Soil Load Rates for Pressure Compensating Subsurface Drip Systems

Effective immediately--revised soil load rates (SLRs) for the design of subsurface drip system soil absorption fields in experimental technology onsite sewage systems (see table below).

These soil load rates are to be used by all designers. The minimum size of the soil absorption field must be determined by dividing the design daily flow (DDF) of the residence or commercial facility by the appropriate soil load rate derived from this table. Soil absorption field size adjustments are built into the values in this table; no additional size reductions are allowed. If site conditions permit, designers are encouraged to size the soil absorption field larger than the minimum required size, and confirm in their plan submittals that the geometric layout of the soil absorption field is the best available for the site.

This table was developed in response to comments received on the SLR table distributed on May 21, 2003. In response to these comments, staff of the Indiana State Department of Health have reviewed SLR tables from other states, notes from our meeting on subsurface drip systems on April 1 and 2, 2003, solicited and reviewed comments from subsurface drip system experts, and consulted with faculty from Purdue University. The soil load rates included in the table below reflect the outcome of this research and consultation. The Indiana State Department of Health is confident that the application of these SLRs will improve the likelihood that subsurface drip systems will function as required when installed in Indiana.

One final note for local health departments: plan review and approval of plan submittals containing experimental technology cannot be performed at the local level without written delegation of this authority by the department to the local health department. The department is working with a number of local health department staff to develop local plan review capability. The department has not yet delegated authority for plan review and approval for experimental technology onsite systems containing a subsurface drip system to any local health department.

If you have any questions or comments regarding this revised soil load rate table, please contact Alan Dunn or Chris Bourke by telephone at 317-233-7177, or by e-mail at adunn@isdh.state.in.us or cbourke@isdh.state.in.us, respectively.

Revised, June 23, 2003

Pressure Compensating Subsurface Drip System
Soil Load Rates (gpd/ft^2)[1,2]

Texture	Structure/Consistence						
	without densic material or fragic soil properties						pl, densic material or fragic soil properties
	sg	gr	strong abk sbk	moderate abk sbk	weak abk sbk / all pr	structureless massive (friable and very friable)	
Gravel (GR) Loamy Very Coarse Sand (LVCOS) Coarse Sand (COS)							
Loamy Coarse Sand (LCOS)	0.80	0.80			0.60		
Medium Sand[3] (S) Fine Sand (FS) Very Fine Sand (VFS) Loamy Sand (LS) Loamy Fine Sand (LFS) Loamy Very Fine Sand (LVFS)	0.60	0.60			0.50		
Coarse Sandy Loam (COSL) Sandy Loam (SL) Fine Sandy Loam (FSL) Very Fine Sandy Loam (VFSL)		0.50		0.40	0.30		
Loam (L)		0.40	0.30	0.30	0.20		
Silt Loam (SIL) Silt (SI)		0.30	0.25	0.25	0.20		
Sandy Clay Loam (SCL)		0.25	0.20	0.20	0.15		
Clay Loam (CL) Silty Clay Loam (SICL)		0.25	0.20	0.20	0.15		
Sandy Clay (SC)		0.15	0.10	0.10	0.05		
Silty Clay (SIC) Clay (C)		0.10	0.05	0.05			
Bedrock, Marl, Muck, Ortstein, and Peat							

Soil absorption fields are not allowed in these soils.

Shape of Structure: sg: single grained; gr: granular; pl: platy; abk: angular blocky; sbk: subangular blocky; pr: prismatic

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Footnotes for
Pressure Compensating Subsurface Drip System Soil Load Rates

[1] Mine spoils and fill are excluded from this table.

[2] The following are assigned a soil load rate (SLR) of < 0.25 gpd/ft^2 or a SLR > 1.2 gpd/ft^2, whichever is applicable:

- compact glacial till (see densic material, special note B.);
- coprogenous earth;
- fragipan;
- soils that have fragic soil properties (see special note C.);
- massive structure with firm and very firm consistence and a texture that contains seventy (70) percent or less sand; and
- soils with more than thirty-five (35) percent [weighted average volume within upper forty (40) inches of soil profile] of rock fragments greater than three (3) inches in diameter.

[3] Has a particle size of 0.25 to 0.50 millimeters (mm).

SPECIAL NOTES:

A. The transitional BC, Bk and CB horizons, that developed in glacial till and have soil properties that are similar to densic material (see special note B.), are assigned the same SLR as the underlying C horizons.

B. Densic materials (USDA, NRCS) are relatively unaltered materials (do not meet requirements for any other named diagnostic horizons nor any other diagnostic soil characteristic) that have a noncemented rupture-resistance class. The bulk density or the organization is such that roots cannot enter, except in cracks. These are mostly earthy materials, such as till, volcanic mudflows, and some mechanically compacted materials, for example, mine spoils. Some noncemented rocks can be densic materials if they are dense or resistant enough to keep roots from entering, except in cracks.
Densic materials are noncemented and thus differ from paralithic materials and the material below a lithic contact, both of which are cemented.
Densic materials have, at their upper boundary, a densic contact if they have no cracks or if the spacing of cracks that roots can enter is ten (10) centimeters (cm) or more. These materials can be used to differentiate soil series if the materials are within the series control section.

C. Fragic soil properties (USDA, NRCS) are the essential properties of a fragipan. They have neither the layer thickness nor volume requirements for the fragipan. Fragic soil properties are in subsurface horizons, although they can be at or near the surface in truncated soils. Aggregates with fragic soil properties have a firm or firmer rupture-resistance class and a brittle manner of failure when soil water is at or near field capacity. Air-dry fragments of the natural fabric, five (5) to ten (10) centimeters (cm) in diameter, slake when they are submerged in water. Aggregates with fragic soil properties show evidence of pedogenesis, including one or more of the following: oriented clay within the matrix or on faces of peds, redoximorphic features within the matrix or on faces of peds, strong or moderate soil structure, and coatings of albic materials or uncoated silt and sand grains on faces of peds or in seams. Peds with these properties are considered to have fragic soil properties regardless of whether or not the density and brittleness are pedogenic.