FUNDAMENTAL SOLUTIONS FOR ENVIRONMENT PROTECTION AND INDUSTRY

Director of ENEKA UAB

Edvardas Kuodis

ENEKA UAB is a Lithuanian company with long-term experience in manufacturing of oil/water separators. Our very first separator was installed in 1996. This unit is still operating properly!

Our customers have already evaluated the efficiency and the reliability of SEPKO separators. We are glad to have many permanent customers (most of them are oil and construction companies) using exclusively SEPKO separators during many years.

We always remember that we have a responsibility towards our customers and contribute to the environment. Our wastewater treatment plants are made by rotary molding of polyethylene, i.e., raw materials that are recycled and reused, avoiding negative environmental impacts. We are pleased that our customers appreciate our products not only in Lithuania but also in export markets. ENEKA products reach customers in various countries – from Scandinavia to the Far East.

ALONGSIDE WITH SEPKO OIL/WATER SEPARATORS ENEKA IS SUPPLYING FOLLOWING PRODUCTS:

RAINY'S rain water harvesting systems

Domestic waste water treatments plants

SNIGO modular polyethylene tanks

GREASLY grease separators

Liquid and Air filters for industrial applications

Car wash water recycling systems

Sewage pumping stations

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OIL/WATER SEPARATORS

ENEKA

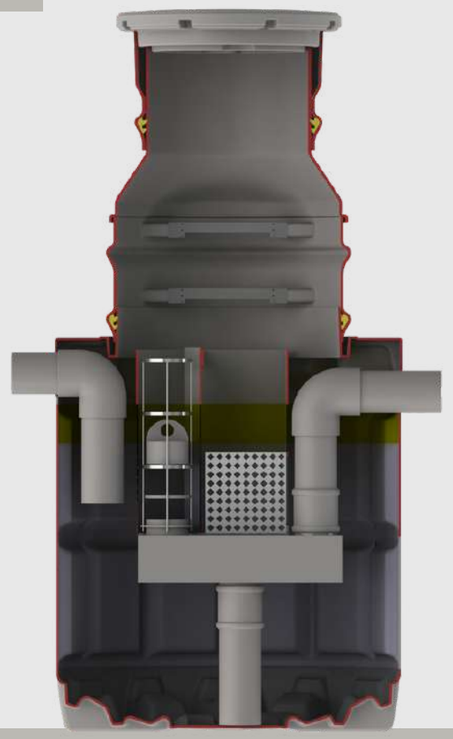
Applications of oil/water separators: rainwater run-off from petrol stations, parking areas, road terrains; process wastewater from car washes, industrial applications etc.

FITS TO EVERY APPLICATION

There are many human activities where oil products are used. In practice, it is impossible to avoid oil spills into the watercourses. A modern and effective oil separation technology is required to prevent the pollution of the environment.

SEPKO oil/water separators are manufactured of all nominal sizes according to European standard EN 858-1 for water flow rates 1.5 to 150 l/s. As an option, integrated sludge trap may be supplied with the separator – all in one body!

SEPKO contains no moving or wearing parts therefore it is very durable and requires little service. The separator is equipped with coalescing technology which has established itself as the most efficient gravitational oil separation material on the market. The coalescing media has also a high degree of resistance to plugging caused by dirt, sludge and biological growth.



CONFORMITY WITH THE LATEST LEGISLATION

SEPKO separators were successfully tested and approved according to provisions of European standard EN 858-1. The testing of treatment efficiency, i.e. determination of nominal size of the separator, water tightness and stiffness of the tank were performed by the independent authorities.

After treatment with SEPKO the residual hydrocarbon content in water of less than 5 mg/l is achieved. This effluent value is mandatory for oil/water separators of Class I according to the standard EN 858-1.

Based on the test results SEPKO separators were granted with CE mark.

HIGH QUALITY PRODUCTION

A body of SEPKO oil/water separator is manufactured from polyethylene by modern process of rotational moulding. The production method is ensuring the proper raw material composition, machine settings and optimised process parameters. Therefore all finished products are made with the highest quality and consistent accuracy.

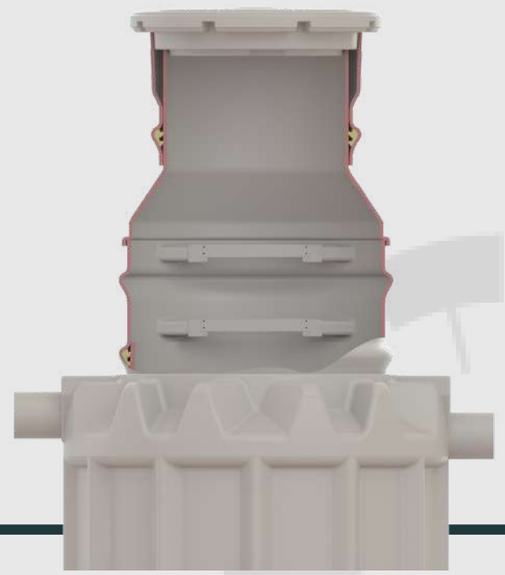
The automatic production is preventing from failures caused by human factor as well. Polyethylene material used for the production can be easily recycled reducing waste and environmental impact. Tanks made from PE are corrosion-proof, their smooth surfaces are ensuring the simple cleaning during servicing.

