

KLARO

KLARO light fluid separators Class I and II

We provide clean water

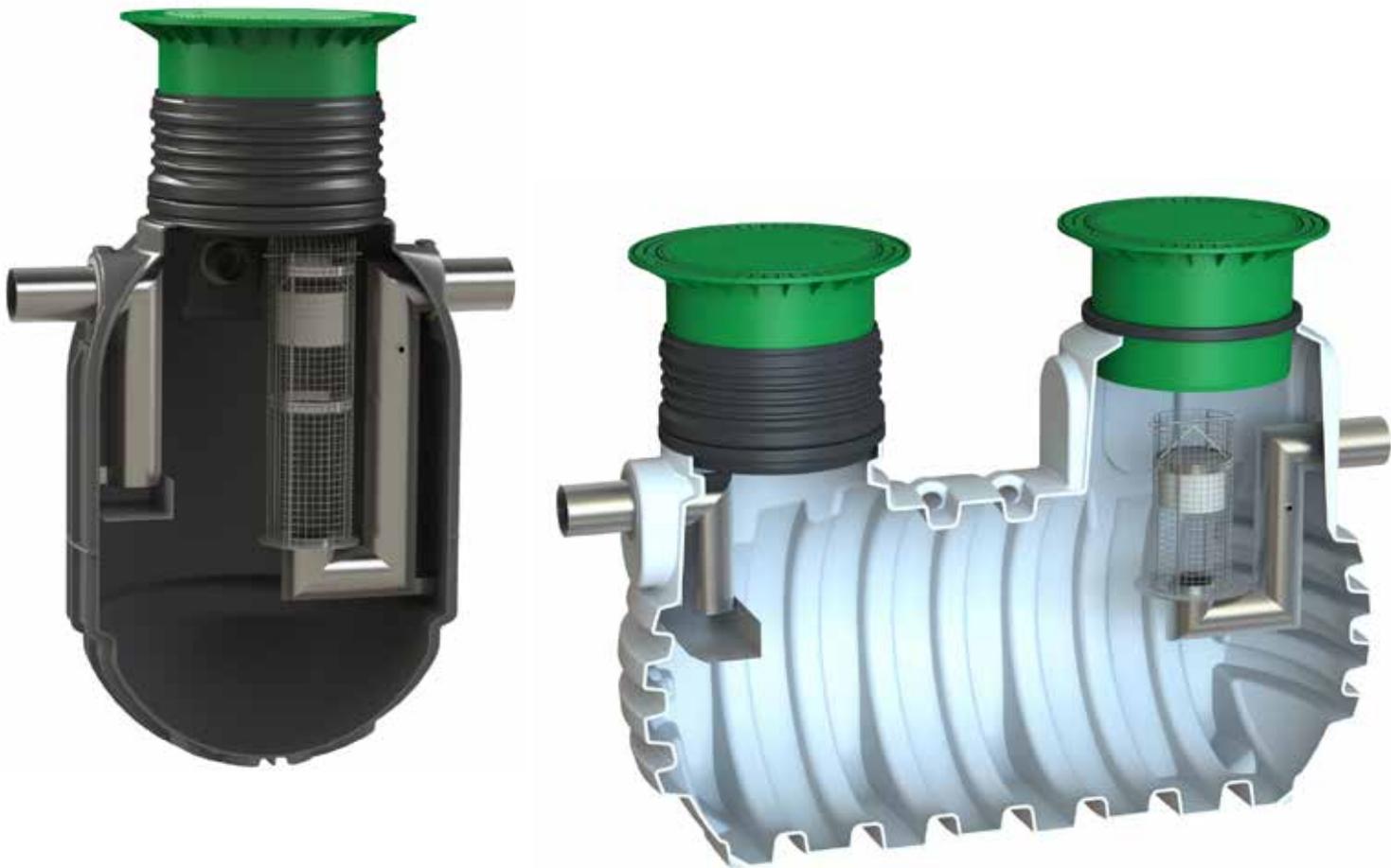


KL sepa.compact
No additional shaft due to
integrated sampling port!



