

KLARO product line

Sophisticated wastewater treatment plants

Advanced separator systems



No mechanical parts
in the wastewater



No pumps
in the wastewater

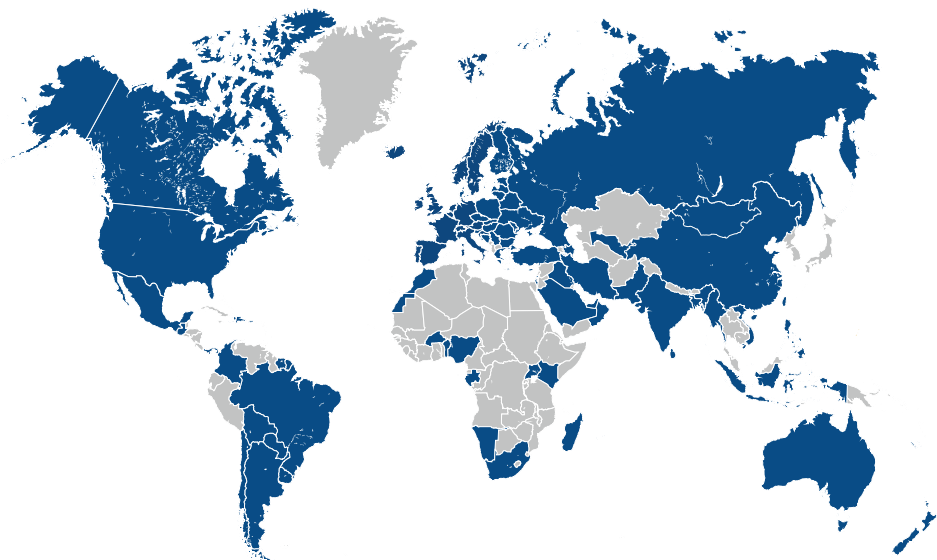


No electrical parts
in the wastewater



- ✓ Current European market leader for small waste water treatment plants
- ✓ Experience since 2001
- ✓ Medium sized company in Germany
- ✓ KLARO is a company of the GRAF group since 2014
- ✓ German design and engineering
- ✓ Wastewater treatment plants from 0.6 m³ / day to 750 m³ / day (4 - 5.000 PE)
- ✓ Solutions for wastewater reuse
- ✓ Grease- and light fluid separators (NS 1 - 15)

More than 950.000 users in over 80 countries





... quality



Quality products
Made in Germany with CE certification.

... safety



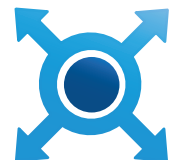
NO mechanical parts, NO electrical parts, and NO pumps in the wastewater.

... technology



State of the art technology, always one step ahead.

... flexibility



Adapted to customer requirements.

... variety



Our systems are flexible, easy adaptable and fast to assemble.

... development



Awarded with the R & D seal of approval.

... eco friendliness



Ecological awareness. Full biological treatment.

... fast production



Standard systems are ready for delivery within a few days.

KLARO products in comparison

System	<p style="text-align: center;">KLARO</p>  <p style="text-align: center;"><i>More information page 6</i></p>	<p style="text-align: center;">KLARO One</p>  <p style="text-align: center;"><i>More information page 8</i></p>	<p style="text-align: center;">KLARO 50+</p>  <p style="text-align: center;"><i>More information page 6</i></p>
Treatment capacity	Up to 50 PE (7,5 m³/day)	Up to 50 PE (7,5 m³/day)	50 to 1.500 PE (7,5 to 225 m³/day)
Process	SBR (anaerobic + aerobic)	SBR One (all aerobic)	SBR (anaerobic + aerobic)
Bacteria	Activated sludge	Stabilized activated sludge	Activated sludge
Standard calculated sludge removal intervall	Approx. 6-12 months	Approx. 24 months	Approx. 6 months
Overground installation	—	—	—
Underground installation	✓	✓	✓
Available as packed plant	✓	✓	—
Retrofitting of one-chamber tanks	—	✓	—
Retrofitting of multiple-chamber tanks	✓	✓	✓
Retrofitting of concrete tanks	✓	✓	✓
Retrofitting of plastic/GRP tanks	✓	✓	✓
Modular system	✓	✓	✓

<p>KLARO One 50+</p>  <p><i>More information page 8</i></p>	<p>KLARO MAX</p>  <p><i>On request</i></p>	<p>KLARO Tiger</p>  <p><i>More information page 10</i></p>	<p>KLARO One UP</p>  <p><i>More information page 12</i></p>	<p>KLARO Container</p>  <p><i>More information page 13</i></p>
50 to 500 PE (7,5 to 75 m³/day)	1.000 to 5.000 PE (150 to 750 m³/day)	Up to 12 PE (1,8 m³/day)	Up to 12 PE (1,8 m³/day)	Up to 1.380 PE (from 207 m³/day)
SBR One (all aerobic)	SBR One (all aerobic)	Fixed bed bio reactor (anaerobic + aerobic)	SBR One (all aerobic)	System dependent
Stabilized activated sludge	Stabilized activated sludge	Biofilm	Stabilized activated sludge	System dependent
Approx. 24 months	Approx. 1 month	Approx. 6 months	Approx. 24 months	System dependent
-	-	✓	✓	✓
✓	✓	✓	-	-
-	-	✓	✓	✓
✓	-	-	-	-
✓	✓	-	-	-
✓	✓	-	-	-
✓	-	-	-	-
✓	✓	-	✓	✓

System KLARO



Wastewater treatment plant KLARO

available from 4 to 1.500 PE (from 7,5 m³ to 225 m³/day)

