

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

Issued to: Generic Listing

Technology: Ultraviolet Disinfection Unit

Classification Type: Alternate technology (A2014-0026-0002)

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

In accordance with Title 25, Chapter 73, Section 73.72, DEP classifies the ultraviolet disinfection unit for use as a component in an alternate onlot sewage treatment system. This classification permits the use of the ultraviolet disinfection unit used for the specific purposes of reducing fecal coliforms in the sewage effluent prior to discharge to an absorption area. Ultraviolet disinfection units conforming to the specifications in this listing have demonstrated that it can produce an effluent with fecal coliform concentrations less than 200 cfu/100 ml on a monthly average basis.

I. Technology Description

The purpose of an ultraviolet disinfection unit is to aid in inactivating microorganisms through the physical process of exposing bacteria, viruses, and protozoa to ultraviolet light. By exposing an organism's cell wall with ultraviolet radiation, the ultraviolet radiation destroys the organism's ability to reproduce.

II. Design Requirements

- A. Siting: The ultraviolet unit shall be placed in the treatment sequence such that it is placed after a filtration unit and prior to discharge to an absorption area.
- B. Construction: A qualified technician must determine if the unit meets or exceeds the following minimum standards:
 - (1) Ultraviolet radiation at a level of 254 nanometers must be applied at a minimum dosage of 25,000 microwatt-seconds per square centimeter at all points throughout the water disinfection chamber. However, a higher dosage may be required based on the specific transmittance of the wastewater. In lieu of determining the specific transmittance level of the wastewater, a dosage of 30,000 to 35,000 microwatt-seconds per square centimeter should be provided.
 - (2) The maximum water depth in the chamber, measured from the tube surface to the chamber wall, shall not exceed 3 inches.
 - (3) The ultraviolet tubes shall be jacketed so that a proper operating tube temperature of about 104°F is maintained. The jacket shall be made of quartz or high-silica glass with similar optical characteristics.
 - (4) The units shall be designed to permit frequent mechanical cleaning of the water contact surface of the jacket without disassembly of the unit.

- (5) An automatic flow control device, accurate within the expected pressure range, shall be installed to restrict flow to the maximum design flow of the disinfection unit.
 - (6) The elevation of the UV unit below grade must be shown on the design permit application plan to ensure accessibility.
 - (7) The UV unit must be located in a watertight or waterproof enclosure with ground access to provide accessibility for maintenance.
- C. Installation: An onsite preconstruction conference attended by the sewage enforcement officer, designer, installer, and the property owner prior to construction is recommended.

III. Minimum Maintenance Standards

- A. Disinfection units shall be inspected and cleaned monthly by the property owner and annually by the Service Provider.
- B. The disinfection unit must be clean and be functioning within the specifications of the manufacturer. Mechanical cleaning of the water contact surface shall be performed monthly.
- C. The UV tube must be replaced in accordance with the specific uv unit manufacturer's recommendations or if it is either found to be necessary during the inspection. At a minimum, the UV tube shall be replaced at least annually.
- D. To ensure that appropriate ultraviolet dose levels are maintained, a warning alarm must be installed to ensure prompt replacement of a burned-out tube.
- E. To ensure continued optical performance of the unit, an accurately calibrated ultraviolet intensity meter, properly filtered to restrict its sensitivity to the point of the disinfection spectrum, may also be installed in the wall of the disinfection chamber at the point of greatest water depth from the tube.
- F. A spare ultraviolet tube and other necessary equipment shall be available to allow prompt repair of the ultraviolet unit by qualified personnel instructed in the operation and maintenance of the equipment.
- G. An annual sample for fecal coliforms shall be taken by the maintenance provider and sent to a certified laboratory for analysis. A copy of the sample results shall be sent to the municipality.

IV. Permitting Requirements

- A. A sewage enforcement officer may independently review the design and issue the permit for components under this listing. All other proposals under this listing must be submitted to the Department for review and comment.
- B. 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