

**IRISH
AGRÉMENT
BOARD**



BUILDING PRODUCT CERTIFICATION

CERTIFICATE No. 01/0098

FM ENVIRONMENTAL LIMITED,
GREENBANK INDUSTRIAL ESTATE, NEWRY, CO. DOWN, IRELAND.
TEL: (048) 30266616 FAX: (048) 30263233

**BIOFILTER PACKAGE
SEWAGE TREATMENT SYSTEMS**

Systemes de Traitement des Eaux Résiduaires
Abwasser Aufbereitung

The Irish Agrément Board is designated by Government to issue European Technical Approvals.

Irish Agrément Board Certificates establish proof that the certified products are '**proper materials**' suitable for their intended use under Irish site conditions, and in accordance with the **Building Regulations 1997**.

The Irish Agrément Board operates in association with the **National Standards Authority of Ireland (NSAI)** as the National Member of UEAtc.



PRODUCT DESCRIPTION

This Certificate relates to the BIOFILTER PACKAGE SEWAGE TREATMENT SYSTEM.

USE

The product is for use in sewage treatment systems and for sewage & waste water collection systems designed in accordance with BS 6297: 1983 *Code of practice for design and installation of small sewage treatment works*

and cesspools for the collection of domestic sewage and for the separation and partial digestion of suspended matter.

MANUFACTURE AND MARKETING

The product is manufactured and marketed by FM Environmental Limited, Greenbank Industrial Estate, Newry, Co. Down, BT34 2PB. NI.

PART

1

CERTIFICATION

1.1 ASSESSMENT

In the opinion of the Irish Agrément Board (IAB), the Biofilter Package Sewage Treatment System is satisfactory for the purpose defined above, and meets the requirements of the Building Regulations 1997 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997

Requirement:

D1 & D2 - MATERIALS AND WORKMANSHIP.

D2 - The Biofilter Package Sewage Treatment System, as certified in this Irish Agrément Board Certificate, is comprised of "proper materials" and is fit for its intended use (see part 4 of this certificate.)

D1 - The Biofilter Package Sewage Treatment System used in accordance with this Irish Agrément Board Certificate, meets the requirements for materials and workmanship.

PART H - DRAINAGE AND WASTE DISPOSAL

H1 Drainage systems:

The Biofilter Package Sewage Treatment System is easily installed and incorporated into soil percolation or sewage treatment systems to meet Building Regulation requirements.

H2 Septic tanks:

The Biofilter sewage treatment system has been designed for use in sewage treatment systems, for the collection, separation and partial digestion of domestic sewage when installed in accordance with the recommendations of BS 6297: 1983 (*Code of practice for*

design and installation of small sewage treatment works and cesspools) and the E.P.A. waste water treatment manual (June 2000). Information on the design capacity, ventilation and location requirements is given in this Agrément Certificate (see sections 2.1, 2.4). The quality of treated wastewater from the Biofilter Package Treatment System exceeds that of the effluent from a septic tank and will meet the building regulation requirements. The Biofilter unit consists of a rectangular tank with tapering sides and is manufactured from glass fibre reinforced plastic (GRP). This tank is divided into four compartments. The system employs a single stage purification process utilising an aerobic biological principle.

PART

2

TECHNICAL SPECIFICATION AND CONTROL DATA

2.1 DESCRIPTION

This Certificate relates to The Biofilter Package Sewage Treatment System comprising of a GRP unit housing a four compartment single stage purification process employing an aerobic biological principle (see fig. 1). The Biofilter Package Sewage Treatment System is proposed to be used instead of a single septic tank system. It is for applications where mainline foul water drainage is not accessible, where septic tank systems are not acceptable, and where sites do not comply with the requirements of S.R.6 :1991 *Septic Tank Systems Recommendations for Domestic Effluent Treatment and Disposal from a Single Dwelling House* and/or where septic tank systems have been known to fail.

an extra surge or balancing tank can be installed upstream of the Biofilter unit. The solids entering the unit fall to the conical base by gravity and accumulate in this region until emptied by de-sludging, usually after a 26 week operational period.

Zone B

This zone incorporates a re-circulation facility and a mesh screening basket (re-circulation is by a low wattage pump with vortex type impeller) which enables the screened primary mixed liquor to be delivered from the screening zone to the biozone, via a delivery system. A distribution trough with double sided notch weirs ensures even distribution of the liquor over the biozone filtermedia. Furthermore, a low wattage fan induces air into the biozone promoting ideal aerobic conditions for the biological process to take place and preventing the build-up of CO₂

Zone C

The biozone incorporates a filter matrix of uniform and continuous cross-flow design that ensures superior air and water mixing. It is packaged and rigidly supported above the primary settlement zone. The distributed liquor displaced from Zone B falls over a media pack (via the weir) which is protected by a plastic mesh to further enhance the screening of non-biodegradable materials which may have passed through the pump screen. The media design ensures that the liquor penetrates evenly throughout the biozone to fall freely and evenly into the secondary part of Zone A, where some mixing with the settled liquor takes place.

Zone D

The transfer of liquor from the primary tank is effected by displacement (dependant upon the rate of flow into the Biofilter) via a baffled outlet to prevent scum entering the final settling zone. Treated effluent discharges via a trapped outlet pipe to a watercourse or soakaway. The humus sludge filters back into the primary tank under gravitational pressure via a slot in the final tank baffle.

