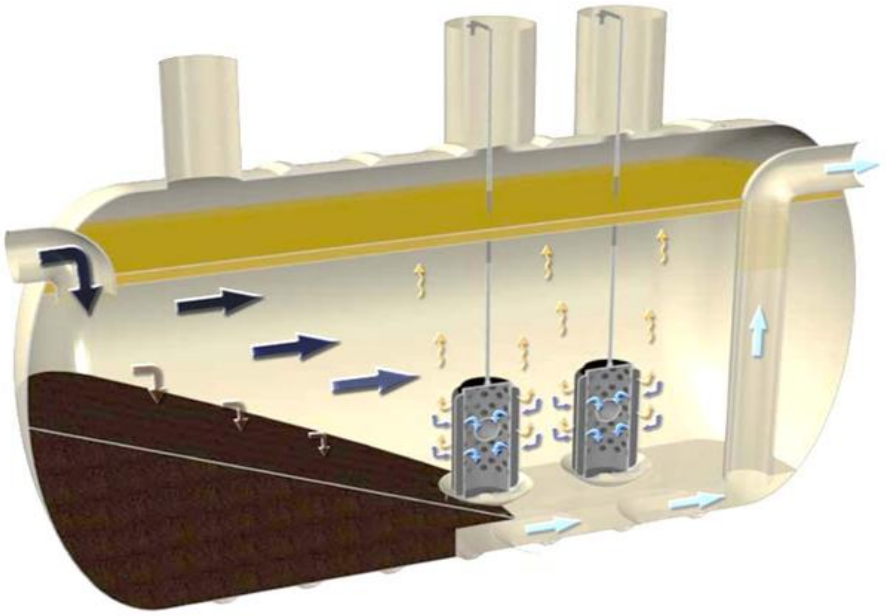
PREMIER TECH

OPERATING & MAINTENANCE GUIDE

TECHNICAL OVERVIEW

REWATEC™

CNS Full Retention Separators



Operating & Maintenance Manual – Technical Overview

Rewatec CNS
Full Retention Separator

Manual Version OM0029 CNS Rev 2

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To Safeguard Warranty Please Ensure You Are Using The Latest Installation Manual.

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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[1] and BS EN 858-2:
2003[2], for the design, use, selection, installation, operation and maintenance of prefabricated separators. The Rewatec CNS Full Retention 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.

Class 1 separators are designed to achieve a discharge concentration of less than 5 mg/litre of oil under standard test conditions[3].

Full retention separators treat the full flow that can be delivered by the drainage system. In accordance with EN 752[4] generally 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 full retention separator treats all of the flow passing through the unit.

The nominal size (NS) 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. Full retention 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 1 "principles of product design, performance and testing, marking and quality control"

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

[3] 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.

[4] BS EN 752 "Drain and sewer systems outside buildings", 2008 Incorporating Corrigenda October 2009 and November 2013

1. Health & Safety

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 this 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.

Please refer to the relevant Installation for installation specific guidance and instructions. General non-site specific significant hazards that are associated with the operation of a separator 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
- Being struck by falling objects
- Moving heavy loads
- Slips and trips
- Entrapment or crushing by a workplace vehicle
- Bad working positions, often in confined spaces
- Receiving injuries from hand tools
- Inhalation of dust
- Handling of rough materials
- Loud noise
- Vibration from tools or vibrating machinery

1.1 Confined Space

While generally it should not be necessary to enter the separator in accordance with maintenance requirements or in extenuating circumstances entry may become necessary; dangers can arise in the confined space because of the following issues:

- Lack of oxygen where heavier gasses or vapours displace breathable air.
- Poisonous gas, fume or vapour that can remain in the tank even after the system is emptied.
- A sudden filling of the tank where there is a failure of the inlet bung during maintenance that occurs in periods of high rainfall.
- Fire and explosion hazards from flammable vapours and liquids.
- Residues on the inner surface of the tank that can give off fumes/vapours and could also result in poor footing conditions.
- Hot conditions leading to a dangerous increase in body temperature due to poor ventilation.
- Injuries resulting in falls from a height; the access to the separator is at ground level but they are in excess of 4 meters deep.
-

You must carry out a suitable and sufficient assessment of the risks for all work activities to decide what measures are necessary for safety. All those involved in the works must be adequately trained in confirmed space and ensure that permit to work and safe systems of work is place for works within the tank and operations around the tank. The following checklist includes essential elements that must be considered when preparing a safe system of work, it is generic, not site specific and must not be considered as an exhaustive list:

