



Wastewater treatment solutions

THE WASTEWATER TREATMENT RANGE



WASTEWATER TREATMENT SYSTEMS

SEPTIC TANKS

CESSPOOLS

INFILTRATION

GRAF – Setting the standards in quality and innovation



Production site at Dachstein (France)

Production site at Teningen (Germany) near Freiburg

For over 45 years, Otto Graf GmbH has been offering high-class plastic products to its customers.

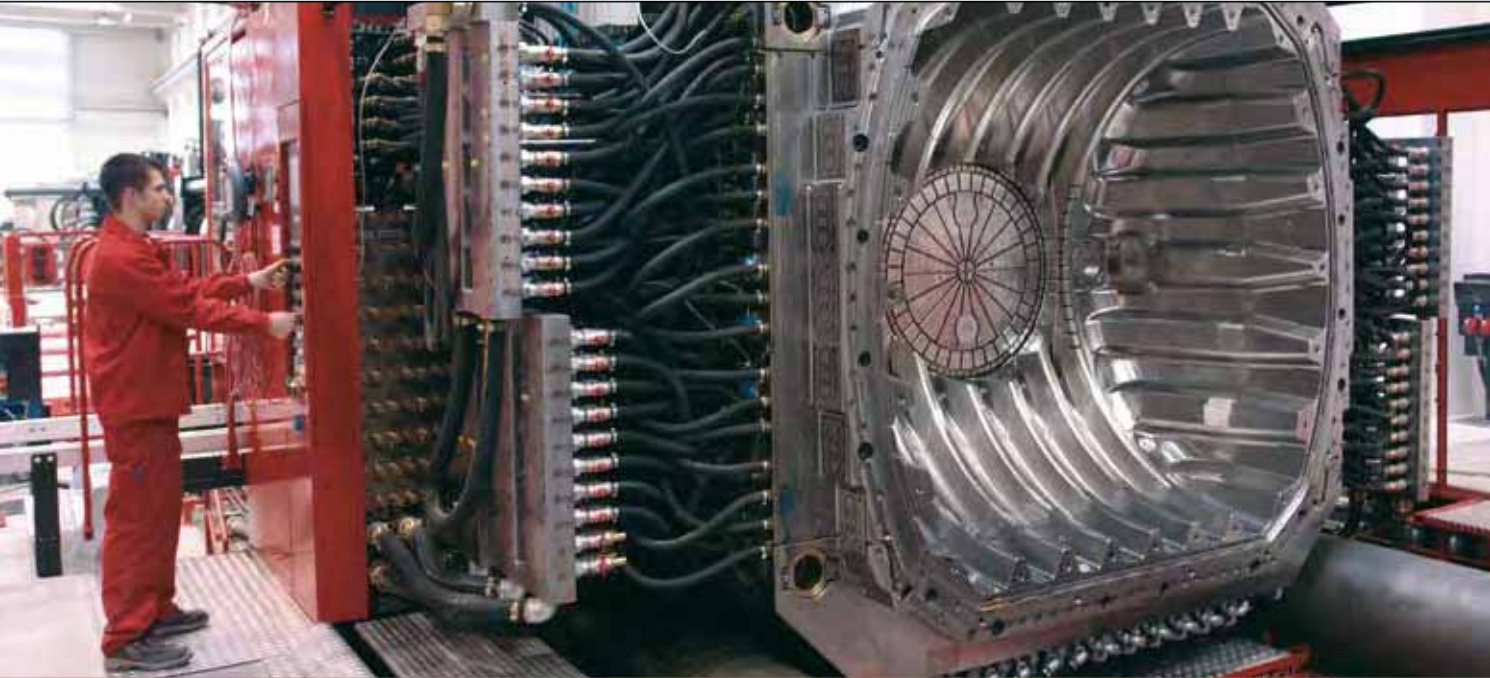
Now GRAF proudly presents the new premium Carat range of the tanks. A range which is manufactured in one of the most modern and efficient plastic manufacturing facilities in the world!

High Quality Manufacturing

GRAF has invested more than € 20 million in a new production site specially set up for the new Carat range. The new facility has an approximate surface area of 155,000 m² – that equals 31 football pitches – one of the most modern production facilities for plastic products in the world. Choosing Germany as the location was easy. On the one hand we feel an obligation to the site because of our history. On the other, we would like to offer our customers products of the highest quality.

Products for the highest demands

Made in Germany



Unique production method

The GRAF Carat S tank range is produced using a method that is as yet unique for tanks of this size. The injection compression process gives the products an incomparable stability – all Carat S underground tanks are suitable for vehicle loading and can be installed in groundwater up to the middle of the tanks. Additionally, the new method guarantees that the components will fit; a result that cannot be achieved with conventional production methods.

15-year warranty

GRAF uses the latest production methods and applies the highest quality standards when producing the Carat S tank range. Because we believe in our top product, we give a 15-year warranty on all Carat S underground tanks.

Our range: versatile and impressive

GRAF has 45 years' experience of developing and manufacturing very high quality plastic products. We are the market leader for plastic rainwater collection tanks in Germany and Europe. Thanks to one of the largest ranges on the market, we are in a position to supply you with the right rainwater harvesting system for any application.

Our strengths: innovation and customer proximity

Our company is always open to new ideas and customer requests. These suggestions flow directly into the development of new products. This makes us one of the most innovative companies in the plastics industry today; proven by numerous patents, copyrights and awards.

Our employees: highly motivated and experienced

GRAF now employs more than 250 people. Together we have more than doubled our turnover in the last 5 years and created over 100 new jobs – a success, which is the result of the know-how, commitment and performance of our employees.

www.graf.info

user-friendly, practical and informative

You will find detailed information on our wastewater, infiltration and rainwater harvesting products on our homepage. There are also numerous downloads for our products.

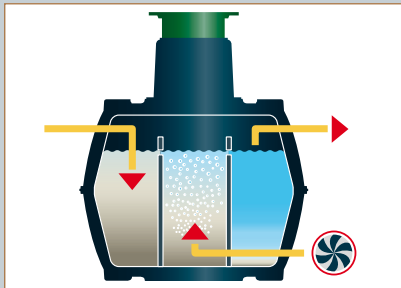
Our goal: your satisfaction

More than 100,000 satisfied customers are already benefiting from the advantages of GRAF rainwater harvesting systems.



How does a wastewater treatment system work?

Cleaning process Moving Bed system



>> System Picobell
page 6

1. A Moving Bed system comprises three chambers. The wastewater first enters the first chamber. All solids sink to the bottom here. Floating particles are retained thanks to the overflow openings.

2. The wastewater enters the second chamber through the overflow openings. Actual biological cleaning by microorganisms occurs here. Those microorganisms stick to the carrier material, which is made of plastic. The carrier material has a very large surface. The bacteria needed for purification stick to the carrier material such as a „biofilm“.

So that the bacteria receive enough oxygen to „breathe“, the Moving Bed is regularly streamed with air. An air compressor is used for this purpose, which is installed in the cellar or in the garden outside the reservoir.

3. Then the wastewater enters the third chamber for final treatment. The remaining solids settle there and they are pumped back to the first chamber from here. The purified wastewater can now be fed into a discharge system (stream, river, sea) or into a GRAF infiltration system.

