Chapter 25

SEPTIC TANKS, SOIL ABSORPTION SYSTEMS, AND OTHER SMALL WASTEWATER SYSTEMS

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Section 1. Authority.

This rule is promulgated pursuant to Wyoming Statutes (W.S.) 35-11-101 through 35-11-1904, specifically 35-11-302(a)(iii).

Section 2. Objective.

This Chapter contains the minimum standards for the design and construction of small wastewater systems which are defined by W.S. 35-11-103(c)(ix). In addition, this Chapter contains the minimum standards for the design and construction of Underground Injection Control (UIC) Class V facilities 5C1-5C3, 5C6, 5D1, 5E1, 5E3-5E5 as defined in Chapter 16, Appendices A and B.

The following situations will require the application package to be sealed, signed, and dated by a professional engineer (PE): non-domestic wastewater from commercial and industrial facilities, high strength wastewater, individual permits to construct, or standard soil absorption systems with a soil percolation rate which is either less than 5 minutes per inch (mpi) or more than 60 minutes per inch (mpi).

These standards pertain to permits required pursuant to Chapters 3 and 25, Wyoming Water Quality Rules and Regulations. The installation of all components of a small wastewater system require a permit to construct. Permits to construct are specified throughout this chapter as general permits, described in Chapter 3, Section 7; permit by rule, described in Chapter 3, Section 8; or as individual permits to construct, described in Chapter 3, Section 6.

Section 3. Definitions.

(a) "**Absorption surface**" means the interface where treated effluent infiltrates into native or fill soil.

(b) "**Bed**" means a soil treatment and dispersal system where the width is greater than three (3) feet.

(c) **"Bedrock"** means geological layers, of which greater than fifty percent (50%) by volume consist of unweathered in-place consolidated rock or rock fragments. Bedrock also means weathered in-place rock which cannot be hand augered or penetrated with a knife blade.

(d) **"Bedroom"** means any room that is or may be used for sleeping.

(e) **"Blackwater"** means water containing fecal matter and/or urine.

(f) **"Five day biochemical oxygen demand (BOD_5)"** means a measurement of the dissolved oxygen used by microorganisms in the biochemical oxidation of organic matter during a five (5) day period.

(g) **"Building sewer"** means the pipe which carries wastewater from the building.

(h) **"Chamber"** means a domed open bottom structure that is used in lieu of perforated distribution pipe and gravel media.

(i) **"Delegated small wastewater program"** means a local governmental entity, delegated by the Administrator, with the authority to administer the provisions of W.S. 35-11-301(a) (iii) for small wastewater systems pursuant to the provisions of W.S. 35-11-304.

(j) **"Direct human consumption food crops"** are crops consumed directly by humans. These include but are not limited to fruits, vegetables, and grains grown for human consumption.

(k) **"Domestic wastewater"** means a combination of the liquid or water-carried wastes from residences, business buildings, institutions, and other establishments arising from normal living activities.

(l) **"Domestic septage"** means liquid or solid material removed from a waste treatment vessel that has received only wastes from residences, business buildings, institutions, and other establishments arising from normal living activities.

(m) **"Dosing tank"** means a tank equipped with an automatic siphon or pump designed to discharge effluent on an intermittent basis.

(n) **"Effluent"** means liquid flowing out of a septic tank, other treatment vessel, or system.

(o) **"Effluent filter"** means a removable, cleanable device inserted into the outlet piping of a septic tank or other treatment vessel designed to trap solids that would otherwise be transported to the soil absorption system or other downstream treatment components.

(p) **"Evapotranspiration"** means the combined loss of water from soil by evaporation from the soil or water surface and by transpiration from plants.

(q) **"Greywater"** means untreated wastewater that has not been contaminated by any toilet discharge, which is unaffected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Greywater" includes but is not limited to wastewater from bathtubs, showers, washbasins, clothes washing machines (unless soiled diapers are serviced), laundry tubs, and kitchen sinks.

(r) **"Grease interceptor"** means a device designed to separate fats, oils, and grease from wastewater.

(s) **"Groundwater"** means subsurface water that fills available openings in rock or soil materials such that they may be considered water saturated under hydrostatic pressure.

(t) **"High groundwater"** means seasonally or periodically elevated levels of groundwater.

(u) **"High strength wastewater"** means a wastewater stream with a BOD_5 higher than 200 mg/L.

(v) "**Holding tank"** means a watertight receptacle designed to receive and store wastewater.

(w) **"Manifold"** means a non-perforated pipe that distributes effluent to individual distribution pipes.

(x) **"Mound system"** means an onsite wastewater system where the bottom of the absorption surface is above the elevation of the existing site grade and the absorption surface is contained in a mounded fill body above the grade.

(y) **"Mulch basin"** means an excavated area that has been refilled with a highly permeable media, organic and inorganic materials intended to distribute greywater to irrigate vegetation.

(z) **"Pathogens"** are disease-causing organisms. These include, but are not limited to certain bacteria, protozoa, viruses, and viable helminth ova.

(aa) **"Percolation rate"** means the time expressed in minutes per inch required for water to seep into saturated soil at a constant rate.

(bb) **"Pipe invert"** means the bottom or lowest horizontal point of the internal surface of the pipe.

(cc) **"Percolation test"** means the method used to measure the percolation rate of water into soil as described in Appendix A.

(dd) **"Permit by rule"** means an authorization included in these rules which does not require either an individual permit or a general permit. A facility which is permitted by rule must meet the requirements found in this chapter, but is not required to apply for and obtain a permit to construct and operate the facility.

(ee) **"Pressure distribution"** means a network of pipes in which effluent is forced through orifices under pressure.

(ff) **"Restrictive layer"** means a nearly continuous layer that has one or more physical or chemical properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide unfavorable root conditions. Examples are bedrock, cemented layers, and dense layers.

(gg) **"Septage"** means liquid or solid material removed from a waste treatment vessel that has received wastes from residences, business buildings, institutions, and other establishments.

(hh) **"Septic tank"** means a buried, watertight tank designed and constructed to receive and treat raw wastewater.

(ii) **"Service provider"** means a person authorized and trained by a system manufacturer or their vendor to operate and maintain any proprietary system.

(jj) **"Soil absorption system"** means a shallow, covered, excavation made in unsaturated soil into which wastewater effluent from the septic tank is discharged through distribution piping for application onto absorption surfaces through porous media or manufactured components placed in the excavations.

(kk) **"Trench"** means an absorption surface with a width of three (3) feet or less.

Section 4. Design Flows.

The volume of wastewater shall be determined by one of the following:

(a) Tables 1 and 2 provided in this section.

(b) Metered water supply data from the facility.

(c) Metered water supply data from another facility where similar water demands have been demonstrated.

Table 1. Residential Design Flow Rates per Bedroom (gallons per day, gpd)[1]

1 bedroom	150
2 bedrooms	280
3 bedrooms	390
4 bedrooms	470
5 bedrooms	550
6 bedrooms	630

[1]An unfinished basement is considered two (2) additional bedrooms.
[2]The design flow shall be increased by eighty (80) gpd for each additional bedroom over six (6).

Table 2. Non-Residential Wastewater Design Flow Rates[1]

Facility	Unit	Flow (gallons/unit/day)
Airports	person	4
Apartment	bedroom	120
Automobile Service Station	vehicle served	10
Bars	seat	20
Bathhouses and swimming pools	person	10
Campgrounds (w/ toilets only)	person	25
Campgrounds (w/shower facility)	person	45
Church	person	4
Country Club	member	25
Day School, Office Building, Retail Store, Warehouse (no showers)	person	15
Hospital	bed	250
Industrial Building (sanitary waste only)	employee	20
Laundry (self-service)	machine	450
Mobile Home	bedroom	see table 1
Motel, Hotel, Resort	bedroom	140
Recreational Vehicle	each	100
Rest Home, Care Facility, Boarding School	bed	100
Restaurant	meal	10
Restaurant (kitchen waste only)	meal	6
Theater	seat	3

[1]Values shown in the above table are the typical flow rates from *Wastewater Engineering Treatment and Reuse*, Metcalf and Eddy, 2003.

