CHAPTER 69
PRIVATE SEWAGE DISPOSAL SYSTEMS

[Prior to 7/l/83, Health Dept. Ch 12]
[Prior to 11/19/86, Water, Air and Waste Management[900] Ch 69]

567—69.1(455B) General.

69.1(1) *Applicability.* These rules are applicable only to private sewage disposal systems.

69.1(2) *Definitions.*

"Administrative authority" means the department and the local board of health as authorized by Iowa Code section 455B.172 and Iowa Code chapter 137.

"Aerobic treatment unit" means a disposal system employing bacterial action which is maintained by the utilization of air or oxygen and includes the aeration plant and equipment and the method of final effluent disposal.

"Approved" means accepted or acceptable under an applicable specification stated or cited in these rules or accepted by the administrative authority as suitable for the proposed use.

"Area drain" means a drain installed to collect surface or storm water from an open area of a building or property.

"Building drain" means that part of the lowest horizontal piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of any building and conveys the same to the building sewer.

"Building sewer" means that part of the horizontal piping from the building wall to its connection with the main sewer or the primary treatment portion of a private sewage disposal system conveying the drainage of a building site.

"Chamber system" means a buried structure, typically with a domed or arched top, providing at least a 6-inch height of sidewall soil exposure below the invert of the inlet and creating a covered open space above a buried soil infiltrative surface.

"Conventional," when used in reference to sewage treatment, means a soil absorption system involving a series of 2- to 3-foot-wide trenches filled with gravel 1 foot deep, containing a 4-inch-diameter rigid pipe or other alternative trench technologies to convey the sewage effluent.

"Distribution box" means a structure designed to accomplish the equal distribution of wastewater to two or more soil absorption trenches.

"Domestic sewage" or *"domestic wastewater"* means the water-carried waste products from residences, public buildings, institutions, or other buildings, including bodily discharges from human beings together with groundwater infiltration and surface water as may be present.

"Drip irrigation" means a form of subsurface soil absorption using shallow pressure distribution with low-pressure drip emitters.

"Drop box" means a structure used to divert wastewater flow into a soil absorption trench. When the trench is filled to a set level, the drop box then allows any additional wastewater not absorbed by that trench to flow to the next drop box or soil absorption trench.

"Dwelling" means any house or place used or intended to be used by humans as a place of residence.

"Expanded polystyrene (EPS) aggregate systems" means cylinders comprised of expanded polystyrene (EPS) synthetic aggregate contained in high-strength polyethylene netting. The cylinders are 12 inches in diameter and are produced both with and without a distribution pipe. Cylinders may be configured in a trench, bed, at-grade and mound applications to obtain the desired width, height and length. Cylinders containing a distribution pipe shall be connected end-to-end with an internal coupling device.

"Fill soil" means clean soil, free of debris or large organic material, which has been mechanically moved onto a site and has been in place for less than one year.

"Foundation drain" means that portion of a building drainage system which is provided to drain groundwater, not including any wastewater, from the outside of the foundation or over or under the basement floor and which is not connected to the building drain.

"Free access filter" means an intermittent sand filter constructed within the natural soil or above the ground surface, with access to the distributor pipes and top of the filter media for maintenance and media replacement.

"Gravel" means stone screened from river sand or quarried and washed free of clay and clay coatings. Concrete aggregate designated as Class II by the department of transportation is acceptable.

"Gravelless pipe system" means a soil absorption system comprised of 10-inch-diameter corrugated plastic pipe, perforated with holes on a 120-degree arc centered on the bottom, wrapped in a sheath of geotextile filter wrap, and installed level in a trench without gravel bedding or cover.

"Grease interceptor" means a watertight device designed to intercept and retain or remove grease and fatty substances. The device may be located inside (grease separator) or outside (grease tank or grease trap) a facility.

"Intermittent sand filter" means a bed of granular materials 24 to 36 inches deep underlain by graded gravel and collecting tile. Wastewater is applied intermittently to the surface of the bed through distribution pipes, and the bed is underdrained to collect and discharge the final effluent. Uniform distribution is normally obtained by dosing so as to utilize the entire surface of the bed. Filters may be designed to provide free access (open filters) or may be buried in the ground (buried filters or subsurface sand filters).

