

*The full modular package for further treatment
of greasy wastewater from the catering industry*

ACO Biojet Wastewater treatment plant

ACO

Optimising the effectiveness of grease separator plants

The high level of organic pollution (oils and fats) in wastewater from the kitchen area and the food-processing industry requires the installation of grease separator plant in order to comply with current regulations.

In these grease separator plants a phased separation of the wastewater is carried out using simple gravity. Doing this normally only removes the freely separable oils and fats, and sediments. Emulsified and dissolved components in the wastewater will pass through the separator virtually unimpeded.

This inevitably leads to exceeding the maximum permitted levels given increasingly stringent requirements on the levels of non-volatile lipophilic substances. As the limit for non-volatile lipophilic substances is coming under closer scrutiny by the authorities in many towns and cities, the implementation of a more thorough cleaning process downstream of the grease separator plants is becoming advisable.

A suitable solution is offered here by the ACO biological wastewater treatment Biojet System – a particularly environmentally friendly application, which has been specifically designed for this application.



Regulatory requirements may require additional treatment of greasy wastewater

A suitable solution is offered here by the ACO biological wastewater treatment Biojet System – a particularly environmental friendly application, which has been specifically designed for this application.

In the next few pages we will present and explain in detail the functions, typical applications and also how to order the right solution for you.

Using the widely installed technology developed by ACO Building Drainage, the permitted thresholds for non-volatile lipophilic substances can be respected long-term and with confidence. In addition the COD and BOD_5 levels, the pH-value, and also sediments are substantially reduced.



ACO Biojet standard biological unit with upstream grease separator (right) and downstream lifting plant (left)

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ACO processing plants ensure clean water flows in trade, industry and agriculture. Biological wastewater treatment is a particularly performant and innovative process, which we as European market-leaders are continuing to develop for ourselves and for our environment.



Where does the aftertreatment of greasy wastewater start?

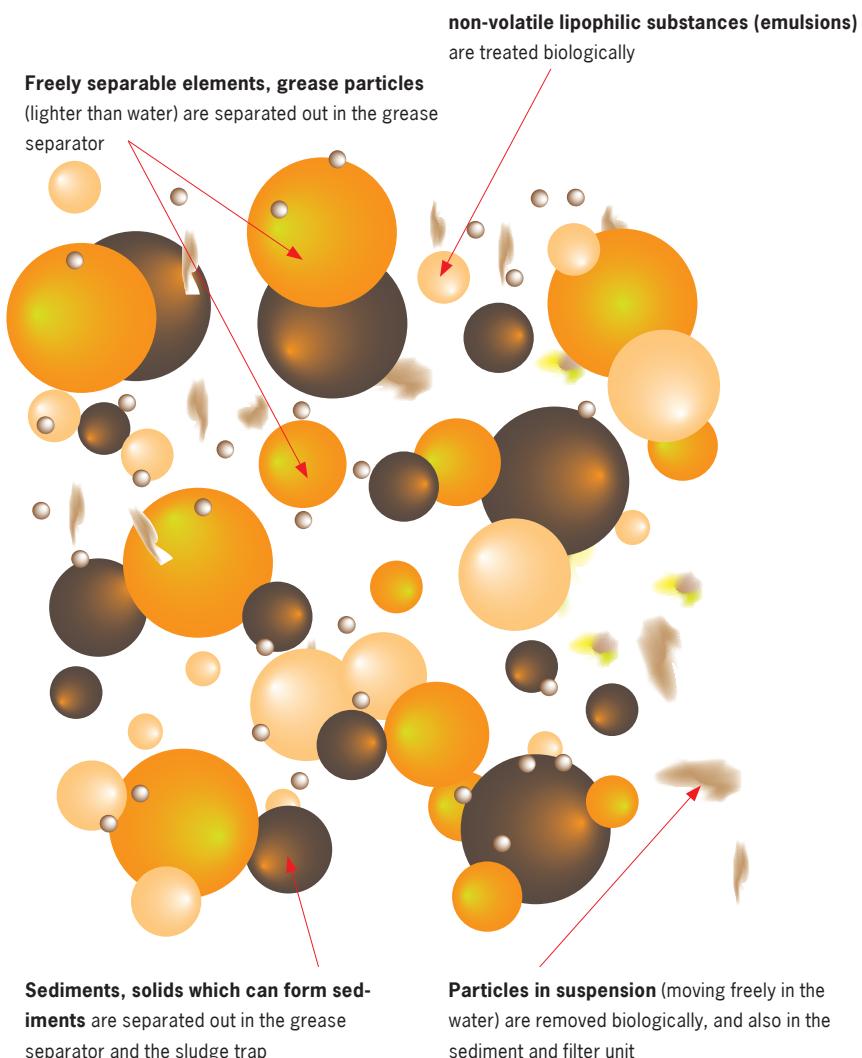
Generally the installation of a grease separator is necessary in all businesses in which greasy wastewater is created, under DIN 1986-100. The sizing and installation must be carried out as per DIN EN 1825 and DIN 4040-100. When using a grease separator the water in the drain usually shows a residue of non-volatile lipophilic substances of around 300 mg/l.

If regulations now require a further reduction in these non-volatile lipophilic substances then the wastewater which has passed through the grease separator needs to be further processed. Now let us take a brief look at the composition of kitchen wastewater. The freely separable substances, e.g. grease particles (lighter than water) and the solids (sediments, heavier than water), are removed in the grease separator.

But if a further reduction in the levels of non-volatile lipophilic substances is to be achieved, then the focus moves to the emulsified and soluble elements and also any suspended matter, which will all be fed through the drain into the sewerage system along with the waste water.

The aim is to achieve a long-term reduction in these elements, so that the maximum level of around 300 mg/l of non-volatile lipophilic substances achieved by the grease separator is significantly reduced before discharge into the sewerage system. This can be achieved using a downstream sedimentation/filtration unit, or the biological wastewater treatment process (ACO Biojet) or a combination of the two. The working of the grease separator is unaffected by this. Disposal must, as now, be carried out accordingly to official guidelines, once or twice a month.

Over the next few pages we will show how the above solution works, followed by a description of the functionality of each of the products.

