

DISPOSAL OF SEWAGE WHERE NO MAINS DRAINAGE IS AVAILABLE: PPG4

POLLUTION PREVENTION GUIDELINES

These notes are for guidance only. They are produced by the Environment Agency for England and Wales, the Scottish Environment Protection Agency and the Environment and Heritage Service in Northern Ireland, jointly referred to as the Agency or Agencies. Each site will be considered according to local circumstances, and early consultation with your local Agency Office is advisable. Contact details will be found at the end of these guidelines.

1. NEW PUBLIC SEWERS

Under many circumstances, it will be possible to require the provision of (or “requisition”) a new or extended public foul sewer from the local sewerage undertaker. For further information on this, contact your Local Authority or sewerage undertaker. This is the preferred disposal option for sewage. If a sewer connection is not possible, then the following options should be considered: septic tank, package treatment plant, reed bed system, waterless toilet, cesspool, or a combination of these.

2. SEPTIC TANKS

- a. A septic tank is a two or three chamber system, which retains sewage from a property for sufficient time to allow the solids to form into sludge at the base of the tank, where it is partially broken down. The remaining liquid in the tank then drains from the tank by means of an outlet pipe.
- b. Effluent from a septic tank is normally disposed of by soakage into the ground, provided that the disposal does not generate a pollution risk to surface waters or groundwater resources (underground water). The most commonly used form of soakaway is a subsurface irrigation area, comprising a herringbone pattern of land drains laid in shallow, shingle filled trenches. The soakaway drains should be located at as shallow a depth as possible, usually within 1 metre of the ground surface.
- c. Before effluent can be disposed of by soaking away into the ground, the area of land required for the soakaway has to be established by means of a percolation test which is described in **Appendix B**. It is recommended that the test is conducted by an independent professional who is able to provide a certificate stating whether or not the ground is suitable for a soakaway and that the test had been conducted according to BS 6297: 1983. Areas of heavy clay, steeply sloping sites or sites where the water table is less than 1 metre below the bottom of the soakaway are not normally suitable. Please note that the Agency does not carry out percolation tests.
- d. For domestic properties, the capacity of a septic tank should be calculated using the following formula:

$$C = (180P + 2000)$$

Where

C = Capacity of the tank in litres.

P = Population served. (i.e. number of people in the house)

See Appendix A for suggested volume requirements for non-domestic properties.

- e. A septic tank should be desludged and serviced on a regular basis to ensure the effective operation of the system. Desludging should normally take place every 12 months and should be carried out by an operator registered for the carriage of such waste by the Agency. This may be the local sewerage undertaker or a private contractor. A check on the nature of the effluent draining from the tank can indicate whether it needs emptying. Normally, the effluent will be light grey in colour. However, as the sludge content of the tank increases, the effluent will increasingly contain dark solids.
- f. The septic tank and soakaway area should be sited not less than 10 metres from any ditch, drain or watercourse and preferably not closer than 15 metres to any dwelling. It is important that there is sufficient vehicular access to allow tank emptying.
- g. Septic tanks and soakaways should not be installed in the vicinity of any well or borehole. The minimum distance required will depend on specific site conditions but will never be less than 50 metres.
- h. An Agency consent may be required for a discharge to a soakaway. (See Section 7) In some cases, a Prohibition Notice containing conditions relating to the construction of the soakaway may be issued.
- i. It is extremely important that clean uncontaminated roof or surface water is excluded from the septic tank as this effectively reduces the tank’s capacity and can cause solids to be flushed out of the tank. This may contravene the Agency’s consent and will impair the operation of the soakaway.

- j. It is not considered good practice to discharge septic tank effluent to a watercourse without further treatment. However, there are exceptional situations where the Agency may consider consenting an isolated discharge, provided that there is adequate dilution in the receiving watercourse (>400 times) and that the outfall is satisfactorily located and designed to ensure that there is no visible plume at the outfall. Consent for the discharge of effluent from septic tanks which do not comply with BS6297:1983 is not usually granted.

3. PACKAGE SEWAGE TREATMENT PLANTS

In the majority of cases where a septic tank and soakaway is not a viable option, then effluent must be treated to a higher standard. This can be achieved by means of a package treatment system or a reed bed system (see Section 4).

