100 × 80	125 × 80	150 × 80
			100 × 100	125 × 125	150 × 150
					150 × 150

NOTE Swept branch projection F may be nominally equivalent to pipe diameter $D \times 3$ for junctions of equal diameter but may be adjusted for smaller branch options. Angle of entry branch to main pipe is 45°.

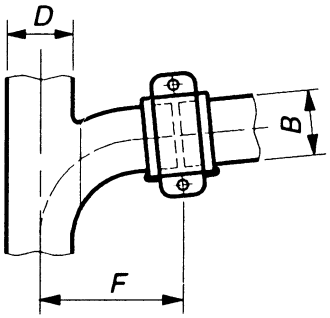


Figure 11 — Stub swept branch connection

Table 12 — Variations of stub swept branch connection

Linear dimensions in millimetres

Angle of branch	From 0 up to approximately 15°				
Branch options $D \times B$	50 × 50	80 × 50	100 × 50	125 × 50	150 × 50
		80 × 80	100 × 80	125 × 80	150 × 80
			100 × 100	125 × 100	150 × 100
				125 × 125	150 × 125
					150 × 150

NOTE Stub swept branch projection F may be nominally equivalent to pipe diameter $D \times 2$ for junctions of equal diameter but may be adjusted for smaller branch options.

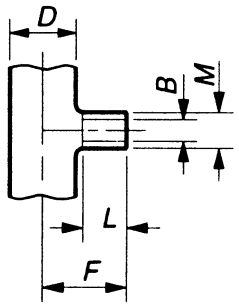


Figure 12 — Waste boss (BSP type) connection

Table 13 — Dimensions of waste boss (BSP type) connection

Dimensions in millimetres

Projection		F		F		F
Boss options $D \times B$	50 × 32	57	50 × 40	58	50 × 50	59
	80 × 32	75	80 × 40	76	80 × 50	77
	100 × 32	89	100 × 40	90	100 × 50	91
	125 × 32	100	125 × 40	101	125 × 50	102
	150 × 32	118	150 × 40	119	150 × 50	120
Boss length L		27		27		27
Outside diameter M		50		55		68

NOTE 1 BSP female iron waste bosses should be parallel threaded welded on to a standard extruded hole with weld free crotch radius and no intrusion into bore of main pipe.
NOTE 2 For PVC-u connections a male iron adaptor should be used.
NOTE 3 For copper connections an insulating connector should be used.

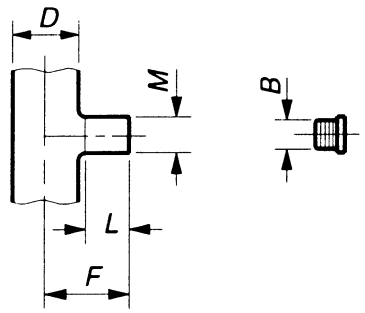


Figure 13 — Waste boss (insert type) connection

Table 14 — Dimensions of waste boss (insert type) connection

Dimensions in millimetres

Projection		F		F		F
Boss options $D \times B$	50 × 32	73	50 × 40	73	50 × 50	82
	80 × 32	91	80 × 40	91	80 × 50	102
	100 × 32	105	100 × 40	105	100 × 50	114
	125 × 32	116	125 × 40	116	125 × 50	125
	150 × 32	142	150 × 40	142	150 × 50	143
Boss length L		42		42		50
Outside diameter M		60		60		76

NOTE 1 Insert bosses should be plainbore sleeves welded on to a standard extruded hole with weld free crotch radius and no intrusion into bore of main pipe.
NOTE 2 Rubber inserts should be supplied to receive wastepipe. For connection to galvanized they should be in accordance with BS 2494; in accordance with BS 2871 and/or PVC-u in accordance with BS 5254 and BS 5255.

