

KESSEL - Oil / Fuel Separators

KESSEL - Coalescence Separators

Polyethylene Separators according to EuroNorm prEN 858



- ▶ Low operation/disposal costs due to optimized chamber volume
- ▶ Compact/lightweight design reduces installation and transport costs
- ▶ Self-adjusting manhole covers compensate for soil settlement and heaving



Product Selection

Oil/Fuel Separators	Coalescence Separators	Sampling Chambers
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KESSEL - Oil/Fuel separators according to EuroNorm prEN 858, Class II

Illustration

Product Description



KESSEL - Oil/Fuel Separators

Polyethylene separators according to EuroNorm prEN 858.
For underground installation.

With integrated sludge separator and oil/fuel overflow closure valve.

Calibrated for fluids with densities between 0.85 and 0.95 g/cm³.

Vertically and laterally adjustable (up to 5°) polymer upper section. Cast iron manhole covers with removal key based on EN 124 in load classes A (1.5 ton), B (12.5 ton) and D (40.0 ton). Passenger car tested at depths of TeÜ from 700 to 1500 mm, Tractor trailer tested at depths of TeÜ from 700 to 1500 mm with steel reinforced concrete support slab, stress tested, inlet and outlet connectable to PE pipe based on DIN 19537.

Sludge trap capacity	..... Liter	Manufacturer
Separator capacity	..... Liter	KESSEL
Weight	..... kg	Article #
max. oil collection capacity	..... Liter	

➕ Accessories:

Sampling chamber for underground installation.

Extension sections.

KESSEL alarm units for monitoring separated oil/fuel level.

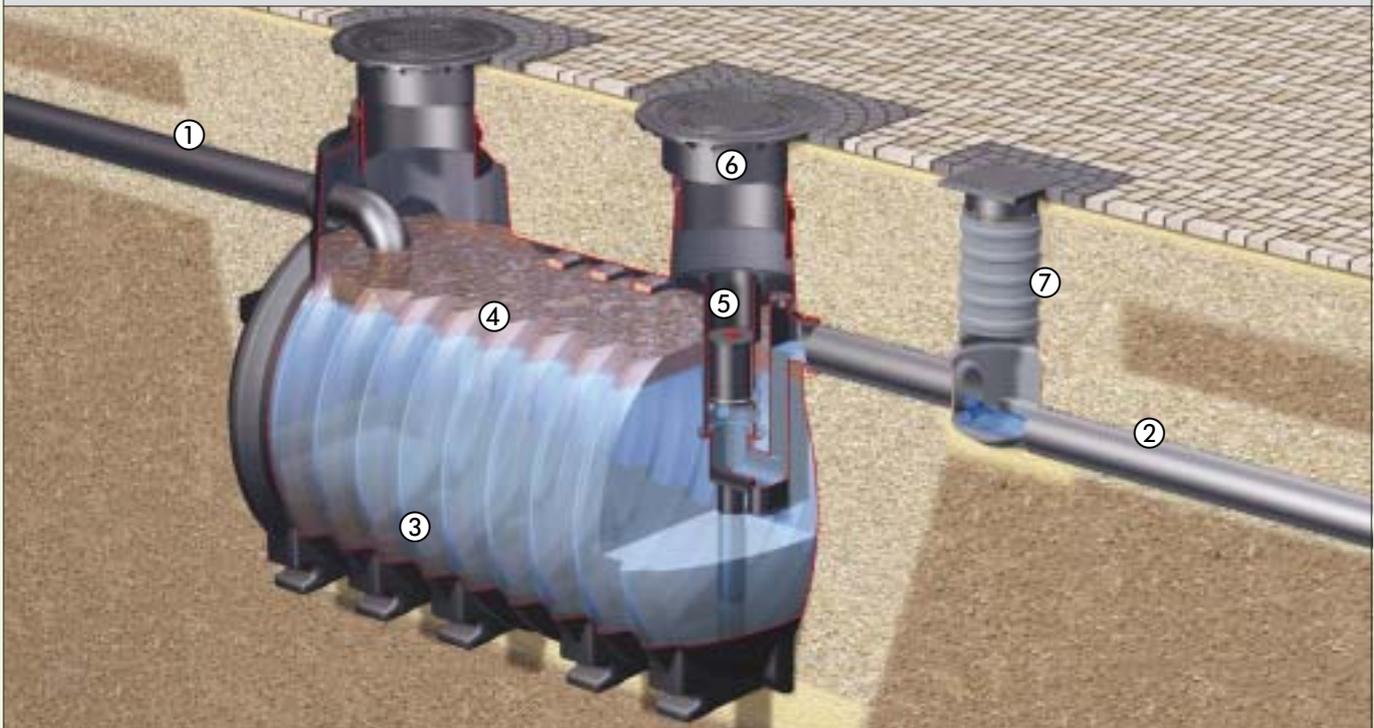
Integrated sampling device. Oil/fuel and sludge removal ports.

Delivered: Completely assembled.