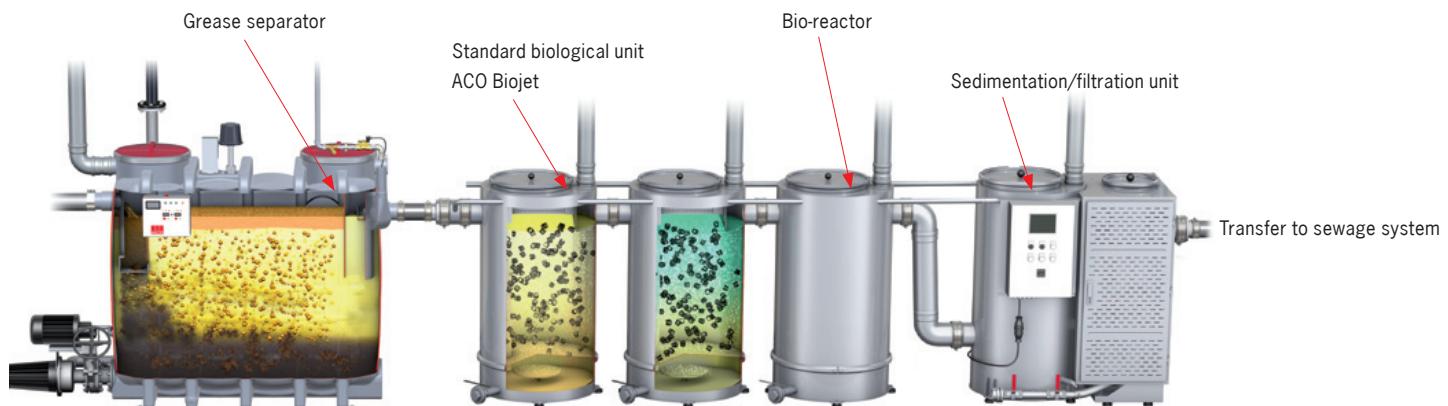


What causes you to exceed which thresholds?

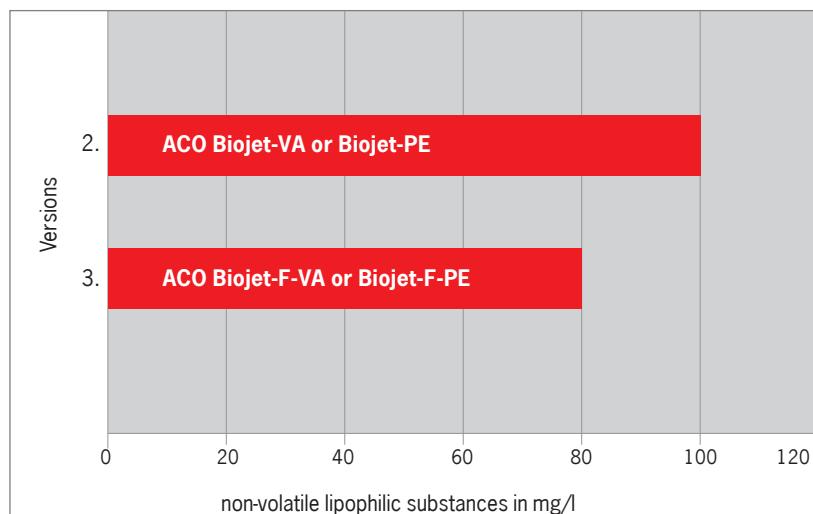
The processing of greasy wastewater can be carried out in four different ways:

1. Using a grease separator
2. Using a grease separator with a downstream biological "ACO Biojet"

3. Using a grease separator with a downstream biological unit and a sedimentation/filtration unit



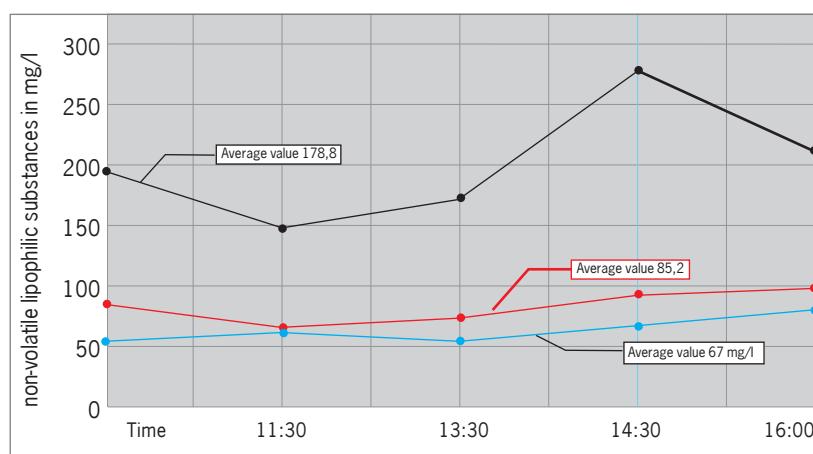
Degradable lipophilic substances



The levels of non-volatile lipophilic substances can be reduced by implementing the treatment process.

The level of non-volatile lipophilic substances is made up from the sum total of the following organic components:

- freely separable lipophilic substances
- non-volatile lipophilic substances



For example this diagram shows the values measured from an ACO Building Drainage treatment plant consisting of a grease separator, a biological unit and a sedimentation and filtration unit.

- = downstream of grease separator
- = downstream of grease separator and biological unit
- = downstream of grease separator and biological unit and sedimentation/filtration unit

measured: Federal police Huenfeld, 2006

The working principle of the ACO Biojet standard biological unit

In order to reduce the levels of non-volatile lipophilic substances to around 100 mg/l, the ACO Biojet biological unit can be installed downstream of the grease separator.

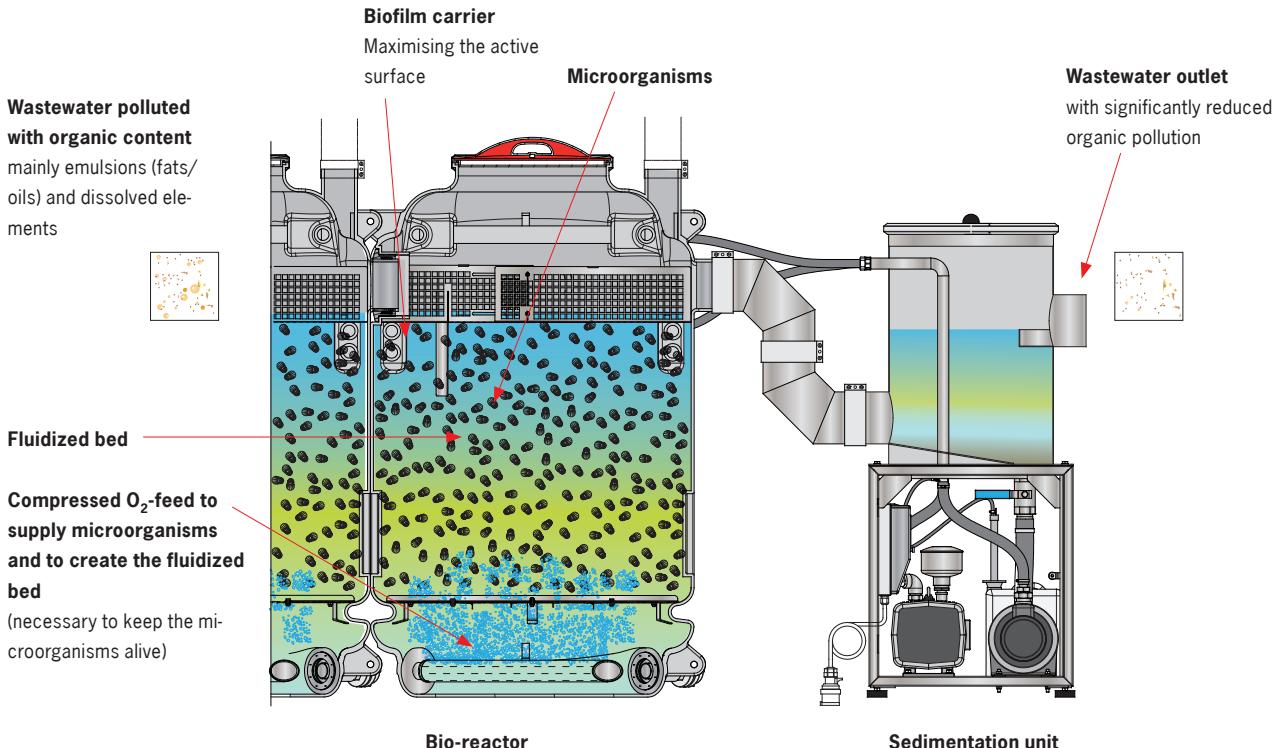
The ACO Biojet consists of a number of biological reactors plus a downstream sedimentation unit. The wastewater which has been pre-treated in the grease separator flows by gravity into the biological reactors and is fed into them using a

