WASTEWATER TECHNOLOGY

NSF/ANSI Standard 350 – *Onsite Residential and Commercial Water Reuse Treatment Systems*

Final Report:

E-Z Treat
Model #600 – Class R
13/12/055/0030

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Evaluation Report:
E-Z Treat #600 – Class R
Residential Wastewater Treatment System

Under the provisions of NSF/ANSI Standard 350
Onsite Residential and Commercial Water Reuse Treatment Systems

January 2016

EXECUTIVE SUMMARY

Testing of the E-Z Treat #600 was conducted under the provisions of NSF/ANSI Standard 350 for Onsite Residential and Commercial Water Reuse Treatment Systems (Dec 2014 version). NSF/ANSI Standard 350 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. Sampling started in the spring, summer and continued through fall, covering a range of operating temperatures.

Over the course of the evaluation, the average effluent $CBOD_5$ was 2 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 average effluent turbidity was 2 NTU, ranging between <1 NTU and 8 NTU and the geometric mean effluent e-coli was 2 MPN/100 mL, ranging between <1 MPN/100 mL and 101 MPN/100 mL.

The E-Z Treat #600 produced an effluent that successfully met the performance requirements established by NSF/ANSI Standard 350 for single family residential dwelling:

> The average $CBOD_5$ was 2 mg/L and 2 mg/L for total suspended solids, both below the allowed average of 10 mg/L. The maximum single sample was 15 mg/L for $CBOD_5$ and 10 mg/L for total suspended solids, both below the allowed maximums of 25 mg/L and 30 mg/L respectively. The average turbidity was 2 NTU, below the allowed average of 5 NTU. The maximum single sample was 8 NTU for turbidity, below the allowed maximum of 10 NTU. The geometric mean e-coli was 2 MPN/100 mL, below the allowed geometric mean of 14 MPN/100 mL. The maximum single sample was 101 MPN/100 mL for e-coli, below the allowed geometric mean of 240 MPN/100 mL.

The effluent pH during the entire evaluation ranged between 6.8 and 7.5, within the required range of 6.0 to 9.0. The E-Z Treat #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 onsite residential water reuse treatment systems is achieved within the provisions of NSF/ANSI Standard 350: Onsite Residential and Commercial Water Reuse Treatment Systems (issued Dec 2014), 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 350 are classified as Residential (R) or Commercial (C) plants according to the system capacity and quality of effluent produced by the plant during the performance evaluation. Class R plants are classified as systems that treat up to 1500 gallon per day and must meet the requirements of EPA Secondary Treatment Guidelines[1] for five day carbonaceous biochemical oxygen demand ($CBOD_5$), total suspended solids (TSS), turbidity, *E. coli* and pH. Residential (R) plants must also demonstrate performance consistent with Class I Standard 40 criteria. Commercial (C) plants are classified as systems that teat combined commercial wastewater, commercial laundry water and commercial graywater with capacities exceeding 1,500 gal/day.

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 350 requires the testing laboratory to provide the manufacturer of an onsite residential water reuse 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 350 (issued Dec 2014) that the E-Z Treat #600 Class R manufactured by E- Z Treat has fulfilled the requirements of NSF/ANSI Standard 350. The #600 has therefore been authorized to bear the NSF Mark so long as E-Z Treat continues to meet the requirements of Standard 350 and NSF General and Program Specific Policies.

General performance evaluation and stress tests were performed at the Wastewater Technology Site located at the NSF Wastewater Technology Testing Facility 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

Sharon Steiner
Business Unit Manager
Wastewater Treatment Unit Program

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1.0 PROCESS DESCRIPTION

The E-Z Treat Synthetic Sand/Media Filter System operates as a fixed media, packed-bed filter system. In these treatment systems, larger solids contained in the applied wastewater are retained within the media by filtration, typically in the upper level of the filter media. A bacterial film forms on the surface of media grains and provides for removal of soluble organic material and small colloidal matter by absorption by the bacteria in the film. Decomposition of the absorbed material occurs during rest periods in the filter, when there is no application of wastewater. The organic material becomes an energy source for the bacteria to maintain themselves and produce new cells. 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 leaving the filter back through the filter surface provides for additional 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, which occurs during the resting (non-dosing) periods, is essential for proper treatment. Long periods with no dosing, such a prolonged power outages, or excessive organic or grease loading can have a significant impact on the system operation.

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 .0.078-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 350 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 (210gallons)
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. Ten 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 three days per week and one day per week.

Influent samples are analyzed three days per week for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), *E. coli* (grab), turbidity, TKN, and NO_2/NO_3 concentrations. Influent samples are also analyzed one day per week for total phosphorus (TP), chemical oxygen demand (COD), total coliforms (grab), total organic carbon (TOC), surfactants (MBAS), fats, oil and grease (FOG) and iron (Fe) concentrations.

Effluent samples are analyzed three days per week for five-day carbonaceous biochemical oxygen demand ($CBOD_5$), TSS, *E. coli* (grab), turbidity, TKN and NO_2/NO_3 concentrations. Effluent samples are also analyzed one day per week for TP, COD), total coliforms (grab), TOC, MBAS, FOG and Fe concentrations. On-site determinations of the effluent temperature and pH are made three 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 R (single family residential dwelling) effluent it is required to produce an effluent, which meets the following guidelines:

(1) $CBOD_5$: The average of all effluent samples shall not exceed 10 mg/L. No single sample shall exceed 25 mg/L.

(2) TSS: The average of all effluent samples shall not exceed 10 mg/L. No single sample shall exceed 30 mg/L.

(3) Turbidity: The average of all effluent samples shall not exceed 5 NTU. No single sample shall exceed 10 NTU.

(4) *E.coli*: The geometric mean of all effluent samples shall not exceed 14 MPN/100 mL. No single sample shall exceed 240 MPN/100 mL.

(5) pH: Individual effluent values remain between 6.0 and 9.0 SU.

Requirements are also specified for effluent color, odor, oily film and foam, energy consumption, 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*[3]. Copies of the data generated during the evaluation are included in Appendix C.

