



Table 10 - Design Guidelines for Intermittent Sand Filters

Parameter	Buried Filters	Open Filters
Pretreatment	Septic Tank	Septic Tank
Setback Distance Residences Water Supplies	50 ft. 100 ft.	200 ft. 100 ft.
Backfill Depths	12-inch minimum	
Distribution Gravel Pipe Venting Dosing Frequency Hydraulic Loading Barrier Material	6" (3/4"-2-1/2") 4" PVC Perforated Down stream end ≥2 per day 1.0 gpd/sq. ft. 3-1/2 fiberglass; untreated building paper (4060 lb.); synthetic fabric; 8" straw	None PVC or equivalent ≥2 per day 2-5 gpd/sq. ft. None
Sand Effective size Uniformity coefficient Fines (<0.13 mm) Depth	0.3-1.22 mm <3.5 ≤1% (by wt.) 24-36"	0.3-1.22 mm <3.5 <1% (by wt.) 24-36"
Collector Lines Minimum Number Slope Gravel Pea Gravel Pipe	2/bed, 1 line per 6' width 1% minimum 4" overpipe; 3/4-2 1/2") 3" (1/83/8") 4" PVC Perforated	2/bed; 1 line per 6' width 1% minimum 4" overpipe (3/4-2 1/2") 3" (1/83/8") 4" PVC Perforated



3. The following shall apply to pressure dosed sand filter systems:

A. Conventional pressure dosed sand filters use an intermittent filter with two feet (2') or more of medium sand designed to filter and biologically treat sewage tank effluent from a pressure distribution system at an application rate not to exceed one and twenty-five hundredths gallons per square foot (1.25 gals./sq. ft.) sand surface area per day, applied at a dose not to exceed one-half gallon (1/2 gal.) per orifice per dose. These sand filters may be buried or open.

B. Recirculating pressure dosed sand filters use a recirculating filter with two feet (2') or more of medium filter media designed to filter and biologically treat sewage tank effluent from a pressure distribution system at an application rate not to exceed five gallons per square foot (5 gals./sq. ft.) filter surface per day, applied at a dose not to exceed two gallons (2 gals.) per orifice per dose. These sand filters shall be uncovered and open to the surface.

C. Minimum filter area for these filters shall be as follows:

(I) Conventional pressure dosed sand filters for single family residences shall be a minimum of three hundred and sixty square feet (360 sq. ft.) in surface area with a design sewage flow not to exceed six hundred gallons (600 gals.). If sand filter design flows exceed an average of four hundred and fifty gallons per day (450 gpd), the minimum sand surface will be based on one and twenty-five hundredths gallons per day per square foot (1.25 gpd/sq. ft.); and

(II) Pressure dosed sand filters for commercial facilities shall be sized on the basis of projected daily sewage flow. If the waste strength is proposed to be greater than residential strength waste, pretreatment shall be required which will reduce the biological oxygen demand to levels not to exceed three hundred (300), total suspended solids to levels not to exceed one hundred-fifty (150), and oil and grease to levels not to exceed twenty-five (25). The minimum sand surface will be based on two to five gallons per day per square foot (2-5 gpd/sq. ft.).

D. Design criteria shall include the following:

(I) Sewage tanks shall be in accordance with section (4) of this rule. Set-back distances as shown in Table 1 of subsection (1)(D) and as specified in subsection (1)(E) of this rule shall apply, unless a variance has been allowed by the administrative authority. Tanks shall be watertight and tested in the field. The test shall be performed by filling the tank two inches (2") above the riser inlet. At the end of the first twenty-four (24)-hour

period, the tank water level should be refilled. After another twenty-four (24)-hour period, no more than one inch (1") of water should have dropped from the original reading. All sewage and pump tanks will be supplied with vandal-proof access risers to grade over the pump units. Risers should have a waterproof epoxy seal between the tank and riser;

(II) Pumping systems for a pressure dosed sand filter system should provide pumping apparatus that is capable of filtering gross solids larger than one-eighth inch (1/8") and draw from the clear zone near the outlet side of the sewage tank. This zone is described as the layer of effluent between the sludge and scum layers of the sewage tank. Pumps should be able to deliver adequate head pressure to control orifice plugging. Pumps should be made of a corrosive resistant material such as Type 316 stainless steel, suitable plastic, or 85-5-5-5 bronze. Screens should have at least ten square feet (10 sq. ft.) of surface area, with one-eighth inch (1/8") openings;

(III) Operation controls should be on a timer dose that distributes the average daily flow over an eighteen (18)-hour period. Recirculating filters will be set to recirculate five (5) times the average daily flow over a twenty-four (24)-hour period. Systems should be designed with a high water alarm and light signal. Control panels should be located on an exterior location. Control operations should be located in an area available for maintenance;

(IV) Intermittent filter media shall be a mixture of sand or durable inert particles with one hundred percent (100%) passing the three-eighths inch (3/8") sieve; ninety to one hundred percent (90-100%) passing the No. 4 sieve; sixty-two to one hundred percent (62-100%) passing the No. 10 sieve; forty-five to eighty-two percent (45-82%) passing the No. 16 sieve; twenty-five to fifty-five percent (25-55%) passing the No. 30 sieve; ten percent (10%) or less passing the No. 60 sieve; four percent (4%) or less passing the No. 100 sieve; or sand meeting the ASTM-C 33 concrete sand specification minus four percent (4%) or less passing the No. 100 sieve. All drainage rock should be a river washed, hardened and weathered rock. The treatment media will be two inches (2") deep and of a coarse media with an effective size of one and one-half to three millimeters (1 1/2-3 mm) and a uniformity coefficient of less than two (2). Limestone or dolomite is not acceptable for drainage rock;

(V) Recirculating filter media shall be a mixture of sand or durable inert particles with one hundred percent (100%) passing the

three-eighths inch (3/8") sieve; seventy-nine to one hundred percent (79-100%) passing the No. 4 sieve; eight to ninety-two percent (8-92%) passing the No. 8 sieve; zero to fifteen percent (0-15%) passing the No. 30 sieve; zero to one percent (0-1%) passing the No. 50 sieve. All drainage rock should be a river washed, hardened and weathered rock. The treatment media will be two inches (2") deep and of a coarse media with an effective size of one and one-half to three millimeters (1-1/2 3 mm) and a uniformity coefficient of less than two (2). Limestone or dolomite is not acceptable for drainage rock; and

(VI) Container designs may be concrete containers consisting of watertight walls and floors to prevent groundwater from infiltrating or effluent from exfiltrating from the filter. All penetrations through the walls shall be watertight. Containers may also consist of a thirty (30) mil polyvinyl chloride liner covering the sand filter bottom and side wall areas. Polyvinyl chloride liners should be supplied with repair kits and boots for passage through the liner wall. The bottom area of the liner should be bedded in two inches (2") of leveling sand. The liner should be constructed to form a waterproof membrane between the trench bottom and trench walls. The polyvinyl liner should incorporate all seams to be a chemically or heat bonded waterproof seam.

E. The filter design criteria shall include the following:

(I) The interior base of the filter container shall be level or constructed at a grade of one percent (1%) or less to the underdrain pipe elevation;

(II) The underdrain piping shall consist of a pipe with one-fourth inch (1/4") grooves cut every four inches (4") along the pipe length to a depth of one-half (1/2) of the pipe diameter. The bottom of the filter container shall be covered with a minimum of six inches (6") of drain media. The underdrain pipe shall be enveloped in an amount and depth of drainage rock to prevent migration of the underdrain media into the pipe perforations;

(III) A minimum of twenty-four inches (24") of approved filter media shall be installed over the underdrain media. The media shall be damp at the time of installation to insure compaction of the media. The top surface of the media shall be level;

(IV) There shall be a minimum of three inches (3") of clean drain media below the distribution laterals, and sufficient media above the laterals equal to or covering the orifice shields and/or pipe;

(V) Distribution laterals shall be evenly spaced on minimum, thirty-inch (30")



centers. Orifices shall be placed such that there is one (1) orifice or more on average per six square feet (6 sq. ft.) of sand surface. Orifice holes shall be one-eighth inch (1/8") in diameter. The diameter of the piping manifold and lateral shall be no less than one-half inch (1/2"). The ends of the distribution laterals should be constructed with a means to perform flushing of the piping, collectively or individually, through the operation of a flushing valve. The flushed effluent may be discharged to the sand filter;

(VI) The top of the intermittent media in which the pressure distribution system is installed shall be covered with a breathable nylon or polypropylene spun filter fabric rated at eighty-five hundredths ounce per square yard (0.85 oz./sq. yd.) to eliminate soil intrusion into the filter media. Recirculating filters shall be open-topped;

(VII) The top of the intermittent sand filter area shall be backfilled with a soil cover, free of rocks, vegetation, wood waste, etc. The soil cover shall have a textural class of loamy sand. The soil cover shall have a minimum depth of six inches (6") and a maximum depth of twelve inches (12"). Intermittent sand filters designs may delete soil cover and incorporate three to six inches (3-6") of a quality cypress or cedar mulch over the entire filter area;

(VIII) Where the effluent from a sand filter is to be discharged via a pump, the pump and related apparatus shall be housed in a vandal resistant vault designed to withstand the stresses placed upon it and not allow the migration of drain media, sand or underdrain media to its interior. The vault shall have a durable, affixed floor. The vault shall provide watertight access to the finished grade with a diameter equal to that of a gravity discharge sand filter. The depth of the underdrain and the operational level of the pump cycle and alarm shall not allow effluent to come within two inches (2") of the bottom of the sand filter media. The pump off level shall be no lower than the invert of the perforations of the underdrain piping. The internal sand filter pump shall be electrically linked to the sand filter dosing apparatus in such a manner as to prevent effluent from entering the sand filter in event the internal sand filter pump fails; and

(IX) Other sand filters which vary in design from those described in this rule may be authorized by the administrative authority if they can be demonstrated to produce a comparable effluent quality.