Advantages of the KLARO light fluid separator

KLsepa.compact



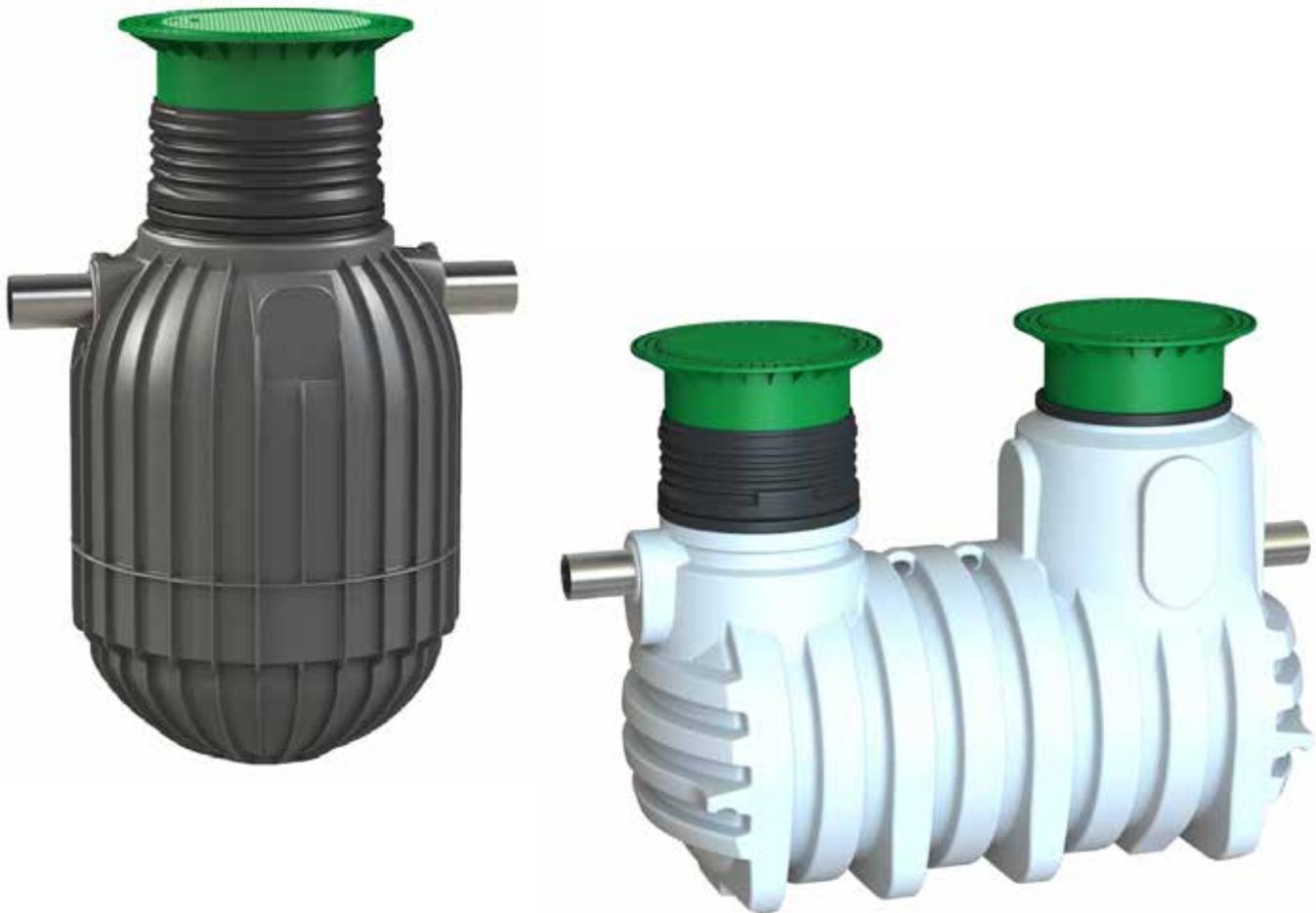
- With integrated sampling port

- Up to Normsize (NS) 10

- Expandable with additional upstream sludge collector

- Available as petrol separator (Class II) or Coalescer (Class I)

Advantages of the KLARO plastic tanks



- Seamless one piece manufacture
- No degradable inner lining
- Attachment parts in plastic with variable height and level adjustment
- Compact sizes
- Low maintenance costs with easy-clean internal surfaces
- 15 year warranty on PE materials

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1.1. KLARO GmbH in Bayreuth



KLARO company site

KLARO GmbH, in Bayreuth, has been ensuring clear water since 2001. Our 26 multi-disciplined employees always create the optimum and most practical solution for your needs. Through our experience and continuous development we have established a portfolio of high quality, clarification solutions for decentralized wastewater treatment. The range of KLARO wastewater treatment technology also now includes a mobile water treatment plant in a 20 foot sea container.

Worldwide there are already 300,000 people who rely on proven KLARO technology.

A further development is the KLARO oil separation system. With the KLsepa.compact we offer sophisticated class I and class II light fluid separators. The range of separators is complemented by the KLsepa.pop grease separator.

KLARO has been a part of the GRAF *group* since January 2014. The GRAF brand has been synonymous with high quality plastic products in the field of water resource management for over 50 years.

GRAF is well-known to KLARO as a long-standing customer and supplier of septic tanks. The high-quality separator containers are manufactured in the GRAF facilities. Therefore you benefit from the expertise and quality of two established brands when you buy a KLARO product.



1.2. Separator systems

Just a single drop of petrol is enough to pollute 1 m³ of water. Today everyone knows just how precious our water resources are. Pure, clean water is one of the most important fundamentals of life, yet it is exposed to multiple hazards.

One of the greatest dangers, is pollution from light mineral liquids. These include oils, fuels and lubricants, i.e. petroleum products. These have become indispensable in our world of high technology. But however as a result they come into contact with water and are mixed. To prevent environmental damage caused

by the uncontrolled discharge of oil-containing wastewater, effective and safe methods of separation technology must be used everywhere where light liquids come into contact with water.

The separator technology is based on a simple principle:

After the wastewater has been slowed down in the pipe to a lower flow rate and flows into the tank container, a natural separation occurs, which results from the physical properties of the different substances. Oils and fats, also known as light liquids, are of a lower density

than water and thus rise to the water surface, where they combine to form a layer. The solids, however, are heavier and collect at the bottom of the tank. This behaviour can be observed with solids in any body of water as well as with oils, for example, whenever you add oil to water when cooking. This is already the first step to clear water, which is supported and optimized by KLARO technology in the further separation process to achieve an even higher clarification performance.



1. General

1.3. Fields of application

A separator must be installed wherever water is contaminated with oil, grease and other light liquids. Separation systems are classified according to

the NS (Norm Size). As soon as you make an inquiry for a separator with us, we will calculate your required NS, which describes the flow rate in litres

per second. Operators of the following facilities must ensure that a suitable, functioning separator is installed.

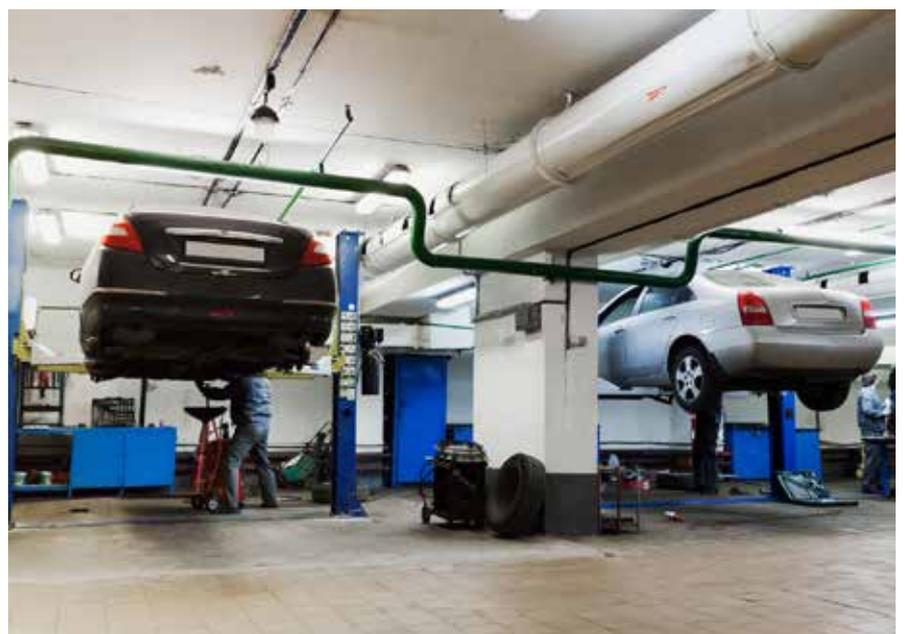
Car wash facilities

In car wash facilities or washing locations, it is not just the visible dirt that is removed from the car but also small droplets of oil, which adhere to each vehicle. Through high-pressure cleaning this oil is dispersed into even smaller particles. The wastewater of these particles must be separated in a separator, before it can be fed to the drainage system.



Workshops

Due to the vehicles which have faults and are left standing in parking areas, a large amount of light liquids are released in a workshop, which can get into the wastewater. For this reason the use of a powerful separator is essential.



Petrol stations

Petrol stations generally experience a lively vehicle trade. In addition, smaller quantities of fuel are continuously being lost during refuelling. In order to keep the wastewater free from light liquids, a separator is also needed here.



Vehicle fleets

Companies from the construction or logistics sectors often have large fleets. Depending on the extent, the surfaces on which these vehicles are moved or parked must also be equipped with a separator.



