



COMMONWEALTH OF MASSACHUSETTS
 EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

MITT ROMNEY
 Governor

ROBERT W. GOLLEDGE, Jr.
 Secretary

KERRY HEALEY
 Lieutenant Governor

ARLEEN O'DONNELL
 Commissioner

GUIDANCE FOR DESIGN, INSTALLATION AND OPERATION OF SUBSURFACE DRIP DISTRIBUTION SYSTEMS AS A REPLACEMENT FOR CONVENTIONAL TITLE 5 SOIL ABSORPTION SYSTEMS FOR DISPOSAL OF SEPTIC TANK EFFLUENT

Effective date: October 25, 2006

Policy/SOP/Guideline #: BRP/DWM/

Program Applicability: BRP, Watershed Permitting, Title 5

Approved by: Glenn S. Haas
 Acting Assistant Commissioner
 Bureau of Resource Protection

Regulation Reference: 310 CMR 15.240, 15.242
 310 CMR 15.247
 310 CMR 15.280-15.289

Supersedes Policy/SOP/Guideline: NONE

PURPOSE:

These guidelines present the Department's position on the approval of technology and design, installation and operation of subsurface drip distribution to replace conventional Title 5 soil absorption systems. . This guidance supplements the provisions for soil absorption systems contained in Title 5, 310 CMR 15.000 and specifically the Department's approvals and certifications for I/A Systems in 310 CMR 15.280 to 15.288.

APPLICABILITY:

This guidance is for technology suppliers that propose approval of subsurface drip distribution technology and for designers, installers, regulatory personnel, owners and operators who design, install, observe, inspect and maintain the systems.

INTRODUCTION

Title 5, 310 CMR 15.000 specifically requires, in section 15.247, the use of pipe and aggregate for soil absorption systems. The following guidance allows the use of subsurface drip distribution systems for either remedial or general use when used as a replacement for a conventional Title 5 soil absorption system for the disposal of septic tank effluent. The subsurface drip distribution

This information is available in alternate format. Call Donald M. Gomes, ADA Coordinator at 617-556-1057. TDD Service - 1-800-298-2207.

MassDEP on the World Wide Web: <http://www.mass.gov/dep>

Printed on Recycled Paper

GUIDANCE FOR DESIGN, INSTALLATION AND OPERATION OF SUBSURFACE DRIP DISTRIBUTION SYSTEMS AS A REPLACEMENT FOR CONVENTIONAL TITLE 5 SOIL ABSORPTION SYSTEMS FOR DISPOSAL OF SEPTIC TANK EFFLUENT

Page 2 of 5

technology can be approved by the Department in accordance with the requirements of 310 CMR 15.280 through 15.288. Subsurface drip distribution technology is equivalent to pressure distribution specified in Title 5 and related guidance documents.

TEXT

Technology Supplier

A technology supplier may obtain approval of subsurface drip distribution technology to dispose of effluent from septic tanks by submitting an application to the Department. The application shall be either for BRP WP61a: Approval of Alternative Technology for Remedial Use or BRP WP 61b: Approval of Alternative Technology for Piloting, Provisional Use, or Certification for General Use.

The technology supplier shall propose loading rates and tubing spacing based on the Department's requirements presented below. Alternative loading rates and tubing spacing may be proposed but must be justified with detailed engineering criteria.

The technology supplier shall provide a design review procedure for systems with design flow of 2000 GPD or greater.

The technology supplier shall propose and be responsible for presenting a training course for designers, installers and inspectors. The course shall be offered at least annually. It shall include design and installation examples for various sized systems with varying soil conditions and a discussion of soil conditions and their impact on drip systems. The soils portion of the course shall include a discussion of the types of soils testing required to evaluate the A and B layers, and installation procedures that are required to avoid disturbing the soil matrix.

The technology supplier shall provide the Department with an installation checklist and technology checklist required for operation and maintenance of the system that shall become a part of the approval.

Drip Design Requirements

Effluent tee filters shall be required for all septic tanks discharging to the drip system for septic tank effluent disposal.

Dosing chambers and pumps shall be designed in accordance with 310 CMR 15.231. Timed dosing with multiple small doses of the drip tubing shall be required for these systems. The dosing chamber between the septic tank and the drip dispersal system, shall be sized and equipped so as to permit timed dosing of the daily sewage flow and shall have a 24 hour reserve storage capacity for system malfunctions.

The drip system shall be equipped with a control panel to regulate dosing frequency / volume, record the number doses, field flushing events and other pertinent information. This control panel shall always be located in an area readily accessible to the operation and maintenance operator.

The subsurface drip distribution system shall be sized using the loading rates in Table 1.

