



- Easy to install
- Easy to operate
- Reliable

## For Ocean's Sake

## **Technical Specification**

#### **Biological Physical Sewage Treatment Plant**

## "Ocean Clean<sup>®</sup> UltraC-1"

#### General design features of UltraC STPs:

- Space-saving design for corner installation
- Complete unit engineered and MADE IN GERMANY
- For black and grey water or black water only
- For gravity and vacuum systems
- Vacuum pump system available on request
- Customized solutions available on request
- Membrane system for best effluent values
- Compact, reliable and robust design
- Lifetime warranty on tank

#### Specifications for UltraC-1:

Designed hydraulic load:	1.8m³/d
Designed biological load:	1.2kg BOD₅/d
Dimensions (LxWxH):	1766x1527x1555mm
Dry weight / wet weight:	Approx. 638 / 1650kg
Power supply:	380-690V / 50/60Hz
Power consumption:	Approx. 4kW
Tank and piping material:	Stainless steel: SAE grade 304
	EN-standard steel no.: 1.4301









## Ocean Clean<sup>®</sup>- A German manufacturer of Oily Water Separators, Biological Sewage Treatment Plants and Waste Handling Components.



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## 1. Foreword:

The Ocean Clean UltraC sewage treatment plant (STP) is a membrane bioreactor (MBR) that is designed and designated for the installation and operation aboard ships. The following pages show the technical specifications for the STP and its attaching parts.

## 2. Rules and Regulations:

Sewage treatment plants have to comply with IMO guidelines for effluent standards and undergo performance tests to ensure they are suitable to be operated on board of ships.

The Ocean Clean UltraC STP is type approved and certified according to MARPOL 73/78 and IMO resolution MEPC.227(64) as modified by resolution MEPC.115(51) by the German Traffic Trade Association ("BG Verkehr") - Ship Safety Division.

The UltraC can be operated on board of all ships that carry more than 15 persons or are larger than 400 GRT. The Certificates are accepted by USCG for non US-flagged vessels.

Effluent values of Ocean Clean UltraC in comparison with IMO regulations							
	UltraC	MEPC.227(64)					
Total Suspended Solids	< 1 mg/l	35 mg/l					
BOD <sub>5</sub>	< 2.8 mg/l	25 mg/l					
COD	< 38 mg/l	125 mg/l					
Coliforms	< 1 per 100 ml	100 per 100 ml					
рН	7.45 - 8.08	6.0 - 8.5					
Chlorine	0.0 (not used)	0.5 mg/l					
Phosphorus	n/a	< 1 mg/l					
Nitrogen	n/a	< 20 mg/l					

### 3. STP add-ons:

- Grease trap to remove fats and oil off the galley water Mandatory:

- Sludge tank to store excess sludge

- Effluent storage tank to store cleaned water in zero-emission zones Optional: - Grease separator for most effective fat and oil removal off galley water

- Settling tank for sludge treatment and dewatering

When provided with an upstream aerated collecting and mixing tank to buffer peak loads the Ocean Clean UltraC-1 can handle up to 75% more sewage/day with identical technical specifications. Please ask for further details!



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## Biological Sewage Treatment

<u>"Ocean Clean® UltraC-1"</u> Biological Physical Sewage Treatment Plant Membrane BioReactor (MBR)

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### 4. General Description:

All accessory units are mounted on the STP (except vacuum unit), with all internal piping and wiring, completely checked and tested, ready-for-connection. Black and grey water (no seawater!) flow to the STP by gravity (vacuum on request). Galley water must be led through a grease trap or separator. Excess sludge inside the STP must be discharged acc. instructions to a sludge tank.

The Ocean Clean UltraC is a three tank system:

First stage: Coarse material removal (stored in built-in *coarse material tank*)

Second stage: Biology activation by aerial oxygen (*activation tank*) where microorganisms ("activated sludge") metabolize the organic pollution into CO<sub>2</sub> and water. Third stage: Membrane filtration (*membrane tank*) to physically separate cleaned water from

activated sludge and bacteria. Filtrate discharge via pump to overboard/effluent tank.