Article # 99 403.10B

Installation Example

Illustration shows KESSEL Oil/Fuel separator



- | | | | |
|----------|------------------------------|-------------------------------|--------------------|
| ① Inlet | ③ Sludge separator | ⑤ Self actuated closure valve | ⑥ Upper section |
| ② Outlet | ④ Separated oil/fuel storage | | ⑦ Sampling chamber |

KESSEL Advantages:

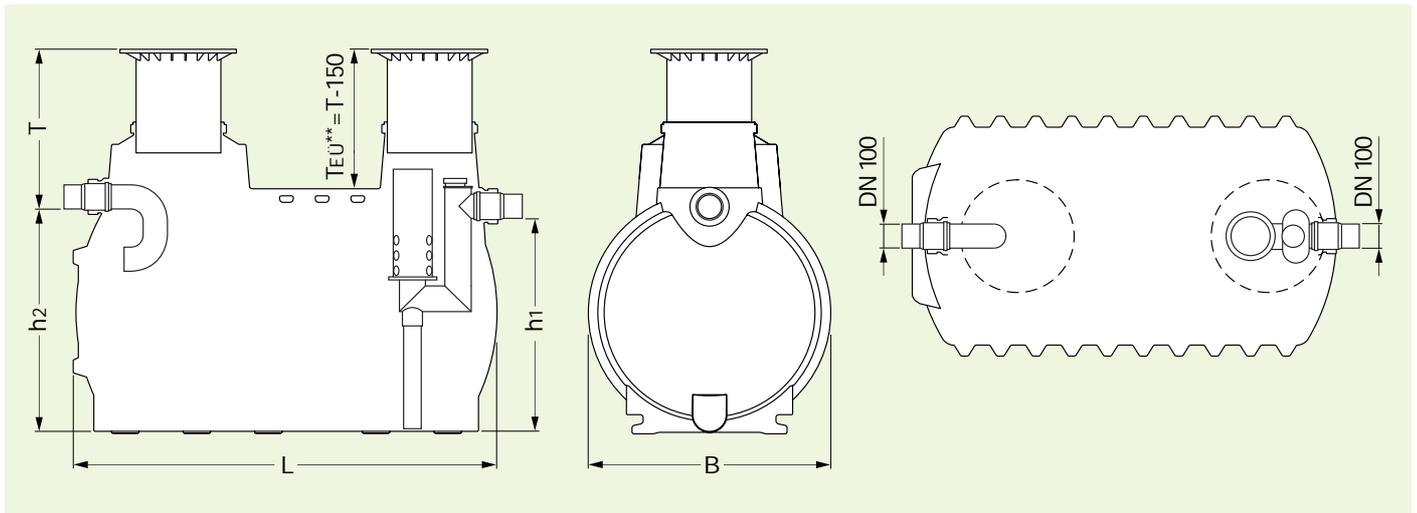


- Adjustable upper section:
- rotatable
- tiltable
- vertically adjustable
- up to Class D (40.0 ton)

KESSEL - Oil/Fuel separators according to EuroNorm prEN 858, Class II

NG	Sludge trap actual	* Sludge trap equivalent	DN	L / B in mm	T in mm min. max.	h2	h1	Separator	Oil collection	Total weight/volumen		Article #	
3- 6	3000 l	6000 l	200	2300 1760	1000 1330	1630	1600	1350 l	450 l	401 kg	4800 l	99 406.30B	99 406.30D
3-10	1000 l	2000 l	150	2080 1200	950 1280	1100	1070	900 l	300 l	331 kg	1800 l	99 403.10B	99 403.10D
3-10	1500 l	3000 l	150	2860 1200	950 1280	1100	1070	1170 l	300 l	403 kg	2500 l	99 410.15B	99 410.15D
3-15	3000 l	3000 l	200	2300 1760	1000 1330	1630	1600	1350 l	450 l	401 kg	4800 l	99 415.30B	99 415.30D
3-20	4000 l	8000 l	200	3060 1760	1000 1330	1630	1600	1900 l	600 l	473 kg	5700 l	99 420.40B	99 420.40D

Dimensioned drawing



* The flow/separation characteristics of the sludge separator portion has been tested by LGA.

According to DIBT (Deutsches Institut für Bautechnik) separators designed to these standards have sludge traps equivalent to double the effective size.

** TEU = Depth of earth coverage

Product Advantages:

- Static/Stress analysis tested.
- LGA tested.
- Easy handling with fork lift grips and light weight construction.
- Low installation costs with integrated components.
- Manhole covers will automatically compensate for settlement or heaving of the soil due to its vertically adjustable upper section.
- Lower disposal costs due to optimally designed chamber volume.
- Low maintenance costs with easy to clean/durable interior.
- Light weight, heavy duty construction.
- Easily upgraded to coalescence separator with higher separation efficiency.
- Float pre-set to handle all types of oils/fuels (spec. gravities from 0.85 to 0.95 g/cm³).

Accessories



Pages:
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Product information



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Technical information



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KESSEL - Coalescence separators according to EuroNorm prEN 858, Class I

Illustration

Product Description



KESSEL - Coalescence Separators

Polyethylene separators according to EuroNorm prEN 858. For underground installation.

With integrated sludge separator and oil/fuel overflow closure valve.

Calibrated for fluids with densities between 0.85 and 0.95 g/cm³.

Vertically and laterally adjustable (up to 5°) polymer upper section. Cast iron manhole covers with removal key based on EN 124 in load classes A (1.5 ton), B (12.5 ton) and D (40.0 ton). Passenger car tested at depths of TEÜ from 700 to 1500 mm, Tractor trailer tested at depths of TEÜ from 700 to 1500 mm with steel reinforced concrete support slab, stress tested, inlet and outlet connectable to PE pipe based on DIN 19537.

Sludge trap capacity	..... Liter	Manufacturer
Separator capacity	..... Liter	KESSEL
Weight	..... kg	Article #
max. oil collection capacity	..... Liter	

⊕ Accessories:

Sampling chamber for underground installation.

Extension sections.

KESSEL alarm units for monitoring separated oil/fuel level.

