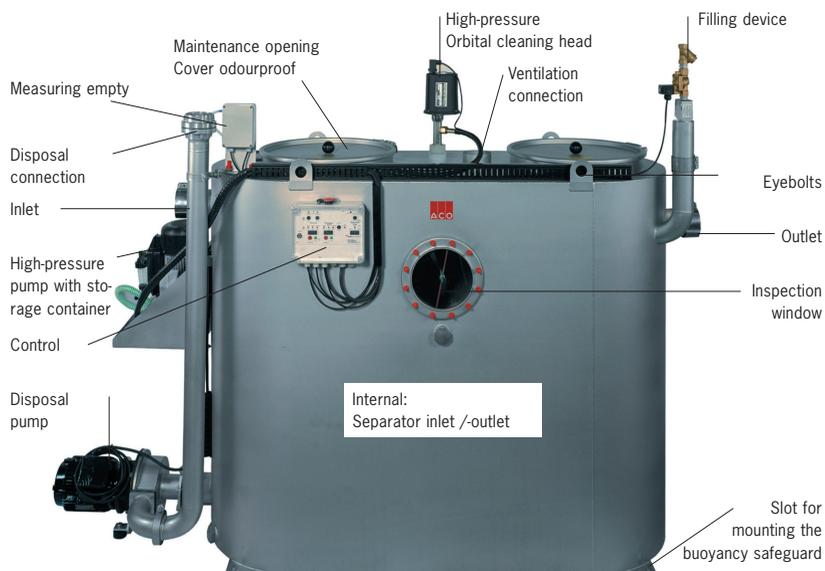


4. Installation and assembly

4.1. Free-standing installation (full disposal)



Important components/operating elements of grease separators.

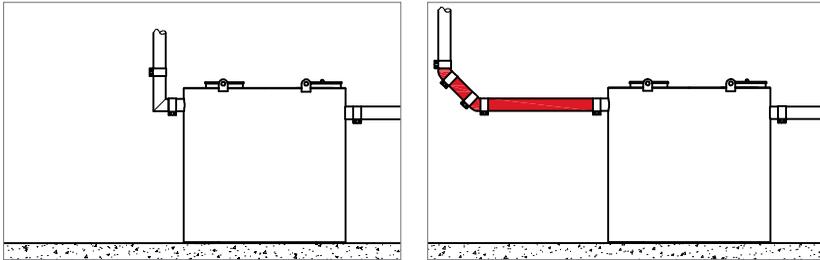
The installation components/operating elements are described under following paragraphs:

Installation component	Chapter
Inlet pipe	4.1.1
Ventilation pipe	4.1.2
Filling device	4.1.3
Inspection window	4.1.4
Sampling pipe	4.1.5
Disposal connection for direct suction	4.1.6.

4.1.1 Inlet pipe

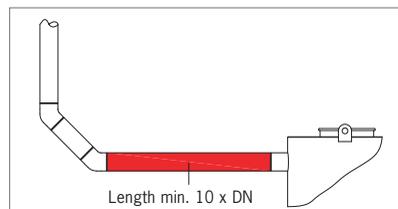
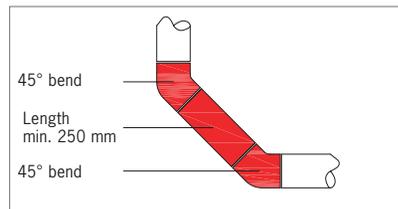
Laying inflow piping in accordance with professional standards and statutory specifications is extremely important for the proper functioning of a grease separator. The aim is to ensure that the water flows into the grease separator without creating any turbulence in the tank. Turbulence has a negative effect on grease separator operation.

Turbulence is normally a consequence of directly connecting a downpipe to the grease separator with a 90° bend. To avoid this, the wastewater should be "calmed" before entering the grease separator by laying the pipe in a suitable way.



Greasy wastewater should be calmed before flowing into the grease separator.

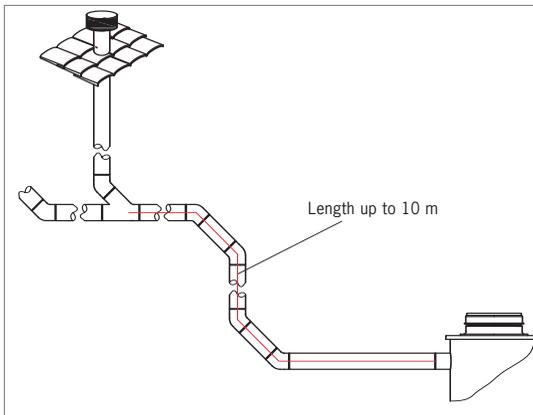
This is done by creating a gentle bend between the horizontal and the vertical pipe by installing two 45° pipe bends. An intermediate section at least 250 mm long should be installed between the two 45° bends. This is then followed by a calming section whose length is at least 10 times the nominal width of the inflow pipe. (Example of inflow with a width of DN 100: $100 \times 10 = 1000$ mm calming section).



The inflow pipe must always be laid down gradient, minimum gradient 2% (1:50). If inflow pipes run for long distances through unheated rooms, we recommend installing auxiliary heating with a thermostat or thermal insulation around the pipes.

4.1.2 Vent pipe

For example, German standard DIN 4040-100 stipulates that the inflow and outflow pipes of grease separators must be adequately vented. The vent pipe should have a minimum diameter of DN 70. Vent pipe must be laid out so that it extends above the roof. All connecting pipes with a length of more than 5 metres must also be vented. If an inflow pipe above the separator is more than 10 metres long with no specially vented connection pipe, an additional venting pipe must be installed in the inflow pipe as close as possible to the grease separator.



Inlet line above grease separators.

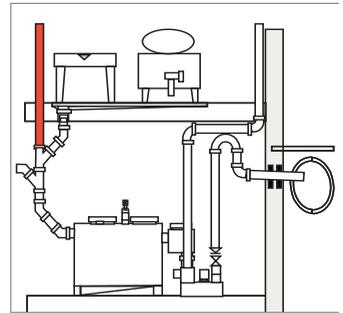
4.1.3 Filling device

Filling devices are installed to refill grease separators with water after they have been emptied during disposal. The filling devices have a G ¾" thread and can therefore be connected to standard drinking water pipe.

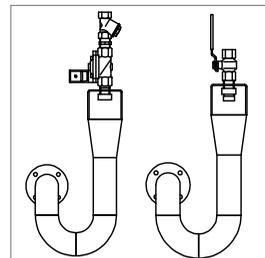
The drinking water is fed into the tank via the filling unit. Depending on the extension stage of the grease separator, the filling unit may have either a ball valve or a solenoid valve, the latter has to be connected to the grease separator control panel.

Because the ACO Haustechnik filling device has an open end pursuant to German standard DIN 1988-4, no special measures are required in situ to protect the drinking water grid against bacterial infection.

Filling device with solenoid valve (left) or ball valve (right), connection of common drinking water lines possible



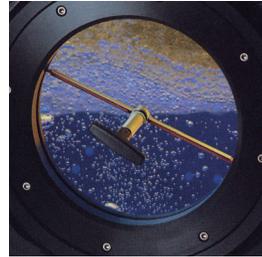
Ventilation of grease separators



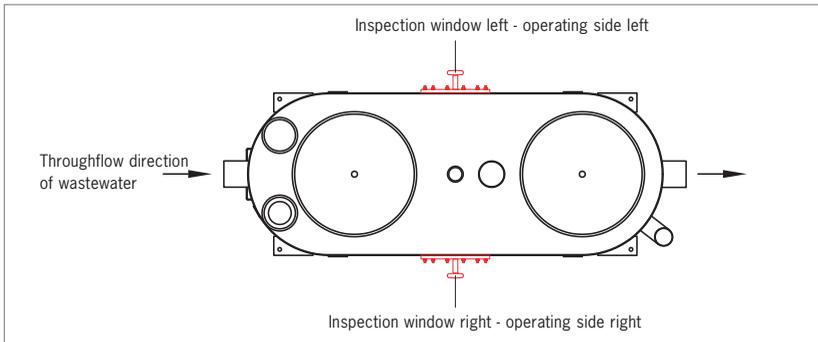
4.1.4 Inspection window

Inspection windows are used to visually control the thickness of the grease layer in grease separators. Inspection windows are factory installed either on the left side or the right side of the separator or can be retrofitted in situ.

The position of the inspection window is always related to the flow direction of the wastewater through the separator.



Inspection window of a grease separator



Grease separator view: Determination of position of inspection window/operating side.

4.1.5 Sampling

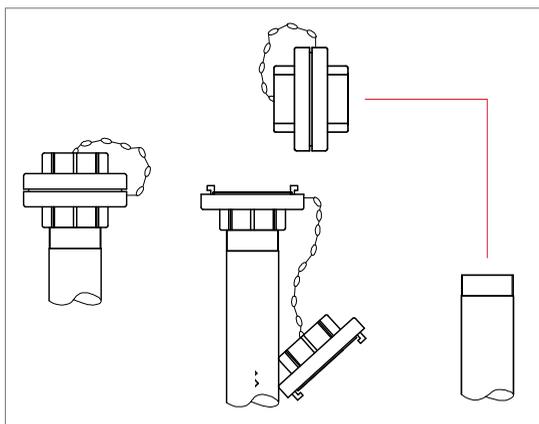
Sampling devices have to be installed downstream of grease separators to extract water samples. The specifications are stipulated in national standards.