Zone E (Optional)

Treated effluent can also be discharged by means of a final effluent pumping station. A single low wattage pump is housed in a small sump incorporated within the Biofilter Unit. During periods of flow to the plant,

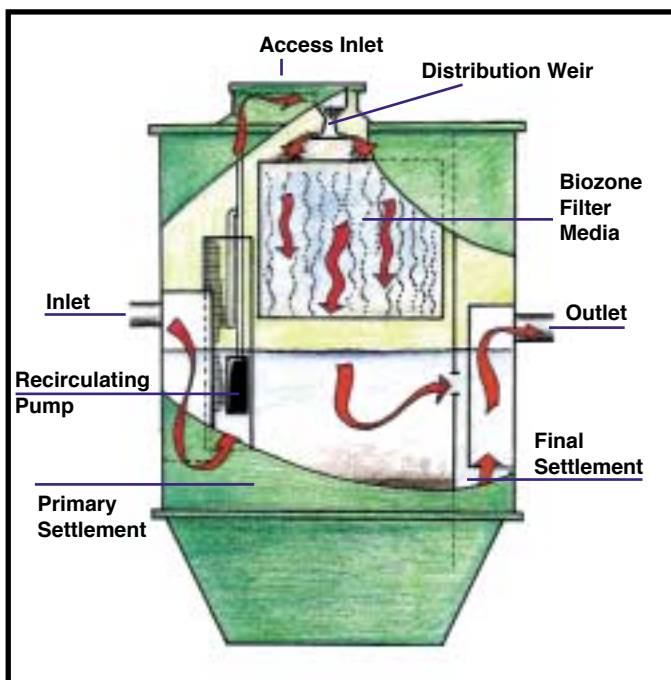


Fig 1: Cross-Sectional Diagram

Zone A:

This compartment receives the flow of incoming domestic sewage (see Fig. 2) from a pumped source or by gravitational flow. The primary settlement zone is of adequate size to cater for the variation of flows normally expected, without the need for any external balancing. Where high daily flows are to be considered,

Model Ref.	Equivalent Population	200 l/h/d Average Flow	60 gms/h/d BOD5 Applied Load	Unit Weight Empty	Unit Weight Full	Pump Rating	Inlet/ Outlet pipe Connections
	No. Served	m³/d	kg/d	Tonnes	Tonnes	kW	mm
VES 1	7	1.4	0.42	0.25	3.02	0.15	100
VES 2	14	2.8	0.84	0.31	4.10	0.15	100

Table 1: General Information on Biofilter Systems

effluent displaces from the final settlement zone into the sump where it is pumped to a soakaway or watercourse (see section 2.4.3). This pumping option gives flexibility when faced with poorly drained or restricted sites allowing the effluent to be pumped to higher or remote locations.

GENERAL

The Biofilter unit is designed to ensure clean air is drawn into the unit from the atmosphere to accelerate the biological process and to reduce the possibility of sewage odour around the plant. Effective biological processes take place within the media pack in zone C (see fig. 2).

The foul sewage drain to the plant should be equipped with a siphoning trap and on the larger plants which receive large amounts of kitchen waste, etc, a suitable grease trap should be incorporated. The grease trap should be maintained in accordance with the manufacturers instructions. An automatic self-cleansing grease removal system can be provided by FM Environmental Limited to ensure adequate grease and fat extraction. Non-biodegradable materials such as plastic bags, rubber items and removable tapes from sanitary towels, disposable nappies etc, should not be flushed down the toilet system or passed through a toilet disintegrator (if applicable). Domestic detergents if used sparingly in normal quantities will not affect the plant, but excessive use of detergents from a dishwasher may affect the plants performance.

The quality of treated effluent from the Biofilter Package Sewage Treatment System can provide better than the 20mg of Biochemical Oxygen Demand and 30mg of Suspended Solid Standards when appropriately sized and maintained.

All pumping is carried out using a low wattage submersible pump.

2.2 MANUFACTURE

The main tank and cover are manufactured by hand or sprayed lay-up from cold setting polyester resin and reinforced with glass fibres (chopped strand mat or woven rovings). The PVC Media and trough are fitted during manufacture. The final GRP panels and cover are then fitted to complete the assembly. The recirculating pump and pipework are installed inside the tank. The fan and recirculating pump are wired back to the main isolator.

Product range:

Biofilter units **VES 1** and **VES 2** are designed to collect the waste water and sewage from dwellings having the populations shown in Table 1.

Quality control.

Quality control includes laminate thickness checks on GRP components, plating thickness of zinc on galvanized components and the checking of bought-in components against specification. Each completed unit is checked and test-run for one hour to ensure that it is mechanically sound.

2.3 DELIVERY, STORAGE AND MARKING

The tanks are completed ready for delivery at the manufacturer's works. All sizes of Biofilter units must be lifted with slings at the points recommended by FM Environmental Ltd. Off-loading must be carefully supervised and the lifting equipment should be selected by taking into account the unit weight dimensions and the distance of lift required and should conform with the requirements of the Safety, Health and Welfare at Work Act 1989. The manufacturer's instructions must be followed to avoid damage to the tanks during off-loading and placing in the excavation. A crane or other suitable lifting equipment must be employed. The weight of each unit empty is given in Table 1.

The tanks are supplied with full installation instructions and are labelled on the outside to indicate the IAB identification Mark incorporating the number of this Certificate.

2.4 INSTALLATION PROCEDURE

2.4.1 GENERAL

FM Environmental Limited provide a service for the design, site survey and installation of Biofilter units. They will also advise clients of the installation requirements, or provide supervision of installations carried out by others.

Electrical connections to the Biofilter unit from the control fuse box of the house must be carried out by a competent person using materials suitable for the purpose.

Electrical connections must be in strict accordance with the manufacturers instructions and must comply with the current 'National Rules For Electrical Installations' (ETCI), Document No. ET101/1991: AI/1997 published by the 'Electro-Technical Council of Ireland'.

Cables must be protected from accidental damage by a suitable conduit or other means of protection, and should be connected to a 10 amp M.C.B. in the Dwelling. The alarm system should be installed beside the fuse box where applicable

The Biofilter units must not be installed in areas liable to localised flooding without adequate protection as specified by FM Environmental Limited.