Section 5. <u>Systems Not Specifically Covered by This Rule.</u>

This section is provided to encourage new technology and equipment and provide a process for evaluating and permitting designs which deviate from this rule. The proposed construction of facilities and processes not in compliance with this rule may be permitted provided that the facility, when constructed and operated, meets the objective of these rules.

(a) Each application for a permit to construct shall include an engineering design report, detailed construction plans, and technical specifications for all piping, tanks, and equipment. All of the documents shall have a suitable title showing the owner's name and the Wyoming registration number, seal, and signature of the engineer.

(b) Each application for a permit to construct will be evaluated on a case-by-case basis using the best available technology. The application shall include at least one of the following:

(i) Data obtained from a full scale, comparable installation which demonstrates the acceptability of the design.

(ii) Data obtained from a pilot plant operated under the design condition for a sufficient length of time to demonstrate the acceptability of the design.

(iii) Data obtained from the theoretical evaluation of the design that demonstrates a reasonable probability the facility will meet the design objectives.

(iv) An evaluation of the flexibility of making corrective changes to the constructed facility in the event it does not function as planned.

(c) If an applicant wishes to construct a pilot plant to provide data necessary to show the design will meet the purpose of the act, a permit to construct must be obtained.

Section 6. Site Suitability.

(a) Small wastewater systems must be located where the surface drainage is sufficient to allow proper operation of the small wastewater system.. Avoid depressions and bases of slopes and areas in the path of runoff from roofs, patios, driveways, or other paved areas unless surface drainage is provided. Small wastewater systems shall not be located beneath buildings, parking lots, roadways, driveways, irrigated landscaping, or compacted areas.

(b) The site must include area for both the proposed soil absorption system and a future replacement soil absorption system. Both the proposed and replacement soil absorption systems shall be sized to receive one-hundred (100%) percent of the wastewater flow. If a trench system is used, the replacement soil absorption system may be located between the trenches of the proposed soil absorption system if there is at least nine (9) feet of spacing between trench sidewalls.

(c) For standard soil absorption systems, effective suitable soil depth shall extend at least four (4) feet below the bottom of the soil absorption system to any restrictive layer, fractured rock, or highly permeable material.

(d) The depth to high groundwater shall be at least four (4) feet below the bottom of the absorption surface for all treatment systems except pressure distribution. For pressure distribution systems, the depth to high groundwater shall be at least three (3) feet below the bottom of the absorption surface if the percolation rate of the soil is five (5) minutes per inch or greater (5-60 mpi).

(e) Slope

(i) Table 3 shows the maximum permissible slopes of the site on which an absorption system may be constructed

Table 3. Slope and Percolation Rates for Absorption Systems

Percolation Rate (minutes/inch)	Maximum Slope[1]
5	25%
6-45	20%
46-60	15%

[1] Flatter slopes may be required where the effluent surfaces downslope.

(ii) Serial distribution, with the use of drop boxes or approved fittings, is the preferred installation method for sloping terrain. The bottom of individual trenches shall be level and the trenches shall be constructed to follow the contours of the land.

(iii) The placement of multiple trenches, with each subsequent trench down slope of the previous trench shall be avoided when the addition of effluent to the soil absorption system trenches may lead to either an unstable slope or seepage down slope.

(iv) All absorption surfaces must be located at least 15 horizontal feet from the top of any break in slope which exceeds the maximum slope allowed.

(f) Soil Exploration Pit and Percolation Tests

(i) Delegated small wastewater programs shall require a percolation test in addition to the soil exploration pit.

(ii) A minimum of one soil exploration pit within the proposed soil absorption system location shall be excavated to a minimum depth of four (4) feet below the bottom of the proposed soil absorption system to evaluate the subsurface conditions.

(iii) The percolation test shall be performed in accordance with Appendix A of this chapter. An evaluation of the soil texture, in the proposed soil absorption system location, by a person experienced in soils classification, may be used as an additional tool to confirm the percolation rate.

(g) Minimum horizontal setback distances (in feet) are as follows:

Table 4. Minimum Horizontal Setbacks for Domestic Wastewater[1,2]

From	To Septic Tank Or Equivalent	To Absorption System
Wells (includes neighboring wells)	50	100
Public Water Supply Well	100	200[2]
Property Lines	10	10
Foundation Wall (w/o drains)	5	10
Foundation Wall (with drains)	5	25
Potable Water Pipes	25	25
Septic Tank	N/A	10
Surface Water, Spring (including seasonal and intermittent)	50	50
Cisterns	25	25

[1] For disposal of non-domestic wastewater, the setback distance shall be determined by a hydrogeological study in accordance with Section 17(b) of Chapter 3, but shall not be less than the distances shown in Table 4.

[2] Small wastewater systems that discharge to the same aquifer that supplies a public water supply well and are located within Zone 1 or 2 (Attenuation) of the public water supply well, as determined by *Wyoming Department of Environmental Quality Source Water Assessment Project (2004)* or as established in Section 2 of the *Wyoming Wellhead Protection Guidance Document (1997),* shall provide additional treatment. These systems will be required to obtain an individual permit to construct and will require that a PE sign, stamp, and date the application, as stated in Section 2 of this chapter. The additional treatment shall be in accordance with Chapter 3 Section 2(b)(ii). The treatment shall reduce the nitrates to less than 10 mg/L of NO_3- as N and provide 4-log removal of pathogens before the discharge leaves the property boundary of each small wastewater system.

Section 7. Soil Absorption System Sizing.

(a) The total infiltration surface area of a soil absorption system shall be calculated by dividing the design flow rates (gpd) from Table 1 or Table 2 by the loading rate (gpd/ft^2) found in Table 5.

Table 5. Rates of Wastewater Application for Soil Absorption System Areas

Percolation Rate (mpi)	Loading Rate (gpd/ft^2)	Percolation Rate (mpi)	Loading Rate (gpd/ft^2)
5	0.80	21	0.45
6	0.75	22	0.44
7	0.71	23-24	0.43
8	0.68	25	0.42
9	0.65	26-27	0.41
10	0.62	28-29	0.40
11	0.60	30-31	0.39
12	0.58	32-33	0.38
13	0.56	34-35	0.37
14	0.54	36-37	0.36
15	0.52	38-40	0.35
16	0.50	41-43	0.34
17	0.49	44-46	0.33
18	0.48	47-50	0.32
19	0.47	51-55	0.31
20	0.46	56-60	0.30

(b) The total infiltration area shall be defined as follows:

(i) For standard trenches the total infiltration area shall be calculated based on the following formula:

$$A = L(W + 2S)$$

A = Total infiltration area

L = Total length of trench

W = Bottom width

S = Sidewall height of 12 inches or less

(A) The sidewall height is the depth below the flowline of the pipe to the bottom of the trench.

(B) The maximum credit for sidewall height shall not exceed twelve (12) inches even if the actual sidewall height exceeds twelve inches.

(ii) For chamber trenches, the total infiltration area shall be calculated based on the following formula:

$$A = L(E + 2S)$$

A = Total infiltration area

L = Total length of trench

E = Effective bottom width (Multiply width of the chamber by factor of 1.43 to get effective bottom width)

S = Sidewall height of 12 inches or less

(A) The factor of 1.43 incorporates a thirty percent (30%) reduction of the bottom area.

(B) The maximum credit for sidewall height shall not exceed twelve (12) inches even if the actual sidewall height exceeds twelve (12) inches.

(C) The sidewall height is the height of the slotted sidewall of the chamber or depth below the flow line of the inlet pipe, whichever is less.

(iii) For bed systems, the total infiltration area shall be calculated based on the following formula:

$$A = LW$$

A = Total infiltration area

L = Total length of bed

W = Width of the bed

(A) The sidewall credit shall not be used in calculating the total infiltration area for a bed system.

(c) Coarse sand or soils having a percolation rate less than one (1) minute per inch (mpi) are unsuitable for subsurface effluent disposal. These soils may be used if a one (1) foot layer of fine sand or loamy sand is placed below the constructed soil absorption system. The soil absorption system shall be sized based on the percolation rate of the fill material.