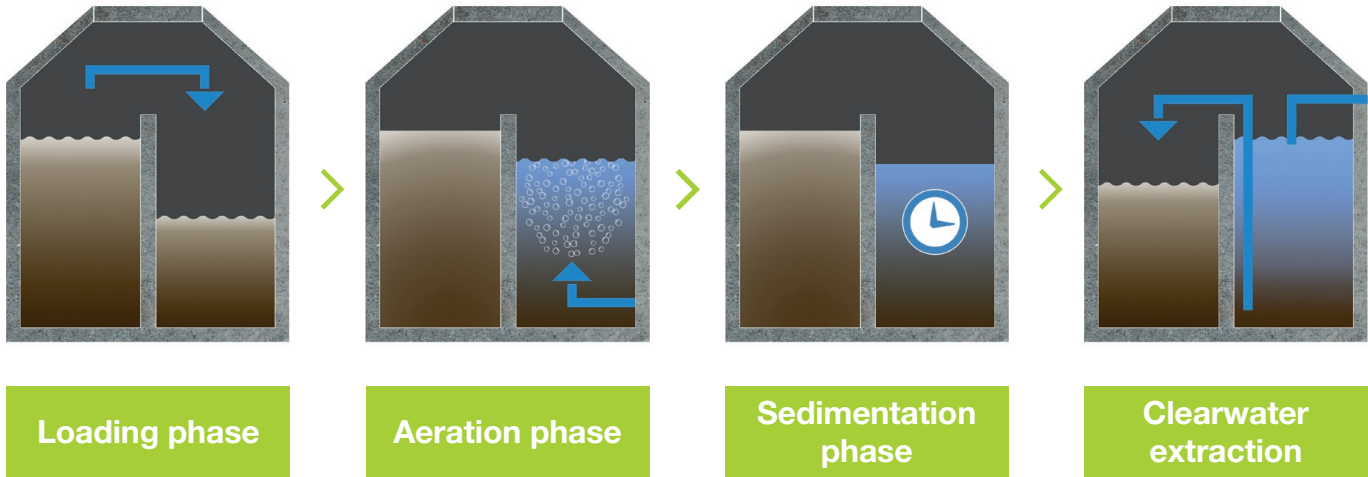
Advantages and features of the KLARO system

- ✓ For tanks made of concrete, plastic, GRP
- ✓ For installation in existing tanks or new systems
- ✓ Very stable process even in case of hydraulic shock loads or underload
- ✓ Separation of switch cabinet and sewage plant:
no pumps, no mechanical and no electrical parts in the wastewater
- ✓ Easy maintenance; durable and reliable
- ✓ Can be retrofitted to 2, 3 or 4 chamber pits
- ✓ Simply extendable with additional components (UV module, phosphate removal, ...)
- ✓ Remote control via WebMonitor® possible
- ✓ Features like underload detection * and vacation mode

*Underload detection :

- KLAROcontrol.S/M checks fill level
- In event of little or no inflow a purification cycle is not operated
- System is marginally aerated to preserve bacteria
- Energy is saved

Process



[Scan for the KLARO process video](#)

Effluent values

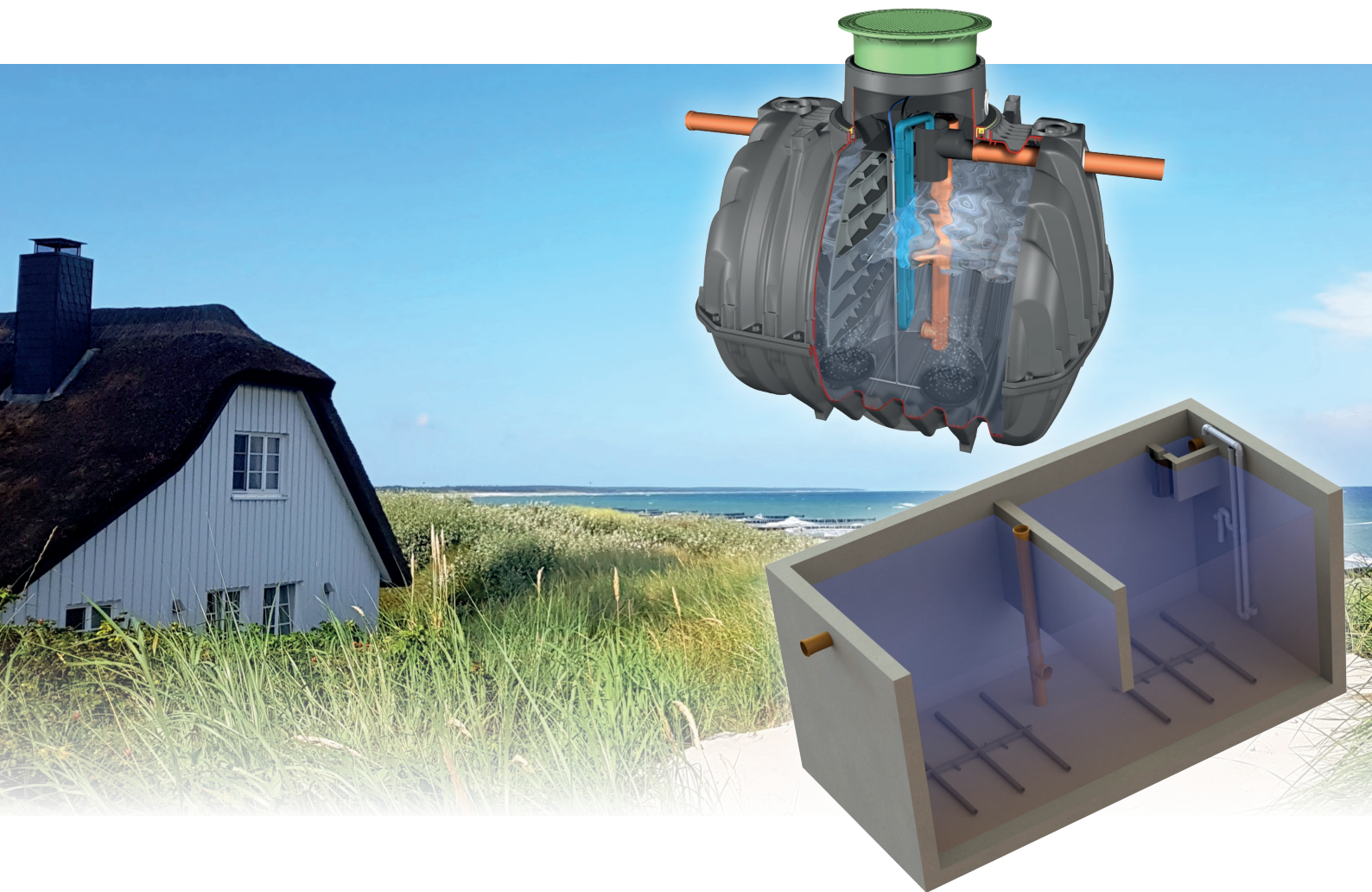
Wastewater parameter	KLARO Easy Effluent values*	Degree of efficiency
COD (chemical oxygen demand)	48 mg/l	92.3 %
BOD ₅ (biochemical oxygen demand)	6 mg/l	97.5 %
NH ₄ -N (ammonium nitrate)**	8.3 mg/l	75.8 %
N _{tot} (total nitrogen)**	16 mg/l	67.5 %
P _{tot} (total phosphate)	3.1 mg/l	56.9 %
SS (suspended solids)	7 mg/l	96.7 %



