2026

HAMANN AG

Built to comply. Made to last.



SEWAGE TREATMENT

EQUIPMENT FOR SHIPS

Sewage Treatment

Galley Water Treatment

Sewage Tanks

Additives

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THIS IS US

ADVANCING MARINE SEWAGE TECHNOLOGY. SINCE 1972.

OUTSTANDING CUSTOMER SUPPORT

Our team is at the customer‘s side from the early planning stage to operation. Direct, personal and flexible.

TAILORED SOLUTIONS

We are the specialists in sewage systems. 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. Our quality management system is ISO 9001 accredited by DNV. High-grade materials and components and superb workmanship distinguish our products. That shows in the details like the quality of the welds on our pipes, frames and tanks as well as clean and secure cable routing.

REPRESENTED WORLDWIDE

Our GLOBAL NETWORK of more than 40 sales agents and service partners provides customer support and technical field service around the world. Wether you are in the market for new sewage system components or you need spare parts or technical service, either HAMANN AG direct or one of our official sales agents and certified service partners is there to help. Find the partner closest to you on our website.

HAMANN AG is a worldwide recognized manufacturer of sewage treatment equipment for the marine 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.

Since delivering our first sewage treatment plant back in 1972, we have installed over 5.500 systems on yachts, ferries, cruise ships, commercial and naval vessels all over the world.

HAMANN plants ensure continuous high effluent quality, reliability in day-to-day operation and low maintenance to the benefit of our customers and the oceans.



OVERVIEW: COMPONENTS OF A SEWAGE SYSTEM

COLLECT. CONDITION. TRANSFER. DISCHARGE.

The sewage system comprises of all the installation and equipment used to collect, distribute, store, condition and process the sewage produced on board. That includes piping, tanks, grease separators, conditioning systems, tank transfer systems and sewage treatment plants. At HAMANN, we always consider grey water and galley water besides black water in sewage systems. All our sewage treatment plants and advanced wastewater treatment systems are designed to process both black water and grey water in the same process. We offer a complete range of high quality components for sewage systems, designed and manufactured in Hollenstedt, Germany. Furthermore, we support our customers in the design and layout of the sewage systems for their vessels to ensure that they are able to perform their duty: Protect the marine environment from pollution by ships.

GS Compact — GREASE SEPARATORS

HL-CONT Compact, Plus, Plus OceanCruise, Plus RiverCruise
- SEWAGE TREATMENT PLANT (HL-CONT Compact / Plus)
- ADVANCED WASTEWATER TREATMENT SYSTEM (HL-CONT Plus OceanCruise / HL-CONT Plus RiverCruise)

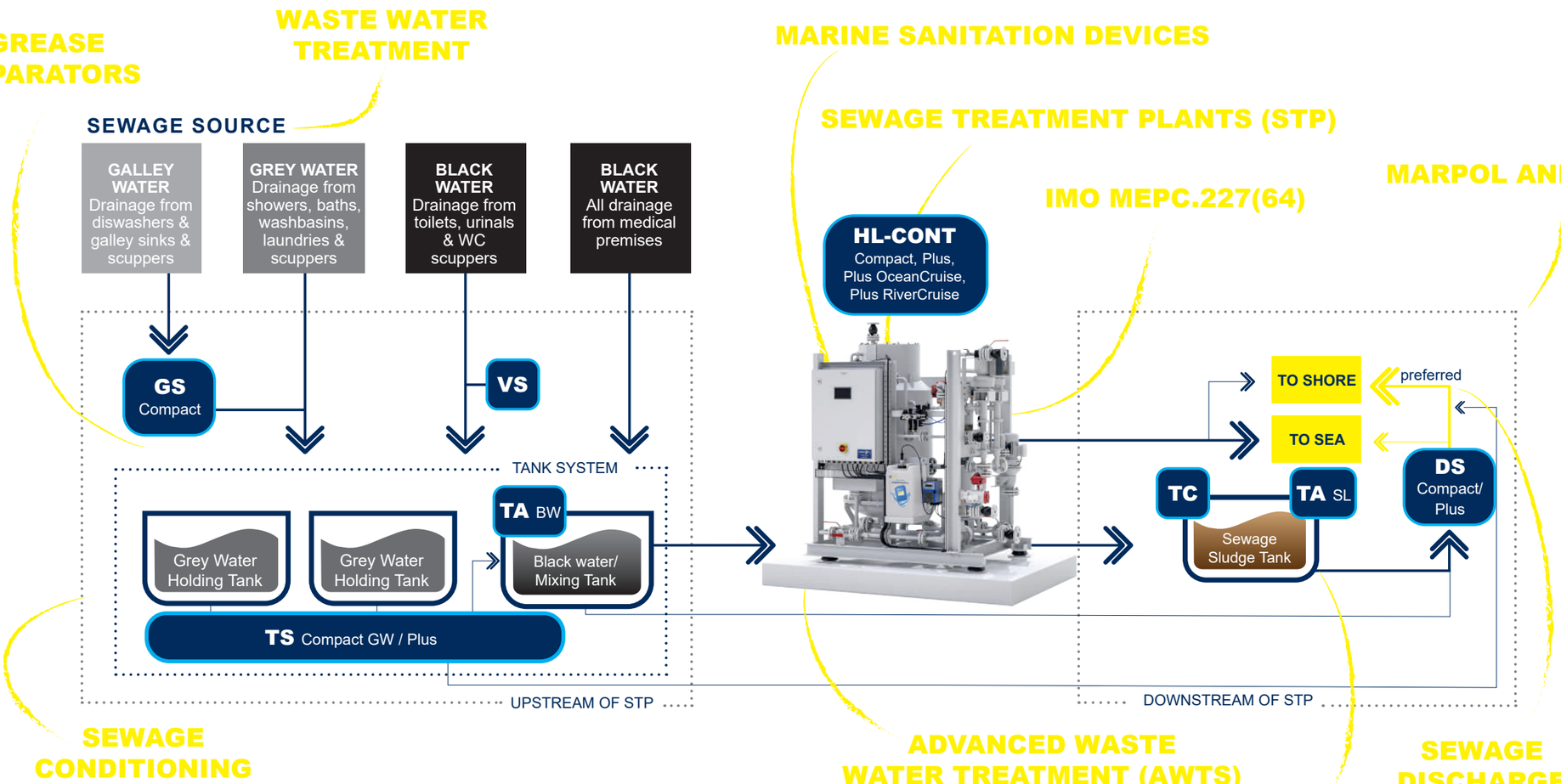
TA BW **TA** SL — TANK AERATION SYSTEI

TC — TANK CIRCULATION SY

TS Compact/Plus — TRANSFER SYSTEM

VS — VACUUM SYSTEM

DS Compact/Plus — DISCHARGE SYSTEM



A LITTLE TERMINOLOGY

"SEWAGE" MEANS
- Black water
- Grey water, when mixed with black water

"BLACK WATER" MEANS
- Drainage and other wastes from any form of toilets, urinals and WC scuppers
- Drainage from medical premises (dispensary, sick bay, etc.) via wash basins, wash tubs and scuppers located in such premises