Section 8. <u>Building Sewer Pipes.</u>

All building sewers shall be installed in accordance with the 2012 International Plumbing Code (IPC). In the absence of a locally approved plumbing code, and in addition to the IPC, the building sewer shall comply with the following:

(a) Suitable building sewer pipe materials are Polyvinyl Chloride (PVC) or Acyrlonitrile–Butadiene-Styrene (ABS). The septic tank inlet and outlet pipes shall be schedule

40 PVC or ABS pipe and shall span the excavations for the septic tank and/or dosing chamber. American Society for Testing and Materials (ASTM) D-3034 Standard Dimension Ratio (SDR) 35 plastic pipe may be used if the void at the tank's side is filled with material which is granular, clean, and compacted.

(b) Building sewer pipes shall be sized to handle the peak hourly flow from the building and shall not be smaller than four (4) inches in diameter. When two different sizes or types of sewer pipes are to be connected, a proper type of fitting or conversion adapter shall be used.

(c) Sewer pipe shall not decrease in size flowing downstream.

(d) Building sewer pipes shall be laid at a standard slope of 1/4 inch per foot, and shall not be flatter than 1/8 inch per foot.

(e) Cleanouts shall be provided at branch connections, every change in alignment, and at least every 100 feet in straight runs.

(f) All sewer piping shall be laid on a firm bed throughout its entire length. It shall be protected from damage due to rocks, hard lumps of soil, debris, and the like.

(g) Special care shall be used to prevent lateral movement or deformation during backfill. The backfill material shall be compacted to a density at least equivalent to the trench walls. Backfill over the pipe shall be of sufficient depth to protect the pipe from expected traffic loads and the wastewater from freezing.

Section 9. <u>Septic Tanks and Other Treatment Tanks.</u>

(a) Septic Tanks

(i) Septic tanks shall be fabricated or constructed of concrete, fiberglass or an approved material. Tanks shall be watertight and fabricated to constitute an individual structure, and shall be designed and constructed to withstand anticipated loads. As part of the application review process, Department of Environmental Quality, Water Quality Division (DEQ/WQD) or the delegated small wastewater program shall review the design of prefabricated septic tanks for compliance with applicable construction standards.

(ii) The septic tank shall be placed on a level grade and a firm bedding to prevent settling. Where rock or other undesirable protruding obstructions are encountered, the opening for the septic tank shall be over excavated, as needed, and backfilled with sand, crushed stone, or gravel to the proper grade.

(A) Septic tanks shall not be buried deeper than the tank manufacturer's maximum designed depth for the tank. The minimum depth of soil cover over the top of the tank is six (6) inches.

(B) Backfill around and over the septic tank shall be placed in such a manner as to prevent undue strain or damage to the tank or connected pipes.

(C) Septic tanks shall not be placed in areas subject to vehicular traffic unless engineered for the anticipated load.

(iii) Size

(A) The minimum liquid volume of a septic tank shall be 1000 gallons for residences up to a four (4) bedroom capacity. Additional capacity of 150 gallons per bedroom shall be provided for each bedroom over four (4).

(B) Septic tanks for high strength wastewater or non-residential units shall have a minimum effective liquid capacity sufficient to provide at least 48 hour retention at design flow or 1,000 gallons, whichever is greater.

(iv) Configuration

(A) Single compartment septic tanks shall have a length to width ratio of no less than two (2) to one (1), or be partitioned to protect against short circuiting flow.

(B) For septic tanks with two (2) compartments or more, the inlet compartment shall not be less than one-half (1/2) of the total capacity of the tank.

(C) The liquid depth shall be between three (3) feet and six (6) feet.

(D) The tank partition shall allow the venting of gases between compartments and out through the vent stack on the plumbing system of the house.

(E) The inlet and outlet on all tanks or tank compartments shall be provided with open-ended sanitary tees or baffles made of approved materials constructed to distribute flow and retain scum in the tank or compartments.

(I) The tees or baffles shall extend above the liquid level a minimum distance of six (6) inches.

(II) The tees or baffles shall extend below the liquid level a distance equal to thirty to forty percent (30-40%) of the liquid depth.

(III) A minimum of three (3) inches of clear space shall be provided over the top of the baffles or tees.

(IV) The inlet pipe shall be at least two (2) inches higher than the outlet pipe. The outlet elevation shall be designed to provide a minimum distance of nine (9) inches or twenty (20) percent of the liquid depth, whichever is greater, between the top of the liquid and the bottom of the septic tank cover for scum storage and the venting of gases.

(v) If additional septic tank capacity over 1,000 gallons is needed, it may be obtained by joining tanks in series provided the following requirements are met:

(A) The inlet of each successive tank shall be at least two (2) inches lower than the outlet of the preceding tank, and shall have no tee or baffle except for the inlet to the first tank and the outlet for the last tank.

(B) The first tank or the first compartment of the first tank shall be equal to fifty percent (50%) or larger of the total septic tank system volume.

(vi) An access shall be provided to each compartment of the septic tank for inspection and cleaning.

(A) The access shall have a minimum diameter of twenty (20) inches. Both inlet and outlet devices shall be accessible.

(B) The riser shall terminate at a maximum of six (6) inches below the ground surface. Riser covers terminating above grade shall have an approved locking device.

(vii) Land application of domestic septage in remote areas that meet the conditions found in Appendix B will be permitted as a permit by rule. Delegated small wastewater programs may issue individual permits.

(viii) An effluent filter with an opening of 1/8-inch or smaller shall be provided on the outlet of a septic tank or other tank that precedes a small diameter pressure distribution system.

(b) Dosing Tanks

(i) Dosing tanks shall meet the same material and installation requirements as septic tanks. Dosing tanks shall have a minimum 20-inch diameter access riser and it shall be brought to the ground surface. The following table shall be used to calculate the size of the dosing tank:

Table 6. Dosing Tank Volume (gallons)

Average Design Flows (gpd)	0-499	500-999	1000-1499	1500-2000
Between Pump “off” and Tank Inlet	350	700	1000	1300
Between Tank Inlet and Alarm Switch	200	400	600	800
Between Alarm switch and Pump “on”	50	100	100	100
Between Pump “on” and Pump “off”	100	200	300	400
Recommended Pump Capacity (gpm)	10	20	30	40

(ii) High water alarms shall be provided for all tanks that utilize pumps or siphons. The alarm device shall be an audible alarm or an indoor illuminated alarm or both.

(iii) The minimum effluent level shall achieve complete submergence of the pump.

(iv) Dosed systems using a siphon shall have a dose counter installed to check for continued function of the siphon.

(c) Holding Tanks

(i) Holding tanks shall meet the same material requirements as septic tanks. Holding tanks shall have a twenty (20)-inch minimum diameter access riser. The riser shall be brought to ground surface.

(ii) Holding tanks shall not be used for residential systems when other alternative systems are available, except on a temporary, seasonal or intermittent basis, or when used to correct a failed soil absorption system when other alternatives are unavailable.

(iii) Holding tanks must be located in an area readily accessible to the pump truck and where the tank itself will not float due to high groundwater. If seasonal high groundwater may be present, the tank shall be properly anchored.

(iv) The minimum liquid volume shall be the greater of 1,000 gallons or seven (7) days storage based upon flow rate determined from Section 4.

(v) All holding tanks shall be equipped with a high-water level alarm. The device shall be an audible alarm or an indoor illuminated alarm or both. The device shall be installed so that the alarm is triggered when the water level reaches 3/4 of the tank capacity.

(vi) A design package for holding tanks is provided online at the Division's website to assist the applicant in submitting a completed application for coverage under the general permit for small wastewater systems. The worksheet and calculations were prepared by a registered professional engineer employed by the Wyoming Department of Environmental Quality, Water Quality Division. The general design requirements stated in this section are incorporated into the worksheets such that by properly completing the forms and installing the components, the system will comply with these requirements.

