

# FBBR 50

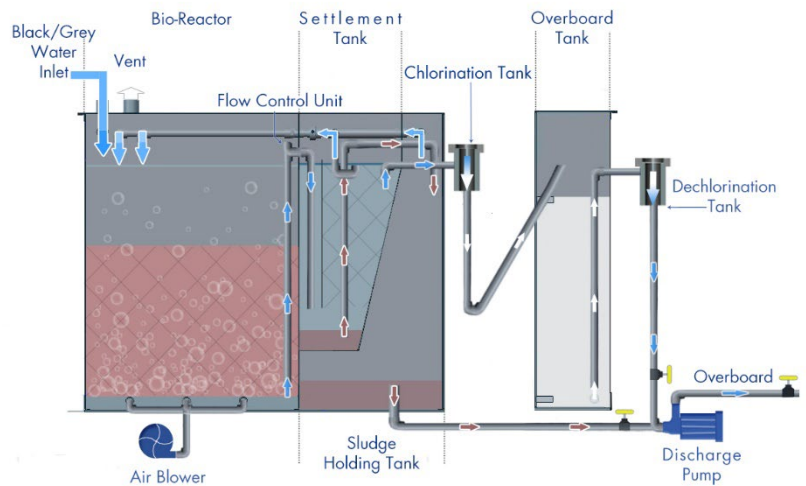
Sewage Treatment Plant  
10.0m<sup>3</sup>/day Hydraulic load



## Victor Marine

### Description

Victor Marine's FBBR Series (Fixed Bed Bio Film Reactor) Biological Sewage Treatment Plant has been developed using the extremely well proven and compact fixed biofilm technology. Fully automatic operation is both effective and reliable, whilst making it easy to use and maintain.



### Key Features

- No high-speed moving parts, which results in less maintenance and lower lifetime costs;
- No delicate expensive membranes;
- No cleaning cycles or backwashing;
- Fully automated PLC-controlled system;
- Ability to process from a gravity or vacuum feed;
- Can be supplied as turnkey package or in modular form for ease of installation;
- Low power consumption;
- Fully Type Approved to IMO and Bureau Veritas standards.

### Technical Information

Biological Load (kg BOD/day)	3.5
Hydraulic Load (m <sup>3</sup> /day)	10.0
Max Length* (Inc. Maint)	2813mm (3208)
Max Width * (Inc. Maint)	2247mm (2730)
Max Height* (Inc. Maint)	1987mm (2129)
Weight	Dry - 1500kg Wet - 6600kg
Electrical Supply	380 – 460 V / 3ph / 50-60hz
Connections (mm/inch)	Wastewater Inlet (Black) – 4” BS4504 PN6 Wastewater Inlet (Grey) - 2” BS4504 PN6 Clean Water Discharge - 1” BSP Sludge Transfer Discharge - 1” BSP Vent Connection - 2” BS4504 PN6 Drain Valves - 1” BSP



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## **Scope of Supply**

Design approved and type tested by Bureau Veritas to satisfy the latest IMO resolution MEPC 227(64) (excluding section 4.2) and MEPC 159(55) meeting the effluent discharge. The FBBR system is internally piped and pre-wired with the following items, supplied as a standard unit:-

- 1<sup>st</sup> Stage Fixed Bed Bio Reactor System with Air Diffusion Tubes;
- 2<sup>nd</sup> Stage Settlement Tank;
- 3<sup>rd</sup> Stage Chlorination Device, Tablet Dispenser;
- 4<sup>th</sup> Stage Chlorine Contact Tank, Discharge Tank;
- 5<sup>th</sup> Stage Dechlorination System, Tablet Dispenser;
- Integral Air Blower;
- PLC – HMI Control System;
- Integrated Sludge Consolidation Tank and Sludge Transfer System;
- Discharge Pump.

## **System Control Panel**

HMI – PLC Control panel installed in a weatherproof steel enclosure, protected to IP55, incorporating:

- 1 No Main interlock isolator switch;
- 1 No PLC/HMI;
- 3 No Motor contactors c/w magnetic- thermal overload;
- 1 No Low voltage control power supply;
- 1 No Power On push button illuminated when on;
- 1 No Emergency stop push button;
- 1 No Sludge transfer push button illuminated when on;  
Set of volt free digital output terminals for IMPS. Comprising of:-
- 1 No Power On status N/C when on;
- 1 No Feed pump status, N/C when running;
- 1 No Air Blower status, N/C when running;
- 1 No Discharge pump status N/C when running;
- 1 No High Level alarm N/C in alarm;
- 1 No Set of terminals for remote Emergency stop control (hard wired);
- 1 No Alarm output (for audio visual alarm c/w mute facility).