"GREY WATER" MEANS
- Drainage free from faecal matter or fat, e.g. from dishwashers, showers, wash basins, laundry, etc.
- Galley water, after it has been processed in a grease separator

"GALLEY WATER" MEANS
- Drainage from kitchen premises via sinks and scuppers located in such premises as it likely contains fat

MARINE SANITATION DEVICES

- Sewage Treatment
- Galley Water Treatment
- Sewage Tanks
- Additives

SEWAGE TREATMENT

SEWAGE TREATMENT PLANTS

HAMANN HL-CONT Compact
HAMANN HL-CONT Plus

ADVANCED WASTEWATER TREATMENT SYSTEMS

HAMANN HL-CONT Plus OceanCruise
HAMANN HL-CONT Plus RiverCruise

SEWAGE TREATMENT PLANTS

HAMANN HL-CONT Compact



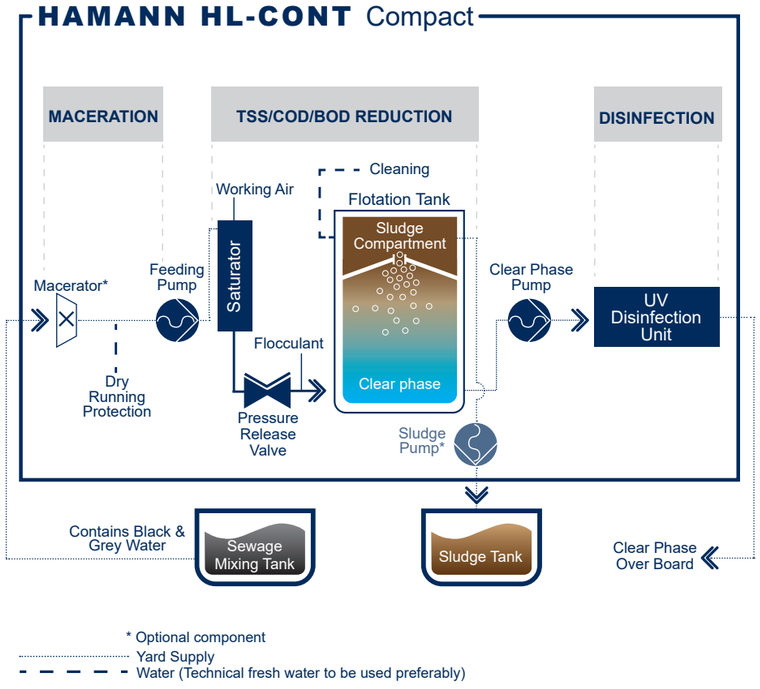




- ✓ **CERTIFIED TO IMO MEPC.227(64), EU-MED & UK-MER**
- ✓ **EXTRA SMALL & LIGHT WITH ADAPTABLE LAYOUT**
- ✓ **OPTIMISED PACKAGE FOR BASIC SCENARIOS**
- ✓ **NO FILTERS OR MEMBRANES**
- ✓ **BLACK WATER & GREY WATER TREATMENT IN THE SAME PROCESS**

HAMANN HL-CONT Compact sewage treatment plants (STP), or marine sanitation devices (MSD), are optimised for the common operating scenarios for units in the capacity range of up to 3000 litres/day in the marine industry. They offer maximum performance and reliability in the smallest and lightest package. Being a true HAMANN sewage treatment plant, the HL-CONT Compact features stainless steel construction to the highest standards and top-quality components throughout. This unit covers all the essential tasks of a sewage treatment plant as part of the sewage system on board and it does so in a truly compact package at lower costs. For sewage treatment plants offering more customisation options, please take a look at our HL-CONT Plus range.

PROCESS DESCRIPTION



PREPARATION: CREATING THE SEWAGE MIX

HAMANN HL-CONT Compact sewage treatment plants are designed to process both black water and grey water 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, grey water and/or black water 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.

MACERATION

Most toilet systems on board of vessels within the size range of the HL-CONT Compact 0125 sewage treatment plant are macerating. If not, a macerator can be ordered as an option for the HL-CONT Compact 0125. The sewage mixture from the sewage mixing tank is then first run through the macerator to chop up solid and fibrous components prior to the next process step.

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 pressure in the saturator. After being discharged into the flotation tank through the pressure release valve, the excess air forms micro bubbles. A flocculant is added in order to let air bubbles and susupended particles 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 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 microoganisms, rendering them incapable of reproducing and infecting. After this finishing step, the treated sewage is safe to be discharged overboard (if permitted).

KEY FACTS

EXTRA SMALL & LIGHT WITH ADAPTABLE LAYOUT

The HL-CONT Compact 0125 is the smallest and lightest sewage treatment plant, or marine sanitation device, with these performance characteristics and full IMO, EU MED and UK MER certification available on the market. It can be set up in two different layouts to suit different mounting positions.

OPTIMISED PACKAGE FOR BASIC SCENARIOS

HL-CONT Compact plants are optimised for the most common operating scenarios in their class. They offer the renowned HAMANN performance and quality at a lower cost.

EASE OF OPERATION & LOW MAINTENANCE

Routine functions on HAMANN plants are fully automatic and no specialised skills are required to operate them. 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.

COMBINED BLACK WATER & GREY WATER TREATMENT

As all HAMANN plants, HL-CONT Compact systems are designed to treat black water and grey water as a sewage mixture in the same process. This benefits the performance and reliability of the sewage treatment system as well as the environment.

PRODUCT SPECIFICATIONS

	0125
Hydraulic loading (m^3/day)	3
Organic loading (kg BOD*//day)	2.41
No. of persons on board* (approx. from/to)	16
Basic measurements** Layout A w/d/h (m)	0.8/0.5/0.9
Basic measurements** Layout B w/d/h (m)	0.9/0.4/0.9
Weight empty (kg)	165
Power consumption*** (kW)	1.2 - 4.8
Certification & Compliance	IMO MEPC.227(64), EU MED & UK MER

PLEASE NOTE:

This information is not to be used for design purposes. All details are subject to change without notice. Detailed technical specifications and all information on the scope of delivery are given in the product specifications. Please contact our sales team via sales@hamannag.com.

* Biological oxygen demand

** Basic measurements of main unit, excluding the following separate components: Control cabinet, feeding pump, flocculant dosing station, uv unit

*** Depending on configuration / optional components

SEWAGE TREATMENT PLANTS

HAMANN HL-CONT Plus

- ✓ CERTIFIED TO IMO MEPC.227(64), USCG TYPE II MSD, EU-MED & UK MER
- ✓ OPTIONAL ON-SITE ASSEMBLY FOR RETROFITS
- ✓ NO FILTERS OR MEMBRANES
- ✓ BLACK WATER & GREY WATER TREATMENT IN THE SAME PROCESS
- ✓ HIGHLY CUSTOMISABLE