TABLE I. SUMMARY OF ANALYTICAL RESULTS

	Average	Std. Dev.	Minimum	Maximum	Median	Interquartile Range
Biochemical Oxygen Demand (mg/L)						
Influent (BOD_5)	200	88	39	590	200	200 - 290
Effluent ($CBOD_5$)	2	2	<1	15	2	2 - 4
Total Suspended Solids (mg/L)						
Influent	190	81	26	600	180	180 - 260
Effluent	2	2	<1	10	1	2 - 3
Turbidity (NTU)						
Influent	150	71	16	360	150	90 - 190
Effluent	*2*	1	<1	8	2	1 – 3
E. coli (MPN/100 mL)						
Influent	*3.4*×10^6	4.0×10^6	2.0×10^5	3.3×10^7	2.6×10^6	1.7×10^6 – 4.1×10^6
Effluent	*2*	15	<1	101	1	1 - 2
pH						
Influent	-	-	6.8	7.9	7.4	7.3 – 7.5
Effluent	-	-	6.8	7.5	7.3	7.3 – 7.4
Temperature (°C)						
Influent	28	2	22	32	28	28 – 30
Effluent	28	4	20	36	29	29 - 32
Dissolved Oxygen (mg/L)						
Tank 2	0.8	0.6	0.3	2.6	0.5	0.5 – 1.6
Effluent	3.3	1.7	0.5	14	3.2	3.2 – 4.7

Notes: The average value for effluent *E. coli* is the geometric mean.
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.

Analyses not listed in Table I were completed on the influent wastewater for purposes of characterizing the challenge water. These analyses included TKN, NO_2/NO_3, TP, COD, TOC, total coliforms, surfactants, FOG, Fe and SAR. The results of these analyses are summarized in Table II.

Table II. Summary of Influent Wastewater Characteristics

Parameter	Average	Std. Dev.	Minimum	Maximum	Mean	Interquartile Range
TKN (mg/L as N)	44	11	26	64	43	35 - 56
NO_2/NO_3 (mg/L as N)	0.3	0.4	0.06	1.6	0.11	0.1 – 0.5
Total P (mg/L as P)	6.0	1.7	2.8	9.1	6.1	4.6 – 7.4
COD (mg/L)	470	130	270	760	470	370 - 540
Total coliform (MPN/100 mL)	$7.5x10^7$	$5.8x10^7$	$1.0x10^7$	$2.4x10^8$	$5.3x10^7$	$3.1x10^7 – 9.8x10^7$
TOC (mg/L)	87	33	40	170	81	57 - 100
FOG (mg/L)	28	9	17	50	26	26 - 32
SAR (mg/L)	2.6	1.1	0.5	3.6	2.9	0.5- 3.6
Fe (mg/L)	1.3	0.5	0.6	2.8	1.2	0.9 – 1.7

Criteria for evaluating the analytical results from the testing are described in Section 8.6 of NSF/ANSI Standard 350.

Section 8.6.1.1 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 the 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.

Section 8.6.1.2 of the Standard addresses events during the test that are considered catastrophic site problems, including, but not limited to, influent characteristics, malfunctions of test apparatus, and acts of God, that might jeopardize the validity of the performance testing and evaluation. If any events occur, the manufacturer will be given the choice to restart, or have the system brought back to pre-existing conditions with no routine maintenance. The stress events were repeated due to test site error. Testing continued through the additional weeks of the evaluation with no further issues.

Sections 3.11 and 8.2.2.1 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 BOD_5 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 within this specified range for the duration of the test.

Biochemical Oxygen Demand

The five-day biochemical oxygen demand (BOD_5) and five-day carbonaceous biochemical oxygen demand ($CBOD_5$) analyses were completed using the Standard Method 5210B. The results of the analyses completed on the samples collected during the testing are shown in Figure 1.

Influent BOD_5:

Individual influent BOD_5 concentrations ranged from 39 to 590 mg/L during the evaluation, with an average and median concentration of 200 mg/L. Thirty day average concentrations ranged from 160 to 280 mg/L.

Effluent $CBOD_5$:

Effluent $CBOD_5$ concentrations ranged from <1 to 15 mg/L over the course of the evaluation, with an average concentration of 2 mg/L. The median effluent $CBOD_5$ concentration was 2 mg/L.

The Standard requires that the effluent $CBOD_5$ not exceed 10 mg/L overall average or 25 mg/L on a single sample. As presented in Table I, over the course of the test the overall average effluent $CBOD_5$ was 2 mg/L and maximum single day result was 15 mg/L. The E-Z Treat #600 met the requirements of Standard 350 for effluent $CBOD_5$.

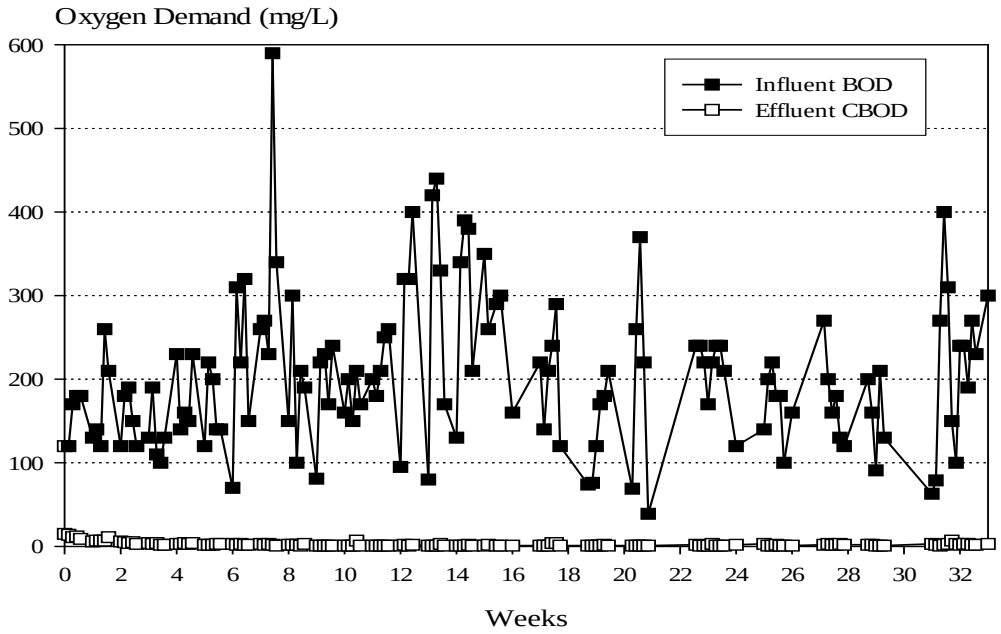


Figure 1. Biochemical Oxygen Demand

Total Suspended Solids

TSS analyses were completed using Method 2540D of *Standard Methods*. The TSS results over the entire evaluation are shown in Figure 2. Data from both influent and effluent 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.

