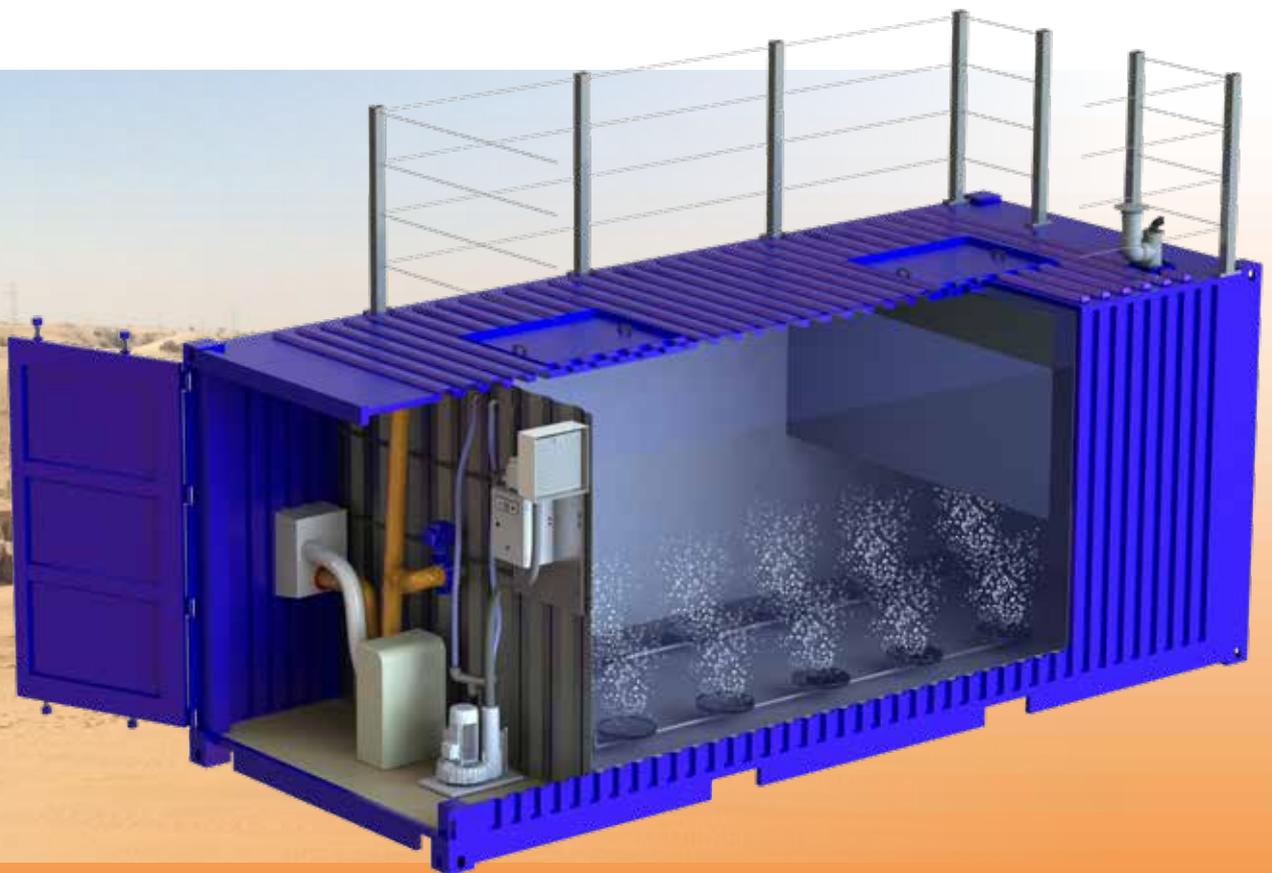


KLARO

KLARO container.one®

The mobile 20 ft (15m³) and 40 ft (30m³)
wastewater treatment solution



No mechanical parts
in the wastewater



No pumps
in the wastewater



No electrical parts
in the wastewater

Art. No. 110-EN-0221

KLARO container.one®

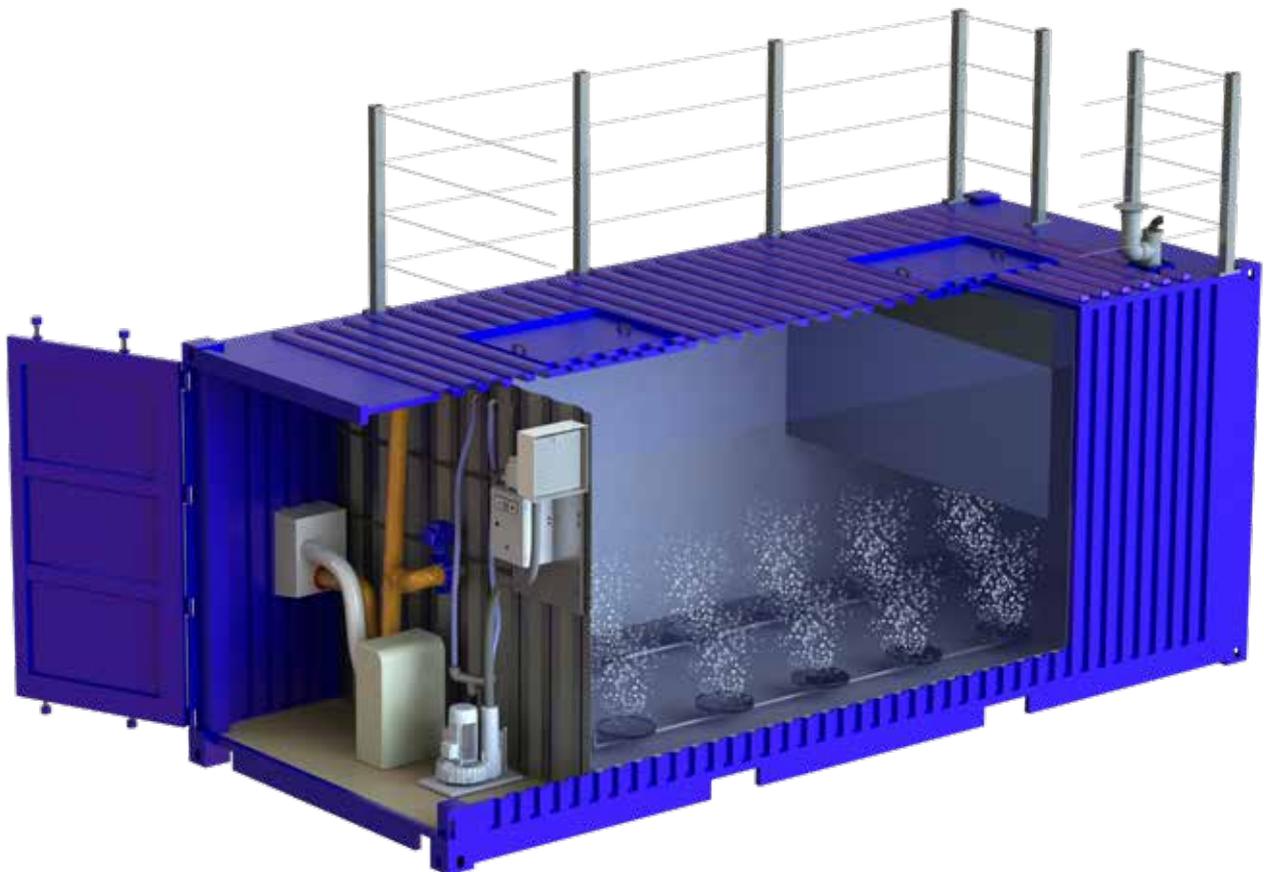
Advantages of our mobile solution

Sturdy design

- Complies with the requirements of EN 1993-1-5, Annex C
- Special, wear-resistant polyurea coating
- Electrical and mechanical components housed in protected, separate compartment
- Only wastewater-proof components in the wastewater
- Standard A/C unit (EU standard)
- Optionally available with a railing

Safety

- Tried & tested KLARO ONE concept
- Fully aerated, preventing foul odours
- Easy to use and low-maintenance
- Clear water decanter with fully automatic backwashing prevents any sludge from being drawn off



General

Treatment capacity	20 ft. : 100 PE (15 m ³ / d) 40 ft. : 200 PE (30 m ³ / d)
Process	KLARO One concept with sludge stabilisation
Bacteria	Stabilised activated sludge
Standard calculation for sludge removal	3 months