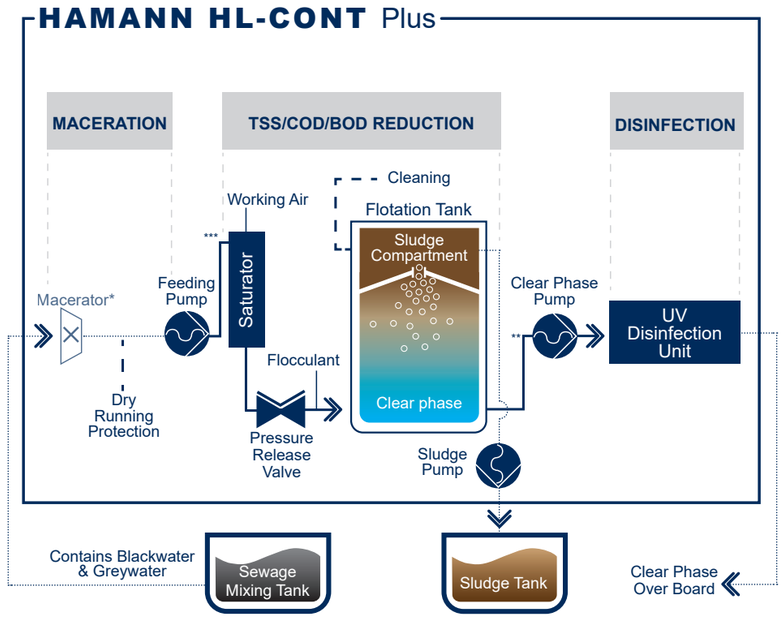






HAMANN HL-CONT Plus sewage treatment plants (STP), or marine sanitation devices (MSD), are available in many different sizes, offering treatment capacities from 3,000 litres/day up to 192,000 litres/day. Stainless steel construction on frames, top-quality components and extensive customisation options make these systems the all-rounders in our program. HAMANN HL-CONT Plus plants are renowned for their ease of operation, reliability, low maintenance requirements and compact dimensions. As with all plants using our Dissolved Air Flotation (DAF) technology, HL-CONT Plus units can be delivered dismounted for assembly at the location of installation on board the vessel. The HAMANN HL-CONT Plus range of sewage treatment plants covers most use-cases in the marine industry and is available for any size of vessel.

PROCESS DESCRIPTION



* Optional component on HL-CONT Plus 0125 / 025
** Yard supply on HL-CONT Plus 0125
*** Yard Supply on some models

Yard Supply
Water (Technical fresh water to be used preferably)

PREPARATION: CREATING THE SEWAGE MIX

HAMANN HL-CONT Plus sewage treatment plants are designed to process both black water and grey water 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, grey water and/or black water 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.

MACERATION

The sewage mixture from the sewage mixing tank is first run through a macerator to chop up solid and fibrous components. A macerator is part of the HL-CONT Plus sewage treatment plant from size 05 upwards and can be ordered as an option on the HL-CONT Plus 0125 and 025 models if the toilet system on board is non-macerating.

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. A flocculant is added in order to let air bubbles and susupended particles 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 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 microoganisms, rendering them incapable of reproducing and infecting. After this finishing step, the treated sewage is safe to be discharged overboard (if permitted).

KEY FACTS

IMO, USCG, EU-MED & UK MER CERTIFICATION

HAMANN HL-CONT Plus sewage treatment plants, or marine sanitation devices comply with the regulations for most use cases: The IMO‘s MEPC.227(64), excluding section 4.2, US 33 CFR 159 (US Coast Guard Type 2 MSD), EU-MED and UK MER.

EXTENSIVE CUSTOMISATION OPTIONS

We offer a wide range of customization options for HL-CONT Plus sewage treatment plants. This enables us to supply a system that exactly meets the customer’s specifications.

OPTIONAL ON-SITE ASSEMBLY FOR RETROFITS

HL-CONT Plus 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 retrofit 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 HL-CONT Plus 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.

COMBINED BLACK WATER & GREY WATER TREATMENT

As all HAMANN plants, HL-CONT Plus systems are designed to treat black water and grey water as a sewage mixture in the same process. This benefits the performance and reliability of the sewage treatment system as well as the environment.

PRODUCT SPECIFICATIONS

	0125	025	05	10	20	40	80
Hydraulic loading (m^3/day)	3	6	12	24	48	96	192
Organic loading (kg BOD*//day)	2.41	4.82	5.81	11.62	23.24	46.5	93.0
Avg. number of persons on board**	16	32	65	130	260	519	1,038
Basic measurements*** main unit w/d/h (m)	0.9/0.8/0.9	0.9/1.2/1.1	1/1.4/1.4	1.2/1.7/1.8	1.6/2.1/2.1	2.2/2.7/2.3	2.3/3.9/3
Weight empty (kg)	165	312	691	880	1,600	2,036	2,684
Power consumption**** (kW)	1.2 - 4.8	1.7 - 4.8	2.6 - 7.4	3.4 - 7.7	5 - 9.8	10.2 - 24	11.1 - 24
Certification & Compliance	IMO MEPC.227(64), USCG Type II (33 CFR 159), EU-MED & UK MER						

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* Biological oxygen demand
** Depending on the assumed volume of sewage per person and day. The information given here is based on 185 l/person per day.
*** Basic measurements of main unit, excluding separate components.
Separate components HL-CONT Plus 0125: Control cabinet, feeding pump, flocculant dosing station, uv unit
Separate components HL-CONT Plus 025 Control cabinet, feeding pump, flocculant dosing station
Separate component HL-CONT Plus 05 / 20 / 40 / 80 / 120: Flocculant dosing station
no separate components on HL-CONT Plus 10
**** Depending on configuration / optional components

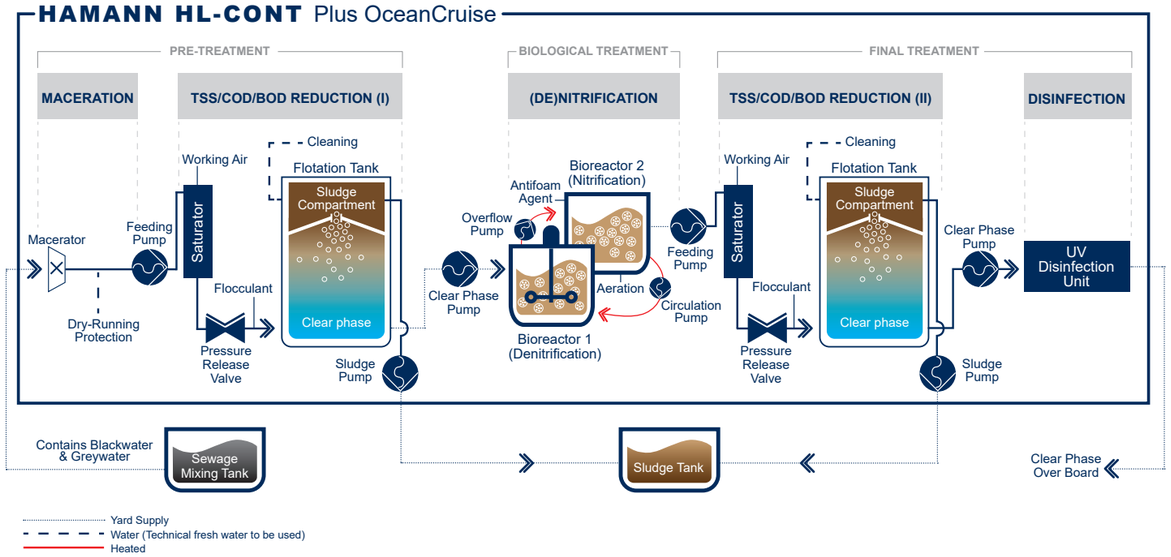
ADVANCED WASTEWATER TREATMENT SYSTEMS

HAMANN HL-CONT Plus OceanCruise

- ✓ **IMO MEPC.227(64) 4.2 (BALTIC SEA) & US 33 CFR 159 SUBPART E (ALASKA) COMPLIANT**
- ✓ **MODULAR DESIGN & SMALL FOOTPRINT**
- ✓ **NO FILTERS OR MEMBRANES**
- ✓ **BLACK WATER & GREY WATER TREATMENT IN THE SAME PROCESS**
- ✓ **IDEAL FOR NEW BUILDS AND RETROFIT PROJECTS**

