States of Jersey
Planning and Environment Committee

The Building Bye-Laws (Jersey) 1997. Code of Practice

TECHNICAL GUIDANCE DOCUMENT

Part 6
Drainage, Hygiene and Water Storage

Contents

Use of Guidance

THE TECHNICAL GUIDANCE DOCUMENTS

The Building Bye-Laws (Jersey) 1997, which come into operation on the twentieth day of February 1997, replace the Building Bye-Laws (Jersey) 1960 and consolidate all subsequent revisions to those Bye-Laws. This document is one of a series that has been approved by the Committee as practical guidance on meeting the requirements of the second schedule and Bye-Law 7 of the Building Bye-Laws (Jersey) 1997.

At the back of this document is a list of those documents currently published which have been approved for the purpose of the Building Bye-Laws.
The detailed provisions contained in the Technical Guidance Documents are intended to provide guidance for some of the more common building situations. In other circumstances, alternative ways of demonstrating compliance with the requirements may be appropriate.

Evidence supporting compliance

The is no obligation to adopt any particular solution contained in a Technical Guidance Document if you prefer to meet the relevant requirement in some other way. However, should a contravention of a requirement be alleged then, if you have followed the guidance in the relevant Technical Guidance Documents, that will be evidence tending to show that you have complied with the Bye-Laws. If you have not followed the guidance then that will be evidence tending to show that you have not complied. It will then be for you to demonstrate by other means that you have satisfied the requirement.

Other requirements

The guidance contained in a Technical Guidance Documents relates only to the particular requirements of the Bye-Laws which that document addresses. The building work will also have to comply with the requirements of any other relevant paragraphs in the second schedule to the Bye-Laws. There are Technical Guidance Documents which give guidance on each of the other requirements in the second schedule and on Bye-Law 7.

LIMITATION ON REQUIREMENTS

In accordance with Bye-Law 8, the requirements in parts 1, 2, 3, 4, 5, 6, 7, 9 and 10 of the second schedule to the Building Bye-Laws do not require anything to be done except for the purpose of securing reasonable standards of health and safety for persons in or about the building.

MATERIALS AND WORKMANSHIP

Any building work which is subject to requirements imposed by the second schedule to the Building Bye-Laws should, in accordance with Bye-Law 7, be carried out with proper materials and in a workmanlike manner.
You may show that you have complied with Bye-Law 7 in a number of ways, for example, by the appropriate use of a product bearing an EC mark in accordance with the Construction Products Directive (89.106/EEC), or by following an appropriate technical specification (as defined in that Directive), a British Standard, a British Board of Agrément Certificate, or an alternative national technical specification of any member state of the European Community which, in use, is equivalent. You will find further guidance in the Technical Guidance Documents supporting Bye-Law 7 on materials and workmanship.

Technical specifications
Building Bye-Laws are made for specific purposes; health and safety, energy conservation and the welfare and convenience of disabled people. Standards and technical approvals are relevant guidance to the extent that they relate to these considerations. However, they may also address other aspects of performance such as serviceability or aspects which although they relate to health and safety are not covered by the Bye-Laws.

When a Technical Guidance Document makes reference to a named standard, the relevant version of the standard is the one listed at the end of the publication. However, if this version of the standard has been revised or updated by the issuing standards body, the new version may be used as a source of guidance provided it continues to address the relevant requirements of the Bye-Laws.

The Requirements

This Technical Guidance Document which takes effect on 20 February 1997, deals with the following requirements from part 6 of the second schedule to the Building Bye-Laws (Jersey) 1997.

Requirements	*Limits on application*
Foul Water Drainage (17) (1) Any system which carries foul water from a building shall— (a) connect to a public sewer where such sewer is available; or (b) connect to a cesspool or septic tank connected to a sub-surface irrigation system where a public sewer is not available, and any such system shall be adequate. (2) In sub-paragraph (1) 'foul water' means waste water which comprises or includes— (a) waste from a sanitary convenience or other soil appliance; or (b) water which has been used for cooking or washing; or (c) trade effluent.	Requirement (22) does not apply to— (a) a hot water storage system that has a storage vessel with a capacity of 15 litres or less; (b) a system providing space heating only; or (c) a system which heats or stores water for the purposes only of an industrial process.
Cesspools, septic tanks and sub-surface irrigation (18) (1) Any cesspool or septic tank and sub-surface irrigation shall be so sited and constructed that it is not prejudicial to the health of any person and will not contaminate any well, borehole, reservoir or stream of water, used or likely to be used by persons for drinking or domestic purposes, or for the manufacture or preparation of food or drink for human consumption. (2) Any cesspool or septic tank shall be— (a) of adequate capacity and so constructed that it is impermeable to liquids; (b) adequately ventilated; and (c) provided with adequate means of access for emptying.	
Rainwater drainage (19) Every building shall be provided with a system which carries rainwater from the roof to a sewer, soakaway , watercourse or some other suitable rainwater outfall, and any such system shall be adequate.	
Sanitary facilities (20) Every building shall have adequate sanitary facilities in rooms provided for that purpose.	
Wells and water tanks (21) A well, borehole, water tank or cistern in connection with a building and intended to supply water for human consumption shall be constructed and installed so as to prevent pollution of the water.	
Hot water storage (22) A hot water storage system with a storage vessel which does not incorporate a vent pipe to the atmosphere shall be installed so as to operate safely, and there shall be precautions to prevent the temperature of stored water at any time exceeding 100°C.	

Guidance

Performance

In the view of the Committee requirement (17) of part 6 will be met if a foul water drainage system:

(a) conveys the flow of foul water to a foul water outfall (a foul of combined sewer, a cesspool, or septic tank connected to a sub-surface system),

(b) minimises the risk of blockage or leakage,

(c) prevents foul air from the drainage system from entering the building under working conditions,

(d) is ventilated, and

(e) is accessible for clearing blockages.

Introduction to provisions

0.1 The capacity of the system should be large enough to carry the expected flow at any point.

0.2 The capacity depends on the size and gradient of the pipes. Minimum sizes and gradient limits are given in the text.

0.3 The flow depends on the type, number and grouping of appliances.

0.4 Appliances are seldom in use simultaneously and the minimum stack and drain sizes in normal use are capable of carrying the flow from quite large numbers of appliances. Table 1 shows approximate flow rates resulting from the typical household group of 1 wc, 1 bath, 1 or 2 washbasins and 1 sink for design purposes in BS 5572.

Table 1 **Flow rates from dwellings**

No of dwellings	Flow rate (litres/sec)
1	2.5
5	3.5
10	4.1
15	4.6
20	5.1
25	5.4
30	5.8

PIPE SIZES

0.5 The pipe sizes quoted in this document are nominal sizes used as a numerical designation in convenient round numbers approximately equal to a manufacturers' size. Equivalent pipe sizes for individual pipe standards will be found in BS 5572 for sanitary pipework and BS 8301 for building drainage.

Provisions meeting the requirement

Section 1
Sanitary Pipework

TRAPS

1.1 All points of discharge into the system should be fitted with a water seal (trap) to prevent foul air from the system entering the building. Under working and test conditions traps should retain a minimum seal of 25mm.

1.2 Table 2 gives minimum trap sizes and seal depths for the appliances which are most used (for other appliances see *Appendix paragraph A2*).

1.3 Ventilation – To prevent the water seal from being broken by the pressures which can develop in the system the branch discharge pipes should be designed as described in paragraphs 1.5 to 1.21.

1.4 **Access for clearing blockages** – If a trap forms part of an appliance the appliance should be removable. All other traps should be fitted directly after the appliance and should be removable or be fitted with a cleaning eye.

Table 2 **Minimum trap sizes and seal depths**

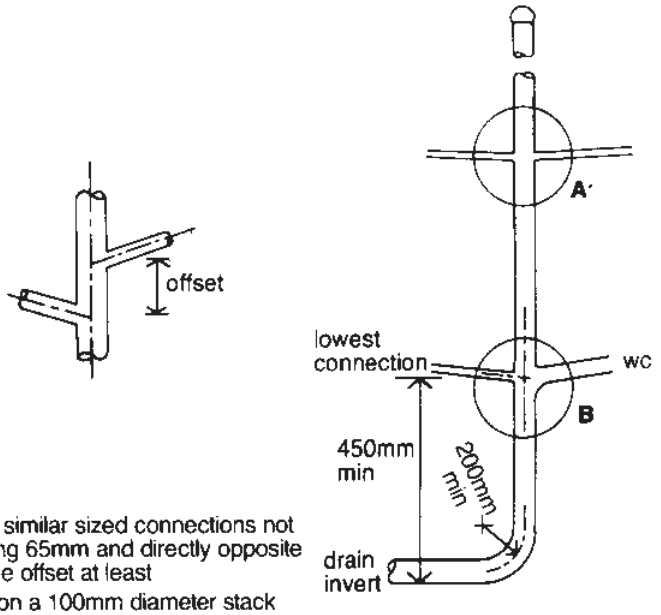
washbasin bidet	32	75
sink* bath* shower* food waste disposal unit urinal bowl	40	75
	(siphonic only)	
wc pan	75	50

* Where these appliances are installed on a ground floor and discharge to a gully, the depth of seal may be reduced to not less than 38mm.

BRANCH DISCHARGE PIPES

1.5 Branch pipes should be discharged into another branch pipe or a discharge stack unless the appliances are on the ground floor.

Diagram 1 **Branch connections to stacks**



Key

A small similar sized connections not exceeding 65mm and directly opposite should be offset at least
110mm on a 100mm diameter stack
250mm on a 150mm diameter stack

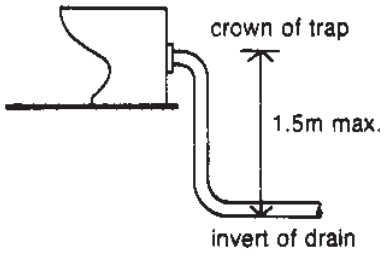
B Angled connection or 50mm diameter parallel junction where a waste branch directly opposite a wc would enter the stack within 200mm below the wc connection centreline

Table 3 **Common branch discharge pipes (unvented)**

Appliance	Max number to be connected	OR	Max length of branch (m)	Min size of pipe (mm)	Gradient limits (fall per metre) min (mm)		max (mm)
WCS	8		15	100	9	to	90
Urinals: bowls	5		*	50	18	to	90
Stalls	7		*	65	18	to	90
Washbasins	4		4 (no bends)	50	18	to	45

Note
*No limitation as regards venting but should be as short as possible.

