Utah Admin. Code 317-4-6

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Section R317-4-6 - Design Requirements
6.1. System Location.
A. Onsite wastewater systems are not suitable in some areas and situations. Location and installation of each system shall be such that with reasonable maintenance, it will function in a sanitary manner and will not create a nuisance, public health hazard, or endanger the quality of any waters of the state.
B. In determining a suitable location for the system, due consideration shall be given to such factors as:
1. the minimum setbacks in Section R317-4-13 Table 2;
2. size and shape of the lot;
3. slope of natural and final grade;
4. location of existing and future water supplies;
5. depth of ground water and bedrock;
6. soil characteristics and depth;
7. potential flooding or storm catchment;
8. possible expansion of the system; and
9. future connection to a public sewer system.
6.2. Minimum Setback Distances.
All systems, including the replacement area, shall conform to the minimum setback distances in Section R317-4-13 Table 2.

6.3. Maximum Ground Slope.
All absorption systems, including the replacement area, shall conform to the ground slope requirements in Section R317-4-4.

6.4 Estimates of Wastewater Quantity.
A. Single Family Dwellings.
A minimum of 300 gallons per day, 1 or 2 bedroom, and 150 gallons per day for each additional bedroom shall be used.

B. Non-Residential Facilities.
The quantity of wastewater shall be determined accurately, preferably by actual measurement. Metered water supply figures for similar installations can usually be relied upon, providing the non-disposable consumption, if any, is subtracted. Where this data is

not available, the minimum design flow figures in Section R317-4-13 Table 3 shall be used to make estimates of flow.

C. Design Capacity.
In no event shall the anticipated maximum daily wastewater flow exceed the capacity for which a system is designed.

6.5. Non-Domestic Effluent.
Effluent shall be treated to levels at or below the defined parameters of non-domestic effluent before being discharged into an absorption system.

6.6. Building Sewer.
A. The building sewer shall have a minimum inside diameter of 4 inches and shall comply with the minimum standards in Section R317-4-13 Table 4.
1. If the sewer leaving the house is three inches, the building sewer may be three inches.
B. Building sewers shall be laid on a uniform minimum slope of not less than 1/4 inch per foot or 2.08% slope.
C. The building sewer shall have a minimum of one cleanout and cleanouts every 100 feet.
1. A cleanout is also required for each aggregate horizontal change in direction exceeding 135 degrees.
2. Ninety degree ells are not recommended.
D. Building sewers shall be separated from water service pipes in separate trenches, and by at least 10 feet horizontally, except that they may be placed in the same trench when all of the following conditions are met.
1. The bottom of the water service pipe, at all points, shall be at least 18 inches above the top of the building sewer.
2. The water service pipe shall be placed on a solid shelf excavated at one side of the common trench with a minimum clear horizontal distance of at least 18 inches from the sewer or drain line.
3. The number of joints in the water service pipe should be kept to a minimum, and the materials and joints of both the sewer and water service pipes shall be of strength and durability to prevent leakage under adverse conditions.
4. If the water service pipe crosses the building sewer, it shall be at least 18 inches above the latter within 10 feet of the crossing. Joints in water service pipes should be located at least 10 feet from such crossings.
E. Building sewer placed under driveways or other areas subjected to heavy loads shall receive special design considerations to ensure against crushing or disruption of alignment.
6.7. Septic Tank.
All septic tanks shall meet the requirements of Section R317-4-14 Appendix A and be approved by the division. Septic tanks shall be constructed of sound, durable, watertight materials that are not subject to excessive corrosion, frost damage, or decay. They shall be designed to be watertight, and to withstand all expected physical forces.

A. Liquid capacity.
1. A septic tank that serves a non-residential facility shall have a liquid capacity of at least 1-1/2 times the designed daily wastewater flow. In all cases the capacity shall be at least 1,000 gallons.
2. The capacity of a septic tank that serves a single family dwelling shall be based on the number of bedrooms that can be anticipated in the dwelling served, including the unfinished space available for conversion as additional bedrooms. Unfinished basements shall be counted as a minimum of one additional bedroom.
a. The minimum liquid capacity of the tank shall be 1,000 gallons for up to three bedroom homes.
b. The minimum liquid capacity of the tank shall be 1,250 gallons for four bedroom homes.
c. Two hundred fifty gallons per bedroom shall be added to the liquid capacity of the tank for each additional bedroom over four bedrooms.
3. The regulatory authority may require a larger capacity than specified in this subsection as needed for unique or unusual circumstances.
B. Tanks in Series.
1. No tank in the series shall be smaller than 1,000 gallons.
2. The capacity of the first tank shall be at least two-thirds of the required total septic tank volume. If compartmented tanks are used, the compartment of the first tank shall have this two-thirds capacity.
3. The connecting pipes between each successive tank shall meet the slope requirements of the building sewer and shall be unrestricted except for the inlet to the first tank and the outlet for the last tank.
C. Maximum Number of Tanks or Compartments.
The maximum number of tanks and compartments in series may not exceed three.