F. Effluent from these sand filters may discharge to the ground surface, provided the effluent is maintained on the owner's

property and the following separation distances are maintained:

(I) The discharge shall be a minimum of one hundred feet (100') from private water supply wells; one hundred-fifty feet (150') from unplugged abandoned wells or wells with less than eighty feet (80') of casing; and three hundred feet (300') from public water supply wells;

(II) The discharge shall be a minimum of one hundred feet (100') from springs; five hundred feet (500') from the edge of surficial sink holes; fifty feet (50') from a classified stream; and twenty-five feet (25') from a stream or open ditch; and

(III) The discharge shall be a minimum of seventy-five feet (75') from property lines.

G. If effluent can not meet the minimum separation distances as described in subparagraph (6)(G)2.F., then the effluent must be disposed of into a soil absorption system. The required footage of the soil absorption system may be reduced by up to one-third (1/3) of that required for a conventional soil absorption system. Shallow bury designs should be utilized whenever possible to achieve the best absorption rates.

(H) Drip Soil Absorption. Drip soil absorption also known as trickle irrigation may be approved by the administrative authority in accordance with section (6) of this rule. Due to the various pretreatment methods and appurtenances and lack of extensive experience, drip soil absorption systems must be viewed as experimental, and back-up design for another system shall be approved in case of failure of the drip soil absorption system.

1. Drip lines shall be placed two feet (2') apart in a parallel arrangement. Emitters shall be placed in the drip lines every two feet (2') so there will be a two-foot by two-foot (2'x2') grid pattern. Other configurations and spacings of the drip line and emitters may be used; however, each emitter will be considered to cover four square feet (4 sq. ft.) of absorption area.

2. The application rate shall not exceed the values as shown in Table 7 for low pressure pipe systems in subparagraph (6)(C)3.A. of this rule.

3. Drip soil absorption systems may be allowed at sites where the soil is classified as being in group IVb. A minimum separation distance of twelve inches (12") shall be maintained between the drip lines and emitters and a high ground water table or other limiting condition. The maximum application rate for IVb soils shall be from five-hundredths to one-tenth gallons per day per square foot (0.05 0.10 gpd/sq. ft.) of absorption field

(I) Wetlands. Constructed wetlands provide secondary levels of treatment, which means that some form of pretreatment (septic tank, aeration tank, lagoon, etc.) must be used prior to the wetland, as wetlands cannot withstand large influxes of suspended solids. The pretreatment used must be capable of removing a large portion of these solids. Effluent from wetlands must be contained on the owner's property with the same set-back distances as required for lagoons in Table 1, located in subsection (1)(D) of this rule.

1. Free water surface wetlands are shallow beds or channels with a depth less than twenty-four inches (24") and filled with emergent aquatic plants. This type of wetland shall not be allowed.

2. Submerged flow wetlands are similar to free water surface wetlands except that the channels are filled with shallow depths of rock, gravel or sand. The depth of the porous media is usually less than eighteen inches (18"). The porous media supports the root systems of the emergent aquatic vegetation. The water level is to be maintained below the top of the porous media so that there is no open water surface.

3. The surface area of wetlands shall be determined by using the following equation:

$$A_s = [Q(\ln C_o - \ln C_e)] / (k_T \times f \times d)$$

where:  $A_s$  = wetland surface area, sq. ft.

$Q$  = daily flow rate to wetland, cu.ft./day([gallons/day] ÷ 7.5);

$C_o$  = influent BOD5 concentration, mg/L;

$C_e$  = effluent BOD5 concentration, mg/L;

$k_T$  = temperature dependent rate constant, per day;

$d$  = water depth in wetland, ft; and

$f$  = void fraction of rock media, decimal.

4. After a surface area has been determined, a cross-sectional area shall be calculated against hydraulic loading by using the following equation:

$$A_h = Q / (K_h \times S)$$

where:  $A_h$  = cross-sectional area (hydraulic loading), sq. ft.;

$K_h$  = hydraulic conductivity of rock media, ft./day\*; and

$S$  = slope of wetland bottom, decimal

\* A value of eight hundred feet per day (800 ft./day) may be used for the hydraulic conductivity for rock of one inch (1") diameter.



\*\* Values for slope should range between twenty-five hundredths and one percent (0.25 -1%).

5. After the hydraulic loading has been determined, an organic loading shall be calculated using the following equation:

$$A_o = OGL/0.05$$

where:  $A_o$  = cross-sectional area (organic loading), sq. ft.; and

OGL = organic loading, lbs BOD5/day.

6. The larger of the two (2) calculations, the hydraulic loading or the organic loading, shall be used to determine the wetland dimensions. Wetlands should not be long and narrow.

7. The width of the wetland shall be calculated by dividing the larger cross-sectional area by the water depth. The calculated width should not be less than one-third (1/3) of the length (a length: width ratio of three to one (3:1)). Should it be necessary to construct a wetland with a ratio greater than three to one (3:1), step-loading along the length of the wetland shall be considered.

8. The configuration of a wetland for an individual home can be a one (1) cell or two (2) cells in series, depending upon the soil properties at the site. Larger systems may consist of multiple cells in parallel or series in order to provide more management options.

A. Single cells may be used where there will be no percolation of water through the bottom of the wetland. Water movement properties of the soil at the wetland construction site must be determined either by use of properly performed percolation tests or a thorough soil profile analysis performed by a qualified person meeting the criteria of 19 CSR 20-3.080.

B. For soils with percolation rates of sixty minutes per inch (60 min./in.) or less and where geological limitations are not severe, a two (2)-cell wetland may be used. The first cell shall be lined, allowing no percolation. The second cell may be unlined and filled with sand (not rock) to promote some percolation from the bottom of the wetland. The second cell shall not be larger than the first cell.

9. Crushed limestone or other rock with sharp edges shall not be used for a porous media as this type of rock will compact with time. Rock with rounded edges, such as creek gravel, shall be used. Rock must be thoroughly washed to remove fines which may cause plugging. Rock substrate size should be one inch (1") diameter, while rock to be used around inlet and outlet pipes may be two to

four inches (2-4") diameter to reduce potential clogging. A three to four inch (3-4") layer of washed pea gravel may be used on top of the one inch (1") substrate for decorative purposes.

10. All piping shall be SDR 35 sewer pipe, Schedule 40 polyvinyl chloride (PVC) DWV pipe, or material of equivalent or stronger construction. Piping shall be a four inch (4") diameter.

11. Influent shall be distributed and effluent collected by header pipes running the width of the wetland. Perforated sewer pipe can be used for the headers. For unperforated pipe, a one and one-half inch (1 1/2") hole shall be drilled every twelve inches (12") along the header. Headers shall be placed at the bottom of the wetland on a bed of rock and covered with two to four inch (2-4") rock. A cleanout shall be placed before the influent header.

A. If effluent from the septic tank flows to the wetland by gravity and there are parallel cells in the wetland, a distribution box shall be placed ahead of the wetland so that flow can be controlled to individual cells.

B. If effluent is pumped, the pumping rate shall not exceed twenty-five gallons per minute (25 gpm) and no more than one-third (1/3) of the daily design flow shall be pumped at one (1) time.

12. Water level in a wetland shall be controllable. The range of control shall be from two inches (2") above the surface of the rock to complete draining of the wetland. Maximum water level in the wetland shall be a minimum of twelve inches (12") below the outlet of the septic tank so that water does not back up into the septic tank.

A. To conveniently check the water level relative to the gravel surface, a four inch (4") diameter perforated pipe may be placed in the bottom of the wetland, through the channel embankment, and then elbowed up to the elevation of the top of the channel.

B. Water level control may be obtained by use of swivel standpipes or collapsible tubing.

13. Surface water shall be kept out of the wetland. This may be accomplished by diverting runoff away from the wetland or constructing an earthen berm around the wetland. Berms shall be a minimum of six inches (6") above the surface of the porous media.

14. Emergent plants shall be selected by the ability of the plants to: root and grow in the wastewater-rock environment, treat wastewater to acceptable levels, produce biomass in amounts that can be controlled and aesthetics. Reference may be made to Tables 11 and 12 in selecting desired plants.

(J) Privy. A privy will be allowed only

under limited conditions and will not be recognized as a method of sewage disposal for a continuously occupied dwelling, business or other structure. A privy will only be considered for remote area not served by a piped water source. Example of these areas may be rural cemetery, a rural church with a small congregation and where hand-washing facilities are available, or a river access point provided by the Department of Conservation. Plans and construction of a privy will need to meet the approval of the administrative authority.

1. The privy shall be use to receive only human excreta and toilet paper. The privy shall not be used as a depository for other wastes.

2. A pit shall be provided for the privy. The sides of the pit shall be curbed to prevent cave-in. If the pit has an earth bottom, the bottom shall be at least three feet (3') above saturated soil conditions. If this separation distance cannot be achieved in the location of the privy, then the pit shall be liquid tight.