Other fields of application: Hazardous goods locations places, tank storage

2. Description of system

2.1. KLsepa.compact system overview

KLsepa.compact

KLsepa.compact

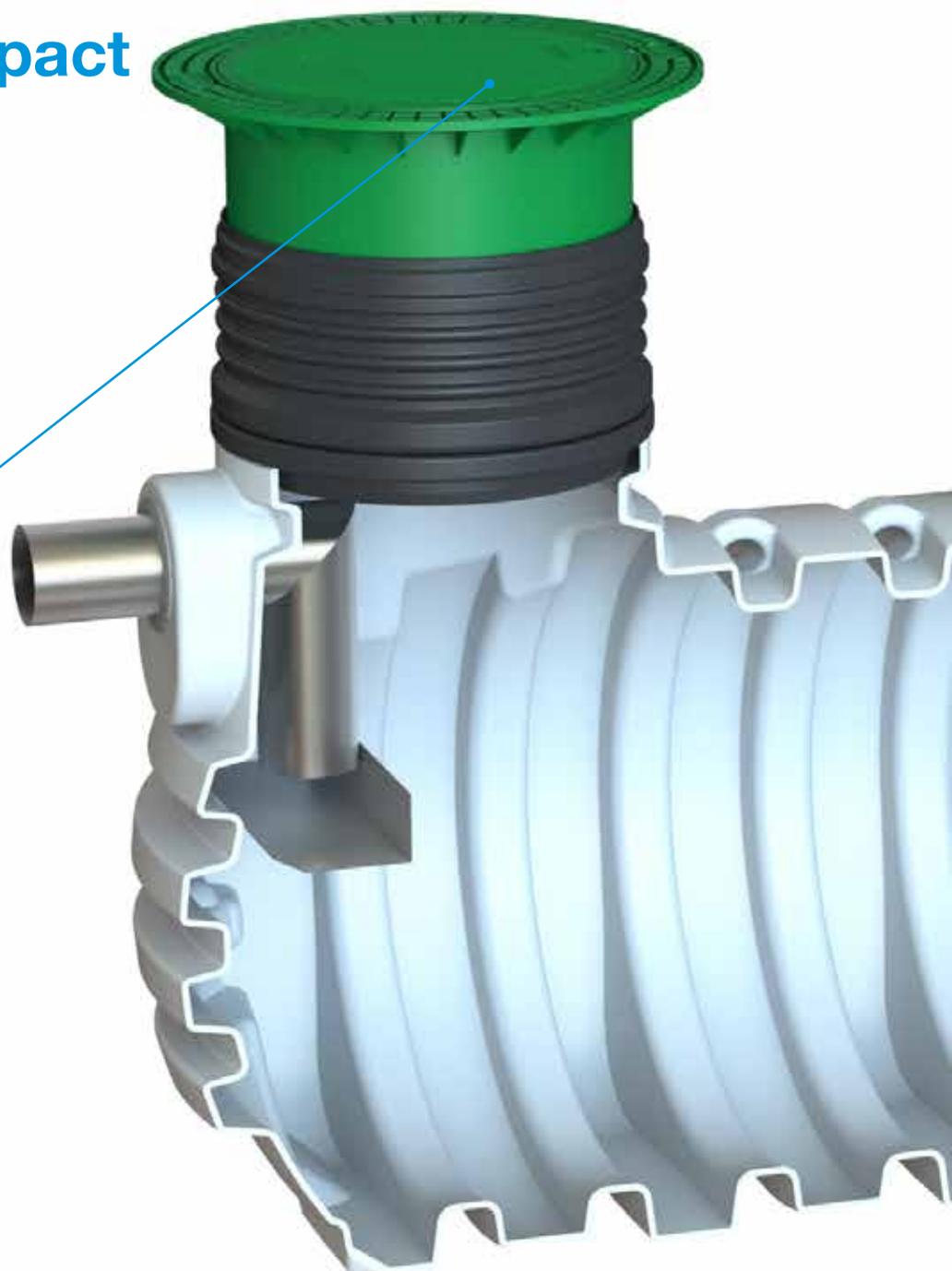
System versions from page 10

Covers

Details on covers on page 15

Optional sludge collector

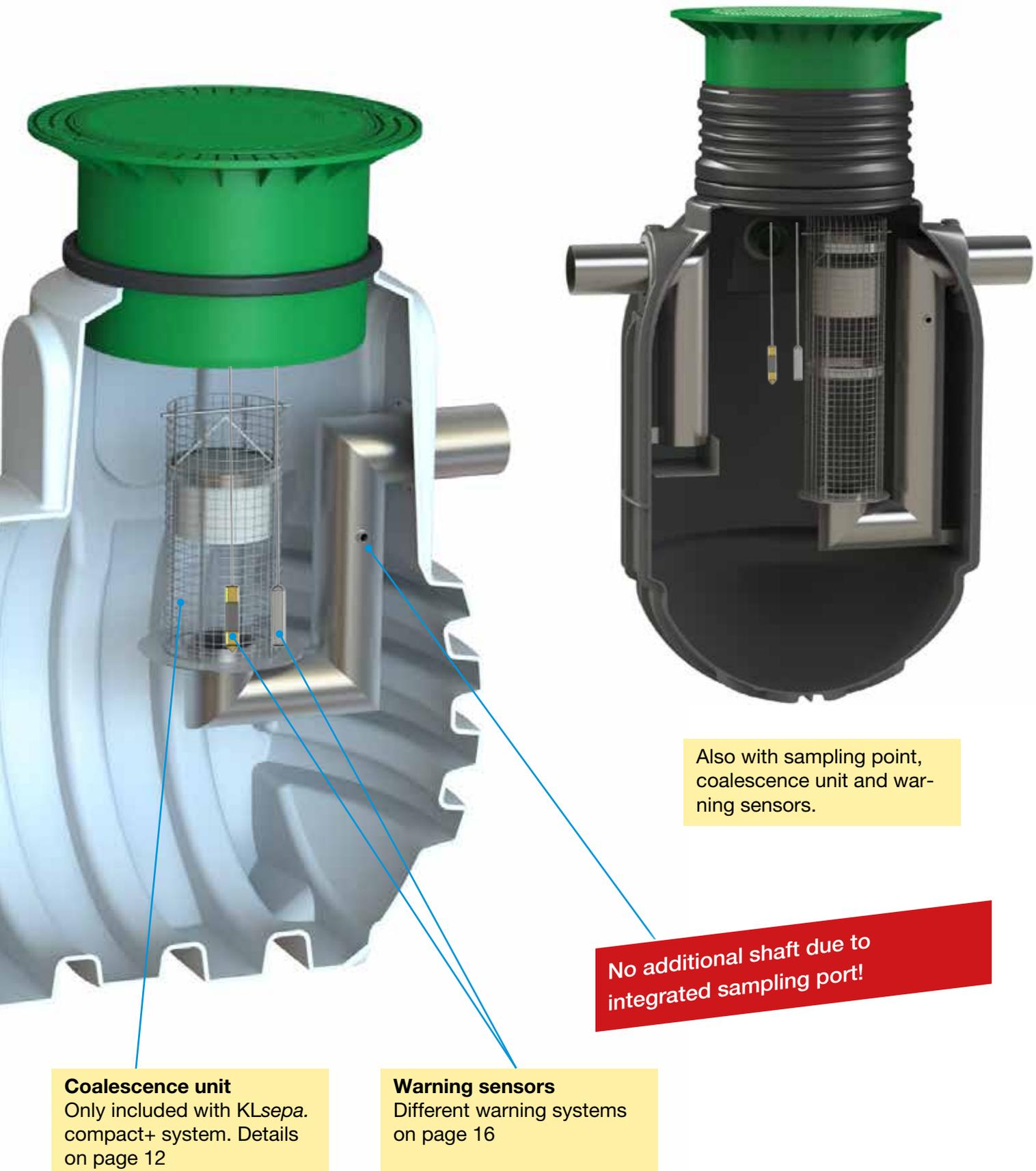
Expansion possible through optional sludge collector
Details from page 13



