INSTALLATION, OPERATING, SERVICE AND MAINTENANCE MANUAL FOR OIL SEPARATOR AS - TOP

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AS-TOP

CONTENTS

1. TECHNICAL DESCRIPTION

1.1 Generally

All plastic oil separators AS-TOP belong for their purpose and construction into category of "Water treatment and cleaning devices" (number of customs declaration tariff 84212190)

They are designed for catching and separation of free oil substances (OS) from polluted waters. Such a cleaned waters can be drawn into the water course or municipal sewerage or they can go to other cleaning (for example chemical etc.), in case they are in accordance with water-law resolutions, esp. Regulation of Government of the Czech republic no. 171/92, which determinates the index of tolerable level of the water pollution. Basic materials for design and placement of the separators are investors`, territorial planning authorities` and water management authorities` demands.

1.2 Usage

Separators are used for cleaning the waste waters from industrial plants, mechanization centres, lay-by and parking areas, petrol stations, washing ramps, agricultural farms etc. it means there, where OS leakage of a various quantity into the surface waters. Separators are able to clean the water with free OS with a density up to 950 kg/m^3 and ignition point min. 55 ^oC (petroleum, mineral oils).

The water including petrol cannot be drawn into the separators from a safety reason. The separators are not efficient for cleaning the waters polluted with emulsified oil substances.

1.3 Description and function

1.3.1 General description

Separators are made in various types and dimensions. The basic material for separators AS-TOP is integral polypropylene. It is used for tank, dividing walls in the tank, parts for placing the technology, filter carriers, tank cover, superstructures and entry shafts. The suitability of the material was proved by the State probationary office ITC in Zlín.
The whole structure is thus made of plastics, non-corrosive, without any requirements for another anti-corrosion protection, lightweight, and can be easily moved.

The tank of the separator is made in two basic types:

A./ SELF-SUPPORTING TANK
The structure is designed in order to resist the ground pressure after back filling without any other structural or static measures. The tank is statically prepared for static load of a back filled ground with these parameters:

mensural weight 1900 kg/m^3
inner friction angle 35^o

The cover of the tank is possible to be loaded by a layer of a ground max. 330 mm and furthermore to be loaded by an immediate load max. 4 kN/m^2. The tank can be put by its bottom max. 3000 mm deep under the terrain from the static reasons
The above mentioned facts must be taken into consideration when installing the tank and when it is necessary, the other static measures have to be done (for example concrete, stabilisation of the ground etc.). The tank is neither designed for other casual loads like a pressure of passing vehicles, building basements etc.

B./ NON SELF-SUPPORTING TANK
The plastic structure serves only as a technology carrier ensuring the waterproofing. It is designed strictly for placing into the concrete only or for other placing which ensures good static stability and solidity of a structure regarding the ground pressure and other casual loads.

The basic performance of a tank is provided with a plastic cover (ceiling) with holes enabling the service and maintenance of the separator. The cover – without special preparations -cannot be walked on (see art. 3.3).
The way of the entry to the separator, the cover of the tank and the hole covers according to its placing in the terrain must be solved in a building project. The possible examples of the solutions are in art. 3.3.

The inlet polypropylene pipe is prepared in accordance with inflow pipe of the sewer system (enabling to insert it into the PP pipe), the outlet PP pipe is also in accordance with piping of the sewer system according to project documentation. Waterproofing connection is carried out by a mean of caulking and silicon seal. As concerns the directions of the inlet and outlet of the separator – it can be also adapted according to requirements of the local conditions.

Above the water level in the closed tank placed under the terrain there is an environment specified by the ČSN 33 2000-3 BE 2N3 – fire danger of the flammable liquids.

Basic technological parameters of the separators are designed in accordance with DIN 1999, ÖNORM B 5101 and ČSN 75 6551.

