



DRAINAGE MAINTENANCE PLAN
McDonald's Ashgrove Road West,
Aberdeen (NB8883)

Document History

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1.0 Introduction

- 1.1 This Sustainable Drainage Maintenance Plan has been prepared by Glanville Consultants Ltd on behalf of McDonald's Restaurants Limited.
- 1.2 The site is located 3.3km west of the centre of Aberdeen, on the northeast corner between Ashgrove Road West and North Anderson Drive.

2.0 Drainage Maintenance Responsibility & Training

- 2.1 The McDonald's site and all of its drainage is privately owned and maintained by McDonald's. It is the store manager's responsibility to ensure that the drainage system is regularly inspected and maintained, in accordance with this plan. Figure 1 shows the layout of the drainage system including the location of each of the items requiring maintenance, listed in this plan and a summary of the maintenance requirements.
- 2.2 The majority of tasks can be completed by McDonald's staff trained for each specific task. Training should include manual handling, for lifting manhole covers. Manholes & chambers can be dangerous due to trapped harmful gases and should not be entered unless staff are confined space trained and issued with appropriate equipment. Entering confined spaces should not normally be required and should be controlled by a permit to enter system administered by the store manager. It may be appropriate to rely on non-store based, specialist staff, on the rare occasions when confined space entry is required.

3.0 Drainage Inspection and Maintenance Requirements and Frequency

Catchpit Manholes and Gullies (Figure 1 - Ref A & C)

- 3.1 Catchpit manholes and gullies are designed to trap silt, leaves and other debris before it reaches more sensitive parts of the drainage system where it could reduce drainage efficiency. Catchpit manholes are located prior to the cellular storage tank and adjacent to surface drainage channels. Gullies are located throughout the car park and drive through lane, adjacent to kerb-lines.
- 3.2 Catchpit manholes and gullies need to be inspected on a monthly basis except during the autumn leaf fall when they may require inspections to be increased to fortnightly.
- 3.3 Equipment required for inspection includes moveable barriers and cones to guard openings, manhole keys, gloves, and a torch. A minimum of two people are required.
- 3.4 Catchpit manholes and gullies need to be emptied once the sump becomes half full. Emptying should be performed using a gully emptying vacuum truck or similar device which does not require man entry.

Foul Water Manholes and Inspection Chambers (Figure 1 - Ref B)

- 3.5 Foul water manholes and inspection chambers need to be inspected on a monthly basis or immediately if foul odours are present or there is a suspected blockage.
- 3.6 Equipment required for inspection includes moveable barriers and cones to guard openings, manhole keys, gloves and a torch. A minimum of two people are required.
- 3.7 If manholes show any signs of blockage, specialist contractors should be called for clearance work, without delay.

Drainage Channel Outlets (Figure 1 - Ref C)

- 3.8 Drainage channel outlets need to be inspected on a monthly basis except during the autumn when leaf fall, may require inspections to be increased to fortnightly.
- 3.9 Equipment required for inspection includes moveable barriers and cones to guard openings, lifting tools, gloves and a torch. A minimum of two people are required.
- 3.10 Silt, leaves and debris should be cleared from the channel outlets during each inspection.

Surface Water Treatment (Figure 1- Ref D)

- 3.11 Catchpit manholes and trapped gullies and kerb drain trapped outlets are located upstream of the petrol interceptor to prolong its life and optimise maintenance visits.
- 3.12 Equipment required for inspection includes, moveable barriers and cones to guard openings, manhole keys, gloves, wire ties and cutters and a torch. A minimum of two people are required.
- 3.13 Staff should have appropriate training for these inspections as they involve specialist products. It is recommended that initial training is provided by manufacturers of this equipment.
- 3.19 The Petrol Interceptor is alarmed and has a silt trap and a treatment Coalescer. It is a SPEL ESR 25-C1 unit and shall be maintained and re commissioned strictly as required by the supplier, see Appendix A for details. Maintenance is required when the alarm is activated.

Cellular Attenuation Tank (Figure 1 - E)

- 3.14 The cellular crates are protected by the upstream catchpit manholes. The catchpit manhole adjacent to the crates will allow inspection of the perforated pipe within the attenuation tank. The perforated pipe should be examined when the catchpits are inspected, on a monthly basis. The perforated pipe should also be inspected after every major storm. If there is any evidence of silt within the perforated pipe, jetting can be performed and any silt should be washed into the catchpit manhole, where it can be emptied.
- 3.15 Jetting requires specialist equipment and should be carried out by specialist contractors to ensure that damage to the crate storage is avoided. Provided the catchpit manholes are emptied appropriately, jetting should not be required. See also the manufacturer's guidelines in Appendix B and guidance in Table 1.

Table 1 - Operation and maintenance requirements for infiltration geo-cellular tanks.

Maintenance schedule	Required action	Recommended Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for three months then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae, or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlets, overflows, and vents	As required
Monitoring	Inspect/check all inlets, outlets, overflows, and vents 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 five years or as required

Grease Trap (Figure 1 - F)

- 3.16 The Grease Trap should be inspected on a monthly basis, by lifting the inspection cover. Any signs of a malfunction or blockage should be reported immediately to the external specialist maintenance company.
- 3.17 The Grease Trap has an alarm hard wired into the Store Manager's office with a visual and audible warning system. If the alarm is triggered the external specialist maintenance company should be called out immediately. See also the manufacturer's guidelines in Appendix C.

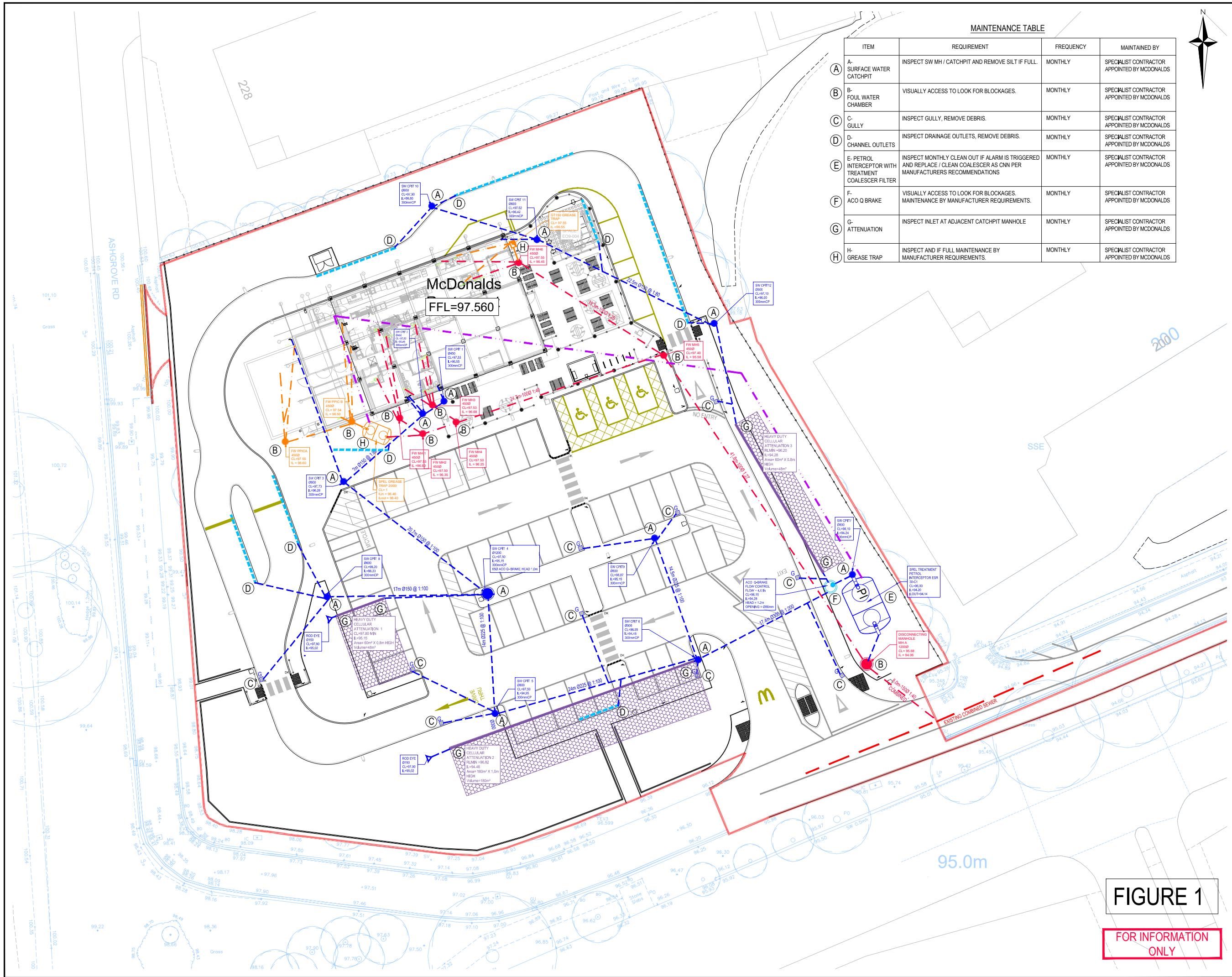
Flow Control (Figure 1 - H)

- 3.18 An orifice plate is present at position H. this should be inspected monthly to look for debris blocking the outlet. Details are shown in Appendix A

4.0 Drainage Inspection and Maintenance Records

- 4.1 Appendix D includes the annual drainage record log sheet, master copy. Copies should be taken of the master log sheet, for use for each year's drainage inspection records. Each inspection should be recorded on the log sheet for that year by the store manager. The log sheet shall be kept with this maintenance plan in the store manager's office for inspection.

Figure



MAINTENANCE TABLE

ITEM	REQUIREMENT	FREQUENCY	MAINTAINED BY
(A) SURFACE WATER CATCHPIT	INSPECT SW MH / CATCHPIT AND REMOVE SILT IF FULL.	MONTHLY	SPECIALIST CONTRACTOR APPOINTED BY MCDONALDS
(B) FOUL WATER CHAMBER	VISUALLY ACCESS TO LOOK FOR BLOCKAGES.	MONTHLY	SPECIALIST CONTRACTOR APPOINTED BY MCDONALDS
(C) GULLY	INSPECT GULLY, REMOVE DEBRIS.	MONTHLY	SPECIALIST CONTRACTOR APPOINTED BY MCDONALDS
(D) CHANNEL OUTLETS	INSPECT DRAINAGE OUTLETS, REMOVE DEBRIS.	MONTHLY	SPECIALIST CONTRACTOR APPOINTED BY MCDONALDS
(E) PETROL INTERCEPTOR WITH TREATMENT COALESCER FILTER	INSPECT MONTHLY CLEAN OUT IF ALARM IS TRIGGERED AND REPLACE / CLEAN COALESCER AS CNN PER MANUFACTURERS RECOMMENDATIONS	MONTHLY	SPECIALIST CONTRACTOR APPOINTED BY MCDONALDS
(F) ACO Q BRAKE	VISUALLY ACCESS TO LOOK FOR BLOCKAGES. MAINTENANCE BY MANUFACTURER REQUIREMENTS.	MONTHLY	SPECIALIST CONTRACTOR APPOINTED BY MCDONALDS
(G) ATTENUATION	INSPECT INLET AT ADJACENT CATCHPIT MANHOLE	MONTHLY	SPECIALIST CONTRACTOR APPOINTED BY MCDONALDS
(H) GREASE TRAP	INSPECT AND IF FULL MAINTENANCE BY MANUFACTURER REQUIREMENTS.	MONTHLY	SPECIALIST CONTRACTOR APPOINTED BY MCDONALDS



- NOTES**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS, DOCUMENTS AND SPECIFICATIONS. ANY DISCREPANCIES BETWEEN INFORMATION SHOWN ON THIS AND ANY OTHER DRAWING SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY.
 - DO NOT SCALE FROM THIS DRAWING. WORK TO FIGURED DIMENSIONS ONLY.
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 - PROPOSED DRAWING BASED ON SCURR SITE LAYOUT PLAN AS PROPOSED [B268-SA-8883-P004B].
 - ALL DRAINAGE TO BE INSTALLED TO BUILDING REGULATIONS PART H AND/ OR SCOTTISH BUILDING REGULATIONS.
 - ALL DRAINAGE TO BS8582.
 - BUILDING INSPECTOR TO INSPECT ALL FOUL DRAINAGE INSTALLATION.
 - ALL DRAINAGE ALARM SYSTEMS COVERING GREASE TRAPS AND TREATMENT UNITS MUST BE INSTALLED, CONNECTED AND COMMISSIONED BY THE GROUNDWORK CONTRACTOR PRIOR TO PRACTICAL HANDOVER OF THE STORE TO MCDONALDS.

KEY

- SITE BOUNDARY
- TOPOGRAPHICAL SURVEY
- PROPOSED SITE LAYOUT
- SW CPIT 6000 CL=105.05 IL=103.90 300mmCP
- SCPIT=CATCHPIT 300mm SUMP
- PROPOSED GULLY WITH 1500 PIPE
- PROPOSED SURFACE WATER DRAINAGE PIPEWORK SHOWING LENGTH, PIPE DIAMETER AND GRADE
- PROPOSED BUILDING SURFACE WATER PPIC CATCHPIT MANHOLE WITH 300mm SUMP
- PROPOSED RAINWATER DOWN PIPE INVERT 500mm BELOW PROPOSED EXTERNAL LEVEL (ALL OUTLETS 1000 & TO HAVE ROOFING ACCESS UNLESS OTHERWISE INDICATED)
- ACO MONO DRAIN PD1000 U.N.O 10.0 DRAINAGE CHANNEL (BLACK)
- SPEL TREATMENT PETROL INTERCEPTOR ESR 30-C1
- PROPOSED FOUL WATER DRAINAGE PIPEWORK SHOWING LENGTH, PIPE DIAMETER AND GRADE
- PROPOSED BUILDING FOUL WATER DRAINAGE INSPECTION CHAMBER
- PROPOSED GREASE WATER DRAINAGE PIPEWORK SHOWING LENGTH, PIPE DIAMETER AND GRADE
- PROPOSED BUILDING GREASE WATER DRAINAGE INSPECTION CHAMBER
- ALARMED 2000 SPEL GREASE TRAP WITH HARD WIRE TO MANAGERS OFFICE
- CLEARFLOW GT150 GREASE TRAP
- 1100 DUCTS FOR GREASE TRAP/ CABLES TO INCOMING ELECTRICS CUFBORD (MUST BE INSTALLED, CONNECTED AND COMMISSIONED BY THE GROUNDWORK CONTRACTOR PRIOR TO PRACTICAL HANDOVER)
- IMPERMEABLE HEAVY DUTY CELLULAR STORAGE SDS 400 OR SIMILAR APPROVED
- RAINWATER PIPE
- SOIL VENT PIPE (WC)
- STUB STACK PIPE (DP)
- CONTROL CHAMBER - ACO Q BRAKE FLOW CONTROL 4 I/s
- EXISTING COMBINED SEWER

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FIGURE 1

FOR INFORMATION ONLY

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Project: **MCDONALD'S RESTAURANT
ABERDEEN, ASHGROVE ROAD**

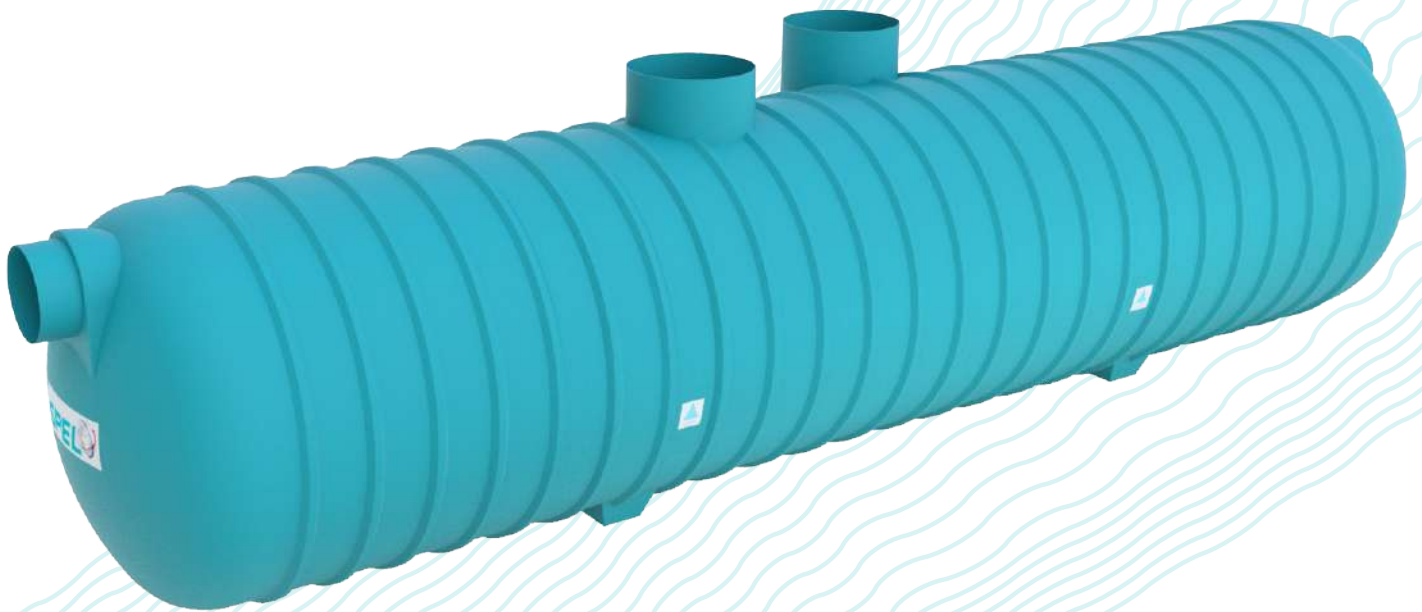
Title: **DRAINAGE MAINTENANCE PLAN**

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Project Director: HBG Date: APR '22
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Appendices

Appendix A:
Surface Water Treatment & Flow Control



SPEL Stormceptor

ESR (Enhanced Silt Retention)

SuDS Compliant ESR Range

spelproducts.co.uk

SPEL Stormceptor ESR Range

By-Pass System

The **total** treatment solution for SuDS

The new SPEL ESR System is fully certified to meet the CIRIA SuDS Mitigation Index. It has been tested by WRc (for TSS and Metals) to the British Water Code of Practice for Manufactured Treatment Devices. This unit is also compliant to the British and European Standard BS EN 858.