ACO Haustechnik sampling pipes have an open pipe end on the inside of the inflow with a drop of at least 160 mm to the lowest point of the outflow pipe leading to the sewer. This is the only arrangement which allows proper and safe sampling by the authorities using the recommended wide-neck bottles and the necessary amount of inspection control.

Sampling pipes are installed on the downstream side of grease separators. PE sampling pipes for this purpose have a push socket (inflow) and a spigot (outflow). The connection to the outflow pipe is made in situ pursuant to national standards.

4.1.6 Disposal connection for direct suction

Disposal connections for direct suction are installed to suck out the contents of the tank without having to open the cover – assuming that the contents of the separator are in a state capable of being sucked out. For example, DIN 1986-100 stipulates that this pipe must have a minimum internal width of 50 mm. The disposal connection must be connected in situ to a pressure pipe (PN 6 or PN 10). This connection can be made with a flange connector or – if using plastic pressure pipes – by welding or gluing.



Fire hose quick coupling Storz-B DN 65

The disposal pipe must be laid at a gradient to the grease separator. The end of the pipe should be laid to a place which is readily accessible by a disposal truck. The end of the pipe should be closed with the DN 65 fire hose quick coupling supplied with the separator. The blank cover can be used to close the pipe.

4.1.7 Water connection of high-pressure internal cleaning

To ensure easy disposal, ACO Haustechnik recommends high pressure cleaning of the inside of the tank (extension stage 2 and 3). A rotating spray-head injects water at a pressure of 175 bar into the separator. The water breaks down the fat to make it flow and simultaneously cleans the inside of the tank.

This system requires a $\frac{3}{4}$ " water connection fitted with a ball valve installed in situ. Cold or warm water can be used although the warm water must not be hotter than 60°C.

4.1.8 Disposal pump connection

The disposal pump is connected in a similar way to the disposal connection for direct suction. See Section 4.1.6.

4.2 Grease separators for ground installation

Grease separators are usually installed in the ground and operated without using any additional components. The contents of the separator are disposed of via the cover. However, it is also possible to install a direct suction system or high pressure tank cleaning system.

4.2.1 Vent pipe

The pipes connected to ground-installed grease separators also need to be properly vented. See Section 4.1.2.

4.2.2 Inlet line

The inflow pipes must be laid so that there is no possibility of the pipes freezing during cold periods. This can be achieved using either of two methods:

- Laying the inflow pipes below the frost depth
- Attaching auxiliary heating to the pipes, or wrapping the pipes in thermal insulation

The frost free depth depends on the region in Germany and ranges from 80 to 120 cm. Please check locally to see if any other specifications apply.

4.2.3. Sampling shaft

Sampling shafts which are buried in the ground function in the same way as sampling pipes used on free-standing separators. They have to be installed downstream of the grease separators and have a separate cover. Sampling shafts should have gradients of 160 mm. In exceptional cases, 30 mm gradients are possible.

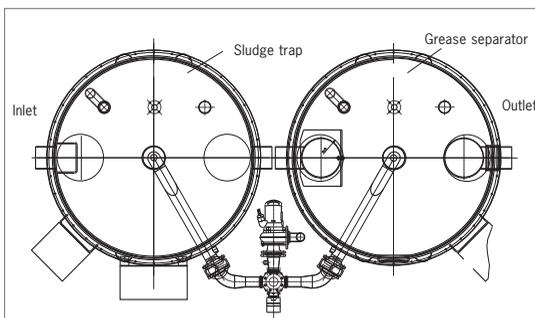


Ground-installed grease separator with sampling shaft.

4.3 Special installation situations

4.3.1 Rooms with low ceiling height

The specific height of the ceiling in the room in which a grease separator is installed is particularly important if large separator systems are involved. If the height of the room does not allow the installation of a standard compact grease separator, it is also possible to install a grease separating system consisting of a separate sludge trap and grease separator.



HYDROJET-RAE NS 20 grease separator with separate, upstream sludge trap.

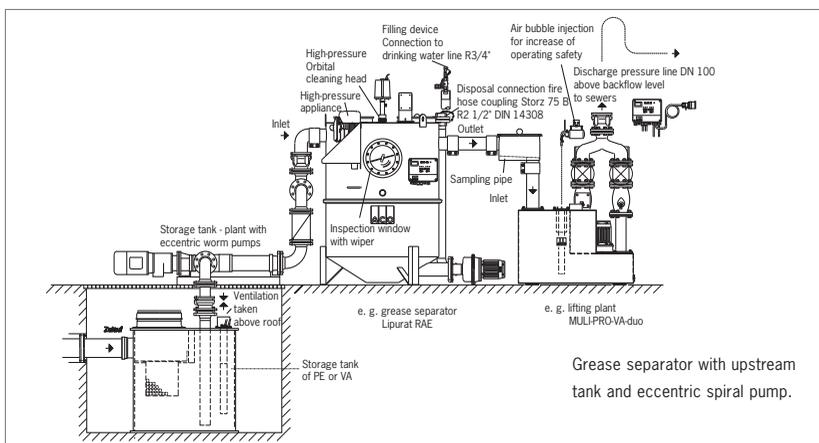
Installing a separate sludge trap and separator reduces the overall height of the grease separation system. Because the sludge trap is not regulated by the hydraulic inspections specified by EN 1825, the certification which applies to the integrated system is also valid for the separate system.

4.3.2 Low inlet heights

Low inflow heights always cause problems when there is no gradient between the inflow pipe and the grease separator.

If it is not possible for structural reasons to install the separator in a deeper position, it will be necessary to pump the wastewater into the grease separator.

Standard lifting plant is not suitable for this purpose because of the grease in the wastewater. In addition, pumping can cause turbulence in the grease separator which will impair the separation process. This problem can be solved by using displacement pumps (e.g. eccentric spiral pumps). Example:



The eccentric spiral pump is connected to a buffer tank which collects the inflowing wastewater. If the inflow pipe (as shown in the diagram above) is laid in the floor plate, it will be necessary to install the buffer tank in a shaft constructed in situ.

A pneumatic switch installed in the buffer tank activates the eccentric spiral pump when the wastewater reaches a set level. The design of the pump prevents it from being blocked with grease. The wastewater can then be pumped into the grease separator without any turbulence.

4.3.3 Ground installation in courtyards

Grease separators installed in the ground should not be installed in strongly frequented areas if possible (see Section 2.2.2). If no other installation site is possible, it is recommended that a grease separator with direct suction be installed.

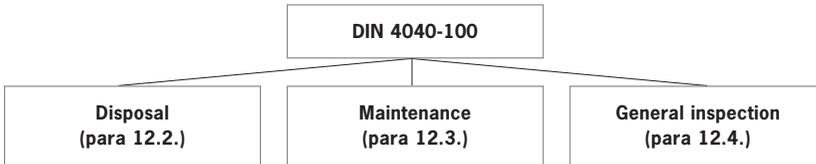
The disposal connection for direct suction can for example be laid in the buried connection shaft or on a house wall. Make sure that the pipe running from the disposal connection to the grease separator always has a gradient.

ECO FPI grease separator with direct suction line.



5. Disposal, maintenance and general inspection

National standards regulate maintenance. For example, German standard DIN 4040-100 divides maintenance into three sections.



An operations log must be kept for each grease separator. This operations log records the following:

- Results of checks carried out by the operator
- Maintenance reports
- Disposal reports
- Inspection reports
- Details on cleaning products used

The operations log must be kept in a safe place by the operator and made available upon request to the responsible authority.

The work and time intervals stipulated in DIN 4040-100 are briefly discussed in the following.

5.1. Disposal

The sludge trap and the separator must be completely emptied and cleaned at least once a month, and preferably every two weeks. The grease separator must be refilled with water (e.g. drinking water, process water, treated wastewater) in compliance with the local discharge regulations.

5.2 Maintenance

A grease separator must be serviced annually by properly qualified personnel in compliance with the manufacturer's instructions. These servicing instructions should be taken from the documentation supplied by the manufacturer.

5.3 General inspection

The general inspection of a grease separator is carried out prior to commissioning, and then at regular intervals not exceeding five years. The grease separator must be inspected by a properly qualified technician to ensure that the grease separator is in proper operating condition and that it is operating in compliance with the regulations.

6. Additional wastewater treatment

6.1 Principles

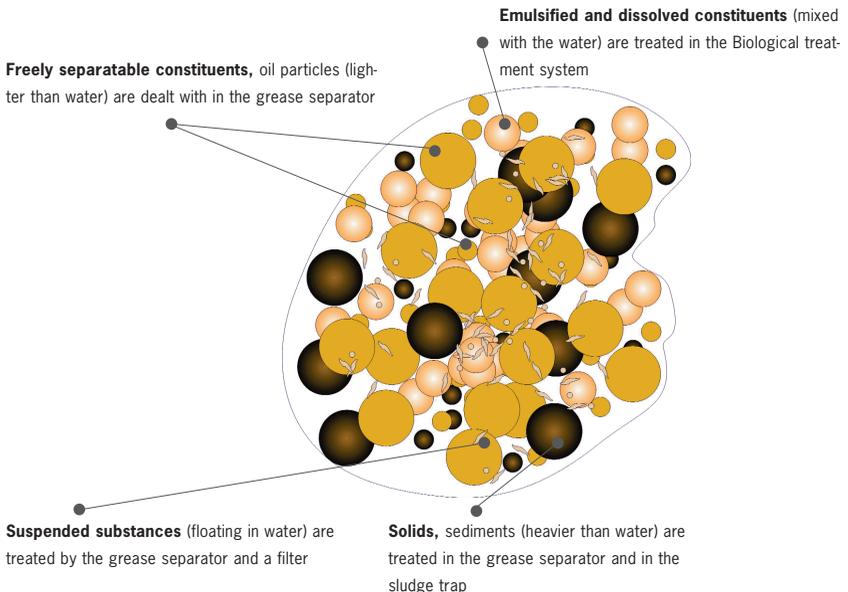
National standards stipulate the use of grease separators in all operations which generate greasy wastewater. Dimensioning and installation must be carried out in compliance with EN 1825 and other national regulations. The wastewater flowing out of grease separators usually has a residual concentration of lipophilic substances of approx. 300 mg/l.

