

WASTEWATER TECHNOLOGY

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

Final Report:

**E-Z Treat
Model #600
13/12/055/0030**



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**Evaluation Report:
E-Z Treat #600 - Wastewater Treatment System**

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

January 2016

EXECUTIVE SUMMARY

Testing of the E-Z Treat Model #600 was conducted under the provisions of NSF/ANSI Standard 40 for Residential Wastewater Treatment Systems (April 2013 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 Testing Facility located in Waco, Texas, using wastewater diverted from the Waco municipal wastewater collection system, which serves predominantly residential development. The evaluation consisted of sixteen weeks of dosing at design flow, seven and one half weeks of stress testing and an additional two and one half weeks of dosing at design flow. The stress weeks were repeated due to sampling error and the test was extended for 34 weeks. Dosing was initiated on March 15, 2015 and the test was officially started on April 5, 2015. Sampling started in the spring and continued through the summer and fall, covering a range of operating temperatures.

Over the course of the evaluation, the average effluent CBOD₅ was 3 mg/L, ranging between <1 and 15 mg/L, and the average effluent total suspended solids was 2 mg/L, ranging between <1 mg/L and 10 mg/L.

The Model #600 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 12 mg/L for CBOD₅ and 8 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 4 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 evaluation ranged between 6.8 and 7.5, within the required range of 6.0 to 9.0. The Model #600 met the requirements for noise levels (less than 60 dbA at a distance of 20 feet), color, threshold odor, oily film and foam.

PREFACE

Performance evaluation of residential wastewater treatment systems is achieved within the provisions of NSF/ANSI Standard 40: *Residential Wastewater Treatment Systems* (revised April 2013), 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 meet the requirements of EPA Secondary Treatment Guidelines¹ for five day carbonaceous biochemical oxygen demand (CBOD₅), total suspended solids (TSS) and pH. Class I plants must also demonstrate performance consistent with the effluent color, odor, oily film and foam requirements of the Standard. Class II plant effluent must have no more than 1% of samples exceeding 60 mg/L CBOD₅ and 100 mg/L TSS.

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 April 2013) that the Model #600 manufactured by E-Z Treat has fulfilled the requirements of NSF/ANSI Standard 40. The Model #600 has therefore been authorized to bear the NSF Mark so long as E-Z Treat 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 Wastewater Technology Site located at the NSF Testing Facility located in Waco, Texas. The raw wastewater used in the test was residential 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.



Jenny Oorbeck
General Manager
Wastewater Treatment Unit Certification



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Business Unit Manager
Wastewater Treatment Unit Programs

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1.0 PROCESS DESCRIPTION

The E-Z Treat Synthetic Sand/Media Filter System operates as a recirculating fixed media, packed-bed filter system. In these type of systems, microorganisms growing on the media remove soluble contaminants from the wastewater, using them as a source of energy for growth and production of new microorganisms. Bacteria specifically for nitrification are also present and they convert ammonia nitrogen to nitrite and nitrate. The spray nozzles in this system are part of the aeration process and deliver aerated wastewater to the surface of the media. The aerated wastewater trickles down through the media and a bacterial film forms on the surface of media grains and where the removal of soluble organic material, small colloidal matter, and nitrification by the bacteria in the film takes place. Over time, as the filter matures, the film layer forms throughout the depth of the filter media and by-products of the biological process pass out of the filter. Recirculation of the water back through the filter surface provides for additional aeration through the spray nozzles and treatment by the bacteria in the media bed, as well as a mechanism for moving partially decomposed organic materials, bacterial waste products and other debris from the filter. This keeps the pore spaces within the media from clogging. Treatment using recirculating media filtration systems is generally an aerobic process and reaeration of the media through the application of aerated wastewater and during resting periods between doses, is essential for proper treatment. Recirculation of part of the aerated wastewater back to the septic tank allows for the nitrified wastewater is denitrified in the anoxic environment found in the septic tank. Excessive organic or grease loading can have an impact on the system operation so proper sizing and operation are key to assuring proper performance.

2.0 PERFORMANCE EVALUATION

2.1 Description of Plant Evaluated

The #600 model tested in this evaluation has a rated capacity of 600 gallons per day (gpd), and was constructed of injection molded polyethylene. Specifications and drawings are included in Appendix A.

Raw wastewater was treated in a 1,000 gallon (gal), two compartment septic tank fitted with an effluent filter designed to remove solids greater than 1/16 inch (in). The septic tank discharged to a 1,000 gal re-circulation tank that was fitted with a float ball by-pass valve and re-circulation pump. The float ball by-pass valve inside the re-circulation tank connected to a 4-in return line from the sand filter. The float by-pass valve maintains a constant liquid volume in the re-circulation tank and allows the effluent to be constantly re-circulated through the sand/media filter, discharging only the daily forward flow volume after it has passed through the filter.

The E-Z Treat Model #600 filter media was installed in a specially designed chamber fitted with an irrigation system for distribution of wastewater over the surface of the media. The spray manifold had eight evenly spaced wide-angle spray nozzles. The nozzles were brass construction with a free passage of 0.0625-in diameter; this large free passage prevents nozzle clogging while maintaining a consistent misting spray. The manifold was assembled with a pressure gauge and valves allowing for flow and rate adjustments

E-Z Treat synthetic sand filter employs a manufactured synthetic media encapsulated in a mattress like container. The mattress is fabricated from a non-biodegradable, chemically resistant, loose weave polypropylene material with a weave pattern at 90 degree intersections. This creates .078-in square openings allowing effluent and air to flow freely while containing the media material. This media is very uniform and provides ample surface area for biological growth. The media also has enough voids to

accommodate good air and liquid flow and the passage of very small solids that would clog many filters. The media is very lightweight making it resistant to compaction which can lead to poor air and liquid flows, a problem that plagues many media filters. The media consists of lightweight, non-biodegradable plastic spheres.

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 plant with 2/3 water and 1/3 raw sewage. The plant was then dosed at the design loading rate of 600 gpd as follows:

- 6 a.m. to 9 a.m. - 35 percent of daily rated capacity (210 gallons)
- 11 a.m. to 2 p.m. - 25 percent of daily rated capacity (150 gallons)
- 5 p.m. to 8 p.m. - 40 percent of daily rated capacity (240 gallons)

Dosing was accomplished by opening an electrically actuated valve to feed wastewater to the test plant. Five gallon doses were spread uniformly over each dosing period to comprise the total dose volume for the period.

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
- Note this test was extended to 34 weeks, stress was repeated due to sampling error.

During the design loading periods, flow proportioned 24-hour composite influent and effluent samples are collected five days per week. The influent samples are analyzed for five-day biochemical oxygen demand (BOD₅) and total suspended solids (TSS) concentrations. The effluent samples are analyzed for five-day carbonaceous biochemical oxygen demand (CBOD₅), and total suspended solids (TSS) concentrations. On-site determinations of the effluent temperature and pH are made five days per 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) TSS: 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 October 11, 2013. The infiltration/exfiltration test, during which the entire system was tested for leaks, was completed on October 11, 2013. The unit was filled with 2/3 fresh water and 1/3 raw sewage and dosing was initiated at the rate of 600 gallons per day beginning March 15, 2015. After a three-week start up period, the test was officially started on April 5, 2015. The stress test sequence was started on July 27, 2015 and ended on November 13, 2015. The stress weeks were repeated due to test site error and the test was extended to 34 weeks. Testing was completed on December 4, 2015.