Diagram 2 **Direct connection of ground floor WC to a drain**



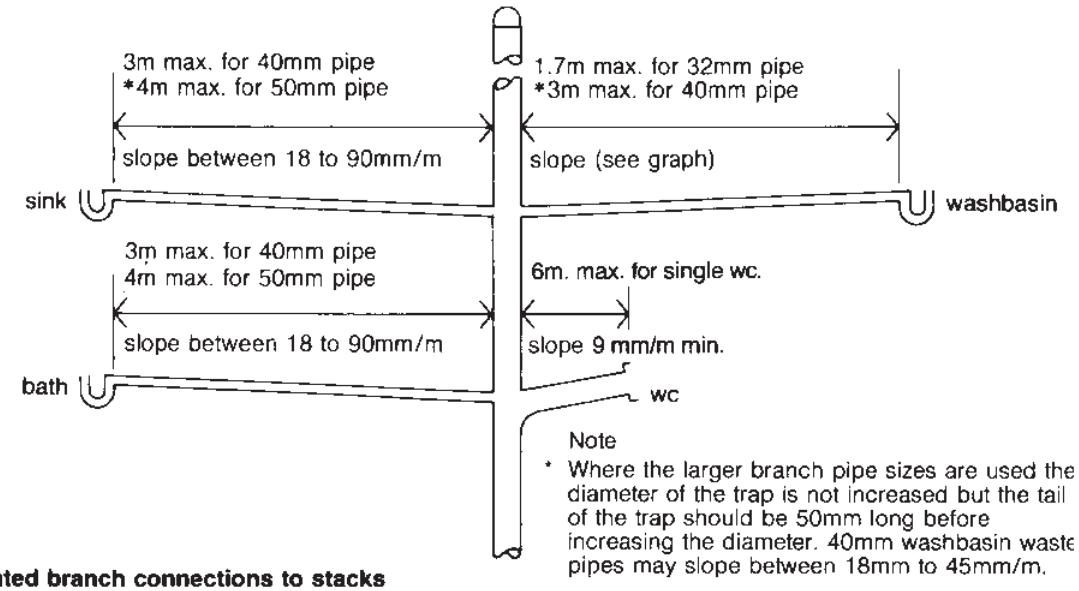
1.6 If the appliances are on the ground floor the pipe(s) may discharge to a stub stack or discharge stack, directly to a drain, or (if the pipe carries only waste water) to a gully. (*See paragraphs 1.9 and 1.2*).

1.7 A branch pipe should not discharge into a stack in a way which could cause crossflow into any other branch pipe. (See *Diagram* 1.)

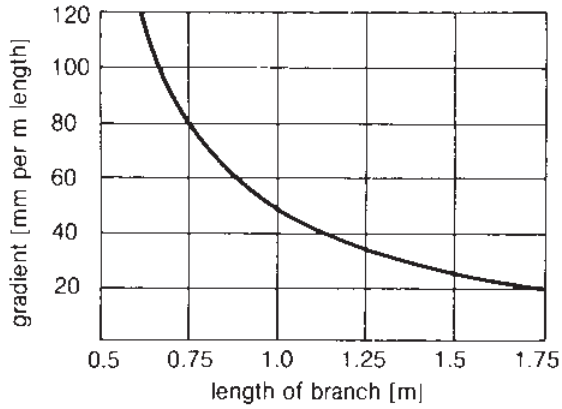
1.8 A branch discharge pipe should not discharge into a stack lower than 450mm above the invert of the tail of the bend at the foot of the stack in single dwellings of up to 3 storeys. (See Diagram 1) For multi storey buildings see *Appendix paragraphs A3 and A4*.)

1.9 A branch pipe from a ground floor closet should only discharge directly to a drain if the drop is less than 1.5m (see *Diagram* 2).

Diagram 3 **Branch connections**



(a) Unvented branch connections to stacks



(b) Design curve for 32mm washbasin waste pipes

1.10 Branch pipes from more than one ground floor appliance may discharge into a stub stack. (See paragraph 1.26.)

1.11 A branch pipe discharging to a gully should terminate between the grating or sealing plate and the top of the water seal.

1.12 Sizes of branch pipes – Pipes serving a single appliance should have at least the same diameter as the appliance trap (see Table 2). If a pipe serves more than one appliance and is unventilated the diameter should be at least the size shown in Table 3.

1.13 Bends in branch pipes should be avoided if possible. Where they cannot they should have as large a radius as possible. Pipes of 65mm or less should have a centre line radius of at least 75mm.

1.14 Junctions on branch pipes should be made with a sweep of 25mm radius or at 45°. Connection of branch pipes of 75mm diameter or more to the stack should be made with a sweep of 50mm minimum radius or at 45°.

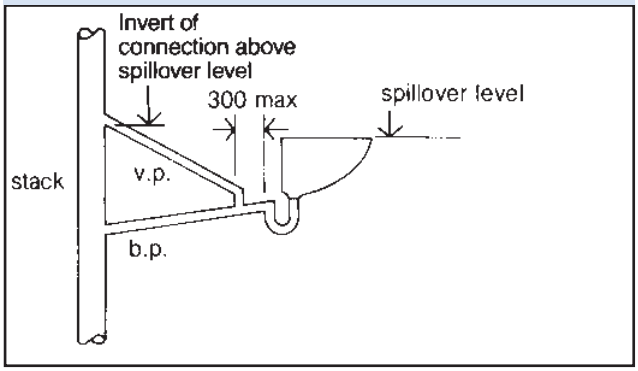
1.15 Ventilation of branch pipes – Separate ventilation will not be needed to prevent the water seals in traps from being lost by pressures which can develop in the system if the length and slope of the branch discharge pipes do not exceed those shown in Diagram 3.

1.16 If the figures are exceeded the branch pipe should be ventilated by a branch ventilating pipe to external air, to a discharge stack (modified single stack system) or to a ventilating stack (ventilated system).

1.17 A separate ventilating stack is only likely to be preferred where the numbers of ventilating pipes and their distance to a discharge stack are large. (See *Appendix paragraphs A5 to A8*).

1.18 Branch ventilating pipes – should be connected to the discharge pipe within 300mm of the trap and should not connect to the stack below the “spillover” level of the highest appliance served (see *Diagram* 4). The ventilation pipe should have a continuous incline from the discharge pipe to the point of connection to the stack.

Diagram 4 **Branch ventilation pipes**



1.19 Branch ventilation pipes which run direct to outside air should finish at least 900mm above any opening into the building nearer than 3m (see *Diagram 6 and paragraph 1.27*).

1.20 Branch ventilating pipes to branch pipes serving one appliance should be at least 25mm diameter or where the branch is longer than 15m or has more than 5 bends, should be at least 32mm.

1.21 Rodding points should be provided to give access to any lengths of discharge pipes which cannot be reached by removing traps or appliances with integral traps (see *paragraph 1.4*).

DISCHARGE STACKS

1.22 All stacks should discharge to a drain. The bend at the food of the stack should have as large a radius as possible and at least 200mm at the centre line.

1.23 Offsets in the 'wet' portion of a discharge stack should be avoided. If they are unavoidable then in a building of not more than 3 storeys there should be no branch connection within 750mm of the offset. In a building over 3 storeys a ventilation stack may be needed with connections above and below the offset. In buildings over 3 storeys discharge stacks should be located inside the building.

1.24 Sizes of stacks – Stacks should have at least the diameter shown in Table 4 and should not reduce in the direction of flow.

Stacks serving urinals should be not less than 50mm, stacks serving siphonic closets not less than 75mm and stacks serving washdown closets not less than 100mm.

1.25 Ventilation of discharge stacks – To prevent water seals in the traps from being lost by pressures which can develop in the system, discharge stacks should be ventilated. Discharge stacks connected to drains liable to surcharging or near an intercepting trap require ventilation pipes of not less than 50mm diameter connected to the base of the stack above the likely flood level.

Table 4 **Minimum diameters for discharge stacks**

Stack size (mm)	Max capacity (litres/sec)
50*	1.2
65*	2.1
75†	3.4
90	5.3
100	7.2

Notes
* No wcs
† Not more than 1 siphonic wc with 75mm outlet.

Diagram 5 **Stub stack**

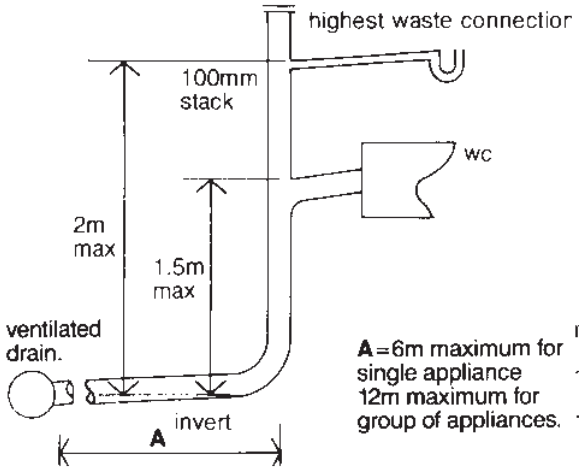
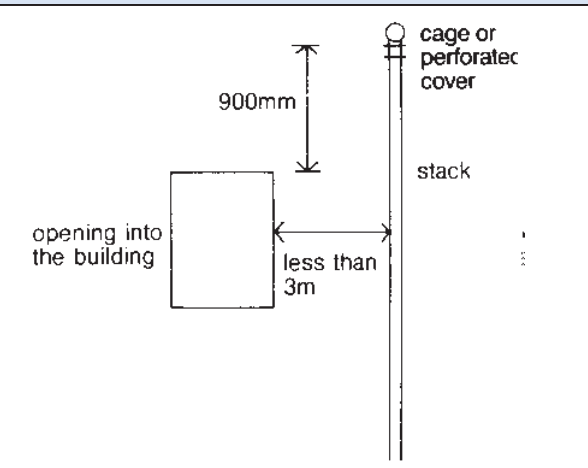


Diagram 6 **Termination of ventilation stacks or ventilating part of discharge stacks**



1.26 Stub stacks – An unventilated stub stack may be used if it connects above ground into a ventilated discharge stack or into a drain not subject to surcharging and no branch into the sub stack is more than 2m above the invert of the connection or drain and no branch serving a closet is more than 1.5m from the crown of the

closet trap to the invert of the connection or drain (see Diagram 5). The length of branch drain from an unventilated sub stack should not be more than 6m where a single appliance is connected and 12m where a group of appliances is connected. (See also *Table* 10 and *paragraph 2.21*.)

1.27 Ventilating pipes open to outside air should finish at least 900mm above any opening into the building within 3m and should be finished with a cage or other perforated corer which does not restrict the flow of air (see *Diagram* 6).

1.28 Sizes of stack ventilation pipes – The size of the part of a discharge stack which serves only for ventilation (the dry part above the highest branch) may be reduced in one and two storey houses, but should be at least 75mm.

1.29 Discharge stacks may terminate inside a building when fitted with air admittance valves. Where these valves are used they should not adversely affect the amount of ventilation necessary for the below ground system which is normally provided by the open stacks of the sanitary pipework. Only an air admittance valve which is the subject of a current British Board of AgrÈment Certificate should be used and the conditions of use should be in accordance with the terms of the Certificate.

1.30 Access for clearing blockages
Rodding points should be provided to give access to any lengths of pipe which cannot be reached from any other part of the system. All pipes should be reasonably accessible for repair.

MATERIALS FOR PIPES, FITTINGS AND JOINTS
1.31 Any of the materials shown in Table 5 may be used (the references are to British Standard Specifications). Where necessary different metals should be separated by non-metallic material to prevent electrolytic corrosion. Pipes should be firmly supported without restricting thermal movement.

Table 5 **Materials for sanitary pipework**

Material	British Standard
Pipes	
cast iron	BS 416, BS 6087
copper	BS 864, BS 2871
galvanised steel	BS 3868
uPVC	BS 4514
polypropylene	BS 5254
plastics	
ABS	
MUPVC	
polyethylene	
polypropylene	
Traps	
copper	BS 1184
plastics	BS 3943

Note
Some of these materials may not be suitable for conveying trade effluent.

AIRTIGHTNESS
1.32 The pipes, fittings and joints should be capable of withstanding an air or smoke test of positive pressure of at least 38mm water gauge for at least 3 minutes. Every trap should maintain a water seal of at least 25mm. Smoke testing is not recommended for uPVC pipes.