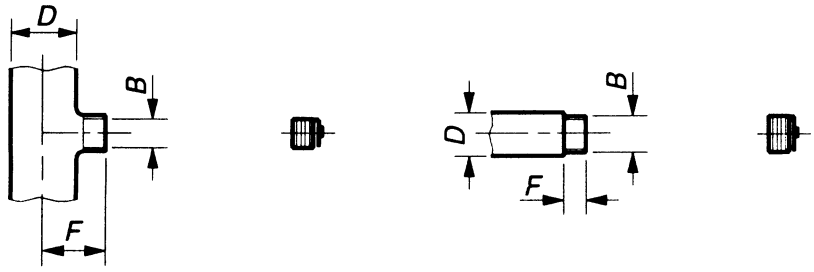


Figure 14 — Cleaning eyes

Table 15 — Dimensions of cleaning eyes

Dimensions in millimetres

Nominal size	Side type			End type				
	D	**50**	**80**	**50**	**80**	**100**	**125**	**150**
Boss size (nominal)	*B*	40	50	40	65	80	100	100
Projection	*F*	50	77	27	27	37	47	47

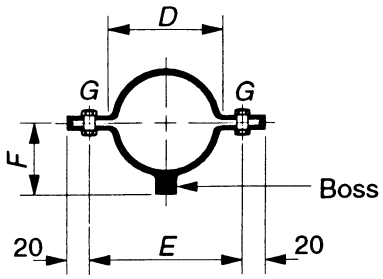


Figure 15 — Munsen bracket

Table 16 — Dimensions of munsen brackets

Dimensions in millimetres

Nominal pipe sizes *D*	50	80	100	125	150
Fixing centres *E*	60	90	115	140	165
Projection (min.) *F*	75	90	100	115	130
Fixing holes (dia.) *G*	8	10	10	14	14
Section	25 × 3	25 × 3	25 × 3	40 × 5	40 × 5

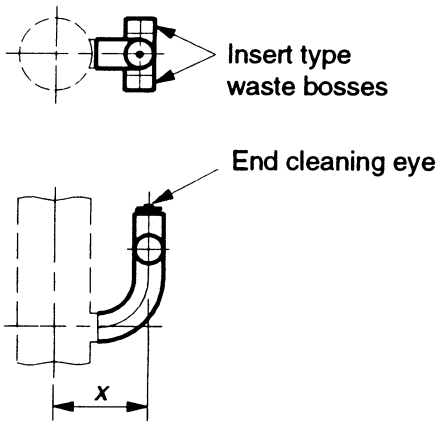
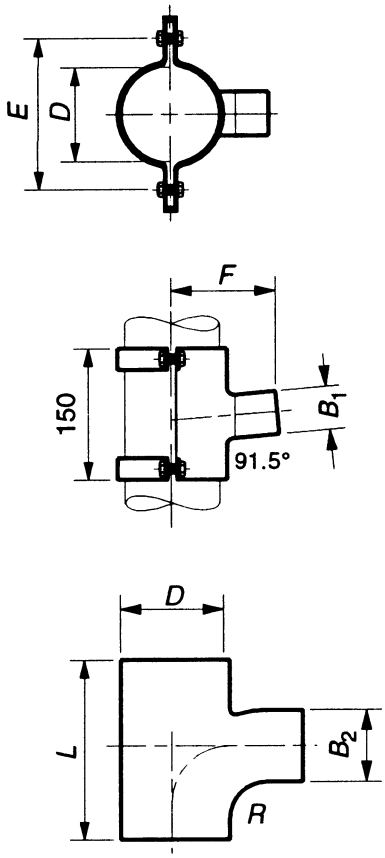


Figure 16 — Waste standpipe

Table 17 — Dimensions of waste standpipe

Dimensions in millimetres

Nominal pipe size	75	100	150
Pipes centre *x* (min.)	100	115	150



Linear dimension is in millimetres.