Components

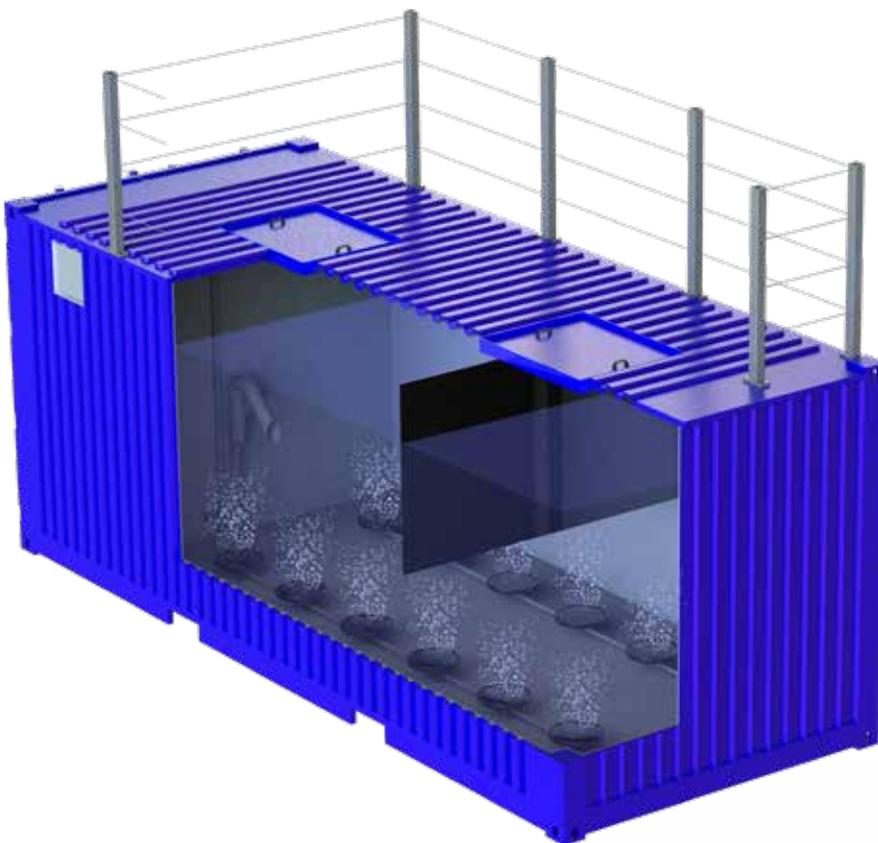
Clear water extraction	Air-lifter and discharge valve
Aeration	Membrane disc aerator
Compressor	Side channel compressor

Flexible

- Easy to transport
- Prefabricated and expandable design
- Can be connected in parallel to process larger volumes
- Stackable and transportable
- Flexibly expandable (e.g. KLARO WebMonitor, disinfection...)
- Suitable for both long-term and temporary use

Efficiency

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



Add-on modules

Guardrail with impact protection

Phosphate precipitation

Chlorine disinfection

UV disinfection

Sludge dewatering



Also available as
40 ft version



Applications

KLARO *container.one* was developed as a temporary solution but can also be used as a permanent sewage treatment plant.

- Labourer or refugee camps
- Communities in the process of rebuilding their communal clarification systems
- Factory water treatment at industrial plants
- Seasonal tourism
- Construction sites for mobile use
- Disaster situations
- Events or mass rallies
- Temporary solutions, rental sewage treatment plants



References



Australia

An Australian mining company uses KLARO container systems to treat the wastewater generated at a mine. The wastewater comes from the worker accommodations.



Oman

A production facility in Oman is also using a KLARO container system. In this hot climate, the system is subjected to high temperatures. Thanks to the built-in cooling system, however, the plant runs just fine.



