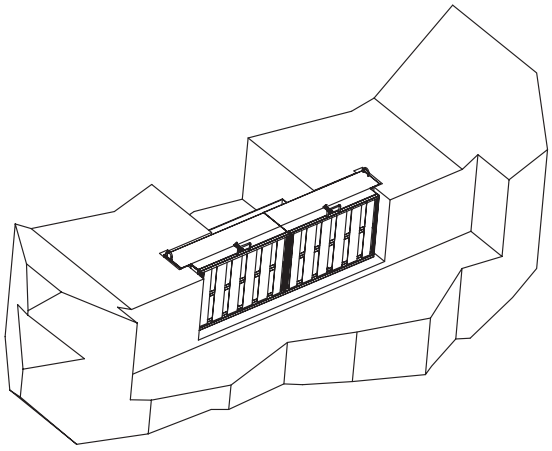
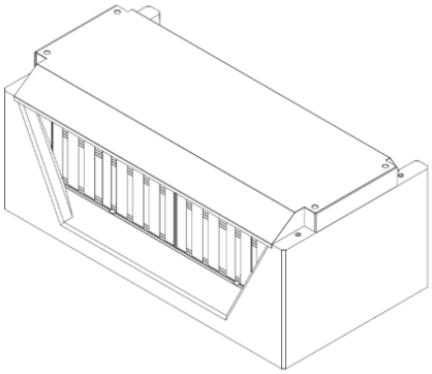
PURECO
THE PURE ECO

ENVIA® TRP AND ENVIA® BOX

DRFIT-TRAP AND LIGHT LIQUID SEPARATOR EQUIPMENT INSTALLABLE IN OPEN-SURFACE WATER-COURSES AND DITCHES

GENERAL OPERATION AND MAINTENANCE INSTRUCTIONS





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INTRODUCTION

This present operation instructions contains general information on the operation of sludge trapping and mineral-oil separating equipment type ENVIA TRP, manufactured and distributed by PURECO KFT.; it provides support to the operator of the equipment, enabling it to carry out this task even on its own safely from the environmental perspective. If the provisions of this document are met, the distributor undertakes to warrant the compliance of the effluent with the relevant provisions.

Light-liquid separator equipment are responsible for cleaning waters contaminated by mineral oils or by settling or suspended particles before such waters are introduced to their respective receiving bodies. Regular inspection and maintenance are preconditions for the effective operation of the equipment. The responsibility for damages due to insufficient or a completely missing maintenance and inspection shall rest with the operator, therefore you are kindly asked to carefully study and observe the provisions of this document. The operator is responsible for the surveillance of the equipment, so these tasks must be carried out even if the regular (6-monthly) maintenance is outsourced by a contract to Pureco Kft.

An anterior bottom and a covered ditch section constructed in front of the equipment are also parts of the process; these parts function as a settling area and a storage facility during the operations; it is important to construct these parts in accordance with the drawings, as they must be dimensioned in accordance with the expectable hydraulic loads and loads due to contaminants. A design aid is available for the dimensioning work. A final weir is installed as part of the equipment; this weir dams up the water on the upstream part of the ditch or water course; this way it creates the above-mentioned, natural storing and settling area, whose dimensions, length and volume, depends primarily from the design/slope of the ditch; this is made complete by a drift-trap „box"; this box should be installed under the flow bottom level of the ditch, made from prefabricated pavement elements for ditches and watercourse beds. The useful volume of this drift-trap box should be equivalent (in m3) with 1/100 of the rated capacity of the planned equipment, specified in l/s. The equipment, cooperating with the storage tank before it and with the drift-trap box work on the principle of separating physical phases; materials lighter than water flow up to the surface already in the storage area; materials, heavier than water settle down. The process components made in the equipment do not allow these materials to leave or to flow away through the equipment towards the saved side. After the installation is complete, construction debris and earth fallen into the equipment must be removed; with this the equipment is ready for operation.

The loads occurring as a result of the composition and the volume of wastewater must always be in compliance with the design- and dimensioning values.

