FERRY INDUSTRY

SEWAGE SOLUTIONS

HAMANN AG

ADVANCING MARINE SEWAGE TECHNOLOGY. SINCE 1972.

HAMANN
SEWAGE & WASTEWATER TREATMENT SYSTEMS

THE CORE OF THE SEWAGE SYSTEM

HL-CONT PLUS
Sewage Treatment Plants (STP)

HIGHLY CUSTOMISABLE
We offer a wide range of customisation options for HL-CONT PLUS models. This enables us to supply the plant that exactly meets the customer's requirements.

DISMOUNTABLE FOR RETROFITTING
HL-CONT PLUS plants can be almost completely disassembled to facilitate retrofitting.

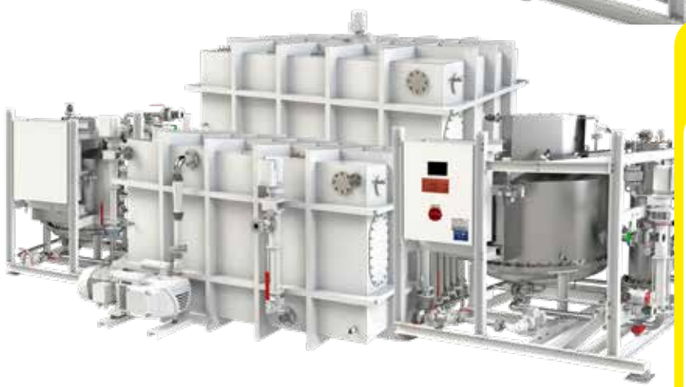
FULLY CERTIFIED
IMO MEPC.227(64), EU MED B & D and USCG Type II

Supported by:

Federal Ministry for Economic Affairs and Energy

on the basis of a decision by the German Bundestag

KF3226001RH3



HL-CONT PLUS OCEANCRUISE
Advanced Wastewater Treatment Systems (AWTS)

ALASKA & BALTIC SEA COMPLIANT
HAMANN HL-CONT Plus OceanCruise systems are certified according to IMO MEPC.227(64) incl. Sect.4.2 and EU MED B & D. They comply with US 33 CFR 159 Subpart E (Alaska) to obtain a permit under the Commercial Passenger Vessel Environmental Compliance (CPVEC) Program of the Alaska Department of Environmental Conservation (ADEC).*

MODULAR DESIGN
HL-CONT PLUS OceanCruise systems consist of four separate modules: Two Dissolved Air Flotation (DAF) units and two Moving Bed Biofilm Reactors (MBBR). Each module can be installed in a different location apart from the other modules, offering exceptional flexibility and the best possible use of space. Ship tanks can be converted to MBBR modules, further reducing the already small footprint of the system.

CUSTOMISED SYSTEMS
HL-CONT PLUS OceanCruise systems are customised to the individual requirements of the customers and the respective conditions on board the vessels.

KEY FEATURES

MINIMISED FOOTPRINT
Due to our technology and design, the footprint of HAMANN Sewage Treatment Plants (STP) and Advanced Wastewater Treatment Systems (AWTS) can be up to 70% smaller than comparable systems from other manufacturers - depending on the model.

DISMOUNTABLE FOR RETROFITTING
HAMANN plants can be almost completely assembled at the location of installation on board the vessel to facilitate movement to the site through most doors and hatches. A huge benefit in refit projects, where this feature can often spare cutting an opening into the hull, saving a lot of time and costs.

EASE OF OPERATION & LOW MAINTENANCE
Routine functions on HAMANN plants are fully automatic and no specialised skills are required for daily operation. Our technology eliminates the need for filters and membranes, which would require a lot of work for regular cleaning and replacement. Routine maintenance on HAMANN plants can be carried out quickly and easily by the crew on board. The open design allows instant access to all components for inspection and service purposes.

RELIABILITY
Proven technology and manufacturing to the highest quality standards combined with straightforward operation and low maintenance requirements give HAMANN plants the reliability and longevity they are known for around the world.

