



**RWO**

# Sewage Treatment

**MARINE WATER TECHNOLOGIES**

# Total Water Management On-board Ships and Offshore Platforms

## Who We Are

For more than 45 years the RWO experts develop, design, manufacture and service high-quality technologies for water treatment onboard ships and offshore installations, both for new installations or retrofitting. The product portfolio includes the treatment of drinking and process water as well as pollution prevention equipment for oily waters, ballast and wastewater as well as a comprehensive range of after sales services. RWO is the worldwide market leader in the treatment of marine oily water. The main offices are located in Bremen, Germany.

## Worldwide Sales & Service Network

RWO's international network of more than 40 qualified sales/service stations ensures short communication links between customer and manufacturer, making us the ideal partner for companies in the maritime sector. Contact us today to find out more about the way we work.



## Key Competences

The RWO brand stands for decades of experience in the construction and service, in all field of maritime water treatment, inclusive of:

- > Oil Water Separation
- > Wastewater Treatment
- > Drinking Water Treatment
- > Process Water Treatment

## Key Benefits

- > High quality in every aspect
- > Worldwide network and support
- > Comprehensive experience in water treatment engineering
- > Get your water management solution from the market leader in OWS

# RWO

## CleanSewage-BIO Biological Sewage Treatment

## Sewage Treatment With Minimal Efforts

CleanSewage-BIO is a compact, type approved marine Sewage Treatment Plant (STP) for cargo vessels. With an incorporated Moving Bed Bioreactor (MBBR), the CS-BIO requires minimal process volume, still meeting the IMO MEPC.227(64) discharge criteria.

CS-BIO is designed for easy maintenance and operation. With the intuitive status control, operators can check at a glance, whether the system is running smoothly or intervention is necessary. The hygienic no-touch-cleaning system for sludge discharge makes maintenance nearly effortless.

The accessibility from one side allows ship designers to plan space in the engine room on a whole new level.