GUIDANCE FOR DESIGN, INSTALLATION AND OPERATION OF SUBSURFACE DRIP DISTRIBUTION SYSTEMS AS A REPLACEMENT FOR CONVENTIONAL TITLE 5 SOIL ABSORPTION SYSTEMS FOR DISPOSAL OF SEPTIC TANK EFFLUENT

Table 1. Loading Rates, GPD/SF

Percolation Rate, MPI	Soil Class				
	Class I	Class II	Class III	Class IV	
≤5	0.37	0.30	----	↑	
6	0.35	0.30	----		
7	0.34	0.30	----		
8	0.33	0.30	----		
10	----	0.30	0.18	↓	
15	----	0.28	0.18		Not Allowed
20	----	0.26	0.17		
25	----	0.20	0.15		
30	----	0.16	0.15		
40	----	----	0.12		
50	----	----	0.10		
60	----	----	0.10		
61 to 90 ¹	—	—	0.075		

1. For Remedial Use sites only

Drip systems shall not be designed for installation in Class IV soils.

Drip systems shall be designed to meet the minimum setback requirements of 310 CMR 15.211 from private water supply wells and suction lines.

Drip systems may be designed for installation, to allow for irrigation of plantings, less than the 10 foot limit in 310 CMR 15.211 but no less than five feet to a building foundation. Irrigation systems shall not be allowed in areas where drip tubing is installed.

Drip systems for septic effluent shall have drip tubing installed at 12 inches on center. This spacing shall not change the footprint area of the system. The SLR shall be based on the most restrictive soil layer located below the infiltrative surface.

Systems shall not receive credit for nitrogen or phosphorous reduction in the soil profile.

The drip system shall be equipped with a flushing system, capable of providing a flushing velocity of greater than 2 feet per second, that shall be automatically activated no less than the minimum frequently required by the drip technology supplier to prevent solids buildup in the tubing.

All drip systems shall be equipped with a filtration system specified by the drip tubing manufacturer to remove suspended solids and prevent clogging of the emitters. The drip system filtration unit shall be backwashed automatically per the technology supplier's recommendations with any backwash returned to the head of the septic tank. The volume of backwash shall not to exceed the hydraulic capacity of the septic tank.

GUIDANCE FOR DESIGN, INSTALLATION AND OPERATION OF SUBSURFACE DRIP DISTRIBUTION SYSTEMS AS A REPLACEMENT FOR CONVENTIONAL TITLE 5 SOIL ABSORPTION SYSTEMS FOR DISPOSAL OF SEPTIC TANK EFFLUENT

Page 4 of 5

The drip system filtration units shall be installed in a readily accessible location. The housing for the filters shall be insulated unless the system drains between dosing periods. All access ports and manholes shall be installed and maintained at grade to allow for ease of access. The system shall have pressure gauges on the filtration system and other points that will show any change in head loss through the system.

Designer Responsibilities

Designers are encouraged to attend a training course presented by the technology supplier prior to designing any drip system.

During the design phase, the soils on the site shall be evaluated for their adequacy for drip dispersal. A soil evaluation in accordance with 310 CMR 15.000 shall be conducted to confirm the loading rates in this guidance meet the minimum requirements of the site.

Design drawings shall include designated traffic areas, and areas on the site acceptable for material stockpiling.

The designer's drawings shall include a plan that defines the soil type and limits equipment access when soils are wet.

Drip irrigation systems shall have adequate construction oversight by the designer to ensure that the system has been installed in accordance with the approved plans. The designer and the technology supplier shall perform and document a startup test that includes running all operational functions to determine that the system is performing adequately, including: dosing periods, volume pumped, flow rates, pressure at inlet and outlet of each zone and the filters, leak detection, flushing function, alarms, "wetspot analysis", etc.

Installation Procedures

Installers shall attend a technology supplier training session prior to installing any drip system.

The preferred method of construction is with the use of vibratory plough, trencher, by hand or by scarifying the surface, adding sand to a specified elevation, laying the tubing on the sand and covering with a filter fabric then covering with at least 6 inches of loam. Other construction techniques may be approved by the Department on a case-by-case basis.

The use of heavy equipment across the proposed SAS must be restricted. Any movement of heavy equipment shall only be allowed under dry soil conditions. Installation procedures shall, at a minimum preclude driving on soils within 24 hours of a rainfall. A longer time period may be required depending on the soil type and the rainfall intensity. Drip systems shall not be installed when soil is wet enough to easily compact or smear. Generally this can be determined if a small lump of soil can be rolled out with the fingers to form a wire of 1/8" thickness and does not crumble when handled. Wet weather installations are forbidden.