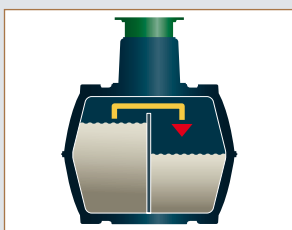
Cleaning process SBR system

With the SBR technology (sequencing batch reactor) there is separate primary treatment to retain the coarse material and a combined sludge activation and

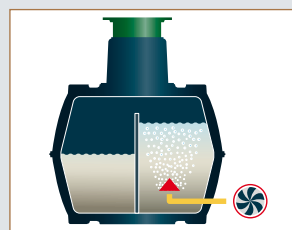
final treatment reservoir, the so-called SBR reservoir. This system comprises 2 chambers.

>> System Klaro Easy
page 8

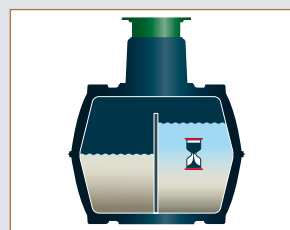
>> System Aqua-Simplex
page 10



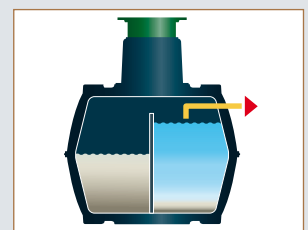
1. Coating phase
The wastewater goes first into primary treatment (1st chamber), where the solid substances are retained. From there, the wastewater is fed into the SBR reservoir (2nd chamber).



2. Aeration phase
The actual biological cleaning by microorganisms now occurs in the SBR reservoir. Short aeration and rest phases interchange in a controlled cleaning process. The so-called live sludge can now develop with millions of microorganisms and clean the water thoroughly.



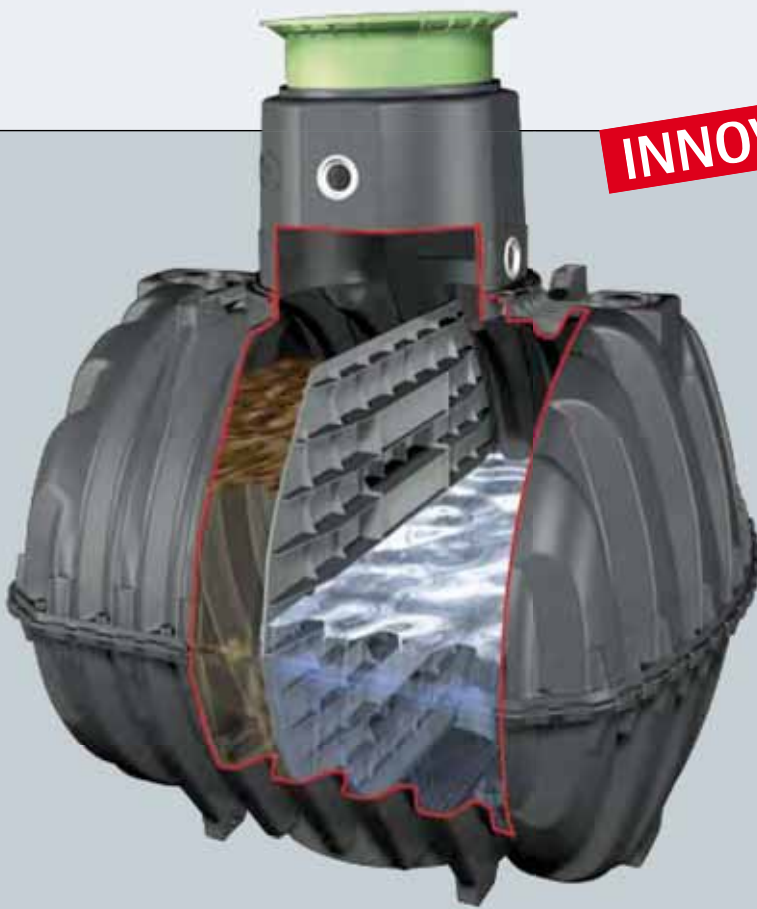
3. Rest phase
A rest phase now follows, during which the live sludge sinks to the bottom of the system. This allows a clarified water zone to form at the top of the SBR reservoir.



4. Sewage water draw-off
The purified wastewater is now be fed into a discharge system (stream, river, sea) or into a infiltration system. Afterwards, the sludge is fed back from the SBR reservoir into the first chamber.

Carat S underground tank with baffle

INNOVATION 2008!



Multiple applications thanks to modular system

- Ideal use for wastewater treatment systems
- Ideal use as a Septic Tank (one, two and three chambers)
- Ideal use as a Cesspool
- Stability tested according to European standards (DIN EN 12566-1), (DIN EN 12566-3)



>> page 21



- Tank consisting of two half-shells
- 5-9 tanks per pallet
- This allows up to 8 times more tank volume to be shipped thanks to this unique product design
- High stability
- Long-lasting tightness thanks to circumferential profile gasket
- Groundwater stable
- Suitable for vehicle loading



Moving Bed wastewater treatment system GRAF Picobell

Simple and cost-effective

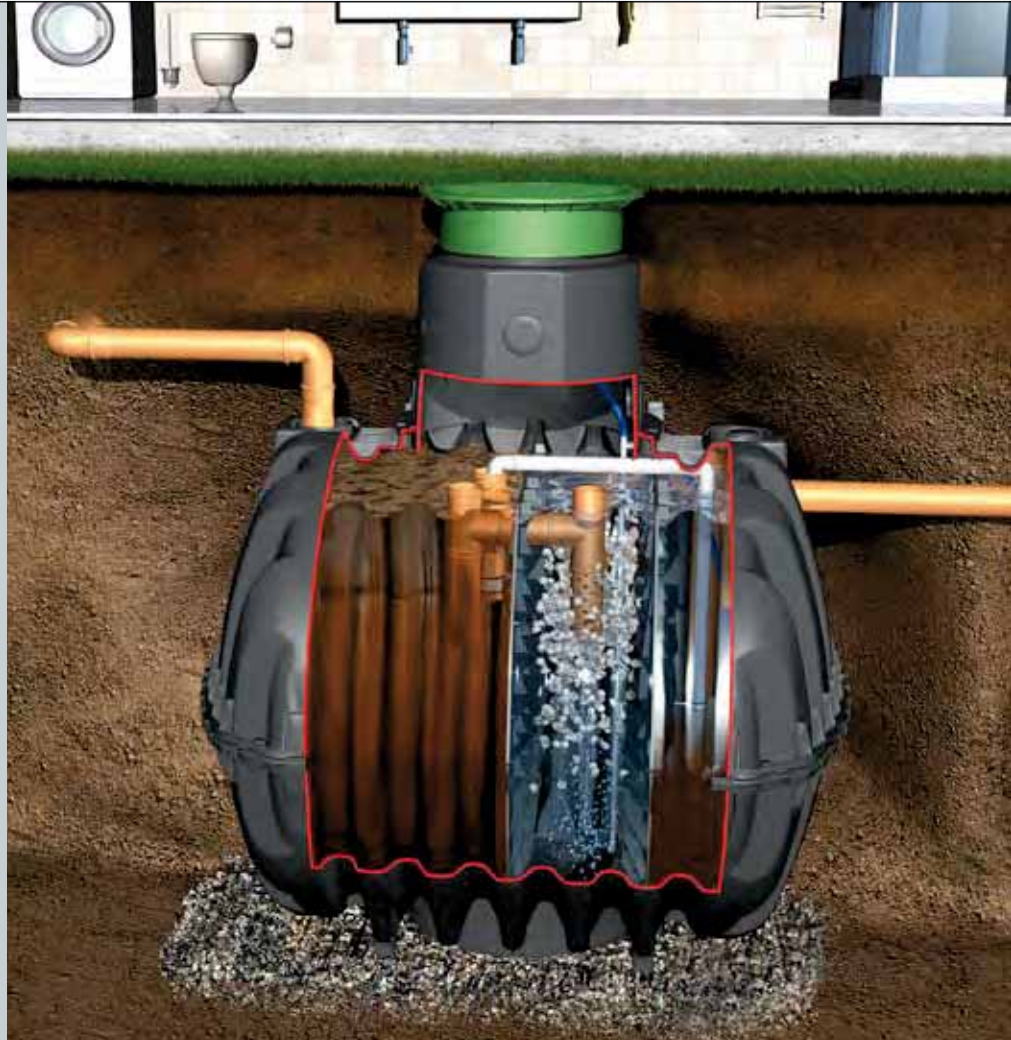
With the development of the Picobell Moving Bed system, a GRAF treatment system is now available which has simple technology and, at the same time, offers high cleaning performance. The system's technology comprises just one air compressor, a pipe ventilator, sludge removal and the carrier material. The system works completely without electronic control, pumps and magnetic valves. A further advantage of the Moving Bed system is that the high cleaning performance is also maintained with strong underfill.



