

WASTEWATER TECHNOLOGY

NSF/ANSI Standard 40 - *Residential Wastewater Treatment Systems*

**Final Report:
Premier Tech Environment
EFX-400B-1 Wastewater Treatment System
06/09/2015/060**



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**Evaluation Report:
Premier Tech Environment Ecoflex™ Textile Filter EFX-400B-1
Wastewater Treatment System**

**Under the provisions of NSF/ANSI Standard 40
Residential Wastewater Treatment Systems**

September 2007

EXECUTIVE SUMMARY

Testing of the Premier Tech Environment Ecoflex™ Textile Filter model EFX-400B-1, was conducted under the provisions of NSF/ANSI Standard 40 for Residential Wastewater Treatment Systems (August 2005 revision). NSF/ANSI Standard 40 was developed by the NSF Joint Committee on Wastewater Technology.

The performance evaluation was conducted at the NSF Wastewater Technology Test Facility located in Waco, Texas using predominantly residential wastewater diverted from the Waco municipal wastewater collection system. The evaluation consisted of sixteen weeks of dosing at design flow, seven and one half weeks of stress testing and two and one half weeks of dosing at design flow. Dosing was initiated on August 28, 2006. After a one-week start up period, sample and data collection for the test was officially started on September 4, 2006. Sampling started in late summer and continued through the winter, covering a range of operating temperatures.

Over the course of the evaluation, the average influent BOD₅ was 260 mg/L, ranging between 69 and 770 mg/L, and the average influent TSS was 360 mg/L, ranging between 53 and 1,400 mg/L. The average effluent CBOD₅ was 3 mg/L, ranging between <2 and 49 mg/L, and the average effluent total suspended solids was 3 mg/L, ranging between <2 mg/L and 32 mg/L.

The EFX-400B-1 produced an effluent that successfully met the performance requirements established by NSF/ANSI Standard 40 for Class I effluent:

The maximum 7-day arithmetic mean was 15 mg/L for CBOD₅ and 13 mg/L for total suspended solids, both below the allowed maximums of 40 and 45 mg/L respectively. The maximum 30-day arithmetic mean was 6 mg/L for CBOD₅ and 6 mg/L for total suspended solids, both below the allowed maximums of 25 mg/L and 30 mg/L respectively.

The effluent pH during the entire evaluation ranged between, 6.2 and 6.9, within the required range of 6.0 to 9.0. The EFX-400B-1 met the requirements for noise levels (less than 60 dbA at a distance of 20 feet), color, threshold odor, oily film and foam.

Although not required by Standard 40, Premier Tech Environment requested that samples of the influent and effluent from the EFX-400B-1 be analyzed for total nitrogen. Samples were taken from September 4, 2006 through February 19, 2007. The average influent and effluent total nitrogen were 39 and 9.7 mg/L, respectively.

PREFACE

Performance evaluation of residential wastewater treatment systems is achieved within the provisions of NSF/ANSI Standard 40: Residential Wastewater Treatment Systems (revised August 2005), prepared by the NSF Joint Committee on Wastewater Technology and adopted by the NSF Board of Trustees.

Conformance with the Standard is recognized by issuance of the NSF Mark. This is not to be construed as an approval of the equipment, but a certification of the data provided by the test and an indication of compliance with the requirements expressed in the Standard.

Plants conforming to Standard 40 are classified as Class I or Class II plants according to the quality of effluent produced by the plant during the performance evaluation. Class I plants must also demonstrate performance consistent with the effluent color, odor, and oily film and foam requirements of the Standard. Class I plants must meet the requirements of EPA Secondary Treatment Guidelines¹ for five day carbonaceous biochemical oxygen demand, suspended solids and pH.

Permission to use the NSF Mark is granted only after the equipment has been tested and found to perform satisfactorily, and all other requirements of the Standard have been satisfied. Continued use of the Mark is dependent upon evidence of compliance with the Standard and NSF General and Program Specific Policies, as determined by periodic reinspection of the equipment at the factory, distributors and reports from the field.

NSF Standard 40 requires the testing laboratory to provide the manufacturer of a residential wastewater treatment system, a report including significant data and appropriate commentary relative to the performance evaluation of the plant. NSF policy specifies provision of performance evaluation reports to appropriate state regulatory agencies at publication. Subsequent direct distribution of the report by NSF is made only at the specific request of or by permission of the manufacturer.

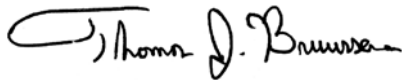
The following report contains results of the entire testing program, a description of the plant, its operation and key process control equipment, and a narrative summary of the test program, including test location, procedures and significant occurrences. The plant represented herein reflects the equipment authorized to bear the NSF Mark.

CERTIFICATION

NSF International has determined by performance evaluation under the provisions of NSF/ANSI Standard 40 (revised August 2005) that the Ecoflex™ Textile Filter model EFX-400B-1 manufactured by Premier Tech Environment, has fulfilled the requirements of NSF/ANSI Standard 40. The EFX-400B-1 has therefore been authorized to bear the NSF Mark so long as Premier Tech Environment continues to meet the requirements of Standard 40 and NSF General and Program Specific Policies.

General performance evaluation and stress tests were performed at the NSF Wastewater Technology Test Facility located in Waco, Texas. The raw wastewater used in the test was municipal wastewater. The characteristics of the wastewater during the test are included in the tabulated data of this report.

The observations and analyses included in this report are certified to be correct and true copies of the data secured during the performance tests conducted by NSF on the wastewater treatment system described herein. The manufacturer has agreed to present the data in this certification in its entirety whenever it is used in advertising, prospectuses, bids or similar uses.



Thomas J. Bruursema
General Manager
Wastewater Treatment Unit Certification



Thomas Stevens
Manager
Federal Programs

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1.0 PROCESS DESCRIPTION

The Ecoflex™ Model EFX-400B-1 uses an attached growth filtering media, which is formed by the assembly of vertical layers of organic material (peat) and synthetic material (textile). The Ecoflex™ EFX-400B-1 uses a natural process where physical, bio-chemical and microbiological reactions take place to purify septic tank effluent. Fixed bacteria on the filtering media treat wastewater aerobically. A complete Ecoflex™ Textile system comprises a primary reactor, a dosing station and an Ecoflex™ Textile Biofilter. As the wastewater trickles down through the filtering media, the contaminants, particulates or soluble forms, are physically filtered or adsorbed by the fibers. The microorganisms naturally attached on the media degrade the contaminants through their metabolic reactions. The organic and synthetic materials in the Ecoflex® media provide a high ratio of surface area to volume so the filter can support a relatively large amount of microbiological activity for a relatively small imprint. Moreover, the high porosity of the media combined with the design features of the shell allows a sufficient oxygenation rate in the filter.

2.0 PERFORMANCE EVALUATION

2.1 Description of Plant Evaluated

The EFX-400B-1 tested in this evaluation has a rated capacity of 500 gallons per day (gpd). Specifications and drawings are included in Appendix A. In the plant that was tested, the wastewater entered the primary reactor that was equipped with a pump, in a pump vault, to dose the Ecoflex™ Textile Filter. The pump doses were adjusted to send a volume between 2 to 2.5 gallons (8 to 10 L) to each filtering media roll in a period of 1 to 2 minutes. Inside the Ecoflex™ shell, a 3"φ PVC pipe was used as a low-pressure distribution chamber. Once evenly distributed between the filtering rolls, the water was sprinkled on the media surface by rotating arms. The wastewater percolated through the filtering media and the treated effluent was collected at the bottom of the unit in three different channels: two of them returned the treated water to the primary reactor and the other directed the water to the sampling port.

2.2 Test Protocol

Section 8 of NSF/ANSI Standard 40 protocol, "Performance Testing and Evaluation", is included in Appendix B. Start up of the plant was accomplished by filling the first compartment of the plant with 2/3 water and 1/3 raw sewage. The plant was then dosed at the design loading rate of 500 gpd as follows:

- 6 a.m. to 9 a.m. - 35 percent of daily rated capacity (175 gallons)
- 11 a.m. to 2 p.m. - 25 percent of daily rated capacity (125 gallons)
- 5 p.m. to 8 p.m. - 40 percent of daily rated capacity (200 gallons)

Doses to the EFX-400B-1 were spread uniformly over each dosing period, with each dose being five gallons of wastewater. After a start up period (up to three weeks at the manufacturer's discretion), the plant is subjected to the following loading sequence:

- Design loading - 16 weeks
- Stress loading - 7.5 weeks
- Design loading - 2.5 weeks

During the design loading periods, flow proportioned 24-hour composite samples are collected of the influent and effluent five days per week. The influent samples are analyzed for five-day biochemical oxygen demand and total suspended solids concentrations. The effluent samples are analyzed for five-day carbonaceous biochemical oxygen demand and total suspended solids concentrations. On-site determinations of the effluent temperature and pH are made five days per week. Upon Premier Tech Environment's request, influent and effluent total nitrogen and fecal coliform were also determined twice a week.

Stress testing is designed to evaluate how the plant performs under non-ideal conditions, including varied hydraulic loadings and electrical or system failure. The test sequence includes (1) Wash Day stress, (2) Working Parent stress, (3) Power/Equipment Failure stress, and (4) Vacation stress. Detailed descriptions of the stress sequences are shown in Appendix B.

During the stress test sequences, 24-hour composite samples are collected before and after each stress dosing pattern. The analyses and on-site determinations completed on the samples are the same as described for the design load testing. Each stress is followed by seven consecutive days of dosing at design rated capacity before beginning the next stress test. Sample collection is initiated twenty-four hours after completion of Wash Day, Working Parent, and Vacation stresses, and beginning 48 hours after completion of the Power/Equipment Failure stress.

In order for the plant to achieve Class I effluent, it is required to produce an effluent, which meets the EPA guidelines for secondary effluent discharge¹:

- (1) CBOD₅: The 30-day average of effluent samples shall not exceed 25 mg/L and each 7-day average of effluent samples shall not exceed 40 mg/L.
- (2) Total suspended Solids: Each 30-day average of effluent samples shall not exceed 30 mg/L and each 7-day average of effluent samples shall not exceed 45 mg/L.
- (3) pH: Individual effluent values remain between 6.0 and 9.0.

Requirements are also specified for effluent color, odor, oily film and foam, as well as maximum noise levels allowed from the plant.

2.3 Test Chronology

The system was installed under the direction of the manufacturer on August 21, 2006. The infiltration/exfiltration test was completed on August 22, 2006, and the tanks were found to be in compliance with the requirements of the Standard. The plant was filled with 2/3 fresh water and 1/3 raw sewage and dosing was initiated at the rate of 500 gpd, beginning August 28, 2006. Sampling was initiated on September 4, 2006. The stress test sequence was started on December 25, 2006 and ended on February 14, 2007. Testing was completed on March 2, 2007.

3.0 ANALYTICAL RESULTS

3.1 Summary

Chemical analyses of samples collected during the evaluation were completed using procedures in *Standard Methods for the Examination of Water and Wastewater*² and USEPA methods. Copies of the data generated during the evaluation are included in Appendix C. The results of the analyses performed during the first week of dosing are also included in Appendix C for informational purposes only. Results of the chemical analyses and on-site observations and measurements made during the evaluation are summarized in Table I.

TABLE I. SUMMARY OF ANALYTICAL RESULTS

	<u>Average</u>	<u>Std. Dev.</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Median</u>	<u>Interquartile Range</u>
Oxygen demand (mg/L)						
<i>Influent (BOD₅)</i>	260	120	69	770	240	180 - 310
<i>Effluent (CBOD₅)</i>	3	5	<2	49	<2	2 - 3
Total Suspended Solids (mg/L)						
<i>Influent</i>	360	210	53	1,400	310	230 - 420
<i>Effluent</i>	3	4	<2	32	<2	2 - 2
pH						
<i>Influent</i>	-	-	6.3	7.0	6.8	6.8 – 6.9
<i>Effluent</i>	-	-	6.2	6.9	6.8	6.8 – 6.9
Temperature (°C)						
<i>Influent</i>	27	4	19	31	30	23 - 30
<i>Effluent</i>	26	5	14	31	30	22 – 31
Dissolved Oxygen (mg/L)						
<i>Effluent</i>	2.3	0.5	1.4	3.3	2.5	1.7 – 2.7

Notes: The median is the point where half of the values are greater and half are less.

The interquartile range is the range of values about the median between the upper and lower 25 percent of all values.

Criteria for evaluating the analytical results from the testing are described in Section 8.5 of NSF/ANSI Standard 40. In completing the pass/fail determination for the data, an allowance is made for effluent suspended solids and CBOD₅ during the first month of testing. The 30 and 7-day averages during this time may not equal or exceed 1.4 times the effluent limits required for the rest of the test. This provision recognizes that an immature culture of microorganisms within the system may require additional time to achieve adequate treatment efficiency. Effluent CBOD₅ and suspended solids concentrations from the EFX-400B-1 during the first calendar month of testing were within the normal limits and did not need to use this provision.

Section 8.5.1.1 of the Standard provides guidance addressing the impact of unusual testing conditions, including sampling, dosing, or influent characteristics, on operation of a system under test. Specific data points may be excluded from 7- and 30 - day average calculations where determined to have an adverse impact on performance of the system, with rationale for the exclusion to be documented in the final report. There were no such conditions during this test.