*For the latest information on the certification of specific models, please contact us or visit www.gisis.imo.org for IMO certificates, www.cgmix.uscg.mil for USCG certificates and www.mared.org for EU MED certificates.

KEY SPECIFICATIONS	HL-CONT Plus				HL-CONT Plus OceanCruise						
	10	20	40	80	025	05	10	20	40	80	120
Capacity (m^3/day)	24	48	96	192	6	12	24	48	96	192	288
People on board (180 l/day)	133	266	533	1,066	33	66	133	266	533	1,066	1,600
Multi-plant systems	Two or more HL-CONT Plus plants can be configured to operate as a system, providing redundancy and/or customized treatment capacities.				Two or more HL-CONT PLUS OceanCruise plants can be configured to operate as a system, providing redundancy and/or customized treatment capacities.						
Basic measurements[1] W / D / H (m)	1.2/1.7/1.8	1/1.2/1.1	2.2/2.7/2.3	2.3/3.9/3	0.9 / 1.2 / 1.1 [3] 0.9 / 0.8 / 0.9 [4]	1 / 1.4 / 1.4 [3] 0.9 / 1.2 / 1.1 [4]	1.2 / 1.7 / 1.8 [3] 1 / 1.4 / 1.4 [4]	1.6 / 2.1 / 2.1 [3] 1.2 / 1.7 / 1.8 [4]	2.2 / 2.7 / 2.3 [3] 1.6 / 2.1 / 2.1 [4]	2.3 / 3.9 / 3 [3] 2.2 / 2.7 / 2.3 [4]	2.7 / 3.5 / 3.4 [3] 2.3 / 3.9 / 3 [4]
Weight empty (kg)	880	1,600	2,036	2,684	Depending on configuration						
Energy consumption (kW)	3.4 - 7.7	5 - 9.8	10.2 - 24	11.1 - 24	Depending on configuration						
Certification & Compliance	USCG Type 2 (33 CFR 159)				Compliant with US 33 CFR 159 Subpart E (Alaska), IMO MEPC.227(64) incl. Sect.4.2 (Baltic sea) and EU MEDB & D standards. [2]						

Please note: This information is not to be used for design purposes. Subject to change without notice! The detailed technical specifications and all information on the scope of delivery are given in the product specifications of the respective plant model. Please contact our sales team via sales@hamannag.com

[1] Main units excl. seperate components; HL-CONT Plus OceanCruise & RiverCruise systems excluding MBBR modules

[2] For the latest information on the certification of specific models, please contact us or check gisis.imo.org for IMO certificates, cgmix.uscg.mil for USCG certificates and mared.org for EU MED certificates.

