

**DRAINAGE MAINTENANCE &
MANAGEMENT PLAN**
OLDLANDS FARMS, BOGNOR



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1.0 INTRODUCTION

The foul and surface water drainage systems proposed as part of the works are shown on EirEng drawings 212039-C004 (see Appendix D in Drainage Report). Pipe sizes and gradients are designed to be self-cleansing, although regular maintenance and inspections are required to ensure the long-term efficiency of the systems.

Any drainage infrastructure located within the site will be the end-user's responsibility to maintain. All works shall be undertaken by suitably qualified personnel and waste shall be treated and removed by an appropriately registered company.

2.0 SEWER NETWORK

The main objective of maintenance control is to establish procedures to ensure the sewer system functions appropriately in the long-term within an environment of fiscal control.

Maintenance includes:

- Cleaning and removal of sediments, obstructions, etc., to restore hydraulic capacity;
- Local repair or local replacement of damaged pipes or other structures in order to maintain the functioning of the sewer;
- Jetting/vacuum of sewers to be undertaken as often as necessary to remove silts and/or ordinary debris. To avoid damaging the pipe, PSI pressures need to be verified before jetting of plastic twin wall sewers;
- In the event that any major issues are encountered during an inspection, further information may be required such as a CCTV survey report;
- Maintenance to be undertaken on a six-monthly schedule.

Cleaning of drainage systems may require the temporary sealing of the system and careful collection of the effluent for disposal off-site by an appropriately registered company.

2.1 Manhole Chambers

All manhole covers shall be lifted and the manholes visually inspected for silt, debris and signs of blockages within the drainage system. Check manhole covers and frames for damage and ensure they are correctly bolted together. This shall be undertaken on a six-monthly basis.

Should any debris or blockages be detected, the manholes shall be cleaned along with associated pipe runs which shall be high pressure jetted and CCTV surveyed to verify/identify that no further remedial works are required.

Any internal manholes shall have their covers checked to ensure they remain airtight.

2.2 Catchpit Manholes

Catchpit manholes are designed with sumps to accumulate silt and debris at specific locations on the sewer network. These shall be checked and cleaned out on a six monthly schedule. Catchpit manholes are identified by reference to 'CP' in the manhole reference on 212039-C004.

2.3 Channel Drains and Slot Drains

Channel drains and slot drains shall be inspected regularly to ensure that the system continues to operate effectively and is free from damage and blockage by debris or solid objects.

The system shall be cleaned once a year or when signs of loss of capacity in the slot drains are evident and incorporated into a planned maintenance schedule. All units to be cleaned with a high-pressure hose in accordance with specialist manufacturer's maintenance document.

2.4 Full Retention Separators

In order to prevent pollution, the separators need to be regularly maintained. This shall be carried out on a six-monthly basis by suitably qualified personnel. The installation document by the suggested supplier, SPEL, together with certification and typical details are provided in Appendix A.

Maintenance shall be as follows:

- All maintenance to be undertaken in accordance with manufacturer's instructions.
- Assess the depth of accumulated oil and silt;
- Check the condition of any coalescing device and replace as necessary;
- Service any electrical equipment, i.e. alarms or management systems; and
- Physically inspect the integrity of the separator and any mechanical parts.

In the event of a spillage, the separator shall be emptied. The separator should be emptied in the event of oil/silt level build up. All extracted waste must be removed off-site and undertaken by a registered waste company that has experience in emptying and servicing separators.

A detailed log shall be kept on-site and filled out when the separator is inspected, maintained, emptied and serviced along with any specific events relating to the system such as cleaning and spillages.

Every five years a full drain down and general inspection should be undertaken, refilling the separator with clean water after the inspection/cleaning.

2.5 Attenuation Storage Tanks

Regular inspection and maintenance is important for efficient operation of the storage system. The design of the system allows for viewing holes to be created to allow for CCTV inspections as required. The installation document by the suggested supplier, Wavin AquaCell, is located in Appendix B.

Further to manufacturer's requirements, it is recommended that inspection is undertaken on a six monthly basis with all inspection points visually inspected for silt, debris and signs of blockages within the tank. Should any debris or blockages be detected, the tanks shall be cleaned and CCTV surveyed to verify/identify that no further remedial works are required.

Detailed guidance on the maintenance relating to attenuation tanks can be found in the SuDS Manual (CIRIA C753, 2015 as updated 2019) Chapter 21: Table 21.3 and Guidance Document (CIRIA C768, 2017).

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface where it may cause risks to performance	Monthly
	Remove sediment from pre-treatment structures and/ or internal fore-bays	Six monthly, or as required
Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

2.6 Foul Pumping Station

Pumping stations should be regularly inspected and serviced, with a planned service every 2-3 years covering the following:

Pumping Station Service

1. Lift pump(s), clean pump and check pump data plate
2. Check pump volute for damage
3. Check impeller for debris and damage unblock as required
4. Check wear ring(s) for damage
5. Assess motor / pump bearing condition
6. Remove oil drain plug and check oil for water ingress (where appropriate)
7. Refit oil drain plug with new "O" ring refill / replace oil (where appropriate)
8. Check motor windings for continuity and insulation integrity
9. Check motor cables for wear and water ingress
10. Check and clean level control floats / ultrasonic head
11. Check condition / serviceability of pump lifting system
12. Check operation of isolation and reflux valves
13. Check condition of wet well pipework
14. Check condition of wet well and valve chamber (where appropriate) including access covers
15. Check condition / serviceability of pump control panel
16. Check and adjust all pump controls where necessary
17. Check and test all safety / alarm facilities
18. Check earth loop resistance
19. Clean control panel
20. Check condition of control panel kiosk (where appropriate)
21. Clean and remove potential items to cause pump blockages from pump chamber

This service should be undertaken by a specialist company on a contract basis, including emergency call outs.