Alternative approach

1.33 The requirement can also be met by following the relevant recommendations of BS 5572: 1978 *Code of practice for sanitary pipework*, Clauses 3, 4 and 7 to 12 are relevant.

Section 2
Foul Drainage

2.1 Some public sewers may carry foul water and rainwater in the same pipe. However, the on site drainage system should be designed to keep the rainwater and foul drainage separate up to a point near the site boundary. Systems which discharge to a cesspool or septic tank should only carry foul water.

2.2 Where a gravity connection to the sewer is impracticable, sewage lifting equipment will be needed. Any pump chamber should be capable of providing 24 hours storage in the event of power failure of other breakdown and be fitted with dual pumps and alarm system. Guidance on sewage lifting installations is contained in BS 8301 *Code of practice for building drainage*.

LAYOUT

2.3 The layout of the drainage system should be kept simple. Changes of direction and gradient should be minimised and as easy as practicable. Access points should be provided only if blockages could not be cleared without them. Connection of drains to other drains or private or public sewers, and of private sewers to public sewers should be made obliquely, or in the direction of flow.

2.4 The system should be ventilated by a flow of air. A ventilating pipe should be provided at or near the head of each main drain, any branch longer than 6m serving a single appliance or 12m serving a group of appliances, or on a drain fitted with an intercepting trap (particularly on a sealed system). Ventilated discharge stacks may be used (see *paragraphs 1.27 and 1.28*).

2.5 Pipes should be laid to even gradients and any change of gradient should be combined with an access point (see *paragraph 2.21*).

2.6 Pipes should be laid in straight lines where practicable but may be laid to slight curves if these can still be cleared of blockages. Any bends should be limited to positions in or close to inspection chambers of manholes (see *paragraph 2.21*) and to the foot of discharge and ventilating stacks. Bends should have as large a radius as practicable (see *paragraph 1.22*)

2.7 Special precautions should also be taken to accommodate the effects of settlement where pipes run under or near a building, on piles or beams, in common trenches or in unstable ground. Precautions may also be necessary in situations involving surcharging of drains, or where control of rodents from sewers is a problem (see *Appendix paragraphs A9 to A14*).

DEPTH OF PIPE COVER

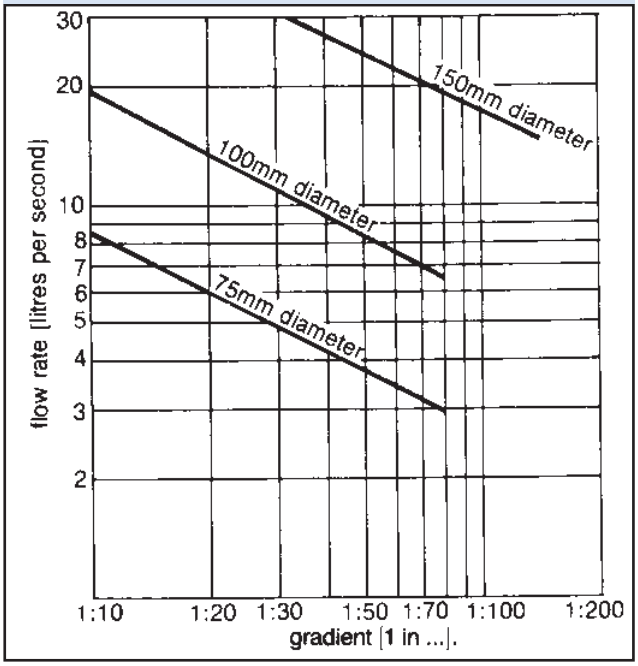
2.8 The depth of cover will usually depend on the levels of the connections to the system, the gradients at which the pipes should be laid and the ground levels.

2.9 Pipes also need to be protected from damage and if the proposed bedding class gives too little cover (or too much, when the pipes could be damaged by the weight of backfilling) for one combination of cover, pipe strength and pipe bedding it may be possible to choose another combination. Alternatively special protection can be provided (see *Appendix paragraphs A15 and A17*).

PIPE GRADIENTS AND SIZES

2.10 Drains should have enough capacity to carry the flow and be laid to falls. The flow depends on the appliances connected (see *paragraphs 0.1 to 0.4 and Table* 1) and the capacity depends on the size and gradient of the pipes (see *Diagram* 7).

Diagram 7 **Discharge capacities of foul drains running 0.75 proportional depth**



2.11 A drain carrying only waste water should have a diameter of at least 75mm and a drain carrying soil water or waste water containing trade effluent a diameter of at least 100mm.

2.12 Table 6 shows the flattest gradients at which drains should be laid, (depending on the flow and the appliances connected to them) and the capacity they will then have (*see also paragraphs 0.1 to 0.4*).

Table 6 **Recommended minimum gradients for foul drains**

Peak flow (litres/sec)	Pipe size (mm)	Minimum gradient (1 in ...)	Maximum capacity (litres/sec)
<1	75	1:40	4.1
	100	1:40	9.2
>1	75	1:80	2.8
	100	1:80*	6.3
	150	1:150†	15.0

Notes
* Minimum of 1 wc.
† Minimum of 5 wcs.

Table 7 **Materials for below ground gravity drainage**

Material	British Standard
Rigid pipes	
asbestos	BS 3656
vitrified clay	BS 65, BSEN 295
concrete	BS 5911
grey iron	BS 437, BS 6087
Flexible pipes	
uPVC	BS 4660
	BS 5481

Note
Some of these materials may not be suitable for conveying trade effluent.

2.13 Combined systems – The capacity of systems carrying foul water and rainwater should take account of the combined peak flow.

MATERIALS FOR PIPES AND JOINTING

2.14 Any of the materials shown in Table 7 may be used (the references are to British Standard Specifications). Joints should be appropriate to the material to the pipes. To minimise the effects of any differential settlement pipes should have flexible joints. All joints should remain watertight under working and test conditions and nothing in the pipes., joints or fittings should project into the pipe line or cause an obstruction. Different metals should be separated by non-metallic materials to prevent electrolytic corrosion where necessary.

BEDDING AND BACKFILLING

2.15 The choice of bedding and backfilling depends on the depth at which the pipes are to be laid and the size and strength of the pipes.

2.16 Rigid pipes – The types of bedding and backfilling which should be used for rigid pipes of standard strength laid in a trench of any width are shown in Diagram 8 and Table 8. Minimum and maximum depths of cover are also shown for each type. For special protection where pipes are laid with less cover see *Appendix paragraph A15*.

2.17 Flexible pipes – These will become deformed under load and require support to limit the deformation to 5 per cent of the diameter of the pipe. The bedding and backfilling should be as shown in Diagram 9. The minimum depth should be 0.9m under any road and 0.6m in

Diagram 8 **Bedding for rigid pipes**

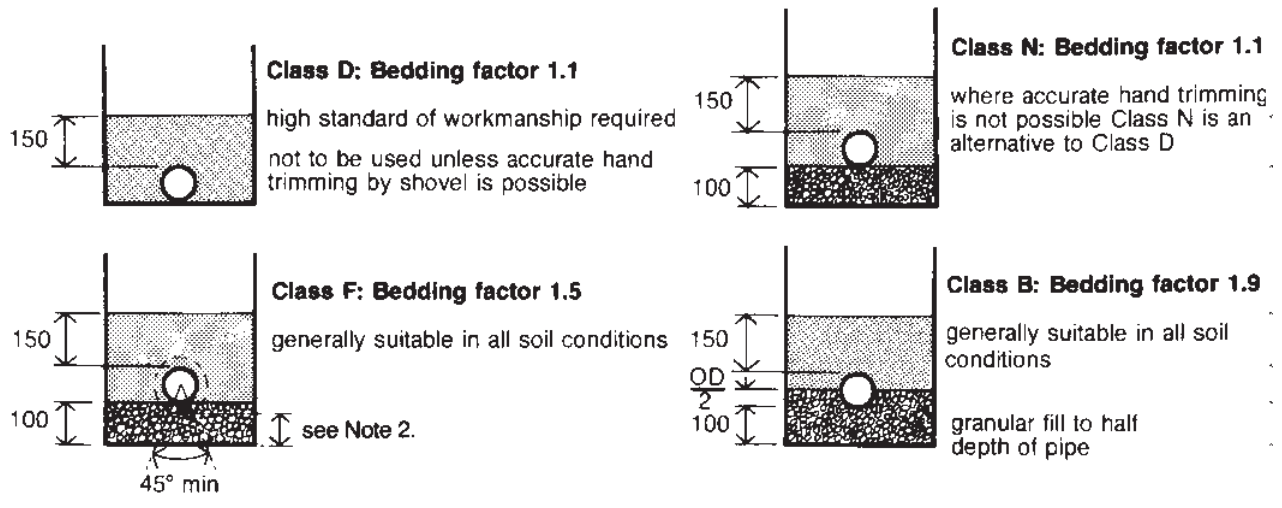
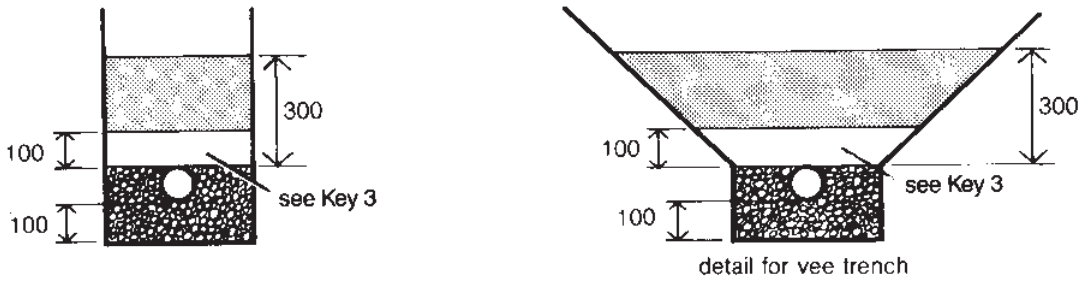


Diagram 9 **Bedding for flexible pipes**



Key

1 Selected fill: free from stones larger than 40mm, lumps of clay over 100mm, timber, frozen material, vegetable matter.

2 Granular material: should conform to BS 882: 1983 Table 4 or BS 8301: 1985 Appendix D. Compaction fraction > 0.3 for Class N > 0.2 for Class F and B.

3 Selected fill or granular fill free from stones larger than 40mm.

Notes

1 Provision may be required to prevent ground water flow in trenches with Class N, F or B type bedding

2 Where there are sockets these should be not less than 50mm above the floor of the trench.

Table 8 **Limits of cover for standard strength rigid pipes in any width of trench**

		Fields and gardens		Light traffic roads		Heavy traffic roads	
Pipe bore	**Bedding class**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
100	D or N	0.4	4.2	0.7	4.1	0.7	3.7
	F	0.3	5.8	0.5	5.8	0.5	5.5
	B	0.3	7.4	0.4	7.4	0.4	7.2
150	D or N	0.6	2.7	1.1	2.5	–	–
	F	0.6	3.9	0.7	3.8	0.7	3.3
	B	0.6	5.0	0.6	5.0	0.6	4.6

fields and gardens. The maximum depth should be 10m. For special protection where pipes are laid with less cover see *Appendix paragraph A16 to A17.*

CLEARANCE OF BLOCKAGES

2.18 Sufficient and suitable access points should be provided for clearing blockages from drain runs which cannot be reached by any other means. The siting, spacing and type of the access points will depend on the layout, depth and size of the runs.