System control
Picobell



15-year warranty on sewage reservoirs
15-year warranty for Picobells
3-year warranty on technology



Cost-effective and well thought-out

The compact and quiet air compressor is integrated in compact housing. It reduces the system's energy consumption to a minimum and is easily installed in the plant room of the house. Additionally, this means the system does not need consistent integration of live technology in the tank. All the movement processes are performed by the whisper quiet air compressor.

Maintenance

The need for maintenance is kept to a minimum. This is mainly due to the permanent self-cleaning of the carrier material and the modern control technology. Thus, maintenance just consists of regular function testing and sludge removal.

The biofilm, which is responsible for cleaning the wastewater, settles on the approx. 3 cm wide Picobells. The unique, lamellae-shaped design gives the carrier material a maximum surface and this is where the cleaning power lies.

Self-cleaning Picobells

The carrier material is constantly mixed in the wastewater through aeration. During the mixing and swirling these will get automatically cleaned. The possible degradation with the time of the cleaning performance belongs now to the past.



Picobell one-reservoir system



Inhabitants [max.]	Total volume [ltrs]	Capacity [ltrs]	Length [mm]	Width [mm]	Height [mm]	Weight [kg]
2-4	3750	3750	2280	1755	2200	200
4-6	4800	4800	2280	1985	2430	255
6-8	6500	6500	2390	2190	2710	310

Scope of supply: 1 Carat S underground tank with 2 baffles, telescopic dome shaft, system pack Picobell for one-reservoir system (page 23 – the modular system). Please order air hose separately (accessories).

Picobell two-reservoir system



Inhabitants [max.]	Total volume [ltrs]	Capacity [ltrs]	Length [mm]	Width [mm]	Height [mm]	Weight [kg]
8-10	7500	2x3750	2280	1755	2200	150
			2280	1755	2200	175
10-12	9600	2x4800	2280	1985	2430	185
			2280	1985	2430	220
12-18	13000	2x6500	2390	2190	2710	220
			2390	2190	2710	265

Scope of supply: 1 Carat S underground tank, 1 Carat S underground tank with baffle, 2 telescopic dome shafts, system pack Picobell for two-reservoir system (page 23 – the modular system). Please order air hose separately (accessories).

Accessories

Air hose sold by the metre

Order no. 372791

Plastic external switch cabinet

for 2-12 inhabitants

On request

SBR wastewater treatment system

GRAF Klaro Easy

Inclusive power failure recognition

The GRAF SBR wastewater treatment system Klaro Easy works according to the principle of SBR lifting technology. No live parts need to be installed in the tank. All movement processes are performed by three air lift pumps, which are operated using a compressor. The compressor also provides the plate ventilator on the bottom of the SBR reservoir with air. The compressor and all other technical components are low maintenance and stored in a switch cabinet, which can be installed in the plant room of the house.



System control
Klaro Easy



15-year warranty on sewage reservoirs
3-year warranty on technology



No live technology in the reservoir

The GRAF SBR wastewater treatment system Klaro Easy does not need consistent integration of live technology in the tank. All movement processes are performed by an air compressor, which is built into the Klaro system control. The distribution of air in the individual pump processes is realised via the control. The air compressor is very durable and whisper-quiet.

Low maintenance

The compact switch cabinet for system control with air compressor and valve unit is installed in the plant room of the house and requires little maintenance.

The LCD display shows the operating hours of the individual devices. Any power failure is indicated with a visual and audio alarm. All components installed in the switch cabinet are arranged in such a way that they can be exchanged very easily. This modular design saves a lot of time and, therefore, money on any maintenance or repair work.

Simple installation

The air pressure hoses of the reservoir and the corresponding connections to the system control are colour-coded. This avoids installation errors.

Already fitted to the carrier system at the factory, so the whole system just needs to be fitted to the baffle of the reservoir. Thanks to the Klaro Easy carrier system, the purifying technology is extremely fast to install (one-reservoir system).

Flexible, as expandable

The SBR wastewater treatment system Klaro Easy can be flexibly adjusted to changing conditions by altering the cycle times. The system can also be switched to holiday mode. The aeration automatically adjusts to the load with the convenience package.

Klaro Easy one-reservoir system



Inhabitants [max.]	Total volume [ltrs]	Capacity [ltrs]	Length [mm]	Width [mm]	Height [mm]	Weight [kg]
2-4	3750	3750	2280	1755	2200	175
4-6	4800	4800	2280	1985	2430	220
6-8	6500	6500	2390	2190	2710	265

Scope of supply: 1 Carat S underground tank with baffle, 1 telescopic dome shaft, system pack Klaro Easy for one-reservoir system (page 23 – the modular system). Please order air hose separately (accessories).

Klaro Easy two-reservoir system



Inhabitants [max.]	Total volume [ltrs]	Capacity [ltrs]	Length [mm]	Width [mm]	Height [mm]	Weight [kg]
2-4	5400	2x2700	2080	1565	2010	120
			2080	1565	2010	120
4-8	5400	2x2700	2080	1565	2010	120
			2080	1565	2010	120
8-10	7500	2x3750	2280	1755	2200	150
			2280	1755	2200	150
10-12	9600	2x4800	2280	1985	2430	185
			2280	1985	2430	185
12-18	13000	2x6500	2390	2190	2710	220
			2390	2190	2710	220

Scope of supply: 2 Carat S underground tanks, 2 telescopic dome shafts, system pack Klaro Easy for two-reservoir system (page 23 – the modular system). Please order air hose separately (accessories).

Options

- +D** Package for denitrification (removal of nitrogen)
Order no. 107044
- +P** Package for phosphate removal
On request
- +H** Hygiene package: the drawn-off sewage water is also irradiated with UV light. Microorganisms are reliably killed as a result.
On request
- +K** Convenience package: most comfortable control with larger display and buttons. Underfill recognition is integrated in the control using a pressure sensor. Necessary for options +H and +P.
Order no. 107277

Accessories

Plastic external switch cabinet

for 2-12 inhabitants

Order no. 107167

for 12-18 inhabitants

Order no. 107168

SBR hose package sold by the metre

consisting of: 1 x Ø 19 mm and 3 x Ø 13 mm hose (max. 20 m length)

Order no. 107047

Sampling point

Order no. 107170

SBR wastewater treatment system

GRAF Aqua-Simplex

With the GRAF SBR Aqua-Simplex system you are getting a fully biological, cutting edge wastewater treatment system using the latest pump technology. Thanks to the well thought-out modular design, the system is quick to install and simple to maintain. The movement processes and aeration of the SBR reservoir are performed by three powerful pumps. Only the compact system control needs to be installed in the plant room of the house.



