



Bord Agrément na hÉireann  
Irish Agrément Board

CERTIFICATE NO. 06/0208

Killarney Plastics Ltd  
Ballyspillane Industrial Estate, Killarney,  
Co Kerry, Republic of Ireland

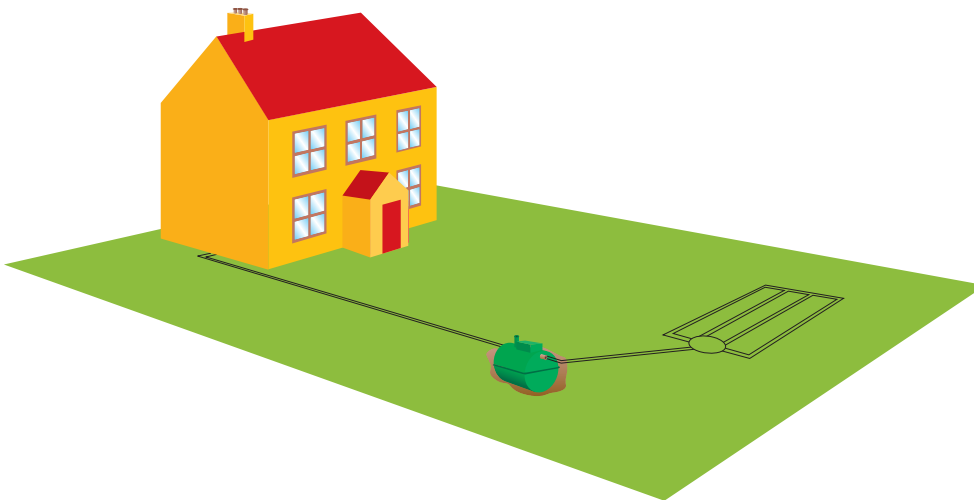
Tel: 064 32421 Fax: 064 22686  
e-mail: sales@killarneyplastics.com  
website: www.killarneyplastics.com

# TRI-CEL<sup>®</sup> Wastewater Treatment System for Single Dwellings.

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 to 2006.

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 TRI-CEL<sup>®</sup> Wastewater Treatment System for Single Dwellings. The system utilises a Biological Aeration Filter process, to treat domestic wastewater, from dwellings with a population equivalent of up to six persons.

The unit is manufactured from glass-reinforced plastic (GRP), is cylindrical in shape and has three operating zones.

The total tank capacity is circa 4100 litres with a treatment capacity of circa 3500 litres. For design loadings and flows, the retention time is in excess of 48 hours. The de-sludging interval is at least one year.

The life of the GRP tank, when installed and operated in accordance with the Certificate holder's instructions, should be in excess of 25 years. However, mechanical components, subject to normal wear and tear, will require replacement within this time.

## USE

The product is for use in wastewater treatment systems designed in accordance with BS 6297: 1983 *Code of practice for design and installation of small sewage treatment works and cesspools*, and the EPA *Wastewater treatment manual – Treatment Systems for Single Houses 2000*, for the collection and treatment of domestic wastewater, including the separation and partial digestion of suspended matter, prior to discharge of the treated effluent.

## MANUFACTURING AND MARKETING

The product is manufactured and marketed by:

Killarney Plastics Ltd., Ballyspillane Industrial Estate  
Killarney, Co Kerry, Republic of Ireland.

Tel: 064 32421 Fax: 064 22686  
e-mail: sales@killarneyplastics.com  
website: www.killarneyplastics.com  
website: www.tricel.ie

**1.1 ASSESSMENT**

In the opinion of the Irish Agrément Board (IAB), the TRI-CEL<sup>®</sup> Wastewater Treatment System is satisfactory for the purpose defined above, and can meet the requirements of the Building Regulations 1997 to 2006, as indicated in Section 1.2 of this Certificate.

**1.2 BUILDING REGULATIONS 1997 to 2006 REQUIREMENT**

**PART D – MATERIALS AND WORKMANSHIP**

**D1** - The TRI-CEL<sup>®</sup> Wastewater Treatment System, used in accordance with this Irish Agrément Board Certificate, can meet the requirements for materials and workmanship.

**D3** - The TRI-CEL<sup>®</sup> Wastewater Treatment System, as certified in this Irish Agrément Board Certificate, is manufactured from proper materials and is fit for its intended use. See Part 4 of this Certificate.

**PART H - DRAINAGE AND WASTE DISPOSAL**

**H1 Drainage systems**

The TRI-CEL<sup>®</sup> Wastewater Treatment System is easily installed and incorporated into soil percolation systems to meet Building Regulation requirements.

**H2 Septic tanks**

The TRI-CEL<sup>®</sup> Wastewater Treatment System has been designed for use in wastewater treatment systems, for the collection and treatment of domestic wastewater, when installed in accordance with the recommendations of BS 6297: 1983 and the EPA *Wastewater treatment manual – Treatment Systems for Single Houses 2000*.

The quality of effluent from the TRI-CEL<sup>®</sup> Wastewater Treatment System exceeds that of the effluent from a septic tank and can meet the Building Regulation requirements.

Information on the design capacity, ventilation, safety and location requirements is given in this Irish Agrément Certificate. See Part 3 and 4 of this certificate.

## Part Two / Technical Specification and Control Data

2

### 2.1 PRODUCT DESCRIPTION

#### 2.1.1 System Details

The TRI-CEL<sup>®</sup> Wastewater Treatment System utilises a Biological Aeration Filter process to treat domestic wastewater from dwellings with a population equivalent of up to six persons.

