
Date	18/12/2019
Report No:	SA4_KE_6429
Client Name	Dunlavin Land Restoration
Site Location & Townland	Usk, Dunlavin, Kildare

Thank you for choosing Tricel for your wastewater treatment requirements. This report contains the following information for your site and is based on a population of 6 and a P/T value of between 3-20.

Please see outlined below the accompanying documents:

Section 1: Information on the Tricel Novo Package Plant

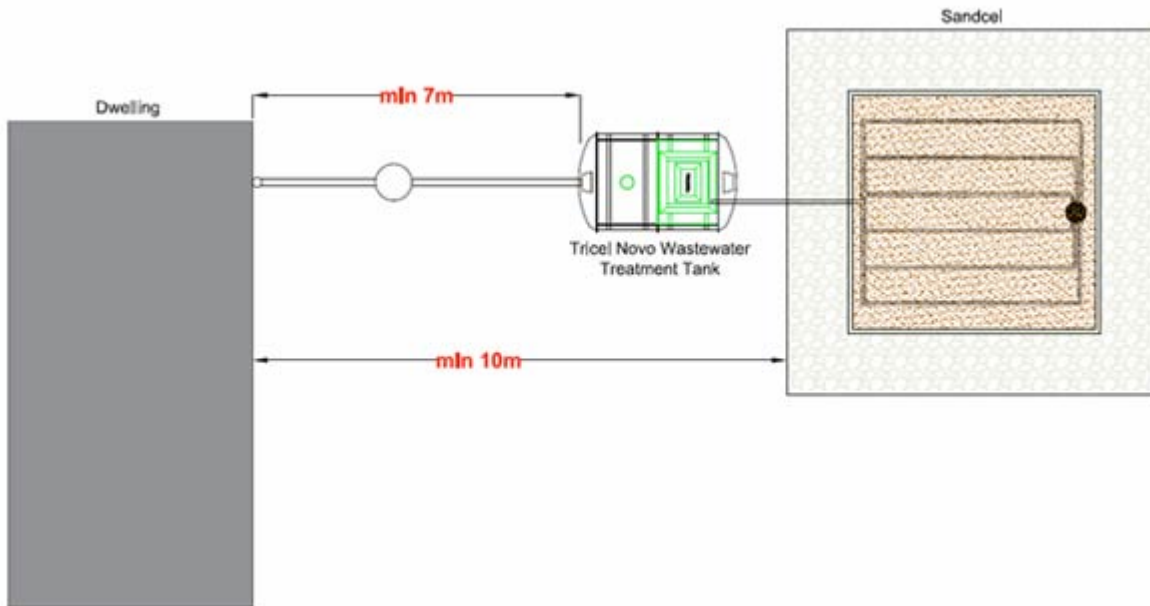
- Manufacturers report and sizing of the Tricel Novo Package Plant
- Drawing of the Tricel Novo Package Plant
- Certification of the selected Tricel Novo Package Plant
- Technical information on the Tricel Novo Package Plant
- Pump selection and technical data
- Optional Novo maintenance agreement

Section 2: Information on the percolation area

- Separation Distances
- Sandcel Sand Polishing Filter drawing
- Sandcel Technical Specification
- Optional Sandcel Maintenance Agreement
- Technical information on the Sandcel sand polishing filter

Based on the information provided to us, using SR66 and the EPA Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses (p.e. ≤ 10), the appropriate solution for treating wastewater on your site is a Tricel Novo wastewater treatment plant followed by a Sandcel sand polishing filter. The Tricel Novo provides secondary treatment using submerged aeration filter technology. The Sandcel sand polishing filter, providing tertiary treatment, consists of a series of pipe work designed to distribute the effluent for treatment over stratified layers of certified sands according to the EPA Code of Practice. They are enclosed in GRP impermeable panels which will not rot or decay, ensuring the structure of the filter will hold for many years. These filters can be installed in above or below ground applications with all pipe work accessible from a service pod.

Typical layout of a Tricel Novo Package Plant and Sandcel Sand Polishing Filter:



For your site we recommend a Tricel Novo IRL6+ wastewater treatment plant which is designed to treat a maximum of 900 litres of wastewater per day. This recommendation is based on the EPA Code of Practice which states the plant selection should be based on a hydraulic loading of 150l/per person /per day. The Novo IRL6+ has a capacity of 4000 litres, of which 2400 are in the primary chamber, this ensures a long desludging interval. The Tricel Novo range of wastewater treatment plants is fully in conformance with EN12566-3 and complies with SR66.

The Tricel Novo pumped plant contains a Tricel 75 pump based on an the Length of Rising Main 5.0 metres and Difference in Height of Rising Main 2.0 metres. The plant outlet is fitted with a 38mm compression fitting for connection to a rising main of 38mm internal bore pipework. Details and pump specifications are contained in Section 1.

The proposed solution for the tertiary treatment on the site is a Sandcel 900, a 15m² sand polishing filter. This is designed to treat the hydraulic load from a Tricel Novo IRL6+ plant. The size of the Sandcel is based on the EPA Code of practice which recommends a maximum hydraulic loading rate of 60l/m²/d. The gravel distribution layer required underneath the Sandcel should be sized based on the following formula: Area = 0.125 x T1 x PE

