

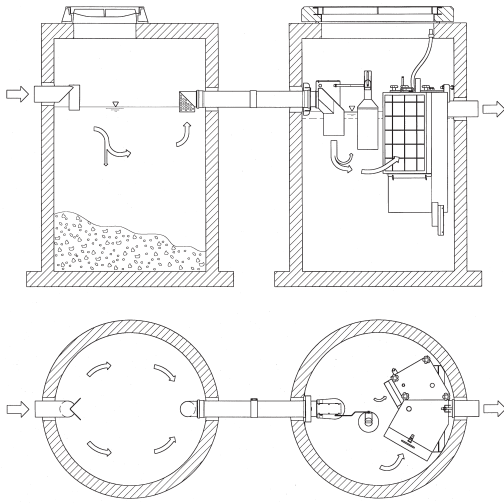
# ECOSEP

HIGH PERFORMANCE-COST  
EFFECTIVE BELOW GROUND OIL  
WATER SEPARATION

PRODUCT OVERVIEW  
INSTALLATION MANUAL  
OPERATION & MAINTENANCE



# THE GOAL IS PROTECTING OUR CLEAN WATER SUPPLY!



## With ecoSep you get high efficiency water separation that is cost effective.

In ancient times, turning water into wine was the miracle. Present day, however, mandates the miracle of turning polluted water into clean water again. Water needs to be separated from light fluids with a high degree of separation, the Ecosep accomplishes this miracle at an unbeatable low cost.

# TODAY'S ENVIRONMENTAL LEGISLATION IS HARD ENOUGH TO COMPLY WITH.

## ecoSep meets tomorrow's standards today.

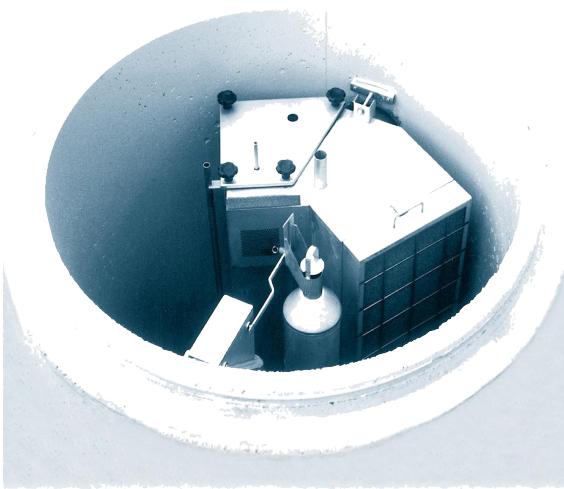
It's not just the Ecosep's long maintenance intervals and low waste-disposal costs that make it such a good investment, but also the fact that it is designed with future standards in mind. Ecosep permanently separates oil from water and allows virtually no oil emulsion formations to develop. The Ecosep far exceeds the strict European standards (DIN 1999 and EN 858) for performance. The outstanding independent testing certificates (available upon request) demonstrate that Ecosep will provide clean water that exceeds today's environmental standards. Ecosep also allows for tighter, future environmental discharge compliance guidelines to be met with little or no modifications to the system. Standard Ecosep units are available up to 320gpm, custom units available up to 1600gpm.

# STOP THROWING YOUR MONEY DOWN THE BLACK HOLE OF CONVENTIONAL OIL/WATER SEPARATORS.

## Put it where you can access it.

A standard 30" x 48" HS-20 traffic loading aluminum hatch provides full access to all basic elements of the Ecosep system. This minimizes confined entry requirements for routine cleaning and maintenance. Annual maintenance cost savings range from 30% to 50% lower than that of conventional separator systems. All internal stainless steel components are factory installed in a 5000 psi precast concrete structure, which accelerates the installation of the Ecosep Oil/Water Separator. This provides the first substantial cost saving in the form of reduced construction site labor.

# ECOSEP AT A GLANCE



## **30% to 50% annual maintenance cost savings**

Due to full access to all major elements and reduced or no confined space entry requirements for cleaning and maintenance.

## **High operational reliability**

No external energy supply is needed. No electrical parts and only mechanical, stainless steel components.