For the cleaning of panelled surfaces, neither chemicals nor such agents that cause oils to emulsify or to get solved should be used. This equipment is not designed to retain detergents („washing agents") or materials harmful to waters (e.g. acids, alkali, or mineral salts).

DESCRIPTION OF THE OIL SEPARATOR EQUIPMENT

The separator equipment is installed in the way of stormwater flowing towards the receiver water course, typically in open-surface, paved channels or ditches. A prefabricated reinforced concrete unit accommodates the equipment; this element has an inlet side suitable to receive contaminated storm waters, joining to a drainage ditch section; it has an interim space suitable for separating light liquids, and it is also equipped with an outlet side to let treated water to flow away; its task is to create the dammed-up water-level necessary for the operations; the interim space is equipped with a filter insert.

A PATENTED PRODUCT. Application Number: P 07 00344

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Operating principles:

The stormwater to be treated flows through a lamellar frame (that can be pulled out for maintenance) located on the inlet side of the filter box; the lamellar frame has the following functions: energy-breaking; protection against frost and shading (protecting the coalescent filter material against UV-radiation).

The three main parts of the lamellar frame are the pull-out handle, the holding frame and the lamella sheets.

After that the water flows through the coalescent filter material that binds suspended micro oil drops that cannot flow up; it binds them on its surface due to its oilophylic and hydrophobic properties; when a sufficient number of micro oil drops are present and they are bound in sufficient vicinity, they coagulate to be an oil drop large enough to be able to flow up to the surface; the water flowing through the filter causes such drops to flow up on the other side of the filter.

The filter box has a self-supporting frame structure, which is made stronger by submerging wall(s) and weir wall(s), which are a must from the process perspective too.

The complete surface of the filter box is covered by a corrosion-proof steel shell. There are handles that serve the purpose of lifting out the filter box from its place. The water level inside the filter box is permanent, ensured by the last weir wall. The submerging wall(s) hang into the permanent water level; their function is to retain light liquids that float on the water surface. The role of the last weir wall could be played by a prefabricated reinforced concrete receiver structure, equipped by an appropriate weir edge, which is expressly intended to accommodate the filter box. Incoming water is spread inside the concrete structure in order to ensure that the loads by water are distributed over the total sectional surface of the filter box; as well as the concrete supporting blocks, made inside the concrete structure, should take up the water pressure the filter box is exposed to.

Sub-assemblies:

Prefabricated, reinforced concrete receiver unit:

This is a reinforced concrete structure, prefabricated at the manufacturing site, suitable for receiving the complete filter unit; it is suitable for connecting to the drainage-ditch section, and it carries the last weir wall that is indispensable from the process perspective. This unit is made in a design and size that meets the desired treatment efficiency requirements and the water flow volumes to be treated. When the water flow is more than the design water flow, excess water tip over the filter box; for this reason at least one row of concrete ditch-pavement panels must be installed, in order to protect the slope, at those sides of the prefabricated reinforced concrete receiver unit, which is parallel with the flow direction; also the narrowed-down parts of the ditch, necessary because of the installation of the reinforced concrete structure, should be provided with an appropriate pavement.

Dammed-up space and drift-trap box:
The characteristics of the space in which the water is swelled up by the weir wall of the prefabricated reinforced concrete receiver unit is that it creates an open-surface water-area and, at the same time, it has a longitudinal settling effect and a flow-balancing effect. The advantage of open-surface water storing is that it makes possible the departure of volatile contaminants washed down from the road pavement; further, the solar UV-radiation facilitates the degradation of hydrocarbons that flow up to the surface in the storing area. Through active evaporation the water level in the storing area gets lower, even to such an extent that settled drifts come out to the dry atmosphere (it may even dry out), which considerable simplifies the removal of drift from the drift-trap box; the quantity of hazardous waste to be disposed of lessens, as well as the fees of transportation and disposal in a landfill. Inside the dammed-up area, the water-bed must be paved up to the maximum, swelled-up process water level, and in a length of at least the length of the drift-trap box.