SPEL's ESR range is a total treatment system removing Hydrocarbons, Total Suspended Solids (TSS) and Metals (particulate). It's a highly efficient, single unit, water quality SuDS component.

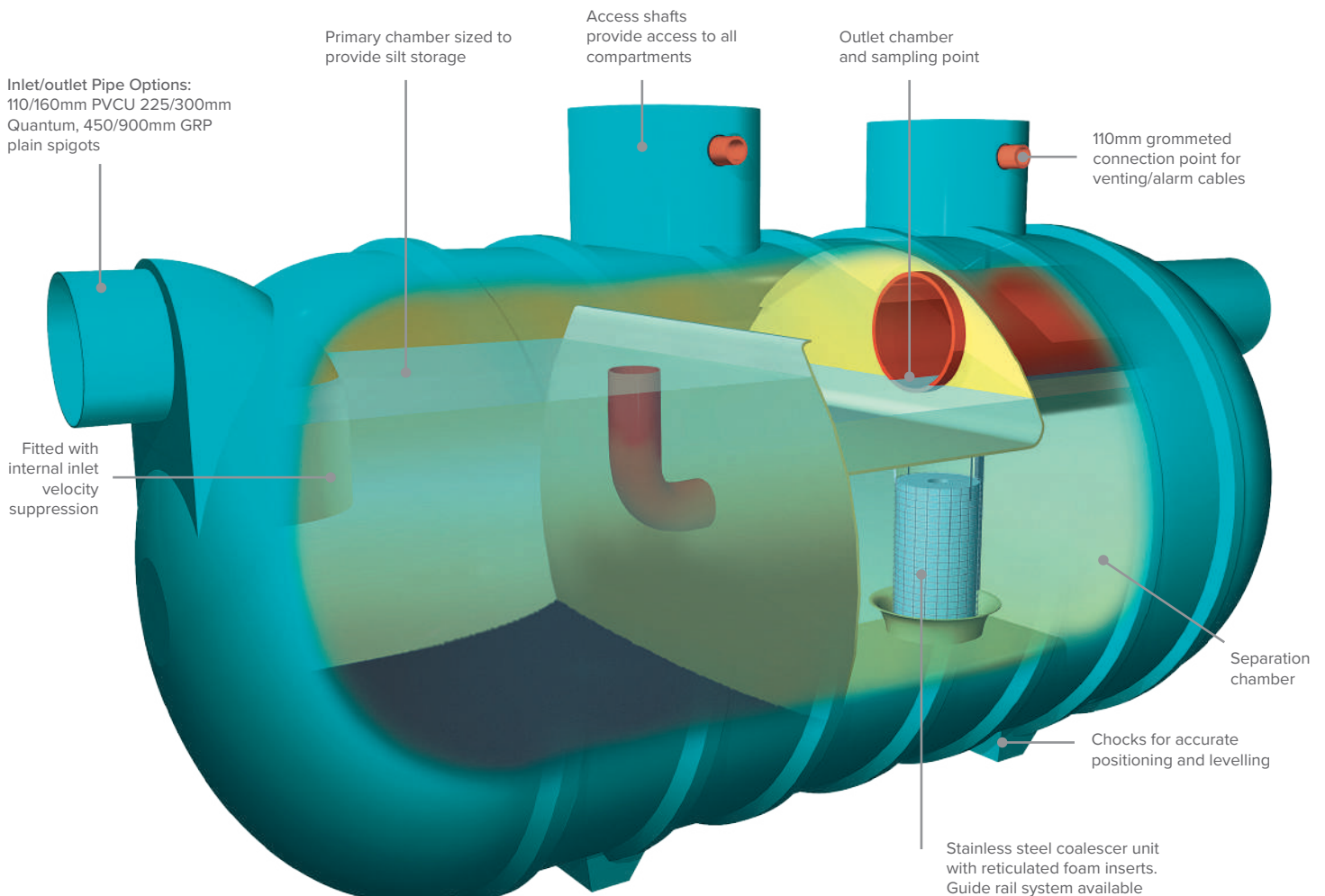
SPEL ESR Stormceptor Certified Mitigation Index

TSS 0.8

Metals 0.6

Hydrocarbons 0.9*

*H R Wallingford test results to BS EN 858



SPEL Stormceptor ESR Range By-Pass System



Surface Water Treatment Device Performance Declaration

Testing carried out according to British Water Code of Practice

Product Details	Description
Manufacturer	SPEL Products
Treatment Device Name/Model	Stormceptor Type 210 C1/SC
General description	Class 1 By-pass Separator with Silt Capacity
Envisaged application	Treatment of Surface Water Run-off
Pollutant(s) captured	Suspended Solids

Test	Value	Unit
Treatment device capacity	3200	litres
Sediment Storage capacity	1000	litres
Treatment Flow rate	10	l/s
Connected Area	1,333	m ²
Pollution retention flow rate	10	l/s

Parameter	Value	Unit
Maximum capacity flow rate	100	l/s
Device head loss (at treatment flowrate)	0.15	m
Device head loss (at maximum capacity treatment flowrate)	-	m
TSS capture and retention efficiency (Milisil W4 test sediment)	82	%
Zinc capture efficiency (if tested)	Not tested for dissolved metals	%
Zinc retention efficiency (if tested)	Not tested for dissolved metals	%
Copper capture efficiency (if tested)	Not tested for dissolved metals	%
Copper retention efficiency (if tested)	Not tested for dissolved metals	%
Dissolved Metals reduction	0.0	%
Particulate metals reduction*	61.5*	%
Total Metals reduction*	61.5*	%
Total Metals Mitigation Index	0.615*	-

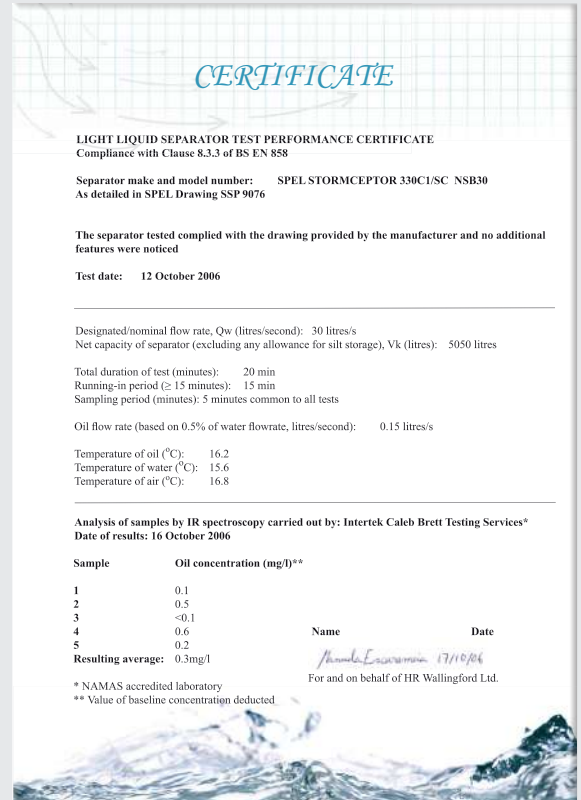
* Extrapolated value in accordance with British Water How to Guide: Applying the CIRIA The SuDS Manual (C753) Simple Index Approach to Proprietary / Manufactured Stormwater Treatment Devices. Version 7, Section 4.3, (2021- under pre-publication review).

Research and Development

Research and development is at the heart of what we do at SPEL, our passion as Zero Pollution Ambassadors is to be at the cutting edge of clean surface water technology.

Months of rigorous testing has resulted in the new SPEL Stormceptor ESR Range.

Certificates of compliance from WRC and HR Wallingford for the SPEL Stormceptor ESR Range



SPEL's Head of Technical Development alongside the WRC testing officer.

Quality Assured Company
BS EN ISO 9001
Design & Manufacture



Protecting our environment for over 45 years

The SuDS Manual is leading good practise in drainage design, SPEL are endorsing this with the release of the new SPEL Stormceptor ESR range.

Total Suspended Solids (TSS)	Metals	Hydrocarbons
0.8	0.6	0.9*

*H R Wallingford test results to BS EN 858

Added to these class-leading Mitigation Indices, the ESR range benefits from:

- British/European Standard BS EN 858-1 2002 certification.
- The SPEL 25 year shell Warranty.
- 50 year+ life expectancy.
- ISO9001 quality assurance.
- ISO14001 committed to environmental improvement

26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

26.3 Indicative SuDS mitigation indices for discharges to surface waters

Type of SuDS component	Mitigation Indices		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond ⁴	0.7 ³	0.7	0.5
Wetland	0.8 ³	0.8	0.8
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Tables from The SuDS Manual (C753), p568-569

For reference notes, please see the full manual: https://www.ciria.org/Memberships/The_SuDs_Manual_C753_Chapters.aspx

SPEL Stormceptor ESR Range By-Pass System

ESR Specification Chart

Model	Series	Treated Flow Rate - l/s	Maximum Flow	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)			
													600	750	900	1200
ESR10/C1	200	10	100	1,333	150	1,000	2,920	1,225	560	1,350	1,300	300	-	1	-	-
ESR15/C1	200	15	150	2,000	225	1,500	4,237	1,225	560	1,350	1,300	300	-	1	-	-
ESR20/C1	300	20	200	2,665	300	2,000	3,200	1,875	700	1,450	1,350	450	2	-	-	-
ESR25/C1	300	25	250	3,333	375	2,500	3,540	1,875	700	1,450	1,350	450	2	-	-	-
ESR30/C1	300	30	300	4,000	450	3,000	4,420	1,875	700	1,450	1,350	450	-	1	1	-
ESR40/C1	300	40	400	5,333	600	4,000	5,760	1,875	740	1,410	1,310	450	1	1	-	-
ESR45/C1	300	45	450	6,000	675	4,500	6,570	1,875	740	1,410	1,310	450	1	1	-	-
ESR50/C1	300	50	500	6,665	750	5,000	7,060	1,875	740	1,410	1,310	450	1	1	-	-
ESR60/C1	400	60	600	8,000	900	6,000	4,400	2,700	950	2,100	2,000	600	1	-	1	-
ESR70/C1	400	70	700	9,333	1,050	7,000	5,250	2,700	950	2,100	2,000	600	1	-	1	-
ESR80/C1	400	80	800	10,665	1,200	8,000	6,170	2,700	950	2,100	2,000	600	1	-	1	-
ESR100/C1	400	100	1000	13,333	1,500	10,000	7,400	2,700	1,100	1,950	1,850	750	1	-	1	-
ESR125/C1	400	125	1250	16,665	1,875	12,500	9,050	2,700	1,100	1,950	1,850	750	1	-	1	-
ESR150/C1	400	150	1500	20,000	2,250	15,000	9,950	2,700	1,100	1,950	1,850	750	-	-	2	-
ESR160/C1	400	160	1600	21,333	2,400	16,000	11,830	2,700	1,250	1,800	1,700	750	1	1	1	-
ESR180/C1	500	180	1800	24,000	2,700	18,000	7,470	3,650	1,185	2,690	2,550	900	-	-	-	-
ESR200/C1	500	200	2000	26,665	3,000	20,000	8,530	3,650	1,185	2,690	2,355	1,200	-	-	-	-
ESR250/C1	500	250	2500	33,333	3,750	25,000	10,040	3,650	1,185	2,690	2,355	1,200	-	-	-	-
ESR300/C1	600	300	3000	40,000	4,500	30,000	10,310	4,150	1,325	2,850	2,675	1,200	-	-	-	-
ESR350/C1	600	350	3500	46,665	5,250	35,000	11,470	4,150	1,325	2,850	2,675	1,200	-	-	-	-
ESR400/C1	600	400	4000	53,333	6,000	40,000	12,690	4,150	1,325	2,850	2,675	1,200	-	-	-	-
ESR500/C1	600	500	5000	66,665	7,500	50,000	15,870	4,150	1,325	2,850	2,675	1,200	-	-	-	-
ESR600/C1	600	600	6000	80,000	9,000	60,000	18,260	4,150	1,325	2,850	2,675	1,200	-	-	-	-
ESR700/C1	600	700	7000	93,333	10,500	70,000	22,250	4,150	2,850	2,850	2,675	1,200	-	-	-	-

*These catchment areas are based on the SuDS Manual requirement for By-Pass devices to treat the 1 in 1 year storm event (27mm).

**This dimension is for A-C inlet/outlet options, larger pipe sizes are available for D-I inlet/outlet options.

200 Series ESR – Inside diameter 1200mm, outside diameter 1225mm.

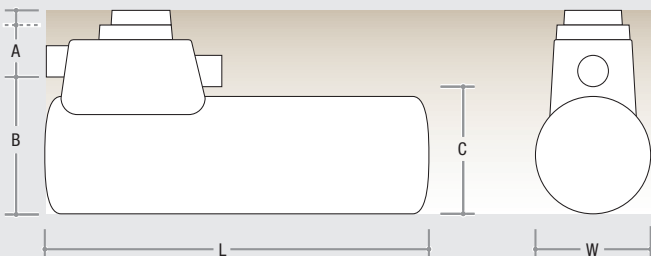
300 series ESR – Inside diameter 1800mm, outside diameter 1875mm.

400 series ESR – Inside diameter 2600mm, outside diameter 2700mm.

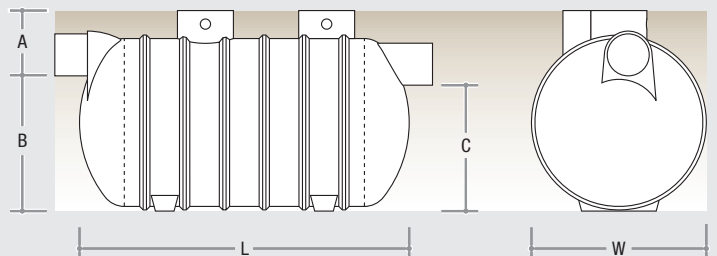
500 series ESR – Inside diameter 3500mm, outside diameter 3650mm.

600 series ESR – Inside diameter 4000mm, outside diameter 4150mm.

200 series



300/400/500 & 600 series



Optional extras

SPEL coalescer unit guide rail systems

To facilitate easy insertion of coalescer units, the SPEL guide rail system manufactured in stainless steel can be incorporated into SPEL Puraceptors and class 1 Stormceptors.

Brackets fixed to the top and bottom of the coalescer unit simply engage the stainless steel guide rail fixed to the top of the stub access shaft. The coalescer unit is then lowered in the normal way, being guided at the correct angle into the conical base.

Lifting chains are available for the larger coalescer units and where extension shafts are fitted.

Extension guide rails can be incorporated into SPEL extension shafts to suit.



Above left: Lifting, locating and locking system with guide rail system.

Above right: The SPEL coalescer unit with lifting chain.

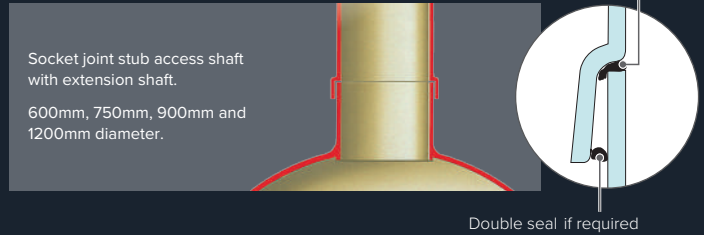
SPEL coalescer unit lifting, locating and locking system

The SPEL lifting, locating and locking system is manufactured in stainless steel and replaces the standard coalescer unit handle.

The locating/locking handle ensures the coalescer unit is seated and locked in its correct position after maintenance.

SPEL extension access shafts

Extension access shafts are available for deep invert applications.



Tank shell specifications

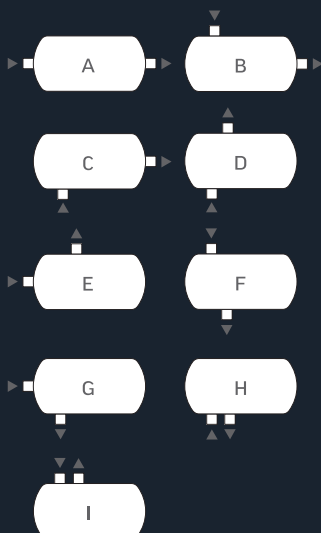
The 'standard' specification is normally adequate for most installations but heavier specifications are available depending upon the burial depth and water table level, in winter. The concern is when the system is emptied completely and remains empty for a period of time.

