

Product group _____
Grease separators


KESSEL



Easy. Clean.

New generation
fully EN 1825 certified
grease separators



 Made in Germany

Leading in drainage



KESSEL grease separators

Always the right product.
Always the right choice.



Water is one of our most precious resources and is not available in unlimited quantities. For this reason, contaminated wastewater from kitchens must be pretreated and cleaned with the aid of appropriate separator systems before it is discharged to the public sewer system. KESSEL offers a wide range of innovative polymer separators for different areas of application and wastewater quantities.



Grease separators

For a clean environment

When to use a grease separator?

Grease separators should be installed in all locations where greases and oils from plant or animal origin are required to be removed from the wastewater stream. This applies to commercial and industrial applications, for example:

- Butchers, meat and sausage factories
- Pre-prepared meal production
- Slaughterhouses and meat preparation facilities
- Soap / stearin production plants
- Restaurants and fast food shops
- Fish production facilities
- Cooking oil refineries, butter / margarine production
- Frying facilities / nut roasting factories
- Cafeterias in commercial buildings, hospitals, universities, military

Reasons for installing a grease separation system

Operations from small restaurants to large scale food processing plants disposing fats, oils and grease (FOGs) into public wastewater drainage systems are becoming an increasing concern to industry, government and environmental agencies. Wastewater travels a long distance from its original source to the wastewater treatment facilities. During this time large amounts of grease and food wastes build up in the drainage pipe systems leading to operational and public effects:

Operational effects

One of the most severe drainage problems in food processing facilities is the build up of grease layers within the drainage system leading to negative effects, such as increased odour emissions, reduced efficiency of the drainage system, additional maintenance costs, pipe blockage or even potential flooding.

- Avoiding a pipe blockage
- Prevention of corrosion and odour build-up

Public effects

FOGs also affect public wastewater streams by causing sewer blockage and reducing the efficiency of public sewage plants. This leads to additional costs for maintenance and repair.

- Effects on wastewater treatment facilities

Polyethylene
Warranty
20 Years

Polyethylene grease separators – the long term solution

Easy transport

Their low weight allows our grease separators to be transported easily by hand on site. A special base design also allows them to be transported by forklift truck.

Simple and fast installation with *EasyClean*

The curved shape of the one-piece tank makes it ideal for retrofitting purposes, even where space is tight through narrow staircases and doorways for example.

Fracture resistance

The polyethylene material ensures a high impact strength. This means that soil movements can easily be compensated for where installation is in the ground.

Resistant to aggressive grease

The polyethylene material used is 100 % resistant to aggressive grease. This guarantees a long service life since there is no damage to the material due to corrosion.



Separator function

Based on EN 1825

The KESSEL Euro separator based on Euro-Norm EN 1825 (as seen in the illustration below) consists of a grease separation chamber with an integrated sludge trap located in the base. Following the separator is a sampling chamber. Wastewater containing fats, oils and grease (FOG) is guided into the separator by a pacifying pipe which allows the wastewater to be slowly and evenly distributed into the separator preventing fast flowing wastewater from disturbing the separation process inside the chamber. The separation of the light material (FOG) and the heavier material (sludge) from the wastewater is all accomplished by the force of gravity. Heavily emulsified greases and oils may not be completely separable with the gravity method.

What can enter the separator?

Only wastewater containing organic FOG, which are required to be separated from the water, should be allowed into the separator. Under no circumstances

should sewage, rainwater or wastewater containing mineral oils (hydrocarbon based) be allowed to enter the separator.

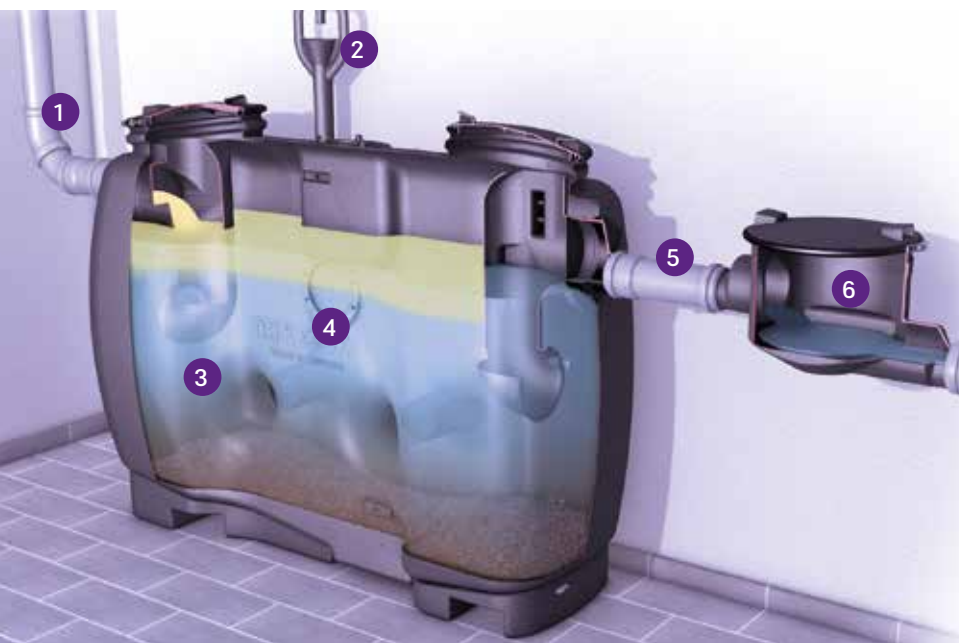
Examples of what should be connected to a separator: floor drains with odour traps, drainage channels, sinks, dishwashing machines and cooking vats.

Sludge separation chamber

The sludge separator serves to collect sludge / sediment which sinks to the bottom of the chamber due to its density being greater than of water.

Grease separation chamber

In the grease separation chamber, organic FOG (being less dense than water) separate from the wastewater and rise to the surface of the chamber. As more wastewater enters the chamber, the layer of separated greases and oils builds from the top down until the grease separation chamber is full and the entire chamber is emptied.