[3] Pre-treatment

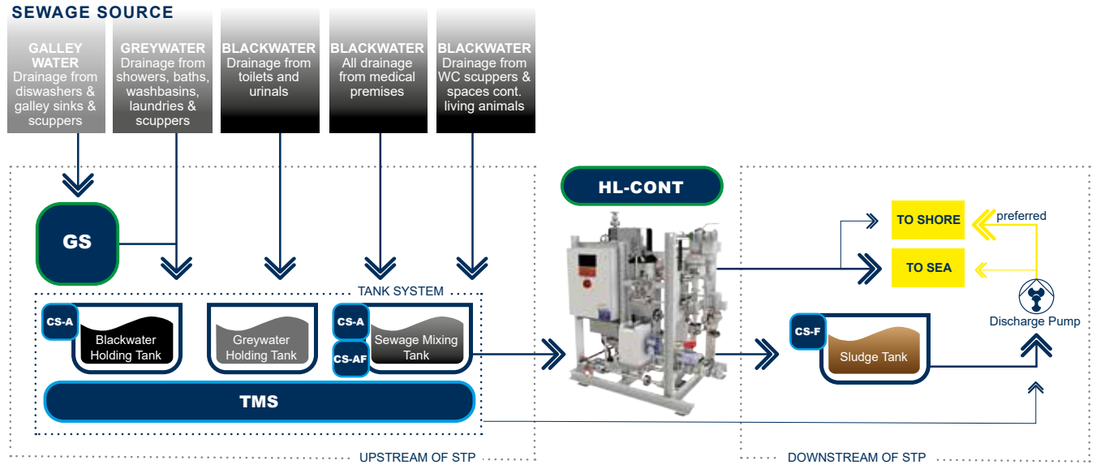
[4] Final treatment

OVERVIEW: COMPONENTS OF A SEWAGE SYSTEM

MORE THAN A SEWAGE TREATMENT PLANT

The sewage system comprises of all the installation, such as piping and tanks, and equipment, such as sewage treatment plants and grease separators, used to collect, distribute, store, condition and process the sewage produced on board. At HAMANN, we always consider greywater and galley water besides blackwater in sewage systems. In addition to the hardware, a sewage management plan is an integral part of the sewage system. We offer a complete range of high quality components for sewage systems, designed and manufactured in Hollenstedt, Germany. Find out more on pages 6 & 7!

SEWAGE SYSTEM Overview



RECOMMENDED ADD-ONS

- CS-A — TANK AERATION SYSTEM
- CS-AF — TANK AERATION & CIRCULATION SYSTEM
- CS-F — SLUDGE CIRCULATION SYSTEM
- TMS — TRANSFER MANAGEMENT SYSTEM

ESSENTIAL COMPONENTS

- GS — GREASE SEPERATOR
- HL-CONT — SEWAGE TREATMENT PLANT (HL-CONT COMPACT / PLUS)

ADVANCED WASTEWATER TREATMENT SYSTEM (HL-CONT PLUS OCEANCRUISE / RIVERCRUISE)

HAMANN AG

ADVANCING MARINE SEWAGE TECHNOLOGY. SINCE 1972.

HAMANN
SEWAGE TREATMENT TECHNOLOGY

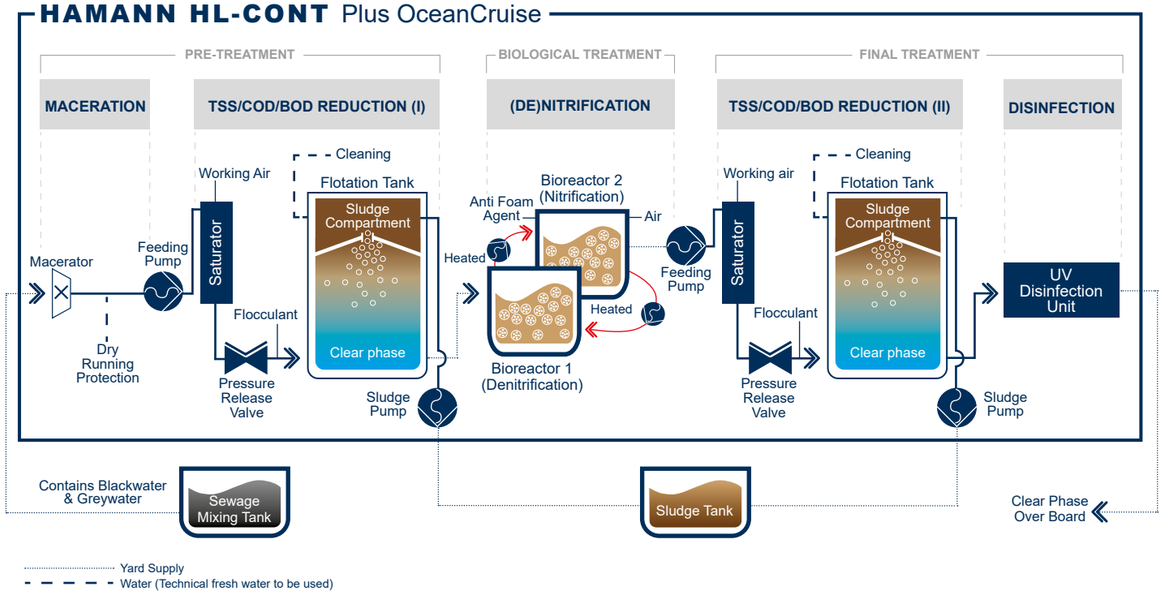
RELIABLE EFFLUENT QUALITY MEETS USABILITY