**Table 11 - Plant Growth Data after one growing season**

<b>Plant Species</b>	<b>Wet Weight</b> (lbs./sq. ft.)	<b>Dry Weight</b> (lbs./sq. ft.)	<b>Top Dry</b>	<b>Root Dry</b>	<b>Top/Root</b>	<b>Root Depth</b> (inches)
<b>Softstem Bulrush</b> <i>(Scirpus validus)</i>	9.74	4.20	3.20	1.00	3.20	7.0
<b>Horsetail</b> <i>(Equisetum hyemale)</i>	1.90	0.55	0.20	0.35	0.57	11.0
<b>Water Iris</b> <i>(Iris pseudacorus)</i>	3.28	0.66	0.31	0.35	0.90	8.0
<b>Pickerel Rush</b> <i>(Pontederia cordata)</i>	6.24	1.30	0.50	0.80	0.63	15.0
<b>Arrowhead</b> <i>(Sagittaria latifolia)</i>	2.25	0.35	0.17	0.18	0.94	10.0
<b>Cattails</b> <i>(Typha latifolia)</i>	7.89	3.00	1.90	1.10	1.73	8.0
<b>Soft Rush</b> <i>(Juncus effusus)</i>	3.00	1.05	0.65	0.40	1.62	18.0
<b>Flowering Rush</b> <i>(Butomus umbellatus)</i>	0.30	0.07	0.01	0.06	0.18	12.0



**Table 12 -Characteristics of Emergent Aquatic Plants**

<b>Plant Species</b>	<b>Bloom Date</b>	<b>Type of Bloom</b>	<b>Bloom Color</b>	<b>Plant Height</b> (inches)	<b>Growth Pattern</b>	<b>Initial Spacing</b> (feet)
Softstem Bulrush <i>(Scirpus validus)</i>	June–July	Oblong Spikelets	Gray	40–60	Spreading	3
Horsetail <i>(Equisetum hyemale)</i>	July–Aug.	Oblong Spikelets	Brown	30–40	Spreading	3
Water Iris <i>(Iris pseudacorus)</i>	May–Aug.	Flower	White- Lt. Blue	10–18	Bunches	2–3
Pickerel Rush <i>(Pontederia cordata)</i>	July–Sept.	Flower	Purple	10–18	Bunches	2
Arrowhead <i>(Sagittaria latifolia)</i>	June–July	Hanging Bulbs	Green- White	6–10	Spreading	2–3
Cattails <i>(Typha latifolia)</i>	May–June	Oblong Spike	Brown	48–72	Spreading	3
Soft Rush <i>(Juncus effusus)</i>	June–July	Flower	Brown	18–30	Bunches	2



3. The pit shall be periodically pumped out by someone who services septic tank systems. At no time shall the pit contents be allowed to accumulate to within one foot (1') of the pit top. The pit contents shall then be transported and disposed into a community sewer system that is in compliance with Chapter 644, RSMo.

4. Both the pit and the privy shall be vented. Inspect-proof openings shall be placed in the walls, below the seat. A vent shall extend from the underside of the seat board through the roof or up to a horizontal vent open to the sides of the toilet. This vent must be flush with the underside of the seat board and shall not extend down into the pit. All vent openings to the outside shall be properly screened to keep out insects. The top of the privy shall have a screened opening on each side. It is preferable the opening be all the way around the top of the privy in order to allow air to pass through and to carry away any odors which may seep into the upper part of the structure. If a crescent-shaped opening is cut into the door or wall of the privy, it shall also be screened.

5. The inside of the privy shall be of durable, smooth, nonabsorbent material. If wood is used, the inside of the structure shall be coated with a polyurethane-type coating so as to minimize the penetration of liquids and odors into the wood.

6. A tight-fitting door, preferably with a self-closing feature, such as a door spring, shall be used.

7. A privy shall be set back from surface waters, buildings, property lines and water supply wells the same distance as required for soil treatment areas. This information may be found in subsection (1)(D), Table 1 of this rule.

8. The privy shall be of sufficient capacity for the facility it serves, but shall have at least fifty cubic feet (50 cu. ft.) of capacity.

9. Abandoned pits shall have the contents removed, transported and disposed into a community sewer system that is in compliance with Chapter 644, RSMo. This activity shall be performed by someone who services septic tank systems. The pit shall then be filled with clean earth and slightly mounded to allow for settling.

(K) Other Systems. Where unusual conditions exist, special systems of treatment and disposal, other than those specifically mentioned in this rule, may be employed provided—

1. Reasonable assurance of performance of the system is presented to the administrative authority;

2. The engineering design of the system is first approved by the administrative authority;

3. Adequate substantiating data indicate that the effluent will not contaminate any drinking water supply, groundwater used for drinking water or any surface water;

4. Treatment and disposal of the wastes will not deteriorate the public health and general welfare;

5. Discharge of effluent, if any, shall be within set-back distances as described in Table 1, located in subsection (1)(D) of this rule; and

6. These systems comply with all applicable requirements of this rule, with all local codes and ordinances, and all applicable requirements of sections 701.025–701.055 and Chapter 644, RSMo.

(L) Variances. Variances may be considered and granted by the administrative authority concerning repair to on-site sewage disposal systems existing prior to January 1, 1996 with site limitations or for property platted prior to January 1, 1996 with site limitations. Where variances have been allowed from the standards, the administrative authority may require that a higher level of pretreatment than that of a septic tank be provided. At the discretion of the administrative authority and with relative assurance for protection of the public health and preservation of the quality of surface and ground waters, variances may be allowed for the following:

1. Setbacks as specified in Table 1, located in subsection (1)(D) of this rule.

2. Minimum distance between the infiltrative surface and restrictive feature or bedrock.

3. Minimum areas for infiltrative surfaces as shown in Table 5 (see (5)(A)4.), Table 6 (see (5)(A)16.C.), Table 7 (see (6)(C)3.A.), Table 8 (see (6)(E)3.), Table 9 (see (6)(E)7.) and Tables 13 and 14 (see (7)(M)) of this rule.

4. A written application for a variance shall be provided to the administrative authority and shall provide the following:

A. An explicit description explaining why the requirements of this rule cannot be complied with, including a description of specific sections of this rule for which a variance is being requested;

B. A design of the proposed system. The design shall show that as much soil absorption as is practically possible will be installed;

C. The existing and maximum occupancy pattern and the existing water usage records, if any;

D. Potential impact, if any, on neighboring property owners and the names and

mailing addresses of these property owners; and

E. Adequate substantiating data to indicate that the effluent will not contaminate any drinking water supply, groundwater used for drinking water or any surface water.

5. These systems shall comply with all applicable requirements of these standards except where variances have been granted.

6. No variance will be granted for any system that would result in noncompliance with Chapter 644, RSMo Missouri Clean Water law and subsequent rules. On-site sewage disposal systems with a discharge, other than a system serving a single family residence lot, must be referred to the Department of Natural Resources and comply with Chapter 644, RSMo, Missouri Clean Water Law and subsequent rules.

7. If effluent can not meet the minimum separation distances as described in Table 1 of subsection (1)(D), then the effluent must be disposed of into a soil absorption system. Set-back distances for lagoons will be considered applicable to alternative systems. The required footage of the soil absorption system following alternative systems may be reduced by up to one-third (1/3) of that required for a conventional soil absorption system. Shallow bury designs should be utilized whenever possible to achieve the best absorption rates.

8. All adjacent and/or affected property owners shall be notified in writing by the administrative authority whenever consideration for granting a variance is likely to result in effluent crossing property lines. The party requesting the variance shall be responsible for supplying the names and addresses of all adjacent and/or affected property owners to the administrative authority. Adjacent and/or affected property owners shall be allowed thirty (30) days from the date of the written notification to contact the administrative authority to express comments concerning the consideration of granting a variance.

9. In cases of complaint abatement, where effluent cannot be maintained on the owner's property, within the required set-back distances and presents a nuisance or threat to public health or surface or ground water quality, the administrative authority may require a holding tank be placed at the optimum location within the sewage system, in order to abate the complaint. The owner shall be responsible for assuring the holding tank is pumped as needed, with the contents being disposed of in a Department of Natural Resources permitted facility.

(7) Detailed Soils Evaluation.

(A) General. The intent of this section is to provide minimum standards for site evaluations



based upon evaluation of the soil characteristics, namely texture, color, structure, drainage and depth. Criteria are also given for sizing standard systems and some alternative systems.

(B) Adoption and Use. Where this rule is administered by an administrative authority, those administrative authorities may adopt this section, in whole or in part, as part of a local code or ordinance. Nothing in this rule or section shall require any administrative authority to allow an installation based upon the criteria contained in this section. The administrative authority may require percolation tests in addition to evaluation of soil characteristics. Whenever percolation tests and these criteria are used, the size of the proposed system or suitability of a site should be based upon which criteria produce the most conservative system. This type evaluation should be conducted by a professional soil scientist, engineer, sanitarian or registered geologist with special training in determining soil morphological characteristics in the field.

(C) Site Evaluation. An investigation of a proposed soil absorption site shall consider the following factors:

1. Topography and landscape position;
2. Soil characteristics (morphology) which includes texture, structure, porosity, consistence, color and other physical, mineral and biological properties of various horizons, and the thickness and arrangement of the horizons in the soil profile;
3. Soil drainage, which includes both external (surface) and internal (soil);
4. Soil depth;
5. Restrictive horizons; and
6. Available space.

(D) Site evaluations shall be made in accordance with subsections (7)(E)–(M) of this rule. Based on this evaluation, each of the factors listed in subsection (7)(C) of this rule shall be classified as suitable, provisionally suitable or unsuitable.

(E) Topography and Landscape Position. Uniform slopes under fifteen percent (15%) shall be considered suitable with respect to topography. When slopes are less than two percent (2%), provisions shall be made to insure adequate surface drainage. When slopes are greater than four percent (4%), the absorption lines shall follow the contour of the ground.

1. Uniform slopes between fifteen percent (15%) and thirty percent (30%) shall be considered provisionally suitable with respect to topography, if the soils are thirty-six inches (36") or more thick. Slopes within this range may require installation of interceptor drains upslope from the soil absorption sys-

tem to remove all excess water that might be moving laterally through the soil during wet period. Usable areas larger than minimum are ordinarily required in this slope range.