- 1 Inlet
- 2 Refill inlet
- 3 Separation chamber
- 4 Inspection window
- 5 Outlet
- 6 Sampling chamber

Selection criteria

A wide range of disposal options

Versions	Auto Mix & Pump	Mix & Pump	Auto Mix	Mix	Direct	Standard
<p>Odour reduced disposal The direct disposal connection allows the disposal truck to vacuum out the separator contents without opening the separator covers. The covers need to be opened only to clean the separator.</p>	✓	✓	✓	✓	✓	✓
<p>Odour free disposal The integrated <i>Shredder-Mix-System</i> intakes the entire separator contents, shreds it and then uses this homogenized mixture to rinse and clean the interior separator walls without having to open the odor-tight covers.</p>	✓	✓	✓	✓	✓	✓
<p>Control unit The <i>Shredder-Mix-System</i>, designed to homogenize the separator contents, can be started and controlled without needing direct access to the separator.</p>	✓	✓	✓	✓	✓	✓
<p>Disposal pump In the case that the disposal truck is too high and/or too far from the grease separator to allow disposal via the truck's vacuum system, the separator can be equipped with its own disposal pump system.</p>	✓	✓	✓	✓	✓	✓
<p>Fully automated operation All of the pre-programmed rinsing and disposal steps of the separator's contents function fully automatically.</p>	✓	✓	✓	✓	✓	✓



Grease separators

for free-standing installation

In addition to individual grease separators, KESSEL also offers complete separator packages consisting of stainless steel floor drains and channels, grease separator, properly matched lifting station and recommended accessories.



Improved access
thanks to the curved shape
Also ideal for retrofitting and renovation work in rooms with very narrow access.



Improved cleaning results
Integrated sloped base for extraction at the lowest point (only 3 litres residual sludge volume).
For nominal sizes NS 2 - NS 10.



Online product selection program:
www.kessel.com/smartselect



Drinking water rinsing

In order to avoid the formation of legionella, standard for Auto Mix & Pump version (PVS).



Resistant to aggressive grease

The polyethylene material used is 100 % resistant to aggressive grease. This guarantees a long service life since there is no damage to the material due to corrosion.



SonicControl for the measurement, display and control of the grease layer thickness in a grease separator.



Planning made easy!

Direction of flow can be changed on site by changing inlet and outlet.

Shredder-Mix-System

serves to mix and clean the tank contents without odor emission during disposal.



Warranty

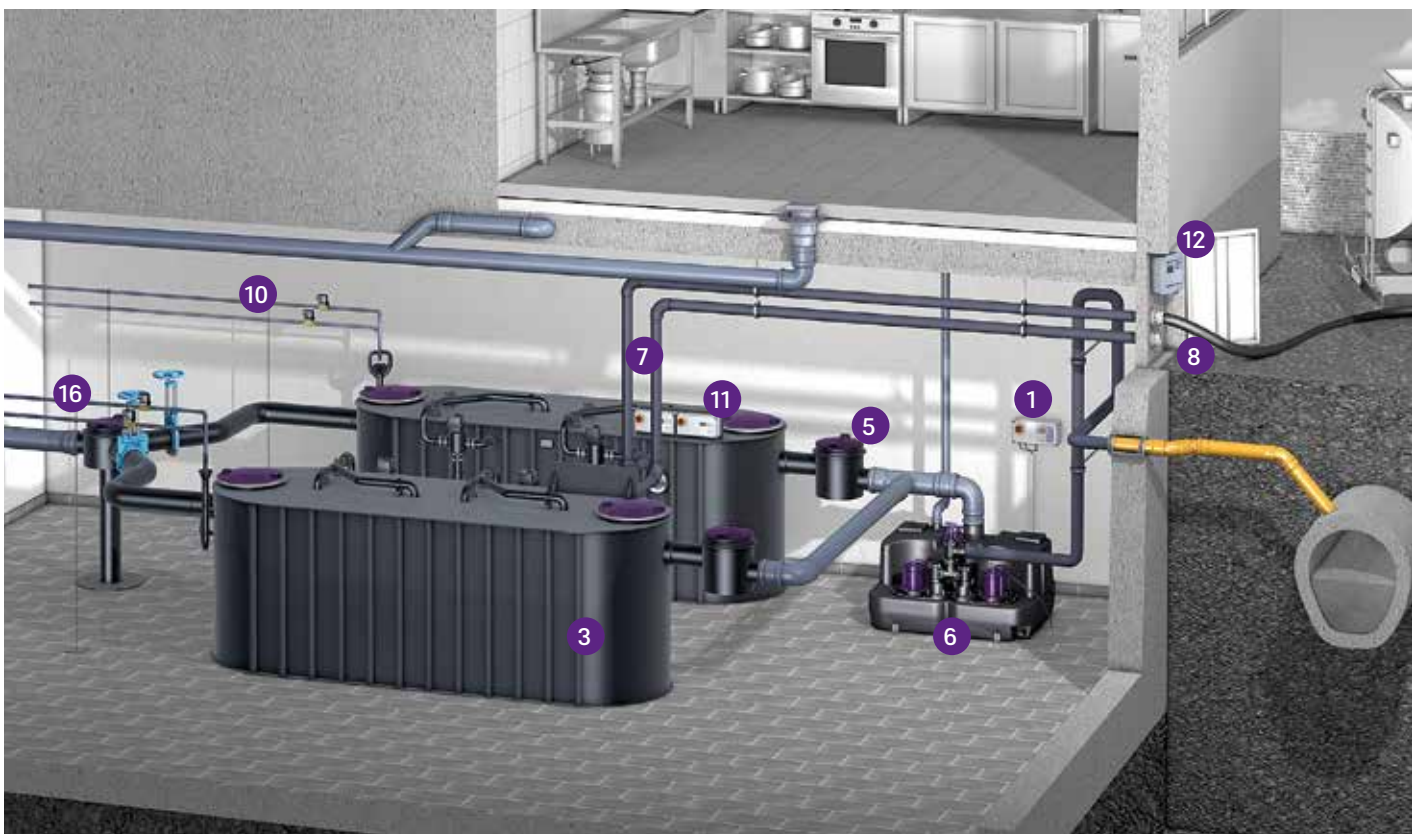
KESSEL offers a factory extended warranty of 20 years on the polyethylene grease separator tanks.