STIFFNESS GUARANTEED

SEPKO provides a perfect load bearing capacity by keeping low weight of the product. The great stiffness of the separator body is achieved due to the advanced design and special ribbed structure. SEPKO is designed to withstand the heavy ground and groundwater loads without any significant deformations.

The main advantage of the rigid body is that SEPKO may be installed in a significant depth from the ground surface without any additional concrete slabs or casings etc. Therefore the time and the cost of installation works of the separator are significantly reduced.

TELESCOPIC MANHOLE SHAFT



A ladder is integrated in the manhole shaft providing the personel an easy and safe access into the tank.

Telescopic shaft is designed to adjust the manhole cover flush with the ground surface in the range of 200 mm. The manhole shaft is designed for connection with standard polyethylene or cast iron lids for load classes from A35 to D400 according to standard EN 124.

The shaft is equipped with two special seals. The first seal is located between tank body and manhole shaft, the second seal is between manhole and telescopic part. The seals ensure that no liquid droplet will penetrate into the tank or from the tank.

SEPKO

SIZING OF FULL RETENTION SEPARATOR

The sizing of light liquid separators shall be based on the nature and flow rate of the liquids. The nominal size of full retention oil separator shall be calculated from the following formula:

$$NS = (Q_r + 2 \cdot Q_s) \cdot f_d$$

NS is the nominal size of the separator
Q_r – is the maximum rainwater flow rate in l/s
Q_s – is the maximum wastewater flow rate in l/s
f_d – is the density factor for the relevant light fluid

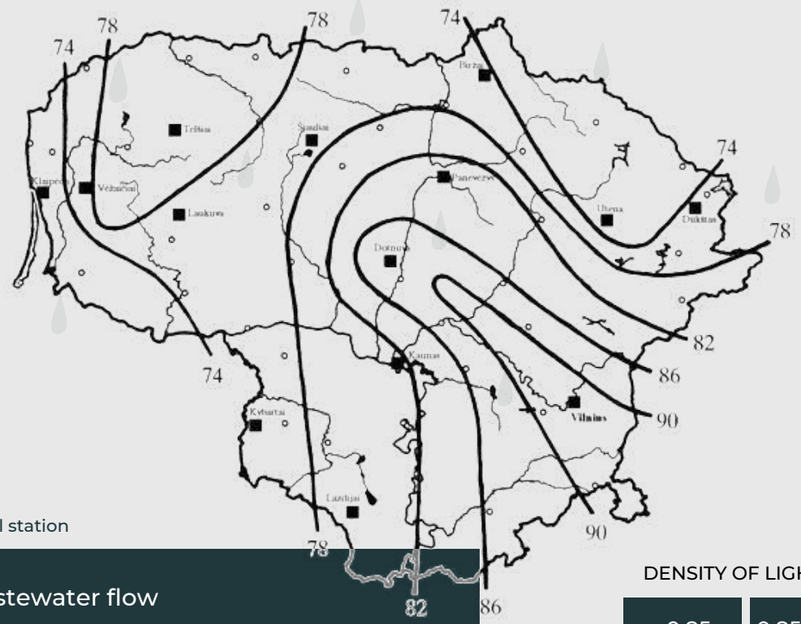
Rainwater flow rate shall be calculated from the following formula:

$$Q_r = C \cdot I \cdot A$$

C – is the run-off coefficient (in most cases C=1).
I – is the rainfall intensity, in l/s · ha
A – is the area receiving rainfall, in ha

Precipitation intensity map of Lithuania

(I, l/s * ha)



N = 1 year
T = 20 min.
- Meteorogical station

Process wastewater flow

Recommendations for process wastewater flow rate selection:
= 2 l/s for each car wash place / high pressure unit,
= 1 l/s for each additional car wash place / high pressure unit

DENSITY OF LIGHT LIQUID IN , G/CM^3

<0,85	0,85...0,90	0,90...0,95
1	1,5	2

DENSITY FACTOR f_d

SIZING OF BYPASS SEPARATOR

The bypass system is dividing the peak rainwater flow in case of heavy rain, i.e. 1/3rd of the total flow is directed to the SEPKO oil/water separator, and the excess goes via bypass. The nominal size of bypass oil separator shall be derived from the following formula:

$$NS_{bypass} = ⅓ \cdot NS$$

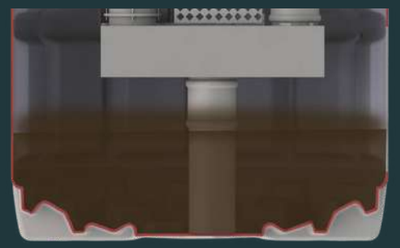
Depending on local regulations there may be different requirements for part of the total rainfall to be treated by the bypass separator. For instance, according to the Lithuanian regulations only 15 % of the total rainfall shall be directed to bypass separator from areas above 3 ha.