Cover plate to protect the structure against theft
There is a hazard of theft or injuring the filter box made from corrosion proof steel; for this reason we have equipped the unit by various mechanisms/parts that protect it against theft. One of such solutions is a cover plate (to protect the structure against theft) that covers the filter box over its top, and prevents it from catching the eye by its shine when viewed from the road; this plate also functions as a physical barrier for the removal of the filterbox. The cover plate is connected to the prefabricated reinforced concrete receiver unit. We fix also the filter box itself to the receiver reinforced concrete unit by bolts at plural points.

Flow-breaker lamellas:
At the point where the flow enters the treatment system, a flow-breaker is installed, which can be lifted out, but it cannot be removed from its place (see: the maintenance chapter). It has a construction that ensures that the energy of water is broken, and the flow is guided to the proper direction. As the water flow slows down due to the flow-breakers, coarse granules, sand, and sludge (eventually with adherent oil drops) settle down to the bottom, or into the drift-trap box, as they are heavier than water. The lamellas act also as the first delineating and supporting structure for the filtering insert.

Coalescent filter:
The water distributed by the flow-breaker lamellas flows evenly onto the surface of the filter, over the whole cross-section. The insert works on the coalescence principle: it retains suspended particles together with the oil contaminants that stick to such particles; these are stored inside the filter material; it also causes the micro oil droplets being in the suspended phase to cohere to its surface; then, after an appropriate size of oil drops is reached, it causes them to flow to the surface. The filter-insert material has a turquoise blue colour, which changes its colour due to the retained materials; the filter insert must be replaced by a new one when its original colour cannot be restored after washing.

Sludge-retaining wall:
The oily sludge that coheres to the filter material, and heavier than water, passes downwards in the filter, and collects at the bottom of the filter box. It is prevented from drifting away with the flowing water by an installed sludge-retaining wall.

Submerging wall:
This is a structurally integrated element; its task is to retain the oil caused to flow up by the filter insert, inside the dead flow area that occurs in front of the filter insert and between the insert and the submerging wall.

Weir area:
The flowing water enters another labyrinth, where, flowing through the combination of the weir- and submerging walls, its energy gets further reduced, and flows away.

Secondary, additional filter:
Its installation/application is justified when the water is discharged into receiving waters with stricter limit values, or when the installation site is exposed to increased risks (most probably the entering water is more contaminated). The filter insert material is identical with that of the above-mentioned filter; it plays a role in the further treatment of already treated water. It also provides additional safety for the receiver in those cases when the primary filter gets saturated, or when the incoming water has a higher velocity or a higher contamination level.

Weir wall and outlet channel:
This is the point at which the water leaves the process; the weir wall connects to the ditch on the outlet side, and it ensures a water level necessary for the functioning, inside the equipment. On the outlet side, a water-jump emerges after the weir wall, therefore the ditch must be paved in a length of at least 3 to 4 meters, up to the height of the maximum swelled process water level.

There are several variants for the process design of the equipment:

ENVIA® TRP
By using a prefabricated reinforced concrete receiver unit (it is not necessary to have a final weir wall placed in the filter box, as its functionality is ensured by the reinforced concrete receiver unit):

Coalescent filter in a single layer
- Flow-breaker lamella
- Coalescent filter
- Submerging wall
- Weir wall integrated to the concrete structure

Coalescent filter installed in two layers
- Flow-breaker lamella
- Coalescent filter I..
- Submerging wall
- Weir wall
- Coalescent filter II.
- Submerging wall
- Weir wall integrated to the concrete structure

ENVIA® BOX
Installed in an already existing reinforced concrete receiver structure, for instance when a previously built pearlite-type oil trap equipment is replaced; in such cases, when the existing reinforced concrete receiver unit is kept, the final weir wall placed in the filter box needs to be used, as the existing reinforced concrete receiver unit does NOT ensure that functionality.