Installation examples

for free-standing installation

- | | | | |
|---|----------------------------------|----|--|
| 1 | Control unit for lifting station | 9 | <i>Shredder-Mix-System</i> |
| 2 | Refill inlet | 10 | Valve for water connection |
| 3 | Grease separator | 11 | Control unit for separator |
| 4 | Suction hose | 12 | Remote control system |
| 5 | Sampling chamber | 13 | Solenoid valve for cold / warm water connections |
| 6 | Lifting station | 14 | Manual switching between mixing / disposal |
| 7 | Disposal line | 15 | Actuator valve (for automatic switching between mixing / disposal) |
| 8 | Connection for disposal truck | 16 | Distribution box |

EasyClean free Auto Mix & Pump



EasyClean free Auto Mix & Pump



EasyClean free Mix & Pump



EasyClean free Auto Mix



EasyClean free Mix



EasyClean free Direct



EasyClean free Standard



Grease separators for underground installation

Outdoor, underground grease separators are easy to install and free up valuable space inside the building. The monolith / single tank bodies are odor and watertight. The upper section can be adjusted during installation to exactly match ground levels and also compensate for any earth movement. Separators come with a choice of load class B (12.5 ton) or D (40.0 ton) odor tight covers.

Simple and fast installation

Complete chamber made in one piece and lightweight PE (polyethylene) material make it easy to place in excavation pit.

SonicControl

Layer thickness measuring device with ultrasonic sensor (optional) For the measurement, display and control of the grease layer thickness and the water temperature.



More flexible planning

Grease separator installed in the ground outside the building leaves more space in the building.

Online product selection program:
www.kessel.com/smartselect



Save and clean alternative

Completely assembled systems installed safely and almost invisibly outside the building.



Variable installation depths

The telescopic upper section allows easy individual installation depths and adaptation to ground levels.



Simple disposal of wastewater

Cleaned wastewater flows via gravity into the sewage channel. No additional pump is required for this.



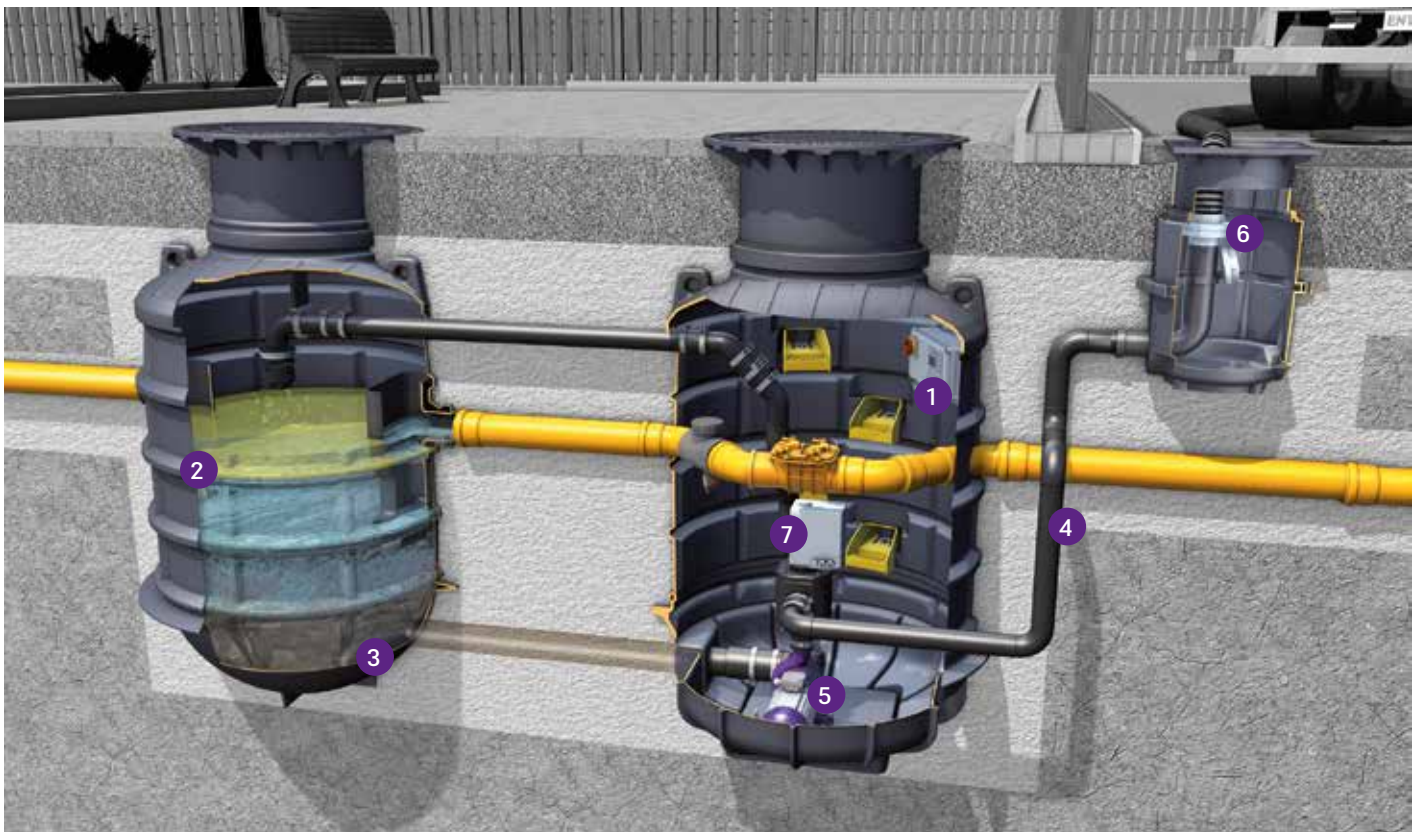
Warranty

KESSEL offers a factory extended warranty of 20 years on the polyethylene grease separator tanks.