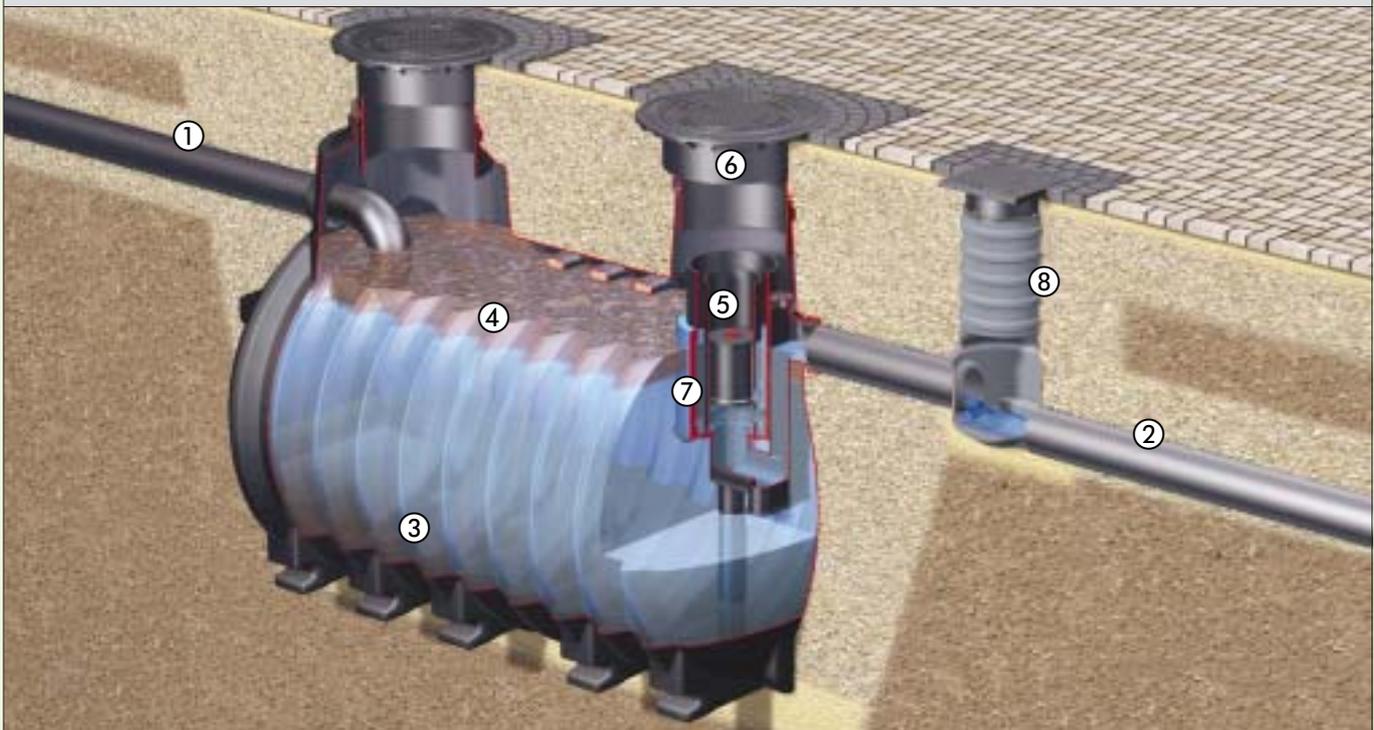
Integrated sampling device. Oil/fuel and sludge removal ports.

Delivered: Completely assembled.

Article # 99 503.10B

Installation Example

Illustration shows KESSEL Coalescence separator



- | | | | | |
|----------|------------------------------|-------------------------------|-----------------|--------------------|
| ① Inlet | ③ Sludge separator | ⑤ Self actuated closure valve | ⑥ Upper section | ⑧ Sampling chamber |
| ② Outlet | ④ Separated oil/fuel storage | ⑦ Coalescence filter insert | | |

KESSEL Advantages:

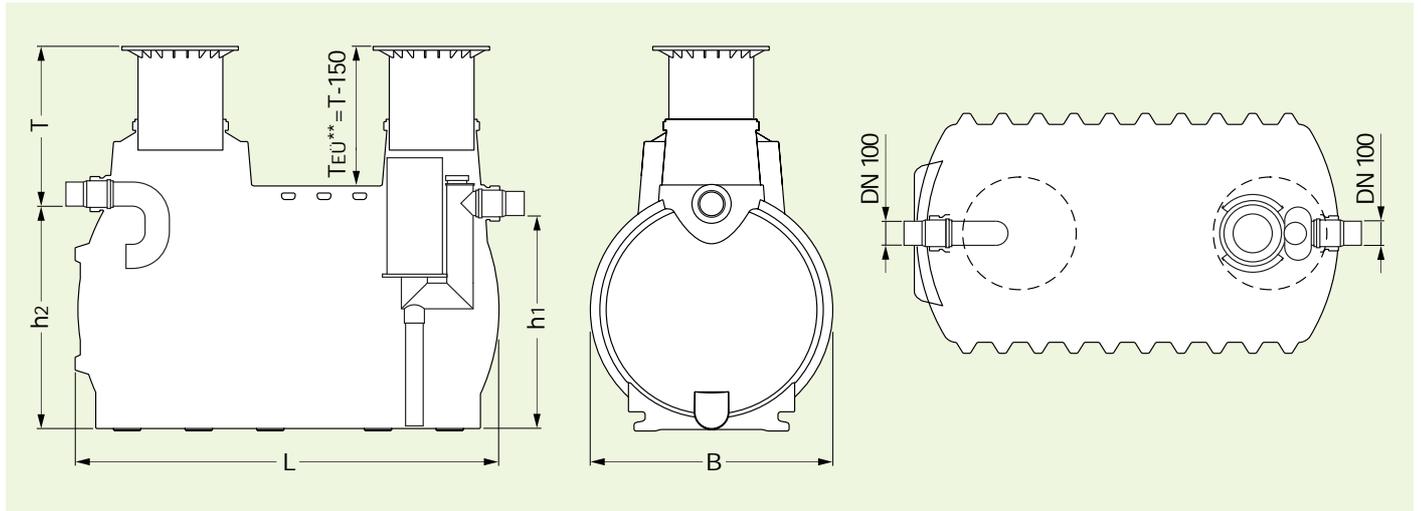


- Adjustable upper section:
- rotatable
- tiltable
- vertically adjustable
- up to Class D (40.0 ton)