(d) Grease Interceptors

(i) A commercial or institutional food preparation facility with a waste stream containing fat, oil, and grease (FOG) in excess of 25 mg/L shall install an exterior grease interceptor or a device approved by the delegated health department or county. Facilities that typically have waste streams high in FOG are, but not limited to, restaurants, cafeterias, slaughterhouses, and institutional kitchens.

(ii) Waste streams high in FOG shall be plumbed separately and directly to a grease interceptor prior to the waste treatment process.

(iii) Waste streams from sanitary facilities such as bathrooms, toilets, urinals, or other similar fixtures shall not be discharged into the grease interceptor. These sources must be connected at least four to six (4-6) feet downstream of the grease interceptor's discharge. The design shall prevent any backflow from the sanitary sources into the grease interceptor.

(iv) Only one source facility per grease interceptor shall be allowed.

(v) Grease interceptors shall be located so that they are easily accessible for inspection, cleaning, and removal of the collected wastes. The interceptor shall not be closer than fifteen (15) feet from the last discharging fixture and no further away than thirty-five (35) feet.

(vi) Grease interceptors shall have at least two (2) compartments with a 20-inch minimum diameter cleanout riser for each compartment. Each cleanout riser shall be brought to the surface and have a sealed lid that is rated for any anticipated load. There shall be a means provided to sample the effluent.

(vii) There shall be no internal cleanout tees or bypasses.

(viii) The inlet and outlet of the grease interceptor shall be vented. The vent pipe shall be at least two (2) inches in diameter. The inlet and outlet vents shall not be interconnected.

(ix) The outlet pipe invert shall be no more than two (2) inches lower than the inlet invert.

(x) The dividing wall between compartments shall be the same height as the other walls and the cover must contact the top of the dividing wall.

(xi) The effluent from each compartment shall be drawn from the bottom of a riser pipe that terminates at least eighteen (18) inches below the inlet pipe invert of that same compartment.

(xii) Grease interceptors shall be accessible during normal business hours without interrupting normal business operations.

(xiii) Grease interceptors shall be installed in accordance with the manufacturer's instructions and applicable requirements of this section. A copy of the manufacturer's instructions shall be submitted with every permit to construct application submitted to DEQ/WQD.

(xiv) Grease interceptors shall be sized according to the following:

Kitchens (grease, garbage)

Number of meals per peak hour	**X**	Waste Flow rate*	**X**	Retention time**	**X**	Storage factor***	=	Interceptor size (liquid capacity)

*Waste flow rate – see Table 2.

**Retention times

Kitchen waste:	
Dishwasher and/or disposal	2.5 hours
Single service kitchen:	
Single serving with disposal	1.5 hours

***Storage factors

Fully equipped commercial kitchen	8 hr. operation: 1 16 hr. operation: 2

	24 hr. operation: 3
Single service kitchen:	1.5

(A) The minimum interceptor size (liquid capacity) shall be 750 gallons.

(e) Other Interceptors

(i) Interceptors are required for oil, grease, sand, and other substances harmful or hazardous to the building drainage system, or the small wastewater treatment system.

(A) Laundries

(I) Commercial laundries, Laundromats, and dry-cleaners shall be equipped with an interceptor in order to reduce the quantity of lint and silt that enter the collection system.

(II) The system must be of adequate size and design to allow for cool-down of wastewater so that separation can be more readily achieved.

(III) The interceptor shall be installed with a wire basket or similar device. The wire basket or similar device shall be removable for cleaning and shall prevent passage into the drainage system of solids 1/2 inch (12.7 mm) or larger in size, such as string, rags, buttons, or other materials which are detrimental to the waste treatment system.

(IV) Sizing must be in accordance with the following formula:

Laundries (grease, lint, silt)

Total gallons per cycle	**X**	Cycles per hour	**X**	Retention time*	**X**	Storage factor**	=	Interceptor

*Retention times

Institutional laundries	2.5 hours
Standard commercial laundry	2.0 hours
Light commercial laundry	1.5 hours

**Storage factors

8 hours of operation	1.0
12 or more hours of operation	1.5

(B) Car Washes

(I) Where automobiles are washed (including detail shops using hand-wash practices), separators shall have a minimum capacity of 1000 gallons for the first bay, with an additional 500 gallons of capacity for every other bay.

(II) Additionally, wash racks must be constructed to eliminate or minimize the impact of run-off from rain/storm events. Minimum requirements are roofed structures with at least two walls and appropriate grading to prevent stormwater infiltration into the sanitary sewer.

(III) An effluent sampling point is required.

(f) Abandonment of Septic and Holding Tanks

The following is the procedure to abandon septic tanks and holding tanks when the system is upgraded, equipment replacement is necessary, or central sewer lines are made available.

(i) The abandoned tank should be pumped and the septage hauled to a licensed facility approved to receive the waste or the septage pumped into the newly constructed septic or holding tank. Discharging to a central sewer requires coordination with, and the approval of, the owner/operator of the sewer system.

(ii) Once the abandoned tank is empty, it should be removed and the excavation backfilled. As an alternative to removing the tank, the access covers can be removed and the tank filled with native soil, pit run, or sand.

(iii) If the abandoned tank is part of a Class V UIC facility, the abandonment must also be in compliance with Chapter 16, Section 12.

Section 10. <u>Effluent Distribution Devices.</u>

Distribution boxes and flow divider tees are suitable for level or nearly level ground and are installed before the soil absorption system with the goal of splitting flows equally between soil absorption system laterals. Drop boxes are suitable for sloping ground and are installed to achieve serial loading.

(a) Distribution Boxes

(i) The distribution box shall be installed on a level, stable base to prevent tilting or settling, and to minimize movement from frost heave.

(ii) Boxes shall be watertight and constructed of concrete or other durable material.

(iii) Boxes shall be designed to accommodate the inlet pipe and the necessary distribution lines. The inlet piping to the distribution box shall be at least one (1) inch above the outlet pipes and all pipes shall have a watertight connection to the distribution box.

(iv) The box shall be protected against freezing and made accessible for observation and maintenance.

(v) Boxes shall have flow equalizers installed on each outflow.

(b) Flow divider tees may be used in place of distribution boxes.

(c) Drop boxes are suitable for sloping ground and are installed to achieve serial loading. The drop boxes shall meet the requirements in paragraphs (a)(i through v) of this section.

Section 11. <u>Standard Soil Absorption Systems.</u>

(a) General Design Requirements:

(i) All soil absorption systems shall be designed in such a manner that the effluent is effectively filtered and retained below the ground surface. The absorption surface accepts, treats, and disperses wastewater as it percolates through the soil.

(ii) Soil absorption systems shall not be excavated when the soil is wet enough to smear or compact easily. Open soil absorption system excavations shall be protected from surface runoff to prevent the entrance of silt and debris. All smeared or compacted surfaces shall be raked to a depth of one (1) inch, and loose material removed before filter or filler material is placed in the soil absorption system excavation.

(iii) Soil absorption systems shall be designed to approximately follow the ground surface contours so that variation in excavation depths will be minimized. The trenches may be installed at different elevations, but the bottom of each individual trench shall be level throughout its length.

(iv) Shallow soil absorption system depths are encouraged to promote treatment and evapotranspiration. The minimum soil cover depth over the soil absorption system is one (1) foot. The maximum depth to the bottom absorption surface of a soil absorption system is five (5) feet. Finished grading shall prevent ponding and promote surface water runoff.

(v) Pipes, chambers or other products shall be bedded on firm, stable material. Heavy equipment shall not be driven in or over soil absorption systems during construction or backfilling.

(vi) Standard trenches refer to perforated pipe embedded in aggregate-filled trenches which shall conform to the following:

(A) The perforated pipe shall have a minimum diameter of 4 inches. Suitable pipe materials include: ASTM D-2729-11 PVC, ASTM D-3034-08 PVC, Schedule 40 PVC ASTM d1784-11, and ASTM F810-07 PE.

(B) The aggregate shall be crushed rock, gravel or other acceptable, durable and inert material which is free of fines, and has an effective diameter between ½ inch and 2- ½ inches.

(C) Prior to backfilling, the aggregate shall be covered throughout with a woven/non-woven geotextile material or a three (3) inch layer of straw.