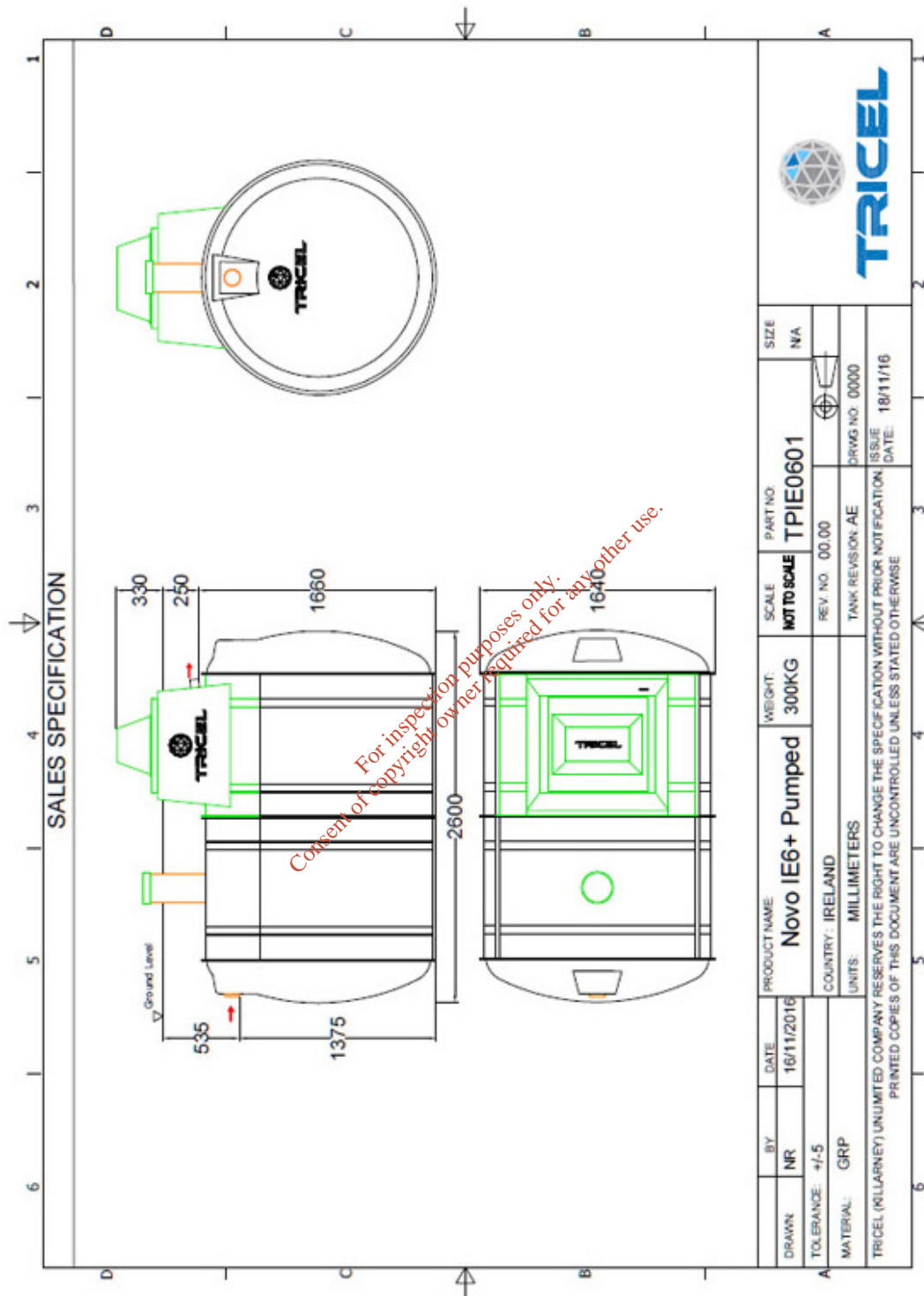
Note:

In the above named site, a substitute wastewater treatment system may not be put in place of the Tricel wastewater treatment system.


This recommendation only applies to the above named site based on the information supplied to Tricel. A Site Characterisation Form should accompany this report. Tricel cannot be responsible for misinformation due to misleading information being received by us from clients.

Please see attached the accompanying documents in Section 1 for the Tricel Novo wastewater treatment plant and Section 2 for the percolation area.

Section 1



Certificate in accordance with SR66 for EN12566-Part 3



**Prüfinstitut für
Abwassertechnik
GmbH**

TREATMENT PERFORMANCE RESULTS

Tricel (Killarney)
 Ballyspillane Industrial Est., Killarney, Co. Kerry, Ireland
EN 12566-3
 Results corresponding to EN 12566-3 and S.R. 66
 PIA-SR66-1512-1062
Novo
 Submerged fixed film

Nominal organic daily load	0.28 kg/d	
Nominal hydraulic daily load	690 m ³ /d	
Material	Glass reinforced plastic	
Watertightness	Pass	
Structural behaviour (Calculation)	Pass (also wet conditions)	
Durability	Pass	
Treatment efficiency (normal sequences)	Efficiency	Effluent
	COD	91.6 % 52 mg/l
	BOD ₅	95.9 % 11 mg/l
	NH ₄ -N	79.9 % 8 mg/l
	SS	95.3 % 16 mg/l
Number of desludging	Not more than once	
Electrical consumption	1.1 kWh/d	

Performance tested by:

PIA – Prüfinstitut für Abwassertechnik GmbH
 (PIA GmbH)
 Hergenrather Weg 30
 52074 Aachen, Germany

This document replaces neither the declaration of performance nor the CE marking.




Notified Body
No.: 1739



Certified according to
ISO 9001:2008





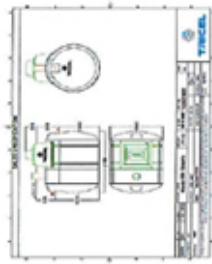


Deutsche
Akreditierungsstelle
D-PL-17713-01-00



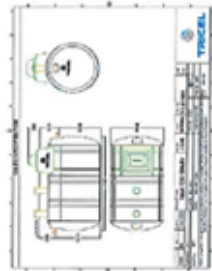


Elmar Lancé July 2016




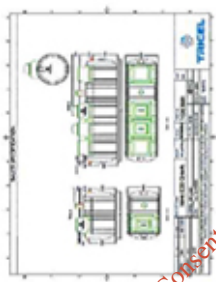
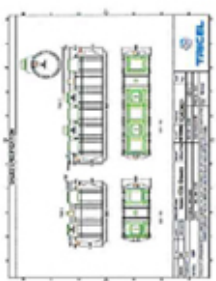
Novo range and its referring test reports:

Population equivalent (PE)	Drawing of model of the range	Watertightness (EN 12566-3 Annex A)	Treatment Efficiency (EN 12566-3 Annex B)	Structural Behaviour (EN 12566-3 Annex C)	Durability
Initial Type Test (ITT) 6		Pass PIA2009-WD-AT0909-1055 PIA2015-WD/NC-1404-1021.01 PIA2015-WD/NC-1406-1031.01	Pass PIA2010-103B18SBc	Pass For wet ground conditions also, 1.25 m installation depth from inlet invert	Pass PIA2015-DH-1504-1023.01
6		Pass PIA2009-WD-AT0909-1055 PIA2015-WD/NC-1404-1021.01 PIA2015-WD/NC-1406-1031.01	Pass Range conformity according to S.R. 66:2015	Pass For wet ground conditions also, 1.25 m installation depth from inlet invert	Pass PIA2015-DH-1504-1023.01
8		Pass PIA2009-WD-AT0909-1055 PIA2015-WD/NC-1404-1021.01 PIA2015-WD/NC-1406-1031.01	Pass Range conformity according to S.R. 66:2015	Pass For wet ground conditions also, 1.25 m installation depth from inlet invert	Pass PIA2015-DH-1504-1023.01

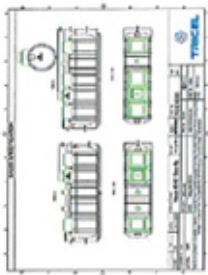
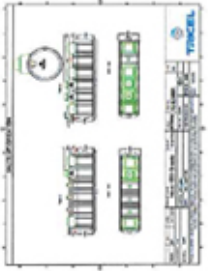


Population equivalent (PE)	Drawing of model of the range	Watertightness (EN 12566-3 Annex A)	Treatment Efficiency (EN 12566-3 Annex B)	Structural Behaviour (EN 12566-3 Annex C)	Durability
10		Pass PIA2009-WD-AT0909-1055 PIA2015-WD/NC-1404-1021.01 PIA2015-WD/NC-1406-1031.01	Pass Range conformity according to S.R. 66:2015	Pass For wet ground conditions also, 1.25 m installation depth from inlet invert	Pass PIA2015-DH-1504-1023.01
12		Pass PIA2009-WD-AT0909-1055 PIA2015-WD/NC-1404-1021.01 PIA2015-WD/NC-1406-1031.01	Pass Range conformity according to S.R. 66:2015	Pass For wet ground conditions also, 1.25 m installation depth from inlet invert	Pass PIA2015-DH-1504-1023.01
18		Pass PIA2009-WD-AT0909-1055 PIA2015-WD/NC-1404-1021.01 PIA2015-WD/NC-1406-1031.01	Pass Range conformity according to S.R. 66:2015	Pass For wet ground conditions also, 1.25 m installation depth from inlet invert	Pass PIA2015-DH-1504-1023.01