Note that bypass separators are used in the areas where only small oil spillages may occur.

SIZING OF SLUDGE TRAP

According to EN858-2 standard, separator systems shall incorporate a sludge trap either as separate unit or as an integral part of the separator. In most models the sludge trap is integrated in the same tank with oil separator.

The volume of the sludge trap can be determined as given in the table below:



VOLUME OF SLUDGE TRAPS	QUANTITY OF SLUDGE	APPLICATION
NS · 100 / f_d^a	SMALL	Processing wastewater with defined small sludge volume Catchment basins on petrol tank areas
NS · 200 /f_d^b	MEDIUM	Petrol stations, vehicle parking lots, garages
NS · 300 /f_d^c	HIGH	Carwash, truck wash places

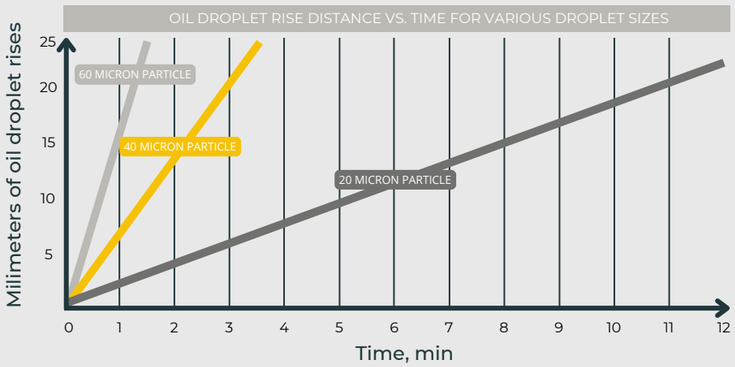
a - Not for separators NS ≤10, except for covered car parks.

b - Minimum volume of sludge trap 600 liters.

c - Minimum volume of sludge trap 5000 liters.

PRINCIPLES OF OIL SEPARATION

Most physical mixtures of oil and water will separate by gravity eventually. Due to lower specific gravity hydrocarbon will eventually float to water's surface. Nevertheless, the separation of small oil droplets will take a very long time (see the chart below). As a result, huge volumes of separation tanks will be required.



The relationship between oil droplet size and it's rise velocity is described by the Stokes' Law:

$$V_R = \frac{D^2 g \cdot (\rho_w - \rho_o)}{18\eta}$$

V_R-is the rise velocity of oil droplet in m/s
D - is the oil droplet diameter in m
g - is the gravitational acceleration (9,81 m^2/s)
η - is the viscosity of water (0,001 kg/m·s)
ρ_w- is the density of water in kg/m^3
ρ_o- is the density of oil in kg/m^3

FEATURES OF THE COALESCING MATERIAL

- Special oleophilic (oil attractive) polypropylene providing years of trouble-free service.