When required, excavation of unsuitable material and backfill with Title 5 fill to the drip line elevation shall be followed by placing of drip lines and final grading. The drip line installation and final grading shall be conducted without operating heavy equipment on fill. No construction activity or heavy equipment may be operated in the SAS area other than the minimum to install the drip system. No equipment shall be parked or stored in the SAS area.

GUIDANCE FOR DESIGN, INSTALLATION AND OPERATION OF SUBSURFACE DRIP DISTRIBUTION SYSTEMS AS A REPLACEMENT FOR CONVENTIONAL TITLE 5 SOIL ABSORPTION SYSTEMS FOR DISPOSAL OF SEPTIC TANK EFFLUENT

Page 5 of 5

The designer or the designer's agent shall be present during construction to inspect and certify construction and installation of the drip system. Because proper installation is so critical, the attached Certification Form shall be made a part of any approval process.

O&M

Subsurface drip distribution systems discharging septic tank effluent shall be inspected and maintained at least twice per year; the inspector shall be a wastewater treatment plant operator with a minimum Grade 2 license.

The inspector shall attend a technology supplier sponsored training course.

The inspection shall be documented using the technology checklist and the Inspection and O&M Form for Title 5 I/A Treatment and Disposal Systems. Results of these inspections shall be submitted annually to the local approving authority and the Department.



COMMONWEALTH OF MASSACHUSETTS
 EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

MITT ROMNEY
 Governor

ROBERT W. GOLLEDGE, Jr.
 Secretary

KERRY HEALEY
 Lieutenant Governor

ARLEEN O'DONNELL
 Commissioner



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Title 5

**Certification of Construction in Conformance with
 Approved Title 5 Design Plans**

310 CMR 15.021(3) states that "Prior to the issuance of a Certificate of Compliance, the Disposal System Installer and Designer shall certify in writing on a form approved by the Department that the system has been constructed in compliance with 310 CMR 15.000, the approved design plans and all local requirements, and that any changes to the design plans have been reflected on as-built plans which have been submitted to the approving authority by the Designer prior to the issuance of a Certificate of Compliance"

Facility Address: _____ City/Town: _____

Facility/System Owner: _____

Address: _____

City/Town: _____ State: _____ Zip: _____

System Designer: _____ Address: _____

City/Town: _____ State: _____ Zip: _____

System Designer: Massachusetts Registered Professional Engineer
 Certification number: _____

Massachusetts Registered Sanitarian
 Certification number: _____

-
1. System is less than 2,000 gpd System is 2,000 gpd or greater, but less than 10,000 gpd
 System is 10,000 gpd or greater, but less than 15,000 gpd
 2. Septic tank with subsurface drip distribution
-

If the Department is the approving authority, enter the DEP I.D. or transmittal number: _____
 Enter the permit application category: **BRP WP** _____

Construction conformance with design plans submitted under a Disposal System Construction Permit for the facility listed above.

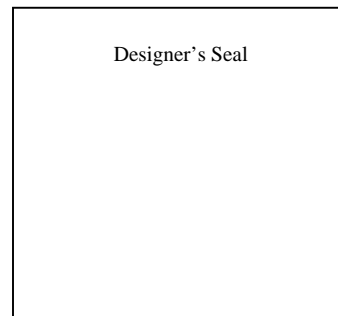
1. a. The original design plans submitted under the Disposal System Construction Permit accurately reflect final location, configuration, and construction of all system components.
 b. As-built plans are attached accurately showing the final location, configuration, and construction of all system components.
2. a. The original list of equipment and materials submitted with the design plans is correct.
 b. A revised list of equipment and materials is attached.
3. a. An operation and maintenance plan has been submitted to the local approving authority.
 b. An operation and maintenance plan is attached.
4. a. Other required drawings or forms, if any, are attached.
5. a. Concrete tank(s) has been tested for water tightness on the site and was constructed in accordance with ASTM Standard C1227.
 b. Other material system tanks have been tested for water tightness on the site and met the requirements for water tightness.
 c. Subsurface drip distribution system has had a successful startup test performed .

Certification:

I, the designer of the plan of record for the facility at the above address, certify under penalty of law that this document and all attachments, to the best of my knowledge and belief, are true, accurate, and complete. I am aware that there may be significant consequences for submitting false information, including, but not limited to, penalties or fine and/or imprisonment for deliberate violations.

Signature of PE or RS: _____

Date: ____/____/____



This completed form and all as-built plans shall be submitted to the local board of health, and the Department if the Department is the approving authority, by the Designer prior to the issuance of a Certificate of Compliance.