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**Agrément  
Certificate  
No 05/4264**

Designated by Government  
to issue  
European Technical  
Approvals

**ALLERTON BIOFILTER SEWAGE TREATMENT UNITS**

Systèmes de traitement des eaux résiduaires  
Abwasseraufbereitung

**Product**

• THIS CERTIFICATE RELATES TO ALLERTON BIOFILTER SEWAGE TREATMENT UNITS.

• Each unit is for the treatment or collection of domestic sewage.

• The units are for use in conjunction with domestic drains and public and private sewers for the collection and treatment of domestic sewage as is permitted to be discharged into public sewers by the Water Industry Act 1991, the Sewerage (Scotland) Act 1968 and the Water and Sewage Services (Northern Ireland) Order 1973.

• This Certificate does not cover the use of any of the units for untreated trade effluents.

continued

**Regulations — Detail Sheet 1****1 The Building Regulations 2000 (as amended) (England and Wales)**

The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of effluent treatment systems with the Building Regulations. In the opinion of the BBA, Allerton Biofilter Sewage Treatment Units, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement:	H2	Wastewater treatment systems and cesspools
Comment:		See the tinted areas in the <i>Design Data — General and Watertightness</i> sections of the accompanying Detail Sheet.
Requirement:	Regulation P	Electrical safety
Comment:		The products are acceptable. See the tinted area of the <i>Installation — General</i> section of the accompanying Detail Sheet.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The products are acceptable. See the <i>Durability</i> section of this accompanying Detail Sheet.

These Front Sheets must be read in conjunction with the accompanying Detail Sheet, which provides information to specific products.

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## 2 The Building (Scotland) Regulations 2004



In the opinion of the BBA, the position of Allerton Biofilter Sewage Treatment Units, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Mandatory Standards as listed below.

Regulation:	8	Fitness and durability of materials and workmanship
Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The products can satisfy this Regulation. See the <i>Durability</i> and <i>Installation</i> sections of the accompanying Detail Sheet.
Regulation:	9	Building standards — construction
Standard:	3.8	Private wastewater treatment systems — treatment plants
Comment:		The products satisfy the requirements of this Standard with reference to clauses 3.8.1 <sup>(1)(2)</sup> to 3.8.7 <sup>(1)(2)</sup> . See the tinted area in the <i>Design Data — General</i> and <i>Watertightness</i> sections of the accompanying Detail Sheet.
Standard:	4.5	Electrical safety
Comment:		The products satisfy the requirements of this Standard with reference to clause 4.5.1 <sup>(1)(2)</sup> . See the tinted area of the <i>Installation — General</i> section of the accompanying Detail Sheet.
		(1) Technical Handbook — Domestic.
		(2) Technical Handbook — Non-Domestic.

## 3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, Allerton Biofilter Sewage Treatment Units, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The products are acceptable. See the <i>Durability</i> section of the accompanying Detail Sheet.
Regulation:	N6	Cesspools, septic tanks and similar structures
Comment:		The products can meet the relevant requirements of this Regulation. See the tinted areas in the <i>Design Data — General</i> and <i>Watertightness</i> sections of the accompanying Detail Sheet.

## 4 Construction (Design and Management) Regulations 1994 (as amended) Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See sections: 2 *Delivery and site handling* (2.1), and *Installation (General)* of the accompanying Detail Sheet.

## 5 The Health and Safety at Work etc Act 1974 and the Health and Safety at Work (Northern Ireland) Order 1978

In buildings subject to this Act and Order, regular maintenance is a requirement for Allerton Biofilter Sewage Treatment Units. See the section on *Maintenance* in the accompanying Detail Sheet.

## 6 The Electrical Equipment (Safety) Regulations 1994 and the Electromagnetic Compatibility Regulations 1994

These Regulations implement the Low Voltage Directive 73/23/EEC (as amended by the CE Marking Directive 93/68/EEC) and the Electromagnetic Compatibility Directive 89/336/EEC and require manufacturers to carry out assessment of their products against the criteria given in the Directives. Declarations of conformity have been provided by the Certificate holder. The BBA has not assessed the product for compliance with these Directives.

