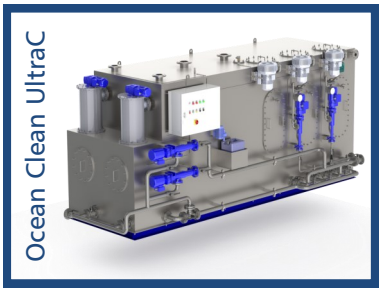
Ocean® Clean GmbH

Biological Sewage Treatment

- **Easy to install**
- **Easy to operate**
- **Reliable**

For Ocean's Sake

Technical Specification



Biological Sewage Treatment Plant

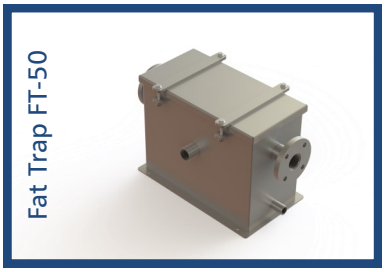
"Ocean Clean® EasyC-13"

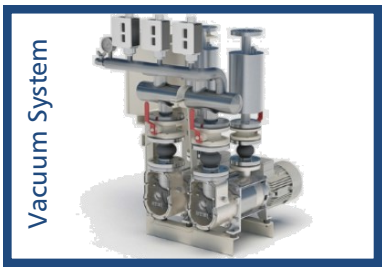
General design features of EasyC STPs:

- Space-saving design for corner installation
- Engineered and designed 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
- Up-to-date effluent values acc. IMO MEPC.227(64)
- Compact, reliable and robust design
- Stainless steel tank

Specifications for EasyC-13:

Designed hydraulic load:	Approx. 13.6m³/d
Designed biological load:	Approx. 8.8kg BOD_5/d
Dimensions (LxWxH):	4.200x2.204x1.800mm
Dry weight / wet weight:	Approx. 3.200 / 14.200kg
Power supply:	380-690V / 50/60Hz
Power consumption:	Approx. 5.6kW
Tank and piping material:	Stainless steel: SAE grade 304
	EN-standard steel no.: 1.4301





Ocean Clean®- A German manufacturer of Oily Water Separators and Biological Sewage Treatment Plants.

Biological Sewage Treatment

- **Easy to install**
- **Easy to operate**
- **Reliable**

Contents:

1. **Foreword**
2. **Rules and Regulations**
3. **STP Extensions**
4. **General Description**
5. **EasyC-13 - detailed description**
6. **EasyC-13 - design & calculation**

Attachments: Dimensional Drawings

1. Foreword:

The EasyC sewage treatment plant (STP) is a biological treatment system that is designated for the installation and operation on ships. The following pages show the technical specifications for the EasyC-13 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 EasyC STP is type approved and certified according to MARPOL 73/78 and IMO resolution MEPC.227(64) as modified by resolution MEPC.115(51) and MEPC.200(62) by the German Traffic Trade Association ("BG Verkehr") - Ship Safety Division.

The EasyC 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 EasyC in comparison with IMO regulations		
	EasyC	MEPC.227(64)*
Total Suspended Solids	1 mg/l	35 mg/l
BOD_5	8 mg/l	25 mg/l
COD	36 mg/l	125 mg/l
Coliforms	1 per 100 ml	100 per 100 ml
pH	6.8 - 7.7	6-8.5
Chlorine	0.0 (not used)	0.5 mg/l

* Without consideration of N + P treatment.

3. STP Extensions:

Galley water has to be treated by a fat trap or separator before led into the STP. Sludge tank for discharge of excess sludge has to be provided. An effluent storage tank is recommended for using the STP in areas where no liquids may be discharged overboard.