- Appoint a supervisor with the responsibility to make sure that the necessary precautions are taken.
- Ensure that individuals involved with the works are competent and in adequate physical condition to complete the works. It may be necessary to seek medical advice on an individual's suitability.
- Isolate all mechanical and electrical equipment serving the tank ensuring that shut off valves are locked off and probes removed from the tank or disconnected as necessary.
- To minimise the build-up of gas, vapors and fumes and to improve footing the tank may be cleaned before commencement of the works.
- Ensure that equipment used by operatives is suitable and does not impact on the individual's ability to enter and exit the tank safely.
- Ensure that all openings to the tank are open and if possible, increase

ventilation using forced air/mechanical means to prevent the build-up of toxic gas, vapours and fumes.

- Testing the air may be necessary to check that it is free from both toxic and flammable vapours and that it is fit to breathe with testing being performed by a competent individual.
- Non-sparking tools and specially protected lighting are essential where flammable or potentially explosive atmospheres are likely.
- Breathing apparatus is essential if the air inside the space cannot be made fit to breathe because of gas, fume or vapour present, or lack of oxygen.
- Prepare emergency plans where emergency arrangements will need to cover the necessary equipment, training and rescue operations.
- Rescue harnesses should be provided with lifeline where the lifeline is run back to a point outside the confined space to assist in rescue operations.
- An adequate communications system is needed to enable communication between people inside and outside the confined space and to summon help in an emergency. A suitable competent individual may be required to communicate with anyone inside, raise
- the alarm quickly in an emergency, and take charge of the rescue procedures

2. Process & Performance

2.1 Description

Full retention separators treat the full flow that can be delivered by a drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 65mm/hour and are used where there is a risk of regular contamination with hydrocarbons and a foreseeable risk of significant spillages. The typical construction of a full retention separator is as indicated in Figure 1 Full Retention 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 x10 litres in accordance with BS EN 858, coalescing filters on a filter bed connected to the outlet.

All Conder full retention separators have an automatic closure device (ACD) fitted as standard. The ACD prevents accumulated pollutants flowing through the unit when maximum storage level is reached and will also shut off the outflow from the separator in the event of a hydrocarbon spillage.

The probes operate under gravity, The probes will be directly connected to the

DCS, hence no power supply is required.

2.2 Separator Operation

For Rewatec separators the removal of hydrocarbons in suspension in the incoming surface water runoff is performed by a foam coalescing filter with an integral automatic closure device. The filter causes fine hydrocarbons droplets to combine creating a sufficient agglomeration that buoyant forces cause it to float to the surface where it ponds and collects.

Filter pods are a primary part of the treatment process and are expected to last between major inspection and maintenance events as set out in BS EN 858. While inspections are included as part of the regular operational maintenance schedule it is recommended that after a major rainfall event additional inspection be performed to ensure continuing operation as intended with minimal risk to the environment.

The ACD consists of a mass balanced float that sinks to the bottom of its encasing chamber within the filter pod in the event that the fluid density in the filter pod reduces below that of water. At the bottom of the pod the ball seals the outlet to the affected filter pod preventing the passage of liquid. Once the float has blocked the outlet from the filter pod the pod has to be removed from the separator to reset the float.

Silt collects at the inlet end of the separator and an idealised distribution is indicated in 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. Actual sludge distribution for the site under consideration may vary from the idealised distribution and will need to be verified in operation to maximise storage volume and calibrate probe heights.