"Lake" means a natural or man-made impoundment of water with more than one acre of water surface area at the high water level.

"Limiting layer" means bedrock, seasonally high groundwater level, or any layer of soil with a stabilized percolation rate exceeding 60 minutes for the water to fall one inch.

"Mound system" means an aboveground soil absorption system used to disperse effluent from septic tanks in cases in which a seasonally high water table, high bedrock conditions, slowly permeable soils, or limited land areas prevent conventional subsurface soil absorption systems.

"Packed bed media filter" means a watertight structure filled with uniformly sized media that is normally placed over an underdrain system. The wastewater is dosed onto the surface of the media through a distribution network and is allowed to percolate through the media to the underdrain system. The underdrain collects the filtrate and discharges the final effluent.

"Percolation test" means a falling water level procedure used to determine the ability of soils to absorb primary treated wastewater. (See Appendix B.)

"Pond" means a natural or man-made impoundment of water with a water surface area of one acre or less at the high water level.

"Pretreated effluent" means septic tank effluent treated through aeration or other methods that, upon laboratory analysis, meets or exceeds a monthly average for biochemical oxygen demand (BOD) of 30 mg/L and total suspended solids (TSS) of 30 mg/L.

"Primary treatment unit" means a unit or system used to separate the floating and settleable solids from the wastewater before the partially treated effluent is discharged for secondary treatment.

"Private sewage disposal system" means a system which provides for the treatment or disposal of domestic sewage from four or fewer dwelling units or the equivalent of less than 16 individuals on a continuing basis. This includes domestic waste, whether residential or nonresidential, but does not include industrial waste of any flow rate.

"Professional soil analysis" means an alternative to the percolation test which depends upon a knowledgeable person evaluating the soil characteristics, such as color, texture, and structure, in order to determine an equivalent percolation or loading rate. A person performing a professional soil analysis shall demonstrate training and experience in soil morphology, such as testing absorption qualities of soil by the physical examination of the soil's color, mottling, texture, structure, topography, and hillslope position.

"Qualified sampler," for the purposes of collecting compliance effluent samples required under NPDES General Permit No. 4, means one of the following persons: a city or county environmental health staff person; an Iowa-certified wastewater treatment operator; or an individual who has received training approved by the department to conduct effluent sampling.

"Roof drain" means a drain installed to receive water collecting on the surface of a roof and discharging into an area or storm drain system.

"Secondary treatment system" means a system which provides biological treatment of the effluent from septic tanks or other primary treatment units to meet minimum effluent standards as required in these rules and NPDES General Permit No. 4. Examples include soil absorption systems, media filters, aerobic treatment units, or other systems providing equivalent treatment.

"Septage" means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or from a holding tank, when the system is cleaned or maintained.

"Septic tank" means a watertight structure into which wastewater is discharged for solids separation and digestion (referred to as part of the closed portion of the treatment system).

"Sewage sludge" means any solid, semisolid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. "Sewage sludge" includes, but is not limited to, solids removed during primary, secondary, or advanced wastewater treatment, scum septage, portable toilet pumpings, Type III marine device pumpings as defined in 33 CFR Part 159, and sewage sludge products. "Sewage sludge" does not include grit, screenings, or ash generated during the incineration of sewage sludge.

"Stream" means any watercourse listed as a "designated use segment" in rule 567—61.3(455B) which includes any watercourse that maintains flow throughout the year or contains sufficient pooled areas during intermittent flow periods to maintain a viable aquatic community.

"Subsurface sand filter" means a system in which the effluent from the primary treatment unit is discharged into perforated pipes, filtered through a layer of sand, and collected by lower perforated pipes for discharge to the surface or to a subsurface soil absorption system. A subsurface sand filter is an intermittent sand filter that is placed within the ground and provided with a natural topsoil cover over the crown of the distribution pipes.

"Subsurface soil absorption system" means a system of perforated conduits connected to a distribution system, forming a series of subsurface, water-carrying channels into which the primary treated effluent is discharged for direct absorption into the soil (referred to as part of the open portion of the treatment system).

69.1(3) *General regulations.*

a. Connections to approved sewer system.

