

ONSITE SEWAGE SYSTEM AND GENERAL SEWAGE SANITATION REGULATIONS

Policy #19: Construction Standards for Intermittent Sand Filters

Effective Date: April 14, 2010

Purpose: The purpose of this policy is to establish specific construction standards for Intermittent Sand Filters intended, or required, to protect onsite sewage systems.

Application Standards

1.1. Location Requirements

1.1.1. The minimum setback requirements for intermittent sand filters are the same as required for sewage tanks.

1.2. Installation Issues

1.2.1. If the containment vessel includes a 30 mil PVC liner, the liner must be protected by a 3 inch layer of sand beneath the liner.

1.2.2. In order to prevent differential settling when the sand filter is put into service, the filter media must have a uniform density throughout.

1.2.3. A geotextile filter fabric must be placed on the gravel bed. If cover soil is used, it must be capable of maintaining vegetative growth while not impeding the passage of air (sandy loam or coarser).

1.2.4. Observation ports: Two observation ports must be installed in the sand filter. One observation port must be installed to the bottom of the drainrock/top of the media interface. A second observation port must be installed to the bottom of the underdrain. In the effluent exits the sand filter through a pumpwell, the pumpwell may be used as the second observation port.

2. Design Standards

2.1. Filter Bed

2.1.1. Coarse Sand Media Specification

The filter media must meet items a, b, and c, below:

2.1.1.1 Particle size distribution

Sieve	Particle Size	Percent Passing
3/8 in	9.50 mm	100
No. 4	4.75 mm	95 to 100
No. 8	2.36 mm	80 to 100
No. 16	1.18 mm	45 to 85
No. 30	0.6 mm	15 to 60
No. 50	0.3 mm	3 to 15
No. 100	0.15 mm	0 to 4

2.1.1.2 Effective Particle Size (D10) > 0.3 mm.

2.1.1.3 Uniformity Coefficient (D60/ D10) < 4.0

2.1.2. Filter Bed Sizing

2.1.2.1 Loading Rate: The loading rate to the sand filter must not exceed 1.0 gallons/day/square foot, using appropriate daily wastewater flow design estimate.

2.1.2.2 Surface area of filter bed: The surface area must be determined by dividing the design flow estimate by the loading rate.

2.1.2.3 Depth of media: The media depth must be a minimum of 24 inches.

2.1.3. Filter bed containment: The filter bed is contained either in a flexible membrane-lined pit, or a concrete vessel. Design and construction must conform to the containment standards set forth in Section 2.4.

2.2. Wastewater Distribution

2.2.1. Pressure distribution: Pressure distribution is required and must comply with the pressure distribution standards and guidance. This requirement applies to all pressure distribution related components.

2.2.2. A minimum of one orifice per 6 ft² of infiltrative surface area, evenly distributed, is required.

Wastewater application to the filter bed: The wastewater must be applied to the layer of drain rock atop the filter media, or sprayed upward against the top of gravelless chambers.

2.3. Treated Wastewater (Filtrate) Collection and Discharge

Filtrate may be collected and discharged from the bottom of the sand filter by either a gravity-flow under-drain, or a pumped-flow pump-well system. When sand filters are membrane-lined, gravity flow under-drains must exit through a watertight boot.

2.4. Concrete Containment Vessel: to be designed and/or approved by a qualified professional engineer if the following conditions are not met.

2.4.1. Above ground tank.

Must be designed as follows, or as approved by the Health Officer:

1. Walls
 - a. at least 6 inches thick
 - b. 4 feet or less in height
 - c. rebar reinforcement: 3/8 inch diameter rebar on 2-foot centers horizontally and vertically, with continuous lengths wrapped around the corners.
2. Floor
 - a. at least 3 1/2 inches thick
 - b. reinforced with steel mesh (CRSI standard #6-1010) to prevent cracking and to maintain water-tightness

3. Tank is to be designed, constructed, and sealed to be watertight.
4. Septic designer must test and certify that the vessel is watertight.

2.4.2. Below ground tank.

Any below-ground concrete tank must be water-tight. The design of any such tank is to be approved by a qualified professional engineer and, where required by local and/or state regulation, the local health officer.

1. Septic designer must test and certify that the vessel is watertight.

2.5. Constructed Wood Containment Vessel

Must be designed as follows, or as approved by the Health Officer:

2.5.1. Above ground wood vessel.

Any above-ground constructed wood containment vessel tank must be water-tight. A 30 mil PVC liner must be used. The design of any such tank is to be approved by a qualified professional engineer and, where required by local and/or state regulation, the local health officer.

2.5.2. Below ground wood vessel.

1. Walls
 - a. ½" plywood
 - b. 2 x 4 or 2 x 2 rim
 - c. 30 mil liner
2. Tank is to be designed, constructed, and sealed to be watertight.

2.6. Under-drains

For Concrete Tanks or Synthetic Membrane-Lined Pits: Either gravity under-drains or pump-wells may be used.