2.7 Attenuation Pond

Regular inspection and maintenance is important for the effective operation of ponds as designed. Maintenance responsibility for a pond and its surrounding area should always be placed with a responsible organisation. Litter and debris removal should be undertaken as part of general landscape maintenance for the site and before any other SuDS management task. All litter should be removed from site.

Site vegetation should be trimmed as necessary to keep the pond free of leaves and to maintain the aesthetic appearance of the site. Slope areas that have become bare should be re-vegetated and any eroded areas should be regraded before replanting.

Detailed guidance on the maintenance relating to ponds can be found in the SuDS Manual (CIRIA C753, 2015 as updated 2019) Chapter 23.

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass – public areas	Monthly (during growing season)
	Cut the meadow grass	Half yearly (spring, before nesting season, and autumn)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc for evidence of blockage and/or physical damage	Monthly
	Inspect water body for signs of poor water quality	Monthly (May – October)
	Inspect silt accumulation rates in any forebay and in main body of the pond and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options.	Half yearly
	Check any mechanical devices, eg penstocks	Half yearly
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1m	Annually

	above pond base; include max 25% of pond surface) Remove 25% of bank vegetation from water's edge to a minimum of 1m above water level Tidy all dead growth (scrub clearance) before start of growing season (Note tree maintenance is usually part of overall landscape management contract) Remove sediment from any forebay. Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays.	Annually Annually Every 1–5 years, or as required Every 5 years, or as required
Occasional maintenance	Remove sediment from the main body of big ponds when pool volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, eg every 25–50 years
Remedial actions	Repair erosion or other damage	As required
	Replant, where necessary	As required
	Aerate pond when signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair/rehabilitate inlets, outlets and overflows	As required

2.8 Headwalls/Culverts/Ditches

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually
	Inspect marginal and bankside vegetation and remove nuisance plants.	Every 3 months.

	Remove sediment from ditches, around structures and near/in culverts. Check vegetation within ditches and banks. Cut/reduce as necessary.	Six monthly, or as required
Remedial Actions	Repair/rehabilitate damaged or worn structures. Repair ditch banks if damaged.	As required
Monitoring	Inspect/check all culverts/ditches to ensure that they are in good condition and operating as designed	Annually
	Survey inside of culvert for sediment build-up and remove if necessary	Every 3-5 years or as required

3.0 SPILLS

Spills of significant amounts of chemicals, oils or fuel spills must not be washed to the drainage system. A supply of suitable absorbent materials should be kept on-site as necessary and used for any accidental spillages.

4.0 HEALTH & SAFETY

The owner shall, so far as is reasonably practicable, provide and maintain systems of work are safe and without risks to health or the environment. The systems of work shall cover all aspects of the above-ground operations, e.g. manhole locations and traffic control, to access the sewer system and all operations within confined spaces of the sewer system.

Work on drainage systems expose personnel to serious Health and Safety Hazards. These include but may not be limited to the following:

- Lifting heavy loads (eg manhole covers)
- The risk of injury through dropping heavy loads
- The risk of falling into chambers or watercourses
- Biohazards from pathogenic bacteria e.g. Weil's disease
- Poisonous, asphyxiating, and explosive gases.
- Drowning.

These hazards can be addressed by the following simple rules:

- Never work alone
- Carry out a Risk Assessment
- Never enter a confined space such as a manhole unless trained and equipped to do so with gas detectors, breathing equipment and a recovery team assisting.
- Always use the correct equipment, eg well-fitting lifting keys etc.
- Always use the correct Personal Protective Equipment (PPE) e.g. gloves, goggles, coveralls etc.
- Always fence unattended open manholes.

In addition, it should be noted that the location of some drainage apparatus may expose maintenance personnel to other hazards e.g. vehicles maneuvering. In general, it is advised that maintenance works (other than simple inspections) be carried out by specialist contractors unless specially trained personnel are available.

5.0 RECORDING MAINTENANCE

The end-user's site manager shall be responsible for recording and updating details of prior maintenance and operations, and also for scheduling future maintenance in accordance with the necessary requirements of each component of the drainage system. These records should be made available for future reference.

6.0 MANAGEMENT

Maintenance of the sewers, manholes, gullies, inlets/outlets and channel drains shall be inspected at 6 monthly intervals and cleaned out at 12 monthly intervals. A full CCTV survey shall be carried out on completion of works, if a suspected blockage and at 10 yearly intervals. For the attenuation system, this would be in line with manufacturer's information and maintenance requirements, in accordance with CIRIA C753 SuDS Manual requirements.

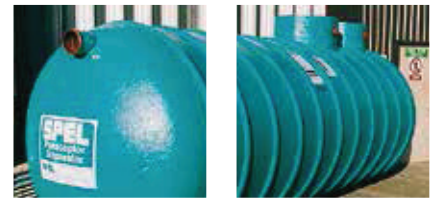
The end user (as landowner) will ensure sufficient funds are available through identified budgets to finance the continued planned maintenance, including replacement as necessary and any reactive maintenance of the drainage in accordance with this manual. The end user has an in-house facilities management team to manage maintenance contracts and a network of nationwide contractors to undertake planned and reactive maintenance works. The maintenance team are controlled centrally with regional facilities teams based locally to respond quickly to any reactive matters and manage quality. The responsibility for maintenance of the drainage would pass in title in the event of ownership of the site being transferred.