special gravity-fed inlet line. The wastewater goes through the special fluidized bed biological treatment. The microorganisms in this fluidized bed process the polluted wastewater. The emulsified and dissolved elements are substantially reduced.

The wastewater then flows onwards into the sedimentation unit. The overflow pipe maintains the water level and draws off the wastewater from the surface.

This then flows by gravity into the outlet pipe to the sewerage system. The sediment-forming solids which are still in the wastewater sink in the transfer station to the base of the container and are pumped back to the plant intake.

The microorganisms used in the biological system are adapted to the type of wastewater being treated.



By using the new ACO Biojet a significant reduction of pollution levels (non-volatile lipophilic substances) is achieved. This means that it is possible to comply with the pollution threshold imposed by many local authorities of 100 mg/l of non-volatile lipophilic substances. Here too, all that is required are normal working conditions and proper procedures as set out in DIN 4040-100.

The benefits of the ACO Biojet

- Reduction in non-volatile lipophilic substances to approx. 100 mg/l after biological treatment
- The biochemical processes in the biological system stabilise the pH-value in the neutral range
- Thanks to biochemical processes the BOD₅ and COD levels in the wastewater are also reduced
- No residues which need to be disposed of finally
- Low cost of maintenance and management
- Lifetime costs consist only of energy to drive the pumping technology and the active ingredients
- No problem in inserting parts into the plant thanks to use of building blocks approach
- The strains of microorganisms used are ecologically safe for health and the environment

ACO Biojet-VA standard biological unit made from stainless steel – how to order

Biological wastewater treatment downstream of grease separator EN 1825/DIN 4040-100 for NS (2/4/7/10)

Low energy and user-friendly automatic version to significantly reduce:

- Non-volatile lipophilic substances
- COD and BOD₅ values
- And to stabilise the pH-value

For indoor freestanding installation, made of stainless steel (material 1.4571), sealed odour-free installation, segmented/modular construction (extensible), sludge recycling as per EN 1825/DIN 4040 into the ACO Biojet, which consists of: bio-reactors and a sedimentation unit

- With low maintenance and low-cost plant technology
- With fluidized bed technology and specially adapted microorganisms (Group 1 non-pathogenic strains)

- With automatic return of sediments from the sedimentation unit into the plant (return pump/volume 12 m³/h)
- Pressurised ventilation using diaphragm membrane; injection pump volume 6.5 ml/min
- With continual discharge of cleaned wastewater into sewerage system
- With standard IP 55 switchbox with automatic program sequence and collection of error messages for central control systems
- With scour outlet DN 100 for maintenance



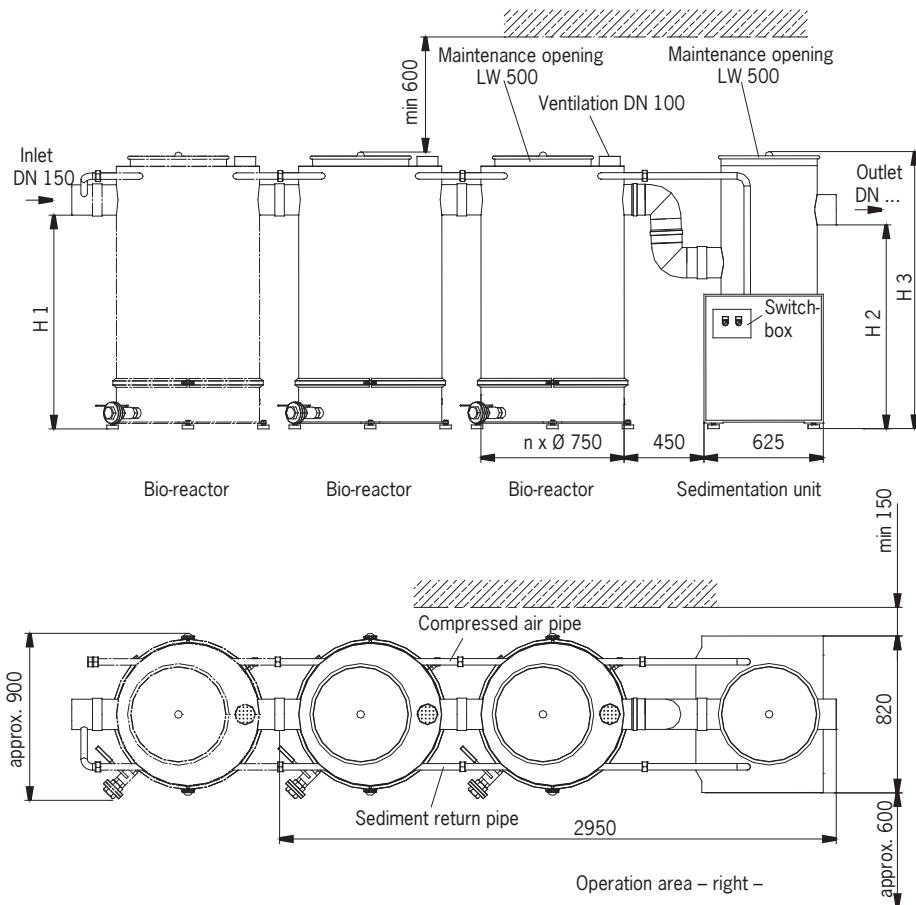
ACO Biojet-VA NS 4

Optional setup for ACO Biojet-VA – other options can be created for a specific project