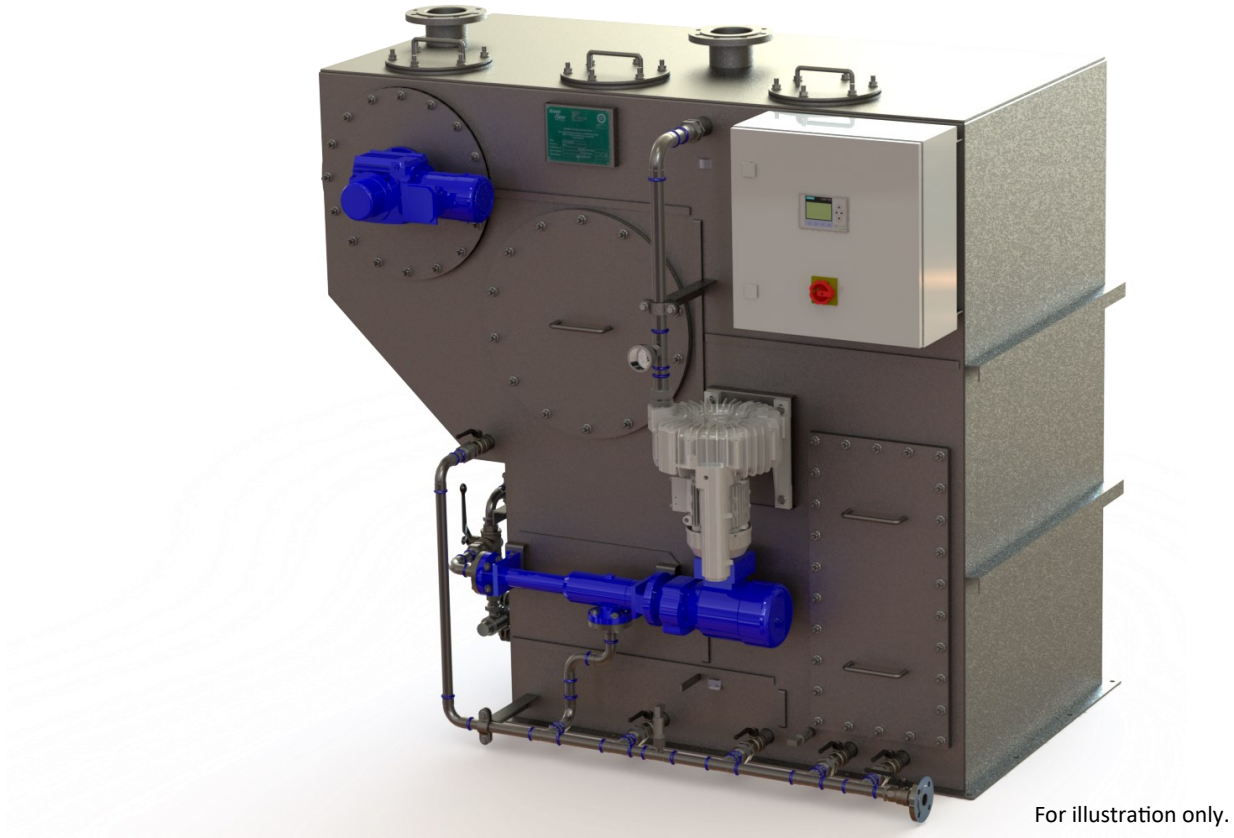
Biological Sewage Treatment

- **Easy to install**
- **Easy to operate**
- **Reliable**

"Ocean Clean® EasyC-13"

Biological Sewage Treatment Plant

Moving Bed Biofilm Reactor (MBBR)



For illustration only.

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 to plug on. The black water and grey water flows (vacuum on request) into the STP via gravity. Incurred excess sludge inside the STP must be discharged acc. instructions into a sludge tank.

The "EasyC" is a three chamber system:
Reject material is removed in the first stage (coarse material tank). Pre-cleaned sewage enters the second stage (activation tank) where microorganisms metabolize the organic pollution into CO_2 and water. A number of exchangeable filter membranes in the last stage (filter tank) separates the cleaned water from the bio mass and excess sludge. A pump discharges the cleaned water through a UV disinfection into a filtrate tank (not part of this STP) or directly overboard.

The exchangeable filter has to be renewed acc. to instruction manual and in fixed intervals!

Ambient air is fed into the STP to support the biological process. 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. EasyC-13 - detailed description:

Electrical system and attached parts:

The electrical control cabinet, including transformer, level relays, all necessary switches, control relays and control lamps (LED), is made of mild steel, protected according to IP66, coated with finish RAL 7035 and equipped with cable glands with stuffing bushes acc. to DIN 89280 and door stoppers.

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

- Coarse material tank

  Reject material that enters the STP is held back in a first stage.

- Discharge pump

  The discharge pump is used to discharge cleaned water via the membrane filter and to empty the STP.

Technical details circulation pump / filtrate pump:	
	Discharge pump
Type	Eccentric screw pump with mechanical seal
Flange sizes suction / discharge side	DN25, PN16
Protection class	IP 55, ISO class F
Capacity [m^3/h] at [bar]	1.0 at 6
Power [kW at Hz]	0.55 at 50

- Air blower

  The air feed of the STP is supplied by a side channel blower. It forces ambient air into the tank via submerged aeration elements (aeration pipes) that both support the biology and clean the membrane filter.

Technical details side channel blower:	
Air flow [m^3/h]	40
Pressure [mbar]	380
Power [kW at Hz]	1.1 at 50 / 1.4 at 60

Biological Sewage Treatment

- **Easy to install**
- **Easy to operate**
- **Reliable**

Tank:

- The EasyC is a three tank system:

  In the first tank coarse material is separated from the sewage.

  The second tank is to activate + accelerate biological processes.

  The third tank is to separated bio mass from the cleaned water by a filter membrane.

  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 on a side of the unit for easy access and a minimum footprint and maintenance space.

- Tank and piping are made of stainless steel.

Connections:

- For electrical connections please refer to the electrical diagram.
- The EasyC is factory tested and ready to plug in. It needs to be fixed to the floor by welding or bolting. The necessary pipe connections need to be established:

Pipe connection:	Inlet	Ventilation	Outlet	Flushing	Discharge
Size [DN]	DN100	DN100	DN25	DN25	DN25
Size [PN]	PN16	PN16	PN16	PN16	PN16

EasyC - version overview

The EasyC STP is available in different versions and sizes.