Population equivalent (PE)	Drawing of model of the range	Watertightness (EN 12566-3 Annex A)	Treatment Efficiency (EN 12566-3 Annex B)	Structural Behaviour (EN 12566-3 Annex C)	Durability
24		Pass PIA2009-WD-AT0909-1055 PIA2015-WD/NC-1404-1021.01 PIA2015-WD/NC-1406-1031.01	Pass Range conformity according to S.R. 66:2015	Pass PIA2013-ST-PIT-1303-1018.01 For wet ground conditions also, 1.25 m installation depth from inlet invert	Pass PIA2015-DH-1504-1023.01
30		Pass PIA2009-WD-AT0909-1055 PIA2015-WD/NC-1404-1021.01 PIA2015-WD/NC-1406-1031.01	Pass Range conformity according to S.R. 66:2015	Pass For wet ground conditions also, 1.25 m installation depth from inlet invert	Pass PIA2015-DH-1504-1023.01
36		Pass PIA2009-WD-AT0909-1055 PIA2015-WD/NC-1404-1021.01 PIA2015-WD/NC-1406-1031.01	Pass Range conformity according to S.R. 66:2015	Pass For wet ground conditions also, 1.25 m installation depth from inlet invert	Pass PIA2015-DH-1504-1023.01



Population equivalent (PE)	Drawing of model of the range	Watertightness (EN 12566-3 Annex A)	Treatment Efficiency (EN 12566-3 Annex B)	Structural Behaviour (EN 12566-3 Annex C)	Durability
42		Pass PIA2009-WD-AT0909-1055 PIA2015-WD/NC-1404-1021.01 PIA2015-WD/NC-1406-1031.01	Pass Range conformity according to S.R. 66:2015	Pass For wet ground conditions also, 1.25 m installation depth from inlet invert	Pass PIA2015-DH-1504-1023.01
50		Pass PIA2009-WD-AT0909-1055 PIA2015-WD/NC-1404-1021.01 PIA2015-WD/NC-1406-1031.01	Pass Range conformity according to S.R. 66:2015	Pass For wet ground conditions also, 1.25 m installation depth from inlet invert	Pass PIA2015-DH-1504-1023.01

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Tricel® Novo

For Single Dwellings & Small Communities

Innovative design for superior performance



What is the Tricel Novo

Tricel Novo wastewater treatment plants are reliable, easy to install and simple to maintain for all wastewater requirements. These highly functional plants can cater for ranges from 1 to 50 PE (population equivalents).

The Tricel Novo submerged aeration plant is suitable for domestic and light commercial or communal applications and uses simple proven fixed bed technology. Each system comprises of 3 independent treatment zones, all fulfilling a different stage of the purification process.

European Certification Requirements

All Tricel wastewater treatment plants have been tested to European certification EN 12566-3 and comply with the requirements of S.R. 66:2015. This certification tests all plants for strength, water tightness, durability and treatment efficiency.

By using a wastewater treatment plant which is CE certified clients can rest assured that it has complied with tests and inspections which guarantee a high level of security and efficiency.

How a Tricel Novo works

These plants use a simple, proven technology, consisting of 3 treatment zones. In each zone a different stage of the treatment occurs.

1. Wastewater from the dwelling, toilets, sinks, shower etc., enters the plant.
2. Effluent enters the primary settlement chamber. Settlement occurs when the heavier solids drop out of the wastewater and settle to the bottom of the tank to create sludge, and the lighter solids float to the top of the water to create a scum. The top layer acts as a seal and stops odours escaping. This chamber separates up to 70% of the solids present.
3. Next is the aeration chamber, where masses of naturally occurring bacteria inhabit specially designed plastic filter media. The bacteria feed on the waste removing it from the liquid. A continuous supply of air from a low pressure, high volume compressor in the top section of the unit sustains these bacteria. Wastewater passes through the filter media over and over, ensuring a very high treatment efficiency.
4. The liquid then proceeds to the final settlement chamber. Any remaining minute bacterial particles separate from the liquid within this chamber before discharge from the plant. This process slows the

liquid's velocity, allowing for any final trace impurities to settle to the bottom of the tank section. A sludge return system then returns these impurities back to the primary settlement chamber.

5. The remaining treated liquid now meets the required standard and is safely passed out of the Tricel Novo plant system. The treated effluent is now ready for discharge to a suitably designed discharge area as required by the relevant local authority.



Tricel Novo Wastewater Treatment Plant

Key features & benefits

- ▶ Compression moulded SMC tank. The compression moulding process is one of the most technologically developed processes available to manufacture structural composites. Components are manufactured under heat and high pressure and have unrivalled strength and durability over standard GRP tanks or PE tanks.
- ▶ SMC is unique in the wastewater treatment industry with Tricel SMC tanks operating in some of the harshest climatic conditions for over 50 years with no defects.
- ▶ Tricel's ceramic diffuser is unique in the domestic wastewater treatment plant market and will last twice

as long as all standard competitors rubber equivalents. This saves money in both call out fees and replacement parts.

- ▶ No concrete backfill for installation on most sites saving up to €400 over lower quality grp/plastic competitors.
- ▶ No moving parts or pumps in the plant ensuring reliable operation and minimal maintenance and repair costs.
- ▶ Tricel Novo plants are designed with a shallow invert to reduce both installation and time costs

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+ 353 (0) 64 6632421

sales@tricel.ie

Homeowners: Individual domestic installation



▶ The lightweight nature of the system makes for easy on-site delivery.



▶ No need for big excavators and large holes that disrupt and disturb your garden.



▶ Very low visual impact from fully installed units.

Larger projects: Commercial installations up to 50PE



▶ These units are suitable for installation at housing estates, camping sites, hotels etc., and have low maintenance and running costs.



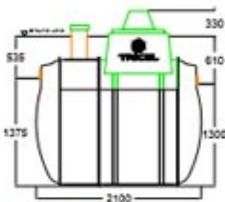
▶ Each WWTP unit is constructed of lightweight SMC and is easy to maneuver which simplifies the installation process.



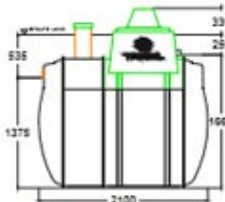
▶ Example of a fully installed 50PE Novo wastewater treatment unit in a 5-star hotel.