#### Activated sludge for starting up has to be provided by yard from municipal sewage plant!

Ambient air is fed into the STP to support the biological process. The biology has to be checked by taking samples on a regular basis. Only biodegradable waste may be led into the STP. Excessive use of detergents or hazardous substances can destroy the biology and cause malfunctions of the STP.

In accordance with the SOLAS regulation II-I/3-5, new installation of asbestos in context with IMO MSC.1/Circ.1374 and 1379, all materials, products and components including packaging by our company are completely free of asbestos.



#### 5. "UltraC-1" - detailed description:

#### Electrical system and attached parts:

• Electrical control cabinet

Including transformer (incl. 24V AC for control voltage), switches, level– and control relays, control lamps (LED), IP66 protection, door stopper, made of mild steel, Finish: coated in RAL 7035

Cable glands: with stuffing bushes acc. to DIN 89280, nickel-plated brass, reputable maker

Start-stop level for transfer pump and high level alarm are measured by level switches. One potential-free contact for a common alarm to ECR is provided.

• Fine screen

Coarse material is filtered by a self cleaning fine screen via brushes and electrical gear motor.

Technical details fine screen motor							
Protection class	IP 55, ISO class F						
Power [kW]	0.12						
Speed [rpm]	6						

#### Circulation and sludge discharge pump

**Circulation:** Biologically active liquid ("*activated sludge*") and sewage are circulated in the STP to be mixed and enable microorganisms to clean the water. The activation tank is constantly re-circulated to the membrane tank to supply the membrane filter with activated sludge.

**Sludge discharge:** the circulation pump is also used to discharge excess sludge and coarse material and to empty the STP.

• Filtrate pump

The filtrate pump is used to discharge cleaned water via the membrane filter.

Technical details circulation pump / filtrate pump								
	Circulation pump	Filtrate pump						
Туре	Eccentric screw pump with mechanical seal							
Flange sizes suction / discharge side	DN25, PN16							
Protection class	IP 55, ISO class F							
Capacity [m³/h] at [bar]	1.0 at 6	0.25 at 6						
Power [kW at Hz]	0.55 at 50	0.37 at 50						

#### The filtrate pump must not be used to empty the STP!

The membrane filter may not dry out once it has been in contact with water. The sensitive material will become brittle and cannot be used again.





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The air feed of the STP is supplied by **one side channel blower**. It forces ambient air into the tanks via submerged aeration elements (breather tubes) that support the biology and clean the membrane filter.

Technical details side channel blower							
Air flow [m³/h]	80						
Pressure [mbar]	250						
Power [kW at Hz]	1.6 at 50 / 2.05 at 60						

#### Sensors

Suction pressure (**one vacuum meter**) is measured between filtrate pump and membrane filter to prevent the membrane from destruction and to determine the time for a chemical membrane cleaning.

Low level, high level and alarm level are sensed by **float switches** inside the activation tank.

#### Tank:

• The UltraC is a three tank system:

Coarse material tank including fine screen Activation tank including aeration elements Membrane tank including membrane filter

All tanks are accessible via manholes either on top or on the sidewalls of the tank. Flanges for inlet and ventilation pipes are on the top of the STP.

The control panel as well as all pumps, blower and instruments are located on the front or one side of the unit for easy access and a minimum footprint and maintenance space.

• Tank and piping made of stainless steel

#### Connections:

- Electrical connections: Please refer to the electrical diagram.
- The Ocean Clean UltraC is factory tested and ready-for-connection. It needs to be fixed to the floor by welding or bolting (please refer to dimensional drawing).