The KLsepa.compact systems are the KLARO light fluid separators. The system is also available with a coalescer in the KLsepa.compact+ version. The

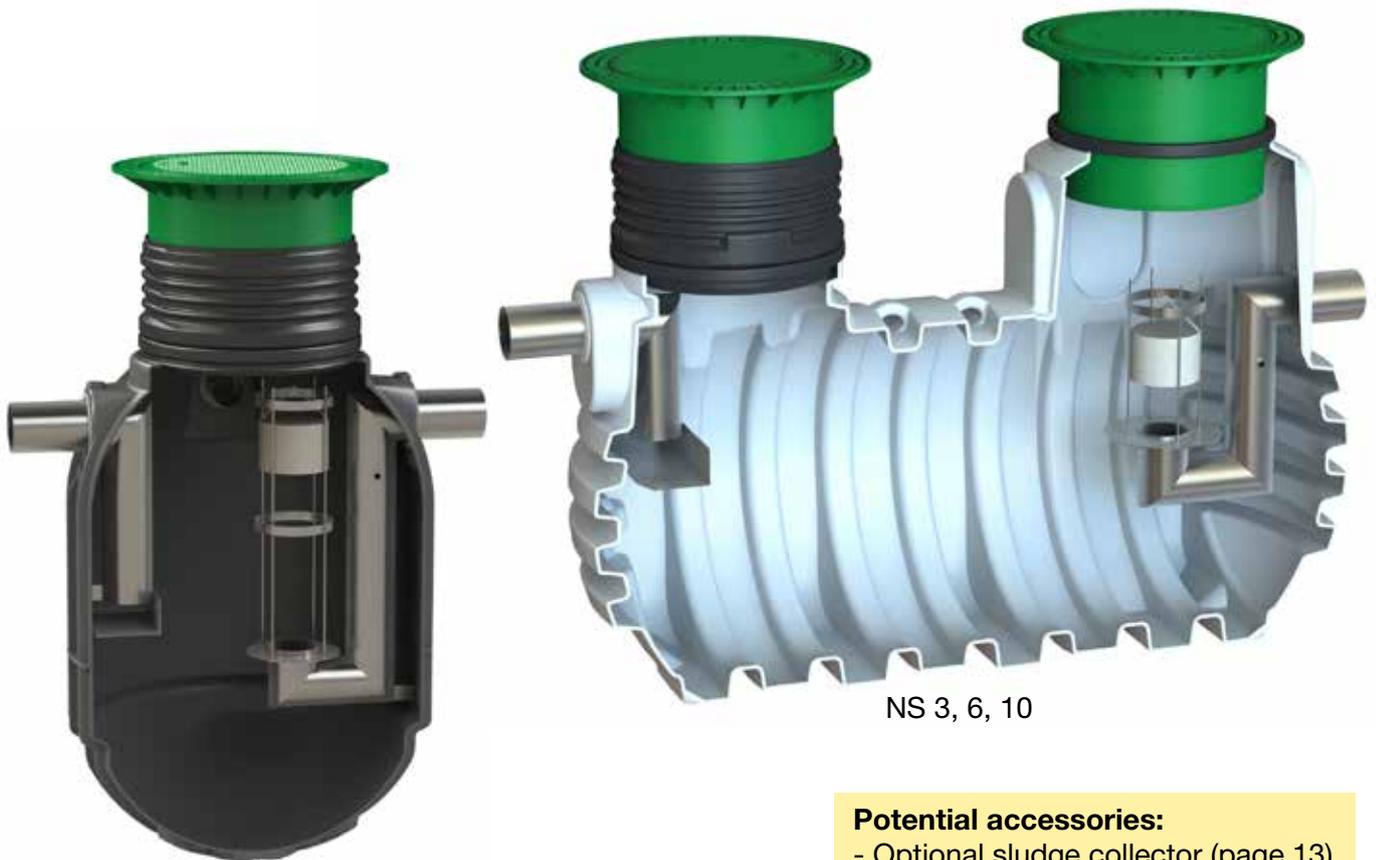
volume for the integrated oil and sludge storage have been maximized so that the separator can also be used at petrol stations with high performance petrol

pumps. Due to the integrated sampling port it may be possible to dispense with a downstream sampling shaft.