D. Inlets and Outlets.
Inlet or outlet devices shall conform to the following:

1. Approved tanks with offset inlets may be used where they are warranted by constraints on septic tank location.
2. Multiple outlets from septic tanks shall be prohibited unless preauthorized by the regulatory authority.
3. A gas deflector may be added at the outlet of the tank to prevent solids from entering the outlet pipe of the tank.
E. Effluent Screens.
All septic tanks may have an effluent screen installed at the outlet of the terminal tank. The screen shall prevent the passage of solid particles larger than a nominal 1/8 inch diameter sphere. The screen shall be easily removable for routine servicing by installing a riser to the ground surface, with an approved cover. Effluent screens are required for non-domestic wastewater systems, unless screening is achieved by some other means acceptable to the regulatory authority.

F. Access to Tank Interior.
Adequate access to the tank shall be provided to facilitate inspection, pumping, servicing, and maintenance, and shall have no structure or other obstruction placed over it and shall conform to all of the following requirements.

1. Riser Heights.
Watertight risers are required, extending to within 6 inches of the surface of the ground when soil covering the septic tank is greater than 6 inches. Preferably, the riser should be brought up to the final grade to encourage periodic servicing and maintenance.

a. If a septic tank is located under paving or concrete, risers shall be extended up through the paving or concrete.
b. If non-domestic wastewater is generated, risers shall be extended to the final grade.
2. Riser Diameter.
The inside diameter of the riser shall be a minimum of 20 inches.

3. Riser Covers.
Riser covers shall be designed and constructed in such a manner that:

a. they cannot pass through the access openings;
b. when closed will be child-proof;
c. will prevent entrance of surface water, dirt, or other foreign materials; and
d. seal odorous gases in the tank.
4. Riser Construction.
The risers shall be constructed of durable, structurally sound materials that are approved by the regulatory authority and designed to withstand expected physical loads and corrosive forces.

5. Multiple Risers Required.
When the tank capacity exceeds 3,000 gallons, a minimum of two access risers shall be installed.

G. Other Requirements.
Tank installation shall conform to all of the following requirements.

1. Ground Water.
a. Septic tanks located in high groundwater areas shall be designed with the appropriate weighted or anti-buoyancy device to prevent flotation in accordance with the manufacturer's recommendations.
b. The building sewer inlet of the tank may not be installed at an elevation lower than the highest anticipated groundwater elevation.
i. If the tank serves a mound or packed bed alternative system and has an electronic control panel capable of detecting water intrusion , the building sewer inlet of the tank may be installed below the maximum anticipated groundwater elevation.

(1) Any component below the anticipated maximum ground water elevation shall be water tightness tested.
2. Depth of Septic Tank.
The minimum depth of cover over the septic tank shall be at least 6 inches and a maximum of 48 inches at final grading. For unusual situations, the regulatory authority may allow deeper burial provided the following conditions are met.

a. The tank shall be approved by the division for the proposed depth and burial cover load.
b. Risers shall:
i. be installed over the access openings of the inlet and outlet baffles or sanitary tees; and
ii. conform to Subsection R317-4-6.7.F, except risers shall be at least 24 inches in diameter.
6.8. Grease Interceptor Tanks.
A grease interceptor tank or automatic grease removal device may be required by the regulatory authority to receive the drainage from fixtures and equipment with grease-laden waste. It shall be sized according to the current Plumbing Code.

A. Accessibility and Installation.
Tanks installed in the ground shall conform to Subsection R317-4-6.7.F for accessibility and installation, except risers are required and shall be brought to the surface of the ground. All interior compartments shall be accessible for inspecting, servicing, and pumping.

6.9. Pump and Recirculation Tanks.
A. Tanks shall be constructed of sound, durable, watertight materials that are not subject to excessive corrosion, frost damage, or decay. They shall be designed to be watertight, and to withstand all expected physical forces.
B. Pump tank volume shall have a liquid capacity adequate for the minimum operating volume that includes the dead space, dosing volume, and surge capacity, and shall have the emergency operation capacity of:
1. storage capacity for the system design daily wastewater flow;
2. at least two independent power sources with appropriate wiring installed; or
3. other design considerations approved by the regulatory authority that do not increase public health risks in the event of pump failure.
C. Accessibility and Installation.
Tanks shall conform to Subsection R317-4-6.7.F for accessibility and installation, except risers are required and shall be brought to the surface of the ground. All interior compartments shall be accessible for inspecting, servicing, and pumping.

D. Outlets of septic tanks upstream of pump tanks shall be fitted with an effluent screen, unless a pump vault is used in a pump tank.
6.10. Pump Vaults.
Pump vaults may be used when approved by the regulatory authority.