System control
Aqua-Simplex



15-year warranty on sewage reservoirs
3-year warranty on technology

Inclusive power
failure recognition



Well thought-out concept

The Aqua-Simplex system requires installation of just one small control in the plant room of a house. This means that the operation of the system produces absolutely no noise inside the house. All operating conditions are stored in the high-tech system control in a log book and are available to the maintenance service for a quick check of the system. The system control automatically switches to holiday saving mode in the event of underfill. The system is also easy to adjust to different waste loads.

Simple installation and maintenance

The purifying technology is extremely fast to install thanks to the Aqua-Simplex carrier system (one-reservoir system). The control is connected to the purifying technology in the reservoir with just one connection cable (20m cable included in scope of supply). This ensures a very fast installation. The integrated sampling enables easy testing of wastewater quality.

Expandable system

The system Aqua-Simplex is easy to adjust to an alteration in the volume of waste if the number of inhabitants changes. Options like the "+ packages" for nitrogen or phosphate removal and the hygiene package with UV light complete the range.

Aqua-Simplex one-reservoir system



Inhabitants [max.]	Total volume [ltrs]	Capacity [ltrs]	Length [mm]	Width [mm]	Height [mm]	Weight [kg]
2-4	3750	3750	2280	1755	2200	175
4-6	4800	4800	2280	1985	2430	220
6-8	6500	6500	2390	2190	2710	265

Scope of supply: 1 Carat S underground tank with baffle, 1 telescopic dome shaft, system pack Aqua-Simplex for one-reservoir system, 20m cable, sampling point (page 23 – the modular system).

Aqua-Simplex two-reservoir system



Inhabitants [max.]	Total volume [ltrs]	Capacity [ltrs]	Length [mm]	Width [mm]	Height [mm]	Weight [kg]
2-4	5400	2x2700	2080	1565	2010	120
			2080	1565	2010	120
6-10	7500	2x3750	2280	1755	2200	150
			2280	1755	2200	150
10-14	9600	2x4800	2280	1985	2430	185
			2280	1985	2430	185
14-18	13000	2x6500	2390	2190	2710	220
			2390	2190	2710	220

Scope of supply: 2 Carat S underground tanks, 2 telescopic dome shafts, system pack Aqua-Simplex for two-reservoir system, 20m cable, sampling point (page 23 – the modular system).

Options

- +D Package for denitrification (removal of nitrogen)
 Order no. 107044
- +P Package for phosphate removal
 On request
- +H Hygiene package: the drawn-off sewage water is also irradiated with UV light. Microorganisms are reliably killed as a result.
 On request

Accessories

Extension cable

Length 10 m

Order no. 107115

Length 25 m

Order no. 107171

Can be extended up to a maximum of 50 m -
20m cable already included in scope of supply

Plastic external switch cabinet

cannot be combined with +H package

Order no. 107278

Plastic external switch cabinet

can be used in connection with +H package

On request

XXL wastewater treatment systems

Up to 200 inhabitants



You have the choice

There are two purification systems available for converting large systems: the Picobell XXL and Klaro XXL systems are available in sizes for up to 200 inhabitants. Additionally, on request for large systems you also have the choice of the proven options of the Klaro system, such as phosphate removal or additional disinfecting of the cleaned wastewater with UV light.

Property consultation – Planning and sizing

Large systems must always be adjusted to individual requirements like cleaning performance or official requirements. When sizing a large system, you must take many basic factors into account. GRAF is happy to support you on individual planning of this type of project and will gladly create individual sizing for your property.

Options



The proven options of the system Klaro Easy are also available on request for large systems.

Accessories

For all large scale treatment systems are external cabinets available on request.



You will find an enquiry form and sizing assistance on our website www.graf.info

System Picobell XXL for the Carat S underground tank

Inhabitants	Total number of reservoirs	Primary treatment [capacity in ltrs]	Moving Bed [capacity in ltrs]	Final treatment [capacity in ltrs]	Length* [m]	Width* [m]
51	4	2 x 4800	1 x 4800	1 x 4800**	10,70	2,00
70	4	2 x 6500	1 x 6500	1 x 6500**	11,10	2,20
90	7	3 x 4800	2 x 4800	2 x 4800	19,10	2,00
120	7	3 x 6500	2 x 6500	2 x 6500	19,80	2,20
140	8	4 x 6500	2 x 6500	2 x 6500	22,70	2,20
160	9	4 x 6500	3 x 6500	2 x 6500	25,60	2,20
200	10	5 x 6500	3 x 6500	2 x 6500	28,50	2,20

Scope of supply: Carat S underground tanks, telescopic dome shafts, system pack Picobell XXL consisting of panel with air compressor for installation inside the house, support media, aerator, activated sludge return, outlet and overflow accessories. (page 23 – the modular system).

Air hoses from the Carat S underground tanks to the control panel are not included. *Total measurements / **Baffle included

System Klaro XXL for the Carat S underground tank

Inhabitants	Total number of reservoirs	Primary treatment [capacity in ltrs]	SBR reservoir [capacity in ltrs]	Required air hoses [quantity x Ø mm]	Length* [m]	Width* [m]
51	4	2 x 6500	2 x 6500	5 x 19	11,10	2,20
80	5	2 x 6500	3 x 6500	9 x 19	11,10	4,90
115	7	3 x 6500	4 x 6500	12 x 19	11,10	4,90
145	9	4 x 6500	5 x 6500	14 x 19	14,00	4,90
160	10	4 x 6500	6 x 9200	16 x 19	11,10	7,60

Scope of supply: Carat S underground tanks, telescopic dome shafts, system pack Klaro consisting of panel with air compressor for installation inside the house, compressed-air lifter for loading, clear water discharge, activated sludge return and membrane aerator. (page 23 – the modular system)

Air hoses from the Carat S underground tanks to the control panel are not included. *Total measurements

System Klaro XXL – fully prefitted in the Diamond underground tank

Inhabitants	Total number of reservoirs	Primary treatment [capacity in ltrs]	SBR reservoir [capacity in ltrs]	Required air hoses [quantity x Ø mm]	Length* [m]	Width* [m]	Order no.
20	2	1 x 7800	1 x 7800	3 x 13 + 1 x 19	5,50	2,30	107279
25	2	1 x 9200	1 x 9200	3 x 13 + 1 x 19	5,50	2,60	106004
35	4	2 x 6500	2 x 6500	3 x 13 + 2 x 19	11,50	2,20	106005
40	4	2 x 7800	2 x 7800	6 x 19	11,50	2,30	106003
50	4	2 x 9200	2 x 7800	6 x 19	11,50	2,60	106009
70	4	2 x 6500	2 x 7800	6 x 19	11,50	2,30	106008
80	7	2 x 6500	2 x 9200	6 x 19	11,00	2,60	106006
100	5	2 x 9200	3 x 7800	6 x 19	14,50	2,60	106007
120	5	2 x 9200	3 x 9200	5 x 19 + 3 x 25	14,50	2,60	107280
150	7	3 x 9200	4 x 9200	8 x 19 + 4 x 25	11,00	5,50	107281
200	9	4 x 9200	5 x 9200	9 x 19 + 5 x 25	17,00	5,50	107282

Scope of supply: Diamond underground tanks with factory-prefitted technology, telescopic dome shafts and switch cabinet for internal fitting.