3.0 ANALYTICAL RESULTS

3.1 Summary

Chemical analyses of samples collected during the evaluation were completed using the procedures in *Standard Methods for the Examination of Water and Wastewater 22nd edition*. Copies of the data generated during the evaluation are included in Appendix C. 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>
Biochemical Oxygen Demand (mg/L)						
<i>Influent (BOD₅)</i>	200	88	39	590	200	200 - 290
<i>Effluent (CBOD₅)</i>	3	3	<1	15	2	2- 4
Total Suspended Solids (mg/L)						
<i>Influent</i>	190	81	26	600	180	180 - 260
<i>Effluent</i>	2	2	<1	10	1	2 - 3
pH						
<i>Influent</i>	-	-	6.8	7.9	7.4	7.3 – 7.5
<i>Effluent</i>	-	-	6.8	7.5	7.3	7.3 – 7.4
Temperature (°C)						
<i>Influent</i>	28	2	22	32	28	28 – 30
<i>Aeration Chamber</i>	28	3	22	33	29	29 - 31
<i>Effluent</i>	28	4	20	36	29	29 - 32
Dissolved Oxygen (mg/L)						
<i>Aeration Chamber</i>	0.8	0.6	0.3	2.6	0.5	0.5 – 1.6
<i>Effluent</i>	3.3	1.7	0.5	14	3.2	3.2 – 4.7

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 TSS 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 TSS concentrations from the #600 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.

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 30-day average BOD₅ concentration between 100 and 300 mg/L and a 30-day average TSS concentration between 100 and 350

mg/L. The 30-day average influent remained inside this specified range for the duration of the test.

3.2 Biochemical Oxygen Demand

The five-day biochemical oxygen demand (BOD₅) and five-day carbonaceous biochemical oxygen demand (CBOD₅) analyses were completed using *Standard Methods for the Examination of Water and Wastewater 22nd edition*. The results of both analyses are shown in Figure 1.

Influent BOD₅:

Individual influent BOD₅ concentrations ranged from 39 to 590 mg/L during the evaluation, with average and median concentrations of 200 mg/L. Thirty day average concentrations ranged from 160 to 280 mg/L.

Effluent CBOD₅:

Effluent CBOD₅ concentrations ranged from <1 to 15 mg/L over the course of the evaluation, with an average concentration of 3 mg/L and a median effluent CBOD₅ concentrations of 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. As presented in Table II, over the course of the test the 7-day average effluent CBOD₅ ranged from 1 to 12 mg/L and the 30-day average ranged from 1 to 6 mg/L. The #600 met the requirements of Standard 40 for effluent CBOD₅.

BOD₅ Loading:

Over the course of the evaluation the influent BOD₅ loading averaged 1.00 lb/day. The #600 achieved an average reduction of 0.98 lbs/day.

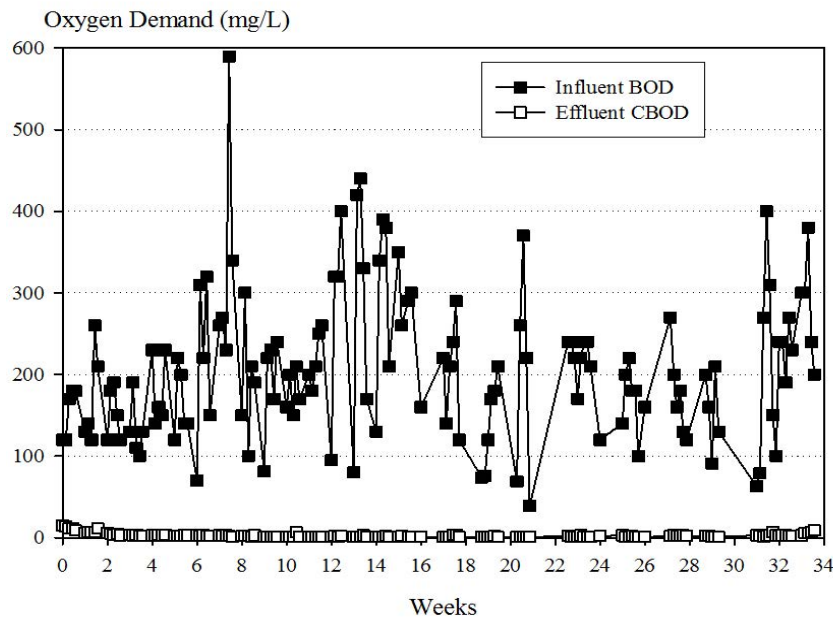


Figure 1. Biochemical Oxygen Demand

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3.3 Total Suspended Solids

TSS analyses were completed using *Standard Methods for the Examination of Water and Wastewater 22nd edition*. The TSS results over the entire evaluation are shown in Figure 2. Data from the TSS analyses are summarized in Table I.

Influent TSS:

The influent TSS ranged from 26 to 600 mg/L during the evaluation, with an average concentration of 190 mg/L and a median concentration of 180 mg/L. The 30-day average concentrations during the test ranged from 130 to 260 mg/L.

Effluent TSS:

The effluent TSS concentration ranged from <1 to 10 mg/L during the evaluation, with an average concentration of 2 and a median concentration of 1 mg/L.

Over the course of the evaluation, NSF/ANSI Standard 40 requires that the effluent TSS 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 TSS ranged from 1 to 8 mg/L and the 30-day average ranged from 1 to 4 mg/L during the test. The #600 met the requirements of NSF/ANSI Standard 40 for effluent TSS.

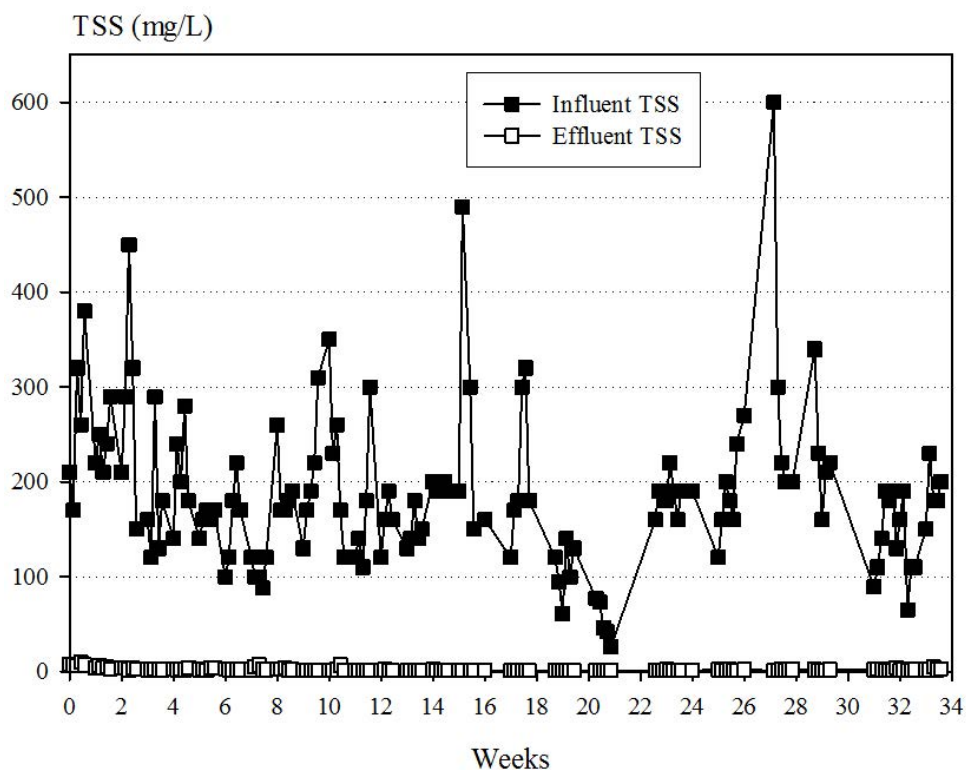


Figure 2. Total Suspended Solids

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	12	6	160
	2	8		
	3	5		
	4	3		
2	5	3	2	220
	6	2		
	7	2		
	8	2		
	9	2		
3	10	1	2	210
	11	2		
	12	1		
	13	2		
4	14	1	1	280
	15	1		
	16	1		
	17	1		
5	18	2	1	170
	19	2		
	20	1		
	21	1		
	22	1		
6	23	1	1	200
	24	1		
	25	1		
	26	2		
7	27	1	2	160
	28	2		
	29	2		
	30	1		
8	31	2	4	230
	32	3		
	33	2		

	34	6		
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Table III. 7- and 30-day 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	8	4	240
	2	4		
	3	3		
	4	2		
2	5	3	3	160
	6	3		
	7	2		
	8	4		
	9	3		
3	10	1	1	190
	11	2		
	12	1		
	13	1		
4	14	1	1	190
	15	1		
	16	1		
	17	1		
5	18	1	1	130
	19	1		
	20	1		
	21	1		
	22	1		
6	23	1	1	180
	24	1		
	25	1		
	26	1		
7	27	1	2	260
	28	1		
	29	2		
	30	1		
8	31	2	2	150
	32	1		

	33	2		
	34	3		

3.4 pH

Over the entire evaluation period, the influent pH ranged from 6.8 to 7.9 (median of 7.4). The effluent pH ranged from 6.8 to 7.5 during the evaluation (median of 7.3); 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 22 to 32 °C (median of 28 °C). The temperature data are shown in Appendix C.