### Additional Information

The management systems of Allerton have been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2000 by Chamber Certification Assessment Services Ltd (Certificate No 2002/236).

### Bibliography

BS EN ISO 9001 : 2000 *Quality management systems — Requirements*

## Conditions of Certification

### 7 Conditions

7.1 This Certificate:

- (a) relates only to the product that is named, described, installed, used and maintained as set out in this Certificate;
- (b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- (c) is valid only within the UK;
- (d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (e) is copyright of the BBA;
- (f) is subject to English law.

7.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

7.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture and/or fabrication including all related and relevant processes thereof:

- (a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;

(b) continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine; and

(c) are reviewed by the BBA as and when it considers appropriate.

7.4 In granting this Certificate, the BBA is not responsible for:

- (a) the presence or absence of any patent, intellectual property or similar rights subsisting in the product or any other product;
- (b) the right of the Certificate holder to market, supply, install or maintain the product; and
- (c) the actual works in which the product is installed, used and maintained, including the nature, design, methods and workmanship of such works.

7.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the installation and use of this product.



In the opinion of the British Board of Agrément, Allerton Biofilter Sewage Treatment Units are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 05/4264 is accordingly awarded to Allerton.

On behalf of the British Board of Agrément

Date of issue: 23rd September 2005

Chief Executive





Allerton

## ALLERTON BIOFILTER SELF-CONTAINED SEWAGE TREATMENT UNITS

Certificate No 05/4264

### DETAIL SHEET 2

## Product



• THIS DETAIL SHEET RELATES TO ALLERTON BIOFILTER SELF-CONTAINED SEWAGE TREATMENT UNITS, SUITABLE FOR POPULATIONS BETWEEN 4 AND 30.

• The product is for use in sewage treatment systems designed in accordance with the recommendations of BS 6297 : 1983, for the retention of domestic sewage, separation and collection of solids, biological treatment of settled sewage and settlement of humus solids in suspension prior to discharge of the treated effluent.

This Detail Sheet must be read in conjunction with the Front Sheets, which give the product's position regarding the Building Regulations, and the Conditions of Certification.

## Technical Specification

### 1 Description

1.1 Allerton Biofilter Self-contained Sewage Treatment Units are available in two types to suit different population sizes. Gravity or pumped models are available:

- Mini Biofilters — available in three sizes 4PE, 6PE and 10PE to suit populations of from one to ten (see Figure 1 and Table 1). Each unit is constructed from two, glass-reinforced polyester (GRP) cylindrical sections with an internal baffle arrangement, access tube for desludging and an access cover
- Midi Biofilters — available in four sizes C8, D8, E8 and G8L to suit populations from 15 to 30 (see Figure 2 and Table 2). Each unit is constructed from an upper GRP cylindrical section and a lower GRP cylindrical section with a conical base, an internal baffle arrangement, an access tube for desludging and an access cover.