The following necessary pipe connections need to be produced (standard acc. to ISO/DIN):

Pipe connection	Inlet	Ventilation	Overflow	Outlet	Flushing	Discharge
Size	DN 100	DN 100	DN 25	DN 25	DN 25	DN 25
Size [pressure class]	PN16	PN16	PN16	PN16	PN16	PN16

Fresh water pressure for flushing: 2 - 5 bar

v16/01

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#### 6. UltraC-1 - design & calculation

• The Ocean Clean UltraC-1 is designed, calculated and type approved to treat a maximum hydraulic load of 1.8 m<sup>3</sup>/d and a biological load of 1.2 kg BOD<sub>5</sub>/d according to the guidelines and specifications of the German BG Verkehr as responsible authority:

		Hydr	Resulting	g no. of persons			
Min. requirements acc. BG Verkehr	Grey Water	Black Water Vacuum	Black Water Gravity	Total Vacuum System	Total Gravity System	Vacuum System	Gravity System
Passenger vessel	160	25	70	185	230	9	7
Seagoing ship except passenger vessel	110	25	70	135	180	13	10

The Ocean Clean calculation is based on experienced data and customer feedback:

		Hydr	Resulting	No. of persons					
Requirements according to	Requirements according to OC experience								
Barge	35	15	35	50	70	36	26		
Commercial vessel	95	25	55	120	150	15	12		
Naval vessel	135	20	65	155	200	12	9		
Stationary Platform	175	25	70	200	245	9	7		
Yacht (charter)	190	25	75	215	265	8	7		
Working ship	190	25	75	215	265	8	7		
River Cruiser	210	25	75	235	285	8	6		
Cruiser	240	25	75	265	315	7	6		
Yacht (owner)	350	25	75	375	425	5	4		

#### Please ask for a project-specific calculation for further details and a load forecast.

To ensure a solid biological process the feeding of the Ocean Clean UltraC-1 should not fall below the following values:

Minimum required feed	Long-term	Short-term	Design maximum	
Hydraulic load [m³/d]	1.0	0.5	1.8	
Biological load [kg/d]	0.9	0.4	1.2	

As a biological and physical system the UltraC is sensitive to the sewage quality. Intensive use of strong detergents or the inlet of chemicals (e.g. chlorine) will destroy the microorganisms of the activated sludge. Insufficient feeding may reduce the concentration of microorganisms severely and cause difficulties when feeding the STP with the standard load.

Flushing the plant and emptying it completely requires to fill in new activated sludge to restart the biological process. The quality of the activated sludge needs to be checked on a regular basis. Otherwise the membrane filter as physical barrier may clog or get damaged which will make an exchangeservice or a chemical cleaning of the filter membranes necessary.



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## 7. UltraC - models

The UltraC STP is available in different versions and sizes. Following table lists the general standard models.

Range of Ocean Clean UltraC models - other versions available on request									
Туре	Max. hydraulic load [m³/d]	Max. biological load [kg BOD₅/d]	Required collecting tank [m³]	Length [mm]	Width [mm]	Height [mm]	Dry weight ca. [kg]	Wet weight ca. [kg]	
UltraC-1	1.8	1.2	-	1766	1527	1555	638	1650	
UltraC-2	2.7	1.9	-	1924	1576	1561	710	1780	
UltraC-5	5.0	3.5	-	1935	1776	1556	1062	2495	
UltraC-9	9.3	6.5	6	1935	1776	1556	1062	2495	
UltraC-10	10.0	7.0	-	2132	4048	2066	1762	2995	
UltraC-15	15.0	10.6	-	5483	2130	2091	2815	o/r	
UltraC-27	27.8	19.6	18	5483	2130	2091	2815	o/r	
UltraC-46	46.2	32.6	30.1	5938	2470	2091	o/r	o/r	

#### Scope of Supply:

- One STP Ocean Clean UltraC including all necessary attaching parts, ready-for-connection
- Manual and documentation in English language including drawings and spare-parts list
- Factory Acceptance Test (FAT) protocol
- Type approval and all necessary certificates
- No special tools required

#### Available on request:

- Thermal dry running protection for pumps
- Vacuum system as stand-by unit (maker: Jets)
- Aeration and mixing and transfer equipment for collecting and mixing tank (transfer pumps, blower, aeration pipes, level sensors, control box)
- Blower and transfer pumps for sludge tank
- Lifting stations including controls
- Class survey certificates (ABS, DNV-GL, LR, ...)
- Worldwide commissioning and service
- Tailor-made solutions

Please note that a sufficient maintenance space is always needed to guarantee a good access to all components. The maintenance space requirement of the Ocean Clean UltraC is very small. Please note the attached drawings for details.