2.19 The provisions described below are for normal methods of rodding (which need not be in the direction of flow) and not mechanical means of clearing.

2.20 Access points should be one of four types. Table 9 shows the depth at which each type should be used and the recommended dimensions it should have. The dimensions should be increased at junctions if they do not allow enough space for branches. The types are:

(a) rodding eyes – capped extensions of the pipes;

(b) access fittings – small chambers on (or an extension of) the pipes but not with an open channel;

(c) inspection chambers – chambers with working space at ground level;

(d) manholes – large chambers with working space at drain level.

Table 9 **Minimum dimensions for access fittings and chambers**

Type	Depth to (m)	Internal sizes: Length × width (mm × mm)	Internal sizes: Circular (mm)	Cover sizes: Length × width (mm × mm)	Cover sizes: Circular (mm)
Rodding eye		As drain but min 100			
Access fitting					
small	0.6 or less	150 × 100	150	150 × 100	150
large		225 × 100	–	225 × 100	–
Inspection chamber	0.6 or less	–	190*	–	190*
	1.0 or less	450 × 450	450	450 × 450	450†
Manhole	1.5 or less	1200 × 750	1050	600 × 600	600
	over 1.5	1200 × 750	1200	600 × 600	600
	over 2.7	1200 × 840	1200	600 × 600	600
Shaft	over 2.7	900 × 840	900	600 × 600	600

Notes
* Drains up to 150mm.
† For clayware or plastics may be reduced to 430mm in order to provide support for cover and frame.

Table 10 **Maximum spacing of access points in metres**

From	To	Access Fitting: Small	Access Fitting: Large	Junction	Inspection chamber	Manhole
Start of external drain*		12	12	-	22	45
Rodding eye		22	22	22	45	45
Access fitting						
small 150 diam						
150 × 100		-	-	12	22	22
large 225 × 100		-	-	22	45	45
Inspection chamber		22	45	22	45	45
Manhole		22	45	45	45	90

Note
*See paragraphs 1.9 and 1.26

2.21 Siting of access points – Access should be provided at the following points:

(a) on or near the head of each drain run, and

(b) at a bend and at a change or gradient, and

(c) at a change of pipe size (but see below if it is at a junction), and

(d) at a junction unless each run can be cleared from an access point (some junctions can only be rodded through from one direction).

2.22 Access should be provided to long runs. The distances between access points depend on the types of access used but should not be more than shown in Table 10 for drains up to and including 300mm.

2.23 Construction of access points – These should contain the foul water under working and test conditions and resist the entry of ground water and rainwater. Any of the materials shown in Table 11 may be used.

2.4 Where half round channels are used in inspection chambers and manholes the branches should discharge into the channel at or above the level of the horizontal diameter. Where the angle of the branch is more than 45° a three quarter section branch should be used. Channels and branches should be benched up at least to the top of the outgoing pipe and at a slope of 1 in 12. The benching should be rounded at the channel with a radius of at least 25mm.

Table 11 Materials for access points

Material		British Standards
1.	Inspection chambers and manholes	
	Clay	
	bricks and blocks	BS 3921
	vitrified	BS 65
	Concrete	
	precast	BS 5911
	in situ	BS 8110
	Plastics	BS 7158
2	Rodding eyes and access fittings (excluding frames and covers)	as pipes see Table 7 BBA Certificates

2.25 Inspection chambers and manholes should have removable non-ventilating covers of durable material (such as cast iron, cast or pressed steel, precast concrete or uPVC) and be of suitable strength. Inspection chambers and manholes in buildings should have mechanically fixed airtight covers unless the drain itself has watertight access covers. Manholes deeper than 1m should have metal step irons or fixed ladders.

WATERTIGHTNESS

2.26 After laying, including any necessary concrete or other haunching or surrounding and backfilling gravity drains and private sewers up to 300mm should be capable of withstanding a final water test to a pressure equal to 1.5m head of water measured above the invert at the head of the drain, or an air test to ensure a maximum loss of head on a monometer of 25mm in a period of 5 minutes for 100mm gauge or 12mm for a 50mm gauge.

2.27 Where the drain is water tested using a stand pipe of the same diameter as the drain, the section of drain should be filled and left to stand for 2 hours and topped up. The leakage over 30 minutes should then be measured and should not be more than 0.5 litres for each metre run of drain for a 100mm drain – a drop in water level of 6.4mm/m, and 0.08 litres for a 150mm drain – a drop in water level of 4.5mm/m.

2.28 To prevent damage to the drain the head of water at the lower end of the section should not be more than 4m and it may be necessary to test a drain in several sections.

Alternative approach

2.29 The requirement can also be met by following the relevant recommendations of BS 8301: 1985 *Code of practice for building drainage*. The relevant clauses are in Section one, Section two, Section three (except Clause 10), Section four (except Clause 23), Section five (Clause 25 only) and Apendices. The Code contains additional detailed information about design and construction and describes the discharge unit method of determining pipe sizes.

Appendix
Additional guidance for large buildings

CAPACITY OF PIPES
(*see paragraphs 0.1 to 0.4*)

A1 Flow rates for other commonly used appliances not covered in Table 1 are shown in Table A1.

Table A1 Flow rates from appliances

Appliance	Flow rate (litres per sec)
Spray tap basin	0.06
Washing machine	0.70

TRAPS
(*see paragraph 1.2*)

A2 Minimum trap sizes and seal depths for appliances not listed in Table 1 are shown in Table A2

Table A2 Minimum trap sizes and seal depths additional to Table 2

Appliance	Diam of trap (mm)	Depth of seal (mm)
sanitary towel macerator	40	75
Food waste disposal unit (industrial type)	50	75
urinal stall (1 to 7 person position)	65	50

BRANCH DISCHARGE PIPES
(*see paragraph 1.5*)

A3 A branch pipe should not discharge into a stack less than 750mm above the invert of the tail of the bend at the foot of the stack in a multi storey building up to 5 storeys. Alternatively a branch pipe serving any ground floor appliance may discharge direct to a drain or into its own stack.

A4 If the building has more than 5 storeys ground floor appliances, unless discharging to a gully or drain, should discharge into their own stack. If the building has more than 20 storeys ground floor appliances, unless discharging to a gully or drain, and first floor appliances should discharge into their own stack.

VENTILATING STACKS
(see paragraph 1.17)

A5 A dry stack may provide ventilation for branch ventilating pipes as an alternative to carrying them to outside air or to a ventilated discharge stack (ventilated system).

A6 Ventilation stacks serving buildings with not more than 10 storeys and containing only dwellings should be at least 32mm diameter (*for all other buildings see paragraph 2.29*).

A7 The lower end of a stack may be connected directly to a bend (*see paragraph 1.22*) or it may be connected to a ventilated discharge stack when the connection should be below the lowest branch discharge pipe.

A8 The upper end of a stack may be carried to outside air (when it should finish as described in paragraph 1.19) or it may be connected to a ventilated discharge stack when the connection should be above the spill-over level of the highest appliance.

SPECIAL PROTECTION – SETTLEMENT
(*see paragraph 2.7*)

A9 A drain may run under a building if at least 100mm of granular or other flexible filling is provided round the pipe. On sites where excessive subsidence is possible additional flexible joints may be advisable or other solutions such as suspended drainage. Where the crown of the pipe is within 300mm of the underside of the slab, concrete encasement should be used integral with the slab.

A10 A drain may run through a wall or foundation and depending on whether it is necessary to build the pipe into the wall either—

(a) an opening formed to give at least 50mm clearance all round the pipe and the opening masked with rigid sheet material to prevent the ingress of fill or vermin or

(b) a length of pipe (as short as possible) built in with its joints as close as possible to the wall faces within at most 150mm) and connected on each side to rocker pipes with a length of at most 600mm and flexible joints (see *Diagram* A1).

A11 A drain trench should not be excavated lower than the foundations of any building nearby (see Diagram A2) unless either:

(a) where the trench is within 1m of the building the trench is filled with concrete up to the lowest level of the building, or

Diagram A1 **Pipes penetrating walls**

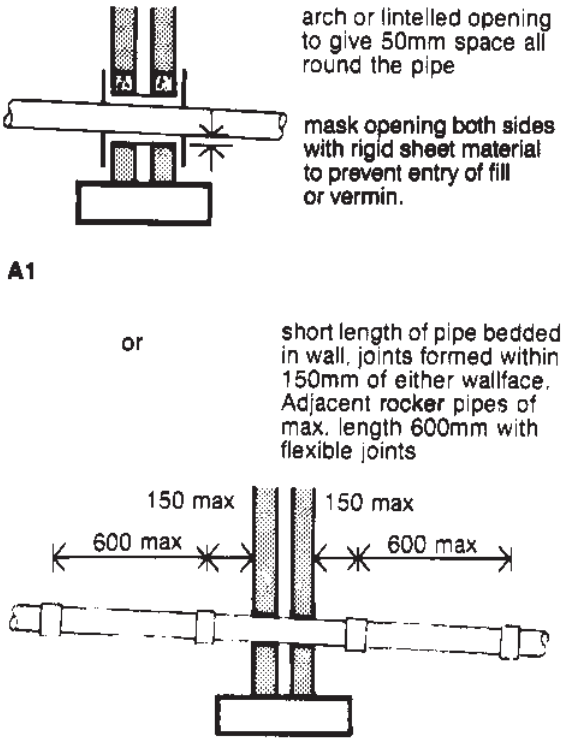
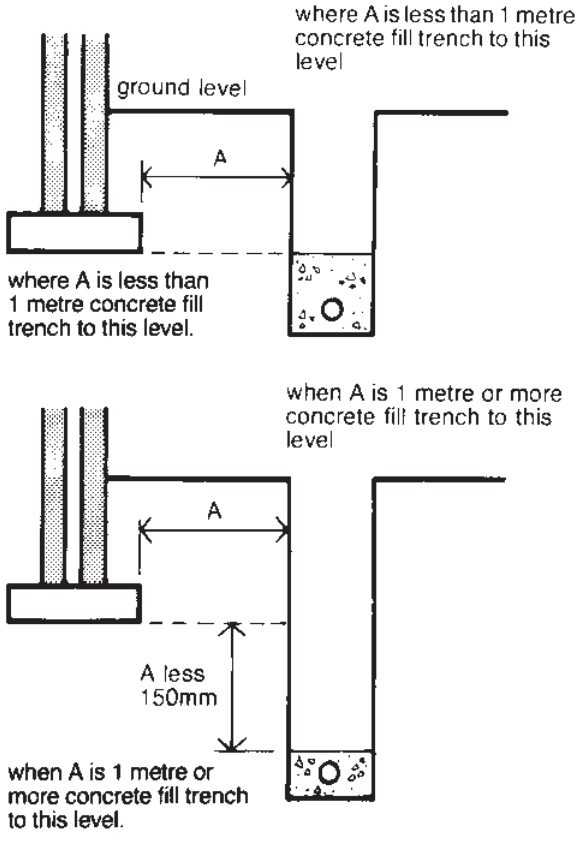


Diagram A2 **Pipe runs near buildings**



(b) where the trench is further than 1m from the building, the trench is filled with concrete to a level below the lowest level for the building equal to the distance from the building, less 150mm.