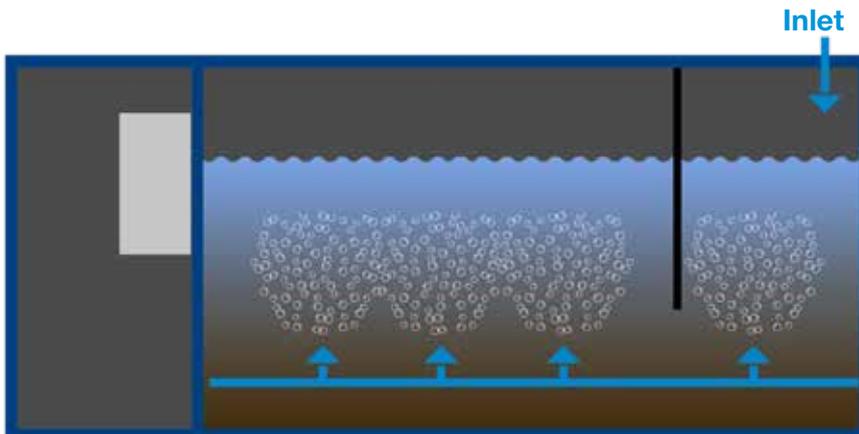
Norway

Located in Spitzbergen, Norway, the village of Ny-Ålesund is the northernmost settlement in Europe. Some time ago, they decided to install a KLARO container system to treat their wastewater. The population of Ny-Ålesund peaks at 120 people, with much fewer researchers and workers during the winter months.

KLARO container.one®

How the container system works

The KLARO container.one is a fully biological wastewater treatment plant using the SBR method (= sequencing batch reactor with activated sludge) with simultaneous aerobic sludge stabilisation. Sludge storage and buffer tank are integrated. Based on the properties of the raw sewage, the following wastewater treatment steps are performed in the course of a cycle:



Aeration phase

The raw sewage enters the primary zone and immediately undergoes aerobic treatment. This aerobic treatment activates the micro-organisms.



Sedimentation phase

When aeration is stopped, the activated sludge settles to the bottom. A clear water zone forms in the upper part of the container. If any raw sewage enters the system, it is retained by the dividing wall or baffle in the primary zone.



Clear water extraction

In the final step, the clarified wastewater is siphoned off by a decanter. The discharge device is briefly backwashed to prevent any sludge from coming out.

Components

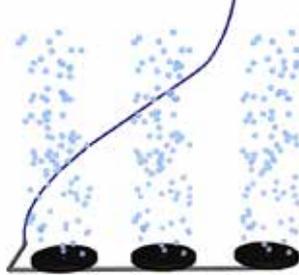


Coating

The KLARO container is sealed with a special coating which is also used in swimming pools, etc.

One of its many advantages of this material is that it's capable of stretching up to 400% without tearing or leaking.

So transporting, lifting and setting down the container is no problem at all.