KESSEL - Coalescence separators according to EuroNorm prEN 858, Class I

NG	Sludge trap actual	* Sludge trap equivalent	DN	L / B in mm	T in mm min. max.	h2	h1	Separator	Oil collection	Total weight/volumen		Article #	
3- 6	3000 l	6000 l	200	2300 1760	1000 1330	1630	1600	1350 l	450 l	401 kg	4800 l	Class B	Class D
3-10	1000 l	2000 l	150	2080 1200	950 1280	1100	1070	900 l	300 l	331 kg	1800 l	99 506.30 B	99 506.30 D
3-10	1500 l	3000 l	150	2860 1200	950 1280	1100	1070	1170 l	300 l	403 kg	2500 l	99 503.10 B	99 503.10 D
3-10	3000 l	3000 l	200	2300 1760	1000 1330	1630	1600	1350 l	450 l	401 kg	4800 l	99 510.15 B	99 510.15 D
3-15	4000 l	8000 l	200	3060 1760	1000 1330	1630	1600	1900 l	600 l	473 kg	5700 l	99 510.30 B	99 510.30 D
												99 515.40 B	99 515.40 D

Dimensioned drawing



* The flow/separation characteristics of the sludge separator portion has been tested by LGA.

According to DIBT (Deutsches Institut für Bautechnik) separators designed to these standards have sludge traps equivalent to double the effective size.

** TEU = Depth of earth coverage

Product Advantages:

- Static/Stress analysis tested.
- LGA tested.
- Easy handling with fork lift grips and light weight construction.
- Low installation costs with integrated components.
- Manhole covers will automatically compensate for settlement or heaving of the soil due to its vertically adjustable upper section.
- Lower disposal costs due to optimally designed chamber volume.
- Low maintenance costs with easy to clean/durable interior.
- Light weight, heavy duty construction.
- Coalescence insert easily removed, cleaned and replaced.
- Float pre-set to handle all types of oils/fuels (spec. gravities from 0.85 to 0.95 g/cm³).

Accessories



Pages:
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Product information



Pages:
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Technical information

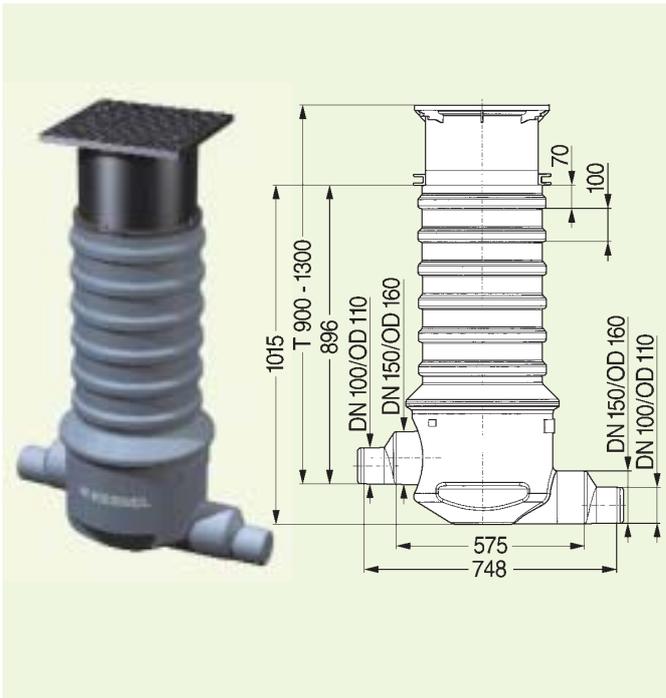


Pages:
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Accessories for KESSEL Separation Systems

Product Illustration



Article Specifications

KESSEL - polyethylene sampling chamber, diameter = 400 mm

For underground installation.

DN 100 / 150 inlets and outlets (cut on-site to required size), connects to plastic pipe based on DIN 19534, 400 mm interior diameter sampling chamber, vertically adjustable upper section with clamp ring, covers available in Class A (1.5 ton), Class B (12.5 ton) and Class D (40.0 ton) load classes, covers are lockable and odor tight, inlet to outlet elevation drop - 120 mm.

Manufacturer: KESSEL

Inlet depth T (mm)	Inlet & Outlet sizes		Load Class	Article #
	DN	OD		
900-1300	100 / 150	110 / 160	A (1.5 ton)	915 880A
900-1300	100 / 150	110 / 160	B (12.5 ton)	915 880B
900-1300	100 / 150	110 / 160	D (40.0 ton)	915 880D

For shallower installation depth, the necessary length of the upper section of the sampling chamber is simply sawed off, gasket is replaced and upper section inserted into gasket/sampling chamber body.

KESSEL - polyethylene sampling chamber, diameter = 800 mm

For underground installation.

Connects to SML pipe based on DIN 19522, 880 mm interior diameter sampling chamber, vertically adjustable and tiltable upper section with clamp ring, manhole entry clearance - 610 mm, covers available in Class A (1.5 ton), Class B (12.5 ton) and Class D (40.0 ton) load classes, covers are odor tight, manhole cover removal tool included.