SPECIAL PROTECTION – SURCHARGING OF DRAINS

A12 Where a drain is liable to surcharge, measures should be taken to protect the building. All drainage unaffected by surcharge should by-pass the protective measures and discharge by gravity either to a surcharge free outlet or if unavoidable into the surcharged part of the system. The measures taken depend on the particular circumstances and the Public Services Department may be able to provide information, and in some cases give guidance, on sites where surcharging could be a problem. Protective measures are described in BS 8301. Where any type of anti-flood device is used additional ventilation may be needed to maintain trap seals (see *paragraph 1.25*).

SPECIAL PROTECTION – RODENT CONTROL

A13 The department of health may be able to provide information on locations where infestation of drains and private sewers by rodents is a problem, and on the measures found most effective in that area. Measures may include 'sealed' drainage, i.e. drainage having access covers to the pipework in the inspection chamber instead of an open channel which gives effective protection. Protection can also be derived from intercepting traps although their liability to blockage can affect the efficiency of the drainage system unless they are regularly maintained. In some situations a combination of both measures may be advisable.

SPECIAL PROTECTION – GROUND LOADS

A14 Where rigid pipes have less than the recommended cover in Table 8 the pipes should, where necessary, be protected from damage by concrete encasement not less than 100mm thick and having movement joints formed with compressible board at each socket or sleeve joint face (see *Diagram A3 and paragraphs 2.9 and 2.16*).

Diagram A3 **Concrete encasement for rigid pipes (minimum sizes)**

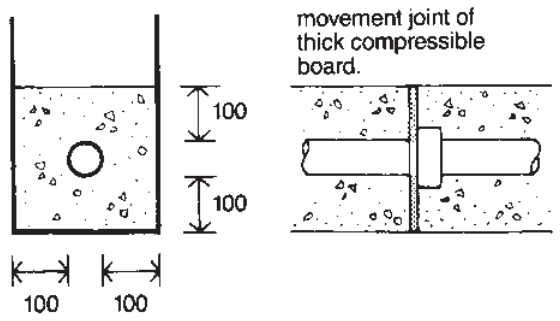
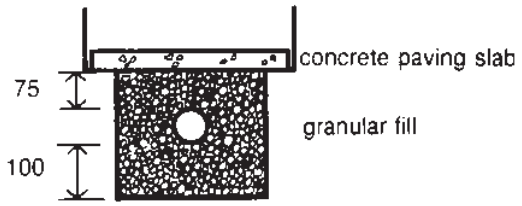


Diagram A4 **Protection for flexible pipes (minimum sizes)**



A15 Where flexible pipes are not under a road and have less than 0.6m cover they should, where necessary have concrete paving slabs laid as bridging above the pipes with at least 75mm of granular material between the top of the pipe and the underside of the slabs (see *Diagram A4 and paragraphs 2.9 and 2.18*).

A16 Where flexible pipes are under a road and have less than 0.9m cover reinforced concrete bridging should be used instead of paving slabs, or a reinforced concrete surround (see *paragraphs 2.9 and 2.14*).

Guidance

Section 3

PERFORMANCE

In the view of the Committee requirement (18) of part 6 will be met if:

(a) cesspools have sufficient capacity to store the foul water from the building until they are emptied;

(b) septic tanks have sufficient capacity to enable breakdown and settlement of solid matter in the foul water from the buildings;

(c) cesspools and septic tanks are constructed so as to prevent leakage of the contents and ingress of subsoil water, and with adequate ventilation;

(d) cesspools and septic tanks are sited so as not to be prejudicial to health, not to contaminate water supplies and so as to permit satisfactory access for emptying;

(e) cesspools are fitted with a warning device which operates automatically when the cesspool is 75% full.

Introduction to provisions

0.1 Paragraphs 1.1 to 1.10 of this document give guidance only on the general principles relating to capacity, siting and ventilation of cesspools and septic tanks.

0.2 Specialist knowledge is advisable in the detailed design and installation of small sewage treatment works and guidance is given in BS 6297: 1983 *Code of practice for design and installation of small sewage treatment works and cesspools* (*see also paragraph 1.11*).

CAPACITY

1.1 Cesspools should have a capacity below the level of the inlet of at least 18,000 litres (18m^3).

1.2 Septic tanks should have a capacity below the level of the inlet of at least 2,700 litres (2.7m^3).

SITING

1.3 Cesspools, septic tanks and sub-surface irrigation systems should be sited:

(a) As far as is practicable (a distance of 15m is desirable) from any dwelling, public building or any building in which any person is employed in any manufactured, trade or business, and,

(b) Within 30m of a vehicle access and at such levels that they can be emptied or desludged and cleaned without hazard to the building occupants of the contents being taken through a dwelling or place of work. Access may be through an open covered space.

DESIGN AND CONSTRUCTION

1.4 Cesspools and septic tanks should prevent leakage of the contents and to ingress of subsoil water. Septic tanks should incorporate at least two chambers or compartments operating in series. Cesspools and septic tanks may be constructed in brickwork, concrete, or glass reinforced concrete. Brickwork should be of engineering bricks and be at least 220mm thick. The mortar should be a mix of 1:3 cement and ratio. In-situ concrete should be at least 150mm thick of C/25/P mix (*see BS 5328*).

1.5 Factory made cesspools and septic tanks are available in glass reinforced plastics, polyethylene or steel and a way of demonstrating compliance is for these to be the subject of a British Board of Agrément (BBA) Certificate, and to be installed in accordance with the certificate and the manufacturer's instructions. Particular care is necessary in ensuring stability of these tanks.

1.6 Cesspools and septic tanks should be covered and ventilated.

1.7 Cesspools, and septic tanks, should be provided with access for emptying or desludging and cleaning. The access should not have any dimension less than 600mm where entry is required. Access covers should be of durable quality having regard to the corrosive nature of the tank contents, and be lockable.

1.8 The inlet of a cesspool and the inlet and outlet of a septic tank should be provided with access for inspection.

1.9 Cesspools should have no openings except for the inlet, access for emptying and ventilation.

1.10 The inlet and outlet of a septic tank should be designed to prevent disturbance to the surface scum or settled sludge. Where the width of the tank does not exceed 1200mm the inlet should be via a dip pipe. To minimise turbulence, provision should be made to limit the flow rate of the incoming foul water. For steeply laid drains up to 150mm the velocity may be limited by laying the last 12m of the incoming drain at a gradient of 1 in 50 or flatter.

Alternative approach

1.11 The requirement can also be met by following the relevant recommendations of BS 6297: 1983 *Code of practice for design and installation of small sewage treatment works and cesspools*. The relevant clauses are in Section one, Section two, Section three (clauses 6-11), Section four and Appendices.

DISPOSAL OF SEPTIC TANK EFFLUENT

Disposal of septic tank effluent should be to underground strata using a sub-surface irrigation system installed in accordance with BS 6297: 1983, Section 3 (Clause 5.3).

A sub-surface irrigation system should be so sited that no part is within 30m of any well, borehole, reservoir or stream of water, used or likely to be used by people for drinking or domestic purposes or for the manufacture of preparation of articles of food or drink for human consumption.

Note: Permission in respect of the Island Planning (Jersey) Law will not normally be given for new development which relies on septic tanks and soakaways or private sewage treatment plants.

A BRIEF OUTLINE OF BS 6297: 1983 SECTION 15.3

If the winter water-table is within one metre of the invert of the proposed irrigation system, it is not advisable to use this method of disposal.

Specification

A system of field drains should be carefully designed from the septic tank, using porous or perforated pipes, laid in trenches with a uniform gradient.

(a) The pipes must be carefully laid to a fall of 1:200 with the perforations downwards.

(b) The trenches should be from 300mm–900mm wide and 150mm deeper than invert level, with 2 metres of undisturbed ground between the pipelines.

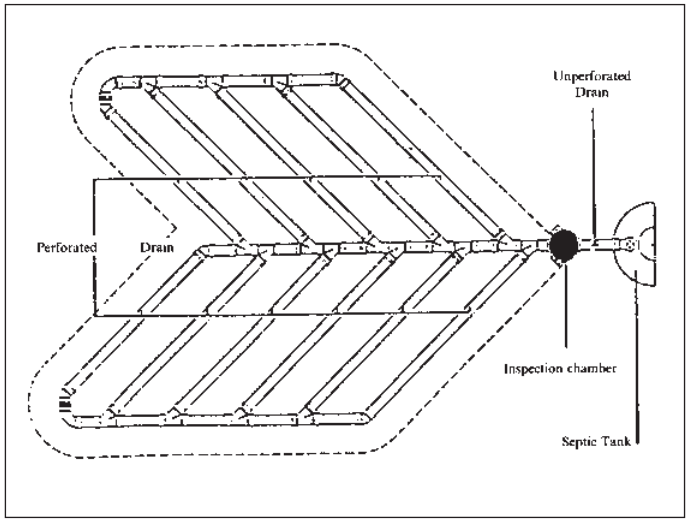
(c) The trenches are then lined with chippings of single size 20mm to a minimum depth of 150mm.

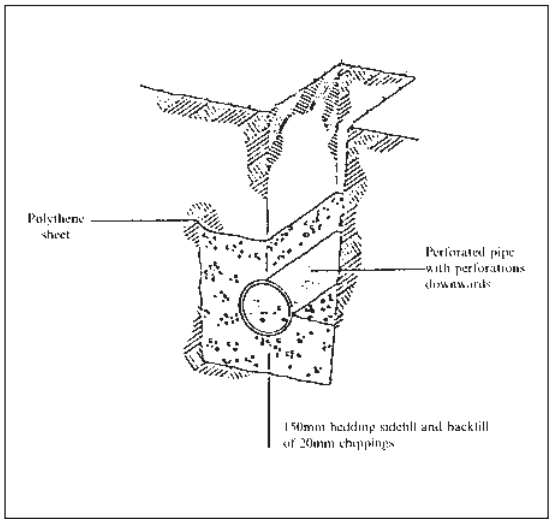
(d) The porous or perforated pipe is then laid on the middle of the trench and side filled to the crown of the pipe.

(e) To prevent ingress of soil and fines a polythene sheet or similar material is laid on top of the pipe to the width of the trench.

(f) Further chippings are then added to a depth of 150mm taking care not to puncture the material and the trench is then back-filled in the normal way using as dug material.

Septic tank installation showing herringbone layout of pipes





Calculating area of drainage trench

The formula and method for calculating the area of a sub-surface irrigation trench is as follows:

$$\text{Trench area in } m^2 = P \times Vp \times 0.25$$

Where P = the number of persons served by the tank.
Vp = the percolation value.

The percolation value is determined as follows:

(i) Excavate a hole 300mm square at the proposed invert level.

(ii) Fill with water to a minimum depth of 250mm and allow the water to seep away overnight.

(iii) Re-fill the test hole the following day to a depth of 250mm and note in seconds the time taken for the water to seep away.

(iv) Divide this time by the initial depth of water in millimetres.

(v) The result of this calculation is the percolation value or the average time for the water to drop 1mm. The percolation value should be the average from at least three test holes over the drainage area.

(vi) If the percolation value exceeds 140 s the soil is not suitable. For values ranging from 100 s–140 s underdrains should be provided in accordance with BS 6297: 1983: Section: 15.3.3.

Guidance

Section 4

PERFORMANCE

In the view of the Committee requirement (19) of part 6 will be met if a rainwater drainage system:

(a) carried the flow of rainwater from the roof to an outfall (a surface water or combined sewer, a soakaway, or a watercourse),

(b) minimises the risk of blockage or leakage,

(c) is accessible for clearing blockages.