Figure 1 Typical Mini Biofilter

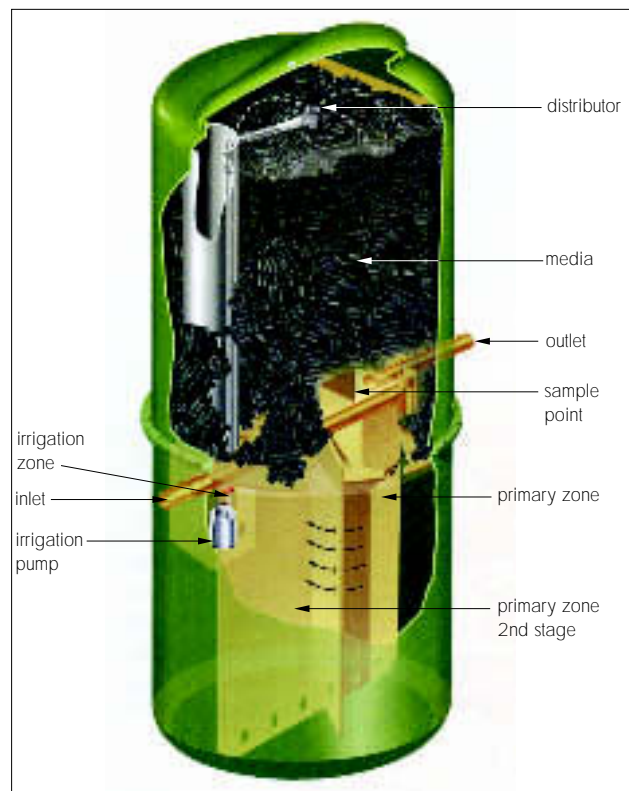




Table 1 Mini Biofilter characteristics

Characteristic	Unit type		
	4PE	6PE	10PE
Population equivalent	4	6	10
Total daily flow (litres)	800	1200	2000
Maximum daily flow	3 x dwf <sup>(1)</sup>	3 x dwf <sup>(1)</sup>	3 x dwf <sup>(1)</sup>
Total daily BOD <sub>5</sub> <sup>(2)</sup> (g)	240	360	600
Primary settlement chamber volume (m <sup>3</sup> )	1.1	1.6	1.6
Sludge storage volume (m <sup>3</sup> )	0.3	0.4	0.4
Desludging frequency	Annual	Annual	Annual
Diameter of unit (mm)	1200	1800	1800
Depth of unit (mm)	2900	2900	2900
Weight of unit empty (kg)	180	250	250
Diameter of inlet and outlet pipe (mm)	110	110	110
Depth of inlet invert (mm)	1650	1375	1275
Depth of outlet invert (mm)	1700	1425	1325

(1) dwf — dry weather flow.

(2) BOD<sub>5</sub> — biological oxygen demand.

Figure 2 Typical Midi Biofilter

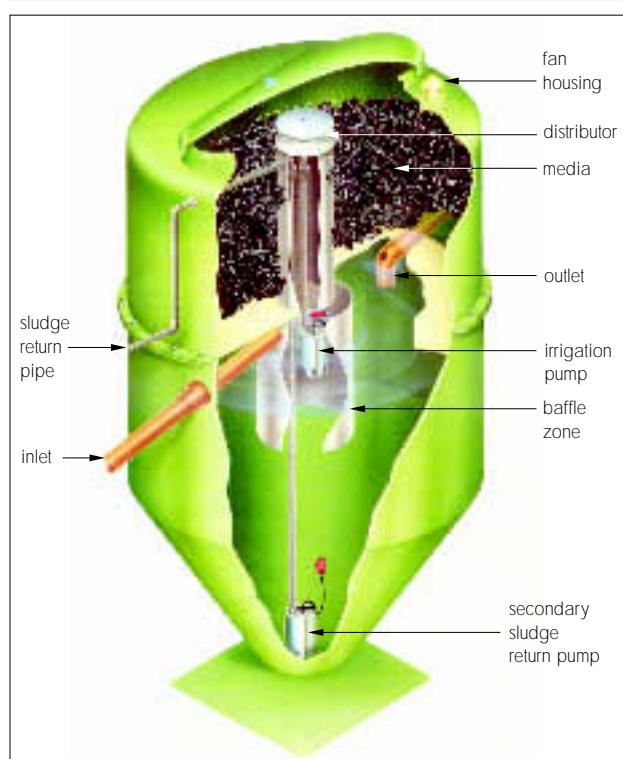


Table 2 Midi Biofilter characteristics

Characteristic	Unit type			
	C8	D8	E8	G8L
Population equivalent	15	20	25	30
Total daily flow (litres)	3000	4000	5000	6000
Maximum daily flow	3 x dwf <sup>(1)</sup>	3 x dwf <sup>(1)</sup>	3 x dwf <sup>(1)</sup>	3 x dwf <sup>(1)</sup>
Total daily BOD <sub>5</sub> <sup>(2)</sup> (g)	900	1200	1500	1800
Diameter of unit (mm)	1800	1800	1800	1800
Depth of unit (mm)	2900	2900	3150	3400
Weight of unit empty (kg)	250	250	250	250
Diameter of inlet and outlet pipe (mm)	110	110	110	110
Depth of inlet invert (mm)	1450	1450	1450	1450
Depth of outlet invert (mm)	1500	1500	1500	1500

(1) dwf — dry weather flow.