Type	Hydraulic load [m³/d]
Ocean Clean EasyC-2	1.7
Ocean Clean EasyC-3	3.4
Ocean Clean EasyC-5	5.4
Ocean Clean EasyC-7	7.2
Ocean Clean EasyC-9	9.4
Ocean Clean EasyC-11	11.6
Ocean Clean EasyC-13	13.6

Please contact Ocean Clean for further information.

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

6. EasyC-13 - design & calculation

The EasyC-13 is designed, calculated and type approved to treat a maximum hydraulic load of approx. 13.6m³/d and a biological load of approx. 8.8 kg BOD_5/d according to the guidelines and specifications of the German BG Verkehr as responsible authority:

	Hydraulic load [litre]					Resulting 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	73	59
Seagoing ship except passenger vessel	110	25	70	135	180	100	75

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

	Hydraulic load [litre]					Resulting No. of persons	
Requirements according to OC experience							
Barge	35	15	35	50	70	222	194
Commercial vessel	95	25	55	120	150	113	90
Naval vessel	135	20	65	155	200	87	68
Stationary Platform	175	25	70	200	245	68	55
Yacht (charter)	190	25	75	215	265	63	51
Working ship	190	25	75	215	265	63	51
River Cruiser	210	25	75	235	285	57	47
Cruiser	240	25	75	265	315	51	43
Yacht (owner)	350	25	75	375	425	36	32

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

To ensure a solid biological process the feeding of the EasyC-13 should not fall below the following values:

	Long-term	Short-term	Design maximum
Hydraulic load	2.72m³/d	1.36m³/d	13.6m³/d
Biological load	1.76kg/d	0.88kg/d	8.8kg/d

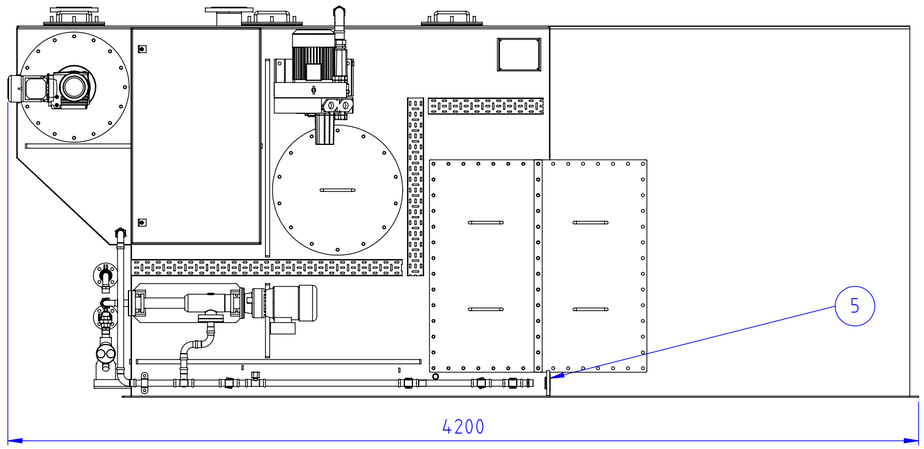
As a biological system the EasyC is sensitive to the sewage quality. Intensive use of strong detergents or the inlet of chemicals (e.g. chlorine) will destroy the microorganisms of the bio mass. Insufficient feeding may reduce the concentration of microorganisms severely and cause difficulties when feeding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

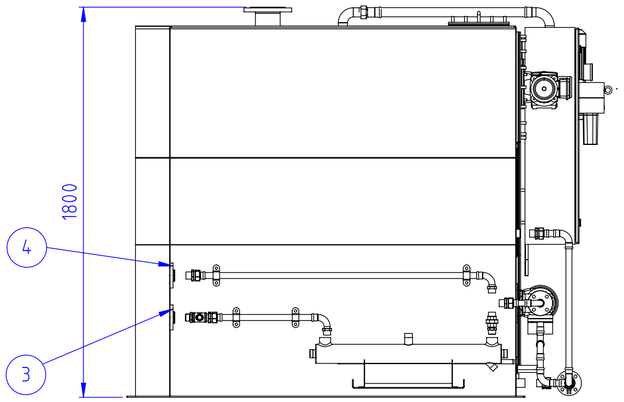
Flushing the plant and emptying it completely requires to restart the biological process.