## **Automatic oil draw-off device**

This prevents emulsion from being formed and allows >90% concentrations of light liquids to be collected.

## **Catastrophic oil spill control**

A shut-off valve (patent pending) in the ecoSep's inlet provides an environmental safety factor, which every facility can afford to have.

## **Specified by NYSDOT & NYSTA**

## **Low disposal cost**

Only the oil is disposed of, not an oil-water mixture.

## **An investment that is built to last**

Thanks to the use of stainless steel and high strength precast concrete containers.

## **5 ppm separation**

The outstanding test results achieved at noted testing institutions show that ecoSep will be able to meet even tougher future standards.

## WORKING PRINCIPLE

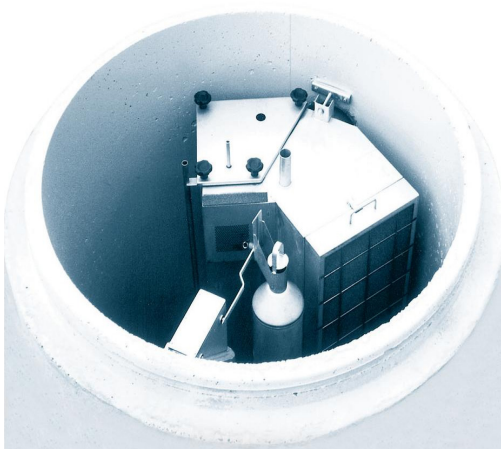
The ecoSep oil water separator is designed to separate free non-water-soluble light with a maximum specific gravity of 0.95 from water (petroleum byproducts such as gasoline, diesel and other mineral oils).

ecoSep does not separate

- Mechanically or chemically emulsified oils
- Vegetable oil or animal fat
- Solid Grease

The following kind of influent must NOT be treated with the separator:

- Flow rates exceeding the design flow rate of the system.
  - Substances, which could impede proper function (large quantities of suspended particles etc.)
  - Detergents and cleaning agents that form stable emulsions.
  - Wastewater inflows that are still influenced by pump, agitator or vibrator movements.
  - Wastewater containing chlorides
- 
- For pH values not within the range from 6 to 8, detailed water analysis need to be provided.



### Purification Step 1: Grit Chamber

The upstream grit chamber removes solids from the influent, thus ensuring unimpeded functioning of the oil separator itself. The grit trap is the first concrete tank of a standard two-tank design. The inlet apron guarantees an optimum usage of the retention time in the system. It works against the formation of so called "Eddy-currents" and thus enables maximum solids separation.

The grit chamber also compensates for influent temperature fluctuations, influent oil concentration influxes and initializes the separation of light fluids. A perforated 90-degree outlet tube retains floating solids from entering the separation chamber.

### Purification Step 2: Gravity Separation

The water is then admitted to the gravity separator via a float-actuated shut-off valve in the inlet. Being lighter than water, the oil floats on the surface. EcoSep can separate light liquids that have a specific gravity below 0.95.





### **Oil Spill Control**

The automatic shut-off valve stops the flow from the grit chamber either when the maximum oil storage capacity is reached or when a certain liquid level in the separation chamber is exceeded. In its closed position, the valve is tight up to 0,5 bar (5m-water column) or 16 feet of total dynamic head pressure. This makes the Ecosep the only separation system to provide maximum security for the facility owner against unexpected, unpredictable and catastrophic petroleum spills.

### **Purification Step 3: Coalescing Media**

In the residual oil media, fine droplets that are too small to be separated by gravity alone are accumulated into bigger drops that rise to the surface. This coalescing media is made of reticular (i.e. "net-like") soft polyurethane foam. The media-cartridge is very easy to lift out and reinstall once it is cleaned/rinsed with a garden hose. The outlet structure features a venting pipe that provides an effluent sampling port. The separated water that leaves the Ecosep has a residual contamination of free petroleum content of less than 5 mg/liter.