Effluent TSS:

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

Over the course of the evaluation, NSF/ANSI Standard 350 requires that the effluent TSS overall average shall not exceed 10 mg/L and no single sample shall exceed 30 mg/L. The effluent average concentration was 2 mg/L and single sample maximum of 10 mg/L, the E-Z Treat #600 met the requirements of NSF/ANSI Standard 350 for effluent TSS.

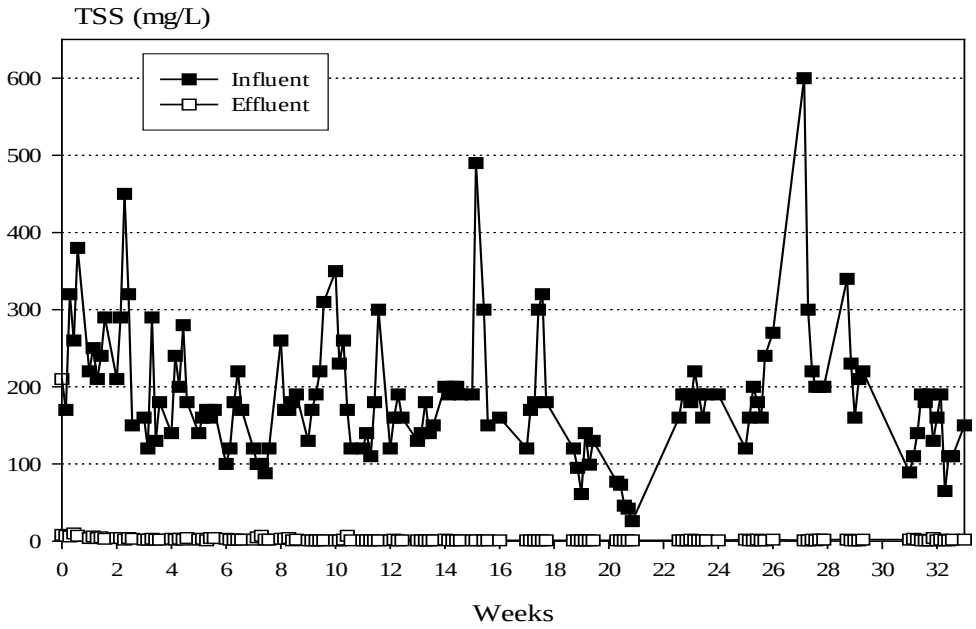


Figure 2. Total Suspended Solids

Turbidity

Turbidity analyses were completed using Method 2130B of *Standard Methods*. The turbidity results over the entire evaluation are shown in Figure 3. Data from both influent and effluent analyses are summarized in Table I.

Influent Turbidity:

The influent turbidity ranged from 16 to 360 NTU during the evaluation, with an average concentration of 150 NTU and a median concentration of 150 NTU.

Effluent Turbidity:

The effluent turbidity concentration ranged from <1 to 8 NTU during the evaluation, with an average and median concentrations of 2 NTU.

Over the course of the evaluation, NSF/ANSI Standard 350 requires that the average effluent turbidity not exceed 5 NTU, with no single sample exceeding 10 NTU. As presented in Table I, over the course of the test the average effluent turbidity was 2 NTU, and maximum single day value was 8 NTU. The E-Z Treat #600 met the requirements of NSF/ANSI Standard 350 for effluent turbidity.

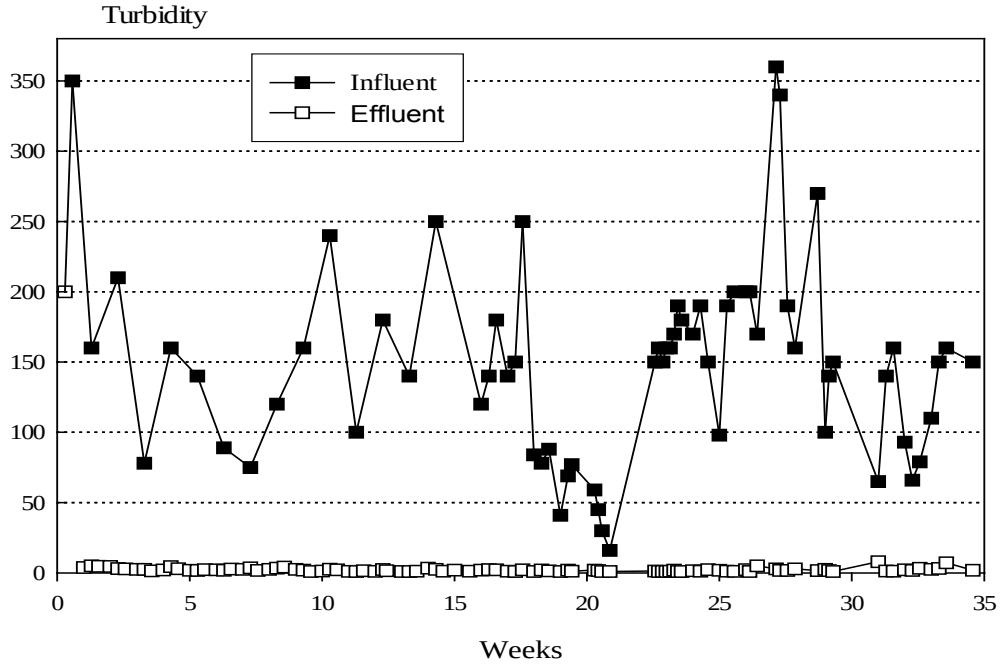


Figure 3. Turbidity

E. coli

E.coli analyses were completed using Method 9223 of *Standard Methods*. The *E. coli* results over the entire evaluation are shown in Figure 4. Data from both influent and effluent analyses are summarized in Table I.