The tank is formed in two halves, from glass reinforced plastic.

An air compressor supplies air to an air bubble diffuser system in the secondary chamber. The compressor, which is located within an integral chamber at the top of the unit, operates on a continuous basis. The air compressor is ventilated through openings in the manhole cover. The unit operates off a normal domestic power supply, and is connected to the dwelling served by a residual current device (RCD).

Inlet and outlet pipe connections are provided and are clearly labelled.

The unit is accessed via the pedestrian duty GRP manhole cover, designed to sit 50 mm above ground level. The cover is locked in place with a specially designed key.

Discharge from the tank is by gravity.

Provision can be made for pumped discharge, by incorporating a pump if required. Pumped systems shall be designed by a **'competent person'**. Adequate provision should be made for storage in the event of pump failure. This is outside the scope of this certificate.

#### 2.1.2 Treatment

Treatment is carried out in three phases, as follows:

**Zone 1** Domestic wastewater enters the primary settlement zone through the inlet pipe. Heavy solids sink towards the base of the chamber, where they are retained, until the tank is de-sludged. Lighter debris and grease rise to the surface to form a crust. The remaining effluent is displaced from the primary zone into the submerged media/activated sludge section (Zone 2).

**Zone 2** As the supernatant liquor passes through the submerged media in the filter chamber, it is biodegraded by microorganisms, which develop and grow in suspension on the bio-media. These naturally occurring organisms utilise the organic material in the effluent as a food source, thus reducing the Biochemical Oxygen Demand. In order to achieve this, the organisms require an adequate supply of oxygen. This is provided by aerating the filter chamber via the air diffuser arrangement. Excess microorganisms are shed from the media as solid particles, known as humus.

**Zone 3** Treated effluent is displaced from the filter chamber into the final settlement zone. Here, humus solids settle out and form a sludge on the tank base, which is re-circulated back to Zone 2. The effluent is discharged, by gravity, into the outlet pipe, and from there, to the percolation area.

### 2.2 MANUFACTURE

#### 2.2.1 General

The tank body is manufactured in two halves, by moulding glass fibres with a cold setting resin.

After curing, the two halves are sealed using a silicone based sealant and bolted together using stainless steel bolts. All internal joints are sealed with the silicone sealant.

The air compressor housing, access cover and internal mouldings are moulded separately before being incorporated into the unit.

The diffuser, and internal and external pipe work are fitted prior to final water tightness testing. The inlet and outlet connections are clearly labelled.

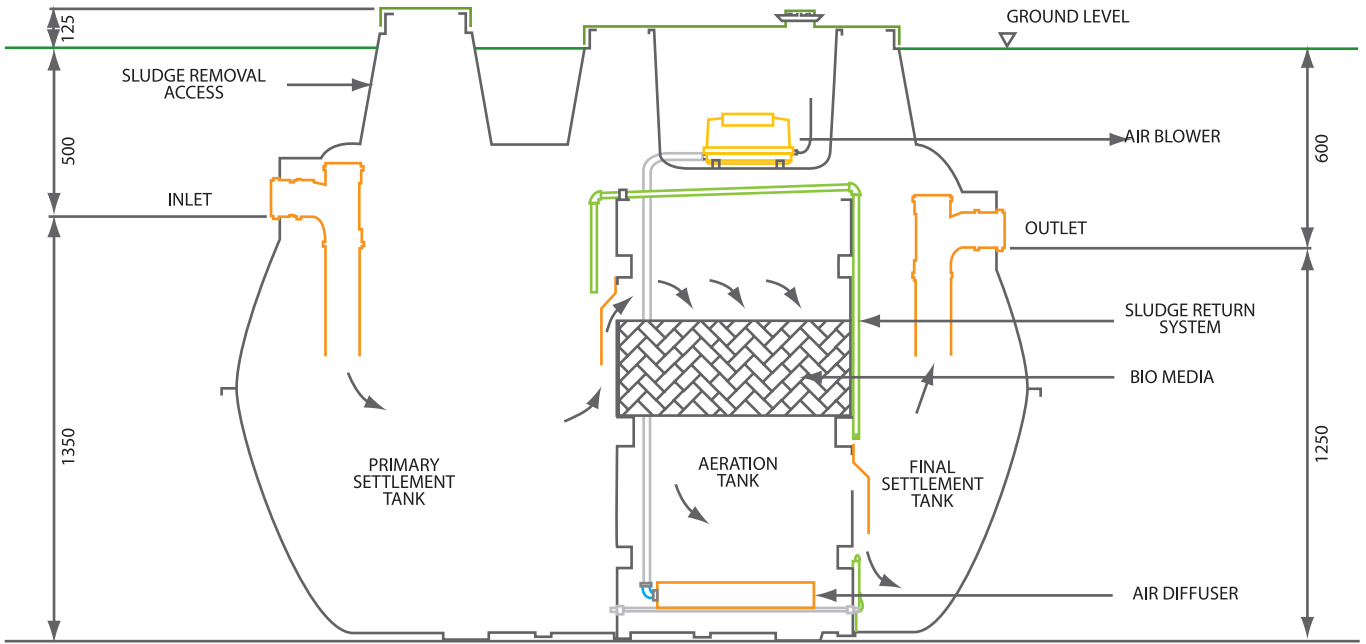
#### 2.2.2 Product range

The system is designed to collect domestic wastewater from dwellings having a population equivalent of up to six persons. System details are shown in Table 1.