- a. Package sewage treatment plants are either self-contained units for the treatment of sewage or units which treat effluent from septic tanks to a higher standard. They must be properly installed in order to operate effectively.
- b. The effluent from a package plant is normally suitable for discharge directly to a watercourse, or into or onto land, where a direct septic tank effluent discharge may be considered unsuitable because of pollution risks. However, if the discharge is made to a watercourse, an Agency consent will be required by the discharger and this may also be the case for discharges into a soakaway (see Section 7).
- c. The consent will set quality and volume limits for the discharged effluent. It is important that Agency advice is sought on the likely effluent quality standard required before ordering the plant, although advice on makes and models of package plant cannot be offered. Assurances should then be sought from the manufacturer that the plant will consistently comply with this standard.
- d. Most package plants require electric power to operate and all will require regular maintenance and desludging in accordance with the manufacturer's instructions in order to ensure that the system operates effectively and the effluent complies with the consent conditions. A maintenance agreement with a suitable contractor may be useful, and the installation of an alarm to warn of power or plant failure is recommended.
- e. Most sewage systems use biological treatment which is vulnerable to abuse. Check with the manufacturer's instructions on the use of cleaning materials, such as bleach, and do not use the drains as a means of disposal for chemicals, oils, solvents or paint brush cleaning fluids. These materials can impair the treatment process and may even damage the plant. Care should be taken to prevent the discharge of grease to the treatment plant as this may also reduce the efficiency of the treatment process.

4. REED BED SYSTEMS

- a. Reed beds are specially designed and constructed plots with a gravel medium and an impermeable base which can be used to improve effluent quality. They have the advantage of having no moving parts and require less maintenance than package treatment plants. Reed beds rely on the ability of certain reeds to absorb and transport oxygen through their stem system to the root zone, where it can be taken up by the organic material present in the sewage and hence effect purification of the effluent.
- b. Before installing a reed bed, the Agency should be consulted to determine whether it will be a satisfactory means of treating the effluent given the local circumstances. Any reed bed should be properly designed, constructed and maintained. A list of consultants who design reed bed systems is available from the Agency.
- c. In some cases, a reed bed system may be a satisfactory means of treating the effluent from a septic tank or package plant before discharge to a watercourse. In all cases, a discharge from a reed bed to controlled waters will require consent (See Section 7).

5. WATERLESS TOILETS

a. Chemical toilets

Waterless chemical toilets are self contained systems which rely on biocides, in one form or another, to control the production of foul odours. They are used on campsites, construction sites and at large events. It is recommended that either the foul sewer or a centralised waste collection/disposal facility is used as a means of disposing of chemical toilet wastes. Should this not be possible, the Agencies should be contacted for advice on disposable options and legislative requirements.

b. Composting toilets

These use natural processes to convert waste matter into compost and do not involve a liquid discharge. They are particularly useful at remote sites, such as nature reserve, where there is no mains water supply or sewer.

6. CESSPOOLS

- a. In Scotland, the Building Regulations do not permit the use of cesspools.
- b. A cesspool is a covered watertight tank used for receiving and storing sewage and has no outlet. It relies on road transport for the removal of raw sewage and is therefore the least sustainable option for sewage disposal. Because of this, a cesspool is best regarded as a temporary measure pending a more satisfactory solution, such as the provision of mains drainage. It is essential that a cesspool is, and remains, impervious to the ingress of groundwater or surface water and has no leaks.

- c. A cesspool requires regular emptying and must not be allowed to overflow. The installation of a level warning device is recommended. Emptying services may be provided by your local authority or a contractor. (You are advised to check, as emptying services may be nonexistent or expensive in your area.)
- d. The average household of three persons will produce 7,000 litres of sewage in about two weeks, the capacity of a typical emptying tanker. (See Appendix A for non-domestic premises).
- e. It is desirable that a cesspool should not be sited closer than 15 metres to any dwelling and as far away from any watercourse as possible normally not less than 10 metres.
- f. The minimum capacity of a cesspool is prescribed by the Building Regulations as 18 cubic metres (18,000 litres) and at least 45 days storage should be provided.
- g. No consent from the Agency is required for a cesspool.