The HAMANN HL-CONT Plus OceanCruise range of advanced wastewater treatment systems (AWTS) are designed to meet or exceed the highest current standards for sewage and greywater discharge. These systems are compliant with IMO regulation MEPC.227(64) including section 4.2 (Baltic Sea as MARPOL Annex IV special area) as well as US regulation 33 CFR 159 Subpart E (Alaska). Therefore, they are the perfect choice for vessels operating in the waters of Alaska or the Baltic Sea. Combining our physical and biological treatment technologies, HL-CONT Plus OceanCruise systems eliminate the need for filters and membranes. Their modular design consists of four separate modules: Two Dissolved Air Flotation (DAF) units and two Moving Bed Biofilm Reactors (MBBR). Each module can be installed apart from the others, even on different decks. This gives tremendous flexibility when it comes to fitting a sewage system into a hull. Moreover, ship's tanks may be converted to become the biological treatment modules. The footprint of a HAMANN HL-CONT Plus OceanCruise system can be up to 70% smaller than that of a comparable system from other manufacturers.

PROCESS DESCRIPTION



PREPARATION: CREATING THE SEWAGE MIX

HAMANN HL-CONT Plus OceanCruise systems are designed to process both black water and grey water 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, grey water and/or black water 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.

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).

KEY FACTS

BALTIC SEA & ALASKA COMPLIANT

HAMANN HL-CONT Plus OceanCruise advanced wastewater treatment systems (AWTS) comply with the strictest regulations on sewage discharge in place today: The IMO's MEPC.227(64) section 4.2 regarding the Baltic Sea as MARPOL Annex IV special area. as well as US 33 CFR 159 Subpart E regarding the waters of the state of Alaska.

SMALL FOOTPRINT

Due to our technology and design, the footprint of HAMANN HL-CONT Plus OceanCruise advanced wastewater treatment systems (AWTS) can be up to 70% smaller than comparable systems from other manufacturers - depending on the model.

RETROFIT-FRIENDLY MODULAR DESIGN

Each of the four separate modules of a HAMANN HL-CONT Plus OceanCruise system is only a fraction of the size of a comparable single block plant. Therefore, it is much easier to find the space to install them, most particularly on an existing vessel. In addition, the DAF units of HAMANN systems can be delivered dismounted for assemby at the location of installation on board the vessel. A huge benefit in retrofit projects, where this feature can often spare cutting an opening into the hull, saving a lot of time and money.

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. The open design of the DAF units allows instant access to all components for inspection and service purposes. Routine maintenance on HAMANN plants can be carried out quickly and easily by the crew on board.

COMBINED BLACK WATER & GREY WATER TREATMENT

As all HAMANN plants, HL-CONT Plus OceanCruise systems are designed to treat black water and grey water as a sewage mixture in the same process. This benefits the performance and reliability of the sewage treatment system as well as the environment.

PRODUCT SPECIFICATIONS

	05	10	20	40	80	120
Hydraulic loading (m^3/day)	12	24	48	96	192	288
Organic loading (kg BOD*/day)	7.21	14.42	28.85	57.70	115.39	173.09
Avg. number of persons on board**	65	130	260	519	1,038	1,567
Basic measurements***						
Pre-Treatment w/d/h (m)	1/1.4/1.4	1.2/1.7/1.8	1.6/2.1/2.1	2.2/2.7/2.3	2.3/3.9/3	2.7/3.5/3.4
Final-Treatment w/d/h (m)	0.9/1.2/1.1	1/1.4/1.4	1.2/1.7/1.8	1.6/2.1/2.1	2.2/2.7/2.3	2.3/3.9/3
Weight empty (kg)	depending on configuration					
Power consumption (kW)	depending on configuration					
Certification & Compliance	Compliant with IMO MEPC.227(64) incl. Sect. 4.2 (Baltic Sea), US 33 CFR 159 Sub-part E (Alaska) and EU MED B & D standards*****					

PLEASE NOTE:

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* Biological oxygen demand

** Depending on the assumed volume of sewage per person and day. The information given here is based on 185 l/person per day.

*** Basic measurements of main unit, excluding MBBR modules for biological treatment (project specific)

**** 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

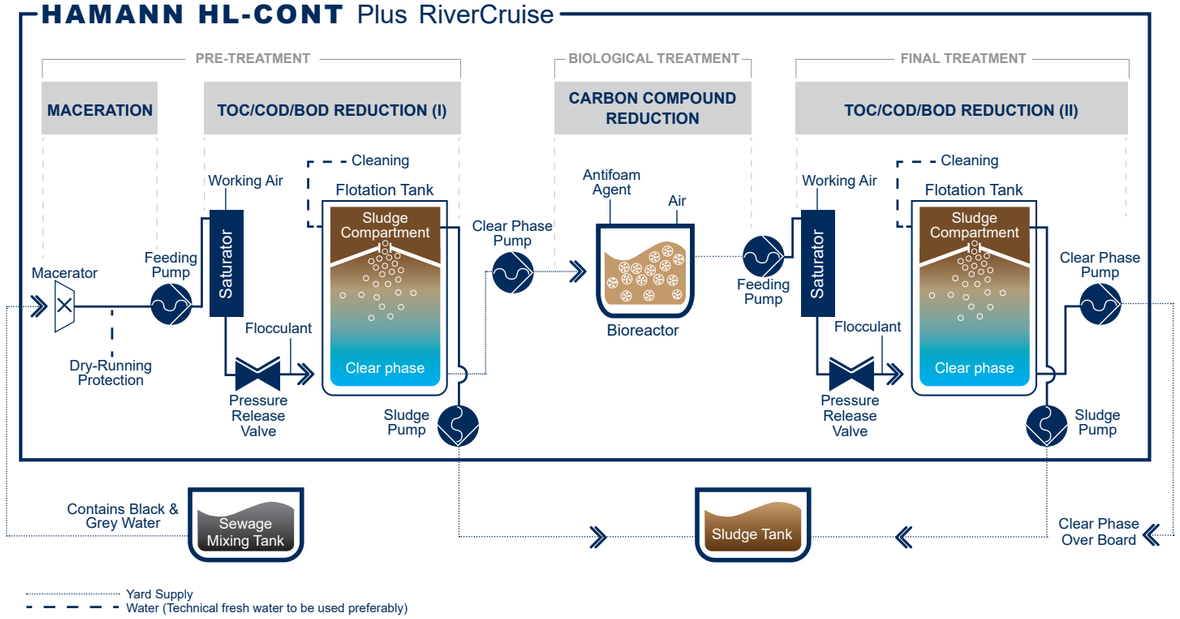
ADVANCED WASTEWATER TREATMENT SYSTEMS

HAMANN HL-CONT Plus RiverCruise

- ✓ EU CERTIFIED FOR INLAND NAVIGATION TO COMMISSION DIRECTIVE 2012/49/EU (ES-TRIN)
- ✓ MODULAR DESIGN & SMALL FOOTPRINT
- ✓ NO FILTERS OR MEMBRANES
- ✓ BLACK WATER & GREY WATER TREATMENT IN THE SAME PROCESS
- ✓ IDEAL FOR NEW BUILDS AND RETROFIT PROJECTS