Sections 3.6 and 8.2.1 of the Standard define influent wastewater characteristics as they apply to testing under the Standard. Typical domestic wastewater is defined as having a BOD₅ concentration between 100 and 300 mg/L and a suspended solids concentration between 100 and 350 mg/L. The influent strength remained within the specified range, with the exception of months three and five of the test. During month three, the 30-day average influent BOD was 350 mg/L and the 30-day average influent TSS was 550 mg/L. During month five, the 30-day average influent TSS concentration was 400 mg/L. Following section 8.5.1.1 of the Standard, NSF made an assessment of the impact of the influent strength on the treatment system for months three and five. NSF determined that the higher wastewater strength did not adversely affect the treatment process, as indicated by the relatively consistent effluent quality during those periods. Effluent total suspended solids averaged 2 mg/L and 3 mg/L during months three and five respectively, with an overall average of 3 mg/L for the entire test. Similar concentrations were found for effluent CBOD₅ for these months. Although the system was subjected to influent concentrations higher than the maximum considered for typical domestic wastewater, it performed within the requirements of the standard.

3.2 Biochemical Oxygen Demand

The five-day biochemical oxygen demand (BOD₅) and carbonaceous five-day biochemical oxygen demand (CBOD₅) analyses were completed using the EPA Method 405.1. The results of the analyses completed on the samples collected during the testing are shown in Figure 1.

Influent BOD₅:

The influent BOD₅ ranged from 69 to 770 mg/L during the evaluation, with an average concentration of 260 mg/L and a median concentration of 240 mg/L.

Effluent CBOD₅:

The effluent CBOD₅ concentrations ranged from <2 to 49 mg/L over the course of the evaluation, with an average concentration of 3 mg/L. The median effluent CBOD₅ concentration was <2 mg/L.

The Standard requires that the effluent CBOD₅ not exceed 40 mg/L on a 7-day average or 25 mg/L on a 30-day average. Table II shows the 7 and 30-day average effluent CBOD₅ concentrations and the 30-day average influent BOD₅ concentrations. The 7-day average effluent CBOD₅ ranged from 2 to 15 mg/L. The 30-day ranged from 2 to 6 mg/L. As shown in Table II, the Ecoflex™ Textile Filter model EFX-400B-1 met the requirements of Standard 40 for effluent CBOD₅.

BOD₅ Loading:

Over the course of the evaluation the influent BOD₅ loading averaged 1.08 lbs/day. The EFX-400B-1 achieved an average reduction of 1.07 lbs/day.

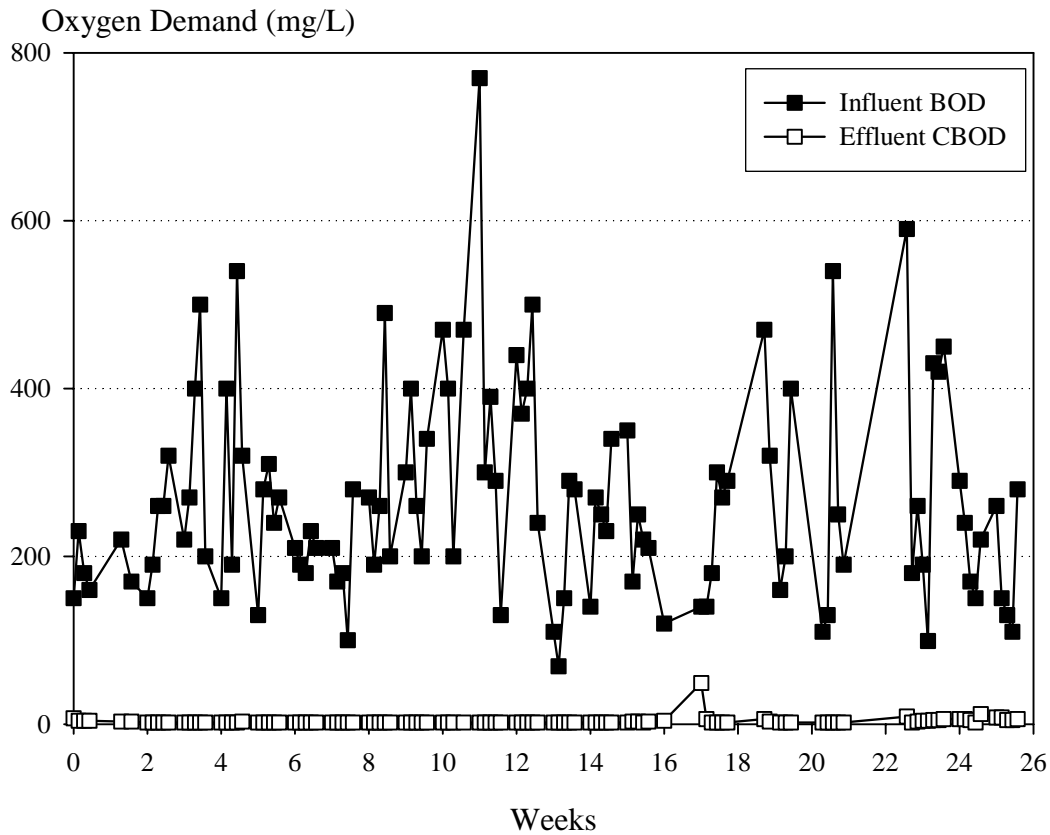


Figure 1. Biochemical Oxygen Demand

3.3 Total Suspended Solids

Total suspended solids analyses were completed using Methods 209C and 209D of *Standard Methods*. The results of the total suspended solids analyses over the entire evaluation are shown in Figure 2. Data from the total suspended solids analyses are summarized in Table I.

Influent total suspended solids:

The influent total suspended solids ranged from 53 to 1,400 mg/L during the evaluation, with an average concentration of 360 mg/L. The median influent total suspended solids concentration during the evaluation was 310 mg/L.

Effluent total Suspended Solids:

The effluent total suspended solids concentration ranged from <2 to 32 mg/L during the evaluation, with an average concentration of 3 mg/L and a median concentration of <2 mg/L.

Over the course of the evaluation, NSF/ANSI Standard 40 requires that the effluent total suspended solids not exceed 45 mg/L on a 7-day average or 30 mg/L on a 30-day average. Table III shows the 7- and 30-day total suspended solids averages.

The 7-day average effluent total suspended solids ranged from 2 to 13 mg/L and the 30-day average ranged from 2 to 6 mg/L. As shown in Table III, the Ecoflex™ Textile Filter model EFX-400B-1 met the requirements of NSF/ANSI Standard 40 for effluent total suspended solids.

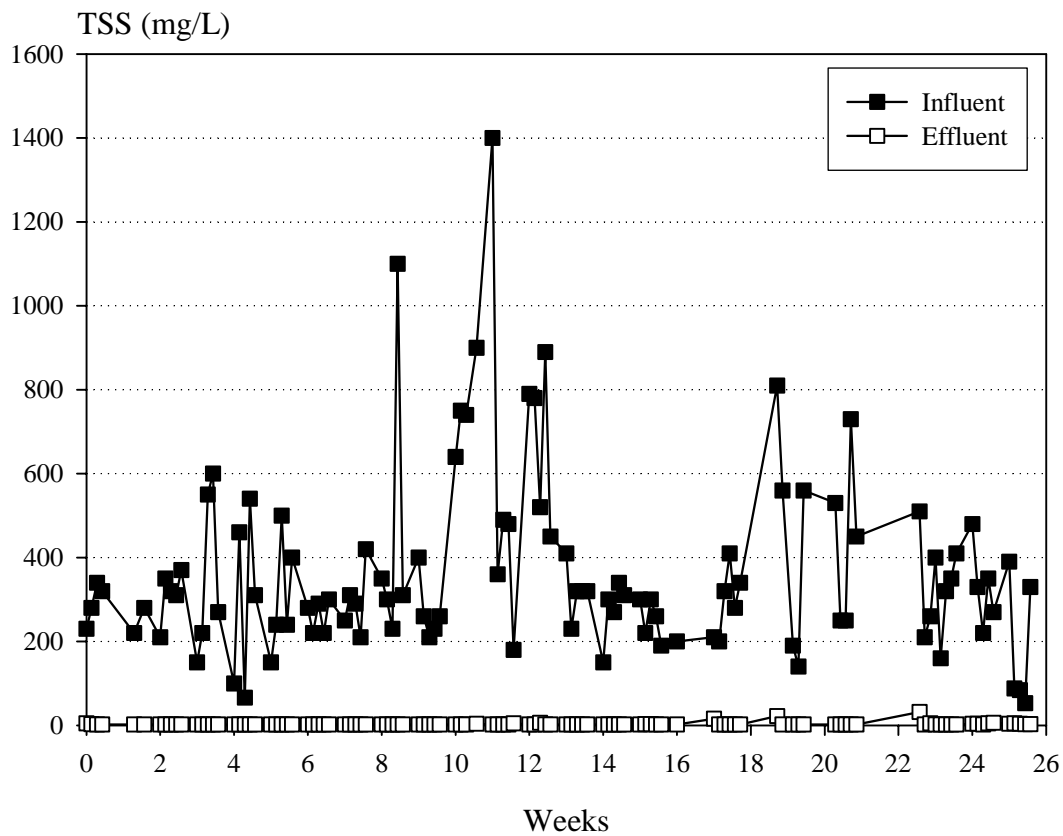


Figure 2. Total Suspended Solids

Table II. 7- and 30-day Average Effluent CBOD₅ and 30-day Average Influent BOD₅

Month	Week	7-day Average Effluent CBOD ₅ (mg/L)	30-day Average Effluent CBOD ₅ (mg/L)	30-day Average Influent BOD ₅ (mg/L)
1	1	5	3	250
	2	3		
	3	2		
	4	2		
2	5	2	2	250
	6	2		
	7	2		
	8	2		
3	9	2	2	350
	10	2		
	11	2		
	12	2		
	13	2		
4	14	2	5	210
	15	2		
	16	3		
	17	3		
5	18	15	3	260
	19	3		
	20	2		
	21	2		
	22	2		
6	23	5	6	260
	24	5		

	25	6	
	26	6	

Table III. 7- and 30-day Average Total Suspended Solids

Month	Week	7-day Average Effluent TSS (mg/L)	30-day Average Effluent TSS (mg/L)	30-day Average Influent TSS (mg/L)
1	1	3	2	310
	2	2		
	3	2		
	4	2		
2	5	2	2	330
	6	2		
	7	2		
	8	2		
3	9	2	2	550
	10	2		
	11	2		
	12	3		
	13	3		
4	14	2	3	270
	15	2		
	16	3		
	17	2		
5	18	6	3	400
	19	9		
	20	2		
	21	2		
	22	2		
6	23	13	6	290
	24	5		

	25	4	
	26	4	

3.4 pH

Over the entire evaluation period, the influent pH ranged from 6.3 to 7.0 (median of 6.8). The effluent pH ranged from 6.2 to 6.9 during the evaluation (median of 6.8), within the 6 to 9 range required by NSF/ANSI Standard 40. The pH data for the evaluation are shown in Appendix C.

3.5 Temperature

Influent temperatures over the evaluation period ranged from 19 to 31°C (median of 30°C). The temperature data are shown in Appendix C.

3.6 Color, Threshold Odor, Oily Film, Foam

Three samples of the effluent were analyzed for color, odor, oily film and foam as prescribed in NSF Standard 40. The effluent was acceptable according to the requirements in NSF Standard 40, with color less than 15 units, non-offensive threshold odor, no visible evidence of oily film and no foam.

3.7 Noise

A reading of the noise level at a distance of 20 feet from the plant was taken while the plant was in operation, using a hand-held decibel meter. The reading was below the 60 dbA required by ANSI/NSF Standard 40.

3.8 Fecal Coliform

Although not required by Standard 40, Premier Tech Environment requested that influent and effluent samples be collected from the EFX-400B-1 for analysis of fecal coliform. Fecal Coliform grab samples were collected two days per week. Sampling started on September 4, 2006 through March 2, 2007. Samples collected during the evaluation for fecal coliform analyses were analyzed by Aquatech Laboratories, a subcontract lab of NSF. The analyses were completed using Standard Method 9222D. The geometric mean of the influent fecal coliform was 7.69×10^6 CFU/100 mL. The geometric mean of the EFX-400B-1 effluent was 7.12×10^4 CFU/100 mL for a two log reduction. All fecal coliform data are shown in Appendix D.

3.9 Total Nitrogen

Although not required by Standard 40, Premier Tech Environment requested that influent and effluent samples from the EFX-400B-1 be analyzed for total nitrogen. Chemical analyses of the samples collected during the evaluation were completed using the procedure from EPA Method 351.2. Copies of the data generated during the evaluation are included in Appendix E. During the evaluation all samples were 24-hour composite samples, collected by automatic samplers programmed to collect samples in coordination with the discharge of treated wastewater from the system. Samples were stored at 2 ± 2 °C and preserved with sulfuric acid at the time of collection. Total nitrogen samples were taken from September 4, 2006 through February 19, 2007. Considering that a 3 weeks period was required to acclimate the nitrification and denitrification processes, the results reported in this report for the nitrogen parameters reflect the testing period of September 13, 2006 through February 19, 2007. A total of 41 samples were analyzed during this period. The

average influent total nitrogen was 39 mg/L and the average effluent total nitrogen was 9.7 mg/L corresponding to a 75% reduction.