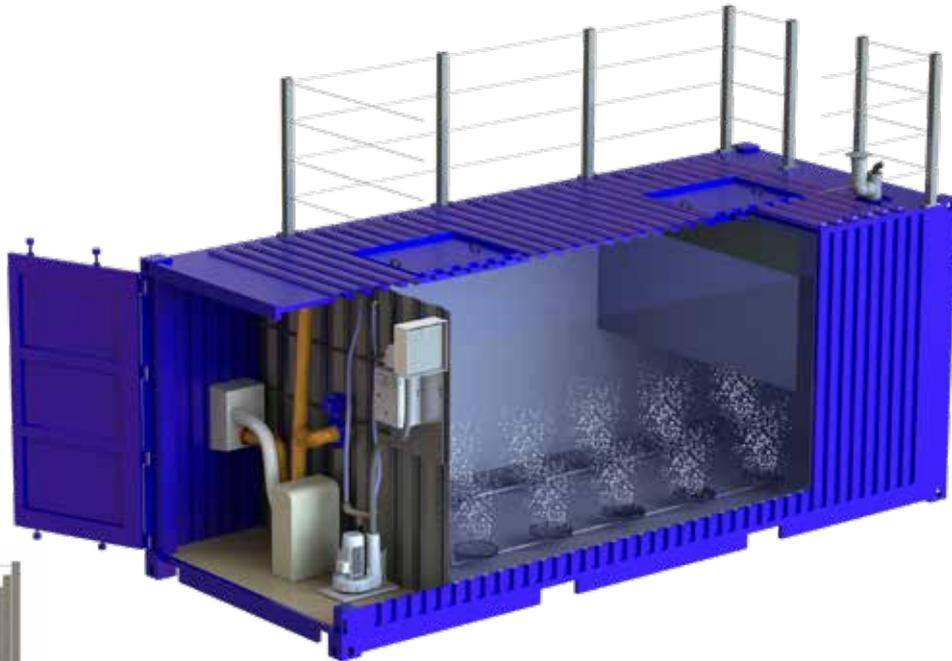
Aeration

The plant contains an aeration unit, comprised of submerged membrane diffusers. These diffusers provide for thorough mixing and fine bubble aeration. They are mounted on a stainless steel pipe.



Decanter

The system uses a fixed clear water discharge system (decanter). The decanter features a butterfly valve. If the butterfly valve is opened by the control unit, clear water is discharged from the system. Before the actual discharging begins, the outlet is backwashed by an air-lifter in order to prevent any sludge from being drawn off.



Mechanics

The main unit of the system is the protected machinery compartment, located at the front of the plant. This space houses all the necessary electromechanical components (control unit, compressor and A/C unit) and controls the treatment processes.

Add-on modules

UV module



KLARO UV modules are used for disinfection of biologically pre-treated waste water. The use of ultraviolet radiation (UV) is an effective and user-friendly method. UV light kills pathogenic bacteria within seconds without leaving any residues, harmful by-products, or odours. The module consists of a UV reactor made of stainless steel and a ballast.

Phosphate precipitation



KLARO P-modules are used for simultaneous phosphate precipitation in the activated sludge tank (SBR). A dosing pump in the machinery compartment doses a precipitant directly into the activated sludge tank on start of the aeration phase. This immediately results in good mixing. The precipitant creates an insoluble compound with the phosphate, which settles well in the tank.

KLARO e-chlorination



Adding chlorine to the purified wastewater is an effective and reliable method of disinfection. Chlorine diffuses through the cell wall of the bacteria and destroys the enzymes, causing the micro-organisms to die off. In addition, chlorine prevents bacteria from regrowing in the wastewater due to its depot effect.

The module comprises a sensor unit, dosing unit and chlorine tank. The sensor unit ensures that chlorine is dosed precisely as required. This results in extremely effective disinfection with minimal residual chlorine content.

KLARO WebMonitor®



The KLARO WebMonitor® is a useful tool for any application requiring maximum operational reliability with minimal operator intervention. The plant can be monitored by a maintenance firm via a remote diagnostic system.

In the event of a fault, intervention is possible immediately from home via internet.

Sludge dewatering

Any excess sludge that accumulates in the KLARO *container* one has to be removed on a regular basis. The liquid activated sludge can be dewatered on site with the sludge dewatering unit and then allowed to dry for disposal. This reduces the volume and mass of the sludge by up to 95%, reducing the cost of disposal and facilitating removal from locations that are difficult to access.



Pump unit

Removing excess sludge as well as dosing and mixing in flocculant are easily done with the pump unit as part of routine plant maintenance.

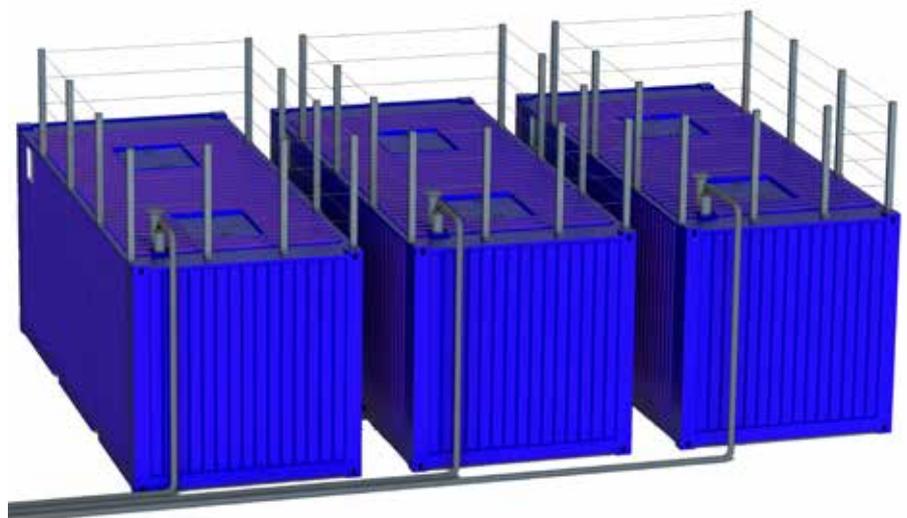


Filter unit

The filter unit is used for dewatering and drying the flocculated sludge. After the sludge is filtered out, it is covered and vented until the next scheduled maintenance date.