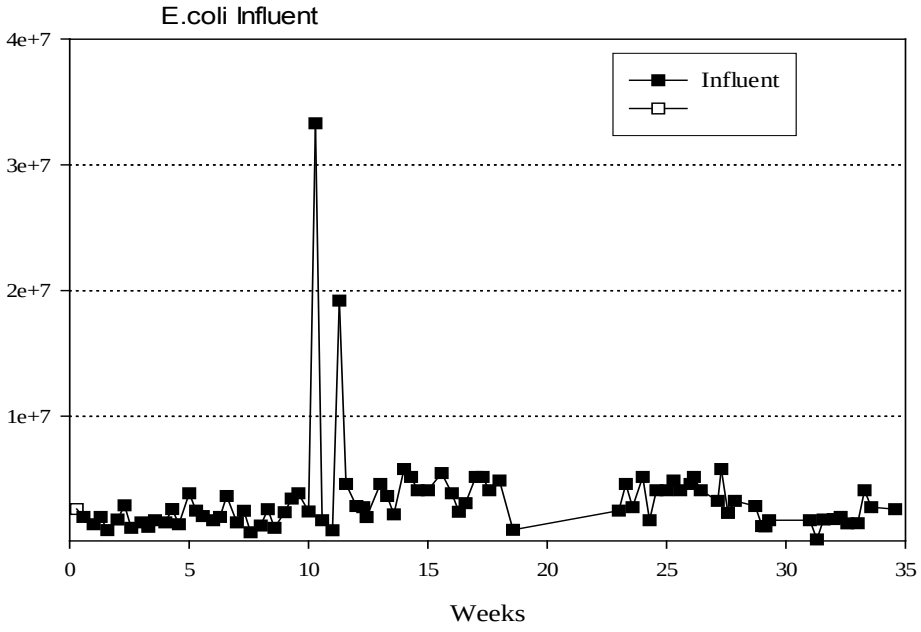
Influent E. coli:

The influent *E. coli* ranged from 2.0×10^5 to 3.3×10^7 MPN/100 mL during the evaluation, with an average concentration of 3.4×10^6 MPN/100 mL and a median concentration of 2.6×10^6 MPN/100 mL.

Effluent E. coli:

The effluent *E. coli* concentration ranged from <1 to 101 MPN/100 mL during the evaluation, with a geometric mean of 2 MPN/100 mL and a median concentration of 1 MPN/100 mL.

Over the course of the evaluation, NSF/ANSI Standard 350 requires that the effluent *E. coli* overall geometric mean not exceed 14 MPN/100 mL and no single sample exceed 240 MPN/100 mL. As presented in Table I, over the course of the test the geometric mean of the effluent *E. coli* was 2 MPN/100 mL and maximum single day result was 101 MPN/100 mL. The E-Z Treat #600 met the requirements of NSF/ANSI Standard 350 for effluent *E. coli*.



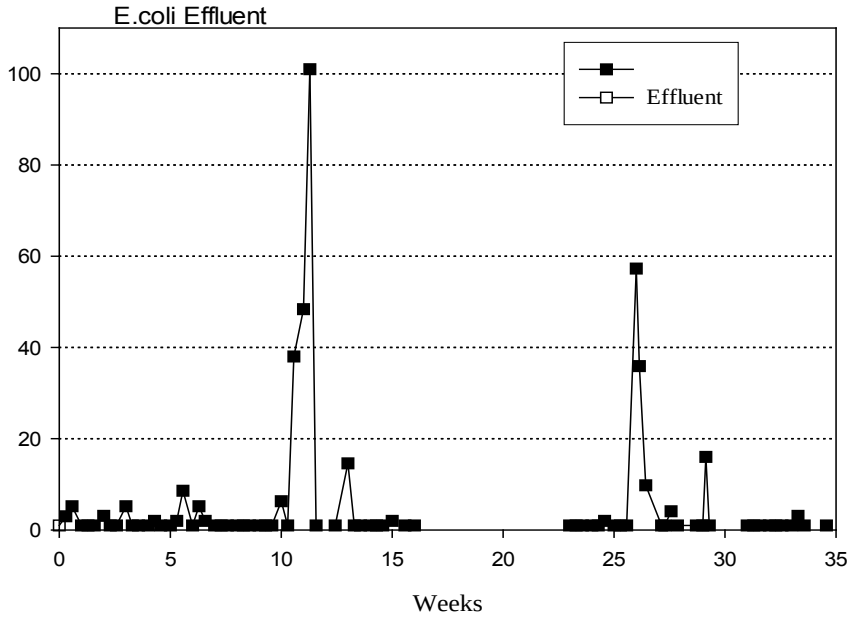


Figure 3. E. Coli

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 350. The pH data for the evaluation are shown in Appendix C.

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.

Dissolved Oxygen

Dissolved oxygen (DO) was measured in the tank 2 and effluent during the evaluation. The tank 2 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 DO data are shown in Appendix C.

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 350. The effluent was acceptable according to the requirements in the Standard, with color less than 15 units, non-offensive threshold odor, no visible evidence of oily film and no foam.

Noise

A reading of the noise level at a distance of 20 feet from the system was taken while it was in operation, using a hand-held decibel meter. The reading was below the 60 dBA required by ANSI/NSF Standard 350.

Energy Consumption

The energy consumption was measured during the test and averaged 3.5 kW/day at 600 gallons/day loading.

4.0 REFERENCES

1. ANSI/AWS D1.1/D1.1M:2010. *Structural Welding Code -Steel*[3]
2. ANSI/AWS D1.3/D1.3M:2008. *Structural Welding Code – Sheet Steel,* 5th Edition, with Errata[3]
3. American Public Health Association (APHA), American Water Works Association (AWWA) & Water Environment Federation (WEF): *Standard Methods for the Examination of Water and Wastewater* (hereinafter referred to as *Standard Methods*)[4]

[3] American Welding Society, 550 N.W. LeJeune Road, Miami, Florida 33126 <http://www.aws.org>.
[4] Standard Methods for the Examination of Water and Wastewater <www.standardmethods.org>.

