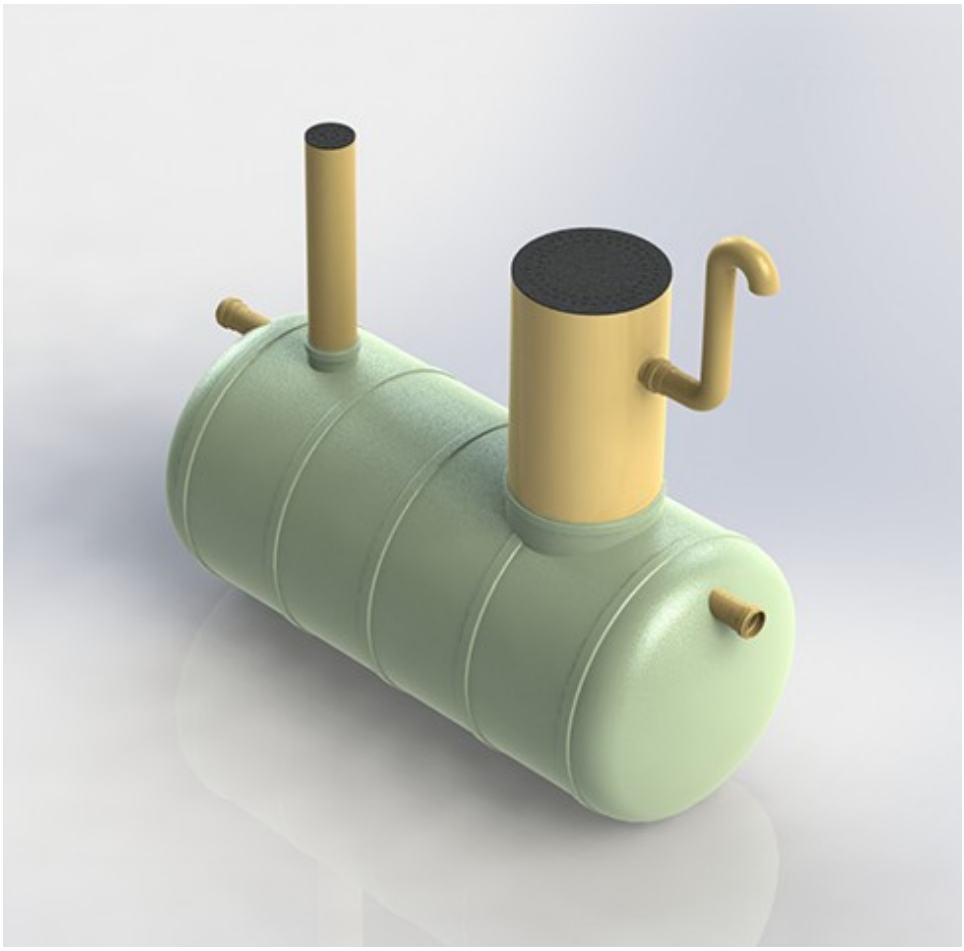
KLAASPLAST

OIL SEPARATOR INSTALLATION MANUAL



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1 GENERAL INFORMATION

The purpose of the manual is to provide detailed instructions for installing a cleaning system for water with oil residues.
In case you need assistance in installing the treatment plant, please contact a construction company, or call Klaasplast OÜ and we will provide you with a list of qualified installers. Klaasplant OÜ assumes no liability for mechanical damage caused to the devices during delivery or assembly, or loss that was caused by disregard of installation instructions.

2 HOW THE TREATMENT PLANT WORKS

The working principle of the oil trap is separation of oil and petrol particles due to gravitation. Residence time and the difference in specific gravities causes lighter than water petroleum products to rise to the surface in the oil trap. Class I oil traps are additionally provided with coalisators that cause even the smallest particles passing through them to join together separating to the surface as a result, ensuring that hydrocarbon content of cleaned water is less than 5 mg/l. Oily rainwater, collected from the territories of big parking lots, terminals and warehouse sites, reaches the trap during the first phase of rain torrents. Larger and already cleaner quantities of water flows that surpass the filtering capability of the trap can be diverted from the trap's coalisation chamber. The operating principle of diverted flow oil trap is that when flow quantity surpasses the oil trap's treatment capability, the level in regulatory chamber rises and the flow amount that is surpassing the treatment capability is diverted into a bypass channel. Klaasplast OÜ's oil traps with bypass channel are manufactured with treated and maximum flow quantity
rate of 1/3. The oil traps are provided with an oil-layer level control device that alerts user by visual and acoustic signal when hydrocarbons level in the trap reaches maximum allowed level.

