

4.5 Drip Distribution System

Revision: August 16, 2018

Installer registration permit: Complex

Licensed professional engineer required: Yes

4.5.1 Description

Drip distribution systems are comprised of a shallow network of thin-walled, small-diameter, flexible tubing with self-cleaning emitters to discharge filtered septic tank effluent or pretreated effluent into the root zone of the receiving soils. The drip system is flushed either continuously or noncontinuously depending upon the system design. Minimum system components include, but are not limited to, the following:

1. Septic tank
2. Pretreatment system (not required in gray water system designs or septic tank effluent drip distribution designs):
 - a. Intermittent sand filter
 - b. Recirculating gravel filter
 - c. Extended treatment package system
3. Filtering system (septic tank effluent systems only): spin filters (screen filter), cartridge or disk filters (flushable filter cartridge), and filter flush return line
4. Effluent dosing system: dosing chamber pump, and timed dosing control
5. Process controller: programmable logic controller (PLC)
6. Flow meter
7. Drip tubing network, associated valving, supply line and manifold, pressure regulators (nonpressure compensating emitters only), return manifold and line, and air/vacuum relief valves

4.5.2 Approval Conditions

1. Site soil must be one of the approved effective soil design subgroups described in Table 2-4.
2. Site slope may not exceed 45%.
3. All components in contact with wastewater must be rated by the manufacturer for wastewater applications.
4. All pressurized distribution components and design elements of the drip distribution system that do not have design criteria specified within section 4.5 shall follow the design guidance provided in section 4.19.
5. System must be designed by a PE licensed in Idaho.
6. The design engineer shall provide an O&M manual for the system to the health district prior to permit issuance.

4.5.3 Design Requirements

Many considerations need to be made in the design of a drip distribution system based on site-, flow-, and effluent-specific characteristics. These characteristics will affect several system components depending on each specific design scenario. The design of a drip distribution system should be approached as an integrated system rather than individual components. System design should account for, but is not be limited to:

1. Tubing material and emitter type
2. Brand of drip tubing to be used and associated proprietary components
3. Level and type of pretreatment to be provided
4. System configuration based on site conditions and constraints
5. Extent of automation, monitoring, and timing of critical operation processes and procedures.

Design requirements vary dependent upon the allowable effluent quality and system flushing. Requirements based on these system parameters are included in the subsequent sections.

4.5.3.1 Basic Design Requirements

The following minimum design elements apply to both septic tank and pretreated effluent systems and continuous and noncontinuous flush drip distribution systems:

1. Drip distribution tubes are placed directly in approved native soil at a depth of 6–18 inches with a minimum final cover of 12 inches.
2. Drip distribution tubes should be placed on contour and slightly slope towards the manifold for proper drainage.
 - a. Installations on slopes must account for depressurization flow and be designed to prevent movement of the wastewater to the bottom of the drip distribution zone during this time.
 - b. Manifold design must allow for all the associated drip tubing to drain back to the manifold and prevent wastewater from drip tubing at higher elevations from draining into drip tubing at the lowest elevations.
3. A minimum of two zones are recommended, but not required, regardless of system size, and zones should be kept as small as is reasonable.
 - a. Individual lateral lengths should be designed to provide equal discharge volumes across the lateral emitters (lateral length is calculated from the connection point on the supply line to the connection point on the return line).
 - b. Lateral lengths may differ within a zone as long as the minimum flushing velocity can be maintained at the terminal end of each lateral.
 - c. Zones within a system should be close to equal in size to achieve efficient and consistent application of wastewater.
 - d. In lower permeability soils (i.e., clayey soils), it is recommended that drip tubing and emitter spacing be reduced while maintaining the minimum square footage to increase the emission points and maintaining the dosing volume to decrease wastewater travel distance through the soil.