Table 1: TRI-CEL<sup>®</sup> Wastewater Treatment System – basic information

Treatment Capacity	3540 litres
Primary treatment zone	1690 litres
Secondary treatment zone	1200 litres
Final settlement zone	650 litres
Design population	6 PE
Overall width	1640 mm
Overall length	2600 mm
Total Height	1950 mm
Weight (empty)*	300 Kg
Design flow rate	1200 litres/day
BOD load	0.36 Kg/day
Inlet invert to base	1350 mm
Outlet invert to base	1250 mm
Ground level to inlet invert level	500 mm
Air blower motor rating	60 watts (minimum)
De-sludge period	1 year minimum
Thickness	6 mm (minimum)
Retention time (design case)	70 hours

\* allow 400 Kg for lifting purpose.



Overall tank dimensions 2600mm long x 1640mm wide x 1950 high.

Figure 1: Section through Tricel Unit

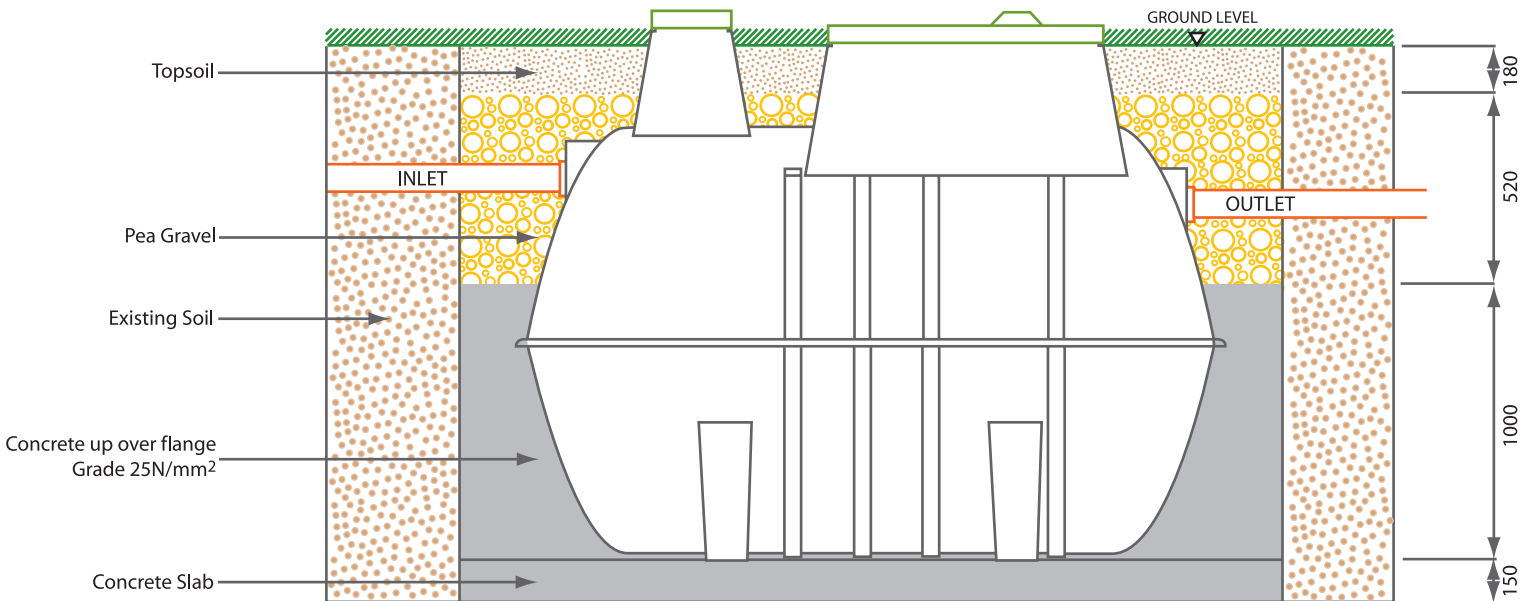


Figure 2: Tank installation details

### Ancillary items

- Marpak Filter media
- Joint sealant (silicone)
- Electrical control panel, float switch and alarm.
- 110 mm uPVC inlet and outlet sockets to BS 4660: 2000 *Thermoplastics ancillary fittings of nominal sizes 110 and 160 for below ground gravity drainage and sewage*
- electrical cable glands
- internal pipe work PVC
- Quartz air diffusers
- Air compressor 60 watt.

All components in contact with effluent are made of stainless steel, uPVC or glass reinforced plastic.

### Quality control

The Certificate holder operates a quality management system and continuous quality control is exercised during manufacture. Quality checks include barcol hardness test, resin glass ratio, flexural and tensile testing, tank wall thickness, visual inspection and water tightness testing.

Killarney Plastics Ltd operates a quality management system in accordance with IS EN ISO 9001: 2000 *Quality Management Systems. Requirements.*

### 2.3 DELIVERY, STORAGE AND MARKING

Killarney Plastics Ltd delivers the unit to site. The unit shall be lifted with certified slings in accordance with the Certificate holder's instructions. Off loading shall be carefully supervised and lifting equipment shall be selected taking into account the unit weight, dimensions and the distance of lift required (see Table 1). All lifting equipment and procedures shall comply with the requirements of the Safety, Health and Welfare at Work Act 2005. The Certificate holder's instructions shall be followed to avoid damage to the tank during off-loading and installation.

All works associated with the excavation and access of it, must be fully in accordance with best practice and all relevant statutory requirements.

The tank should be stored upright, on ground which is level and free of sharp objects, with the cover in place to prevent ingress of water.

Each unit bears a unique serial number, for traceability purposes. This is located on an identification plate in the turret. The Certificate holder's details, model type and population equivalent capacity, are listed on the cover, such that all are clearly visible once installation is complete.