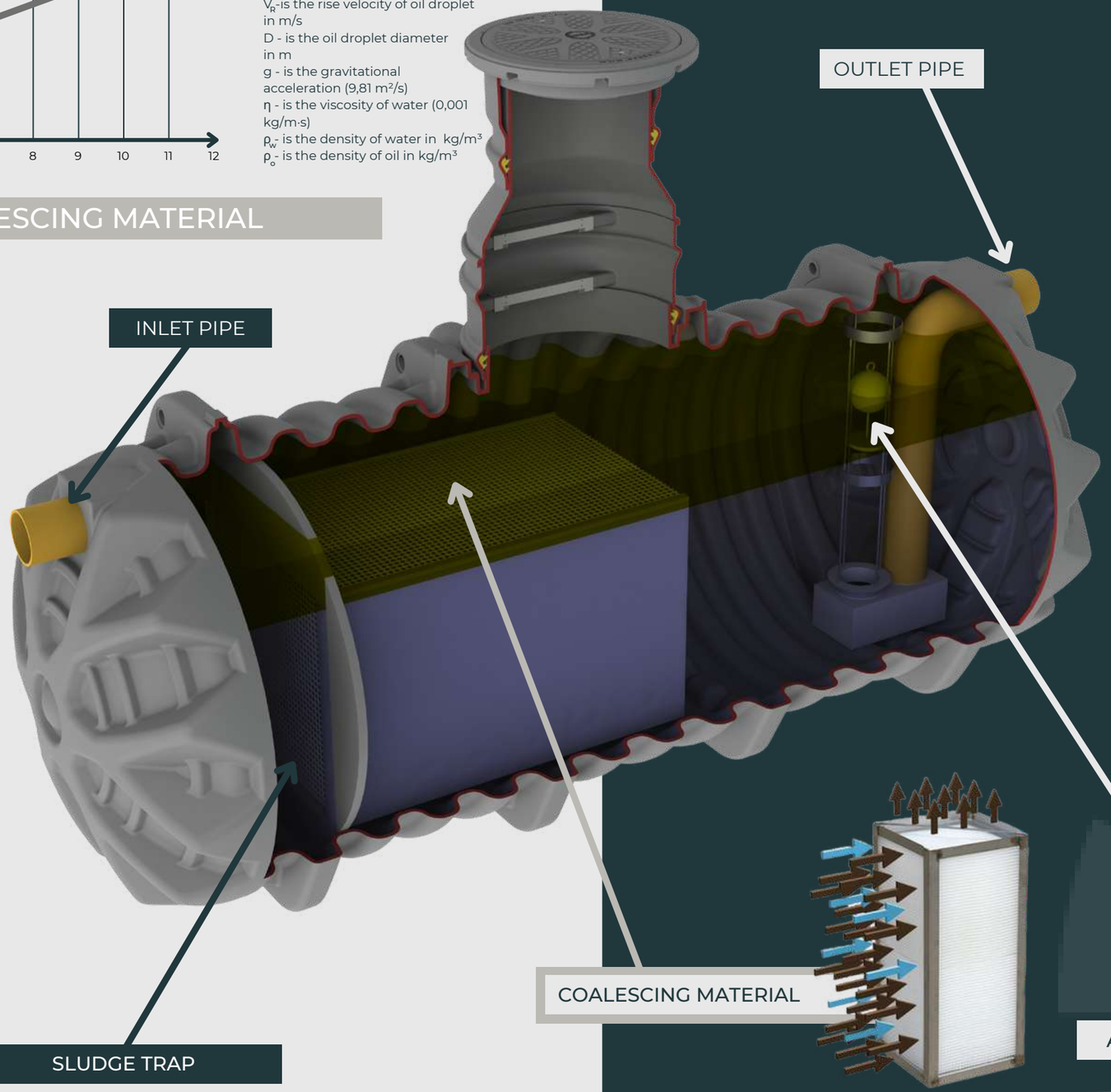
- Oil droplet's rising distance is reduced to 6 mm. The shorter distance means lesser rise time travelled to coalesce which will result in better removal rates.

- Coalescing surface (approx. 450 m^2/m^3) is more than 3 times larger as other commonly used media.

- Resistance against plugging by solid particles due to self cleaning design.

- 99,99+ % removal of free and dispersed oil regardless of micron size.

SEPKO



COALESCING MATERIAL – ENHANCED GRAVITY SEPARATION

As can be derived from the Stokes' law, there is quadratic relationship between droplet size and it's rise velocity, i.e. twice bigger droplet rises up four times faster.

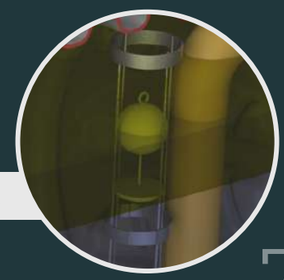
Therefore, the main objective of the oil/water separator is to increase the droplet size as quickly as possible, thereby decreasing the volume and cost of the separator. The coalescing material employed in SEPKO oil/water separators is very efficiently managing this task.

OPERATION

Oily water influent enters into the separator tank under water surface through the inlet pipe. Water flows to the first primary settling section where solids particles and bigger oil droplets are removed by gravity. Then water is directed through the coalescing media. As water passes horizontally through the pack of coalescing media the oil droplets rise vertically until they contact the material. By contacting the oleophilic surface, the oil particles are captured and they coalesce with other particles becoming larger. As the process continues, bigger oil droplets will be formed and driven upwards by gravity until they reach the water surface.

As solid deposits accumulate on the coalescing media they increase in mass and eventually slough off to the bottom of the separator where they accumulate until disposal. This self-cleaning feature significantly reduces the frequency of cleaning of the coalescing media.

Clean water after treatment is discharged through outlet pipe. SEPKO is equipped with an automatic closure device which is calibrated to float on water and to sink in oil. This floating valve closes water outlet when the amount of accumulated oil on the water surface has reached the maximum level.



BYPASS SYSTEMS

Bypass systems can be used when it is considered an acceptable risk not to provide full treatment for high flows, e.g. where only small spillages may occur and the risk of spillage is small. The system is dividing the peak rainwater flow in case of heavy rain. Only 1/3rd (in some cases even less) of the average maximum rainfall flow is directed to the SEPKO oil/water separator, and the excess flow goes via bypass. Considerable investment cuts may be obtained by using bypass system, in comparison with conventional full retention treatment systems.

The bypass system allows employing of smaller and more cost-efficient oil/water separators.

According to the environmental studies the biggest part of oil and other pollutants is washed off in the beginning of the shower while the complete rainwater flow is treated by the oil/water separator.