Coalescent filter in a single layer
•Flow-breaker lamella
•Coalescent filter
•Submerging wall
•Weir wall

Coalescent filter installed in two layers
•Flow-breaker lamella
•Coalescent filter I.
•Submerging wall
•Weir wall
•Coalescent filter II.
•Submerging wall
•Weir wall

MAINTENANCE AND OPERATION:
General inspection:
the installed equipment must be visually inspected once in every 3 months. During the inspection the following must be checked:

- How much is the drift-trap filled up,
- Is there a floating oil-contamination on the surface of the storing area (is the water-surface iridescent)?
- Is the anti-theft cover plate at its place? As it intact and unharmed?
- Are there any debris or drift caught on that surface of the equipment that faces the flow (e.g. branches of trees, floating material, PET-bottles, nylon-bags, etc.)?
- Can the water flow unimpededly through the equipment?

Any debris or drift caught by the flow-breaker lamellas must be removed on the occasion of the inspection. The anti-theft cover plate should be removed from its place, and the moving part(s) must be checked (flow-breaker lamella, and the secondary filter frame). By lifting these parts out, the filter inserts can also be checked visually.
In accordance with the contamination of the filter inserts, the amount of drift stored by the drift-trap, and the presence of a floating oil film on the water surface, the date of the maintenance works and of filter cleaning must be established (immediately, within 1 to 2 weeks, within 1 to 2 months, or nothing needs to be done until the next quarterly inspection).

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Settled contamination, floating oil and large particles:
The separated and settled sludge must be removed from the bed of the water course/ditch, or from the drift-trap box from time to time, but at least once a year, according to the findings of general, 3-monthly inspections. With view to the fact, that the removal frequency, depending on the exposures, may be once a year (and the separated sludge may turn to be a hard layer in such a long time), it is not enough to remove only the liquid phase in such occasions. For the first step of cleaning, the floating light liquids must be removed from the storing area; these must be handled as hazardous waste. During the maintenance and

cleaning works (to be carried out at least once a year.) it must be ensured that settled and hardened sludge and/or sand layers should be broken up and removed, and the whole system be cleaned. The annual maintenance, or the removal of settled drift should be scheduled to take place after a sunny and dry period; by this time the major part of floating hydrocarbons in the storing area will have been decomposed as a result of solar UV radiation, and the water level in the storing area has got lower due to active evaporation (even to such extent that the settled drift comes out to the dry atmosphere (it may even get dried). This may considerably simplify the removal of drift from the drift trap box; the volumes of hazardous waste to be transported is reduced, as well as the fees of transport and disposal in a landfill.

As part of the maintenance works, the lamellar guiding plates must be washed by a high-pressure washing equipment; the washing direction must be opposite of the water flow direction, that is, from the weir wall towards the drift trap box. At the inlet side, the contamination caught between or settled out to the lamellas must be removed; also, when the lamellar board is pulled out upwards, and fixed, the saved side of the lamellar board can also be washed conveniently.

During the operations, care must be taken to ensure an unimpeded inlet path; when there are large amounts of floating pieces of drift, it must be removed from the system.

Filter insert:
In the oil separator, the coalescent filter separates floating, free-phase (non-bound) oil droplets, as well as it retains the residual fine sludge that floats in an intermediate phase. This fine floating material, that adsorbs typically a microscopic oil film, adheres to the filter surface, and blocks it after a while.