The tank is supplied with full installation instructions and is labelled with the IAB identification Mark

incorporating the number of this Certificate.

### 2.4 INSTALLATION

#### 2.4.1 General

A '**competent person**', e.g. an appropriately qualified and experienced engineer, shall conduct a site suitability assessment. Based on this assessment, the '**competent person**' should design and supervise installation and commissioning of the wastewater treatment system including all relevant drainage pipe work and connections, vent pipes, manholes, inspection chambers, distribution box, percolation areas and fencing.

The '**competent person**' should ensure that all aspects of installation are in accordance with

- the Building Regulations
- the conditions of planning e.g. unit loading remains as per design, percolation trench properties and water levels are as specified in the planning submission and
- Cl. 2.4.and Part 3 of this Certificate, and ensure that ground conditions are adequate.

#### 2.4.2 Certificate Holder's Installation Policy

It is Killarney Plastics Ltd's policy to

- deliver each unit to site and supervise off loading;
- supply detailed installation instructions;
- commission all units before use.

Installation (including electrical wiring of control panel and air compressor) shall be carried out by '**competent persons**' in accordance with the installation instructions provided (see Cl 2.4.3).

#### 2.4.3 Electrical Works

Electrical connections shall be strictly in accordance with the Certificate holder's instructions, ET101: *National Rules for Electrical Installations* (current version) and ET 207: *Guide to the National Rules for Electrical Installations As Applicable To Domestic & Similar Installations* (current version), published by the Electro-Technical Council of Ireland (ETCI). A '**competent person**', using materials suitable for the purpose (i.e. a four core + earth SWA cable) complete with earth), shall carry out electrical connections, from the mains supply board through a Residual Current Device (RCD).

Electrical cables shall be protected from accidental damage in accordance with ETCI requirements. It is recommended that the control panel is clearly visible from a suitable location within the house.

#### 2.4.4 Site Works

The excavation shall be of sufficient size to permit placement of the unit and back filling and to allow for timbering and sheeting as necessary to meet the requirements of The Safety, Health and Welfare at Work Act, 2005. There should be sufficient area on site to permit excavation, dumping of excess spoil,

backfilling, handling and installation, without causing damage to the unit or the ancillary equipment.

It is essential to prevent damage due to superimposed loading, from vehicles or site traffic. A suitable fence shall be erected around the unit to restrict loading. The distance between the fence and the unit should be equal to or greater than the depth of excavation for the unit.

Care shall be taken to prevent accidental damage arising from blows from tools, or concentrated loads on the unit during installation.

Similarly, sharp corners or edges of bricks and stones shall be kept clear of the unit. This shall be borne in mind when back filling, as the resultant load of a sharp object could fracture the unit.

The tank should not be lifted if it contains water.

#### 2.4.5 Design

The potential suitability of a site, for the installation of such a system, shall be assessed using the methodology outlined in the EPA *Wastewater treatment manual – Treatment Systems for Single Houses 2000*. The ground water protection responses set out in ‘*Groundwater Protection Responses for on-site Wastewater Systems for Single Houses*’ published by EPA/DoELG/GSI (2001) should be used in the desk study assessment of the site, to give an early indication of the suitability of the site for such a system.

**The system should only be installed where a ‘competent person’ determines the ground conditions, and the water table levels, to be adequate to support the tank, and to provide for disposal of the effluent in accordance with relevant regulations. The system should not be installed in unsuitable ground conditions.**

Where poor ground conditions prevail, e.g. soft ground or shrinking clay, further advice must be sought from a ‘competent person’, to establish if the ground is adequate to support the tank and prevent differential settlement.

Good ground working practice shall be followed, particularly with regard to the gradient on drainage pipe runs. The inlet pipe should have a gradient of between 1:40 and 1:60. The outfall pipe should have a final gradient of between 1:70 and 1:200.

Storm water run-off e.g. from roofs or paved areas shall be excluded from the system.

The unit shall not be installed in areas liable to localised flooding, unless adequate additional protection is provided in accordance with the Certificate holder’s instructions.

The thickness and strength of concrete surround shall be selected to suit the ground conditions, imposed loads etc., for the design life of the unit. Minimum requirements are given in this certificate.

Adequate provision should be made for access, inspection and maintenance, in the drainage system upstream and downstream of the unit, through the provision of manholes, distribution chambers etc.

Adequate provision shall be made for ventilation, to ensure that noxious odours and dangerous gases can escape.

#### 2.4.6 Health and Safety

Excavation, placing and backfilling should be carried out strictly in accordance with the requirements of the Safety, Health and Welfare at Work Act 2005 and all other relevant legislative requirements.

#### 2.4.7 Procedure

a) Equipment and materials:

It is recommended that all plant and materials necessary for the installation should be on site before excavation commences.

b) Tank Installation – dry site

A dry site is defined as one where the local water table never rises above the base of the treatment unit.

The tanks shall be installed as follows:

1. Dig a hole circa 2.9 x 2.2m in plan. The unit shall be installed at the required depth to accommodate incoming drainage pipes. Remove any soft spots or boulders from the base of the excavation. A level graded base is then formed using sand blinding.
2. A foundation of semi-dry concrete is laid and levelled. The concrete shall be of sufficient grade and thickness (minimum 150 mm and grade 25 N) to ensure that the unit is fully supported with due regard to subsoil conditions and loads imposed by the unit. Care shall be taken to eliminate voids.
3. The tank is lifted into position using slings in accordance with the Certificate holder’s instructions. Care should be taken to prevent damage to external flanges or pipe work and to ensure correct orientation of the inlet and outlet pipe work.
4. The concrete is haunched up around the base of the unit, ensuring the feet are embedded, the top of the tank is level and that all connections line up.
5. As backfilling progresses, the unit is progressively filled with water.
6. The excavation is then backfilled to above the joint, with a minimum of 200 mm surround (G25N concrete).
7. The backfilled concrete shall be carefully compacted around the unit, to ensure transfer of ground loads and to prevent stress

concentrations. Vibrating rammers shall not be used as these may damage the tank unit.