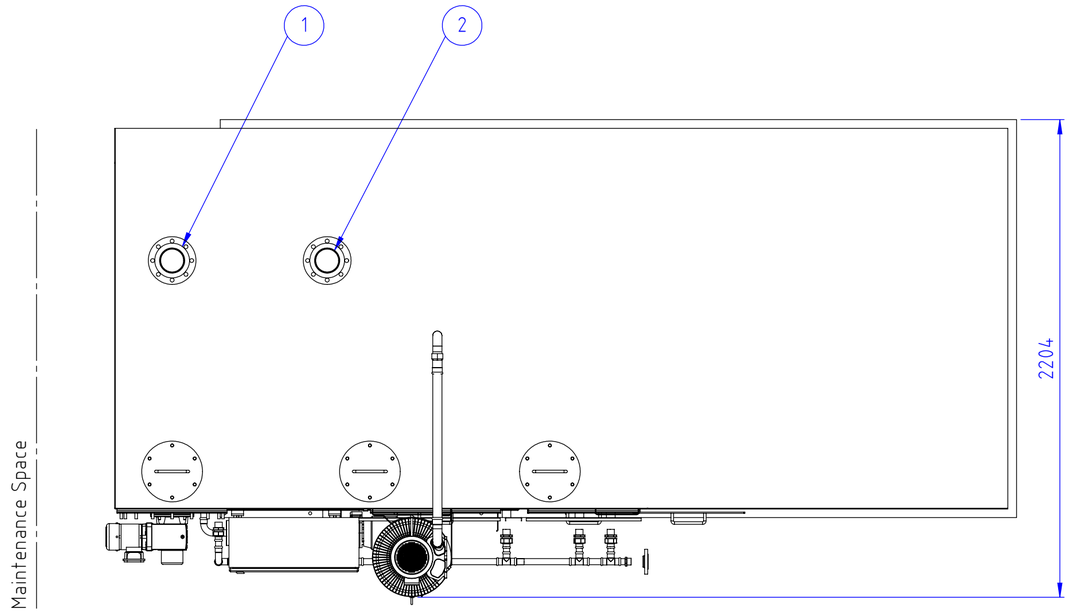
Effluent quality and hydraulic flow may vary due to condition of the filter membrane. A worn out filter membrane may stress the discharge pump. Always check the condition of the filter membrane via differential pressure gauge. Exchange when necessary.

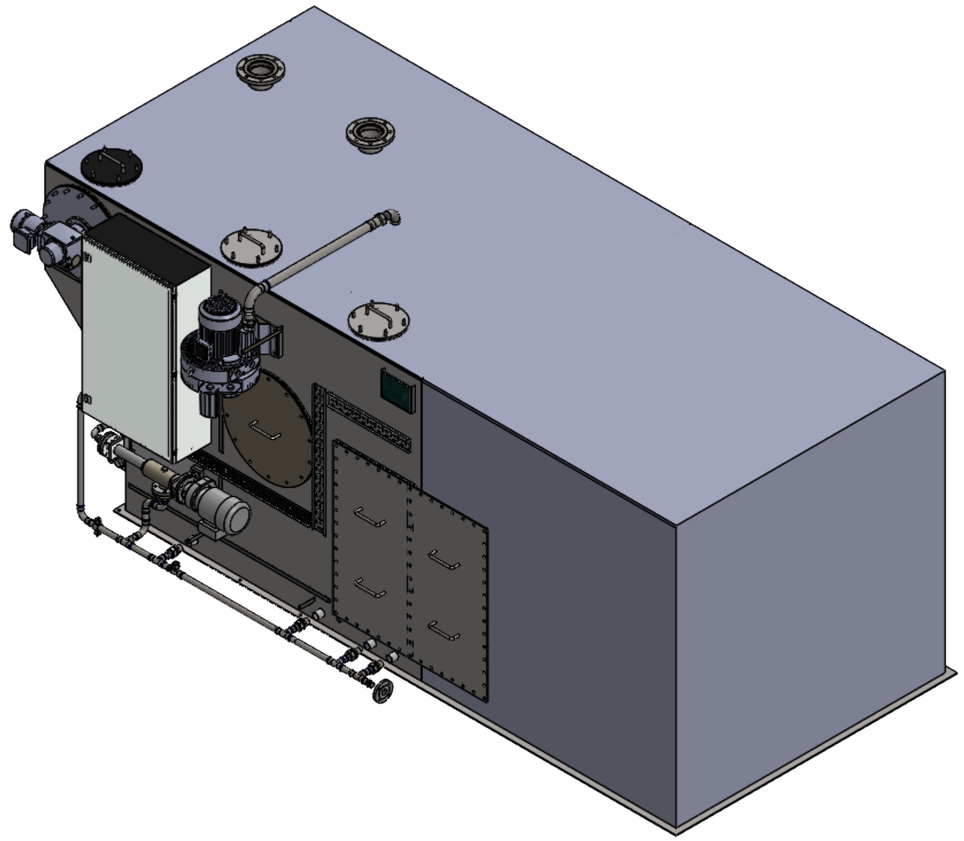
Contact Ocean Clean for original, reliable and genuine spare parts.

Pos.	Description
1	Inlet
2	Vent
3	Effluent discharge
4	Sludge discharge
5	Flush connection









Maintenance Space

Preliminary Drawing. Subject to technical changes and misprints.