PREPARATION: CREATING THE SEWAGE MIX

HAMANN sewage treatment plants are designed to process both blackwater and greywater as a sewage mixture. This mixture is created in the sewage mixing tank from which it is pumped into the sewage treatment plant. Depending on the tank configuration on board, greywater and/or blackwater are transferred into the sewage mixing tank to create the sewage mixture. When the filling level in the sewage mixing tank reaches a predefined level, the feeding pump of the sewage treatment plant starts to operate and the treatment process is initiated.

HAMANN TECHNOLOGY
Key Benefits

- ✓ No filters or membranes: Less and cleaner maintenance work for the crew
- ✓ Blackwater and greywater treatment in the same process
- ✓ HL-CONT Plus: Unaffected by strong fluctuations in the load and longer downtimes
- ✓ HL-CONT Plus OceanCruise: Effluent quality meets highest standards



PROCESS DESCRIPTION
HL-CONT Plus OceanCruise

PRE-TREATMENT

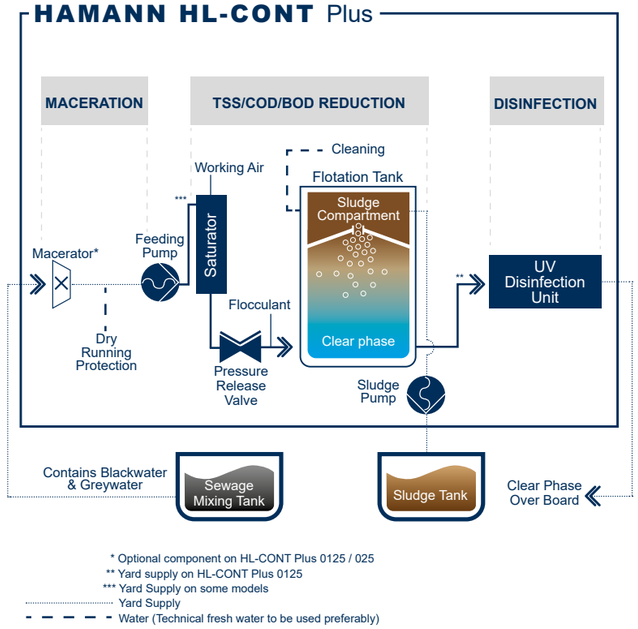
The sewage mix from the sewage mixing tank is first run through a macerator to chop up solid and fibrous components. By means of our Dissolved Air Flotation (DAF) technology we separate the suspended solids (TSS) and reduce the chemical (COD) and biological (BOD) oxygen demand. With the addition of a flocculant, the solids create a sludge foam on the surface, leaving the clear phase in the lower part of the flotation tank. The sludge foam spills into the sludge compartment and is subsequently fed into the ship's sludge tank.

BIOLOGICAL TREATMENT

The pre-treated sewage is drained into the two-stage biological treatment, consisting of two Moving Bed Biofilm Reactors (MBBR). Circulating between the denitrification and nitrification stages, bacteria metabolize the nitrogren compound in the sewage.

FINAL TREATMENT

Since the bacterial processes in the biological treatment also produces biomass, the solids have to be removed in the second DAF unit. The flocculant used in this process also removes the phosphorus.
The already largely purified sewage is finally exposed to UV radiation to degrade the DNA of bacteria and microorganisms, rendering them incapable of reproducing and infecting. After this finishing step, the treated sewage is safe to be discharged overboard (if permitted).



MACERATION

The sewage mix from the sewage mixing tank is run through a macerator to chop up solid andfibrous components.