Standard tanks			Heavy tanks		
Series	WT (m)	D (m)	Series	WT (m)	D (m)
100/200	1.0	4.0	100/200	2.0	6.0
300	0.9	4.0	300	2.8	5.6
400	1.3	5.0	400	3.5	6.0
500	1.9	5.7	500	4.5	7.25
600	2.4	6.2	600	4.7	7.3

Based on installation in concrete with concrete surround
For pea gravel surround, see SPEL Data Manual p13.5

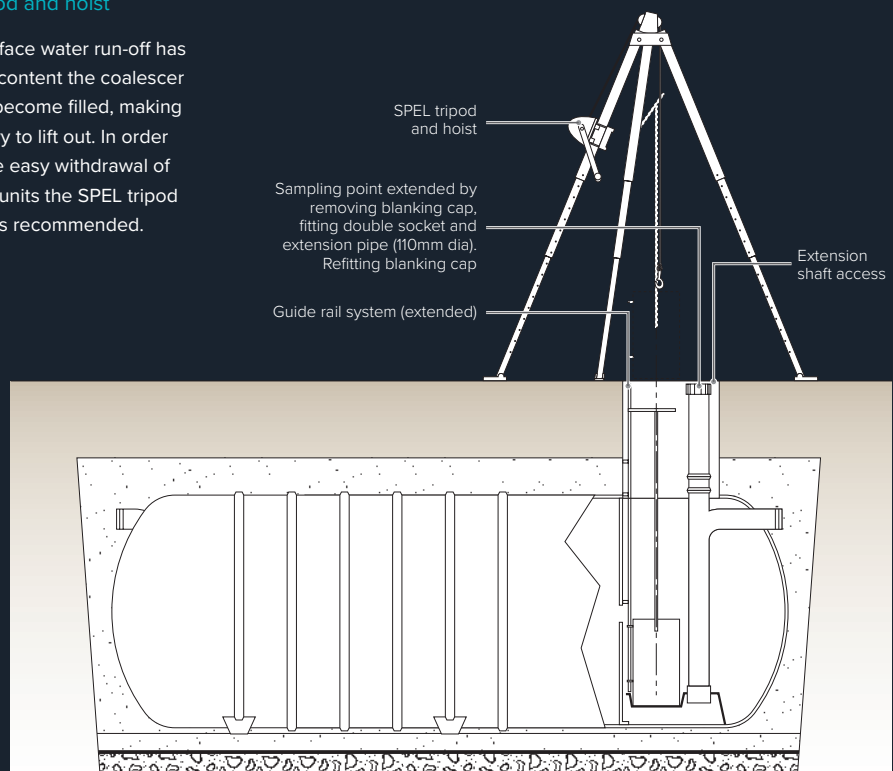
SPEL ESR Range – Inlet/outlet orientation

Dependent upon model and diameter of connections, these nine different orientations are available. However on the larger models it is important to check with our technical department.



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 and hoist is recommended.



SPEL

Quality that protects the environment the **safest way**



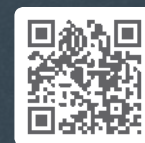
The SPEL underground tanks have been designed with reference to BS EN 13121

SPEL Tank shells carry a 25 year Warranty and have a life expectancy of over 50 years

Rigorous quality control procedures at all stages of manufacture for each serial numbered tank, ISO 9001.

SPEL is an environmentally accredited company to ISO 14001.

Certificate No: FM 35174 UVDB/Achilles accredited – Supplier No. 88611.



Scan code with a QR reader to launch our website: spelproducts.co.uk

#ZeroPollutionAmbassadors

SPEL 10/21

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Uniclass JR12/JR23 L731	
Cl/SfB (52.7)	

ACO Water Management: Civils + Infrastructure



Surface Water Flow Control Systems

ACO Q-Brake Vortex and ACO Q-Plate



Introduction to the ACO Group

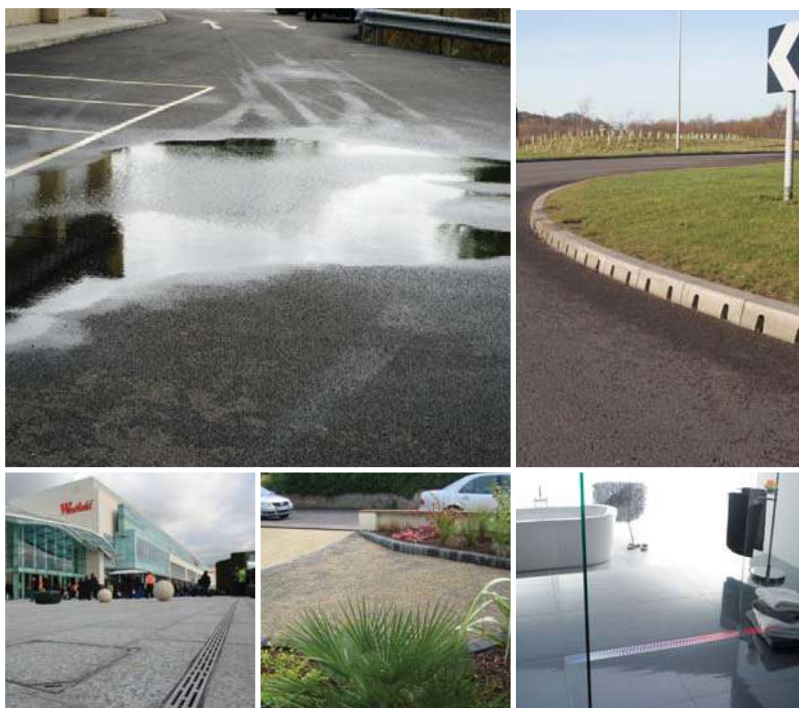
Throughout the world ACO branded drainage and surface water management systems are recognised for their innovative design, high quality manufacture, environmental excellence and industry leading performance.

Today the ACO Group has a research and production base that reaches across four continents. This unmatched resource pioneers the development of solutions that are tailored to individual applications, meeting the need for high performance, sustainable products that deliver optimum value throughout their operational life.

ACO Technologies plc

ACO operates as ACO Technologies plc in the United Kingdom. Founded over 25 years ago, the company has grown quickly on a reputation for design innovation and customer service.

There are 2 core divisions, ACO Water Management and ACO Building Drainage, that serve every sector of the construction industry, providing solutions for applications as diverse as rail, highways, airports, landscaping, retail, distribution centres and environmentally sensitive projects.



To help architects, designers and contractors meet the legal requirements that now tightly control the way surface water is managed, ACO has created its unique 'Surface Water Management Cycle' – Collect, Clean, Hold, Release – the four core processes now required for the complete and sustainable management of surface water drainage.



Contents

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Benefits of using a surface water control system	6
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ACO Q-Brake Vortex features overview	8
ACO Q-Brake Vortex specification and design process	10
ACO Q-Brake Vortex Installation detail	11
Operation and maintenance recommendations	12
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Introduction to ACO Q Plate	14

Introduction to ACO's Surface Water Flow Control Systems

ACO's range of flow control systems are designed to regulate storm water flow before it discharges into the watercourse or sewer networks. ACO Q-Brake Vortex flow controls and ACO Q-Plate orifice plates are capable of regulating any flow for surface water applications and can be used in conjunction with retention and attenuation systems, such as ACO StormBrixx, as an integrated sustainable urban drainage (SuDS) scheme.

What is ACO Q-Brake Vortex?

ACO Q-Brake Vortex is a horizontal vortex flow control designed to regulate storm water flows from 1-100 litres per second. Manufactured from grade 304 stainless steel, each ACO Q-Brake Vortex is individually configured to suit specific performance criteria.

The design of a vortex flow control is based on the fluid mechanics principle of the forced vortex, which permits flow regulation without any moving parts.

ACO Q-Brake Vortex utilises the upstream head and discharge to generate a 'vortex' within the structure of the unit. The water is then released at a pre-determined controlled rate preventing downstream flooding.

Unlike more conventional methods, ACO Q-Brake Vortex is less prone to blockage, and permits higher flow at a lower head of water, as a vortex control allows an outlet 4-6 times larger in cross sectional area to be used.

ACO Q-Brake Vortex can form part of the design of any integrated drainage scheme for a wide range of infrastructure, industrial and other SuDS applications.



What is ACO Q-Plate?

ACO Q-Plate orifice plates are designed for use where an ACO Q-Brake vortex is not the most effective solution.

To suit application requirements, the range is available with or without remote bypass and drain down and is designed to match a variety of manhole configurations.

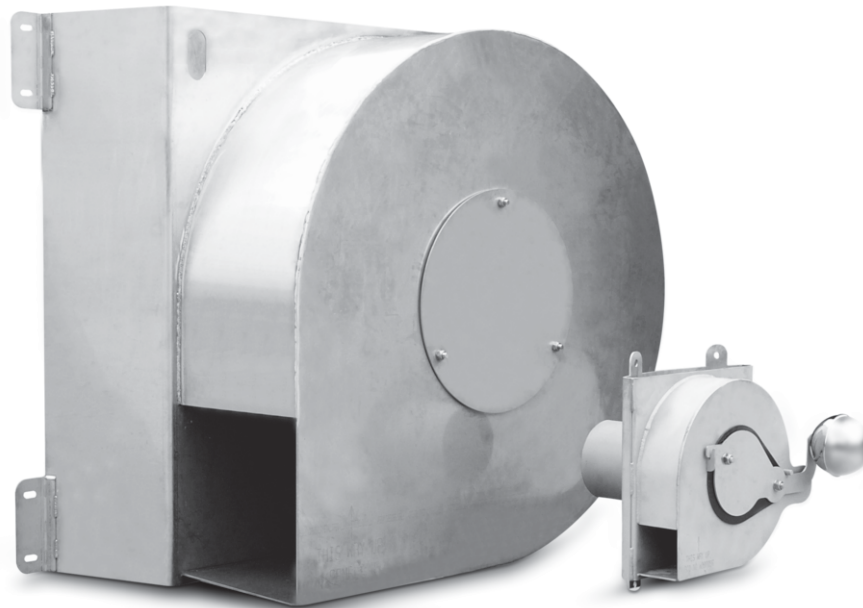
Information regarding the specification of ACO Q-Plates can be found on page 14.



ACO Q-Plates with and without draindown



Why choose ACO Q-Brake Vortex?



▶ Planning and connection

ACO Q-Brake Vortex addresses the planning and connection requirements set out in the Floods and Water Management Act. Where a discharge restriction is in place, ACO Q-Brake Vortex regulates the surface water flow to the specified rate.

▶ Tailored performance

Each ACO Q-Brake Vortex is tailored to the specific performance requirements of the application providing optimum efficiency within the system.

▶ Optimum hydraulic efficiency

The mechanism employed within ACO Q-Brake Vortex provides superior hydraulic performance in comparison to traditional flow control systems.

▶ Water Authority Approval

ACO Q-Brake Vortex has been approved for use by a number of water authorities including Severn Trent, Anglian and Scottish Water.

▶ Proven performance

ACO Q-Brake Vortex is UK manufactured and has been independently laboratory tested to verified discharge rates.

▶ Simplified access and maintenance

ACO Q-Brake Vortex has large clear openings making it less prone to blockage. The absence of any loose parts also reduces maintenance requirements.

The patented bypass door and emergency drain down facility allows ACO Q-Brake Vortex to be remotely accessed from the surface to allow the upstream system to be independently drained, completely bypassing the inlet. Building Regulations 2000 Section H discourages direct man access to sewer manholes.

▶ Reduces total installed cost

ACO Q-Brake Vortex allows more flow at lower heads, reducing the need for on-site storage volume requirements lowering installation costs.

▶ Ease of installation

Each ACO Q-Brake Vortex unit is custom built to suit the profile of the chamber. Radius fixing options remove the need for additional benching - simplifying installation and reducing cost.

▶ WinDes

ACO Q-Brake Vortex can be sized and modelled on the latest version of the design software and can be incorporated into the overall hydraulic drainage design.



Benefits of using a surface water flow control system

Storage and the controlled release of clean water into the natural environment is an important aspect of managing surface water in the SuDS approach. The Floods and Water Management Act now gives overall responsibility to the local regulatory body to impose, where appropriate, the discharge rate of a surface water flow control system.

ACO's range of flow control systems can be used in conjunction with ACO's award-winning attenuation and infiltration system, ACO StormBrixx, to provide a fully integrated storm water control system meeting the requirements of the regulations.

This diagram simulates how the ACO StormBrixx system is used to provide storm water attenuation, whilst the ACO Q-Brake Vortex is used to regulate the rate of discharge from the development into the watercourse or sewer network.

Compared to the use of traditional flow control systems, the combination of ACO StormBrixx and ACO Q-Brake Vortex can reduce the need for additional upstream storage lowering overall installation and maintenance costs.

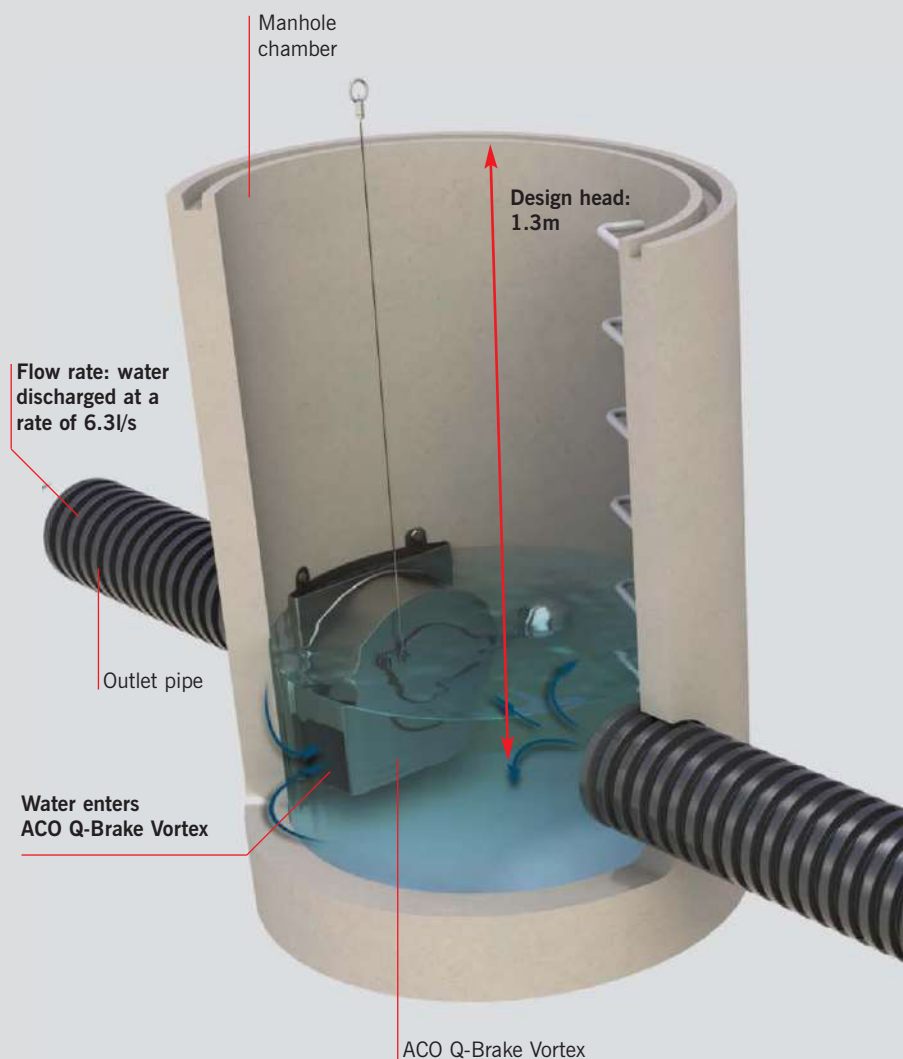
This benefit is best demonstrated in the example opposite. The conclusion of the example means that upstream storage can be reduced by 11m³ compared to using a traditional flow control system.



For more information on ACO's award winning attenuation and infiltration system, ACO StormBrixx, please go to www.stormbrixx.co.uk.

Example:

There is a project in Bedford, England with a catchment area of 13,000m². The project has design criteria of a 1 in 30 year storm and the runoff from the site must not exceed 6.3l/s at a design head of 1.3m.