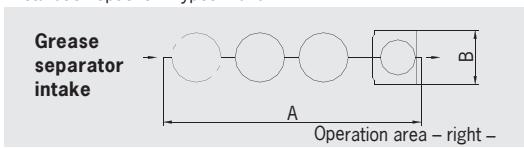
ACO Building Drainage System

Inlet and outlet DN 150, connector nozzle(s) with external diameter 160 mm, for separate plant ventilation, connector nozzle(s) on the biological reactors, with external diameter 110 mm, electrical connection 400 V/50 Hz/1.5 kW, required air volume: 3 times the space volume/hr

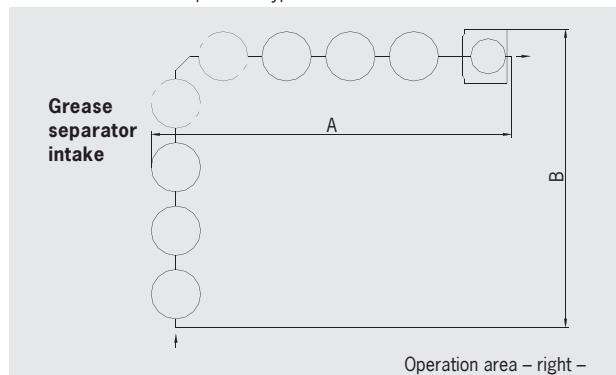
Biological treatment for grease separators NS	Total weight/max. individual part in kg		Number of containers/ Total volume in litres		Art. no. Operating side right	Art. no. Operating side left
	Empty	Full	Biological treatment unit	Sedimentation/filtration unit		
2	450/50	1442	2/990	1	7902.00.00	7902.00.10
4	600/50	2050	3/1450	1	7904.00.00	7904.00.10
7	1160/55	4500	6/3300	1	7907.00.00	7907.00.10
10	1600/60	6600	8/5000	1	7910.00.00	7910.00.10

ACO Biojet-VA wastewater treatment plant made from stainless steel – dimensions

Installation in series or in parallel

Installation options – Types 2 and 4 –



Installation options – Types 7 and 10 –



Biological treatment for grease separators NS	Number of bio-reactors [n]	Dimensions in mm				
		H1	H2	H3	A	B
2	2	1120	1070	1450	31	900
4	3	1120	1070	1450	410	900
7	6	1290	1240	1630	4600	3700
10	8	1470	1420	1820	5500	4600

Other installation options can be configured for specific projects

ACO Biojet-VA wastewater treatment unit made from plastic – how to order

Biological wastewater treatment downstream of grease separator

**EN 1825/DIN 4040-100 for
NS (2/4/5.5/7/8,5/10/15/20/25)**

Low energy and user-friendly automatic version to significantly reduce:

- Non-volatile lipophilic substances
- COD and BOD₅ values
- And to stabilise the pH-value
- Freestanding installation in frost-free areas
- Bio-reactor, container made of polyethylene (PE-HD)
- Sedimentation unit, container and housing in stainless steel, material grade 1.4571
- Sealed odour-free installation
- Segmented/modular construction (extensible)

Plant consists of:

- Bio-reactors and a sedimentation unit
- With low maintenance and low-cost plant technology
- With fluidized bed technology and specially adapted microorganisms (Group 1 non-pathogenic strains)
- With automatic return of sediments from the sedimentation unit into the plant (return pump/volume 12 m³/hr)
- With automatic discharge of cleaned wastewater into sewerage system
- With standard IP 55 switchbox with automatic program sequence and collection of error messages for central control systems
- With scour outlet DN 50 for maintenance

ACO System:

- Inlet and outlet DN 150
- Connection socket or nozzle for connection pipe with external diameter: 160 mm (adaptor to DN 100 supplied unfitted in NS 2/4)
- Separate plant ventilation, connection nozzle with external diameter 110 mm
- Electrical connection: 400 V/50 Hz/1.5 kW
- Required air volume: 3 times space volume per hour

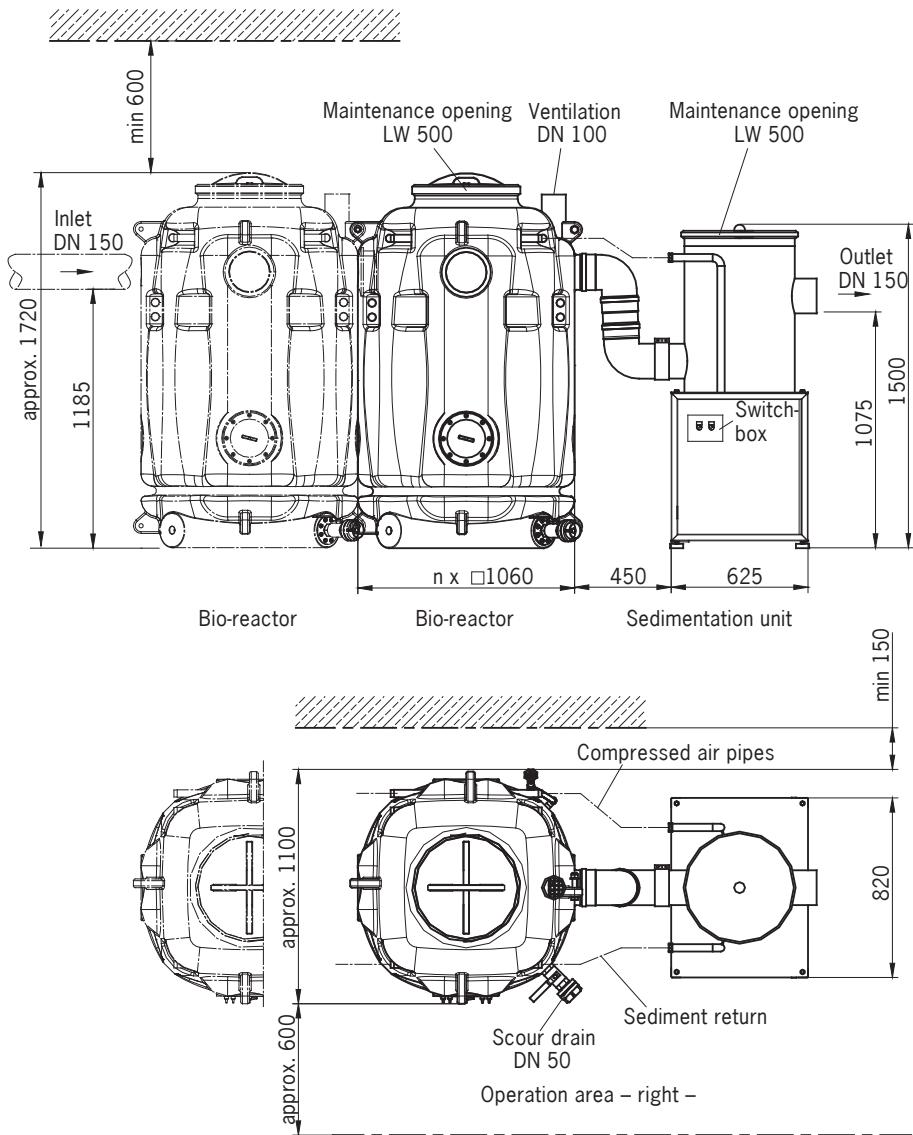


ACO Biojet-PE

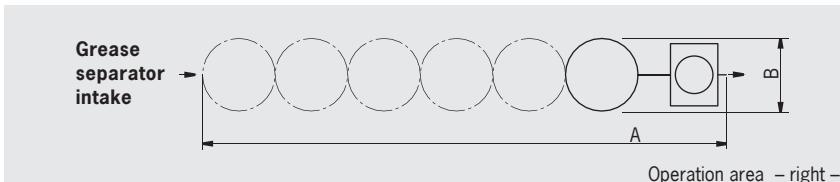
Optional setup for ACO Biojet-PE – other options can be created for a specific project