7. CONSENT REQUIREMENTS

- a. Under the provisions of the Water Resources Act 1991 in England and Wales, the Control of Pollution Act 1974 (as amended) in Scotland and the Water Act 1972 in Northern Ireland, a consent from the relevant Agency is required for any discharge of sewage effluent into "controlled waters". "Controlled waters" include all inland watercourses, coastal waters and groundwaters. A consent may also be required for any discharge into a soakaway or a self contained pond. The holder of the discharge consent for a sewage treatment plant is responsible for ensuring that the plant is well maintained and that the effluent complies with the consent conditions. Such consents are not granted automatically, and are not normally granted where a public foul sewer is available. Except in Northern Ireland, there is an administration charge made by the Agency for application for consent and an annual fee to cover monitoring and other costs. Full details can be supplied on request.
- b. If a discharge is to be made to a 'Main River' watercourse, separate Environment Agency permission for the outfall structure will also be required under the provisions of the Water Resources Act 1991. This provision does not apply in Scotland and Northern Ireland.
- c. Other permissions may be required, for example from a riparian owner, drainage board or Local Authority and you should contact the appropriate person/Authority as soon as possible. In particular, approval for the construction and installation may be needed from the Local Authority's building control department.

8. USEFUL REFERENCES

1. Code of Practice for the Design of Small Sewage Treatment Works and Cesspools. BS6297:1983: British Standards Institute: Telephone 0181 996 7000
2. Septic Tanks and Small Sewage Treatment Works, A Guide to Current Practice and Common Problems: 1993: CIRIA Technical Note 146: Construction Industry Research and Information Association: Telephone 0171 222 8891
3. Septic tank systems: A users guide: CIRIA
4. On site sewage disposal: Options: CIRIA
5. Septic tank systems: Design and installation: CIRIA
References 3-5 are available from your local Environment Agency/ SEPA / Environment and Heritage Service office
6. Policy and Practice for the Protection of Groundwater; ISBN 1-873160-37-2: The Stationery Office, Tel: 0171 873 9090
7. Groundwater Protection Strategy for Scotland, SEPA

Appendix A

Guideline Per Capita Sewage Volumes

Property	Per Capita Volume (litres per day)	Property	Per Capita Volume (litres per day)
Domestic	180	Offices	55
Hotels	200	Factories	65
Restaurants	25	Public Houses	15
Campsites	75	Caravans	120
Dayschool	50	Rest Homes	300
Boarding school	180	Hospitals	450

Note: Particular care is needed in designing treatment systems for catering establishments, where significant quantities of grease and cooking oil may be present in the effluent. If these pass into treatment plants or soakaways, they may interfere with treatment and block drains and soakaways. It is recommended that expert advice is sought.

Appendix B Percolation Test

Avoid carrying out this test in extreme weather conditions such as drought, frost and heavy rain.

- a. Excavate three holes 300mm square to a depth 250mm below the proposed invert level (bottom of pipe) of the land drain and space them evenly along the proposed line of the subsurface irrigation system.
- b. Fill each hole with water and allow to seep away overnight.
- c. Next day, refill each hole with water to a depth of no more than 300mm and observe the time in seconds for the water to seep away completely.
- d. Divide each figure by the depth of water in millimetres placed in the hole. This answer gives the time required (in seconds) for the water to drop 1mm.

This is the **percolation value** (in seconds).

- e. The average figure for the percolation value (V) is obtained by summing all three values and dividing by three.
- f. If the percolation value exceeds 100sec/mm, then ground conditions may be unsuitable for discharge from a septic tank system and an alternative means of disposal will have to be considered to avoid ponding of septic effluent on the surface due to inefficient soakage.
- g. For domestic premises, the floor area of soakaway land drains (A in square metres) required may be calculated from:

$$A = P \times V \times 0.25$$

Where

P is the number of persons served by the tank.

V is the percolation value described above.

If in doubt, consult your professional advisor or Local Authority building control officer for advice.

All the Agencies' pollution prevention guidance notes are available on the web sites listed below.

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HEAD OFFICE

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The 24-hour emergency hotline number for reporting all environmental incidents relating to air, land and water in England, Wales, Scotland and Northern Ireland.

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