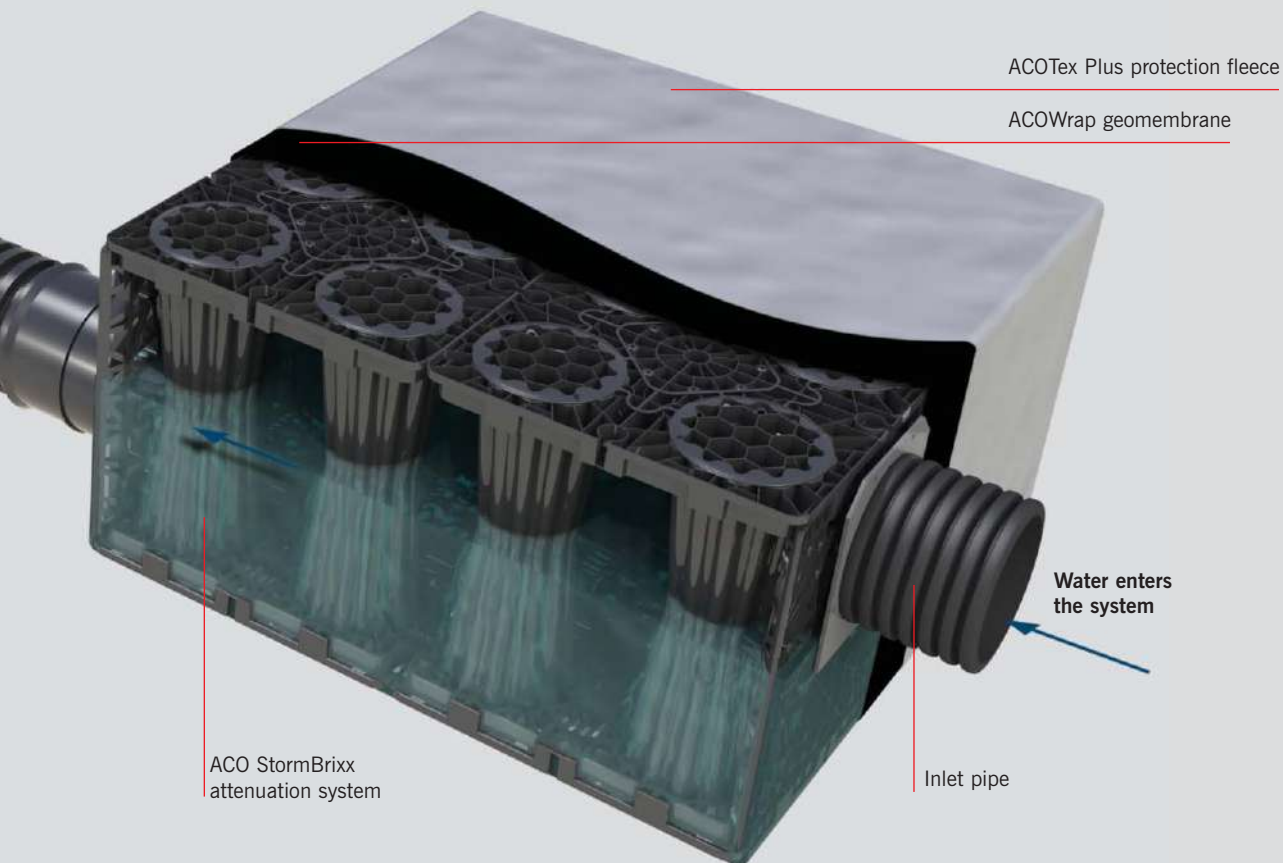
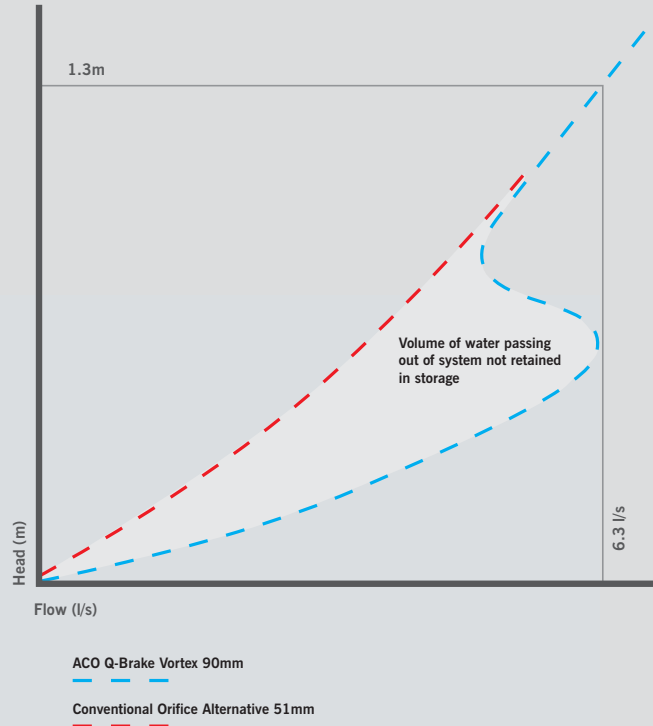


Results:

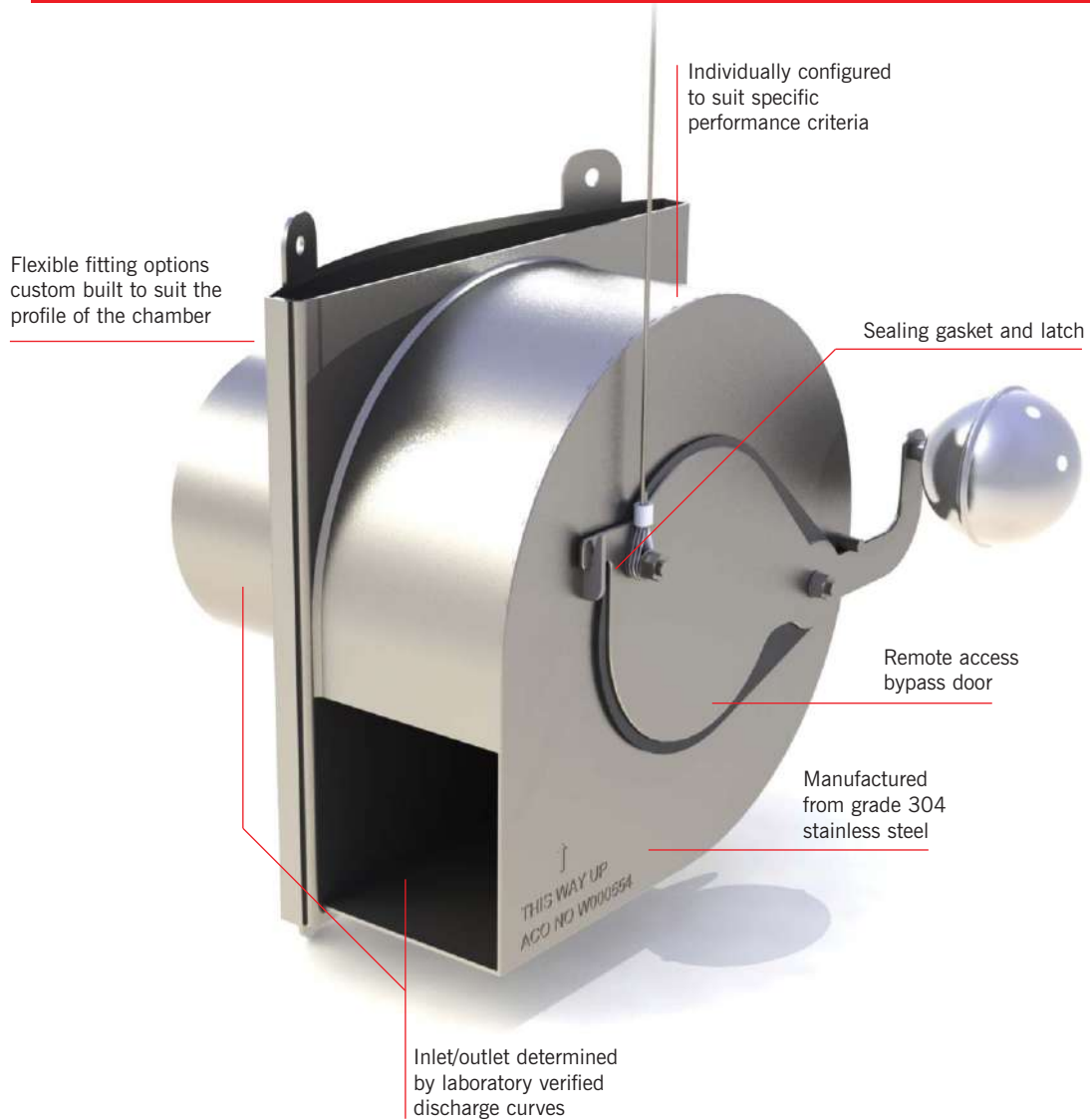
Using MicroDrainage® software, ACO has compared the upstream storage requirements using ACO Q-Brake Vortex and a traditional orifice plate. The results are summarised below:

- ▶ ACO Q-Brake Vortex required $\varnothing 90\text{mm}$. Upstream attenuation required 402m^3 .
- ▶ Orifice plate size required $\varnothing 51\text{mm}$. Upstream attenuation required 413m^3 . ACO Q-Brake Vortex reduces upstream attenuation by 11m^3 whilst having an orifice over three times the area of the traditional orifice plate and making ACO Q-Brake Vortex more efficient and far less prone to blockage.

Discharge characteristics

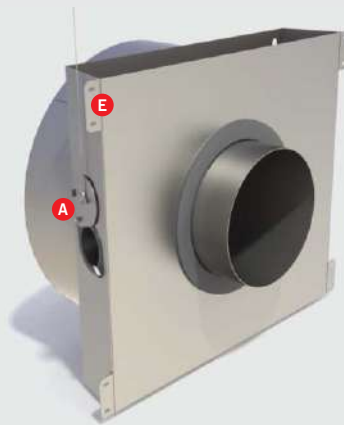


ACO Q-BRAKE FLOW CONTROL FEATURES OVERVIEW



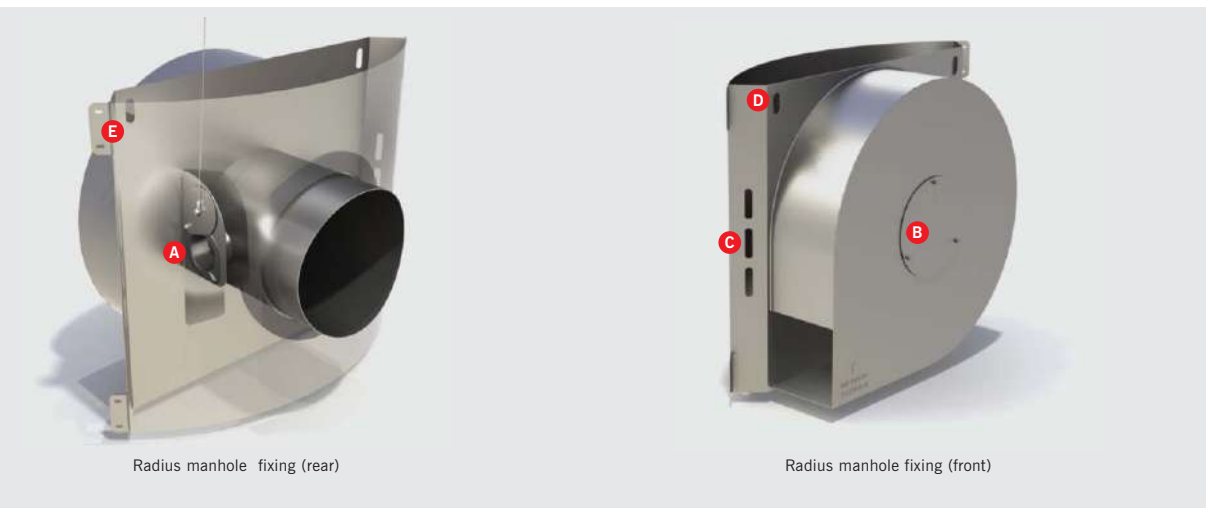
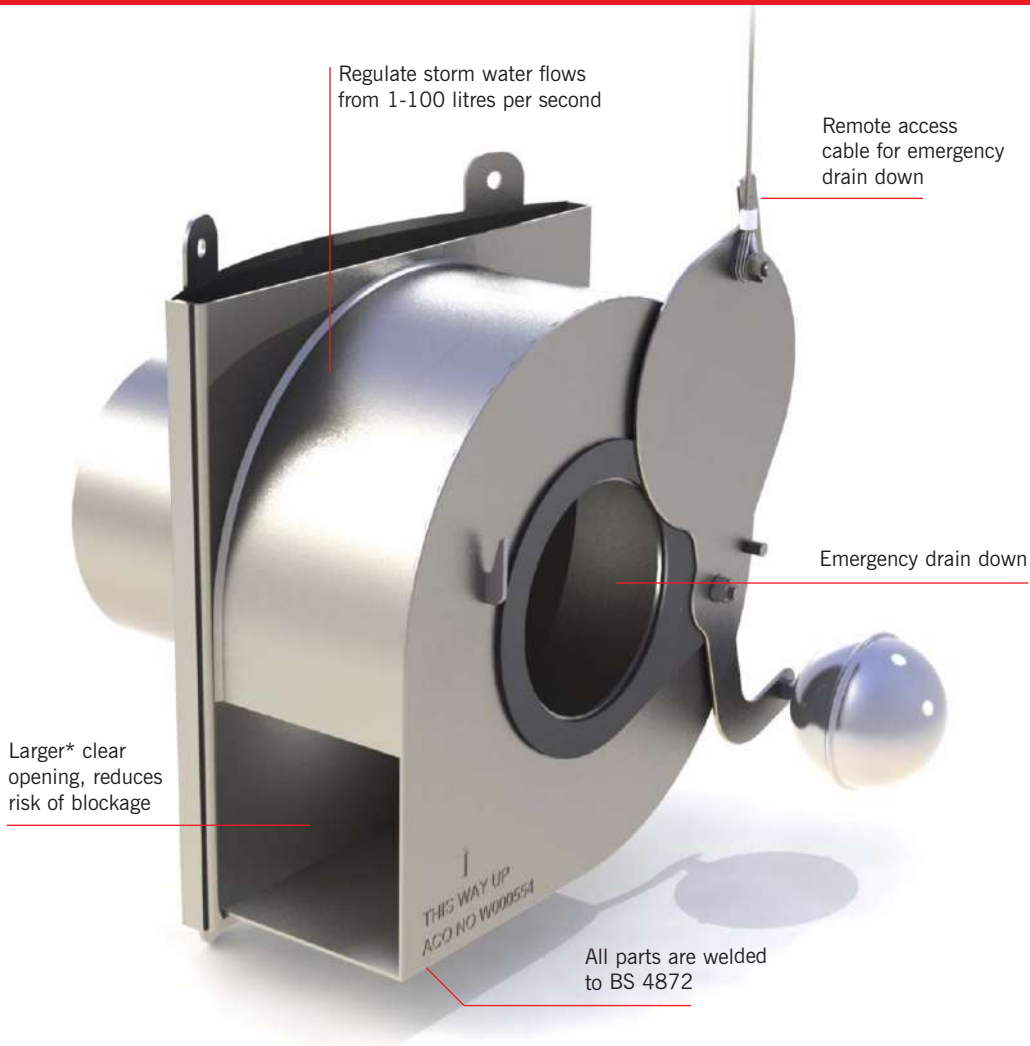
Additional and varying features for ACO Q-Brake Vortex >40l/s

- A** Remote access bypass door and emergency draindown. Located in a different position to ACO Q-Brake Vortex units <40l/s
- B** Removable maintenance cover
- C** Side vents to aid draindown on units with radius fixing
- D** Lifting eyes
- E** Fixing locators



Square manhole fixing (rear)

*Larger than traditional orifice plates



ACO Q-Brake Vortex specification and design process

Manufactured from grade 304 stainless steel, each ACO Q-Brake Vortex is individually configured to suit specific performance criteria. Our engineers will use industry standard drainage software and hydraulic design calculations to ensure the system is correctly sized for any project requirement.

In order to complete this process and deliver the product options available, please provide the ACO engineers with the following information:

- ▶ The proposed design flow – maximum allowable discharge
- ▶ The proposed design head – invert of outlet pipe to top water level
- ▶ The proposed outlet pipe diameter
- ▶ The proposed type and size of outlet manhole

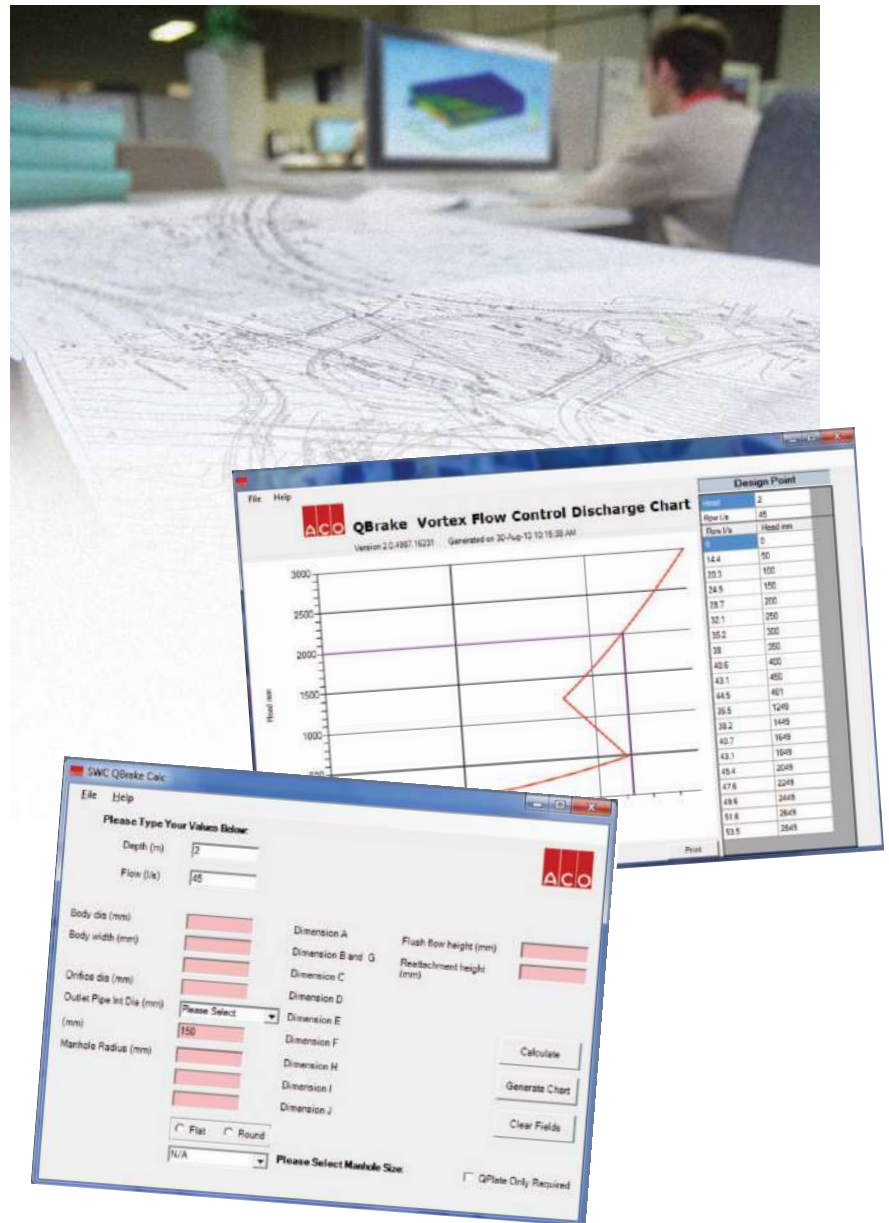
Before production can commence, ALL of the above information must be verified on ACO's Contract Review Document issued at the time of order placement.