Results of the practical test carried out by PIA (Prüfinstitute für Abwassertechnik GmbH), Aachen test report number PIA2019-349B15.02

*average effluent values and efficiencies of the plant operation for nominal phases (100%)

** nitrogen characteristics for water temperatures of 12°C and more in the bioreactor



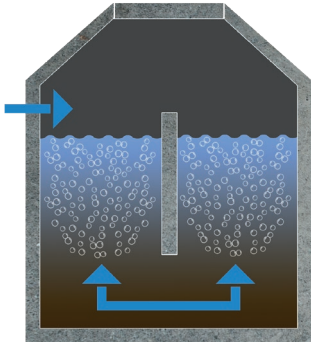
Wastewater treatment plant KLARO One

available from 4 to 500 PE (from 7,5 m³ to 75 m³/day)

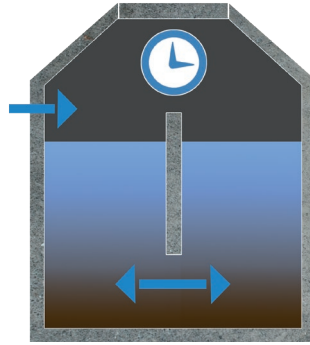
Advantages and features of the KLARO One system

- ✓ Fully aerobic system (no putrid odours)
- ✓ Large buffer, designed for the total daily volume
- ✓ Independent of tank material and geometry
- ✓ Installation in one chamber tank possible
- ✓ Automatic level measurement
- ✓ Excellent effluent values
- ✓ Extended sludge removal intervals
- ✓ Minimal power consumption
- ✓ Minimal maintenance
- ✓ Microprocessor control
- ✓ Plug & Play retrofit kit

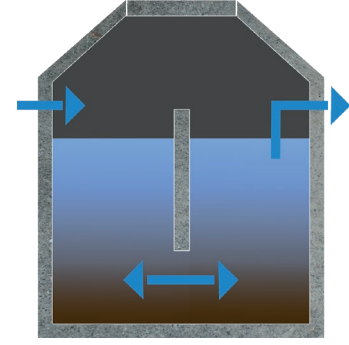
Process



Aeration phase



Sedimentation phase



Clearwater extraction



[Scan for the KLARO One process video](#)

Effluent values

Wastewater parameter	KLARO One Effluent values*	Degree of efficiency
COD (chemical oxygen demand)	41 mg/l	94.2 %
BOD ₅ (biochemical oxygen demand)	7 mg/l	96.0 %
NH ₄ -N (ammonium nitrate)**	0.5 mg/l	96.3 %
N _{tot} (total nitrogen)**	7.9 mg/l	87.0 %
P _{tot} (total phosphate)	1.6 mg/l	96.3 %
SS (suspended solids)	14 mg/l	96.3 %



Results of the practical test carried out by PIA (Prüfinstitute für Abwassertechnik GmbH), Aachen.

* Average values and efficiencies of the plant operation for nominal phases (100%)

** nitrogen characteristics for water temperatures of 12°C and more in the bioreactor



Basic wastewater treatment plant KLARO *Tiger*

available as 4 PE in a 1.600l tank up to 12 PE with 4.800l in three tanks

Advantages and features of the KLARO *Tiger* system

- ☑ Fully biological system
- ☑ Simple and robust system working with the KLARO principle: No mechanical, no pumps and no electrical parts in the wastewater.
- ☑ No control unit, no valves
- ☑ Suitable for underground as well as above installation
- ☑ Use of reliable air lift technology
- ☑ Low footprint due to compact tank
- ☑ Low shipping costs due to stackable tanks
- ☑ Stable performance even in underload cases
- ☑ No wearing parts inside the tank
- ☑ Extension of existing or local septic tanks possible