The on-site treatment and pollution prevention measures with the provision of the full retention separators, and catchpit manholes, will provide adequate stages of treatment prior to discharge to the existing watercourse.

Appendix A – SPEL Puraceptor Full Retention Separator

SPEL Products data manual

Section 8 SPEL Puraceptor® class 1 full retention separators



SPEL Puraceptor class 1 separators are full retention single or two chamber units incorporating an automatic closure device and a coalescer unit.

Compliant to the European Standard BS EN 858-1, the Environment Agency's Pollution Prevention Guidelines PPG3 and the Construction Products Regulations.

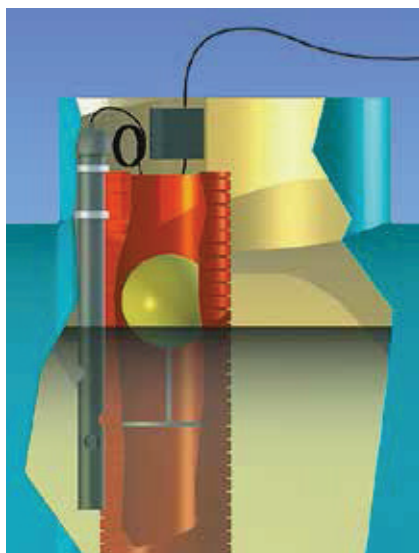
SPEL

The ‘heart’ of the SPEL Puraceptor is the unique long life, low maintenance coalescer unit which ‘polishes’ the final effluent AFTER 90% hydrocarbons of silt have been separated out.

The SPEL Puraceptor models are designed for high performance and long service life between maintenance periods. SPEL Puraceptors have been tested in accordance with the European Standard BS EN 858-1 and the results were substantially within the maximum hydrocarbon concentration in the outlet of 5mg/litre. The average for all units tested was 1.22mg/litre.

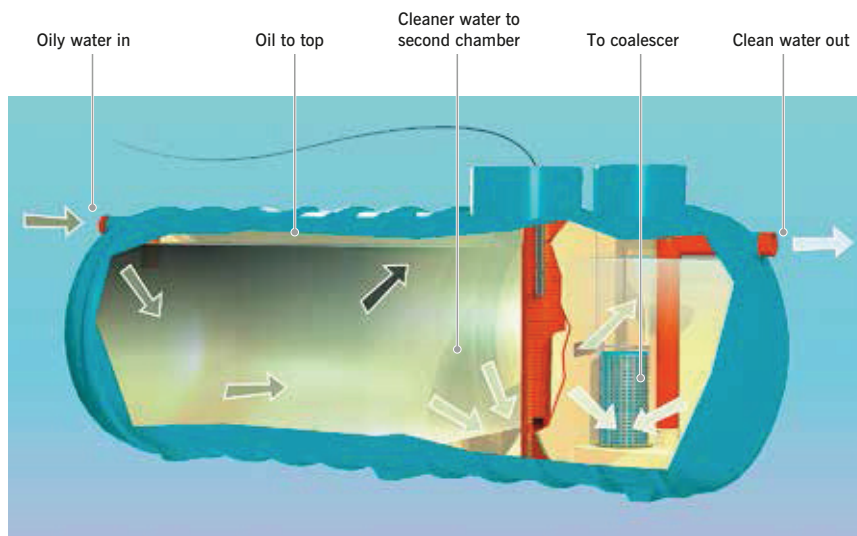
The Puraceptor is available in two versions, single or two chamber, dependent upon the site application and requirements.

The ‘heart’ of the separation process is the robust and highly efficient coalescer unit or units. These strong stainless steel units incorporate robust high volume reticulated foam inserts. The inserts efficiently coalesce the finer globules of hydrocarbons for gravity separation and due to their large volume, last for long periods before requiring cleaning. Cleaning is then a simple operation using normal pressure water. The inserts can be reused again and again, rarely requiring replacement.



The automatic closure device automatically closes the outlet point, thus preventing pollutants passing to the drain when there is a heavy spillage.

Compliant to the European Standard BS EN 858-1, the Environment Agency's Pollution Prevention Guidelines PPG3 and the Construction Products Regulations



SPEL Puraceptor class 1 – single chamber units are suitable for:

- Medium to high risk oil/fuel storage and handling areas.
- Filling stations, (SPEL Puraceptor forecourt separator FP1CSC).
- Commercial vehicle/plant maintenance yards and heavily contaminated industrial areas.

SPEL Puraceptor class 1 – two chamber units

The coalescer unit is mounted in the second chamber, providing a coalescence process for the separation of smaller globules of light liquid pollutants before final discharge to the surface water drain.

Being incorporated in the second chamber prevents contamination or blockage of the coalescer insert in the event of heavy spillages, large amounts of accumulated hydrocarbon or heavy silt content in surface water. It can be simply lifted out for cleaning during routine maintenance.

Typical applications are:

- High risk oil/fuel storage and handling areas
- Filling stations, (SPEL Puraceptor forecourt separator FP2C).
- Heavily contaminated industrial areas, commercial vehicle/plant maintenance yards, power/sub stations, fire training grounds and railway light maintenance and fuelling depots.

8.2 SPEL Puraceptor® class 1 full retention separators – single and two chamber versions

Projects of interest



SPEL Puraceptor Class 1 full retention single chamber separator NS942 with 'automatic' Econoskim System serving a large catchment area (5.0 hectares) at Bristol International Airport.



SPEL Puraceptor class 1 forecourt separator 300 series FP2C (two chamber) for garage forecourts, LFCDA approved. Under test the average hydrocarbon content measured at the outlet was 1.86mg/l.