2. Slopes greater than thirty percent (30%) shall be considered unsuitable except when a thorough study of the soil characteristics indicates that a soil absorption system will function satisfactorily and sufficient ground area is available to properly install such a system. Slopes greater than thirty percent (30%) may be classified as provisionally suitable when all of the following conditions are met:

A. The slope can be terraced or otherwise graded or the absorption lines located in naturally occurring soil to maintain a minimum ten-foot (10') horizontal distance from the absorption trench and the top edge of the fill embankment;

B. The soil characteristics can be classified as suitable or provisionally suitable to a depth of at least one foot (1') below the bottom of the absorption trench;

C. Surface water runoff is diverted around the absorption field so that there will be no scouring or erosion of the soil over the field;

D. If necessary, groundwater flow is intercepted and diverted to prevent the water from running into or saturating the soil absorption system; and

E. There is sufficient ground area available to install the septic tank system with these modifications.

3. Complex slope patterns and slopes dissected by gullies and ravines shall be considered unsuitable to topography.

4. Areas subject to frequent flooding shall be considered unsuitable to landscape positions.

5. Depressions shall be considered unsuitable with respect to landscape positions except when the site complies essentially with the requirements of this section and is specifically approved by the administrative authority.

6. If directed by the administrative authority, the surface area on or around a ground absorption system sewage treatment and disposal system shall be landscaped to provide adequate drainage. The interception of perched or lateral groundwater movement shall be provided where necessary to prevent soil saturation on or around the ground absorption sewage treatment and disposal system.

(F) Soil Characteristics (Morphology). Soil borings or pits shall be taken at the site to be used for soil absorption systems. These borings shall be taken to a depth of forty-eight inches (48") or as required to determine

the soil characteristics. Soil borings or pits and core samples shall be evaluated and a determination made on the suitability of the soil to treat and absorb septic tank effluent. The important soil characteristics which shall be reviewed by the administrative authority are as follows:

1. The relative amounts of the different sizes of mineral particles in a soil are referred to as soil texture. All mineral soils are composed of sand, two to five hundredths millimeters (2–.05 mm) in size; silt, which includes intermediate-sized particles that cannot be seen with the naked eye but feel like flour when pressed between the fingers, five hundredths to two thousandths millimeter (0.05–0.002 mm) in size; or clay, which is extremely small in size and is the mineral particle that gives cohesion to a soil, less than two thousandths millimeters (0.002 mm) in size or a combination of these. The texture of the different horizons of soils may be classified into five (5) general groups and shall be used for determining the application rates shown in Tables 6 and 7 of this rule.

A. Soil Group I. Sandy texture soils contain more than seventy percent (70%) sand-sized particles in the soil mass. These soils do not have enough clay to be cohesive. Sandy soils have favorable sewage application rates, but may have a low filtering capacity leading to malfunction due to contamination of groundwater. The sandy group includes the sand and loamy sand soil textural classes and shall generally be considered suitable in texture.

(I) Sand. Sand has a gritty feel, does not stain the fingers and does not form a ribbon or ball when wet or moist.

(II) Loamy sand. Loamy sand has a gritty feel, stains the fingers (silt and clay), forms a weak ball and cannot be handled without breaking.

B. Soil group II. Coarse loamy texture soils contain more than thirty percent (30%) sand-sized particles and fewer than twenty percent (20%) clay-sized particles in the soil mass. They exhibit slight or no stickiness. The coarse loamy group includes sandy loam and loam soil textural classes and shall generally be considered suitable in texture.

(I) Sandy loam. Sandy loam feels gritty and forms a ball that can be picked up with the fingers and handled with care without breaking.

(II) Loam. Loam may feel slightly gritty but does not show a fingerprint and forms only short ribbons ranging from twenty-five hundredths to fifty hundredths inch (.25–.50") in length. Loam will form a ball that can be handled without breaking.





C. Soil group III. These fine loamy texture soils contain fewer than forty percent (40%) clay-sized particles and not more than thirty percent (30%) sand-sized particles in a soil mass. Also this group is limited to less than thirty-five percent (35%) clay when the clay minerals exhibit high shrink/swell characteristic and exhibit slight to moderate stickiness. The fine loamy group includes sandy clay loam, silt loam, clay loam and silty clay loam textural classes and shall generally be considered provisionally suitable in texture.

(I) Silt loam. Silt loam feels floury when moist and will show a fingerprint but will not ribbon and forms only a weak ball.

(II) Silt. Silt has a floury feel when moist and sticky when wet but will not ribbon and forms a ball that will tolerate some handling.

(III) Sandy clay loam. Sandy clay loam feels gritty but contains enough clay to form a firm ball and may ribbon to form seventy-five hundredths to one-inch (.75-1") pieces.

(IV) Silty clay loam. Silty clay loam is sticky when moist and will ribbon from one to two inches (1-2"). Rubbing silty clay loam with the thumbnail produces a moderate sheen. Silty clay loam produces a distinct fingerprint.

(V) Clay loam. Clay loam is sticky when moist. Clay loam forms a thin ribbon of one to two inches (1- 2") in length and produces a slight sheen when rubbed with the thumbnail. Clay loam produces a non-distinct fingerprint.

D. Soil group IV. These clayey texture soils contain forty percent (40%) or more clay-sized particles and include sandy clay, silty clay and clay. This group may also include clay loam and silty clay loam when the clay fraction is greater than thirty-five percent (35%) and of a high shrink/swell nature. There are two (2) major types of clays nonexpandable and expandable. The nonexpandable clays, when wet, are slightly sticky to sticky; when moist, are friable to firm; and when dry, they are slightly hard to hard. The nonexpandable clays (Group IVa) shall generally be considered provisionally suitable in texture. The expandable clays, when wet, are very sticky and very plastic and when moist, these clays are very firm to extremely firm and when dry, are very hard to extremely hard. The expandable clays (Group IVb) shall be considered unsuitable in texture.

(I) Sandy clay. Sandy clay is plastic, gritty and sticky when moist and forms a firm ball and produces a thin ribbon to over two inches (2") in length.

(II) Silty clay. Silty clay is both plastic and sticky when moist and lacks any

gritty feeling. Silty clay forms a firm ball and readily ribbons to over two inches (2") in length.

(III) Clay. Clay is both sticky and plastic when moist, produces a thin ribbon over two inches (2") in length, produces a high sheen when rubbed with the thumbnail and forms a strong ball resistant to breaking.

E. Soil group V. This soil group may be of any texture, however, the most predominant are cherty and very cherty clays, silt loams and silty clay loams. The amount of rock fragments in these soils is of a concern in areas of residual soils overlying highly permeable bedrock where groundwater could become contaminated. In general, soils with less than fifty percent (50%) rock fragments will be considered suitable. In general, soils with greater than fifty percent (50%) rock fragments over highly permeable bedrock will be considered unsuitable. Soils with greater than fifty percent (50%) rock fragments will be considered provisionally suitable if geological limitations are not severe.

F. The soil texture shall be estimated by field testing; and

2. Soil consistency. Soil consistency is comprised of the attributes of soil material, typically clay, that are expressed by the degree and kind of cohesion and adhesion or by the resistance to deformation or rupture.

A. Soil consistency when wet shall be considered as follows:

(I) Stickiness. Stickiness is the quality of adhesion to other objects. For field evaluation of stickiness, wet soil material is pressed between thumb and finger and its adherence noted. Degrees of stickiness are described as follows:

(a) Slightly sticky. After pressure, soil material adheres to both thumb and finger but comes off one or the other cleanly. It is not appreciably stretched when the digits are separated;

(b) Sticky. After pressure, soil material adheres to both thumb and finger and tends to stretch somewhat and pull apart rather than pulling free from either digit; and

(c) Very sticky. After pressure, soil material adheres to both thumb and finger and is decidedly stretched when they are separated; and

(II) Plasticity. Plasticity is the ability to change shape continuously under the influence of an applied stress and to retain the impressed shape on removal of the stress. For field determination of plasticity, the soil material shall be rolled between the thumb and finger to observe whether or not a wire or thin rod of soil can be formed. Degree of resistance to deformation at or slightly above field capacity is as follows:

(a) Slightly plastic. Wire formable but soil mass easily deformable;

(b) Plastic. Wire formable and moderate pressure required for deformation of the soil mass; and

(c) Very plastic. Wire formable and much pressure required for deformation of the soil mass.

B. Soil consistency when moist. Consistency when moist is determined at a moisture content approximately midway between air dry and field capacity. At this moisture content, most soil materials exhibit a form of consistency—characterized by tendency to break into smaller masses rather than into powder; some deformation prior to rupture; absence of brittleness; and ability of the material after disturbance to cohere again when pressed together. To evaluate this consistency, a mass that appears slightly moist shall be selected and attempt made to crush in the hand.

(I) Friable. Soil material crushes easily under gentle to moderate pressure between thumb and finger, and coheres when pressed together.

(II) Firm. Soil material crushes under moderate pressure between thumb and finger but resistance is distinctly noticeable.

(III) Very firm. Soil material crushes under strong pressure; barely crushable between thumb and finger.

(IV) Extremely firm. Soil material crushes only under very strong pressure; cannot be crushed between thumb and finger and must be broken apart bit by bit.

C. Soil consistency when dry. The consistency of soil materials when dry is characterized by rigidity, brittleness, maximum resistance to pressure, more or less tendency to crush to a powder or to fragments with rather sharp edges, and inability of crushed material to cohere again when pressed together. For evaluation, the air-dry mass shall be selected and broken in the hand.

(I) Slightly hard. Weakly resistant to pressure, easily broken between thumb and finger.

(II) Hard. Moderately resistant to pressure; can be broken in the hands without difficulty but is barely breakable between thumb and finger.