Air hoses from the Diamond underground tanks to the control panel are not included. *Total measurements

Accessories for Diamond underground tanks and shafts

Double walled PE lid

for pedestrian loading

Order no. 381500

Extension 400 mm

Order no. 319501

Telescopic dome shaft with PE lid

for pedestrian loading

Order no. 381502

Septic tank

Three chambers

Septic tanks with partial biological processes are used to extract floating and removable substances. Due to the sizing of 1500 ltrs per inhabitant, the wastewater passes through the system in approx. 10 days. This allows the microorganisms that have emerged in the sludge to effect partial breakdown of the organic waste, in addition to pure mechanical purification (partial biological purification). These septic tanks require 1500 ltrs per inhabitant and must comprise at least 3 chambers.



Carat S underground tank with three chambers



Inhabitants [max]	Total volumes [ltrs]	Capacity [ltrs]	Length [mm]	Width [mm]	Height [mm]	Weight [kg]
3	5400	2700	2080	1565	2010	120
		2700	2080	1565	2010	145
5	7500	3750	2280	1755	2200	150
		3750	2280	1755	2200	175
6	9600	4800	2280	1985	2430	185
		4800	2280	1985	2430	220
8	13000	6500	2390	2190	2710	220
		6500	2390	2190	2710	265

Scope of supply: Carat S underground tank with baffle.
Suitable covers page 23.

Accessories

Inspection end DN 200

Order no. 410092

Septic tank

Two chambers / One chamber



Floating and removable material is extracted from domestic wastewater in mechanical septic tanks. This is pure mechanical cleaning, for which you need 500 ltrs of capacity per inhabitant. If you assume a volume of 150 ltrs, the wastewater passes through the system in 3 days. These septic tanks must have a total volume of at least 2000 ltrs. A 2000 ltr system is sufficient for 4 inhabitants, another 500 ltrs, must be incorporated for each additional inhabitant.



- Quality tested: the underground tanks are TÜV safety-tested and production is TÜV monitored.
- Low weight: can also be installed in difficult local conditions without a crane.
- Reasonable purchase and installation costs. Compare!
- Low maintenance: maintenance or cleaning work can be performed through the shafts.
- Tanks can be used as rainwater harvesting systems after thorough cleaning.

Carat S underground tank with two chambers



Inhabitants [max]	Total volumes [ltrs]	Capacity [ltrs]	Length [mm]	Width [mm]	Height [mm]	Weight [kg]
5	2700	2700	2080	1565	2010	145
7	3750	3750	2280	1755	2200	175
9	4800	4800	2280	1985	2430	220
13	6500	6500	2390	2190	2710	265

Scope of supply: Carat S underground tank with baffle.
Without baffle also as an one chamber septic tank available.
Suitable covers page 23.

Accessories

Inspection end DN 200

Order no. 410092

Cesspool

Why GRAF wastewater tanks?

- Easy installation due to low net weight.
- The tank can also be used as a rainwater collection tank after cleaning.
- Can be expanded as required



Carat S underground tank Cesspool



Capacity [ltrs]	Length [m]	Width [m]	Height [m]	Weight [kg]
2700	2080	1565	2010	120
3750	2280	1755	2200	150
4850	2280	1985	2430	185
6500	2390	2190	2710	220

Suitable covers page 23.

Accessories



Overflow guard

Emits visual and audio alarm, battery-operated (9V).

Order no. 104009

Odour filter for ventilation shaft

Reliably filters unpleasant odours.

Order no. 104018



Special seal DN 100

for connections

Order no. 332033

Drill DN 100

with view shaft

Order no. 104012

The Herkules tank

For overground and underground installation



Advantages

- Stability tested according to European standard (DIN EN 12566-1)
- Construction approved by DIBt for domestic wastewater TÜV safety-tested
- Groundwater stable
- Fits through any door (80 cm) – each half shell weighs just 30 kg
- Fast tank fitting with profile seal and patented fast connectors
- Tanks can be used as rainwater harvesting systems after thorough cleaning
- Can be expanded as required



Herkules tank

Total volumes [ltrs]	Capacity [ltrs]	Height [mm]	Ø max. [mm]	Weight [kg]
Herkules – Septic tank (Three chambers)				
	1600	1600	1350	60
4800	1600	1600	1350	60
	1600	1600	1350	60
Herkules – Septic tank (Two chambers)				
	1600	1600	1350	60
3200	1600	1600	1350	60
Herkules – Septic tank (One chamber)				
1600	1600	1600	1350	60
Herkules – Cesspool				
1600	1600	1600	1350	60

Accessories

Tank dome DN 200
with telescopic end, length 1 m

Order no. 104010

Extension set

2 x seal DN 100 without connection pipe

Order no. 104011

Drill DN 100

with view shaft

Order no. 104012

Incomparable advantages:



Long-Lasting

Durably sealed thanks to solid profile sealing (Sealing life-time of more than 25 years proven in laboratory tests)



Can be extended as desired

Shape-matched end connectors and connection surfaces enable volumes of several 10,000 ltrs (2,639 US-gal)



Easy transport

Thanks to low weight of 30 kilos per half shell and practical size; fits through all doorways (from 80 cm)



Stackable

Infiltration system

GRAF Infiltration Tunnel



There is no suitable river course or ditch to discharge the totally biologically cleaned wastewater in your area? Then you can easily infiltrate the cleaned wastewater underground using the GRAF Infiltration Tunnel. You just need soil that can handle infiltration and a sufficient distance to the groundwater of at least 80 cm.



12,000 litres of infiltration volume on one pallet

The GRAF Infiltration Tunnels can easily be stacked on top of each other with thanks to their special construction. Up to 40 Infiltration Tunnels can be transported on one pallet, saving on logistic costs and storage space.

Vehicle loading

In order to facilitate free design of the surface above, the system can be permanently loaded with approx. 3.5 t per m² and, thus, is also suitable for vehicle loading.

Cost-effective

The GRAF Infiltration Tunnel can hold 3 times the volume of a conventional gravel ditch. 1 module (11 kg) replaces approx. 800 kg of gravel or 36 m of drainage pipe. You will save money with the Infiltration Tunnel by saving on ground excavation and thanks to the good price-performance ratio compared to a conventional gravel ditch!

Easy to install

The Infiltration Tunnel is installed in one row and can be flexibly adjusted to the conditions and the desired storage capacity. Installing the module is easy, fast and variable. It can be installed without heavy equipment - a Infiltration Tunnel weighs just 11 kg. The individual tunnel modules are simply pieced together in one row and secured with two end plates per row.

Flexible connection options –
DN 100/200.



Flexible connection options –
DN 100/150/200/300.



The special construction of the GRAF Infiltration Tunnel guarantees long-lasting, high infiltration performance.