SPS FLOW CONTROL CHAMBER

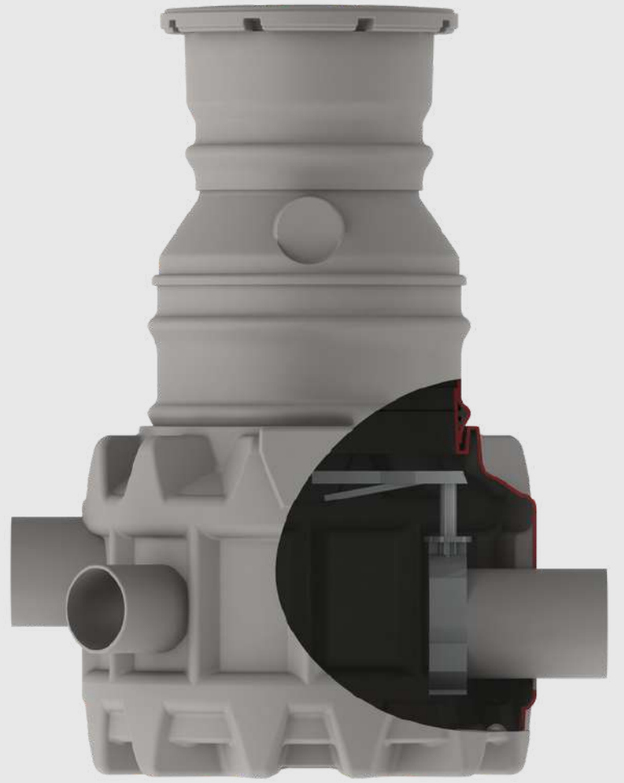
SPS flow control chamber is designated to restrict the rainwater flow entering the oil/water separator. It is ensuring that nominal flow through the separator is not exceeded.

The chamber is installed before the separator.

MPS SAMPLING CHAMBER

MPS sampling chamber is a part of each oil separator system employed to monitor the quality of treated water. The chamber is installed in the outlet flow of oil/water separator. It serves for taking the water samples and connecting the pipeline.

The sampling chamber is usually equipped with a shut-off valve preventing from oil passing through the system and polluting the watercourses in case of emergency.



INTEGRATED BYPASS LINE

SEPKO oil/water separators can be equipped with an integrated bypass line. Although the bypass line can be used with separators of different nominal sizes it is particularly cost - efficient solution for smaller flow rates.

SEPARATOR ALARMS

SEPKO oil/water separators can be equipped with alarm system for automated and remote monitoring of accumulated oil, sludge or liquid levels.

Alarm allows the operator time to take corrective action ensuring the safe and economic operation of separators. The system is preventing oil passing through the separator and polluting watercourses which may result in expensive fines and clean up costs. Timely removal of accumulated sludge and oil from reduces the servicing costs of separator.

There are two models of separator alarms. The alarm model UTA is fitted with one probe for monitoring the oil layer. The alarm model IP65 can be equipped with up to 3 probes for warning of excessive levels of oil, sludge and liquid within. The standard version of the alarm is mains powered.

Battery or solar powered alarms can be supplied upon request. Options: beacon, sounder, GSM alarm notification. The alarm units are ATEX approved (Baseefa 08ATEX0110/1).

EASY SERVICING

The servicing of SEPKO oil/water separator is very simple; it does not require much labour and material costs. Main servicing procedures are:

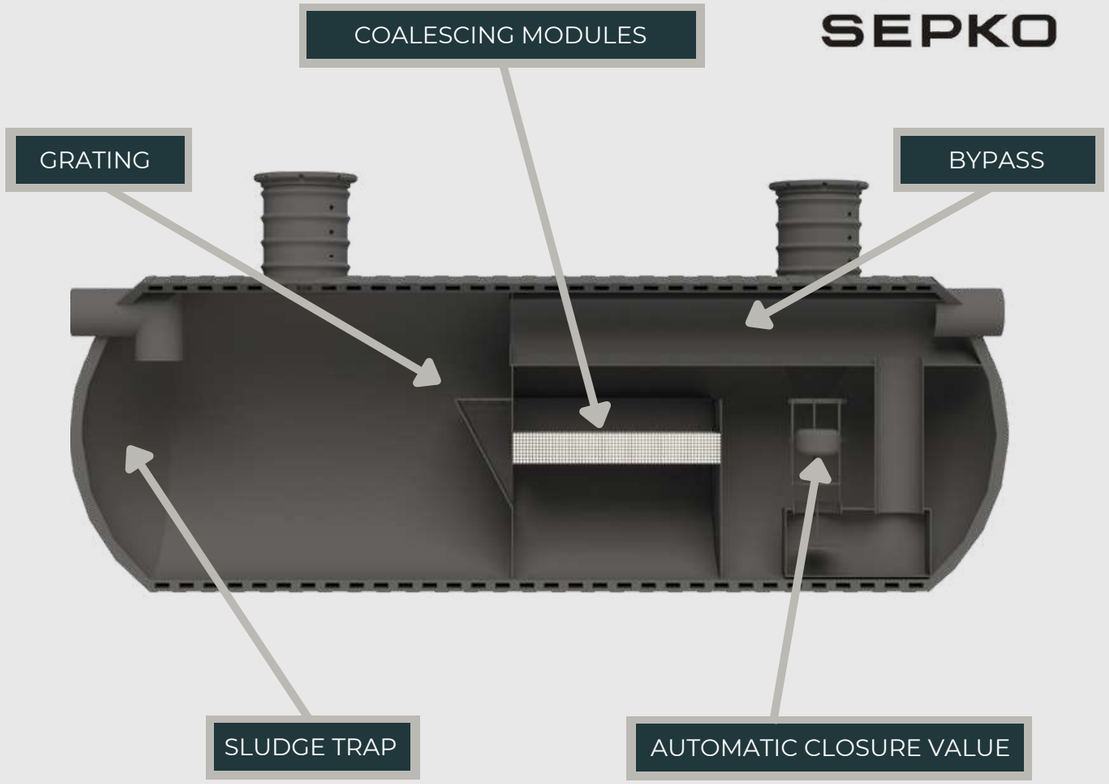
- extraction and disposal of accumulated oil and sludge by means of vacuum truck,