Technical characteristics/ Plant dimensions

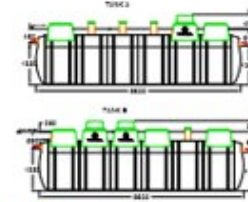
Novo Design Population	No. of people	Length	Width	Height	Horizontal inlet/outlet diameter	Weight empty	Inlet Invert to base	Outlet Invert to base	Inlet Invert to ground level	Air Blower rating
		m	m	m	mm	kg	m	m	watts	
IE6	1-6	2.1	1.64	2.24	110	300	1.375	1.3	0.535	60
IE6+	2-6	2.6	1.64	2.24	110	300	1.375	1.3	0.535	60
IE8	2-8	2.6	1.64	2.24	110	300	1.375	1.3	0.535	80
IE10	3-10	3.1	1.64	2.24	110	370	1.375	1.3	0.535	80
IE12	4-12	3.6	1.64	2.27	110	400	1.375	1.3	0.535	100
IE18	6-18	4.6	1.64	2.27	110	500	1.375	1.3	0.535	200
IE24	8-24	6.6	1.64	2.27	150	700	1.35	1.3	0.56	200
IE30	Tank A	10-30	2.6	1.64	150	300	1.35	1.3	0.46	
	Tank B		5.6	1.64	2.27	600	1.35	1.3	0.56	200 x 80
IE36	Tank A	12-36	3.6	1.64	199	400	1.35	1.3	0.46	
	Tank B		6.6	1.64	2.27	700	1.35	1.3	0.56	200 x 80
IE42	Tank A	14-42	5.6	1.64	2.27	600	1.35	1.3	0.46	
	Tank B		5.6	1.64	2.27	600	1.35	1.3	0.56	200 x 2
IE50	Tank A	16-50	6.6	1.64	2.27	700	1.35	1.3	0.46	
	Tank B		6.6	1.64	2.27	700	1.35	1.3	0.56	200 + 120 + 80



▶ **IE6 gravity outlet**
Up to 6PE domestic gravity flow outlet.



▶ **IE6 pumped outlet**
1-6 domestic pumped unit. Suitable for pumping to a raised discharge area (over).



▶ **Gravity IE50 outlet**
Suitable for commercial installation, caters for up to 50 people.

Tricel Novo riser options for deep installation

Tricel offer 3 different manhole riser heights to suit different invert/inlet levels. Manhole risers allow for the positioning of the treatment plants at the depth which is optimum to each individual installation. Wastewater is gravity fed from the home to your treatment plant. The inlet pipe's position from the premises determines the excavation depth for the WWTP plant. Tricel offer a choice of manhole risers 250mm/500mm/750mm to help with installation where site conditions require a flexible solution.

Tricel Group

Tricel is an established and world recognised global provider of high performance solutions for the Construction, Environmental, Water and Materials Industries and is a brand built upon service, back up and reliability.

We occupy a unique position in the field of reinforced plastics, combining the technical expertise of over 40 years in the press-moulding and composites industry. Tricel is proud of being one of the largest manufacturers of Wastewater Treatment plants in Europe, and are regarded by regulators as the standard setters within the industry.

Tricel are experts in Sheet Moulding Compound (SMC) processes and produce the only wastewater treatment plant in Europe constructed from this material. This process gives the highest strength to thickness ratio of any tank on the market, and has no risk of corrosion over time.

Our company offers industry leading innovative solutions that our customers can trust, and with manufacturing locations in 5 countries we supply a comprehensive range of products to over 50 countries worldwide.



Membership of European governing bodies on wastewater treatment



The Tricel Environmental Waste Water Treatment Plants are fully tested and accredited to **European standards for CE certification**. PIA (Prüfinstitut für Abwassertechnik GmbH) are the leading Test Institute in Europe for wastewater technology. Tricel Wastewater treatment plants meet with **EN12566-3** requirements which test both the quality of the components as well as the overall performance of the plant.



The **Irish Water Treatment Association (IWA)** is the national association for the treatment, conservation, recycling and reuse of water and wastewater.



The **Irish Onsite Wastewater Association (IOWA)** formed in 2007 with the goal of improving the standard of professional work on the on-site treatment of wastewater in Ireland.

WARRANTY

- The warranty period for mechanical parts within the products is **12 months** from the date of purchase. This includes the compressor, control panel, ceramic diffuser and all internal components.
- The SMC structure of the tanks carry a **10 year warranty** from date of purchase.
- All products are **CE certified** to EU safety, health and environmental requirements.

All warranties are subject to correct installation and use of the product, including maintenance as per manufacturer guidelines

Get a Quote

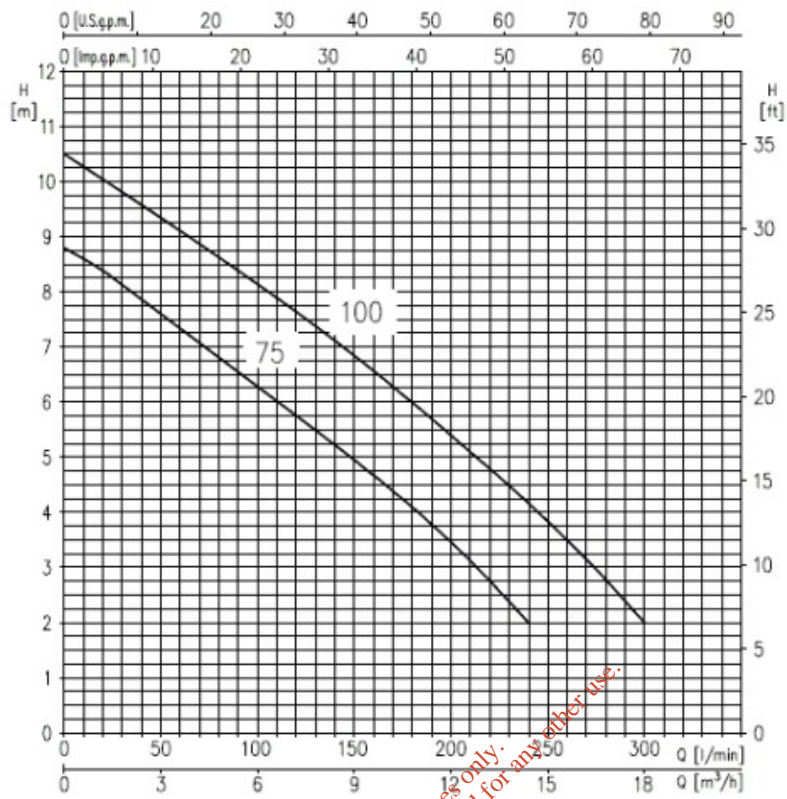
Contact us Today
to get a free quote on
00 353 (0) 64 6632421
or email us at
sales@tricel.ie

Tricel, Ballyspillane Industrial Estate, Killarney, Co Kerry, Ireland
 Tel: +353 (0) 64 6632421 | Email: sales@tricel.ie | www.tricel.ie

In accordance with Tricel's normal policy of product development these specifications are subject to change without notice.
 Tricel (Killarney) Unlimited Company trading as Tricel