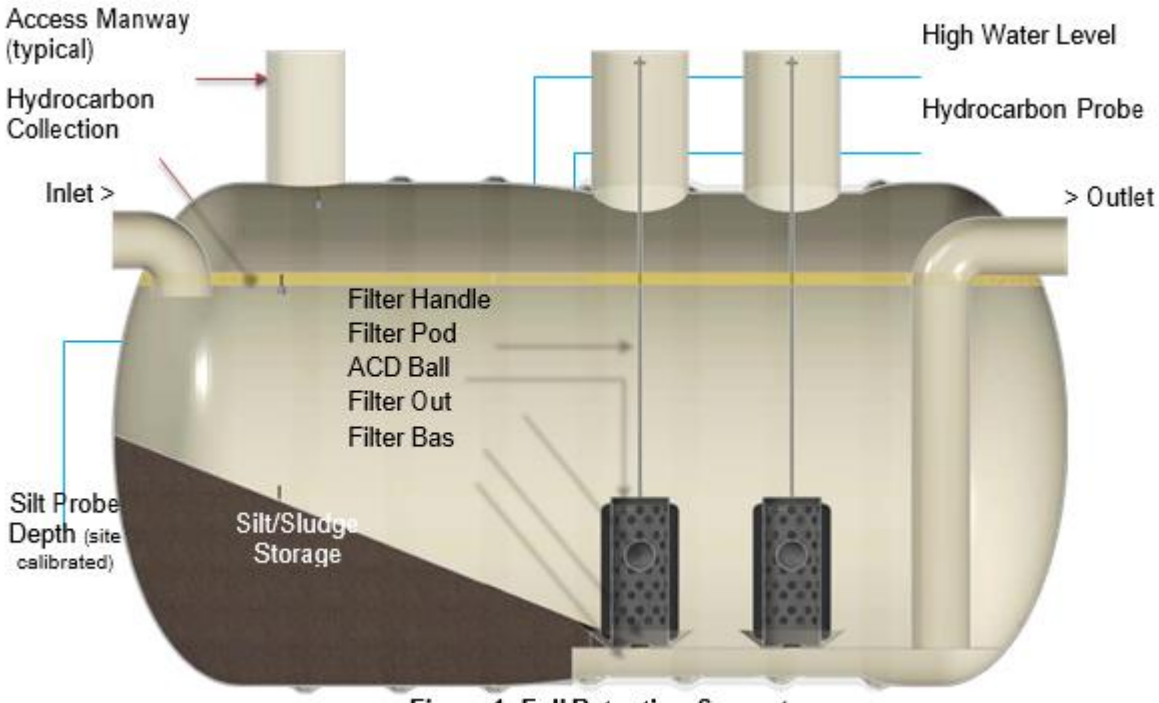


Figure 1: Full Retention Separator

2.3 Probes

The light liquid level probe is a twin output signal probe able to notify the user for the height of the hydrocarbon level in addition with potential spillages. Details with regards the technical features and the signals type of the probe are shown on par. 6.

2.4 Junction Box

The probe cables need to be connected in a junction box with those at the control panel. The box will be positioned in the turret and be ATEX certified (IP65). The necessary item should be sealed resistant and able to accommodate at least two inputs and outputs.

2.5 DCS System

The DCS will be provided by the installer/end-user and is the mechanism that will be in direct communication with the probes to signal potential errors.

2.6 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 considering 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 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 multiple vent pipes will be required i.e. one pipe from each turret.

2.7 Periodic Inspection

The requirements for Separator Maintenance are as set out in EN 858: Part 2: 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.
- 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.

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.

3.Installation

3.1 General

Please read the Health and Safety instruction above 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 UTG9501/9502 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 must 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, considering the buoyancy of the

unit when being emptied, external forces exerted by the water table, back-fill, traffic loads etc. The installation should be carried out in accordance with the requirements of regulations issued by the corresponding regulatory body. During installation, the following minimum equipment will be required:

- Normal construction equipment and plant.
- Concrete with a minimum compressive strength of 20N/mm2 (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. Silicon caulking is only suitable
- where hydrostatic water pressure is expected to be very low. Use a foil backed butyl flashing tape
- applied externally over the turret and tank joint where ground water level is high.
- 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 S.W.L.

3.1.1 Straps (Optional)

To promote stativity, use of belt straps is recommended, especially in the case that the tank would be buried underground. The number of straps that is required is two for every 10m^3 (e.g. for CNS100s that is 10m^3 two straps is required) (Details at the UTG9501/9502 document)

3.2 GRP Tank Specific Installation Instructions

Instruction for the transportation, unloading, storage and installation of the CNS are as set out in the installation guidelines (Conder Underground Tanks) at the UTG9501/9502 document:

- UTG9501 is used where the tanks are to be backfilled with granular material and is suitable for tanks structural shell.
- Please note that the structural shell class must not be confused with the Treatment or Operational Class.

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.

3.3 Filter and ACD Pods

Each separator is normally shipped with the filter pods located in position within the tank. Although the filter pods are held in position by the lifting and position handle 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 and the pods can be removed as part of the installation process at the discretion of the installer. Please refer to Maintenance Instructions regarding the correct procedure for removing and installing the filter pods. See details further.