It is essential to take precautions to prevent damage by site traffic. Superimposed loads from vehicles, livestock etc. should not be permitted within a distance equal to the depth of excavation, unless suitable structural protection is provided. A suitable fence may be required to prevent vehicles and livestock from approaching too close to the unit.

Procedure:

Biofilter units are installed fully or partly buried. The excavation must be large enough for easy placement of the unit, to permit subsequent backfilling and to allow timbering and sheeting as required to meet the Safety, Health and Welfare at Work Act, 1989, (see Fig. 2).

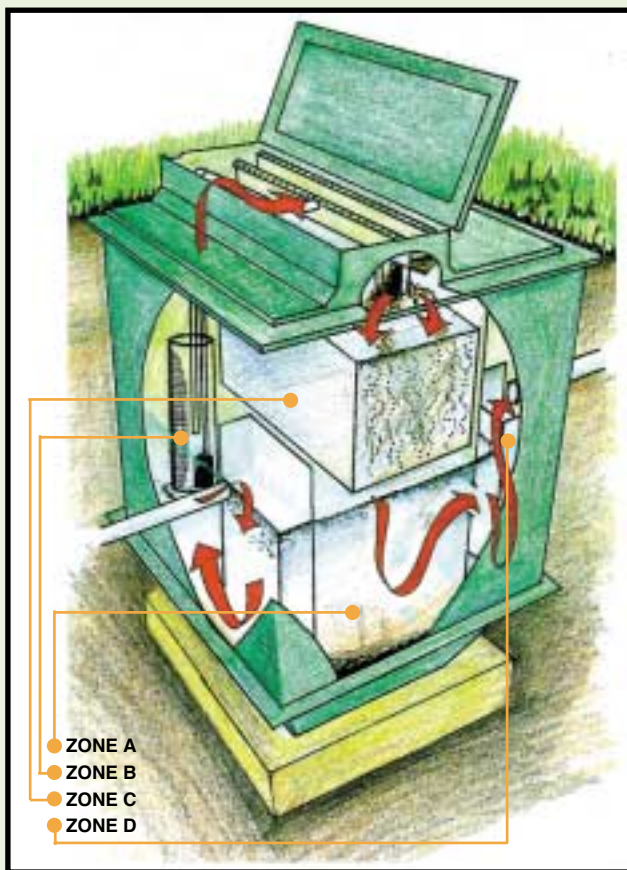


Fig 2: Flow Pattern Diagram

The base of the excavation should be dewatered, consolidated with suitable hardcore and covered with grade 25N concrete of sufficient thickness to ensure that the tank is fully supported when full. This concrete base must be absolutely level so as not to compromise equal distribution of the sewage over the filter media. On placement of the tank on the base, it must then be filled to inlet invert with water, before backfilling with grade 25N concrete. This backfill of concrete must be carefully consolidated around the sloped base area and above the flanged joint surrounding the tank.

Pipe Connections

The tank is connected to 100 mm diameter uPVC pipes as required at the inlet and outlet. For other types of pipe such as vitrified clayware etc. suitable adaptors are used with short lengths of uPVC pipe as necessary.

2.4.2 LOCATION

Biofilter units should be sited so that they are not prejudicial to the health of any person, and that there is an adequate means of access for emptying. i.e. within 30 m of a vehicle access, without the contents being taken through a dwelling or place of work.

Units must be sited at a minimum distance of 3–5 m from habitable buildings as shown in Table 2.

Ventilation must be provided in accordance with the Building Regulations 1997.

	Biofilter Unit [m]	Percolation Area [m]
Dwelling Served	3 - 5 ⁽¹⁾	5 ⁽³⁾ - 7
Adjacent Dwelling	5 - 7 ⁽¹⁾	5 ⁽³⁾ - 7
Site Boundaries	3	1 - 3
Well/Springs	10	20 - 100 ⁽²⁾
Walls	3 ⁽¹⁾	3
Roads	3 ⁽¹⁾	3
Watercourse	3	3

Table 2: Minimum Distance Required For The Biofilter Unit

- (1) The depth of the excavation to accommodate the Biofilter unit must be taken into account when determining these distances. The separation distance should be such that the excavation does not undermine adjacent buildings, boundaries, roads or walls. This distance should not be less than 1.5 times the excavation depth.
- (2) This separation distance should not be less than 20 metres but in the case of very free draining soils or gravels a minimum distance of 40 metres should be maintained. The irrigation area should be downhill of any nearby well. Where this is not possible a separation distance of at least 100 metres must be maintained.
- (3) These minimum permissible distances are for guidance and have been established on the basis of performance tests on the Biofilter Package Sewage Treatment System in use and subject to normal loading but each site should be assessed on its own merits. However, where the site permits, irrigation areas should be located at greater separation distances from the dwelling. Also, where practical, on sloping sites the irrigation area should be down slope from the dwellings.

The tank should be located not closer than 1.5 times the depth to the bottom of the tank or 3 m (which ever is greater) to any building, road or wall, so as to avoid damage to foundations during excavations for the tank.

2.4.3 DISPOSAL OF FINAL EFFLUENT

The information required for designing the percolation area comes from two sources, site layout and soil test results (in accordance with the code of practice detailed in S.R. 6 1991 and section 15.3.2 of BS 6297: 1983 *code of practice for design and installation of small sewage treatment works and cesspools*). Also, the physical properties of the soil, the general characteristics of the site, the hydraulic loading on to the system and the quality of the treated waste water are important considerations when designing the percolation area.

There are five main methods of disposal of the final effluent:

1 – **Sub-surface percolation:** This is where the treated effluent flows by gravity to a sub-surface drainage system, the size of which will be determined by the soil type and the population served. See Table 3 and Fig. 4.

2 – **Sub-surface pressurised percolation area:** This is where the treated effluent is pumped through a 50 mm line to a sub-surface percolation system at a depth of 200 mm below ground level. See Fig. 3 and 6.