PUMP		
Liquid	Type of liquid	Clean and dirty water
	Max [°C]	50°
Handled	Max solids size [mm]	35 spherical
	Maximum immersion [m]	2 (with power cable length 5 m) 7 (with power cable length 10 m)
Construction	Impeller	Open vortex type
	Shaft seal type	Double mechanical seal
	Bearing	Sealed ball bearing
Pipe	Suction-Flange [mm]	35 open
	Discharge-Flange [inch]	G1½ UNI ISO 228
Material	Casing	AISI 304
	Impeller	AISI 304
	Casing cover	AISI 304
	Shaft seal	Pump side: SiC/SiC/NBR
		Motor side: Carbon/Ceramic/NBR
	Seal cover	AISI 304
	Shaft	AISI 303 (Wet extension)
Lubricating liquid	White mineral oil: Esso Marcol 152 (180 cc)	
Applicable standard of test		ISO 9906 Annex A

MOTOR		
Type	Submersible dry type	
	Single Phase	
No. of Poles	2	
Rotation speed [min ⁻¹]	≈ 2875	
Insulation Class	F	
Protection degree	IP X8	
kW/HP Rating	[kW]	0.55 ÷ 0.75
	[HP]	0.75 ÷ 1
Frequency [Hz]	50	
Voltage [V]	230 ± 10%	
Capacitor	Built in	
Over load protection	Built in	
Float Switch	Optional	
Float Switch Cable	Material	H07RN-F
	Size	3G1
Power cable	length [m]	5 (only for internal usage); 10
	material	H07RN-F
	size	3G1
Dimensions of cable entry		Cable Gland



Pump Type	Power		Capacity								
	[KW]	[HP]	l/min	40	80	120	160	200	240	300	
			m ³	0	2.4	4.8	7.2	9.6	12	14.4	18
H = Total manometric head in meters											
Tricel 75	0.55	0.75		8.8	7.6	6.8	5.7	4.7	3.4	2	0

**Tricel Novo: Wastewater Treatment System
Service Agreement**

Establishing a regime of yearly inspections and maintenance is advised to ensure that your Tricel Novo continues to perform to the same high standards throughout its lifetime. The service agreement covers travel, the service and the labour cost of servicing only. Other labour costs are excluded, as are all replacement parts.

Tricel (Killarney) Unlimited Company, Ballyspillane Industrial Estate, Killarney, Co. Kerry, V93 X253, Ireland ("the Company") enter this Tricel Novo service agreement with the Customer named below:

Customer Details:			
Name:			
Address:		Address of Site: (If other)	
Telephone No.:			
Date of Tricel Novo Order:			
Work Order No.:			
Date of Delivery of Tricel Novo:			
Date of System Commissioning:			
Service Agreement Fee Paid:			
Date of Service Agreement Commencement:			
Unit Serial No.:			

During routine servicing, the service technician will perform a series of checks and procedures:

Checks:

- The air-diffuser is monitored to check for sufficient dispersion of air.
- The sludge return system is functioning correctly.
- The covers and locks are in place and in good condition.
- General appearance and condition of the treatment system is good.

Procedures:

- The blower is tested.
- The blower filter is replaced.
- The system alarm is tested.
- The pump and float-switch are tested (If applicable).
- The vents are cleared of any blockages.
- The sludge level in the primary chamber is measured.

Notes:

- Full inspection labour is covered (including any immediate minor system adjustment required). This service agreement does not cover the cost of any labour or materials that may arise as a result of this inspection.
- Components that require replacing will incur additional charges.
- All service agreements exclude de-sludging.

Tricel (Killarney) Unlimited Company trading as Tricel.

March 2017

Service Agreement Options:

TICK THE SERVICE AGREEMENT OPTION YOU WISH TO AVAIL OF: (Please tick one option only)	
Single Service: One standard scheduled visit to service the system	<input type="checkbox"/>
Single service & one emergency breakdown service *: One standard scheduled visit to service the system & one emergency breakdown visit if required	<input type="checkbox"/>
Three-year service: One scheduled visit to service the system per year, for 3 years.	<input type="checkbox"/>
Five-year service: One scheduled visit to service the system per year, for 5 years.	<input type="checkbox"/>

* Unused emergency breakdown cover fees cannot be refunded if a breakdown does not materialise.

Note: In cases in which multiple service agreements have been purchased by a customer for individual components of a complete wastewater treatment plant, i.e. a Tricel Novo, Tricel Puraflo or Sandcel - a discount will apply.

This contract is subject to terms & conditions. For Terms & Conditions, please contact Tricel:

Tricel (Killarney) Unlimited Company, Ballyspillane Industrial Estate, Killarney, Co. Kerry, V93 X253, Ireland.
 Tel: +353 (0)64 6632421 Fax: +353 (0)64 6632777
 Email: sales@tricel.ie | Web: www.tricel.ie

This service agreement relates only to the Tricel Novo, manufactured by Tricel, its subsidiaries and associated companies, and is between the company, or person named in this document, & Tricel.

By signing the declaration below, I hereby acknowledge that I, the Customer, have read, understand and agree to the information in the Novo Technical Manual, this service agreement and also the relevant terms & conditions.

<i>Tricel agrees to provide the services listed on this service agreement subject to the terms and conditions:</i>	<i>Please supply the services listed on this service agreement subject to the terms and conditions:</i>
<i>Signed on behalf of the Company:</i>	<i>Signed by the Customer:</i>
Name (Block Capitals):	Name (Block Capitals):
Signature:	Signature:
Date:	Date:

Important: Original signed service agreements must be returned to Tricel with payment in full and in advance, in order for the service agreements to be initiated. You are reminded of your obligations to the relevant County Council.

Tricel (Killarney) Unlimited Company trading as Tricel.

March 2017

Section 2

The location and construction of the sand polishing filter is the responsibility of the site engineer. A full site layout drawing should accompany this report.

The EPA CoP 2009 outlines the design, siting and construction requirements for sand polishing filters.

The tables below outline some of the key factors to take into consideration when designing and locating a sand polishing filter.