4. 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; remove the bung once the plant is commissioned.

1. Remove the filter pod units in accordance with the instructions for Filter Pod Removal and maintenance ensuring the pods are in clean condition and that ACD ball is free to move within its housing
2. Lower the filter pod and ACD into the separator until it is firmly located inside the coned seating on the filter base of the separator.
3. Ensure that the positioning handle is in the bracket fixed to the separator turret and hand-tighten the wing nut to ensure the filter pod remains in position.
4. Ensure that the stilling housing tube for the hydrocarbon level probe is securely fastened to the relevant turret.
5. Set the depth of each probe, which is suspended off from its attached cable, to the correct level clipping or locking the probes in place.
6. It is advisable to connect the probe cables to a cable distribution box which should be fixed near to the top of the separator neck. The junction box must be IP65 rated
7. Remove the bung to the inlet of the separator and ensure all covers are in position.

5. Declaration

The Start-up Commissioning Checklist & Declaration should be completed by the Principle Contractor having control of the site during the installation of the CNS. Where the Principle Contractor has, sub contracted any part of the works (including the probe installation and commissioning) written declarations must be obtained from each of the relevant Sub- Contractors responsible for those parts of the works in which they were involved and the declarations should be kept with this document as part of the O&M Manual.

5.1. Start-up and commissioning declaration

It is confirmed that the CNS has been Installed and Commissioned in accordance with the requirements of BS EN 858, Premier Tech Aqua, Building Regulation and any Applicable Regulatory Body requirements. In addition, prior to bringing the CNS into service the following items are confirmed as having been checked as being operational:

- Each automatic closure device float is free to move within its filter pod housing.
- Each filter pod and the associated automatic closure devices are adequately seated in the filter floor housing.
- Each filter pod positioning handle is locked in place in the restraining bracket.
- A suitably designed ventilation system has been installed to vent any dangerous gasses from the separator without endangering any other installation within the site.
- The high hydrocarbon/oil probe is adequately fixed in place and set at the appropriate height within the tank as set out in the manufacturers' documentation.
- All manway access covers are in place.
- Sub-contractor written declarations have been returned and copies of these declarations are included in the O&M

Checked by: Signature:

Date:

Company name:

6. Maintenance

6.1 General Requirements

The owner of the Rewatec 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 licensed contractor. When working in or near a deep excavation or tanks, ensure all necessary safety precautions are taken to provide safe working conditions for site personnel.

All works or inspections associated with the installation must be adequately risk assessed and all appropriate control measures in place prior to commencement. PTAU recommend that all inspections are performed remotely using suitable IP, IECEx and ATEX remotely controlled equipment and that man entry into separators is only performed as a last resort and under strict supervision and control.

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.

Liquid should be prevented from entering and exiting the separator during maintenance and inspection operations and probe calibration.

6.2 6 Month (Max. Interval) 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. Note it should not be necessary to enter the separator as part of this typical 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.
- Checking the integrity and permeability of the coalescing filter.
- Checking the function of the warning devices.

In the course of normal operation of the separator any hydrocarbon and silt/sludge shall be removed as required. Before removing and replacing the filter pods it is necessary to ensure that any collected hydrocarbons are removed to prevent fouling of the coalescing filter foam when removing the replacing the filter pods. In the event that the hydrocarbon removal frequency is less than the six-month period between the required inspections it is recommended that:

- Collected hydrocarbons are removed from the system.
- The sludge/silt volume is checked and if necessary the separator is desludged.
- The integrity and permeability of the coalescing filter are checked once the hydrocarbons are removed.
- The operation of the automatic closure devices is checked while the filter pods are out of the separator.

6.3 Major (5 Year) Inspection

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.

Inspection should be by remote viewing/telemetry systems eliminating hazards associated with man entry into separators. The separator is considered as a confined space and any inspection, where man entry into the tank is proposed, must be carried out in accordance with the requirements of Confined Space Regulations and any national and locally applicable requirements or regulations.