1.3.2 AS-TOP P type – basic type
The oil separator consists of the tank, where the dividing walls create individual functional spaces. The inlet part slows down the inflowing stream of water and it is created by a canalisation wall, which divides the stream evenly. The sedimentation part is designed for catching the buoyant substances and settling the sedimenting substances. The separation of oil substances in this part is partial. The separated sludge is accumulated in a sludge part on the bottom of the sedimentation area. The water from this part comes through the first coalescent filter and scumboard into the second functional part of the separator – separating part – this water is already mechanically pre-cleaned. The separating part is divided into calm area and the main coalescent filter with collecting and storage areas of a separated oil substances . Through the lower opening and the outlet shaft flows the clean water out of the separator into the outlet drainage. The higher part of the outlet shaft is used as the extraction place of samples for time-to-time check of the quality of the clean out-flowing water.
Both of the coalescent filters have special fillers of the various porosity made from polyurethane foam AS-ISP. They are easy to regenerate by the only washing and they guarantee really low values of the oil substances in the outlet – **under 5 mg/l**.

1.3.3 AS-TOP PS type – basic type „P“ with sorption part for extra low effluent values

1.3.4 AS-TOP VF type
The separator is designed for organisational and parking areas with low content of oil substances in waste rain waters (max. 30 mg/l). It is suitable for example for parking and lay-bay areas near supermarkets, motels, city and periphery parking places and many other large surfaces for parking cars and trucks without any other manipulation with oil substances. The separators VF can be connected into large structures for big water flows for example 204 l/s and higher.

1.3.5 AS-TOP VFS type - basic type „VF“ with sorption part for extra low effluent values

1.3.6 AS-TOP MINI type
This type is a variation of a basic type P. Separators AS-TOP MINI are designed for a max. discharge of a 0,6 l/s, for use especially in garages, and similar parking places under the roof and without rainfall discharges.

1.3.7 AS-TOP XX type – atypical separators on the customers request

1.4 Technical parameters

Basic technical parameters of each type of separator are stated in the prospectus or on the internet page www.asio.cz – Czech version is better.

Coalescent filters are filled with a special foam (polyurethane on the polyether) with opened pores with following technical parameters:
- specific foam weight ..... 25 kg/m^3
- tensile strength ..... 120 – 135 kPa
- resistance to temperature ..... –40 - +100 ^oC
- compressibility ..... 40 % compression at 5,0 kPa
- stretch properties ..... 80 – 100 %

It matches up to dissociative capacity according to standard DIN 24 185 – EU 1 – EU 4 class.

1.5 Identification

Separators are equipped with a production plate with following dates:

- name and seat of the producer
- protective mark of the of the producer
- type
- production number
- date of production
- standard
- transporting weight
- discharge (l/s)

2. MANIPULATION, TRANSPORT AND STORAGE

2.1 Manipulation

Take care when handling, with consideration to the plastic materials used on the separator (lower impact resistance).
Before handling the separator, it is necessary to check its overall condition, especially the solidity of the ropes. Further it is necessary to check that all the inner spaces of the separator are free of the unproper objects and rain water. It must be drained before manipulation.
The separator shall be manipulated with a crane with a minimal loading capacity according to the type of the separator and its weight (the loading capacity of the crane determines the designer). As the mean of bonding for the manipulation shall be used four-hook corresponding with the weight of separator, with minimal length of 3,6 m.
The manipulation must be done only by the mean of the ropes on the tank and with the maximal consideration to the lower impact resistance of the material.

It is prohibited to manipulate with the separator anyhow during winter – when the temperature is below -5 ^oC – the damage may occur.

2.2 Transport, storage

AS-TOP separators are delivered as complete and assembled. Installation on the building place is done by the purchaser, starting the operation and service staff training is done by a supplier or authorised service centre.
When transporting the separator it is necessary to use a mean of transport of the corresponding loading capacity and dimensions.
When transporting and during a storage before the installation of the separator, it is necessary to put it on the corresponding flat and solid surface and prepare conditions which eliminate the possibility of any damage, unauthorised handling or the possibility of injury.
For a longer storage (more than 2 months), the shading of the separator against the solar radiation must be prepared (the material of the separators is not UV rays resistant).