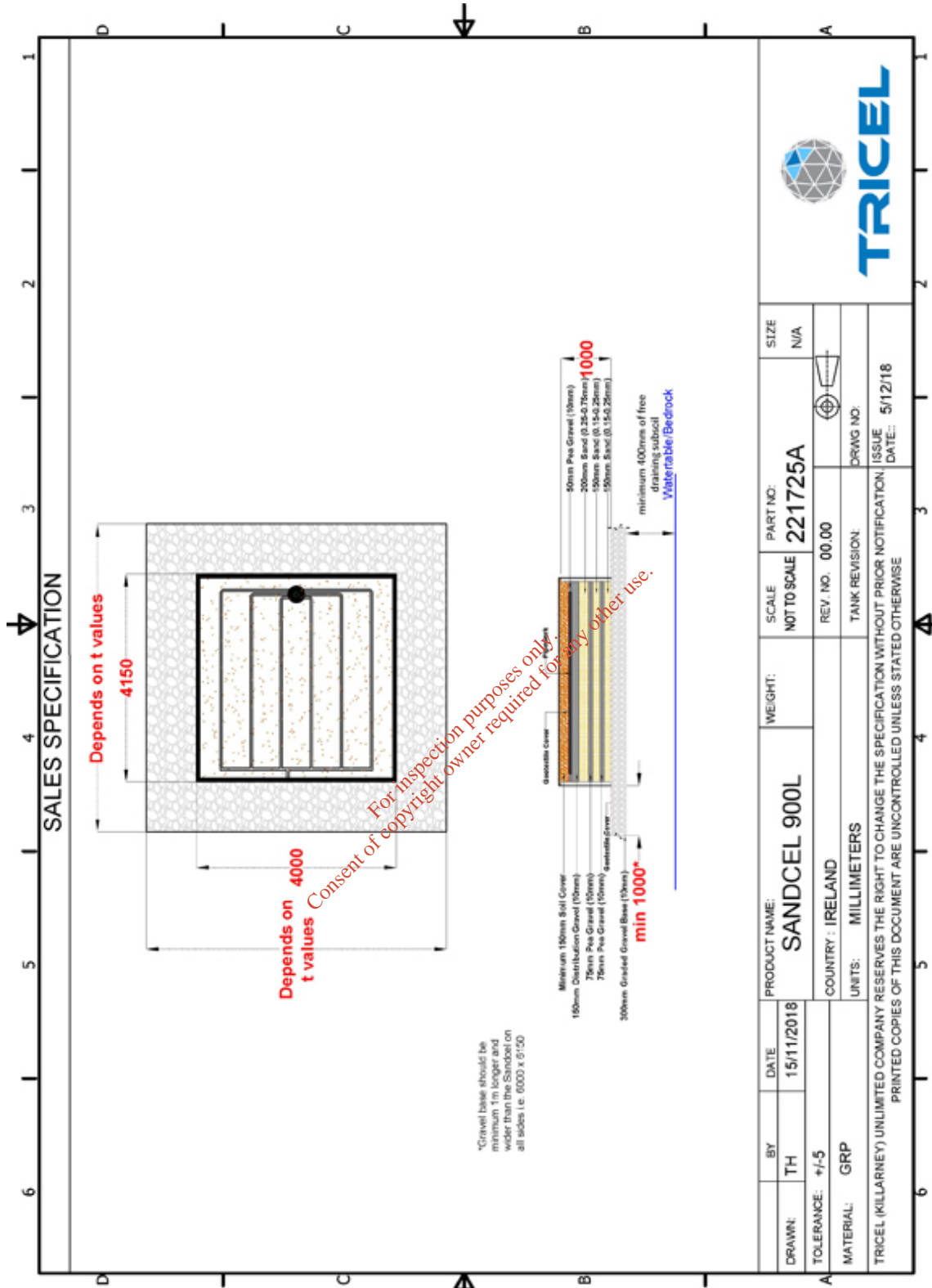
TABLE 6.1. MINIMUM SEPARATION DISTANCES IN METRES.

	Septic tank, intermittent filters, packaged systems, percolation area, polishing filters (m)
Wells ¹	-
Surface water soakaway ²	5
Watercourse/stream ³	10
Open drain	10
Heritage features, NHA/SAC ³	-
Lake or foreshore	50
Any dwelling house	7 septic tank 10 percolation area
Site boundary	3
Trees ⁴	3
Road	4
Slope break/cuts	4

¹See Annex B: Groundwater Protection Response.
²The soakaway for surface water drainage should be located down gradient of the percolation area or polishing filter and also ensure that this distance is maintained from neighbouring storm water disposal areas or soakaways.
³The distances required are dependent on the importance of the feature. Therefore, advice should be sought from the local authority environment and planning sections, conservation officer and heritage officer) and/or from the Department of the Environment, Heritage and Local Government (DoEHLG), specifically the Archive Unit of the National Monuments Section and the National Parks and Wildlife Service. If considering discharging to a watercourse that drains to an NHA/SAC the relevant legislation is Article 63 of the Habitats Directive. (NHA, National Heritage Area; SAC, Special area of Conservation.)
⁴Tree roots may lead to the generation of preferential flow paths. The canopy spread indicates potential root coverage.

Table 6.1 EPA CoP 2009- Minimum separation distances

The Sandcel sand polishing filter is a tertiary filter designed to the EPA CoP. It can be located above or below ground depending on the existing bedrock or subsoil. According to the EPA CoP the treated effluent which passes through a sand polishing filter is treated to a high enough standard to be allowed to discharge to groundwater through a distribution bed of gravel.



The Sandcel is available in 2 options:

- As a complete supply and fit product including a detailed report containing photographic evidence of works carried out, certification of sands used, testing of pipe network and sign off by a certified engineer.
- As a kit comprising of all certified components and assembly instruction.

The Sandcel comprises of three layers, an upper layer of coarse sand and two lower layers of fine sand separated from each other by a thin layer of gravel as per **Fig. 1.0**.

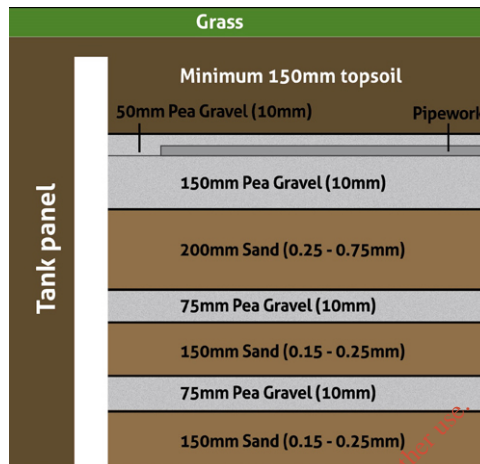


Fig. 1.0 Sandcel stratified layers

The sands used throughout are provided with certification to ensure compliance with the EPA Code of Practice. This washed and graded sands ensure little or no binding of sand particles during use. A sample copy of the certs are contained in Fig 2.0

Particle Size Distribution, Sieving Method: EN 933-1				Particle Size Distribution, Sieving Method: EN 933-1			
Identification of Sample: 0.4-1.4mm Production Sample				Identification of Sample: 0.1-0.3mm Production Sample			
Method Used: Washing and Sieving				Method Used: Washing and Sieving			
Total dry mass M ₁ =		0.350 kg		Total dry mass M ₁ =		0.274 kg	
Dry mass after washing M ₂ =		0.35200 kg		Dry mass after washing M ₂ =		0.27400 kg	
Dry mass of fines removed by washing (M ₁ -M ₂) =		0.00000 kg		Dry mass of fines removed by washing (M ₁ -M ₂) =		0.00000 kg	
Sieve Aperture Size	Mass of material retained R _i	Percentage of material retained R _i /M ₂ × 100	Cumulative percentage passing 100 - (R _i /M ₂ × 100)	Sieve Aperture Size	Mass of material retained R _i	Percentage of material retained R _i /M ₂ × 100	Cumulative percentage passing 100 - (R _i /M ₂ × 100)
mm	kg			mm	kg		
3.000	0	0.00 %	100.00 %	3.000	0	0.00 %	100.00 %
2.000	0	0.00 %	100.00 %	1.400	0	0.00 %	100.00 %
2.000	0.00000	0.00 %	100.00 %	1.000	0.00000	0.00 %	100.00 %
1.000	0.03	7.68 %	92.32 %	0.600	0	0.00 %	100.00 %
1.000	0.01510	3.85 %	96.15 %	0.500	0.01200	4.38 %	95.62 %
0.600	0.25	64.54 %	35.46 %	0.315	0.04	14.66 %	85.04 %
0.600	0.330	85.71 %	14.29 %	0.250	0.148	54.01 %	45.99 %
0.315	0.371	94.64 %	5.36 %	0.180	0.213	77.74 %	22.26 %
0.250	0.362	100.00 %	0.00 %	0.125	0.254	92.70 %	7.30 %
0.125	0.352	100.00 %	0.00 %	0.063	0.274	100.00 %	0.00 %
Material in the pan P = 0 kg				Material in the pan P = 0 kg			
Percentage fines (F) passing the 0.3 mm sieve ((M ₁ -M ₂)/M ₂) × 100				Percentage fines (F) passing the 0.3 mm sieve ((M ₁ -M ₂)/M ₂) × 100			
Percentage fines (F) = 0.0 %				Percentage fines (F) = 0.0 %			
E ₉₅ -P = 0.352 kg		Remarks: D ₁₀ = 0.43mm C _u = 2.5		E ₉₅ -P = 0.274 kg		Remarks: D ₁₀ = 0.335mm C _u = 2.69	
(M ₂ - (E ₉₅ + P)) / (M ₂) × 100 < α = 1%		Sieving has been validated.		(M ₂ - (E ₉₅ + P)) / (M ₂) × 100 < α = 1%		Sieving has been validated.	
(M ₂ - (E ₉₅ + P)) / (M ₂) × 100 = 0.0 %				(M ₂ - (E ₉₅ + P)) / (M ₂) × 100 = 0.0 %			