PROCESS DESCRIPTION
HL-CONT Plus

TSS/COD/BOD REDUCTION

By means of our Dissolved Air Flotation (DAF) technology we separate the suspended solids (TSS) and reduce the chemical (COD) and biological (BOD) oxygen demand. The sewage is enriched with air under a pressure in the saturator. After being discharged into the Flotation Tank through the Pressure Release Valve, the excess air forms micro bubbles. Under addition of a flocculant the air bubbles adhere to the suspended particles in the sewage and form larger flakes. These flakes float upwards, creating a sludge foam on the surface and leaving the clear phase in the lower part of the Flotation Tank. The sludge foam spills into the Sludge Compartment and is subsequently fed continuously into the ship's Sludge Tank.

DISINFECTION

The already largely purified sewage is finally exposed to UV radiation to degrade the DNA of bacteria and microorganisms, rendering them incapable of reproducing and infecting. The treated sewage effluent is safe to be discharged overboard (if permitted).

ADVANCING MARINE SEWAGE TECHNOLOGY

SINCE 1972

OUTSTANDING PRE-SALES & AFTER-SALES CUSTOMER SUPPORT

We are the specialist partner for sewage systems and are at our customer's side from the planning stage to operation. With over 40 sales agents and service partners in the HAMANN GLOBAL NETWORK we provide customer support and technical field service around the globe.

TAILORED SOLUTIONS

We listen carefully, provide expert consultancy and then offer the best system for the customer's project. Providing customer specific solutions is part of HAMANN's DNA.

QUALITY MADE IN GERMANY

All our products are designed and made in Hollenstedt, Germany according to our accredited ISO 9001 quality management system and with attention to detail. We only use high-grade materials and components. The quality of the welds on our pipes, frames and tanks is second to none and cable routing is clean and secure.

HAMANN AG is a worldwide recognized manufacturer of sewage treatment technology for the maritime industry. We serve our clients to meet ever stricter regulation on sewage discharge and thus to rise to our joint responsibility to protect the marine environment. Our commitment to quality goes far beyond the R&D, engineering and manufacturing processes. The same amount of effort and attention to detail goes into every step that follows; from sales to engineering consultancy to commissioning and technical support many years later.
All these aspects account for the fact that HAMANN plants ensure continuous high effluent quality, reliability in day-to-day operation and low maintenance to the benefit of our clients and the oceans. Since delivering our first sewage treatment plant back in 1972, we have installed over 5.500 systems on superyachts, ferries, cruise ships and naval vessels all over the world.

HAMANN AG
ADVANCING MARINE SEWAGE TECHNOLOGY. SINCE 1972.

HAMANN
SEWAGE SYSTEM ADD-ONS

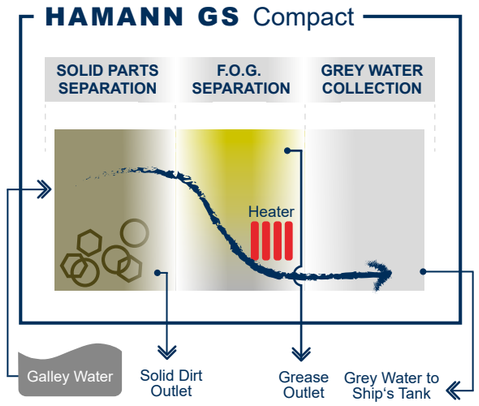
PREPARE. CONDITION. DISTRIBUTE.

HAMANN
GREASE SEPARATORS

Fats, oils and greases (short: FOG) have many properties which negatively impact the performance of the sewage system. Pipelines and sensors can be blocked or sealed by deposits. In holding tanks, fats and greases accelerate the formation of hydrogen sulphide (H2S) and subsequently of sulphuric acid (H2SO4). In addition, they severely impair the purification performance of the sewage treatment plant or advanced wastewater treatment system. Fats, oils and greases mainly get into the sewage via food residues. Therefore, all drainage from galley areas, i.e. from sinks and dishwashers, must first be processed in a grease separator before it is fed into a holding tank. After this treatment, galley water may be considered as greywater. HAMANN GS Compact grease separators work according to the principle of gravity separation and have no moving parts. They feature all stainless steel construction for maximum robustness and are certified by TÜV Rheinland according to DIN EN 1825-1, DIN EN 1825-2 and DIN EN 4040.