(1) No private sewage disposal system shall be installed, repaired, or rehabilitated where a publicly owned treatment works (POTW) is available or where a local ordinance requires connection to a POTW. The POTW may be considered as unavailable when such POTW, or any building or any exterior drainage facility connected thereto, is located more than 200 feet from any proposed building or exterior drainage facility on any lot or premises which abuts and is served by such POTW. Final determination of availability shall be made by the administrative authority.

(2) When a POTW becomes available within 200 feet, any building then served by a private sewage disposal system shall be connected to said POTW within a time frame or under conditions set by the administrative authority.

(3) When a POTW is not available, every building wherein persons reside, congregate, or are employed shall be provided with an approved private sewage disposal system.

(4) If a building is to be connected to an existing private sewage disposal system, that existing system shall meet the standards of these rules and be appropriately sized.

b. Discharge restrictions. It is prohibited to discharge any wastewater from private sewage disposal systems (except as permitted in this chapter) to any ditch, stream, pond, lake, natural or artificial waterway, county drain tile, surface water drain tile, or land drain tile, to the groundwater, or to the surface of the ground. Under no conditions shall effluent from private sewage disposal systems be discharged to any abandoned well, agricultural drainage well or sinkhole. Existing discharges to any of the above-listed locations or structures shall be eliminated by the construction of a system in compliance with the requirements of these rules.

c. Construction or alteration. All private sewage disposal systems constructed or altered after March 18, 2009, shall comply with this chapter. Alteration includes any changes that affect the treatment

or disposal of the waste. Repair of existing components that does not change the treatment or disposal of the waste is exempt. However, the discharge restrictions in paragraph *"b"* above apply.

d. Abandonment. Private sewage disposal systems that are abandoned shall have the septic tank pumped, the tank lid crushed into the tank, and the tank filled with sand or soil.

69.1(4) *Construction permit required.* No private sewage disposal system shall be installed or altered as described in paragraph 69.1(3)*"c"* unless a construction permit issued by the administrative authority has been obtained. The installation shall be in accordance with these rules.

69.1(5) *Permit by rule.* This chapter is intended to act as a permit by rule for private sewage disposal systems. Activities in compliance with this chapter are permitted by the director for purposes of compliance with sections 455B.183 and 455B.186 of the Code of Iowa.

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.2(455B) Time of transfer inspections.

69.2(1) *Inspections required.* Beginning July 1, 2009, prior to any transfer of ownership of a building where a person resides, congregates, or is employed that is served by a private sewage disposal system, the sewage disposal system serving the building shall be inspected. A building that will be demolished without being occupied does not require an inspection. A legally binding document verifying that the building will be demolished shall be provided to the county and to the department for record. In the event that weather or other temporary physical conditions prevent the certified inspection from being conducted, the buyer shall execute and submit a binding acknowledgment with the county board of health to conduct a certified inspection of the private sewage disposal system at the earliest practicable time and to be responsible for any required modifications to the private sewage disposal system as identified by the certified inspection. Title abstracts to property with private sewage disposal systems shall include documentation of compliance with the requirements in this rule.

a. Inspection criteria. If a private sewage disposal system is failing to ensure effective wastewater treatment or is otherwise improperly functioning, the private sewage disposal system shall be renovated to meet current construction standards, as adopted by the department, either by the seller or, by agreement, within a reasonable time period as determined by the county or the department, by the buyer. If the private sewage disposal system is properly treating the wastewater and not creating an unsanitary condition in the environment at the time of inspection, the system is not required to meet current construction standards.

b. Inspection validity. An inspection is valid for a period of two years for any ownership transfers during that period.

69.2(2) *Certified time of transfer inspectors.* Inspections shall be conducted by an inspector certified by the department. In order to be a certified time of transfer inspector, an individual shall have met the experience requirements, have successfully completed the inspection course and examination, and have been issued a current certificate by the department in accordance with this rule.

a. Experience requirements. In order to be certified by taking the inspection course and examination only, an individual must have at least two years' experience in the operation, installation, inspection, design or maintenance of private sewage disposal systems. Individuals lacking this experience must complete additional coursework before attending the inspection course with testing. The additional courses shall include, but not be limited to, "Onsite Basics 101" and "Alternative Systems" offered by the Onsite Wastewater Training Center of Iowa or courses determined by the department to be equivalent.

