

G&O BIOREACTOR BR-11100 BG-V



Installation onboard "Mary Arctica" owned by Royal Arctic Lines, dk

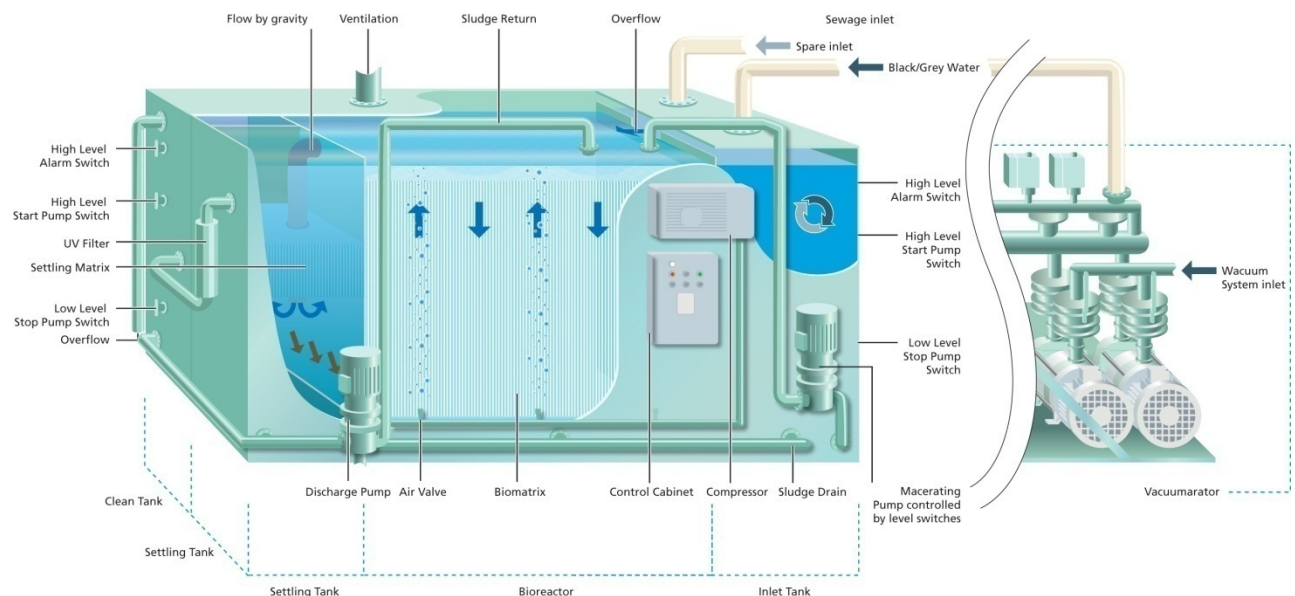
1. INTRODUCTION

The G&O Bioreactor represents the next generation of Biological Sewage Plants and is able to handle grey and black water from any Ship or Offshore construction. The plant is an "Aerated Submerged Fixed Film Unit" which operates by use of the "Matrix Technology". The G&O Bioreactor system provides an excellent growth environment for our bacteria media. The tank is fitted with a rigid PP/PVC matrix. By this we obtain a 125 times larger internal surface where the bacteria media can adhere compared to any traditional Active Sludge Plant/tank. In this manner we secure any operator full operational freedom all around the globe with a system that exceeds any known or expected future environmental demands.

2. PRINCIPLE OF OPERATION

Black and Grey water is directed to the Inlet Mixing Tank either by gravity or by a Vacuumator Pump. The Inlet Mixing Tank is designed to even-out peak loadings to ensure a steady liquid flow through the plant and thus optimizing the biological cleaning process in the Bioreactor tank.

From the Inlet Mixing Tank, the waste water is transferred to the Bioreactor Tank by a Macerating Pump mixing grey and black water and cutting up all solids. The mixed waste water passes the vertically installed Matrix in the Bioreactor Tank driven by compressed air fed into the process by air diffusers in the bottom part of the tank. The compressed air further supplies oxygen and in turn enhances the biological process in the Bioreactor Tank. The treated water flows from the Bioreactor Tank to the Settling Tank by gravity. In the Settling Tank the treated water passes an installed matrix prior to being transferred to the Clean Water Tank. By exposure to an advanced UV light filter all remaining Thermo Tolerant Coli Bacteria are eradicated prior to entering the Clean Water Tank. Organic and mineral sludge deposits in the Settling Tank are at regular intervals transferred to the Bioreactor Tank for further treatment. Liquid level in both the Inlet Mixing Tank and the Clean Water Tank is controlled by 2 level switches: A high level switch starting a transfer pump and low level switch stopping the pump. The plant is designed for fully automatic operation but can also be operated manually from the control cabinet. The plant is designed for easy access for all maintenance purposes.