3 OIL-PETROL LAYER LEVEL CONTROL DEVICE

Control device Darcy comprises of an electronic control unit that is connected to fill level sensor. When predetermined oil-petrol layer thickness has been surpassed, the control device informs the user by visual and acoustic signal (filling alarm). It is also possible to connect fill level sensor to the control device that alarms a user in case of sewage pipe congestion (filling alarm).
If it is necessary to extend the cable that comes with the sensors, a two-groove 1.5 mm2 cable with maximum length of 200 m should be used.The fill-level sensor should be installed into the oil trap in a way that its lower end does not reach deeper than 150 mm below constant water level. When installing the fill-level sensor, the sensor's lower end must be at the same level with the upper edge.

4 MAINTENANCE

Installation manual for plastic horizontal containers
Extracts relevant for installation of a well according to the standard EN 976-2

Lifting up the container

Use lifting belts for lifting up the container. Steel cables and chains should not be put around the container.

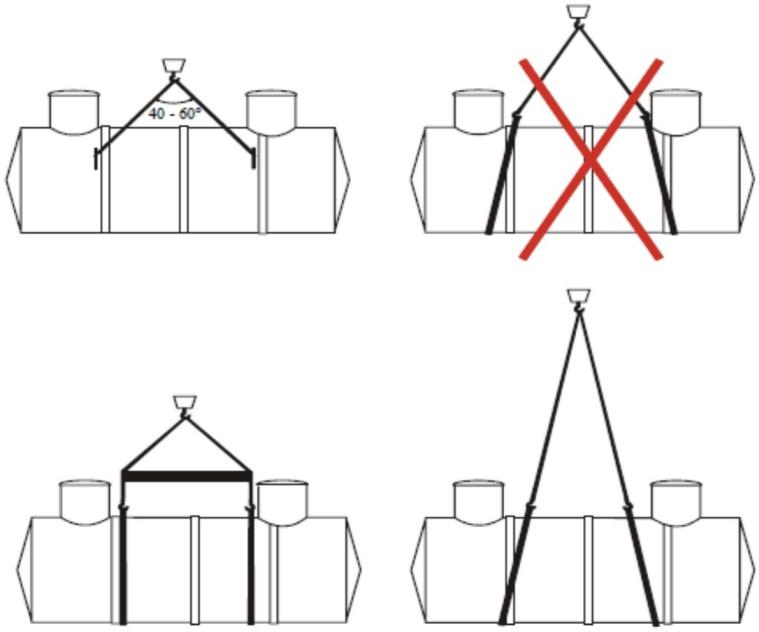


Figure 1: Lifting up the container

Lifting up the container
Use all lifting positions that exist or that are marked on the container (please see Figure 1). Lift the containers up and place them on the filling bottom in correct position and at the required level.
Requirements for installation components

Filling material
The material should be clean, sorted, freely flowing and should not contain ice, snow, clay, organic materials or bodies too big or heavy that could damage the container when falling upon it. Minimal bulk density is 1,500 kg/m³.

Gravel
Filling material may pass through a screen with 2.4 mm openings only to the extent of 3%. The material must be round pea-shaped like gravel with a particle size between 3 mm and 20 mm.

Stone chippings
The particle size of chippings must be between 3 mm and 16 mm, and the material may pass through a screen with 2.4 mm openings only to the extent of 3%.

Sand
Sand must be thoroughly sorted and the material may pass through a screen with 75 µm openings only to the extent of 8%. The size of the biggest particle must be less than 3 mm.