4.0 REFERENCES

1. "Environmental Protection Agency Guidelines for Secondary Treatment", Federal Register, Volume 28, No. 159, 1973.
2. APHA, AWWA, WPCF, Standard Methods for the Examination of Water and Wastewater, 20th Edition, American Public Health Association, Washington, D.C.
3. U.S. EPA, Methods for Chemical Analysis of Water and Wastes, U.S. Environmental Protection Agency, Washington, D.C.

APPENDIX A
PLANT SPECIFICATIONS

PLANT SPECIFICATIONS
Premier Tech Environment EFX-400B-1

Plant Capacity

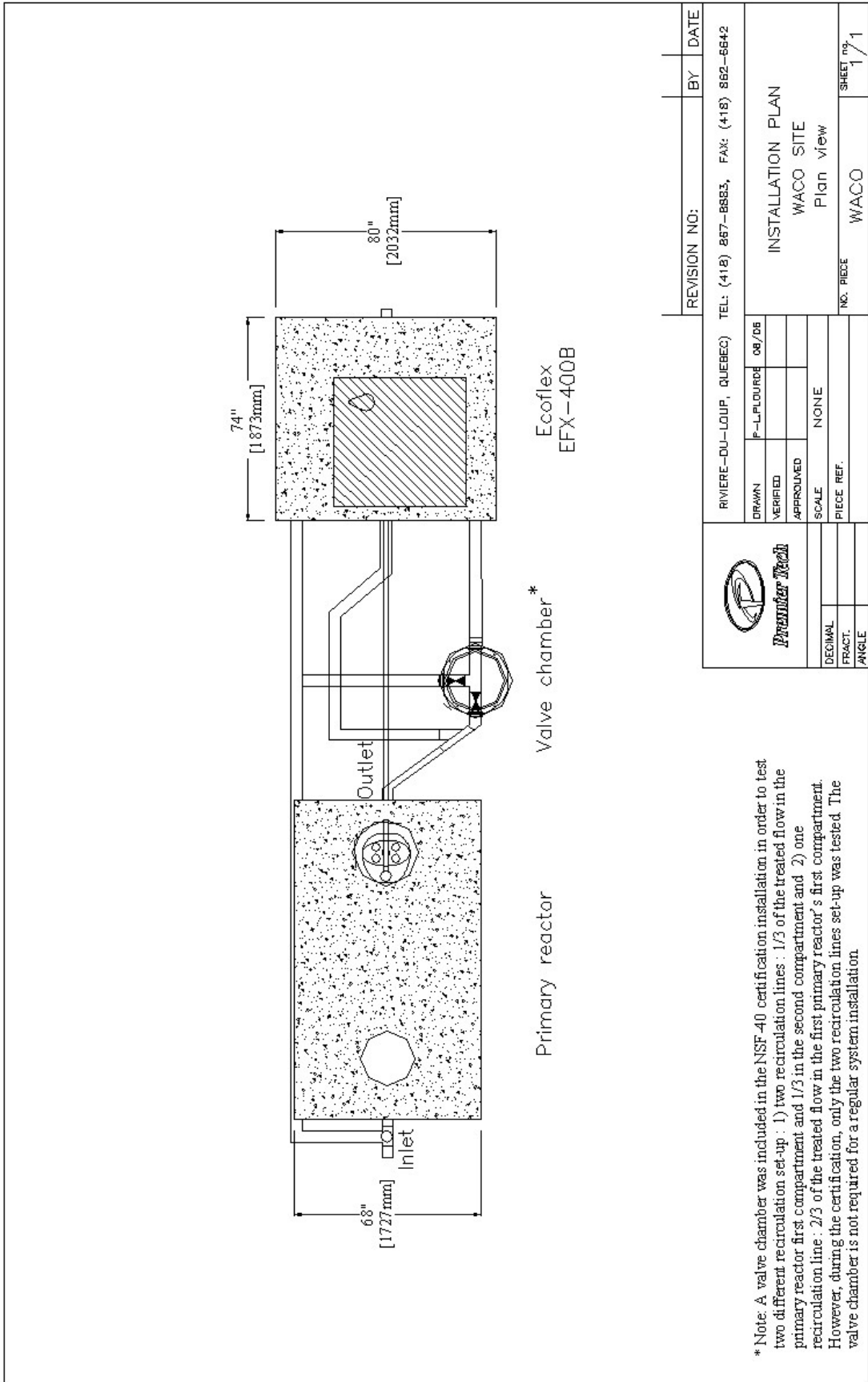
Design Flow	500 gpd
Pre-treatment Hydraulic Capacity (at Design Flow)	1,450 gallons
First compartment (septic tank)	1,250 gallons
Second compartment (dosing station)	200 gallons
Pre-treatment Hydraulic Retention Time (at Design Flow)	
First compartment (septic tank)	60 hours
Second compartment (dosing station)	10 hours

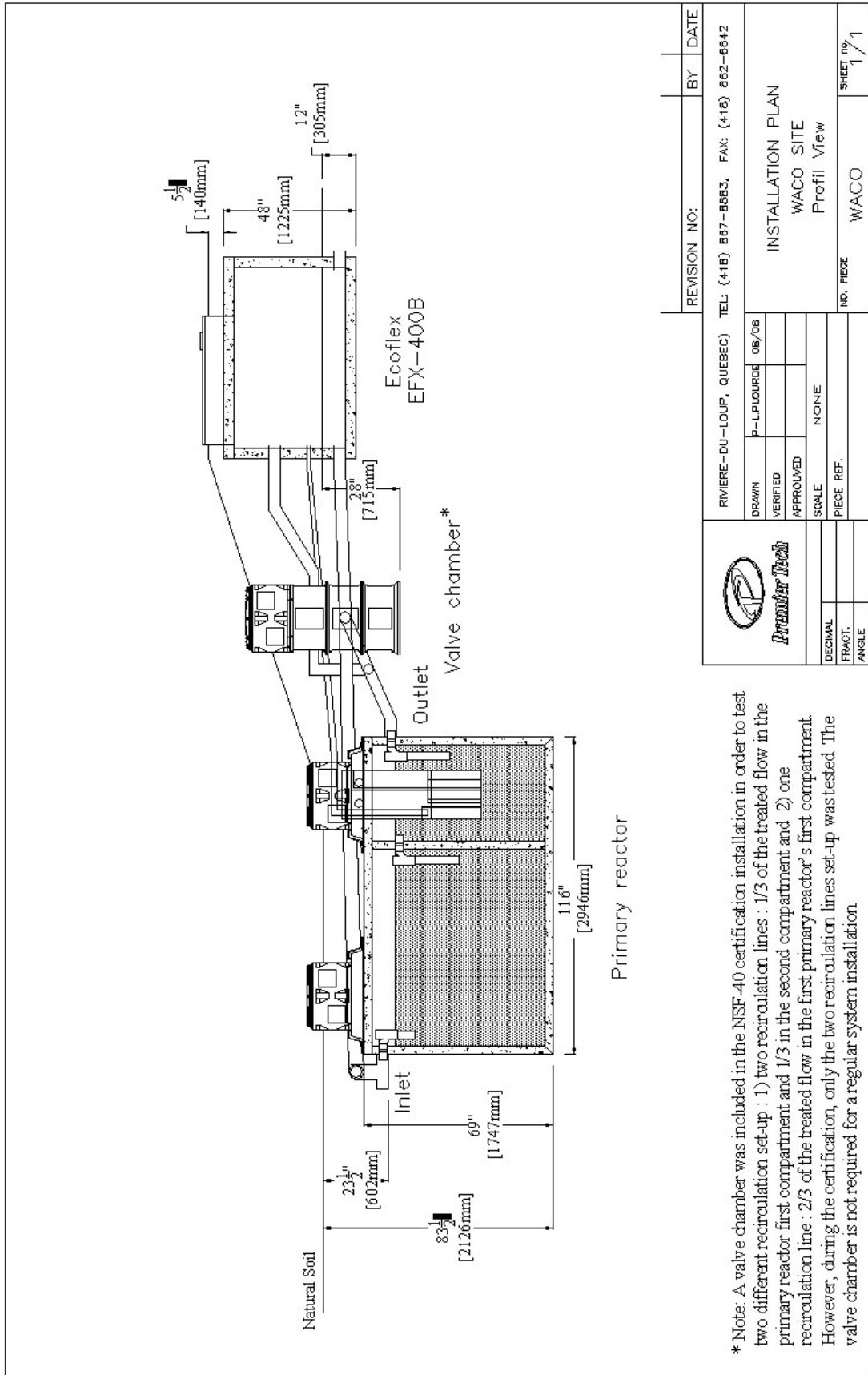
Ecoflex™ Textile Filter

Concrete Shell Dimensions	Height: 52 ¾" Width: 74" Length: 88"
Number of Media Rolls	4
Media Roll Dimensions	Height: 24" Diameter: 31.5" Nominal Total Area: 5.4 ft ²

Textile Filtering Media

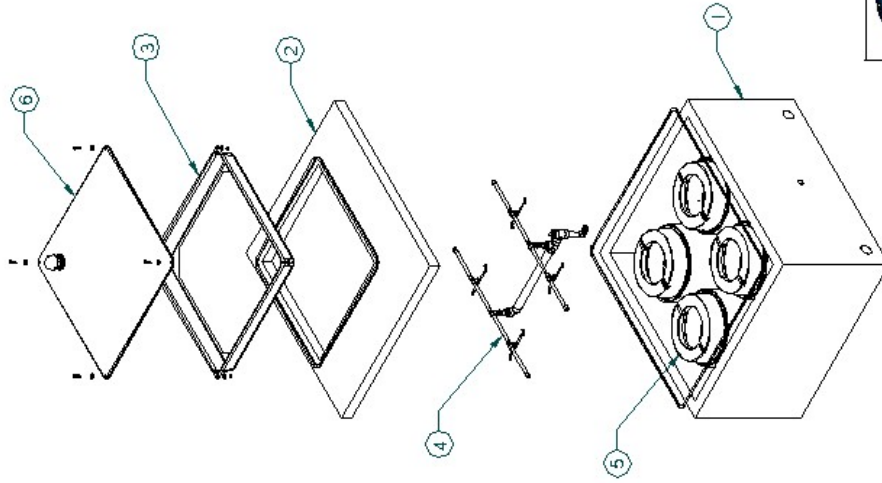
The Ecoflex™ filtering media is formed by the assembly of vertical layers of material with different porosity and porometry (synthetic material: textile and organic material: peat) with a thickness each of $\frac{3}{16}$ " and wrapped around a 2" diameter tube. This alternation of different material creates zones, or vertical planes, that on one hand, promote a dynamic retention of the fluids (flow), and on the other hand, a static retention of the same fluids. If needed, a protective layer can be added to the surface of the filter to trap undesirable matters. Each filter has a diameter of 31.5", a height of 24" (cylindrical shape) and an effective area of 5.4 ft².






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DRAWN	P-L-LOUQUE	06/06	
VERIFIED			
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SCALE	NONE		
PIECE REF.			
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INSTALLATION PLAN		WACO SITE	
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		SHEET NO. 1/1	

Item	Description
1	Concrete shell
2	Concrete S/lab
3	Main access filter glass
4	Distribution s ystem
5	Filtering media roll
6	Lid access with carbon filter



		RIVIERE-DU-LOUP, QUÉBEC TEL: (418) 67-8883, FAX: (418) 862-6642 DRAWN: S.BRISSON P418007 VERIFIED: _____ APPROVED: _____ SCALE: none UNIT: inches	REVISION NO.: _____ BY: _____ DATE: _____ ECOFLEX EFX-400B module Ass embly
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APPENDIX B

**NSF STANDARD 40 PERFORMANCE EVALUATION
METHOD AND REQUIREMENTS**

8 Performance testing and evaluation

This section describes the methods used to evaluate the performance of residential wastewater treatment systems. Systems shall be designated as Class I or Class II. The performance classification shall be based upon the evaluation of effluent samples collected from the system over a six-month period.

8.1 Preparations for testing and evaluation

8.1.1 The system shall be assembled, installed, and filled in accordance with the manufacturer's instructions.

8.1.2 The manufacturer shall inspect the system for proper installation. If no defects are detected and the system is judged to be structurally sound, it shall be placed into operation in accordance with the manufacturer's start-up procedures. If the manufacturer does not provide a filling procedure, $\frac{2}{3}$ of the system's capacity shall be filled with water and the remaining $\frac{1}{3}$ shall be filled with residential wastewater.

8.1.3 The system shall undergo design loading (see 8.2.2.1) until testing and evaluations are initiated. Sample collection and analysis shall be initiated within 3 weeks of filling the system and, except as specified in 8.5.1.2, shall continue without interruption until the end of the evaluation period.

8.1.4 If conditions at the testing site preclude installation of the system at its normally prescribed depth, the manufacturer shall be permitted to cover the system with soil to achieve normal installation depth.

8.1.5 Performance testing and evaluation of systems shall not be restricted to specific seasons.

8.1.6 When possible, electrical or mechanical defects shall be repaired to prevent evaluation delays. All repairs made during the performance testing and evaluation shall be documented in the final report.

8.1.7 The system shall be operated in accordance with the manufacturer's instructions. However, routine service and maintenance of the system shall not be permitted during the performance testing and evaluation period.

NOTE – The manufacturer may recommend or offer more frequent service and maintenance of the system but for the purpose of performance testing and evaluation, service and maintenance shall not be performed beyond what is specified in this Standard.