3.6 Dissolved Oxygen

Dissolved Oxygen (DO) was measured in the aeration chamber and effluent during the evaluation. The aeration chamber DO ranged between 0.3 and 2.6 mg/L (median of 0.5 mg/L), while the effluent DO ranged between 0.5 and 14 mg/L (median of 3.2 mg/L). All dissolved oxygen data are shown in Appendix C.

3.7 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.

3.8 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.

3.9 Alkalinity

Over the entire evaluation period, the influent alkalinity ranged from 230 to 420 (average of 320). ; within the average greater than 175 mg/L as CaCO₃ required by NSF/ANSI Standard 40

4.0 REFERENCES

1. American Public Health Association (APHA), American Water Works Association (AWWA) & Water Environment Federation (WEF): *Standard Methods for the Examination of Water and Wastewater*, 21st Edition, 2005 (hereinafter referred to as *Standard Methods*).
2. ANSI/AWS D.1.1/D1.1M:2010, *Structural Welding Code – Steel* and ANSI/AWS D1.3/D1.3M:2008, *Structural Welding Code – Sheet Steel*, 5th Edition, with Errata

4. US EPA, *Code of Federal Regulations (CFR), Title 40: Protection of Environment, July 1, 2010.*

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APPENDIX A

PLANT SPECIFICATIONS

PLANT SPECIFICATIONS

E-Z Treat Model #600

600 GPD

Plant Capacity

Design Flow 600 gpd

System Hydraulic Capacity

Pretreatment Chamber	1000 gallons
Re-Circulation Chamber	1000 gallons
Total Hydraulic Capacity	600 gallons

Hydraulic Retention Time (at Design Flow)

Pretreatment Chamber	12 hours
Re-Circulation Chamber	12 hours
Total Hydraulic Retention	24 hours

Filter Media

Manufacture	International Cushioning Company
Model #	Styrene Media
Shape	Spheres
Size	0.165 to 0.200 in. diameter
Material	Plastic

Re-Circulation Pump

Sta-Rite STEP 20	110V
	1/2 HP
	25 gpm @ 55 head

Effluent Filter

Manufacture Zabel	300
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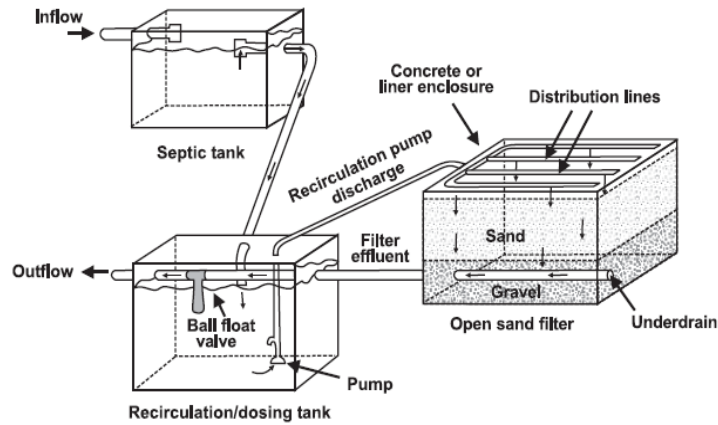
Alarm Panel

Manufacture OEC Company	Model # 2/11 – 254X
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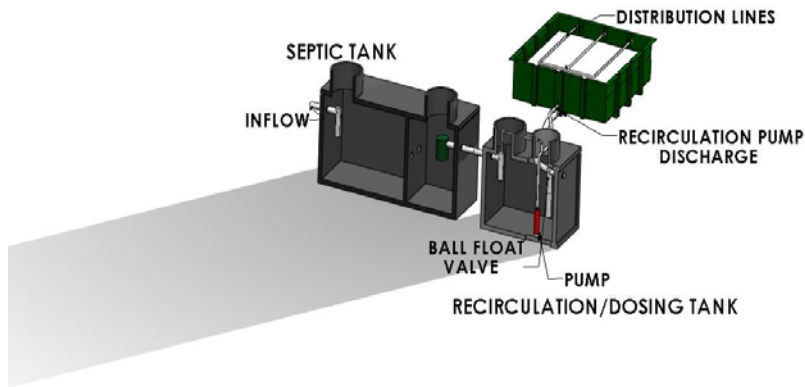


E-Z Treat System Overview

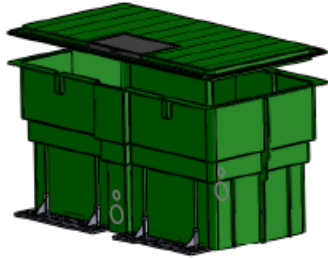
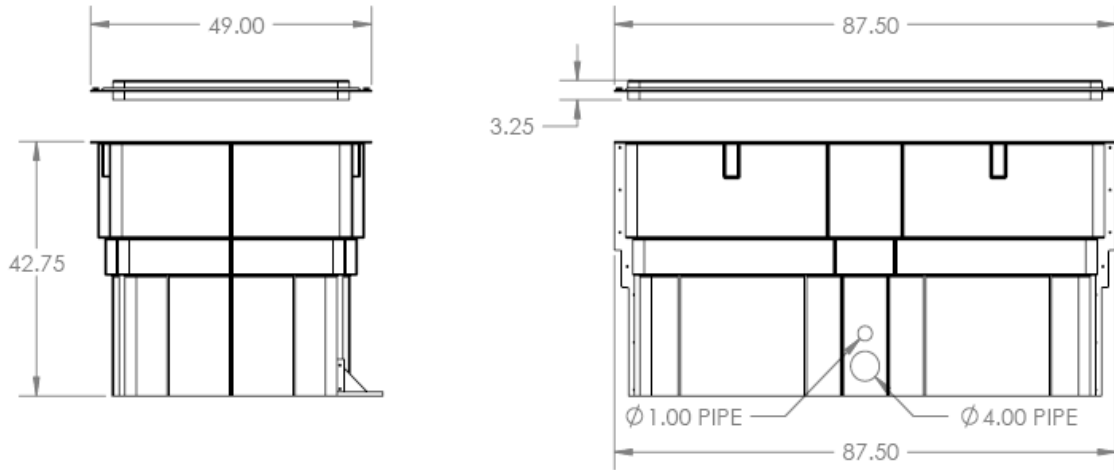
Figure 1. Typical Recirculating sand filter system



E-Z TREAT RECIRCULATION SAND/MEDIA FILTERS



E-Z Treat Model #600 Pod/Unit



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		FRACTIONAL: ±	DRAWN		
		ANGULAR: MACH: ± BEND: ±	CHECKED		
		TWO PLACE DECIMAL: ±	ENG APPR.		
		THREE PLACE DECIMAL: ±	MFG APPR.		
		INTERPRET GEOMETRIC	Q.A.		
		TOLERANCING PER:	COMMENTS:		
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION		DO NOT SCALE DRAWING			

MODEL - 600

SIZE	DWG. NO.	REV
A	E-Z TREAT MODEL- 600 ASSEMBLY	
SCALE: 1:24	WEIGHT:	SHEET 1 OF 1

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 wk 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.