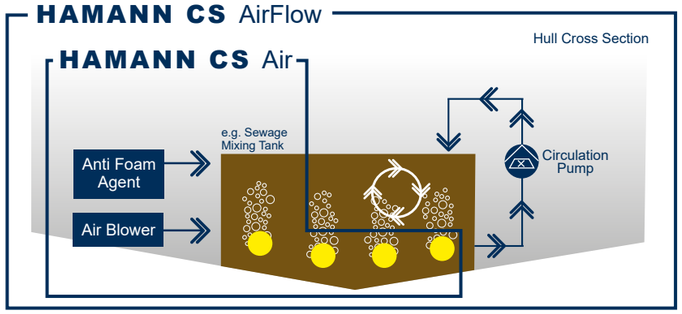
SYSTEM ADD-ONS
Key Benefits

- ✓ Influent to the STP/AWTS is free from fats, oils and grease
- ✓ STP/AWTS is constantly fed with a sewage mixture of blackwater and greywater
- ✓ Untreated sewage is kept in aerobic condition and well circulated
- ✓ Sewage sludge is kept pumpable for later discharge



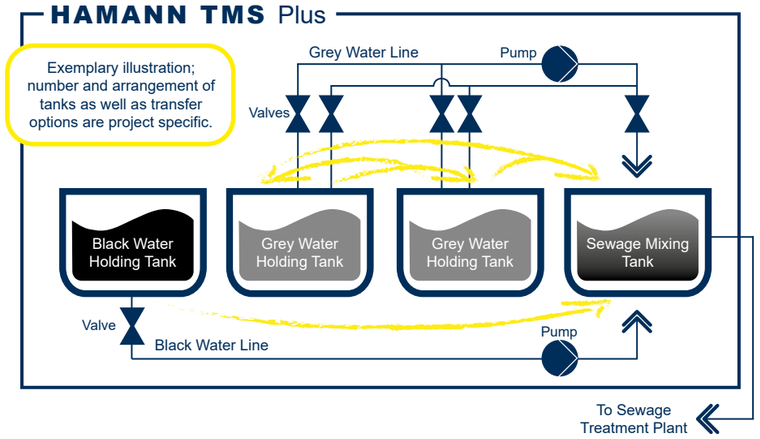
HAMANN
TANK AERATION & CIRCULATION SYSTEMS

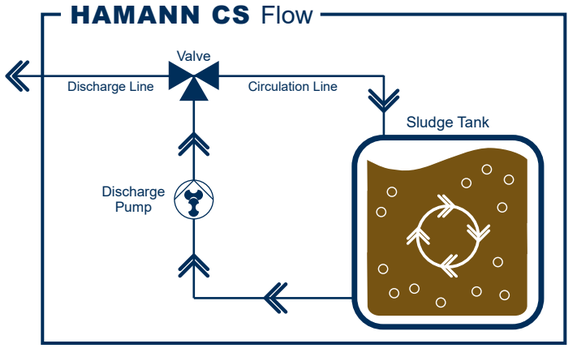
Anaerobic conditions and sedimentation are two problems associated with the storage of untreated sewage or blackwater. Anaerobic conditions develop due to natural oxygen consuming biological processes within the sewage. As a result, hydrogen sulphide (H2S) or even sulphuric acid (H2SO4) may form. The first is an extremely smelly and potentially lethal gas, the latter can erode the substance of the plant, the piping and ultimately the ship's structure. Sedimentation occurs when the suspended solids settle and concentrate in the lower layers of the sewage in a tank. When the "thick" lower layers are fed into the STP/AWTS, they may cause clogging of valves, sensors and pipes of the plant. A HAMANN CS Air tank aeration system compensates the oxygen consumption by supplying fresh oxygen and thereby also assists the active biological processes. It also helps to counteract sedimentation of solid particles, although not as effectively as a HAMANN CS AirFlow system. This system combines our aeration technology with a circulation of the tank content to achieve maximum conditioning performance. Besides keeping the sewage in aerobic condition, a HAMANN CS AirFlow system also effectively prevents sedimentation. We recommend HAMANN CS AirFlow systems for the sewage mixing tank and HAMANN CS Air systems for all holding tanks containing black water.