3 – **Sub-surface percolation with periphery drains:** This is where the treated effluent flows by gravity or alternatively through a 50 mm pumped line to a sub-surface percolation system as shown in Fig. 7 and 8.

4 – **Banked-up and sub-surface percolation area:** In this case the treated effluent is pumped via a 50 mm line to a sub-surface percolation system constructed within a mound of imported topsoil See Fig. 5.

5 – **Direct discharge into receiving waters:** This can only be carried out with the permission of the Local Authority.

Note: *These are all typical layouts of percolation areas. Advice must always be sought from FM Environmental Limited with regard to the design of specific percolation areas.*

Table 3 gives general guidance for sizing of the irrigation area.

2.5 Commissioning:

Commissioning must be carried out by FM Environmental Limited service technicians after installation is completed and all services are connected.

Population Equivalent	Percolation Value (Seconds / mm.)			
	10 - 30	30 - 50	50 - 80	80 - 150
4	12	15	20	30
5	15	20	30	45
7	20	30	45	70
10	30	40	60	90
14	40	60	90	140

N.B. These figures are based on a percolation trench width of 900 mm.

Table 3: Guidance For The Sizing Of The Percolation Area (in linear metres of pipe)

PART 3 DESIGN DATA

3.1 GENERAL

The Biofilter package treatment systems **VES 1** and **VES 2** are suitable for the collection and treatment of domestic sewage and should be installed in accordance with the manufacturer's instructions and to conform with the recommendations of BS 6297: 1983 *Code of practice for design and installation of small sewage treatment works and cesspools*. It is important that the loadings are based on the maximum population to be served.

Biofilter units should be sited in accordance with the relevant Building Regulations (see Table 2).

Ground water and flood levels should always be below plant outlet level, unless specific arrangements have been made to overcome this problem.

The discharge of the unit must be to a suitable sub-soil irrigation system or water course; where a water course is to be used a licence must be obtained from the Local Authority.

An access cover is provided for inspection and maintenance of the unit, but this cover should be kept closed and locked during use. No attempt should be made to enter the unit through the hatch.

The effluent resulting from the sewage treated by the Biofilter unit will normally be within Royal Commission Standard (i.e. suspended solids content less than 30 mg per litre and Biochemical Oxygen Demand (BOD) less than 20 mg per litre) provided that the hydraulic and BOD loadings are within the limits recommended by the manufacturer for the unit installed (200 litres per head

per day and 60 grammes per head per day, respectively - see Table 4).

3.2 Design Basis

The sizes and relevant dimensions of the Biofilter units certified, are shown in Table 1.

FM Environmental Limited offer Biofilter clients a maintenance service contract for regular inspection and necessary maintenance of Biofilter units. They can also undertake plant installation and repair work.

The specification and power requirements of the Biofilter range are listed in Table 1.

A short period of acclimatisation must be allowed after commissioning of the unit before a full degree of treatment can be expected. This period is generally within 1-2 weeks and is normal for any biological treatment plant.

3.3 Final Effluent Quality

pH	6-9
Biochemical oxygen demand	< 20mg/litre
Suspended Solids	< 30mg/litre
Ammonia as N	< 5mg/litre
Nitrate as N	< 23mg/litre
Phosphorous as P	<11mg/litre