Finished product

From this information ACO will size and design the ACO Q-Brake Vortex to meet the design criteria and to suit the proposed surface water application.

ACO will supply:

- ▶ Head discharge table & graph
- ▶ ACO Q-Brake Vortex installation details
- ▶ Information for manhole sizing



ACO Water Management Design Services Team

ACO has embraced the concept of 'value engineering' – a totally new approach to on-site construction that saves both time and money. ACO will review any design to minimise the total scheme and life cost of a proposal.

By utilising ACO's portfolio of products, it is often possible to remove the need for conventional underground drainage.

ACO Water Management Design Services Team

Tel: 01462 816666
Email: technical@aco.co.uk

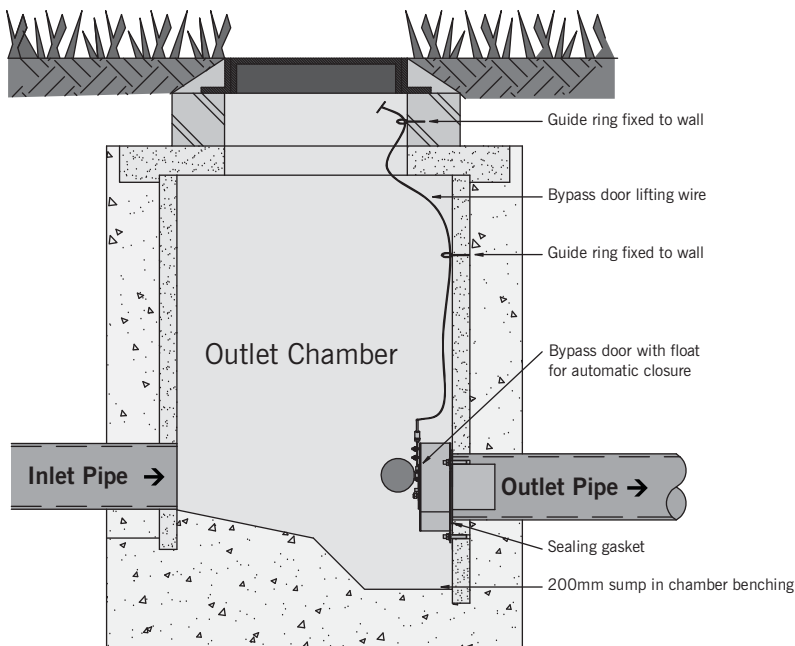


Micro Drainage Modelling

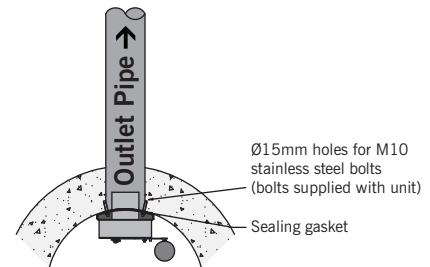
ACO Q-Brake Vortex can be sized and modelled on the latest version of Micro Drainage.



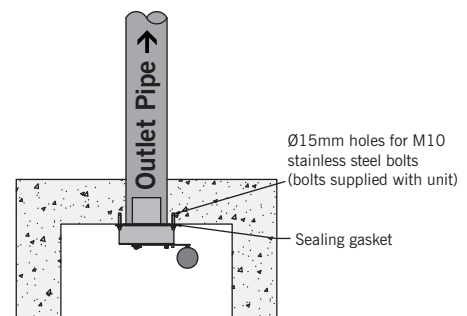
Installation detail



Fixing installation detail for round manhole chambers



Fixing installation detail for flat sided manhole chambers



Guide to installing ACQ Q-Brake Vortex flow control regulator

Step 1:

Construct the chamber that is to house the ACQ Q-Brake Vortex flow control. Note that if the chamber has a curved wall (e.g. a concrete ring manhole), the diameter of the chamber should be specified on the order and Contract Review Document for the ACQ Q-Brake Vortex flow control unit.

Step 2:

The base of the chamber must be at a level 200mm below the bottom of the ACQ Q-Brake Vortex flow control. When the chamber base is benched, there must be a 200mm deep sump below the bottom of the unit as shown on the sketch.

Step 3:

Offer the ACQ Q-Brake Vortex flow control unit up to the outlet pipe using the lifting eyes where appropriate. Ensure the unit is upright (arrow pointing vertically up). Mark the position of the fixing holes on the chamber wall. Remove the unit and drill fixing holes to suit the M10 bolts supplied with the unit. (Note bolts are Rawlbolt R-XPT-S stainless steel M10 bolts requiring a hole 15mm diameter).

Step 4:

Place bolts into the drilled holes. Locate the ACQ Q-Brake Vortex flow control onto the bolts (again check it is upright). Ensure that the gasket is flat against the wall. Fit the nuts and tighten them to pull the unit against the gasket and seal it against the wall.

Step 5:

Fix the two wire guide rings (supplied) to the chamber wall, one approx mid height and one just under the access cover. Thread the bypass door lifting wire through the rings. Adjust the length of the wire by fixing the handle in the correct position and cut to length if necessary.



An electronic version of the ACQ Q-Brake Vortex installation detail is available to download from the ACQ website. Visit www.aco.co.uk.

Operation and maintenance recommendations

Commissioning the product

Before the product is commissioned, the chamber containing the ACO Q-Brake Vortex should be inspected in line with normal practice. Any debris or silt should be removed. Any visible fixing bolts should be checked.

If an internal blockage is suspected, the control can be inspected internally and cleaned out by opening the inspection bypass door on the upstream end. The bypass door must be returned to the closed position before the control becomes operational or bolted shut.

Frequency of inspection / maintenance

Inspections should be carried out at frequent and regular intervals (approximately every 3-6 months). The frequency will depend upon the location and the environment, and should be based on local knowledge. Action is only required in the event of a blockage or suspected blockage.

Maintenance plan

ACO Q-Brake Vortex flow controls require no routine maintenance although inspections should be carried out at regular intervals (See frequency of inspection / maintenance section).

Manual handling

ACO Q-Brake Vortex flow controls should be handled in accordance with current legislation and regulations:

- The Health and Safety at Work Act 1974
- The Management of Health and Safety at Work Regulations 1999
- The Manual Handling Operations Regulations 1992

Service life

ACO Q-Brake Vortex flow controls have no moving parts to wear or fail. Manufactured from grade 304 stainless steel plate they will resist scour, degradation and chemical attack. The unit is designed to easily outlast the drainage system in which it is installed.

COSHH

ACO Q-Brake Vortex flow controls are manufactured from grade 304 stainless steel. This material is not regarded as hazardous to health and demonstrates no chemical hazard when used for the stated applications.

MODEL SPECIFICATION CLAUSE

The vortex flow control device shall be supplied by ACO Technologies plc; all materials and components within the scope of this system shall be obtained from this manufacturer.

All units shall be manufactured from grade 304 stainless steel incorporating rear mounted remote access bypass and emergency drain down door complete with stainless steel cable and fixings.

ACO Q-Brake Vortex is a vortex flow control device designed to suit a design head of #mm and design flow of # litres per second.

Insert information as appropriate

NBS Specification

ACO Q-Brake Vortex should be specified in section R12. Assistance in completing this clause can be found in the ACO Water Management entry in NBS Plus, or please contact the ACO Water Management Design Services Team.

Note: A specification in NBS format is available to download from www.thenbs.com or www.aco.co.uk

RECYCLED CONTENT

ACO Technologies aims to incorporate as much recycled material or waste material as is practicable in its manufactured products.



Typically steel products contain between 25% and 33% recycled content by weight. Therefore the total recycled content of the ACO Brake Vortex will contain be at minimum approximately 25% by weight recycled material.

ACO Q-Brake Vortex is intended for a long life with low maintenance, to reduce the need to recycle, but when eventually the product is no longer needed, much of its content can be readily recycled with a very low risk of pollution to the environment.



Product Testing

Through ACO's continual product development and refinement programme has led to an enhanced range of ACO Q-Brake Vortex flow controls. The range has been independently tested and complex software written to ensure that the best possible characteristics and curves are achieved to help reduce upstream storage requirements and installation costs.

What is ACO Q-Plate?

ACO Q-Plate orifice plates are designed for use where an ACO Q-Brake vortex is not the most effective solution. To suit application requirements, the range is available with or without remote bypass and drain down and is designed to match a variety of manhole configurations. A neoprene sealing gasket and fixing holes are featured on each unit.



ACO Q-Plate with remote draindown and bypass
recommended for all orifice apertures less than 100mm



ACO Q-Plate

ACO Q-Plate Bypass features

- ▶ Manufactured from 304 stainless steel
- ▶ Orifice aperture up to 150mm
- ▶ Sealing pipe gasket
- ▶ Emergency drain-down and access cable
- ▶ Bypass door (with improved seal) and latch
- ▶ Flat or curved radius to suit manhole diameter
- ▶ Manhole fixings

ACO Q-Plate features

- ▶ Manufactured from 304 stainless steel
- ▶ Four fixing positions
- ▶ Pipe sealing gasket
- ▶ Manhole fixings
- ▶ Flat or curved radius to suit manhole diameter

ACO Q-Plate Specification and design process

To suit project requirements, two options of ACO Q-plate are available:

ACO Q-Plate Bypass

< 100mm orifice with remote drain-down and bypass (also available up to 150mm)

ACO Q-Plate

> 100mm orifice without remote drain-down and bypass

In order to complete this process and deliver the product options available, please provide the ACO engineers with the following information:

- ▶ The proposed design flow – maximum allowable discharge
- ▶ The proposed design head – invert of outlet pipe to top water level
- ▶ The proposed outlet pipe diameter
- ▶ The proposed type and size of outlet manhole

Before production can commence, ALL of the above information must be verified on ACO's Contract Review Document issued at the time of order placement.

Finished product

From this information ACO will size and design the ACO Q-Plate to meet the design criteria and to suit the proposed surface water application.

ACO will supply:

- ▶ Head discharge table & graph
- ▶ ACO Q-Plate installation details
- ▶ Information for manhole sizing

Guide to installing an ACO Q-Plate

Step 1:

Construct the chamber that is to house the ACO Q-Plate orifice control. Note that if the chamber has a curved wall (e.g. a concrete ring manhole), the diameter of the chamber should be specified on the order and Contract Review Document for the ACO Q-Plate Orifice control unit.

Step 2:

There should be a small sump under the outlet to ensure the orifice control does not easily block, ideally there should be upstream sediment and debris traps. When the chamber base is benched, there should be a minimum 200mm deep sump below the bottom of the unit as shown on the sketch.

Step 3:

Offer the ACO Q-Plate orifice control unit up to the outlet pipe. Ensure the unit is upright (arrow pointing vertically up) and that the orifice is correctly positioned at the invert of the outlet pipe.

Check there is a good seal between the orifice plate and the outlet pipe. Mark the position of the fixing holes on the chamber wall. Remove the unit and drill fixing holes to suit the bolts supplied with the unit.

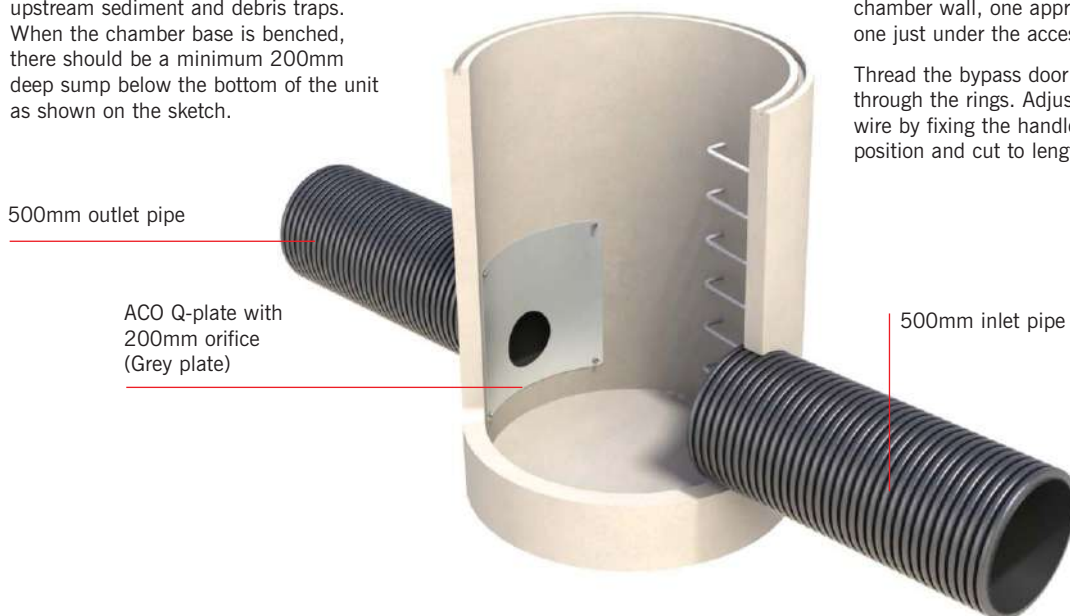
Step 4:

Place bolts into the drilled holes. Locate the ACO Q-Plate orifice control onto the bolts (again check it is correctly aligned). Ensure that the gasket is flat against the wall. Fit the nuts and tighten them to pull the unit against the gasket and seal it against the wall.

Step 5:

If you have been supplied the Q-Plate with the drain down and bypass door fix the two wire guide rings (supplied) to the chamber wall, one approx mid height and one just under the access cover.

Thread the bypass door lifting wire through the rings. Adjust the length of the wire by fixing the handle in the correct position and cut to length if necessary.



Model specification

ACO Q-Plate orifice control *with remote drain down and bypass (delete as appropriate), ##mm orifice designed to suit a pipe outlet size of ###mm, a design head of ## mm and design flow of # litres per second.

ACO Technologies plc

- ACO Water Management
Civils + Infrastructure
Urban + Landscape
- ACO Building Drainage
- ACO Sport
- ACO Wildlife

ACO Water Management: Civils + Infrastructure

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e-mail Technical: technical@aco.co.uk
website: www.aco.co.uk

The ACO Group: A strong family you can depend on.

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ACO CARES ABOUT THE ENVIRONMENT

Printed on material approved by the Forest Stewardship Council (FSC) who provide a means of assuring that products come from responsibly managed forest.



ISO 9001
FM 13502



ISO 14001
EMS 538781



OHSAS 18001
OHS 524145

Appendix B:
Cellular Attenuation Tank

SDS

Water
Infrastructure
Systems

INNOVATORS IN WATER TECHNOLOGY

SDS GEOLight®

Stormwater Management System



SDS
Water
Infrastructure
Systems

SDS GEOLight® is an ultra lightweight honeycombed modular structure, made from recycled PVC, that provides an underground storage facility for the application of stormwater attenuation or infiltration.

Stormwater Management

The Environment Agency is keen to promote the wider use of sustainable drainage systems, which reduce the impact of surface water runoff. There are two main ways of storing surface water for stormwater management:

- Stormwater attenuation tanks
- Soakaway infiltration systems

Stormwater Attenuation Systems

This consists of underground water storage facilities that hold excess water during periods of peak rainfall.

The stored water is gradually released in a controlled manner into the surface water drainage system or directly into watercourses, reducing the risk of upstream and downstream flooding.

Soakaway Infiltration Systems

Soakaways are designed to store surface water runoff until it can be gradually absorbed by the surrounding ground.

