



Marine & Offshore
Division

Certificate number: 22434/B1 EC

File number: ACM 217/2302/04

Annex A1 Item number: A.1/2.6

*This certificate is not valid when presented without the full
attached schedule composed of 7 sections*

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Notified Body 0062 - MARINE EQUIPMENT DIRECTIVE 96/98/EC

EC TYPE EXAMINATION CERTIFICATE

as per Module B of European Union Council Directive 96/98/EC on marine equipment
as amended by Commission Directive (EU) 2015/559

This certificate is issued to

Red Fox Environmental Services, Inc.

Youngsville - UNITED STATES OF AMERICA

for the type of product

SEWAGE SYSTEMS

Red Fox Marine Model RF-100-M thru RF-15000-M

Red Fox Marine Model RF-200-M-FG thru RF-2000-M-FG

Requirements:

- MARPOL 73/78 as amended, Annex IV, Regulation 9
- IMO Resolution MEPC.159(55)
- IMO Resolution MEPC.227(64)

This certificate is issued on behalf of the French Maritime Authorities to attest that BUREAU VERITAS did undertake the relevant type-examination procedures for the product identified above which was found to comply with the relevant requirements of the Council Directive 96/98/EC of 20 December 1996 as amended.


This certificate will expire on: 04 Aug 2019

For BUREAU VERITAS Notified Body 0062,

At BV PORT EVERGLADES CENTRE, on 24 May 2016,

Flavio Rosas



This certificate does not allow to issue the Declaration of Conformity and to affix the mark of conformity (wheelmark ) to the products corresponding to this type. To this end, the production-control phase module (D, E or F) of Annex B of the Directive is to be complied with and controlled by a written inspection agreement with a notified body.

This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. BUREAU VERITAS is designated by the French Maritime Authority as a "notified body" under the terms of the French Regulations Division 140 Chapter 140-2. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine & Offshore Division available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Red Fox Marine Model RF-100-M, RF-200-M, RF-350-M, RF-500-M, RF-750-M, RF-1000-M, RF-1500-M, RF-2000-M, RF-2500-M, RF-3000-M, RF-3500-M, RF-4000-M, RF-4500-M, RF-5000-M, RF-5500-M, RF-6000-M, RF-6500-M, RF-7000-M, RF-7500-M, RF-8000-M, RF-8500-M, RF-9000-M, RF-12000-M and RF-15000-M

Red Fox Marine Fiberglass Model RF-200-M-FG, RF-350-M-FG, RF-500-M-FG, RF-750-M-FG, RF-1000-M-FG, RF-1500-M-FG and RF-2000-M-FG

1.1 Design of Red Fox Marine Model Sewage Treatment Plant

- Operates on a biological treatment process. The process consists of (2) mechanical components: 1) air blower and 2) chemical injection pump
- Does not utilize any control, alarm or monitoring systems
- Manufactured out of mid strength steel/fiberglass and consists of (4) compartments/chambers: 1) aeration 2) clarification 3) polishing media and 4) disinfection

1.2 Technical Data

Red Fox Marine Model	Designed hydraulic loading (m ³ /day)	Organic loading (kg/day)	Red Fox Marine Model	Designed hydraulic loading (m ³ /day)	Organic loading (kg/day)
RF-100-M	0.38	0.3	RF-200-M *	0.76	0.6
RF-350-M *	1.33	1.05	RF-500-M *	1.9	2.0
RF-750-M *	2.9	3.0	RF-1000-M *	3.79	4.0
RF-1500-M *	5.7	6.0	RF-2000-M *	7.6	8.0
RF-2500-M	9.5	10.0	RF-3000-M	11.4	12.0
RF-3500-M	13.3	14.0	RF-4000-M	15.2	16.0
RF-4500-M	17.1	18.0	RF-5000-M	19.0	20.0
RF-5500-M	20.9	22.0	RF-6000-M	22.8	24.0
RF-6500-M	24.6	26.0	RF-7000-M	26.5	28.0
RF-7500-M	28.5	30.0	RF-8000-M	30.3	32.0
RF-8500-M	32.2	34.0	RF-9000-M	34.2	36.0
RF-12000-M	45.6	47.0	RF-15000-M	56.0	59.0