4. NFPA 70®. *National Electrical Code*® (NEC®), 2011[5]

5. NSF/ANSI 40. *Residential Wastewater Treatment Systems*

6. ISO 12103-1. *Road Vehicles – Test Dust for Filter Evaluation*[6]

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

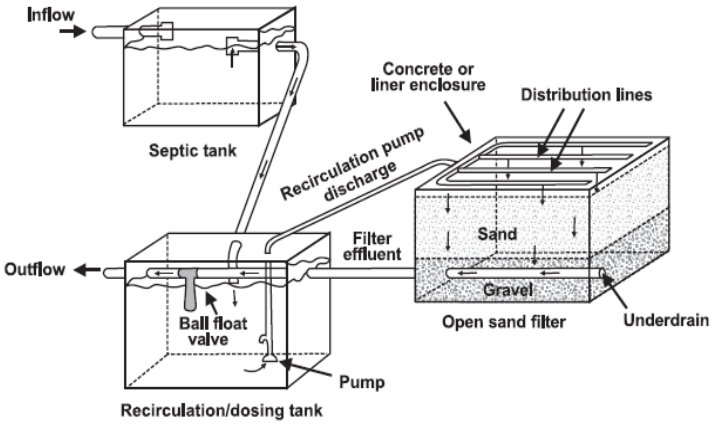
Manufacture Zabel	300

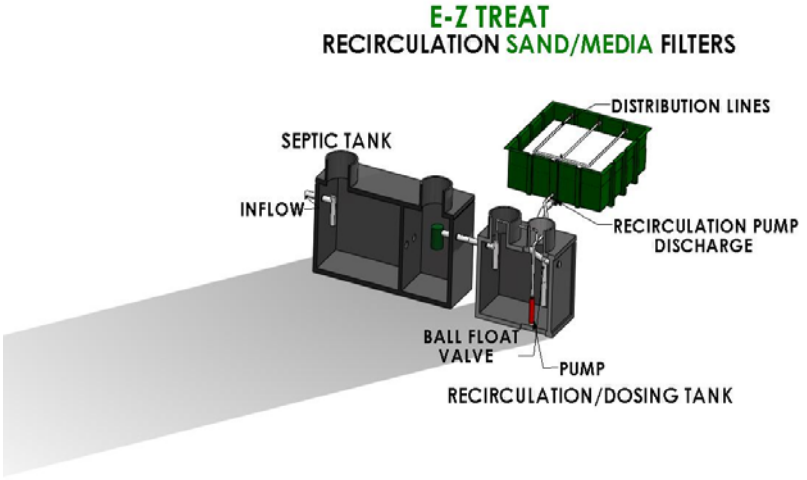
Alarm Panel

Manufacture OEC Company	Model # 2/11 – 254X

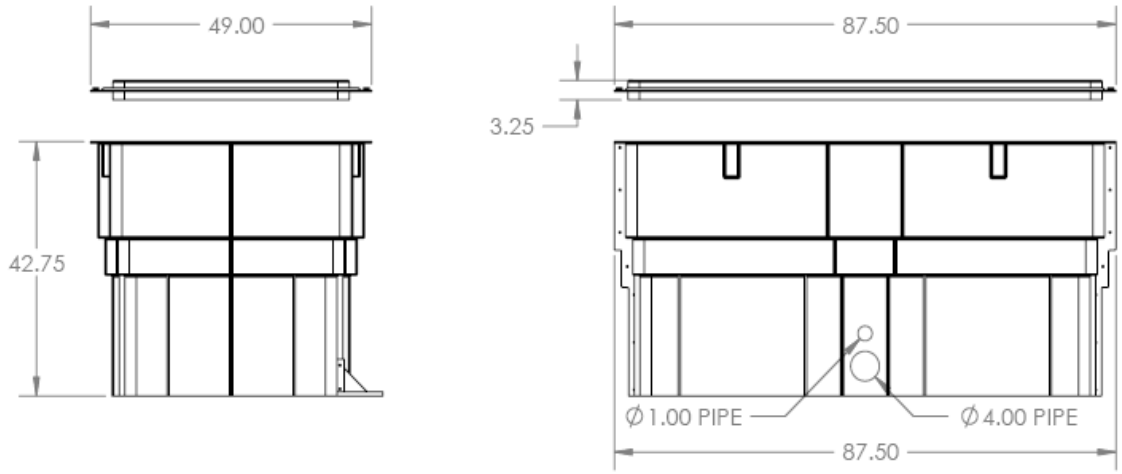
E-Z Treat System Overview

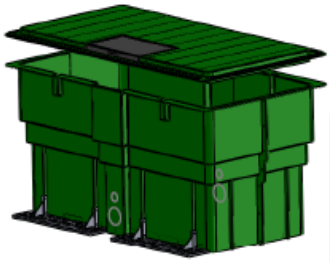
Figure 1. Typical Recirculating sand filter system





E-Z Treat Model #600 Pod/Unit





PROPRIETARY AND CONFIDENTIAL

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	DRAWN		
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL	COMMENTS:		
NEXT ASSY	USED ON	FINISH			
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 350 PERFORMANCE EVALUATION METHOD AND REQUIREMENTS

8 Performance testing and evaluation

8.1 All sample collection methods shall be in accordance with *Standard Methods* unless otherwise specified.

8.2 Residential wastewater treatment systems with capacities up to 5,678 L/day (1,500 gal/day)

This section describes the methods used to evaluate the performance of residential wastewater treatment systems. Systems shall be classified as Class R (residential), in accordance with 8.6.2. The performance classification shall be based upon the evaluation of effluent samples collected from the system over a 6 m (26 wk [182 d]) period.

8.2.1 Preparations for testing and evaluation

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

8.2.1.2 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, ⅔ of the system's capacity shall be filled with water and the remaining ⅓ shall be filled with residential wastewater.

8.2.1.3 The system shall undergo design loading (see 8.2.2.2.1) until testing and evaluations are initiated. Sample collection and analysis shall be initiated within 3 wk (21 d) of filling the system and, except as specified in 8.6.1.2 shall continue without interruption until the end of the evaluation period.

8.2.1.4 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.