This Control system includes all necessary power supplies for the STP unit. The only shipboard supply required is the incoming power to the interlock isolator.

All internal controls are 24V DC.

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## **HMI (Human Machine Interface) PLC (Programmable Logic Controller)**

HMI with 160 x 128 pixel graphic display touch screen, 4 operator program function keys, plus 1 non-user system key for PLC/HMI diagnostics.

Programmed specifically for the control of the Victor FBBR Series Sewage Treatment Plant.

## **Chlorination Device**

Disinfection is carried out by chlorine tablets in a chlorine contact device which is easy to refill without the need to stop the system.

## **Dechlorination Device**

To ensure the effluent quality, there is a dechlorination system, this can be easily refilled.

## **Air Blower**

The side channel air blower supplies air to the diffuser tubes in the bio zone, air pressure for the air lift pump flow control to the settlement tank, air pressure for the automatically controlled solenoid operated sediment removal and scum removal system and for the sludge consolidation tank aeration. The side channel air blower has the added benefits of low noise operation, small size and a virtually maintenance-free design.

## **Side Channel Air Blower Specifications**

Type	RT-3011
Maximum Air Flow	2.4 – 2.9 m <sup>3</sup> /min
Protection	IP 55
Power	0.9 – 1.1 kW
Current Full Load Y	2.4 – 2.8 Amperes
Insulation Class	F
Max. Pressure	1800 mmAq
Material - Casing	Aluminium
RPM	2800 - 3350
Noise Level	64 - 65 dB.

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## Discharge Pump

Used for the overboard discharge of the clarified effluent. The discharge pump also has manual isolation/diverter valves to enable the discharge pump to transfer the sludge from the consolidation tank to another storage tank or for disposal.

## Discharge Pump Specifications

Maximum discharge	1.5 m <sup>3</sup> /H
Protection	IP 54
Power	0.45 kW
Current	1.3 Amperes
Insulation Class	F
Max. discharge head	18 Metres
Material - pump casing	Cast Iron
RPM	2900

## Painting Standard

Surface Preparation	Swedish standard Sa2½
Internal Paint	Interseal 670HS to @ 100µm
	Interseal 670HS @ 100µm
External Paint	Intergard 251 @ 75µm
	Intergard 251 @ 75µm
	Interthane 990 @ 60µm

## Certification & Documentation

1. FBBR Series STP system offered is certificated to IMO MEPC 227(64) & MEPC 159(55) for Black and Grey waste water.
2. Equipment can be provided with the following certification:-  
Bureau Veritas Type Approval Certificate according to IMO MEPC 227(64) (excluding section 4.2) and MEPC 159(55);

EC Type Examination (Module B) Certificate issued by Bureau Veritas Marine Division for compliance to Marine Equipment Directive (MED).

EC (Module D) Certificate of Conformity issued by Bureau Veritas Marine Division.

3. Equipment is supplied with one standard IETM (Interactive Electronic Training Manual) Level 3 on CD-ROM, in English language and one hard copy Installation, Operation & Maintenance Manual complete with drawings, also in English language. Additional copies and/or translated versions are chargeable.

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## **Limitations**

The efficient performance of plant is limited by the fulfilment of the following conditions:-

1. The hydraulic and biological loadings are within the design limits;
2. The STP is installed and wired in accordance with the FBBR STP Series manual;
3. The STP is commissioned in accordance with the FBBR STP Series manual;
4. The STP is operated correctly as detailed in the FBBR STP Series manual.
5. The waste entering the STP is macerated to required level as detailed in the FBBR STP Series manual.\*  
\* macerator offered as optional item

## **Guarantees**

1. Any machinery which fails within 18 months of despatch or 12 months after installation, whichever is sooner, through faulty materials or workmanship, will be replaced free of charge in accordance with the above limitations regulations being fully and correctly complied with. The cost of labour is excluded.
2. All products are sold without liability for consequential loss of any description.

## **Storage**

Victor Marine systems are provided with preservation guaranteed for the duration of transportation. If a period of intermediate storage is foreseen before the system would be commissioned, then the system should be kept inside the original transportation packaging. The storage location should be free from moisture, frost, dust, extreme heat/sunlight (50°C and above), vibrations and shocks. For prolonged storage (over 6 months) please contact Victor Marine's UK office for detailed storage instructions.