The average wastewater alkalinity of the wastewater delivered to the system over the course of the testing shall be greater than 175 mg/L as CaCO₃ (alkalinity may be adjusted if inadequate). Unless requested by the manufacturer, the raw influent shall be supplemented with sodium bicarbonate if the wastewater is found to be deficient in alkalinity.

8.2.2 Hydraulic loading and schedules

The performance of the system shall be evaluated for 26 consecutive wk. During the testing and evaluation period, the system shall be subjected to 16 wk of design loading, followed by 7.5 wk (52 days) of stress loading, and then an additional 2.5 wk (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	Approximate % rated daily hydraulic capacity
6 a. m. – 9 a. m.	35
11 a. m. – 2 p. m.	25
5 p. m. – 8 p. m.	40

NOTE – The individual dosage shall be no more than 10 gallons per dose, unless the dosage system is based on a continuous flow, and be uniformly applied over the dosing periods.

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 h. After 48 h, 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 $100\% \pm 10\%$ 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 three 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. The maximum length of the test to obtain the 96 data days shall be no more than 34 wk. 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 26 wk.

NOTE – In the event that a catastrophic site problem occurs, as described in 8.5.1.2, the maximum length of the test shall be no more than 37 wk.

8.3.1.2 All sample collection methods shall be in accordance with *Standard Methods* 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. Effluent samples shall be representative of all treated effluent discharged from the system, as sampled from a central point of collection of all treated effluent.

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 h 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 h 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 *Standard Methods* for each listed parameter. Grab samples shall be collected during the morning dosing period for gravity flow systems and during a time of discharge for systems that are pump discharged.

NOTE – Standards Methods requires pH and temperature to be sampled as grab samples.

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 *Standard Methods*.

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 *Standard Methods*.

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 wk 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 recovery.

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.

NOTE – 8.5.1.3, 8.5.1.4, and 8.5.1.5 are testing minimums. These minimums shall be attained to be considered a valid test.

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 Pollutants⁶, 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 three diluted composite effluent samples shall be reported. There are no criteria that these values shall meet.

8.5.2.3.2 Odor

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

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.

8.5.3.2 TSS

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

APPENDIX C
ANALYTICAL RESULTS

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Week Beginning: 5-Apr-15 Plant Code: EZ Treat
 Plant Effluent

Weeks Into Test: 1

Weekend Dosing: Sunday 600 gallons Saturday 600 gallons Friday 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	0.59	0.54	0.57	0.50	0.66
Temperature (C)	6.14	5.90	6.88	5.97	5.44
	23	23	24	24	24
pH	22	23	23	23	23
	22	23	23	23	23
Biochemical Oxygen Demand (mg/L)	7.1	7.0	7.2	7.0	7.3
	7.2	7.1	7.2	7.2	7.3
Suspended Solids (mg/L)	7.4	7.3	7.3	7.3	7.4
	120	120	170	180	180
Suspended Solids (mg/L)	15	14	11	12	9
	210	170	320	260	380
Suspended Solids (mg/L)	8	7	6	10	7

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

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Week Beginning: 12-Apr-15 Plant Code: EZ Treat
 Plant Effluent

Weeks Into Test: 2

Weekend Dosing: Sunday 600 gallons Saturday 600 gallons Friday 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	0.51	0.41	0.61	0.53	0.45
Temperature (C)	4.88	5.19	4.69	5.51	4.33
	25	24	24	25	24
pH	24	24	23	24	24
	24	23	23	24	24
Biochemical Oxygen Demand (mg/L)	7.2	7.1	6.9	7.3	7.0
	7.2	7.2	7.1	7.3	7.1
Suspended Solids (mg/L)	7.3	7.4	7.3	7.4	7.2
	130	140	120	260	210
Suspended Solids (mg/L)	6	7	7	7	11
	220	250	210	240	290
Suspended Solids (mg/L)	4	6	4	5	3

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

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Week Beginning: 19-Apr-15 Plant Code: EZ_Treat
 Plant Effluent

Weeks Into Test: 3

Weekend Dosing: Sunday 600 gallons Saturday 600 gallons Friday 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	0.57	0.54	0.35	0.47	0.43
Temperature (C)	3.84	4.63	4.33	4.08	5.18
	22	25	25	24	25
pH	24	24	24	24	24
	24	24	24	24	24
Biochemical Oxygen Demand (mg/L)	6.8	7.2	7.0	6.9	7.2
	7.2	7.2	7.2	7.1	7.2
Suspended Solids (mg/L)	7.3	7.3	7.2	7.2	7.2
	120	180	190	150	120
Notes:	6	5	4	5	3
	210	290	450	320	150
(a) Site problem	4	4	2	4	3

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

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Week Beginning: 26-Apr-15 Plant Code: EZ_Treat
 Plant Effluent

Weeks Into Test: 4

Weekend Dosing: Sunday 600 gallons Saturday 600 gallons Friday 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	0.44	0.53	0.60	0.62	0.54
Temperature (C)	5.45	2.67	4.58	4.66	4.68
	25	24	23	24	22
pH	24	24	24	23	23
	25	24	24	25	24
Biochemical Oxygen Demand (mg/L)	7.1	6.8	7.1	7.2	7.0
	7.1	7.0	7.2	6.5	7.1
Suspended Solids (mg/L)	7.2	7.1	7.3	6.8	7.2
	130	190	110	99	130
Notes:	4	3	4	2	2
	160	120	290	130	180
(a) Site problem	2	2	3	2	2

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

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Week Beginning: 3-May-15 Plant Code: EZ Treat
 Weeks Into Test: 5
 Sunday 600 gallons Saturday 600 gallons
 Weekend Dosing: 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	0.54	0.50	0.57	0.53	0.54
Temperature (C)	4.47	5.10	6.07	6.12	5.44
	25	25	26	26	25
pH	24	25	25	25	25
	25	25	25	25	25
Biochemical Oxygen Demand (mg/L)	6.9	6.8	7.0	7.1	6.9
	7.1	7.0	7.1	7.2	7.1
Suspended Solids (mg/L)	7.2	7.1	7.2	7.2	7.2
	230	140	160	150	230
Suspended Solids (mg/L)	3	3	4	3	4
	140	240	200	280	180
Suspended Solids (mg/L)	3	2	3	2	4

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

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Week Beginning: 10-May-15 Plant Code: EZ Treat
 Weeks Into Test: 6
 Sunday 600 gallons Saturday 600 gallons
 Weekend Dosing: 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	0.49	0.43	0.61	0.55	0.52
Temperature (C)	4.49	3.08	4.61	5.46	4.41
	26	26	26	25	26
pH	26	25	25	25	25
	26	25	26	25	26
Biochemical Oxygen Demand (mg/L)	7.0	6.9	7.1	6.8	7.0
	7.2	7.0	7.2	7.0	7.1
Suspended Solids (mg/L)	7.2	7.1	7.2	7.1	7.2
	120	220	200	140	140
Suspended Solids (mg/L)	2	2	2	3	3
	140	160	170	160	170
Suspended Solids (mg/L)	2	3	1	4	4

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

NSF International

Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent

Week Beginning: 17-May-15 Plant Code: EZ Treat

Weeks Into Test: 7

Weekend Dosing: Sunday 600 gallons Saturday 600 gallons Friday 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	0.60	0.53	0.49	0.41	0.58
Temperature (C)	4.24	4.45	4.36	4.82	1.83
	26	26	26	27	26
pH	26	26	26	27	26
	6.9	7.0	7.0	6.9	7.1
Biochemical Oxygen Demand (mg/L)	7.2	7.2	7.1	7.1	7.2
	7.2	7.2	7.2	7.2	7.2
Suspended Solids (mg/L)	70	310	220	320	150
	3	2	3	2	2
Suspended Solids (mg/L)	100	120	180	220	170
	3	2	2	2	2

Notes:

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

NSF International

Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent

Week Beginning: 24-May-15 Plant Code: EZ Treat

Weeks Into Test: 8

Weekend Dosing: Sunday 600 gallons Saturday 600 gallons Friday 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	d	0.57	0.53	2.62	1.24
Temperature (C)	d	4.35	4.45	4.08	4.29
	d	25	26	26	26
pH	d	26	26	26	26
	d	26	26	27	27
Biochemical Oxygen Demand (mg/L)	d	7.0	7.0	7.5	7.2
	d	7.2	7.2	7.2	7.2
Suspended Solids (mg/L)	260	270	230	590	340
	3	2	3	2	1
Suspended Solids (mg/L)	120	100	100	88	120
	2	5	7	2	2

Notes: The on-site measurements were not completed on 5/25 due to the holiday.