2. Description of system

2.1.1. KLsepa.compact - Class II petrol separator



NS 3

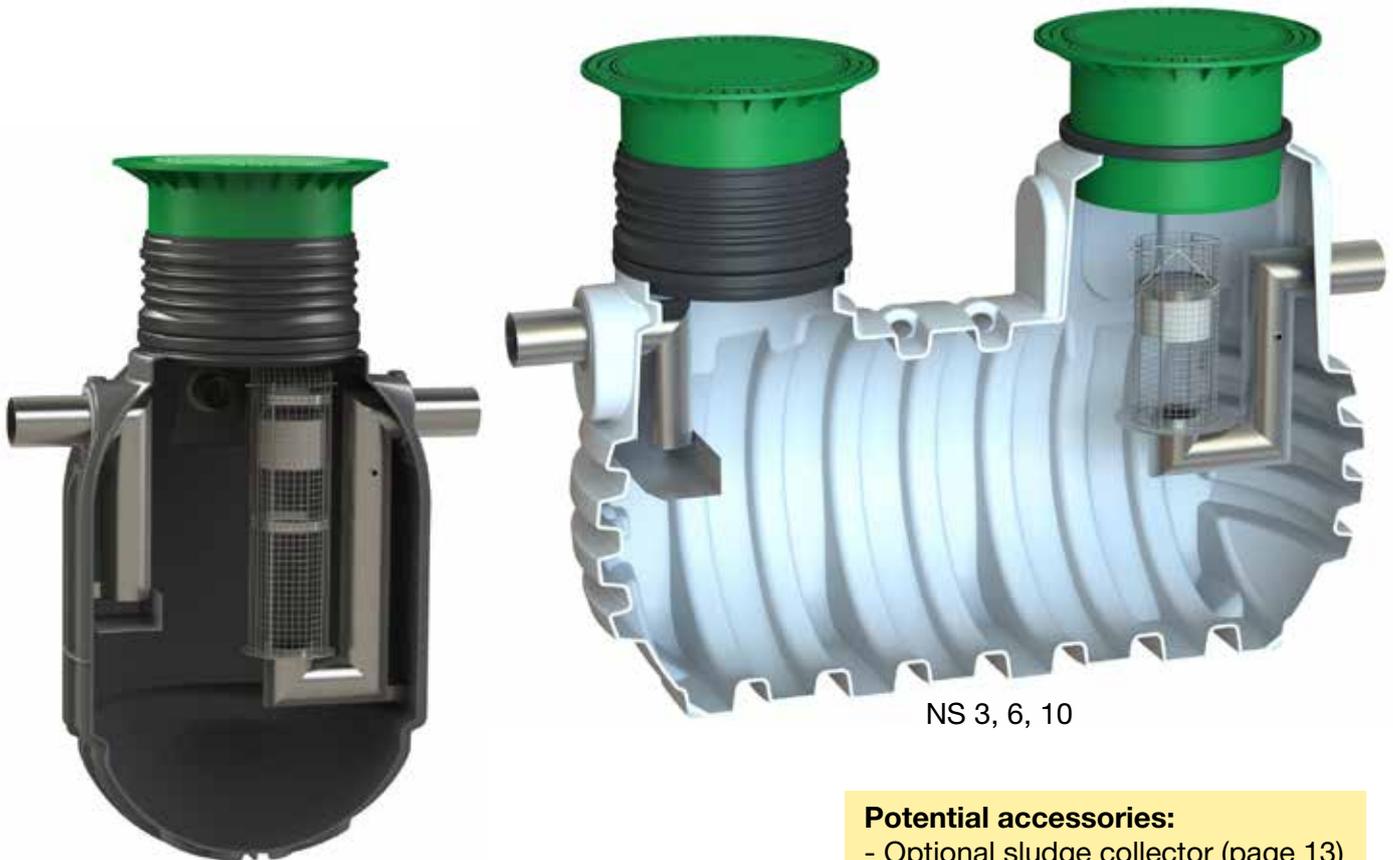
NS 3, 6, 10

Potential accessories:

- Optional sludge collector (page 13)
- Warning systems (page 16)
- Optional integrated sampling port (page 14)

		Tank geometry			Volume			Weight
		Length	Width	Height <small>(w/o dome assembly)</small>	Light fluids	Sludge	Total	approx.
NS	DN	l	w	h	[l]	[l]	[l]	[kg]
[l/s]	[mm]	[m]	[m]	[m]				
3	150	1,16	1,16	1,67	500	400	1090	88
3	150	2,45	1,15	1,66	500	1500	2150	181
6	150	2,45	1,15	1,66	500	1500	2150	181
10	150	2,45	1,15	1,66	500	1500	2150	181

2.1.2. KLsepa.compact+ - Class I coalescence separator



NS 3

NS 3, 6, 10

Potential accessories:

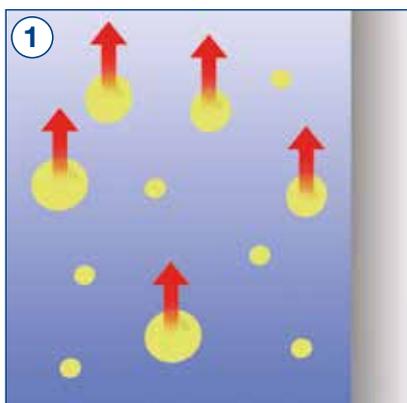
- Optional sludge collector (page 13)
- Warning systems (page 16)
- Optional integrated sampling port (page 14)

		Tank geometry			Volume			Weight
		Length	Width	Height <small>(ohne Domaufbau)</small>	Light fluids	Sludge	Total	approx.
NS	DN	l	w	h	[l]	[l]	[l]	[kg]
[l/s]	[mm]	[m]	[m]	[m]				
3	150	1,16	1,16	1,98 - 2,28	500	400	1090	80
3	150	2,45	1,15	1,77-2,07	500	1500	2150	250
6	150	2,45	1,15	1,77-2,07	500	1500	2150	250
10	150	2,45	1,15	1,77-2,07	500	1500	2150	250

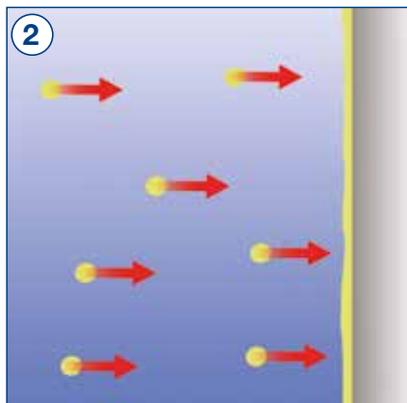
2. Description of system

2.2. Coalescence unit

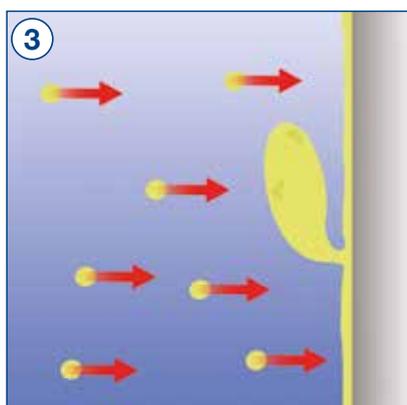
The KLARO KLsepa.compact+ separator systems are coalescence separators. This means that they are extended by a coalescence unit, which allows a significantly higher degree of separation. While the limit of the separation efficiency of a petrol separator is less than 100 mg of residual oil per litre of water, with the help of a coalescence unit this value can be reduced to a residual oil level below 5 mg/l.



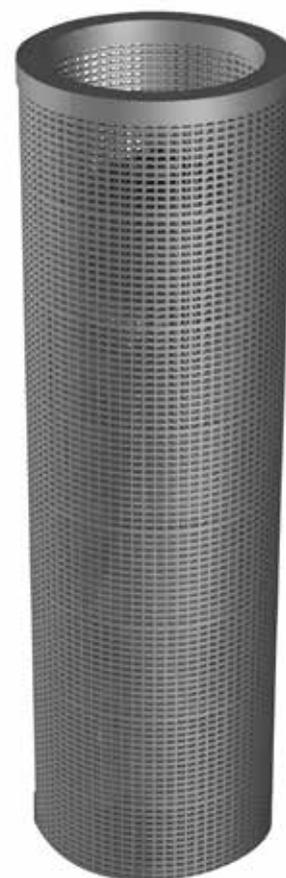
In addition to readily separable oil drops in a light fluid separator, very small oil droplets arise, whose density difference to water is too small to make them rise to the surface in the time available. Therefore, they remain in the effluent water.



In order to precipitate out these smaller oil droplets, a material is positioned before the discharge, which the droplets adhere to and together form an oil film.