Cabinets

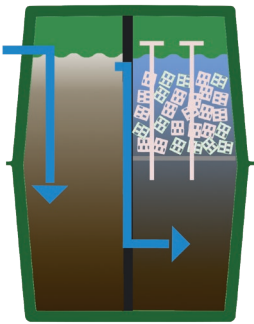


Outdoor cabinet for compressor

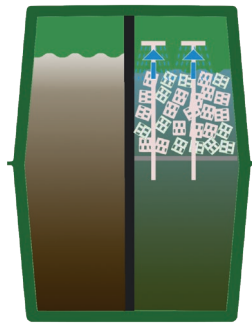


Indoor mounting plate for compressor

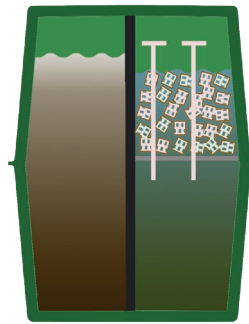
Process



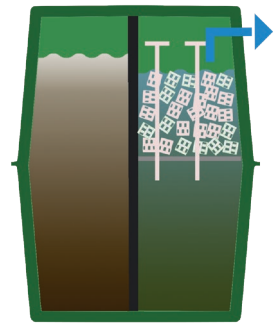
Pre-treatment



Aeration phase



Biofilm growth



Discharge

Effluent values

Wastewater parameter	KLARO Tiger Effluent values*	Degree of efficiency
COD (chemical oxygen demand)	74 mg/l	85.3 %
BOD ₅ (biochemical oxygen demand)	19 mg/l	89.6 %
NH ₄ -N (ammonium nitrate)**	18 mg/l	45.3 %
N _{tot} (total nitrogen)**	27 mg/l	42.3 %
P _{tot} (total phosphate)	3.9 mg/l	33.5 %
SS (suspended solids)	19 mg/l	92.8 %



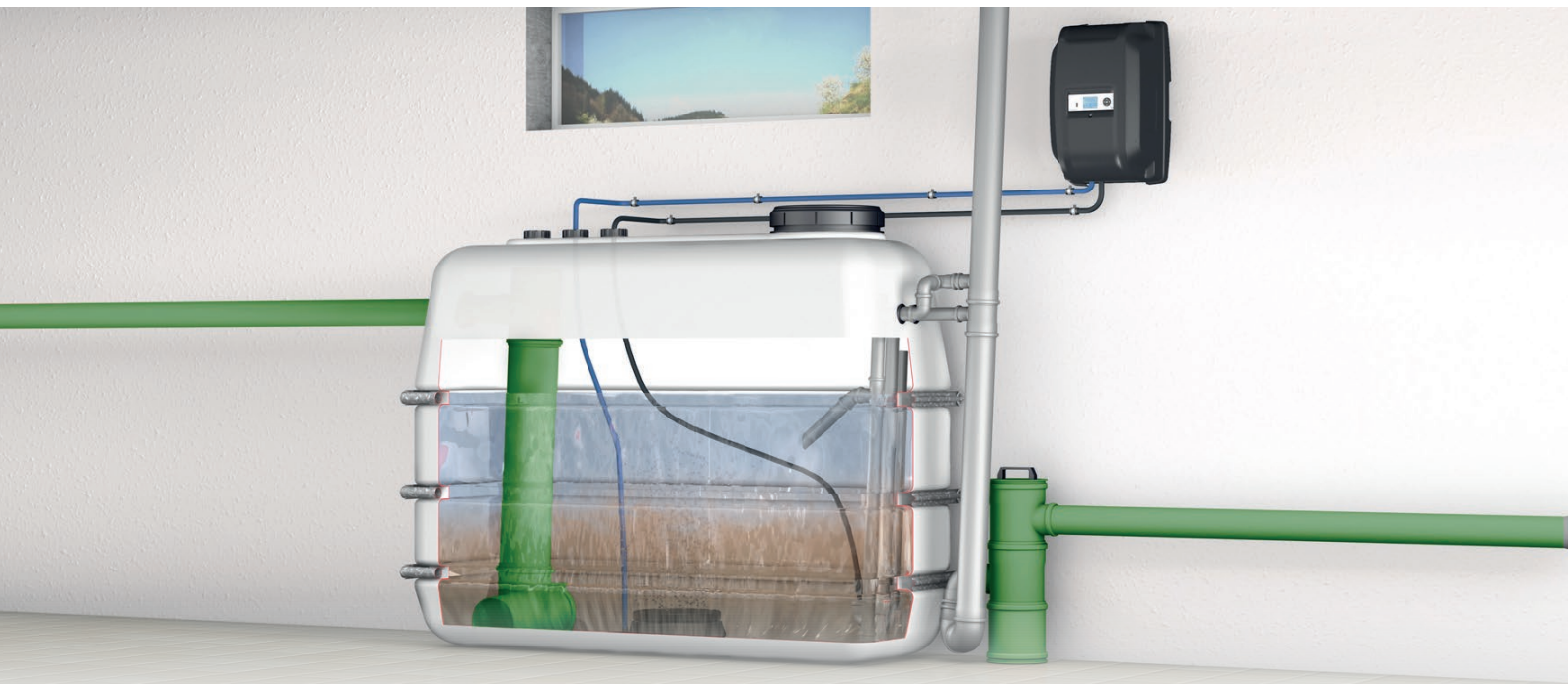
Electrical consumption: 1.7 kWh/d

Results of the practical test carried out by PIA (Prüfinstitute für Abwassertechnik GmbH), Aachen test report number PIA2014-216B14.02

*average effluent values and efficiencies of the plant operation for nominal phases (100%)