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

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Week Beginning: 31-May-15 Plant Code: EZ Treat
 Weeks Into Test: 9
 Weekend Dosing: Sunday 600 gallons Saturday 600 gallons Friday 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	0.60	a	0.56	0.77	0.64
Temperature (C)	4.24	a	4.15	4.32	4.24
	26	a	26	26	26
pH	26	a	26	26	26
	6.9	a	a	a	a
Biochemical Oxygen Demand (mg/L)	7.2	a	a	a	a
	7.2	a	a	a	a
Suspended Solids (mg/L)	150	300	97	210	190
	2	2	2	1	<3
Suspended Solids (mg/L)	260	170	170	180	190
	3	3	4	1	2

Notes: The pH meter failed on 6/2, resulting in loss of pH, temperature, and D.O. data on that day. pH measurements were not completed until the problem was resolved on 6/12.

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

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Week Beginning: 7-Jun-15 Plant Code: EZ Treat
 Weeks Into Test: 10
 Weekend Dosing: Sunday 600 gallons Saturday 600 gallons Friday 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	1.36	0.48	0.51	0.78	0.97
Temperature (C)	4.78	0.93	2.11	2.61	4.17
	27	27	27	27	27
pH	30	30	29	30	29
	30	29	30	30	29
Biochemical Oxygen Demand (mg/L)	a	a	a	a	7.4
	a	a	a	a	7.3
Suspended Solids (mg/L)	a	a	a	a	7.4
	81	220	230	170	240
Suspended Solids (mg/L)	<1	<1	1	<1	<1
	130	170	190	220	310
Suspended Solids (mg/L)	<1	<1	1	<1	<1
	<1	<1	1	<1	<1

Notes:

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

NSF International

Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent

Week Beginning: 14-Jun-15 Plant Code: EZ Treat

Weeks Into Test: 11

Weekend Dosing: Sunday 600 gallons Saturday 600 gallons Friday 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	0.95	1.27	1.21	1.41	1.21
Temperature (C)	4.67	4.22	4.03	3.30	3.99
	27	28	27	27	27
pH	29	29	29	28	29
	30	29	29	29	29
Biochemical Oxygen Demand (mg/L)	7.5	7.4	7.5	7.6	7.5
	7.3	7.3	7.3	7.3	7.3
Suspended Solids (mg/L)	7.3	7.2	7.3	7.2	7.2
	160	200	150	210	170
Suspended Solids (mg/L)	<1	<1	<1	7	<1
	350	230	260	170	120
	<1	<1	<2	7	<1

Notes:

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

NSF International

Standard 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent

Week Beginning: 21-Jun-15 Plant Code: EZ Treat

Weeks Into Test: 12

Weekend Dosing: Sunday 600 gallons Saturday 600 gallons Friday 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	1.82	1.84	1.96	1.87	1.87
Temperature (C)	4.07	4.21	4.87	5.01	4.54
	27	27	27	28	28
pH	28	28	28	29	28
	28	29	28	28	28
Biochemical Oxygen Demand (mg/L)	7.6	7.3	7.5	7.4	7.5
	7.3	7.2	7.1	7.5	7.3
Suspended Solids (mg/L)	7.2	7.2	7.0	7.1	7.1
	200	180	210	250	260
Suspended Solids (mg/L)	<1	1	1	<1	1
	120	140	110	180	300
	<1	<1	<1	<1	<1

Notes:

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

NSF International
Standard 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Week Beginning: 28-Jun-15 Plant Code: EZ Treat
 Weeks Into Test: 13
 Sunday 600 gallons Saturday 600 gallons
 Weekend Dosing: 13 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	2.27	1.87	2.09	2.08	d
Temperature (C)	6.30	5.70	5.42	5.82	d
pH	28	28	28	28	d
Biochemical Oxygen Demand (mg/L)	31	31	31	31	d
Suspended Solids (mg/L)	32	30	30	31	d
	7.6	7.5	7.6	7.5	d
	7.1	7.3	7.3	7.2	d
	7.3	7.4	7.4	7.4	d
	95	320	320	400	d
	1	2	1	2	d
	120	160	190	160	d
	1	2	<1	<1	d

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Week Beginning: 5-Jul-15 Plant Code: EZ Treat
 Weeks Into Test: 14
 Sunday 600 gallons Saturday 600 gallons
 Weekend Dosing: 14 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	2.21	2.46	2.11	2.32	2.28
Temperature (C)	4.27	5.07	4.84	4.33	4.63
pH	28	28	28	28	28
Biochemical Oxygen Demand (mg/L)	29	29	29	29	29
Suspended Solids (mg/L)	31	30	30	31	31
	7.7	7.7	7.8	7.8	7.9
	7.1	7.4	7.4	7.2	7.3
	7.1	7.4	7.3	7.2	7.2
	80	420	440	330	170
	1	1	1	3	<1
	130	140	180	140	150
	<1	<1	<1	<1	<1

Notes: No sampling and field data on 7/3 due to the holiday.
 Replaced UV bulb due to broken filament on 7/1.

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

Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent

Week Beginning: 12-Jul-15 Plant Code: EZ Treat

Weeks Into Test: 15

Weekend Dosing: Sunday 600 gallons Saturday 600 gallons Friday 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	d	1.34	1.55	1.51	1.47
Temperature (C)	effluent	4.34	4.06	3.70	4.03
	influent	29	29	29	29
pH	chamber	30	30	30	30
	effluent	31	31	31	31
Biochemical Oxygen Demand (mg/L)	influent	7.5	7.5	7.3	7.4
	chamber	7.3	7.3	7.2	7.3
Suspended Solids (mg/L)	effluent	7.2	7.3	7.2	7.2
	influent	130	340	390	380
Dosed Volume (gallons)	influent	1	1	1	2
	chamber	200	190	200	200
effluent	2	<1	<1	<1	1

- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other
- Notes: On-site data was not measured on 7/15 due to lab error.

Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent

Week Beginning: 19-Jul-15 Plant Code: EZ Treat

Weeks Into Test: 16

Weekend Dosing: Sunday 600 gallons Saturday 600 gallons Friday 600 gallons

Dosed Volume (gallons)	Monday	Tuesday	Wednesday	Thursday	Friday
Dissolved Oxygen (mg/L)	1.21	1.21	1.86	2.26	1.74
Temperature (C)	effluent	3.84	3.75	a	2.43
	influent	29	31	a	31
pH	chamber	31	31	31	31
	effluent	31	32	a	29
Biochemical Oxygen Demand (mg/L)	influent	7.2	7.4	a	7.3
	chamber	7.2	7.2	7.2	7.3
Suspended Solids (mg/L)	effluent	7.1	7.1	a	7.2
	influent	350	260	a	290
Dosed Volume (gallons)	influent	1	2	a	1
	chamber	190	490	a	300
effluent	<1	<1	a	<1	

- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other
- Notes: Evening dosing was missed on 7/21 and morning dosing was missed on 7/22 due to problems with the Waco test site dosing system.
TSS, BOD, and CBOD samples were not collected on 7/22 due to the problems with the dosing system.