Installation examples for underground installation

- 1 Control unit for grease separator
- 2 Grease separator
- 3 Suction hose
- 4 Disposal line
- 5 *Shredder-Mix-System*
- 6 Connection for disposal truck
- 7 Actuator valve (for automatic switching between mixing / disposal)
- 8 Sampling chamber

EasyClean ground Auto Mix & Pump



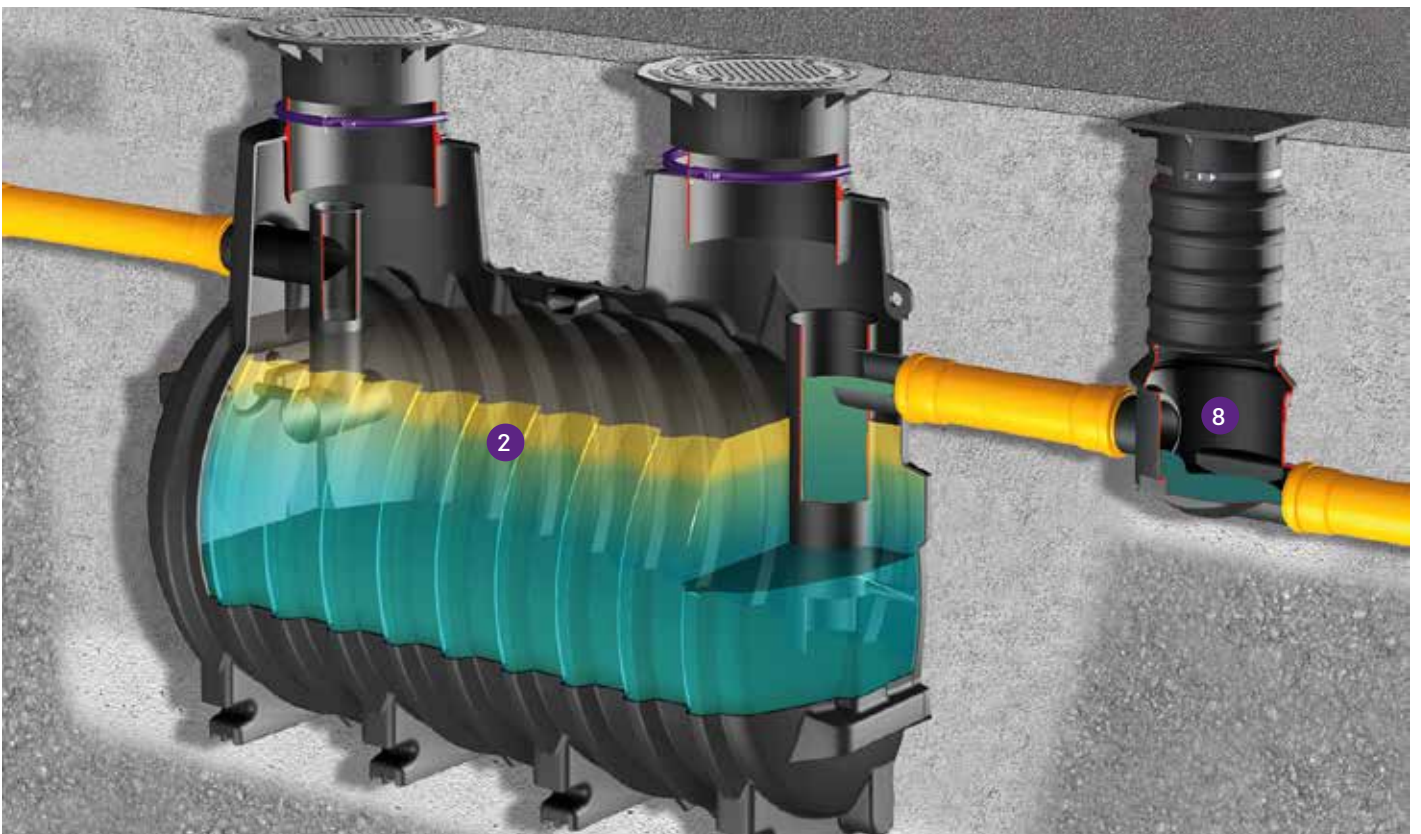
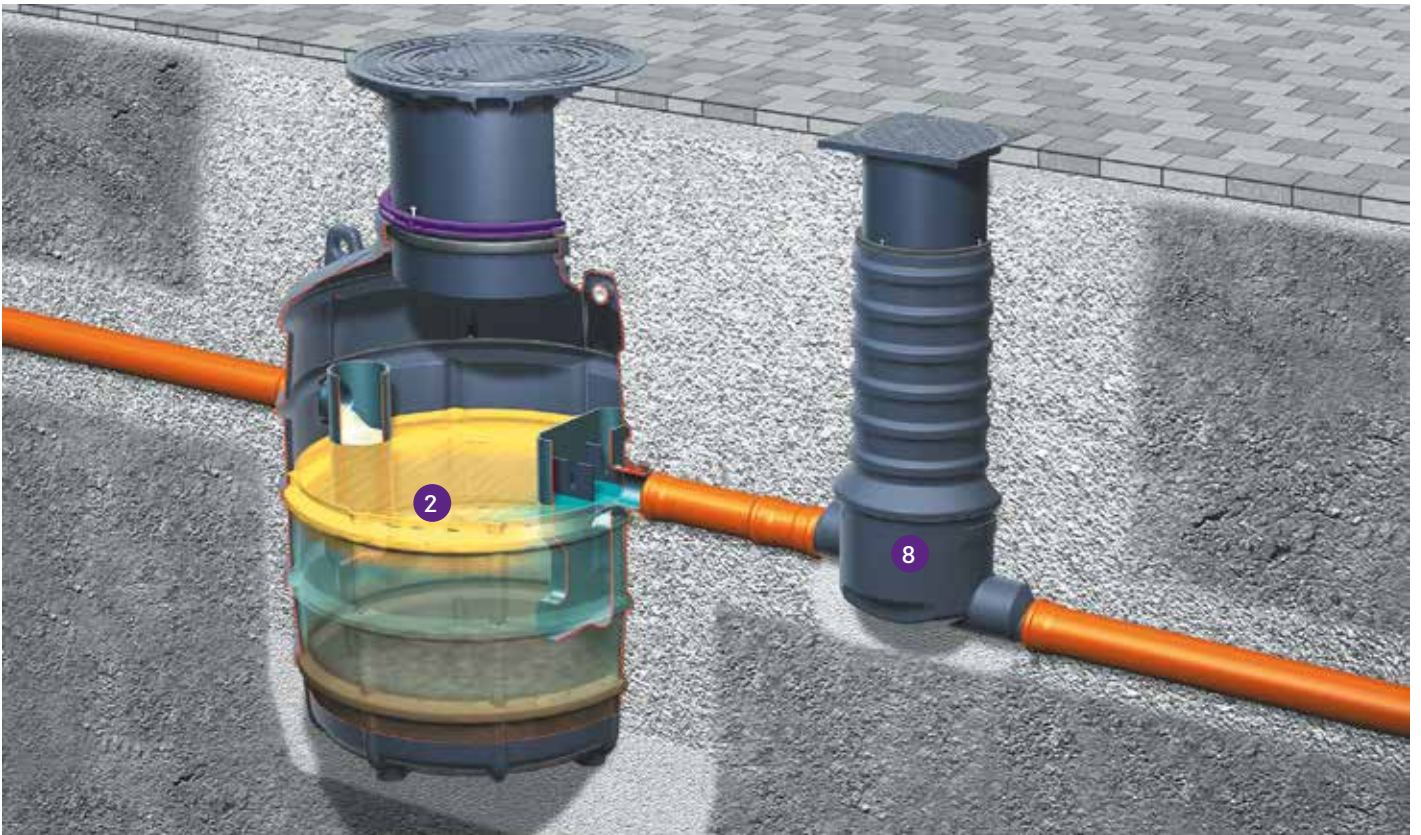
EasyClean ground Auto Mix



EasyClean ground Mix



EasyClean ground Standard



Direct disposal / disposal chamber



Custom lifting stations

When kitchen wastewater needs to be pumped up into the grease separator.