SPEL Puraceptor class 1 separators (two chamber) are frequently specified for transformer stations, rail maintenance depots etc. Both single and two chamber models are available dependant upon category of site.

SPEL Puraceptor class 1 single and two chamber separators are compliant to the Environment Agency's Pollution Prevention Guidelines PPG3, the European Standard BS EN 858-1 and the Construction Products Regulations.

Design and manufacture with reference to BS 4994/BS EN 976 and BS 8301. SPEL Puraceptor separators are filament wound in glass reinforced polyester and have a life expectancy in excess of fifty years.

SPEL Puraceptor separators have been designed and tested to meet the stringent European Standard BS EN 858-1 for installations for separators of light liquids where the maximum hydrocarbon concentration in the outlet does not exceed 5mg/l, suitable for discharging into a surface water drain.

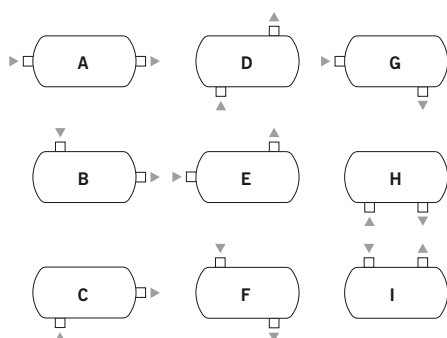
One important feature of SPEL class 1 separators is the design and construction of the coalescer units. These strong stainless steel units incorporate robust high volume reticulated foam inserts. The inserts efficiently coalesce the finer globules of hydrocarbons for gravity separation and due to their large volume, last for long periods before requiring cleaning. Cleaning is then a simple operation using normal pressure water. The inserts can be reused again and again, rarely requiring replacement.

Features

- Tank shell designed in accordance with BS4994/BS EN 976.
- Filament wound shell – the embodiment of strength and durability – yet lightweight.
- Life expectancy in excess of 50 years.
- Smooth, high gloss internal corrosion resistant surface.
- External 'flow coat' water penetration barrier.

Choice of pipe connections

Orientation of inlet/outlet pipe connections.



- Good access to all parts for desludging.
- Coalescer unit/s incorporated into second chamber.
- Coalescer unit/s provided with lifting handle.
- Access shafts for generous access for desludging tank and servicing of ACD and coalescer units.
- Sampling point incorporated into outlet
- Robust stainless steel coalescer unit with long life foam insertion and lifting handle.
- Sized for working capacity PLUS fuel/oil and sludge containment ensuring optimum performance between maintenance periods.
- Generous sizing extends maintenance free periods and reduces desludging costs.
- Stainless steel/plastic or copper ball automatic closure device (ACD).
- Designed for high performance and low maintenance over a long life span.
- Dip pipe inlet for minimum turbulence and to prevent inflammable vapours passing upstream in drainage system.

Optional extras

- Chemical resistant inner lining for aviation fuels, toluene etc. (CR and HCR specification available – see 1.2 – 1.4).
- Extension shafts available ex. stock in standard lengths of 0.5, 1.0, 1.5 and 2.0m.
- Extension/access shafts for man access – 750 or 900 diameter available to order.
- Extension/access shafts with GRP ladder and stainless steel fixings available to order.
- Coalescer unit guide rail and lifting/locating locking systems available for easy removal and re-insertion of coalescer units during maintenance – see 9.7.
- SPEL tripod and hoist for raising and lowering coalescer units during maintenance – see 9.8/9.9.
- SPEL Econoskim® light liquid/oil skimming and separate containment system for 400, 500 & 600 series separators – see section 11.
- Flex-Seal/Band-Seal or similar flexible couplings are available for connecting to site pipe work if required.
- Access shaft safety grating can be incorporated under the manhole cover for additional safety when carrying out an inspection.

Inlet/outlet connections

- 160/225/300mm diameter PVCU socket/spigot.
- 400/450mm diameter GRP spigot only.

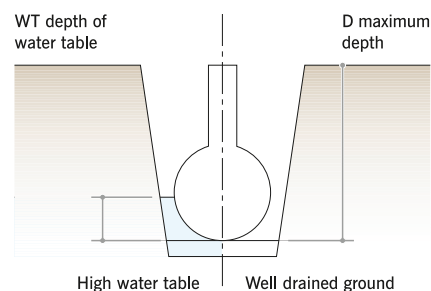
For connecting to site pipework Flex-Seal/Band-Seal or similar flexible couplings can be used.

Specification

Standard, heavy, extra heavy or special specification available dependent upon tank burial depth and water table level in winter. The tables below refer to tanks with a concrete surround. For extra heavy and special specification range and pea gravel surround refer to section 4 or contact technical sales.

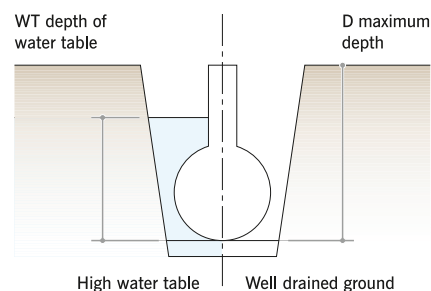
Standard tanks

Series	WT(m)	D(m)
100/200	1.0	4.0
300	0.9	4.0
400	1.3	5.0
500	1.9	5.7
600	2.4	6.2



Heavy tanks

Series	WT(m)	D(m)
100/200	2.0	6.0
300	2.8	5.6
400	3.5	6.0
500	4.5	7.25
600	4.7	7.3



8.4 SPEL Puraceptor® class 1 single and two chamber separators

Full retention

Handling

Tanks should be lifted using slings not chains or wire ropes. DO NOT drag tanks along the ground for any distance and avoid jarring or bumps. DO NOT lift with water in the tank. See 4.2.