The HAMANN HL-CONT Plus RiverCruise range of advanced wastewater treatment systems (AWTS) is specifically designed to meet the technical requirements of Commission Directive 2012/49/EU on sewage and greywater discharge for inland waterway vessels. Combining our physical and biological treatment technologies, HL-CONT Plus RiverCruise systems eliminate the need for filters and membranes. Their modular design consists of three separate units: Two Dissolved Air Flotation (DAF) units and one Moving Bed Biofilm Reactor (MBBR). Each of these modules can be installed apart from the others, even on different decks. This gives tremendous flexibility when it comes to fitting a sewage system into a hull. Moreover, ship's tanks may be converted to become the biological treatment module. The footprint of a HAMANN HL-CONT Plus RiverCruise system can be up to 70% smaller than that of a comparable system from other manufacturers.

PROCESS DESCRIPTION



PREPARATION: CREATING THE SEWAGE MIX

HAMANN HL-CONT Plus RiverCruise systems are designed to process both black water and grey water 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, grey water and/or black water 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.

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 susequently fed into the ship's sludge tank.

BIOLOGICAL TREATMENT

The pre-treated sewage is drained into a Moving Bed Biofilm Reactor (MBBR). Under permanent aeration and at a controlled temperature, bacteria metabolise the carbon compound (TOC) 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 treated sewage effluent is safe to be discharged overboard (if permitted).

KEY FACTS

EU CERTIFIED FOR INLAND NAVIGATION

HAMANN HL-CONT Plus RiverCruise advanced wastewater treatment systems (AWTS) are certified to the Euopean Union's Commission Directive 2012/49/EU (ES-TRIN) regarding technical requirements for inland waterway vessels.

SMALL FOOTPRINT

Due to our technology and design, the footprint of HAMANN HL-CONT Plus RiverCruise advanced wastewater treatment systems (AWTS) can be up to 70% smaller than comparable systems from other manufacturers - depending on the model.

RETROFIT-FRIENDLY MODULAR DESIGN

Each of the three separate modules of a HAMANN HL-CONT Plus RiverCruise system is only a fraction of the size of a comparable single block plant. Therefore, it is much easier to find the space to install them, most particularly on an existing vessel. In addition, the DAF units of HAMANN systems can be delivered dismounted for assemby at the location of installation on board the vessel. A huge benefit in retrofit projects, where this feature can often spare cutting an opening into the hull, saving a lot of time and money.

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 of the DAF units allows instant access to all components for inspection and service purposes.

COMBINED BLACK WATER & GREY WATER TREATMENT

As all HAMANN plants, HL-CONT Plus RiverCruise systems are designed to treat black water and grey water as a sewage mixture in the same process. This benefits the performance and reliability of the sewage treatment system as well as the environment.

PRODUCT SPECIFICATIONS

	025	05	10	20	40	80
Hydraulic loading (m^3/day)	6	12	24	48	96	192
Organic loading (kg BOD*/day)	2.4	4.8	9.6	19.2	38.4	76.8
Avg. number of persons on board**	26	52	104	208	417	835
Basic measurements***						
Pre-treatment w/d/h (m)	0.9/0.8/0.9	0.9/1.2/1.1	1/1.4/1.4	1.2/1.7/1.8	1.6/2.1/2.1	2.2/2.7/2.3
Final-treatment w/d/h (m)	0.9/1.2/1.1	1/1.4/1.4	1.2/1.7/1.8	1.6/2.1/2.1	2.2/2.7/2.3	2.3/3.9/3
Weight empty (kg)	depending on configuration					
Power consumption (kW)	depending on configuration					
Certification & Compliance	Comission Directive 2012/49/EU / ES-TRIN					

PLEASE NOTE:

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* Biological oxygen demand

** Depending on the assumed volume of sewage per person and day. The information given here is based on 230 l/person per day.

*** Basic measurements of main unit, excluding MBBR modules for our biological treatment (project specific)

Sewage Treatment

Galley Water Treatment

Sewage Tanks

Additives

GALLEY WATER TREATMENT

GREASE SEPARATORS

HAMANN GS Compact

GREASE SEPARATORS

HAMANN GS Compact

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 reduce 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 grey water.

HAMANN grease separators are completely made of stainless steel. This makes them extremely robust and reliable. The effectiveness of HAMANN grease separators have been tested and confirmed by TÜV Rheinland according to DIN EN 1825-1.

KEY FACTS

REDUCED RISK OF SEWAGE SYSTEM BLOCKAGES AND H2S-FORMATION

Fats, oils and greases can block pipes and sensors. They also accelerate the formation of hydrogen sulohide (H2S) and subsequently sulphuric acid (H2SO4). HAMANN GS Compact grease separators reduce these risks by removing fats, oils and greases from the galley water before it enters the greywater system.

EASE OF OPERATION & LOW MAINTENANCE

HAMANN GS Compact grease separators work with gravity separation. There are no moving mechanical parts inside the plant and no additives are needed. Operation is extremely easy and maintenance requirements are minimal.

ROBUST & RELIABLE

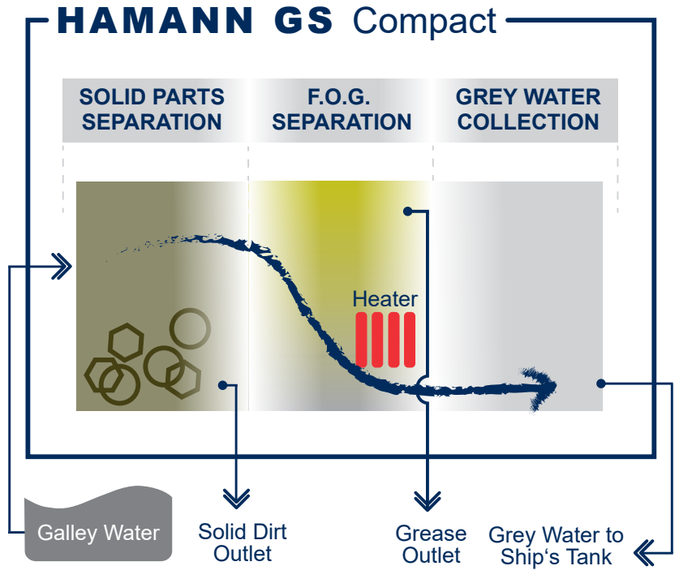
HAMANN grease separators are completely made of stainless steel for maximum robustness, durability and reliability.