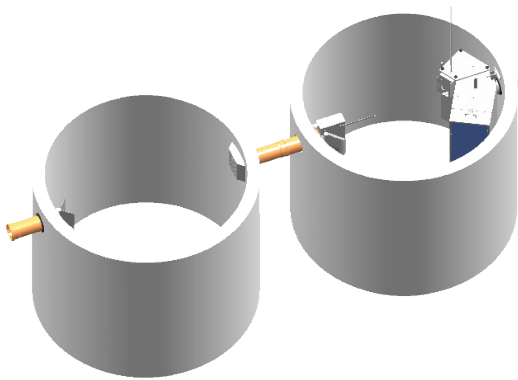
### **Manual or Automatic Oil Draw-off Device (ADD)**

Separators without an oil draw-off accumulate light fluids in direct contact to the water surface. Increasing emulsification at the oil/water interface is the result. Those stable emulsions which can no longer be separated by a physical method would leave the separator. Ecosep solves that problem. A standard version of Ecosep is equipped with a manual oil drawoff, a valve that can be opened and closed from grade to collect oil in the independent oil recipient. As an option, the patented automatic oil drawoff device (ADD) can be installed (US-Patent No.: 5,622,619). This ADD constantly removes accumulated light fluids from the water surface and stores them in the oil recipient.

The collected oil, which is free of any water, can be pumped through a standpipe and disposed of. The costly disposal of large quantities of oil and water mixtures is then eliminated. Facilities that have the ADD actually are paid by waste oil companies that service their Ecosep systems.



# INSTALLATION



## Preparation of concrete tanks

Manhole base to be used for the installation of the ecoSep components has to be prepared as follows:

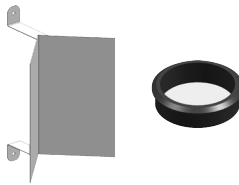
- Interior of base section coated with epoxy paint or lined with PE liner.
- Manhole base section must be set on concrete pallet and pallet leveled.

## ecoSep grit chamber

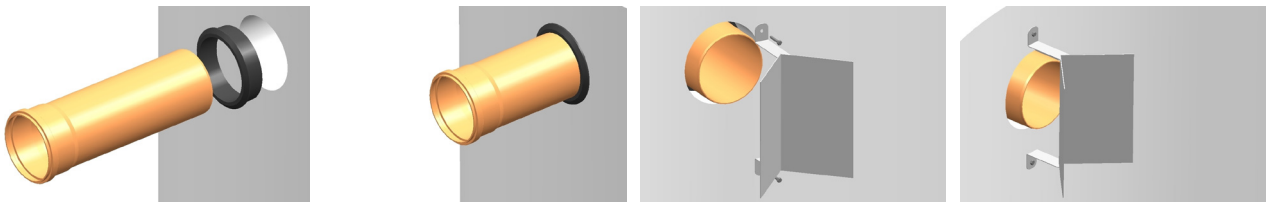
### Installation of the ecoSep inlet diffuser

Components required:

- Inlet diffuser for grit chamber (1x)
- Mounting material for ecoSep
- Existing inlet pipe (not provided)



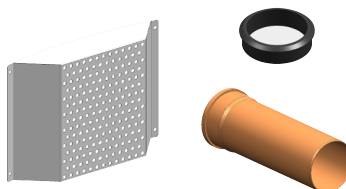
1. Core hole for grit chamber inlet at predetermined elevation.  
Hole diameter shall be adapted to the existing pipe diameter.
2. Seal the existing pipe towards the inlet opening of the grit chamber.
3. Hold inlet diffuser to the center of the hole and make marks for two anchor holes.
4. Drill 2 anchor holes using a 10 mm masonry drill bit to desired depth.
5. Insert provided plastic anchors.
6. Secure inlet diffuser with 2 stainless steel bolts that are provided.