- 8 The remainder of the excavation is then backfilled, with suitable selected self-compacting pea gravel or suitable granular material, (compaction factor of 0.2 or less), to the underside of pipe work connections, ensuring the connections remained exposed.

**c) Additional requirements for wet sites**

A wet site is defined as one where the local water table can rise above the base of the treatment unit. Installation in a wet site may be precluded by site considerations in relation to effluent disposal.

9. A 250 mm hardcore sub-base is laid, compacted and levelled.
10. The excavation is kept dry by pumping excess water using a site pump/sump hole/suction hose arrangement. De-watering should be continued for as long as necessary and at least until the concrete has set.
11. The excavation is then lined with a continuous layer of 1200 gauge polyethylene sheet. The grade and thickness of the concrete base should be designed to suit site conditions (minimum 250 thick, grade 25 N).
12. The unit shall be installed and the excavation backfilled generally in accordance with the requirements for dry sites. However, the excavation shall be backfilled with concrete to approx 300 mm below ground level. Allowance shall be made for flexible joints at pipe connections where necessary.

**d) Drainage Connections**

The tank is provided, at the inlet and outlet, with 110mm uPVC pipes connections to BS 4660. These should be connected, via a flexible connection to allow for differential movement, (300mm length of pipe with flexible joints), to the drainage system. Suitable adapters shall be used for connection to other types of pipe work.

**e) Ducting**

A 100 mm uPVC duct should be laid from the marked connection point on the unit to the power supply.

**f) Completion of backfilling**

When connections to drainage pipe work are complete and ducting in place, continue backfilling, terminating 180mm below ground level. The remaining backfilling should be completed to ground level, using selected non-angular excavated material or topsoil.

**2.5 LOCATION**

The units should be sited so that adequate access is available for safe installation, subsequent maintenance and de-sludging of the unit.

Table 2: Minimum Separation Distance (m)

	Unit	Irrigation Area
Dwelling served	7 <sup>1</sup>	10 <sup>3</sup>
Adjacent dwelling	7 <sup>1</sup>	10 <sup>3</sup>
Wall	3 <sup>1</sup>	3
Road	4 <sup>1</sup>	4
Site boundary	3 <sup>1</sup>	3
Potable water source	10	30-100 <sup>2</sup>
Water course	10	10
Lake	50	50

1. The depth of excavation to accommodate the unit shall be taken into account when determining this distance. The separation distance should be such that the excavation does not undermine adjacent buildings, roads or walls. This distance should be not less than 1.5 times the excavation depth.

2. The separation distance should be not less than 30 metres except in the case of very free draining soils or gravels, where a minimum distance of 40 metres should be maintained. The irrigation area should be down hill of any nearby well. Where this is not possible, a separation distance of at least 100 metres shall apply. For further details see *Ground Water Protection Responses for On-Site Waste Water Systems for Single Houses* published by EPA/DoELG/GSI (2001).

3. These minimum permissible distances are for guidance only. A 'Competent Person' should assess each site on its own merits. However, where the site permits, irrigation areas should be located at greater separation distances from the dwelling. Also where possible on sloping sites, the irrigation area should be down slope from the dwelling.

De-sludging should be carried out by a licensed operator using a de-sludging tanker, which requires access to within 30m of the unit. The minimum separation distances given in Table 2 apply.

**2.6 TREATED WASTEWATER DISPOSAL**

**2.6.1 General Principles**

The unit produces an effluent which is more easily absorbed into soil strata than septic tank effluent. There are two methods used for the disposal of treated wastewater i.e.:

- a) Sub-surface irrigation, or
- b) Raised percolation bed.

**2.6.2 Site Suitability Assessment**

A 'competent person', as defined by the appropriate Authority, should undertake the site suitability assessment, and choice of disposal method (see Cl 2.4.5).

The assessment shall include a detailed visual inspection of the site, inspection of the trial hole for