- cleaning of the coalescing modules from solids using high pressure cleaner.

The design of the modules allows convenient lifting off the tank and washing out of the 4 sides. After the proper cleaning 100 % functionality is returned to the oil/water separator. SEPKO does not contain any replacement filters which should be disposed of as hazardous waste.

LARGE CAPACITY SEPARATORS SERIES SEPKO-D

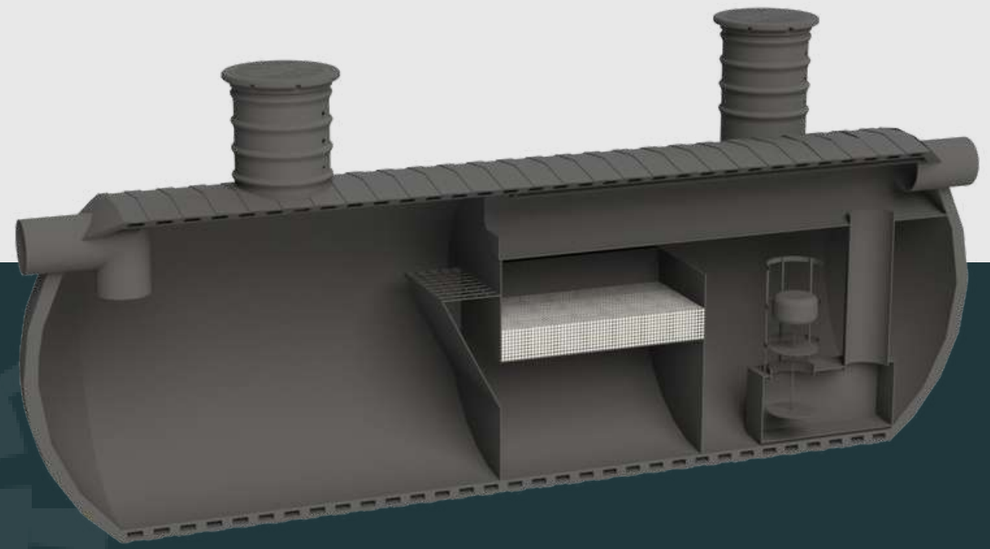
The oil/water separator series SEPKO-D is most often used for the treatment of storm/surface water from large areas, i.e. motorways, street sections, big car parking, airport territories etc.



- Great stiffness of SEPKO-D separator’s body is ensured due to the double-skin structure.
- Spherical snowflake-shaped end parts are connected to the body by a double welded connection.

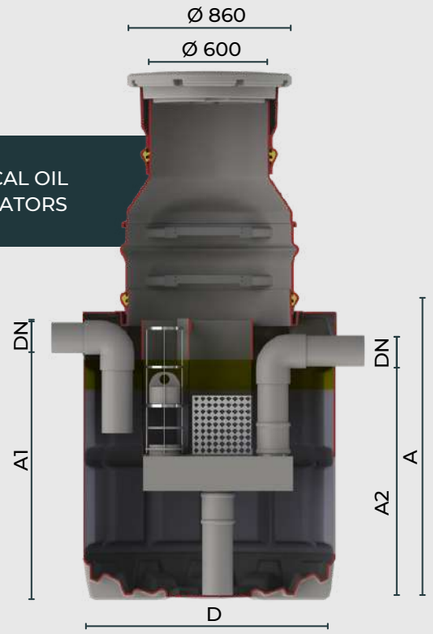
LARGE CAPACITY SEPARATORS SERIES SEPKO-D

- The robust design of the body allows for withstanding heavy ground and groundwater loads without any noticeable deformations.
- The body can be suited to load classes SN2, SN4, or SN8 are available.
- Flow rates from 150 to 500 l/s.
- Integrated sludge trap.
- The typical oil concentration in the inlet is below 200 mg/l.
- Residual oil content after treatment is below 5 mg/l.
- High-efficiency coalescing material is enhancing the separation of tiny oil particles.
- No replacement parts. During the maintenance, the coalescence modules can be easily lifted and cleaned by high water pressure.
- Automatic closure valve with the two-way operation. On one side, the valve will prevent the accumulated oil contaminants from entering the environment. On the opposite side, the closure valve also acts as a non-return valve to protect against flooding.
- The separator can be used with an integrated bypass.
- The optional grating may be installed before the coalescing material to protect against plugging by big contaminants (plastic bottles etc.).