(III) Very hard. Very resistant to pressure; can be broken in the hands only with difficulty; not breakable between thumb and finger.

(IV) Extremely hard. Extremely resistant to pressure; cannot be broken in the hands.

3. Soil structure. In many soils, the sand, silt and clay particles tend to cling or



stick to one another to form a ped or a clump of soil. This is known as soil structure. Soil structure may have a significant effect on the movement of effluent through a soil. Structure is usually not important in soil groups I and II, and these types of soils shall generally be considered suitable as to structure. The three (3) kinds of soil structure that are most significant in movement of sewage effluent through groups III and IV soils are block-like, platy and the absence of soil structure or massive conditions. These kinds of soil structure are described as follows:

A. Block-like soil structure. In groups III and IV soils, if the soil exhibits many peds of angular and subangular peds, then the soils have block-like structure. The sewage effluent may move between the cracks of these types of peds. Block-like structure in groups III and IV soils is frequently destroyed by mechanical excavating equipment manipulating the soil when it is too wet. Trenches for absorption lines being placed in groups III and IV soils with block-like structure should only be dug when the soils are moist or dry. Block-like soil structure in groups III and IV soils shall be considered provisionally suitable;

B. Platy soil structure. If groups III and IV soils fall out into plate-like sheets, then the soil would have platy structure. Water or effluent movement through these soils would be extremely slow, and the structure shall be considered unsuitable; and

C. Absence of soil structure. Some groups II, III and IV soils are massive and exhibit no structural aggregates. In these kinds of soils, water or effluent movement would be negligible. This structure shall be considered unsuitable.

(G) Soil Drainage. Soils with seasonally high water tables are of major concern in evaluating sites for sewage effluent disposal. These are the soil areas that give good sewage absorption rates during dry seasons of the year but force sewage effluent to the surface during the wetter seasons.

1. The depth of the seasonal high water table can commonly be recognized by those examining soil profiles. The criterion for recognition of high water tables is that of soil color. Subsurface horizons that are in colors of reds, yellows and browns generally indicate good soil aeration and drainage throughout the year. Subsurface horizons that are in colors of gray, olive or bluish colors indicate poor aeration and poor soil drainage. These dull or grayish colors may occur as a solid mass of soil or may be in mottles of localized spots. The volume of grayish color is indicative of the length of time that free water stands in that soil profile. There are soils that have light-colored mottles which are relic

from the light-colored rock from which the soils have weathered. These soils would not have high water tables, so one must distinguish between a true soil composed of sand, silts and clays, or the rock material that may still exist in the soil profile. Similarly, there are also some soils with surface or subsurface eluvial horizons with light colors which can be unrelated to drainage conditions.

2. Any soil profile that has the grayish colors of chroma 2 or less (Munsell color chart) indicative of high water tables, or is either subject to periodic high water, within twenty-four inches (24") of the surface, or is less than twelve inches (12") between the proposed trench bottom and the high water table, shall be considered unsuitable as to drainage. Soils where the seasonally high water table is less than forty-eight inches (48") and more than twenty-four inches (24") below the naturally occurring surface shall be considered provisionally suitable for soil drainage, provided there remains at least twelve inches (12") of soil between the proposed trench bottom and the seasonally high water table. Soils where the seasonally high water table is greater than forty-eight inches (48") below the naturally occurring surface shall be considered suitable for soil drainage. Drainage systems installed for groundwater lowering shall be maintained so that a minimum separation of one foot (1') occurs between the absorption trench bottom and the seasonally high water table. For extensive drainage systems, such as groundwater lowering in subdivisions, easements shall be recorded and shall have adequate width for reasonable egress and ingress for maintenance.

(H) Soil Thickness. The thickness of soils to rock which are classified as suitable or provisionally suitable in texture and structure shall be at least forty-eight inches (48") when conventional soil absorption systems at conventional depths are to be utilized. Soil thickness greater than forty-eight inches (48") shall be considered as suitable as to soil thickness. Soil thickness less than forty-eight inches (48") and greater than thirty-six inches (36") shall be considered provisionally suitable. Where special design and installation modifications can be made to provide at least two feet (2') of naturally occurring soil below the bottom of the absorption trench, these soils may be reclassified as provisionally suitable in thickness.

(I) Restrictive Horizons. Restrictive horizons in soils are recognized by their apparent resistance in excavation or in the use of a soil auger. Restrictive horizons may occur as fragipans or claypans. The fragipan is a layer that owes its hardness mainly to extreme den-

sity or compactness as opposed to high clay content or cementation. The layer is typically dense and brittle. Although fragments are friable when removed, when in place the material is so dense that water moves through it very slowly. Unlike fragipans, the claypan is a compact, slowly permeable layer in the subsoil having a much higher clay content than the overlying material. A sharply defined boundary exists between the claypan and the overlying material. Claypans are typically hard when dry and plastic and sticky when wet.

1. Restrictive horizons that are greater than six inches (6") thick severely restrict the movement of water and sewage effluent and do not adequately respond to groundwater lowering drainage systems. Where these horizons are less than six inches (6") thick, they do not severely restrict the movement of water and sewage effluent, but rather indicate the presence of a seasonally high water table and may be modified after special investigation.

2. Soils in which restrictive horizons are six inches (6") or more in thickness and at depths greater than forty-eight inches (48") below the ground surface shall be considered suitable as to depth to restrictive horizons. Restrictive horizons six inches (6") or more in thickness and at depths between forty-eight inches and twenty-four inches (48-24") shall be considered provisionally suitable as to depth to restrictive horizons. Restrictive horizons six inches (6") or more in thickness encountered at depths less than twenty-four inches (24") below the ground surface shall be considered unsuitable as to depth to restrictive horizons.

(J) Other Applicable Factors. The site evaluation should include consideration of any other applicable factors involving environmental principles including:

1. The potential environmental hazard of possible failures of soil absorption systems involving large quantities of sewage, which would dictate larger separation distances than the minimums specified in subsection (1)(D) of this rule; and

2. The potential environmental and health hazard of possible massive failures of soil absorption systems proposed to serve large numbers of residences, as in residential subdivisions or mobile home parks.

(K) Determination of Overall Site Suitability. All of the criteria in subsections (7)(E)-(J) of this rule shall be determined to be suitable, provisionally suitable or unsuitable as indicated. If all criteria are classified the same, that classification shall prevail. Where there is a variation in classification of the several criteria, the following shall be



used in making the overall site classification. The lowest of the uncorrectable characteristics will determine the overall site classification. The administrative authority shall make this determination—

1. If the topography is classified as unsuitable, it may be reclassified provisionally suitable under the conditions outlined in subsection (7)(E) of this rule;

2. If the soil texture is classified as unsuitable, the overall classification will be unsuitable regardless of the other criteria unless the provisions of subsection (6)(K) of this rule are met;

3. If the soil structure is classified as unsuitable, the overall classification will be unsuitable regardless of the other criteria unless the provisions of subsection (6)(K) of this rule are met;

4. When soil thickness is classified as unsuitable, it may be reclassified as provisionally suitable under the conditions outlined in subsection (7)(H) of this rule;

5. When the restrictive horizon is classified unsuitable, it may be reclassified as provisionally suitable under the conditions outlined in subsection (6)(K) of this rule; and

6. When drainage (groundwater level) is unsuitable, it may be reclassified as provisionally suitable under the conditions outlined in subsection (7)(G) of this rule.

(L) Site Classification. Sites classified as suitable may be utilized for a ground absorption sewage treatment and disposal system consistent with this rule. A suitable classification generally indicates soil and site conditions favorable for the operation of a ground absorption sewage treatment and disposal system or have slight limitations that are readily overcome by proper design and installation.

1. Sites classified as provisionally suitable may be utilized for a ground absorption sewage treatment and disposal system consistent with this rule but with moderate limitations. Sites classified provisionally suitable require some modifications and careful planning, design and installation for a ground absorption sewage treatment and disposal system to function satisfactorily.

2. Sites originally classified as unsuitable may be used for soil absorption disposal systems, provided engineering, hydrogeologic and soil studies indicate to the administrative authority that a suitable septic tank system or a suitable alternate system can reasonably be expected to function satisfactorily. These sites may be reclassified as provisionally suitable upon submission to the administrative authority and meeting the department's requirements in subsection (6)(K) of this rule.

(M) Design Criteria. Tables 13 and 14 shall be used when determining application

rates for the appropriate sewage disposal system design.

1. Table 13 shall be used when determining the application rate for septic tank systems of conventional design when using the site evaluation criteria in this rule.

2. The construction of any conventional or LPP system must meet the other applicable requirements as set forth in section (6) of this rule. Soils for LPP systems must be classified as suitable or provisionally suitable to a depth of two feet (2') from the original ground surface. Table 14 shall be used when determining the application rate when using the site evaluation criteria in this rule.