(2) BOD<sub>5</sub> — biological oxygen demand.

1.2 Each upper section contains plastic media, a collection of inert polypropylene components distributed randomly.

1.3 A mechanically-pumped distribution system, incorporating a venturi (to introduce air into the sewage liquor) lifts the liquor from the settlement zone and sprinkles it onto the plastic media. Air is vented from the unit via a vent pipe which can be connected to the property soil vent pipe or separate system. The bacteria, occurring naturally in sewage, multiply on the media and digest the organic waste in the liquor. The liquor is recycled over the media until clear. Following purification, the resulting liquid enters the outlet chamber where it either passes via a 110 mm diameter outlet pipe to the outfall (gravity system models) or is pumped through a 25 mm diameter pumping main (pumped system models) to the outfall point. Samples can be taken from the outlet pump and sample chamber (see Figure 1) where required. The outfall can be a ditch, soakaway or underground irrigation system.

1.4 The upper and lower sections and baffles are manufactured from cold-setting polyester resin, reinforced with short strand glass fibres.

1.5 Inlet and outlet pipes are of PVC to BS EN 1401-1 : 1998 and 110 mm in diameter (Mini and Midi).

1.6 Internal pipe work is of 1 inch diameter PVC-U, Class E, to BS EN 1452-1 : 2000.

1.7 The discharge outlet point is a 1 inch BSP male joint.

1.8 The outlet and media pumps are single-phase Grundfos KP150 A 1 units connected to 1 inch diameter PVC pipe work with 1 inch BSP joints. Each unit is checked and test-run before release.

1.9 Control panels are manufactured by the Certificate holder and are mounted either externally or in a suitable nearby building.

## 2 Delivery and site handling

2.1 The biofilter units must be lifted using webbing slings of a suitable specification attached to the designated lifting points. Lifting equipment should be selected by taking into account the unit weight, dimensions and the distance of lift required on site.

2.2 The product's cover bears the marketing company's name, labels denoting the inlet and outlet, a list of all the items supplied, installation guidance, the product specification code, serial numbers and inspection date.

2.3 Care must be taken during handling. Prior to installation, the unit should be placed on clear ground, free from sharp objects, and restrained from toppling.

### 3 General



3.1 Allerton Biofilter Self-contained Sewage Treatment Units are suitable for the collection and treatment of domestic sewage from properties where the maximum population equivalent ranges between 4 and 30, provided the sewage output per person does not exceed 200 litres and 60 grammes of Biochemical Oxygen Demand (BOD5) per day. The units are not suitable for nitrification.

3.2 Units are available with differing inlet invert depths to accommodate site drain levels (see Tables 1 and 2).

3.3 The general design of the installation must be in accordance with BS 6297 : 1983.

3.4 The biofilter units should be sited as far as possible from domestic dwellings or other facilities, in accordance with the relevant Building Regulations.

3.5 Where discharge is required to be at a higher level, an internal pumped outlet option should be specified.

3.6 The discharge from the unit must be to a suitable sub-soil irrigation system or watercourse in accordance with the requirements of the Environment Agency, the Scottish Environment Protection Agency or the Environment and Heritage Service, Belfast.

3.7 The treated effluent discharging from the biofilter units will normally be within Band 1 of Table 10 of BS 7781 : 1994 [ie suspended solids (SS) content <30 mg per litre and Biochemical Oxygen Demand (BOD5) <20 mg per litre], provided the hydraulic and BOD loadings are within the Certificate holder's specifications (see section 3.1). Under certain conditions the effluent may not be within these Standards. This is normal for any biological sewage treatment process and can be caused by unusual hydraulic or BOD loading, weather conditions, contamination by grease, excessive amounts and/or strength of laundry wastewater, cleaning agents, chemicals or medicines, such as antibiotics.

3.8 The Certificate holder offers a maintenance service contract for regular inspection and necessary maintenance of biofilter units, and will also undertake repair work.

3.9 The specification and power requirements of the product range are listed in Tables 1 and 2.

3.10 The biofilter units require a period of acclimatisation after commissioning before a full degree of treatment can be expected. This period is generally between two to three months.