Table 4: Treated waste water characteristics

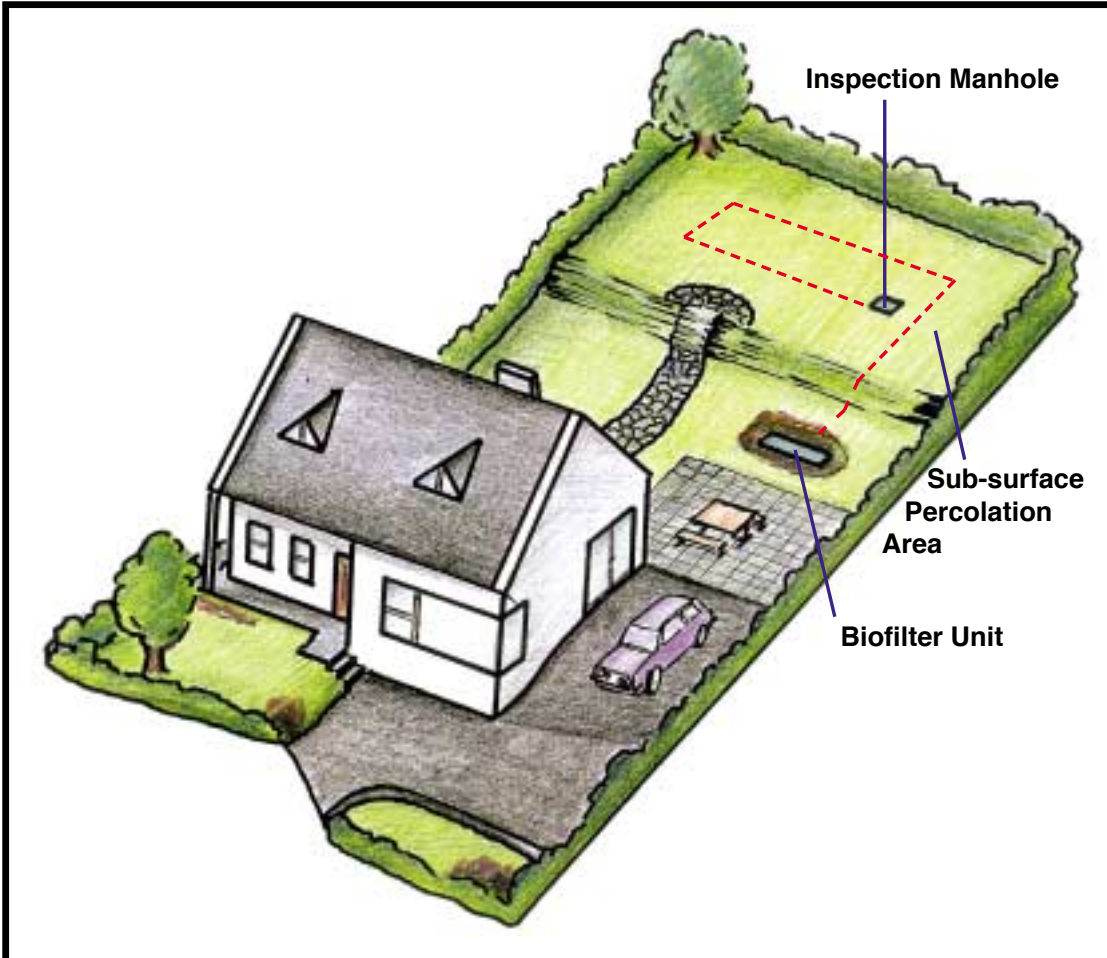


Fig 3: Typical layout of Biofilter Unit & Sub-surface Percolation Area Pressurised.

SPECIMEN COPY

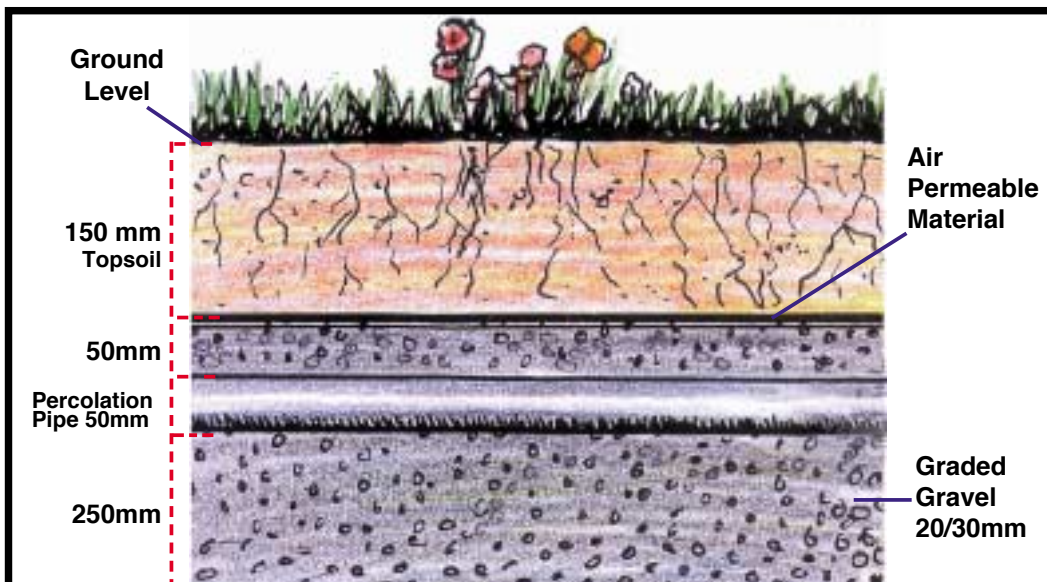


Fig 6: Typical Section of sub-surface percolation system.