**Table 13 - Application Rates by Soil Groups for Conventional Systems**

Soil Group	Soil Texture	Soil Structure/ Color	Application Rate (gpd./sq.ft.)
I	Sand, Loamy sand	Any striation/Brown (No gray)	(conventional) 1.2 - 0.8
II	Sandy loam, Loam	Granular, fine and medium subangular blocky	0.9 - 0.7
	Sandy loam, Loam	Prismatic; coarse, subangular, and angular blocky	0.7 - 0.5
III	Silt loam, Clay loam, Sandy clay loam, Silty clay loam	Granular, fine, and medium subangular blocky	0.6 - 0.4
	Silt loam, Clay loam, Sandy clay loam, Silty clay loam	Prismatic, coarse subangular and angular blocky	0.4 - 0.3
IVa	Sandy clay, Silty clay, Clay (low to moderate shrink/swell)	Granular, fine, and medium subangular blocky	0.4 - 0.2
	Sandy clay, Clay, Silty clay (low-moderate shrink/swell)	Prismatic; coarse subangular or angular blocky	0.3 - 0.1
IVb	Sandy clay, Clay, Silty clay loam, Silty clay (high shrink/swell potential)	Subangular, Angular blocky, or Prismatic	Not suitable
V	Skeletal (less than 50% coarse fragments), Silt loam, Silty clay loam, Clay, Silty clay	Anything but platy or massive	0.4 - 0.2

**Table 14 - Application Rates by Soil Group**

<b>Soil Group</b>	<b>Soil Texture</b>	<b>Classes</b>	<b>Application Rate Low Pressure Pipe) (gpd/sq. ft.)</b>
I	Sand, Loamy Sand	No structure (Brown colors)	0.5–0.4
II	Sandy loam, Loam	Granular; fine and medium subangular blocky	0.4–0.35
	Sandy loam, Loam	Prismatic; coarse subangular and angular blocky	0.3–0.2
III	Silt loam, Clay loam Sandy clay loam, Silty clay loam	Granular; fine and medium subangular blocky	0.3–0.2
	Silt loam, Clay loam, Sandy clay loam, Silty clay loam	Prismatic; coarse subangular and angular blocky	0.20–0.15
IVa	Sandy clay, Silty clay, Clay (low to moderate shrink/swell)	Granular; fine and medium subangular blocky	0.2–0.1
	Sandy clay, Clay, Silty clay	Prismatic; coarse subangular or angular blocky	0.1–0.05
IVb	Clay, Sandy clay, Silty clay loam, Clay loam, Silty clay (high shrink/ swell potential)	Subangular, Angular blocky, or Prismatic	Not suitable
V	Skeletal (less than 50%), Silt loam, Silty clay loam, Clay, Silty clay	Anything but platy or massive	0.3–0.15



*AUTHORITY: sections 701.040(1) and 701.043.1., RSMo 1994.\* Emergency rule filed April 17, 1995, terminated April 26, 1995. Original rule filed April 17, 1995, effective Dec. 30, 1995.*

*\*Original authority: 701.040 and 701.043, RSMo 1994.*

### 19 CSR 20-3.070 Requirements for On-Site Wastewater Treatment System Inspectors/Evaluators

*PURPOSE: This rule establishes criteria for inclusion on the lists of those individuals licensed to inspect or evaluate on-site wastewater treatment systems for the purposes of real estate transactions.*

*PUBLISHER'S NOTE: The secretary of state has determined that the publication of the entire text of the material which is incorporated by reference as a portion of this rule would be unduly cumbersome or expensive. This material as incorporated by reference in this rule shall be maintained by the agency at its headquarters and shall be made available to the public for inspection and copying at no more than the actual cost of reproduction. This note applies only to the reference material. The entire text of the rule is printed here.*

(1) Applicability. The requirements and procedures included in this rule apply to individuals qualified to perform inspections and/or evaluations of existing on-site wastewater treatment systems upon a request from a lending institution, a prospective purchaser, the owner of the property, a real estate agent, or a real estate broker.

#### (2) Definitions.

(A) "Administrative authority" shall mean the department or local public health agencies, planning and zoning commissions, county building departments, county public works departments, sewer districts, and/or municipalities that have authority to govern on-site wastewater treatment systems.

(B) "Department" shall mean the Missouri Department of Health and Senior Services.

(C) "Lending institution" shall mean a bank, savings and loan association, credit union, consumer credit lender, mortgage banker, or any other association or institution, which makes real estate loans.

(D) "Licensed individual" shall mean any person, including staff of local administrative authorities, licensed by the department, to inspect or evaluate an existing on-site wastewater treatment system for the purposes of a real estate transaction.

(E) "On-site wastewater treatment system (OWTS)" shall mean any system handling, or treatment facility receiving, domestic sewage which discharges three thousand (3,000) gallons per day or less into a subsurface soil absorption system or a single-family residence lagoon.

(F) "Property owner" shall mean the person with the legal right to possession of real estate.

(G) "Requesting party" shall mean a lending institution, a prospective purchaser, the property owner, a real estate agent, or a real estate broker who requests an inspection or evaluation of an OWTS serving a property that is the subject of a real estate transaction.

(3) An individual must be licensed with the department to inspect or evaluate an existing OWTS upon the request from a lending institution, which is providing either a government loan or conventional loan, or from another requesting party in connection with a real estate transaction. If the inspection or evaluation determines that the OWTS does not meet department standards, any new construction, major modification, or major repair must be conducted according to the standards set forth in sections 701.025 through 701.059, RSMo, and any rules promulgated thereunder or applicable local OWTS ordinance.

(4) As deemed necessary by the department, an inspection or evaluation of an OWTS will include a microbiological test and other examination(s) of the private water supply intended for potable use serving the same property as the OWTS. In addition, the inspection or evaluation will include an inspection of any visible portion of the water supply construction, from the source to the storage vessel, and may include review of the well drilling reports.

(5) If it is necessary to enter any adjoining property in the course of an inspection or evaluation to properly make a determination regarding the OWTS inspection/evaluation, a licensed individual shall notify the owner of the adjoining property and obtain permission before entry is made.

(6) An individual must be licensed with the department to perform inspections and evaluations of existing OWTS for the purposes of a real estate transaction. To be licensed with the department, an individual shall:

(A) Complete a basic installer training course conducted by or approved by the department with a score of seventy percent (70%) or higher;

(B) Complete a licensed inspector training course conducted by or approved by the

department with a score of seventy percent (70%) or higher; and

(C) Complete the department's licensing process described in section (7) of this rule.

#### (7) Department's Licensing Process.

(A) The license shall be issued to only one (1) individual person and not to a company, firm, association, or other group. The license is not transferable.

(B) To obtain a license from the department, an individual must submit a completed application packet to the department for approval. Completed application packets shall be mailed to the Missouri Department of Health and Senior Services, Attention: Fee Receipts, PO Box 570, Jefferson City, MO 65102-0570.

(C) The application packet shall include the following:

1. The completed application form, Mo Form #1 (6-08), Application for Licensure, is incorporated by reference in this rule and is available on the Internet at [www.dhss.mo.gov/Onsite](http://www.dhss.mo.gov/Onsite) or by contacting the department at PO Box 570, Jefferson City, MO 65102-0570, (573) 751-6095. This rule does not incorporate any subsequent amendments or additions;

2. Documentation of the successful completion of both the basic installers training course and licensed inspector training course; and

3. A check or money order made payable to the Missouri Department of Health and Senior Services for the nonrefundable-processing fee of ninety dollars (\$90). The processing fee may be waived for the staff of a local administrative authority that has enacted local ordinances, which include requirements for inspections of existing OWTS that are at least equal to department standards.

(8) Department's Renewal Licensing Process. An individual's license with the department shall expire thirty-six (36) months from the month of issuance unless the license has been revoked or surrendered.

(A) To renew their license with the department, an individual must submit a renewal application packet to the department for approval. Completed application packets shall be mailed to the Missouri Department of Health and Senior Services, Attention: Fee Receipts, PO Box 570, Jefferson City, MO 65102-0570.

(B) The renewal application packet shall include:

1. The completed application form, Mo Form #2 (6-08), Application for Licensure Renewal, is incorporated by reference in this rule and is available on the Internet at [www.dhss.mo.gov/Onsite](http://www.dhss.mo.gov/Onsite) or by contacting



the department at PO Box 570, Jefferson City, MO 65102-0570, (573) 751-6095. This rule does not incorporate any subsequent amendments or additions;

2. A check or money order made payable to the Missouri Department of Health and Senior Services for the nonrefundable-processing fee of ninety dollars (\$90). The processing fee may be waived for the staff of a local administrative authority that has enacted local ordinances, which include requirements for inspections of existing OWTS that are at least equal to department standards; and

3. Documentation of the applicant's successful completion, within the previous thirty-six (36) months of the following minimum continuing education:

A. For individuals who are renewing their license for the first time, at least twenty (20) hours of department-approved continuing education units of which at least eight (8) continuing education units shall meet select department criteria; or

B. For individuals who are renewing their license for the second or subsequent time, at least twelve (12) hours of department-approved continuing education units of which at least eight (8) continuing education units shall meet select department criteria.

(C) Individuals submitting a renewal application more than fifteen (15) calendar days after the previous license expires shall pay a late charge of ten dollars (\$10) in addition to the ninety-dollar (\$90) processing fee.

(D) License renewal applications will not be accepted if received by the department more than forty-five (45) calendar days after the previous license expires. Individuals submitting license renewal applications more than forty-five (45) calendar days after the expiration of their license will be required to complete the initial licensing process, including any department training requirements for an initial license.

(9) A fifteen-dollar (\$15) processing fee will be assessed for duplicate and/or replacement license identification cards.

(10) Standards of Practice for Licensed Individuals.

(A) A licensed individual shall:

1. Possess a current license with the department before conducting any inspection or evaluation of an OWTS;

2. Inspect or evaluate only those OWTS for which requests have been made for the purposes of real estate transactions. Investigations of complaints or alleged violations of Chapter 701, RSMo, may only be made by the department or a local administrative authority;

3. As part of an OWTS inspection or evaluation, collect a water sample from a private water supply for microbiological testing and inspect any visible portion of the water supply construction, from the source to the storage vessel;

4. Record their license number on all bids, proposals, contracts, invoices, inspection reports, evaluation reports, and other correspondence with the requesting party or the department;

5. Apply department standards for all inspections and evaluations of OWTS using the correct procedures and forms to complete the inspection or the evaluation. Combining inspection and evaluation procedures or forms is not acceptable;

6. Document inspections and evaluations accurately in writing on department-approved forms;

7. Clearly state any defect(s), if the OWTS is found to be malfunctioning or otherwise not meeting department standards;

8. Retain one (1) copy of the completed documentation of the inspection or evaluation for at least three (3) years and submit a copy to the department, the local administrative authority, if applicable, the requesting party, and the property owner;

9. Submit completed inspection/evaluation reports to the department within thirty (30) calendar days of completion, including water sample results if applicable; and

10. Notify the property owner that he/she is not obligated to contract for repair or re-inspection services with the initial licensed individual if the OWTS has been found to be malfunctioning or otherwise not meeting department standards. However, this paragraph does not preclude the licensed individual from offering these services to the owner.

