

Commonwealth of Pennsylvania
Department of Environmental Protection (DEP)
Bureau of Point and Non-Point Source Management
Harrisburg, PA

Issued to: Bio-Sun Systems, Inc.
7088 Route #549, Suite #1
Millerton, PA 16936
Phone: (570) 537-2200 or (607) 738-2034

Technology: Composting Toilet

Classification Type: Alternate technology (A2014-0012-0002)

Classification Date: February 6, 2004 (ASG)
February 24, 2014

In accordance with Title 25, Chapter 73, Section 73.72, DEP classifies the Bio-Sun Systems composting toilet for use as an alternate onlot sewage treatment system. This classification permits the use of the Bio-Sun composting toilet as a treatment system used for the specific purposes of treating human excreta or human excreta mixed with other organic household materials.

I. Technology Description

The composting toilet utilizes a process to decompose sewage through an aerobic process without the addition of liquid. The aerobic biological process takes advantage of the micro-organisms present in the deposited organic material to compost the waste. Through the use of a fan, a continuous supply of fresh air is drawn into the container and exhausted through a vent. Excess liquid is evaporated through air flow turbulence and exhalation venting.

II. Design Requirements

- A. Location: The composting toilet may be installed for the treatment of human excreta or human excreta mixed with other organic household materials serving a new construction or as a repair.
- B. Sizing Requirements: Complete, detailed design plans and specifications and instructions for the installation, initiation of service, operation, and maintenance must be provided to the permittee which includes the following at a minimum.
- (1) Projected volumes and ratios of input urine liquids and input fecal solids which shall include paper usage;
 - (2) Chemical and biological characteristics of those materials;
 - (3) Oxygen requirements for complete conversion and stabilization of those materials;
 - (4) Ratio of waste mass volume to waste mass exposed surface and retention time;
 - (5) Air to waste interface efficiency of any aeration equipment;
 - (6) Average monthly and annual ambient air temperature and relative humidity;
 - (7) Design calculations based on factors used to design the individual composting unit;
 - (8) Arrangement of plumbing and electrical components;

(9) Parts lists for replacement parts;

C. Construction:

- (1) An onsite preconstruction conference attended by the sewage enforcement officer, designer, installer, and the property owner prior to construction is recommended.
- (2) The composting toilet must be designed and installed as a custom, integral part of a building or structure.
- (3) Materials: All materials proposed for use in the construction of the composting device (containment used to compost organic matter) must be durable and watertight, preclude infiltration of groundwater and prevent the escape of any liquids.
- (4) Structural Soundness: Construction must be designed to withstand hydrostatic pressures when the composting device is full and withstand earth pressures when the composting chamber is either full or empty.
- (5) The composting device is constructed to prevent the entry of insects into any component in which biological activity is intended to occur except for entry points where wastes are intended to be deposited under normal usage.
- (6) The design distance between the upper surface of the seat and the untreated waste is not less than 12 inches unless a leveling device or cleanable barrier is included in the design.
- (7) Water inlets must be protected against back siphoning or backflow by an air gap or vacuum breaker.
- (8) Component parts subject to malfunction, wear, or requiring maintenance must be accessible.
- (9) Electrical work, equipment and materials must comply with the National Electrical Manufacturers Association standards and the National Electric Code.

III. Minimum Maintenance Standards

A. Warranty:

The manufacturer of the Bio-Sun composting toilet must provide a minimum 2-year warranty on all defects due to materials or workmanship.

B. Sampling and monitoring to determine if the composting unit is functioning within the performance specifications prescribed by NSF 41 must include the following at a minimum:

- (1) All sample collection methods shall be in accordance with EPA/625/R-92/013, Appendix F, Section 1.2 and the modifications described by Section III.B(2) and Section III.B(3).
- (2) Solid and liquid end products shall be collected when the user is first required to remove each of these end products from the system.
- (3) End products shall be sampled at the location specified by the manufacturer as the point for product removal and collected in sufficient volume to measure all of the parameters necessary for evaluation. The solid end product shall consist of a minimum of 5 core samples of approximately equal weight or volume. The collection of core samples shall be evenly distributed and representative of the entire clean-out finishing box port. The 5 solid samples shall be collected, mixed together, and placed in 1 container. If applicable, 5 samples of liquid products shall also be collected, mixed together, and placed in 1 sample container. Both the solid and liquid product

- samples shall be analyzed for the parameters described by Section III.B.6. Each core sample must be collected by a commercial laboratory that certifies the validity of the sample location. Samples shall be representative of end product material. Sampling of non-end product material such as bulking agents or bedding materials shall be avoided.
- (4) All devices shall provide for containment of liquid. The volume of the liquid end product that accumulates during the test shall not exceed the designed liquid storage capacity of the system. If the system is designed for liquid product discharge, the discharged volume shall not exceed the manufacturer's designed discharge rate. Liquid containment shall be evaluated weekly.
 - (5) Odor (Gas) emitted from the vent system shall be nonoffensive at ground level, and there shall be nonoffensive odors at the toilet seat at all times. Odor shall be evaluated weekly.
 - (6) Solid end products shall not produce an objectionable odor immediately following removal from the system. Tests must also be conducted for fecal coliform and moisture content. Moisture content of the solid end product shall not exceed 65 percent by weight. The sample must not contain fecal coliforms in excess of 200 MPN per gram.
 - (7) Liquid end products shall not produce an objectionable odor immediately following removal from the system. Liquid end products shall not contain fecal coliform in excess of 200 MPN per 100 ml.

IV. Permitting Requirements

- A. Composting toilets that bear the seal of the NSF under Standard 41 as prescribed by Section 73.65 may be permitted by the SEO as a conventional component. Components that adhere to the Bio-Sun Composting Toilet listing may be independently reviewed and permitted as an alternate component by the sewage enforcement officer. All other proposals under this listing must be submitted to the Department for review and comment.
- B. The manufacturer's representative must meet with the property owner within one (1) month of system start-up and/or occupancy of the dwelling and with the local agency's SEO upon request, to explain the operation and maintenance of the system and provide written instructions to the property owner that includes:
 - (1) An Operation and Maintenance Manual;
 - (2) The locations of all parts of the system;
 - (3) A commitment that the manufacturer's service provider will investigate and troubleshoot system problems;
 - (4) Contact information for the manufacturer, the manufacturers' representatives, and manufacturer's service provider;
- C. A signed statement by a representative of the manufacturer certifying the items in Section II must be attached to the permit application and permit. A copy of each completed permit application must be sent to DEP regional and central offices by the SEO. This mailing is in addition to the normal transmittal of permit applications.

- D. An Operation and Maintenance manual must be provided to the permittee. The operation and maintenance manual must include the following at a minimum.
- (1) A maintenance schedule for all components;
 - (2) A detailed procedure for visual evaluation of system component functions;
 - (3) A description of olfactory and visual techniques for the evaluation of end product quality; and
 - (4) The expected end product characteristics of the system as established through analytical methods described or referenced in the NSF 41 standard.
- E. Liquid containment and odor shall be evaluated weekly. Solid and liquid end products shall be collected when the user is first required to remove each of these end products from the system.
- F. The sewage enforcement officer shall include on both the *Application for An Onlot Sewage Disposal* permit (Part III, Section 1) and the permit, the classification number itemized in the Classification Type of this listing.

V. Planning Requirements

Not applicable.