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

8.2.1.6 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.

8.2.1.7 The system shall be operated in accordance with the manufacturer's instructions. 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.

8.2.2 Testing and evaluation conditions, hydraulic loading, and schedules

8.2.2.1 Influent wastewater characteristics

The 30-d average BOD_5 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.

8.2.2.2 Hydraulic loading and schedules

The performance of the system shall be evaluated for 6 m (26 wk [182 d]). During the testing and evaluation period, the system shall be subjected to 4 m (16 wk [112 d]) of design loading, followed by 7.5 wk (52 d) of stress loading, and then an additional 2.5 wk (18 d) of design loading.

8.2.2.2.1 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

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

8.2.2.2.2 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 m (26 wk [182 d]) testing and evaluation period, and each of the four stress conditions shall be separated by 1 wk (7 d) of design loading (see 8.2.2.2.1).

8.2.2.2.2.1 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 8.2.2.2.1), however during the first two dosing periods per day, the design loading shall include 3 wash loads (3 wash cycles and 6 rinse cycles).

8.2.2.2.2.2 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).

8.2.2.2.2.3 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 hour period with 60% of its daily hydraulic capacity, which shall include 1 wash load (1 wash cycle and 2 rinse cycles).

8.2.2.2.2.4 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).

8.2.2.3 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.

8.2.2.4 Color, odor, foam, and oily film assessments

During the 6 m (26 wk [182 d]) 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).

8.4 Sample collection

The following requirements apply to all reuse systems evaluated in accordance with 8.1, 8.2 and 8.3.

For systems with storage of treated reuse water, samples shall be collected from the outlet of the storage component. For those systems without storage of treated reuse water, samples shall be collected from the outlet of the final treatment component.

8.4.1 Sample frequency

8.4.1.1 Graywater

Influent samples shall be collected two times per week. Effluent samples shall be collected three times per week during design loading periods and two times during each stress recovery period (the week following completion of each of the stress simulations described in 8.1.2.2.2). Effluent samples shall be collected two times per week during all stress events, except power/equipment failure stress and vacation stress where no samples shall be collected. SAR will be collected on the influent and effluent once every 2 m (8 wk [56 d]) for a total of 3 samples over the course of the test.

8.4.1.2 Residential Wastewater

Influent residential wastewater samples shall be collected three times per week, except for the following (which shall be collected one time per week): total phosphorous; COD; total coliforms; TOC; surfactants, iron, fats, oil and grease. Effluent samples shall be collected three times per week during design loading periods and two times during each stress recovery period. Effluent samples shall be collected two times per week during all stress events, except power/equipment failure stress and vacation stress where no samples shall be collected. SAR will be collected on the influent and effluent, and color, odor, oily film and foam on the effluent once every 2 m (8 wk [56 d]) for a total of 3 samples over the course of the test.

8.4.2 All sample collection methods shall be in accordance with *Standard Methods* unless otherwise specified.

8.4.3 Influent and effluent wastewater samples shall be collected in accordance with the table below. Influent samples shall be obtained during periods of system dosing, and effluent samples shall be 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. 24-h composite samples shall be flow-proportional. The location of the grab sample shall be appropriate to provide a sample that is representative of the influent or effluent. Systems containing storage of treated graywater shall be sampled at the outlet of the storage container.

Parameter	Sample type	Sample location	
		Raw influent	Treated effluent
BOD_5	24-h composite	X	
$CBOD_5$	24-h composite		X
Total suspended solids	24-h composite	X	X
pH	Grab	X	X
Temperature (°C)	Grab	X	
E. coli	Grab	X	X
Turbidity	24-h composite	X	X
Disinfectant[1]	Grab or 24-h composite		X
TKN	24-h composite	X	
NO_2/NO_3	24-h composite	X	
Total phosphorous	24-h composite	X	
COD	24-h composite	X	
Total coliforms	Grab	X	
TOC	24-h composite	X	
Surfactants	24-h composite	X	
Fats, oil and grease	24-h composite	X	
SAR	24-h composite	X	X
Iron	24-h composite	X	

[1] If the treatment system introduces a disinfectant; the disinfectant shall be measured in the effluent sample. The sample type shall be 24-h composite except when the disinfectant is not stable for 24-h, in which case grab samples shall be collected.

NOTE – Manufacturer's may request additional sampling during testing depending on end use of the effluent.

8.5 Analyses (applicable to all reuse systems evaluated in accordance with 8.1, 8.2 and 8.3)

8.5.1 Color, odor, oily film, and foam

8.5.1.1 General

The effluent composite samples shall be diluted 1:1000 with deionized water. Three composite effluent samples shall be tested during the 6 m (26 wk [182 d]) evaluation period, as described in 8.1.2.4 and 8.2.2.4.

8.5.1.2 Color

The apparent color of the diluted effluent samples shall be determined with the visual comparison method described in Method 2120 B of *Standard Methods*.

8.5.1.3 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 Method 2150 B of *Standard Methods*.

8.5.1.4 Oily film and foam

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

8.5.1.5 Energy consumption

Total energy consumption of the system shall be measured throughout the test using a kilowatt meter. Consumption shall be reported.

8.6 Criteria (applicable to all reuse systems evaluated in accordance with 8.1, 8.2 and 8.3)

8.6.1 General

8.6.1.1 If conditions during the testing and evaluation period result in system upset, improper sampling, improper dosing, or influent characteristics outside of the specified ranges, 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 averages of effluent measurements. Rationale for all data exclusions shall be documented in the final report.

8.6.1.2 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 nature, 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 (21 d) after the site problem has been identified and corrected. Data collected during the system recovery period shall be excluded from 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).

8.6.1.3 During the design loading sequence, a minimum of ⅔ of the total scheduled data days shall be necessary for the test to be considered valid.

8.6.1.4 During the stress loading sequence (8.1.2.2.2 and 8.2.2.2.2), a minimum of ⅔ of the total scheduled data days and from at least 2 of the scheduled data days during any single stress recovery shall be necessary for the test to be considered valid.