Installation guidance notes

Installation should be carried out by a competent contractor in accordance with the following procedures, Health & Safety at Work legislation and good building practice.

For detailed instructions see section 4 or installation instructions supplied with every tank.

1. Determine the size of the excavation allowing for the drain invert depth and a concrete surround. Allowance should be made for consolidating concrete under the unit when backfilling.
2. Pour concrete base to correct depth and level off.
3. When the concrete has set sufficiently, place the tank in position, check for levels (including inlet/outlet inverts) and fill with water to a maximum depth of: 200 series – 200mm, 300 series – 300mm, 400 series – 400mm. Ensure concrete slab is clean ready for placing concrete surround. Surround should preferably be placed within 48 hours of casting the base slab.
4. Place backfill concrete (ST4 mix) up to the depth of the water in the tank ensuring the concrete is properly consolidated under the tank to prevent voids. Consolidate by hand – do not use vibrating pokers. Connect up pipework.
5. Continue backfilling with concrete and at the same time filling the tank with water to equalise pressure and resist floatation. Where the tank is divided into chambers ensure all chambers are filled equally.
6. Top up the tank with water to inlet/outlet invert level and place remainder of concrete to a depth of approximately 200-250mm above the top of the tank. Where extension access shaft is fitted, this can be surrounded in concrete once the main tank concrete surround has set. (See Extension access shafts).
7. Where the concrete slab over the tank is to take vehicle loading it should be reinforced in accordance with good practice to take the maximum load and should be extended onto unexcavated ground. It is important that vehicle loading is not transferred to the tank shell or its concrete surround.
8. Incorporate inspection cover and frame.

Venting

SPEL Separators are governed by the requirements of petroleum regulations: Petrol filling stations: Construction and Operation HS(G)41, ISBN 0-11885449-6. These state in paragraph 45, that each chamber of a petrol interceptor should be vented and vent pipes should extend to not less than 2.4m above ground level, should not be less than 75mm diameter and of a robust construction, and should be manifolded above ground.

Extension access shafts

SPEL extension shafts should be surrounded with concrete. Pour in lifts of approximately 500mm, allowing the concrete to set between each lift.

SPEL automatic alarm/monitoring system

Requirement of the Environment Agency's Pollution Prevention Guidelines PPG3

The SPEL automatic alarm/monitoring system shall be fitted for continuous monitoring of the separator contents by sensing when the light liquid within the separator has filled to a predetermined level (with design safety margins), and provides a simple audio-visual warning to alert the operator that the separator needs to be emptied.

The system is very easy to install and comprises two parts: a compact control unit and a probe unit. It is self-contained and requires only a normal 240v AC electrical supply. The control incorporates a ATEX approved intrinsically safe circuit, which enables the probe unit to be used in Zone Zero Environments. See section 10.

Maintenance

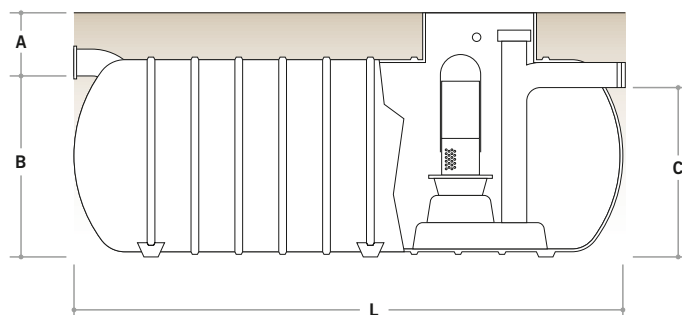
The SPEL Separators have good access for periodic emptying of retained light liquids and sludge which is essential to maintain the units optimum performance.

Periods between emptying will have to be determined depending on site conditions but normally at least twice a year. For further details see Section 9.