Because many towns (for example, see adjacent table for German cities) are taking an increasingly strict view of lipophilic substances, it is necessary in some cases to install additional treatment steps downstream of grease separators. This is not regulated by any European standards. The use of additional wastewater treatment is stipulated at a local authority level, and the limits are laid down by the local authority.

If the local authority stipulates that the lipophilic concentration must be lower than 300 mg/l, the wastewater from a grease separator must undergo further treatment. Consider the composition of wastewater generated by a kitchen:

The easily separable grease particles (lighter than water) and the solids (sediments, heavier than water) are separated by the grease separator. If a further reduction in the lipophilic concentration is required, attention turns to emulsified and soluble constituents, as well as suspended substances which are normally discharged in the water leaving the grease separator.

The aim is to permanently reduce this proportion to considerably undercut the previous limit of approx. 300 mg/l lipophilic substances leaving the grease separator and entering the sewers. This can be achieved by installing filter systems, standard Biological systems or a combination of the two.



Limit value – lipophilic substances difficult to volatilize in mg/l (example: German cities)

	100	150	200	250	300
Aachen				x	
Aschaffenburg		x			
Augsburg				x	
Aurich				x	
Bad Kissing				x	
Bad Salzflun				x	
Bad Tölz				x	
Bamberg				x	
Bayreuth					x
Berlin					x
Bielefeld	x				
Bocholt	x				
Bonn				x	
Braunschweig					x
Bremen		x			
Bremerhaven		x			
Chemnitz				x	
Cottbus				x	
Cuxhaven	x ¹⁾			x ²⁾	
Daun	x				
Dessau				x	
Dortmund	x ¹⁾			x ²⁾	
Dresden			x		
Duisburg					x
Düsseldorf	x				
Eisenach					x
Emden				x	
Erfurt	x ¹⁾			x ²⁾	
Erlangen				x	
Essen				x	
Frankfurt/Main	x				
Garmisch Partenkirchen				x	
Gera				x	
Göppingen				x	
Görlitz	x ¹⁾			x ²⁾	
Göttingen	100 – 300, no fixed value, depending on single case				
Halle/Saale			x		
Hamburg				x	
Hamm				x	
Hanau		x			
Hannover				x	

	100	150	200	250	300
Heidelberg				x	
Heilbronn					x
Helmstedt				x	
Hildesheim				x	
Ingolstadt				x	
Kaiserslautern					x
Karlsruhe					x
Kassel				x	
Kiel				x	
Koblenz					x
Köln				x	
Konstanz				x	
Leipzig	x				
Lingen				x	
Lübeck	x ¹⁾			x ²⁾	
Lüdenscheid				x	
Magdeburg				x	
Mainz				x	
Mannheim					x
Minden				x	
Mönchengladbach				x	
München				x	
Münster	x				
Neubrandenburg	x				
Nürnberg				x	
Oberstdorf				x	
Osnabrück				x	
Paderborn				x	
Passau				x	
Pforzheim				x	
Pirmasens	x				
Regensburg				x	
Rosenheim				x	
Rostock				x	
Schweinfurt				x	
Schwerin				x	
Speyer				x	
Stuttgart	x ¹⁾			x ²⁾	
Trier				x	
Ulm	x				
Villingen				x	
Würzburg				x	

1) direct

2) DIN 4040

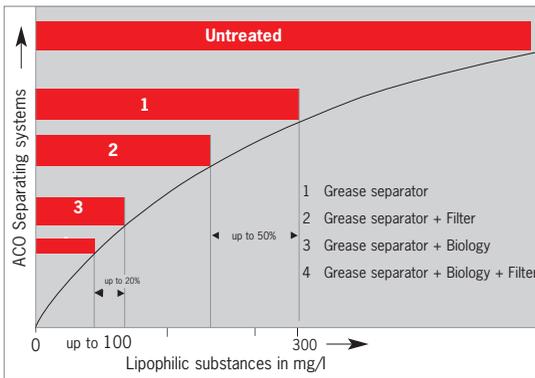
The following describes the efficiency of the aforementioned systems and the functions of each type of plant.

6.2 Products and efficiency of plant for additional wastewater treatment

There are four ways of treating greasy wastewater. Whichever additional system is selected, it will always have to have an upstream grease separator to reduce the volume of physically separable grease in the wastewater.

1. A grease separator
2. A grease separator with a downstream high performance filter
3. A grease separator with a downstream Biological treatment system
4. A grease separator with a downstream Biological treatment plant and filter

Decomposable lipophilic substances

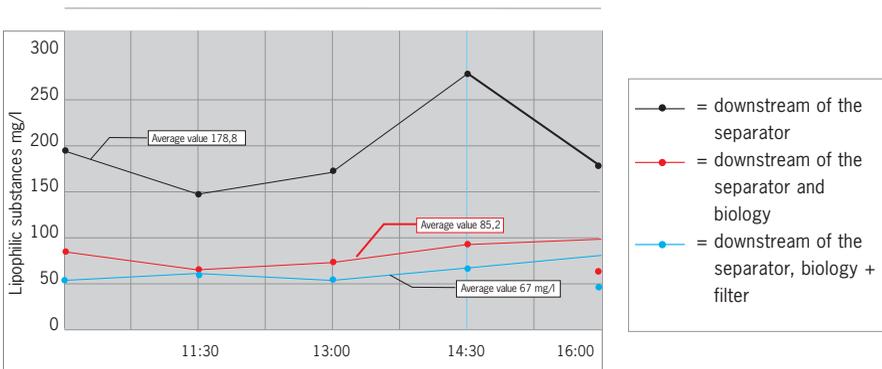


The diagram on the left provides a general overview of how the concentration of lipophilic substances can be reduced by using these treatment systems.

The lipophilic substances are made up of the following organic constituents:

- > freely separable constituents, grease constituents
- > emulsified and dissolved constituents
- > suspended substances

The diagram below shows an example of the measured values produced by an ACO Haustechnik treatment plant consisting of a grease separator, a Biological system and a filter:

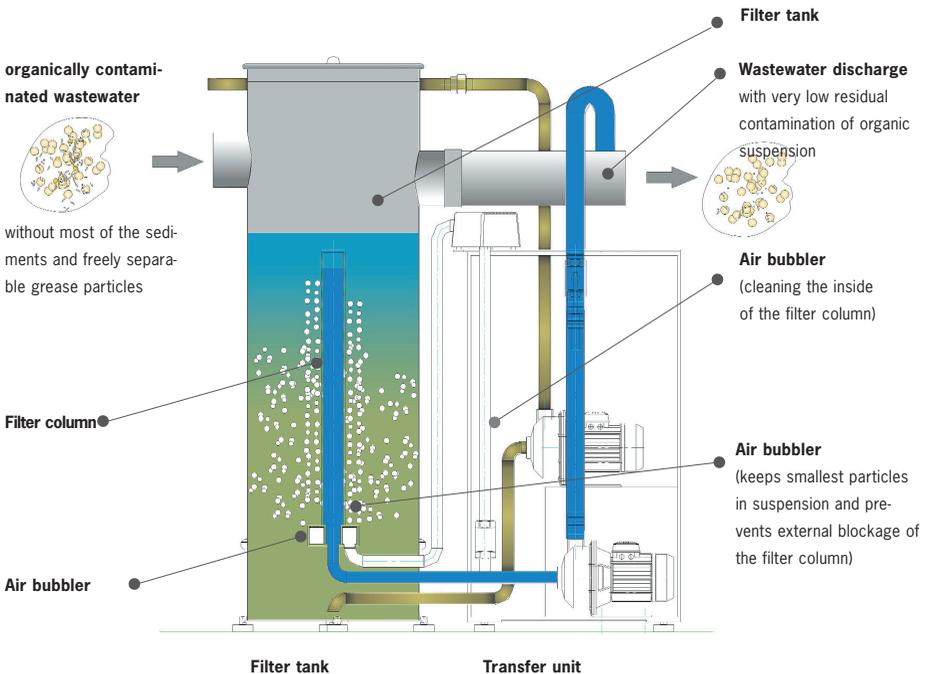


6.2.1 High performance filter

A high performance filter can be installed downstream of a grease separator to reduce even the smallest grease particles and suspended substances.

The filter consists of a filter frame and a transfer unit. The wastewater pre-treated in a grease separator flows down gradient into the filter tank. A pump located in the transfer unit sucks out the wastewater when it has reached a specific level in the tank to pump it through a filter column and then discharge it into the sewer.

The filter retains the smallest fat particles and suspended particles. An air bubble ring injects air bubbles into the filter tank. The air bubbles clean the outer surface of the filter and suspend the smallest organic particles in the wastewater. Air bubbles are regularly injected into the inside of the filter column when the wastewater is not being pumped into the sewers. The air bubbles clean the filter surface from inside to out. The filtrate which collects inside the filter tank is regularly pumped back into the grease separator inflow at regular intervals by a second pump.