8.2 Testing and evaluation conditions, hydraulic loading, and schedules

8.2.1 Influent wastewater characteristics

The 30-d average BOD₅ concentration of the wastewater delivered to the system shall be between 100 mg/L and 300 mg/L.

The 30-d average TSS concentration of the wastewater delivered to the system shall be between 100 mg/L and 350 mg/L.

8.2.2 Hydraulic loading and schedules

The performance of the system shall be evaluated for 26 consecutive weeks. During the testing and evaluation period, the system shall be subjected to 16 weeks of design loading, followed by 7.5 weeks (52 days) of stress loading, and then an additional 2.5 weeks (18 days) of design loading.

8.2.2.1 Design loading

The system shall be dosed 7 days a week with a wastewater volume equivalent to the daily hydraulic capacity of the system. The following schedule shall be adhered to for dosing:

Time frame	% rated daily hydraulic capacity
6:00 a.m. to 9:00 a.m.	approximately 35
11:00 a.m. to 2:00 p.m.	approximately 25
5:00 p.m. to 8:00 p.m.	approximately 40

8.2.2.2 Stress loading

Stress loading is designed to evaluate a system's performance under four non-ideal conditions. Systems shall be subjected to each stress condition once during the 6-month testing and evaluation period, and each of the four stress conditions shall be separated by 7 days of design loading (see 8.2.2.1).

8.2.2.2.1 Wash-day stress

The wash day stress shall consist of 3 wash days in a 5-day period. Each wash day shall be separated by a 24-h period. During a wash-day, the system shall be loaded at times and capacities similar to those delivered during design loading (see 8.2.2.1), however during the first two dosing periods per day, the design loading shall include 3 wash loads (3 wash cycles and 6 rinse cycles).

8.2.2.2.2 Working-parent stress

For 5 consecutive days, the system shall be subjected to a working-parent stress. During this stress, the system shall be dosed with 40% of its daily hydraulic capacity between 6:00 a.m. and 9:00 a.m. Between 5:00 p.m. and 8:00 p.m., the system shall be dosed with the remaining 60% of its daily hydraulic capacity, which shall include 1 wash load (1 wash cycle and 2 rinse cycles).

8.2.2.2.3 Power/equipment failure stress

The system shall be dosed with 40% of its daily hydraulic capacity between 5:00 p.m. and 8:00 p.m. on the day the power/equipment failure stress is initiated. Power to the system shall then be turned off at 9:00 p.m. and dosing shall be discontinued for 48 hours. After 48 hours, power shall be restored and the system shall be dosed over a 3- h period with 60% of its daily hydraulic capacity, which shall include 1 wash load (1 wash cycle and 2 rinse cycles).

8.2.2.2.4 Vacation stress

On the day that the vacation stress is initiated, the system shall be dosed at 35% of its daily hydraulic capacity between 6:00 a.m. and 9:00 a.m. and at 25% between 11:00 a.m. and 2:00 p.m. Dosing shall then be discontinued for 8 consecutive days (power shall continue to be supplied to the system). Between 5:00 p.m. and 8:00 p.m. of the ninth day, the system shall be dosed with 60% of its daily hydraulic capacity, which shall include 3 wash loads (3 wash cycles and 6 rinse cycles).

8.2.3 Dosing volumes

The 30-d average volume of the wastewater delivered to the system shall be within 100% ± 10% of the system's rated hydraulic capacity.

NOTE – All dosing days, except those with dosing requirements less than the daily hydraulic capacity, shall be included in the 30-d average calculation.

8.2.4 Color, odor, foam, and oily film assessments

During the 6-month testing and evaluation, a total of 3 effluent samples shall be assessed for color, odor, foam, and oily film. The assessments shall be conducted on effluent composite samples selected randomly during the first phase of design loading (weeks 1 – 16), the period of stress loading (weeks 17 – 23.5), and the second phase of design loading (weeks 23.5 – 26).

8.3 Sample collection

8.3.1 General

8.3.1.1 A minimum of 96 data days shall be required during system performance testing and evaluation. No routine service or maintenance shall be performed on the system whether the time period to achieve the 96 data days falls within or exceeds 6 months.

8.3.1.2 All sample collection methods shall be in accordance with APHA's *Standard Methods for the Examination of Water and Wastewater* unless otherwise specified.

8.3.1.3 Influent wastewater samples shall be flow-proportional, 24-h composites obtained during periods of system dosing. Effluent samples shall be flow-proportional, 24-h composites obtained during periods of system discharge.

8.3.2 Design loading

During periods of design loading, daily composite effluent samples shall be collected and analyzed 5 days a week.

8.3.3 Stress loading

During stress loading, influent and effluent 24-h composite samples shall be collected on the day each stress condition is initiated. Twenty-four hours after the completion of washday, working-parent, and vacation stresses, influent and effluent 24-h composite samples shall be collected for 6 consecutive days. Forty-eight hours after the completion of the power/equipment failure stress, influent and effluent 24-h composite samples shall be collected for 5 consecutive days.

8.4 Analytical descriptions

8.4.1 pH, TSS, BOD₅, and CBOD₅

The pH, TSS, and BOD₅ of the collected influent and the pH, TSS and CBOD₅ of the collected effluent 24-h composite samples shall be determined with the appropriate methods in APHA's *Standard Methods for the Examination of Water and Wastewater*.

8.4.2 Color, odor, oily film, and foam

8.4.2.1 General

The effluent composite samples shall be diluted 1:1000 with distilled water. Three composite effluent samples shall be tested during the 6-month evaluation period.

8.4.2.2 Color

The apparent color of the diluted effluent samples shall be determined with the visual comparison method described in APHA's *Standard Methods for the Examination of Water and Wastewater*.

8.4.2.3 Odor

A panel consisting of at least 5 evaluators shall qualitatively rate 200 mL aliquots of the diluted effluent samples as offensive or non offensive when compared to odor-free water prepared in accordance with APHA's *Standard Methods for the Examination of Water and Wastewater*.

8.4.2.4 Oily film and foam

Diluted effluent sample aliquots shall be visually evaluated for the presence of an oily film or foaming.

8.5 Criteria

8.5.1 General

8.5.1.1 If conditions during the testing and evaluation period result in system upset, improper sampling, improper dosing, or influent characteristics outside of the ranges specified in 8.2.1, an assessment shall be conducted to determine the extent to which these conditions adversely affected the performance of the system. Based on this assessment, specific data points may be excluded from the 7-d and 30-d averages of effluent measurements. Rationale for all data exclusions shall be documented in the final report.

8.5.1.2 In the event that a catastrophic site problem not described in this Standard including, but not limited to, influent characteristics, malfunctions of test apparatus, and acts of God, jeopardizes the validity of the performance testing and evaluation, manufacturers shall be given the choice to:

- 1) Perform maintenance on the system, reinitiate system start-up procedures, and restart the performance testing and evaluation; or
- 2) With no routine maintenance performed, have the system brought back to pre-existing conditions and resume testing within 3 weeks after the site problem has been identified and corrected. Data collected during the system recovery period shall be excluded from 7-d and 30-d averages of effluent measurements.

NOTE – Pre-existing conditions shall be defined as the point when the results of 3 consecutive data days are within 15% of the previous 30-d average(s).

8.5.1.3 A 7-d average discharge value shall consist of a minimum of 3 data days. If a calendar week contains less than 3 data days, sufficient data days may be transferred from the preceding calendar week to constitute a 7-d average discharge value. If there are not sufficient data days available in the preceding calendar week, the transfer of data days may take place from the following calendar week to constitute a 7-d average discharge value. No data day shall be included in more than one 7-d average discharge value.

8.5.1.4 A 30-d average discharge value shall consist of a minimum of 50% of the regularly scheduled sampling days per month. If a calendar month contains less than the required number of data days, sufficient data days may be transferred from the preceding calendar month to constitute a 30-d average discharge value. If there are not sufficient data days available in the preceding calendar month, the transfer of data days may take place from the following calendar month to constitute a 30-d average discharge value. No data day shall be included in more than one 30-d average discharge value.

8.5.1.5 During the stress loading sequence, consisting of wash-day, working-parent, power/equipment failure, and vacation stress loading periods, data shall be collected from a minimum of $\frac{2}{3}$ of the total scheduled sampling days and from at least 2 of the scheduled sampling days during any single stress loading period.

8.5.2 Class I systems

The following criteria shall be met in order for a system to be classified as a Class I residential wastewater treatment system.

All requirements for each parameter shall be achieved except as provided for in 8.5.2.2.

8.5.2.1 EPA secondary treatment guideline parameters

8.5.2.1.1 CBOD₅

The 30-d average of CBOD₅ concentrations of effluent samples shall not exceed 25 mg/L.

The 7-d average of CBOD₅ concentrations of effluent samples shall not exceed 40 mg/L.

8.5.2.1.2 TSS

The 30-d average of TSS concentrations of effluent samples shall not exceed 30 mg/L.

The 7-d average of TSS concentrations of effluent samples shall not exceed 45 mg/L.

8.5.2.1.3 pH

The pH of individual effluent samples shall be between 6.0 and 9.0.

8.5.2.2 Effluent concentration excursions

System performance shall not be considered outside the limits established for Class I systems if, during the first calendar month of performance testing and evaluation, 7-d average and 30-d average effluent CBOD₅ and TSS concentrations do not equal or exceed 1.4 times the effluent limits specified in 8.5.2.1.

NOTE – The technology utilized in many residential wastewater treatment systems is biologically based. The allowance of excursions from the effluent limits established in this Standard during the first calendar month of performance testing and evaluation reflects the fact that an immature culture of microorganisms within the system may require additional time to achieve adequate treatment efficiency.

The value of 1.4 is based on the USEPA Technical Review Criteria for Group I Pollutants, including CBOD₅ and TSS.

8.5.2.3 Color, odor, oily film, and foam

8.5.2.3.1 Color

The color rating of each of the 3 diluted composite effluent samples shall not exceed 15 units.

8.5.2.3.2 Odor

The overall rating of each of the three diluted composite effluent samples shall be non offensive.

8.5.2.3.3 Oily film and foam

Oily films and foaming shall not be visually detected in any of the diluted composite effluent samples.

8.5.3 Class II systems

The following criteria shall be met in order for a system to be classified as a Class II residential wastewater treatment system.

8.5.3.1 CBOD₅

Not more than 10% of the effluent CBOD₅ values shall exceed 60 mg/L.

TSS

Not more than 10% of the effluent TSS values shall exceed 100 mg/L.

APPENDIX C
ANALYTICAL RESULTS

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: September 3, 2006 Plant Code: Site #4
Weeks Into Test: 1

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons Friday 500 gallons

Weeks Into Test: 2

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons Friday 500 gallons

Dosed Volume (gallons)		Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	aceration chamber influent	3.0	3.1	2.9	2.9	3.0
	aceration chamber effluent	3.1	3.1	3.1	3.1	3.1
Temperature (C)	aceration chamber influent	31	31	31	31	31
	aceration chamber effluent	31	31	31	31	31
pH	aceration chamber influent	6.8	6.8	6.8	6.8	6.8
	aceration chamber effluent	6.7	6.7	6.8	6.7	6.7
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	150	230	180	160	260
	effluent (CBOD ₅)	7	4	4	4	d
Total Suspended Solids (mg/L)	influent	230	280	340	320	360
	aceration chamber effluent	5	3	2	2	<2
Volatile Suspended Solids (mg/L)	influent	190	240	290	240	310
	aceration chamber effluent	4	3	2	2	<2
45 Minute Settleable Solids (mL/L)	aceration chamber					

Notes: Effluent CBOD not available on 9/8 due to laboratory error.

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: September 10, 2006 Plant Code: Site #4
Weeks Into Test: 2

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons Friday 500 gallons

Weeks Into Test: 2

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons Friday 500 gallons

Dosed Volume (gallons)		Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	aceration chamber influent	2.9	2.8	2.8	2.8	2.8
	aceration chamber effluent	3.0	3.0	3.0	3.0	3.0
Temperature (C)	aceration chamber influent	31	31	31	31	31
	aceration chamber effluent	31	31	31	31	31
pH	aceration chamber influent	6.8	6.8	6.8	6.8	6.9
	aceration chamber effluent	6.8	6.8	6.8	6.8	6.8
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	190	210	220	210	170
	effluent (CBOD ₅)	d	d	3	d	3
Total Suspended Solids (mg/L)	influent	490	240	220	280	280
	aceration chamber effluent	2	2	2	2	<2
Volatile Suspended Solids (mg/L)	influent	420	210	190	240	240
	aceration chamber effluent	2	<2	<2	<2	<2
45 Minute Settleable Solids (mL/L)	aceration chamber					

Notes: (d) No data due to laboratory error.