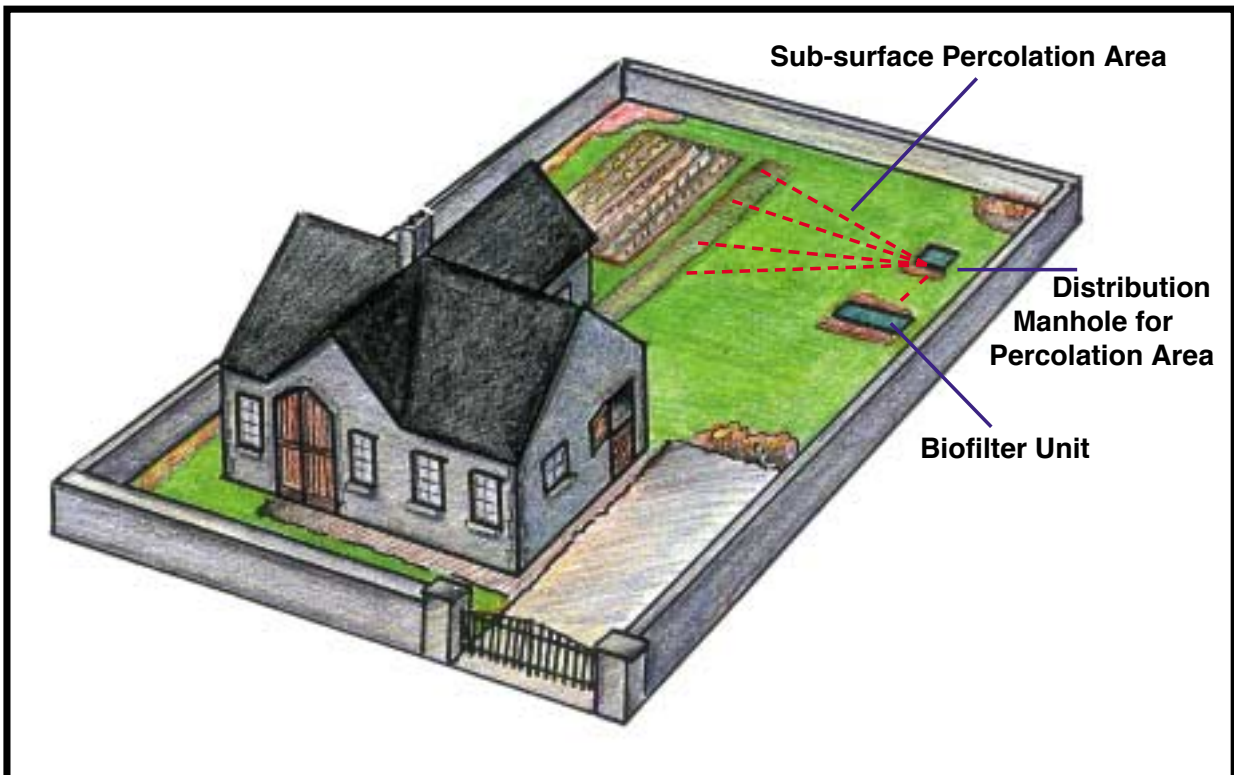


Fig 4: Typical layout of Biofilter Unit & Sub-surface Percolation Area

SPECIMEN COPY

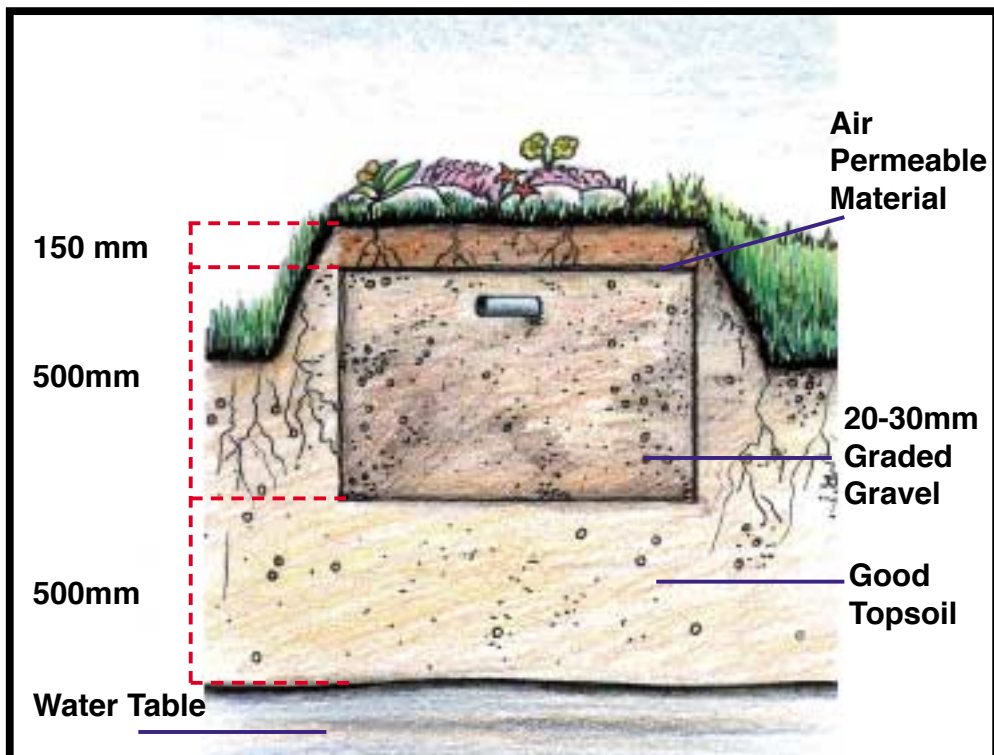


Fig 5: Construction of Mound System

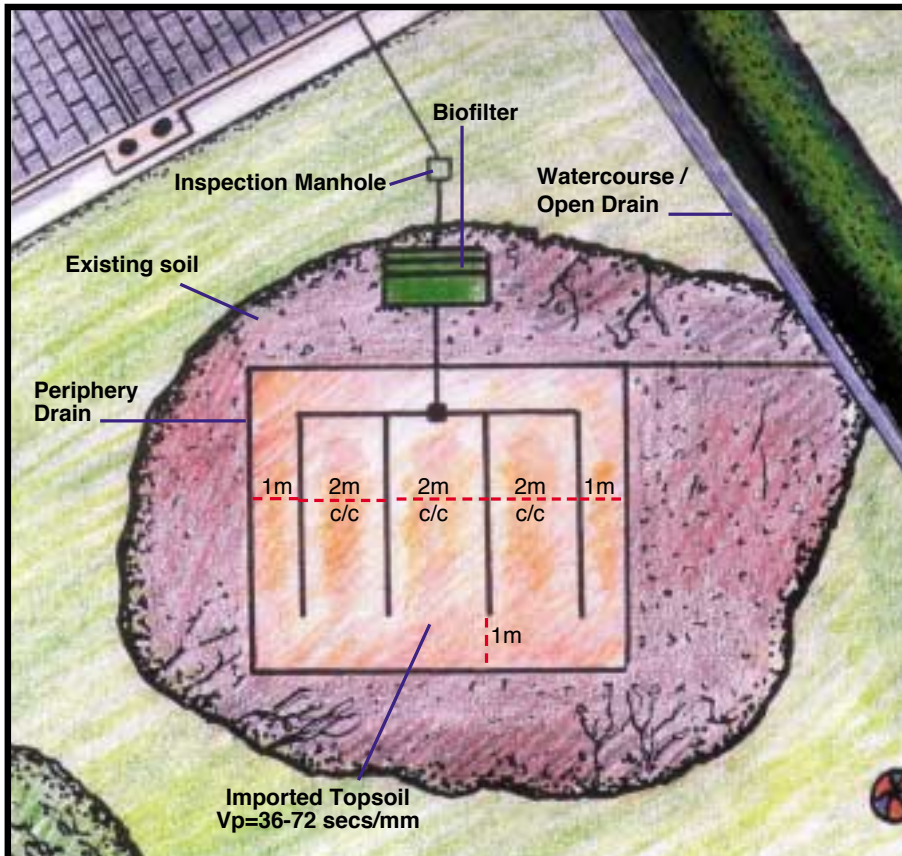


Fig 7: Typical layout of Biofilter & Sub-surface Percolation Area with peripheral drains for sites with impervious soil and access to a watercourse / open drain.

