PREMIER TECH

OPERATION & MAINTENANCE GUIDE

REWATEC™

CNSB Bypass Separators

Operation & Maintenance Guide

Rewatec CNSB Bypass Separators

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To Safeguard Warranty Please Ensure You Are Using The Latest Data Sheet.

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1. Introduction

Surface water may be contaminated by the disposal of rainfall runoff with hydrocarbon content accumulated from deposits on paved areas that is washed into the drainage system. Separators are fitted to surface water drainage systems to protect the environment from pollution by hydrocarbons. They separate the hydrocarbon contaminants from the water retaining the material safely until it is removed. They are installed to contain leaks from vehicles and plant, accidental spillages and hydrocarbon built up on hardstanding during periods of little or no rainfall.

The UK has adopted a two-part European Standard, BS EN 858-1: 2002 and BS EN 858-2: 2003[1], for the design, use, selection, installation, operation and maintenance of prefabricated separators. The Premier Tech Water and Environment CNSB Bypass Separator is designed and manufactured entirely in the UK and is designed to give long and reliable service.

BS EN 858 refers to two 'classes' of separator, based on performance under standard test conditions and two types of separators being bypass and full retention based on the separator operation.

Operational Class 1 separators are designed to achieve a discharge concentration of less than 5 mg/litre of oil under standard test conditions[2].

Full retention separators treat the full flow that can be delivered by the drainage system where the 'full flow' is equivalent to the flow generated by a rainfall intensity of 65 mm/hour. A bypass separator will permit part of the flow to bypass the hydrocarbon separation treatment once a set inflow is exceeded.

The nominal size of a separator is determined in accordance with BS EN 858-1 Clause 5 and is approximately equivalent to the maximum effluent flow in litres per second from the separator. Separators must include light liquid storage and may include silt storage volumes in addition to the operational volume of the tank.

[1] BS EN 858 Separator systems for light liquids (e.g. oil and petrol), Part 2: "Selection of nominal size, installation, operation and maintenance"

[2] The oil concentration limits of 5 mg/litre only apply under standard test conditions and it should not be expected that the separator will always perform within these limits under actual field operating conditions. In addition, these levels of oil might be too high in some environmentally sensitive areas to allow the discharge to pass directly into the water environment without additional treatment.

2. Health and Safety

Important – Please Read This First

Section 6(a) of the United Kingdom Health and Safety at Work Act 1974 Act requires manufacturers to advise their customers on the safety and the handling precautions to be observed when installing, operating, maintaining and servicing their products. The user's attention is therefore drawn to the following:

1. The appropriate sections of the applicable O&M Manual must be read before working on the installation.
2. Installation and servicing must only be carried out by suitably trained or qualified personnel.
3. Normal safety precautions must be taken and appropriate procedures observed to avoid accidents.
4. All works associated with the installation must be adequately risk assessed and all appropriate control measures in place prior to commencement of the works.

General non site specific significant hazards that are associated with the operation of a CNSB include but are not limited to:

- Explosive atmospheres
- Falls from working at height
- Confined space working
- Asphyxiation
- Working near, in, or over water
- Exposure to dangerous substances, chemical and biological
- Moving heavy loads

3. Process & Performance

Description

Bypass separators treat part of the full flow that can be delivered by a drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 6.5mm/hour. Flows above this rate are allowed to bypass the separator and bypass separators are used when it is considered an acceptable risk not to provide full treatment for high flows. The typical construction of a bypass separator is as indicated in Figure 1 Bypass Separator.