GRAF Infiltration Tunnel

Capacity [ltrs]	Length [mm]	Width [mm]	Height [mm]	Colour	Order no.
300	1220	800	510	black	410090

End plate for GRAF Infiltration Tunnel

Item	Order no.	Order no.
End plate (Set 2 units)	black	410099

Accessories



Batch feeding shaft

- Can be used for infiltration
- Even distribution to the trickling pipe network
- Connections: inflow – DN 150
outflow – 3 x DN 100
- For pedestrian and vehicle loading
- Suitable covers page 13
(for continuously variable installation depths of 800 – 1600 mm)

Order no. 107021

Variable
connection
options



Universal shaft 600

- Many uses, e.g. as inspection shaft, sampling shaft, water meter shaft, etc.
- 4 variable connection faces
- For pedestrian and vehicle loading
- Suitable covers page 13

Order no. 107023

Variable
connection
options



Universal shaft 400

- Many uses, such as sampling shaft, water meter shaft, etc.
- Continually adjustable installation depth of 600 – 1250 mm
- Height loss inlet / outlet 120 mm
- Connections DN 100/150 + 2 variable connection faces

Suitable for pedestrian loading

Order no. 107024

Suitable for vehicle loading

Order no. 107025

Inspection end

DN 200

Order no. 410092



Deaeration end

DN 100

Order no. 202004



Graf-Tex geotextile

Material sold by the metre, roll width 5 m

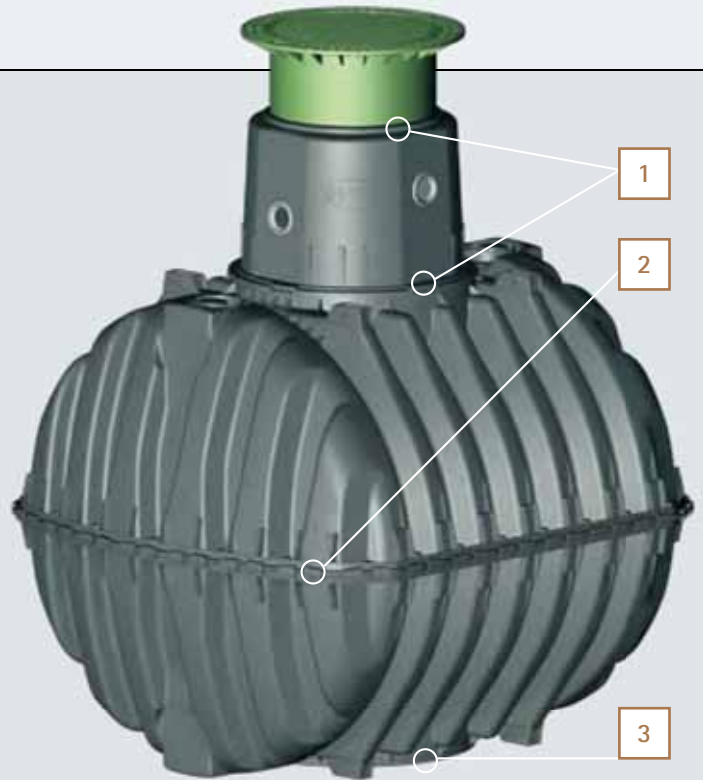
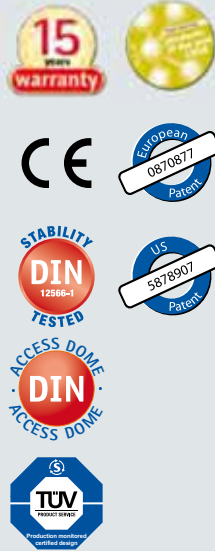
Order no. 369023

The Carat S

The wastewater underground tank one of its kind!

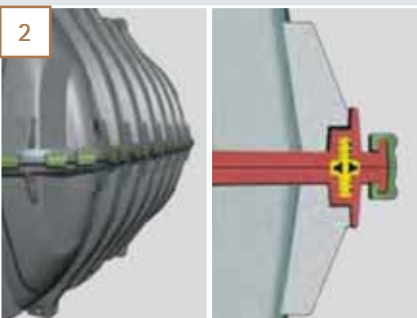
An overview of advantages

- Investment security thanks to 15-year warranty – compare it!
- Highest stability thanks to modern production methods
- Unique fit accuracy of the components thanks to new production processes
- Consistent quality through TÜV safety testing and production monitoring
- Suitable for vehicle loading (when combined with the telescopic dome shaft cast iron page 23)
- Groundwater-stable up to the middle of the tank thanks to its extremely stable construction
- Easy to transport due to low weight and encircling H profile
- Can be expanded as required



Flush with ground level (2 seals)

The Carat S underground tank has numerous seals to stop dirt getting into the tank effectively. This means that seepage water cannot get into the tank. The seals are in the intersection between the tank and the tank dome and between the tank dome and the telescopic dome shaft. All supplied pipes connected to the tank dome are also sealed with five lip seals as standard.



Encircling stabilisation ring in unique H profile

The Carat S underground tank has a unique profile for more stability and security. Thanks to the additional ribbing, the Carat S underground tank suffers no significant warping even under extreme loads. Therefore, the Carat S underground tank is suitable for vehicle loading in principle up to a total weight of 3,5t, groundwater-stable up to the middle of the tank and can be installed with an earth covering up to 1.2m. Additionally, the encircling H profile acts as a convenient carry handle for transport and as a tread when fitting the tank dome. Please follow our installation instructions (can also be downloaded at www.graf.info).



Ribbed tank base

The tank base of the Carat S underground tank is extremely stable thanks to its numerous ribs. These enable the Carat S to be installed in groundwater up to the middle of the tank. Furthermore, the stable base means the tank is very robust for transportation to site. The tank base has already proven its excellent rigidity in numerous computer simulations during the development process as well as test through the TÜV and the CE accredited institute. Please follow our installation instructions (can also be downloaded at www.graf.info).

The modular system Carat S

Simply unique

Carat S underground tank

The underground tank Carat S is the basis for the modular system. It is available in sizes from 2700 ltrs to 6500 ltrs (700 - 1700 US-gal) and can be combined for up to many 10000 ltrs (2640 US-gal). Its high quality makes it suitable for vehicle loading and groundwater-stable (page 22).

Tank cover

Would you like to install your tank in the garden or in a heavy traffic yard entrance? GRAF offers you the most diverse telescopic tank covers from plastic to cast iron (page 23).

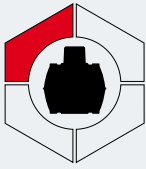


System pack

The system packs bring the desired purifying technology to the tank. There are three purification systems to choose from (page 25).

Baffle

The baffle separates the Carat S underground tank into two or three chambers as desired. This means that purifying systems with several chambers can be accommodated in just one reservoir. A Carat S underground tank with baffle is ready for use as a multi-chamber reservoir (page 24).