7. Separator Details

7.1 Probe Calibration

The hydrocarbon probe level will be reasonably set from the design value and only minor adjustments should be required. Calibrating the silt probe to optimize silt storage is more problematic; the following is a suggested sequence of operation that can be used to determine a suitable operational site desludging frequency:

1. The initial depth for the hydrocarbon probe is set on leaving the manufacturing plant.
2. The silt probe is generally shipped loose with depths set on site based on the separator model and manway access arrangement.
   a. Where the silt probe is located in a manway used to remove filter pods the probe will be set at the filter base depth.
   b. Where the probe is located in an access manway remote from the filter pods the probe is initially set at one third the tank diameter measured from the tank invert.
3. On an alarm event for either the hydrocarbon or the silt storage arrangements should be made for the tank to be desludged and the collected hydrocarbons removed.
4. The depth of sludge/silt in the tank should be determined by taking a dip tape measurement and the value recorded to facilitate calibration of the probe. This will be more critical for case 2b above as the filter base sets the limit for silt probe in smaller units.
5. The volume of each material removed should be recorded for comparison against the rated storage.
6. Where the relevant volume of the material removed is at or near the rated value then the probes should not be adjusted; note it will be easier to obtain finer adjustments on the hydrocarbon probe.
7. In the event that the volume of hydrocarbon or silt material recovered is less than the rated value then the depth of the probes can be adjusted;
   a. Hydrocarbon probe depth can be increased by approximately 1mm for each 1% difference between the recorded and rated value i.e. recorded storage is 1800 litres which equals 90% of storage → increase the depth of the probe by an additional
   10mm. Where volumes recovered are greater than the rated value the depth of the
   probe must be reduced.

b. Silt probe depth can be decreased by 100mm for and approximate increase of 0.7m^3 of silt storage. Care is to be exercised when increasing the silt storage; it may not be possible to obtain the theoretical maximum silt storage within the tank if the operation of the filters pods will be affected.

8. Once the tank is desludged and the probes adjusted the filter pods should be extracted and inspected for contamination by suspended solids.
9. The process is repeated during the next hydrocarbon or silt alarm event with probes being adjusted as necessary. Once the tank is desludged the filter pods are again inspected.
10. In the event that filter pods are showing signs of increased silt/sludge soiling and/or if there are frequent high-water alarm events without excessive storm events this indicates excessive head-loss across the filter pod foam. The head loss is probably as a result of too much silt storage within the tank fouling the filters and the volume of silt stored should be reduced.
11. Once the separator probes are calibrated optimum de-sludging frequency will be a factor of either the silt storage volume for sites with heavily silted runoff or the hydrocarbon volume for sites with high concentrations of hydrocarbons in the runoff. It is expected that hydrocarbon accumulation will be the determining factor for de- sludging operations at the site under consideration.
12. An optimum de-sludging interval occurs when the silt and hydrocarbon both need desludging at the same time; however, it is not considered unreasonable to have to remove materials at different intervals based on the following guide:
    a. On high silt/sludge alarm hydrocarbons should be removed where sludge/silt removal is required to facilitate inspection of the filter pods.
    b. On high oil alarm where sludge levels are at less than 50% of actual tank capacity then hydrocarbons only need be removed and the filter pods checked.
    c. On extended high water alarm collected hydrocarbon should be removed, the tank de-sludged and the filter pods removed for inspection and cleaning as necessary. The foam or filter pod may need repair or replacement.

7.2 Coalescing Filter Pod & ACD

7.2.1 General

Please read the Health and Safety instruction in Par.2 prior to removal of the coalescing filter pods. Entry into the tank is not required for this operation. There may be a build-up of gas, vapor or fumes once the cover is removed therefore it is recommended that the tank is allowed to vent for several minutes before the filter pods are removed. 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.

Filter pod removal is required periodically to facilitate inspection of the filter foam, checking of the automatic closure device and to clean the device as required. 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. Liquid should be prevented from entering and exiting the separator during maintenance operations and probe calibration.

Ensure that the separator is filled with water prior to removing or installing the filter pod; installing the filter pod in an empty tank will result in the automatic closure device remaining closed. DO NOT extract the filter pod if there is excessive hydrocarbons/light liquid present as it will coat the filter foam and may impair the correct operation of the filter.

7.2.2 Installing The Filter Pod

1. Ensure that the inlet and outlet are adequately blocked to prevent the passage of liquids through the separator.
2. Ensure that the automatic closure device is freely moving within the filter housing.
3. Lift the filter housing by the handle (mechanical assistance can be used if necessary) and carefully guide the filter pod past the relevant manway access.
4. Carefully lower the filter pod into the separator; once the filter pod comes in contact with the water surface it is expected that there will be some resistance until all the trapped air has evacuated from the pod housing, do not use excessive force to push the filter pod under the water surface.
5. Once submerged the filter pod is quire buoyant ad mechanical assistance will no longer be required; remove or disconnect the mechanical lifting device.
6. Once the filter pod is fully submerged carefully lower the pod assembly into the separator until it is firmly located inside the coned seating at the bottom of the tank. To ensure the pod is correctly seated when lowering the pod keep the

filter pod handle vertical.

