

Installation Guide

GRAVEL-LESS LEACHFIELD SYSTEM POLYETHYLENE DRAINAGE PIPE (SWP)

OVERVIEW

The installation procedure for Springfield Plastics, Inc. Gravel-Less Leachfield System (GLS) is critical to the proper operation of a private sewage disposal system. The results of improper installation can be quite serious and range from nuisance odors to ground water contamination. The following procedures have been written to provide the installer of a GLS absorption system with the guidelines to follow. These procedures are in no way a substitute for local and state public health code requirements.

ALL LOCAL AND STATE PUBLIC HEALTH CODES MUST BE FOLLOWED.

STORAGE AND HANDLING OF GLS PIPE

If the pipe comes with a protective wrap (black sleeve) it should be removed prior to installation. If the pipe is going to be exposed to direct sunlight for longer than three months the protective wrap is required. Caution should be used when loading and unloading not to damage the filter sock.

SITE EVALUATION

Site evaluation is the first step in the process of installing a GLS system. Proper location is critical in the operation of a GLS absorption system. The following procedures should be used in the site evaluation:

1. Site Topography and Landscape should be examined and evaluated for the following characteristics:
 - A. Excessive slope
 - B. Existence of low spots, surface depressions
 - C. Probability of surface flooding
 - D. Location of easements, utilities and water wells
 - E. Available area for system
 - F. Location of buildings or proposed buildings
 - G. Any other characteristics that affect surface and subsurface drainage (i.e. ditches, streets, parking lots, roof downspout drains)
 - H. Existence of other private sewage disposal systems
 - I. Existence of high water table
 - J. Are soils native or fill
2. Soils Investigation should be conducted in the following manner:
 - A. Review county soil survey maps published by the USDA Natural Resources Conservation Service to determine the particular type of soil that will be encountered. The soil survey indicates how an absorption system will perform when installed in that type of soil. This should be used as a guide only in the evaluation of the specific site.
 - B. The specific soil absorption capacity should be determined by either (a) or (b) or both below:
 - (a) Soil borings should be taken to determine characteristics by a soil scientist, professional engineer or geologist. The borings should be done in sufficient number (minimum of 3) and spaced far enough apart to provide accurate evaluation of the site. Borings should be a minimum of 60 inches below natural ground surface. Soil characteristics that should be examined are: seasonal and permanent water saturation, texture (mineral content), soil consistency, structure, compaction thickness, color, and depth of limiting layer, soil profiles, drainage classifications and permeability range. The person performing this soil analysis should provide the installer/owner with a written report assessing the suitability of the site for an absorption system.
 - (b) Percolation tests should be performed using a minimum of three test holes spaced throughout the system to provide an accurate view of the soils' permeability. Each test hole should be approximately 6 inches in diameter and be bored to the trench bottom depth of the proposed system. Each hole should be prepared by picking or scratching the bottom and sides to remove any smearing and provide a natural soil surface. Remove all loose material from bottom and place 2" of washed gravel in the hole.



Fill the holes with water and maintain for a minimum of 4 hours. The hole should then be covered and allowed to stand for a minimum of 24 hours. This will allow soil particles to swell. Then for all soils except sand, fill the hole to a depth of 8 inches over the gravel. Measurements should be made at thirty minute intervals. The hole should be refilled for each test and continue until three measurements vary by no more than ten percent. The percolation rate is determined by dividing 30 minutes by the inches of drop in the water level.

In sandy soils with a small amount of clay a percolation test may be attempted after the 4 hour pre-soak without waiting the 24 hour period. Fill the hole to a depth of 8 inches over the gravel. Determine the time it takes for the water level to drop one inch. This should be done until all the water has left the hole. This test shall continue until three (3) consecutive rate measurements vary by no more than ten percent. If the percolation rate exceeds 8 min./in. the test must be repeated using the 24 hour swell period. If the percolation rate is less than 8 min./in. then that percolation rate will be used to size the system. Note that if the percolation rate is under 3 min./in. the site is unsuitable for a subsurface seepage system.

SYSTEM LAYOUT

Each system shall have a minimum of two trenches with no trench longer than one hundred feet. There should be a minimum of five feet of undisturbed earth between each trench and between the nearest trench and the septic tank.