3. PLANNING, SETTLEMENT AND INSTALLATION

3.1 Building preparedness

The building preparedness must be carried out according to accredited plan made by a competent person, who requests the proper materials from a supplier. The separator can be settled into the ground in several ways. First, a pit must be excavated with corresponding ground dimensions and a concrete foundation board must be prepared. In case of a high level of a ground water it is necessary to lower the level under the board before concrete works by drawing off.
The separator must be partially or completely cased with concrete with regards to a ground water level in order to prevent its damage by a water uplift pressure.
Other necessary concrete works result from a project and depend on a type of the separator (see art. 3.3). Settling of the separator consists of its placing on the flat concrete foundation board with an accuracy ± 5 mm, connecting to inlet and outlet pipes, filling the water into the separator 1 m high and back filling the soil or concrete works. Filling with water and filling back the soil or the concrete works must be carried out concurrently.

3.2 Installation description

- The ground water level must be lower than the concrete foundation board before starting the installation.
- Check, that the flatness of the foundation board is within the permitted toleration in all directions ± 5 mm and make a report about the measuring (either the local flatness either the overall flatness of the board are thought). Also the solidity and the thickness of the foundation board must correspond with the load capacity of the ground and the weight of the tank full of water.
- Check overall condition of the separator with stress on the manipulation ropes. When finding out any damage (especially on the tank) contact the supplier immediately in order he fixed it before the settling into the pit.
After settling the separator on the foundation board the purchaser in every case fills in the tank with 1 meter of water
- In those cases when the ground water level is higher than the foundation rift, the purchaser shall carry out the casing of the base of the separator with concrete up to the height determined by a designer on the base of the static calculations
- In case of casing with concrete the whole tank of the separator (when the self-supporting tank cannot be used – the designer judges) it is necessary to secure the inside of the tank against the concrete press for example with parallel filling of all the inner spaces of the separator with water and wooden props.
Be careful to support also the cover of the separator in case it is used as a loosing boarding of reinforced concrete ceiling board.
- Before back filling the soil around the tank - in case of settling without the concrete – it is also necessary to fill in the tank with cca. 1 m of water and add more water together with back filling of soil which must be also done evenly layer–by–layer.
- Before back filling the soil, the waterproofing connection to the inflow and outflow of the sewer system must be carried out
- Invite supplier or authorised service company to start the operation of the separator and train the service staff
- After back filling the soil and finishing the terrain it is necessary to allow safety access to the separator and secure the separator against the access of unauthorised persons.

3.3 Settling the separator into the terrain

When settling the separator into the ground it is necessary to respect the type of the tank – see art. no. 1.3.1. The way of settling must be solved in an accredited project carried out by a competent person.

Possible ways of settling

A – modification with concrete
Used for non self-supporting tank with big static weight down (under the roads, near the foundations of the buildings, roads, in large depths etc.). The tank itself with the cover (ceiling) can be used in this case as a loosing boarding. The access shafts and its covers are not the object of delivery of the separator.

B – modification without a cover
Used for self-supporting tanks (settled in green areas) or non self-supporting (settling with A). For settling type it is necessary to respect instructions stated in art. 1.3.1.
The tank of the separator is enlarged by an extension to a max. height of 3000 mm and it is without a cover. The covering of the tank is done with divided plastic covers (it can be an object of the delivery of the separator) or it can be solved individually (wooden planks, sheet metal). The plastic covers cannot be walked. When they are removed, the whole inside of the tank is accessible.

C – self-supporting modification
Used for self-supporting tanks settled in green areas. The height of the tank can be adapted to the depth of the settling below the terrain level. The extension is for maximal height of the tank of 3000 mm. The maximal height of the soil on the cover is 330 mm. For settling type it is necessary to respect instructions stated in art. 1.3.1. The ground over the separator can be loaded by an accidental load of 4 kN/m^2 at the maximum. Access shafts which are the part of the cover can be equipped with plastic covers, which are an object of the delivery (the covers cannot be walked) or cast-iron covers according to ČSN EN 124, which are not the object of the delivery of the separator.