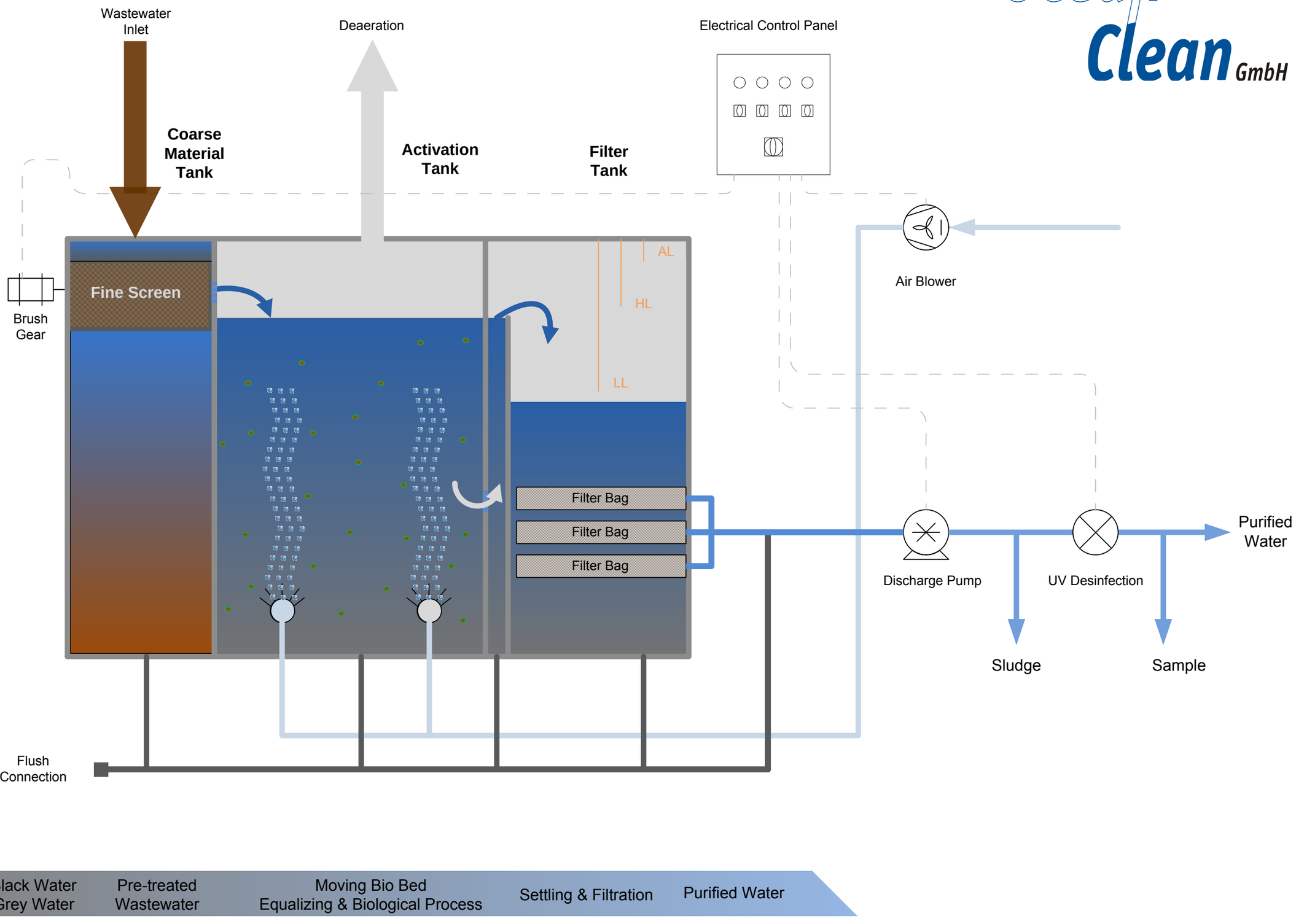
ALL MEASUREMENTS IN MILLIMETER SURFACE CONDITIONS: REMOVE PICKLES TOLERANCES: DIN ISO 2768 T.1 MIDDLE			SURFACE FINISH: PAINTING:			BREAK TRIMMINGS AND SHARP EDGES TO R=0,2	
	NAME	DATE					
DRAWN	M. Grund	14.08.2020					
CHECKED							
APPROVED							
PRODUCTION							
QUALITY							

Ocean Clean
ZUM KÜHLHAUS 5, D - 18069 ROSTOCK

PROJEKT:			WEIGHT: 5784513.04
MATERIAL:Material <nicht festgelegt>			
DESIGNATION: Ocean Clean EasyC-13			
DRAWING NO.: OC-e13-BG-000-00			
SCALE: 1:20	REVISION:	FORMAT: A2	PAGE: 1 / 1

Biological Sewage Treatment Plant **EasyC** Operation Scheme

Ocean® Clean GmbH



Black Water Grey Water	Pre-treated Wastewater	Moving Bio Bed Equalizing & Biological Process	Settling & Filtration	Purified Water

STP
Ocean Clean EasyC

Grey water
Black water
Galley water
Grease Trap
N5 Galley
N6
N7
N8
N9
Sewage inlet
Vent
B1
M
Screen
Alarm level
High level
Low level
Moving Bio Bed
Filter
Ae
Ae
Recommended: Bypass Line
Overboard discharge
To Marpol flange
Grey water tank
V1
V2
V3
V4
V5
V6
Fresh water connection
UV Treatment
V8
V9
Sample Valve
P1
V7
V10
P6
Vent
Sludge tank
P*

STP – Scope of supply Ocean Clean

Do not reduce diameter of output/discharge pipes! Deaeration pipes have to be steadily rising; emergency overflow pipe steadily tending downwards!