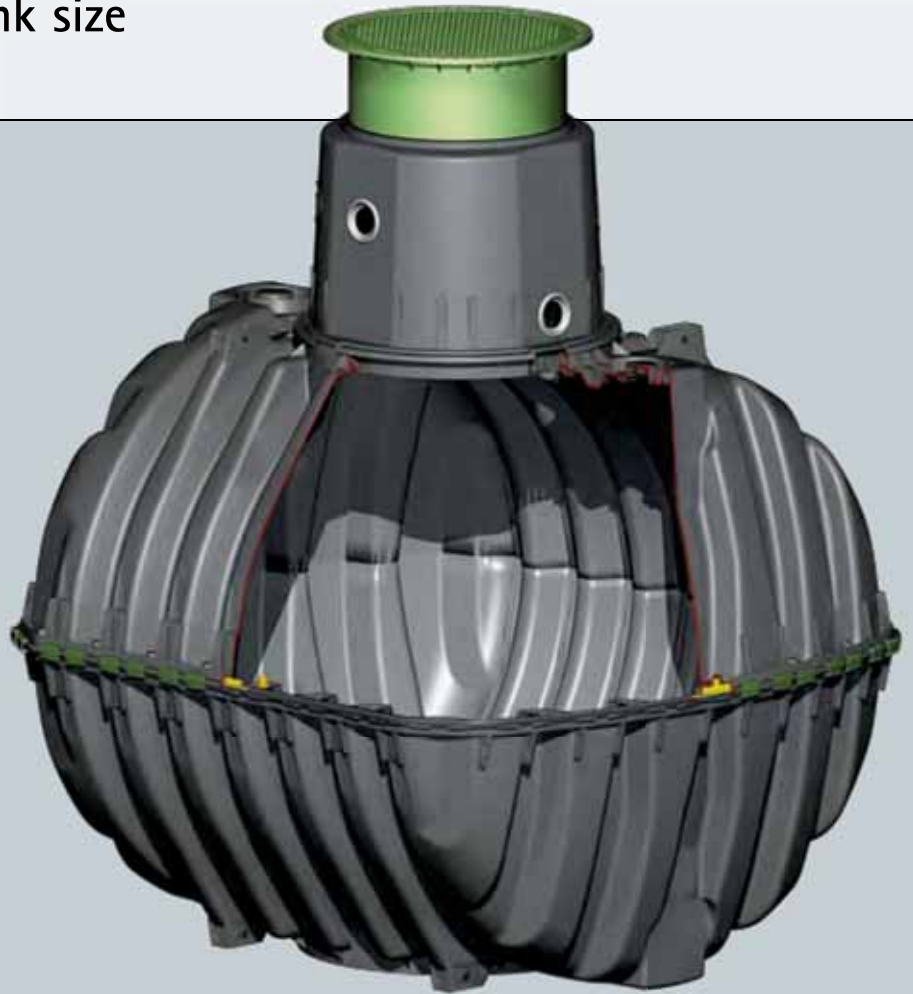


The modular system Carat S

Choose your tank size

Carat S underground tank




Size 2700 – 13000 ltrs (700 – 3400 US-gal).
 Designed to be used in conjunction with the vehicle loading telescopic dome shaft. The access dome is designed in accordance to DIN testing.

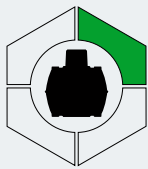


Volume

Capacity/ltrs	US-gal	Order no.
2700	700	372001
3750	1000	372002
4800	1250	372003
6500	1700	372004
7500*	2000	
9600*	2500	
13000*	3400	

Sizes/Technical data

Dimensions / weight	2700 ltrs 700 US-gal	3750 ltrs 1000 US-gal	4800 ltrs 1250 US-gal	6500 ltrs 1700 US-gal	7500 ltrs* 2000 US-gal	9600 ltrs* 2500 US-gal	13000 ltrs* 3400 US-gal
Order no.	372001	372002	372003	372004			
Length	2080 mm (81.9 inch)	2280 mm (89.8 inch)	2280 mm (89.8 inch)	2390 mm (94.1 inch)	*Set consisting of two Carat S underground tanks		
Width	1565 mm (61.6 inch)	1755 mm (69.1 inch)	1985 mm (78.2 inch)	2190 mm (86.2 inch)			
Height (including tank dome)	2010 mm (79.1 inch)	2200 mm (86.6 inch)	2430 mm (95.7 inch)	2710 mm (106.7 inch)	Dimensions see 3750 ltrs tank	Dimensions see 4800 ltrs tank	Dimensions see 6500 ltrs tank
Height of tank dome	610 mm (24.0 inch)						
Internal Ø tank dome	800 mm (31.5 inch)						
Weight	120 kg (265 lbs.)	150 kg (331 lbs.)	185 kg (408 lbs.)	220 kg (485 lbs.)			
Load							
Max. axle load	suitable for vehicle loading				see	see	see
Earth covering	800 - 1200 mm (31.5 - 47.2 inch)				3750 ltrs tank	4800 ltrs tank	6500 ltrs tank
Groundwater							
Groundwater-stable	up to the middle of the tank				see	see	see
Required earth covering	800 mm (31.5 inch)				3750 ltrs tank	4800 ltrs tank	6500 ltrs tank



The modular system Carat S

Choose your tank cover



Mini telescopic dome shaft with PE lid, suitable for pedestrian loading



Infinitely adjustable from 750 mm - 950 mm (29.5 inch - 37.4 inch) earth covering above the tank, can be tilted by 5°. Including PE casting cover with childproof lock. Colour: Grass green. Length: 360 mm (14.2 inch), Ø inner: 600 mm (23.6 inch),

Ø outer: 778 mm (30.6 inch), weight 6 kg. The well thought-out cover for the Carat S underground tank. Ideal for garden use.

Order no. 371010

Maxi telescopic dome shaft with PE lid, suitable for pedestrian loading



Infinitely variable from 750 mm - 1,050 mm (29.5 - 41.3 inch) earth covering above the back of the tank. Including PE cast cover with childproof lock. Colour: Grass green Length: 476 mm (18.7 inch), Ø inner: 600 mm (23.6 inch), Ø outer: 850 mm

(33.5 inch), weight 13 kg. The sturdy cover for the Carat S underground tank. Ideal for household use.

Order no. 371011

Vehicle loading telescopic dome shaft with cast iron lid



For vehicle loading - with class B cast iron cover, infinitely variable from 750 mm - 1,050 mm (29.5 - 41.3 inch) earth covering over the tank. Length: 476 mm (18.7 inch), Ø inner: 600 mm (23.6 inch), Ø outer: 850 mm

(33.5 inch). For use in the home and garden. The tank is flush with the ground.

Order no. 371020

Extension



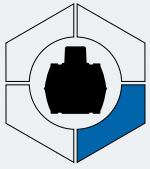
Length: 400 mm (19.7 inch), Ø 700 mm (27.6 inch). An earth covering of max. 1,350 mm (59.1 inch) can be implemented using the extension and the telescopic dome shaft. For use with the basic Carat S tank

with an earth covering of 1 m. Follow the installation instruction.

Order no. 371003

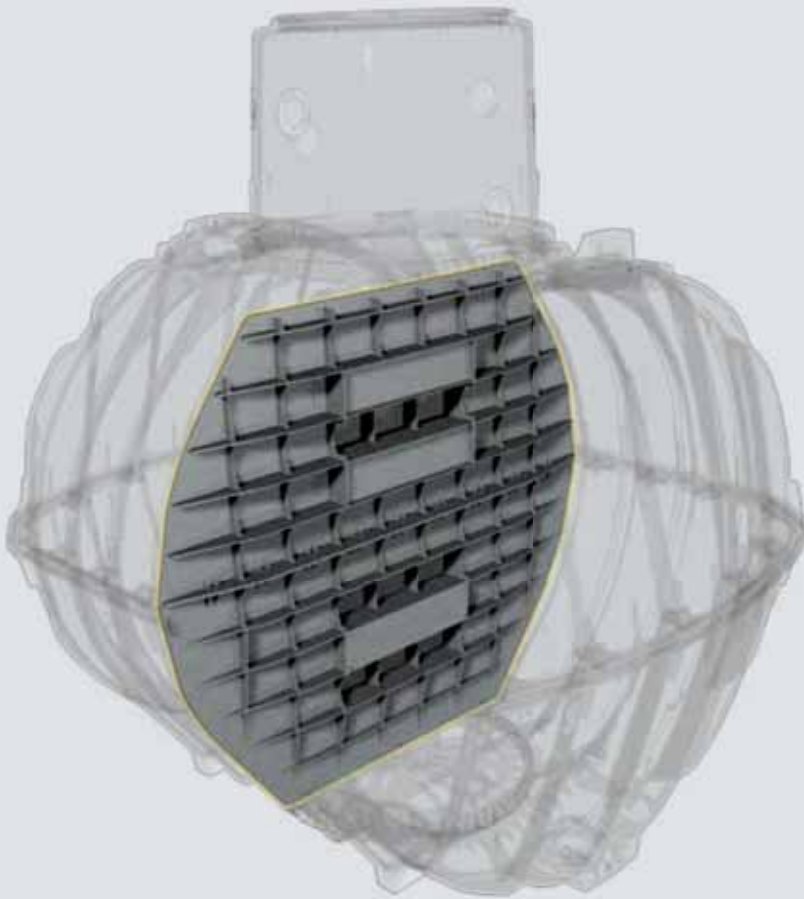


Flush fitting to the top edge of ground.