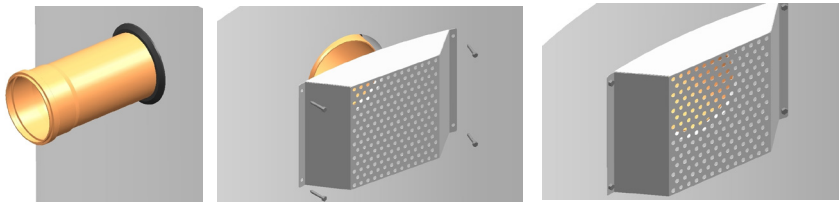
### Installation of the ecoSep outlet screen

Components required:

- Outlet screen for grit chamber
- Compression gasket NBR (1x)
- PVC pipe stub (500 mm long)
- Mounting material for ecoSep



1. Core hole for grit chamber outlet at predetermined elevation:  
 Hole diameter for DN100 NBR gasket: 138 mm  
 Hole diameter for DN150 NBR gasket: 186 mm  
 Hole diameter for DN200 NBR gasket: 226 mm  
 Hole diameter for DN250 NBR gasket: 276 mm
2. Hold outlet screen to the center of the hole and make marks for 4 anchor holes.
3. Drill 4 anchor holes using a 10 mm masonry drill bit to desired depth. Insert provided plastic anchors.
4. Insert compression gasket at the outside of the manhole and push a (500 mm long) PVC stub from the outside of the manhole into the inlet boot.

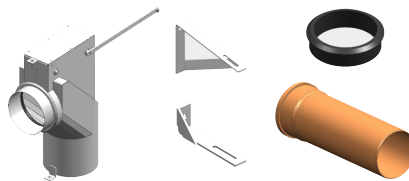


## ecoSep separation chamber

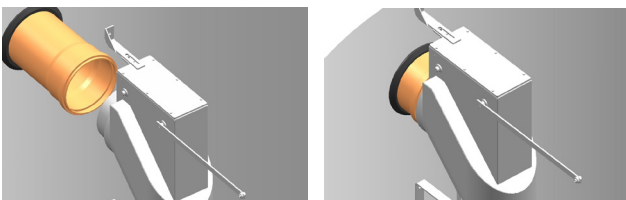
### Installation of the spill control valve

Components required:

- Spill control valve
- Mounting bracket for spill control valve 1
- Mounting bracket for spill control valve 2
- Compression gasket NBR (1x)
- PVC pipe stub (500 mm long)



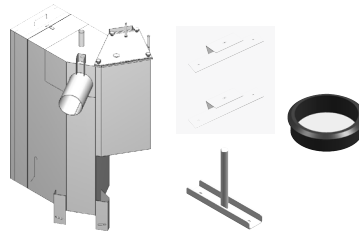
1. Core hole for spill control valve at predetermined elevation:  
 Hole diameter for DN100 NBR gasket: 138 mm  
 Hole diameter for DN150 NBR gasket: 186 mm  
 Hole diameter for DN200 NBR gasket: 226 mm  
 Hole diameter for DN250 NBR gasket: 276 mm
2. Mount both brackets to the valve as shown in drawing.
3. Insert compression gasket NBR at the inside of the manhole.
4. Lubricate and push provided orange PVC pipe from the inside of the manhole into the inlet boot.
5. Lightly lubricate the pipe stub of the valve and push it into the bell section of the PVC pipe and make marks for 2 anchor holes.
6. Drill 2 anchor holes using a 10 mm masonry drill bit to desired depth. Insert provided heavy duty anchors. Secure valve with 2 stainless steel bolts that are provided.



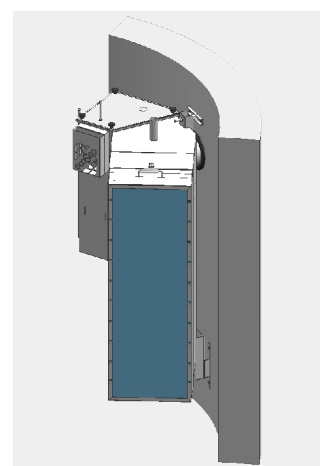
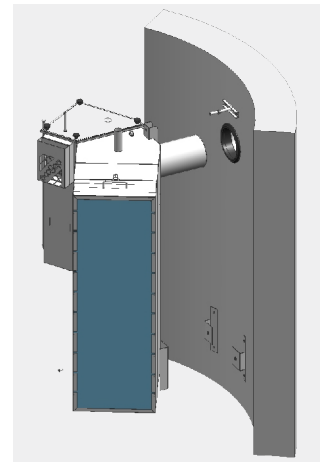
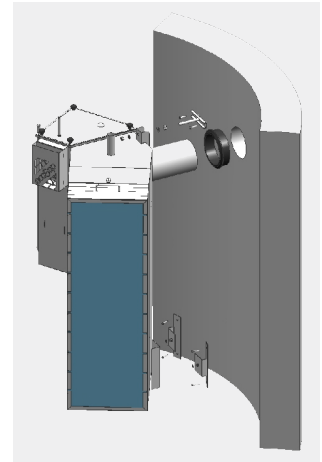
## Installation of ecoSep outlet structure