HAMANN
TRANSFER MANAGEMENT SYSTEMS

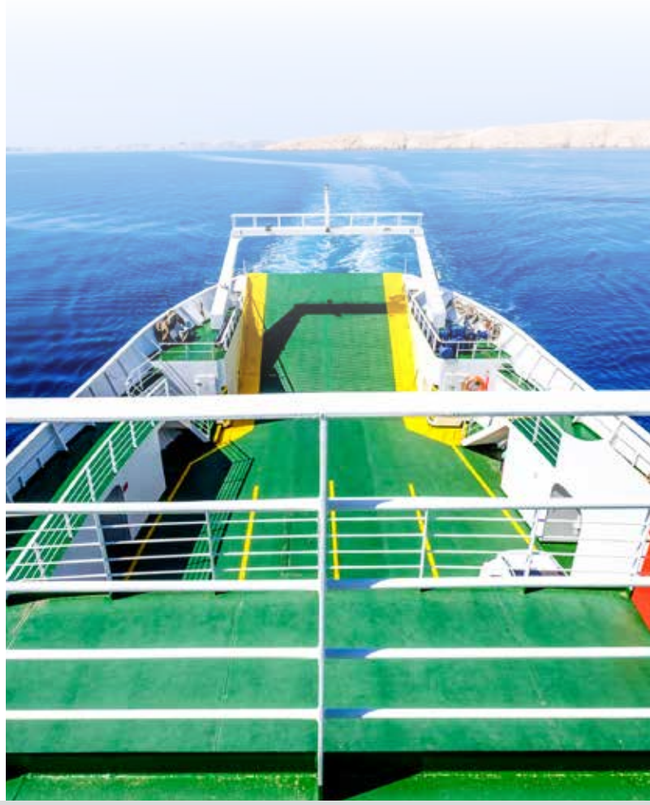
In most cases, there will be two or more separate holding tanks on board a vessel, containing either blackwater or greywater or both. For several reasons, a system is then needed to distribute the tank contents onwards. There may be the need to transfer sewage or greywater back and forth between different holding tanks, e.g. to equalise the filling levels. Depending on the tank system configuration, greywater and blackwater need to be transferred from their dedicated holding tanks into the sewage mixing tank, from which the STP/AWTS is fed. HAMANN TMS Plus transfer management systems take over all these tasks automatically and/or semi-automatically. The system software controls when and from which tank and in what quantity sewage is transferred to the sewage mixing tank or another holding tank. This ensures that the available tank capacities are used in the best possible way, that the filling of all tanks is optimally coordinated and that a mixture of blackwater and greywater is available in the sewage mixing tank for feeding into the STP/AWTS.





HAMANN
SLUDGE CIRCULATION SYSTEMS

Sewage sludge stored in a holding tank tends to rapidly develop sedimentation. The lower layers will then no longer be pumpable for discharge purposes and have to be manually removed from the tank, requiring a considerable amount of time and effort. To avoid having to execute this most unpleasant task, a HAMANN CS Flow sludge circulation system should be installed. It constantly circulates the sludge in the holding tank, keeping it in pumpable condition at all times.



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HAMANN GLOBAL NETWORK

GET IN TOUCH - FOLLOW US!

Our GLOBAL NETWORK of sales agents and service partners supports HAMANN customers around the world. Wether you are looking for new sewage system components or you need spare parts or technical service for an existing system, either HAMANN AG direct or one of our official sales agents and certified service partners is there for you. Find the partner closest to you on our website:

www.hamannag.com/global-network

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