** nitrogen characteristics for water temperatures of 12°C and more in the bioreactor

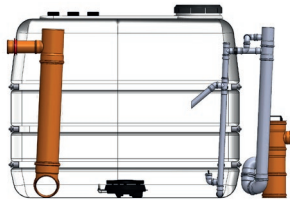
KLARO Special solutions



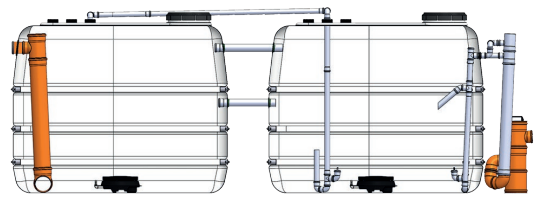
KLARO One UP

The solution for overground installation up to 12 PE (1,8 m³/day)

Types of tanks



PE	Qd [l/d]	Bd [g/d]	Tank
3	450	180	2.000L
6	900	360	4.000L



PE	Qd [l/d]	Bd [g/d]	Tank
6	900	360	2x 2.000L
12	1800	720	2x 4.000L

Advantages and features

- Fully aerated, fully biological treatment system
- Tank made of HDPE
- Above-ground installation
- Small and compact - fits even in tight spaces
- Fits through conventional doors
- For small quantities of wastewater
- UV resistant (optionally available)

Areas of application

- Where no civil engineering is possible (no access with construction machinery, rock, water)
- Houseboats
- Small commercial enterprises
- Garden house, weekend house, vacation home
- Mobile wastewater treatment plant
- Experimental wastewater treatment plant



KLARO Container

The intelligent mobile wastewater treatment solution

KLARO Container is the new mobile sewage treatment plant in a standard 10/20/40 ft container. It is constructed for easy set-up and take-down (plug-and-play). Therefore the container plant is especially suitable for temporary use.

As the technology is installed inside the container it is ideally protected from all weather conditions and furthermore easy to transport.

Sturdy design

- Complies with the static requirements of EN 1993-1-5, Annex C
- Special, wear-resistant polyurea coating
- Only wastewater-proof components in the water

Safety

- Tried & tested KLARO SBR concept
- Easy to use and low-maintenance
- Optionally available with railing

Flexible

- Easy to transport
- Prefabricated and expandable design
- Flexibly expandable (e.g. WebMonitor, disinfection...)
- Suitable for both long-term and temporary use

Efficiency

- Low energy consumption
- Fully automated and user-friendly
- Wear-resistant components for low maintenance
- Quick to install and remove (plug-and-play)

Areas of application

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> Worker and research camps | <input checked="" type="checkbox"/> Disaster situations | <input checked="" type="checkbox"/> Seasonal tourism |
| <input checked="" type="checkbox"/> Construction sites | <input checked="" type="checkbox"/> Municipalities | <input checked="" type="checkbox"/> Hotels |
| <input checked="" type="checkbox"/> Mining industry | <input checked="" type="checkbox"/> Refugee and military camps | <input checked="" type="checkbox"/> Oil and Gas sector |

Scan for:



Product video



Brochure

KLARO components

Controller for all KLARO systems

Main features of the controller

- ✓ Microprocessor controller, real-time controlled
- ✓ Large graphic display, multi-line, with backlighting
- ✓ Control pad with OK
- ✓ LED status display
- ✓ USB interface for data exchange - read out and upload data, software update
- ✓ Redundancy
- ✓ Level-dependent operation (e.g. underload detection)
- ✓ Manual operation function: loads can be operated individually
- ✓ Measured values can be viewed, e.g. temperature, pressure, water depth, voltage, current consumption
- ✓ 3 operating levels (operator / service / manufacturer)
- ✓ Universally applicable - also for other treatment systems
- ✓ JSON protocol for communication with KLARO WebMonitor or other PLC control, e.g. SCADA



KLAROcontrol.S



KLAROcontrol.M

Examples of indoor switch cabinets



PP indoor cabinet

- ✓ 4 to 10 PE
- ✓ Minimal space required:
40 cm x 54 cm x 29 cm



Indoor cabinet 3

- ✓ Up to 50 PE
- ✓ Size: 80 cm x 65 cm x 53 cm

Examples of outdoor switch cabinets



PP outdoor cabinet

- ✓ 4 to 10 PE
- ✓ for the extension of the
I-cabinet PP
- ✓ Size: 45 cm x 142 cm x 40 cm
- ✓ Optional with chemical tank



Outdoor cabinet 4

- ✓ Up to 200 PE
- ✓ Size: 114 cm x 100 cm x 72 cm

KLARO *airlift*.blue retrofit kit up to 50 PE

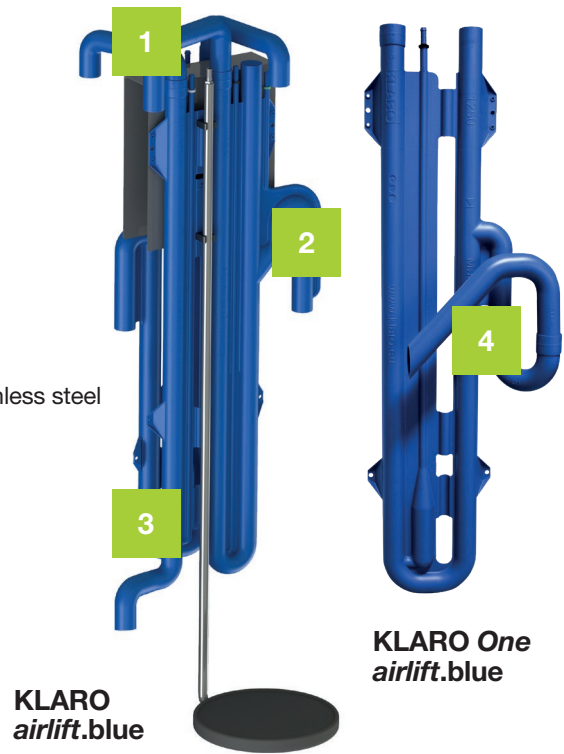
- ✓ Suitable for installation into tanks made of plastic, concrete, etc.
- ✓ Suitable for all new installations and retrofits
- ✓ All transfer processes carried out using compressed air
- ✓ No wear, no blockages
- ✓ All components are made of wastewater- resistant plastic (HDPE) or stainless steel