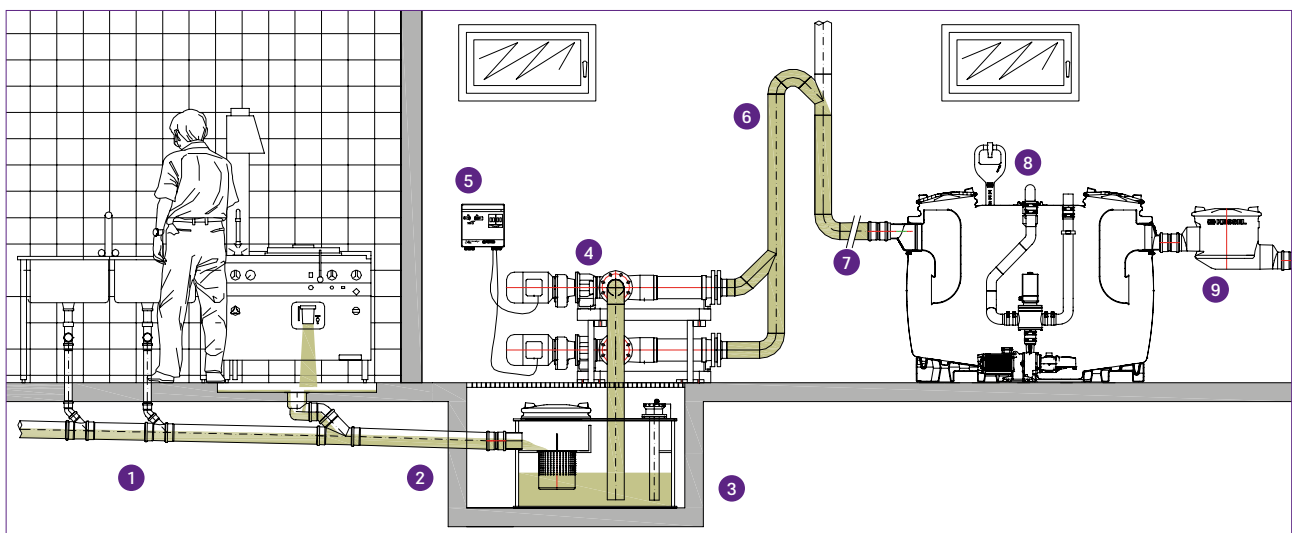
In the case where the grease separator is located higher than the collected wastewater from the kitchen, the EN 1825 norm requires the use of special lifting stations.

Standard lifting stations with vortex or macerating pumps 'mix' the wastewater as it is pumped. This causes the food waste and grease from the kitchen to fully mix with the wastewater which can negatively effect the efficiency of an EN 1825 grease separator. For this reason, positive displacement pumps (also known as 'screw' pumps) are required for use in these cases. A screw pump 'pushes' the wastewater into the grease separator, without any mixing taking place, allowing for proper grease separator operation.

For additional information concerning Kessel positive displacement pumps, please contact KESSEL directly.



- | | | |
|-------------------------|----------------------------|--------------------|
| 1 Drains in the kitchen | 4 Screw pump double system | 7 Calmed inlet |
| 2 Inlet pipe | 5 Control unit | 8 Grease separator |
| 3 Collecting tank | 6 Pressure pipe | 9 Sampling chamber |



KESSEL-Calculator

For grease separators

The KESSEL calculations sheets listed below serve to properly size the separator to its facility and also to help choose the proper model.

1. General Information

1.1. Project / Location

Project / Site Location: _____

Planner: _____

Builder: _____

Version: _____

1.2. Facility

- | | | |
|--|---|--|
| <input type="checkbox"/> Care facility (retirement home) | <input type="checkbox"/> Slaughter / Meat processing plants | <input type="checkbox"/> Oil / grease processing plants |
| <input type="checkbox"/> Hotel kitchen | <input type="checkbox"/> Meat processing plant (with slaughtering) | <input type="checkbox"/> Butter / margarine manufacturer |
| <input type="checkbox"/> Fine cuisine kitchen | <input type="checkbox"/> Meat processing plant (without slaughtering) | <input type="checkbox"/> Cooking oil refinery |
| <input type="checkbox"/> Business kitchen / cafeteria | <input type="checkbox"/> Butcher with slaughtering | <input type="checkbox"/> Oil manufacturer |
| <input type="checkbox"/> Hospital / University kitchen | <input type="checkbox"/> Butcher without slaughtering | <input type="checkbox"/> Prepared meal manufacturer |
| <input type="checkbox"/> All day service kitchen | <input type="checkbox"/> Supermarket with meat processing | <input type="checkbox"/> Fish processing plant |
| <input type="checkbox"/> Standard restaurant | <input type="checkbox"/> Poultry slaughterhouse | <input type="checkbox"/> |

1.3. Times of operation

Daily operation:

_____ hours / day

Weekly operation:

_____ days / week

Wastewater discharge:

continuous

discontinuous

1.4. Legal limits for wastewater entering public / private sewage systems

(Consult local statutes or local water authority for legal limits / concentrations)

Values to be identified at the wastewater's point of entry into the (public) sewage system

Wastewater temperature: _____ °C

Allowable pH-value: _____ pH-value

Saponifiable oils and greases (lipophilic substance): MAX. _____ mg/l

2. Sizing the grease separator (NS - liters / second)

2.1. Calculating the maximum wastewater flow Q_s

Method 1: Q_s -Calculation based on maximum wastewater flow during peak kitchen operation measured with a flow metering device