Non-Ocean Clean piping only for illustration and recommendation. Preliminary Drawing. Subject to technical changes and misprints.

CONNECTION	SIZE
Sewage inlet	Flange DN100 PN16
Fresh water/Flushing	Flange DN25 PN16
Discharge pump	Flange DN25 PN16
Vent	Flange DN100 PN16
N5	Flange DN80 PN10
N6	Flange DN80 PN10
N7	Flange DN25 PN10
N8	Flange DN25 PN10
N9	Flange DN25 PN10

Pos.	Description
N5	Galley water inlet
N6	Galley water outlet
N7	Vent
N8	Grease drain
N9	Drain

Pos.	Description
Ae	Aeraetion element
B1	Blower
P1	Discharge pump
P6	Grey Water Pump
P*	Sludge pump

No.	Changes	Date	Name

Drawn: M.Grund / 24.01.2019
Checked:
Approved:

P & I DIAGRAM

Ocean Clean EasyC – gravity system
black water only / grey water collecting tank

SIZE	CUSTOMER	DRAWING.NR.	REV.
A3			
SCALE 1:1		PAGE 1 / 1	

Ocean® Clean GmbH

EC-CONFORMITY MARINE EQUIPMENT DIRECTIVE

Grease Trap

- Easy to install
- Easy to operate
- Reliable

For Ocean's Sake

Ocean Clean Grease Trap

"FT-320"

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 m³/h*
- *Reliable and well known design in dependence on German DIN 4040 and DIN-EN 1825*

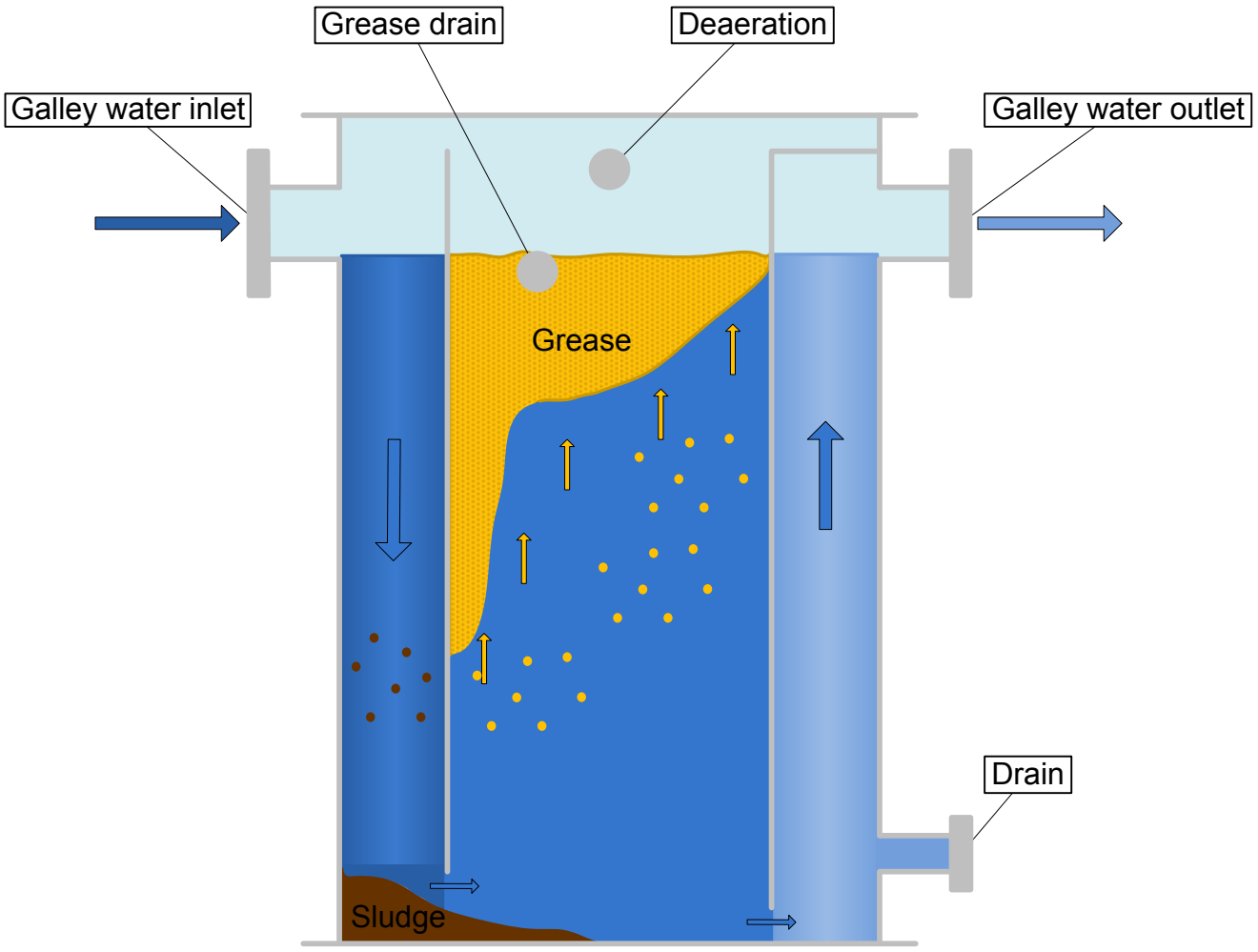
General technical specifications for FT-320 (customized solutions available):