1 Air connections

3 Adjustable feed

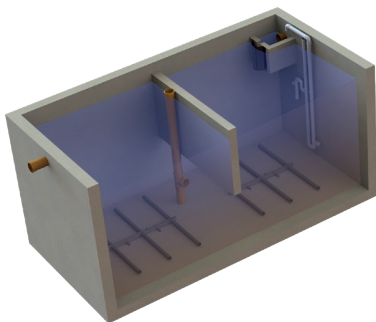
2 Patented air barrier

4 Inflow chicane

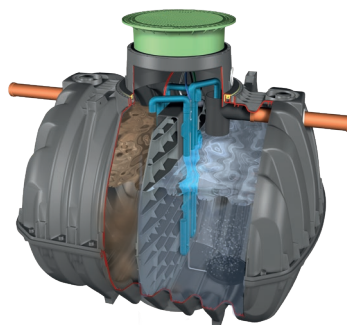


Tanks (not delivered by KLARO)

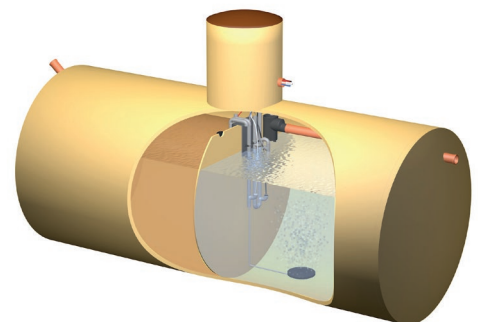
Onsite concrete



Plastic tanks



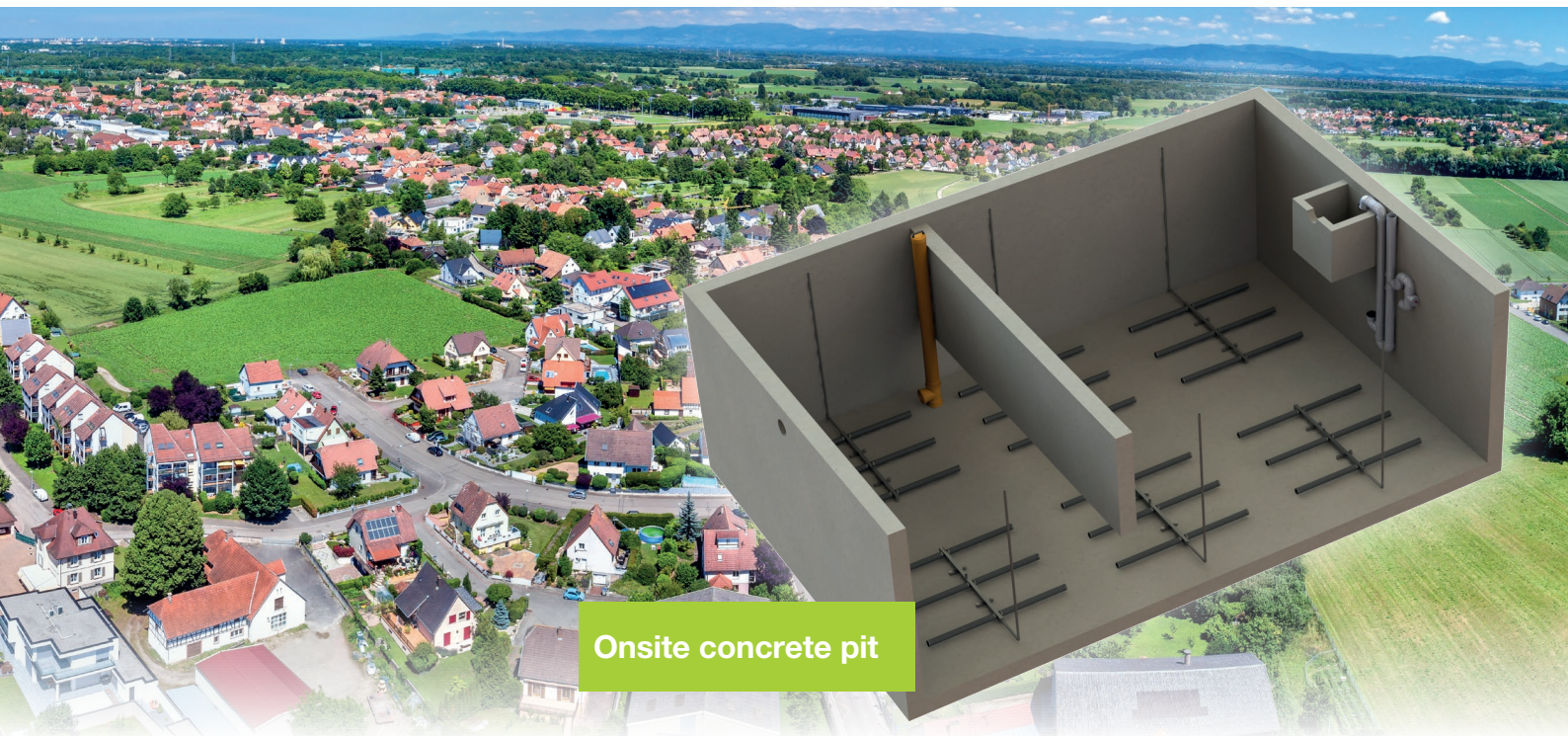
GRP tanks



Advantages

- ✓ Installation in new or existing tanks
- ✓ For every tank geometry (round, rectangular ...)
- ✓ Various materials (concrete, plastic, GRP ...)
- ✓ Retrofitting for 1-, 2-, 3- or 4-chamber pits

KLARO from 50 PE/7.5 m³ – 5.000 PE/750 m³ per day



Individual projects

Systems for more than 50 inhabitants / 7.5 m³ work on the same principle as small wastewater treatment systems and use the SBR process. Because of the special requirements involved, all systems for more than 50 inhabitants / 7.5 m³ are planned as individual projects. Our experienced team of engineers and technicians will help you to plan your project. We take all local circumstances into account from the concept planning phase to implementation.