Measured flow Q_s : _____

l/s: _____

$Q_s =$ _____ l/s

Method 2: Q_s -Calculation based on types of kitchens

The maximum wastewater flow is calculated for either a) commercial kitchens or b) meat processing plants based on volume and type of wastewater.

a) Commercial kitchen → calculating maximum wastewater flow Q_s

$Q_s =$ _____ l/s

Equation
$$Q_s = \frac{V_M \times F \times M_M}{t \times 3600}$$

V_M : wastewater volume per warm meal in liters (l) (See Table 1)

F: Surge factor relevant to operational conditions (See Table 1)

M_M : Monthly average of the daily prepared warm meals (avg. meals per day)

Inputs
$$Q_s = \frac{\quad \times \quad}{\quad \times 3600}$$

t: Average hours of operation when the separator will be receiving fat laden wastewater

Table 1 (Types of facilities)

Types of commercial kitchens	V_M (liters)	F	M_M (kg)	t (hours)
Hotel restaurant kitchen	100	5		
Fine cuisine restaurant kitchen	50	8.5		
Fast food restaurant kitchen	5	20		
Hospital / Retirement facility kitchen	20	13		
Military base barracks kitchen	10	22		
Standard restaurant kitchen	15	10		

b) Meat processing plants → calculating maximum wastewater flow Q_s

$Q_s =$ _____ l/s

Equation
$$Q_s = \frac{V_p \times F \times M_p}{t \times 3600}$$

V_p : facility specific wastewater volume per kilogram meat / sausage production in liters (l)(See Table 2)

F: Surge factor relevant to operational conditions (See Table 2)

M_p : Daily average of meat / sausage production (kg)

Inputs
$$Q_s = \frac{\quad \times \quad}{\quad \times 3600}$$

t: Average hours of operation when the separator will be receiving fat laden wastewater

Table 2 (Meat processing facilities)

Meat processing facilities	V_p (liters)	F	M_p (kg)	t (hours)
Small (up to 5 large livestock*)	20	30		
Medium (up to 10 large livestock*)	15	35		
Large (up to 40 large livestock*)	10	40		

*1 large livestock = 1 cow (cattle) = 2.5 pigs

Method 3: Q_s -Calculation based on actual fixtures installed in kitchen

This calculation is based on summing the maximum output (flow) of each fixture (kettles, rinse downs, dishwashing machines, etc.)

→ calculating maximum wastewater flow $Q_{S(K)}$ from kitchen fixtures

$Q_{S(K)} = \underline{\hspace{2cm}} \text{ l/s}$

Table 3 (Wastewater flow ($Q_{S(K)}$ in liters / second) from kitchen fixtures)

Total number (n)	cooking kettle (outlet)		tiltable cooking kettle (outlet)		sinks with odor trap		sinks without odor trap		dishwashing machine	tiltable frying pans	frying pans	high pressure floor washer	peeling machine*	vegetable washing machine
	Ø 45	Ø 50	Ø 75	Ø 110	Ø 40	Ø 50	Ø 40	Ø 50						
1	0.45	0.9	0.45	1.35	0.36	0.68	1.13	1.8	1.2	0.45	0.05	0.9	0.68	0.9
2	0.62	1.24	0.62	1.86	0.5	0.93	1.55	2.48	2	0.62	0.06	1.24	0.93	1.24
3	0.75	1.5	0.75	2.25	0.6	1.13	1.88	3	2.4	0.75	0.07	1.5	1.13	1.5
4	0.84	1.68	0.84	2.52	0.67	1.26	2.1	3.36	3.83	0.95	0.09	1.68	1.26	1.68
5	1	2	1	3	0.8	1.5	2.5	4	3	1	0.1	2	1.5	2
6	1.2	2.4	1.2	3.6	0.96	1.8	3	4.8	3.6	1.2	0.12	2.4	1.8	2.4
7	1.4	2.8	1.4	4.2	1.12	2.1	3.5	5.6	4.2	1.4	0.14	2.8	2.1	2.8
8	1.6	3.2	1.6	4.8	1.28	2.4	4	6.4	4.8	1.6	0.16	3.2	2.4	3.2
9	1.8	3.6	1.8	5.4	1.44	2.7	4.5	7.2	5.4	1.8	0.18	3.6	2.7	3.6
10	2	4	2	6	1.6	3	5	8	6	2	0.2	4	3	4
n > 10	n x 0.2	n x 0.4	n x 0.2	n x 0.6	n x 0.16	n x 0.3	n x 0.5	n x 0.8	n x 0.6	n x 0.2	n x 0.02	n x 0.4	n x 0.3	n x 0.4
Total														

*Potato peeling machines are to be connected to an independent starch separator

The calculation below is based on summing the maximum output (flow) of each kitchen faucet. Please note that if a fixture in the above table has already been included for calculation (for example a sink) that the faucet connected to this sink should not be counted. This would result in double counting certain values. Please count one or the other.

→ calculating maximum wastewater flow $Q_{S(A)}$ from kitchen faucets

$Q_{S(A)} = \underline{\hspace{2cm}} \text{ l/s}$

Table 4 (Wastewater flow ($Q_{S(A)}$ in liters / second) from kitchen faucets)

Total number (n)	Outlet size (inches)		
	DN 15 R ½	DN 20 R ¾	DN 25 R 1
1	0.23	0.45	0.77
2	0.31	0.62	1.05
3	0.38	0.75	1.28
4	0.42	0.84	1.43
5	0.5	1	1.7
6	0.6	1.2	2.04
7	0.7	1.4	2.38
8	0.8	1.6	2.72
9	0.9	1.8	3.06
10	1	2	3.4
n > 10	n > 0.1	n > 0.2	n > 0.34
Total			

QS-Calculation based on actual fixtures installed in kitchen.

Total maximum output from all kitchen faucets and fixtures

in liters per second $Q_s = Q_{S(K)} + Q_{S(A)}$

$Q_s = \underline{\hspace{2cm}} \text{ l/s}$

2.2. Calculation of influential factors

The following three factors (fd, ft, fr) are required to properly size a grease separator.

2.2.1. Calculation of density factor f_d

$f_d =$ _____

Density of oils and fats at 20°C	Density factor f_d
up to 0.94 g/cm ³	1.0
over to 0.94 g/cm ³	1.5*

*for substances such as castor oil, wool fat, resin / rosin oil, beef drippings.