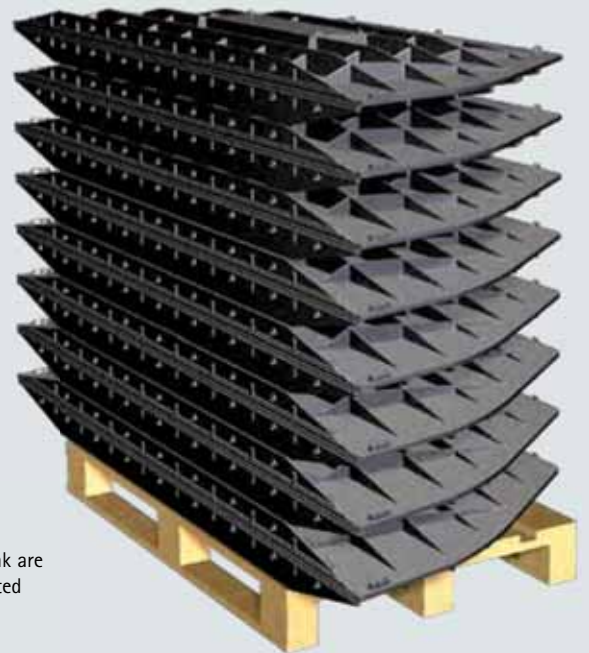


The modular system Carat S

Choose your baffle position

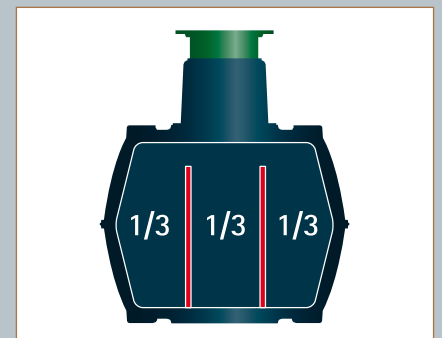
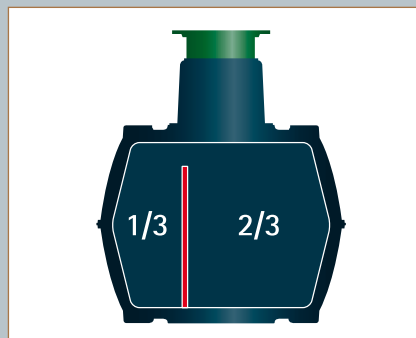
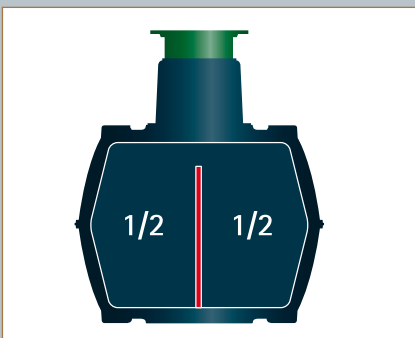


The baffle separates the Carat S underground tank into two or three chambers as desired. It consists of two halves and is simple to insert when assembling the second tank half of the Carat S. A profile seal provides reliable and permanent separation of the chambers. The Carat S underground tank with baffle is ready for use as a multi-chamber reservoir. This can be then expanded to a wastewater treatment system with a system pack (page 25). The system pack is simply fitted to the baffle and the control unit is installed in the house – the wastewater treatment system is ready to go.

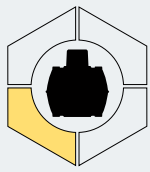


The baffles of the Carat S underground tank are supplied on pallets and can easily be inserted in the tanks as needed.

Flexible baffle positions



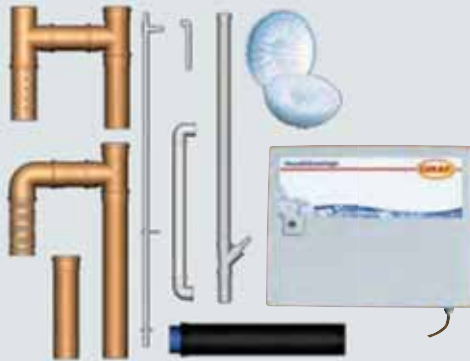
Note: Additional baffle position possible – please inquire.



The modular system Carat S

Choose your system pack

System pack Picobell



The system pack Picobell (page 6) works according to the Moving Bed process. This requires a sewage tank with three chambers.

Scope of supply: switch cabinet with analogue control and air compressor, carrier material, ventilator, sludge removal and all connecting links.

Air hose sold by the metre

Order no. 372791

Sizes

Inhabitants [max.]	Capacity [ltrs]	Order no.
for one-reservoir system		
2-4	3750	372700
4-6	4800	372701
6-8	6500	372702
for two-reservoir systems		
8-10	2 x 3750	372703
10-12	2 x 4800	372704
12-18	2 x 6500	372705
for XXL plants		
51	4 x 4800	372720
70	4 x 6500	372721
90	7 x 4800	372722

Other sizes for up to 200 inhabitants on request! (page 12)

System pack Klaro Easy



The system pack Klaro Easy (page 8) works according to the SBR air lift pump process. This requires a sewage reservoir with two chambers.

Scope of supply: switch cabinet with air compressor for internal mounting, system pack Klaro Easy comprises air lift pumps and plate ventilator.

SBR hose package sold by the metre

consisting of: 1 x Ø 19 mm and 3 x Ø 13 mm hose (max. 20 m length)

Order no. 107047

Sizes

Inhabitants [max.]	Capacity [ltrs]	Order no.
for one-reservoir system		
2-4	3750	107076
4-6	4800	107077
6-8	6500	107078
for two-reservoir systems		
6-8	2 x 2700	107093
8-10	2 x 3750	107094
10-12	2 x 4800	107095
12-18	2 x 6500	107096
for XXL plants		
51	4 x 6500	372710
80	5 x 6500	372711
115	7 x 6500	372712

Other sizes for up to 160 inhabitants on request! (page 12)

System pack Aqua-Simplex



The system pack Aqua-Simplex (page 10) works according to the SBR pump process. This requires a sewage reservoir with two chambers.

Scope of supply: microprocessor control, insert with ventilation pump, clarified water and feeding pump.

Sizes

Inhabitants [max.]	Capacity [ltrs]	Order no.
for one-reservoir system		
2-4	3750	107050
4-6	4800	107050
6-8	6500	107051
for two-reservoir systems		
2-6	2 x 2700	107220
6-10	2 x 3750	107052
10-14	2 x 4800	107053
14-18	2 x 6500	107054

Other sizes for up to 53 inhabitants on request!



Wastewater treatment solutions

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