b. Examination application. A person wishing to take the examination necessary to become a certified inspector shall complete the Certified Time of Transfer Inspector Application, Form 542-0192. A listing of dates and locations of examinations is available from the department upon request. The application form requires the applicant to indicate pertinent educational background, training and past experience in providing private sewage disposal services. The completed application and the application fee shall be sent to Time of Transfer Inspector Certification, Iowa Department of Natural Resources, 502 E. 9th Street, Des Moines, Iowa 50319-0034. An application for examination must be received by the department at least 60 days prior to the date of the examination.

c. Application evaluation. The director may designate department personnel or an experience review committee to evaluate all applications for examination. A notification of the application review decision will be sent to the applicant prior to the examination date. The applicant shall have the right to dispute the application evaluation.

d. Certification. Applicants who successfully meet the department's requirements will receive a written certification from the department. The department shall maintain a current listing of certified time of transfer inspectors. The list shall be available on the department's Web site and shall be provided to county boards of health and other interested parties.

e. Fees. The following nonrefundable fees apply:

(1) Examination fee. The fee for each examination shall be $50.

(2) Certification fee. The fee for inspector certification shall be $75 for each one-half year of a two-year period from the date of issuance of the certification to June 30 of the next even-numbered year.

(3) Certification renewal fee. The fee for certification renewal shall be $300 for the two-year period.

(4) Penalty fee. The penalty fee shall be $100 for each 30 days in delinquency. The penalty fee is for late payment of the initial certification fee or renewal fee or for incomplete application forms.

f. Renewal period. All certificates shall expire on June 30 of even-numbered years and must be renewed every two years in order to maintain certification.

69.2(3) *Continuing education.*

a. CEU requirements. Continuing education units (CEUs) must be earned during each two-year period from April 1 of the even-numbered year until March 30 of the next even-numbered year. A certified inspector must earn 1.2 CEUs or 12 contact hours during each two-year period. Newly certified time of transfer inspectors (previously uncertified) who become certified after April 1 of a two-year period will not be required to earn CEUs until the next two-year period.

b. CEU approval. All activities for which CEU credit will be granted must be approved by an accredited college or university, an issuing agency, or the department and shall be related to private sewage disposal systems.

c. CEU reporting. It is the personal responsibility of the certified inspector to maintain a written record of and to notify the department of the CEUs earned during the period. The CEUs earned during the period shall be shown on the application for renewal.

69.2(4) *Certificate renewal.*

a. Certification period. All certificates shall expire on June 30 of even-numbered years and must be renewed every two years in order to stay effective.

b. Application for renewal. Renewal applications shall be submitted on DNR Form 542-0192 60 days before the expiration date of the current certificate. Late applications or incomplete applications may lead to revocation of the certificate. Renewal of certificates will only be granted to inspectors in good standing.

c. CEUs. Only those certified inspectors fulfilling the continuing education requirements before the end of each two-year period (June 30) will be allowed to renew their certificates. The certificates of inspectors not fulfilling the continuing education requirements shall expire on June 30 of the even-numbered year.

d. Renewal fee. A renewal fee in the amount of $300 must accompany the renewal application in order for the certificate to be renewed. Failure to submit the renewal fee on time may lead to revocation of the certificate in addition to a penalty fee.

69.2(5) *Obligations of certified inspectors.*

a. Certified inspectors shall conduct time of transfer inspections according to this rule.

b. Following an inspection, the inspection form and any related reports shall be provided to the county environmental health department for enforcement of any follow-up mandatory improvements to the system, to the department for record, and to the county recorder's office.

69.2(6) *Disciplinary action.*

a. Reasons for disciplinary action. Disciplinary action may be taken against a certified time of transfer inspector on any of the grounds specified in Iowa Code section 455B.219 and the following more specific grounds.

(1) Failure to use reasonable care or judgment or to apply knowledge or ability in performing the duties of a certified inspector.

(2) Failure to submit required records of inspection or other reports required under applicable permits or rules of the department, including failure to submit complete records or reports.

(3) Knowingly making any false statement, representation, or certification on any application, record, report or document required to be maintained or submitted under any applicable permit or rule of the department.

(4) Fraud in procuring a certificate.

(5) Professional incompetence.