ACO High performance filter - function and components

The ACO high performance filter can reduce the sedimentable and freely separable constituents in wastewater downstream of the filter to approx. 150-200 mg/l. These limits can be achieved if standard operating conditions are maintained and the system is operated in accordance with German standard DIN 4040-100.

6.2.2 Biological wastewater treatment

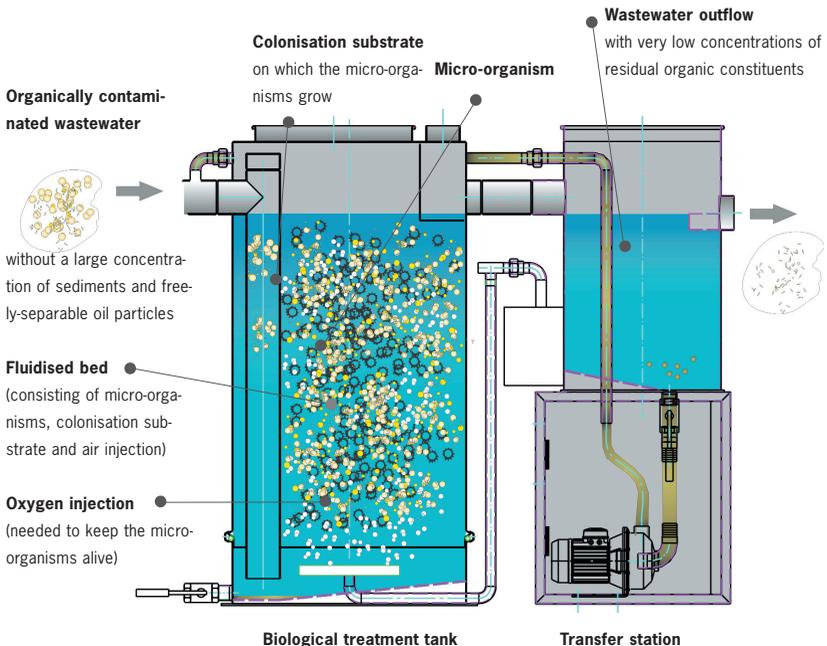
A Biological wastewater treatment plant (Biological) can be installed downstream of grease separators to further reduce the concentrations of emulsified and soluble constituents.

The ACO BIOJET Biological consists of one or more bioreactors and a downstream transfer station.

The wastewater pre-treated in the grease separators flows into the Biological tank through a sloping pipe where it flows upwards through the fluidised bed. The micro-organisms in the fluidised bed break down the constituents in the contaminated wastewater. This significantly reduces the concentrations of emulsified and dissolved organic constituents.

The wastewater then flows into the transfer station. The overflow lip in front of the outlet pipe maintains a constant water level and drains off the wastewater from the surface. This then flows down gradient through the outlet pipe into the sewers. The sedimentable constituents still in the wastewater sink to the floor of the transfer station from where they are pumped to the inlet of the standard Biological treatment system and fed back into the decomposition process as active biomass.

The micro-organisms used in the Biological treatment plant adapt to the different operating conditions.



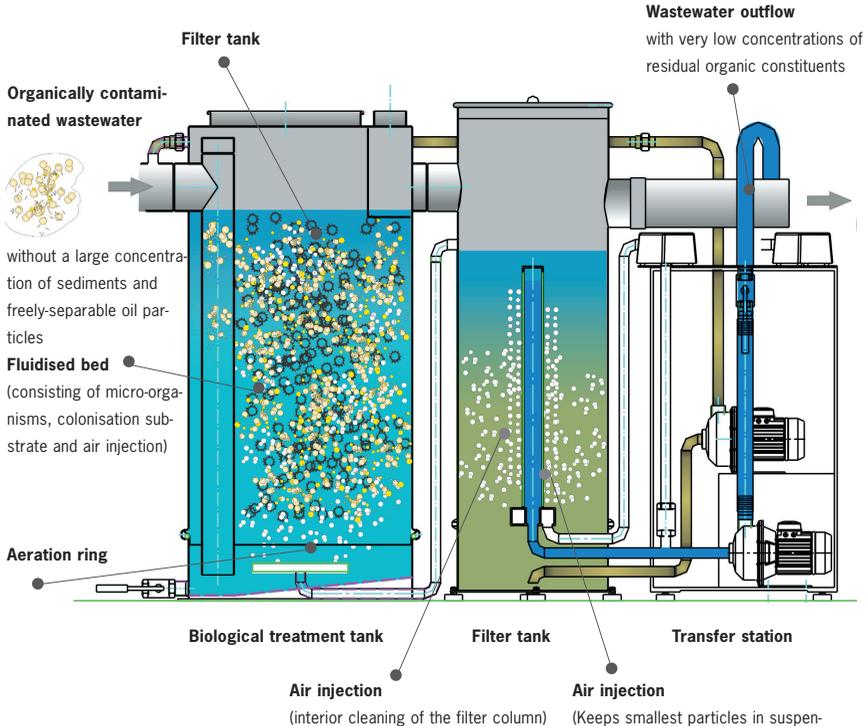
ACO BIOJET Biological treatment – function and components.

The input values of lipophilic substances can be significantly reduced in an ACO BIOJET Biological treatment plant. This plant makes it possible to comply with limits of max. 100 mg/l lipophilic substance concentrations stipulated by many local authorities for wastewater discharged into public sewers. Undercutting this limit can be achieved by operating under normal conditions and properly complying with the stipulations in German standard DIN 4040-100.

6.2.3 Biological treatment plant and high performance filter

The highest possible reduction of lipophilic substances (ultrafine oil particles, suspended particles, emulsified and dissolved constituents) in wastewater flowing out of grease separators can be achieved by treating this water with a combination of a Biological treatment plant and a filter plant.

The separate modus operandi of the high performance filter and the Biological treatment plant are described in Sections 6.2.1 and 6.2.2 respectively.



ACO BIOJET-F Biological treatment plant and high performance filter – function and components

The ACO BIOJET-F combined Biological treatment plant and filter plant significantly reduces the discharge values of lipophilic substances. Using this system enables the discharge limits of max. 80 mg/l lipophilic substances specified by many local authorities for discharge into public sewers to be complied with. Undercutting these limits naturally involves fulfilling all of the usual operating conditions and fully complying with stipulations in German standard DIN 4040-100.

7. Products and Applications

7.1 ECO-Mobil

Fields of application

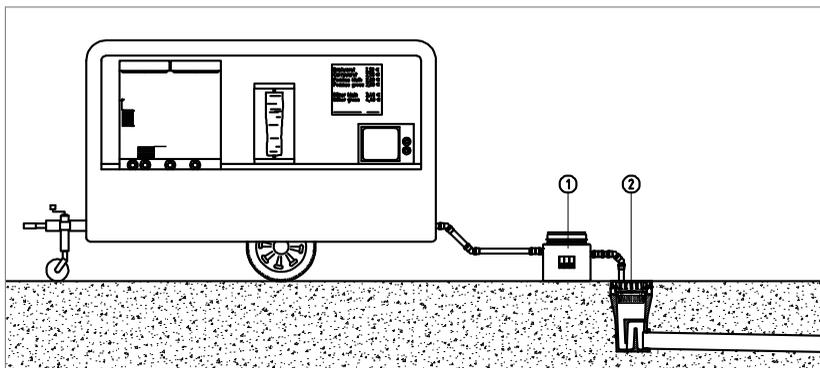
- mobile snack bars
- crockery vehicles
- occasional meal preparation as in town houses without servicing

Test sign Z-54.6-316



Standards/regulations

- EN 1825-1 — Production principles and check
 EN 1825-2 — Dimensioning and installation



Products

Item	Article description	Art. no.	Catalogue chapter
1	ECO-Mobil	3700.01.00	Separators/grease separators/free-standing installation
2	Road drain	—	—

Installation notes

The separator should only be used with a commercial dishwasher with a minimum rinsing period of 1.5 minutes and a changing time of half a minute. This results in a cycle period of two minutes. Consumption of subsequent rinsing water of commercial dishwasher $V_s = 5$ litres.

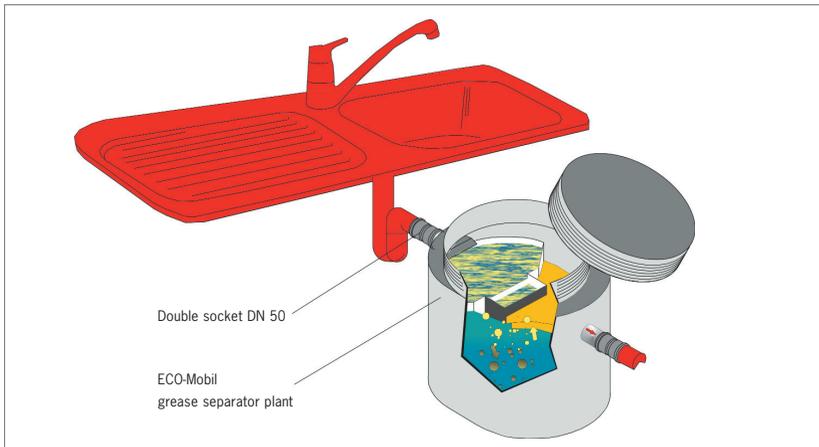
Besides the dishwasher connection, it is possible to connect an outlet of a device used to pre-rinse the dishes. This, however, may only be carried out for a short time.