Introduction to provisions

0.1 There are no provisions in this document for draining the rainfall on overall areas of 6m^2 or less including small roofs and balconies unless they receive a flow from a rainwater pipe or from paved and other hard surfaces.

0.2 The capacity of the drainage system should be large enough to carry the expected flow at any point in the system.

0.3 The flow depends on the area to be drained and the intensity of the rainfall which should be assumed to be 75mm an hour for roof drainage design.

0.4 The capacity depends on the size and gradient of the gutters and pipes. Capacities and minimum sizes are given in the test.

0.5 Rainwater or surface water should not be discharged to a cesspool or septic tank.

0.6 Rainwater or surface water soakaways should be positioned at least 5m from any building.

Gutters and rainwater pipes

GUTTERS

1.1 The flow into a gutter depends on the area of surface being drained and whether the surface is flat or pitched (and, if it is pitched, on the angle of pitch). Table 1 shows a way of allowing for the pitch by working out an effective area.

Table 1 Calculation of area drained

	Type of surface	Effective design area (m^2)
1	flat roof	plan area of relevant portion
2	pitched roof at 30° pitched roof at 45° pitched roof at 60°	plan area of portion x 1.15 plan area of portion x 1.40 plan area of portion x 2.00
3	pitched roof over 70° or any wall	elevation area x 0.5

1.2 Table 2 shows the largest effective area which should be drained into the gutter sizes which are most often used. These sizes are for a gutter which is laid level, half round in section with a sharp edged outlet at only one end and where the distance from a stop end to the outlet is not more than 50 times the water depth. At greater distances the capacity of the gutter should be reduced. The Table shows the smallest size of outlet which should be used with the gutter.

Table 2 Gutter sizes and outlet sizes

Max effective roof area (m^2)	Gutter size (mm dia)	Outlet size (mm dia)	Flow capacity (litres/sec)
6.0	–	–	–
18.0	75	50	0.38
37.0	100	63	0.78
53.0	115	63	1.11
65.0	125	75	1.37
103.0	150	89	2.16

Note
Refers to nominal half round eaves gutters laid level with outlets at one end sharp edged. Round edged outlets allow smaller downpipe sizes.

1.3 Where the outlet is not at the end of the gutter should be of the size appropriate to the larger of the areas draining into it. Where there are two end outlets they may be up to 100 times the depth of flow apart.

1.4 Gutters should be laid with any fall towards the nearest outlet. Where there is a fall or the gutter has a section which gives it large capacity than a half-round gutter or the outlet is round edged it may be possible to reduce the size of the gutter and pipe. Paragraph 1.8 gives a reference to some detailed recommendations which makes reductions possible. Gutters should also be laid so that any overflow in excess of the design capacity, caused by conditions such as above normal rainfall, will be discharged clear of the building.

RAINWATER PIPES

1.5 Rainwater pipes should discharge into a drain or gully but may discharge to another gutter or onto another surface if it is drained. Any rainwater pipe which discharges into a combined system should do so through a trap.

1.6 The size of a rainwater pipe should be at least the size of the outlet from the gutter. A down pipe which serves more than one gutter should have an area at least as large as the combined areas of the outlets.

MATERIALS FOR GUTTERS, RAINWATER PIPES AND JOINTS

1.7 The materials used should be of adequate strength and durability and,

(a) all gutter joints should remain watertight under working conditions. Pipes inside a building should be capable of withstanding the airtightness test described in paragraph 1.32 of section one to this Technical Guidance Document.

(b) Gutters and rainwater pipes should be firmly supported without restricting thermal movement, and

(c) Different metals should be separated by non-metallic material to prevent electrolytic corrosion.

Alternative approach

1.8 The performance can also be met by following the relevant recommendations of BS 6367: 1983 *Code of practice for drainage of roofs and paved areas*. The relevant clauses are in Section one, Section two, Section three (except Clause 9), Section four, Section five (except Clause 18) and Appendices. The Code contains additional detailed information about design and construction.

Rainwater drainage

DESIGN

2.1 The following provisions apply if the drainage system is to carry only rainwater.

2.2 Where there is evidence of a liability to surcharging from sewers, or levels in the building or on the site make gravity connection impracticable, surface water lifting equipment will be needed. Guidance on surface water lifting installations is contained in BS 8301 *Code of practice for building drainage*.

LAYOUT

2.3 Refer to paragraphs 2.3 to 2.7 in Section 2.

DEPTH OF PIPES

2.4 Refer to paragraphs 2.8 and 2.9 in Section 2.

PIPE GRADIENTS AND SIZES

2.5 Drains should have enough capacity to carry the flow, which may include the run off from paved or other hard surfaces—although the run off from these surfaces is not covered by building bye laws. A rainfall intensity of 50mm per hour should be assumed for these areas (see *paragraph 0.3*). The capacity depends on the size and gradients of the pipes.

2.6 Drains should be at least 75mm diameter. Diagram 1 shows the capacities of drains of various sizes at different gradients. 75mm and 100mm rainwater drains should be laid at not less than 1:100. However the capacity can be increased by increasing the gradient, or by using larger pipes.

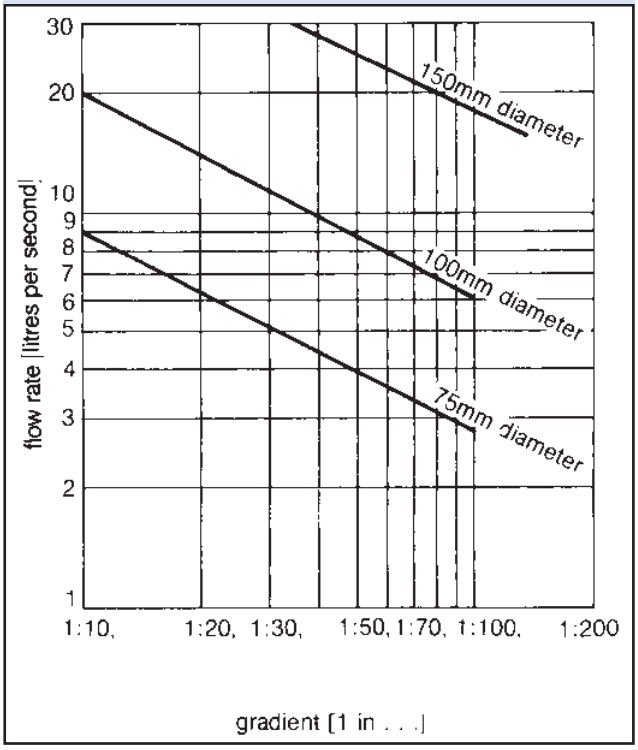
MATERIALS FOR PIPES AND JOINTING

2.7 See paragraph 2.14 in Section 2.

BEDDING AND BACKFILLING

2.8 See paragraphs 2.15 to 2.17 in Section 2.

Diagram 1 **Discharge capacities of rainwater drains running full**



CLEARANCE OF BLOCKAGES

2.9 See paragraphs 2.18 to 2.25 in Section 2.

WATERTIGHTNESS

2.10 See paragraphs 2.26 to 2.28 in Section 2.

Alternative approach

2.11 The requirement can also be met by following the relevant recommendations of BS 8301: 1985 *Code of practice for building drainage*. The relevant causes are in Section one, Section two, Section three (except Clauses 7 and 10), Section four (except Clause 23), Section five (Clause 25 only) and Appendices. The Code contains additional detailed information about design and construction.

Guidance

Section 5

PERFORMANCE

In the view of the Committee requirement (20) of part 6 will be met if there are provided:

a. sanitary conveniences in sufficient numbers of the appropriate type for the sex and age of the persons using the building; and

b. washbasins, with hot and cold water, in rooms containing water closets; sited, designed and installed so as not to be prejudicial to health, in accordance with paragraphs 1.1 to 1.11 below, and

c. in dwellings a bathroom containing a fixed bath or shower having supplies of hot and cold water with a connection to a foul water drainage system.

Meaning of terms
The following meanings apply to terms in Section 5.

Sanitary conveniences means closets and urinals.

Sanitary accommodation means a room containing closets or urinals whether or not it also contains other sanitary appliances. Sanitary accommodation containing one or more cubicles counts as a single space if there is free circulation of air throughout the space.

SANITARY FACILITIES

Number, type and siting of appliances

1.1 Any dwelling should have at least one closet and one wash-basin.

1.2 Restaurants, public houses, cafes and fast food outlets should have sanitary facilities as set out in tables 1, 2 and 3.

1.3 A space containing a closet or urinal should be separated by a door from a space used for the preparation of food (including a kitchen and any space in which washing up is done).

1.4 Washbasins should be located in the room containing the closet.

Design

1.5 A closet, urinal or washbasin should have a surface which is smooth and non-absorbent and capable of being easily cleaned.

1.6 Any flushing apparatus should be capable of cleansing the receptacle effectively. No part of the receptacle should be connected to any pipe other than a flush pipe or discharge pipe.

1.7 A wash-basin provided in sanitary accommodation containing a water closet should have a supply of hot water, which may be from a central source or from a unit water heater, and a piped supply of cold water.

Installation

1.8 A closet fitted with flushing apparatus should discharge through a trap and discharge pipe into a discharge stack or a drain.

1.9 A urinal fitted with flushing apparatus should discharge through a grating, a trap and a branch pipe to a discharge stack or a drain.

1.10 A closet fitted with a macerator and pump may be connected to a small bore branch discharge pipe discharging to a discharge stack if:

a. there is also access to a closet discharging directly to a gravity system, and

b. the macerator and pump small bore drainage system is the subject of a current European Technical Approval issued by a member body of the European Organisation for Technical Approvals eg the British Board of Agrément and the conditions of use are in accordance with the terms of that document.

1.11 A washbasin should discharge through a grating, a trap and a branch discharge pipe to a discharge stack or may, where the washbasin is located on the ground floor, discharge into a gully or direct to a drain.

Alternative approach

1.12 The requirement can also be met, subject to other legislation, by following the relevant recommendations of clauses 2, 3 and 6 to 8 of BS 6465 Sanitary installations, Part 1: 1984 *Code of practice for scale of provision, selection and installation of sanitary appliances.*

Table 1 **Sanitary facilities for public houses**

Maximum number of patrons	Minimum requirements				
	For female patrons		For male patrons		
	W.C's	Washbasins	W.C's	Urinals	Washbasins
Up to 50	2		1	2	2
51 to 100	3	2	1	2	2
101 to 150	4	2	1	3	2
151 to 200	5	3	1	3	2
201 to 250	6	3	2	3	3
251 to 300	7	4	2	4	3
301 to 350	8	4	2	5	3
351 to 400	9	5	2	6	4
401 to 450	10	5	3	6	5
451 to 500	11	6	3	7	5
501 to 550	12	6	3	7	5
551 to 600	13	7	3	8	5
601 to 650	14	7	3	9	5
651 to 700	15	8	4	9	6

Table 2 **Sanitary facilities for restaurants**

Maximum number of patrons	Minimum requirements				
	For female patrons		For male patrons		
	W.C's	Washbasins	W.C's	Urinals	Washbasins
Up to 60	2	1	1	Nil	1
61 to 100	3	2	1	1	2
101 to 150	3	2	1	2	2
151 to 200	4	2	1	3	2
201 to 250	4	2	2	5	3
251 to 300	4	2	2	6	4
301 to 350	4	2	2	7	4
351 to 400	4	2	2	8	4
401 to 450	5	3	3	9	5
451 to 500	5	3	3	10	5

Table 3 **Sanitary facilities for cafes, canteens and fast food outlets**

Maximum number of patrons	Minimum requirements						
	For female patrons		For male patrons			For staff	
	W.C's	Washbasins	W.C's	Urinals	Washbasins	W.C's	Washbasins
Up to 15	Nil	Nil	Nil	Nil	Nil	1	1
16 to 60	1	1	1	Nil	1	-	-
61 and over	See Table 2						

BATHROOM

1.13 Any dwelling should have at least one bathroom with a fixed bath or shower.

1.14 A bath or shower should have a supply of hot water, which may be from a central source or from a unit water heater, and a piped supply of cold water.