Summary of effluent criteria for individual classifications

Measure	**Class R**		**Class C**	
	Test Average	Single Sample Maximum	Test Average	Single Sample Maximum
$CBOD_5$ (mg/L)	10	25	10	25
TSS (mg/L)	10	30	10	30
turbidity (NTU)	5	10	2	5
E. coli [2] (MPN/100 mL)	14	240	2.2	200
pH (SU)	6.0 – 9.0	NA[1]	6.0 – 9.0	NA
storage vessel disinfection (mg/L)[3]	≥ 0.5 – ≤ 2.5	NA	≥ 0.5 – ≤ 2.5	NA
color	MR[4]	NA	MR	NA
odor	Non-offensive	NA	Non-offensive	NA
oily film and foam	Non-detectable	Non-detectable	Non-detectable	Non-detectable
energy consumption	MR	NA	MR	NA
SAR	MR	MR	MR	MR

[1]NA: not applicable.

[2]Calculated as geometric mean.

[3](See 8.6.2.6 or 8.6.3.6)

[4]MR: measured and reported only.

8.6.2 Class R systems (single family residential dwelling)

The following criteria shall be met in order for a system to be classified as a residential reuse water treatment system for restricted indoor and unrestricted outdoor use, such as toilet, urinal flushing and surface and subsurface irrigation.

8.6.2.1 $CBOD_5$

The average $CBOD_5$ of all effluent samples shall not exceed 10 mg/L. No single sample shall exceed 25 mg/L.

8.6.2.2 TSS

The average TSS of all effluent samples shall not exceed 10 mg/L. No single sample shall exceed 30 mg/L.

8.6.2.3 Turbidity

The average turbidity of all effluent samples shall not exceed 5 NTU. No single sample shall exceed 10 NTU.

8.6.2.4 *E. coli*

The geometric mean of all *E. coli* effluent samples shall not exceed 14 MPN/100 mL. No single sample shall exceed 240 MPN/100 mL.

8.6.2.5 pH

The pH of individual effluent samples shall be within the range of 6.0 to 9.0 SU.

8.6.2.6 Storage vessel disinfection

Systems containing storage of treated reuse water shall provide adequate disinfection. In the case of chlorine, the average total residual chlorine concentration of all effluent samples shall be ≥ 0.5 mg/L and ≤ 2.5 mg/L. Other disinfection procedures shall provide adequate disinfection to prevent microorganism growth in the treated reuse water storage while avoiding degradation of plumbing components and fixtures exposed to the treated reuse water.

8.6.2.7 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.

8.6.2.8 Odor

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

8.6.2.9 Oily film and foam

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

8.6.2.10 Energy consumption

The total energy consumption of the system measured throughout the test shall be reported as kWh/unit of water treated. There are no criteria that this value shall meet.

APPENDIX C
ANALYTICAL RESULTS

	Date	Influent Total Coliform	Influent Total Phos (mg/L)	Influent Total COD (mg/L)	Influent Total TOC (mg/L)	Influent Total MBAS (mg/L)	Influent Total O&G (mg/L)	Influent Total Iron (mg/L)	Influent TKN (mg/L)	Influent NO2/NO3	Influent SAR	Effluent SAR	Influent Turbidity 3/week	Final Effluent Turbidity Ave <5 Max <10	Final Effluent CBOD Ave <10 Max <25	Final Effluent TSS Ave <10 Max <30	Final Influent E-Coli	Final Effluent E-Coli Ave <14 Max <240	Final Effluent pH
		1/week	1/week	1/week	1/week	1/week	1/week	1/week	3/week	3/week	every 8 weeks	every 8 weeks	3/week	3/week	3/week	3/week	3/ week	3/week	3/week
Week 1	4/6/15														15	8		1	7.4
	4/8/15	54800000	8.3	472	71	<0.20	31.8	1.17	47.7	0.52	2.9		200		11	6	2610000	3	7.3
	4/10/15												350		9	7	1990000	5.2	7.4
Week 2	4/13/15													3.9	6	4	1410000	1	7.3
	4/15/15	10200000	7.17	368	77.4	0.39	21.8	0.934	42.7	0.07			160	5.0	7	4	1990000	1	7.3
	4/17/15													4.7	11	3	933000	1	7.2
Week 3	4/20/15													4.6	6	4	1780000	3.1	7.3
	4/22/15	173000000	7.41	506	92	<0.20	45.2	0.971	40.6	0.10			210	3.1	4	2	2910000	1	7.2
	4/24/15													2.9	3	3	1120000	1	7.2
Week 4	4/27/15													2.5	4	2	1550000	5.2	7.2
	4/29/15	30800000	4.59	289	43	<0.20	<16	0.84	26	1			78	2.6	4	3	1200000	1	7.3
	5/1/15													1.5	2	2	1730000	1	7.2
Week 5	5/4/15													2.1	3	3	1550000	1	7.2
	5/6/15	29100000	5.06	359	57.3	0.60	28.2	1.15	31.8	0.08			160	4.5	4	3	2610000	2	7.2
	5/8/15													3.0	4	4	1410000	1	7.2
Week 6	5/11/15													1.9	2	2	3870000	1	7.2
	5/13/15	61300000	5.46	442	74.6	0.34	17.5	0.895	34.6	<0.05	3.5	3.7	140	1.8	2	1	2490000	2	7.2
	5/15/15													2.3	3	4	2060000	8.6	7.2
Week 7	5/18/15													2.2	3	3	1730000	1	7.2
	5/20/15	51700000	5.34	427	87.1	0.47	<17.3	0.764	35.4	0.10			89	1.9	3	2	1990000	5.2	7.2
	5/22/15													2.8	2	2	3650000	2	7.2
Week 8	5/25/15													2.5	3	2	1550000	1	holiday
	5/27/15	112000000	2.79	424	89.7	<0.2	<17.2	1.25	39.3	<0.05			75	3.6	3	7	2480000	1	7.2
	5/29/15													1.8	1	2	770000	1	7.2
Week 9	6/1/15													2.5	2	3	1300000	1	7.2
	6/3/15	46100000	4.78	273	39.6	0.23	<17.1	1.01	26.6	<0.05	2.3	1.9	120	3.4	2	4	2600000	1	a
	6/5/15													4.2	3	2	1120000	1	a
Week 10	6/8/15													2.6	1	1	2360000	1	a
	6/10/15	64900000	6.05	483	81.0	0.45	18.2	1.29	44	0.09			160	2.0	1	1	3450000	1	a
	6/12/15													1	1	1	3870000	1	7.4
Week 11	6/15/15													1.4	1	1	2420000	6.3	7.3
	6/17/15	>2419.6	5.04	420	50	<0.2	24.3	2.81	27.7	0.22			240	2.7	1	2	33300000	1	7.3
	6/19/15													2.2	1	1	1720000	38	7.2
Week 12	6/22/15													1.1	1	1	921000	48.4	7.2
	6/24/15	242000000	4.40	418	80.4	0.61	17.2	0.747	40.8	0.06			100	1	1	1	19200000	101	7
	6/26/15													1.6	1	1	4610000	1	7.1
Week 13	6/29/15													1.1	1	1	2850000		7.3
	7/1/15	36500000	6.48	691	131	0.39	<16.3	1.870	48.1	0.07			180	2.4	1	1	2760000		7.4
	7/2/15													1.6	2	1	1970000	1	7.4
Week 14	7/6/15													1	1	1	4610000	14.6	7.1
	7/8/15	98000000	4.92	735	162	0.76	23.7	0.989	61.4	0.09			140	1	1	1	3650000	1	7.3
	7/10/15													1.3	1	1	2190000	1	7.2
Week 15	7/13/15													3.4	1	2	5790000	1	7.2
	7/15/15	199000000	6.82	759	172.0	0.7	25.9	1.18	59.2	0.08			250	2.6	1	1	5170000	1	7.3
	7/17/15													1.3	1	1	4110000	1	7.2
Week 16	7/20/15	98000000						1.92	62.3	0.06				2	1	1	4110000	2	7.1
	7/21/15														2	1			7.1
	7/24/15													1.3	1	1	5480000	1	7.2