Images and diagrams for illustration only. Subject to technical changes and misprints.

## Biological Sewage Treatment Plant UltraC Operation Scheme





**Purified Water** 



Sludge





3 





Premilinary drawing. Subject to technical changes and misprints.

				N	lumber	Desc	ription	Size
					1	Sewa	ige Inlet	DN100/PN16
					2	Dea	eration	DN100/PN16
					3	Flushing	Connection	DN25/PN16
					4	Sludge	Discharge	DN25/PN16
					5	Filtrate	Discharge	DN25/PN16
					6	Emergen	DN25/PN16	
				[	Do not re	educe diam	eter of output	/discharge pipes!
					Dea	eration pip	e has to be st	eadily rising!
Rev	rision :			Obe	erfläche:		Maßstab:1:20 Gew	vicht: 638.36kg
							Werkstoff:	
					Datum	Name		
				Erst.	02.12.2015	M.Hille	UltraC-1	
				Freig.			-	
				Ocea Zum I	n Clean Gml Kühlhaus 5	ын Dh	1	
				18069 Rostock Germany Phone: +49 (0) 381-811 2930 Fax: +49 (0) 381-811 2939			OCS-u1-E	3G-000-00
Index	Änderung	Datum	Name	info@	oceanclean	.de		A3









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## For Ocean's Sake

#### **Ocean Clean Grease Trap**

#### "FT-50"

#### **Design features:**

- Compact and solid unit MADE IN GERMANY
- No moving parts
- No spare parts required
- Easy access for simple cleaning
- Customized solutions available on request
- Available in capacities from 0.1—1.0 m<sup>3</sup>/h
- Reliable and well known design in dependence on German DIN 4040 and DIN-EN 1825

#### <u>General technical specifications for FT-50</u> (customized solutions available):

- Volume: 0.05m<sup>3</sup>
- Dimensions (LxWxH): 660x344x420mm
- Dry weight: 37kg
- Made of 1.4301
- Grease discharge at the top
- Cover removable
- Draining connection at the bottom

Ocean Clean<sup>®</sup>—A german manufacturer of Oily Bilge Separators and Biological Sewage Treatment Plants.





## Fat Trap **Operation Scheme**

# Grease drain Deaeration Galley water inlet Galley water outlet Grease Drain Sludae

)ceap<sup>®</sup> Clean<sub>GmbH</sub>

A grease trap removes fat, oil and grease (called FOG) and solids (food particles, sand and grit etc.) by a gravity separation process.

The grease trap slows down the flow of waste water long enough for the FOG and solids to separate. The solids settle to the bottom and the grease floats to the top. The middle layer is free water which is discharged to the sewer.

The longer the flow is kept inside the trap, the better job it will do of separating the waste materials.





			5	
Number	Description	Size		
	Inlet Outlot			
3	Grease Drain	R 1"/male	,	
4	Drain	R 1″/male		
5	Deaeration	R 1″/male		
Revision	n :	Erst. 02. Gepr.	ache: Datum Name 12.2015 M.Hille	Werkstoff: - 1.4301 - Fat Trap FT-50 DN80
Index Är	nderung Datum	Freig.   Ocean Cle   Zum Kühll   18069 Ro:   Germany   Phone: +4   Fax: +45   Name	ean GmbH haus 5 stock 9 (0) 381-811 2930 9 (0) 381-811 2939 anclean.de	FT-50VA-BG-100