7. Once the filter pod is seated in the filter base housing lock the filter pod in position using the thumb screw in the handle retaining bracket located in the turret.
8. Remove the bungs or open the valves on the separator's inlet and outlet once all of the filter pods are correctly positioned.

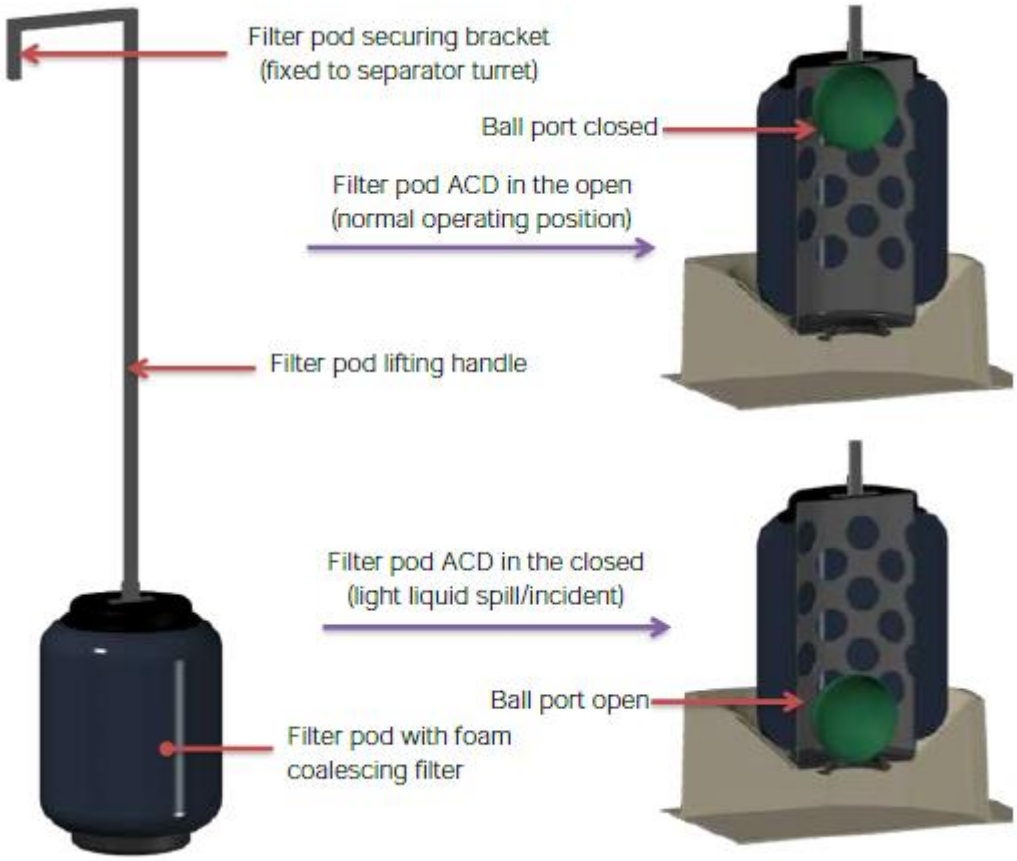


Figure: Filter pod and ACD (typical arrangement)

7.2.3 Removing The Filter Pod

1. Ensure that the inlet and outlet to the separator are adequately blocked to prevent the passage of liquids through the separator.

2. Ensure that collected hydrocarbon/light liquid is removed before removing the filter pod.

   Where the operation is part of desludging works de-sludge the plant before removing the filter.

3. Undo the thumb screw on the handle retaining bracket located on the turret.

4. Carefully begin to remove the filter pod by lifting the filter pod handle straight up. The filter pod will be quite buoyant at this point and no mechanical assistance will be required.

5. The rate of rise of the filter pod should be such that there is little resistance experienced as the pod is extracted; occasional surges of liquid to the surface may be encountered as liquid pressure equalizes within the filter.