A. The vault shall be constructed of durable material and resistant to corrosion.

B. The vault shall have an easily accessible screen with 1/8 inch openings or smaller.
C. All components of the vault shall be accessible from the surface.
D. When a pump vault is used in a septic tank:
1. The tank size shall be increased by the larger of the following:
a. two hundred fifty gallons; or
b. ten percent of the required capacity of the tank.
2. At least two independent power sources with appropriate wiring, or other design considerations approved by the regulatory authority that do not increase public health risks, shall be installed.
3. The maximum drawdown within the tank shall be no more than 3 inches per dose.
6.11. Pumps.
See Section R317-4-14 Appendix B for details.

6.12. Sampling Ports.
When a system is required to have effluent sampling or receives non-domestic wastewater, the system shall include a sampling port at an area approved by the regulatory authority capable of sampling effluent prior to the absorption system.

6.13. Effluent Sewer.
A. The effluent sewer shall have a minimum inside diameter of 4 inches and shall comply with the minimum standards in Section R317-4-13 Table 4.
B. The effluent sewer shall extend at least 5 feet beyond the septic tank before entering the absorption system.
C. Effluent sewers shall be laid on a uniform minimum slope of not less than 1/4 inch per foot or 2.08% slope. When it is impractical, due to structural features or the arrangement of any building, to obtain a slope of 1/4 inch per foot, a sewer pipe of 4 inches in diameter or larger may have a slope of not less than 1/8 inch per foot or 1.04% slope when approved by the regulatory authority.
D. The effluent sewer lines shall have cleanouts at least every 100 feet.
E. Effluent sewer placed under driveways or other areas subjected to heavy loads shall receive special design considerations to ensure against crushing or disruption of alignment.
6.14. Absorption Systems.
A. System Types.
1. Absorption Trenches.
a. Standard Trenches.
b. Chambered Trenches.
c. Bundled Synthetic Aggregate Trenches.
2. Absorption Beds.
3. Deep Wall Trenches.
4. Seepage Pits.
B. General Requirements.
1. Replacement Area for Absorption Systems.

Adequate and suitable land shall be reserved and kept free of permanent structures, traffic, or adverse soil modification for 100% replacement of each absorption system. If approved by the regulatory authority, the area between standard trenches or deep wall trenches may be regarded as replacement area.

a. In lieu of a replacement area, two complete absorption systems shall be installed with a diversion valve. The valve shall be accessible from the final grade. The valve should be switched at least annually.
2. Protection of Absorption Systems.
The site of the initial and replacement absorption system may not be covered by asphalt, concrete, or structures, or be subject to vehicular traffic, or other activity that would adversely affect the soil, such as construction material storage, soils storage, etc. This protection applies before and after construction of the onsite wastewater system.

3. Sizing Criteria for Absorption Systems.
Absorption systems shall be sized based on Section R317-4-13 Table 5 or 6.

4. Design Criteria for Absorption Systems.
Many different designs may be used in laying out absorption systems, the choice depending on the size and shape of the available areas, the capacity required, and the topography of the dispersal area.

a. Horizontal Setbacks.
Absorption systems shall comply with the setbacks in Section R317-4-13 Table 2.

b. Sloping Ground.
Absorption systems placed in 10% or greater sloping ground shall be designed so that there is a minimum of 10 feet of undisturbed earth measured horizontally from the bottom of the distribution line to the ground surface. This requirement does not apply to drip irrigation.

c. Undisturbed Natural Earth.
That portion of absorption systems below the top of distribution pipes shall be in undisturbed natural earth.

d. Tolerance.
All piping, chambers, and the bottoms of absorption system excavations shall be designed level.

e. Distribution Pipe.
Distribution pipe for gravity-flow absorption systems shall be 4 inches in diameter and shall comply with the minimum standards in Section R317-4-13 Table 4.

i. The pipe shall be penetrated by at least two rows of round holes, each 1/2 inch in diameter, and located at approximately 6 inch intervals. The perforations should be located

at about the five o'clock and seven o'clock positions on the pipe.
ii. The open ends of the pipes shall be capped.
f. Absorption System Laterals.
Absorption system laterals should be designed to receive proportional flows of wastewater.

g. Drain Media Protection.
Drain media shall be covered with a barrier material before being covered with earth backfill.

h. Prohibitions.
i. In gravity-flow absorption systems with multiple distribution lines, the effluent sewer may not be in direct line with any one of the distribution pipes, except where drop boxes or distribution boxes are used.
ii. Any section of distribution pipe laid with non-perforated pipe may not be considered in determining the required absorption area.
iii. Perforated distribution pipe may not be placed under driveways or other areas subjected to heavy loads.
i. Exceptions.
Deep wall trenches and filled seepage pits may be allowed beneath unpaved driveways on a case-by-case basis by the regulatory authority, if the top of the distribution pipe is at least 3 feet below the final ground surface.