(D) Aggregate shall extend the full width and length of the soil absorption system to a depth of at least twelve (12) inches with at least six (6) inches of drain gravel under the distribution pipe and at least two (2) inches over the distribution pipe.

(E) Maximum width of trench excavation is three (3) feet.

(F) Minimum spacing of trenches (wall to wall) is three (3) feet. Trench spacing shall be increased to nine (9) feet when the area between each trench is considered as reserve area. For clay loam soils that have percolation rates greater than 60 min/in., the nine (9) foot spacing shall also be required but it is not considered as reserve area.

(vii) Standard beds shall conform to the same pipe and aggregate requirements for trenches as found in subparagraphs (vi)(A through D) of this section. Standard beds shall also conform to the following:

(A) The soils shall have percolation rates less than 60 minutes per inch (5-60 mpi). The bottom of the bed must be level, therefore the site shall be relatively flat, sloping no more than one (1) foot from the highest to the lowest point in the installation area.

(B) Distribution laterals within a bed must be spaced on not greater than six (6) feet centers. Sidewalls shall not be more than three (3) feet from a distribution lateral.

(C) Beds must not be wider than twenty-five (25) feet if gravity distribution is used. Multiple beds must be spaced at one-half the bed width.

(D) Rubber tired vehicles must not be driven on the bottom surface of any bed excavation.

(viii) Chambered trenches, when used in lieu of perforated pipe and aggregate, shall be installed in conformance with the manufacturer recommendations. No cracked, weakened, modified, or otherwise damaged chamber units shall be used in any installation.

(A) All chambers shall be an open, arch-shaped structure of durable, non-degradable design, suitable for distribution of effluent without filter material.

(B) All chamber endplates shall be designed so that the bottom elevation of the inlet pipe is at least six (6) inches from the bottom of the chamber.

(C) Inlet and outlet effluent sewer pipes shall enter and exit the chamber endplates. Inspection ports shall be installed at all outlet effluent sewer pipes.

(D) All chambers shall have a splash plate under the inlet pipe or another design feature to avoid unnecessary channeling into the trench bottom.

(E) The maximum width of the bottom absorption surface for a chambered trench is three (3) feet. The excavation to install a chambered trench may exceed three (3) feet.

(F) Minimum spacing of trenches (wall to wall) is three (3) feet. Trench spacing shall be increased to nine (9) feet when the area between each trench is considered as reserve area. For clay loam soils that have percolation rates greater than 60 min/in., the nine (9) foot spacing shall also be required but it is not considered as reserve area.

(ix) Chambered beds shall conform to the same requirements for chambered trenches as found in subparagraphs (viii)(A through D) of this section. Aggregate, as specified in subparagraph (vi)(B) of this section, or native soil shall be used to fill the space between the chambers.

(x) Serial Sidehill Trench:

(A) A minimum of six (6) feet of undisturbed soil shall be maintained between adjacent trench or bed side walls.

(B) The bottom of each serial trench or bed system shall be level.

(C) The overflow pipe between serial soil absorption systems shall be set no higher than the mid-point of the upstream distribution pipe. The overflow pipe shall not be perforated.

(b) A design package for standard soil absorption systems is provided online at the Division's website to assist the applicant in submitting a completed application for coverage under the general permit for small wastewater systems. The worksheet and calculations were prepared by a registered professional engineer employed by the Wyoming Department of Environmental Quality, Water Quality Division. The general design requirements stated in this section are incorporated into the worksheets such that by properly completing the forms and installing the components, the system will comply with these requirements.

Section 12. <u>Pressure Distribution Systems.</u>

(a) General Design Requirements:

(i) The basic elements of a pressure distribution system include a dosing tank, filter, and a means to deliver specified doses to a small diameter pipe network within a soil absorption system. Pressure distribution is required for mound systems or for bed systems with a width greater than twenty-five (25) feet.

(ii) Pumps must be sized to match the distribution system curve or demand. Pumps shall be designed for sewage pumping applications and be accessible from the ground surface.

(iii) The control system for the pump and dosing tank shall, at a minimum, consist of a "pump off" switch, a "pump on" switch, and a "high liquid alarm".

(A) All electrical connections must be made outside of the chamber in either an approved weatherproof box or an explosion-proof junction box.

(B) The wiring from the junction box to the control box must pass through a sealing fitting to prevent corrosive gases from entering the control panel.

(C) All wires must be contained in solid conduit from the dosing chamber to the control box.

(iv) The pressure transport piping between the tank and the soil absorption system shall be designed to prevent freezing.

(A) The ends of lateral piping shall be constructed with long sweep elbows or an equivalent method to bring the end of the pipe to finished grade. The ends of the pipe shall be provided with threaded plugs, caps, or other devices to allow for access and flushing of the lateral.

(B) All joints in the manifold, lateral piping, and fittings shall be solvent-welded using the appropriate joint compound for the pipe material. Pressure transport piping may be solvent-welded or flexible gasket jointed.

(C) Where automatic siphons or other devices are used, they shall be designed to empty the dosing tank in less than ten (10) minutes.

(v) The pressure distribution system shall have a combination of at least three (3) vertical feet of filter sand and/or unsaturated native soil above the high groundwater level. The filter sand shall conform to ASTM C-33, with less than 2% passing the #200 sieve.

(b) A design package for pressure distribution systems is provided online at the Division's website to assist the applicant in submitting a completed application for coverage under the general permit for small wastewater systems. The worksheet and calculations were prepared by a registered professional engineer employed by the Wyoming Department of Environmental Quality, Water Quality Division. The general design requirements stated in this section are incorporated into the worksheets such that by properly completing the forms and installing the components, the system will comply with these requirements.

Section 13. <u>Sand Mound Systems.</u>

The sand mound consists of a sand fill, an aggregate bed and a soil cap.

(a) Selection Criteria:

The high groundwater level, bedrock, or impervious clay layer is less than four (4) feet below the bottom of the soil absorption system excavation.

(b) Site Requirements:

(i) A minimum of one (1) foot of vertical separation of the native soil is required between the bottom of the sand fill and the top of the high groundwater level, any restrictive layer, or any highly permeable material.

(ii) The percolation rate of the native soil at the interface of the sand fill shall be greater than five (5) and less than sixty (60) minutes per inch (5-60 mpi). The percolation shall be measured in the top twelve (12) inches of native soil.

(c) General Design Requirements:

(i) Sand Layer

(A) Filter sand shall conform to ASTM C-33, with less than two percent (2%) passing through the #200 sieve.

(B) The minimum depth of sand below the aggregate bed surface shall be one (1) foot.

(C) The sand mound shall have a combination of at least four (4) vertical feet of filter sand and unsaturated native soil above the high groundwater level.

(I) For sand mounds using pressure distribution systems, the depth to high groundwater shall be three (3) feet below the bottom of the absorption surface if the percolation rate of the soil is five (5) minutes per inch or greater (5-60 mpi).

(D) The top of the sand layer under the aggregate bed shall be level in all directions.

(E) The sand layer shall fill around the perimeter of and to the top of the aggregate bed.

(F) The slope of all sides shall be three (3) horizontal to one (1) vertical or flatter. The side slopes shall be graded to prevent seepage and/or ponding at the bottom of the slope.

(G) The infiltration area which is the bottom of the sand fill shall be calculated by dividing the design flowrates (gpd) from Table 1 or Table 2 by the loading rate (gpd/ft^2) found in Table 5.

(ii) Aggregate Bed

(A) The aggregate shall be crushed rock, gravel or other acceptable, durable and inert material which is free from fines, and has an effective diameter between one-half (1/2) inch and two and one half (2 ½) inch.

(B) The aggregate bed depth shall not be less than nine (9) inches with a minimum of six (6) inches of clean aggregate placed below the distribution pipe and two (2) inches above the distribution pipe. The aggregate shall be covered with an approved geotextile material after installation and testing of the pressure distribution system.

(C) The design shall be a long, narrow bed design with a maximum width of twenty-five (25) feet.