Biological treatment for grease separators	Number of bio-reactors	Contents		Weight		Art. no. Service side		
		NS	[n]	Bio-reactors [l]	Overall [l]	Empty [kg]	Full [kg]	Right
2	1	820		900	240	1140	3502.00.00	3502.00.10
4	2	1640		1720	340	2060	3504.00.00	3504.00.10
5.5	3	2460		2540	440	2980	3505.00.00	3505.00.10
7	4	3280		3360	540	3900	3507.00.00	3507.00.10
8,5	5	4100		4180	640	4820	3508.00.00	3508.00.10
10	6	4920		5000	740	5740	3510.00.00	3510.00.10
15	8	6560		6640	940	7580	3515.00.00	3515.00.10
20	10	8200		8280	1140	9420	3520.00.00	3520.00.10
25	12	9840		9920	1340	11260	3525.00.00	3525.00.10

Individual weight (empty): Bio-reactor 100 kg, Sedimentation unit 140 kg

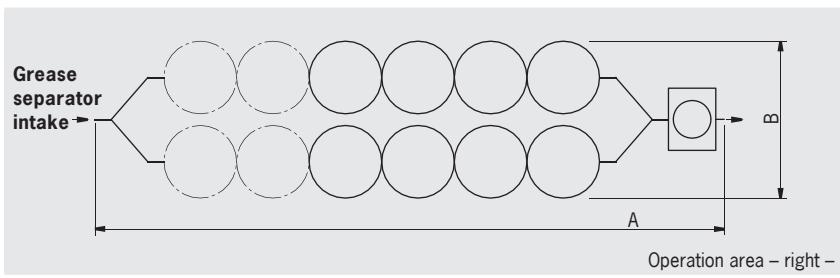
ACO Biojet-VA wastewater treatment unit made from plastic – dimensions

Installation in series or in parallel

Installation options – Types 2 to 10 –



Biological treat- ment unit for grease separator NS	Number of bio-reactors [n]	Dimensions in mm	
		A	B
2	1	2100	1100
4	2	3050	1100
5,5	3	4050	1100
7	4	5050	1100
8,5	5	6050	1100
10	6	7050	1100
15	8	3800	2500
20	10	7800	2500
25	12	8800	2500

Installation options – Types 15, 20 and 25 –


**Other installation options can be
configured for specific projects**

The working principle of the ACO Biojet standard biological unit

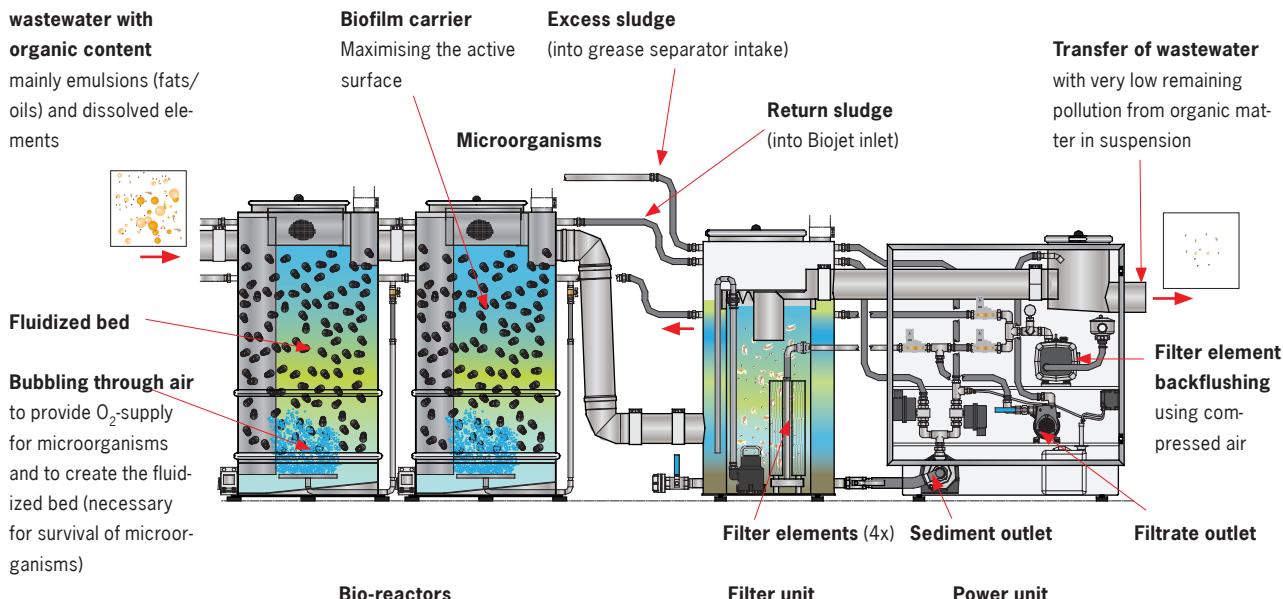
In order to reduce the levels of non-volatile lipophilic substances to around 80 mg/l, a combination of biological treatment and a sedimentation/filtration unit can be installed downstream of the grease separator. This treatment system consists of the standard biological unit and a downstream sedimentation/filtration unit.

The pre-treated wastewater from the grease separator flows into the biological reactors by gravity.

The wastewater goes through the special fluidized bed biological treatment. The microorganisms in this fluidized bed process the polluted wastewater. The emulsified and dissolved elements are substantially reduced.

The sedimentation/filtration unit removes suspended particles. Between each drainage session into the sewerage system, the filter elements are backflushed with compressed air. The air cleans the filter surfaces from the inside outwards.

The sediments collected in the filter container are pumped by a second pump at regular intervals into the plant inlet. Using the ACO Sedimentation/filtration unit the levels of sediment-forming and freely separable elements in the wastewater can be substantially reduced. All that is required are normal working conditions and proper procedures as set out in DIN 4040-100. The microorganisms used in the biological unit adapt to the properties of the wastewater.



By using the new ACO Biojet-F a significant reduction in pollution levels (non-volatile lipophilic substances) is achieved. This means that it is possible to comply with the pollution threshold imposed by many local authorities of 80 mg/l of non-volatile lipophilic substances. Here too, all that is required are normal working conditions and proper procedures as set out in DIN 4040-100.