C. Effluent Distribution Devices.
1. Distribution Boxes.
Distribution boxes may be used on level or nearly level ground. They shall be watertight and constructed of durable, corrosion resistant material. They shall be designed to accommodate the inlet pipe and the necessary distribution lines.

a. The outlet inverts of the distribution box shall be not less than 1 inch below the inlet invert.
b. Distribution boxes shall have risers brought to final grade.
2. Drop Boxes.
Drop boxes shall be watertight and constructed of durable, corrosion resistant material and may be used to distribute effluent within the absorption system and shall meet the following requirements:

a. Drop boxes shall be designed to accommodate the inlet pipe, an outlet pipe leading to the next drop box, except for the last drop box, and one or two distribution pipes leading to the absorption system.
b. The inlet pipe to the drop box shall be at least 1 inch higher than the outlet pipe leading to the next drop box.
c. The invert of the distribution pipes shall be 1 through 6 inches below the outlet invert. If there is more than one distribution pipe, their inverts shall be at exactly the same elevation.

d. Drop boxes shall have risers brought to final grade.
3. Effluent Pump to Absorption System.
a. If a pump is used to lift effluent to an absorption system, the pump tank or pump vault shall meet the requirements of Subsection R317-4-6.9 or R317-4-6.10 and the pump and controls shall meet the requirements of Section R317-4-14 Appendix B.
b. Pumping to an absorption system may not warrant any reductions to the absorption area.
4. Other Devices.
Tees, wyes, ells, or other distributing devices may be used as needed to permit proportional flow to the branches of the absorption system. A clean out or other means of access from the surface shall be provided for these devices.

D. Effluent Distribution Methods.
1. Closed Loop.
In locations where the slope of the ground over the absorption system area is relatively flat, the trenches should be interconnected to produce a closed loop system and the trenches shall be installed at the same elevations.

2. Non-Closed Loop.
If a non-closed loop design is used, effluent shall be proportionally distributed to each lateral.

3. Serial or Sequential.
Serial or sequential distribution may be used in absorption systems designed for sloping areas, or where absorption system elevations are not equal.

a. Serial trenches shall be connected with a drop box or watertight overflow line in such a manner that a trench will be filled before the effluent flows to the next lower trench.
b. The overflow line shall be a 4-inch solid pipe with direct connections to the distribution pipes. It should be laid in a trench excavated to the exact depth required. Care must be exercised to ensure a block of undisturbed earth remains between trenches. Backfill should be carefully tamped.
4. Pressure Distribution.
a. General Requirements.
i. Conformance to Applicable Requirements.
All requirements stated elsewhere in this rule for design, setbacks, construction and installation details, performance, repairs, and abandonment shall apply.

ii. Design Criteria.
All systems that use this method shall be designed by a person certified at Level 3 in accordance with Rule R317-11.

(1) The designer shall submit details of all system components with the necessary calculations.

(2) The designer shall provide to the local health department and to the owner operation and maintenance instructions that include the minimum inspection levels in Section R317-4-13 Table 7 for the system.
iii. Record in the Chain of Title.
When a system utilizing pressure distribution exists on a property, notice of the existence of that system shall be recorded in the chain of title for that property.

b. Design.
i. Pressure distribution may be permitted on any site meeting the requirements for an onsite wastewater system if conditions in this rule can be met.
ii. Pressure distribution should be considered when:
(1) effluent pumps are used;
(2) the flow from the dwelling or structure exceeds 3,000 gallons per day;
(3) soils are a Type 1 or have a percolation rate faster than five minutes per inch; or
(4) soils are a Type 5 or have a percolation rate slower than 60 minutes per inch.
iii. The Utah Guidance for Performance, Application, Design, Operation and Maintenance: Pressure Distribution Systems document shall be used for design requirements, along with the following:
(1) Dosing pumps, controls and alarms shall comply with Section R317-4-14 Appendix B.
(2) Pressure distribution piping.
(a) All pressure transport, manifold, lateral piping, and fittings shall meet PVC Schedule 40 standards or equivalent.
(b) The ends of lateral piping shall be constructed with sweep elbows or an equivalent method to bring the end of the pipe to final grade. The ends of the pipe shall be provided with threaded plugs, caps, or other devices acceptable to the regulatory authority to allow for access and flushing of the lateral.
E. Design of Absorption Systems.
i. An absorption system shall be designed to approximately follow the ground surface contours so that variation in excavation depth will be minimized. The excavations could be installed at different elevations, but the bottom of each individual excavation shall be level throughout its length.
ii. Absorption systems should be constructed as shallow as is possible to promote treatment and evapotranspiration.
iii. Observation ports may be placed to observe the infiltrative surfaces of the trenches or beds.
1. Absorption Trenches.
a. Absorption trenches shall conform to the following:
i. The minimum required effective absorption area shall be calculated using Section R317-4-13 Table 5 or 6.
ii. The effective absorption area of absorption trenches shall be calculated as the total bottom area of the excavated trench system in square feet.
iii. Minimum number of absorption trenches: 2.