### Components required:

- Coalescing outlet structure
- Compression gasket NBR (1x)
- Holding device, adjustable (1x)
- Mounting bracket for circular structures (2x)
- Mounting material



1. Core hole for grit chamber inlet at predetermined elevation:  
Hole diameter for DN100 NBR gasket: 138 mm  
Hole diameter for DN150 NBR gasket: 186 mm  
Hole diameter for DN200 NBR gasket: 226 mm  
Hole diameter for DN250 NBR gasket: 276 mm
2. Insert compression gasket NBR at the inside of the manhole.
3. Using the prefabricated steel jig, mount in the outlet opening (lower of the two cored holes) and place in the installed gasket. Use a torpedo level to ensure the jig is level. After the jig is level, mark the six holes (2 in the top & 4 in the bottom of jig) to be drilled. Drill jig-marked anchor holes using the prescribed masonry drill bit diameter to desired depth. Insert anchors and secure.
4. Secure both mounting brackets for circular structures to the 4 bottom holes with stainless steel bolts that are provided. Do not tighten bolts down, leave brackets loose. Secure upper stainless steel holding device to the 2 top holes with stainless steel bolts that are provided. Do not tighten bolts down, leave bracket loose.
5. Lower the stainless steel outlet structure into the base section. Guide outlet structure into the base section to avoid scratching or damaging the interior coating.
6. A clevis is inserted into the bolt opening on the top flange of the outlet structure for lowering into base section. The clevis bolt must be inserted from the opposite side from the pipe stub so it can be removed after placement into the base section.
7. Stack dunnage to allow the stainless steel outlet structure to rest on once it is lowered into the base section.
8. Introduce pipe stub of outlet structure into the compression gasket and secure outlet structure with upper stainless steel holding device. Move structure to secure it to mounting brackets with two bolts (one on either side).
9. Remove the four black hand bolts and the stainless steel cover to reveal the internal level in the outlet structure. Adjust positioning of outlet structure until unit is level. Side to side leveling is done from the bottom brackets. Forward and back adjustments are done from the top mounting bolt. Once the bubble in the level is centered in the circle, tighten the bolts on the bottom bracket and the nut on the top mounting bolt.
10. Take a 6' length of pre-cut pressure hose and stainless steel clamp to the pipe on the side of the outlet structure.





## Location

The separator must be installed below grade, as close as possible to the source of run-off. When choosing the location, make sure that the separator as well as the grit chamber can easily be accessed for installation as well as for maintenance vehicles. As much as possible avoid any pipes or hydraulic structures that might cause turbulence upstream to the separator. To ensure unimpeded flow to and from the system, inlet and outlet pipes of the separation system should have a grade of at least 2%. Ensure that there is a firm standing area available on site to receive the units and they are securely stacked so there is no danger of units falling or rolling.

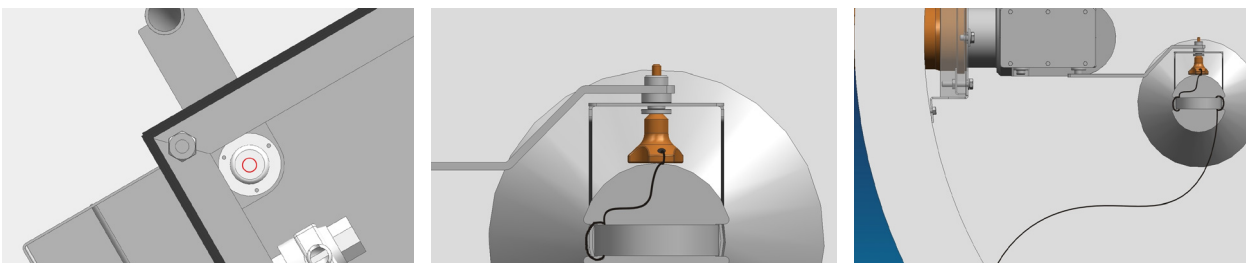
## PUTTING INTO SERVICE

To ensure an unimpeded functioning of manual or automatic oil draw-off device, the outlet structure of the system has to be level.