(D) The infiltration area, which is the bottom of the aggregate bed, shall be calculated by dividing the design flowrates (gpd) from Table 1 and Table 2 by the loading rate of 0.8 gpd/ft^2.

(iii) Soil Cover

(A) The soil cap shall be constructed of a sandy loam, loamy sand, or silt loam. The depth of the soil cap shall be at least six (6) inches at the edges to twelve (12) inches at the center. The slope of all sides shall be three (3) horizontal to one (1) vertical or flatter.

(B) A layer of top soil at least six (6) inches thick shall be placed over the entire sand mound area. The sand mound should be planted with vegetation that does not require watering and will not establish deep roots. Native grasses are commonly used.

(d) A design package for sand mound systems is provided online at the Division's website to assist the applicant in submitting a completed application for coverage under the general permit for small wastewater systems. The worksheet and calculations were prepared by a registered professional engineer employed by the Wyoming Department of Environmental Quality, Water Quality Division. The general design requirements stated in this section are incorporated into the worksheets such that by properly completing the forms and installing the components, the system will comply with these requirements.

Section 14. <u>Small Wastewater Lagoons.</u>

(a) Selection Criteria:

(i) Lagoons shall only be considered in areas of Wyoming where the annual evaporation exceeds the annual precipitation during the active use of the lagoon.

(ii) Lagoons shall only be allowed when the percolation rate exceeds sixty (60) minutes per inch and the soil extends vertically down at least two (2) feet from the bottom of the lagoon to the seasonal high groundwater table or bedrock formations.

(iii) A lagoon shall not be constructed within the 100 year flood plain.

(b) General Design Requirements:

(i) Beyond the horizontal setback distances requirements specified in Section 6(g) of this rule, the lagoon shall not be placed within one hundred (100) feet of the owner's property line.

(ii) The use of a septic tank which meets the specifications in Section 9 of this rule shall be required before the small wastewater lagoon.

(iii) The lagoon shall be located and constructed so it will not receive surface runoff water.

(iv) The slope of the lagoon site shall not exceed five percent (5%).

(v) The lagoon site must be located in an area of maximum exposure to sun and wind.

(vi) The lagoon shall be designed for complete retention.

(vii) The area of the lagoon shall be calculated based on the following formula.

$$A = \frac{584\ x\ Q}{(365\ x\ S) + (E - P)}$$

A = Area of the lagoon (in square feet) at the maximum operating depth of five (5) feet.

Q = Average daily sewage flow, gallons per day. (Multiply values from Table 1 or 2 by 0.6 to get average daily flow.)

E = Average annual lake evaporation in inches per year. (Note: lake evaporation is less than pan evaporation; lake evaporation equals pan evaporation times a pan coefficient of 0.7)

P = Average annual precipitation rate in inches per year.

S = Seepage rate in decimal form, in inches per day.

(viii) The slopes of the dikes shall not be steeper than three (3) horizontal to one (1) vertical. The minimum width of the top of the dike shall be four (4) feet.

(ix) All fill shall consist of impervious material that is well compacted and free of rocks, frozen soil, or other large material.

(x) The minimum operating depth shall be two (2) feet. The dikes shall provide a minimum freeboard of two (2) feet.

(xi) The floor of the lagoon shall be level and maintained free of all vegetation.

(xii) The influent line into the lagoon must discharge near the center.

(xiii) A cleanout or manhole shall be provided in the influent line near the dike.

(xiv) The area around the small wastewater lagoon shall be fenced to preclude the entrance of livestock, pets, and humans. The fence shall be equipped with a locking gate. The gate shall have a sign indicating "NO TRESPASSING – WASTEWATER LAGOON".

(c) A design package for a small wastewater lagoons is provided online at the Division's website to assist the applicant in submitting a completed application for coverage under the general permit for small wastewater systems. The worksheet and calculations were prepared by a registered professional engineer employed by the Wyoming Department of Environmental Quality, Water Quality Division. The general design requirements stated in this section are incorporated into the worksheets such that by properly completing the forms and installing the components, the system will comply with these requirements.

Section 15. Privies.

Pre-fabricated privies and outhouses shall be sealed, water-tight vaults and shall meet the following conditions.

(a) The horizontal setback distance requirements for sealed privies shall comply with Section 6(g) for septic tanks.

(b) The depth to seasonally high groundwater from the bottom of a water tight vault shall be sufficient to prevent floatation of the empty vault.

(c) The vault must have sufficient capacity for the dwelling served, and must have at least 27 cubic feet or 200 gallons of capacity.

(d) The privy must be easily maintained and insect tight. The door must be self-closing. The privy seat must include a cover. All exterior openings, including vent openings, shall be screened.

(e) Privies must be adequately vented.

(f) Privies shall not be constructed within the 100 year flood plain.

(g) A design package for privies is provided online at the Division's website to assist the applicant in submitting a completed application for coverage under the general permit for small wastewater systems. The worksheet and calculations were prepared by a registered professional engineer employed by the Wyoming Department of Environmental Quality, Water Quality Division. The general design requirements stated in this section are incorporated into the worksheets such that by properly completing the forms and installing the components, the system will comply with these requirements.

Section 16. Greywater Systems.

It is the intent of this section to encourage and facilitate the productive and safe reuse of greywater from domestic wastewater.

(a) Applicability

(i) This section applies to any person who utilizes greywater for beneficial irrigation uses.

(ii) This section is not applicable if the intent is to provide blackwater treatment.

(iii) A city, county, or other local government agency may, after a public hearing and enactment of an ordinance or resolution, further restrict or prohibit the use of greywater systems.

(b) Greywater Operation and Requirements

(i) Restrictions

(A) Spray irrigation of greywater is not permitted.

(B) The installation of a greywater system shall not reduce or alter the sizing requirements of the onsite wastewater system.

(C) Human, domestic pets, and animal contact with greywater and soil irrigated with greywater shall be minimized.

(D) Greywater shall not leave the property on which it is generated. Ponding or runoff is prohibited.

(E) Water which has been used to wash diapers or similarly soiled or infectious garments shall not enter the greywater system and shall be diverted into the sanitary sewer or septic system.

(F) Water which contains hazardous materials such as paint, solvents, petroleum products, oil, gasoline, antifreeze, solvents, pesticides and herbicides shall not enter the greywater system. Greywater shall not contain hazardous chemicals derived from activities such as cleaning car parts, washing greasy or oily rags, or disposing of wastewater solutions from home photo labs or similar hobbyist or home occupational activities.

(G) Greywater systems shall not be installed in a delineated floodplain.

(H) The volume of greywater shall not exceed an average of 2000 gallons per day.

(I) Greywater shall not come in direct contact with or adversely impact surface or groundwater.

(J) Filter backwash water and flush water shall not be used for any purpose. The filter backwash and flush discharge shall be contained and disposed of into the

building sewer system or septic tank with a design capacity to accept all the blackwater and greywater. Sanitary procedures shall be followed when handling filter backwash and flush discharge or greywater.

(ii) Odor control of the greywater system shall meet the requirement of Wyoming DEQ Air Quality Regulations Chapter 2, Section 11.

(iii) Stormwater

(A) The greywater system shall not be located in a drainage way.

(B) The greywater system shall prevent storm runoff from carrying the greywater off of the application site.

(iv) If the greywater system is to be used during the winter, the greywater system shall be designed to prevent freezing.

(c) Estimating Greywater Discharge

(i) The greywater discharge for single family and multi-family dwellings shall be calculated by estimates of greywater use based on water use records, or the following procedure:

(A) The number of occupants of each dwelling unit shall be calculated as 2 occupants per bedroom.

(B) The estimated greywater flows of each occupant shall be calculated in gallons per day (gpd) as follows:

Showers, bathtubs and wash basins – 25 gpd/occupant

Laundry – 15 gpd/occupant

(ii) The total number of occupants shall be multiplied by the applicable estimated greywater discharge as provided above and the type of fixtures connected to the greywater system.

(d) Greywater Components and Configurations

(i) Flow Diversion

(A) All greywater systems shall have a flow diverter which directs greywater to either the blackwater system or the greywater system.