* Red Fox Marine Fiberglass Model RF-200-M-FG thru RF-2000-M-FG have same design

1.3 Red Fox Marine Style Models were tested and produced an effluent which, on analysis, produce:

Parameters	Unit	MEPC.227(64) *
Thermotolerant Coliform (TCC)	MPN/100 ml	< 100
Total Suspended Solids (TSS)	mg/l	< 35 Qi/Qe
5-day Biochemical Oxygen Demand (BOD ₅ without Nitrification)	mg/l	< 25 Qi/Qe
Chemical Oxygen Demand (COD)	mg/l	< 125 Qi/Qe
pH value	-	Between 6.0 and 8.5
Residual Chlorine Demand	mg/l	< 0,5
Total Nitrogen	mg/l	< 20 Qi/Qe or at least 70% reduction
Total Phosphorus	mg/l	< 1.0 Qi/Qe or at least 80% reduction

* Dilution Factor (Qi/Qe) of 1

2. DOCUMENTS AND DRAWINGS

Drawings

General Arrangement	Drawing Number	Issue
RF-100-M to RF-1500-M	xx xxx GA 001 rev. 0	10/03/2011
RF-200-M-FG	RF-200-M-FG 001 rev. 0	16/06/2014
RF-350-M-FG	RF-350-M-FG 001 rev. 0	16/06/2014
RF-500-M-FG	RF-500-M-FG 001 rev. 0	17/06/2014
RF-750-M-FG	RF-750-M-FG 001 rev. 0	18/06/2014
RF-1000-M-FG	RF-1000-M-FG 001 rev. 0	18/06/2014
RF-1500-M-FG	RF-1500-M-FG 001 rev. 0	18/06/2014
RF-2000-M-FG	RF-2000-M-FG 001 rev. 0	18/06/2014

- Drawing No. 09 034 GA 001 A General arrangement RF-1500-M
- Drawing No. 09 034 GA 002 0 General arrangement - IMO testing tank addition to RF-1500-M
- Drawings No. 09 034 EP 001 0 Plate locations, 034 SS 001 0 Skid, Standard structural details rev. 0

Documentation

- Manufacturer's CD including technical description, process principle and equipment list
- Installation, operation and maintenance manual

No departure from the above documents shall be made without the prior consent of the notified body named on this certificate. The manufacturer must inform the notified body of any modification or changes to these documents and drawings.

3. TEST REPORTS

3.1 The water quality analysis according to the requirements of IMO Resolution MEPC.159(55) were carried out ashore, conducted by the accredited hoh-PAK Laboratory's State of Louisiana Department of Environmental, US, and witnessed by the notified body. The tests were carried out on a type RF-1500-M representing all the range of sewage treatment plants and all samples were drawn by the laboratory. Type test reports rev. 0 dated 29/10/2009.

3.2 Additional water quality analysis in accordance with IMO Resolution MEPC.159(55) were carried out ashore, conducted by TEi-Testing Services (USA), accredited laboratory by USCG. The tests were carried out on type RF-200-M and RF-1500-M representing all the range of sewage treatment plants and all samples were drawn by the laboratory. TEi Testing Services' report TS-P00849 dated 30/11/2010 and test reports TS-A04969 (RF-200-M) and TS-A04971 (RF-1500-M) dated 29/11/2010.

3.3 Additional tests were carried out, conducted by TEi-Testing Services (USA), accredited laboratory by USCG. The tests were carried out on the RF-500-M-FG model representing all the range of fiberglass construction. TEi Testing Services' report TS-P00909 dated 04/04/2014 and test report TS-M00641 dated 04/04/2014.

3.4 The water quality analysis according to the requirements of IMO Resolution MEPC.227(64) were carried out ashore, conducted by TEi-Testing Services (USA), accredited laboratory by USCG. The tests were carried out on RF-1500-M representing all the range of sewage treatment plants and all samples were drawn by the laboratory. TEi Testing Services' report TS-P00927 dated 04/03/2016.

3.5 Environmental tests carried out, performed by TEi-Testing Services (USA), accredited laboratory by USCG. TEi Testing Services's reports listed in 3.2, 3.3 and 3.4 above.

Note: Details of tests and results obtained are shown on the Appendix to this Certificate.