3. LAYOUT DRAWING

PLEASE SEE ATTACHED DRAWING FOR FURTHER DETAILS.

STANDARD PLANT SIZES (VACUUM)

STP Type	Org. Load [BOD ₅ / day]	Hydr. Load [m ³ /day]	Dimensions [mm]	Dry weight 316L/St 52-3 [kg]	Operating weight 316L/St 52-3 [kg]
BR 1850	0.75	1.85	2910x1320x1560	954/1117	3006/3170
BR 3700	1.50	3.70	3010x1620x1560	1069/1285	3970/4185
BR 5500	2.25	5.50	3610x1620x1560	1202/1488	5086/5372
BR 7400	3.00	7.40	4210x1650x1560	1347/1685	6504/6541
BR 9250	3.75	9.25	4010x1650x1860	1410/1777	6973/7340
BR 11100	4.50	11.10	4460x1650x1860	1586/1996	8035/8445

Recommended service area:

Front	Min. 1000 mm
Left side	Min. 500 mm
Right side	Min. 500 mm
Above	Min. 500 mm

4. TYPICAL P&I DIAGRAM

PLEASE SEE ATTACHED DRAWING FOR FURTHER DETAILS.

5. TECHNICAL SPECIFICATIONS

CONSTRUCTION

The system is delivered as one complete unit with separate vacuum-aerator pumps.

The plant is produced and tested according to internal G&O QA prior to delivery.

Factory Acceptance Test (FAT) with fresh water is available.

MAIN COMPONENTS

Macerating Pump - ORPU type ES 135/4	1 off
Max. flow	9 m ³ /h
Max. delivery head	6 mWC
El. consumption	1,3 kW
Discharge Pump - ORPU, type ES 130	1 off
Max. flow	17 m ³ /h
Max. delivery head	23 mWC
El. consumption	2,6 kW
UV, Van Remmen, type W1	1 off
El. consumption	0.06 kW
Vacuumerator - JETS 25MB-D	2 off
Max. flow	26 m ³ /h
Max. delivery head	15 mWC (water)
El. consumption	3,45 kW/each
Control cabinet 400/440V 50/60 Hz	1 off
Air Compressor, Becker, type DT 4.25	1 off
El. consumption	1,25 kW
Tank plating	6 mm Black steel 52-3 coated
Optional tank plating	4 mm Stainless steel 316L
Power supply	3 x 400/440V 50/60 Hz
Power consumption 60 Hz (with compressor)	12,1 kW (installed)

Gertsen & Olufsen A/S

Savsvinget 4, DK-2970 Hørsholm
 Tel: +45 45 76 36 00, Fax: +45 45 76 17 73
 www.g-o.dk, info@g-o.dk, CVR. DK 16 31 48 97

TECHNICAL SPECIFICATIONS

Rev. No: 05

Piping connections

Black water to vacuumators	2 off	Flanged DN50 / PN10
Grey water to inlet mixing tank	1 off	Flanged DN100 / PN10
Spare to inlet mixing tank	1 off	Flanged DN50 / PN10
Venting	1 off	Flanged DN65 / PN10
Emergency overflow	1 off	Flanged DN50 / PN10
Discharge	1 off	Flanged DN40 / PN10
Filling	1 off	Flanged DN50 / PN10

OPERATION ENVIRONMENT

The G&O Bioreactor is designed for use in a marine environment. For special environmental conditions, modifications of the standard design may, however, be required.

Generally the maximum relative humidity shall not exceed 90% and the environmental temperature shall be in the range of 5 - 55°C for normal continuous operation. The optimum temperature for biological process is 5 - 40°C

DESIGN LIMITATIONS

The G&O Bioreactor is specifically designed for efficient treatment of grey and black waste water originating from normal use of toilets and bathrooms. In case the G&O Bioreactor in addition is to treat galley waste water, the requirement for a grease trap must be evaluated to ensure continued optimum performance of the biological cleaning process.

The system design must also be evaluated in more detail if larger amounts of chemicals may be directed to the sewage treatment plant.

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Savsvinget 4, DK-2970 Hørsholm
Tel: +45 45 76 36 00, Fax: +45 45 76 17 73
www.g-o.dk, info@g-o.dk, CVR. DK 16 31 48 97