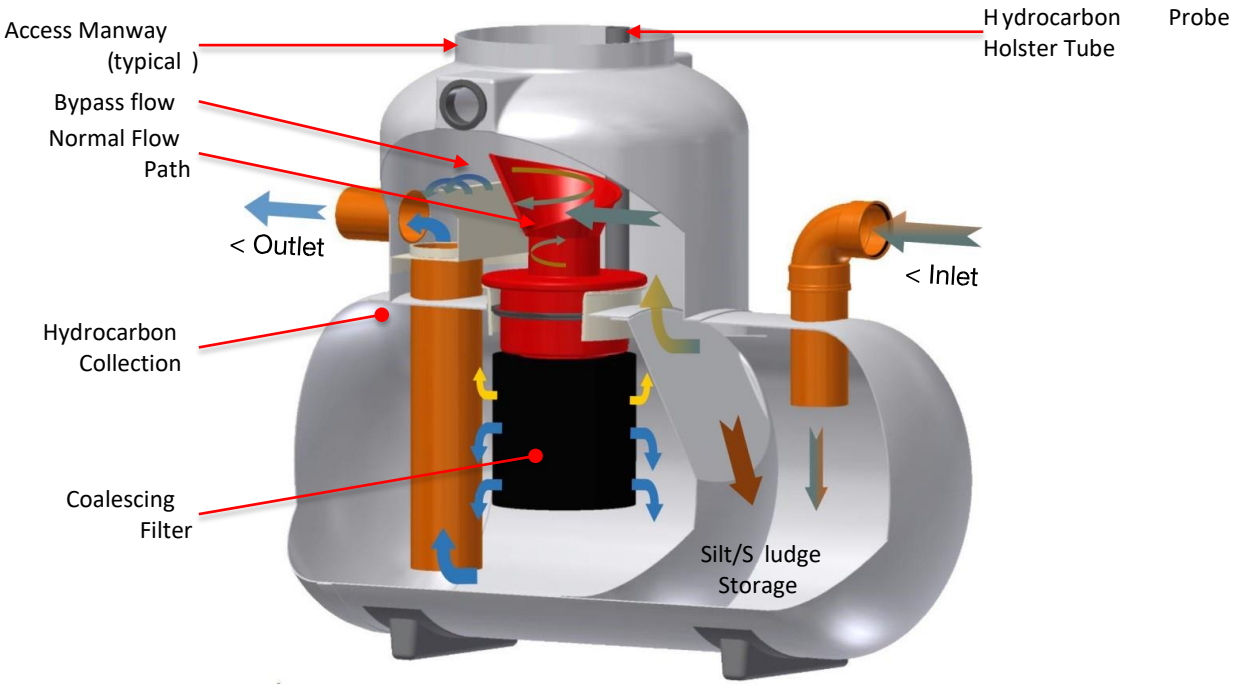

Figure 1: Bypass Separator

The separator consists of; inlet and outlet pipework with minimum pipework sizes in accordance with BS EN 858; silt storage volume (where provided), light liquid storage of nominal size x 15 litres in accordance with BS EN 858, coalescing filters and bypass overflow.

The separator system operates under gravity; power is only required to operate the alarm control panel and associated probes. In accordance with current regulations as a minimum an oil/light liquid probe comes fitted as standard in the bypass separator. If excessive levels are reached the alarm activates to notify the end user that the separator needs emptying/servicing.

Separator Operation

In Premier Tech Water and Environment separators the removal of light liquid in suspension in the incoming surface water runoff is performed by a foam coalescing filter. The filter causes fine hydrocarbons droplets to combine creating an agglomeration of sufficient volume that buoyant forces cause it to float to the surface where it ponds and collects.

Silt collects at the inlet end of the separator, see Figure 1. There are many variables that can affect the distribution such as the type of material collected i.e. sand or silt sludge inflow velocity, type of site served i.e. paved site, development area, highway carriageway. Although not supplied as standard a silt probe can be installed in the separator.

Alarm Control Panel

The '14300 Mains Separator Alarm Panel' is capable of monitoring up to 3 probe units, displaying their current status via a display; an output relay enables these status to be signalled to a remote location or activate a beacon if required. With the exception of the alarm control panel and the associated probes there are no parts within the separator that require electrical power.