(B) Diverter valves shall not have the potential to allow backflow from the blackwater system into the greywater system.

(C) Pipe elbows with rotatable compression fittings or equivalent components may be used to connect greywater sources with the greywater system or blackwater system if the pipe can only be connected to one system at a time. A capping device such as a

rubber slip cap with band clamp shall be used to seal the plumbing of the system that is not in use.

(D) The rubber discharge hose from a laundry washing machine may be moved between a vertical blackwater riser pipe and a vertical greywater riser pipe without the need for a diverter valve.

(ii) Greywater Collection Tank

(A) When the greywater system design includes a tank, specifications for the tank shall be submitted for approval. Such plans shall show all dimensions and other pertinent data.

(B) Shall be constructed of solid, durable materials not subject to excessive corrosion or decay and shall be water-tight.

(C) Shall be structurally designed to withstand all anticipated earth or other loads. Tank covers shall be capable of supporting an earth load of not less than three hundred (300) pounds per square foot when the tank is installed underground.

(D) Shall be covered to prevent access by flying insects, rodents, domestic animals and people.

(E) Shall be vented with a suitable screen to keep animals and insects out of the system.

(F) Inside collection tank shall be installed in accordance with the International Building Code for internal plumbing for black water.

(G) Shall not hold greywater for more than 24 hours.

(H) Overflow Requirements:

(I) Each tank shall have an overflow drain. The overflow drain shall have a permanent connection to the building drain or building sewer, upstream of septic tanks, if any. The overflow drain shall not be equipped with a shutoff valve.

(II) The overflow drain shall not be less in diameter than the inlet pipe.

(III) The overflow system must be designed so that the tank overflow will drain by gravity to the existing sewer line or septic tank. The tank shall be protected against sewer line backflow by a check valve.

(iii) Piping

(A) Greywater conveyance pipes shall be permanently labeled for Greywater or shall be colored purple. Non-paint marking pens are unacceptable as permanent labeling.

(B) Gravity flow pipes shall be constructed to allow complete draining of the pipe.

(C) Pressurized pipe systems shall be constructed and designed to be drained or the water evacuated by compressed air for winterization.

(iv) Disinfection

(A) All greywater to be used for surface irrigation shall be disinfected.

(B) Disinfection may be accomplished through chemical methods or ultraviolet disinfection systems.

(I) Chemical disinfection

(1.) Chemical disinfection methods include the use of iodine, chlorine, or bromine.

(2.) Chemical disinfection shall provide the proper dosage of disinfection to achieve a fecal coliform level of 200/100 mL or less.

(II) Ultraviolet disinfection systems

(1.) Ultraviolet (UV) disinfection systems shall be designed and installed according to the manufacturer recommendations.

(2.) Greywater disinfected by a UV disinfection system shall have a UV transmittance less than the UV transmittance rated by the manufacturer.

(3.) The max flow rate of the UV disinfection system shall not be exceeded.

(e) Setbacks

(i) A 30 foot buffer zone is required between the greywater application site and adjacent property lines and any public right-of-way. This buffer zone requirement may be met by the use of a subsurface drip irrigation system.

(ii) A 30 foot separation distance is required between greywater application sites and all surface waters.

(iii) A 100 foot separation distance is required between greywater application sites and all potable water supply wells.

(f) Greywater Applications.

(i) General

(A) Each zone of an irrigation field must be of adequate size to receive the greywater anticipated in that zone.

(B) No irrigation or disposal field shall extend within three (3) vertical feet of the highest known seasonal groundwater, or to a depth where greywater contaminates the groundwater or surface water.

(C) Permeable pipe systems designed for greywater shall be installed according to manufacturer's recommendations.

(ii) Subsurface Irrigation

(A) Subsurface irrigation with greywater may be used to irrigate land and vegetation.

(B) Food crops for direct human consumption shall not be harvested for 30 days after application of greywater.

(C) Subsurface irrigation shall not overwhelm the absorption system leading to overland flow.

(D) Mulch Basins

(1.) The total irrigation and/or mulch basin area required must be equal to the estimated greywater discharge (gpd) divided by the absorption capacity (gpd/ft^2).

(2.) Shall be sized to provide sufficient depth, length and width to prevent ponding or runoff during the greywater surge of a clothes washer, bathtub or shower. Mulch shall be replenished as required due to decomposition of organic matter. Mulch basins will require periodic maintenance, reshaping or removal of dirt to maintain surge capacity, accommodate plant growth, and prevent ponding or runoff.

(3.) Shall not be deeper than the root zone of the plants to be irrigated.

(4.) Free Flow Outlets

a. Greywater shall be applied at the top of the mulch.

b. Application point(s) shall be protected from access by flying insects, rodents, domestic animals and people. Protections shall be constructed to allow easy access for cleaning and maintenance.

c. Inlet piping to the mulch basin shall be no less than 1 inch higher than the surface to which it is applied to allow for free fall of water.

(5.) Sub-mulch Outlets

a. Greywater shall be applied below the surface of the mulch into one or more distribution chambers constructed of perforated material.

b. Inlet piping to distribution chamber of the mulch basin shall be no less than 2 inches higher than the surface to which it is applied to allow for free fall of water.

c. Distribution chamber shall be constructed for easy cleaning and maintenance.

(6.) A compost pile shall meet the requirements of a mulch basin.

(E) Drip Systems

(1.) Shall be filtered prior to the point of application or shall be designed to prevent frequent clogging.

(2.) Discharge nozzles shall be specifically designed for the application of greywater without clogging.

(3.) Drilled pipe drip system holes shall be no smaller than ¼ inches in diameter.

(4.) Point of application flow shall be low enough to prevent any surface flow of greywater.

(iii) Surface Irrigation

(A) Greywater used for surface irrigation shall receive a level of disinfection so the maximum fecal coliform level is 200/100 mL or less.

(B) Surface irrigation with greywater that has been treated by disinfection may be used for irrigation of land and vegetation.

(C) Flood irrigation

(1.) Shall not cause channeling or erosion of the application site.

(2.) Shall use a distribution system to evenly distribute flows across the site.

(3.) Shall not pond in excess of ¼ inch in depth.

(4.) Greywater shall not remain on the ground surface for more than 15 minutes after source flow has stopped.

(g) A design package for greywater systems is provided online at the Division's website to assist the applicant in submitting a completed application for coverage under the general permit for small wastewater systems. The worksheet and calculations were prepared by a registered professional engineer employed by the Wyoming Department of Environmental Quality, Water

Quality Division. The general design requirements stated in this section are incorporated into the worksheets such that by properly completing the forms and installing the components, the system will comply with these requirements.

Section 17. Operation and Maintenance.

(a) For any system that disposes of wastewater through land application or subsurface filtration, the owner shall not add any chemical or biochemical additive to the system that would adversely affect the quality of the groundwater as stated in the WDEQ Water Quality Rules & Regulations, Chapter 8.

(b) Septic tanks shall be pumped as needed to prevent solids carryover into the soil absorption system.

(c) Holding tanks and sealed vaults shall be pumped prior to reaching their maximum capacity.

(d) Any service provider that pumps septic tanks, holding tanks, or sealed vaults, shall dispose of the wastewater contents at a permitted wastewater treatment facility or in a manner approved by the Division or delegated authority.

(e) Damaged fittings and broken, crushed or plugged piping associated with any small wastewater system shall be replaced in a timely manner.

(f) Composting or non-discharging toilets, where permitted, shall have their waste disposed of at a permitted wastewater treatment facility or landfill, or in a manner approved by the Division or delegated authority.

Section 18. Commercial and Industrial Wastes and/or Domestic Wastes Greater than 2000 Gallons Per Day.

(a) Commercial/industrial wastewater systems or combination commercial/industrial and domestic wastewater systems are subject to applicable requirements listed in sections 1 through 14 of this chapter, in addition to requirements in this section.

(b) If the wastewater is classified as, or determined to be hazardous, toxic, and/or contain petroleum products, the applicant shall demonstrate to the administrator that any discharge or seepage from the wastewater facility will not cause a violation of the surface and/or groundwaters of the state in accordance with Chapter 1, "Quality Standards for Wyoming Surface Waters" and Chapter 8, "Quality Standards for Wyoming Groundwaters."