3.4 Starting the operation of the separator and presentation to the customer

The order for starting the operation of the separator must be always given to the supplier or an authorised service company before the back filling of the soil.
The future operating staff must be present on the starting the operation of the separator because the training is provided at the same time.
The starting the operation consists of:
- check of the completeness and the integrity of the delivery
- check of the flatness of settling
- check of the easy removal of the fillers of the coalescent filters
- possible adjustment of the overflow edges
- the staff training
- handing over the documentation

Starting the operation and presentation of the separator is finished by an Installation and Conveyance protocol, which includes a record concerning the operating staff training with names and signatures.
At the same time the following technical documentation is handed over to the customer:
- warranty certificate
- record of tank waterproof test
- installation, operating, maintenance and service manual
- proposal of the operational order (prepares the entrepreneur according to local conditions)
- operational diary

3.5 Service of the separator

The supplier provides:
- complex function test of the equipment
- service during warranty period and after warranty period
- regular service checks
- delivery of spare parts

4. OPERATING, CONTROL, MAINTENANCE

4.1 General instructions

Following instructions concern only operation of the separator itself. They can serve as basic materials for a preparation of the operational order for a water-management object as a whole, according to local conditions. Proposal of the operational order is handed over as a part of the technical documentation.

The entrepreneur is responsible especially for following operations:
- keeps an operational diary with records concerning operating of the separator which proposal is a part of delivery AS-TOP. Records especially dates of repairs, modifications, removals of a sludge from a sludge space, removal of separated oil substances, extractions of the samples etc.
- controls the separator according to the user's guide and only by a mean of a person trained for this operation
- on his own account provides the water analysis in a quantity requested by a water-management authority.

4.2 Operational diary

It is recommended to keep an Operational diary for each separator. The operating staff makes records into it concerning faults, defects, problems, time when they occurred and when they were fixed, spare parts and maintenance. Further manipulations like a date of sludge removals, its quantity, time and place of an extraction of water samples etc. are also recorded.
Besides this the person records the need of works and modifications which is not able to manage and notifies his senior person.
The visit of the supplier, authorised service company or water-management authority is also recorded and confirmed into a diary.
In case of need e.g. claim, the diary must be presented to a supplier or authorised service company on request.

4.3 Periodical service operations

The operating staff must ensure following periodical operations:
- once a week: visual check of an equipment, levels in a separator, filter mess up etc.
- if needed: removal of the separated oil substances from a water surface – or once a half a year
- if needed: after filling of sludge spaces or min. once a year remove a settled sludge.
- if needed: regeneration or change of the fillers for coalescent and sludge filters. The regeneration must be done once a two month at the minimum.
- if needed: water analysis according to instructions of the water-management authorities and the instructions in operational order.
- if needed: TOP-S type – change of the fibroil – see art. 4.4.7

4.4 Instructions for each operation

4.4.1 Starting the operation of the separator
It is provided by a supplier or service company

4.4.2 Visual function check
The operating staff checks the level of the water surface in all the parts of the separator, the condition of the sludge filters, the quantity of oil substances on a water surface.

4.4.3 Removal of the separated oil substances
It is done manually from a water surface (e.g. with a suitable sorption material) or with a special pump.

This operation can be also done together with a sludge removal carried out by a special authorised company.
The liquidation of the removed oil substances must correspond with regulations concerning the waste liquidation. The oil substances have the character of a dangerous waste according to the law no. 125/1997 and the regulation of Ministry of environment no. 337/1997 (catalogue of wastes).

4.4.4 Removal of the sludge
The removal needs to be done after filling of the sludge spaces (see art. 4.3). Maximal height of the sludge layer on the bottom of the sludge spaces is 500 mm. It is measured with a special bar with a listel 150 x 150 mm. The sludge is removed through a manipulation openings, which layout depends on a type of the separators. If the removal is done with a sludge removal truck, the suction basket must be put into the separator carefully in order the bottom damage did not occur. Before the sludge removal from a separator, the oil substances from a water surface must be removed.
The liquidation of the removed sludge must be in correspondence with regulations concerning the waste liquidation.
The sludge have the character of a dangerous waste according to the law no. 125/1997 and the regulation of Ministry of environment no. 337/1997 (catalogue of wastes).

4.4.5 Regeneration and change of the fillers of the coalescent and sludge filters
Coalescent and sludge filters can be pulled out with their handles. To push them back you must do a reverse process. For regeneration it is necessary to remove polyurethane fillers out of filter frames. The filler is washed through with a stream of a clean water and the solid dirt is removed mechanically.
In case of mechanical damage of the filter fillers (e.g. ragged, cut) it is necessary to change them for the new.