Ventilation

Separators must be vented to prevent the build-up of dangerous and explosive gasses within the tank. The extensions of vent piping above ground should be located where gasses and vapours will be dispersed safely into the atmosphere. Locations should be chosen taking into account conditions at or near the site which could adversely affect the safe dispersal of any flammable discharge to atmosphere. These conditions include but are not limited to the nature, height and location of surrounding developments; the direction of prevailing winds and the possibility of unusual air currents caused by high buildings; the proximity of possible ducts for the conveyance of flammable vapours, such as roof gutters, down pipes, chimney stacks, ventilation shafts, trees, narrow passages and gaps between buildings.

Vent pipes should be as short as practicable and be terminated not less than 2.4m above paving level and not less than 1m above the head of any openable window or door. The vent discharge point should not be within a horizontal distance of 3m of opening windows or any other opening to a building. Vent pipes should not be less than 3m from the boundary; however, where there is an imperforate wall at the boundary extending from ground level and for at least 3m in any direction from the vent discharge point, they may be located close to the boundary.

All venting pipe should be provided with cowl at their termination to avoid any birds, vermin or small animals from blocking the vent pipe or falling into the separator tank. The minimum suggested diameter of any vent pipe is 100mm and where the separator has multiple manway access turrets then multiple vent pipes will be required i.e. one pipe from each turret to a common vent line.

4. Installation

General

Please read the Health and Safety instruction in Section 2 prior to commencement of any works. All works associated with the installation must be adequately risk assessed and all appropriate control measures in place prior to commencement of the works. When working in a deep excavation, ensure all necessary safety precautions are taken to provide safe working conditions for site personnel. The only time anyone needs to be working at the bottom of the excavation is when levelling the base and ensuring that the first back-fill is correctly placed.

The lifting procedures as set out in the relevant Installation Guidance in the appendix to this document have been developed to ensure the safe handling of the unit. Failure to comply may result in damage to the unit and/or injury to site personnel and invalidation of the product warranty. The installing contractor is responsible for off-loading all items of equipment with due regard to the following:

- Do not lift the tank if it contains water.
- Do not subject the tank to impacts or contact with sharp surfaces.
- Always use lifting slings placed underneath the tank and between the ribs.
- Never attempt to lift the unit by attaching lifting equipment to the pipes or nozzles.
- Ensure that when backfilling the tank there is water within the tank and the water level within the tank is never greater than 300mm above the backfill level or less than the backfill level.

Before installing the tank, care has to be given on how to provide adequate ventilation across the plant. As each site is different provision is made in the design of the tank; on site ventilation design and layout is the responsibility of the end user.

Do not use vibrating pokers to compact the concrete. Facility must be provided for cable entry into the unit, through the side of the access turret. The electrician responsible for the wiring should be consulted, to ensure a correctly sized duct is provided. The installer is responsible for determining the concrete thickness and strength required for the actual ground conditions, taking into account the buoyancy of the unit when being de-sludged, external forces exerted by the water table, back-fill, traffic loads etc..

The installation should be carried out in accordance with the requirements of the Construction and Building Regulations. During the course of the installation, the following minimum equipment will be required: • Normal construction equipment and plant.

- Concrete with a minimum compressive strength of 20N/mm^2 (subject to site specific conditions that may require a stronger concrete) and 30-50 mm slump (initially 100mm).
- Rivets and waterproofing caulking for sealing the turret to the sump
- An adequate supply of fresh water to fill the sump at the same rate as backfilling.
- De-watering equipment as necessary.
- Lifting straps or ropes of the correct length and adequate safe working load.

GRP Tank Specific Installation Instructions

Instruction for the transportation, unloading, storage and installation of the separator are as set out in the relevant "Premier Tech Aqua Installation Guidelines" that are included with the tank order. Please note that the structural shell class must not be confused with the separator operation class:

- UTG9501 is used where tanks have a structural shell rating of 'Class 1' and the tanks can be backfilled with granular or concrete material.
- UTG9502 is suitable for the installation of a 'Class 1' or 'Class 2' structural shell tank for installation in concrete.

Please refer to the relevant UTG instructions for the installation works. The installation of the product must be carried out by a suitable qualified/approved installer. Any deviation from the requirements of the installation instructions could invalidate the product warranty.