(11) The department may audit the work of a licensed individual at any time to determine whether the standards of practice, as defined by this rule, are being met. Failure to adhere to department standards may be cause for placement on probation, suspension, or revocation of the license, or for mandatory successful completion of a training course and/or testing as described in section (6) of this rule. The audit may be an unannounced visit to the property inspected or evaluated, or a visit during an inspection or evaluation with or without prior appointment with the licensed individual.

(12) A licensed individual may have his/her license placed on probation, suspended, or revoked if the individual:

(A) Fails an audit or refuses to participate in an audit;

(B) Fails to submit reports, submits false reports, or allows another individual to use his/her license;

(C) Is convicted of a violation of any provisions of sections 701.025 through 701.059, RSMo, or any rules promulgated under these statutes;

(D) Has pled guilty or has been found guilty of an infraction, misdemeanor, or felony involving misrepresentation, fraud, or other crime relating to activities of inspecting, evaluating, installing, repairing, or otherwise associated with an OWTS;

(E) Directs or allows an unlicensed individual to conduct any part of an inspection or evaluation of an OWTS; or

(F) Fails to comply with the standards of practice established in this rule.

(13) The suspension or revocation of an individual's license shall be served in writing by certified mail or personal service to the affected individual or his/her representative. The decision of the department may be appealed to the Administrative Hearing Commission as provided in Chapters 536 and 621, RSMo.

(14) Any individual whose license has been revoked may not reapply for a license for at least one (1) year from date of revocation, must complete the department's training requirements for licensure described in section (6) of this rule, and complete the department's licensing process as described in section (7) of this rule.

(15) An individual may be permanently barred from reapplying for a license if the individual:

(A) Has pled guilty or has been found guilty of an infraction, misdemeanor, or felony involving misrepresentation, fraud, or other crime relating to activities associated with an OWTS; or

(B) Has his/her license revoked a second time within five (5) years.

(16) No person without a valid license may conduct any part of an inspection or evaluation of an OWTS, whether on his/her own or under supervision of a person with a valid license. Persons conducting inspections or evaluations without the required license, or representing themselves as licensed, are considered in violation of section 701.053, RSMo, which is a class A misdemeanor.

*AUTHORITY: section 701.033, RSMo Supp. 2008 and sections 701.046 and 701.051, RSMo 2000.\* Emergency rule filed April 17, 1995, terminated April 26, 1995. Original rule filed April 17, 1995, effective Dec. 30,*



1995. Rescinded and readopted: Filed Oct. 22, 2008, effective May 30, 2009.

\*Original authority: 701.033, RSMo 1986, amended 1993, 1994, 1995, 2004; 701.046, RSMo 1994; and 701.051, RSMo 1994, amended 1997.

**19 CSR 20-3.080 Requirements for Percolation Testers, On-Site Soils Evaluators and Registered On-Site Wastewater Treatment System Installers**

*PURPOSE: This rule establishes the criteria for inclusion on the lists of those individuals qualified to perform percolation tests and/or soils morphology evaluations in determining soil properties for on-site wastewater treatment systems and for inclusion on the registered on-site wastewater system installers list in accordance with sections 701.025 through 701.059, RSMo.*

*PUBLISHER’S NOTE: The secretary of state has determined that the publication of the entire text of the material which is incorporated by reference as a portion of the rule would be unduly cumbersome or expensive. This material as incorporated by reference in this rule shall be maintained by the agency at its headquarters and shall be made available to the public for inspection and copying at no more than the actual cost of the reproduction. This note applies only to the reference material. The entire text of the rule is printed here.*

(1) Applicability. The requirements and procedures included in this rule apply to individuals qualified to perform percolation tests and/or soil morphology evaluations and installers who are seeking inclusion on the department’s on-site wastewater treatment systems professionals registry.

(2) Definitions.

(A) “Administrative authority” shall mean the department or local public health agencies, planning and zoning commissions, county building departments, county public works departments, sewer districts, and/or municipalities that have authority to govern individual on-site wastewater treatment systems.

(B) “Advanced on-site wastewater treatment system (OWTS) installer” shall mean an individual registered by the department to install advanced OWTS as listed by the department.

(C) “Basic on-site wastewater treatment system (OWTS) installer” shall mean an individual registered by the department to install basic OWTS as listed by the department.

(D) “Department” shall mean the Missouri Department of Health and Senior Services.

(E) “Installer” shall mean any individual, other than a homeowner, who installs a system for their own personal use, who alters, extends, repairs, or constructs an OWTS, including but not limited to, excavating or earthmoving work connected with the construction of an OWTS on behalf of, or under contract with, the property owner.

(F) “Licensed professional engineer” shall mean any person authorized pursuant to the provisions of Chapter 327, RSMo, to practice as a professional engineer in Missouri, as the practice of engineering is defined in section 327.181, RSMo.

(G) “On-site soil evaluator” shall mean individuals including soil scientists, licensed professional engineers, and registered geologists meeting the requirements of this rule.

(H) “On-site wastewater treatment system (OWTS)” shall mean any system handling, or treatment facility receiving, domestic sewage which discharges three thousand (3,000) gallons per day or less into a subsurface soil absorption system or a single-family residence lagoon.

(I) “Registered geologist” shall mean any person authorized pursuant to the provisions of Chapter 256, RSMo, to practice as a registered geologist in Missouri, as defined in section 256.453(10), RSMo.

(J) “Soil morphology evaluation” shall mean the method of testing or evaluating absorption qualities of the soil by physical examination of the soil’s color, mottling, texture, structure, topography, and hill-slope position.

(K) “Soil scientist” shall mean a person that has successfully completed at least fifteen (15) semester credit hours of soils science course work, including at least three (3) hours of course work in soil morphology and interpretations.

(3) An individual must be registered with the department to conduct any part of a percolation test or soil morphology evaluation in which results are intended for use in the design or installation of an OWTS according to the standards set forth in sections 701.025 through 701.059, RSMo, and 19 CSR 20-3.060.

(A) Percolation Tests. To register with the department to conduct percolation tests, an individual shall:

1. Successfully complete a training course conducted by or approved by the department, which shall include, at a minimum, course work, field work, a written examination, and a practical examination; or
2. Meet the definition of an on-site soil

evaluator, licensed professional engineer, or registered geologist; and

3. Complete the department’s registration process described in section (5) of this rule.

(B) Soil Morphology Evaluations. To register with the department to perform soils morphology evaluations, an individual shall:

1. Meet the definition of a soil scientist with at least fifteen (15) semester credit hours of soils science course work, including at least three (3) hours of course work in soil morphology and interpretations; or

2. Meet the definition of a licensed professional engineer or registered geologist with at least ten (10) semester credit hours of soils science course work, including at least three (3) hours of course work in soil morphology and interpretations; and

3. Complete a written and field test conducted by or approved by the department with a score of seventy percent (70%) or higher on all sections of each examination; and

4. Complete the department’s registration process described in section (5) of this rule.

(4) An individual must be registered with the department, with the exception of a homeowner meeting the requirements of section 701.055, RSMo, to install an OWTS. Only installers registered as advanced OWTS installers shall install systems listed by the department as advanced OWTS.

(A) Basic OWTS Installer. To register with the department as a basic OWTS installer, an individual shall:

1. Complete a basic installer training course conducted by or approved by the department with a score of seventy percent (70%) or higher; and

2. Complete the department’s registration process described in section (5) of this rule.

(B) Advanced OWTS Installer. To register with the department as an advanced OWTS installer, an individual shall:

1. Possess a basic OWTS installer’s registration in good standing;

2. Complete an advanced OWTS installer training course conducted by or approved by the department with a score of seventy percent (70%) or higher; and

3. Complete the department’s registration process described in section (5) of this rule.

(5) Department’s Registration Process.

(A) To register with the department, an individual must submit a completed application packet to the department for approval. Completed application packets shall be





mailed to the Missouri Department of Health and Senior Services, Attention: Fee Receipts, PO Box 570, Jefferson City, MO 65102-0570.

(B) The application packet shall include the following:

1. The completed application form, Mo Form #1 (6-08), Application for Registration, which is incorporated by reference in this rule and is available on the Internet at [www.dhss.mo.gov/Onsite](http://www.dhss.mo.gov/Onsite) or by contacting the department at PO Box 570, Jefferson City, MO 65102-0570, (573) 751-6095. This rule does not incorporate any subsequent amendments or additions;

2. For on-site soil evaluators, mail an original transcript from the college or university attended directly from the registrar to the Missouri Department of Health and Senior Services, Attention: Bureau of Environmental Regulation and Licensure, PO Box 570, Jefferson City, MO 65102-0570. If requested, provide course descriptions from the college or university attended to verify the nature of the course work;

3. For percolation testers and on-site soil evaluators, provide proof of licensure as a professional engineer or certificate of registration by the Board of Geologist Registration indicating the registrant is in good standing, if applicable; and

4. A check or money order made payable to the Missouri Department of Health and Senior Services for the nonrefundable-processing fee of ninety dollars (\$90).