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Plant Code: EZ Treat

Week Beginning: 26-Jul-15

Weeks Into Test: 17

	26	27	28	29	30	31	1
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)	600	600	600	600	600	600	600
Dissolved Oxygen (mg/L)	eration chamber	1.79	1.71	1.65	1.41	1.57	1.63
	effluent	-	3.25	3.73	3.44	3.69	3.33
Temperature (C)	influent	29	30	30	30	30	30
	eration chamber	-	31	31	31	31	31
pH	effluent	-	32	32	33	32	32
	influent	7.3	7.4	7.7	7.6	7.4	7.5
Biochemical Oxygen Demand (mg/L)	eration chamber	-	7.3	7.4	7.4	7.3	7.4
	effluent	-	7.3	7.2	7.2	7.1	7.2
Suspended Solids (mg/L)	influent	160	160			160	
	eration chamber		1			d	
effluent		160			140		
		1				d	

- (a) Site problem
 (b) Malfunction of system under test
 (c) Weather problem
 (d) Other
- Notes: Wash Day Stress 7/27 through 7/31.
 d) Not a sampling day for NSF 40. Effluent CBOD and TSS samples missed on 7/31 due to lab error.

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Plant Code: EZ Treat

Week Beginning: 2-Aug-15

Weeks Into Test: 18

	2	3	4	5	6	7	8
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)	600	600	600	600	600	600	600
Dissolved Oxygen (mg/L)	eration chamber	1.51	1.66	1.52	1.45	1.69	1.61
	effluent	2.31	2.56	1.89	2.21	1.97	2.08
Temperature (C)	influent	31	30	30	30	31	30
	eration chamber	32	31	32	32	32	31
pH	effluent	32	32	31	32	31	31
	influent	7.2	7.6	7.5	7.3	7.3	7.5
Biochemical Oxygen Demand (mg/L)	eration chamber	7.2	7.2	7.3	7.2	7.2	7.2
	effluent	7.1	7.2	7.2	7.2	7.2	7.2
Suspended Solids (mg/L)	influent	220	220	140	210	240	120
	eration chamber		1	1	<1	4	4
effluent		120	170	180	300	320	180
		<1	<1	<1	<1	<1	<1

- (a) Site problem
 (b) Malfunction of system under test
 (c) Weather problem
 (d) Other
- Notes: Working Parent Stress started on 8/8.

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Plant Code: EZ Treat

Week Beginning: 9-Aug-15

Weeks Into Test: 19

	9	10	11	12	13	14	15
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)	600	600	600	600	600	600	600
Dissolved Oxygen (mg/L)	1.68	1.19	0.42	0.47	0.39	0.39	0.41
	3.54	2.48	3.87	3.22	2.14	3.08	3.21
Temperature (C)	31	32	32	32	32	31	32
	32	32	32	32	32	32	32
pH	33	32	34	34	36	34	34
	7.3	7.5	7.4	7.4	7.5	7.4	7.4
Biochemical Oxygen Demand (mg/L)	7.2	7.4	7.3	7.3	7.4	7.3	7.3
	7.2	7.2	7.2	7.3	7.4	7.3	7.3
Suspended Solids (mg/L)	76	d	110	200	d	d	74
	d	d	120	d	d	d	120
	d	d	d	d	d	d	d

- (a) Site problem
 (b) Malfunction of system under test
 (c) Weather problem
 (d) Other
- Notes: Working Parent Stress completed on Aug 12
 d) Not a sampling day for NSF 40. Effluent CBOD and TSS samples missed on 8/10 and 8/12 due to lab error.

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Plant Code: EZ Treat

Week Beginning: 16-Aug-15

Weeks Into Test: 20

	16	17	18	19	20	21	22
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)	600	600	600	600	600	0	353
Dissolved Oxygen (mg/L)	0.39	0.34	0.34	0.35	0.33	0.29	0.27
	3.57	3.42	2.86	3.30	3.07	-	-
Temperature (C)	31	32	31	31	31	31	31
	32	33	32	33	32	32	32
pH	33	34	35	35	34	-	-
	7.3	7.4	7.6	7.5	7.5	7.5	7.4
Biochemical Oxygen Demand (mg/L)	7.4	7.3	7.4	7.3	7.2	7.1	7.3
	7.4	7.4	7.4	7.4	7.4	-	-
Suspended Solids (mg/L)	76	120	170	180	210		
	1	<1	1	2	1		
	95	61	140	99	130		
	<1	<1	<1	<1	<1		

- (a) Site problem
 (b) Malfunction of system under test
 (c) Weather problem
 (d) Other
- Notes: Power/Equipment Failure Stress 8/20 through 8/22.

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Week Beginning: 30-Aug-15 Plant Code: EZ Treat
 Weeks Into Test: 22

	30	31	1	2	3	4	5
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)	360	0	0	0	0	0	0
Dissolved Oxygen (mg/L)	aeration chamber	0.48	0.39	0.37	0.47	1.11	1.56
	effluent	1.58	-	-	-	-	-
Temperature (C)	influent	31	-	-	-	-	-
	aeration chamber	31	31	32	32	32	32
pH	effluent	32	-	-	-	-	-
	influent	7.3	-	-	-	-	-
pH	aeration chamber	7.3	7.3	7.3	7.4	7.5	7.4
	effluent	7.3	-	-	-	-	-
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	<39	-	-	-	-	-
	effluent (CBOD ₅)	<1	-	-	-	-	-
Suspended Solids (mg/L)	influent	26	-	-	-	-	-
	aeration chamber	-	-	-	-	-	-
45 Minute Settleable Solids (mL/L)	effluent	<1	-	-	-	-	-
	aeration chamber	-	-	-	-	-	-

- Notes: Vacation Stress started on 8/30.
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Week Beginning: 23-Aug-15 Plant Code: EZ Treat
 Weeks Into Test: 21

	23	24	25	26	27	28	29
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)	600	600	600	600	600	600	600
Dissolved Oxygen (mg/L)	aeration chamber	0.51	0.47	0.57	0.48	0.46	0.52
	effluent	3.26	3.18	3.02	3.27	3.15	2.86
Temperature (C)	influent	31	31	31	31	31	31
	aeration chamber	31	31	31	31	31	31
pH	effluent	32	32	32	32	32	32
	influent	7.4	7.6	7.5	7.5	7.5	7.5
pH	aeration chamber	7.3	7.3	7.2	7.2	7.3	7.3
	effluent	7.3	7.3	7.3	7.2	7.3	7.3
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	-	-	-	69	260	220
	effluent (CBOD ₅)	-	-	-	1	1	1
Suspended Solids (mg/L)	influent	-	-	-	77	73	46
	aeration chamber	-	-	-	-	-	-
45 Minute Settleable Solids (mL/L)	effluent	-	-	-	1	1	<1
	aeration chamber	-	-	-	-	-	-

- Notes: odor <1 T.O.N measured on 8/26.
- (a) Site problem
 - (b) Malfunction of system under test
 - (c) Weather problem
 - (d) Other

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Week Beginning: 6-Sep-15 Plant Code: EZ Treat
 Weeks Into Test: 23

Dosed Volume (gallons)	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dissolved Oxygen (mg/L)	0	0	360	600	600	600	600
	1.76	1.91	2.57	0.34	0.36	0.33	0.34
Temperature (C)	-	-	-	1.40	1.80	2.17	1.98
	-	-	31	31	31	30	31
pH	32	32	32	32	32	32	32
	-	-	-	33	32	33	32
Biochemical Oxygen Demand (mg/L)	-	-	7.4	7.4	7.1	7.3	7.3
	7.5	7.5	7.6	7.6	7.5	7.5	7.6
Suspended Solids (mg/L)	-	-	-	7.5	7.5	7.5	7.5
	-	-	-	-	-	-	-
Notes: Vacation Stress completed on 9/8.							