Through the flow of further oil, the thickness of the oil film increases, until the adhesion of the oil film is exceeded. Individual droplets work free, whose size is sufficient to rise to the surface, due to the difference in density, and therefore they are also deposited.



Example of a coalescence unit

2.3. Accessories

2.3.1. Optional sludge collector

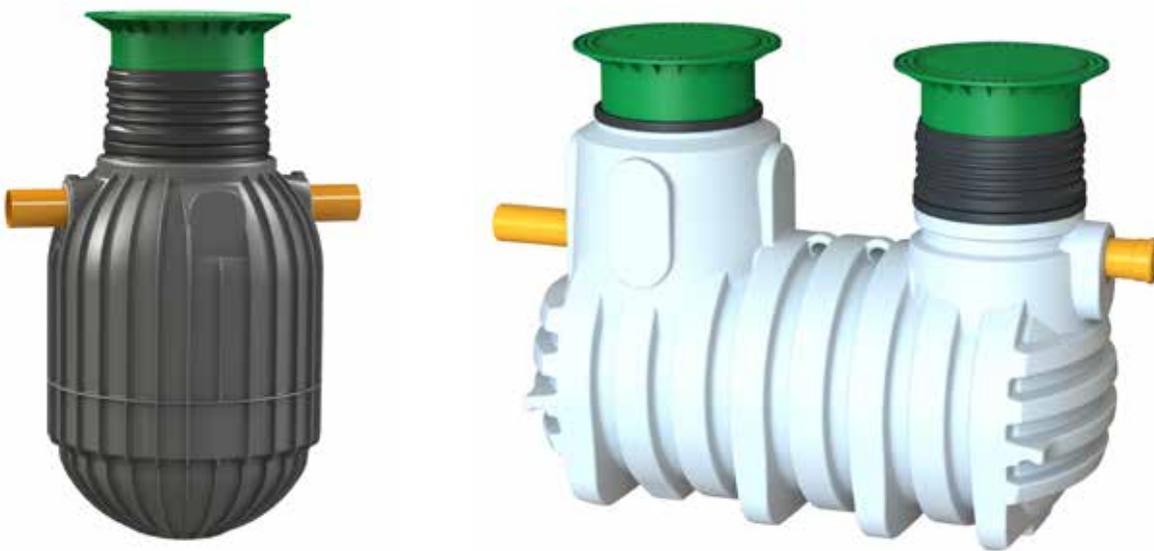
All KLARO separator systems can be expanded with an upstream sludge collector. Additional sludge collectors are used for pre-filtration of contaminants contained in the water, whose density is greater than that of water. The contaminants are deposited on the bottom. In addition, larger floating material is already stopped here. The efficiency of the sludge collector is dependent on the surface area, the dwell time, the flow path and the volume. 50% of

the sludge collector volume (with static water level) can be used for storage of the sludge. Once this level is reached, the contents of the sludge collector must be disposed of.

Freed of coarse sediments and floating debris, the wastewater flows into the separator. The incoming volume of flow is regulated by a baffle and directed into the container with an optimized flow. This also initiates the sedimentation process.

Additional sludge traps are useful and necessary with increased accumulation of dirt in the oil-containing wastewater, for example:

- Washing areas for construction vehicles, construction machinery, agricultural machinery, truck wash stalls and automatic vehicle wash systems, e.g. gantry car washes or drive-through car washes.



		Tank geometry			Weight
		Length	Width	Height <small>(w/o dome assembly)</small>	approx.
Volume	DN	l	w	h	[kg]
[l]	[mm]	[m]	[m]	[m]	
1090	100/150	1,16	1,16	1,67	67
2070	100/150	2,45	1,15	1,66	155
3160	150/200	2,45	1,40	1,90	235
4650	150/200	2,45	1,70	2,20	300

2. Description of system

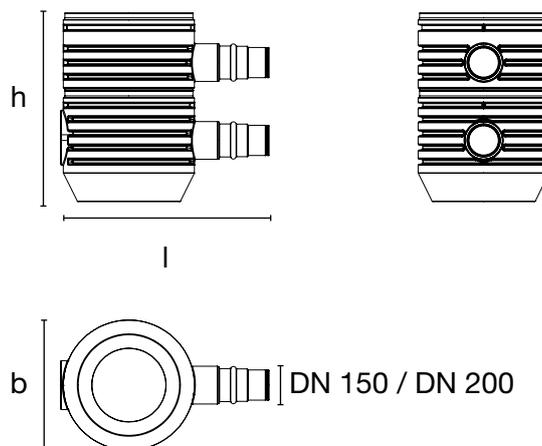
2.3.2. Sampling

External sampling shaft

The KLARO separators can be expanded with an external sampling point. The sampling shaft is connected downstream of the separator tank.

The sampling shaft is part of the sep-

arator. It is used, in addition to the prescribed collection of wastewater samples, for the control, maintenance and cleaning of the system.



External sampling	Dimensions [cm]			Weight [kg] (w/o cover)
	l	b	h	approx.
with DN 150 connection	101	69	100	19
with DN 200 connection	101	69	100	19

Internal sampling

The KL sepa.compact separator system also provides the option of integrated sampling. A sampling unit is installed before the discharge so that it is accessible from the riser shaft.

Attention: In many countries and regions an external sampling point is stipulated.

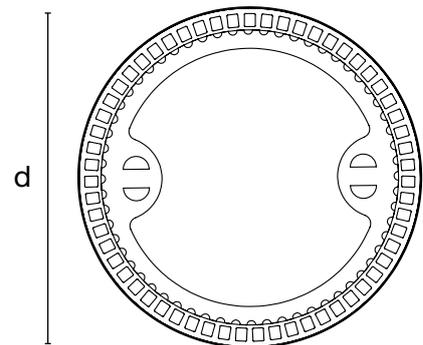


2.3.3. Dome assembly and covers

- Incl. standard lip seals for easy connection
- Sealed to ground level
- Easily adapted to ground level with telescopic/tilting dome shaft
- Excellent stability due to modern

- manufacturing
- Unique precision fit of the components through new production process
- Suitable for foot traffic, or car/truck traffic with standard concrete rings and covers (supplied by customer).

- Fully adjustable ground level cover over the tank top, tiltable to 5°. Ideal for asphalt surfaces.