Model	Series	Nominal size (NS)	Catchment area (m ²)	Oil storage (litres)	Silt capacity (litres)	Overall length* (mm)	Overall diameter (mm)	Inlet Invert (mm)	Base to Inlet (mm)	Base to outlet (mm)	Max in/out pipe diameter (mm)	Number of access shafts (dia. mm)			
						L						600	750	900	1200
P004/1CSC	200	4	222	40	400	1,720	1225	540	1,200	1,140	160	–	1	–	–
P006/1CSC	200	6	333	60	600	2,270	1225	540	1,200	1,140	160	–	1	–	–
P010/1CSC	200	10	556	100	1,000	3,410	1225	540	1,200	1,140	160	–	1	–	–
P015/1CSC	300	15	833	150	1,500	3,200	1875	350	1,800	1,740	225	–	1	–	–
P020/1CSC	300	20	1111	200	2,000	3,540	1875	350	1,800	1,740	225	1	1	–	–
FP1CSC	300	20	1111	200	2,000	4,290	1875	350	1,800	1,740	225		1	–	–
P030/1CSC	300	30	1667	300	3,000	4,420	1875	390	1,760	1,700	300	1	–	1	–
P040/1C	300	40	2222	400	–	4,020	1875	390	1,760	1,700	300		–	1	–
P040/1CSC	300	40	2222	400	4,000	5,760	1875	390	1,760	1,700	300	1	–	1	–
P050/1C	300	50	2778	500	–	5,070	1875	390	1,760	1,700	300	–	–	1	–
P050/1CSC	300	50	2778	500	5,000	7,060	1875	390	1,760	1,700	300	1	–	1	–
P065/1C	400	65	3611	650	–	3,710	2700	425	2,625	2,525	300		–	2	–
P065/1CSC	400	65	3611	650	6,500	4,810	2700	425	2,625	2,525	300	1	–	2	–
P080/1C	400	80	4444	800	–	4,400	2700	425	2,625	2,525	300	–	–	2	–
P080/1CSC	400	80	4444	800	8,000	5,700	2700	425	2,625	2,525	300	1	–	2	–
P100/1C	400	100	5555	1000	–	5,250	2700	475	2,575	2,475	400		–	2	–
P100/1CSC	400	100	5555	1000	10,000	7,400	2700	475	2,575	2,475	400	1	–	2	–
P125/1C	400	125	6944	1250	–	6,090	2700	475	2,575	2,475	400	–	–	2	–
P125/1CSC	400	125	6944	1250	12,500	8,580	2700	475	2,575	2,475	400	–	1	2	–
P150/1C	400	150	8333	1500	–	7,400	2700	475	2,575	2,475	400	–		2	–
P150/1CSC	400	150	8333	1500	15,000	10,180	2700	475	2,575	2,475	400	–	1	2	–
P165/1C	400	165	9166	1650	–	7,960	2700	500	2,550	2,450	450	2		1	–
P165/1CSC	400	165	9166	1650	16,500	11,200	2700	500	2,550	2,450	450	2	1	1	–
P200/1C	400	200	11110	2000	–	9,600	2700	660	2,390	2,290	600	2	1	1	–
P200/1CSC	400	200	11110	2000	20,000	13,710	2700	660	2,390	2,290	600	2	1	1	–
P250/1C	400	250	13888	2500	–	11,830	2700	660	2,390	2,290	600	2		2	–
P250/1CSC	400	250	13888	2500	25,000	16,750	2700	660	2,390	2,290	600	2	1	2	–
P300/1C	400	300	16665	3000	–	14,120	2700	660	2,390	2,290	600	2		2	–
P300/1CSC	500	300	16665	3000	30,000	12,410	3650					1	2	2	–
P400/1C	500	400	22220	4000	–	11,180	3650					2	1	2	–
P400/1CSC	500	400	22220	4000	40,000	15,760	3650					2	2	2	–
P500/1C	500	500	27775	5000	–	14,340	3650					2	2	1	1
P500/1CSC	500	500	27775	5000	50,000	20,530	3650					2	2	1	1
P500/1C	600	500	27775	5000	–	11,470	4150		To suit site drainage requirements			2	2	1	1
P500/1CSC	600	500	27775	5000	50,000	16,040	4150					2	2	1	1
P550/1C	600	550	30553	5500	–	12,690	4150					2	2	1	1
P550/1CSC	600	550	30553	5500	55,000	17,450	4150					2	2	1	1
P600/1C	600	600	33330	6000	–	13,510	4150					2	2	–	2
P600/1CSC	600	600	33330	6000	60,000	19,080	4150					2	2	–	2
P800/1CSC	600	800	44440	8000	80,000	24,660	4150					3	2	2	1
P1000/1C	600	1000	55550	10000	–	22,270	4150					3	2	1	3

Note: Model **FP1C** is a special forecourt unit with 7600 litre spillage holding capacity.

*Overall length subject to inlet/outlet size and orientation.

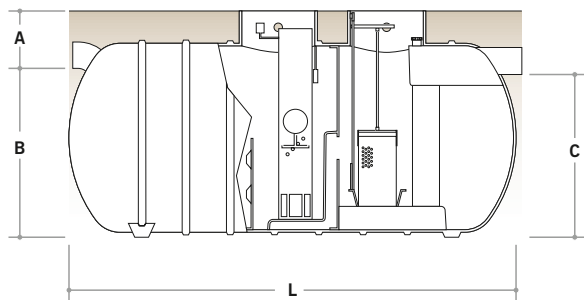


8.6 SPEL Puraceptor® class 1 two chamber separators – full retention

Model	Series	Nominal size (NS)	Catchment area (m ²)	Oil storage (litres)	Silt capacity (litres)	Overall length** (mm) L	Overall diameter (mm)	Inlet Invert (mm) A	Base to Inlet (mm) B	Base to outlet (mm) C	Max in/out pipe diameter (mm)	Number of access shafts (dia. mm)				
												450	600	750	900	1200
P006/2CSC	200	6	333	60	600	3,050	1225	340	1,200	1,140	160	–	–	2	–	–
P010/2CSC	200	10	556	100	1,000	3,820	1225	340	1,200	1,140	160	–	–	2	–	–
P015/2CSC	300	15	833	150	1,500	4,020	1875	350	1,800	1,740	225	–	–	2	–	–
P020/2CSC	300	20	1111	200	2,000	4,020	1875	350	1,800	1,740	225	–	–	2	–	–
P025/2CSC	300	25	1389	250	2,500	4,290	1875	350	1,800	1,740	225	–	–	2	–	–
P030/2CSC	300	30	1667	300	3,000	4,420	1875	390	1,760	1,700	300	–	1*	2	–	–
FP2CSC	300	20	1111	200	2,000	5,500	1875	350	1,800	1,740	225	–	–	2	–	–
P035/2CSC	300	35	1944	350	3,500	5,070	1875	390	1,760	1,700	300	–	1*	2	–	–
P040/2CSC	300	40	2222	400	4,000	5,760	1875	390	1,760	1,700	300	–	1*	2	–	–
P050/2CSC	300	50	2778	500	5,000	7,060	1875	390	1,760	1,700	300	–	1*	2	–	–
P065/2CSC	300	65	3611	650	6,500	9,180	1875	390	1,760	1,700	300	1	–	2	–	–
P065/2CSC	400	65	3611	650	6,500	5,470	2700	425	2,625	2,525	300	1	–	1	1	–
FP15/2CSC	400	15	833	150	1,500	7,400	2700	425	2,625	2,525	300	–	1	2	–	–
P080/2CSC	400	80	4444	800	8,000	5,700	2700	425	2,625	2,525	300	–	–	1	1	–
P100/2CSC	400	100	5555	1000	10,000	7,400	2700	475	2,575	2,475	400	–	–	1	1	–
P125/2CSC	400	125	6944	1250	12,500	8,580	2700	475	2,575	2,475	400	–	–	2	1	–
P150/2CSC	400	150	8333	1500	15,000	10,180	2700	500	2,550	2,450	450	–	–	2	1	–
P200/2CSC	400	200	11110	2000	20,000	13,710	2700	660	2,390	2,290	600	–	1	2	1	–
***P300/2CSC	500	300	16665	3000	30,000	12,530	3650	675	3,200	3,100	600	–	1	2	–	1
P350/2CSC	500	350	19443	3500	35,000	13,950	3650	675	3,200	3,100	600	–	2	2	2	–
***P400/2CSC	500	400	22220	4000	40,000	15,980	3650	675	3,200	3,100	600	–	2	2	2	–