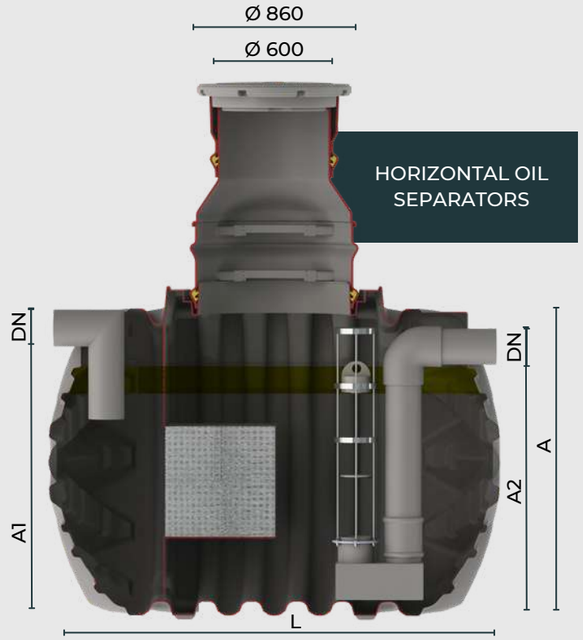


SEPKO

VERTICAL OIL SEPARATORS



HORIZONTAL OIL SEPARATORS



VERTICAL OIL SEPARATORS

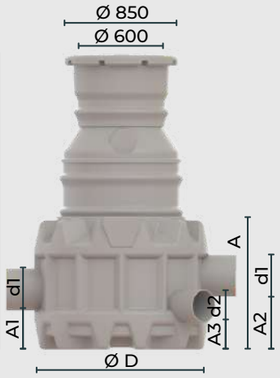
MODEL	FLOW RATE, L/S	SLUDGE TRAP VOLUME, L	DN, mm	D, mm	A, mm	A1, mm	A2, mm	WEIGHT, kg
EXCLUDING SLUDGE TRAP								
SEPKO-1.5 T	1.5	-	160	1300	980	730	660	102/142
SEPKO-3	3	-	160	1300	980	730	660	102/142
SEPKO-6 T	6	-	160	1300	980	730	630	102/142
SEPKO-10 T	10	-	160	1300	1480	1200	1130	143/200
INCLUDING SLUDGE TRAP NSX100								
SEPKO-6/600 T	6	600	160	1300	980	730	660	143/200
INCLUDING SLUDGE TRAP NSX200								
SEPKO-1,5/600 T	1,5	600	160	1300	980	730	660	102/142
SEPKO-3/600	3	600	160	1300	1480	1230	1160	130/185

HORIZONTAL OIL SEPARATORS

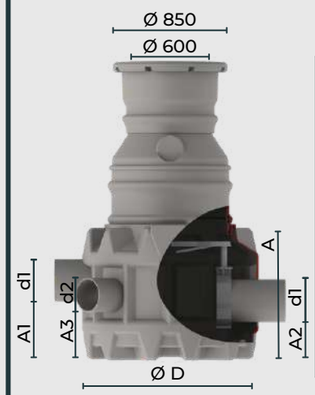
Model	Flow rate, L/S	Sludge trap volume, L	DN, mm	D, mm	A, mm	L, mm	Quantity of manhole shafts	A1, mm	A2, mm	Weight, kg
EXCLUDING SLUDGE TRAP										
SEPKO-15	15	-	200	1690	1830	2500	1	1430	1360	298/410
SEPKO-20	20	-	200	1690	1830	3000	1	1430	1360	419/530
SEPKO-30	30	-	250	1690	1830	4500	1	1500	1400	584/780
SEPKO-40	40	-	315	2400	2420	3300	1	2120	2050	1200
SEPKO-50	50	-	315	2400	2420	4000	1	2120	2050	1400
INCLUDING SLUDGE TRAP NSX100										
SEPKO-10/1000 T	10	1000	160	1410	1515	2400	1	1200	1130	201/290
SEPKO-15/1500	15	1500	200	1410	1515	4000	2	1130	1060	376/510
SEPKO-20/2000	20	2000	200	1690	1830	4000	2	1430	1360	492/650
SEPKO-30/3000	30	3000	250	1690	1830	6000	2	1470	1400	694/860
SEPKO-40/4000	40	4000	315	2400	2420	4500	2	2120	2050	1470
SEPKO-50/5000	50	5000	315	2400	2420	5500	2	2120	2050	1730
INCLUDING SLUDGE TRAP NSX200										
SEPKO-6/1200	6	1200	160	1410	1515	2400	1	1200	1130	191/280
SEPKO-10/2000 T	10	2000	160	1690	1830	2500	2	1430	1360	299/410
SEPKO-15/3000	15	3000	200	1690	1830	4000	2	1520	1420	426/590
SEPKO-20/4000	20	4000	200	1690	1830	5500	2	1450	1380	592/810
SEPKO-30/6000	30	6000	250	1690	1830	3500+4500	2	1520	1400	825/1120
SEPKO-30/6000	30	6000	250	2400	2420	4570	2	2100	2000	1320
SEPKO-40/8000	40	8000	315	2400	2420	5600	2	2120	2050	1720
SEPKO-50/10000	50	10000	315	2400	2420	6850	2	2120	2050	2040
INCLUDING SLUDGE TRAP NSX300										
SEPKO-3/5000	3	5000	160	1430	1515	4000	2	1200	1130	279/430
SEPKO-6/5000	6	5000	160	1690	1830	4000	2	1430	1360	326/500
SEPKO-10/5000	10	5000	200	1690	1830	4500	2	1430	1360	360/560
SEPKO-15/5000	15	5000	200	1690	1830	5000	2	1430	1360	411/630