6. If excessive drag is experienced while extracting the submerged filter reduce the rate of extraction accordingly, i.e. if the operator experiences resistance when lifting the filter pod or there is excessive lateral movement of the filter pod as it is extracted slow down the extraction rate.

7. Once the top of the filter pod is visible at the top water level of the separator there will be reduced buoyancy benefits from the water and the apparent weight of the separator can substantially increase (apparent weight can be up to 55kg while the water drains from the filter pod). A minimum of 2 people or mechanical lifting equipment can be used at this stage to prevent injury to individuals but care must be exercised to prevent damaging the filter.

. The filter pod should be extracted from the water within the separator at a maximum rate of approximately 20mm per second by hand or with the aid of mechanical lifting equipment to facilitate draining of the filter without damaging the filter foam. Note it should take approximately 1 minute to extract each filter pod from the water in the separator.

9. Once the filter pod is clear of the water surface and drained of any liquid the pad can be carefully lifted from the separator, ensure that the filter pod does not snag or get caught up on the manway as it is extracted from the separator.

10. Carefully place the filter pod on a suitable surface disconnecting the mechanical lifting equipment and ensuring there is nothing that can damage the filter foam.

7.2.4 Inspecting & Cleaning The Coalescing Filter

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. Without adequate maintenance, the filter foam may require replacing on an annual basis. It is likely that filters may need replacing in the event that the surface water sewer becomes surcharged. In any event while the filter pods may last up to the 5-year maintenance interval the filter foam should be replaced and usage should not exceed major inspection intervals of 5 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. The filter foam must not be removed from the filter pod for inspection or cleaning purposes. The following guide is applicable when inspection and cleaning the filter:

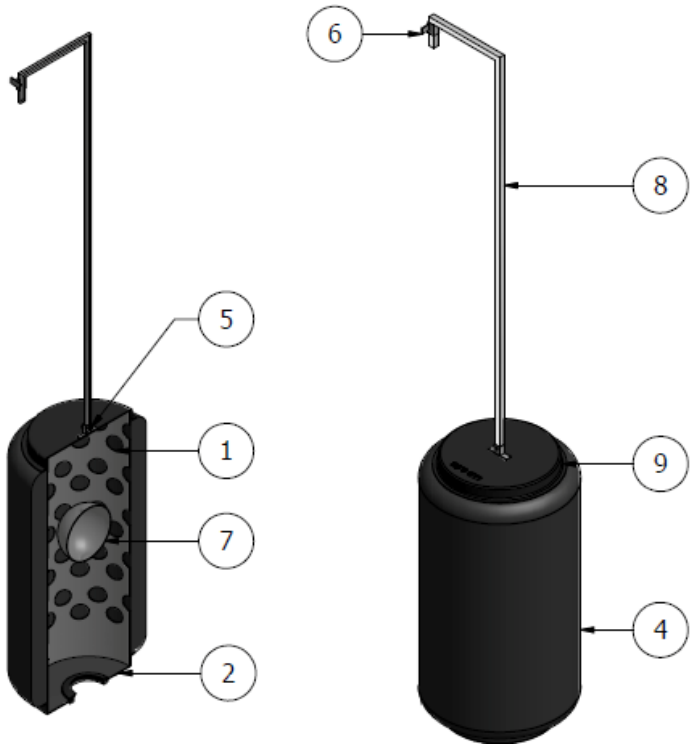
1. Initially place the filter pod on a surface standing in the vertical position or suspended from a mechanical lift device. It may be necessary to remove the filter pod extension handle if the pod is unstable in the vertical position when placed on a surface.
2. Perform a cursory inspection of the filter foam examining the material for any obvious signs of damage and any contaminants that may affect or damage the foam and carefully remove and such contaminants (plastic wrapping, twigs, etc.) by hand disposing of the waste to a suitable receptacle.
3. While still in the vertical position and positioned over a suitable catch basin commence cleaning of the filter pod coalescing foam. The catch basin can be located upstream of the separator so that any cleaning waste will pass through the separator once the separator is mad operational again.
4. Cleaning should be performed with a standard low-pressure garden type hose: do not use a power hose as this will damage the coalescing foam. A combination of a spray and direct flow may be required depending on the extent of cleaning required.
5. Suitable detergent may also be used to assist in cleaning the coalescing filter foam. Consult detergent manufactures' data as the suitability for use with the coalescing filter foam.
6. Where emulsifying detergents are used to assist in removing any surface contaminants; ensure that where detergents are used and the waste flows back through the separator that there is sufficient time allowed for the emulsified

hydrocarbon material to separate.