4.1 The Certificate holder's design has been assessed as satisfactory. The biofilter units have adequate strength to resist damage from minor impacts only, such as during handling. The unit must be slung at the lifting points provided (see section 2.1).

4.2 The units must be installed in accordance with the *Installation Guidelines* provided with the units (see section 10). Particular attention should be given to the provision of concrete backfill to resist flotation due to groundwater.

### 5 Resistance to chemicals

The biofilter units are resistant to the small quantities of acid, alkali or other substances likely to be found in normal domestic sewage or the surrounding backfill.

### 6 Watertightness



The biofilter units, when correctly installed, will not allow seepage either into or from the surrounding soil. The pipe joints, when correctly made, will be watertight.

### 7 Maintenance

7.1 Maintenance<sup>(1)</sup> should be carried out in accordance with the *Information Handbook* supplied with each unit. When carrying out any work on a biofilter unit, it is important to observe all the Health and Safety warnings in the handbook.

(1) The Certificate holder offers a maintenance service.

7.2 Maintenance varies with the biofilter unit type and is summarised as follows:

- Mini Biofilter — at three-monthly intervals the pump operation should be checked visually via the access lid
- Midi Biofilter — at weekly-intervals the irrigation pump and circulation fan should be checked for correct operation. The distributor should be cleared, if required, and the secondary sludge pump checked.

7.3 Air inlet perforations under the lid should be cleaned to ensure continuous air flow. The distributor must be checked and cleared.

7.4 Annually, the units should be cleaned and desludged. After first switching off the power at the irrigation pump, the outlet pump (in a pumped system) together with associated pipe work are disassembled and removed from the unit for cleaning and checking pump oil levels. The primary and final zones are desludged using a hose of not greater than 100 mm diameter. Backwashing is recommended to ensure thorough cleaning.

7.5 After re-installing the pump(s) and pipe work, the primary and final zones are filled with clean water and power restored.

7.6 The control panel should be checked at weekly intervals for correct operation.

## 8 Durability



8.1 The structural properties of the GRP from which the chamber components are constructed, in common with all similar materials, will deteriorate with time. The deterioration is accelerated by contact with groundwater, sewage and dissolved or suspended organic or inorganic compounds. The GRP components and media should remain serviceable for at least 20 years. Internal PVC pipe work (Class E) is covered by BS EN 1452-1 : 2000.

8.2 Protected steel components may require further protection by painting. The mechanical and electrical components are liable to wear during operation, but the design layout is such that they can be replaced as required.

## Installation

### 9 General

9.1 Allerton Biofilter Self-contained Sewage Treatment Units should be buried, ensuring the rim of the cover is at least 50 mm above ground level to avoid blocking the air holes around the rim. The excavation must be large enough for easy placement of the unit, to permit subsequent concrete backfilling and to allow timbering and sheeting as required to meet Regulation 8(1) of the Construction (General Provision) Regulations 1961.



9.2 Electrical connections to the biofilter unit from the control box must be carried out by a person registered with a government-approved competent person scheme using material suitable for the purpose. Alternatively, notification should be made to the Local Authorities Building Control in advance of installation. The Certificate holder's *Installation Manual* provides further details.

9.3 Electrical connections must be in strict accordance with the Certificate holder's instructions and must comply with the local electricity distribution authority's regulations. Cables must be protected from accidental damage by a suitable conduit or other means of protection. The control panel can be located within the property it serves or in a separate housing or cabinet protected from accidental damage by vehicles or weather conditions.

9.4 The biofilter units must not be installed in areas liable to flooding and local accumulation of water after rainfall.

9.5 It is essential to take precautions to prevent damage by site traffic. Superimposed loads, eg from vehicles, should not be permitted within a distance equal to the depth of excavation. Fencing

or other suitable barriers may be required to prevent vehicles from approaching too close to the unit.

### Siting

9.6 Biofilter units should be sited to ensure:

- they are not prejudicial to the health of any person
- there is an adequate means of access for emptying and sludge removed without the contents being taken through a dwelling or place of work.