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: September 24, 2006 Plant Code: Site #4

Weeks Into Test: 4

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

Dosed Volume (gallons)		Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	aeration chamber effluent	2.8	2.8	2.7	2.8	2.7
	in fluent	3.0	3.0	3.0	3.0	3.0
Temperature (C)	aeration chamber effluent	31	31	31	31	31
	in fluent	6.8	6.8	6.8	6.8	6.9
pH	aeration chamber effluent	6.8	6.8	6.9	6.9	6.9
	in fluent	6.8	6.8	6.9	6.9	6.9
Biochemical Oxygen Demand (mg/L)	in fluent (BOD ₅)	220	270	400	500	200
	effluent (CBOD ₅)	<2	<2	<2	<2	<2
Total Suspended Solids (mg/L)	in fluent	150	220	550	600	270
	aeration chamber effluent	<2	<2	<2	<2	<2
Volatile Suspended Solids (mg/L)	in fluent	130	190	470	510	230
	aeration chamber effluent	<2	<2	<2	<2	<2
45 Minute Settleable Solids (mL/L)	aeration chamber effluent	<2	<2	<2	<2	<2
	aeration chamber effluent	<2	<2	<2	<2	<2

Notes:
(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

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Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: September 17, 2006 Plant Code: Site #4

Weeks Into Test: 3

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

Dosed Volume (gallons)		Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	aeration chamber effluent	2.7	2.6	2.6	2.6	2.7
	in fluent	3.0	3.0	3.0	3.0	3.0
Temperature (C)	aeration chamber effluent	31	31	31	31	31
	in fluent	6.8	6.8	6.8	6.8	6.8
pH	aeration chamber effluent	6.8	6.9	6.9	6.9	6.9
	in fluent	6.8	6.9	6.9	6.9	6.9
Biochemical Oxygen Demand (mg/L)	in fluent (BOD ₅)	150	190	260	260	320
	effluent (CBOD ₅)	<2	<2	<2	<2	<2
Total Suspended Solids (mg/L)	in fluent	210	350	320	310	370
	aeration chamber effluent	<2	<2	<2	<2	<2
Volatile Suspended Solids (mg/L)	in fluent	170	290	250	290	300
	aeration chamber effluent	<2	<2	<2	<2	<2
45 Minute Settleable Solids (mL/L)	aeration chamber effluent	<2	<2	<2	<2	<2
	aeration chamber effluent	<2	<2	<2	<2	<2

Notes:
(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: October 8, 2006 Plant Code: Site #4

Weeks Into Test: 6

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

	Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)	500	500	500	500	500
Dissolved Oxygen (mg/L)	aceration chamber				
	effluent	2.6	2.6	2.7	2.7
Temperature (C)	in fluent	30	30	30	30
	aceration chamber				
pH	effluent	31	31	31	31
	in fluent	6.8	6.8	6.8	6.8
Biochemical Oxygen Demand (mg/L)	aceration chamber				
	effluent	6.8	6.8	6.8	6.8
Total Suspended Solids (mg/L)	in fluent	130	280	310	240
	aceration chamber				
Volatile Suspended Solids (mg/L)	effluent	<2	<2	<2	<2
	in fluent	150	240	500	240
45 Minute Settleable Solids (mL/L)	aceration chamber				
	effluent	<2	<2	<2	<2

- Notes:
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: October 1, 2006 Plant Code: Site #4

Weeks Into Test: 5

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

	Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)	500	500	500	500	500
Dissolved Oxygen (mg/L)	aceration chamber				
	effluent	2.7	2.7	2.8	2.8
Temperature (C)	in fluent	30	30	30	30
	aceration chamber				
pH	effluent	31	31	31	31
	in fluent	6.9	6.8	6.9	6.9
Biochemical Oxygen Demand (mg/L)	aceration chamber				
	effluent	6.8	6.9	6.8	6.9
Total Suspended Solids (mg/L)	in fluent	150	400	190	540
	aceration chamber				
Volatile Suspended Solids (mg/L)	effluent	<2	2	2	2
	in fluent	100	460	66	540
45 Minute Settleable Solids (mL/L)	aceration chamber				
	effluent	2	<2	<2	<2

- Notes:
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: October 15, 2006 Plant Code: Site #4

Weeks Into Test: 7

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons Friday 500 gallons

	Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)	500	500	500	500	500
Dissolved Oxygen (mg/L)	eration chamber effluent	2.7	2.6	2.6	2.6
	in fluent	30	30	30	30
Temperature (C)	eration chamber effluent	31	31	31	31
	in fluent	6.8	6.9	6.8	6.8
pH	eration chamber effluent	6.9	6.9	6.9	6.8
	in fluent	2.10	190	180	230
Biochemical Oxygen Demand (mg/L)	eration chamber effluent	<2	<2	<2	<2
	in fluent	280	220	290	220
Total Suspended Solids (mg/L)	eration chamber effluent	<2	<2	<2	<2
	in fluent	220	180	230	180
Volatile Suspended Solids (mg/L)	eration chamber effluent	<2	<2	<2	<2
	in fluent	220	180	230	180
45 Minute Settleable Solids (mL/L)	eration chamber effluent	<2	<2	<2	<2

- Notes:
(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

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Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: October 22, 2006 Plant Code: Site #4

Weeks Into Test: 8

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons Friday 500 gallons

	Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)	500	500	500	500	500
Dissolved Oxygen (mg/L)	eration chamber effluent	2.6	2.7	2.6	2.6
	in fluent	30	30	30	30
Temperature (C)	eration chamber effluent	30	30	30	30
	in fluent	6.8	6.8	6.8	6.9
pH	eration chamber effluent	6.8	6.9	6.9	6.9
	in fluent	2.10	170	180	100
Biochemical Oxygen Demand (mg/L)	eration chamber effluent	<2	<2	<2	<2
	in fluent	250	310	290	210
Total Suspended Solids (mg/L)	eration chamber effluent	<2	<2	<2	<2
	in fluent	210	210	230	180
Volatile Suspended Solids (mg/L)	eration chamber effluent	<2	<2	<2	<2
	in fluent	210	210	230	180
45 Minute Settleable Solids (mL/L)	eration chamber effluent	<2	<2	<2	<2

- Notes:
(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

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Plant Effluent

Week Beginning: October 29, 2006

Weeks Into Test: 9

Week Beginning: November 5, 2006

Weeks Into Test: 10

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Week Beginning: October 29, 2006

Weeks Into Test: 9

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Plant Effluent

Week Beginning: November 5, 2006

Weeks Into Test: 10

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons Friday 500 gallons

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons Friday 500 gallons

Dosed Volume (gallons)		Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	aceration chamber effluent	2.6	2.5	2.5	2.6	2.5
	influent	30	30	30	30	30
Temperature (C)	aceration chamber effluent	30	30	30	30	30
	influent	6.8	6.8	6.9	6.9	6.8
pH	aceration chamber effluent	6.9	6.9	6.9	6.9	6.8
	influent	300	190	260	490	200
Biochemical Oxygen Demand (mg/L)	effluent	<2	<2	<2	<2	<2
	influent	350	300	230	1100	310
Total Suspended Solids (mg/L)	aceration chamber effluent	<2	<2	<2	<2	<2
	influent	300	240	200	910	240
Volatile Suspended Solids (mg/L)	aceration chamber effluent	<2	<2	<2	<2	<2
	influent	<2	<2	<2	<2	<2
45 Minute Settleable Solids (mL/L)	aceration chamber effluent	<2	<2	<2	<2	<2
	influent	<2	<2	<2	<2	<2

Dosed Volume (gallons)		Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	aceration chamber effluent	2.6	2.5	2.6	2.5	2.6
	influent	30	30	30	30	30
Temperature (C)	aceration chamber effluent	30	30	30	30	30
	influent	6.8	6.8	6.9	6.8	6.8
pH	aceration chamber effluent	6.9	6.8	6.9	6.8	6.8
	influent	270	190	260	490	200
Biochemical Oxygen Demand (mg/L)	effluent	<2	<2	<2	<2	<2
	influent	350	300	230	1100	310
Total Suspended Solids (mg/L)	aceration chamber effluent	<2	<2	<2	<2	<2
	influent	300	240	200	910	240
Volatile Suspended Solids (mg/L)	aceration chamber effluent	<2	<2	<2	<2	<2
	influent	<2	<2	<2	<2	<2
45 Minute Settleable Solids (mL/L)	aceration chamber effluent	<2	<2	<2	<2	<2
	influent	<2	<2	<2	<2	<2

- Notes:
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

- Notes:
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

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Plant Effluent

Week Beginning: November 19, 2006 Plant Code: Site #4

Weeks In to Test: 12

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

Dosed Volume (gallons)		Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	aeration chamber effluent	2.4	2.4	2.5	2.4	2.4
	influent	2.5	2.5	2.5	2.5	2.5
Temperature (C)	aeration chamber effluent	22	23	23	23	23
	influent	7.0	7.0	7.0	7.0	7.0
pH	aeration chamber effluent	6.8	6.8	6.8	6.8	6.8
	influent	7.0	7.0	7.0	7.0	7.0
Biochemical Oxygen Demand (mg/L)	influent	770	300	390	290	130
	effluent (CBOD ₅)	<2	<2	<2	<2	<2
Total Suspended Solids (mg/L)	influent	1400	360	490	480	180
	aeration chamber effluent	<2	<2	<2	<2	5
Volatile Suspended Solids (mg/L)	influent	1200	310	430	410	160
	aeration chamber effluent	<2	<2	<2	<2	2
45 Minute Settleable Solids (mL/L)	aeration chamber effluent					

- Notes:
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

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Plant Effluent

Week Beginning: November 12, 2006 Plant Code: Site #4

Weeks In to Test: 11

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons

Dosed Volume (gallons)		Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	aeration chamber effluent	2.2	2.2	2.2	1.8	2.2
	influent	2.9	2.8	2.6	2.6	2.5
Temperature (C)	aeration chamber effluent	24	23	23	20	23
	influent	6.8	6.8	6.5	6.7	6.3
pH	aeration chamber effluent	6.3	6.4	6.4	6.5	6.2
	influent	470	400	200	d	470
Biochemical Oxygen Demand (mg/L)	influent	<2	<2	<2	<2	<2
	effluent (CBOD ₅)	640	750	740	1600	900
Total Suspended Solids (mg/L)	influent	<2	<2	<2	2	4
	aeration chamber effluent	540	650	620	1300	750
Volatile Suspended Solids (mg/L)	influent	<2	<2	<2	<2	<2
	aeration chamber effluent					
45 Minute Settleable Solids (mL/L)	aeration chamber effluent					

- Notes:
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

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Plant Effluent

Week Beginning: December 3, 2006 Plant Code: Site #4

Weeks Into Test: 14

Weekend Dosing: 500 gallons Sunday 500 gallons Saturday 500 gallons Friday

Dosed Volume (gallons)	Monday		Tuesday		Wednesday		Thursday		Friday	
	500	500	500	500	500	500	500	500	500	500
Dissolved Oxygen (mg/L)	in aeration chamber effluent	1.6	1.8	2.4	1.8	2.4	2.4	1.7	1.7	1.7
	in aeration chamber	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Temperature (C)	in aeration chamber effluent	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	in aeration chamber	6.8	6.8	6.8	6.8	6.9	6.8	6.8	6.8	6.8
pH	in aeration chamber effluent	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.9
	in aeration chamber	110	69	150	290	290	290	290	280	280
Biochemical Oxygen Demand (mg/L)	in aeration chamber effluent	<2	<2	<2	<2	<2	<2	<2	<2	<2
	in aeration chamber	410	230	320	320	320	320	320	320	320
Total Suspended Solids (mg/L)	in aeration chamber effluent	<2	<2	<2	<2	<2	<2	<2	<2	<2
	in aeration chamber	350	200	260	270	270	270	270	270	270
Volatile Suspended Solids (mg/L)	in aeration chamber effluent	<2	<2	<2	<2	<2	<2	<2	<2	<2
	in aeration chamber	<2	<2	5	<2	<2	<2	<2	<2	<2
45 Minute Settleable Solids (mL/L)	in aeration chamber effluent	<2	<2	<2	<2	<2	<2	<2	<2	<2
	in aeration chamber	<2	<2	<2	<2	<2	<2	<2	<2	<2

Notes:

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: November 26, 2006 Plant Code: Site #4

Weeks Into Test: 13

Weekend Dosing: 500 gallons Sunday 500 gallons Saturday 500 gallons Friday

Dosed Volume (gallons)	Monday		Tuesday		Wednesday		Thursday		Friday	
	500	500	500	500	500	500	500	500	500	500
Dissolved Oxygen (mg/L)	in aeration chamber effluent	1.6	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	in aeration chamber	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Temperature (C)	in aeration chamber effluent	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	in aeration chamber	6.8	6.8	6.7	6.7	6.7	6.7	6.7	6.8	6.8
pH	in aeration chamber effluent	6.7	6.7	6.8	6.8	6.8	6.8	6.8	6.8	6.8
	in aeration chamber	4.40	370	400	500	500	500	500	2.40	2.40
Biochemical Oxygen Demand (mg/L)	in aeration chamber effluent	<2	<2	<2	<2	<2	<2	<2	<2	<2
	in aeration chamber	790	780	520	890	890	890	890	4.50	4.50
Total Suspended Solids (mg/L)	in aeration chamber effluent	<2	<2	6	2	2	2	2	2	2
	in aeration chamber	620	590	400	720	720	720	720	390	390
Volatile Suspended Solids (mg/L)	in aeration chamber effluent	<2	<2	5	<2	<2	<2	<2	<2	<2
	in aeration chamber	<2	<2	<2	<2	<2	<2	<2	<2	<2
45 Minute Settleable Solids (mL/L)	in aeration chamber effluent	<2	<2	<2	<2	<2	<2	<2	<2	<2
	in aeration chamber	<2	<2	<2	<2	<2	<2	<2	<2	<2

Notes:

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

Weeks Into Test: 15
Weekend Dosing: Sunday 500 gallons Saturday 500 gallons Friday 500 gallons