The benefits of the ACO Biojet-F

- Reduction of non-volatile lipophilic substances to approx. 80 mg/l after biological treatment
- The biochemical processes in the biological system stabilise the pH-value in the neutral range
- Thanks to biochemical processes the BOD₅ and COD levels in the wastewater are also reduced
- No residues which need to be disposed of finally
- Low cost of maintenance and management
- Lifetime costs consist only of energy to drive the pumping technology and the active ingredients
- No problem in inserting parts into the plant thanks to use of building blocks approach
- The freestanding construction provides simple installation, inspection and maintenance
- The strains of microorganisms used are ecologically safe for health and the environment

ACO Biojet-F-VA wastewater treatment plant made from stainless steel – how to order

ACO Biojet-F-VA wastewater treatment plant made from stainless steel – how to order
Biological aftertreatment stage downstream of grease separator
EN 1825/DIN 4040-100 for NS

(2/4/7/10)

Low energy and user-friendly automatic version to significantly reduce organic pollution from:

- Non-volatile lipophilic substances
- Sediment-forming substances
- COD and BOD₅ values
- And to stabilise the pH-value

For indoor freestanding installation, made of stainless steel (material grade 1.4571), sealed odour-free installation, segmented/modular construction (extensible), sludge recycling, which consists of:

Biological reactors, sedimentation/filtration Unit

- With low maintenance and low-cost plant technology
- With fluidized bed technology and specially adapted microorganisms (Group 1 non-pathogenic strains)

- With automatic return of sediments (return pump/volume 12 m³/h)
- With continual discharge of cleaned wastewater into sewerage system
- With standard IP 55 switchbox with automatic program sequence and collection of error messages for central control systems
- With scour outlet DN 100 for maintenance



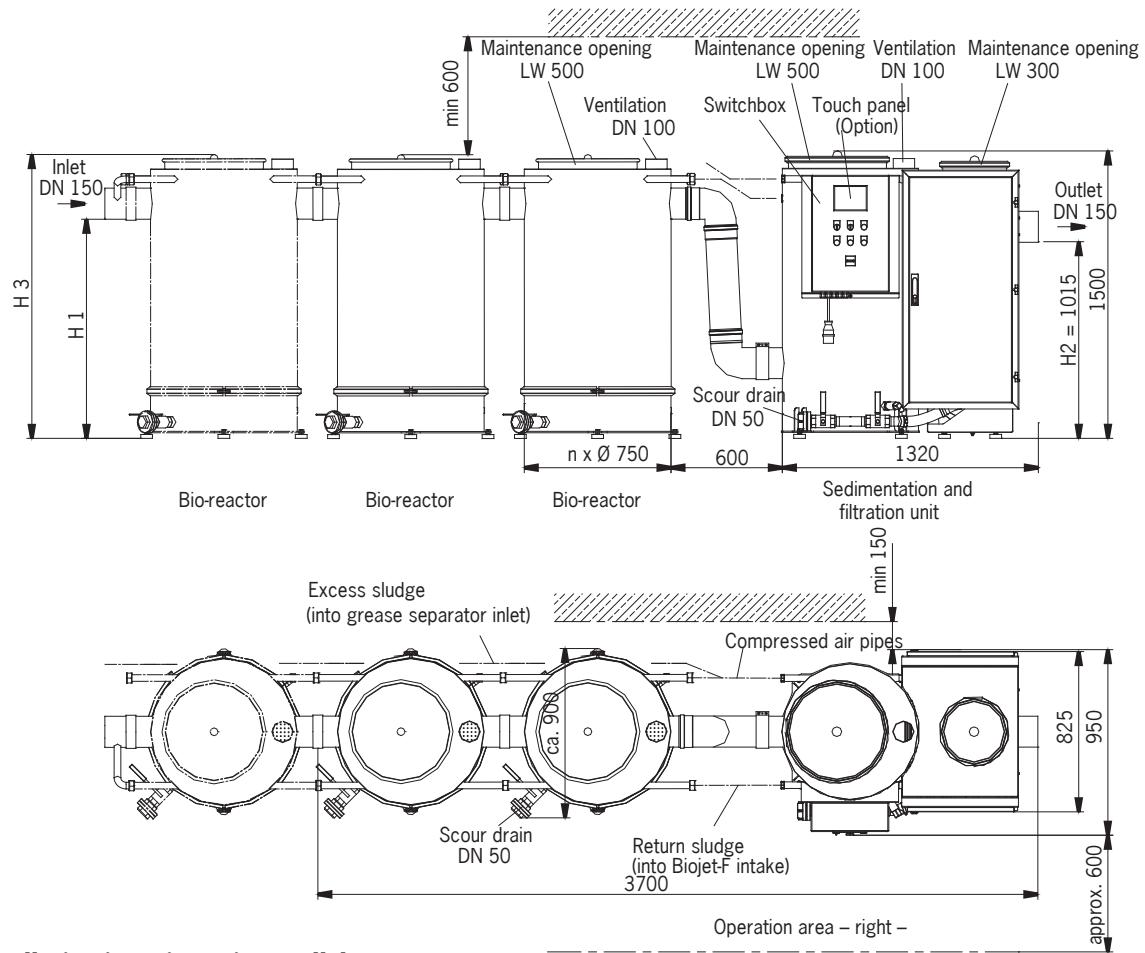
Optional setup for ACO Biojet-F-VA – other options can be created for a specific project

ACO Building Drainage System

Inlet and outlet DN 150, connector nozzle(s) with external diameter 160 mm, for separate plant ventilation, connector nozzle(s) on the biological reactors, with external diameter 110 mm. Electrical connection 400 V/50 Hz/2.5 kW, required air volume: 3 times the space volume/hr

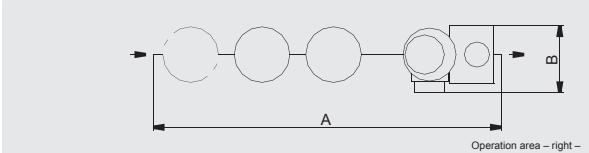
Biological unit and filter for grease separator NS	Total weight/max. individual part in kg		Number of containers/ Total volume in litres		Art. no. Operating side right	Art. no. Operating side right
	Empty	Full	Biological treatment unit	Sedimentation/filtration unit		
2	550/150	1680	2/1130	1	7902.20.00	7902.20.10
4	700/150	2290	3/1590	1	7904.20.00	7904.20.10
7	1252/167	4660	6/3450	1	7907.20.00	7907.20.10
10	1670/177	8360	8/5100	1	7910.20.00	7910.20.10

ACO Biojet-F-VA wastewater treatment plant made from stainless steel – dimensions