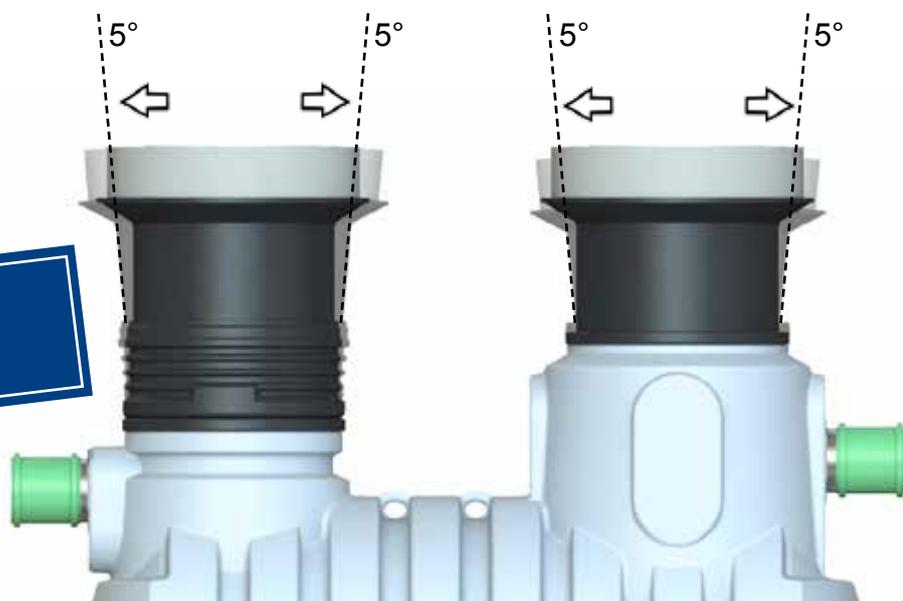


Attention: To ensure permanent suitability for car/truck traffic an outer concrete lining is required round the shaft. Further information is available in the installation instructions.

Cover	Dimensions [cm]		Weight [kg]
	d	h	approx.
Foot traffic plastic	85	46 - 64	25
Car traffic concrete	74	57 - 75	120
Truck traffic concrete	78	61 - 79	180

The dome assemblies are fully adjustable for height and tilt (up to 5%) providing a high degree of flexibility in installation.

Adjustable height and up to 5% tilt



2. Description of system

2.3.4. Warning systems

According to EN 858-1 the separator must be equipped with automatic warning devices.

If an excessive increase is not complied with, the alarm system must react to the light liquid layer thickness.

Local authorities may permit the use of separator systems without automatic warning devices.

An automatic warning devices may then be omitted if the leakage of light liquid from the separator and the shaft assemblies is excluded.



Functionality:

Using sensors that are mounted in the separator, the following functions can be monitored:

- Monitoring of the layer thickness, i.e. alert raised when a defined maximum capacity limit of oil/petrol collection has been reached.
- Detection of liquid overflow, i.e. if the general liquid level rises with a clogged coalescing filter or an automatically closed outlet.
- Recognition of a declining liquid level, i.e. with a leak in the oil separator.

Available Sets:

Type 1: Oil layer thickness alarm

Type 2: Overflow alarm

Type 3: Oil layer thickness and overflow alarm

2.3.5. Maintenance case

The KLARO maintenance case for separator systems contains everything necessary to perform monthly self-monitoring. The operator of a light liquid separator should carry out a monthly check of the system. Further information can be found on page 26.



Separator maintenance case

Contents:

- Oil level float
- Tape measure with carabiner
- Indicator strips on a roll
- Measuring cup
- Pointed plumb bob
- Short measurement plumb with strike plate
- Manhole/cover keys

3.1. Check list - road map for separator

1. Replacement or new installation?

The operator must first determine whether the separator is a completely new installation or whether it is a replacement of an older existing separator system. This makes a difference in so far as a new installation in general must be approved by the relevant authority (water authority, environmental agency, town council etc.). If it is a replacement, the operator only needs to report the planned new separator.

2. Assessment

Next, an assessment is made by KLARO to find the optimum system to meet the needs of the operator. As a basis for the assessment we need certain information. For this purpose use the form in section 3.3 (page 19). An assessment is also required for a replacement system as well as a new installation, as the external conditions, such as the rainfall surface area, water connections and the light fluids present, can change over the years.

The following steps may differ according to the region/country:

3. Assessment to the authority

After the assessment has been completed by KLARO, it must be submitted by the operator or the construction company contracted by the operator, as required, to the relevant authority.

4. Installation of the system

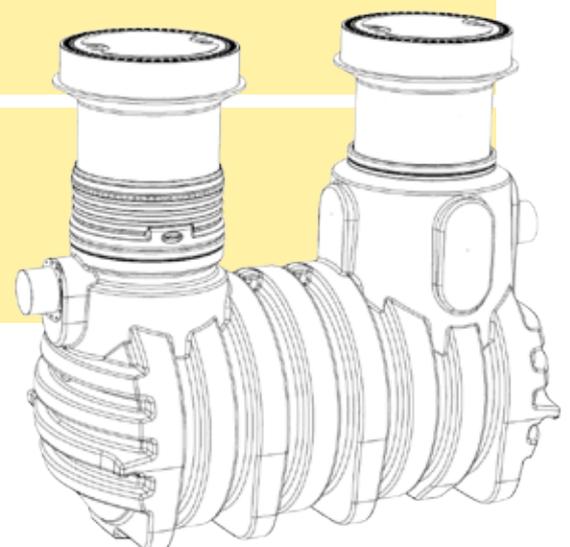
Once the design has been approved, construction work can begin. The construction company responsible should be an approved construction organisation.

5. General inspection

After the completion of the separator, a general inspection should be carried out. A specialist in separator technology should check the installation, the sealing of the container and the operation of the system.

6. Commissioning

After successful completion of the general inspection the unit can be put into operation.



3. Information

3.2. Inspection and maintenance

Monthly self-monitoring

The operator, or a person appointed by him, should perform a monthly self-inspection of the facility. The inspection person should be a qualified expert.

The following steps are carried out at the monthly self-monitoring:

- Measure oil layer and sludge layer
- Test float for function
- Visual inspection
- Sign the log book

The KLARO separator maintenance case (see page 16) contains all the measurement tools necessary.

A simple examination of the warning system is **not** sufficient for this!

Six monthly maintenance

The operator, or a person appointed by him, must perform the following steps at the six monthly maintenance:

- Clean float (remove sludge layer)
- Clean coalescence material (if installed)
- Clean the gutter in the sampling shaft
- Sign the log book

5-yearly General Inspection

Every five years, the separator must be given a general inspection, as with commissioning, by a qualified person in separator technology.

Oil removal as needed

The integrated oil reservoir is emptied through the suction connection piece when the oil level specified in the original instructions has been reached.



3.3. Detailed information for the assessment

The assessment of the separator system is made in accordance with EN 858-2.

Based on the following data, we calculate the required Nominal Size (NS) for your separator.

Please scan your information and send it to us per Mail (info@klaro.eu) or by Fax (**+49 (0) 921/16279-100**).

1. General information

1.1 Property / Installation location

1.2 Client / Construction contractor

Name

Street

Town of residence

Telephone Comments

Fax

E-Mail

1.3 Planner

Name

Telephone Fax

E-Mail

1.4 Relevant water authority

3. Information

2. Originating area of wastewater

Sector:

- Petrol station operations
- Transport / Bus operations
- Construction operation
- Car service
- Special vehicles
- Car wash facilities
- Scrap metal merchant
- Miscellaneous

Area in use:

- De-waxing
- Cleaning of vehicles/vehicle components
- Maintenance/repair of vehicles/vehicle components
- Trading in vehicles/vehicle components
- Storage areas for crashed vehicles
- Dewatering of tank areas
- Scrap yards
- Vehicle storage compounds/ multi-storey car parks
- Machine and component cleaning areas
- Refilling stations/ Loading bays/ Storage areas

2.1. Type of oil-containing wastewater

For what purpose will the separator be used?