Coalescing Filter Pod

Each separator is normally shipped with the filter(s) located in position within the tank. Although the filter pods are held in position by the seating arrangement it is possible that the pods may move during transport. As part of the commissioning process each pod will need to be re-seated in position once the separator is filled to its operational level with clean water. The pods can be removed as part of the installation process at the discretion of the installer.

Alarm Control Panel

It is not possible to state a specific installation configuration that would suit all sites. To ensure a safe and cost effective installation, the selection of current protection devices must remain the responsibility of the installer as the person best qualified to assess site conditions and supply configuration. It is therefore imperative that electrical installation of this equipment is entrusted to a fully qualified electrician. When installing the electrical supply the following points should be considered:

1. The supply to the unit should be provided through a dedicated circuit via isolation and protection devices consistent with the requirements for fixed equipment and in accordance with the latest regulations issued by the Institution of Electrical Engineers.
2. The supply to the unit should be fed through a dedicated MCB.
3. All connections made to the junction enclosure should be via correctly sized and rated glands.

Start-up & Commissioning

Following the installation process the tank should already be filled with clean water to the outlet/operational level of the separator. Ensure that the inlet to the separator is temporarily blocked until the unit is commissioned. On completion of the commission procedure the bung can be removed and the unit will be ready to treat surface water runoff.

The commissioning should be completed by a suitably competent and qualified individual/contractor. Where a Main Contractor has sub contracted any part of the works (including the alarm control panel and associated probe installation and commissioning) declarations must be obtained from each of the relevant Sub-Contractors responsible those parts of the works in which they were involved and the declarations should be kept with the O&M Manual.

5. Operation & Maintenance

Maintenance: General Requirements

The owner of the separator is responsible for its operation and ensuring that the effluent quality does not breach any Discharge Consent Standards. It is advisable to set up a 'Service Agreement' with an effluent disposal contractor who can provide 'automatic' and regular maintenance and advise you if any problems with the system occur. The owner is reminded that the existence of a 'Service Agreement' does not necessarily transfer responsibility for general maintenance which must be conducted in accordance with this operation and maintenance manual.

It is advisable to set up a 'Service Agreement' with an effluent disposal contractor who can provide 'automatic' and regular maintenance and advise you if any problems with the system occur. Any regulations and requirements for avoiding accidents and the handling of dangerous materials shall be followed and waste disposal should be by a licenced contractor.

Any documentation relating to cleaning and maintenance records shall be kept on site and made available to Premier Tech Aqua or any Regulatory Authorities upon request. The records will include the volume of materials removed off of site and should include remarks on specific events for example repairs, accidents, modifications etc.

Periodic Inspection

The requirements for Separator Maintenance are as set out in EN 858: Part 2: "Selection of nominal size, installation, operation and maintenance", Clause 6 "Operation, inspection and Maintenance". In accordance with the requirements of EN 858 maintenance of the system will

be carried out at least every six months by experienced personnel and shall include the following items:

- Determination of sludge/silt volume.
- Measurement of the thickness of light liquids.
- Checking the operation of the automatic closure devices (where applicable).
- Checking the integrity and permeability of the coalescing filter.
- Checking the function of the warning devices.

In accordance with the requirements of EN 858 intervals of at maximum five years the separator system shall be emptied and then submitted to general inspection covering the following items:

- Water tightness of the system.
- Structural Condition.
- Condition of internal linings.
- Condition/sate of electrical probes
- Checking the in position seating and condition of the automatic closure devices (where applicable.

All works or inspections associated with the installation must be adequately risk assessed and all appropriate control measures in place prior to commencement. In the interests of safety health and welfare at work inspections should be performed remotely wherever and whenever possible. PTAU recommend that all inspections are performed remotely using suitable IP, IECEx and ATEX remotely controlled equipment and that person entry into separators is only performed as a last resort and under strict supervision and control.

Coalescing Filter

Filter pod removal is required periodically to facilitate inspection of the filter foam and to clean the device as required. Please read the Health and Safety instruction in Section 2 and relevant plant O&M manual prior to removal of the coalescing filter pods. An explosive atmosphere may exist at or near the manways once the covers are removed; ensure there are no sources of ignition near the system prior to commencing the works and that the tank is allowed to vent for several minutes before filter pod removal.