Sand/gravel mixes
Sand/gravel mixes can be used if the constituent parts fulfill the above-provided requirements set for the gravel, chippings and sand.
Sand/gravel mixes should be compacted according to the instructions below.

The prescribed filling material is gravel or stone chippings. Ease of placement and of ability to achieve proper supporting surface with minimal need for compacting make these materials ideal as filling materials.

NOTE:
If the containers are installed without complete coating layer, they can start to drift during flooding even when fixed with belts. Therefore, if filling works are interrupted and the container is left without any coating layer, ballast liquid should be poured into the container to prevent its drifting.

Anchoring of the container

If calculation shows that the weight of soil over the container is not sufficient to prevent it from lifting up (to prevent flotation of one container, it is usually sufficient to have coating layer with a thickness of 0.7 times of diameter of the container), the container should be anchored using bottom plates or sleepers. The number of anchoring points at the both sides of the container must be equal to the number of positions shown on the container.

Concrete bottom plate
If base is needed, it must consist of reinforced concrete with a thickness of at least 200 mm, that has two layers of light reinforced net (interval 200 x 200, wire diameter 7 mm, 3.02 kg/m²), minimum strength 21 N/mm² (28 days later) that is installed evenly on a
50 mm sand foundation. If soil conditions require, sulphate-resistant concrete must be used. Bottom plate must extend at least 300 mm further than the sides of the container and must be of the same length as the container's total length.

Sleepers
Sleepers must be made of concrete. They must be sufficiently large to prevent the container lifting up after filling the pit. All sleepers must have at least two anchoring points and the total number of corresponding points on the sleepers must equal the number of points shown on the container. Sleepers should be installed outside of the container's diameter.

Anchoring points
Anchoring points should be constructed from 20 mm steel rods that are bent into the corresponding shape and are installed under the bottom reinforcement by one end. The rods should not be under the container's edge and inside 150 mm radius from the bottom edge. All extruding metallic parts must be hot-dip galvanized and covered with protection layer or protected against corrosion in some other suitable manner. Alternatively, anchoring belts can be pulled under the bottom or through the bottom opposite to anchoring points locations; in that case, the belts are positioned vertically.

Anchoring belts
Anchoring belts must be manufactured from GRP, nylon or other nonmetallic material that is resistant to the surrounding environment and is able to completely withstand to upward tension created by empty container surrounded by filling. The belts must be located at the places indicated on the container by manufacturer. Tensioning of the belts too much should be avoided to prevent damaging the container.

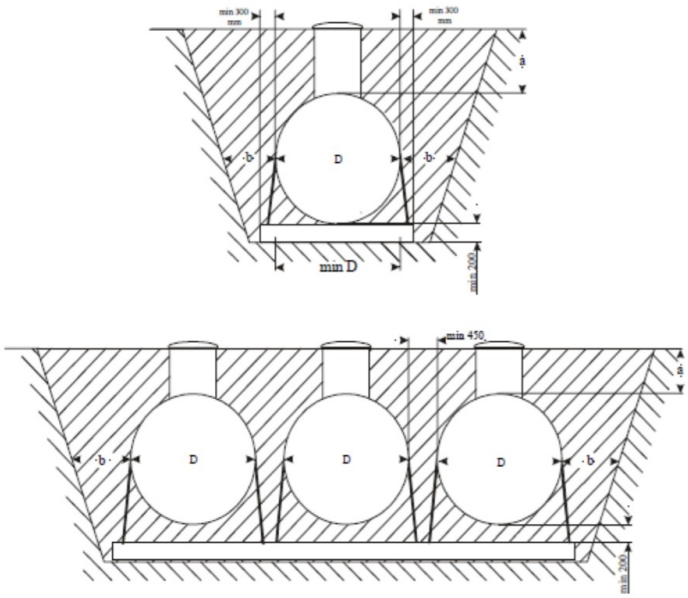


Figure 2. Anchoring of the container to the plate.