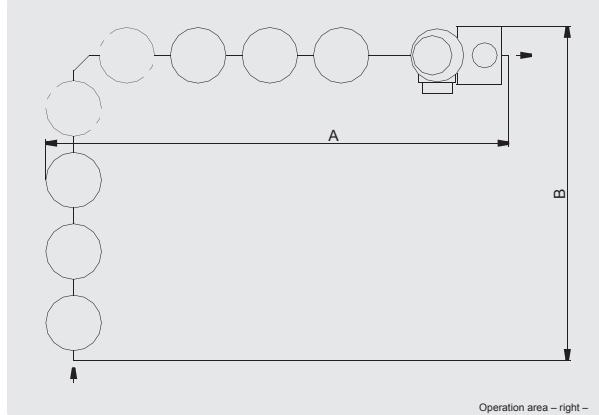


Installation in series or in parallel

Installation options – Types 2 and 4 –



Installation options – Types 7 and 10 –



Biological treatment for grease separators NS	Number of bio-reactors [n]	Dimensions in mm				
		H1	H2	H3	A	B
2	2	1120	1015	1450	3700	950
4	3	1120	1015	1450	4700	950
7	6	1290	1015	1630	5300	3650
10	8	1470	1015	1820	6300	4600

Other installation options can be configured for specific projects

ACO Biojet-F-PE wastewater treatment unit made from plastic – how to order

**Biological wastewater treatment downstream of grease separator
EN 1825/DIN 4040-100 for
NS (2/4/5.5/7/8.5/10/15/20/25)**

Low energy and user-friendly automatic version to significantly reduce:

- Non-volatile lipophilic substances
- COD and BOD₅ values
- And to stabilise the pH-value
- Freestanding construction in frost-free areas
- Bio-reactor, container made of polyethylene (PE-HD)
- Sedimentation unit, container and housing in stainless steel, material grade 1.4571
- Sealed odour-free installation
- Segmented/modular construction (extensible)

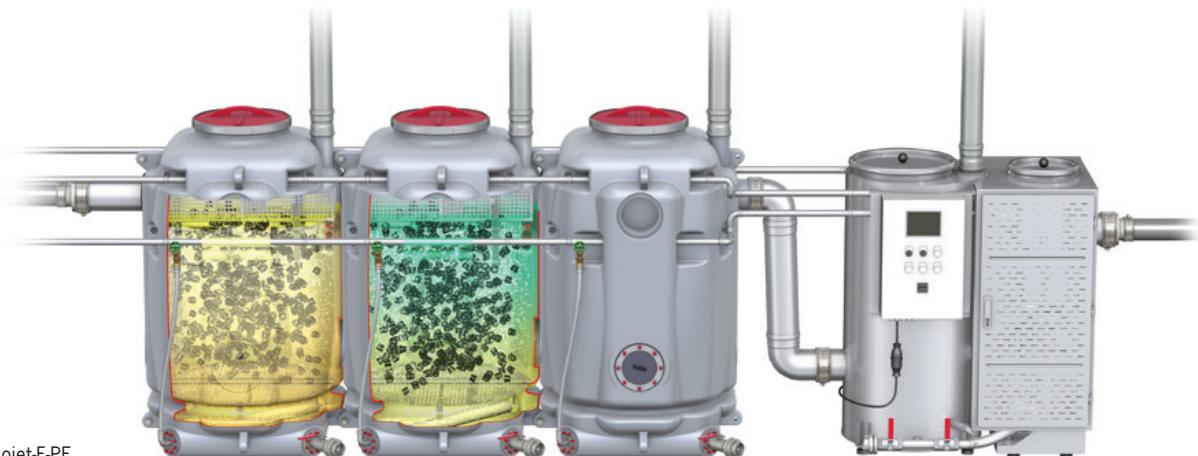
Plant consists of:

- Bio-reactors and a sedimentation unit
- With low maintenance and low-cost plant technology
- With fluidized bed technology and specially adapted microorganisms (Group 1 non-pathogenic strains)
- With automatic return of excess sludge (into grease separator intake and the return sludge (into ACO Biojet-F inlet) from the sedimentation unit into the plant (return pump/volume: 12 m³/hr)
- With automatic discharge of cleaned wastewater into sewerage system
- With standard IP 55 switchbox with automatic program sequence and collection of error messages for central control systems

- With scour drain DIN 50 on bio-reactor and sedimentation unit for maintenance purposes

ACO System:

- Inlet and outlet DN 150
- Connector socket or connector nozzles for connecting pipe with external diameter 160 mm (adaptor to DN 100 supplied unfitted in NS 2/4)
- Separate plant ventilation, connector nozzles on bio-reactor and sedimentation unit with external diameter 110 mm
- Electrical connector: 400 V/ 50 Hz/2.5 kW
- Required air volume: 3 times space volume per hour