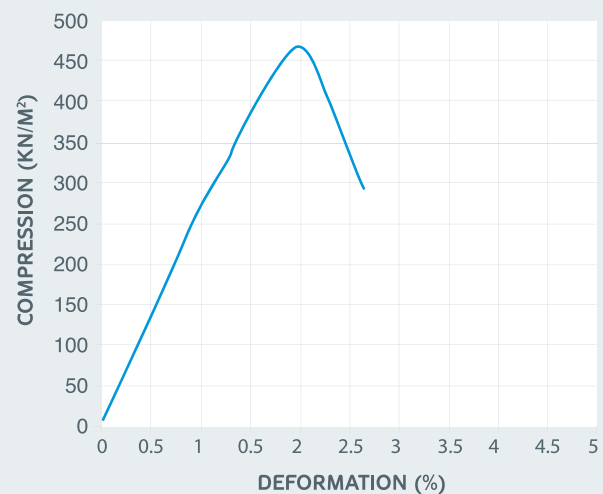
SDS GEOLight® – an efficient and economic solution for stormwater management.

SDS GEOLight® Attenuation

SDS GEOLight® has been specifically designed to form underground water storage reservoirs in stormwater management schemes. Its honeycombed structure gives it certain unique characteristics that make it ideal for this purpose:

- The high void rate (95%) of GEOLight® means that the maximum volume of water is stored in the minimum volume of storage unit.
- High compressive strength. GEOLight® is available in two strengths as standard: 200 and 400kN/m². Note: Higher compressive strengths available from 600 to 1000 kN/m². The graph on the right shows the results of a compression test, where samples of GEOLight® 400 were compressed at the rate of 1mm per minute. The deformation at 400kN/m² is about 1.6%.

RESULTS OF COMPRESSION TEST ON SDS GEOLIGHT® 400



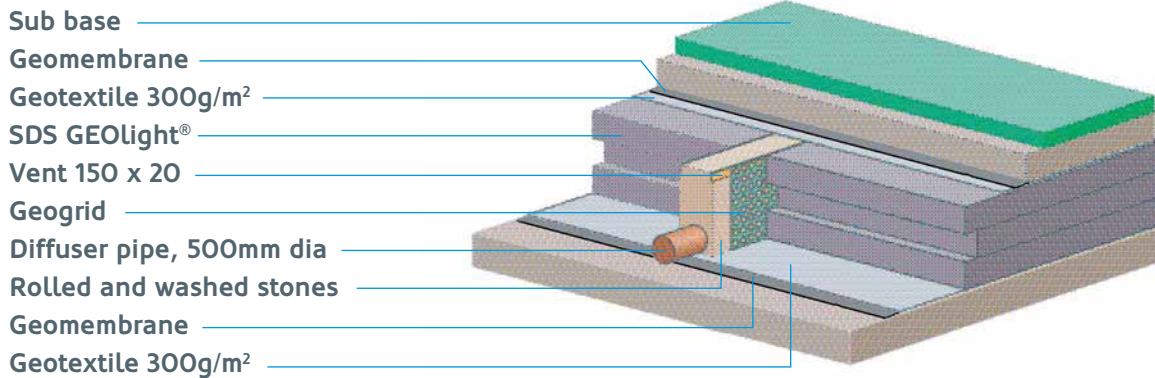
The GEOLight® Stormwater Attenuation System consists of two manholes (inspection chambers) connected by a length of perforated distribution pipe which feeds the stormwater storage reservoirs on either side formed from GEOLight®.

The distribution pipe is normally from 225mm up to 500mm diameter, generally covered in a trench that is filled with draining material such as 15/25 clean graded stone, free from fines.

The reservoirs and distribution pipe are wrapped in a waterproof membrane, such as butyl, to prevent seepage of water into the surrounding ground. The top of each GEOLight® reservoir has a vent which is connected back to the upstream manhole.

A geotextile or 10mm mesh geogrid is laid between the distribution pipe and GEOLight® to prevent the GEOLight® units being clogged by the draining materials.

SDS GEOLight® Attenuation



How does it work?

- 1. In normal conditions, water enters a back drop manhole. This is the upstream manhole and any silt or sediment will collect in the bottom of the chamber. The water then flows along the distribution pipe into the downstream manhole. The upstream pipework is sized to cope with normal flow conditions. The distribution pipe and attenuation tank are sized to cope with storm conditions. The outflow pipe is sized to cope with the permissible discharge.
- 2. In storm conditions the flow restrictor (vortex flow control or orifice plate) in the downstream manhole limits the amount of water flowing out of the manhole. This causes the water level in the distribution pipe to rise and water to spill into the GEOLight® reservoirs on either side. As the water level rises in the reservoirs, air is forced out of the high level vents into the upstream manhole.

- 3. Once the storm has passed, the water level in the GEOLight® reservoirs gradually falls as water passes through the flow restrictor in the downstream manhole. The vents now allow air to return into the GEOLight® reservoirs. Gradually the reservoirs empty. The flow restrictor prevents excess surges of flood water to pass downstream and uses the storage reservoirs to store the water for the period of the storm.

Calculating the storage capacity

The storage capacity of the GEOLight® reservoirs is determined by the maximum outflow permitted, (set by the water company or Environment Agency), the impermeable area of the site and the rainfall return period – normally 1 in 30 years, but again can be dictated by the water company. A full design service, including calculations, can be supplied via a third party consultant.

Please contact SDS for details.

Other uses

The water storage ability of SDS GEOLight® lends itself to a number of other uses:

- Water recycling combines with irrigation systems – this is increasingly popular: GEOLight® is used to retain stormwater which is then pumped as required to a network of standpipes for irrigation.
- Drainage channels – the natural permeability of GEOLight® lends itself for use as an underground drainage channel that collects and drains away groundwater.
- Pollution control – improved water runoff quality. When used in combination with oil / petrol separators, GEOLight® can replenish groundwater without the risk of contamination from oil, chemicals or suspended solids.
- To form lightweight embankments (slope stabilisation) – GEOLight® can be used to quickly form the base of embankments that only weigh a fraction of earth embankments.

Stormwater Attenuation System

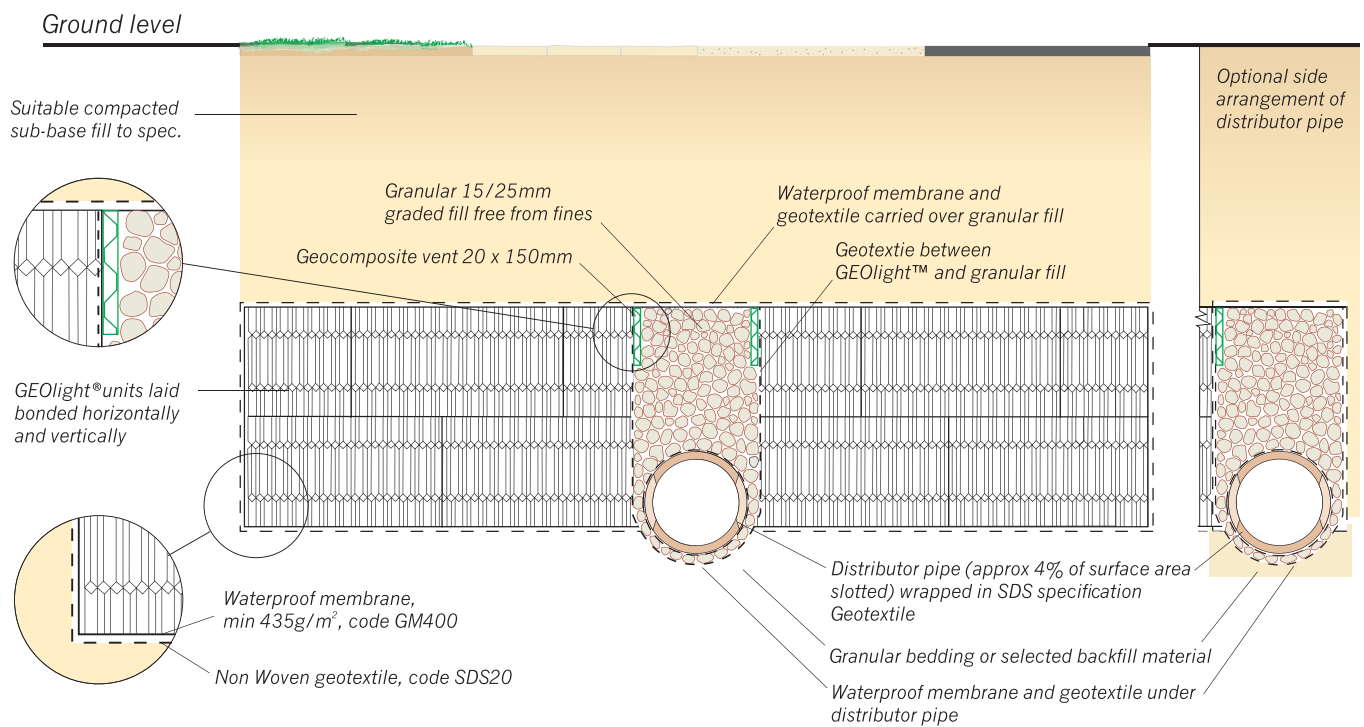
Design Details

The details on these two pages illustrate the construction of a typical SDS GEOLight® Stormwater Attenuation System. The length and height of the GEOLight® reservoirs is determined by the quantity of water to be stored.

The layout of each scheme is specifically designed to suit the characteristics and limitation of the site. Typically the distributor pipe would be arranged in the centre of the reservoir, but can alternatively be placed at the side where topographical constraints dictate.

The high performance waterproof membrane should be sealed continuously to encapsulate the GEOLight® reservoirs, distributor pipe and granular fill. It is protected by a heavyweight needle punched, non woven geotextile. To help with maintenance a high flow geotextile is placed between the granular fill and GEOLight® attenuation units to prevent silt and particles being washed into the reservoir. GEOLight® can be used under a range of surfaces e.g. grass, porous paving, standard paving block, tarmac and concrete.

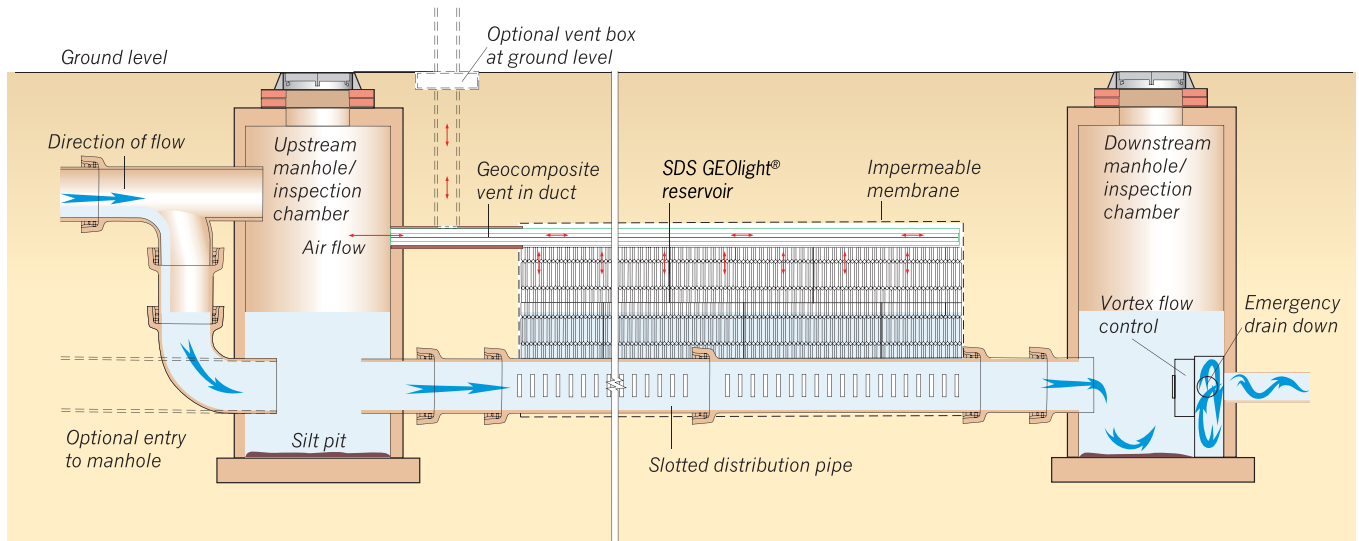
Cross Section



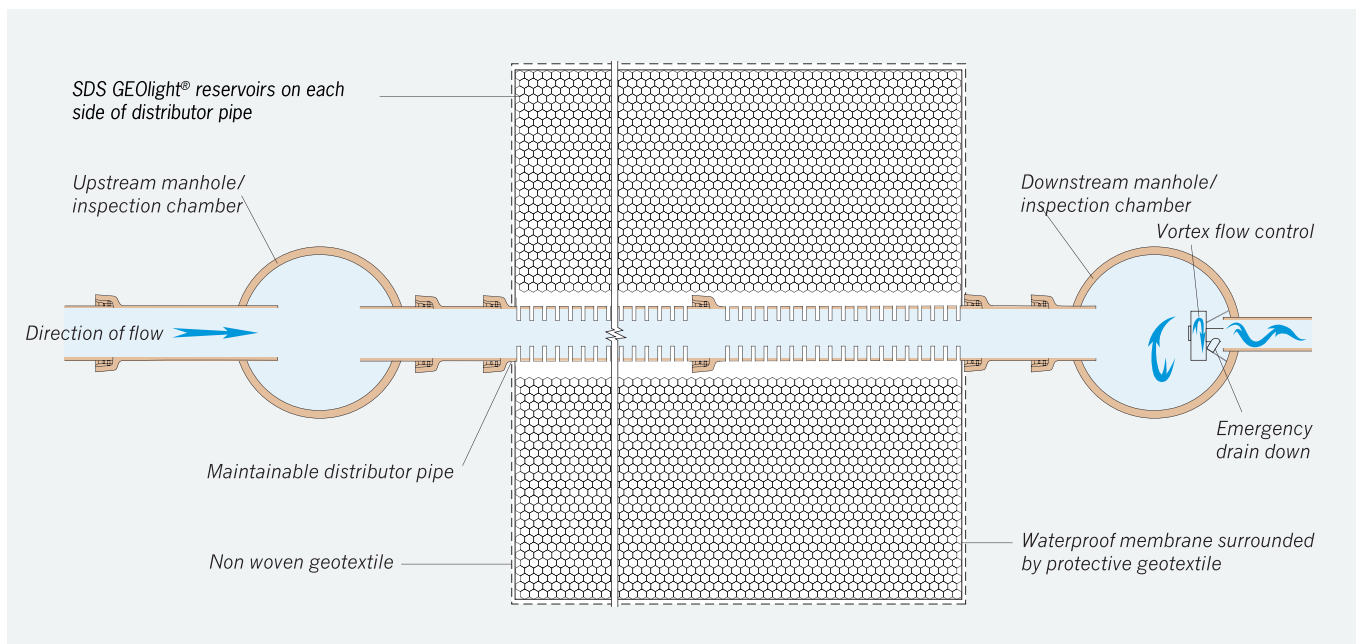
Stormwater Attenuation System

Design Details

Long Section



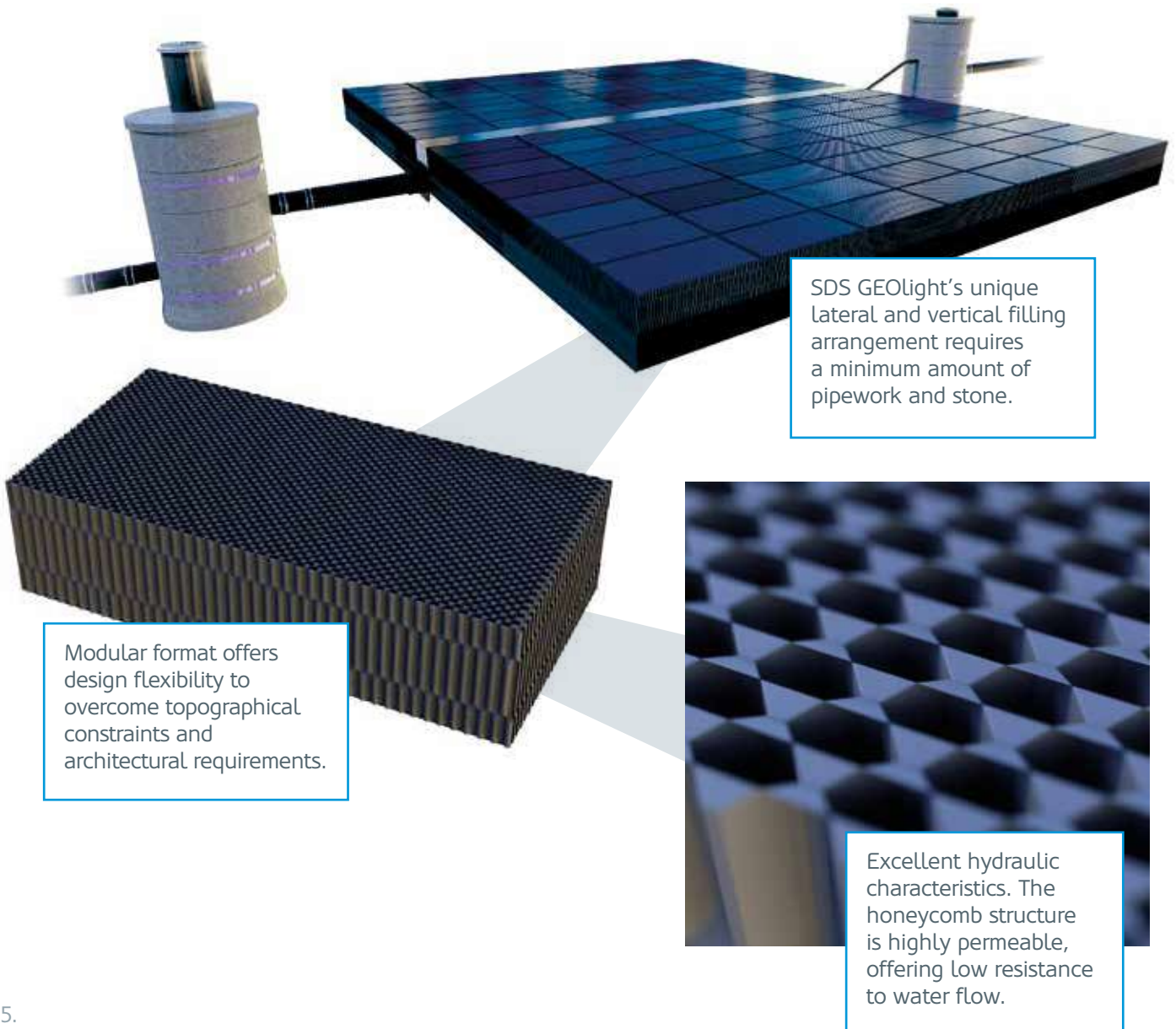
Plan



Benefits

- High compressive strength – can be located under all roads, car parks and amenity area surfaces.
- Reduced excavation costs – the very high void rate (95%) minimises the required volume of earthworks.
- Speed of installation – 1000m³ reservoir, completed in one week.
- Light and easy to handle.
- Depth of tank invert reduced by using patented lateral supply.
- Simplified distribution pipe network, easy maintenance – dispensing with costly and complicated pipework configurations.
- Greatly reduces the risk of flooding when used as stormwater storage.
- Can also be used for water recycling and combining with irrigation systems.
- Can virtually eliminate pollution when used in combination with specialist petrol / oil separators.
- Design service available, including calculations.