iv. Maximum length of absorption trenches, not including connecting trenches: 150 feet.
v. Minimum spacing of absorption trenches from wall to wall: 7 feet.
vi. Minimum width of absorption trench excavations: 24 inches.
vii. Maximum width of absorption trench excavations: 36 inches.
viii. Minimum depth of absorption trench excavations below original, natural grade: 10 inches.
ix. Minimum depth of soil cover over the absorption trenches: 6 inches.
x. Minimum separation from the bottom of the absorption trenches to:
(1) the anticipated maximum ground water table: 24 inches; and
(2) unsuitable soil or bedrock formations: 48 inches.
b. Standard Trenches.
Standard trenches shall conform to the following:

i. Top of distribution pipe may not be installed above original, natural grade.
ii. The distribution pipe shall be centered in the absorption trench and placed the entire length of the trench.
iii. Drain media shall extend the full width and length of the trenches to a depth of at least: 12 inches.
iv. Minimum depth of drain media under the distribution pipe: 6 inches.
v. Minimum depth of drain media over the distribution pipe: 2 inches.
vi. Minimum depth of cover over the barrier material: 6 inches.
c. Chambered Trenches.
Chambered trenches shall conform to the following:

i. All chambers shall meet International Association of Plumbing and Mechanical Officials (IAPMO) Standard PS 63-2005, which is hereby incorporated into this rule by reference.
ii. The minimum required effective absorption area of chambered trenches shall be calculated:
(1) for Type A Chambers as: 36 inches; and
(2) for Type B Chambers as: 24 inches;
(3) using Section R317-4-13 Table 5 or 6 and may be reduced by: 30%.
iii. The chambered trenches shall be designed and installed in conformance with manufacturer recommendations, as modified by these rules.
iv. Type A Chambers.
(1) Minimum width of chambers: 30 inches.
(2) Maximum width of trench excavations: 36 inches.
v. Type B Chambers.
(1) Minimum width of chambers: 22 inches.
(2) Maximum width of trench excavations: 24 inches.
vi. Minimum elevation of the inlet pipe invert from the bottom of the chamber: 6 inches.
vii. All chambers shall have a splash plate under the inlet pipe or another design feature to avoid unnecessary channeling into the trench bottom.

viii. Inlet and outlet effluent sewer pipes shall enter and exit the chamber endplates.
ix. Minimum depth of cover over the chambers: 12 inches.
The depth of cover may be reduced to no less than 6 inches, if approved by the regulatory authority, considering the protection of absorption systems as required in Subsection R317-4-6.14.B.2, and other activities, as determined by the authority.

d. Bundled Synthetic Aggregate Trenches.
Bundled synthetic aggregate trenches shall conform to the following.

i. All synthetic aggregate bundles shall meet IAPMO Standards for the General, Testing and Marking and Identification of the guide criteria for Bundled Expanded Polystyrene Synthetic Aggregate Units.
ii. The effective absorption area of bundled synthetic aggregate trenches shall be calculated as the total bundle length times the total bundle width in square feet.
iii. The bundled synthetic aggregate trenches shall be designed and installed in conformance with manufacturer recommendations, as modified by these rules.
iv. Only 12-inch diameter bundles are approved in this rule.
(1) For bundles with perforated pipe the minimum depth of synthetic aggregate under pipe: 6 inches.
v. Width of trenches.
(1) When designed for a 3 foot wide trench, three bundles are laid parallel to each other with the middle bundle containing perforated pipe.
(2) When designed for a 2 foot wide trench, two bundles are placed on the bottom, with one bundle containing perforated pipe.
vi. Minimum depth of cover over the bundles: 12 inches.
The depth of cover may be reduced to no less than 6 inches, if approved by the regulatory authority, considering the protection of absorption systems as required in Subsection R317-4-6.14.B.2, and other activities, as determined by the authority.

2. Absorption Beds.
Absorption beds shall conform to the requirements applicable to absorption trenches, except for the following.

a. The minimum required effective absorption area shall be calculated using Section R317-4-13 Table 5 or 6.
b. The effective absorption area of absorption beds shall be considered as the total bottom area of the excavated bed system in square feet.
c. Absorption beds may be built over naturally existing soil types per Section R317-4-13 Table 5 or 6.
d. The bottom of the entire absorption bed shall be level.
e. The distribution pipes or chambers shall be interconnected to produce a closed loop distribution system.
f. Minimum number of laterals in an absorption bed: 2.

g. Maximum length of laterals in an absorption bed: 150 feet.
h. Maximum distance between laterals: 6 feet.
i. Minimum distance between laterals and sidewalls: 1 foot.
j. Maximum distance between laterals and sidewalls: 3 feet.
k. Minimum distance between absorption beds: 7 feet.
l. Minimum depth of an absorption bed excavation from original, natural grade: 10 inches.
m. Absorption beds with drain media:
i. Minimum depth of drain media under distribution pipe: 6 inches.
ii. Minimum depth of drain media over distribution pipe: 2 inches.
iii. Minimum depth of cover over the barrier material: 6 inches.
n. Absorption beds with chambers:
i. Chambers shall be installed with sides touching, no separation allowed.
ii. All chambers shall be connected in a closed loop distribution system.
iii. The outlet side of the chamber runs shall be connected through the bottom port of the end plates.
iv. No absorption area reduction factor shall be given for using chambers in absorption beds.
v. Minimum depth of cover over the chambers: 12 inches.
3. Deep Wall Trenches.
Deep wall trenches shall conform to the following:

a. The minimum required effective absorption area shall be calculated using Section R317-4-13 Table 5 or 6.
b. The effective absorption area of deep wall trenches shall be calculated using the total trench vertical sidewall area below the distribution pipe. The bottom area and any highly restrictive or impervious strata or bedrock formations may not be considered in determining the effective sidewall absorption area.
c. If percolation tests are used, they shall be conducted in accordance with Section R317-4-14 Appendix D and in the most restrictive soil horizon.
d. Maximum length of trenches: 150 feet.
i. Does not include connecting trenches.
e. Minimum spacing of trenches from wall to wall: 12 feet, or three times the depth of the media under the distribution pipe, whichever is the larger distance.
f. Vertical depth of trenches.
i. Minimum effective sidewalls: 2 feet.
ii. Maximum effective sidewalls: 10 feet.
iii. Calculate using only suitable soil formation.
g. Minimum width of trench excavations: 24 inches.
h. Minimum separation from the bottom of deep wall trench to:
i. the anticipated maximum ground water table: 48 inches;
ii. unsuitable soil or bedrock formations: 48 inches.

i. Drain media shall cover the coarse drain media to permit leveling of the distribution pipe and shall extend the full width and length of the trenches.
i. Minimum depth of drain media: 12 inches.
ii. Minimum depth of drain media under the distribution pipe: 6 inches.
iii. Minimum depth of drain media over the distribution pipe: 2 inches.
j. Minimum depth of cover over the barrier material: 6 inches.
k. The distribution pipe shall be centered in the trench and placed the entire length of the trench.
l. Setback to property lines: 10 feet.
4. Seepage Pits.
Seepage pits shall be considered as modified deep wall trenches and shall conform to the requirements applicable to deep wall trenches, except for the following:

a. The effective absorption area of seepage pits shall be calculated using the total pit vertical sidewall area below the distribution pipe. The bottom area and any highly restrictive or impervious strata or bedrock formations may not be considered in determining the effective sidewall absorption area.
b. Minimum diameter of pits: 3 feet.
c. Vertical depth of pits.
i. Minimum effective sidewalls: 4 feet.
ii. Maximum effective sidewalls: 10 feet.
iii. Calculate using only suitable soil formation.
d. Filled Seepage Pits.
i. In pits filled with coarse drain media, the perforated distribution pipe shall run across each pit. A layer of drain media shall be used for leveling the distribution pipe.
ii. The entire pit shall be completely filled with coarse drain media to at least the top of any permeable soil formation to be calculated as effective sidewall absorption area.
e. Hollow-Lined Seepage Pits.
i. For hollow-lined pits, the inlet pipe shall extend horizontally at least 1 foot into the pit.
ii. The annular space between the lining and excavation wall shall be filled with crushed rock or gravel ranging from 3/4 through 6 inches in diameter and free of fines, sand, clay or organic material. The maximum fines in the gravel shall be 2% by weight passing through a US Standard #10 mesh or 2.0 millimeter sieve.
iii. Minimum width of annular space between lining and sidewall: 12 inches.
iv. Minimum thickness of reinforced perforated concrete liner: 2-1/2 inches.
v. Minimum thickness of reinforced concrete top: 6 inches.
vi. Minimum depth of drain media in pit bottom: 6 inches.
vii. Minimum depth of cover over seepage pit top: 6 inches.
viii. A reinforced concrete top shall be provided.
(1) When the cover over the seepage pit top exceeds 6 inches, risers shall conform to Subsection R317-4-6.7.F for accessibility.
6.15. Alternative Systems.

A. System Types.
1. At-Grade.
2. Mounds.
3. Packed Bed Media.
a. Intermittent Sand Filters.
b. Recirculating Sand Filters.
c. Recirculating Gravel Filters.
d. Textile Filters.
e. Peat Filters.
4. Sand Lined Trenches.
B. General Requirements.
1. Conformance to Applicable Requirements.
All requirements stated elsewhere in this rule for design, setbacks, construction and installation details, performance, repairs and abandonment shall apply unless stated differently for a given alternative system.

2. Sizing Criteria for Alternative Systems.
Absorption area shall be sized based on Section R317-4-13 Table 5 or 6 except as specified in this section.

3. Design Criteria for Alternative Systems.
All alternative systems shall be designed by a person certified at Level 3 in accordance with Rule R317-11.

a. The designer shall submit details of all system components with the necessary calculations.
b. The designer shall provide to the local health department and to the owner operation and maintenance instructions that include the minimum inspection levels in Section R317-4-13 Table 7 for the system.
4. Record in the Chain of Title.
When an alternative system exists on a property, notice of the existence of that system shall be recorded in the chain of title for that property.