Modular extension

These mobile wastewater treatment plants feature a modular extension and set-up concept. This allows for maximum flexibility when it comes to designing your wastewater treatment solution. In case of larger volumes of wastewater, you could either use two or more complete 20 or 40-foot KLARO *container* one systems or opt for one complete 40-foot container plant. Container plants are also available in various treatment stage versions. So they can be used specifically for pre-treatment stages, biological stages, final treatment stages or sludge treatment stages. Plant designs are project-specific and based on customer preferences.



System specifications

System	20 ft front door container treatment plant	40 ft front door container treatment plant
Material	Steel	
Weight (tara)	3,180 kg	4,000 kg
Dimensions (external)	Length	6,058 mm
	Width	2,438 mm
	Height	2,591 mm
Door opening	Width	2,144 mm
	Height	2,169 mm
Total capacity	31 m ³	62 m ³
Inlet	Wastewater pipe connection dia. 110 mm, back door, external height: 2,310 mm	
Outlet	Wastewater pipe connection dia. 110 mm, longitudinal side door, external height: 1,074 mm	
Ventilation	Wastewater pipe connection dia. 110 mm, back door, external height: 2,310 mm	
Recommended operating voltage	400 V, 50 Hz (60 Hz)	
Recommended current load	16 A	
Operating temperature range	-10°C ... +35°C	
Fault current circuit breaker	25 / 0.03 A	
Power consumption	13 kWh/d	35 kWh/d

Design criteria

The containerized treatment plant is designed based on German regulations and standards for wastewater treatment. The design factors in both hydraulic and organic loads as well as the required treatment efficiency. The components are designed based on these requirements.

Raw wastewater

This plant is designed for the following wastewater values:

Total suspended solids TSS	150 – 400 mg/l
BOD ₅	150 – 500 mg/l
COD	300 – 1,000 mg/l
pH	7.5 - 8.5
N _{tot}	20 – 80 mg/l
P _{tot}	6 – 25 mg/l

Flow rate pattern

The maximum waste water flow rate depends on the plant version selected.

	20 feet	40 feet
Total inflow (maximum)	15 m ³ /d (approx. 100 people)	30 m ³ /d (approx. 200 people)
Operating hours	24 h	
Flow rate	0.63 m ³ /h	1.25 m ³ /h
Mode	Automatic	

Clarified wastewater

The quality of the treated wastewater is normally within or below the following ranges:

pH	7.0 - 8.0
SS	< 30 mg/l
BOD ₅	< 10 mg/l
COD	< 120 mg/l
NH ₄ -N	< 10 mg/l
P _{tot}	< 20 mg/l
E. coli	< 100 cfu
Enterococcus	< 100 cfu

KLARO GmbH in Bayreuth



KLARO in Bayreuth

KLARO has been taking care of your clear water needs since 2001. Wherever a connection to the sewage system is economically not feasible, our services come in useful. From single-family houses to hotels or entire municipalities – KLARO has the right clarification system for every application, accommodating anywhere from one to about 5,000 residents. With the KLARO modular build concept, you get a system that is highly flexible and future-proof.

So far, over 750,000 people in over 70 countries already rely on KLARO technology. Our team consists of about 35 team members from a range of different fields. Together, we find the optimal, most practical solution for your needs.

A company of the GRAF group

Since 2014, KLARO has been a company of the GRAF Group. The GRAF brand has been synonymous with high quality plastic products in the field of water resource management for over 50 years.

GRAF is well-known to KLARO as a long-standing customer and supplier of water clarification tanks made of plastic. Thus, when you buy a KLARO product, you benefit from the know-how and quality of two established brands in the field of local waste water disposal.



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