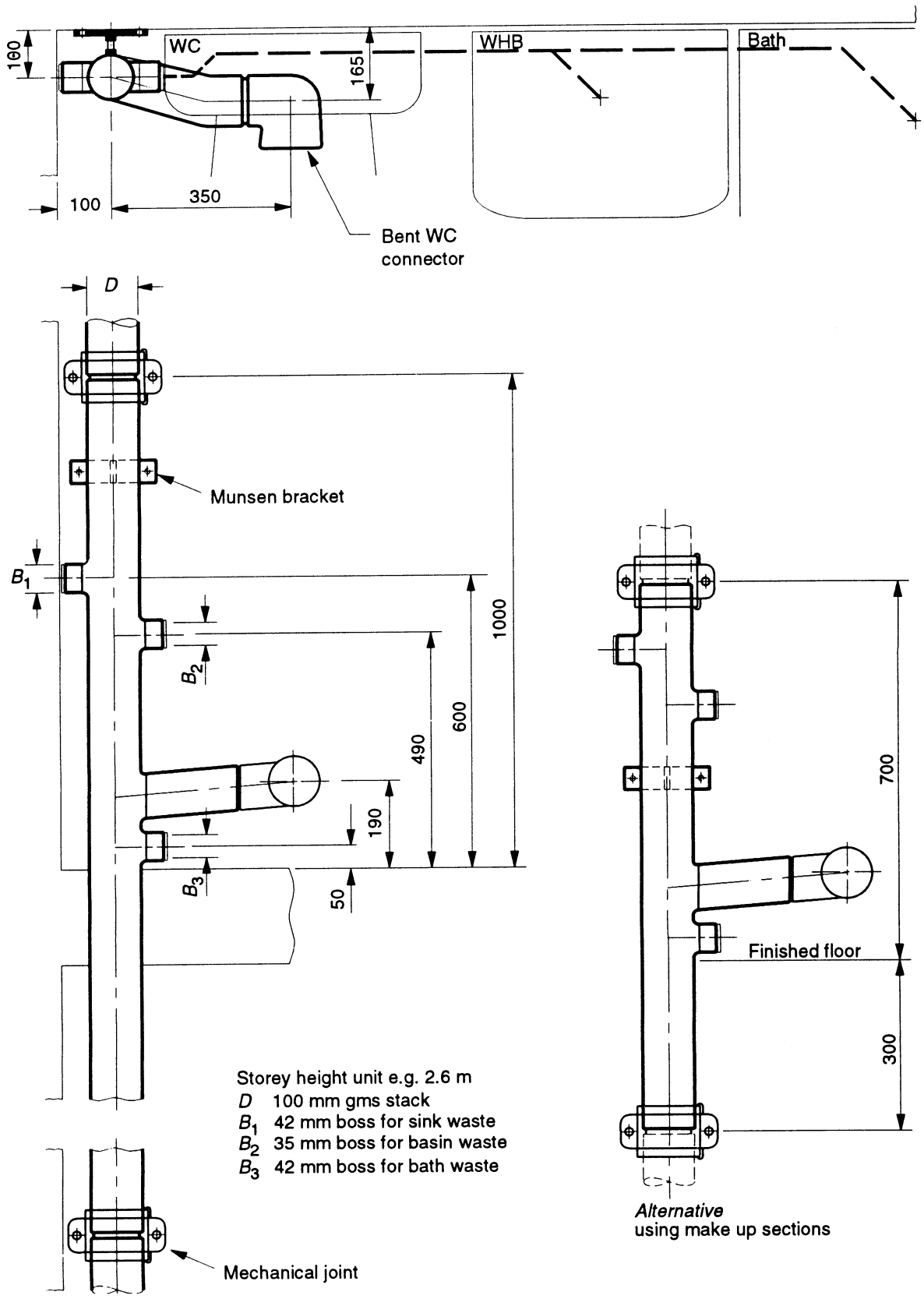
Figure 17 — Saddle connections

Table 18 — Dimensions of saddle connections

Dimensions in millimetres

Project F	100	100	110	120	135
Boss option $D \times B_1$ (see note 1)	50 × 32	80 × 32	100 × 32	125 × 32	150 × 32
	50 × 40	80 × 40	100 × 40	125 × 40	150 × 40
Fixing centre E	105	135	165	195	220
Branch option $D \times B_2$		80 × 50	100 × 50	125 × 50	150 × 50
		80 × 50	100 × 80	125 × 80	150 × 80
			100 × 100	125 × 100	150 × 100
				125 × 125	150 × 150
					150 × 150
Length L		210	250	280	350

NOTE 1 Component insertion via couplers for B_1.
NOTE 2 Component should be strapped on to the existing stack after drilling in situ.
NOTE 3 Sealing should be effected by means of an elastomeric seal.