4.4.6 Extraction of the water samples
The water samples are extracted in an extraction place in a outlet shaft of the separator.

4.4.7 Change of the fibroil filling
The sorption filter with the fibroil filler is pulled out with a handle, which is on the filter frame, after re-adjusting the latch. After this the upper cover of the filter is open and the old fibroil filler is replaced with a new one. The density of filling is 70 kg/m^3 of the volume of the filter.

4.4.8 Access into the separator for operating and maintenance purposes
Inside parts of the separator are accessible after opening the covers (A, C types) or after the removal of the covers (B type). When entering the separator, the safety instructions according to art. 5.1 must be observed.

4.5 Winter operation
The operation of the separator during winter, its maintenance and control is the same as in summer. The separators are subterranean objects as standard, which are covered with a soil or planks or sheet metal. Considering the water surface level which is under the inflow sewerage level (it should be in the non-freezing depth), it is in the non-freezing depth and when simply covered with planks or sheet metal, the freezing in the separator should not occur. When necessary, the sheet metal cover with an insulation can be also delivered.
The restriction for the winter operation is the change or check of filters (both coalescent and sorption) when freezing. If the filters were taken out of the separator they would freeze and the filter fillers could be damaged.

WARNING!
When freezing the filters should be neither changed nor checked – the damage of filter fillers can occur!

Similar caution is necessary when extracting the samples during frosts – the water in a test tube could freeze.

5. SAFETY AND PROTECTION OF HEALTH DURING WORK

5.1 Instructions for keeping the safety and protection of health

5.1.1 General instructions

- the device can be operated and maintained only by a person over 18 years, physically and mentally eligible for such a work and trained for operating of separator.
- the service staff is obligated to keep the instructions stated in Instructions for service staff and in Operational order of the separator
- the service staff is not allowed to manipulate with separator or its parts anyhow, if such manipulations do not correspond with user's manual or Operational order
- when working inside the tank or in cases when the contact with waste water, sludge or oil substances can occur, it is necessary to do everything in order to prevent from such a contact or use protective tools. If necessary the compressive water can be used for splashing.
- the waste waters can be a source of various diseases, especially skin diseases. For this reason it is necessary to prevent from any direct contact with these waters. When operating with separator it is prohibited to eat, drink and smoke. After finishing, the hands have to be washed with warm water and soap.

It is prohibited for staff:

- to do any work in incongruity with instructions for operating, safety instructions and operational order
- to use the alcoholic drinks before starting to work or during work or to use any medications which lower the vigilance

5.1.2 Instructions for entering into the object of separator

- when entering the separator, it is necessary to use the ladder with hanging hooks
- before entering, all the covers and lids must be opened and the separator ventilated
- entering into object can do minimally two workers – one worker assists out of the separator
- during the work in the separator all the covers must be opened
- in case of need the safety mask must be used
- when entering, the safety helmet must be used
- it is prohibited to smoke and manipulate with opened fire in the separator and in the nearest surrounding

WARNING!
Inside the separator there is a danger of fire of flammable liquids!

6. SPARE PARTS

The following spare parts for separators are available:

- complete filters
- fillers for filters (polyurethane foam)
- sorption baskets, including the filling
- oil-resistant rubber buckles
- the lid of the extraction place in the outlet shaft

The spare parts can be ordered on the address: ASIO, spol. s r.o.
Tuřanka 1, P.O. BOX 56
627 00 BRNO
Czech Republic
tel.: 00420 5 48 42 81 11,
fax: 00420 5 48 42 81 00

7. SAFETY IDENTIFICATION

Near the access shafts of the separator it is necessary to place the safety table with following content:

- warning sign NB.3.03 according to CSN ISO 3864 (The danger of fire)
- restriction sign B.1.1 according to CSN ISO 3864 (No smoking)
- restriction sign B.1.2 according to CSN ISO 3864 (Open fire prohibited)
- safety text "Oil separator – the danger of fire"

8. ACCESSORIES

The following accessories of the separator are available on a special request:

- stainless steel float stopper of outlet for case of defect
- pump for extraction of samples
- portable belt collector of oil substances from a water surfaces

Brno, August 2000