Fig 2.0 Examples of sand grading certificates supplied with Sandcel

The Sandcel must be placed on a gravel distribution bed to disperse the treated effluent. The plan area of this distribution bed is dependent on the T value or percolation rate of the receiving subsoil. It is compulsory that the T test is carried out at the infiltration level which is located at the base of the proposed Sandcel. This distribution bed should comprise of a 300mm layer of 10mm pea gravel as in Fig 3.0.



Fig 3.0 Cross section through Sand filter

For subsoil with a $T > 20$ the distribution area is calculated using the formula from EPA Code of Practice for Waste Water treatment and Disposal Systems serving single houses 2009 Clarification February 2012

Area = $0.125 \times PE \times T$

- **Where Area** the area of the distribution layer
- **0.125** remains a constant
- **PE** is the population equivalent of the site
- **T** is the T value of the subsoil

For subsoil with a $T < 20$ the minimum size of the distribution layer is equivalent to the area of the Sandcel, plus an additional 1m on each side for construction purposes.

The distribution gravel layer must be located on a 400mm (min) layer of free draining subsoil as highlighted in **Fig. 3.0**

Critical to the life of the sand filter is the impermeable liner as dictated in the EPA CoP. Tricel use a unique panel liner manufactured from a hybrid material known as Sheet Moulding Compound, SMC, which is a form of Glass Reinforced Plastic. These panels are used to form a durable, chemically and impact resistant, watertight, long lasting structure.

The distribution pipework in each zone, which is designed as a low pressure uPVC pipe network, is housed within the top pea-gravel layer. It comprises of 32mm dia. uPVC pipe, which disperses the effluent evenly of the entire surface area of the filter media. The pipework consists of a series of 3.4m laterals spaced at 0.6m centers. Each lateral contains 6 no orifices 4.8mm in diameter spaced at 0.6m along each length. The laterals are fed from a pump in the wastewater treatment unit through the main pipe manifold.

The network is designed with the following pipework dimensions:

Sandcel 900		
Description	Unit	Qty
No of Residents	Persons	6
Daily Flow rate	litres	900
Polishing filter Loading Rate	l/m2	60
Size of Polishing Filter	m2	15
Length of Polish Filter	m	4
Width of Polishing Filter	m	3.75
Orifice Diameter	mm	4.8
Orifice Spacing	m	0.6
Lateral Spacing	m	0.6
No. of laterals		6
Length of laterals	m	3.4
Lateral Diameter	mm	32
No of Orifices/lateral		6
Total No. of Orifices		36
Size of rising Main	mm	37.5
Min Dose Volume	litres	200
Discharge Rate	l/min	90
Total Head	m	0.750

A full set of Sandcel design calculations is available on request.

**Sandcel: Sand Polishing Filter System
 Service Agreement**

Establishing a regime of yearly inspections and maintenance is advised to ensure that your Sandcel sand polishing filter continues to perform to the same high standards throughout its lifetime. This service agreement covers travel, the service and the labour cost of servicing only. Other labour costs are excluded, as are all replacement parts.

Tricel (Killarney) Unlimited Company, Ballyspillane Industrial Estate, Killarney, Co. Kerry, V93 X253, Ireland ("the Company") enter this Sandcel service agreement with the Customer named below:

Customer Details:			
Name:			
Address:		Address of Site: (If other)	
Telephone No.:			
Date of Sandcel Order:			
Work Order No.:			
Date of Delivery of Sandcel:			
Date of Sandcel Commissioning:			
Service Agreement Fee Paid:			
Date of Service Agreement Commencement:			
Unit Serial No.:			

During routine servicing, the service technician will perform a series of checks and procedures:

Checks:

- There should be no evidence of ponding.
- There must be no planting of vegetation in or around the Sandcel.
- The surface of the Sandcel is in good condition i.e. there is no damage from traffic/machinery passing over the surface area.
- The panels are aligned correctly (above-ground Sandcels only).
- The soil level is correct within the Sandcel.
- The access cover of the sampling chamber is in good condition.
- The pipework within the sampling chamber is secure and there are no signs of leakage.
- The connection at the outlet of wastewater treatment system/pump-chamber is secure.
- The pipework at the inlet is secure and no signs of leakage (above-ground Sandcels only).

Procedures:

- The vents in the sampling chamber are cleared.
- The vent from the gravel layer in service pod is cleared.
- The pipework within the Sandcel is rodded to ensure there are no blockages.
- The pipework is flushed, after rodding, to ensure there are no leakages in the sampling chamber and the pipework is secure.

Tricel (Killarney) Unlimited Company trading as Tricel.

March 2017

Service Agreement Options:

TICK THE SERVICE AGREEMENT OPTION YOU WISH TO AVAIL OF: (Please tick one option only)	
Annual Service Agreement 1 year: (covers system for 2 years overall): One standard scheduled service visit per year	<input type="checkbox"/>
Annual Service Agreement 4 year: (covers system for 5 years overall): One standard scheduled service visit per year	<input type="checkbox"/>

The first years' service is included in the original purchase of your Sandcel.

Note: In cases in which multiple service agreements have been purchased by a customer for individual components of a complete wastewater treatment plant, i.e. a Tricel Novo, Tricel Puraflo or Sandcel - a discount will apply.

This contract is subject to terms & conditions. For the terms & conditions, please contact Tricel:

Tricel (Killarney) Unlimited Company, Ballyspillane Industrial Estate, Killarney, Co. Kerry, V93 X253, Ireland.
 Tel: +353 (0)64 6632421 Fax: +353 (0)64 6632777
 Email: sales@tricel.ie | Web: www.tricel.ie

This service agreement relates only to the Sandcel sand polishing filter, manufactured by Tricel, its subsidiaries and associated companies, and is between the company, or person named in this document, & Tricel.

