



U. S. Department of Homeland Security  
**United States Coast Guard**  
**Certificate of Approval**

Coast Guard Approval Number: 159.015/10106/0

Expires: 15 March 2021

SEWAGE POLLUTION PREVENTION EQUIPMENT  
CERTIFICATE OF TYPE TEST UNDER IMO RES. MEPC.227(64)

RED FOX ENVIRONMENTAL SERVICE INC  
1513B Shemin Agreeable Road  
Youngsville LA 70592

Models RF-4500-M, RF-5000-M, RF-5500-M; 4500, 5000, and 5500 GPD capacity.

This is to certify the models listed above, having a designed hydraulic loading of 17.1, 19.0, and 20.9 m<sup>3</sup>/day an organic loading of 18.0, 20.0, and 22.0 kg/day Biochemical Oxygen Demand without nitrification (BOD) and of the design shown on drawings RF-4500-M, RF-5000-M, and RF-5500-M have been examined and satisfactorily tested in accordance with IMO resolution MEPC.227(64) to meet the operational requirements referred to in regulation 9 of Annex IV of the International Convention for the Prevention of Pollution from Ships (MARPOL).

The tests on the equipment were carried out ashore at TEi-Testing Services, LLC , and completed on 4MAR2016. The equipment tested produced an effluent which did not exceed the geometric mean of 100 thermotolerant coliforms per 100 mL, Total Suspended Solids of 35 Qi/Qe mg/L, a geometric mean of 5-day biochemical oxygen demand without nitrification of no more than 25 Qi/Qe mg/l, a geometric mean of chemical oxygen demand (COD) of no more than 125 Qi/Qe mg/l and a pH between 6 and 8.5; a geometric mean of total nitrogen of no more than 20 Qi/Qe mg/l or at least 70 percent reduction; and a geometric mean of total phosphorus of no more than 1.0 Qi/Qe mg/l or at least 80 percent reduction.

These models have been tested in accordance with MEPC.227(64) including section 4.2, nitrogen and phosphorus removal standard. This equipment does not meet the hazardous locations requirements specified on 46 CFR 111.105, and therefore may not be installed in hazardous locations on U.S. flag vessels.

The Administration is satisfied that the sewage treatment plant can operate at angles of inclination of 22.5 degrees in any plane from the normal operating position.

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

A copy of this certificate should be carried on board any ship equipped with the above described sewage treatment plant.

This certificate documents compliance with 33 CFR Part 159.

\*\*\* End \*\*\*

THIS IS TO CERTIFY THAT the above named manufacturer has submitted to the undersigned satisfactory evidence that the item specified herein complies with the applicable laws and regulations as outlined on the reverse side of this Certificate, and approval is hereby given. This approval shall be in effect until the expiration date hereon unless sooner canceled or suspended by proper authority.

GIVEN UNDER MY HAND THIS 15<sup>th</sup> DAY OF  
MARCH 2016, AT WASHINGTON D.C.



S. T. BRADY  
Chief Engineering Division  
BY DIRECTION OF THE COMMANDANT

**TERMS:** The approval of the item described on the face of the Certificate has been based upon the submittal of satisfactory evidence that the item complies with the applicable provisions of the navigation and shipping laws and the applicable regulations in Title 33 and/or Title 46 of the Code of Federal Regulations. The approval is subject to any conditions noted on this Certificate and in the applicable laws and regulations governing the use of the item on vessels subject to Coast Guard inspection or on other vessels and boats.

Consideration will be given to an extension of this approval provided application is made 3 months prior to the expiration date of this Certificate.

The approval holder is responsible for making sure that the required inspections or tests of materials or devices covered by this approval are carried out during production as prescribed in the applicable regulations.

The approval of the item covered by this certificate is valid only so long as the item is manufactured in conformance with the details of the approved drawings, specifications, or other data referred to. No modification in the approved design, construction, or materials is to be adopted until the modification has been presented for consideration by the Commandant and confirmation received that the proposed alteration is acceptable.

**NOTICE:** Where a manufacturer of safety-at-sea equipment is offering for sale to the maritime industry, directly or indirectly, equipment represented to be approved, which fails to conform with either the design details or material specifications, or both, as approved by the Coast Guard, immediate action may be taken to invoke the various penalties and sanctions provided by law including prosecution under 46 U.S.C. 3318, which provides:

"A person that knowingly manufactures, sells, offers for sale, or possesses with intent to sell, any equipment subject to this part (*Part B. of Subtitle II of Title 46 U.S.C.*) and the equipment is so defective as to be insufficient to accomplish the purpose for which it is intended, shall be fined not more than \$10,000, imprisoned for not more than 5 years or both."

APPENDIX

U. S. Coast Guard Approval Number: 159.015/10106/0

Expires: March 15, 2021

TEST DATA AND RESULTS OF TESTS CONDUCTED ON SAMPLES FROM THE SEWAGE TREATMENT PLANT IN ACCORDANCE WITH IMO RESOLUTION MEPC.227(64)

Sewage Treatment Plant, Type: IMO Res. MEPC.115(51), Reg 9.1.1, and 33 CFR 159 Subpart C

Manufactured by: Red Fox Environmental Services, Inc.

Organization conducting the test: TEi Testing Services/Model RF-1500-M, Report Number TS-P00927 dated May 4, 2016

Designed hydraulic loading: 5.7 m<sup>3</sup>/day

Designed organic loading: 6.0 kg/day BOD

Number of effluent samples tested: 40

Number of influent samples tested: 40

Raw sewage (influent) quality: 618 mg/l total Suspended Solids

Maximum hydraulic loading: 2.85 m<sup>3</sup>/day

Minimum hydraulic loading: 0.57 m<sup>3</sup>/day

Average hydraulic loading: 1.14 m<sup>3</sup>/day

Total Nitrogen influent quality: 15.1 mg/l

Total Phosphorus influent quality: 8.4 mg/l

Dilution Compensation Factor (Qi/Qe): 1.0

Geometric Mean of Total

Suspended Solids: 10.3 mg/L

Geometric Mean of the Thermotolerant

Coliform Count: 9 coliforms/100 ml

Geometric Mean of BOD<sub>5</sub>: 12.1 mg/l

Chemical Oxygen Demand (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: 0.4 mg/L

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

Greywater 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 5.0 paragraph 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: After 0 Deg. C and 55 Deg. C

Humidity: After 90% RH at 55 Deg. C

Inclination: 22.5 Deg.

Vibration: N/A

\*\*\* END \*\*\*