Inlet depth T (mm)	Inlet & Outlet sizes		Article #	
	DN	OD	Class A / B	Class D
450- 950	150	160	915 760/80B	915 760/80D
620-1120	150	160	915 762/80B	915 762/80D
620-1120	200	200	upon request	upon request

For shallower installation depths, the necessary length of the upper section is simply sawed off.

KESSEL - polyethylene extension section

400 mm extension section complete with sealing gasket.

Article #
917 402





Product Illustration	Article Specifications		
	<p>KESSEL - sampling device, integrated (see pages 10 and 11).</p> <table border="1" data-bbox="807 360 1072 432"> <tr> <td>Article #</td> </tr> <tr> <td>917 800</td> </tr> </table>	Article #	917 800
Article #			
917 800			
	<p>KESSEL - alarm unit For monitoring oil/fuel level inside the separator (see pages 10 and 11).</p> <table border="1" data-bbox="807 689 1072 761"> <tr> <td>Article #</td> </tr> <tr> <td>917 801</td> </tr> </table>	Article #	917 801
Article #			
917 801			
	<p>KESSEL - alarm unit Alerts when outlet of separator is blocked or if inlet flows are exceeding the separators capacities; (see pages 10 and 11).</p> <table border="1" data-bbox="807 994 1072 1066"> <tr> <td>Article #</td> </tr> <tr> <td>917 802</td> </tr> </table>	Article #	917 802
Article #			
917 802			
	<p>KESSEL - Oil/fuel direct disposal device (see pages 10 and 11).</p> <table border="1" data-bbox="807 1272 1072 1344"> <tr> <td>Article #</td> </tr> <tr> <td>917 803</td> </tr> </table>	Article #	917 803
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917 803			
	<p>KESSEL - Sludge/sediment direct disposal device (see pages 10 and 11).</p> <table border="1" data-bbox="807 1576 1072 1648"> <tr> <td>Article #</td> </tr> <tr> <td>917 804</td> </tr> </table>	Article #	917 804
Article #			
917 804			
	<p>KESSEL - Coalescence filter insert</p> <table border="1" data-bbox="807 1845 1072 1917"> <tr> <td>Article #</td> </tr> <tr> <td>917 805</td> </tr> </table>	Article #	917 805
Article #			
917 805			



► How it works

Oil/Fuel separator

Wastewater containing oil and fuel is drained from floor, area or channel drains and into the separator. *Please note that drains connected to the separator must not be equipped with odor traps, vapors in the inlet piping must be able to escape into the free atmosphere.* The wastewater then enters the separator through a hydraulically engineered inlet which aides in calming and evenly dispersing the incoming wastewater. As the wastewater slowly and evenly flows through the main body of the separator, the heavier sludge and sediment are separated from the wastewater and sink to the bottom of the chamber while at the same time the lighter oils and fuels are separated from the wastewater and rise to the surface. The specially designed outlet allows the cleaned wastewater to exit the separator without allowing any of the separated sludge/oils and fuels from leaving the separating chamber.

Coalescence separator

The coalescence separators are identical to the oil/fuel separators except that an additional coalescence filter is integrated into the system. This coalescence filter is located near the outlet of the separator and aides in separating the finer/more difficult to separate oil/fuel droplets from the wastewater. These fine droplets reach the coalescence filter where they combine with other fine droplets creating larger drops which then release from the coalescence filter and rise to the surface of the separator.

Self activated closure lock

Both the oil/fuel and the coalescence separators are equipped with a self activated closure lock which completely closes the outlet of the separator when the separator reaches its maximum oil/fuel storage

volume. This safety feature consists of a float inside a flooded guide chamber. The float is calibrated to float in water and sink in oil/fuel (handles all substances with a specific gravity between 0.85 and 0.95 grams/cm³). When the maximum oil/fuel storage volume is reached oil/fuel flood the guide chamber causing the float to quickly sink which in turn completely seals off the outlet of the separator.