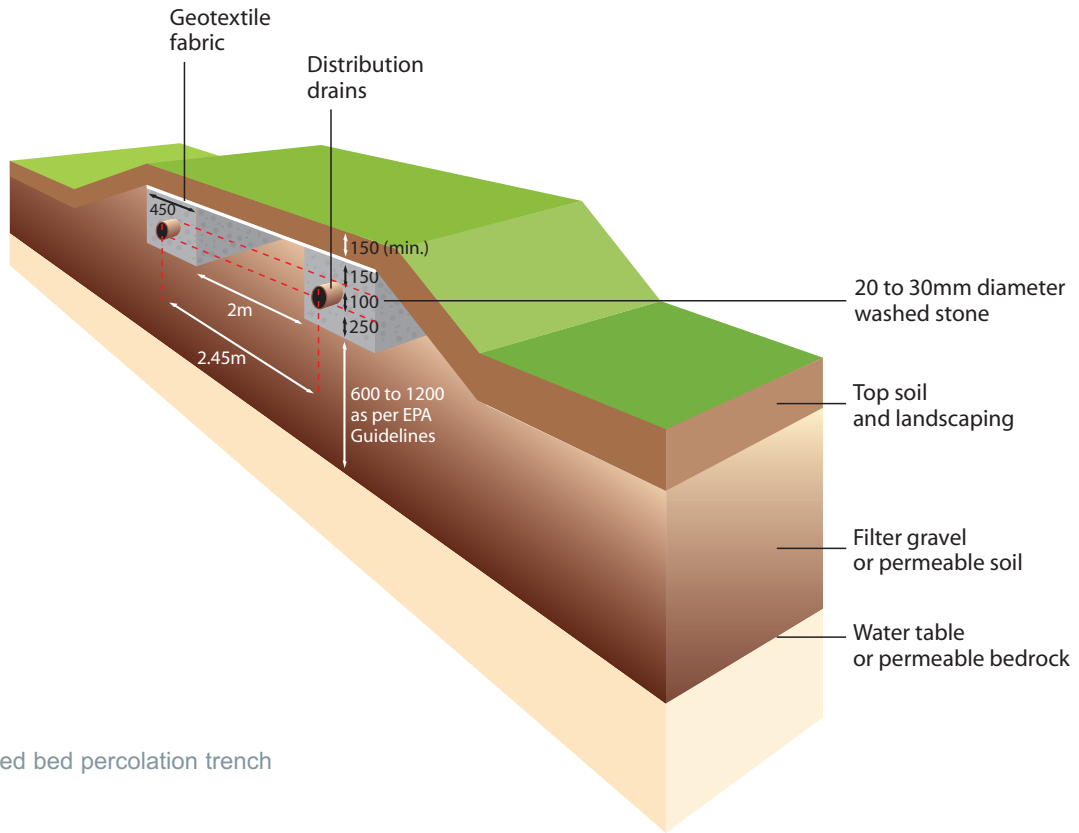


Figure 3: Raised bed percolation trench

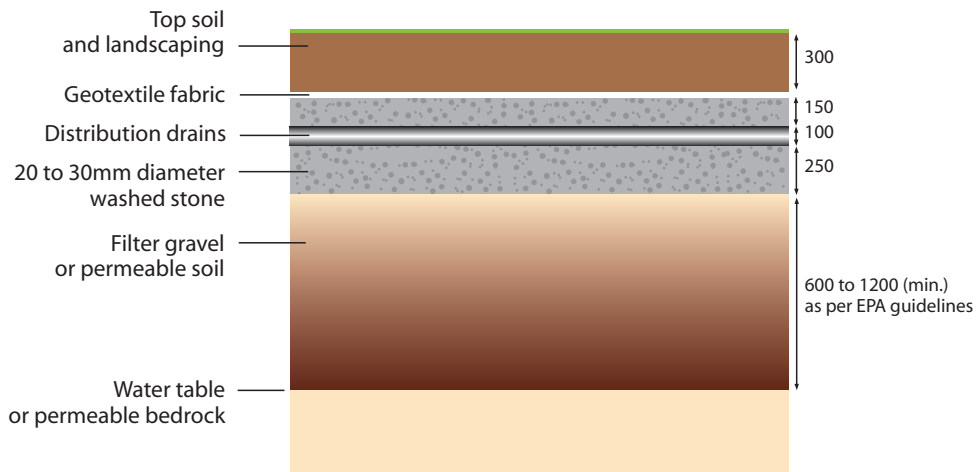


Figure 4: Percolation trench

soil profile, depth of water table, percolation value, (e.g. Standard 'T/P' test), together with local knowledge of the area. From this information it should be possible to ascertain the suitability of the site and the size and type of percolation area required.

The results of this assessment will (a) determine if the site is suitable and (b) enable the selection of the most suitable method for disposing of the final treated effluent, having due regard to soil type and percolation characteristics, water table level and other factors.

Guidance for sizing of a percolation area is set out

in Table 3. Treated wastewater is discharged from the unit by gravity or by pumping if a raised bed facility is required (See CI 2.1.1).

### 2.6.3 Sub-Surface percolation

The treated wastewater discharges, by pump or by gravity, into a network of perforated pipes laid in stone filled trenches. The objective is to spread the effluent as evenly as possible, via a distribution box, over the required land area, thus minimising the possibility of the ground becoming over-saturated.

The discharge from the unit contains minimal suspended solids and is therefore, more readily absorbed than septic tank effluent.

The percolation area is to be designed in detail by a **‘competent person’**, taking into consideration all relevant information including:

- the site assessment;
- all pertinent hydrological and geotechnical information
- percolation test results (in some cases it may be necessary to carry out percolation tests to verify design assumptions e.g. after site improvement works);
- population to be served;
- properties of influent;
- design flows;
- locations of boundaries, dwellings etc
- planning conditions;
- any other relevant information.

Values in Tables 2 and 3 are given for guidance only.

Trenches are generally 450 mm wide. The base of the trench should be at 600 to 1200 mm above the water table or fissured bedrock (as per EPA guidelines). Typically, perforated pipe (110 mm OD for gravity discharge; 32 mm OD for pumped discharge) is laid on a 250 mm bed of clean 20/30 mm washed stone or gravel. The percolation trench is backfilled to give 500 mm overall depth of washed stone or gravel. The trench is then covered with a geotextile layer, before final backfilling to ground level with 300 mm topsoil.

Layout of the trenches will be determined by site topography; the overall fall of the pipes should be not more than 1 in 200.

**2.6.4 Raised percolation bed**

Where raised percolation beds are required e.g. thin topsoils and/or rock or water table close to the surface, the capacity of the pump needs to be selected to suit (See CI 2.1.1).