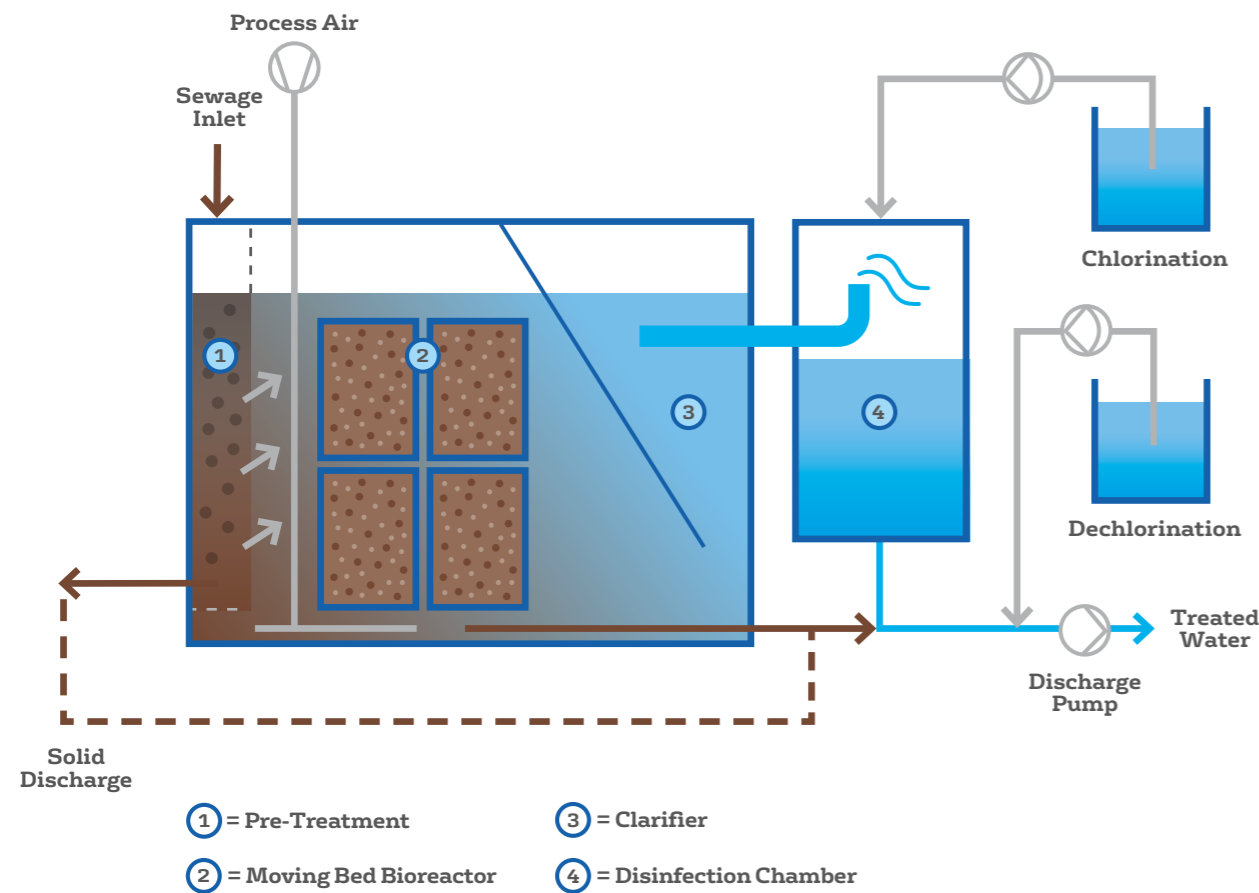


CS-BIO compact biological sewage treatment

# How it Works

CleanSewage-BIO combines mechanical pre-treatment (screening), biological treatment by activated sludge (AS) with moving bed biofilm technology (MBBR) and solid separation via clarifier in the same tank. Compared to an activated sludge system, CS-BIO is a high efficiency solution for the removal of organic matter with very low sludge production due to the biofilm technology.

1. As a first step the sewage is separated from heavier solids and particles by a screen, thus preventing clogging or damages in further process steps.
2. In the biological stage, bacteria degrade organic matter into carbon dioxide and water. These bacteria grow as a biofilm on the carriers in the so-called moving bed. Aeration is applied both for the suspension of the biofilm carriers and the oxygen supply of the bacteria. As a natural process, bacteria accumulate in the system and form sludge flocs (also called excess sludge) which can be collected and disposed according to national and international laws.
3. In the clarifier residual solids and suspended activated sludge are separated by sedimentation and turned back into the biological chamber. The clean sewage flows into the disinfection chamber.
4. In the disinfection chamber a chlorine-based chemical is added to reduce bacteria to a minimum level. The clean water is then pumped overboard. To meet the limit values set for the chlorine content, a neutralising agent is dosed prior to the discharge pump.



# Key Features & Benefits

## Safe

- > Integrated mechanical pre-treatment
- > No harmful or flammable chemicals
- > Certificate of Type Approval for Sewage Treatment Plants according IMO MEPC.227(64) issued under the authority of the Federal Republic of Germany by BG Verkehr

## Small

- > No holding tank necessary
- > Up to 25% less space demand through unique one-side access

## Easy to operate

- > No-touch-system for hygienic sludge discharge
- > 100 % control through individual switches for every component
- > Fast restart after maintenance due to biomass carrier in cages
- > Suitable for black & grey water
- > Compatible with all vacuum systems

CS-BIO Size	Organic Load kg/d BOD <sub>5</sub>	Hydraulic Load m <sup>3</sup> /d	Dimensions L x W x H mm	Weight	
				Net kg	Wet kg
02	1.38	2.16	2095 x 1250 x 1480	859	2923
03	2.07	3.24	2608 x 1346 x 1612	1149	4134
04	2.76	4.32	2559 x 1646 x 1618	1335	5293
05	4.15	6.48	2781 x 1656 x 2058	1627	7407
06	5.53	8.64	3365 x 1656 x 2058	1885	9278
07	6.91	10.80	3365 x 1986 x 2058	2121	11719

# RWO

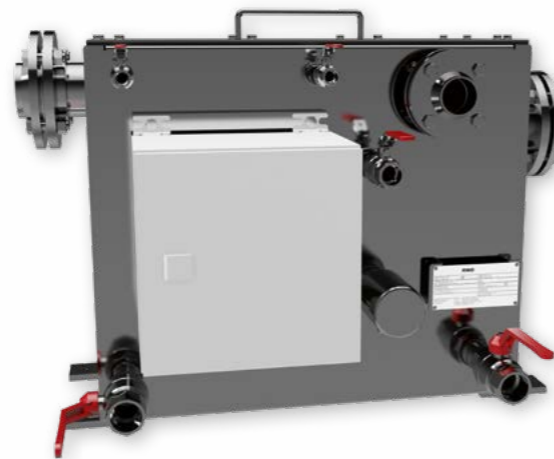
## Grease Interceptor for CleanSewage-BIO

### State-of-the-Art Galley Water Pre-Treatment

Waters originating from ship galleys contain grease, fats, oils and food waste. The Grease Interceptor works using the principle of gravity; Substances heavier than water settle down while lighter substances, such as grease and oil, rise. Galley water pre-treated in the Grease Interceptor can then be fed to RWO's wastewater treatment systems for further treatment. The system is part of RWO's **Total Water Management** offer.