Alarm units

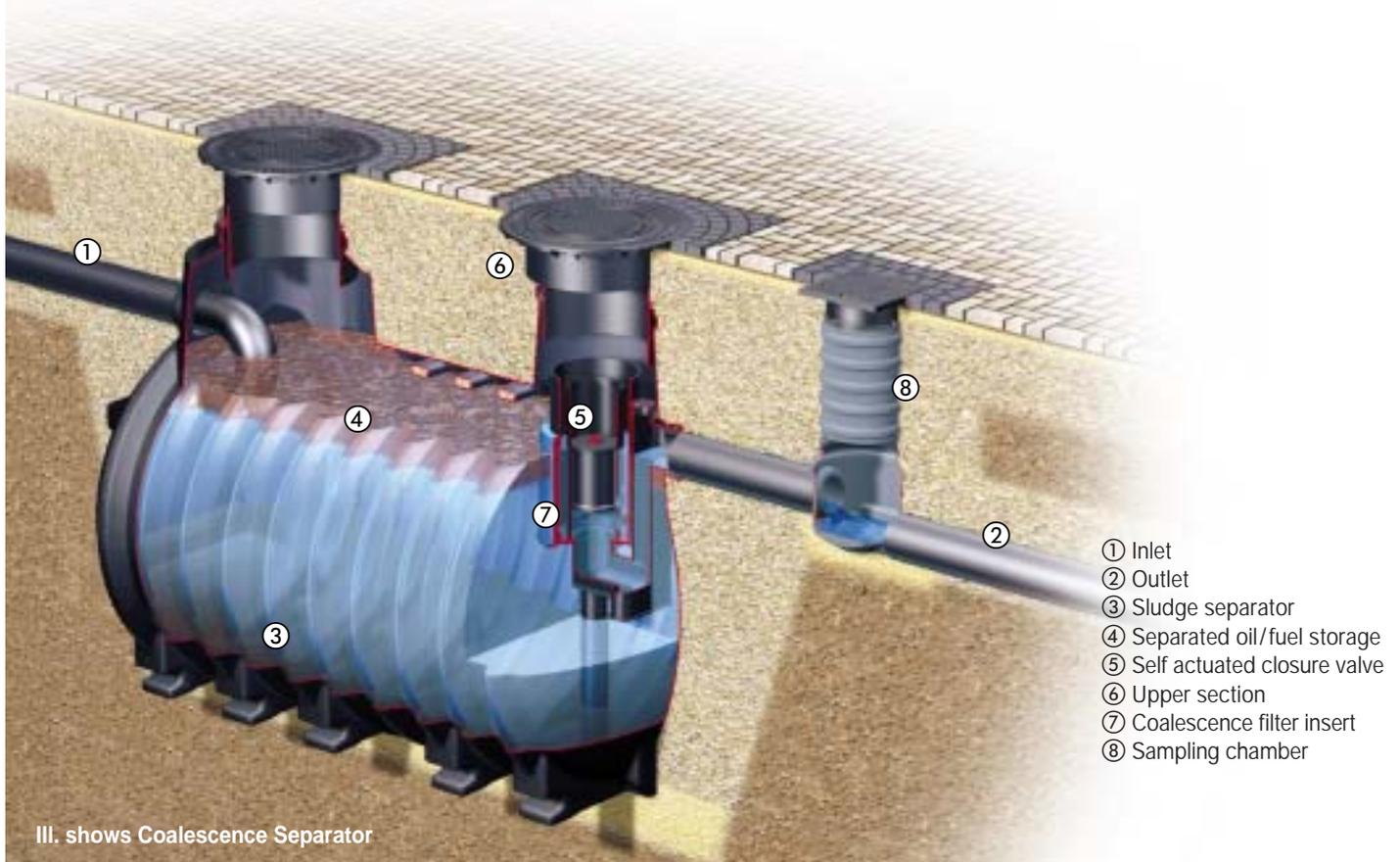
To reduce the chances of the separator shutting down due to over-capacity in the oil/fuel storage chamber, an alarm unit can be installed which monitors the oil/fuel level so that the contents of the separator can be emptied at the appropriate time.

In cases where the outlet of the separator becomes blocked or the flow entering the separator exceeds the rated capacity of the separator, a second alarm unit can be installed to detect these occurrences. It is recommended that all coalescence separators are equipped with both of the above mentioned alarm units.

Sampling accessories

The sampling chamber is designed to allow the quick, easy and accurate taking of samples from the effluent stream of the separator. The sampling chambers allow the owner or local/governmental officials to accurately remove effluent samples to monitor the function of the separator (please see page 8).

For more convenience in taking effluent samples, a permanently installed sampling hose can be equipped to the outlet portion of the separator. This is accompanied by a stainless steel hand pump which can be attached to the sampling hose with a quick connect/release mechanism (please see page 9).



III. shows Coalescence Separator

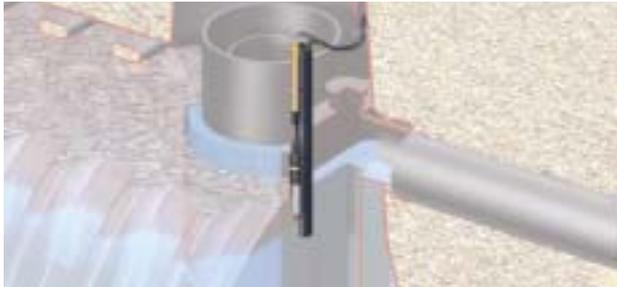
- ① Inlet
- ② Outlet
- ③ Sludge separator
- ④ Separated oil/fuel storage
- ⑤ Self actuated closure valve
- ⑥ Upper section
- ⑦ Coalescence filter insert
- ⑧ Sampling chamber



► Product advantages

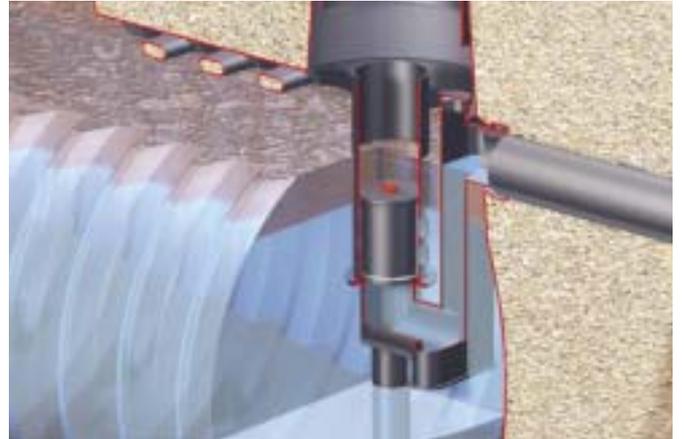
Alarm notification units

Monitoring of the separated oil/fuel storage volume, notification of pipe blockages or inlet flows exceeding the designed capacity of the separator - all can be handled with the installation of KESSEL alarm units.



Outlet closure lock - self actuated

Outlet closure lock provides a safety factor to insure that no oil/fuel are released from the outlet of the separator.



Sludge/sediment direct disposal device

Direct disposal hardware for disposing the sludge/sediment or for disposing the entire contents of the separator.



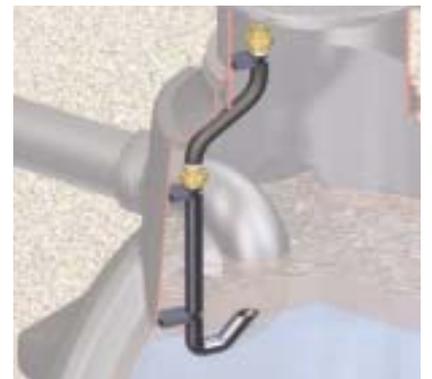
Integrated sampling device

The sampling chamber can be complemented with a permanently installed sampling hose for quick and easy removal of effluent samples.