(6) Knowingly making misleading, deceptive, untrue or fraudulent representations in the practice of the certified inspector's profession or engaging in unethical conduct or practice harmful or detrimental to the public. Proof of actual injury need not be established.

(7) Habitual intoxication or addiction to the use of drugs.

(8) Conviction of a felony related to the profession or occupation of the certified inspector. A copy of the record of conviction or plea of guilty shall be conclusive evidence.

(9) Fraud in representations as to skill or ability.

(10) Use of untruthful or improbable statements in advertisements.

(11) Willful or repeated violations of the provisions of Iowa Code chapter 455B, division III.

b. Disciplinary sanctions. Disciplinary sanctions may include the following:

(1) Revocation of a certificate. Revocation may be permanent without chance of recertification or for a specified period of time.

(2) Partial revocation or suspension. Revocation or suspension of the practice of a particular aspect of the inspection of private sewage disposal systems may be imposed.

(3) Probation. Probation under specified conditions relevant to the specific grounds for disciplinary action may be imposed.

(4) Additional education, training, and examination requirements. Additional education, training, and reexamination may be required as a condition of reinstatement.

(5) Penalties. Civil penalties not to exceed $1,000 may be assessed for causes identified in paragraph 69.2(6)*"a"* through the issuance of an administrative order.

c. Procedure.

(1) Initiation of disciplinary action. The department staff shall initiate a disciplinary action by conducting such lawful investigation as is necessary to establish a legal and factual basis for action. Written notice shall be given to a certified inspector against whom disciplinary action is being considered. The notice shall provide the certified inspector with 20 days to present any relevant facts and to indicate the certified inspector's position in the matter.

(2) A certified inspector's failure to communicate facts and positions relevant to the disciplinary investigation by the required date may be considered by the department when determining appropriate disciplinary action.

(3) If an agreement as to appropriate disciplinary action, if any, can be reached between the department and the certified inspector, a written stipulation and settlement shall be entered into. The stipulation and settlement shall recite the basic facts and violations alleged, any facts established by the certified inspector, and the reasons for the particular sanction imposed.

(4) If an agreement as to appropriate disciplinary action cannot be reached, the department may initiate formal disciplinary procedures through the issuance of a letter imposing such disciplinary sanction as the department has deemed appropriate. Service shall be provided by certified mail.

(5) A certified inspector may appeal any disciplinary sanction imposed by the department by filing a notice of appeal with the director within 30 days of receipt of the letter imposing disciplinary sanction. If an appeal is filed by the certified inspector, contested case proceedings shall be initiated by the department in accordance with 567—Chapter 7 and Iowa Code chapter 17A.

(6) Reinstatement of revoked certificates. Upon revocation of a certificate, application for certification may be allowed after two years from the date of revocation unless otherwise specified in accordance with paragraph 69.2(6)*"b."* Any such applicant must meet all eligibility requirements

pursuant to subrule 69.2(2) and successfully complete an examination and be certified in the same manner as a new applicant.

69.2(7) *Procedures for noncompliance with child support order.* Upon receipt of a certification of noncompliance with a child support obligation as provided in Iowa Code section 252J.7, the department will initiate procedures to deny an application for certification or renewal or to suspend a certification in accordance with Iowa Code section 252J.8(4). The department shall issue to the person by restricted, certified mail a notice of its intent to deny or suspend inspector certification based on receipt of a certificate of noncompliance. The suspension or denial shall be effective 30 days after receipt of the notice unless the person provides the department with a withdrawal of the certificate of noncompliance from the child support recovery unit as provided in Iowa Code section 252J.8(4)*"c."* Pursuant to Iowa Code section 252J.8(4), the person does not have a right to a hearing before the department to contest the denial or suspension action under this subrule but may seek a hearing in district court in accordance with Iowa Code section 252J.9.