3.6 Inclination test at angle of at least 22.5° in any plane from the normal operating position.

3.7 USCG Certificates of type test dated 15/03/2016

Approval No.	Model Number	Approval No.	Model Number
159.015/10102/0	RF-100-M, RF-200-M, RF-350-M	159.015/10103/0	RF-500-M, RF-750-M, RF-1000-M
159.015/10104/0	RF-1500-M, RF-2000-M, RF-2500-M	159.015/10105/0	RF-3000-M, RF-3500-M, RF-4000-M
159.015/10106/0	RF-4500-M, RF-5000-M, RF-5500-M	159.015/10107/0	RF-6000-M, RF-6500-M, RF-7000-M
159.015/10108/0	RF-7500-M, RF-8000-M, RF-8500-M	159.015/10109/0	RF-9000-M, RF-12000-M and RF-15000-M
159.015/10164/0	RF-200-M-FG, RF-350-M-FG	159.015/10165/0	RF-500-M-FG, RF-750-M-FG, RF-1000-M-FG
159.015/10166/0	RF-1500-M-FG, RF-2000-M-FG		

4. APPLICATION / LIMITATION

4.1 The sewage treatment plants comply with MEPC.227(64) including section 4.2 for nitrogen and phosphorus removal standard.

4.2 The scope of the appraisal made by Bureau Veritas to issue this certificate is strictly restricted to the relevant requirements stated on the front page of this certificate. Other requirements like Ship's Flag Administration Regulations and/or Classification

Societies Rules, typically for electrical equipment including control, safety devices and cables, are excluded from the scope of this certificate.

4.3 The installation on board is to be carried out in compliance with manufacturer's instructions and in accordance with the provisions of IMO Resolution in force.

4.4 A copy of this EC type-examination certificate shall be carried on board any ship equipped with the above described sewage treatment plant at all times.

4.5 The ship staff shall be familiarized with the operation and maintenance of the sewage treatment plant or properly trained by manufacturer's specialist.

4.6 Each sewage treatment plant is to be supplied with its manual for installation, use and maintenance in language accepted by the Ship's Flag Administration.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 This certificate does not allow the applicant to issue the Declaration of Conformity and to affix the mark of conformity (wheelmark) to the products corresponding to this type. To this end, the production-control phase module D "Production Quality Assurance" or E "Product Quality Assurance" or F "Product Verification" of Annex B of the Directive is to be complied with and controlled by a written inspection agreement with a notified body.

5.2 The manufacturer shall institute quality control procedure in order to ensure that the sewage treatment plant is produced to the same standard as the prototype approved one, and to keep records of any production tests carried out in accordance with Requirements stated on the front page of this certificate.

5.3 Each sewage treatment plant shall be delivered with a declaration of conformity to type issued by the manufacturer.

Place of production

**Red Fox Environmental Services, Inc.
1513B Chemin Agreeable Road
70592 Youngsville, LA
UNITED STATES OF AMERICA**

6. MARKING OF PRODUCT

A plate or durable label shall be placed on the sewage treatment plant with at least:

- Manufacturer's name or logo
- Model and serial number
- Type designation
- Hydraulic loading

- *Markings as per MED 96/98/EC when authorized by a Notified Body: ☒ YYYY/XX where YYYY is the number of the notified body undertaking surveillance module (when BV, 0062) and where XX are the last two digits of year mark affixed.*

7. OTHERS

This approval is given on the understanding that the manufacturer will accept full responsibility for informing shipbuilders or their sub-contractors of the proper method of fittings and general maintenance of the sewage treatment plant and of the conditions of this approval.

This certificate supersedes the EC Type-Examination Certificate No. 22434/B0 EC issued on 04/08/2014 by the Society.

*Appendix-1 to the EC Type Examination Certificate No. 22434/B1 EC***Red Fox Marine Model RF-100-M thru RF-1500-M**

Test results and details of tests conducted on samples from the sewage treatment plant in accordance with resolution MEPC.227(64):

Sewage treatment plant, Type: **Red Fox Marine Model RF-1500-M**

Manufactured by: **Red Fox Environmental Services, Inc.**

Organization conducting the test:

a) For Water Analysis: TEi Testing Services, LLC

b) For Environmental Testing: TEi Testing Services, LLC

TEi Testing Services' report TS-P00927 dated 04/03/2016

Designed hydraulic loading: **5.7 m³/day**

Designed organic loading: **6.0 kg/day BOD**

Number of effluent samples tested: **40**

Number of influent samples tested: **40**

Total suspended solids influent quality: **618 mg/l**

Total nitrogen influent quality: **15.1 mg/l as nitrogen**

Total phosphorus influent quality: **8.4 mg/l as phosphorus**

BOD5 without nitrification influent quality: **311.3 mg/l**

Maximum hydraulic loading: **2.85 m³/day**

Minimum hydraulic loading: **0.57 m³/day**

Average hydraulic loading (Qi): **1.14 m³/day**

Effluent flow (Qe): **1.14 m³/day**

Dilution compensation factor (Qi/Qe): **1**

Geometric mean of total suspended solids: **10.3 mg/l**

Geometric mean of the thermotolerant coliform count: **9 coliforms/100ml**

Geometric mean of BOD5 without nitrification: **12.1 mg/l**

Geometric mean of COD: **37 mg/l**

Geometric mean of total nitrogen: **0.89 mg/l or 94.1% reduction**

Geometric mean of total phosphorus: **0.07 mg/l or 99.2% reduction**

Maximum pH: **7.6**

Minimum pH: **6.8**

Type of disinfectant used: **Chlorine**

If Chlorine - residual Chlorine:

Maximum: **0.6 mg/l** Minimum: **0.1 mg/l**

Geometric Mean: **0.4 mg/l**

Was the sewage treatment plant tested with:

Fresh water flushing: **Yes**

Salt water flushing: **No**

Fresh and salt water flushing: **No**

Grey water added: **Yes - Black to Grey Water - 20% Black to 80% Grey Water**

Was the sewage treatment plant tested against the environmental conditions specified in section 5.9 of resolution MEPC.227(64):

Temperature: **Yes**

Humidity: **Yes**

Inclination: **Yes**

Vibration: **Yes**

Reliability of Electrical and Electronic Equipment: **Yes**

Limitations and the conditions of operation are imposed:

Salinity: **N/A**

Temperature: **0-55°C**

Humidity: **90% @ 55°C**

Inclination: **22.5 degrees**

Vibration: **N/A**

Results of other parameters tested: **N/A**

*Appendix-2 to the EC Type Examination Certificate No. 22434/B1 EC***Red Fox Marine Model RF-200-M-FG thru RF-2000-M-FG**

Test results and details of tests conducted on samples from the sewage treatment plant in accordance with resolution MEPC.227(64):

Sewage treatment plant, Type: **Red Fox Marine Models RF-1500-M**

Manufactured by: **Red Fox Environmental Services, Inc.**

Organization conducting the test:

a) For Water Analysis: TEi Testing Services, LLC

b) For Environmental Testing: TEi Testing Services, LLC

TEi Testing Services' report TS-P00927 dated 04/03/2016

Designed hydraulic loading: **5.7 m3/day**

Designed organic loading: **6.0 kg/day BOD**

Number of effluent samples tested: **40**

Number of influent samples tested: **40**

Total suspended solids influent quality: **618 mg/l**

Total nitrogen influent quality: **15.1 mg/l as nitrogen**

Total phosphorus influent quality: **8.4 mg/l as phosphorus**

BOD5 without nitrification influent quality: **311.3 mg/l**

Maximum hydraulic loading: **2.85 m3/day**

Minimum hydraulic loading: **0.57 m3/day**

Average hydraulic loading (Qi): **1.14 m3/day**

Effluent flow (Qe): **1.14 m3/day**

Dilution compensation factor (Qi/Qe): **1**

Geometric mean of total suspended solids: **10.3 mg/l**

Geometric mean of the thermotolerant coliform count: **9 coliforms/100ml**

Geometric mean of BOD5 without nitrification: **12.1 mg/l**

Geometric mean of COD: **37 mg/l**

Geometric mean of total nitrogen: **0.89 mg/l or 94.1% reduction**

Geometric mean of total phosphorus: **0.07 mg/l or 99.2% reduction**

Maximum pH: **7.6**

Minimum pH: **6.8**

Type of disinfectant used: **Chlorine**

If Chlorine - residual Chlorine:

Maximum: **0.6 mg/l** Minimum: **0.1 mg/l**

Geometric Mean: **0.4 mg/l**

Was the sewage treatment plant tested with:

Fresh water flushing: **Yes**

Salt water flushing: **No**

Fresh and salt water flushing: **No**

Grey water added: **Yes - Black to Grey Water - 20% Black to 80% Grey Water**

Was the sewage treatment plant tested against the environmental conditions specified in section 5.9 of resolution MEPC.227(64):

Temperature: **Yes**

Humidity: **Yes**

Inclination: **Yes**

Vibration: **Yes**

Reliability of Electrical and Electronic Equipment: **Yes**

Limitations and the conditions of operation are imposed:

Salinity: **N/A**

Temperature: **0-55°C**

Humidity: **90% @ 55°C**

Inclination: **22.5 degrees**

Vibration: **N/A**

Results of other parameters tested: **N/A**

***** END OF CERTIFICATE *****