The filter bodies must be taken out from their place, and their cleanliness must be checked; these tasks must be carried out during the quarterly general inspections or more frequently, depending on the utilisation levels, and on the basis of operating experiences. When, during the inspections, the filters are found to be saturated by greyish-brownish fine sludge (a thin, oily fine sludge trickles down from the filter), then the filters must be washed through, under any circumstances. First the main filter insert must be pulled out, then the flow-breaker lamellas must be lifted out by a handle, and a securing pin must be inserted at the outlet side; then the insert should be tipped out from its frame to open the way for washing. You are kindly asked to exercise care during such works, in order to avoid injuries. After these actions, the filter insert can be cleaned by the following method.
The removed filter should be rinsed through by using cold water through a garden hose (it is FORBIDDEN to use high-pressure washing equipment or steam-shavers). The washing may take place in the vicinity of the inlet point, either on a paved slope that belongs to the drift-trap box section, or on the sole of a paved ditch-section in front of the drift trap ditch. After cleaning, the filter can be used again. It is practicable to wear rubber boots when washing the filters, by continuously trampling upon the filter. With view to the fact, that this is one of the most important components of the system, their cleanliness and/or continuous inspection is very important. When the filter is clogged by sludge, water cannot flow through it anymore; even with an increased pressure in the oil separator, the water cannot flow through the filter with proper velocity, therefore the water level keeps rising, resulting in water filling up the section in front of the equipment; in extreme cases the contaminated water does not flow through the technology, instead it may leave untreated over the filter box to the saved side. The saturation of the filter insert may be such, that the contamination retained by the filter insert gets washed out to the clean-water side, and leaves the

equipment.

Please **do not let the equipment get to such a condition** (non-operational condition, improper treatment). Please note, that the operator can be called to account in such cases!

CLEANING THE FILTER BY SOLVENTS OR BY CHEMICALS IS FORBIDDEN AND UNNECESSARY!
It is not recommended either to use high-temperature steam shaving for cleaning, as it may cause damages to the filter. It is recommended to replace the filter once in 2 to 4 years (depending on its utilisation level), or to have it replaced by the supplier.

The separated oil can be removed by a mobile oil skimmer equipment (this is carried out by the supplier under a maintenance contract).

After the cleaning/washing operation is complete, the insert should be tipped back to its place, then the lamellar board should be lowered and fixed at its own position.

When stormwaters need to be treated to achieve stricter treatment limit values (SZOE<2 mg/l), then a secondary filter must be installed in the system. In a two-stage treatment equipment a secondary filter is installed. The frame that holds the filter should be lifted out by a handle on the frame; after fixing it, the insert can be tipped out from the frame (after the delineating grill has been removed). The cleaning process is the same as for the main filter.

When the inserts are put back to their place, care must be taken to ensure that they sit exactly at the place they are intended to.

In the cleaning process, also the prefabricated reinforced concrete receiver unit, and the stainless steel fittings must be washed down. For these units it is recommended to use high-pressure cleaning equipment, by continuously sucking away the water used for washing as well as the contamination. In the case of TRP type equipment, a mobile pump can be placed in the area in front of the weir integrated into the concrete unit, on the outlet side; with this pump, the water produced during washing and considered to be a hazardous waste, must be recirculated to the drift-trap box, already cleaned.

EMERGENCY EVENTS
If an emergency event occurs in the water-catchment area of the water that goes into the equipment, the equipment is able to contain spilled hazardous wastes, as a result of its combination of submerging and weir walls, up to the volume of the storing area in front of the equipment; anyhow, immediate action must be taken, the retained materials must immediately be removed, and an overhaul of the equipment (as described above) is needed. Please, give us a call!

The general accident-prevention rules must be observed in the maintenance works of the equipment, with special view to the provisions for the treatment of hazardous waste. Maintenance works must be carried out only under supervision!

Increased attention must be paid to the danger of skidding! **During maintenance, it is strictly FORBIDDEN to smoke or to use naked flames!** When work is being carried out, the equipment must be cordoned off!

The material removed from the oil separator (oil, oily sludge) is considered to be a hazardous waste, which must be treated in accordance with the relevant provisions! Such materials must be disposed of by such companies only that hold authorative licences for such operations. The Employer or the responsible Operator shall be obliged to check if such a licence is held by the assigned company! An operation log must be maintained on the operation of the equipment, in which the following data must be recorded: inspections performed, maintenance and other operations; the events when hazardous wastes are disposed of, and the removed quantities.
Should you have any questions in connection with the operation of the equipment, please contact our colleagues at:

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