- For the treatment of wastewater (industrial wastewater)
- For the treatment of oil-contaminated rainwater (rainfall run-off)
- To restrain uncontrolled leaking of light fluid

2.2. Substances contained in wastewater

- Petrol Diesel fuel Engine oil Gearbox oil Hydraulic oil Miscellaneous

Viscosity of light fluids

- < 0.85 g/cm³ 0.85 to 0.90 g/cm³ 0.90 to 95 g/cm³
- Biodiesel component 0% < c <= 5% Biodiesel component 5% < c <= 10%
- Biodiesel component 10% < c <= 40% Biodiesel component c > 40%

Anticipated amount of sludge:

The classification of the sludge amount to determine the sludge collector content corresponds to the following list:

- none:**
 - Condensate
- low:**
 - Process waste waters with defined small quantities of sludge
 - All rainwater catchment areas where neither road abrasion and dirt by vehicular traffic or the like is generated
- medium:**
 - Petrol stations, hand car washing, parts washing, bus washing stands
 - Wastewater from repair shops, parking areas, power plants, engineering companies
- large:**
 - Washing areas for construction vehicles, construction machinery, agricultural machinery
 - Truck washing stands
- Special case:**
 - Automatic car wash equipment, such as gantry car washes, drive-through car washes

2.3. Wastewater discharge

Discharge into

Effluent / combined drain Storm drain Surface waters Miscellaneous

3. Accumulated rainwater

3.1 Selection of rainfall for assessment

The authoritative local rainfall is determined by the relevant authority and can be obtained from them.

150 l/(s*ha) 200 l/(s*ha) 300 l/(s*ha)

3.2 Free surfaces

Give the area of all surfaces in m²:

Repair areas	<input type="text"/> m ²	Fuelling areas	<input type="text"/> m ²
Non-covered washing areas	<input type="text"/> m ²	Storage sites, compounds, scrap yards	<input type="text"/> m ²
Storage areas for accident vehicles	<input type="text"/> m ²	Other areas	<input type="text"/> m ²

3. Information

4. Accumulated wastewater

4.1 Wastewater flow from existing drain connections

Nominal diameter of the outlet valves		Quantity
DN 15	R 1/2"	<input type="text"/>
DN 20	R 3/4"	<input type="text"/>
DN 25	R 1"	<input type="text"/>

4.2 Wastewater flow from car/truck wash equipment and vehicle washing stands

Give the quantity of:

Drive-through car washes	<input type="text"/>	Truck gantry washes	<input type="text"/>
High pressure floor cleaners	<input type="text"/>	Car gantry washes	<input type="text"/>

4.3 Wastewater flow from high pressure and steam jet washers

Give the quantity of:

HP and steam jet devices	<input type="text"/>
HP and steam jet devices in connection with an automatic washing equipment	<input type="text"/>

4.4 Covered washing areas?

Yes

No

Place, Date

Signature

3.4. CE Declaration

KLsepa.compact

LEISTUNGSERKLÄRUNG nach VERORDNUNG (EU) Nr. 305/2011

KLARO GmbH Spitzwegstrasse 63 95447 Bayreuth Deutschland 14	
EN 858-1	
Abscheideranlage für Leichtflüssigkeiten Klasse I mit integriertem Schlammfang und separater Probennahmestelle	
<ul style="list-style-type: none"> - Referenz: KLARO LF-Abscheider Klasse I gemäß Typenliste - Material Behälter: PE-HD - Material Einbauteile: Nichtrostender Stahl - Verwendungszweck: Abtrennung von Leichtflüssigkeiten vom Abwasser zum Schutz von Entwässerungssystemen und Oberflächengewässer 	
System zur Bewertung und Überprüfung der Leistungsbeständigkeit:	4
Notifizierte Prüfstelle	NPD
Brandverhalten	E
Flüssigkeitsdicht (Prüfung mit Wasser)	bestanden
Wirksamkeit	bestanden
Tragfähigkeit (statische Berechnung)	bestanden
Dauerhaftigkeit	bestanden

Typenliste KLARO Koaleszenzabscheider

Bezeichnung	Nenngröße	Schlammfang	Ölspeicher
	NS	[l]	[l]
sepal03-1100	3	550	500
sepal06-1100	6	550	500
sepal06-1500	6	750	500
sepal10-1500	10	750	500
sepal15-1500	15	750	500
compactl03-300	3	300	75
compactl03-450	3	450	160
compactl03-600	3	600	300
compactl03-1500	3	1500	500
compactl06-1500	6	1500	500
compactl10-1500	10	1500	500
compactl15-2000	15	2000	500
compactl10-1500	20	2000	500

LEISTUNGSERKLÄRUNG nach VERORDNUNG (EU) Nr. 305/2011

KLARO GmbH Spitzwegstrasse 63 95447 Bayreuth Deutschland 14	
EN 858-1	
Abscheideranlage für Leichtflüssigkeiten Klasse II mit integriertem Schlammfang und separater Probennahmestelle	
<ul style="list-style-type: none"> - Referenz: KLARO LF-Abscheider Klasse II gemäß Typenliste - Material Behälter: PE-HD - Material Einbauteile: Nichtrostender Stahl - Verwendungszweck: Abtrennung von Leichtflüssigkeiten vom Abwasser zum Schutz von Entwässerungssystemen und Oberflächengewässer 	
System zur Bewertung und Überprüfung der Leistungsbeständigkeit:	4
Notifizierte Prüfstelle	NPD
Brandverhalten	E
Flüssigkeitsdicht (Prüfung mit Wasser)	bestanden
Wirksamkeit	bestanden
Tragfähigkeit (statische Berechnung)	bestanden
Dauerhaftigkeit	bestanden

Typenliste KLARO Benzinabscheider

Bezeichnung	Nenngröße	Schlammfang	Ölspeicher
	NS	[l]	[l]
sepal03-1100	3	550	500
sepal06-1100	6	550	500
sepal06-1500	6	750	500
sepal10-1500	10	750	500
sepal15-1500	15	750	500
compactl03-300	3	300	75
compactl03-450	3	450	160
compactl03-600	3	600	300
compactl03-1500	3	1500	500
compactl06-1500	6	1500	500
compactl10-1500	10	1500	500
compactl15-2000	15	2000	500
compactl10-1500	20	2000	500

KLARO

A company of the GRAF group

KLARO GmbH
Spitzwegstraße 63
95447 Bayreuth

Telephone: +49(0)921 16279-0
Fax: +49(0)921 16279-100
E-Mail: info@klaro.eu

Further information under
www.klaro.eu



Technical hotline
+49 (0) 921 16279-330

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