Oil/fuel direct disposal device

Lower disposal volume/disposal costs achievable with the direct oil/fuel disposal device. Sludge/sediment and water remain in the separator while only the separated oil/fuel is removed.





▶ Product advantages

Load Class D (40.0 ton) manhole covers

KESSEL separators are available in class B (12.5 ton) and D (40.0 ton) cast iron manhole covers. Class D manhole covers handle the loads of full size tractor trailers meaning that the separators can be installed in all types of traffic areas.



Recyclable Material

The material polyethylene can be fully recycled and re-used in the manufacture of high grade plastic products.

Light weight - Heavy duty

The material polyethylene combined with state of the art manufacturing creates high grade, heavy duty products. The underground polyethylene separators can compensate for minor earth settlements and movements.



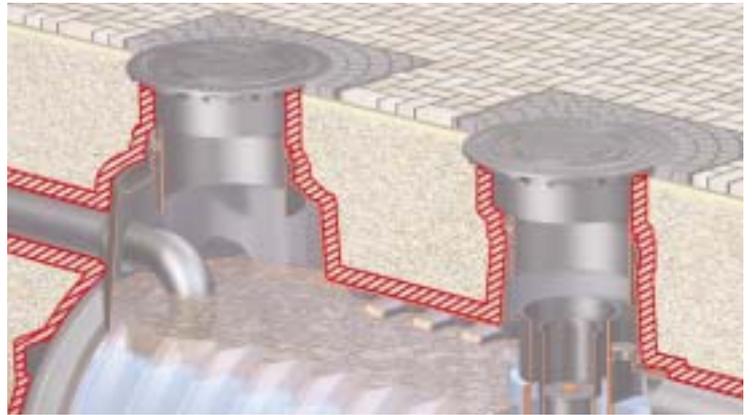
Transport friendly

The KESSEL oil/fuel and coalescence separators are easily shipped with standard trucks because of their light weight/heavy duty construction. On site the separators can also be easily moved with fork lifts using the integrated fork lift grips.



Leak proof separating system

The monolith chamber construction accompanied with vertically adjustable upper sections and custom sealing gaskets provide a leak-proof system which keeps oils and fuels inside the separator and away from the environment.



Adjustable upper sections

The upper sections of KESSEL oil/fuel and coalescence separators provide important installation advantages. During installation the upper section can be twisted, tilted by up to 5° and vertically adjusted by up to 500 mm. This allows for the upper sections and manhole covers to be easily matched to on-site grades and elevations. An additional advantage is that during the life of the product, the KESSEL manhole covers automatically compensate for settlement or heaving of the soil.



1. Dimensioning

1.1. Rainwater Totals Q_r

local precipitation * liter / (sec. x hect.)	Rainwater Totals (liter / sec.)			
	100 m ²	300 m ²	500 m ²	800 m ²
150	1.5	4.5	7.5	12.0
200	2.0	6.0	10.0	16.0
300	3.0	9.0	15.0	24.0

* Please contact the appropriate source in your area for rainfall totals (150 liter / sec. x hectore is minimum value).

Local precipitation (LP) = liter / sec. x hect.

Rainwater Collection Area 1 = m²

Rainwater Collection Area 2 = m²

Rainwater Collection Area 3 = m²

Total (RCA) = m²

Formula:

$$Q_r = \frac{(RCA) \text{ m}^2 \times (LP) \text{ l}/(\text{sec.} \times \text{hect.})}{10.000} = \dots \text{ lit. / sec.}$$

1.2. On-site wastewater production Q_s

◆ **Q_{s1} : Valves and faucets**

Valves and faucets, which have high pressure washers connected to them, should not be counted here.

..... Quantity DN 15 (R 1/2 inch) at 0.5 l/s = lit. / sec.

..... Quantity DN 20 (R 3/4 inch) at 1.0 l/s = lit. / sec.

..... Quantity DN 25 (R 1 inch) at 1.7 l/s = lit. / sec.

Total Q_{s1} : lit. / sec.

◆ **Q_{s2} : Automatic Car Wash**

..... Quantity at 2 lit. / sec. Total Q_{s2} : lit. / sec.

◆ **Q_{s3} : High pressure washers (HPW)**

- Single unit: 2 lit. / sec.
 - Add 1 lit. / sec. for each additional HPW unit
 - Single HPW in connection with automatic vehicle washer add 1 lit. / sec.
- Quantity Total Q_{s3} : lit. / sec.

Total $Q_s = Q_{s1} + Q_{s2} + Q_{s3} = Q_s$ lit. / sec.

1.3. Either rainwater or on-site produced wastewater collection

In cases where the collection of falling rainwater and the simultaneous collection of on-site produced wastewater is not expected, the larger of the Q_r or Q_s should be used. The smaller of the two values should be discarded. An example of this is at a public vehicle washing facility

where the reality of vehicles being washed during rainfall is extremely improbable. In cases where it is possible that vehicles will be washed during rainfall, both values should be used.

Simultaneous washing during rain?:

yes no

1.4. Density factor f_d (specific gravity), (g/cm³)

Oil/fuel density g / cm ³	Density factor based on DIN 1999, Part 2 (Oil / fuel)	Density factor based on DIN 1999, Part 6	
		(Coalescence)	(Oil / fuel + Coalescence)
up to 0.85	1	1	1 - 1
up to 0.90	2	1.5	1 - 1
up to 0.95	3	2	1 - 1

Note: For gasoline stations and washing facilities for passenger cars and buses a density factor (f_d) of 1 should be used. In cases where large quantities of oil / fuel are expected, a tandem set up of an oil / fuel

separator followed by a coalescence separator can be implemented (in this case both the oil / fuel and the coalescence separator should use a density factor (f_d) of 1).