TÜV RHEINLAND TESTED

The effectiveness of HAMANN grease separators have been tested and confirmed by TÜV Rheinland according to DIN EN 1825-1.



PROCESS DESCRIPTION



HAMANN GS Compact grease separators work exclusively according to the principle of gravity separation without mechanical parts or additives. Solid food residues are first separated from the galley water by gravity. Then, the fats and oils, which are lighter than water are collected at the top of the separation chamber of the grease separator. From there the collected fats and oils can be drained. A built-in heater keeps the fat liquid so that it can be drained more easily. Separated fats and oils from the grease separator, as well as solid food residues are transfered into external containers via the outlets provided for this purpose and disposed of ashore.

PRODUCT SPECIFICATIONS

	025	050	100	200	280	400	1000
Flow rate capacity (m^3/h)	1	2	4	7.2	11	16.5	41
Galley capacity (Persons)	~25	~50	~100	~200	~280	~400	~1,000
Basic measurements w/d/h (cm)	72/61/92	98/68/110	154/76/124	144/111/124	222/111/124	196/127/140	342/205/165
Weight empty (kg)	76	116	188	243	323	560	1,756
Grease compartment volume (l)	16	40	80	120	200	240	600
Certification	Certified by TÜV Rheinland according to DIN EN 1825-1						

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Sewage Treatment

Galley Water Treatment

Sewage Tanks

Additives

SEWAGE TANKS

TANK TRANSFER SYSTEMS

HAMANN TS Compact GW

HAMANN TS Plus GW

CONDITIONING SYSTEMS

HAMANN TA Tank Aeration Systems

HAMANN TC Tank Circulation Systems

DISCHARGE SYSTEMS

HAMANN DS Compact

HAMANN DS Plus

VACUUM SYSTEMS

HAMANN VS

TANK TRANSFER SYSTEMS

HAMANN TS Compact | HAMANN TS Plus

In most cases, grey water and sewage / black water are collected in separate tanks onboard a vessel. There will likely be two or more separate holding tanks for grey water in addition to the sewage / black water tank. The sewage treatment plant, or advanced wastewater treatment system, requires a mixture of sewage / black water and grey water for its treatment process and it is fed from one single tank, the sewage mixing tank (please also refer to „COMPONENTS OF A SEWAGE SYSTEM“ on pages 6/7). The common procedure is to use the black water tank as sewage mixing tank and transfer grey water from the holding tank into this tank. The main task of a tank transfer system is to perform these transfers fully automated.

In addition, there are several other reasons to distribute contents of holding tanks onwards. Storage times of sewage should always be kept short and tank contents should be processed in the sewage treatment plant as soon as possible. There may also be the need to transfer sewage or grey water back and forth between different holding tanks to equalise the filling levels. Whatever the requirements may be, our TS Compact and TS Plus tank transfer systems cover all application scenarios and preferences.

KEY FACTS

AUTOMATED ROUTINE TRANSFERS

HAMANN TS tank transfer systems take over routine transfers fully or semi-automatic and therefore support the crew in the operation of the sewage system.

OPTIMISED SEWAGE MIX FOR BETTER TREATMENT PERFORMANCE

The automated transfer of grey water into the sewage mixing tank helps to maintain the required sewage mix to be treated in the sewage treatment plant, which is essential for the STP's performance. It is therefore an important part of the sewage system.

UNIDIRECTIONAL OR MULTIDIRECTIONAL TRANSFER PATHS

Depending on the individual requirements, you can choose between our TS Compact tank transfer systems for unidirectional transfer paths from the holding tank(s) to the sewage mixing tank or our TS Plus tank transfer systems for additional multidirectional transfer paths between holding tanks and overboard.

EASY MANAGEMENT OF TANK CAPACITIES

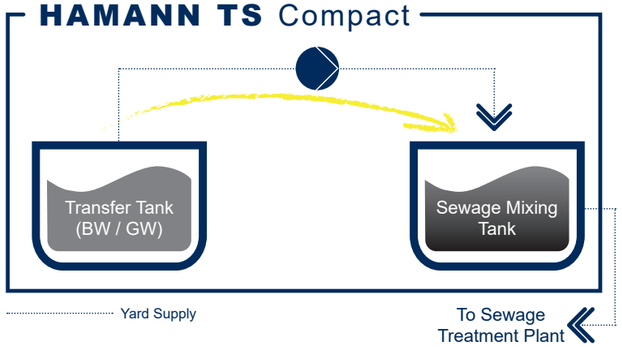
HAMANN TS Plus tank transfer systems can support the crew in the management of tank capacities. A touch operated display on the switch cabinet shows the fill levels for every tank in the system and manual transfers between holding tanks can be initiated easily.

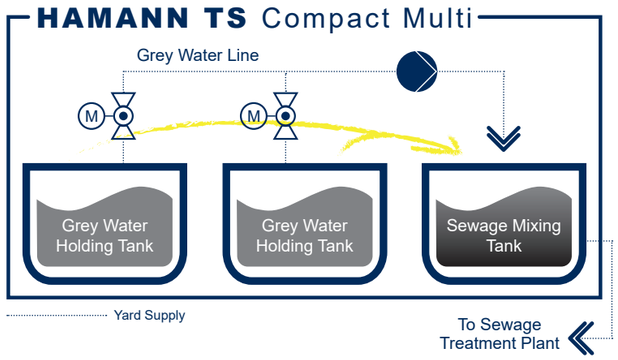


PROCESS DESCRIPTION

HAMANN TS COMPACT

A simple tank transfer system designed for basic tank layouts with one grey water holding tank and one black water tank, which is used as the mixing tank. It provides automated unidirectional transfers from the grey water holding tank to the mixing tank to provide the required mixture of black water and grey water for treatment in the sewage treatment plant.



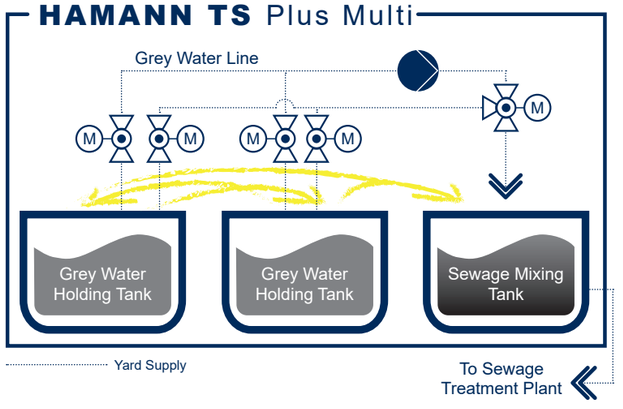


HAMANN TS COMPACT MULTI

TS Compact tank transfer systems are designed to cover the transfer requirements of tank systems with multiple holding tanks. They provide automated and manual unidirectional transfer paths from the holding tank, or multiple holding tanks, to the sewage mixing tank, out of which the sewage mix is pumped into the sewage treatment plant. The focus is on transferring grey water to the sewage mixing tank to provide the required mixture of black water and grey water for treatment in the sewage treatment plant.
TS Compact Multi systems are available for any number of holding tanks.