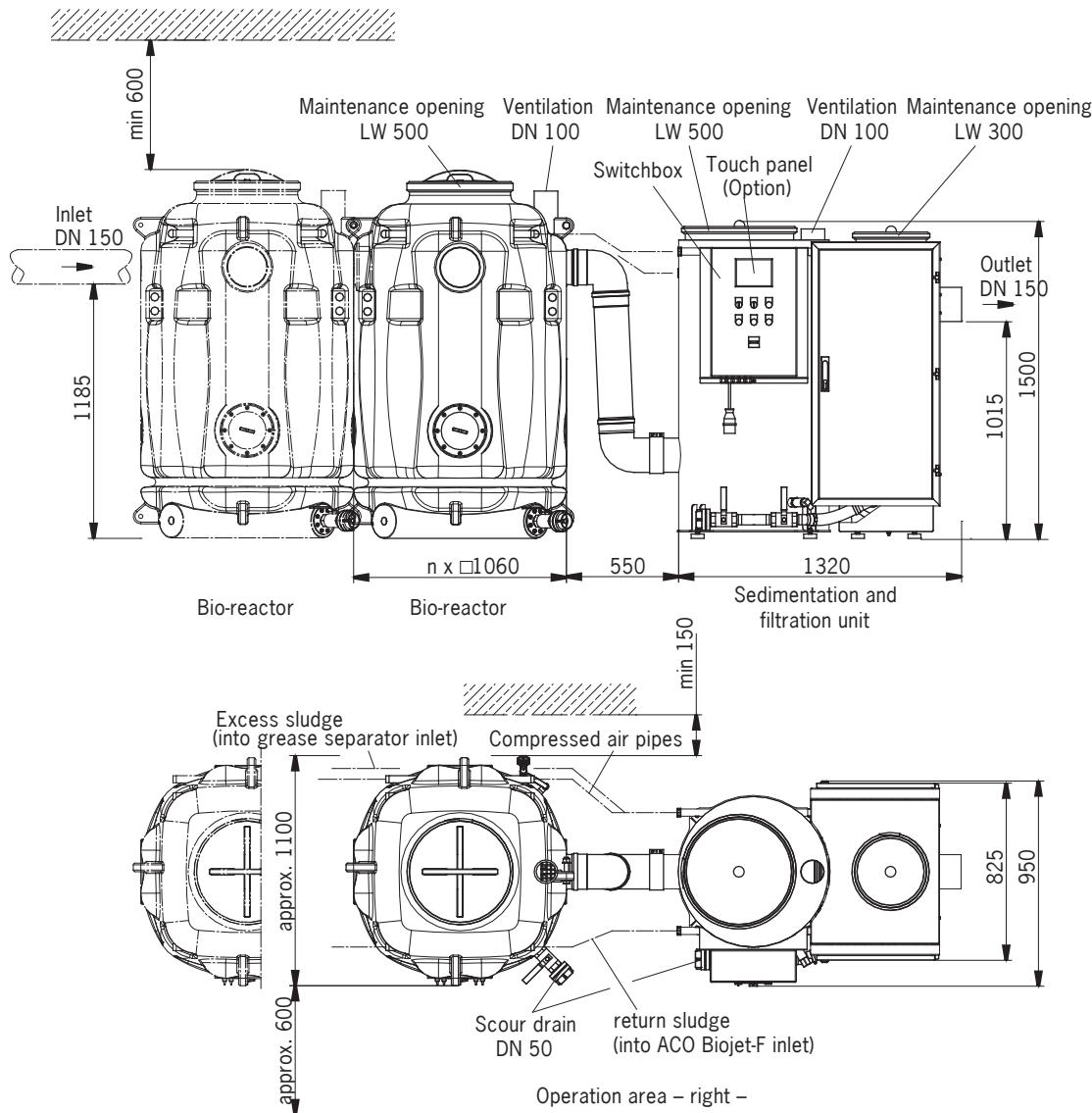
ACO Biojet-F-PE

Optional setup for ACO Biojet-PE – other options can be created for a specific project

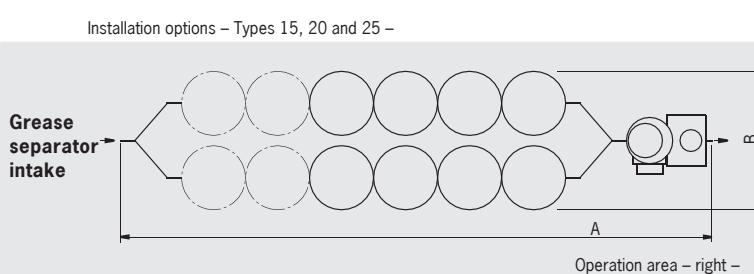
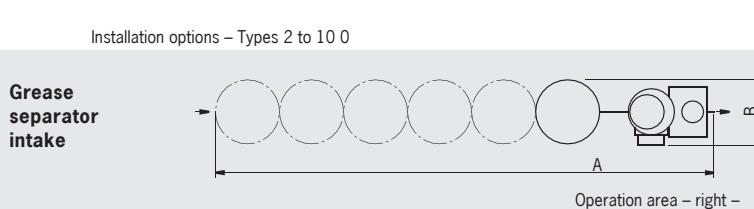
Biological treatment for grease separators	Number of bio-reactors	Contents		Weight		Art. no. Service side		
		NS	[n]	Bio-reactors [l]	Overall [l]	Empty [kg]	Full [kg]	Right
2	1	820		1250	440	1690	3502.20.00	3502.20.10
4	2	1640		2070	540	2610	3504.20.00	3504.20.10
5.5	3	2460		2890	640	3530	3505.20.00	3505.20.10
7	4	3280		3710	740	4450	3507.20.00	3507.20.10
8.5	5	4100		4530	840	5370	3508.20.00	3508.20.10
10	6	4920		5350	940	6290	3510.20.00	3510.20.10
15	8	6560		6990	1140	8130	3515.20.00	3515.20.10
20	10	8200		8630	1340	9970	3520.20.00	3520.20.10
25	12	9840		10270	1540	11810	3525.20.00	3525.20.10

Individual weight (empty): Bio-reactor 100 kg, Sedimentation unit 340 kg

ACO Biojet-F-PE wastewater treatment unit made from plastic – dimensions



Installation in series or in parallel



Biological treatment unit for grease separator NS	Number of bio-reactors [n]	Dimensions in mm	
		H1	H2
2	1	2900	1100
4	2	3850	1100
5,5	3	4850	1100
7	4	5850	1100
8,5	5	6850	1100
10	6	7850	1100
15	8	7500	2500
20	10	8500	2500
25	12	9500	2500

Other installation options can be configured for specific projects

**To assess the correct aftertreatment
(biological/filters) please supply the
following information:**

▼ Sender

▼ Contact person
(must be supplied)

▼ Telephone

▼ Fax

▼ Email

Please fax the completed page to
ACO Building Drainage
Fax: +49(0)036965 819-361

- Planner Trade Industry
- (Local) Authority Constructor Private individual

Required threshold in mg/l
non-volatile lipophilic substances

COD _____ BOD₅ _____
(if this applies)

1. Existing grease separator

Nominal size of the grease separator _____

Threshold values from drainage system

Wastewater temperature on leaving
the grease separator _____

Wastewater temperature _____

pH-value on leaving the grease separator _____

pH-value _____

Non-volatile lipophilic substances in mg/l
on leaving the grease separator _____

Non-volatile lipophilic substances in mg/l _____

Rated data available Yes
(if yes, please attach)

Yes

COD _____

BOD₅ _____

2. No existing grease separator

Rated data available
(if yes, please attach)

Yes

Threshold values from drainage system

Wastewater temperature _____

pH-value _____

Non-volatile lipophilic substances in mg/l _____

3. Local site factors

Water connection available Yes No Dimension _____

Electrical connection available Yes No Dimension _____

Space ventilation (intake/extract) available Yes No Dimension _____

Separate ventilation pipe available Yes No Dimension _____

Installation area, drawings available Yes No File as DWG Paper

Planning and dimensioning process engineering – profit from ACO expertise

eServices

Easy download of scale drawings and article descriptions with the Online catalogue on our website. Product selection made easy with the relevant selection criteria.

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- easy keyword and article searches
- article descriptions (TXT, Datanorm and GAEB)
- scale drawings (DXF)
- product visuals Installation and assembly instructions

www.aco-haustechnik.de/catalogue

Type	Number of bioreactors	Table of Contents	Total	Weight	Article No.	Article	Note
2	2	Content of bioreactors [1]	105	465	1570	2902.00,-	Details
4	3	1650	1571	675	2210	3944.00,-	Details
7	6	3420	3522	1400	4520	5970.00,-	Details
10	8	5200	5340	2670	7419	7910.00,-	Details

Type	Number of bioreactors	Table of Contents	Total	Weight	Article No.	Article	Note
2	2	Content of bioreactors [1]	105	465	1570	2902.00,-	Details
4	3	1650	1571	675	2210	3944.00,-	Details

Notes



Notes

A large grid of squares, approximately 20 columns by 30 rows, designed for writing notes.