Dosed Volume (gallons)		Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	in aeration chamber influent	1.6	1.7	1.6	1.8	1.5
	in aeration chamber effluent	2.4	2.3	2.3	2.3	2.3
Temperature (C)	in aeration chamber influent	2.3	2.2	2.2	2.2	2.2
	in aeration chamber effluent	6.8	6.9	7.0	6.9	6.9
pH	in aeration chamber influent	6.8	6.8	6.8	6.8	6.9
	in aeration chamber effluent	1.40	2.70	2.50	2.30	3.40
Biochemical Oxygen Demand (mg/L)	in aeration chamber influent	<2	<2	<2	<2	<2
	in aeration chamber effluent	1.50	3.00	2.70	3.40	3.10
Total Suspended Solids (mg/L)	in aeration chamber influent	<2	<2	<2	<2	<2
	in aeration chamber effluent	1.30	2.60	2.30	2.80	2.60
Volatile Suspended Solids (mg/L)	in aeration chamber influent	<2	<2	<2	<2	<2
	in aeration chamber effluent	<2	<2	<2	<2	<2
45 Minute Settleable Solids (mL/L)	in aeration chamber influent					
	in aeration chamber effluent					

Notes:
(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

Weeks Into Test: 16
Weekend Dosing: Sunday 500 gallons Saturday 500 gallons Friday 500 gallons

Dosed Volume (gallons)		Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	in aeration chamber influent	1.9	1.8	1.8	1.6	1.6
	in aeration chamber effluent	2.3	2.3	2.3	2.3	2.3
Temperature (C)	in aeration chamber influent	2.3	2.3	2.3	2.3	2.3
	in aeration chamber effluent	6.8	6.9	6.9	6.8	6.8
pH	in aeration chamber influent	6.9	6.8	6.9	6.8	6.9
	in aeration chamber effluent	35.0	17.0	25.0	2.20	2.10
Biochemical Oxygen Demand (mg/L)	in aeration chamber influent	<2	3	3	2	3
	in aeration chamber effluent	3.00	2.20	3.00	2.60	1.90
Total Suspended Solids (mg/L)	in aeration chamber influent	<2	3	3	<2	<2
	in aeration chamber effluent	2.60	1.80	2.50	2.30	1.60
Volatile Suspended Solids (mg/L)	in aeration chamber influent	<2	3	2	<2	<2
	in aeration chamber effluent	<2	3	2	<2	<2
45 Minute Settleable Solids (mL/L)	in aeration chamber influent					
	in aeration chamber effluent					

Notes:
(a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: December 31, 2006 Plant Code: Site #4

Weeks Into Test: 18

	Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)	500	500	500	500	500	500	500
Dissolved Oxygen (mg/L)	eration chamber						
	effluent	1.6	1.5	1.6	1.5	1.4	1.5
Temperature (C)	in fluent	23	23	23	23	23	23
	eration chamber						
pH	in fluent	23	23	23	23	23	23
	eration chamber	6.9	7.0	6.9	6.9	6.8	6.8
Biochemical Oxygen Demand (mg/L)	in fluent						
	effluent	6.9	6.9	6.9	6.9	6.9	6.8
Total Suspended Solids (mg/L)	in fluent	140	140	180	300	270	290
	effluent	49	6	<2	<2	<2	<2
Volatile Suspended Solids (mg/L)	in fluent	210	200	320	410	280	340
	effluent						
45 Minute Settleable Solids (mL/L)	in fluent	16	<2	<2	<2	<2	<2
	eration chamber	180	170	280	340	220	290
45 Minute Settleable Solids (mL/L)	in fluent	14	<2	<2	<2	<2	<2
	eration chamber						

Notes: Working parent stress started on 1/6/07.

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: December 24, 2006 Plant Code: Site #4

Weeks Into Test: 17

	Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)	500	500	500	500	500	500	500
Dissolved Oxygen (mg/L)	eration chamber						
	in fluent	1.6					
Temperature (C)	in fluent	23					
	eration chamber						
pH	in fluent	23					
	eration chamber	6.9					
Biochemical Oxygen Demand (mg/L)	in fluent	6.9					
	effluent	120					
Total Suspended Solids (mg/L)	in fluent	4					
	effluent	200					
Volatile Suspended Solids (mg/L)	in fluent	<2					
	eration chamber	170					
45 Minute Settleable Solids (mL/L)	in fluent	<2					
	eration chamber						

Notes: Wash day stress 12/25 through 12/29.

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: January 7, 2007 Plant Code: Site #4

Weeks Into Test: 19

Dosed Volume (gallons)		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dissolved Oxygen (mg/L)	eration chamber							
	effluent							1.6
Temperature (C)	in influent							23
	eration chamber							
pH	effluent							23
	in influent							6.9
Biochemical Oxygen Demand (mg/L)	eration chamber							
	effluent							6.8
Total Suspended Solids (mg/L)	in influent							470
	eration chamber							
pH	effluent							6
	in influent							810
Total Suspended Solids (mg/L)	eration chamber							
	effluent							22
Volatiles Suspended Solids (mg/L)	in influent							d
	eration chamber							
45 Minute Settleable Solids (mL/L)	effluent							d
	eration chamber							

- (a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other
- Notes: Working Parent Stress completed on 1/10.
VSS measurements missed on 1/13 due to laboratory error.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: January 14, 2007 Plant Code: Site #4

Weeks Into Test: 20

Dosed Volume (gallons)		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dissolved Oxygen (mg/L)	eration chamber							
	effluent	1.6	1.6	1.8	1.7	3.3		
Temperature (C)	in influent	22	22	20	21	19		
	eration chamber							
pH	effluent	22	22	22	22	15		
	in influent	6.9	6.8	6.8	6.9	7.0		
Biochemical Oxygen Demand (mg/L)	eration chamber							
	effluent	6.8	6.9	6.8	6.8	6.7		
Total Suspended Solids (mg/L)	in influent	320	140	160	200	400		
	eration chamber							
Volatiles Suspended Solids (mg/L)	effluent	3	d	<2	<2	2		
	in influent	560	170	190	140	560		
45 Minute Settleable Solids (mL/L)	eration chamber							
	effluent	<2	d	<2	<2	2		
45 Minute Settleable Solids (mL/L)	in influent	d	d	150	120	430		
	eration chamber							
45 Minute Settleable Solids (mL/L)	effluent	d	d	<2	<2	2		
	eration chamber							

- (a) Site problem
(b) Malfunction of system under test
(c) Weather problem
(d) Other
- Notes: Power/Equipment Failure Stress 1/18 through 1/20.
VSS measurements missed on 1/14 and 1/15 due to laboratory error.
Effluent CBOD and TSS measurements missed on 1/15 due to laboratory error.

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: January 28, 2007 Plant Code: Site #4

Weeks Into Test: 22

Dosed Volume (gallons)		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dissolved Oxygen (mg/L)	eration chamber	300	0	0	0	0	0	0
	effluent							
Temperature (C)	in fluent	2.6						
	eration chamber	19						
pH	effluent	14						
	in fluent	6.9						
Biochemical Oxygen Demand (mg/L)	eration chamber							
	effluent	6.8						
Total Suspended Solids (mg/L)	in fluent	190						
	effluent	2						
Volatiles Suspended Solids (mg/L)	(CBOD ₅)							
	in fluent	450						
45 Minute Settleable Solids (mL/L)	eration chamber							
	effluent	<2						
45 Minute Settleable Solids (mL/L)	in fluent	360						
	eration chamber							
45 Minute Settleable Solids (mL/L)	effluent	<2						
	eration chamber							

- Notes: Vacation Stress started on 1/28.
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: January 21, 2007 Plant Code: Site #4

Weeks Into Test: 21

Dosed Volume (gallons)		Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dissolved Oxygen (mg/L)	eration chamber	500	500	500	500	500	500	500
	effluent							
Temperature (C)	in fluent				2.4	2.5	2.5	2.5
	eration chamber				19	19	19	19
pH	effluent				14	14	14	14
	in fluent				6.9	6.8	6.8	6.9
Biochemical Oxygen Demand (mg/L)	eration chamber							
	effluent				6.9	6.9	6.9	6.9
Total Suspended Solids (mg/L)	in fluent				110	130	540	250
	effluent				<2	<2	<2	2
Volatiles Suspended Solids (mg/L)	(CBOD ₅)							
	in fluent				530	250	250	750
45 Minute Settleable Solids (mL/L)	eration chamber							
	effluent				<2	<2	<2	<2
45 Minute Settleable Solids (mL/L)	in fluent				410	190	190	610
	eration chamber							
45 Minute Settleable Solids (mL/L)	effluent				<2	<2	<2	<2
	eration chamber							

- Notes:
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: February 4, 2007 Plant Code: Site #4

Weeks Into Test: 23

	Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)	0	0	0	300	500	500	500
Dissolved Oxygen (mg/L)	aceration chamber						
	effluent				2.6	2.4	
Temperature (C)	aceration chamber						
	effluent				15	15	
pH	aceration chamber						
	effluent				6.9	6.8	
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)					590	180
	effluent (CBOD ₅)					9	2
Total Suspended Solids (mg/L)	influent					510	210
	aceration chamber						
Volatile Suspended Solids (mg/L)	effluent					32	2
	influent					4.50	190
45 Minute Settleable Solids (mL/L)	aceration chamber						
	effluent					29	2

Notes: Vacation Stress completed on 2/7.

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: February 11, 2007 Plant Code: Site #4

Weeks Into Test: 24

	Sun	Mon	Tue	Wed	Thur	Fri	Sat
Dosed Volume (gallons)	500	500	500	500	500	500	500
Dissolved Oxygen (mg/L)	aceration chamber						
	effluent	2.5	2.4	2.5	2.4	2.3	2.5
Temperature (C)	aceration chamber						
	effluent	19	20	20	19	19	19
pH	aceration chamber						
	effluent	15	15	15	15	15	15
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	6.9	6.8	6.9	6.8	6.8	6.9
	effluent (CBOD ₅)	6.9	6.8	6.9	6.8	6.8	6.8
Total Suspended Solids (mg/L)	influent	260	190	99	430	420	450
	aceration chamber						
Volatile Suspended Solids (mg/L)	effluent	3	4	4	5	5	6
	influent	260	400	160	320	350	410
45 Minute Settleable Solids (mL/L)	aceration chamber						
	effluent	5	2	<2	2	2	2
45 Minute Settleable Solids (mL/L)	aceration chamber						
	effluent	2.40	350	130	280	290	340
45 Minute Settleable Solids (mL/L)	aceration chamber						
	effluent	4	2	<2	<2	2	2

Notes:

- (a) Site problem
- (b) Malfunction of system under test
- (c) Weather problem
- (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: February 18, 2007 Plant Code: Site #4

Weeks Into Test: 25

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons Friday 500 gallons

Dosed Volume (gallons)	Monday					Tuesday					Wednesday					Thursday					Friday									
	500					500					500					500					500									
Dissolved Oxygen (mg/L)	aeration chamber effluent					2.7					2.7					2.7					2.6					2.6				
	influent					20					20					20					20					20				
Temperature (C)	aeration chamber effluent					15					15					15					16					15				
	influent					7.0					7.0					6.9					6.9					6.9				
pH	aeration chamber effluent					6.9					6.9					6.9					6.9					6.9				
	influent					2.90					2.40					1.70					1.50					2.20				
Biochemical Oxygen Demand (mg/L)	aeration chamber effluent					6					6					5					2					12				
	influent					480					330					220					350					270				
Total Suspended Solids (mg/L)	aeration chamber effluent					4					4					2					5					6				
	influent					410					310					180					320					230				
Volatile Suspended Solids (mg/L)	aeration chamber effluent					3					4					<2					5					5				
	influent																													
45 Minute Settleable Solids (mL/L)	aeration chamber																													
	influent																													

- Notes:
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

NSF International
Standard 40 - Residential Wastewater Treatment Systems
Plant Effluent

Week Beginning: February 25, 2007 Plant Code: Site #4

Weeks Into Test: 26

Weekend Dosing: Sunday 500 gallons Saturday 500 gallons Friday 500 gallons

Dosed Volume (gallons)	Monday					Tuesday					Wednesday					Thursday					Friday									
	500					500					500					500					500									
Dissolved Oxygen (mg/L)	aeration chamber effluent					1.7					1.6					1.6					1.6					1.5				
	influent					18					19					19					19					19				
Temperature (C)	aeration chamber effluent					17					17					17					17					17				
	influent					6.9					7.0					6.9					6.9					6.8				
pH	aeration chamber effluent					6.8					6.9					6.8					6.9					6.9				
	influent					260					150					130					110					280				
Biochemical Oxygen Demand (mg/L)	aeration chamber effluent					8					8					5					5					6				
	influent					390					88					84					53					330				
Total Suspended Solids (mg/L)	aeration chamber effluent					4					5					4					3					3				
	influent					320					72					72					46					260				
Volatile Suspended Solids (mg/L)	aeration chamber effluent					4					4					3					3					3				
	influent																													
45 Minute Settleable Solids (mL/L)	aeration chamber																													
	influent																													