Care must be exercised in any operation involving the coalescing filter pods, the items are robust while in the tank but are reasonable fragile during the removal process and can cause injury to the operator if not extracted correctly.

The foam used in the coalescing filter is a primary part of the treatment process and consists of reticulated polyurethane foam based on a polyether with an entirely open cellular network i.e. it does not contain any closed cells. The filter pods may be expected to last between major inspection and maintenance events as set out in BS EN 858; however, this is dependent on the duty on the separator and that the filter pods are adequately inspected and maintained as

necessary. The filter pods may last beyond this 5 year interval; however, filter pod usage should not exceed major inspection intervals or 10 years.

The filter pod coalescing foam should be inspected whenever the coalescing filter pods are removed from the separator. Exercise care when handling and examining the filter for as even a minor tare or rip will render the foam ineffective.

6. General Bypass Separator Technical Specification

Tank

Tank Structure:	Crystic 2-8500PA Glass Reinforced low styrene emission, pre-accelerated, orthophthalic polyester resin
Tank Liner:	Crystic 2-8500PA Glass Reinforced low styrene emission, pre-accelerated, orthophthalic polyester resin

Alarm and Alarm Control Panel (14300 or 14308)

Manufacturer: (14308) Darcy Products Ltd, Unit B7 Chaucer Business Park, Watery Lane, Kemsing, Sevenoaks, Kent, TN15 6QY
Replacement/Parts: (14300) Darcy Products Ltd, Unit B7 Chaucer Business Park, Watery Lane, Kemsing, Sevenoaks, Kent, TN15 6QY

Alarm Control Panel:	Separator Monitor Type 14300 (14308)
Certificate Number:	Baseefa 08ATEX0110/2 IECEx BAS 11.0095
Probes:	High Oil/Hydrocarbon (14005)*
*Mandatory	High Liquid Level (14011)**
**Optional subject to the local laws and regulations	Silt/Sludge (14220)**

Coalescing Filter

Coalescing Filter Foam:	FT-T20 reticulated polyurethane foam based on a polyether Density: 25 kg/m^3 Nominal Porosity: 15 to 25 pores per square inch

Typical[3] Bypass Separator Model Sizes

Area Drained (m2)	Tank Code inc. Silt	Length inc. Silt (mm)	Oil Storage Capacity (L)	Silt Storage Capacity (L)	Internal diameter (mm)	Overall Height (mm)	Base to Inlet Invert (mm)	Base to Outlet Invert (mm)
1667	CNSB3S/21	1400	45	300	1016	2200	1805	1755
2500	CNSB4.5S/21	1785	67.5	450	1016	1875	1270	1220
3333	CNSB6S/21	1975	90	600	1016	1875	1270	1220
4444	CNSB8S/21	2165	120	800	1016	1875	1270	1220
5555	CNSB10S/21	2485	150	1000	1016	1875	1270	1220
8333	CNSB15S/21	2670	225	1500	1210	1450	1450	1400

11111	CNSB20S/21	3115	300	2000	1210	1450	1450	1400
13889	CNSB25S/21	3555	375	2500	1210	1450	1450	1400
16667	CNSB30S/21	3520	450	3000	1510	1770	1770	1720
22222	CNSB40S/21	4090	600	4000	1510	1770	1770	1720
33333	CNSB60S/21	4415	900	6000	1880	2025	2025	1975
44444	CNSB80S/21	5225	1200	8000	1880	2025	2025	1975
55556	CNSB100S/21	6010	1500	10000	1880	2025	2025	1975

Larger capacity full retention separators are available on request to Premier Tech Aqua.

[3] Typical Conder® NSB separator sizes and the area drained are determined considering rainfall runoff only with a design rainfall intensity of 65mm/h. Where larger design rainfall intensities are required and/or where trade effluent forms part of the separator influent please contact PTAU Technical Department to assess the correct nominal size separator for your specific application.


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