ecoSep oil water separator is equipped with a spirit level, which is located underneath the cover of the oil recipient. To level out the outlet structure, adjust the three bolts that hold the unit to the concrete tank. Before the plant is put into service, the system **MUST** be filled with clean water (unless it has been filled during a tightness test). Any materials left behind from installation (e.g. mortar, soil,...) must be removed prior to filling the tanks with fresh water.

**IMPORTANT:** Fill the separator via the grit chamber until the separation chamber is full and water leaves the separator through the outlet structure. Make sure that the float is disconnected from the float lever and the inlet valve to the separation chamber is open! The valve is open, when the float lever is in a horizontal position (see section Maintenance of spill control valve and float). Do not connect the float to the spill control valve unless there is sufficient water in the system.

After the system has been filled with water, carefully connect the float to the float lever. Make sure that the float is not getting submerged and the valve remains open! To avoid loss of the float and float-pin, we recommend to secure float pin with a thin wire and float with a light-weight rope.



**The separator is now ready to work.**

# OPERATION AND MAINTENANCE

## General

For an unimpeded functioning of the system, the separator has to be maintained periodically. All parts of the separator have to be inspected monthly, as well as after all non-routine events. Please report all damages to the system to the manufacturer.

All separated substances (grit, petroleum byproducts, and floatables) have to be pumped and disposed in time. To make sure that the separator is maintained properly, a person must be designated to this task. Please use the enclosed maintenance sheet to report maintenance work and other events related to the operation of the system. Due to the danger of explosions, it is strictly forbidden to smoke or light any flames anywhere near the plant, particularly after the cover has been opened.

Before entering the plant, remove the separated oil and make sure that the plant has been well ventilated. Entry into ecoSep oil water separator is considered to be confined space entry and as such all workover safety precautions for confined space entry must be strictly followed. Each worker entering the plant must be attached to a safety rope held by another worker staying outside the plant. We recommend wearing breathing apparatus when entering the plant (confined space entry). The access covers must fit correctly, and must be accessible at all times so that they can be lifted easily when necessary. They must not be covered with earth or any other material. The stated test loads of the cover slabs must not be exceeded.

An authorized specialist company must carry out the maintenance and emptying of the plants. The relevant maintenance and operating manual must be made available to this company. The substances collected when the plants are emptied must NOT be disposed of to the sewer, in standing or flowing water, or sewage treatment plants. They MUST be disposed of by being taken to licensed collection and recycling points. All damage to the plant must be repaired immediately. It is forbidden to make constructional changes to the plant, to interfere with its mode of action or to increase the dimensions of the inlet or designed flow rates.

## Removal of grit

Sediments collected in the grit chamber have to be disposed off on a regular basis.

## Cleaning of the media cartridge

The coalescing media cartridge has to be cleaned periodically. Since the maintenance intervals strongly depend on the very application, check the condition of the element weekly during the first two months of operation. To detach the filter cartridge from the outlet structure, release the quick lock on top of the cartridge and lift the filter on the handle. The filter media can be cleaned/rinsed with a pressure washer or garden hose. Drain the wash-water into the grit chamber of the separator. We recommend to insert a replacement cartridge while cleaning the filter element, alternatively shut off any flow through the separation chamber by sinking the float (note MUST ensure this is refloated after cleaning).