SPS FLOW CONTROL CHAMBERS

MODEL	10/30	15/45	20/60	30/90	40/120	50/150
BYPASS FLOW RATE	10	15	20	30	40	50
TOTAL RAINWATER FLOW	30	45	60	90	120	150
D	850	850	850	850	1300	1300
d1	200	250	250	315	315	400
d2	160	200	200	250	315	315
A	1000	1000	1000	1000	1000	1000
A1	250	250	250	250	250	250
A2	350	350	350	400	400	400
A3	200	200	200	200	200	200
WEIGHT	93	94	99	129	200	209



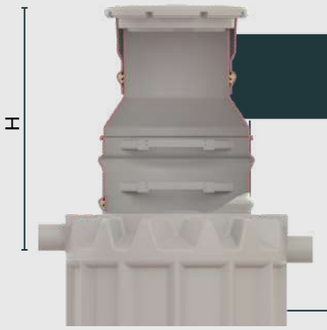
SEPKO TECHNICAL DATA SHEET



MPS SAMPLING CHAMBERS

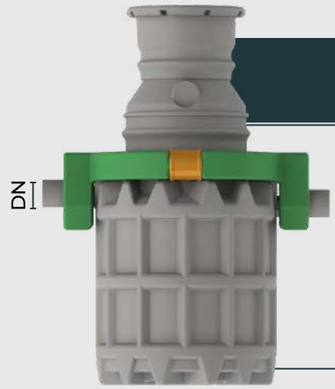
MODEL	10/30	15/45	20/60	30/90	40/120	50/150
BYPASS FLOW RATE	10	15	20	30	40	50
TOTAL RAINWATER FLOW	30	45	60	90	120	150
D	850	850	850	850	1300	1300
d1	200	250	250	315	315	400
d2	160	200	200	250	315	315
A	1000	1000	1000	1000	1500	1000
A1	350	350	350	400	400	400
A2	200	200	200	200	200	200
A3	250	250	250	250	250	250
WEIGHT	120	135	135	140	185	265

MANHOLE SHAFTS



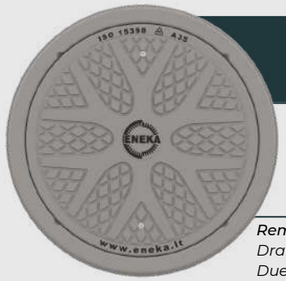
Model	Diameter of clear opening d, mm	External diameter D, mm	Height H, mm*	Weight, kg
MS H1.0	600	Ø850	750-1000	31
MS H1.25	600	Ø850	1000-1250	33
MS H1.5	600	Ø850	1250-1500	42
MS H1.75	600	Ø850	1500-1750	52
MS H2.0	600	Ø850	1750-2000	62
MS H2.25	600	Ø850	2000-2250	71
MS H2.5	600	Ø850	2250-2500	80

BYPASS LINES



Model	Inlet diameter DN	Bypass diameter DN	Max. Flow rate, l/s
BLM-200/200	200	200	30
BLM-250/200	250	200	60
BLM-315/200	315	200	60
BLM-315/2x200	315	2x200	90
BLD-315/315	315	315	120
BLD-400/315	400	315	150
BLD-400/400	400	400	195
BLD-500/400	500	400	300
BLD-500/2x400	500	2x400	450

LIDS



Model	Material	External diameter, mm	Diameter of clear opening, mm	Height, mm	Weight, kg
A15 - 1,5 t	Polyethylene	Ø1068	Ø800	164	20
A35 - 3,5 t	Polyethylene	Ø850	Ø600	162	13
B125 - 12,5 t	Cast iron	Ø868	Ø600	190	45
D400 - 40 t	Cast iron	Ø868	Ø600	190	90

Remarks: *All dimensions are approximate for general information only.*
Drawings of separators up to NS 150 are available on request.
Due to continuous product development the dimensions can be changed without further notice.