Week 17	7/27/15												120	2	1	1	3870000	1	7.3
	7/29/15												140	2.3			2400000		7.2
	7/31/15												180	2.2			3080000		7.2
Week 18	8/3/15												140	1.3	1	1	5170000		7.2
	8/5/15												150	1	1	1	5170000		7.2
	8/7/15												250	2.2	4	1	4110000		7.2
Week 19	8/10/15												84	1			4880000		7.2
	8/12/15								33.6	1.6	3.6	5.5	78	2.1					7.3
	8/14/15												88	1.5			960000		7.3
Week 20	8/17/15												41	1	1	1			7.6
	8/19/15												69	2	1	1			7.7
	8/20/15												77	1.2	1	1			7.4
Week 21	8/26/15												59	2	1	1			7.2
	8/27/15												45	1.7	1	1			7.3
	8/28/15												30	1	1	1			7.4
Week 22	8/30/15												16	1	1	1			7.3
	9/2/15																		
	9/4/15																		
Week 23	9/9/15																		7.5
	9/11/15												150	1.4	1	2			7.5
	9/12/15												160	1	1	1			7.5
Week 24	9/13/15												150	1.1	1	1			7.3
	9/14/15												160	1	1	2	2490000	1	7.3
	9/15/15												160	1.2	3	1			7.3
	9/16/15	32600000	7.96	503	101	0.74	36.2	1.2	55.6	0.25			170	2	1	1	4610000	1	7.3
	9/17/15												190	1	1	1			7.3
	9/18/15												180	1	1	1	2760000	1	7.3
Week 25	9/21/15												170	1.6	2	1	5170000	1	7.3
	9/23/15	68700000	9.08	632	117	0.67	31.9	1.68	63.9	0.11	3.2	4.5	190	1.2	1	1	1720000	1	7.3
	9/25/15												150	2.3	1	1	4110000	2	7.3
Week 26	9/28/15												98	1.9	3	2	4110000	1	7.3
	9/30/15	46100000	7.03	477	109	0.48	25.2	1.65	50.6	0.20			190	1.3	1	1	4880000	1	7.3
	10/2/15												200	1.1	1	1	4110000	1	7.2
Week 27	10/6/15												200	2.3	1	2	4610000	57.3	7.3
	10/7/15	98000000	6.95	466	85.5	0.66	33.9	1.56	52.0	0.11			200	1	1	1	5170000	35.9	7.3
	10/9/15												170	5	3	2	4110000	9.8	7.3
Week 28	10/13/15												360	2.9	2	1	3260000	1	7.3
	10/14/15	98000000	8.48	541	68.0	0.50	50.4	2.07	46.7	0.14	0.5	<0.2	340	1.8	3	1	5790000	1	7.2
	10/16/15												190	1.8	2	1	2310000	4.1	7.3
Week 29	10/17/15														2	2			7.2
	10/18/15	37800000	7.35	375	55.6	0.65	26.4	1.0	40.6	0.5			160	2.9	2	2	3260000	1	7.4
	10/24/15												270	1.7	2	2	2850000	1	7.2
Week 30	10/26/15												100	2.5	1	1	1260000	1	7.2
	10/27/15												140	1.7	1	1	1240000	16	7.3
	10/28/15	46100000	6.38	351	48.1	<0.2	21.2	1.52	34.8	0.8			150	1	1	2	1720000	1	7.3
Week 31	11/2/15																		7.4
	11/4/15																		7.3
	11/6/15																		7.4
Week 32	11/9/15												65	8	3	2	1730000	1	7.4
	11/11/15	27200000	4.55	514	97.8	0.97	<17.3	1.08	46.3	<0.05	2.4	3.0	140	1.4	1	2	196000	1	7.2
	11/13/15												160	1.3	3	1	1780000	1	7.4
Week 33	11/16/15												93	2.2	2	1	1820000	1	7.3
	11/18/15	>2420000	3.33	294	74.1	1.1	<17.8	0.56	35.0	0.32			66	1.8	3	1	1990000	1	7.2
	11/20/15												79	3.3	2	2	1470000	1	7.3
Week 34	11/23/15	43500000	3.66	567	103	2.0	28.7	0.66	57.1	0.73			110	2.5	3	2	1480000	1	7.3
	11/25/15												150	3.2	6	5	4110000	3.1	7.3
	11/27/15												160	7.2	9	3	2760000	1	7.4

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 tasted 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 orders 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**.