Note: Model FP2C is a special forecourt unit with 7600 litre spillage holding capacity.

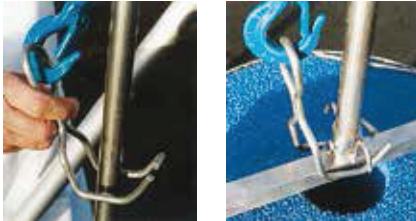
*Optional for ease of silt removal. **Overall length subject to inlet/outlet and orientation. ***500 or 600 series available – designed to suit specific requirements.



SPEL tripod and hoist

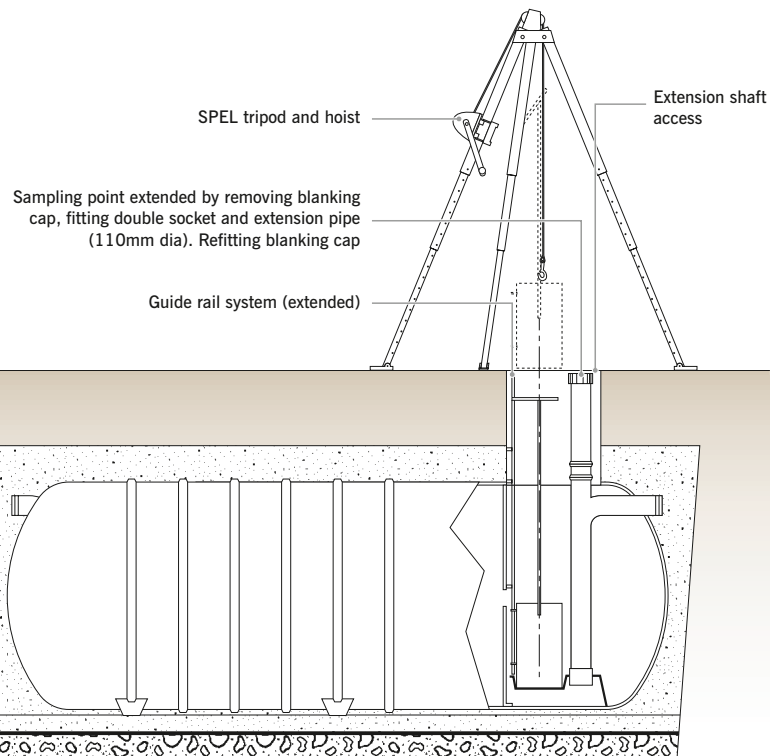
Where surface water run-off has a high silt content the coalescer units can become filled, making them heavy to lift out. In order to facilitate easy withdrawal of coalescer units the SPEL tripod & hoist is recommended.

A stainless steel lifting hook is included for automatically engaging the coalescer unit,



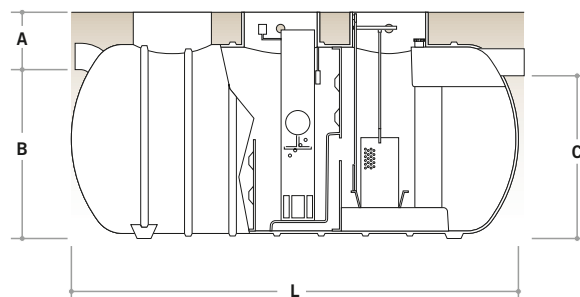
even under water. This enables coalescer units to be lifted out safely from ground level.

Note: The SPEL tripod and hoist can be used for servicing pumps in SPEL package pumping stations. For further details see SPEL Data Manual section 9.