The percolation trench construction is similar to that specified for sub-surface percolation. The base of the percolation trench should be at least 600 to 1200 mm above the highest water table or fissured bedrock (as per EPA guidelines). The perforated pipe is laid on a 250 mm bed of clean 20/30 washed stone or gravel. The trench is then backfilled to give an overall depth of 500mm. The trench is covered with a geotextile layer, before backfilling to ground level with 150 mm minimum of good quality topsoil.

**2.6.5 Provision for inspection of percolation area**

For monitoring, sampling and maintenance purposes, access to the effluent percolation systems should be provided at the end of each irrigation or filter trench via a suitably constructed

inspection chamber.

**2.6.6 Further treatment**

In some instances (e.g. proximity to a drinking water source), the effluent may require "polishing" before discharge, to reduce coliform bacteria levels. A commonly used method is to pass the discharge through a sand filter. In this situation, the discharge is pumped to the sand filter using an effluent pump set capable of discharging in 180 litre doses. Polishing filters can be partly or wholly above ground soil, covered or open. A typical filter serving a 4-person household would have a plan area of 8 m<sup>2</sup> to 20 m<sup>2</sup> depending on design and type of sand used.

Where part of the polishing system is exposed above ground, care shall be taken to ensure there is no risk of casual or accidental access to the area.

**2.7 DESIGN FOR PLANT MALFUNCTION**

**2.7.1** A visual and audible alarm is supplied to warn of power failure in the tank unit, compressor breakdown or high water level in the tank unit.

**2.7.2 Freeboard**

A freeboard of approximately 600 litres is provided.

**2.8 COMMISSIONING**

Killarney Plastics Ltd. service technicians shall carry out commissioning of the unit, after installation is complete and all services are connected.

**2.9 SERVICING AND MAINTENANCE**

Killarney Plastics Ltd offer service and maintenance contracts and can also carry out repair work.

**2.10 ENCLOSURE**

The area around the tank and percolation area should be fenced off to protect it from farm animals and other unwanted traffic.

Table 3: . Guidance for sizing of percolation area (linear metres of percolation pipe)

Population served	T/P values 21-50* Loading at 25l/ m <sup>2</sup> per day	T/P values 1-20* Loading at 50l/ m <sup>2</sup> per day
3	48	24
4	64	32
5	80	40
6	96	48

\* Based on 450 mm trench width and gravity discharge

### 3.1 GENERAL

The TRI-CEL<sup>®</sup> Wastewater Treatment System is suitable for the collection and treatment of domestic wastewater and shall be installed in accordance with the Certificate holder's instructions, the EPA *Wastewater treatment manual – Treatment Systems for Single Houses 2000* and to conform with the recommendations of BS 6297: 1983. The following conditions shall apply:

- a) Design and selection of the wastewater treatment unit shall be carried out by a '**competent person**', based on an adequate assessment of all relevant information and having regard to the population to be served and the influent to be treated.
- b) Ground water and flood levels shall always be below outlet level.
- c) The effluent shall be discharged to a suitable sub-soil irrigation system or raised percolation bed. The percolation area shall be designed by a '**competent person**', taking into consideration all relevant design information e.g. the detailed site assessment report.
- d) The unit shall be sited and installed in accordance with the Certificate holder's instructions, this Certificate, the Building Regulations 1997 – 2006 and any relevant planning conditions. It is recommended that a '**competent person**' supervise the installation of the system.
- e) The Certificate holder is in a position to provide the user with the knowledge and competencies necessary to enable compliance with the Building Regulations in all respects, including permitted influent and conditions of use, installation, maintenance and de-sludging requirements, design and installation of the percolation area and recommendations regarding monitoring.
- f) The effluent from the 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 Certificate holder for the unit installed (180 litres per head per day and 60g per head per day, respectively). The end user is responsible for ensuring that influent, usage and discharge comply with national and local regulations.
- g) Discharge to the unit does not exceed the design loadings and is limited to domestic

effluent. This excludes rainwater, run off from paved areas or areas where animals are housed, effluent with high grease, oil, chlorine or offal content, discharge from garbage grinders or water softeners, Jacuzzis/hot tubs, rags, medicines, pesticides, oil, strong acids or alkalis, biological emulsifiers, disinfectants or chemicals/poisons. If necessary, the certificate holder should be contacted for advice.

- h) All wastewater treatment systems shall be

Table 4: Treated wastewater characteristics

pH	6-9
BOD	< 20mg/l O <sub>2</sub>
Suspended Solids	< 30mg/l
Ammonia	< 20mg/l N

indelibly marked with the model type and population equivalent in such a way that when installation has been completed, these details are clearly visible for record purposes.

- i) The Certificate holder or his agent shall maintain detailed records as appropriate e.g. site assessment records, design calculations, percolation test results, commissioning records, installation locations, customer complaints etc.
- j) If there is a concern regarding the suitability of the treatment unit for a particular application, the Certificate holder should be contacted for advice.

The Certificate holder recommends

- The use of a grease trap between the dwelling and the unit;
- The use of phosphate free detergents.

### 3.2 DESIGN BASIS

#### 3.2.1 General

The relevant dimensions of TRI-CEL<sup>®</sup> Wastewater Treatment System certified in this Agrément Certificate are shown in Table 1.

#### 3.2.2 Wastewater quality

The specification and power requirements of the TRI-CEL<sup>®</sup> Wastewater Treatment System are listed in Table 1.

A short period of acclimatisation shall be allowed after commissioning of the unit before the system is fully operational. This period is generally a few weeks and is normal for any biological treatment plant.