C. Design of Alternative Systems.
1. At-Grade Systems.
Absorption trenches and absorption beds may be used in at-grade systems. At-grade systems shall conform to the requirements applicable to absorption trenches and absorption beds, except for the following:

a. Horizontal setbacks in Section R317-4-13 Table 2 are measured from edge of trench sidewall, except at property lines, where the toe of the final cover shall be 5 feet or greater in separation distance to a property line.
b. Minimum number of observations ports provided within absorption area: 2.

i. The ports shall be installed to the depth of the trench or bed.
c. Depth of absorption excavations below natural grade: 0-10 inches.
d. Minimum cover over the absorption area: 6 inches.
e. Maximum slope of natural ground surface: 4%.
f. The maximum side slope for above ground fill shall be four horizontal to one vertical: 25% slope.
g. Where final contours are above the natural ground surface, the cover shall extend from the center of the wastewater system at the same general top elevation for a minimum of 10 feet in all directions beyond the limits of the absorption area perimeter, before beginning the side slope.
2. Mound Systems.
Mound systems shall conform to the following:

a. The design shall generally be based on the Wisconsin Mound Soil Absorption System: Siting, Design and Construction Manual, January 2000 published by the University of Wisconsin-Madison Small-Scale Waste Management Project, with the following exceptions.
i. The minimum separation distance between the natural ground surface and the anticipated maximum ground water table: 12 inches.
ii. Mound systems may be built over naturally existing soil types per Section R317-4-13 Table 5 or 6 provided the minimum depth of suitable soil is:
(1) between the natural ground surface and bedrock formations or unsuitable soils: 36 inches; or
(2) above soils that have a percolation rate faster than one minute per inch: 24 inches.
iii. The minimum depth of sand media over natural soil: 12 inches.
iv. The maximum slope of natural ground surface: 25 %.
v. The separation distances in Section R317-4-13 Table 2 are measured from the toe of the final cover.
vi. The effluent loading rate at the sand media to natural soil interface shall be calculated using Section R317-4-13 Table 5 or 6.
vii. The effluent entering a mound system shall be at levels at or below the defined parameters of non-domestic effluent.
viii. The minimum thickness of aggregate media around the distribution pipes of the absorption system shall be the sum of 6 inches below the distribution pipe, the diameter of the distribution pipe and 2 inches above the distribution pipe or 10 inches, whichever is larger.
ix. The cover may not be less than 6 inches in thickness, and shall provide protection against erosion, frost, storm water infiltration and support vegetative growth and aeration of distribution cell.
x. A minimum of three observation ports shall be located within the mound at each end and the center of the distribution cell.
(1) At least one port shall be installed at the gravel-sand interface, and one port at the sand-soil interface.

b. Mounds shall use pressure distribution.
i. The Utah Guidance for Performance, Application, Design, Operation and Maintenance: Pressure Distribution Systems document and Subsection R317-4-6.14.D.4 shall be used for design requirements.
(1) See Section R317-4-14 Appendix B for pump and control requirements.
3. Packed Bed Media Systems.
Packed bed media systems shall conform to the following:

a. System Design Criteria.
i. Wastewater Design Flows.
(1) For single-family dwellings the design shall be based on a minimum of 300 gallons per day for two bedrooms and 100 gallons per day for each additional bedroom.
(2) All other flow estimates shall be based on Subsection R317-4-6.4.
(3) Special design considerations shall be given for non-domestic effluent.
ii. Effluent Distribution.
Effluent shall be uniformly distributed over the filter media using pressure distribution.

b. Absorption System Requirements.
Absorption systems shall conform to the following:

i. Siting Conditions.
Packed bed media absorption systems may be sited under the following conditions:

(1) The minimum separation distance between the natural ground surface and the anticipated maximum ground water table: 12 inches.
(2) Packed bed media absorption systems may be built over naturally existing soil types per Section R317-4-13 Table 5 or 6 provided the minimum depth of suitable soils:
(a) above soils that have a percolation rate faster than one minute per inch: 24 inches; and
(b) between the natural ground surface and bedrock formations or unsuitable soils: 36 inches; or
(c) between the natural ground surface and bedrock formations or unsuitable soils: 18 inches based on an evaluation of infiltration rate and hydrogeology from a professional geologist or engineer that is certified at the appropriate level to perform onsite wastewater system design and having sufficient experience in geotechnical engineering based on:
(i) type, extent of fractures, presence of bedding planes, angle of dip;
(ii) hydrogeology of surrounding area; and
(iii) cumulative effect of all existing and future systems within the area for any localized mounding or surfacing that may create a public health hazard or nuisance, description of methods used to determine infiltration rate and evaluations of surfacing or mounding conditions.
(3) A non-chemical disinfection unit, capable of meeting laboratory testing parameters in Table 7.3, and a maintenance schedule consistent to Section R317-4-13 Tables 7.1 and 7.3, shall be used in excessively permeable soils.

(4) Conformance with the minimum setback distances in Section R317-4-13 Table 2, except for the following that require a minimum of 50 feet of separation:
(a) watercourses, lakes, ponds, reservoirs;
(b) non-culinary springs or wells;
(c) foundation drains, curtain drains; or
(d) non-public culinary grouted wells, constructed as required by Title R309.
ii. Sizing Criteria.
The minimum required effective absorption area shall be calculated using Section R317-4-13 Table 5 or 6 and may be reduced by: 30%.