GEOLight® block



COSHH and Handling Information

1. COMPOSITION/INFORMATION ON INGREDIENTS:

Hazardous ingredients:

None as finished goods or products.

Types of materials:

Polyvinyl chloride (PVC)
MEK

2. HAZARDS IDENTIFICATION

Nature of hazard:

There are no health risks from the products during normal use. The products may contain various pigment colours and stabilisers that may be toxic. The chemicals are, however, bound within the product material and not easily extracted.

3. FIRST-AID MEASURES

Eye contact:

Plastic materials may cause physical irritation in the eyes. Wash out with large amounts of water. If irritation persists, seek medical advice.

Skin contact:

Not applicable.

Inhalation:

Not applicable.

Ingestion:

Not expected to have any toxic effects.

4. FIRE-FIGHTING MEASURES

Extinguishing media:

On small fires use any hand-held extinguisher type.
On large fires use water.

Fire and explosion hazards:

Melting plastics may flow and spread in a large fire.
Products of fire will be thick black toxic smoke.

Material characteristics:

PVC products will burn in the presence of a flame but are classed as self-extinguishing.

Protective equipment:

Wear self-contained breathing apparatus and protective clothing.

5. HANDLING AND STORAGE

Handling:

There are no hazards associated with the finished products. However, when cutting SDS GEOLight®, we recommend that the correct tools are used e.g. Handsaw or Alligator saw. When cutting, dust may be created; avoid inhaling these dusts. Take care of heat build-up within materials during cutting etc. The pallets of SDS GEOLight® units should be placed on level ground and should not be stacked on site. The maximum weight of the pallet of SDS GEOLight® units as delivered to site is 650kg (700kg on one copy), including packaging. Machines used to lift the pallet should be able to lift this weight safely. Loose individual units should not be stored more than three units high. SDS GEOLight® units are lightweight ranging from 23kg to 55kg and can be easily handled – one or two person lift.

Storage:

SDS GEOLight® units will resist the effects of UV light for up to six months; however, prolonged storage in direct sunlight should be avoided. SDS GEOLight® units should not be stored near to any fuel storage areas or any other solvents. SDS GEOLight® units are very robust and resistant to damage during normal handling; however, they should be secured in areas where impacts from vehicles or construction plant will be avoided.

Material characteristics:

PVC products will burn in the presence of a flame but are classed as self-extinguishing.

Protective equipment:

Wear self-contained breathing apparatus and protective clothing.

6. EXPOSURE CONTROLS / PERSONAL PROTECTION

Respiratory protection:

Not required under normal conditions of use. Where cutting etc. creates dust, wear a disposable half-mask to the standard FFP2S.

Hand protection:

Wear impervious strong gloves to prevent cuts to the hands while handling, cutting etc.

Eye protection:

Wear safety glasses when cutting etc.

Skin protection:

Wear overalls.

7. SITE HAZARDS

Other hazards for consideration:

Working in excavations and trenches – SDS GEOLight® may be designed with a shallow invert for infiltration (soakaway) or attenuation (storage) system. This negates the need for deep excavations or trenches, excavation near services e.g. gas, electricity or contaminated soil areas. N.B. All risk assessments should be undertaken by the main contractor for forklift, access to and working in excavations and trench support.

8. STABILITY AND REACTIVITY

Decomposition products:

Major thermal decomposition products are oxides of carbon. Relevant differences are (in addition): PVC may produce amounts of Hydrogen Chloride.

Stability:

These materials are stable at temperatures up to normal operating limits (moulding parameters).

9. ECOLOGICAL INFORMATION

Biodegradability:

Plastic products are not readily biodegradable but are not detrimental to terrestrial wildlife.

Aquatic toxicity:

Non-toxic to marine life.

10. DISPOSAL CONSIDERATIONS

Method:

The preferred method of disposal is collection and recycling. Plastics can safely be placed with regular industrial or household wastes where recycling is not available.

11. OTHER INFORMATION

As the handling, storage, use and disposal of the product are beyond our control SDS disclaims all liability for loss, damage, injury or expense in any way connected with such activities and further makes no warranties, expressed or implied, as to the suitability of the product for any particular use.

The preferred method of disposal is collection and recycling. Plastics can safely be placed with regular industrial or household wastes where recycling is not available.

SDS

Water
Infrastructure
Systems

INNOVATORS IN WATER TECHNOLOGY



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Appendix C:
Grease Trap

GA-1

Grease Separator Alarm Device

Installation and Operating Instructions



TABLE OF CONTENTS

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5	REPAIR AND SERVICE	9
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SYMBOLS



Warning / Attention



Device is protected by double or reinforced insulation

1 GENERAL

GA-1 is an alarm device for monitoring the thickness of the grease layer accumulating in a grease separator.

The system consists of GA-1 control unit, GA-SG1 sensor and a cable joint.

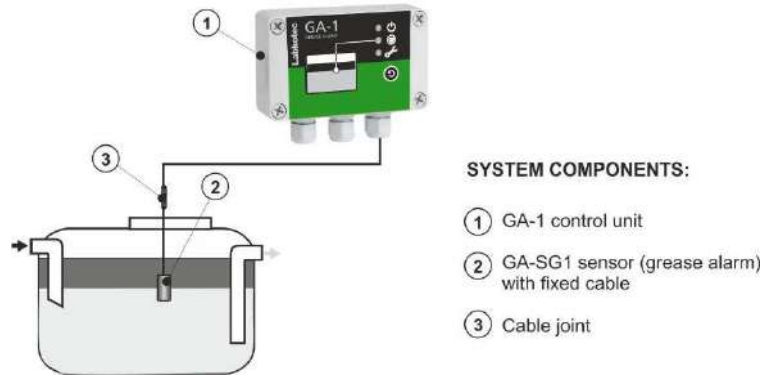


Figure 1. Grease separator supervision with GA-1 alarm device

GA-SG1 sensor is installed into the grease separator and it supervises thickness of grease layer.

The LED indicators, push button and interfaces of the GA-1 control unit are described in figure 2.

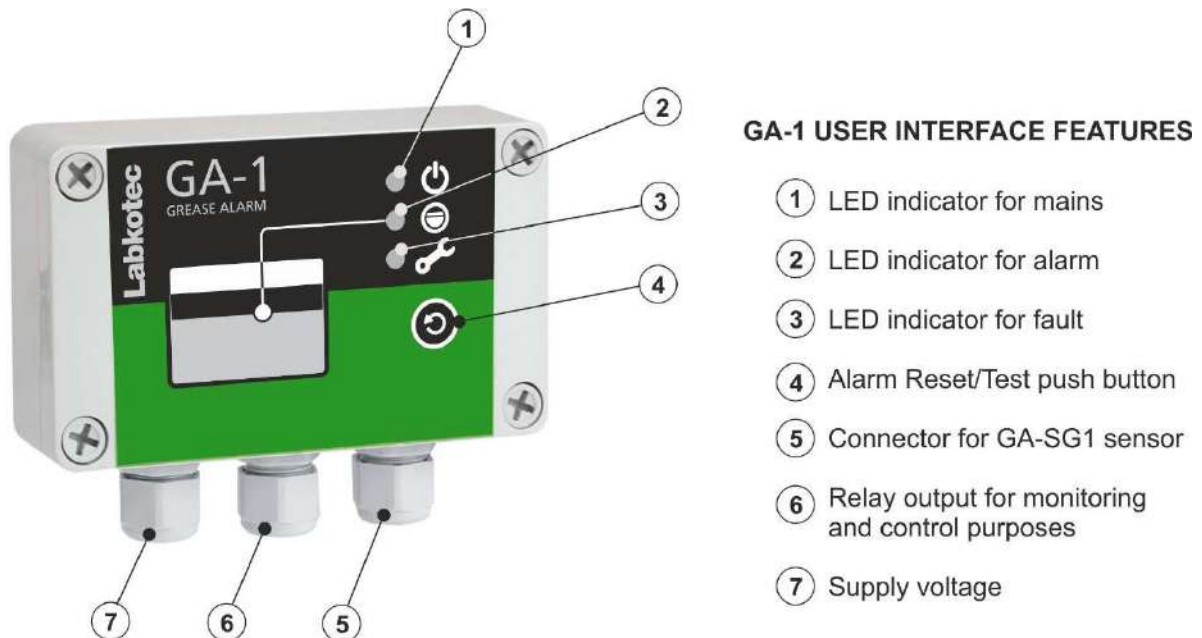


Figure 2. GA-1 control unit – features

2 INSTALLATION

2.1 GA-1 control unit

GA-1 control unit can be wall-mounted. The mounting holes are located in the base plate of the enclosure, beneath the mounting holes of the front cover.

The cover of the enclosure must be tightened so, that the edges touch the base frame. Only then does the push button function properly and the enclosure is tight.

Before installation, please read the safety instructions in chapter 6!

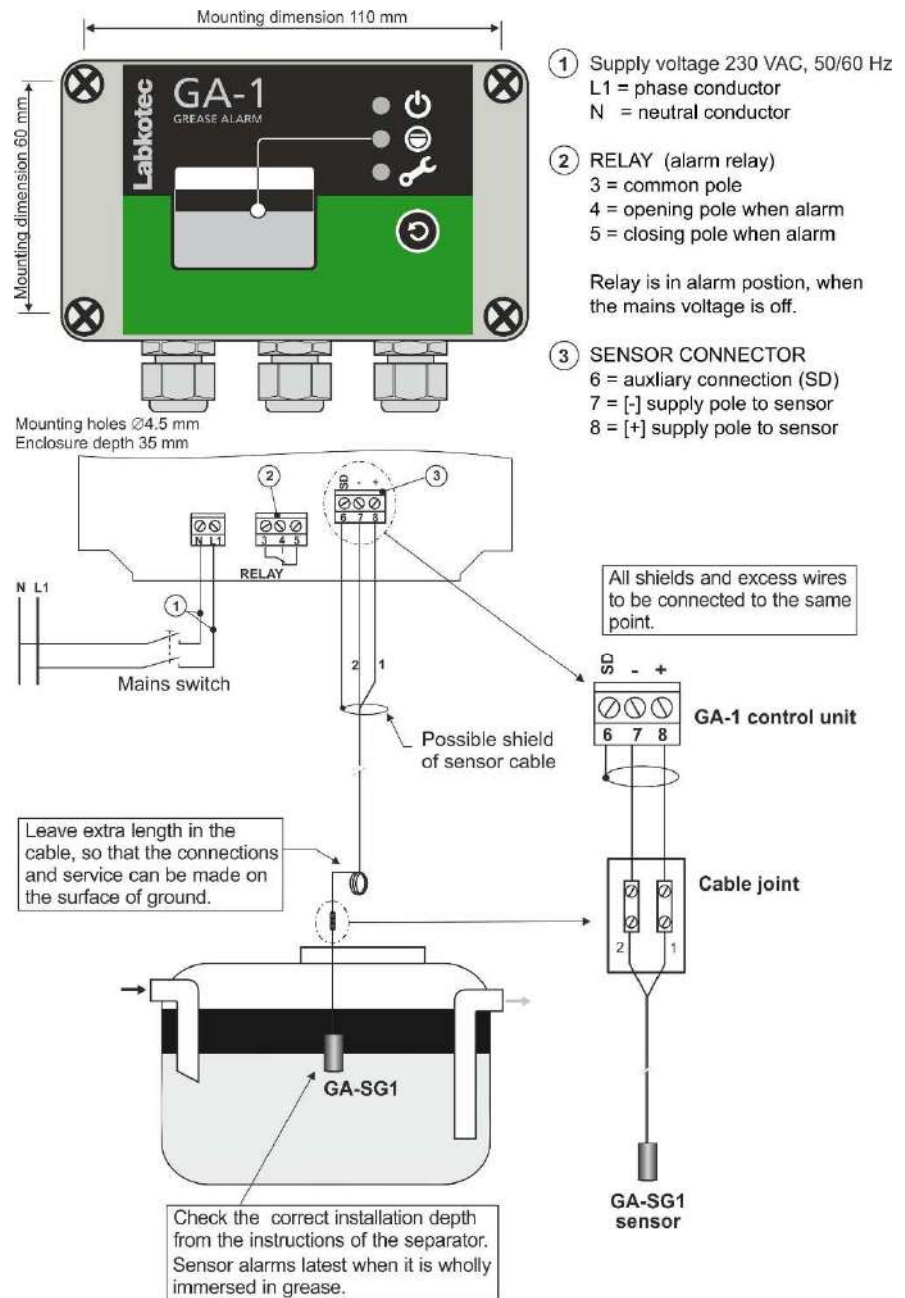


Figure 3. GA-1 alarm device installation.

2.2 GA-SG1 sensor

GA-SG1 sensor should be installed as described in figure 3.

The sensor gives an alarm latest when it is wholly immersed in grease.

Please check the correct installation depth also from the instructions of the grease separator.

2.3 Installation Accessories

The delivery includes a cable joint (figure 4), fixing accessories (figure 5) for installation of the control unit and the sensor. In figure 6 is an installation example of cable with suspension hook.

Connections of the sensor cable inside the cable joint are explained in figure 3. If shielded cable is used cable shields and possible excess wires need to be connected to the same point in galvanic contact.

IP rating of the cable joint is IP68. Make sure, that the cable joint is closed properly.



Figure 4 Cable joint



Figure 5. Fixing accessories



Figure 6. Cable installation example

3 OPERATION

The operation of the alarm device should be checked always after the installation. Also check the operation always when emptying the separator or at least once every six months.

Functionality test

1. Immerse the sensor into water. The device should be in normal mode.
2. Lift the sensor up in air or grease. A grease alarm should be generated (see chapter 3.1 for more detailed description).
3. Clean up the sensor.
4. Immerse the sensor back into water. The alarm should go off after a delay of 10 sec.

A more detailed description of the operation is provided in chapter 3.1. If the operation is not as described here, check connections and cabling. If necessary contact a representative of the manufacturer.

3.1 Modes of operation

Normal mode – no alarms

Sensor is totally immersed in water.
Mains LED indicator is on.
Other LED indicators are off.
Relay is energized.

Grease alarm

Sensor is immersed in grease. (the sensor gives an alarm latest when it is wholly immersed in grease).
Mains LED indicator is on.
Grease Alarm LED indicator is on.
Buzzer on after 10 sec delay.
Relay de-energize after 10 sec delay.
(Note. The same alarm takes place when GA-SG1 sensor is in the air.)

After removal of an alarm, the Grease Alarm LED indicator and buzzer will be off, and relay will be energized after 10 sec delay.

Fault alarm

Sensor cable break, short circuit or a broken sensor.
Mains LED indicator is on.
Sensor circuit Fault LED indicator is on after 10 sec delay.
Buzzer is on after 10 sec delay.
The relay de-energize after 10 sec delay.

Reset of an alarm

When pressing the Reset/Test push button.
Buzzer will go off.
Relay and LED indicator will not change their position until the alarm or fault situation is removed.
If the buzzer is not reset, it goes off automatically after three days.

TEST FUNCTION

Test function provides an artificial alarm, which can be used to test the function of the GA-1 alarm device and the function of other equipment, which are connected to GA-1 via its relay.



Attention! Before pressing the Reset/Test button, make sure that the change of relay status does not cause hazards elsewhere!

Normal situation

*When pressing the Reset/Test push button:
Grease Alarm and Fault LED indicators are immediately on.
Buzzer is immediately on.
Relay de-energize after 2 sec of continuous pressing.