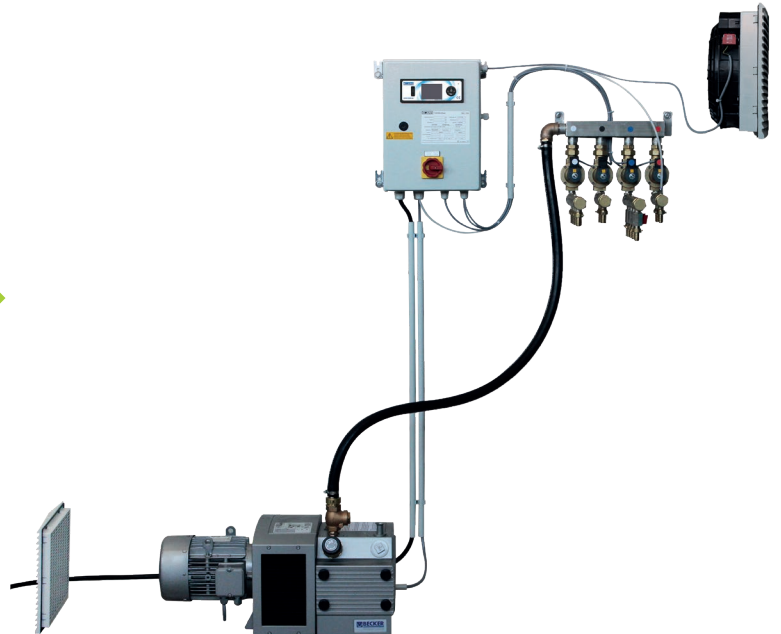


Multiple lines

- ✓ Can be installed with multiple lines
- ✓ Multiple lines are meaningful for projects with seasonal fluctuations (hotels, campsites)
- ✓ Lines can be switched off during low season to prevent underload and save energy

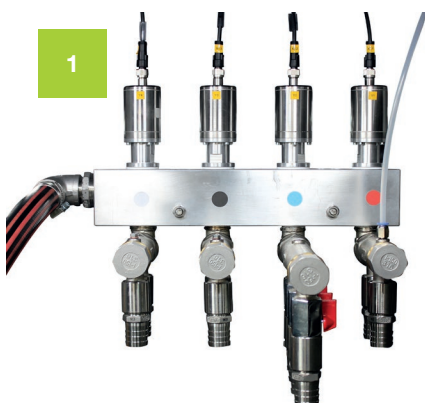
Machine technology

- ✓ Alternative to a conventional control cabinet
- ✓ Technical components can be installed in a dedicated room or machine house
- ✓ Sufficient space for components
- ✓ Maximum flexibility



Outdoor cabinet 4

- ✓ Size:
120 x 111 x 80 cm
- ✓ Empty weight:
140 kg



Step motors replace solenoid valves

- ✓ Nearly maintenance free
- ✓ Control with 24V DC
- ✓ Almost noiseless
- ✓ Minimum power consumption

More information can be found in our brochure for „Individual wastewater solutions for up to 750 m³/d“.





KLARO WebMonitor® - the intelligent remote control

The KLARO WebMonitor® is an internet portal that gives maintenance companies and operators the option to monitor small wastewater treatment plants online, regardless of where they are. The small sewage treatment plant is queried everyday and reports automatically when something isn't right - definitely!

The KLARO WebMonitor® provides ...

- ✓ Increased customer benefit through monitoring service
- ✓ Cost-effective remote diagnosis in case of malfunctions
- ✓ Higher effectiveness
- ✓ Higher operational reliability
- ✓ Optimized service intervals

Operation via Internet

- ✓ No monitoring on-site
- ✓ Automatic data storage
- ✓ Monitoring when absent
- ✓ Remote of outdoor cabinets

Advantages for the partner

- ✓ Overview of all plants
- ✓ Direct access via internet
- ✓ Email-notification in the case of an error
- ✓ Continuous automatic monitoring

UV module

For disinfection

For sensitive zones with high requirements in terms of environmental protection, an additional UV module can be installed. For clear water extraction, the outflow water is intensively irradiated with UV light. This inactivates the resulting bacteria which die off within a few seconds.

- ✓ For sensitive zones with high requirements
- ✓ Low operating costs
- ✓ Simple, retrofittable
- ✓ Can be integrated into a tank



Phosphate pump

For phosphorous elimination

The phosphate content of the wastewater is regulated by implementing a dosing pump which releases a special precipitant. The precipitant creates an insoluble compound with the phosphate, which settles well in the tank. This variation has also been tested and approved for application in sensitive areas.

- ✓ Cleaning performance tested and certified
- ✓ Easy to maintain
- ✓ Long life span
- ✓ Retrofitting possible



Carbon pump

For carbon dosing

Carbon can be added to the activated sludge stage to compensate for a nutrient deficiency. This can be problem-solving in the case of extreme underload phases or unfavorable wastewater composition.