HAMANN TS PLUS MULTI

HAMANN TS Plus Multi tank transfer systems are designed to manage all the tasks involved with managing multi-tank systems automatically and/or semi-automatically. They provide automated unidirectional transfer paths from the holding tank, or multiple holding tanks, to the sewage mixing tank and in addition manual multidirectional transfer paths between holding tanks, as well as between holding tanks and overboard. Besides ensuring the required sewage mix of black water and grey water in the mixing tank for processing in the sewage treatment plant, HAMANN TS Plus Multi tank transfer systems support the crew in the management of more complex tank systems.
TS Plus Multi systems are available for any number of holding tanks.



CONDITIONING SYSTEMS

HAMANN TA BW/SL | HAMANN TC

Anaerobic conditions and sedimentation are two problems associated with the storage of untreated sewage (black water) and sewage sludge. 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 because of the solid particles and suspended solids, e.g. from toilet paper or hairs, in the sewage. As they are heavier than water, they tend to settle and concentrate in the lower layers of the sewage in a holding tank. When the "thick" lower layers are fed into the sewage treatment plant, they may cause clogging of valves, sensors and pipes of the plant. Both anaerobic conditions and sedimentation in the sewage mix lead to significantly reduced treatment performance of the sewage treatmen plant. Therefore, both are to be avoided.

KEY FACTS

PREVENTS SMELLY AND TOXIC GASES

HAMANN TA tank aeration systems ensure a constant supply of oxygen in sewage holding tanks to prevent the formation of hydrogen sulphide (H2S) or subsequently sulphuric acid (H2SO4).

PROMOTES ACTIVE BIOLOGICAL PROCESSES

The constant supply of oxygen also assists the active biological processes in the sewage. This is the natural way of sewage treatment. It is a form of natural pre-treatment that contributes to the performance of the sewage system on board.

REDUCES RISK OF BLOCKAGES OF PIPES, SENSORS AND VALVES

Pumping sewage concentrated by sedimentation into the sewage treatment plant can result in blockages of pipes, sensors and valves, which will reduce the performance of the plant or cause it to fail altogether. HAMANN TA tank aeration systems counteract sedimentation of solid particles through the movement in the tank contents induced by blowing air into the tank.

KEEPS SEWAGE SLUDGE PUMPABLE

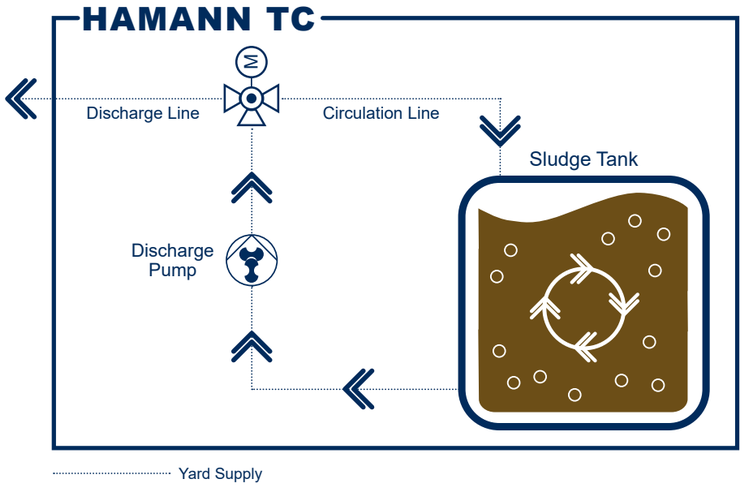
Sewage sludge stored in a holding tank tends to rapidly develop sedimentation and will then no longer be pumpable. A HAMANN TC tank circulation systems effectively prevents sedimentation and keeps sludge pumpable at all times.

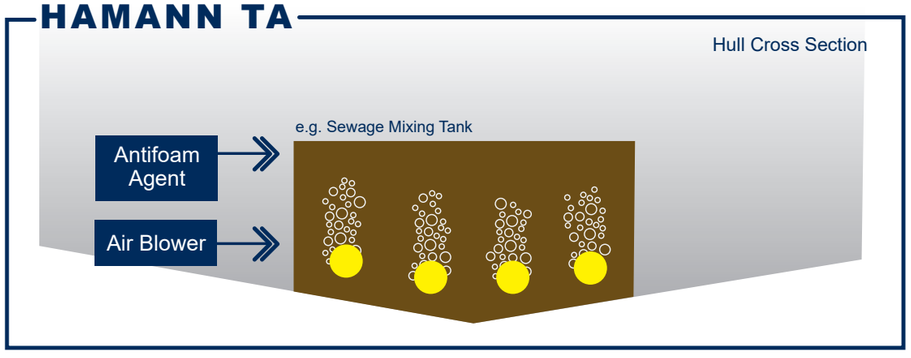


PROCESS DESCRIPTION

HAMANN TC TANK CIRCULATION SYSTEMS

Sludge basically consists of the solid particles and suspended solids extracted from the sewage in the treatment process. Therefore, it already has a thickened consistency, but is still pumpable. Sewage sludge stored in a holding tank tends to rapidly develop sedimentation. Within a very short period of time, the lower layers in the sludge tank will then no longer be pumpable. To be discharged, the contents then would 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 TC tank circulation system should be installed. It constantly circulates the sludge in the holding tank, preventing sedimentation and keeping it in pumpable condition at all times. TC tank circulation systems are operated in conjunction with HAMANN DS Compact/Plus discharge systems and are controlled via the HAMANN sewage treatment plant.





HAMANN TA BW/TA SL TANK AERATION SYSTEMS

A HAMANN TA tank aeration system compensates the oxygen consumed by biological processes within the sewage by supplying fresh oxygen. This effectively prevents the build-up of hydrogen sulphide (H2S) in black water and sewage sludge holding tanks. The constant supply of oxygen also assists the active biological processes in the sewage. This is the natural way of sewage treatment. It is a form of natural pre-treatment that contributes to the performance of the sewage system on board.

Blowing air into the tank also creates movement in the tank contents. That helps to counteract sedimentation of solid particles. We recommend HAMANN TA systems for all holding tanks containing black water (TA BW) and sewage sludge (TA SL).