Included in the scope of supply is the grease separator and a double socket DN 50 each for the inlet and the outlet.

Inlet and outlet have to be connected as shown in the following example.

As per requirements of the German Institute for Building Technology Berlin (DIBt), the grease has to be removed daily. The grease separator must be fully emptied and cleaned after every use, however at least once a week.

Example for installation below a sink:



7.2 ECO-JET-O (NS 1,2,3,4,7 and 10)

Fields of application

- Kitchens of minor use without risk of odour nuisance of customers and guests during disposal/cleaning

Test sign:

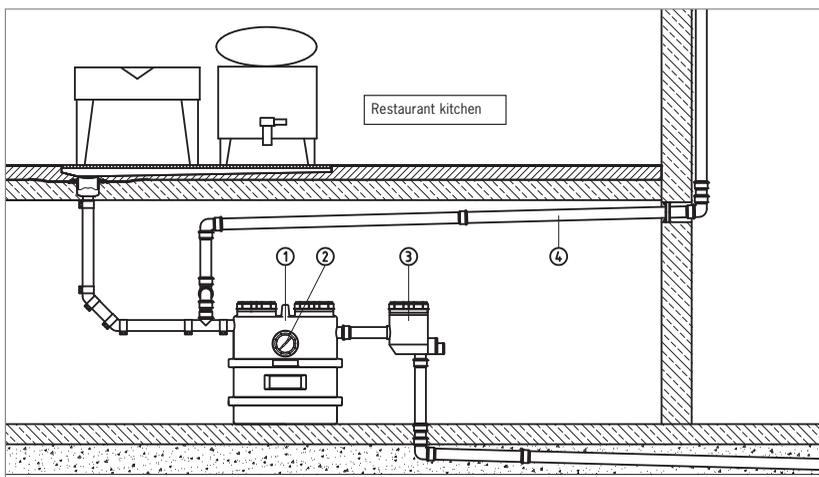
Z-54.6.291 (NS 1 – 4)

Z-54.6.324 (NS 7 + 10)



Standards/regulations

- EN 1825-1 — Production principles and check
- EN 1825-2 — Dimensioning and installation



Products

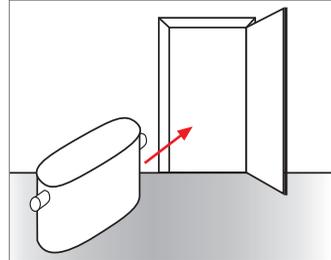
Item	Article description	Art. no.	Catalogue chapter
1	ECO-JET-O NS 2	0159.00.61	Separators/grease separators/free-standing installation
2	Inspection window, flow direct. right	3300.11.10	
3	Sampling pot DN 100, vertical	3300.10.10	
4	Ventilation DN 100 above roof	—	

Installation notes

Bringing-in dimensions

Depending on nominal size, the doors must have the following widths:

NS 1	750 mm
NS 2	750 mm
NS 3	750 mm
NS 4	780 mm
NS 7	920 mm
NS 10	920 mm



Connection to piping

The grease separator can be connected to inlet and outlet pipes using cast iron pipes (e.g. KML). This can be done using the CV connections supplied with the grease separator. Supporting rings should be used to support both sockets in situ to reduce the stress on the grease separator sockets.

If plastic pipes are used (PE pipe, HT pipe) double sockets are required to make the connections to the inlet and outlet. Butt welding with heat reflectors can be used to connect the PE pipe to the grease separator.

Connection to the vent stack

The vent pipes can also be made up using unpressurised drainage pipe. The vent stack should always be installed separately and extend beyond the roof. Ventilation valves (e.g. made by "Durgo") should not be used. It is illegal to connect the vent stack from a grease separator to the vent stack of a lifting plant.

More on venting in Section 4.1.2.

7.3 ECO-JET-GD (NS 2 and 4)

Fields of application

- Restaurant kitchens
- Works canteens

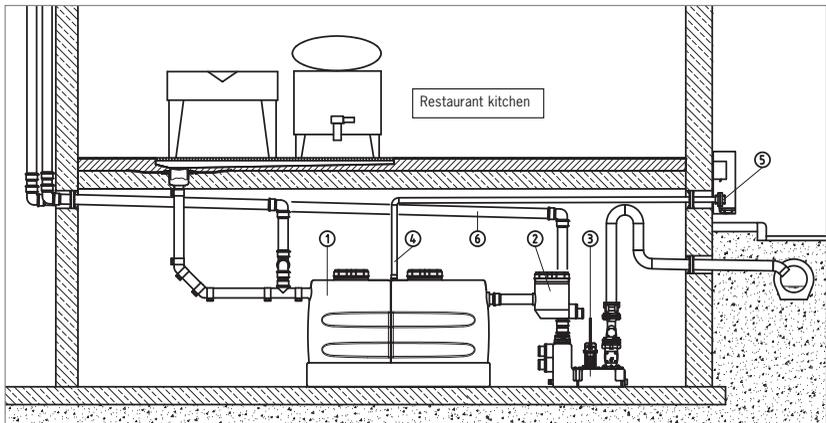
Particularly suitable for building refurbishment with narrow bringing-in openings.

Test sign: Z-54.6-363



Standards/regulations

- EN 1825-1 — Production principles and check
- EN 1825-2 — Dimensioning and installation



Products

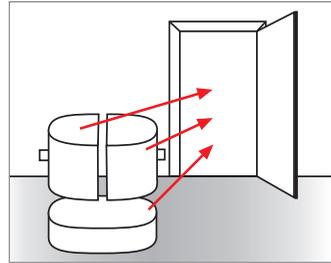
Item	Article description	Art. no.	Catalogue chapter
1	ECO-JET-GD NS 4	3804.50.00	Separators/grease separators/free-standing installation
2	Sampling pot DN 100, vertical	3300.10.10	
3	MULI PE Duo lifting plant with air bubble injection	0159.04.18	Pumps/wastewater lifting plants
4	Suction device DN 50	—	—
5	Storz-B coupling for suction vehicles	—	—
6	Vent pipes	—	—

Installation notes

Bringing-in dimensions

The grease separator contains of three segments. Following bringing-in dimensions are required:

NS 2	670 x 700 x 1360 mm
NS 4	1140 x 700 x 1360 mm



Piping and vent stack connection

See 7.2

Connecting pipes for direct suction

The disposal socket DN 50 (DA 63 mm) has an external thread. The pressure pipe thread DN 65 (min. PN 6) can be screwed on in situ.

Depending on the type of pressure pipe used, the other connections in the pipe can/must be made up using adhesive (PVC pressure pipe), welding (PE pressure pipe) or using the appropriate compression joints.

Connecting the pressure pipe to the lifting plant

DN 80 pressure pipe is the minimum size to be used to make up the pressure pipe if wastewater from toilets is also to be connected to the lifting plant. Installing a DN 80 shut off valve is possible by using a special DN 80 – 100 connection adapter.

CV claws must be always be used in addition to CV connectors when making up a pressure pipe.

The pressure pipe has to be fed over the backflow level. Use the special bends to make up the backflow loop.

7.4 LIPURAT-RS (NS 2,4,7,10,15 and 20)

Fields of application

- Hotel kitchens
- Restaurant kitchens
- Works canteens

Dismountable in single segments (recommended e. g. in the case of right-angled access routes). NS can be adapted in situ by exchanging the centre segments (e. g. from NS 7 to NS 10).

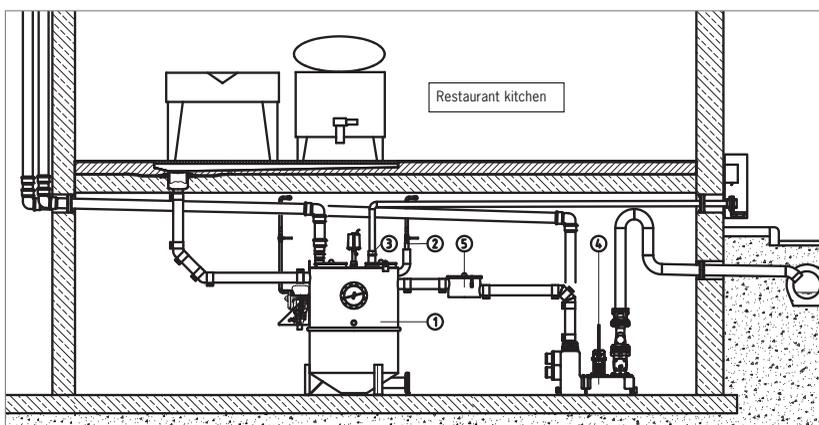


Standards/regulations

- EN 1825-1 — Production principles and check
 EN 1825-2 — Dimensioning and installation

Test sign: Z-54.6-320

For ventilation, please also refer to para 4.1.2.



Products

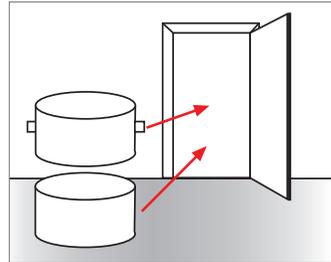
Item	Article description	Art. no.	Catalogue chapter
1	LIPURAT- RS NS 4 – Inspection window, flow direct. right	7504.73.41	Separators/grease separators/free-standing installation
2	Filling device with ball valve 3/4"	Included in supply	
3	Direct suction connection	Included in supply	
4	MULI PE Duo lifting plant	0159.04.17	Pumps/wastewater lifting plants
5	Sampling pot DN 100	7300.09.10	Separators/grease separators/free-standing installation

Installation notes

Bringing-in dimensions

The number of segments and their size is a function of the nominal size.