- ✓ Simple and efficient
- ✓ Many years of practical experience
- ✓ Supplementary component
- ✓ Especially for holiday homes, hotels and seasonal accommodation



Additional components



KLARO blue.cycle®

One of the biggest challenges in waste water treatment today is finding solutions for reusing the treated water. The goal is for water used in sewage treatment plants to be put directly to use, e.g. for watering gardens.

KLARO blue.cycle® is the result of a long and intensive period of development by KLARO and stands for innovative solutions for disinfection and reuse, designed as an extension for sewage treatment plants.

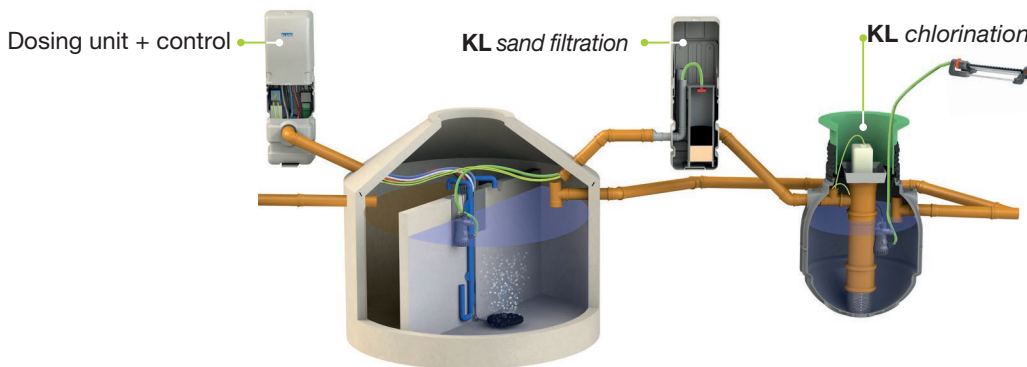
The KLARO blue.cycle concept is based on a chlorination process. Chlorination is the worldwide most established method for the effective kill of many pathogens present in wastewater and inhibits their regrowth through its long term effect.



KL reuse

The system KL reuse consists of the proven KL sand filtration and KL chlorination. The combination of both processes guarantees the optimum treatment to reuse the treated water e.g. for irrigation. The secondary effluent is first filtrated by the KL sand filtration, followed by a chemical disinfection by the KL chlorination in the disinfection tank. Suspended solids are removed, E.coli are killed.

- ✔ Dual media filter for very effective filtration
- ✔ Automatic backwash system for sand filter
- ✔ Further reduction of COD and BOD
- ✔ Very small non harmful doze of liquid chlorine, chlorine dosing timed with batch arrival
- ✔ Possible up to 40 PE or 80 PE (with two-lines)
- ✔ Officially tested according to EN 12566-7

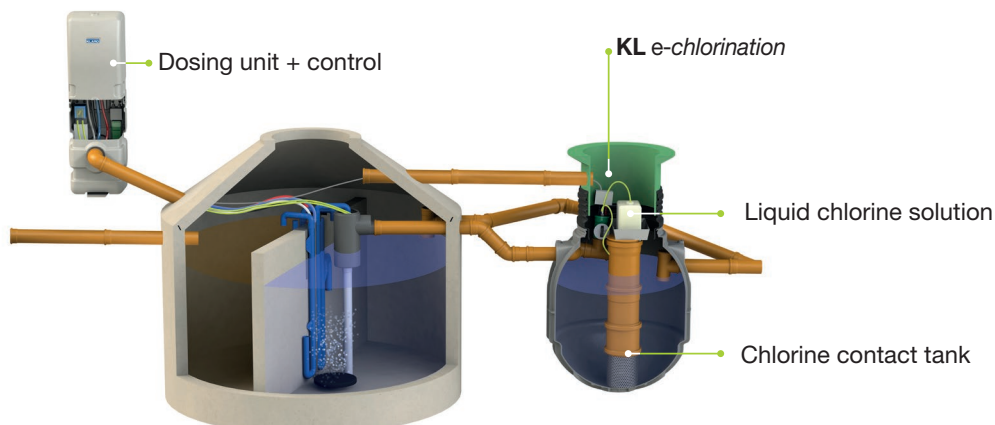


Reuse process video

KL e-chlorination

The System KL e-chlorination was especially developed for bigger applications and can be used up to 500 PE with one module. The module uses electrodes, which activate the chlorine dosing if it's needed. The system has no connection to the controller and is mounted in the disinfection tank. The KL e-chlorination can be installed after a SBR-plant or a continuous running system.

- ✔ Chlorination with well available liquid sodium hypochlorite solution
- ✔ Chlorine dosing only if water passes the electrodes to avoid overdosing
- ✔ Easy maintenance
- ✔ Total coliforms will be nearly completely killed
- ✔ Modular principle: one module up to 500 PE (75 m³/day) – easy upscaling with parallel connection
- ✔ No electric parts or submersible pump in the bio reactor necessary



International references

Climatic conditions



- 40 PE church in Meadowbank
- High humidity, low temperatures, snow, heat have no effect on KLARO technology
- Protected environment because of underground environment



Systems up to 1.225 PE



- 1.225 PE plant for village in Hungary
- Tank manufactured according to our specifications
- Multiple line system



Multiple lines



- 585 PE two-line wastewater treatment system for a hotel in Mauritius.
- For commercial wastewater
- KLARO system
- Suitable for high and low season periods





367 PE Milk production - India



3 PE Animal shelter - Germany



150 PE Restaurant - New Caledonia



200 PE Stadium - Rwanda



400 PE Hotel - Luxemburg



50 PE School - Uruguay

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KLARO GmbH



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