- Notes:
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

APPENDIX D
FECAL COLIFORM RESULTS

Date	Raw Influent (#/100mL)	Ecoflex™ Effluent (#/100mL)
09/04/06	19,600,000	Inconclusive
09/06/06	36,000,000	110,000
09/11/06	41,000,000	85,000
09/15/06	Inconclusive	156,000
09/18/06	8,400,000	11,000
09/20/06	13,500,000	10,500
09/25/06	14,000,000	90,000
09/27/06	18,000,000	65,500
10/02/06	13,400,000	135,000
10/04/06	980,000	126,000
10/9/06	35,000,000	110,000
10/11/06	28,000,000	160,000
10/16/06	20,500,000	268,000
10/18/06	44,000,000	168,000
10/20/06	14,400,000	Missed Sample
10/23/06	24,000,000	140,000
10/25/06	14,400,000	2,600,000
10/27/06	16,800,000	93,000
11/1/06	19,000,000	120,000
11/3/06	17,000,000	206,000
11/6/06	12,000,000	88,000
11/8/06	9,000,000	68,000
11/10/06	5,000,000	51,000
11/13/06	8,250,000	58,500
11/15/06	8,000,000	4,800
11/20/06	5,750,000	110,000
11/22/06	10,200,000	261,000
11/24/06	7,850,000	220,000
11/27/06	1,040,000	29,000
11/29/06	740,000	110,000

Date	Raw Influent (#/100mL)	Ecoflex™ Effluent (#/100mL)
12/1/06	1,700,000	608,000
12/4/06	500,000	740,000
12/6/06	1,060,000	11,000
12/8/06	11,800,000	230,000
12/11/06	6,530,000	63,000
12/13/06	7,200,000	420,000
12/15/06	12,200,000	760,000
12/18/06	8,400,000	90,000
12/20/06	5,540,000	73,000
12/22/06	5,800,000	30,000
12/25/06	13,400,000	70,000
1/1/07	5,700,000	11,000
1/3/07	5,900,000	18,000
1/5/07	36,000,000	200,000
1/15/07	3,800,000	53,000
1/17/07	3,330,000	45,000
1/24/07	4,070,000	35,000
1/26/07	6,800,000	<1000
2/9/07	4,800,000	3,500
2/12/07	3,100,000	207,000
2/14/07	3,400,000	35,000
2/16/07	9,800,000	108,000
2/19/07	2,100,000	30,000
2/21/07	10,000,000	5,200
2/23/07	4,600,000	165,000
2/26/07	1,300,000	45,100
2/28/07	3,200,000	43,400
3/2/07	2,750,000	20,000

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APPENDIX E
TOTAL NITROGEN RESULTS

Date	Influent	Ecoflex™ Effluent		
	Total Kjeldahl Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Nitrate-Nitrite Combined Nitrogen (mg/L)	Total Nitrogen (mg/L)
9/4/2006	30.9	23.8	0.71	24.51
9/6/2006	40.7	32	6.58	38.58
9/11/2006	46.5	9.56	16.6	26.16
09/13/06	40.1	3.26	8.59	11.85
09/18/06	31.0	1.58	6.46	8.04
09/20/06	46.5	0.78	6.07	6.85
09/25/06	46.9	0.85	6.71	7.56
09/27/06	52.8	0.8	6.64	7.44
10/02/06	56.8	1.5	0.65	2.15
10/04/06	33.6	1.12	6.26	7.38
10/09/06	78.4	1.02	3.54	4.56
10/11/06	56.0	0.56	3.53	4.09
10/16/06	29.3	0.73	3.86	4.59
10/18/06	32.7	2.05	3.12	5.17
10/23/06	46.4	1.84	2.61	4.45
10/25/06	30.3	1.2	2.96	4.16
10/30/06	35.6	2.77	2.51	5.28
11/01/06	38.5	2.26	3.66	5.92
11/06/06	25.4	2.65	4.46	7.11
11/08/06	50.9	3.39	3.63	7.02
11/13/06	31.0	3.12	4.27	7.39
11/15/06	52.5	2.54	5.03	7.57
11/20/06	36.5	0.52	5.84	6.36
11/22/06	39.8	5.17	4.05	9.22
11/27/06	59.7	5.98	3.99	9.97
11/29/06	37.7	0.47	3.58	4.05

Date	Influent	Ecoflex™ Effluent		
	Total Kjeldahl Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Nitrate-Nitrite Combined Nitrogen (mg/L)	Total Nitrogen (mg/L)
12/04/06	41.1	7.05	3.20	10.25
12/06/07	49.0	5.19	3.99	9.18
12/11/07	56.6	4.42	4.62	9.04
12/13/07	43.9	3.74	4.74	8.48
12/18/07	32.8	5.63	12.6	18.23
12/20/07	44.4	10.6	2.97	13.57
12/25/07	29.6	22.3	8.14	30.44
01/01/07	34.8	9.09	10.0	19.09
01/03/07	30.3	8.67	7.75	16.42
01/15/07	11.6	6.01	5.94	11.95
01/17/07	36.2	5.08	5.17	10.25
01/24/07	41.5	3.93	6.82	10.75
01/26/07	42.1	5.31	9.66	14.97
02/09/07	36.7	6.71	12.3	19.01
02/12/07	17.7	7.68	6.91	14.59
02/14/07	23.6	5.16	6.94	12.1
02/16/07	30.5	5.75	6.34	12.09
02/19/07	12.1	6.66	3.75	10.41

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APPENDIX F
OWNER'S MANUAL

Ecoflex™ systems EFX-400 and EFX-400B

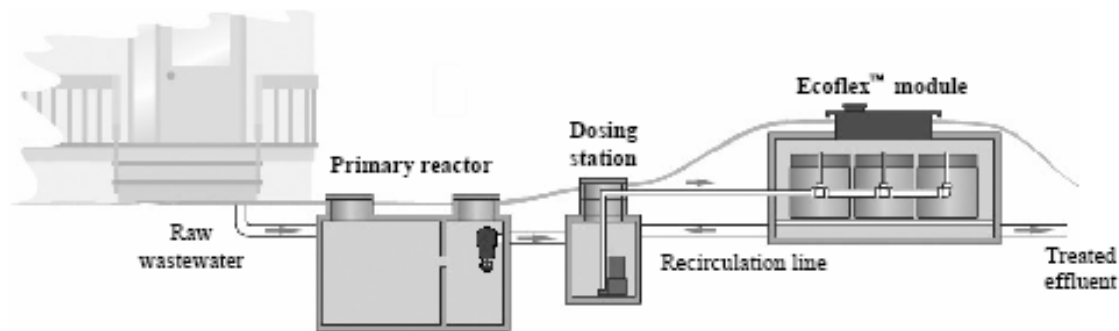
Owner's Manual – USA-NSF

Congratulations for your purchase of an Ecoflex™ system. In selecting the Ecoflex™ system, you have wisely chosen to protect your health as well as the environment. This manual contains information on system operation and maintenance, guidelines for use and warranties. For additional information, please contact our customer service at 1 800 632-6356

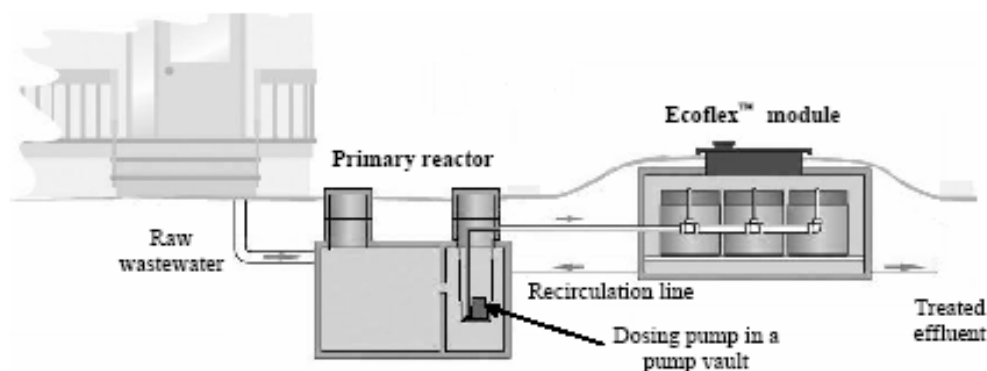
Operating principle

The Ecoflex™ system EFX-400 or EFX-400B is made of precast concrete or fiberglass module containing 4 filtering media rolls made of overlapping layers of textile and peat. This composite media has been specially designed to treat domestic wastewater. The system is fed by a submersible pump controlled by a dosing unit allowing time-dosing on a 24 hour basis. The treated effluent is collected at the bottom of the unit and divided in two parts: one part is returned to the dosing station and the other one is directed toward a disposal field or a polishing unit prior to discharge.

The Ecoflex™ system has been tested and listed under standard 40. Each model of Ecoflex™ described here meets Class I requirements as per ANSI/NSF standard 40.



Ecoflex™ system with a separate dosing station - EFX-400(B) F series



Ecoflex™ system with a pump vault inside the primary reactor - EFX-400(B) P series

Model description

The complete Ecoflex™ system comprises a primary reactor equipped with a Premier Tech effluent filter EFT-080R (or Polylok PL-122 with flow regulator), a dosing station, one to three Ecoflex™ modules and, depending on the type of installation, one or more other components : disinfection unit, absorption field, etc. Take note that the pre-treatment equipment (primary reactor and dosing station) can be regrouped in one tank to simplify installation. In this case, a pump vault approved by Premier Tech Environment must be used to protect the pump.

There are different models of Ecoflex™ systems depending on the material of the module (concrete or fiberglass) and the treatment capacity. It is identifiable through the product code. The number following the letters in the code indicates the amount of filtering media rolls in the system. The Ecoflex™ unit having 4 filtering media rolls is coded EFX-400. If the module is made of concrete, the letter B is added directly after the number 400. As stated above, the Ecoflex™ system can include more than one Ecoflex™ module. The number after 400 indicates the quantity of modules included in the system. The final letter (F or P) refers to the pre-treatment equipment configuration: F for a separate dosing station and an effluent filter in the primary reactor, and P when a pump vault is included inside the primary reactor. Table 1 presents the different Ecoflex™ system models and the specifications of its components.

Table 1 Specifications of the Ecoflex™ system in regards to residential applications

Flow rate (gpd)	Primary reactor minimal effective capacity (gal.)			Effluent filter or pump vault model	Number of Ecoflex™ modules required	Ecoflex™ system model code			
	Primary reactor	Dosing station	Total			Concrete shell		Fiberglass shell	
						with pump vault	with effluent filter	with pump vault	with effluent filter
500	1,250	200	1,450	1 × EFT-080R or equivalent ¹	1	EFX-400BP-1	EFX-400BF-1	EFX-400P-1	EFX-400F-1
1,000	2,500	330	2,830	1 × EFT-080R or equivalent ¹	2	EFX-400BP-2	EFX-400BF-2	EFX-400P-2	EFX-400F-2
1,500	3,500	500	4,000	1 × EFT-080R or equivalent ¹	3	EFX-400BP-3	EFX-400BF-3	EFX-400P-3	EFX-400F-3

¹ Equivalent: Effluent filter Polylok PL-122 with a flow regulator or pump vault approved by Premier Tech Environment. A minimal total filtration area of 50 in² is required for a pump vault.

Guidelines for use

The Ecoflex™ module is a compact biofiltration system designed to treat domestic wastewater from a residential dwelling. It is installed downstream of a primary treatment unit. It can also be used to treat wastewater from commercial, communal and municipal project if the wastewater loads are similar than regular domestic effluent (see Table 2). Please contact our customer service for more information.

Table 2 Characteristics of domestic effluent (after primary treatment)

Parameters	Total Suspended Solids (TSS)	Biochemical Oxygen Demand (BOD ₅)	Fecal coliforms
Typical levels	≤ 75mg/L	≤ 250 mg/L	≤ 2,000,000 cfu/100 mL

To ensure optimum treatment efficiency of any septic installation (Ecoflex™ system, Ecoflo® Peat Filter system, leach field, etc.):

Do not discharge any of the following substances into the sewer:

- Water softener backwash;
- Oil and grease (engine oil, cooking oil, etc.);
- Wax and resin;
- Paint and solvent;
- Petroleum products;
- Pesticides of any kind;
- Any kind of septic tank additive;
- Toxic substance;
- Anything not easily biodegradable (e.g. coffee beans, cigarette butts, sanitary napkins, tampons, condoms, etc.).



Avoid:

- Using an automatic toilet bowl cleaner;
- Using a garbage disposal or sewage pump (upstream of the septic tank).

And never:

- Cover or bury the Ecoflex™ module access lids;
- Plant trees within 10' of the Ecoflex™ system;
- Open or enter the Ecoflex™ module without prior authorization;
- Connect a drainage pipe or roof gutter to the septic system.

Note: There is no action to be taken if the system is to be used intermittently or if extended periods of non-use are anticipated

What You Should Know

Keep heavy weights off your septic installation

Never drive vehicles or place objects weighing more than 500 lbs within 5' of the Ecoflex™ access lid(s) if the module is made of concrete, and within 10' if the module is made of fiberglass. If you are planning to do some landscaping or any other type of work, make sure you notify those involved so they do not damage your septic system.

Do not shovel or blow snow so it accumulates excessively over the septic system. The overload could cause damage. Mark/indicate the location of your system components if required.

Concerning your home

Your home must be equipped with a working air vent, and plumbing must comply with the local building Code. Any change in the use or function of your home, or any modification to your Ecoflex™ system must be authorized by the local authorities, and Premier Tech Environment must be informed. The warranty for the Ecoflex™ system will be void if this condition has not been fully respected.