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

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Week Beginning: 13-Sep-15 Plant Code: EZ Treat
 Weeks Into Test: 24

Dosed Volume (gallons)	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dissolved Oxygen (mg/L)	600	600	600	600	600	600	600
	0.35	0.37	0.42	0.36	0.29	0.31	-
Temperature (C)	2.57	2.70	1.41	1.39	2.32	1.31	-
	30	30	30	30	30	30	-
pH	31	31	31	31	31	31	-
	32	33	32	32	33	32	-
Biochemical Oxygen Demand (mg/L)	7.5	7.5	7.4	7.4	7.4	7.4	-
	7.2	7.3	7.3	7.2	7.2	7.2	-
Suspended Solids (mg/L)	7.3	7.3	7.3	7.3	7.3	7.3	-
	220	170	220	240	240	210	-
Notes: (a) Site problem (b) Malfunction of system under test (c) Weather problem (d) Other							

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

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent Plant Code: EZ Treat

Week Beginning: 20-Sep-15

Weeks Into Test: 25

Dosed Volume (gallons)	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	600	700	600	700	600	700	600
Dissolved Oxygen (mg/L)	0.38	0.36	0.37	0.39	0.38	0.36	0.37
Temperature (C)	1.37	1.29	0.49	1.52	0.67	1.31	1.11
	30	30	30	30	29	29	29
pH	31	31	31	31	31	31	31
	32	32	32	31	32	32	32
Biochemical Oxygen Demand (mg/L)	7.4	7.4	7.4	7.4	7.3	7.3	7.3
	7.2	7.2	7.3	7.2	7.2	7.2	7.2
Suspended Solids (mg/L)	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	120	2	1	260	140	1	140
aeration chamber effluent	190	1	220	160	1	160	1
	1	<1	<1	<1	<1	<1	<1

Notes: The stress sequences were repeated, starting in week 25 because some of the required sampling was missed during the first set of stress sequences.
 Wash Day Stress 9/21 through 9/25.
 Wash loads were added on the wash days, without adjusting the normal dosing, due to lab error. This resulted in 100 extra gallons of dosing on 9/21, 23, and 25.

NSF International
Standard 40 and 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent Plant Code: EZ Treat

Week Beginning: 27-Sep-15

Weeks Into Test: 26

Dosed Volume (gallons)	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	600	600	600	600	600	600	600
Dissolved Oxygen (mg/L)	0.46	0.33	0.41	0.33	0.30	0.36	0.37
Temperature (C)	0.75	0.67	0.77	1.28	0.62	0.71	0.77
	29	29	29	30	30	30	29
pH	30	30	30	30	30	30	30
	32	30	30	30	29	30	30
Biochemical Oxygen Demand (mg/L)	7.1	7.3	7.6	7.4	7.3	7.3	7.3
	7.2	7.3	7.3	7.2	7.2	7.2	7.2
Suspended Solids (mg/L)	7.2	7.3	7.3	7.2	7.3	7.2	7.3
	140	3	1	220	180	180	100
aeration chamber effluent	120	120	160	200	180	160	240
	2	2	1	<1	2	1	1

Notes: Working Parent Stress didn't start on 10/3 as scheduled, due to a site technical issue with the influent.

NSF International
Standard 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Week Beginning: 4-Oct-15
 Weeks Into Test: 27

Plant Effluent
 Plant Code: EZ Treat

Dosed Volume (gallons)	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dissolved Oxygen (mg/L)	600	600	600	600	600	600	600
	0.48	0.64	0.39	0.41	0.44	0.39	0.46
Temperature (C)	29	29	29	29	29	30	29
	1.14	1.10	1.51	3.23	2.42	2.38	2.15
pH	29	29	30	30	30	30	30
	7.2	7.3	7.6	7.3	7.3	7.4	7.4
Biochemical Oxygen Demand (mg/L)	7.3	7.2	7.3	7.3	7.1	7.1	7.2
	7.3	7.3	7.4	7.3	7.2	7.3	7.3
Suspended Solids (mg/L)	<39	160	1	220	180	210	2
	1	1	1	1	3	2	2
aeration chamber effluent	31	270	240	240	230	280	
	<1	2	<1	<1	2	2	2

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

Notes: No sampling on 10/4 because there was site technical issue with the influent on 10/3 and 4, which was resolved on 10/5.
 Working Parent Stress 10/6 through 10/10.

NSF International
Standard 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Week Beginning: 11-Oct-15
 Weeks Into Test: 28

Plant Effluent
 Plant Code: EZ Treat

Dosed Volume (gallons)	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dissolved Oxygen (mg/L)	600	600	600	600	600	600	600
	0.37	0.33	0.38	0.37	0.35	0.41	0.34
Temperature (C)	30	30	30	30	30	30	30
	1.79	1.52	0.83	1.22	1.60	1.52	1.38
pH	30	30	30	30	29	30	30
	7.3	7.3	7.3	7.3	7.4	7.3	7.3
Biochemical Oxygen Demand (mg/L)	7.1	7.0	7.1	7.0	7.1	7.1	7.0
	7.3	7.3	7.3	7.2	7.3	7.3	7.2
Suspended Solids (mg/L)	270	2	3	200	160	180	130
	600	600	300	300	220	200	200
aeration chamber effluent	<1	<1	1	1	2	1	2

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

Notes: 10/14 measurements:
 Color: 35 Pt-Co units
 Odor: 5 T.O.N
 Only film and foam: Not detected

NSF International
Standard 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Plant Code: EZ Treat

Week Beginning: 18-Oct-15

Weeks Into Test: 29

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)	600	0	360	600	600	600	600
Dissolved Oxygen (mg/L)	aeration chamber	0.32	0.36	0.33	0.48	0.41	0.37
	effluent	1.21	-	0.65	0.75	0.89	1.13
Temperature (C)	influent	29	-	29	29	29	28
	aeration chamber	29	29	29	28	28	28
pH	influent	27	-	23	28	28	27
	aeration chamber	7.4	-	7.3	7.3	7.3	7.3
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	7.0	7.0	7.0	7.0	7.2	7.0
	effluent (CBOD ₅)	7.2	-	7.2	7.1	7.2	7.2
Suspended Solids (mg/L)	influent	120	-	-	-	-	200
	aeration chamber	2	-	-	-	-	2
	influent	200	-	-	-	-	340
	effluent	-	-	-	-	-	-
	2	-	-	-	-	-	2

Notes: Power/Equipment Failure Stress 10/18 through 10/20.
 (a) Site problem
 (b) Malfunction of system under test
 (c) Weather problem
 (d) Other

NSF International
Standard 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Plant Code: EZ Treat

Week Beginning: 25-Oct-15

Weeks Into Test: 30

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)	600	600	600	360	0	0	0
Dissolved Oxygen (mg/L)	aeration chamber	0.41	0.47	0.54	0.37	0.46	0.42
	effluent	1.46	2.83	1.79	3.06	-	-
Temperature (C)	influent	27	27	27	27	-	-
	aeration chamber	27	26	26	26	26	25
pH	influent	26	26	26	26	-	-
	aeration chamber	7.3	7.3	7.5	7.4	-	-
Biochemical Oxygen Demand (mg/L)	influent (BOD ₅)	7.1	7.2	7.2	7.2	7.2	7.2
	effluent (CBOD ₅)	7.2	7.2	7.3	7.3	-	-
Suspended Solids (mg/L)	influent	160	91	210	130	-	-
	aeration chamber	2	1	1	1	-	-
	230	160	210	220	-	-	
	1	1	1	2	-	-	

Notes: Vacation Stress started on 10/28.
 (a) Site problem
 (b) Malfunction of system under test
 (c) Weather problem
 (d) Other

NSF International
Standard 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Plant Code: EZ Treat

Week Beginning: 1-Nov-15
 Weeks Into Test: 31

Dosed Volume (gallons)	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dissolved Oxygen (mg/L)	0	0.44	0.45	0.47	0.51	0.67	0.68
Temperature (C)	0	-	-	-	-	-	2.36
	0	-	-	-	-	-	2.27
pH	0	24	24	24	24	24	24
	0	-	-	-	-	-	20
Biochemical Oxygen Demand (mg/L)	0	7.3	7.3	7.2	7.3	7.3	7.3
	0	-	-	-	-	-	7.4
Suspended Solids (mg/L)	0	-	-	-	-	-	-
	0	-	-	-	-	-	-

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

Notes: Vacation stress completed on 11/6.