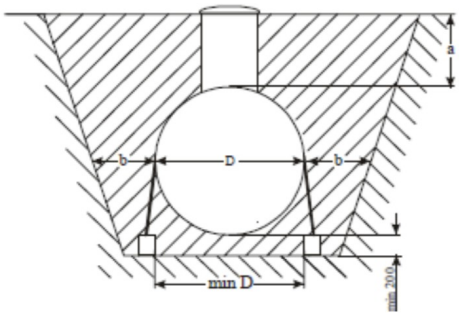


Figure 3. Anchoring of the container with sleepers.

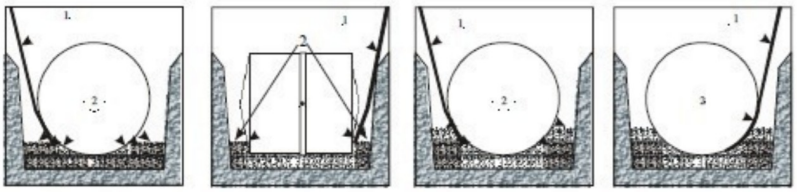
a) length of the servicing well
b) 450 mm in case of stable surface and ½ D in case of unstable surface

Bottom layer
A layer of at least 200 mm of gravel filling must be installed on the bottom of the pit or the concrete plate. Place the container to the layer and anchor it. Shovel sand manually between the ribs and legs and under the end covers. To force and compact sand under the ribs and end covers, use 50 mm x 100 mm board. Ensuring a good compactness under end covers and under container's bottom is very important. The first two lifting layers need manual probing and compacting.

Filling
Gravel filling must be placed evenly around all sides of the container and compacted by nonmetallic probes (for example by wooden board). Filling must be thoroughly compacted, especially between the sides and the legs and under/around pipe connections. When using sand, it should be compacted mechanically with 300 mm intervals at least to 95% of the standard compactness, watering sand if necessary. Water should be poured into the container in parallel with back filling work until the current back filling level. The process is continued until the filling material has risen to neck of the inlet opening. Detailed description of the

filling procedure is given below (separately for gravel and for sand).

Use the same materials as for the bottom layer. Install the first 300 mm evenly around the containers. To ensure that there is necessary support, filling must be pushed completely under the bottom between the ribs and under the end covers. A long probe can be used for penetrating the filling, by pushing it between all the ribs and under the end covers in points 3 to 5. Place next 300 mm evenly around the containers. Pour water into the container until it reaches the same back filling level. Repeat the filling compacting procedure.



1) Probe with long shaft	1) Probe with long shaft	1) Probe with long shaft	1) Probe with long shaft
2) First 300 mm of filling	2) First 300 mm of filling	2) Second 300 mm of filling	2) Rounded and compacted part
3) 200 mm bottom layer	3) 200 mm bottom layer	3) 200 mm bottom layer	3) 200 mm bottom layer

Figure 4. Installation procedure using gravel filling

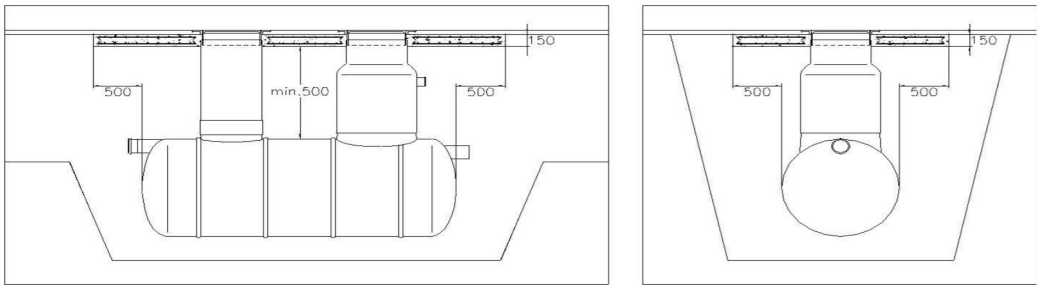
If it is necessary to prevent freezing of the container and connector pipes, install thermal insulation plates over them, between lifting layers.

Dimensions tests
When the container has been fixed into place by filling, measure the vertical diameter of the container to make sure that it has not changed +2.0% or –1.0%; a measuring result outside the range means filling was done incorrectly. Horizontal deviation can also be measured.