For wastewater from kitchens, restaurants, hospitals, slaughter/meat processing plants as well as fish processing plants a density factor (f_d) value of 1 is generally applicable.

2.2.2. Wastewater temperature factor f_t

$f_t =$ _____

Incoming wastewater temperature	Temperature factor f_t
up to 60°C	1.0
over to 60°C	1.3

2.2.3. Cleaner (detergent) solution factor f_r

$f_r =$ _____

Are standard cleaners used in the kitchen?	Cleaner solution factor f_r
No	1.0
Yes	1.3

In special circumstances (Hospital for example) a cleaner solution factor of $f_r \geq 1.5$ could be required.

2.3. Calculating the separator size (NS) (liters / second) according to DIN V 4040-2, date 02/1999

$$NS = Q_s \times f_d \times f_t \times f_r$$

$$NS = \text{_____} \times \text{_____} \times \text{_____} \times \text{_____}$$

Appropriate authority:

Applicant:

location, date _____

location, date _____

signature _____

signature _____

3. Choosing the type of grease separator

3.1. Calculating the sludge trap volume

- Restaurants, hotels: cafeterias, meat processing plants without slaughter, etc. Slaughter houses: meat processing plants with slaughter

NS _____ x 100 liter = _____ liter

NS _____ x 200 liter = _____ liter

3.2. Type of grease separator

Installation location

- free standing in frost free area

Delivery to installation site

- Smallest passage through which separator must pass:

L x W = _____ mm x _____ mm

Make and type of free standing grease separator

- Grease separator version Auto Mix & Pump
(program-controlled disposal, rinsing device and Shredder-Mix-System)
- Grease separator version Mix & Pump
(manual disposal, rinsing device and Shredder-Mix-System)
- Grease separator version Auto Mix
(automatic direct disposal with program-controlled Shredder-Mix-System)
- Grease separator version Mix
(direct disposal with Shredder-Mix-System)
- Grease separator version Direct, direct disposal*
(disposal via disposal pressure pipe, manual cleaning of the separator with open covers)
- Grease separator version Standard
(manual disposal and cleaning of separator with open covers)

*Desired position of accessories (in direction of flow): Manhole covers

- | | | |
|--------------------------------|--------------------------------|--------------------------------|
| Inspection window | Disposal hook-up | Refill pumps |
| <input type="checkbox"/> left | <input type="checkbox"/> left | <input type="checkbox"/> left |
| <input type="checkbox"/> right | <input type="checkbox"/> right | <input type="checkbox"/> right |

Accessories

- Inspection window in direction of flow
- Refill equipment in direction of flow
- Sampling chamber with lateral / vertical outlet
- Pump / lifting station
- Automatic level sensing system *SonicControl*

Installation location

- Underground installation in frost free areas
- Outdoor underground installation

- Groundwater susceptible area

Make and type of underground grease separator

- Grease separator version Auto Mix & Pump
(program-controlled disposal, rinsing device and Shredder-Mix-System)
- Grease separator version Auto Mix
(automatic direct disposal with program-controlled Shredder-Mix-System)
- Grease separator version Mix
(direct disposal with Shredder-Mix-System)
- Grease separator version Direct
(disposal via disposal pressure pipe)
- Grease separator version Standard
(manual disposal and cleaning of separator with open covers)

Installation D

The local frost free depth must be considered. D is measured from ground level to the bottom of the inlet of the grease separator. D = _____ mm

** Please note that with Direct version separators, the disposal suction height and length must be considered

Manhole covers

- Class A (1.5 ton)
- Class B (12.5 ton) passenger car
- Class D (40 ton) tractor trailer

Accessories

- Sampling chamber
- Pump in collection chamber
- Automatic level sensing system *SonicControl*