- *Volume: 0.25m³*
- *Dimensions (LxWxH): 640x560x1035mm*
- *Dry weight: 94kg*
- *Made of 1.4301*
- *Grease discharge at the top*
- *Cover removable*
- *Draining connection at the bottom*

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

Fat Trap **Operation Scheme**

Ocean® Clean GmbH

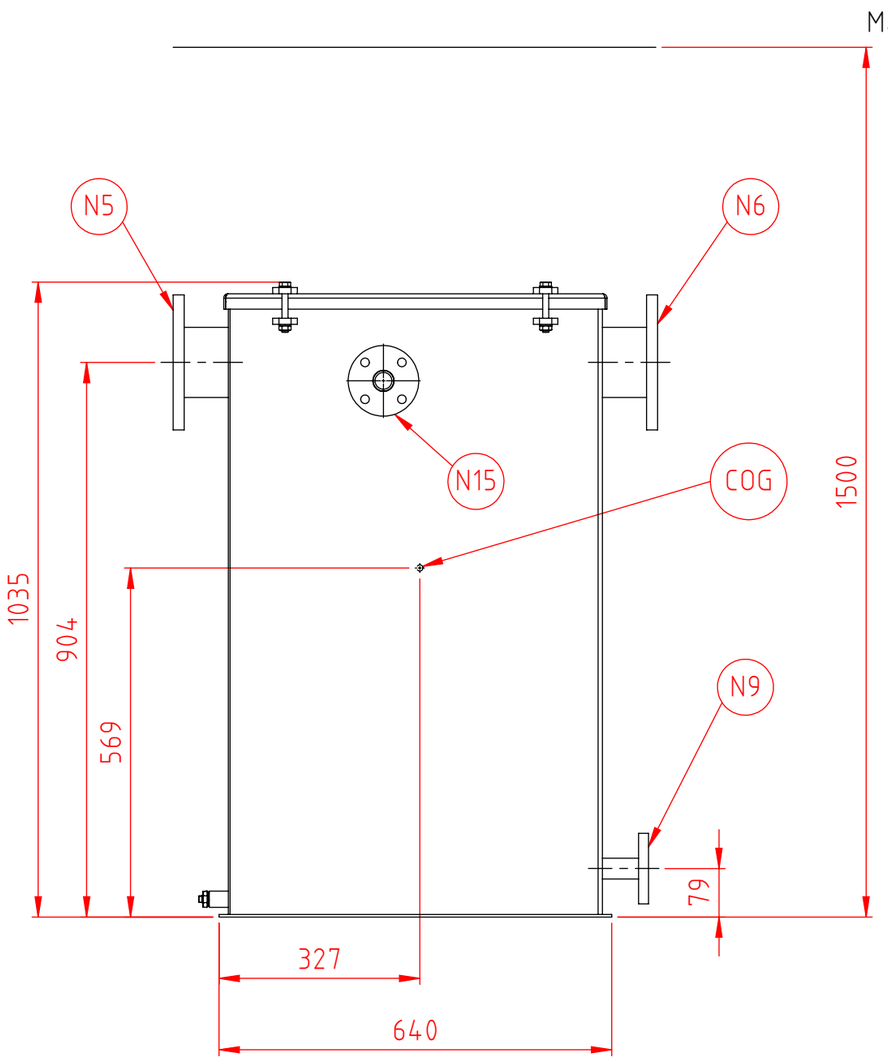


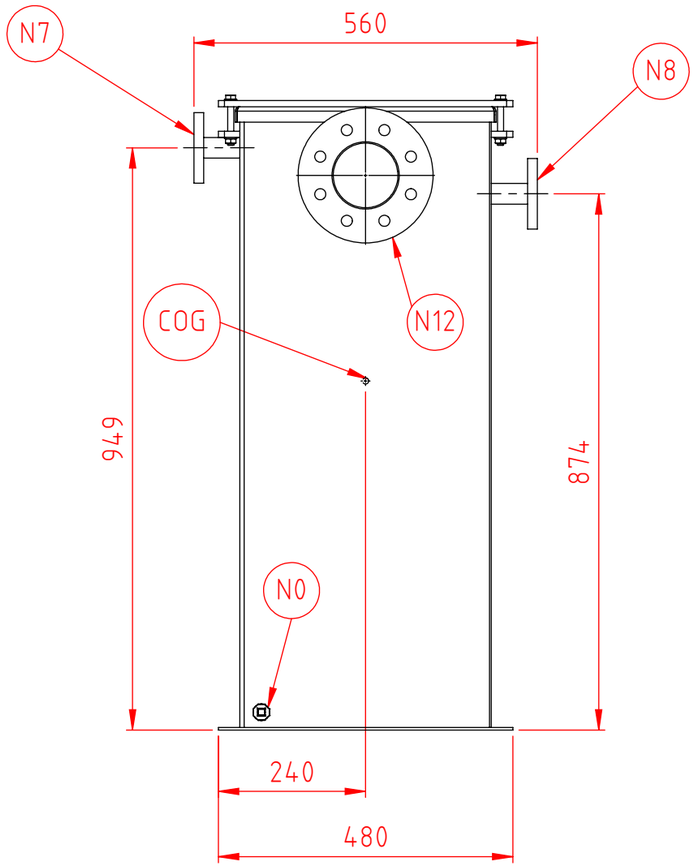
A grease trap removes fat, oil and grease (called FOG) and solids (food particles, sand and grit etc.) by a gravity separation process.

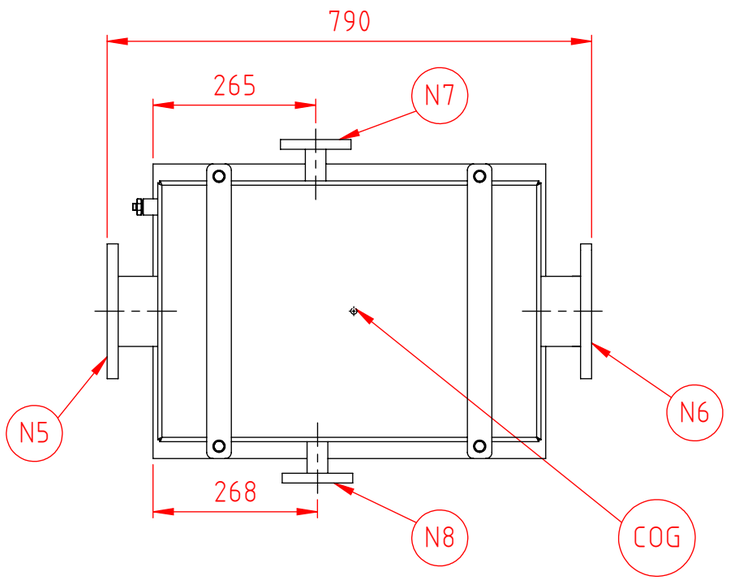
The grease trap slows down the flow of waste water long enough for the FOG and solids to separate. The solids settle to the bottom and the grease floats to the top. The middle layer is free water which is discharged to the sewer.