1.15 A bath or shower should discharge through a grating, a trap and branch discharge pipe to a discharge stack, or may, if it is on the ground floor, discharge into a gully or directly to a foul drain.

1.16 A bath or shower may be connected to a macerator and pump small bore drainage system which is the subject of a current European Technical Approval issued by a member body of the European Organisation for Technical Approvals, eg the British Board of Agrément, and the conditions of use are in accordance with the terms of that document.

Guidance

Section 6

PERFORMANCE

In the view of the Committee requirement (21) of part 6 will be met if a well or borehole intended to supply water for human consumption is sited a minimum of 30m from any part of a sewage treatment system.

If the water supply serving the building is connected via a storage tank or cistern, the tank or cistern should be covered by a non-airtight cover capable of excluding light and insects.

Guidance

Sections 7 and 8

PERFORMANCE

In the view of the Committee requirement (22) of part 6 will be met if a hot water storage system that has a storage vessel with no vent pipe to the atmosphere.

a. has been installed by a competent person;

b. has safety devices that prevent the temperature of the stored water at any time exceeding 100°C;

c. has pipework that safely conveys the discharge of hot water from safety devices to where it is visible but will cause no danger to persons, in or about the building.

Meaning of terms
The following meanings apply to terms in Sections 7 and 8.

Unvented hot water storage system means an unvented vessel for either:

a. storing domestic hot water for subsequent use; or

b. heating domestic water that passes through an integral pipe or coil (eg water jacketed tube heater/combi boiler)

and fitted with safety devices to prevent water temperatures exceeding 100°C and other applicable operating devices to control primary flow, prevent backflow, control working pressure and accommodate expansion.

Unit means an unvented hot water storage system having the safety devices described in paragraph 7.3 or 7.4 and all operating devices factory-fitted by the manufacturer.

Package means an unvented hot water storage system having the safety devices described in paragraph 7.3 or 7.4 factory-fitted together with a kit containing other applicable devices, supplied by the package manufacturer, to be fitted by the installer.

Domestic hot water means water that has been heated for ablution, culinary and cleansing purposes. The term is used irrespective of the type of building in which an unvented hot water storage system is installed.

Section 7

SYSTEMS UP TO 500 LITRES AND 45kW

7.1 This section describes the provisions for an unvented hot water storage system having a storage vessel of not more than 500 litres capacity and a power input not exceeding 45kW heated directly or indirectly and requirements related to its installation.

Design

7.2 Any unvented hot water storage system should be in the form of a proprietary unit or package which is:

a. approved by a member body of the European Organisation for Technical Approvals (EOTA) operating a technical approvals scheme e.g. the British Board of Agrément (BBA) as meeting the relevant requirement of the Building Regulations of England and Wales or

b. approved by a certification body having National Accreditation Council for Certification Bodiesí (NACCB) accreditation and testing to the requirements of an appropriate standard that will ensure requirement (22) of part 6 will be met eg BS 7206 *Specification for unvented hot water storage units and packages;* or

c. the subject of a proven independent assessment that will clearly demonstrate an equivalent level of verification and performance to a. or b. above.

Direct heating

7.3 To meet the requirement a directly heated unit or package should have a minimum of two temperature activated safety devices operating in sequence:

a. a non self-resetting thermal cut-out to BS 3955: 1986 *Specification for electrical controls for household and similar general purposes*, or to BS 4201: 1976 (1984) *Specification for thermostats for gas burning appliances* and

b. one or more temperature relief valves to BS 6283 *Safety and control devices for use in hot water systems* Part 2: 1991 *Specification for temperature relief valves for pressures from 1 bar to 10 bar*, or Part 3: 1991 *Specification for combined temperature and pressure relief valves for pressures from 1 bar to 10 bar*. These devices are additional to any thermostatic control which is fitted to maintain the temperature of the stored water.

7.4 Other safety devices providing at least an equivalent degree of safety in preventing the temperature of stored water at any time exceeding 100°C which are:

a. approved by a member of EOTA eg BBA; or

b. approved by a body having NACCB accreditation eg Kitemarked to an appropriate BS; or

c. the subject of a proven independent assessment that will clearly demonstrate an equivalent level of verification and safety to a. and b. above.

7.5 In both units and packages, the temperature relief valve(s) specified in paragraph 7.3 (see also 7.4) should be located directly on the storage vessel, such that the stored water does not exceed 100°C. The valve(s) should be sized to give a discharge rating measured in accordance with Appendix F of BS 6283 Part 2: 1991 or Appendix G of BS 6283 Part 3: 1991 at least equal to the power input to the water. The valve(s) should not be disconnected other than for replacement or relocated in any other device or fitting. Each valve should discharge via a short length of metal pipe (D1) of a size not less than the nominal outlet size of the temperature relief valve either directly or by way of a manifold sized to accept the total discharge from the discharge pipes connected to it, through an air break over a tundish located vertically as near as possible to the valve(s).

Indirect heating

7.6 Safety devices listed in paragraph 7.3 (see also 7.4) for direct heating are also required for indirectly heated units and packages but the non self-resetting thermal cut-out should be wired up to a motorised valve or some other suitable device to shut off the flow to the primary heater, that is:

a. approved by a member of EOTA eg BBA; or

b. approved by a body having NACCB accreditation eg Kitemarked to an appropriate BS; or

c. the subject of a proven independent assessment that will clearly demonstrate and equivalent level of verification and performance to a. and b. above.

If the unit incorporates a boiler the thermal cut-out may be on the boiler. The temperature relief valve should be sized and located and the discharge pipe (D1) provided all in accordance with paragraph 7.5.

7.7 Where an indirect unit or package has any alternative direct-method of water heating fitted, a non self-resetting thermal cut-out device will also be needed on the direct source(s).

Installation

7.8 The unit or package should be installed by a competent person ie one holding a current Registered Operative identity card for the installation of unvented domestic hot water storage systems issued by:

a. the Construction Industry Training Board (CITB); or

b. the Institute of Plumbing; or

c. the Association of Installers of Unvented Hot Water Systems (Scotland and Northern Ireland); or

d. individuals who are designated Registered Operatives and employed by companies included on the list of Approved Installers published by the BBA up to the 31 December 1991; or

e. an equivalent body.

Discharge pipes

7.9 The discharge pipe (D1) from the vessel up to and including the tundish is generally supplied by the manufacturer of the hot water storage system (see paragraph 7.5). Where otherwise, the installation should include the discharge pipe(s) (D1) from the safety device(s). In either case the tundish should be vertical, located in the same space as the unvented hot water storage system and be fitted as close as possible and within 500mm of the safety device eg the temperature relief valve.

The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge, be of metal and:

a. be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9m long ie discharge pipes between 9m and 18m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device, between 18 and 27m at least 3 sizes larger, and so on. Bends must be taken into account in calculating the flow resistance. Refer to Diagram 1, Table 1 and the worked example.

An alternative approach for sizing discharge pipes would be to follow BS 6700: 1987 *Specification for design installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages*, Appendix E, section E2 and Table 21.

b. have a vertical section of pipe at least 300mm long, below the tundish before any elbows or bends in the pipework,

c. be installed with a continuous fall,

d. have discharges visible at both the tundish and the final point of discharge but where this is not possible or is practically difficult there should be clear visibility at one or other of these locations. Examples of acceptable discharge arrangements are:

i. ideally below a fixed grating and above the water seal in a trapped gully.

ii. Downward discharges at low level; ie up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that where children may play or otherwise come into contact with discharges a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility.

iii. discharges at high level; eg into a metal hopper and metal down pipe with the end of the discharge pipe clearly visible (tundish visible or not) or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastics guttering system that would collect such discharged (tundish visible).

iv. Where a single pipe serves a number of discharges, such as in blocks of flats, the number served should be limited to not more than 6 systems so that any installation discharging can be traced reasonably easily. The single common discharge pipe should be at least one pipe size larger than the largest individual discharge pipe (D2) to be connected. If unvented hot water storage systems are installed where discharges from safety devices may not be apparent ie in dwellings occupied by blind, infirm or disabled people, consideration should be given to the installation of an electronically operated device to warn when discharge takes place.

Note: The discharge will consist of scalding water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.

7.10 Electrical non self-resetting thermal cut-outs should be connected to the direct heat source or indirect primary flow control device in accordance with the current Regulations for Electrical Installations of the Institution of Electrical Engineers.