#### 4.1 ENVIRONMENTAL ASSESSMENT

The treated wastewater from a number of working units has been monitored. The test results show that values stated for the parameters listed in Table 4 are consistently achievable over a range of operating conditions.

#### 4.2 STRENGTH

The Certificate holder's design has been assessed as satisfactory. The unit can adequately resist damage from minor impacts during handling but it shall be slung in accordance with the Certificate holder's instructions.

The unit has sufficient structural strength to resist soil loads in non-cohesive dry soils, but it is recommended that excavations are backfilled in accordance with 2.4.7.b) and c). The cover and frame assembly is suitable for pedestrian traffic only.

#### 4.3 WATERTIGHTNESS

The system, 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 glass-reinforced plastic, 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 Certificate holder's design code. In the opinion of the IAB the product will have a design life in excess of 25 years when installed in accordance with this Certificate. The mechanical and electrical components may require replacement within the design life of the unit.

#### 4.5 MAINTENANCE

Cleaning and maintenance shall be carried out in accordance with the Certificate holder's Operation and Maintenance Instructions.

Killarney Plastics Ltd strongly recommends that access to the tank interior be restricted to Killarney Plastics Ltd trained operatives or authorised and competent maintenance contractors.

Access to the tank interior is via the manhole cover, using the appropriate tools. The cover is of lightweight, but strong construction, and will lift easily. Both the compressor and the associated pipe work can also be accessed for removal and cleaning.

The tank is easily de-sludged, in the conventional manner by a suction tanker. De-sludging should be

carried out by a licensed operator, in accordance with the Certificate holder's instructions.

#### Summary of maintenance instructions

The TRI-CEL<sup>®</sup> Wastewater Treatment System is de-sludged by a suction tanker. Care shall be taken to avoid damage by the hose nozzle. The primary settlement zone shall be de-sludged, through the sludge removal access, in accordance with the Certificate holder's recommendations.

The Certificate holder, or a suitably experienced person, using standard GRP repair techniques, can repair local damage to GRP components. Any repairs shall be carried out in dry conditions. The GRP laminate to be repaired shall be thoroughly cleaned, dried, lightly abraded and prepared with a suitable bonding agent.

#### Frequency of inspection

It is recommended that the homeowner should:

- conduct an inspection of the system regularly, and at least every six months, in accordance with the Certificate holder's 'Operation and Maintenance instructions'.
- Monitor effluent to ensure ongoing compliance

#### 4.6 SAFETY

##### 4.6.1 Safety of personnel

The access cover is securely fixed and lockable, to prevent unauthorised access. The access cover shall not be left off an unattended tank.

Sewage treatment plants are potentially dangerous, particularly when being de-sludged. De-sludging shall never be carried out alone. If it is necessary to enter the unit, adequate safety precautions shall be made to ensure the safety of personnel involved. Naked lights, which can cause explosions, shall not be used in the vicinity of the tanks.

##### 4.6.2 Safety of the unit

The 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 THE FOLLOWING:

- Resin/glass ratio based on BS 2782-10:Method 1002:1977, *Methods of testing plastics. Glass reinforced plastics. Determination of loss on ignition.*
- Barcol hardness, based on BS 2782:Method 1001:1977 *Methods of testing plastics. Glass reinforced plastics. Measurement of hardness by means of a Barcol impressor*
- Degree of cure

- Watertightness.
- Strength of cover and frame assemblies.
- Resistance of units to hydrostatic and ground pressure.
- Resistance to flotation.
- Joint strength
- Environmental performance.
- Laminate thickness.
- Flexural tests on composite specimens to BS EN ISO 178:1997 *Plastics. Determination of flexural properties*
- Tensile tests on composite specimens to BS EN ISO 527-1: 1996 *Plastics. Determination of tensile properties. General principles*
- Water absorption
- Specific Gravity to IS EN ISO 1183 – 1:2004 *Plastics. Methods for determining the density of non-cellular plastics. Immersion method, liquid pycnometer method and titration method*

#### 4.8 OTHER INVESTIGATIONS

- (i) 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.
- (ii) An examination of the results of sample analysis of effluent from the system, to measure suspended solids content and Biochemical Oxygen Demand, was undertaken.
- (iii) 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.
- (iv) Site visits were conducted to assess the practicability of installation
- (v) Bought in components were assessed for suitability for use.

No failures of the product in use have been reported to the IAB.

## Part Five / Conditions of Certification

5

### 5.1 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 for five years so long as:

- (a) the specification of the product is unchanged.
- (b) the Building Regulations 1997 to 2006 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.
- (f) the registration and/or surveillance fees due to IAB are paid.

5.2 The IAB mark and certification number may only be used on or in relation to product/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 the products already marked.

5.3 In granting Certification, the NSAI makes no representation as to;

- (a) the absence or presence 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 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/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, 2005, or of any other 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.

## The Irish Agrément Board

This Certificate No.06/0208 is accordingly granted by the NSAI to Killarney Plastics Ltd.on behalf of The Irish Agrément Board.

Date of Issue: November 2004

Signed



Director, Irish Agrément Board

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. Fax: (01) 807 3842. [www.n sai.ie](http://www.n sai.ie)

Revisions: December 2006

The certificate has been revised to reflect the following:

- Manufacturing procedure changed.
- Unit treatment capacity increased from 3000 litres to circa 3500 litres.
- Modifications to joint detail, provisions for venitlation, diffuser specification, locking mechanisms and provision for lifting
- General: Modifications to reflect current Irish Agrément Board requirements and recommendations.
- Reference to relevant regulations updated as appropriate.