By signing the declaration below, I hereby acknowledge that I, the Customer, have read, understand and agree to the information in the Sandcel Technical Manual, this service agreement and also the relevant terms & conditions.

<i>Tricel agrees to provide the services listed on this service agreement subject to the terms and conditions:</i>	<i>Please supply the services listed on this service agreement subject to the terms and conditions:</i>
<i>Signed on behalf of the Company:</i>	<i>Signed by the Customer:</i>
Name (Block Capitals):	Name (Block Capitals):
Signature:	Signature:
Date:	Date:

Important: Original signed service agreements must be returned to Tricel with payment in full and in advance, in order for the service agreements to be initiated. You are reminded of your obligations to the relevant County Council.

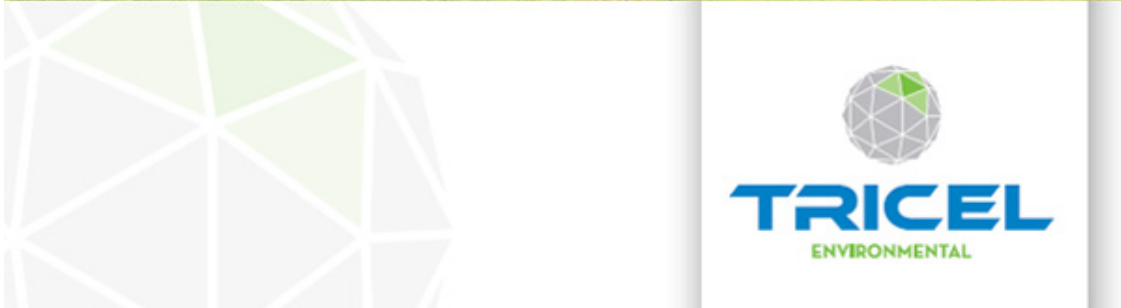
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March 2017

SAND POLISHING FILTER

Tricel® Sandcel

Innovative design for superior performance



How a Tricel Sandcel works

Sandcel sand polishing filters are designed to the EPA Code of Practice as tertiary treatment systems. These filters are the perfect solution for treatment and disposal of effluent from a secondary treatment unit. The filters comprise of stratified layers of certified sands according to the EPA Code of Practice.

They are enclosed in GRP impermeable panels which will not rot or decay, ensuring the structure of the filter will hold for many years. The filters can be installed above or below ground with all pipe work accessible from a service pod.

Treatment efficiency:
 Sandcel filters provide excellent polishing of treated effluent. Sample testing of some sites where a Sandcel and Tricel Novo wastewater treatment plant were in operation have shown final effluent quality of <1 mg/ltr BOD₅.

Why buy a Tricel Sandcel?

<p>Solid impermeable structure</p> <p>Filter enclosure will not rot or decay like timber surrounds.</p>	<p>Small footprint</p> <p>Only 16m² area for a 6 A/cisan application eliminating the need of large percolation area.</p>	<p>Aesthetic finish</p> <p>Filter can be covered with topsoil and planted with a lawn to blend into garden.</p>
<p>Long life components</p> <p>Certified sands and gravel used as the filter bed which will not break down over time.</p>	<p>Flexible design</p> <p>Under and overground applications possible.</p>	<p>Future</p> <p>Pipework accessible from service pod to future proof your system.</p>
<p>Engineered design</p> <p>Specifically designed pipework network to ensure equal distribution over the entire bed.</p>	<p>High performance</p> <p>Excellent treatment of effluent.</p>	<p>Legacy sites</p> <p>Ideal compact solution designed to the EPA CoP fulfilling most Local Authority requirements.</p>
<p>Quick installation</p> <p>Reduced on site labour costs.</p>	<p>Certification</p> <p>Certified components used.</p>	<p>Peace of mind</p> <p>Tricel have earned an unrivalled reputation in the environmental field in over 20 countries worldwide.</p>



Tricel Sandcel
 -Up to 10 persons-

	Sandcel 900	Sandcel 1200	Sandcel 1500
Capacity	900 litres per day	1200 litres per day	1500 litres per day
Length	4000mm	4000mm	4000mm
With	3850mm	5000mm	6350mm
Depth	1000mm	1000mm	1000mm
Footprint	15.4m ² (165.77 sq/ft)	20.0m ² (215.28 sq/ft)	25.4m ² (269.10 sq/ft)

>10 persons available on request.

Tricel Group

Tricel is an established and world recognised global provider of high performance solutions for the Construction, Environmental, Water and Materials Industries and is a brand built upon service, back up and reliability.

We occupy a unique position in the field of reinforced plastics, combining the technical expertise of over 40 years in the press-moulding and composites industry. Tricel is proud of being one of the largest manufacturers of Wastewater Treatment plants in Europe, and are regarded by regulators as the standard setters within the industry.

Tricel are experts in Sheet Moulding Compound (SMC) processes and produce the only wastewater treatment plant in Europe constructed from this material. This process gives the highest strength to thickness ratio of any tank on the market, and has no risk of corrosion over time.

Our company offers industry leading innovative solutions that our customers can trust, and with manufacturing locations in 5 countries we supply a comprehensive range of products to over 50 countries worldwide.



The **Irish Water Treatment Association (IWTA)** is the national association for the treatment, conservation, recycling and reuse of water and wastewater.



The **Irish Onsite Wastewater Association (IOWA)** formed in 2007 with the goal of improving the standard of professionalism in the on-site treatment of wastewater in Ireland.



Sandcel sand polishing filter has been designed in accordance to the **Environmental Protection Agency (EPA) Code of Practice (CoP)**.

Sanding 10/7/2016 (Rev 2018)

Environmental solutions



Novo
Domestic wastewater treatment plants



Vento
Septic tanks



Sandcel
Sand polishing filter



Pump stations



Puraflo
Secondary & Tertiary treatment plants

Get a Quote

Contact us Today to get a free quote on 00 353 (0)64 663 2421 or email us at sales@tricel.ie

Tricel, Ballyspillane Industrial Estate, Killarney, Co. Kerry, Ireland.
 Tel: +353 (0) 64 6632421 | Email: sales@tricel.ie | www.tricel.ie

In accordance with Tricel's normal policy of product development these specifications are subject to change without notice.
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Fig 4.0 Completed pipe network on a Sandcel before placement of final gravel layer

All Sandcel filters have a service pod which is designed to provide access to the complete pipe network. All laterals terminate in the pod and are capped and sealed to maintain the pressure within the network. This ensures access to the pipe network for service and rodding if required.



Fig. 5.0 Servicing pod

A layer of geotextile is placed on top of the final layer of gravel to protect the filter from silt being washed down. On this geotextile a layer of topsoil can be placed to blend the entire unit in with its surroundings.

Terms and conditions:

Tricel cannot accept responsibility for incorrect site details or calculations as these are based on user inputs which are outside of Tricel control.

Full terms of website use are available at www.tricelsiteassessor.ie/TermsOfWebsiteUse