NS 2 – 4	3 segments, Ø 1000 mm (segment height 783 mm)
NS 7 – 10	3 segments, Ø 1500 mm (segment height 787 mm)
NS 15 – 20	3 segments, Ø 1750 mm (segment height 820 mm)



Assembling the direct suction pipe

The relevant grease separator models have a connection for disposing of the contents of the separator. The grease separators are supplied as standard with a connection coupling/female threaded end with an R 2 ½" fire hose quick connection 75 (B) blank cover system which complies with national standards.

If the suction truck cannot access this connection, lay disposal pipeline. The connecting coupling with the blank cover can then be dismantled from the connection pipe of the grease separator and screwed back on the end of the disposal pipeline which has been built in situ. Make up the connection pipe using minimum PN 6 pressure pipe made of PE or stainless steel.

Connection high pressure internal cleaning

An R ¾" drinking water connection is needed for the high pressure internal cleaning. Ensure that the flow rate of 30 l/min is guaranteed. To enhance the cleaning effect further, connect up a warm water supply (max. 60°C). A shut off valve/ball valve must be installed in the water pipe. The buffer tank for the high pressure internal cleaning system should be connected to the drinking water supply using a washing machine connector.

Filling unit connection

A R ¾" cold water drinking water connection is required for the filling unit. A pressure reducer must also be installed if the water pressure exceeds 4 bars.

Hydraulic separation is installed as standard pursuant to national standards for both the high pressure internal cleaning as well as the filling unit.

Connecting pipes and vent stacks

See 7.2.

7.5. HYDROJET-OAE (NS 1,2,3,4,7 and 10)**Fields of application**

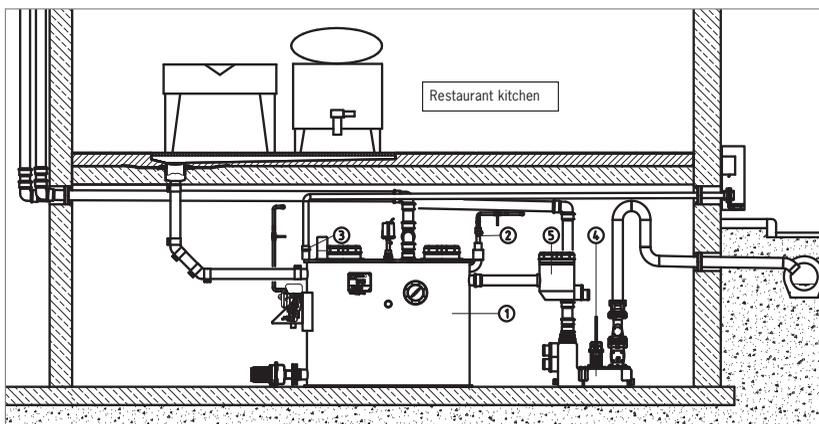
- Hotel kitchens
- Restaurant kitchens
- Works canteens

With disposal pump for large delivery heads and delivery lengths.

Test sign:**Z-54.5-291 (NS 1 - 4)****Z-54.6-324 (NS 7 + 10)****Standards/regulations**

EN 1825-1 — Production principles and check

EN 1825-2 — Dimensioning and installation

**Products**

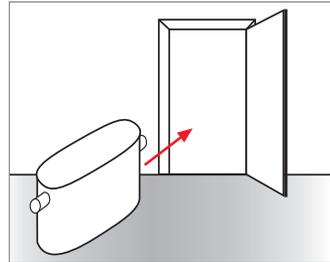
Item	Article description	Art. no.	Catalogue chapter
1	HYDROJET-OAE NS 4 (Inspection window in flow direction right)	3554.83.42	Separators/grease separators/free-standing installation
2	Filling device with solenoid valve 3/4"	Included in supply	
3	Connection for disposal line	Included in supply	Pumps/wastewater lifting plants
4	MULI PE Duo lifting plant	0159.04.17	
5	Sampling pot DN 100, vertical	3300.10.10	

Installation notes

Bringing-in dimensions

Depending on nominal size, the doors must have the following widths:

NS 1	700 mm (height: 1440 mm)
NS 2	700 mm (height: 1390 mm)
NS 3	700 mm (height: 1520 mm)
NS 4	760 mm (height: 1535 mm)
NS 7	910 mm (height: 1835 mm)
NS 10	910 mm (height: 2020 mm)



Assembling the disposal pipe

The relevant grease separator models have a connection for disposing of the contents of the separator. The grease separators are supplied as standard with a connection coupling/female threaded end with an R 2 ½" fire hose quick connection 75 (B) blank cover system which complies with national standard. If the suction truck cannot access this connection, lay disposal pipeline. The connecting coupling with the blank cover can then be dismantled from the connection pipe of the grease separator and screwed back on the end of the disposal pipeline which has been built in situ.

Automatic control connection

A CEE mains socket with a connected load of 400 V/50 Hz/3 X 20 A fuses are necessary for the control box.

Connection high pressure internal cleaning

An R ¾" drinking water connection is needed for the high pressure internal cleaning. Ensure that the flow rate of 30 l/min is guaranteed. To enhance the cleaning effect further, connect up a warm water supply (max. 60°C). A shut off valve/ball valve must be installed in the water pipe.

Filling unit connection

A R ¾" drinking water connection is required for the filling unit. A pressure reducer must also be installed if the water pressure exceeds 4 bars. A shut off valve/ball valve must be installed in the water pipe.

Connecting pipes and vent stacks

See 7.2

7.6. LIPATOMAT (NS 2,4,7,10 and 15)

Fields of application

- Ships kitchens
- Areas inaccessible with a disposal vehicle
- In connection with e. g. wet refuse disposal installations

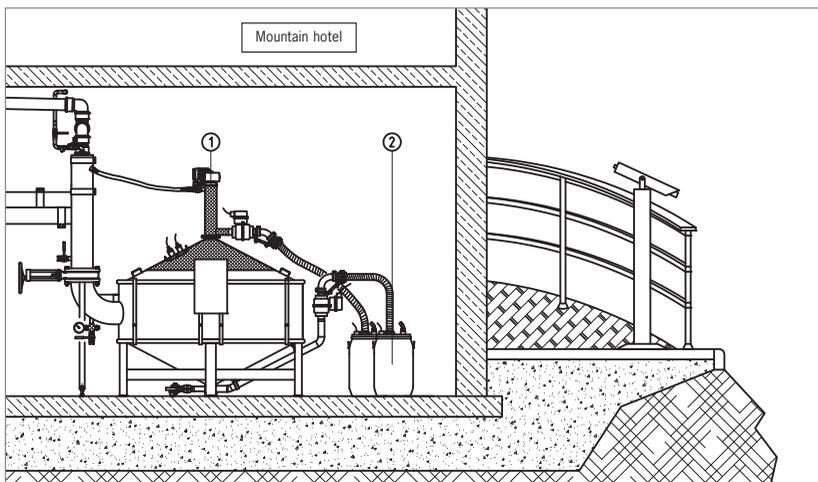
90% of the total volume remain in the separator. It is possible to dispose of the contents without having to interrupt kitchen operation.

Test sign: Z-54.6-163



Standards/regulations

- EN 1825-1 — Production principles and check
 EN 1825-2 — Dimensioning and installation



Products

Item	Article description	Art. no.	Catalogue chapter
1	LIPATOMAT NS 4	7674.60.00	Separators/grease separators/free-standing installation
2	Grease and sludge collecting drums	Included in supply	

Installation notes

Connection to the vent stack

The vent pipes can also be made up using unpressurised drainage pipe. The vent stack should always extend beyond the roof. The ventilation bridge already has a connection for the vent stack. Ventilation valves (e.g. made by "Durgo") should not be used.

It is illegal to connect the vent stack from a grease separator to the vent stack of a lifting plant.

Inlet and outlet connections

With pipe connectors and claws for pipe connections pursuant to EN 877.

Automatic control connection

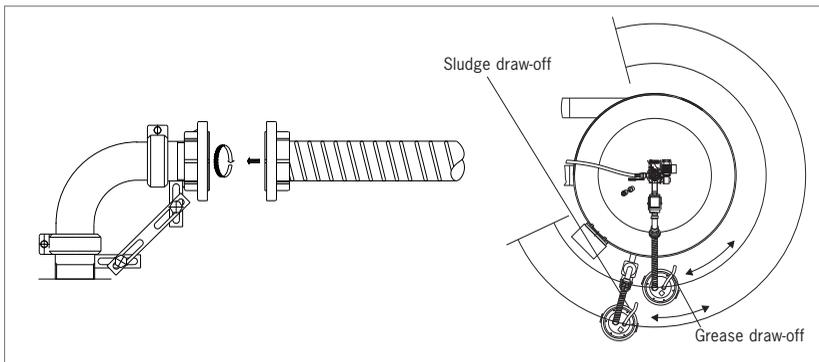
A CEE mains socket with a connected load of 220-230 V/50-60 Hz/1.75 kW/20 A fuses are necessary for the control box.

Filling unit connection

A R ¾" drinking water connection is required for the filling unit with a solenoid valve. A pressure reducer must also be installed if the water pressure exceeds 4 bars. A shut off valve/ball valve must be installed in the water pipe.