The system should be designed using the above information. Table 1, 2, or 3 should be used to determine the appropriate square footage required.

TRENCH CONSTRUCTION

The trench for the GLS pipe should be cut 4 (8" GLS) to 6 (10" GLS) inches below the 4 inch outlet pipe so the outlet pipe enters the top portion of the pipe. The trench should be 18 to 24 inches wide and 18 to 30 inches deep. The trench bottom should be on grade (level) and have a smooth firm surface, free of exposed rock and debris. The trench bottom should be cut so that the top of the gravelless pipe is at least 1 inch below the bottom of the outlet on the septic tank. It is preferable to cut a semicircular groove (See fig. 1) in the middle of the trench to support the pipe and provide a means of alignment during installation.

PIPE PLACEMENT

Place the pipe in the semicircular groove in the trench, locating stripe up, and connect with gravelless adapter to the 4 inch pipe leaving the septic tank. The outlet pipe from the septic tank should always enter into the top portion (See fig. 2) of the gravelless pipe. The outlet pipe should have a minimum grade (slope) of 1/8 inch per foot. Pipe should be connected together with split or snap couplings. The filter fabric envelope should be pulled back when the coupling is being installed and replaced back over the coupler after the coupler is installed. The end of each line should be capped or it can be looped and connected to the adjacent line. Fittings (Adapters, Couplers, Tees, Bends, Caps) recommended by Springfield Plastics, Inc. should be used at all times. The pipe should not be bent to a radius of less than five feet.

BLINDING AND BACKFILLING

Blind the pipe in the ditch with native backfill to a minimum of two inches over the pipe. The bedding material should preferably be topsoil or other porous materials containing no large or hard objects (rocks, clods, fill materials). The pipe should be held in place during this procedure to insure proper alignment and level grade. The bedding material should be worked along the side of the pipe to insure that the pipe has adequate side wall support. This material should not be compacted. The remaining backfilling should be done so that displacement and/or deflection of the pipe does not occur. Avoid large stones, frozen material that can concentrate direct loads on the pipe. Avoid compacting the trench or near the trench with the tractor or any other means.

Springfield Plastics, Inc. Recommendations

TABLE 1

Recommended	Absorption	Area	
Percolation Rate-Time required (minutes/inch)	Required Absorption Area (sp.ft./bedroom)	Lineal Ft./bedroom -8 GLS - 10 GLS-	Allowable application rate (GPD/sq.ft.)
3-10	200	100ft. 70ft.	1.00
11-15	210	105ft. 70ft.	0.95
16-20	235	120ft. 80ft.	0.85
21-25	265	135ft. 90ft.	0.75
26-30	290	145ft. 100ft.	0.69
31-40	320	160ft. 110ft.	0.62
41-50	350	175ft. 120ft.	0.57
51-60	385	195ft. 130ft.	0.52

Please refer to local codes for required absorption area.

Illinois Department of Public Health

TABLE 2

Recommended	Absorption	Area	
Percolation Rate-Time required for last 6 inches	Required Absorption Area (sp.ft./bedroom)	Lineal Ft./bedroom -8 GLS - 10 GLS-	Allowable application rate (GPD/sq.ft.)
18-60	200	100ft. 70ft.	1.00
90	210	105ft. 70ft.	0.95
120	235	120ft. 80ft.	0.85
150	265	135ft. 90ft.	0.75
180	290	145ft. 100ft.	0.69
240	320	160ft. 110ft.	0.62
300	350	175ft. 120ft.	0.57
360	385	195ft. 130ft.	0.52

Missouri Department of Public Health

TABLE 3

Recommended	Absorption	Area	
Percolation Rate-Time required (minutes/inch)	Required Absorption Area (sp.ft./bedroom)	Lineal Ft./bedroom -8 GLS - 10 GLS-	Allowable application rate (GPD/sq.ft.)
10*	150	100ft. 72ft.	1.00
11-30	200	133ft. 96ft.	0.8
31-45	265	177ft. 127ft.	0.45
46-60**	300	200ft. 144ft.	0.4
61-120***	600	400ft. 288ft.	0.2

* Should be evaluated by geologist or soil morphology exam

** Special backfill materials are required

*** Must be designed and approved by Missouri registered engineer

Drain Code 606.