

### What is Biochemical Oxygen Demand?

BOD is an indirect measurement of the amount of organic matter in the water. A BOD test shows how much oxygen the bacteria would require if they were to digest all of the organic matter in the water. The result is usually expressed as BOD<sub>5</sub>, with the '5' indicating that the sample has been subject to testing over five (5) consecutive days. This test is based on the fundamental chemical reaction that describes bacterial digestion: - Organic Waste + Oxygen = Bacteria, which will eventually lead to Water and Carbon Dioxide.

### Building Regulations

On 1 April 2002 Part H of the Building Regulations came into force. This standard indicates that "package treatment systems should be type tested in accordance with BS EN 12566-3 (scheduled for publication May 2003, superseding BS 7781) or otherwise tested by an approved body".

No accredited body has been established in the UK to test to either standard. However, ANSI (American National Standards Institute) testing is carried out by the approved environmental test agency, NSF International and they have tested and approved the Diamond treatment plant.

ANSI is recognised by British Standards Institute and NSF International is associated with the UK's Water Research Council (WRC). Both have comprehensive websites for further reference.

The ANSI/NSF Standard 40 has a similar testing protocol to BS 7781. For a copy of the most recent ANSI/NSF Standard 40 report and a sample CE certificate, please contact WPL.



### Who to contact for more help

England & Wales  
Environment Agency  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)  
0845 9333111

Scotland: SEPA  
[www.sepa.org.uk](http://www.sepa.org.uk)  
01786 457700

Northern Ireland: DoE NI  
[www.nireland.gov.uk/env.htm](http://www.nireland.gov.uk/env.htm)  
028 9054 0540

NHBC [www.nhbc.co.uk](http://www.nhbc.co.uk)  
01494 434477

WRC  
[www.wrcplc.co.uk](http://www.wrcplc.co.uk)  
01793 865000

Local Authority Building Control Offices can be found at [www.labc-services.co.uk](http://www.labc-services.co.uk)



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So you need a sewage  
treatment plant.....

## What you should know about your treatment plant



**Keywords:** Sewage, Treatment, sizing, Building, regulations, design, Diamond, site, consent, quoted, smell, odour, maintain, tanker, flow, cesspool, septic

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## Domestic Sewage Disposal

Until recently, planning approvals were only necessary for drainage facilities within the home. Consequently, external drainage equipment for homes not connected to the mains could be installed at the owners/builders discretion, without any associated red tape.



A disguised sewage treatment plant

However, government guidance under DETR circular 3/99 is now aiming to ensure that planning approval is obtained for all off-mains drainage. This has restricted the self-builder's ability to install sewage

treatment plant, whether cesspool, septic tank or

treatment plant since a full report is now required. Failure to provide the report can mean refusal of planning permission.

The following document sets out a list of frequently asked questions and answers, and includes a brief guide on the DETR Circular 3/99. A full CIRIA brochure is available from WPL Ltd.

### What are the planning implications of the Circular?

The DETR Circular 3/99 – *Planning Requirements in Respect of the Use of Non-Mains Sewerage* – requires that an independent site assessment be carried out, by a drainage specialist or surveyor, prior to the installation of a sewage treatment plant. Assessment criteria includes:

- Site plan
- Water interest survey
- Soil profile
- Depth of water table below ground level
- Percolation test

The result of the assessment, combined with the requirements of the Environment Agency (EA), will help you determine which type of plant is best for your site.

### What methods of sewage treatment are available for sites without mains drainage?

1. Septic tanks - cheap to buy and maintain but unpopular due to the poor quality effluent produced.
2. Package treatment plants - produce cleaner effluent and enable licensed discharge to environments other than soakaways. More expensive to buy and maintain than septic tanks, however, removal of sludge on plants such as WPL's Diamond is only required every 3/5 years, reducing overall costs.
3. Cesspools - cheap to buy but require frequent emptying.

Before considering the above, thoroughly explore the option of connecting to mains drainage. Even though the logistics and cost may deter you, if there is access to mains drainage you may not get EA consent to discharge.

### What is the difference between a cesspool, septic tank and treatment plant?

A **CESSPOOL** is purely a holding tank with no outlet. It stores raw sewage until it's full and the householder pays to have it emptied by a licensed disposal company. Cesspools are normally recommended for use:

- where the soil sub-strata is impermeable, making discharge to soakaway impossible
- for plots close to Sites of Special Scientific Interest (SSSI)
- for proximity to sources of drinking (potable) water.

A **SEPTIC TANK** is a multi-chambered tank with an outlet. Modern septic tanks are usually only allowed to discharge to a soakaway system built into soil of high porosity. Older septic tanks may still be discharging to open ditches or watercourses. They work by separating the solid matter through settlement and floatation; the heavy matter sinks to create sludge and the light matter floats to create a crust. Some of the sludge is degraded by naturally occurring, non-oxygen reliant (anaerobic) bacteria.

A **PACKAGE TREATMENT PLANT** facilitates greater breakdown and degradation of sewage than a septic tank. This enables discharge to a soakaway constructed in less porous soil and EA licensed discharge to ditches and watercourses. This greater treatment is usually achieved by artificially introducing air and consequently oxygen transfer into the sewage. It's this oxygen transfer that encourages the growth of more effective, oxygen-reliant (aerobic) bacteria.



WPL's Diamond Treatment Plant

*NB. Under Part H of Building Regulations, all package treatment systems should be type tested in accordance with BS EN 12566-3 (scheduled for publication May 2003) or otherwise tested by an approved body.*

### What is a "consent to discharge"?

Under the terms of the Water Resources Act 1991, schedule 10 (as amended by the Environment Act 1995), the following parties have authority over the discharge of sewage and other effluents into the environment:

- Environment Agency (EA) in England and Wales,
- Scottish Environment Protection Agency (SEPA) in Scotland
- Department of the Environment (DoE NI) in Northern Ireland

In most cases, it's necessary to gain their consent to discharge a specified volume and quality of effluent - or 'consented effluent standard'.

### Do you always need EA consent to discharge?

Not always. Although EA national policy is interpreted differently by the regional offices, the discharge of sewage effluent, derived solely from domestic use, doesn't require consent if:

- the maximum daily volume discharged is less than five cubic metres (5,000 litres) and
- discharge is to a suitably designed soakaway system with no connection to land drain, ditch or surface water system.

However, if in doubt, contact the EA on 08459 333111 who will put you in touch with your local office.

### How do I calculate the volume?

EA recommendation is to assume that the maximum consistent occupancy of a property is one person per bedroom plus half of one person per property. For example, a 4-bedroom property would give a population equivalent of 4.5. The EA then assumes that each person will use 180 litres of water per day. Therefore  $180 \times 4.5 = 810$  litres = 0.81 cubic metres. Most treatment plant manufacturers use 200 litres per person per day, totalling 910 litres or 0.91 cubic metres.

### What does the consented effluent standard mean?

A discharge standard is usually categorised in one of two ways, either 'descriptive' or more commonly 'numeric'. A descriptive consent usually means that provided the treatment plant is well maintained, is fully operational, the discharge effluent looks clear and doesn't appear to be having a detrimental effect on the environment, then it's 'clean' enough for discharge.

Numeric consent will normally have figures in milligrams per litre (mg/l) or parts per million (ppm) for the amount of Biochemical Oxygen Demand (BOD), Suspended Solids (SS) and perhaps Ammonia (NH<sub>3</sub>) permitted in the discharge effluent. A typical discharge standard granted by the EA might be 20mg/l biochemical oxygen demand and 30mg/l suspended solids.