Dimensions are in millimetres unless otherwise stated.

Figure 18 — Example of a drainage stack system

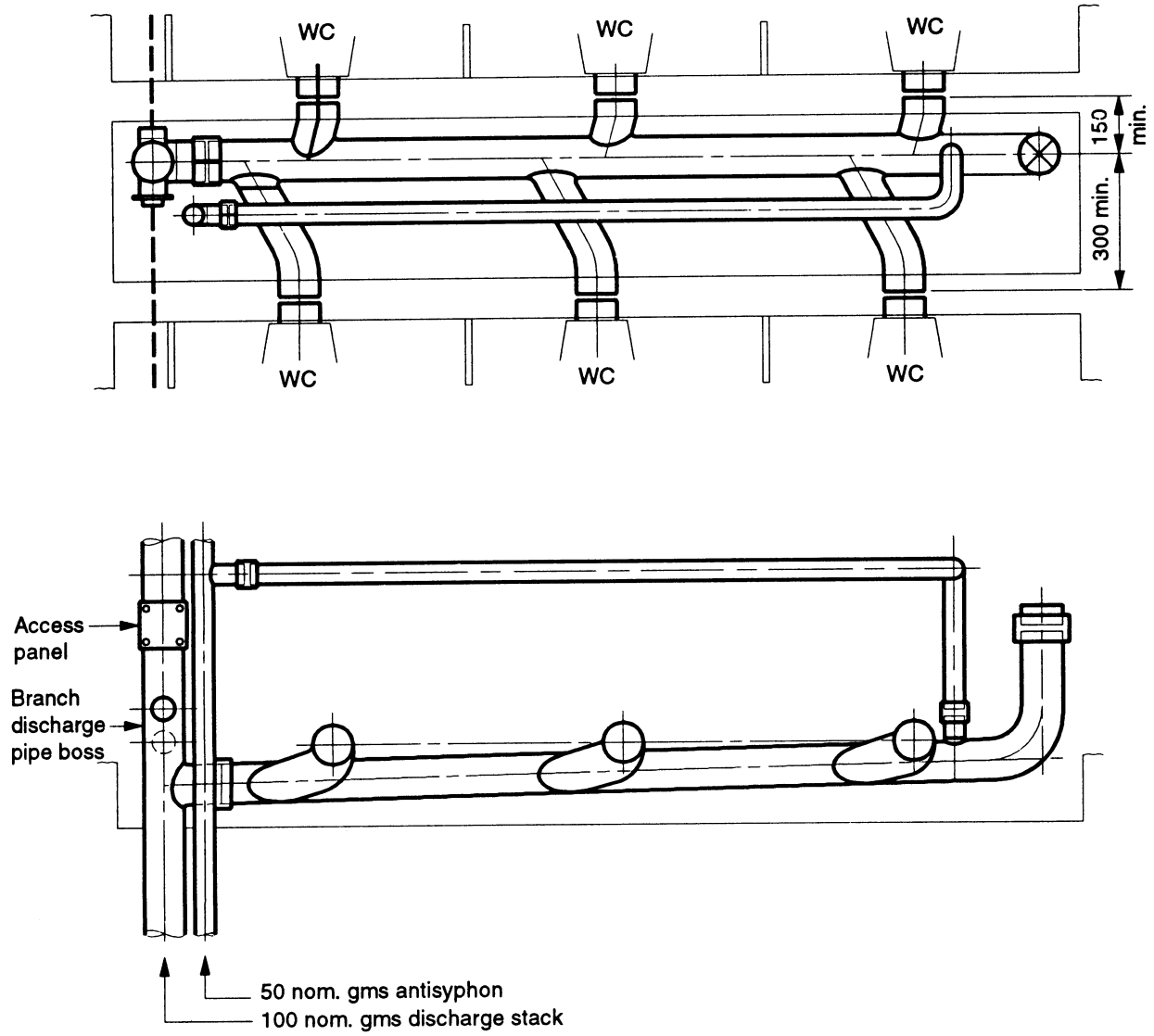


Figure 19 — Example of a WC system off the stack

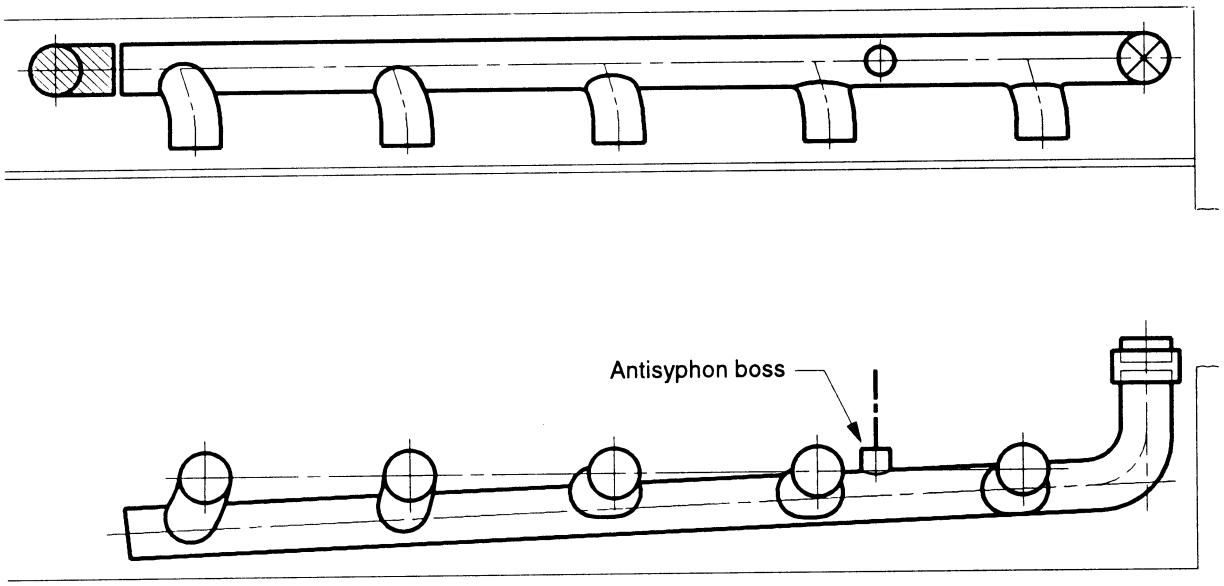


Figure 20 — Example of a WC manifold

List of references (see clause 2)

Normative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS 729:1971, *Specification for hot dip galvanized coatings on iron and steel articles.*

BS 1387:1985, *Specification for screwed and socketed steel tubes and tubulars and for plain end steel tubes suitable for welding or for screwing to BS 21 pipe threads.*

BS 2971:1991, *Specification for class II arc welding of carbon steel pipework for carrying fluids.*

BS 4504, *Circular flanges for pipes, valves and fittings (PN designated).*

BS 5572:1978, *Code of practice for sanitary pipework.*

BS 6100, *Glossary of building and civil engineering terms.*

BS 6100-1, *General and miscellaneous.*

BS 6100-1.3, *Parts of construction works.*

BS 6100-1.3.2:1989, *Roofs and roofing.*

BS 6100-1.3.6:1991, *Jointing products, builders' hardware and accessories.*

BS 6100-1.5, *Operations; associated plant and equipment.*

BS 6100-1.5.1:1984, *Coordination of dimensions; tolerances and accuracy.*

BS 6100-2, *Civil engineering.*

BS 6100-2.7:1992, *Public health. Environmental engineering.*

BS 6100-3, *Services.*

BS 6100-3.3:1992, *Sanitation.*

BS 7671:1992, *Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition.*

Informative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS 2494:1990, *Specification for elastometric seals for joints in pipework and pipelines.*

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

BS 4514:1983, *Specification for unplasticized PVC soil and ventilating pipes, fittings and accessories.*

BS 5254:1976, *Specification for polypropylene waste pipe and fittings (external diameter 34.6 mm, 41.0 mm and 54.1 mm).*

BS 5255:1989, *Specification for thermoplastics waste pipe and fittings.*

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