### Design

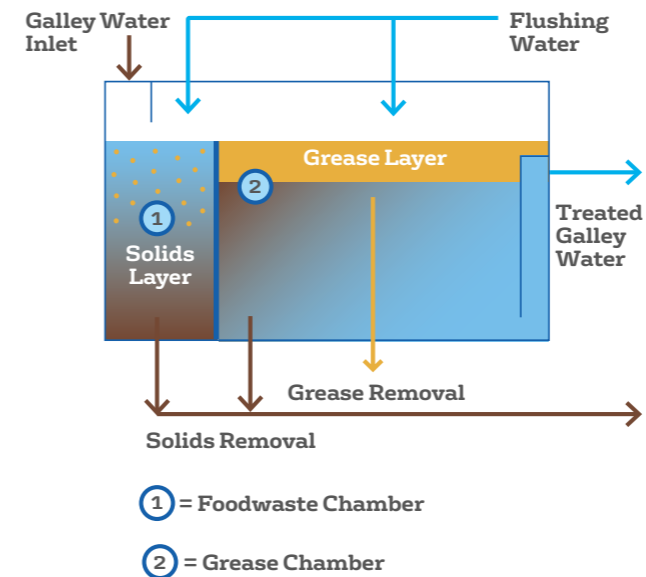
- > Compact and robust design in stainless steel 316Ti
- > Two-chamber process, designed in accordance with DIN EN 1825-1:2004
- > Cleaning-in-place (CIP) philosophy
- > Optional: An electrical heating system for grease removal and a 360° spraying system for flushing for minimal maintenance effort



Grease Interceptor for galley waste water pre-treatment

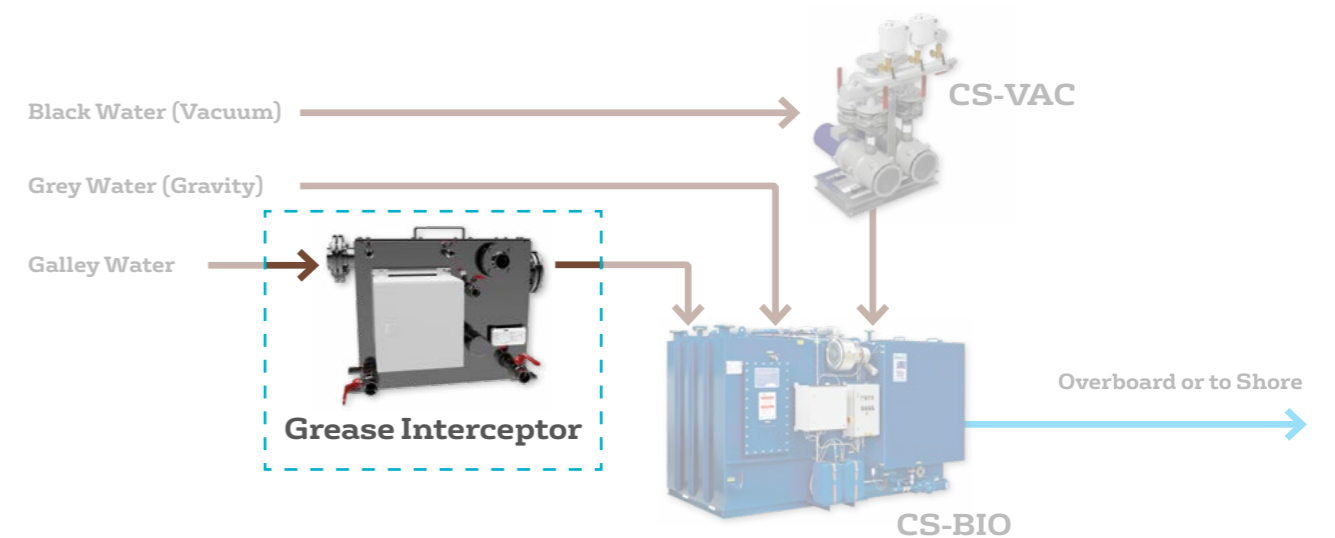
### How it Works

The Grease Interceptor separates particles, fat, oil and grease (FOG) acc. to their density. It consists of a foodwaste and a grease retaining section. While heavier particles settle down and are collected in the lower section of the foodwaste chamber, grease and oils float on the upper part of the grease chamber.



### Key Features & Benefits

- > Easy removal of solids and grease (dispose onboard or ashore)
- > Legal and safe operation while discharging
- > Expected lifetime exceeds industrial average even with difficult, acidic or super-alkaline waters
- > No consumables required for operation
- > No bad odour during normal maintenance
- > Accessibility from one side only



Type	# People	Collection Capacity		Dimensions L x W x H mm	Weight	
		Grease l	Sludge l		Net kg	Wet kg
GI 20	up to 20	6.2	15.5	832 x 360 x 661	55	142
GI 50	up to 50	13.4	33.5	902 x 460 x 661	73	213
GI 100	up to 100	20.8	52	1132 x 580 x 661	91	296

According to: MARPOL 73/78 Annex V