Connection to a collecting tank

The flex hoses from the grease and sludge collecting tanks should be connected up as shown in the diagram. The offtake pipes for extracting the grease and the sludge are fitted as standard. The collecting tanks can be placed in different positions if a different arrangement is required at the installation site.



7.7 ECO-FPI (NS 1,2,3,4,7 and 10 with single or double sludge trap)

Fields of application

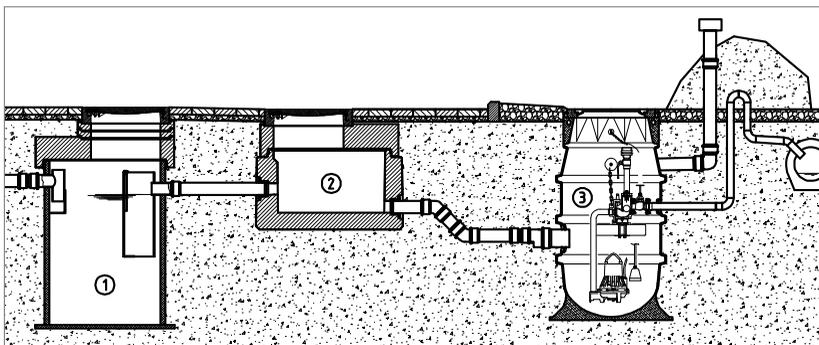
Outside buildings in the ground with heavy duty traffic for load class up to D 400.
Load class D 400 is achieved without additional concrete measures in the vicinity of the cover.



Test sign: Z-54.6-353

Standards/regulations

- EN 1825-1 — Production principles and check
- EN 1825-2 — Dimensioning and installation
- EN 1917 — Shaft structure



Products

Item	Article description	Art. no.	Catalogue chapter
1	ECO-FPI NS 4 with cover class D 400	3204.55.01	Separators/grease separators/ground installation
2	Sampling shaft class D 400	upon request	
3	MULI-MAX-F pump shaft with submersible pumps	upon request	Pumps/prefab pump stations

Installation notes

Construction pit

The ground in which buried grease separators are installed must comply as a minimum with soil class G1 to G2 pursuant to ATV DVWK A-127. The groundwater table must not lie higher than 1 metre above the level of the floor plate on which the grease separator is positioned. If the groundwater table exceeds 1 metre, measures must be undertaken to prevent the tank from floating upwards (concrete casing).

If the area is not affected by any traffic load, the foundations for the grease separator should consist of well compacted non-binding soil (e.g. gravel sand 0-32). Take care to ensure that the floor plate sits on a permanently level surface.

If traffic loads are expected, the foundations must consist of non-binding to weakly binding soil which is filled up and compacted in layers. Compaction should reach up to 97% Proctor density.

Connection and supply pipes

Grease separators must be connected to the public wastewater sewers. Backflow protection must be guaranteed.

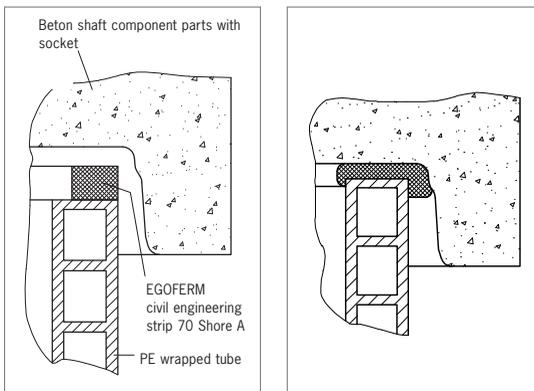
Comply with the stipulations in national standards when filling and supporting the connection pipes. If required, take the necessary in situ measures to protect the pipes laid in the ground from corrosion.

The pipes draining the separators must have suction protection – for instance by laying them in a shaft or ensuring proper venting of the outflow pipes.

Shaft construction

Special civil engineering strip (pursuant to national standards) must be laid and pressed onto the upper face of the clean and dry PE wrapped tube before installing the shaft structure.

The concrete shaft ring (or a concrete cover plate) must be set in place properly centred and vertical. The constant compression from the weight of the concrete components compresses the strip and ensures a proper seal is formed. Any unevenness is automatically compensated for by the plastic deformation of the sealing strip.

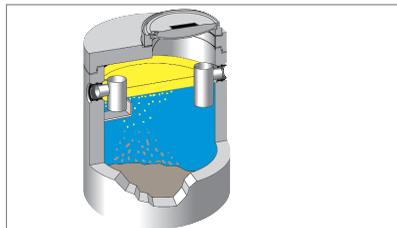


7.8 LIPUMAX optionally with inliner (NS 1,2,4,7,10,15,20 and 25)

Fields of application

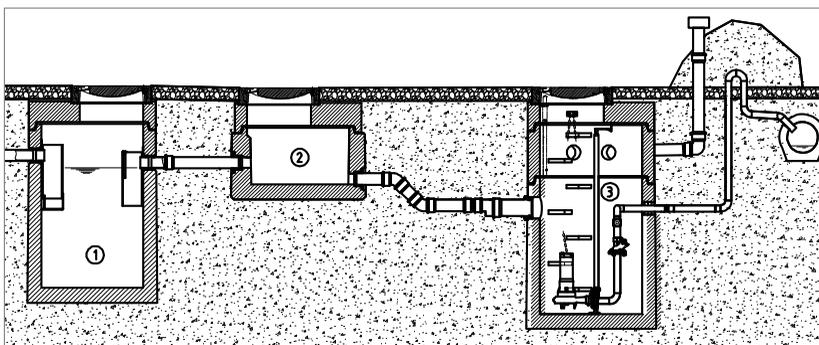
Outside buildings in the ground with heavy duty traffic for load class up to D 400 and ground water.

Test sign: Z-54.6-157



Standards/regulations

- EN 1825-1 — Production principles and check
- EN 1825-2 — Dimensioning and installation
- EN 1917 — Shaft structure



Products

Item	Article description	Art. no.	Catalogue chapter
1	LIPUMAX-Inliner NS 4 class D	8480.42.62	Separators/grease separators/ground installation
2	Sampling shaft class D	8750.46.00	
3	Twin pump station class D	upon request	Pumps/prefab pump stations

Installation notes

Construction pit

Under normal soil conditions, all that is required is a properly graded, compacted sand or gravel bed with a horizontal base. Maximum soil compaction is 15.5 N cm².

Pay attention when carrying out the work that the plant and the pipes are not damaged, and they do not move from their specified positions. Take all the necessary precautions to ensure that the components are not affected by subsidence at a later date.

If the flat base is to be made out of concrete, place a 5 cm thick sand layer on top to ensure uniform load distribution and to compensate for any manufacturing intolerances.

Connection and supply pipes

Grease separators must be connected to the public wastewater sewers. Backflow protection must be guaranteed.

Comply with the stipulations in national standards when filling and supporting the connection pipes. If required, take the necessary in situ measures to protect the pipes laid in the ground from corrosion.

The pipes draining the separators must have suction protection – for instance by laying them in a shaft or ensuring proper venting of the outflow pipes.

Shaft construction

The shaft is constructed using concrete sections. Comply with the stipulations in EN 1917.

The position of the cover plate is very important for later maintenance, and this must be taken into consideration when planning the installation of the separators. Use the details in each of the scale drawings when planning installation.

Before installation, check that the use of the site planned for the installation complies with the classification in EN 124.

Glossary

Accumulation height

A certain accumulation height is assumed for flat roof drains pursuant to DIN EN 1253. This means that the deliberate accumulation of a certain amount of water on the roof is planned to increase the performance of the roof drainage system. This applies to open channel drainage as well to syphonic drainage systems.

Open channel drains

DN 70 to DN 100: accumulation height 35mm

DN 125 to DN 150: accumulation height 45mm

Syphonic drains:

General accumulation height: 55mm

Active backflow safety valve

If a backflow safety valve drains wastewater over the backflow level using a powered device, this system is known as an active backflow safety valve. The sanitary installations connected to the system can continue to be operated during a backflow situation.

Adhering flange

An adhering flange is used to fix a sealing membrane to a floor drain in situ. The sealing membrane is glued to the adhering flange of the drain body.

Air bubble injection

This method is used to increase the operational performance of wastewater lifting units installed downstream of grease separators. By permanently injecting air bubbles into the pilot tube of the water level sensor, the air bubbles ensure continuous movement within the tank and prevent any settling of "floating layers" which might otherwise form an oil layer (e.g. residual grease leaving the separator).

Axial thrust fastenings

Axial thrust is the force generated in an axial direction by the flow in the pipe. This force can occur in drainage pipes because of the layout of the piping (bends). Axial thrust fastenings are fastening clamps used to fix the pipes in place and protect them against axial thrust.

Backflow

Backflow is the flowing back of wastewater out of a sewer into the connected pipes. This can occur during periods of very heavy rainfall, river flooding or if pipes become blocked.

Backflow level

The backflow level is the highest point in an installation. This is the point at which contaminated water can rise during a backflow situation, the backflow level is usually defined as the top of the road surface including the footpath.