Diagram 1 **Typical discharge pipe arrangement**

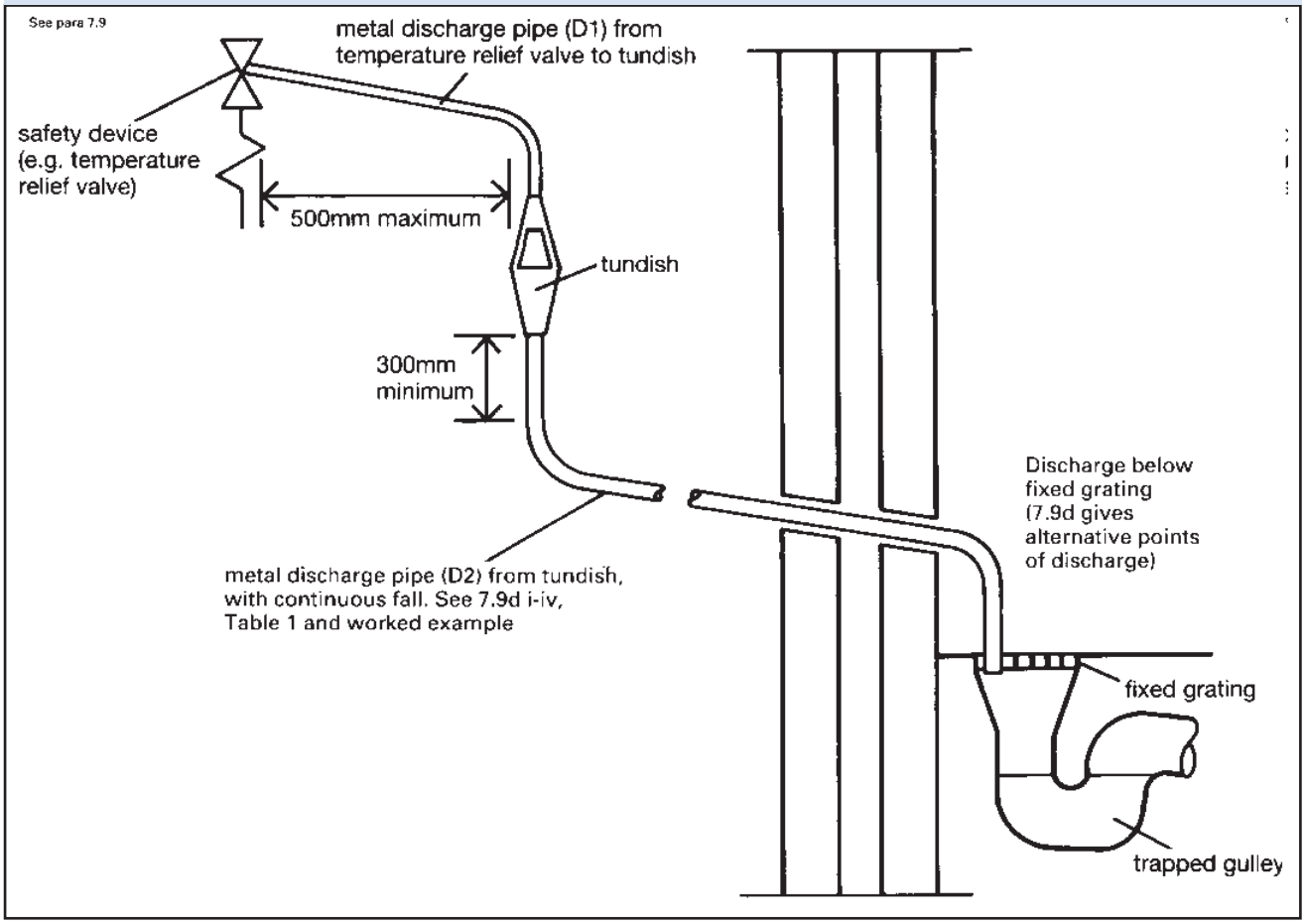


Table 1 **Sizing of copper discharge pipe 'D2' for common temperature relief valve outlet sizes**

Valve outlet size	Minimum size of discharge pipe D1*	Minimum size of discharge pipe D2* from tundish	Maximum resistance allowed, expressed as a length of straight pipe (i.e. no elbows or bends)	Resistance created by each elbow or bend
G½	15mm	22mm 28mm 35mm	up to 9m up to 18m up to 27m	0.8m 1.0m 1.4m
G¾	22mm	28mm 35mm 42mm	up to 9m up to 18m up to 27m	1.0m 1.4m 1.7m
G 1	28mm	35mm 42mm 54mm	up to 9m up to 18m up to 27m	1.4m 1.7m 2.3m

*see 7.5, 7.9, 7.9(a) and Diagram 1

Worked example:-

The example below is for a G½ temperature relief valve with a discharge pi[e (D2) having 4 No. elbows and length of 7m from the tundish to the point of discharge.

From Table 1:
Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from a G½ temperature relief valve is: 9.0m
Subtract the resistance for 4 No. 22mm elbows at 0.8m each = 3.2m

Therefore the maximum permitted length equates to: 5.8m

5.8m is less than the actual length of 7m therefore calculate the next largest size.

Maximum resistance allowed for a straight length of 28mm pipe (D2) from a G½ temperature relief valve equates to: 18m

Subtract the resistance for 4 No. 28mm elbows at 1.0m each = 4m

Therefore the maximum permitted length equates to: 14m
As the actual length is 7m, a 28mm (D2) copper pipe will be satisfactory.

Section 8

SYSTEMS OVER 500 LITRES OR OVER 45KW

8.1 This section describes the provisions for an unvented hot water storage system having a storage vessel providing a capacity of more than 500 litres or having a power input of more than 45kW.

8.2 Unvented hot water storage systems within the scope of Section 8 will generally be individual designs for specific projects and inappropriate for EOTA or NACCB approval. Where this is the case the unvented hot water storage system should be designed to the same safety requirements by an appropriately qualified engineer and the system should be installed by a competent person (see paragraph 7.8).

8.3 An unvented hot water storage system with a storage vessel of more than 500 litres capacity and a power input of not more than 45kW should have safety devices in accordance with the relevant recommendations in BS 6700: 1987 *Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages* (the relevant Clause is Section 2 Clause 7) or other equivalent practice specifications that recommend a similar operating sequence for safety devices to prevent the temperature of stored water at any time exceeding 100°C.

8.4 Any unvented hot water storage vessel with a power input of more than 45kW should have the appropriate number of temperature relief valves either to BS 6283 Parts 2 and 3 (see paragraph 7.3) or equivalent (see paragraph 7.4) to give a combined discharge rating at least equal to the power input, or equally suitable temperature relief valves market with the set temperature in °C and the discharge rating marked in kW, measured in accordance with Appendix F of BS 6283 Part 2: 1991 or Appendix G of BS 6283 Part 3: 1991 or equivalent (see paragraph 7.4) by a member of EOTA eg BBA or another recognised testing body such as the Associated Offices Technical Committee (AOTC). The valves should be factory fitted to the storage vessel and the sensing element located as described in paragraph 7.5.

8.5 Non self-resetting thermal cut-outs appropriate to the heat source should be incorporated and installed in a similar manner to that described in paragraphs 7.6, 7.7 and7.10.

8.6 Discharge pipes to convey any discharges from safety devices should be installed as described in paragraph 7.9.

Standards referred to

BS 65: 1991 *Specification for vitrified clay pipes, fittings and ducts, also flexible mechanical joints for use solely with surface water pipes and fittings.*

BSEN 295: *Vitrified clay pipes and fittings and pipe joints for drains and sewers*

Part 1: 1991 *Test requirements*
Part 2: 1991 *Quality control and sampling*
Part 3: 1991 *Test methods.*

BS 416 *Discharge and ventilating pipes and fittings, sand-cast or spun in cast iron,*

Part 1: 1990 *Specification for spigot and socket systems.*
Part 2: 1990 *Specification for socketless systems.*

BS 437: 1978 *Specification for cast iron spigot and socket drain pipes and fittings.*
Amendment slip number 1: AMD 5877.

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

Part 2: 1983 *Specification for capillary and compression fittings for copper tubes.*
Amendment slip number 1: AMD 5097
2: AMD 5651.

BS 882: 1983 *Specification for aggregates from natural sources for concrete.*
Amendment slip number 1: AMD 5150

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

Part 1: 1971 *Copper tubes for water, gas and sanitation.*
Amendment slip number 1: AMD 1422
2: AMD 2203.

BS 3656: 1981 (1990) *Specification for asbestos-cement pipes, joints and fittings for sewerage and drainage.*
Amendment slip number 1: AMD 5531.

BS 3868: 1973 (1980) *Specification for prefabricated drainage stack units: galvanised steel.*

BS 3921: 1985 *Specification for clay bricks.*

BS 3943: 1979 (1988) *Specification for plastics waste traps.*
Amendment slip number 1: AMD 3206
2: AMD 4191
3: AMD 4692.

BS 4514: 1983 *Specification for unplasticized PVC soil and ventilating pipes, fittings and accessories.*
Amendment slip number 1: AMD 4517
2: AMD 5584.

BS 4660: 1989 *Specification for unplasticized polyvinyl chloride (PVC-U) pipes and plastics fittings of nominal sizes 110 and 160 for below ground drainage and sewerage.*

BS 5254: 1976 *Specification for polypropylene waste pipe and fittings (external diameter 34.6mm, 41.0mm and 54.1mm)*
Amendment slip number 1: AMD 3588
2: AMD 4438.

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

BS 5481: 1977 (1989) *Specification for unplasticized PBC pipe and fittings for gravity sewers.*
Amendment slip number 1: AMD 3631
2: AMD 4436.

BS 5572: 1978 *Code of practice for sanitary pipework.*
Amendment slip number 1: AMD 3613
2: AMD 4202.

BS 5911 *Precast concrete pipes fittings and ancillary products.*

Part 2: 1982 *Specification for inspection chambers and street gullies.*
Amendment slip number 1: AMD 5146.

Part 100: 1988 *Specification for unreinforced and reinforced pipes and fittings with flexible joints.*
Amendment slip number 1: AMD 6269.

Part 101: 1988 *Specification for glass composite concrete (GCC) pipes and fittings with flexible joints.*

Part 120: 1989 *Specification for reinforced jacking pipes with flexible joints.*

Part 200: 1989 *Specification for unreinforced and reinforced manholes and soakways of circular cross section.*

BS 6087: 1990 *Specification for flexible joints for grey or ductile cast iron drain pipes and fittings* (BS 437) *and for discharge and ventilating pipes and fittings* (BS 416).
Amendment slip number 1: AMD 6357.

BS 7158: 1989 *Specification for plastics inspection chambers for drains.*

BS 8110 *Structural use of concrete.*

Part 1: 1985 *Code of practice for design and construction*
Amendment slip number 1: AMD 5917
2: AMD 6276.

BS 8301: 1985 *Code of practice for building drainage.*
Amendment slip number 1: AMD 5904.

BS 5328: *Concrete.*

Part 1: 1991 *Guide to specifying concrete.*

Part 2: 1991 *Methods for specifying concrete mixes.*

Part 3: 1990 *Specification for the procedures to be used in producing and transporting concrete.*
Amendment slip number 1: AMD 6927.

Part 4: 1990 *Specification for the procedures to be used in sampling, testing and assessing compliance of concrete.*
Amendment slip number 1: AMD 6928.

BS 6297: 1983 *Code of practice for design and installation of small sewage treatment works and cesspools.*

BS 6367: 1983 *Code of practice for drainage of roofs and paved areas.*
Amendment slip number 1: AMD 4444.

BS 8301: 1985 *Code of practice for building drainage.*
Amendment slip number 1: AMD 5904
2: AMD 6580.

BS 5906: 1980 (1987) *Code of practice for the storage and on-site treatment of solid waste from buildings.*

BS 3955: 1986 *Specification for electrical controls for household and similar general purposes.*
Amendment slip number 1: AMD 5940.

BS 4201: 1979 (1984) *Specification for thermostats for gas-burning appliances.*
Amendment slip number 1: AMD 4531
2: AMD 6268.

BS 6283 *Safety and control devices for use in hot water systems:*

Part 2: 1991 *Specification for temperature relief valves for pressures from 1 bar to 10 bar.*

Part 3: 1991 *Specification for combined temperature and pressure relief valves for pressures from 1 bar to 10 bar.*

BS 6700: 1987 *Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.*

BS 7206: 1960 *Specification for unvented hot water storage units and packages.*

BS 6465 *Sanitary installations.*

Part 1: 1984 *Code of practice for scale of provision, selection and installation of sanitary appliances.*

List of codes of practice currently issued or approved by the Planning and Environment Committee for the purpose of showing compliance with the Building Bye-Laws (Jersey) 1997.

Technical Guidance Document. Part 1	Structure
Technical Guidance Document. Part 2	Fire Safety
Technical Guidance Document. Part 3	Heat Producing Appliances and Storage of Fuels
Technical Guidance Document. Part 4	Site Preparation and Resistance to Moisture
Technical Guidance Document. Part 5	Ventilation
Technical Guidance Document. Part 6	Drainage, Hygiene and Water Storage
Technical Guidance Document. Part 7	Stairs, Tamps and Protective Barriers
Technical Guidance Document. Part 8	Access and Facilities for Disabled People
Technical Guidance Document. Part 10	Glazing—Safety and Protection
Technical Guidance Document. Part 11	Conservation of Fuel and Power
Technical Guidance Document. Supporting Bye-Law 7.	Materials and Workmanship