2. Calculating the separator size

2.1. Dimensioning formula oil/fuel separation capacity

$$(NG) = (Q_r + 2 Q_s) \times f_d \quad (\text{Value "2" is a safety factor which doubles the } Q_s \text{ value})$$

$$(NG) = (\dots\dots\dots + \dots\dots\dots) \times \dots\dots\dots$$

$$(NG) = \dots\dots\dots \quad (\text{Value NG is the calculated NG separator size})$$

2.2. Oil/fuel storage capacity

The capacity of the oil/fuel storage portion of the separator will effect how often the separator needs to be emptied. Take into consideration the desired or required oil/fuel capacities when selecting a separator.

Required oil/fuel storage capacity: liters

3. Dimensioning for sludge separator sizing

All oil/fuel and coalescence separators must be equipped with an integrated, sufficiently sized sludge separator. According to prEN 858, for example, all commercial automated car washes should have a minimum sludge storage capacity of 5000 liters.

Sludge storage capacities (according to prEN 858) for separators up to and including size NG 10:

NG Size	Sludge storage capacity (minimum)
Up to and including NG 3	650 liters
Above NG 3 up to NG 10	2500 liters

Desired/required sludge storage capacity liters

Sludge storage capacities (according to prEN 858) for separators over size NG 10:

Sludge storage capacity	Sludge collection conditions
small: = 100 x NG *	- for areas with limited dirt, sand and sludge - all rainwater collection areas where there is no possibility of the collection of dirt/sludge from any type of vehicle
medium: = 200 x NG *	- gas stations, self-service car washes - passenger bus washes - wastewater from repair stations/garages
large: = 300 x NG *	- washing areas for construction equipment, tractors, tractor trailers, lorries etc. - automated car washes

* Please note - if using the above formula for calculating sludge storage capacities, please remove the Density factor (fd) from the NG equation when multiplying NG x 100, 200 or 300.

4. Additional required separator information

4.1. Manhole Covers

Separators are ideally placed away from high traffic areas although it is important that the underground separator is installed in a location which is easy to access for maintenance and disposal purposes. KESSEL separator manhole covers are offered in load classes A (1.5 metric ton), B (12.5 metric ton) and D (40.0 metric ton). Please check the appropriate box below which meets your manhole cover load class requirements.

<input type="checkbox"/> Manhole cover load class based on DIN EN 124 / DIN 1229:		
<input type="checkbox"/> A 1.5 met.ton	<input type="checkbox"/> B 12.5 met.ton	<input type="checkbox"/> D 40.0 met.ton
Manhole (internal diameter, mm): <input type="checkbox"/> Ø 600		

4.2. Installation Depth

Please input the planned installation depth (T) of the separator. The depth T is measured from the ground level to the level of the inlet of the separator (bottom of inlet). Please take note that the lower level of the inlet must always be below the frost level.

Installation Depth T = mm.

4.3. Accessories

<input type="checkbox"/> Extension sections for installation depths below the standard level T. <input type="checkbox"/> offer <input type="checkbox"/> do not offer
<input type="checkbox"/> Sampling chamber <input type="checkbox"/> offer <input type="checkbox"/> do not offer
<input type="checkbox"/> Alarm units, type
<input type="checkbox"/> Other:

5. Important Points

Cleaners/detergents - the concentration of cleaners/detergents in the wastewater entering the separator should be kept to a minimum. Cleaners/detergents that are used for washing and are thus present in the wastewater entering the separator should be ph-neutral, hydrogen chloride free and also have low cleanser concentrations. Chlorinated hydrocarbons are not allowed in these cleaners. In cases where more than one cleaner/detergent is being used, they must be compatible with one another. In case of doubt, contact the cleaner/detergent supplier for further information on compatibility.

Emulsification - Emulsification can occur when high pressure washers are used inappropriately or when cleaners/detergents are injected directly into a high pressure washer and then sprayed into oil/sludge contaminated surfaces. Untreated emulsifiers present in the wastewater entering the separator can not be separated by oil/fuel/coalescence separators. In cases where emulsifiers are present in the wastewater, special emulsification treaters can be installed to treat the wastewater before it enters the separator.

6. Helpful Hints

- Separators should not be installed directly below the area which they serve. They should be easy accessible for inspection and disposal.
- All drains connected to the separator must not be equipped with odor traps.
- Separator manhole covers should not be ventilated and in no circumstances should be physically attached to the separator with screws, bolts, locks etc.
- Wastewater should enter the separator by the force of gravity. Pumps/lifting stations cannot be used to „lift“ wastewater into the separator. Pumps/lifting stations can however be used after the outlet of a separator to „lift“ the cleansed wastewater into drainage piping.
- Sampling chambers (installed after the separator in direction of flow) should always be installed.
- For separator sizes up to and including NG 6, the cover/grill elevation of the lowest drain connected to the separator should be a minimum of 13 cm below the elevation of the separator’s manhole covers. For separators larger than NG 6, this elevation difference between lowest inlet and separator manhole cover must be discussed with the regulating authorities. In cases where this is not feasible, the installation of alarm units is required. KESSEL recommends that alarm units are installed with every separator.

Everything for Drainage

Professional drainage solutions from a single source



- ▶ Backwater valves and cleanouts
- ▶ Polymer and cast iron drains
- ▶ Volatile liquid traps
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- ▶ Stainless steel drains and channels



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