(c) If the impact of the hazardous, toxic, and/or petroleum products cannot be determined and mitigated, disposal of the wastewater using a soil absorption system shall be prohibited.

(d) Pre-treatment of the wastewater to remove the hazardous, toxic, and/or petroleum products shall be required prior to disposal if deemed necessary to protect the groundwater(s) and surface water(s) of the state.

(e) The minimum horizontal setback distances (in feet) shown in Table 7 shall be maintained for commercial and industrial wastes and/or wastes greater than 2000 gallons per day but less than 10,000 gallons per day.

Table 7. Minimum Horizontal Setbacks for Commercial and Industrial Wastes[1]

From	To Septic Tank Or Equivalent	To Absorption System
Wells (includes neighboring wells)	50	200
Public Water Supply Well	100	500[2]
Property Lines	10	10
Foundation Wall (w/o drains)	5	10
Foundation Wall (with drains)	5	50
Potable Water Pipes	25	50
Septic Tank	N/A	10
Surface Water, Spring (including seasonal and intermittent)	50	100
Cisterns	50	50

[1] For systems larger than 10,000 gallons per day, the isolation distance shall be determined by a hydrogeological study in accordance with Section 17(b) of Chapter 3, but shall not be less than those shown in Table 7.

[2] Wastewater systems that discharge to the same aquifer that supplies a public water supply well and are located within Zone 1 or 2 (Attenuation) of the public water supply well, as determined by *Wyoming Department of Environmental Quality Source Water Assessment Project (2004)* or as established in Section 2 of the *Wyoming Wellhead Protection Guidance Document (1997)*, shall provide additional treatment. These systems will be required to obtain an individual permit to construct and will require that a PE sign, stamp, and date the application, as stated in Section 2 of this chapter. The additional treatment shall be in accordance with Chapter 3, Section 2(b)(ii). The treatment shall reduce the nitrates to less than 10 mg/L of NO_{3-} as N and provide 4-log removal of pathogens before the discharge leaves the property boundary of each small wastewater system.

APPENDIX A Percolation Test Procedure

Section 1. Purpose

(a) Percolation tests are used to determine absorption system site suitability and to size the absorption system.

Section 2. Procedure

(a) General Requirements:

(i) Percolation tests shall not be conducted in test holes which extend into groundwater, bedrock, or frozen ground.

(ii) The percolation test shall be conducted only after the soil exploration pit has been dug and examined.

(iii) A minimum of three (3) percolation test holes are required.

(iv) The percolation test holes shall be spaced uniformly over the proposed soil absorption system site.

(b) Preparation

(i) A twelve (12) inch diameter hole shall be dug or bored to the proposed depth of the soil absorption system.

(ii) The walls shall be vertical, with the natural soil surface exposed without smearing.

(iii) The sides and bottom shall be scarified with a sharp pointed instrument and the loose material shall be removed from the hole.

(iv) Two (2) inches of gravel or coarse sand shall be placed in the bottom of the hole to prevent it from scouring and sealing during water addition.

(c) Presoaking

(i) The purpose of presoaking is to have the water conditions in the soil reach a stable condition similar to that which exists during continual wastewater application. The minimum time of presoaking varies with soil conditions but must be sufficiently long so that the water seeps away at a constant rate. The following presoaking instructions are usually sufficient to obtain a constant rate.

(A) Fill each hole with clear water to a level at least eighteen (18) inches above the gravel or coarse sand. If the eighteen (18) inches of water seeps away in eighteen (18) minutes or less, add eighteen (18) inches of water a second time. If the second filling of eighteen

(18) inches of water seeps away in eighteen (18) minutes or less, this indicates the soil is sandy and is excessively permeable. The soil absorption system shall meet the requirements of Section 7 (c).

(B) If either the first or second fillings of eighteen (18) inches of water does not seep away in ninety (90) minutes, eighteen (18) inches of water must be maintained in the hole for at least four (4) hours to presoak the test hole. After the four (4) hours of water contact time, wait at least twelve (12) hours before starting the percolation rate measurement.

(d) Percolation Rate Measurement

(i) Fill each test hole with twelve (12) inches of water and allow the soil to rehydrate for fifteen (15) minutes prior to any measurements.

(ii) Establish a fixed reference point to measure the incremental water level drop at constant time intervals. The water level drop should be measured to the nearest ⅛ of an inch and the minimum time interval is ten (10) minutes.

(iii) Refill the test hole to twelve (12) inches above the gravel before starting the measurements. Continue to measure the incremental water level drop at a constant time interval until a consistent incremental water level drop is achieved. A consistent water level drop is achieved when three (3) consecutive water level drops are within ⅛ inches of each other.

(iv) Before the water level drops below one (1) inch above the gravel, refill the test hole to twelve (12) inches and continue to measure the incremental water level drop.

(v) The percolation rate is calculated for each hole using the following formula:

$$\frac{\textit{Time Interval (Minutes)}}{\textit{Final Water Level Drop (inches)}} = \textit{Percolation Rate (minutes/inch)}$$

(vi) If only three to five percolation tests are performed, the design percolation rate for the absorption system is the largest rate from all the holes tested. If six or more percolation tests are performed, the design percolation rate for the absorption system is the average of all the holes tested as determined by the above formula.

(e) The following information shall be recorded:

(i) Date(s) of test(s);

(ii) Location, diameter, and depth of each test hole;

(iii) Duration of presoak;

(iv) Time of day for beginning and end of each water-level drop interval;

(v) Each water-level drop measurement;

(vi) Calculated percolation rate;

(vii) Name and signature of person performing test;

(viii) Name of owner or project name; and

(ix) Certification that the percolation test was done in accordance with Wyoming Water Quality Rules and Regulations Chapter 25 Appendix A.

APPENDIX B Land Application of Domestic Septage in Remote Areas

Section 1. Restrictions and Requirements

To qualify for the land application of domestic septage in remote areas, the following conditions must be met.

(a) Location restrictions:

(i) Domestic septage generated on a specific property may be land applied on said property, and shall not be transported to another location for land application.

(ii) No land application of domestic septage shall occur within 1,000 feet of all adjacent properties.

(iii) No land application of domestic septage shall occur within 300 feet of a public road, permanent surface water body, or intermittent stream.

(b) Site restrictions:

(i) The land application of domestic septage shall only occur on those sites with established vegetation such as rangeland, pasture or hay meadows.

(ii) No more than 5,000 gallons of domestic septage per acre per year shall be land applied.

(iii) No land application of domestic septage shall occur where the site's slope exceeds five percent (5%) or where the depth to groundwater is less than four (4) feet.

(iv) The land application of domestic septage shall not occur between November 1 and May 1, or any other time when frozen or saturated ground conditions exits.

(v) No public access shall be allowed to any site where domestic septage has been applied for at least one (1) year following application.

(vi) No grazing animals shall be allowed access to any site where domestic septage has been land applied for at least thirty (30) days following application.

(c) Crop restrictions:

(i) No root crops shall be harvested from soils where domestic septage has been land applied for at least thirty-eight (38) months following application

(ii) No truck crops (harvested parts touch land surface) shall be harvested from soils where domestic septage has been land applied for at least fourteen (14) months following application.

(iii) No commodity crops (other food, feed, and fiber crops whose harvested parts do not touch land surface) from soils where domestic septage has been land applied shall be harvested for at least thirty (30) days following application.

(iv) No turf shall be harvested from soils where domestic septage has been land applied.for at least one (1) year following application.

(d) Reporting Requirements:

(i) The property owner shall notify the appropriate Department of Environmental Quality, Water Quality Division (DEQ/WQD) District Engineer prior to the land application of domestic septage to confirm the requirements and to arrange a possible DEQ/WQD inspection of the land application.

(ii) All records related to each septage application will be maintained for at least five (5) years.

(iii) There is a worksheet provided online at the Division's website that must be completed, signed, and returned to the DEQ/WQD, or the appropriate delegated local permitting authority, within 15 days of the land application.