- Backflow loop** A backflow loop is an artificially raised part of a piping system which rises up above the backflow level to ensure that any backflowing water initially only flows into all of the lower lying spaces in the piping system. It can be assumed that pipe network as a whole will have an adequate volume, so the backflow loop is the safest means of protecting a system from backflow.
- Bitumen** Bitumen is a by-product of petroleum refining. The black mass (viscous/adhesive to hard depending on its condition) can be made to flow by heating it up. Bitumen can be either hot or cold. Hot bitumen is melted at around 140°C and used for applications such as sticking together bitumen sheeting on roofs. Cold bitumen is treated with additives to make it liquid, and it is used for applications such as sealing off cellar walls from outside to prevent the penetration of water.
- Black water** Black water is the name for wastewater containing faeces.
- Communicating pipes** Communicating pipes are pipes which are open at the top but are connected to one another below. Because of the constant air pressure and gravity, liquids standing in communicating pipes all reach the same height in each of the pipes. This principle is used in backflow protection. Because of the principle of communicating pipes, the backflowing wastewater only rises as high in the pipes in the building as the level of the backflowing wastewater outside the building.
- Compact drain** Compact drains (primarily cellar drains) only consist of a drain body and a grating. They have no infinitely adjustable top sections. This means that they have a low installation height.
- Complete disposal** Complete disposal is one of the two options available for disposing of the wastewater collecting in a grease separator (see partial disposal). The total contents of the grease separator (grease layer, sludge, and grease separator water) must be removed from the grease separator (every 14 days, or at least once a month). The contents must be disposed of by specialised companies. Grease separators designed for complete disposal cannot be converted into partial disposal systems.
- Complete drain** A complete drain consists of a drain body and a height adjustable top section (top section and grating). The top sections are usually rotatable. This enables optimal adjustment of the grating to the direction in which the tiles are laid.

Compliance declaration	Confirmation that building product complies with the standards or the authorisation certification.
Compression sealing flange	A compression sealing flange is used to fix a sealing membrane laid in situ to a floor drain. The sealing membrane is laid on the fixed flange of the drain body and subsequently held in place on the fixed flange by screwing down the loose flange.
Emulsion	An emulsion is a mixture of two different liquids (normally non-mixable). The inner phase (dispersive phase) is in the form of tiny droplets spread throughout the outer phase (dispersion medium). Emulsions are therefore classified as a dispersive system. Depending on the phases present, one can differentiate between water in oil emulsions (W/O) or oil in water emulsions (O/W).
Fire and smoke seal	Fire and smoke seals in a floor drain prevent the spread of fire and smoke through the floor drain into a different fire zone.
Fire resistance duration	The fire resistance duration is also known as the flame resistance duration. It is the time during which a building component retains its original function after a fire has started. The functions which a building component must fulfil during a fire include maintaining its load bearing capacity, sealing a room, providing thermal insulation, or effectively sealing off smoke.
Fire spread	Fire spread is the spreading out of a fire from its source to other areas within the fire zone.
Grease layer	The grease layer forms as a result of the separation processes taking place in a grease separator. The oil and grease particles separate out in the separation compartment and float to the surface to form grease oil layer. The contents of the grease separator must be disposed of once the grease layer reaches its maximum thickness (see manufacturer's details).
Grey water	Grey water is wastewater free of faeces.
Intumescent mass	Intumescence is the term used in the fire protection sector for the swelling up of preventative fire protection material under the influence of heat. ACO fire protection cartridges use a material which expands in volume under the influence of heat.
Lipophilic substances	A substance is described as lipophilic (oil loving) if it easily dissolves in grease, oil, hydrocarbons or similar substances. These substances are usually also hydrophobic (cannot mix with water).

Load class	Floor drains are classified according to the amount of load they can withstand and are divided into the following classes: H1.5; K3; L15, M125.
Non-pressurised water	Non-pressurised water is water in liquid form which can form droplets, e.g. precipitated, percolated or process water, which only exert minor or no hydrostatic pressure on the sealing membrane.
Partial disposal	Partial disposal is one of the two options (see full disposal) for disposing of the contents of a grease separator. A grease separator designed for partial disposal has separate collecting containers (drums or collecting tanks) for the oily part of the wastewater and the sludge. The residual process water remains in the grease separator. The contents of the drums or collecting tanks have to be disposed of regularly.
Passive backflow safety valves	This applies to backflow safety valves which protect any connected drainage installations against backflow when required. The sanitary installations connected to the passive backflow safety valve cannot be used during a backflow situation.
Pipe fire barrier	If classified fire barriers are used, they ensure in the event of a fire that the side of the fire barrier facing away from the source of the fire is not heated up by more than 180°C at any point or 140°C on average.
Pressure pipe	Pressure pipe is resistant to higher pressures than conventional wastewater pipe. Applications for pressure pipes include the batch systems downstream of lifting units used to lift wastewater above the backflow level. Also used for the permanently installed suction pipes for emptying grease separators. Pressure pipes are manufactured in all of the standard materials. Pressure pipes with nominal pressures of PN 6 or PN 10 are most commonly used for building drainage. PN 6 for instance designates pipe which can withstand a maximum pressure of 6 bar at a room temperature of 20°C.
Pressurised water	Water flowing freely in the soil which exerts a hydrostatic pressure on the seal, e.g. groundwater, flood water, etc.
Properly qualified personnel	Properly qualified personnel are defined as staff working for the operator or third parties whose training, knowledge and practical experience ensure that they can properly carry out the necessary evaluations or tests required in the relevant areas. (Extract from DIN 4040-100)

Properly qualified technicians	Properly qualified technicians are defined as the staff of third party companies, experts, or other institutions with certified special technical knowledge on the operation, maintenance and testing of the separators described here, and the necessary technical understanding of the separators required to test the separators. On a case-by-case basis, when involving large companies, these inspections can also be carried out by in-house properly qualified technicians employed by the operator who act independently and whose accountabilities free them from having to obey instructions and who have the necessary qualifications and the necessary technical understanding to professionally carry out the inspection. (Extract from DIN 4040-100)
Reversed roof	A reversed roof is a flat roof with a structure in which the layers are in reversed order compared to a conventional roof. In a reversed roof, the insulation is above the concrete ceiling and is therefore exposed to the weather. Waterproof insulation material is therefore used: polystyrene, foam glass or polyurethane. The insulation is usually fixed in place with a gravel layer. This forms the top of the roof.
Rising damp	This is caused by capillary water from the soil being transported upwards against gravity purely by capillary forces.
Sealing membrane	Used to seal off buildings and parts of buildings to prevent the penetration of soil moisture, non-pressurised and pressurised water.
Secondary fire	A secondary fire is a fire which starts as a result of heat generation and can take place in different zones in a burning building.
Separation compartment	The separation compartment in the grease separator is where the separation processes take place. This is where the particles float to the surface of the water (oil layer), whilst the sediments sink to the floor (sludge trap). This is purely physical separation based on density differences. Both processes take place simultaneously.
Sludge trap	The sludge trap is the part of a grease separator into which the heavy sediments (e.g. sludge) fall during the separation process.
Standard fire test	Fire test under the standard temperature time curve defined in DIN 4102.

Starting height

The starting height, also known as Δh_A (VDI 3806), is the height difference between the roof sealing membrane (the barrier on which the water collects) to the centre of the offtake pipe. The starting height is an extremely important parameter for "syphonic drainage". The spontaneous start of the syphonic drainage process is crucially influenced by the starting height and the down pipe cross section.

The lower the starting height, the smaller the cross section of the down pipe to ensure reliable drainage using the syphonic effect. The starting height ensures that water is safely transported from the roof drain via the collection pipe to the down pipe.

Thermal insulation

Thermal insulation comprises all of the measures for insulating buildings to keep in warmth and keep out cold.

Isolation is the term used for complete insulation, whereas the term insulation more generally used only causes a reduction in the amount of energy crossing the material. Examples for thermal insulation include the insulation materials laid in storey ceilings or floor plates

Thin-bed flange

A thin-bed flange is used when thin-bed filler is spread on screed to form the sealing layer. When it has hardened, the thin-bed filler acts as the sealing membrane.

Trapezoidal sheet roof

Trapezoidal sheet roofs are mostly used to construct factories or warehouses. They are classified as lightweight roofs and are mainly used to cover steel or wooden trusses which form the structure of the roof. Trapezoidal sheet steel supports the roof insulation and the sealing membranes, as well as vapour diffusion barriers if insulation is used.

Wastewater

Water drained from buildings is divided into rainwater and wastewater. Wastewater is again differentiated into grey water (wastewater free of faeces), or black water (wastewater containing faeces).

References

- EN 12056-2 Wastewater installations: planning and calculation
- EN 12056-3 Roof drainage: planning and calculation
- EN 1986-100 Drainage installations for buildings and land, supplementary regulations to DIN EN 752 and DIN EN 12056
- EN 4102-11 Fire properties of building materials and building components; pipe cladding, pipe fire barriers, installation shafts and ducts, covers with air inspection openings; terms, specifications and tests
- EN 1253 Drains for buildings
- EN 752 Drainage systems outside of buildings
- EN 13564-1 Backflow stops for buildings – specifications
- EN 13564-2 Backflow stops for buildings – testing methods
- EN 13564-3 Backflow stops for buildings – quality assurance
- EN 1825-1 Grease separators: construction, modus operandi and testing principles
- EN 1825-2 Grease separators: selection of nominal sizes, installation, operation and maintenance
- DIN 4040-100 Grease separators: specifications for the use of grease separators pursuant to EN 1825-1 and EN 1825-2
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Dipl.-Ing Jürgen Wesche (2001) Comments on application recommendations in the Pipe and Cable System Regulations (Building Regulations) MLAR/LAR/RbALei, Krefeld 2001
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