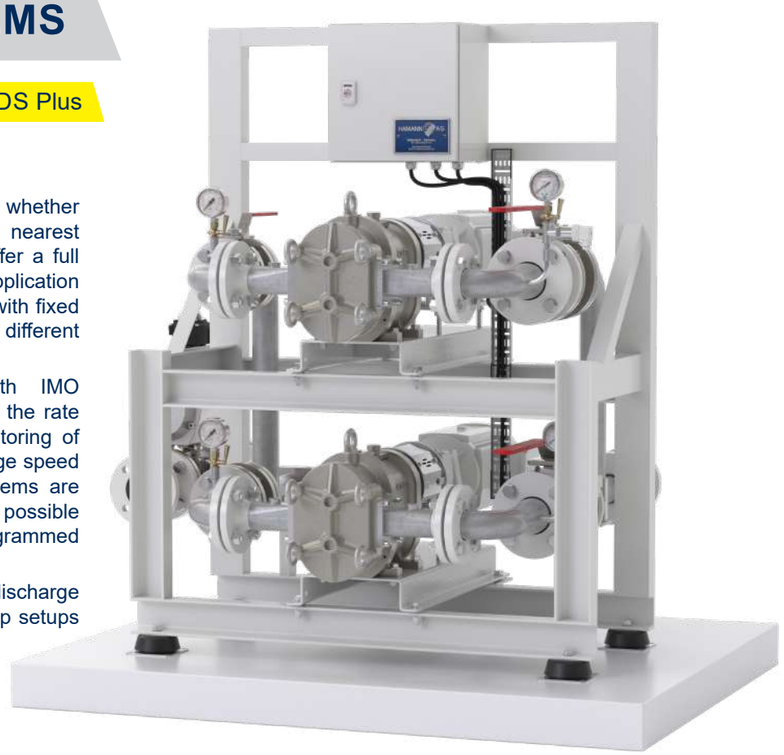
DISCHARGE SYSTEMS

HAMANN DS Compact | HAMANN DS Plus

To discharge the contents of holding tanks, whether to shore or to sea outside 12nm from the nearest land, a discharge system is needed. We offer a full range of discharge systems that covers all application scenarios – from our DS Compact systems with fixed discharge rates to our advanced DS Plus with different selectable discharge rates.

Discharges at sea in compliance with IMO MEPC.157(55), which defines standards for the rate of discharge, require attention to and monitoring of several variables such as the vessel's average speed and it's draft. Our DS Plus discharge systems are designed to make it as easy and reliable as possible for the crew to be compliant, with custom-programmed according to the vessel's discharge table.

HAMANN DS Compact and DS Plus discharge systems are available as single or dual pump setups and with different pump options.



PRODUCT DESCRIPTION

DS COMPACT / DS COMPACT DUAL

Our DS Compact and DS Compact Dual discharge systems focus are designed for applications where the basic function is prime. Fixed pump flow rates make these systems as straightforward as can be. Compliance with MEPC.157(55) needs to be considered when choosing the flow rate of the discharge system.

DS PLUS / DS PLUS DUAL

Our DS Plus and DS Plus Dual discharge systems are designed to make it as easy and reliable as possible for the crew to be compliant with IMO MEPC.157(55). With pumps with variable flow rates and selectable discharge rates custom-programmed according to the vessel's discharge table, they greatly simplify the process and help to reduce regulatory compliance risks.

DS Compact	
HLCC-0125	Discharge system for HAMANN HL-CONT Compact 0125 STP, 3m³/h
2CBM	Discharge system, 2m³/h
3CBM	Discharge system, 3m³/h
6CBM	Discharge system, 6m³/h
15CBM	Discharge system, 15m³/h
Dual 2CBM	Discharge system with dual pump setup, 2x 2m³/h
Dual 3CBM	Discharge system with dual pump setup, 2x 3m³/h
Dual 6CBM	Discharge system with dual pump setup2x 6m³/h
Dual 15CBM	Discharge system with dual pump setup, 2x 15m³/h
DS Plus	
1.5-15CBM	Discharge system with custom programmed selectable discharge rates, 1,5 - 15m³/h
Dual 1.5-15CBM	Discharge system with dual pump setup with custom programmed selectable discharge rates, 2x 1.5-15m³/h

VACUUM SYSTEMS

HAMANN VS

Using vacuum instead of gravity for toilet systems has several advantages. Water consumption for flushing the toilets is significantly reduced, pipe diameters can be significantly smaller and the positioning of toilets and tanks is much more flexible as the vacuum allows the direction of flow to be also upwards and not just downwards.

Due to their advantages, vacuum toilet systems are very commonly used, making the generators providing the negative pressure a vital piece of equipment. Without the vacuum, the toilets are not operable. Therefore, reliability is key.



PRODUCT DESCRIPTION

Our VS vacuum systems are designed to make vacuum toilet systems as reliable as possible and they are made to the highest standards of construction and finish which make HAMANN products stand apart. They are available as dual or triple pump setups and with Jets or Evac vacuum generators, covering all application scenarios and preferences.

VS J-S01	
Dual	Vacuum system on frame with 2x Jets Edge S01 vacuum generator
Triple	Vacuum system on frame with 3x Jets Edge S01 vacuum generator
VS J-M01	
Dual	Vacuum system on frame with 2x Jets Edge M01 vacuum generator
Triple	Vacuum system on frame with 3x Jets Edge M01 vacuum generator
VS E-V32	
Dual	Vacuum system on frame with 2x Evac V32 vacuum generator
Triple	Vacuum system on frame with 3x Evac V32 vacuum generator
VS E-V52	
Dual	Vacuum system on frame with 2x Evac V52 vacuum generator
Triple	Vacuum system on frame with 3x Evac V52 vacuum generator

Sewage Treatment

Galley Water Treatment

Sewage Tanks

Additives

ADDITIVES

FLOCCULANT

HAMANN BlueFloc

FLOCCULANT

HAMANN BlueFloc

KEY FACTS

HIGH PERFORMANCE FLOCCULANT FOR SEWAGE TREATMENT PLANTS

Flocculant is essential for the treatment process HAMANN sewage treatment plants and advanced wastewater treatment systems applied and is required for their operation.

SUPPORTS TSS/COD/BOD REDUCTION

The flocculant is used in the process step, where TSS (Total Suspended Solids), COD (Chemical Oxygen Demand) and BOD (Biological Oxygen Demand) are reduced by Dissolved Air Flotation (DAF).

ENHANCES FLOCCULATION & CONTRIBUTES TO THE TREATMENT PERFORMANCE

HAMANN BlueFloc is designed to optimise the flocculation during the Dissolved Air Flotation (DAF) process and thus optimise the treatment performance achieved in this process step.

READY-TO-USE MIXTURE OF ALUMINIUM-BASED FLOCCULANT AND POLYMER

HAMANN BlueFloc is an aluminium-based mix with polymers and ready to use right out of the container.



Flocculant is required for the operation of HAMANN HL-CONT Compact / HL-CONT Plus sewage treatment plants and HL-CONT Plus OceanCruise / HL-CONT Plus RiverCruise advanced wastewater treatment systems. The flocculant supports the Dissolved Air Flotation (DAF) process, the main sewage treatment technology applied in these plants. Better flocculation results in a better treatment performance of the sewage treatment plant. HAMANN BlueFloc has been developed to the specifications of the HAMANN R&D team and has been proven in our test facilities.

HAMANN sewage treatment plants and advanced wastewater treatment systems apply our Dissolved Air Flotation (DAF) technology as one of several steps in the sewage treatment process. To support the flotation process, a flocculant is needed. HAMANN BlueFloc is designed to optimise the flocculation and thus optimise the treatment performance achieved in this process step.

The flocculant is used in the process step, where TSS (Total Suspended Solids), COD (Chemical Oxygen Demand) and BOD (Biological Oxygen Demand) are reduced by Dissolved Air Flotation (DAF).

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. The flocculant is added in order to let air bubbles and suspended particles 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 into the ship's sludge tank.

To learn more about the treatment principles applied in HAMANN sewage treatment plants and advanced wastewater treatment systems, please turn to pages 10-25.

NOTES

NOTES

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