7. Once the coalescing filter foam is suitable cleaned perform a detailed visual inspection of the foam for defects. Where serious defects or tears are identified the filter, pod will need to be replaced. Suitable replacements are available from Premier Tech Aqua.
8. Where the coalescing filter foam is in adequate condition move the filter pod to a suitable position and onto a suitable surface where it can be laid on the side to examine the automatic closure device (ACD).
9. The chamber housing the ACD should be free of any debris that will prevent the float form moving freely within the housing. Carefully remove any debris that may be encountered.
10. While the ACD hosing may have some fine silt build-up it should not be excessively dirty unless the coalescing filter foam has failed. Light cleaning may be required with a standard low-pressure garden type hose: do not use a power hose
11. The operation of the ACD ball float should be checked by hand by physically rolling the float along the longitudinal axis of the housing.
12. Once the ACD, coalescing filter foam and general condition of the filter pod assembly are checked, cleaned and deemed adequate the filter pod can be put back into service.

The following figure is a typical coalescing filter with ACD. Generally the filter pod assemblies are a consumable item within the separator and will require changing out over time. The standard filter pod assembly is not designed to have the filter foam replaced on site. When replacing the filter pod assemblies please retain the stainless-steel handle and extension handle.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	FT2.5NS-PVC CTR VENT	CTR VENT PIPE
2	1	FT1.8NS-POLY BASE	GRP FILTER BASE
4	1	FT2.5NS-FILTER WRAP	FOAM FILTER WRAP
5	1	FT1.0NS-BRKT1	STAINLESS STEEL BRACKET
6	1	FT1.0NS-BRKT2	STAINLESS STEEL BRACKET
7	1	FT1.0NS-BALL FLOAT	BALL FLOAT
8	1	FT1 CNS HANDLE & EXT.	STAINLESS STEEL FILTER HANDLE
9	1	FT1.8-2.5NS-POLY TOP	GRP FILTER BASE
10	1	16964-150 GROMMET	



General Full Retention Separator Technical Specification

Tank

Tank Structure:	Crystic 2-8500PA Glass Reinforced low styrene emission, pre-accelerated, orthophthalic polyester resin
Tank Liner:	Crystic 199 high performance isophthalic polyester resin
Effluent quality	Effluent quality: ≤ 5.0 ppm of hydrocarbons (for influent >5.0)
Maximum temperature	60 °C (refers to lining)

Alarm and Alarm Control Panel IP65 (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	
Oil Probe (Essential)	High oil/Hydrocarbon probe (14005)

Water level probe (recommended)	High liquid level (14011)
Silt buildup probe, optional subject to local regulations and needs	Silt/sludge (14220)

ACD & Coalescing Filter Pod

Coalescing Filter Foam:	FT-T20 reticulated polyurethane foam based on a polyether Density: 25 kg/m^3 Nominal
ACD Ball	Weighted copper ball of SG 0.95

Typical[5] Full Retention 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)	Base to Inlet Invert (mm)	Base to Outlet Invert (mm)
222	CNS4S/11	1822	40	400	1016	1120	1070
333	CNS6S/11	2649	60	600	1016	1120	1070
444	CNS8S/11	2570	80	800	1200	1310	1260
556	CNS10S/11	3162	100	1000	1200	1310	1260
833	CNS15S/11	3094	150	1500	1500	1610	1560
1111	CNS20S/11	4041	200	2000	1500	1610	1560
1667	CNS30S/11	4249	300	3000	1800	1910	1860
2222	CNS40S/11	5566	400	4000	1800	1910	1860
2778	CNS50S/11	3869	500	5000	2500	2670	2620
3333	CNS60S/11	4551	600	6000	2500	2670	2620
3889	CNS70S/11	5234	700	7000	2500	2670	2620
4444	CNS80S/11	5916	800	8000	2500	2670	2620
5556	CNS100S/11	7281	1000	10000	2500	2670	2620

Indicative maximum transport height = Base to inlet invert height + inlet pipe diameter (Up to a maximum of 4100mm). Available upon enquiry.

Larger sizes from CNS100 up to CNS1000 can be manufactured as a single tank;
Different arrangement/diameters available upon request.

[5] Typical Rewatec® NS 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 PTWE Technical Department to assess the correct nominal size separator for your specific application.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