(6) Department's Temporary and Probationary Registration Process.

(A) Upon completion of the department's registration process described in section (5) of this rule, the department may issue a one (1)-time temporary basic OWTS installer registration, valid for no more than one hundred eighty (180) calendar days for work in a specific county or counties. The temporary basic OWTS registration will be converted to a basic OWTS installer registration upon completion of a training course conducted by or approved by the department. Failure to complete the training or the department's registration process will result in termination of the individual's temporary basic OWTS installer registration.

(B) The department may issue a probationary basic OWTS installer registration for work in a specific county or counties. This registration will be valid for a specific period of time, as determined by the department, and will be dependent on the registered individual meeting and maintaining specific requirements as established by the department and completing the department's regis-

tration process as described in section (5) of this rule.

(7) Department's Renewal Registration Process. An individual's registration with the department shall expire thirty-six (36) months from its effective date unless the registration has been revoked or surrendered.

(A) To renew his or her registration with the department, an individual must submit a renewal application packet to the department for approval. Completed application packets shall be mailed to the Missouri Department of Health and Senior Services, Attention: Fee Receipts, PO Box 570, Jefferson City, MO 65102-0570.

(B) The renewal application packet shall include:

1. The completed application form, Mo Form #2A (6-08), Application for Registration Renewal, which is incorporated by reference in this rule and is available on the Internet at [www.dhss.mo.gov/Onsite](http://www.dhss.mo.gov/Onsite) or by contacting the department at PO Box 570, Jefferson City, MO 65102-0570, (573) 751-6095. This rule does not incorporate any subsequent amendments or additions;

2. A check or money order made payable to the Missouri Department of Health and Senior Services for the nonrefundable-processing fee of ninety dollars (\$90); and

3. Documentation of the applicant's successful completion, within the previous thirty-six (36) months, of the following minimum continuing education:

A. For on-site soil evaluators, percolation testers, and basic and advanced OWTS installers who are renewing their registration for the first time, at least twenty (20) hours of department-approved continuing education units of which at least eight (8) continuing education units shall meet select department criteria;

B. For on-site soil evaluators and advanced OWTS installers who are renewing their registration for the second or subsequent time, at least twelve (12) hours of department-approved continuing education units of which at least eight (8) continuing education units shall meet select department criteria related to their OWTS profession; or

C. For basic OWTS installers and percolation testers who are renewing their registration for the second or subsequent time, at least eight (8) hours of department-approved continuing education units.

(C) Individuals submitting a renewal application more than fifteen (15) calendar days after the previous registration expires shall pay a late charge of ten dollars (\$10) in addition to the ninety dollar (\$90) registration-processing fee.

(D) Registration renewal applications will not be accepted if received by the department more than forty-five (45) calendar days after the previous registration expires. Individuals submitting registration renewal applications more than forty-five (45) calendar days after expiration of their registration will be required to complete the initial registration process, including any department training requirements for an initial registration.

(8) A fifteen-dollar (\$15) processing fee will be assessed for duplicate and/or replacement registration identification cards.

(9) Standards of Practice for Percolation Testers, On-Site Soil Evaluators, and OWTS Installers.

(A) A percolation tester or on-site soil evaluator shall:

1. Possess a current registration with the department before performing any activities related to a percolation test or soil morphology evaluation;

2. Record their registration number on all bids, proposals, contracts, invoices, percolation test reports, soil morphology evaluation reports, and other correspondence with the property owner or administrative authority;

3. Provide true and accurate information on any application, percolation test report, soil morphology evaluation report, and any other OWTS documentation;

4. Maintain a current address and phone number with the department and submit any address or phone number changes to the department in writing within thirty (30) calendar days of the change taking place;

5. Conduct percolation tests in accordance with section (2) of 19 CSR 20-3.060; and

6. Conduct site/soil morphology evaluations in accordance with the standards detailed in sections (2) and (7) of 19 CSR 20-3.060. Specifically, the on-site soil evaluator shall:

A. Evaluate the nine (9) items listed in paragraphs (2)(A)2. through 10. of 19 CSR 20-3.060;

B. Evaluate and classify six (6) site factors listed in subsection (7)(C) of 19 CSR 20-3.060, as suitable, provisionally suitable, or unsuitable according to subsections (7)(E) through (L) of 19 CSR 20-3.060;

C. Include a diagram showing location and extent of the area(s) evaluated;

D. Make recommendations regarding the use and effectiveness of water lowering systems when there is evidence of a high water table; and

E. Based on subsection (7)(M) and



Tables 13 and 14 of 19 CSR 20-3.060, for horizons that are not classified as unsuitable, assign a conventional soil loading rate for each horizon and assign an alternative soil loading rate for each horizon to a depth of at least twelve inches (12") below the likely depth of an alternative system.

(B) A registered basic OWTS installer or a registered advanced OWTS installer shall:

1. Possess a current basic OWTS installer registration or advanced OWTS installer registration with the department before beginning construction of any OWTS;

2. Record their registration number on all bids, proposals, contracts, invoices, permit application construction drawings, and other correspondence with the property owner or administrative authority;

3. Provide true and accurate information on any application and any other OWTS documentation;

4. Notify the administrative authority if their involvement as the registered installer with the permit application and OWTS changes;

5. Begin the construction of an OWTS only after obtaining approval from the administrative authority, unless approval is not required;

6. Construct the OWTS meeting the construction standards and permit criteria required by sections 701.025 through 701.059, RSMo, and any rule adopted thereunder or the more stringent requirements of the administrative authority, if applicable;

7. Construct the OWTS that has been authorized by the administrative authority for the specific location identified in the application;

8. Be present at the construction site during construction and supervise all construction activities;

9. Provide required notice and an opportunity for inspection prior to completion of the OWTS installation as required by the administrative authority;

10. Submit complete and accurate "certification without on-site inspection form," when requested;

11. Not create or increase a health or safety hazard, nuisance condition, or surface water or groundwater contamination when constructing, repairing, modifying, or troubleshooting an OWTS; and

12. Maintain a current address and phone number with the department and submit any address or phone number changes to the department in writing within thirty (30) calendar days of the change taking place.

(10) The department may audit the work of a percolation tester, on-site soil evaluator, reg-

istered basic OWTS installer, or registered advanced OWTS installer at any time to determine whether the standards of practice, as defined by this rule, are being met. Failure to adhere to department standards may be cause for placement on probation, suspension, or revocation of the registration, or for mandatory successful completion of a training course and/or testing as described in sections (3) and (4) of this rule. The audit may be an unannounced visit to the property on which the percolation test, soil morphology examination, or OWTS installation was conducted, which may include an independent soil percolation test or soil morphology examination, or a visit within the period of a soil percolation test, soil morphology examination, or OWTS installation with or without prior appointment with the registered individual.

(11) A percolation tester, on-site soil evaluator, registered basic OWTS installer, or registered advanced OWTS installer may have their registration placed on probation, suspended, or revoked if the individual:

(A) Fails to maintain any professional license necessary for registration as a percolation tester or on-site soil evaluator;

(B) Fails an audit or refuses to participate in an audit;

(C) Fails to submit reports, submits false reports, or allows another individual to use his/her registration;

(D) Is convicted of a violation of any provisions of sections 701.025 through 701.059, RSMo, or any rules promulgated under these statutes;

(E) Has pled guilty or has been found guilty of an infraction, misdemeanor, or felony involving misrepresentation, fraud, or other crime relating to activities of percolation testing, soil morphology evaluations, installing, repairing, inspecting, or otherwise associated with an OWTS;

(F) Directs or allows an unregistered individual to conduct a percolation test or soil morphology examination;

(G) Directs or allows an unregistered individual to install an OWTS without direct supervision; or

(H) Fails to comply with the standards of practice established by this rule.

(12) The suspension or revocation of a percolation tester's, on-site soil evaluator's, or OWTS installer's registration shall be served in writing by certified mail or personal service to the affected individual or his/her representative. The decision of the department may be appealed to the Administrative

Hearing Commission as provided in Chapters 536 and 621, RSMo.

(13) Any individual whose registration has been revoked may not reapply for registration for at least one (1) year from date of revocation, and must complete the department's training requirements for registration described in sections (3) and (4) of this rule and complete the department's registration process as described in section (5) of this rule.

(14) An individual may be permanently barred from reapplying for registration if the individual:

(A) Has pled guilty or has been found guilty of an infraction, misdemeanor, or felony involving misrepresentation, fraud, or other crime relating to activities associated with an OWTS; or

(B) Has his/her registration revoked a second time within five (5) years.

(15) No person without a valid registration may conduct any part of a percolation test or soil morphology evaluation for an OWTS, whether on their own or under supervision of a person with a valid registration. Persons conducting percolation tests or soil morphology evaluations without the required registration, or representing themselves as registered, are considered in violation of section 701.053, RSMo, which is a class A misdemeanor.

(16) No person as defined in section 701.025, RSMo, may authorize, permit, or knowingly allow a percolation test or soil morphology evaluation for an OWTS by an unregistered individual or the installation of an OWTS by an unregistered individual other than the homeowner.

*AUTHORITY: section 701.033, RSMo Supp. 2008 and section 701.040, RSMo 2000.\* Emergency rule filed April 17, 1995, terminated April 26, 1995. Original rule filed April 17, 1995, effective Dec. 30, 1995. Emergency amendment filed Sept. 2, 2004, effective Sept. 12, 2004, expired March 10, 2005. Rescinded and readopted: Filed Sept. 2, 2004, effective Feb. 28, 2005. Amended: Filed Oct. 22, 2008, effective May 30, 2009.*

*\*Original authority: 701.033, RSMo 1986, amended 1993, 1994, 1995, 2004 and 701.040, RSMo 1994.*