Maintenance

Ecoflex™ module

The owner of a biofiltration system shall follow the manufacturer's recommendations concerning maintenance of the system. For that purpose, he must have, at all times, a valid contract with the manufacturer or its representative, and a copy of the contract must be filed with the local authorities in which the system is located.

Because periodic maintenance is essential to the proper functioning of the Ecoflex™, it comes with a maintenance agreement binding Premier Tech Environment to service the Ecoflex™, free of charge for a limited period of time following its installation (please see maintenance agreement for more details). This agreement is automatically renewed with the purchase of new filter rolls from Premier Tech Environment. Every Ecoflex™ sold must be serviced annually for the duration of its useful life.

Bi-annual maintenance for the first two years is carried out by Premier Tech Environment or an authorized agent. This service includes a visual inspection of all components to ensure proper functioning of the system, the cleaning (if required) of the Ecoflex™ distribution system, the replacement of all protective layers of the filtering media rolls, the cleaning (if required) of the protection distribution system device and an effluent quality inspection consisting of a visual assessment for color turbidity and an olfactory assessment for odor. After each inspection, you will be given a maintenance record, which should be kept in a safe place with this manual. If a problem is observed during the inspection and cannot be remedied at the time of inspection, the maintenance record will include an estimated date of correction. For the following years, Premier Tech Environment offers an extended service policy including annual maintenance and follow-up as described above that will be invoiced on an annual basis.



The Ecoflex™ filtering media has to be replaced in time (every 10 to 12 years), depending on use and compliance with the above guidelines. The filter rolls are easily replaced through the access lids so no excavation is required and the owner's property landscaping is not disturbed. The new filtering media rolls must be installed by Premier Tech Environment or by an authorized agent. Easy access to the lids is essential for maintenance purposes.

Primary reactor

Emptying your primary reactor as instructed helps to keep your septic system in proper working order. We recommend that you keep proof of emptying (invoice) with this owner's manual so as to have a record of complete system maintenance. The pumping standards of the primary reactor (septic tank) prescribed by local authorities must be respected. For main residences, the septic tank should be inspected yearly. It should be pumped out (first and second compartments) at least every 2 years or when a maximum depth of sludge of 20 inches is reached in the first compartment, whichever comes first. However, when a by-law governing the pumping of septic tanks has been adopted by a municipality or county, a septic tank may need to be pumped out after measuring the scum or sludge layer. Consult your local regulations for prescribed inspection and pumping frequency.

We recommend that



Premier Tech effluent filter EFT-080R (or Polylok PL-122 with flow regulator)

The filter should be inspected at least once a year and cleaned if necessary. Pull the cartridge out of its container and gently hose it off to remove any scum and sludge. You should do this while holding the filter over the primary reactor's first compartment so that scum washes back into the tank.

Who to Contact in Case of...

Flooding

Certain sites are prone to flooding or ground water rise, which can cause malfunctioning of the Ecoflex™ or any other septic system. If this happens with your Ecoflex™ system, contact Premier Tech Environment.

Backflow

Backflow rarely occurs in homes. If it does, and no alarm has been detected by the system control panel, it is generally caused by the primary reactor. The primary reactor inlet may be blocked by solid wastes or maybe it is time to clean the effluent filter or the pump vault. Your septic system installer or pumper can usually tell you what to do.

Alarm

Your Ecoflex™ is fed by a submersible pump controlled by a time-dosing unit equipped with a programmable timer (DCU-100). The dosing unit DCU-100 is equipped with a visual and audible alarm to warn you of any problems associated with the pump and/or the Ecoflex™ distribution system. If the control panel signal light comes on or if you hear the audio alarm, please contact our customer service immediately. It is possible to turn off the audio alarm by pressing the « reset » button or turning the switch to: "SILENCE" position (Please refer to the DCU-100 Owner's Manual for more information).

Odors

The air vent positioning, as well as other factors unrelated to the Ecoflex™, can restrain proper dispersion of septic gases and lead to odors. If this happens, contact Premier Tech Environment for solutions.

In the event that a problem arises or service is required you should refer to the system data plate located on the side of the control panel or inside the access neck of the Ecoflex™ module(s).

**PLEASE CONTACT OUR CUSTOMER SERVICE
FOR ANY QUESTION OR COMMENT:
1 800 632-6356**

For further information or comment, please contact our customer service:



**Premier Tech
Environment**

1, Avenue Premier, Rivière-du-Loup (Québec) G8R 6C1 CANADA
☎ 1.800.632.6356 / 418.882.8888 ☎ 418.882.8842
✉ RTE@PREMIERTECH.COM 🌐 WWW.PREMIERTECH.COM

The content of this article is based upon the latest information available at the time of printing and is aimed at providing a general introduction to Premier Tech's products. No warranty or representation is hereby made by Premier Tech as to the accuracy of said information. Premier Tech is constantly updating and improving its products and reserves the right to amend, discontinue, alter or change specifications and prices without prior notice.

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Certificate of Warranty for the Ecoflex™ system EFX-400 or EFX-400B

1. Preamble

Premier Tech Technologies Ltd. (hereinafter called "Premier Tech") is proud to provide its customers with an exclusive wastewater treatment system guaranteed by an innovative warranty.

For the purpose of this warranty, "Customer" shall mean the person who has acquired an Ecoflex™ system EFX-400P-1, EFX-400F-1, EFX-400P-2, EFX-400F-2, EFX-400P-3, EFX-400F-3, EFX-400BP-1, EFX-400BF1, EFX-400BP-2, EFX-400BF-2, EFX-400BP-3, EFX-400BF-3 certified by NSF, which may be composed, depending of the type of the system, of a EFT-080R effluent or a pump vault approved by Premier Tech and a primary reactor (the whole system being hereinafter referred to as "Ecoflex™ system"), as well as any Subsequent Purchaser (hereinafter called "Subsequent Purchaser(s)"), according to the disposition of paragraph 8 of this present warranty. "Successor" shall mean any other person entitled to exercise Customer's rights under the law.

2. Nature of the Warranty

Premier Tech warrants the components of its Ecoflex™ system as follows:

- Premier Tech warrants that the filtering media rolls of the Ecoflex™ system will function properly for a period of two (2) years starting on the date of its installation.
- Premier Tech warrants its EFT-080R effluent filter (parts) against manufacturing defects for a period of two (2) years from the date of its installation.
- Premier Tech warrants all other components of the Ecoflex™ system (primary reactor, pump vault, dosing pump, components of the Ecoflex™ module) against any manufacturing defects for a period of two (2) years commencing on the date of purchase by the Initial Purchaser.
- Premier Tech warrants the concrete module of the Ecoflex™ EFX-400B system against any manufacturing defects for a period of thirty (30) years starting on the date of purchase by the Initial Purchaser.
- Premier Tech also warrants the fiberglass module of the Ecoflex™ EFX-400 system against any manufacturing defects for a period of two (2) years starting on the date of purchase by the Initial Purchaser.

The date of installation shall be the date written on the maintenance agreement.

This warranty of effectiveness, sound manufacture and durability is given by Premier Tech to the Customer in addition to the legal warranty or other Customer's rights in accordance with any applicable law, but does not alter them in any way and is a conventional warranty applicable under the terms and conditions of this warranty certificate.

This conventional warranty of Premier Tech is expressly limited to the text of this certificate and is valid if the installation of the Ecoflex™ system has been made in accordance with applicable regulations and with the manufacturer's recommendations.

3. Notice

For this warranty to be valid, the Customer must notify Premier Tech in writing immediately upon the appearance of any indication of an anomaly or irregularity in the Ecoflex™ system.

Such notice must be given by mail to Premier Tech's head office at 1, avenue Premier, Rivière-du-Loup, Québec, G5R 6C1, CANADA or by facsimile at (418)-862-6642.

Upon receipt of this notice, Premier Tech will examine the situation and, if necessary, take appropriate corrective measures in accordance with the terms of the present warranty.

4. Exclusions

The following damages or problems are excluded from the warranty:

- (a) Any damage or problem caused by a fortuitous event or "force majeure", such as, without limiting the generality of the foregoing, earthquake, flood, hurricane, landslide, explosion or dynamiting;
- (b) Any damage or problem caused by the fault or act of a third party;
- (c) Any damage or problem arising from a defective installation carried out by a person authorized by Premier Tech, or any installation, modification, correction or addition carried out by a person not authorized by Premier Tech;
- (d) Any damage or problem arising from any installation, modification, correction or addition to the treatment system carried out after installation of the Ecoflex™ system without Premier Tech's prior written approval;
- (e) Any damage or problem caused by the use of a septic tank which does not comply with any applicable regulations and/or with Premier Tech's specifications (SPEC), as detailed in the owner's manual;
- (f) Any damage or problem, if it is demonstrated that the Ecoflex™ system was not used in accordance with the instructions and guidelines contained in the owner's manual;
- (g) Any damage or problem, if the maintenance of the Ecoflex™ system has not been executed by a person authorized by Premier Tech in accordance with the maintenance agreement;
- (h) Any damage or problem caused by the fault or action of the Customer or the Customer's Successors including, without limiting the generality of the foregoing, refusal to allow access to the system for maintenance;
- (i) Any damage or problem, if it is found that the Customer has modified or changed the use of the property served by the Ecoflex™ system resulting in the alteration of the

Certificate of Warranty for the Ecoflex™ system EFX-400 or EFX-400B

nature or quality of wastewater being treated and/or that constitutes a violation of the applicable regulations;

(j) Any damage or problem caused during the work performed in order to access to the Ecoflex™ system, including, without limiting the generality of the foregoing, excavation, snow-removal or demolition.

(k) Any damage or problem arisen from site's and/or soil's prior condition not reported or not properly reported to Premier Tech by the Customer or the person performing the site investigation.

5. Particular Exclusions

It is further expressly understood that the Customer may not carry out or cause to be carried out any repair or verification of the Ecoflex™ system sold, or attempt to carry out any work or to apply any corrective measures whatsoever to said work, before notifying Premier Tech in accordance with the provisions of section 3 of this warranty and before Premier Tech has visited the site to verify the situation, within a reasonable time following receipt of said notice.

If the Customer carries out or causes to be carried out repairs, or attempts to carry out any work or to apply corrective measures of any kind whatsoever to the Ecoflex™ system sold, without prior authorization from Premier Tech, this warranty shall be considered null and void and Premier Tech shall be considered completely discharged from any and all of its obligations under this warranty.

6. Indemnities and Damages

Premier Tech's liability and obligations under this warranty shall be in any event limited to the replacement of the filtering media and/or of one or several components of the Ecoflex™ system as well as the supply of the required labor, if applicable, in accordance with sections 3 and 4.

7. Limitation of liability

Premier Tech may not be held liable for any other damage sustained by the Customer. Premier Tech's compensation's or indemnification's obligation shall be limited to the provisions of section 6 of this warranty.

8. Transfer of Ownership

In the event of transfer of ownership, sale, assignment or any other way of disposition of Customer's property to a third party, this warranty shall continue to apply if and only if Subsequent Purchaser or its Successor confirms, by transmitting to Premier Tech the attached "Notice of Warranty Transfer", within a reasonable delay, that he/she is the new owner of the property, he/she understands and is aware of the content of this warranty certificate and accepts its terms and conditions.

The person proceeding to the transfer of the property, sale, assignment or any other type of disposition, undertakes to hand over to the Subsequent Purchaser or its Successor, the warranty certificate remitted upon completion of the work, as well as the owner's manual and, when applicable, the maintenance and environmental monitoring program for the Ecoflex™ system.

Default to respect the conditions of the present Section 8 may cause, at Premier Tech's discretion, abandonment or rejection of the present warranty.

9. Inspection

The Customer and/or the Customer's Successors shall allow Premier Tech or its duly authorized representative to carry out all necessary monitoring and inspection as required for implementation of this warranty

If the Customer or the Customer's Successors make a request to Premier Tech under this warranty and that it is found after inspection and verification that the Ecoflex™ system is performing in accordance with the standards and specifications of Premier Tech, a minimum charge of one hundred fifty U.S. dollars (\$ 150.00 US) plus direct expenses shall be paid by the Customer and/or the Customer's Successors for the cost of such inspection. Otherwise, no charge shall be billed by Premier Tech.

10. Priority of the Certificate of Warranty

This warranty supplements any contracts or understandings, written or verbal, entered into between the Customer and Premier Tech.

In case of contradiction between this warranty and any other documents and/or contracts entered into between the Customer and Premier Tech, this warranty shall prevail.

11. Subsequent Purchasers and Successors

Subject to the provisions of this warranty and of section 8 in particular, this warranty shall continue to apply to the Subsequent Purchasers and Customer's Successors and shall continue to have full effect until the end of the agreed warranty period provided for in section 2 of this certificate.

Certificate of Warranty for the Ecoflex™ system EFX-400 or EFX-400B

Notice of Transfer

Name of former owner: _____

I, the undersigned _____ hereby declare that I have acquired the property located at
Name (please print)

_____ *Street* *City* *State*

_____ *Zip Code* () *Telephone*

I have read and I understand the warranty provided by Premier Tech Technologies Ltd. for the Ecoflex™ system for wastewater biofiltration. I wish to benefit from this warranty for the remaining period, if any; I accept to be bound by this warranty and by any and all of the clauses, undertakings and conditions set forth therein; I have had the opportunity to examine the Ecoflex™ system and declare myself satisfied with it at the time of this transfer.

I ask Premier Tech Technologies Ltd. to take note of this transfer of ownership.

_____ *Signature*

_____ *Date*