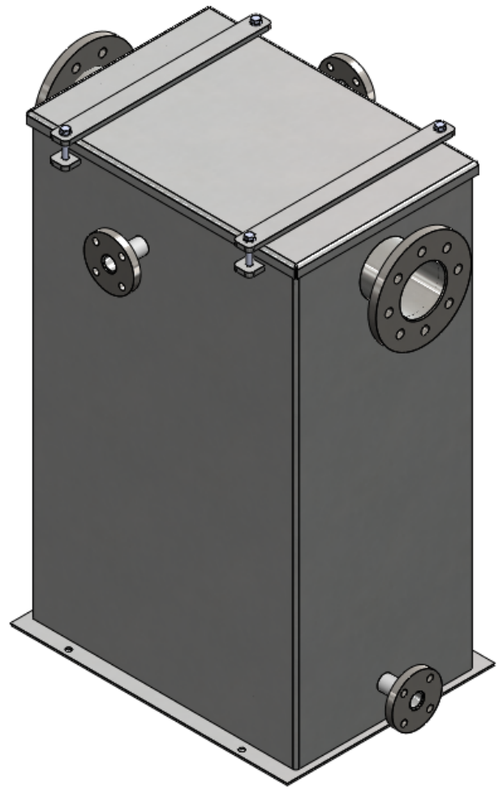
The longer the flow is kept inside the trap, the better job it will do of separating the waste materials.

Pos.	Description	Size
N5	galley water inlet	DN100 PN10
N6	galley water outlet	DN100 PN10
N7	deaeration	DN25 PN10
N8	grease drain	DN25 PN10
N9	drain	DN25 PN10
N0	OC internal use	R 1/2"
COG	center of gravity	









Revision :				Oberfläche:		
					Datum	Name
				Erst.	21.05.2013	M.Hille
				Gepr.		
				Freig.		
Index	Änderung	Datum	Name			

Ocean Clean GmbH
Zum Kühlhaus 5
18069 Rostock
Germany
Phone: +49 (0) 381-811 2930
Fax: +49 (0) 381-811 2939
info@oceanclean.de

Maßstab: 1:10 | Gewicht: 94.33kg empty

Werkstoff:
mild steel

Fat Frap FT-320

FT-320-BG-100

Seite 1/1

A3