NSF International
Standard 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Plant Code: EZ Treat

Week Beginning: 8-Nov-15
 Weeks Into Test: 32

Dosed Volume (gallons)	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dissolved Oxygen (mg/L)	600	0.55	0.41	0.48	0.44	0.39	0.34
Temperature (C)	600	4.67	6.19	4.21	5.60	3.87	2.19
	600	26	26	26	26	26	26
pH	600	24	24	24	24	24	24
	600	22	24	26	25	24	24
Biochemical Oxygen Demand (mg/L)	600	7.3	7.3	7.4	7.3	7.4	7.3
	600	7.3	7.3	7.3	7.1	7.2	7.2
Suspended Solids (mg/L)	600	7.4	7.4	7.4	7.2	7.3	7.3
	600	-	63	79	270	400	150
Suspended Solids (mg/L)	600	-	3	2	1	2	7
	600	-	89	110	140	190	190
Suspended Solids (mg/L)	600	-	2	3	2	1	<1
	600	-	-	-	-	-	-

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

Notes: 11/11 measurements:
 Color: 25 Pt-Co units
 Odor 5 T.O.N
 Only film and foam: Not detected

NSF International
Standard 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Plant Code: EZ Treat

Week Beginning: 15-Nov-15
 Weeks Into Test: 33

Dosed Volume (gallons)	Weeks						
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dissolved Oxygen (mg/L)	600	0.39	0.41	0.52	0.61	0.58	0.59
	600	3.18	3.83	2.69	2.08	2.37	2.44
Temperature (C)	24	26	27	31	28	28	25
	24	24	24	24	23	24	
pH	24	24	24	24	24	24	
	7.4	7.5	7.4	7.1	7.2	7.3	7.5
Biochemical Oxygen Demand (mg/L)	7.3	7.2	7.2	7.1	7.2	7.2	
	7.3	7.3	7.2	7.2	7.3	7.3	
Suspended Solids (mg/L)	100	240	240	190	270	230	
	3	2	3	3	2	2	
aeration chamber effluent	130	160	190	65	110	110	
	4	1	2	1	1	2	

Notes: D.O., temperature, and pH data collected from 11/14 through 11/20 was measured with an instrument that was past it's calibration due date. However, the instrument was calibrated in house for both pH and DO each day before collecting data.

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

NSF International
Standard 245 - Wastewater Treatment Systems- Nitrogen Reduction
Standard 350 - Onsite Residential and Commercial Water Reuse Treatment Systems

Plant Effluent
 Plant Code: EZ Treat

Week Beginning: 22-Nov-15
 Weeks Into Test: 34

Dosed Volume (gallons)	Weeks						
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dissolved Oxygen (mg/L)	600	0.89	1.37	1.99	2.14	2.02	
	600	1.32	2.13	2.96	3.21	3.43	
Temperature (C)	24	23	23	24	25	25	23
	22	22	22	22	23	23	
pH	20	20	22	23	23	22	
	7.5	7.5	7.6	7.7	7.5	7.1	7.2
Biochemical Oxygen Demand (mg/L)	7.2	7.2	7.2	7.2	7.2	7.3	
	7.3	7.3	7.3	7.3	7.3	7.4	
Suspended Solids (mg/L)	300	300	300	380	240	200	
	3	6	6	6	7	9	
aeration chamber effluent	150	150	230	180	180	200	
	2	2	2	5	2	3	

Notes:

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

APPENDIX D
OWNER'S MANUAL



PO Box 176
Haymarket, Virginia 20168

Attention System Owner and Users

Your E-Z Treat system is a Class I system meeting NSF/ANSI 40 and has been tested and Listed under NSF Standard 40.

Caution: Do Not Open or Enter Any System Components for Any Reason. If a Problem Exists or You have Questions about Your System, Call Your Certified Services Provider.

Once the E-Z Treat System is installed, a post-construction conference is recommended. This is an opportunity to familiarize the owner with the system. No attempt should be made to adjust any component of this system except by a Certified Operator.

Your system, as terms of sale, and/or as required by your states regulations, shall have a 2 Year service policy to include semiannual visits. In order to assure long term high quality, reliable and economical service from your treatment system contact your local service provider or E-Z Treat Company for information about an extended service policy this policy will containing terms comparable to the terms offered in your initial service policy.

Your service policy should, as a minimum, include semi- annual service visit during the first two years. During the service visit the provider will inspect the general condition of the system, make needed adjustments to the system, clean all filters and spray nozzles, check for leaks, evaluate the effluent quality to assure the system meets effluent quality specified by the state, if needed replace any components and provide a written report to the owner. **All state regulations governing on-site services preempt E-Z Treats' suggested service guidelines.**

The E-Z Treat Synthetic Sand/Media Filter System allows the homeowner to receive a high quality, reliable and economical wastewater system that protects the environment. As with any onsite wastewater treatment system, the homeowner should be familiar with basic guidelines which help the system achieve repetitive, reliable performance. Please do not hesitate to contact your certified operator or E-Z Treat Company with any questions, concerns or comments about your E-Z Treat Synthetic Sand/Media Filter.

E-Z Treat is a fixed media treatment system. Periods of inactivity such as vacations or intermittent use will not affect the performance of your E-Z Treat system, adjustments to the system are not necessary. If you are concerned about power consumption call your service provider and they will make adjustments to the system run time timers. If you chose to have the run timers adjusted make sure you notify your service provider as to when you anticipate normal activity.

Attention System Owners and Users

Users of the System.....**Remember!** Your E-Z Treat system is designed to treat domestic strength waste generated from residential kitchen and baths.

To assure proper performance of your E-Z Treat Re-Circulating Synthetic Sand/Media Filter, you should avoid disposing of the following products into your septic tank:

- Oil & Grease (kitchen waste)
- Water Softener backwash
- Wax & resins
- Petroleum Products
- Paint & Paint Solvents
- Pesticides
- Condoms & sanitary napkins
- Toxic substances (Liquid Plumber, Drano, etc.)
- Non-Biodegradable products (cigarette butts, antibacterial wipes, etc.)
- Any kind of septic tank additive (Rid-X, etc.)
- Keep heavy loads and traffic off of your onsite system components and drainfield
- Never drive cars or trucks within 10 feet of any system access lids
- Landscaping or future building projects should be planned with the drainfield and drainfield repair area in mind.
- Do not shovel or blow snow on top of your onsite wastewater system. This will temporarily limit access to your system and could overload and damage the system.
- Makes sure drainage from the house or around the property is carried away from your onsite system.
- **DO NOT OPEN OR ENTER ANY OF THE TREATMENT SYSTEM TANKS, SEPTIC GASSES CAN BE TOXIC, CAUSING SERIOUS INJURY OR DEATH!**

You should call your Service Provider if:

Your E-Z Treat system located outside of your house will have a data plate affixed to the lid stating the Model # and Serial # of the unit. The service provider and installing contractor contact information will be listed on the inside of the E-Z Treat Control panel door. This control may be located inside your home or it may be outside, it is clearly marked with the E-Z Treat name.

- You notice water surfacing around the area of your E-Z Treat system or your system components.
- You smell strong odors emitting from any component of your treatment system.
- You see any red flashing lights.
- You hear any loud pulsing noise coming from any of the components of the treatment system.

Your E-Z Treat system and components are equipped with Pulsing Audible Alarms if this alarm activates you can turn it off by pressing the clearly marked “**OFF**” button located next to the audible alarm. **Immediately Call Your Service Provider.**