**IMPORTANT:** Do not expose the coalescing media to extended periods of sunlight or UV-radiation!

## Removal of accumulated oil

### Manual removal of oil

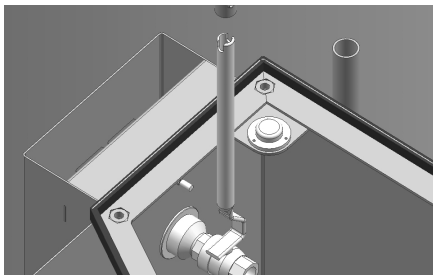
Accumulated oil can just be removed manually when there is no flow through the separator. Connect the handle to the extension of the manual draw-off valve and turn it 90° counterclockwise to open the valve. Drain oil into the oil recipient and close the valve before water can enter the tank. During operation of the separator make sure that the manual draw-off is shut.

### Automatic oil draw-off device

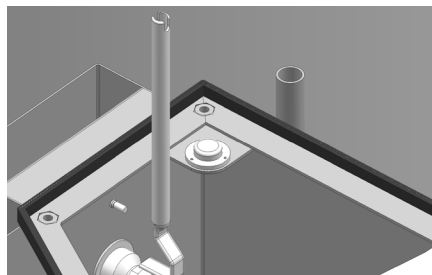
If your ecoSep™ oil water separator is equipped with an automatic oil draw-off device, please see our O&M manual for the ADD.

### Oil disposal

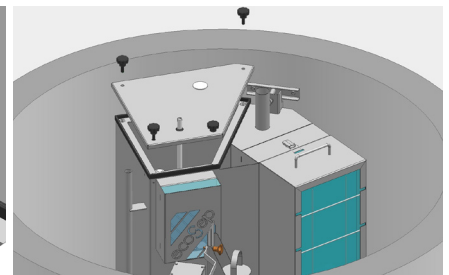
To check the liquid level in the oil recipient, remove cover of the recipient. If necessary, pump the collected oil through the standpipe of the oil recipient.



closed draw-off valve



open draw-off valve



oil disposal pipe  
(standpipe)

## Maintenance of spill control valve and float

The spill control valve at the inlet operates in two working conditions:

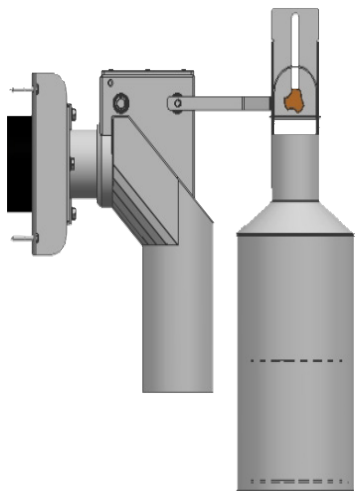
- Open valve: Float lever is in a horizontal position, the float is floating in water.
- Closed valve: Float lever is pointing downwards, the float is submerged.

During operation the valve is open, water is admitted to the gravity separator. The automatic shut-off valve stops the flow from the grit chamber either when the maximum oil storage capacity is reached or when a certain liquid level in the separation chamber is exceeded. To set the valve back to its operating condition after a spill, remove the float pin and detach the float from the float lever.

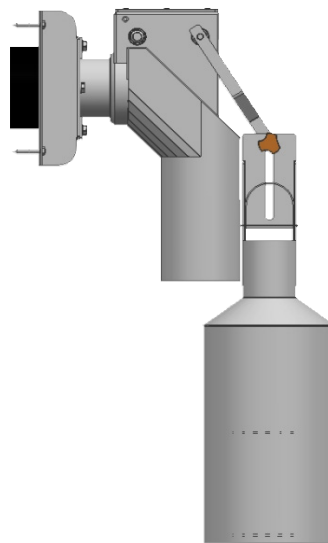
Lift out and empty the float. Pump the accumulated oil in the separation chamber and refill the system with fresh water. Use the float pin to connect the float to the float lever again. Make sure to release the float carefully so that it is not sinking. The valve should now be in its operating condition again. If the valve has been closed due to a backup in the separation chamber, please clean the filter element and set the valve back to its operating condition.

**Standard Maintenance:**

- Detach the float from float lever by removing the float pin (see picture).
- Check whether the float lever is free moving and the valve can be opened and closed easily.
- Check the condition of the gasket.
- To clean the inside of the valve remove lid and rinse with high pressure washer.
- If necessary, lubricate moving parts.



open valve



closed valve







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ECOTECHNIC

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