When the Reset/Test push button is released:
LED indicators and buzzer go immediately off.
Relay energize immediately.*

Alarm on

*When pressing the Reset/Test push button for the first time:
Buzzer will go off.

When pressing the Reset/Test push button after that:
Fault LED indicator is immediately on.
Grease Alarm LED indicator remains on.
Buzzer remains on. If it has been reset earlier, it will return to be on.

When the Reset/Test push button is released:
The device returns right away to the preceding status.*

Fault alarm on

*When pressing the Reset/Test push button:
The device does not react to the test at all.*

4 TROUBLE-SHOOTING

Problem: **No alarm when sensor in grease or air, or the alarm will not go off**
Possible reason: *Sensor is dirty.*
To do: 1. *Clean-up the sensor and check the operation again.*



The following operations must be performed only by a qualified electrician!

Problem: **MAINS LED indicator is off**
Possible reason: *Device doesn't get supply voltage.*
To do: 1. *Check that power separation switch is not switched off.*
2. *Measure the voltage between poles N and L1. It should be 230 VAC + 10 %.*

Problem: **FAULT LED indicator is on**
Possible reason: *Current in sensor circuit too low (cable break or out of connector) or too high (cable in short circuit). The sensor might also be broken.*
To do: 1. *Make sure, that the sensor cable has been connected correctly to the GA-1 control unit.*
2. *Measure the voltage separately between the poles 7 and 8. The voltages should be between 7,0 - 8,5 V. Note! The voltage alternates between the sensor connectors in 1 second intervals.*
3. *Measure sensor current when the sensor is in the air or in grease. The measured current should be 7,0 – 8,5 mA.*
4. *Measure current when the sensor is in the water. Measured current should be 2,5 – 3,5 mA*

If the problem can not be solved with the above instructions, please contact Labkotec Oy's service.

5 REPAIR AND SERVICE

The sensor should be cleaned and the operation should also be tested when emptying or maintaining the grease separator or at least once every six months. The easiest way to check the operation is to lift the sensor up in the air and to put it back to the separator. The operation is described in chapter 3.

For cleaning, a mild detergent (e.g. washing-up liquid) and a scrubbing brush can be used.

In case of queries, please contact Labkotec Oy's service:

service@labkotec.fi.

6 SAFETY INSTRUCTIONS



The device does not include a mains switch. A two pole mains switch (250 VAC 1 A), which isolates both lines (L1, N) must be installed in the main power supply lines in the vicinity of the unit. This switch facilitates maintenance and service operations and it has to be marked to identify the unit.



If opening of housing's cover is needed, only a qualified electrician is allowed to install or to maintain the device.




If the device is used against the manufacturer's instructions, the protection provided by the device may be damaged.



The device is not allowed to install in hazardous areas.

7 TECHNICAL DATA

GA-1 control unit	
Dimensions	125 mm x 75 mm x 35 mm (L x H x D)
Weight	250 g Package 0,8 kg (control unit + sensor + cable joint)
Enclosure	IP 65, material polycarbonate Cable glands adjustment range is 6 – 10mm
Operation temperature	-30 °C...+50 °C
Supply voltage	230 VAC ± 10 %, 50/60 Hz The device is not equipped with a mains switch
Power consumption	5 VA
Sensors	GA-SG1 sensor
Relay output	Potential-free relay output 250 V, 5 A Operational delay 10 sec. Relay de-energize at trigger point.
Electrical safety	IEC/EN 61010-1, Class II  , CAT II
EMC	Emission IEC/EN 61000-6-3 Immunity IEC/EN 61000-6-1
Manufacturing year: Please see the serial number on the type plate	xxx x xxxxx xx YY x where YY = manufacturing year (e.g. 14 = 2014)

GA-SG1 sensor	
Principle of operation	Capacitive
Material	POM, PUR, AISI 316
Weight	350 g (sensor + fixed cable)
IP-classification	IP68
Operation temperature	0 °C...+90 °C
Cable	Fixed cable 2 x 0.75 mm ² . Standard length 5 m, other lengths optional. The max. length of the fixed cable is 15 m, can be extended. Maximum cable loop resistance is 75 Ω.
EMC	Emission IEC/EN 61000-6-3 Immunity IEC/EN 61000-6-1
Manufacturing year: Please see the serial number from the bottom of sensor	GAxxxxxYY where YY = manufacturing year (e.g. 14 = 2014)

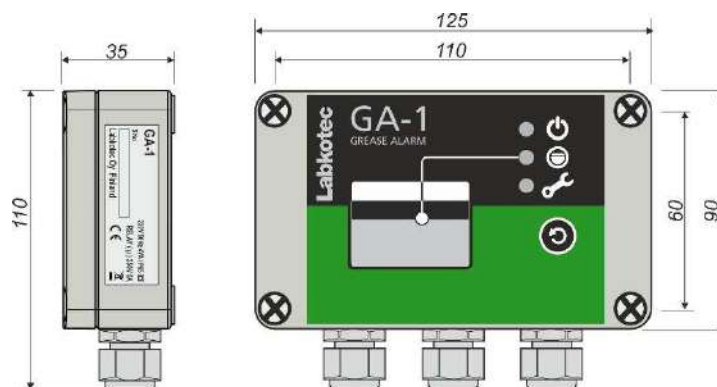
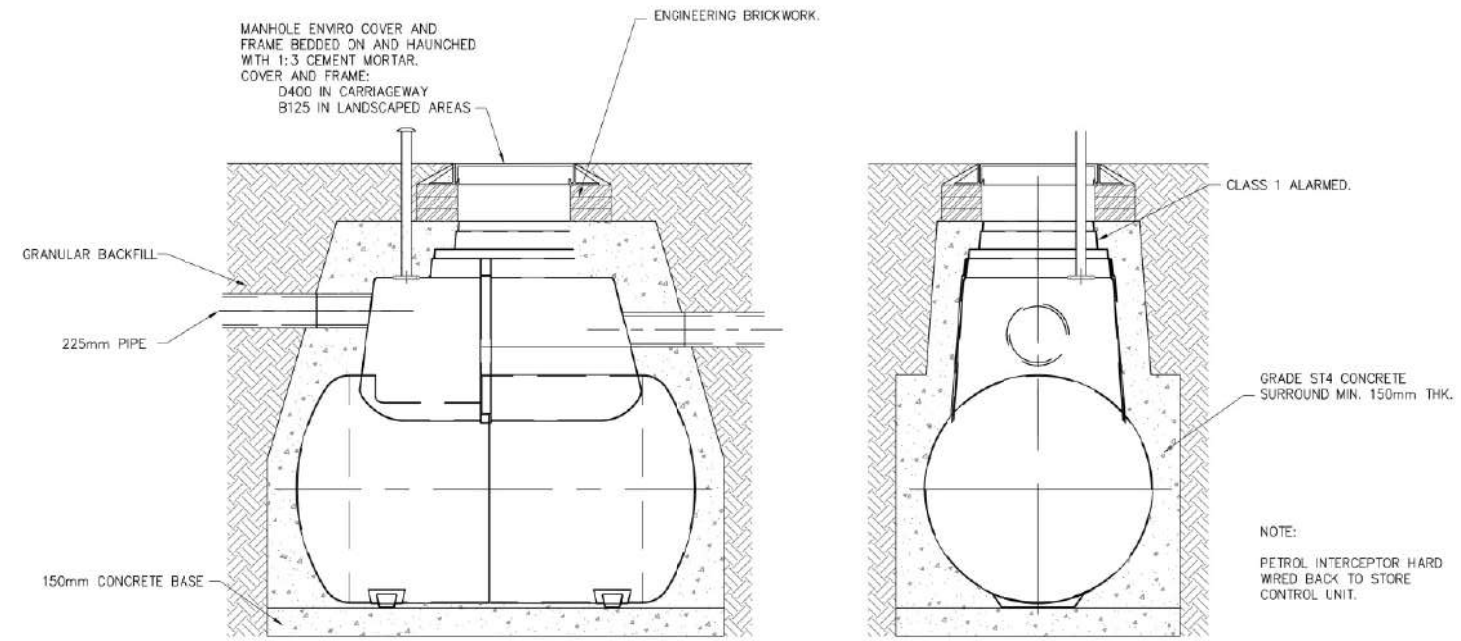


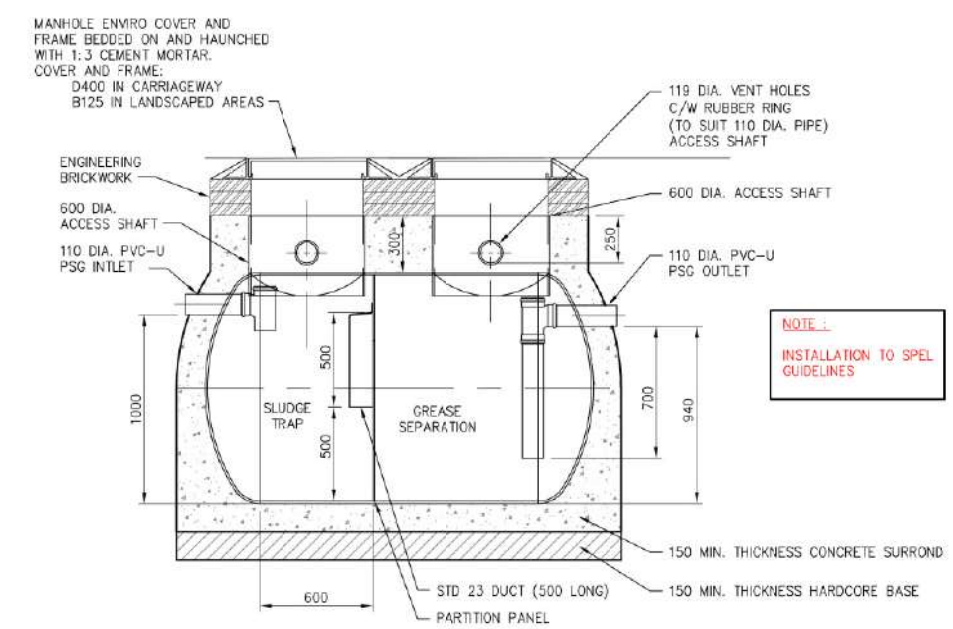
Figure 7. GA-1 control unit



Figure 8. GA-SG1 sensor

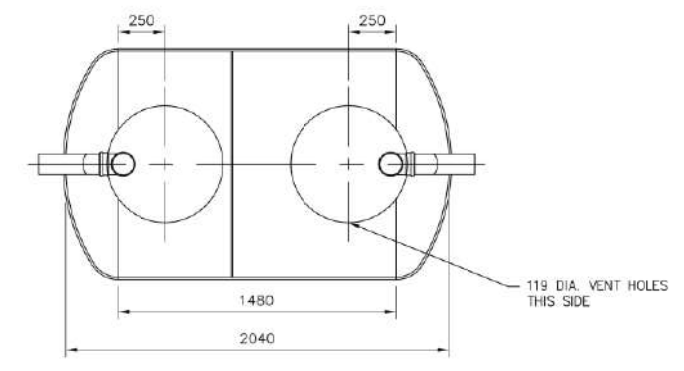


SPEL 206 C1 PETROL INTERCEPTOR (OR SIMILAR APPROVED). CONCRETE SURROUND
 Scale 1:20



NOTE:
 INSTALLATION TO SPEL GUIDELINES

SECTION



PLAN

2000L SPEL GREASE INTERCEPTOR WITH TELEMETRY ALARM
 SCALE 1:20

FOR INFORMATION ONLY

Rev.	Description	Date	Chkd

Glanville
 3 Grovelands Business Centre
 Boundary Way
 Hemel Hempstead, Herts, HP2 7TE
 Tel: (01442) 635999 Fax: (01442) 259924
 petco@glanville.co.uk www.glanville.co.uk

Client:

Project: **MCDONALD'S RESTAURANT**

Title: **PROPOSED GREASE TRAP & PETROL INTERCEPTOR**

Project Engineer: J.H. Scale: AS SHOWN
 Project Director: J.B. Date: APR' 2014

Status: **INFORMATION**

Declaration of Conformity

This declaration certifies that the below mentioned apparatus conforms to the essential requirements of the EMC directive 2004/108/EY and Low-Voltage directive (LVD) 2006/95/EC.

Description of the apparatus: Measuring and control unit with sensor

Type: GA-1 Grease Alarm control unit with GA-SG1 sensor
GA-2 Grease Alarm control unit with two GA-SG1 sensors

Manufacturer: Labkotec Oy
Myllyhaantie 6
FI-33960 Pirkkala
FINLAND

The construction of the appliance is in accordance with the following standards:

EMC:

EN 61000-6-1 (2007) Electromagnetic compatibility, Generic standards – Immunity for residential, commercial and light-industrial environments.

EN 61000-6-3 (2007)
+A1 (2011) Electromagnetic compatibility, Generic standards – Emission standard for residential, commercial and light-industrial environments.

EN 61000-3-2 (2006)
+A1+A2 (2009) Electromagnetic compatibility, Product family standard: Harmonic current emissions.

EN 61000-3-3 (2008) Electromagnetic compatibility, Product family standard: Voltage changes, fluctuations and flicker sensation.

LVD:

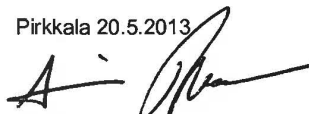
EN 61010-1 (2010) Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements.

This product is CE-marked since 2013.

Signature

The authorized signatory to this declaration, on behalf of the manufacturer, and the Responsible Person based within the EU, is identified below.

Pirkkala 20.5.2013



Ari Tolonen
CEO
Labkotec Oy

SPEL Grease/Fat Separators

Introduction

Grease separators are used to remove fat and grease from waste water. This is often essential to eliminate incidents of drain blockages caused by the waste from catering establishments. The operation of septic tanks, pumps, and sewage treatment systems will also be improved by removing the fat and grease from the effluent.

Siting and Installing the Tank

The tank should not be installed near a road or driveway, where it could be subjected to high external loads, unless the installation is designed to withstand such loadings so they are not transferred to the tank shell.

Where the tank is to be emptied using a tanker, it should be sited within 30m of a vehicle access provided that the invert level of the septic tank is no more than 3m below the level of the vehicle access. This distance may need to be reduced where the depth to the invert of the tank is more than 3m. There should also be a clear route for the hose such that the tank can be emptied and cleaned without the contents being taken through a dwelling or place of work.

Adequate ventilation of the tank and the inlet pipework must be provided to prevent the accumulation of fermentation gases.

For full installation instructions concerning tank specification handling and burial please consider our supplied installation guidelines, Sec4.

Operation

Please refer to a supplied drawing. Contaminated water flows into the tank through the inlet pipe. Heavy deposits will settle on the bottom of the chamber and light contaminants will mostly float on top of the water. Cleaner water flows through to the second chamber where water is allowed to pass out of the tank taken from the cleanest part of the chamber.

Maintenance

Grease, sludge and other fatty effluents remain in the tank until removed by a specialist cleansing or waste disposal contractor. The tank must be emptied periodically of retained grease, sludge and other fatty effluents. Other than this action SPEL Grease separators are essentially maintenance free, however, it is not possible to predict site specific maintenance requirements. SPEL tank shells usually carry a 25-year warranty.

Alarm Options

SPEL can provide a range of alarms to suit your needs.

Access

SPEL Grease separators have good access to both chambers for period emptying of retained grease, sludge and similar fatty effluents. Access is made in each case through a circular access shaft of 600mm diameter at the crown of the chamber.

Emptying Period

Periods between emptying will have to be determined depending on site conditions but normally at least twice a year.

Emptying Procedure

Typically the contents of the chambers will be sucked out by a specialist cleansing or waste disposal contractor. Both light and heavy deposits should be removed at this time. A Large hose is usually lowered down into the chamber through the access shaft. As the contents are sucked out care should be taken to ensure that both chambers contents are reduced equally. If one chamber is allowed to contain too great a quantity of fluid in comparison with the other chamber damage to the dividing baffle wall may result. Following removal the tank should be re-charged with clean water. The removed contents should be disposed of by the specialist contractor.

The contents of this document are supplied for general guidance only. SPEL Products can accept no liability for harmful incidents that arise as a result of the contents of this document. It is not possible for SPEL Products to predict site specific operational or maintenance requirements.

Appendix D:
Maintenance Schedule

Inspection Log - Year sheet 1 of 2

Inspection Date	A - Surface Water Catchpit Manholes	B - Foul Water Manholes	C - Gulley	D - Channel Outlets	E - Surface Water Treatment	F - Surface Water Flow Control Chamber	G - Cellular Attenuation Tank	H - Grease Trap	Comments
'Month'									
February									
March									
April									
May									
June									

How to complete this Log:

- 1.0 Write date in LH column.
- 2.0 Tick which items have been inspected for that date.
- 3.0 Add to notes and maintenance completed e.g. gullies / catchpits emptied.

Inspection Log - Year sheet 2 of 2

Inspection Date	A - Surface Water Catchpit Manholes	B - Foul Water Manholes	C - Gulley	D - Channel Outlets	E - Surface Water Treatment	F - Surface Water Flow Control Chamber	G - Cellular Attenuation Tank	H - Grease Trap	Comments
July									
August									
September									
October									
November									
December									

How to complete this Log:

- 1.0 Write date in LH column.
- 2.0 Tick which items have been inspected for that date.
- 3.0 Add to notes and maintenance completed e.g. gullies / catchpits emptied.



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