(1) The use of chambered trenches with a packed bed media system may not receive additional reductions as allowed in Subsection R317-4-6.14.E.1.c.
iii. Separation from Ground Water Table.
The bottom of the absorption system shall have a vertical separation distance of at least 12 inches from the anticipated maximum ground water table.

iv. Observation Ports.
A minimum of two observation ports shall be provided within the absorption area.

v. Drip Irrigation.
Drip irrigation absorption may be used for packed bed media absorption system effluent dispersal based on type of soil and drip irrigation manufacturer's recommendations.

(1) Materials shall be specifically designed and manufactured for onsite wastewater applications.
(2) Non-absorption components shall be installed per Section R317-4-6 and Section R317-4-13 Table 2.
c. Intermittent Sand Filter Systems.
i. Media.
Either sand media or sand fill as described below may be used.

(1) Minimum depth of sand media: 24 inches.
(2) Minimum depth of sand fill: 24 inches.
(a) Effective size: 0.35-0.5 millimeter.
(b) Uniformity coefficient: less than 4.0.
(c) Maximum fines passing through #200 sieve: 1%.
ii. Maximum application rate per day per square foot of media surface area:
(1) Sand media: 1.0 gallons.
(2) Sand fill: 1.2 gallons.
iii. Maximum dose volume through any given orifice for each dosing: 2 gallons.
iv. Effluent entering an intermittent sand filter shall be at levels at or below the defined parameters of non-domestic effluent.
c. Recirculating Sand Filter (RSF) Systems.

i. Media.
(1) Minimum depth of washed sand: 24 inches.
(2) Effective size: 1.5-2.5 millimeter.
(3) Uniformity coefficient: less than 3.0.
(4) Maximum fines passing through #50 sieve: 1%.
ii. Maximum application rate per day per square foot of media surface area: 5 gallons.
d. Recirculating Gravel Filter (RGF) Systems.
i. Media.
(1) Minimum depth of washed gravel: 36 inches.
(2) Effective size: 2.5-5.0 millimeter.
(3) Uniformity Coefficient: less than 2.0.
(4) Maximum fines passing through #16 sieve: 1%.
ii. Maximum application rate per day per square foot of media surface area: 15 gallons.
e. Textile Filter Systems.
i. Media shall be geotextile, AdvanTex, or an approved equal.
ii. Maximum application rate per day per square foot of media surface area: 30 gallons.
f. Peat Filter Systems.
i. Minimum depth of peat media: 24 inches.
ii. Maximum application rate per day per square foot of media surface area: 5 gallons.
4. Sand Lined Trench Systems.
Sand lined trench systems shall conform to the following:

a. Siting Conditions.
i. The minimum depth of suitable soil or saprolite between the sand media in trenches and the anticipated maximum ground water table: 12 inches.
ii. Sand lined trench systems may be built over naturally existing:
(1) soil types 1 through 4; or
(2) soils or saprolite with a percolation rate between 1 and 60 minutes per inch.
iii. The minimum depth of suitable soil or saprolite is:
(1) between the sand media in trenches and bedrock formations or unsuitable soils: 36 inches; or
(2) above soils or saprolite that have a percolation rate faster than one minute per inch: 24 inches.
c. Trench Requirements.
Sand lined trenches shall conform to the requirements applicable to absorption trenches except for the following:

i. Trenches in Suitable Soil.
The minimum required effective absorption area shall be calculated using Section R317-4-13 Table 5 or 6.

ii. Trenches in Saprolite.

The minimum required effective absorption area shall be based on percolation rate using Section R317-4-13 Table 5.

(1) This rate shall be determined by conducting percolation tests. The soil shall be allowed to swell not less than 24 hours or more than 30 hours.
iii. The use of chambered trenches with a sand media system may not receive additional reductions as allowed in Subsection R317-4-6.14.E.1.c.
iv. Width of absorption trench excavations: 36 inches.
v. The entire trench sidewall shall be installed in natural ground. At-Grade system designs are not allowed.
vi. Minimum depth of sand media: 24 inches.
vii. Sand lined trenches with drain media.
(1) Minimum depth of drain media under the pressure lateral distribution pipe: 6 inches.
(2) Minimum depth of drain media over pressure lateral distribution pipe: 2 inches.
(3) Minimum depth of soil cover or saprolite over drain media: 6 inches.
viii. Sand lined trenches with Type A chambers.
(1) Minimum depth of soil cover or saprolite over chambers: 12 inches.
ix. Minimum number of observation ports per trench: 1.
c. Effluent Distribution.
Effluent shall be uniformly distributed over the sand media using pressure distribution.

i. Design shall generally be based on the Utah Guidance for Performance, Application, Design, Operation and Maintenance: Pressure Distribution Systems document.
Utah Admin. Code R317-4-6

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