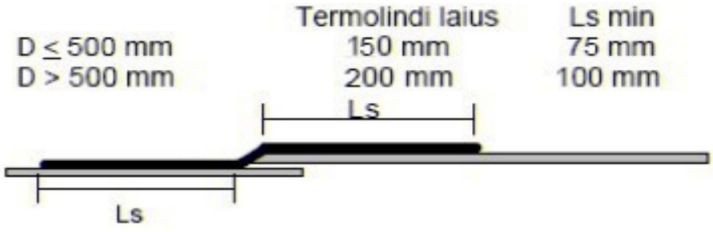
5. INSTALLATION UNDER ROADS

If the container is installed into an area that is being run over by vehicles, the filling layer thickness over the container must be at least 500 mm. On the filling layer, a load balancing plate made of concrete with 150 mm thickness must be cast or installed, that is reinforced in accordance to the load that affects the plate.

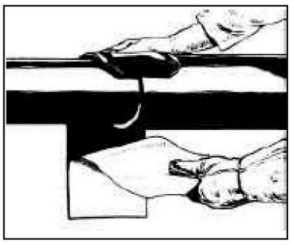
The load-balancing plate must have at least 1,000 mm greater diameter and length than the container. If the container is installed under a road, it should always be provided cast-iron floating hatches. It is important to make sure that the cast iron hatches are not supported on the lip of the maintenance well and service duct.

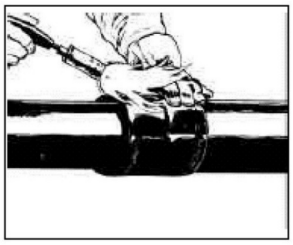


Installation of a servicing well
A servicing well is pushed onto the factory-installed collar of the container. To make the connection waterproof, it must be covered with a heat-shrinkable tape. Heat shrinkable tape must be 220 mm longer than the pipe's diameter. The width of the heat-shrinkable tape must be 200 mm in case of 600 mm servicing well.



Termolindi laius – Width of the heat-shrinkable tape





6. MAINTENANCE

It is suggested to perform regular inspection and discharge two times a year. Regular maintenance must be verifiable (inspection register). Inspection must include the following:
oil trap

- measure oil layer thickness, empty if necessary;
- measure the amount of sediment collected into the first chamber, empty if necessary;
- check coalisators, clean or replace if necessary;
- check oil layer fill level sensors and their installation;

sampling well

- check functioning of the rotating flap;
- clean the well if necessary.

You should maintain the emptying and maintenance register.
Vacuum waste collection vehicle should be called immediately when alarm of the control device for oil layer is triggered.
The suction tube of the truck must be placed into the special pipe for separating oil layer in the maintenance well. The pipe for separating an oil layer is always located at the outlet side in the maintenance well. The pipe for separating oil layer fixes the truck's tube at the correct height, making it possible to get only oil layer that has separated to water surface. The truck should continue to suck until the water level is lower than the separation pipe. Oil layer fill level sensors should also always be cleaned at the same time with emptying the trap. The coalisators must be cleaned of sediment and water suspended solids at least two times a year. This prevents them to be clogged up and ensures stable cleaning characteristics. To clean the oil trap, it should be completely emptied and the coalisators should be lifted out through the maintenance well or service duct. The coalisators have special lifting eyes for that purpose. After lifting out, the oil trap walls and attachment sockets for the coalisators should also be cleaned. Pressure wash the coalisators and

make sure that used washing water is guided into oil trap equipped sewage network.
After emptying, the traps should always be filled with clean water. That ensures that they are immediately ready to use and reduces upward pushing force caused by the ground water.
The sampling well should be serviced once every two years. Empty the well and clean its bottom and walls of sediments. Check, if turning flap operates correctly by closing and opening it.

NB! In an emergency, when the trap is filled with petroleum products or when it contains other environmentally hazardous substances, you must

- immediately close the turnable flap in the sampling well
- call a vacuum-waste collection vehicle