Model	Series	Nominal Size (NS)	Catchment Area (M²)	Oil Storage (Litres)	Silt Capacity (Litres)	Overall Length (mm) L	Overall Diameter (mm)	Inlet Invert (mm) A	Base to Inlet (mm) B	Base to Outlet (mm) C	Max In/Out Pipe Diameter (mm)	Number of Access Shafts (Dia mm)			
												450	750	900	1200
P006/2CSC/NG	200	6	333	60	600	3,050	1225	427	1,110	1,050	160	–	1	1	–
P010/2CSC/NG	200	10	556	100	1,000	4,700	1225	427	1,110	1,050	160	–	3	–	–
P015/2CSC/NG	300	15	833	150	1,500	4,020	1875	540	1,610	1,550	225	–	3	–	–
P020/2CSC/NG	300	20	1111	200	2,000	4,020	1875	540	1,610	1,550	225	–	3	–	–
P025/2CSC/NG	300	25	1389	250	2,500	4,290	1875	540	1,610	1,550	225	–	3	–	–
P030/2CSC/NG	300	30	1667	300	3,000	5,070	1875	550	1,600	1,500	300	–	2	1	–
P040/2CSC/NG	300	40	2222	400	4,000	6,570	1875	550	1,600	1,500	300	–	2	1	–
P050/2CSC/NG	300	50	2778	500	5,000	8,260	1875	550	1,600	1,500	300	–	2	1	–
P065/2CSC/NG	300	65	3611	650	6,500	10,220	1875	550	1,600	1,500	300	1	2	1	–
P065/2CSC/NG	400	65	3611	650	6,500	5,470	2700	665	2,385	2,285	300	1	1	1	–
P080/2CSC/NG	400	80	4444	800	8,000	6,170	2700	665	2,385	2,285	300	1	1	1	–
P125/2CSC/NG	400	125	6944	1250	12,500	9,600	2700	765	2,285	2,185	400	1	2	1	–
P150/2CSC/NG	400	150	8333	1500	15,000	11,200	2700	790	2,280	2,180	450	1	2	1	–
P200/2CSC/NG	400	200	11110	2000	20,000	16,400	2700	940	2,130	2,030	600	2	2	1	–
P300/2CSC/NG	500	300	16665	3000	30,000	12,530	3650	875	3,000	2,900	600	2	2	–	1
P400/2CSC/NG	500	400	22220	4000	40,000	16,330	3650	875	3,000	2,900	600	3	2	2	–

*A minimum oil storage volume of 4000 litres is provided in all models except P006 and P010 which have 60 and 100 litres of oil capacity respectively.

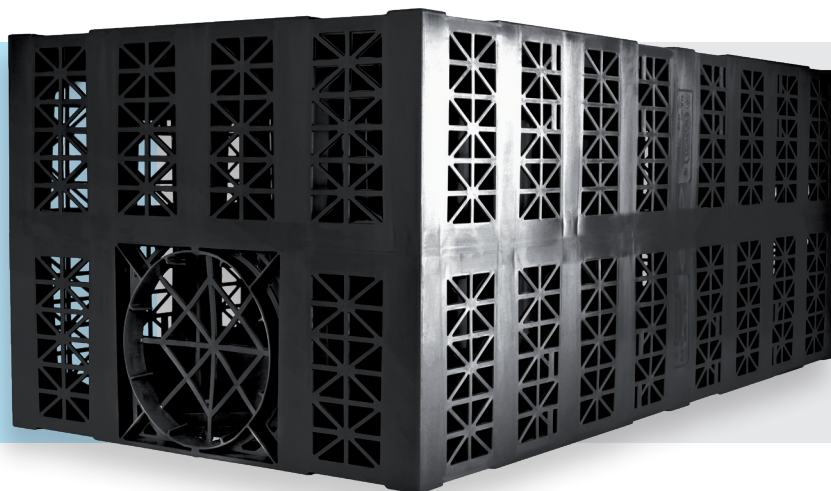


Appendix B – Wavin AquaCell Geocellular Storage

AquaCell Core-R

Product description

AquaCell Core-R has been designed for use in deep applications, subject to regular and heavy traffic loadings, e.g. cars and HGV's. AquaCell Core-R can also be used in both landscaped and deep soakaway applications.



Technical specification

Cat code	6LB150	Void ratio	95%
Colour	Black	Material	Recycled PP
Dimensions	1m x 0.5m x 0.4m	Vertical loading	66.9 tonnes/m ² (669 kN/m ²)
Weight	11.5kg	Lateral loading	12.3 tonnes/m ² (123 kN/m ²)
Storage volume	190 litres	BBA approval	Certificate 03/4018

Maximum installation depths

Typical soil type	Maximum depth of installation – to base of units (m) ¹				
	Soil weight kN/m ³	Angle of internal friction ϕ (degrees) ^{2,3}	Landscaped areas	Vehicle mass <9 tonnes ^{4,5}	Vehicle mass <44 tonnes
Over consolidated stiff clay	20	24	3.85	3.61	3.36
Silty sandy clay	19	26	4.35	4.09	3.83
Loose sand and gravel	18	30	5.34	5.06	4.78
Medium dense sand and gravel	19	34	5.94	5.68	5.41
Dense sand and gravel	20	38	6.68	6.43	6.18

Minimum cover depths

	Landscaped areas	Car parks with vehicle mass <3 tonnes ⁵	Car parks with vehicle mass <9 tonnes	Car parks with vehicle mass <12 tonnes	Low speed roads with vehicle mass <60 tonnes
Minimum cover depth (m)	0.30	0.50	0.60	0.70	1.11

- Without groundwater present below base of units – AquaCell Core-R may be used where groundwater is present, contact Wavin for technical advice.
- Loosening of dense sand or softening of clay by water can occur during installation. The designer should allow for any such likely effects when choosing an appropriate value of ϕ .
- The design is very sensitive to small changes in the assumed value of ϕ , therefore, it should be confirmed by a chartered geotechnical engineer. In clay soils, it may be possible to utilise cohesion in some cases.
- Applicable for car parks or other areas trafficked only by cars or occasional refuse collection trucks or similar vehicles (typically one per week).
- This category should be used when considering landscaped areas that may be trafficked by ride on mowers.

Assumptions made:

- Ground surface is horizontal
- Shear planes or other weaknesses are not present within the structure of the soil

Source: BBA