3.3. Chosen grease separator

Grease separator / Accessories

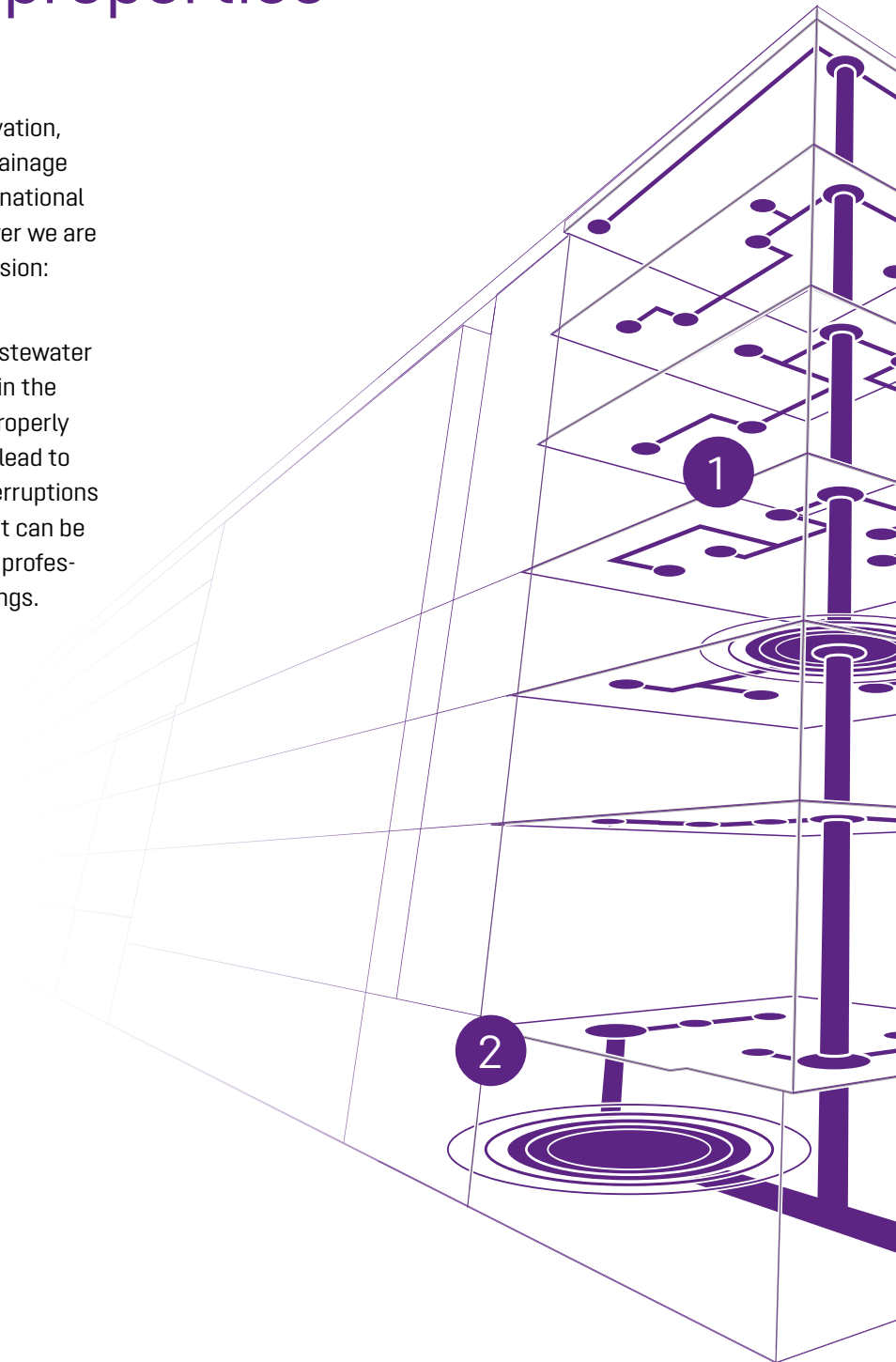
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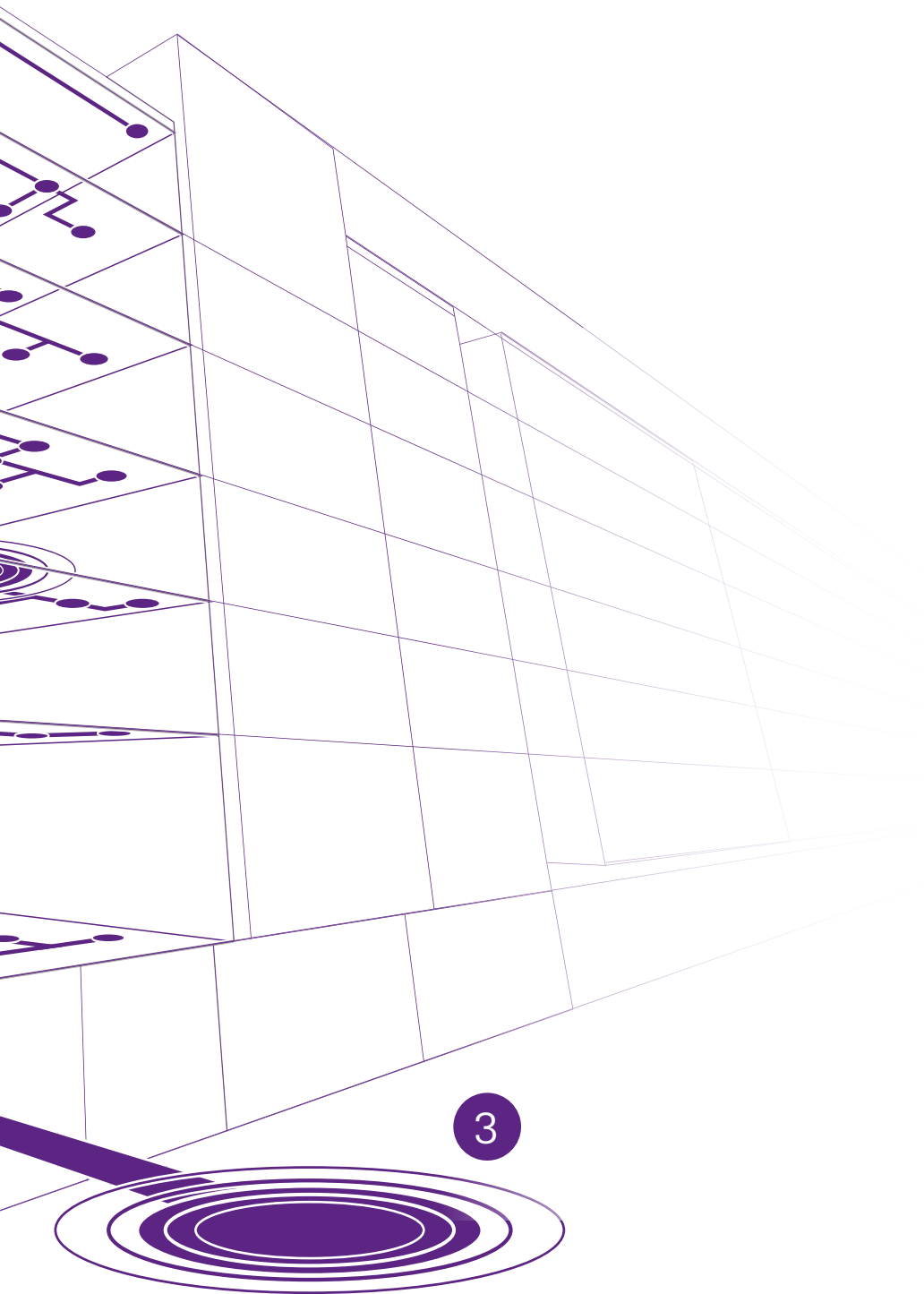
Leading in drainage of buildings and properties

KESSEL has stood for quality, innovation, safety and service in the field of drainage technology since 1963. As an international premium supplier and industry driver we are continuously striving to fulfil our vision:

KESSEL – Leading in drainage

The design of water supply and wastewater drainage systems is a critical part in the planning of a modern building. Improperly functioning drainage systems can lead to serious water damage, service interruptions as well as subsequent damage that can be costly to repair. KESSEL stands for professional drainage solutions for buildings.





1 Wastewater discharge

The collection and proper discharge of wastewater into sewers

- Project drains
- Bathroom / shower drains
- Shower channels
- Wall drains
- Basement drains
- Stainless steel drains and channels
- Parking deck, yard, balcony, roof drains

2 Wastewater treatment

The treatment and proper disposal of wastewater contaminated with oil / fuel and grease

- Grease separators
- Oil / fuel / coalescence separators
- Sediment separators

3 Backwater protection

The reliable protection of property from damaging storms

- Backwater valves
- Backwater chambers
- Hybrid lifting stations
- Lifting stations



more information on
www.kessel.com



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