SPECIMEN COPY

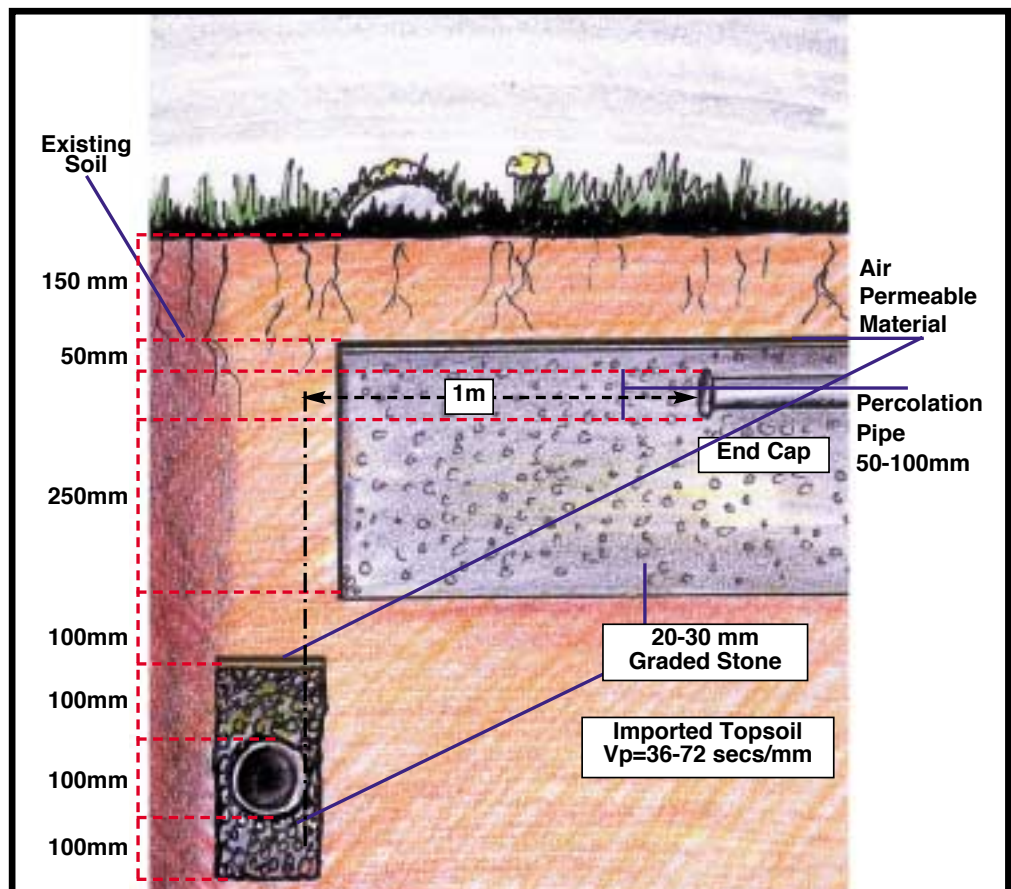


Fig 8: Section through sub-surface percolation trench with periphery drain for sites with impervious soil.

4.1 ENVIRONMENTAL ASSESSMENT

The treated waste water from a number of working installations has been comprehensively monitored for 8 months. The test results show that values stated for the parameters listed in Section 3.3 are consistently achievable over a range of operating conditions.

4.2 STRENGTH

The manufacturer's design has been assessed as satisfactory. The Biofilter has adequate structural strength to resist damage from minor impacts during handling but it must be slung and supported at the points recommended and marked by the manufacturer. The Biofilter has sufficient structural strength to resist soil loads in non-cohesive dry soils. However, it is recommended that the Biofilter is backfilled with dense mass concrete to resist upthrust due to buoyancy where there is the possibility of a high water table or where the tank is installed in a non-free draining ground condition.

The cover and frame assembly is suitable for use where subject to foot traffic only.

4.3 LIQUID WATER PENETRATION

The Biofilter with its pipe connections, when correctly installed has been assessed as fully capable of preventing seepage either into or from the surrounding soil. The pipe joints, when correctly made, will be watertight.

4.4 DURABILITY

The structural properties of the GRP from which the tank is constructed, in common with all similar materials, will deteriorate with time. This deterioration is accelerated by contact with ground water, sewage and dissolved or suspended organic or inorganic compounds. The resulting loss of strength or stiffness has been taken into account in the manufacturer's design code. In the opinion of the IAB the product when used in the context of this Certificate, will have a life in excess of 30 years when installed in accordance with this Certificate. Protected steel components may require further protection by painting, but this should not be required for at least 15 years. The mechanical and electrical components are liable to wear during operation, but the design layout is such that they can be replaced as required.

4.5 CLEANING AND MAINTENANCE

Cleaning and maintenance should be carried out in accordance with the Maintenance Recommendations for the Biofilter unit *supplied* by FM Environmental Limited.

A maintenance contract is also provided by the Company.

Summary of main instructions

The Biofilter is desludged by a suction tanker. Care must be taken to avoid damage by the hose nozzle. The primary settlement zones must be desludged in accordance with FM Environmental Limited recommendations for the particular size of Biofilter unit (see Table 1).

Maintenance Recommendations for Biofilter unit

The Biofilter unit is designed to ensure clean air is drawn into the unit from the atmosphere to reduce the possibility of sewage odour around the plant, and ensure the biological process takes place.

Monthly

Lift the access cover and ensure the mixed liquor is being effectively spread over the surface of the media mattress.

If the distribution trough is partially blocked, shut the pump off at the isolator. Remove the complete pump assembly by the quick release union connections; wash down pump and clean pipework; clean the distribution trough, V-notch weir, trough holes and splash plates; replace and restart the pump. Observe the distribution action to ensure the unit is operating correctly. If the pump is not operating, and after having checked the electrical connection and protection fuse, contact FM Environmental Limited for pump overhaul or a replacement pump.

The air intake fan should be observed to ensure it is operative and drawing in air. If it is not operating then contact FM Environmental Limited for either a service or replacement fan.