9.7 Concrete used on the base of the unit and for backfill surround can be either wet or dry mix (site or ready mix) with a minimum strength of 20 Nmm<sup>-2</sup>.

## 10 Procedure

10.1 Concrete approximately 150 mm thick<sup>(1)</sup> is laid at the base of the excavation (ensuring all voids are eliminated) and allowed to set.

(1) A greater or lesser thickness may be required depending on local sub-soil conditions.

10.2 The unit is lowered onto the concrete base using the slings in the lifting points (see section 2.1), and checks are made for level and position of the inlet and outlet points.

10.3 The unit is connected to PVC-U sockets at the inlet and outlet points. Where there are other types of pipe, eg vitrified clayware, suitable adaptors should be used with short lengths of PVC-U pipe introduced where necessary.

10.4 When fully connected, concrete is poured around the unit to an average thickness of 150 mm. When a chute is used to dispense the concrete, the concrete must not be discharged directly against the side wall of the unit. During this operation, the unit should be checked to maintain level positioning. Pipe work and sockets should also be examined for misalignment and repositioning.

10.5 The concrete should be carefully consolidated around the unit (without the use of a poker vibrator), to ensure even transfer of loads and prevent localised stress concentrations. If necessary, the unit should be ballasted with water, keeping the water level 300 mm above the top level of the concrete as work progresses.

10.6 A final check on the level of the unit is made and the media chamber is then filled with mixed media and evenly distributed.

10.7 The internal pipe work, pump and electrical conduit are fitted and connected to the control panel prior to a three-core steel wire armoured (SWA) being laid to the connection box.

10.8 The Certificate holder's *Information Handbook* should be consulted in respect of warranty provided if installation and commissioning is carried out by other than the Certificate holder.



## Technical Investigations

The following is a summary of the technical investigations carried out on Allerton Biofilter Self-contained Sewage Treatment Units.

### 11 Tests

11.1 Tests were carried out on GRP samples in accordance with MOAT No 9 : 1973 to determine:

- resin/glass ratio, based on BS EN ISO 1172 : 1999
- Barcol hardness, based on BS 4549-1 : 1970
- cross-breaking strength by water boil, based on methods in BS 3532 : 1990, Appendix C.

11.2 The durability of the GRP on prolonged exposure to water was assessed by exposing samples to boiling water for 1000 hours and measuring the loss of cross-breaking strength, bending stiffness and ductility.

11.3 The BBA carried out vacuum testing on a selection of units to determine the resistance to the loading likely to occur from hydrostatic pressure, and soil pressure, wet concrete and a varying water table.

11.4 The Certificate holder satisfactorily carried out a 24-week testing programme on a Mini 10PE unit in compliance with BS 7781 : 1994.

### 12 Investigations

12.1 An examination was made of the results of sample analyses of effluent from a Mini Biofilter unit, carried out to measure BOD and suspended solids content.

12.2 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

12.3 A site visit was made to assess the practicability and ease of installation.

12.4 A survey was undertaken of a number of existing sites, where the product had been installed, to assess its performance in use.

## Bibliography

BS 3532 : 1990 *Method for specifying unsaturated polyester resin systems*

BS 4549-1 : 1970 *Guide to quality control requirements for reinforced plastics mouldings — Polyester resin mouldings reinforced with chopped strand mat or randomly deposited glass fibres*

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

BS 7781 : 1994 *Procedure for type testing of small biological domestic wastewater treatment plants*

BS EN 1401-1 : 1998 *Plastics piping systems for non-pressure underground drainage and sewerage. Unplasticized poly(vinylchloride) (PVC-U) — Specifications for pipes, fittings and the system*

BS EN 1452-1 : 2000 *Plastics piping systems for water supply — Unplasticized poly(vinyl chloride) (PVC-U) — General*

BS EN ISO 1172 : 1999 *Textile-glass-reinforced plastics — Prepregs, moulding compounds and laminates — Determination of the textile-glass and mineral-filler content — Calcination methods*

MOAT No 9 : 1973 *Directive for the Assessment of Products in Glass-Reinforced Polyester for use in Building*



On behalf of the British Board of Agrément

Date of issue: 23rd September 2005

Chief Executive