3-Monthly

Check sludge level with suitable probe. If this appears to be excessive arrange to have the unit de-sludged.

6-Monthly

Inspect the pump screen to ensure it is not clogged. Remove the pump and screen assembly if necessary, hose down screen, collecting the debris in a plastic bag, seal and have it removed to the local refuse Collection Compound or nearest Sewage Treatment Works.

Replace pump and clean screen.

Remove off any debris on the media mattress which could clog the media.

12-Monthly

The unit should be desludged as per manufacturers instructions. Remove screen and pump as per 6-monthly maintenance procedure, hose down the interior walls only of unit NOT THE MEDIA, fill with clean water up to the outlet pipe invert and restart Pump.

24-Monthly

Have the plant completely overhauled and serviced by FM Environmental Limited. An overview of the typical service is supplied with the unit.

Flooding

Repair or replacement may be required should the mechanical and electrical components be subject to damage in the event of flooding.

4.6 SAFETY

4.6.1 SAFETY OF PERSONNEL

All tank chamber covers are securely fixed to prevent unauthorised access. The manhole covers must not be left off an unattended tank. The manufacturers provide a locking device to the covers to ensure that they can not be removed without keys.

If any damage occurs to the Biofilter Treatment Unit, this should be reported to FM Environmental Limited so that remedial action if necessary can be carried out. On no account should anybody attempt to enter the treatment unit.

The Biofilter unit should be positioned, or marked, or protected, to prevent superimposed loading or accidental impact by vehicles.

4.7 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE

Test were carried out to determine:

- Resin/glass ratio Based on ISO 1172: 1996
- Barcol hardness, based on BS 4549: Part 1: 1997
- Cross breaking strength by water boil, based on methods in BS 3532: 1990 (1995) Appendix C and BS 2782: Part 3: Method 335A: 1993.
- Degree of cure, by the Coggeshall test.
- Water soak test based on ISO 62: 1999.
- The durability of the GRP on prolonged exposure to water was assessed by exposing samples to boiling water for 1000 hours and then measuring any loss in cross breaking strength, bending stiffness or ductility.
- Watertightness.
- Strength of cover and frame assemblies.

Hydrostatic testing of complete tanks for internal and external pressure loading.

- Resistance of units to hydrostatic and ground pressure.
- Resistance to flotation
- Environmental performance

4.8 OTHER INVESTIGATIONS

- (i) Existing data on the history of use of previous installations.
- (ii) 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.
- (iii) An examination was made of the results of sample analysis of settled sewage from the Biofilter unit to measure suspended solids content and Biochemical Oxygen Demand.

An assessment of the tank was made in relation to:

- degradation of mechanical properties owing to exposure to sewage, ground water, dissolved salts and dilute acids or alkalis; long-term loading conditions.
- Structural steel components
- Specification and durability of the corrosion protection process.
- Bought in components
- Suitability for use.

- (iv) Site visits were conducted to assess the practicability of installation.
- (v) A user survey and visits to established sites were conducted to evaluate performance in use.
- (vi) No failures of the product in use have been reported to the IAB.

SPECIMEN COPY

5.1 CONDITIONS OF CERTIFICATION

The National Standards Authority of Ireland (“NSAI”) following consultation with the Irish Agrément Board (“IAB”) has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this certificate and in accordance with the manufacturer’s instructions and usual trade practice. This certificate shall remain valid so long as:

- (a) the specification of the product is unchanged;
- (b) the Building Regulations, 1997 and any other regulation or standard applicable to the product/process, its use or installation remain unchanged;
- (c) the product continues to be assessed for the quality of its manufacture and marking by NSAI;
- (d) no new information becomes available, which in the opinion of the NSAI would preclude the granting of the certificate;
- (e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.

5.2 The IAB mark and certification number may only be used on or in relation to products/processes in respect of which a valid certificate exists. If the certificate becomes invalid, the certificate holder must not use the IAB mark and certification number and must remove them from products already marked.

5.3 In granting this certificate, the NSAI makes no representation as to:

- (a) the presence or absence of patent rights subsisting in the product/process; or

- (b) the legal right of the certificate holder to market, install or maintain the product/process; or

- (c) whether individual products have been manufactured or installed by the certificate holder in accordance with the descriptions and specifications set out in this certificate.

5.4 This certificate does not comprise all installation instructions and does not replace the manufacturer’s directions or any professional or trade advice relating to use and installation which may be appropriate.

5.5 Any recommendations contained in this certificate relating to the safe use of the certified product or process are preconditions to the validity of the certificate. However, the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act, 1989 or of any other current or future statute or current or future common law duty of care owed by the manufacturer or by the certificate holder.

5.6 The NSAI is not responsible to any person or body for loss or damage, including personal injury, arising as a direct or indirect result of the use of this product or process.

5.7 Where reference is made in this certificate to any Act of the Oireachtas, regulation made thereunder, statutory instrument, code of practice, national standards, manufacturer’s instructions or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this certification.

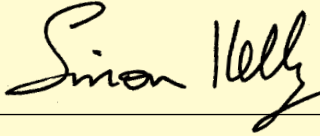
SPECIMEN COPY

THE IRISH AGRÉMENT BOARD

This Certificate No. 01/0098 is accordingly granted to FM Environmental Limited. on behalf of the Irish Agrément Board.

Date of Issue: February 2001

Signed: _____



Chief Executive, NSAI

Readers may check that the status of this Certificate has not changed by contacting the Irish Agrément Board, NSAI, Glasnevin, Dublin 9. Ireland.

Telephone: (01) 807 3800.

Telefax: (01) 807 3842.

SPECIMEN COPY

**Revised and reprinted
February 2001**



BUILDING PRODUCT CERTIFICATION

**Irish Agrément Board,
NSAI,
Glasnevin,
Dublin 9.
Ireland.
Telephone: (01) 807 3800.
Telefax: (01) 807 3842.**