69.2(8) *Inspection procedures.* Inspections shall be conducted as follows:

a. Inspection form. The inspection shall be conducted using DNR Form 542-0191, Time of Transfer Inspection Report.

b. Record search. Prior to an inspection, the certified inspector shall contact the administrative authority to obtain any permits, as-built drawings or other information that may be available concerning the system being inspected. Information may also be obtained from service providers or the homeowner. If an as-built drawing is available, the system inspection shall verify that drawing. If no as-built drawing is available, the inspector shall develop an as-built drawing as part of the inspection.

c. Septic tank. At the time of inspection, any septic tank(s) existing as part of the sewage disposal system shall be opened and have the contents pumped out and disposed of according to 567—Chapter 68. In the alternative, the owner may provide evidence of the septic tank's being properly pumped out within three years prior to the inspection by a commercial septic tank cleaner licensed by the department which shall include documentation of the size and condition of the tank and its components at the time of such occurrence. If the septic tank(s) is opened, the condition of the tank and its components shall be documented and included in the final report.

d. Pumps and pump chambers. Pump chambers or vaults shall be opened for inspection, and the pump shall be tested to ensure proper operation.

e. Secondary treatment. Proof that a secondary treatment system is in place must be provided. This proof may include, but is not limited to:

(1) Opening a distribution box or uncovering a header pipe for a soil absorption system. Existing distribution boxes shall be opened for inspection.

(2) Verification of the existence of a sand filter by locating the vents and discharge pipe.

(3) Locating and opening the lid(s) of an advanced treatment unit.

(4) Absorption fields shall be probed to determine their condition. The condition of the fields shall be noted on the inspection report. The condition of the absorption field may also be determined with a hydraulic loading test.

f. Discharging systems. An effluent test shall be performed on any legally discharging private sewage disposal system. The effluent shall be tested to determine if it meets the requirements of NPDES General Permit No. 4, and the test results shall be included in the inspection report.

(1) The certified inspector shall ensure that a legally discharging private sewage disposal system has an NPDES General Permit No. 4, if applicable.

(2) The certified inspector shall ensure that a Notice of Intent to discharge is submitted to the department for coverage under NPDES General Permit No. 4.

g. Packaged treatment units. An advanced treatment unit, such as an aerobic treatment unit, textile filter, peat filter or fixed activated sludge treatment system, shall be inspected according to the manufacturer's recommendations.

h. Other systems and system components. Private sewage disposal systems not mentioned above shall be inspected for code compliance, and an effluent sample shall be taken if applicable. Any components of the private sewage disposal system not mentioned above shall be inspected for proper

function. Examples of other components include, but are not limited to, effluent screens, tertiary treatment systems, disinfection devices, alarms, control boxes and timers.

i. Inspection reports. Following an inspection, the inspection form and a narrative report describing the condition of the private sewage disposal system at the time of the inspection shall be provided to the county environmental health department, to the department for record, and to the county recorder in the county where the inspection occurred.

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.3(455B) Site analysis.

69.3(1) *Site evaluation.* A site evaluation shall be conducted prior to issuance of a construction permit. Consideration shall be given to, but not be limited to, the impact of the following: topography; drainage ways; terraces; floodplain; percent of land slope; location of property lines; location of easements; buried utilities; existing and proposed tile lines; existing, proposed and abandoned water wells; amount of available area for the installation of the system; evidence of unstable ground; alteration (cutting, filling, compacting) of existing soil profile; and soil characteristics determined from a soil analysis, percolation tests, and soil survey maps if available.

a. Soil survey reports. During a site analysis and investigation, maximum use should be made of soil survey reports, which are available from USDA Natural Resources Conservation Service. A general identification of the percolation potential can be made from soil map units in Iowa. Verification of the soil permeability of the specific site must be performed.

b. Final inspections. All newly constructed private sewage disposal systems shall be inspected by the administrative authority before the system is backfilled or at a time prescribed by the administrative authority. A final as-built drawing shall be made as part of the final inspection.

c. Onsite wastewater tracking system. All pertinent information including, but not limited to, the site address, owner, type, date of installation, and as-built drawing of the private sewage disposal system shall be entered into the department's Web-based onsite wastewater tracking system.

69.3(2) *Minimum distances.* All private sewage disposal systems shall be located in accordance with the minimum distances shown in Table I.

Table I

Minimum Distance in Feet From	Closed Portion of Treatment System(1)	Open Portion of Treatment System(2)
Private water supply well	50	100
Public water supply well	200	200
Groundwater heat pump borehole	50	100
Lake or reservoir	50	100
Stream or pond	25	25
Edge of drainage ditch	10	10
Dwelling or other structure	10	10
Property lines (unless a mutual easement is signed and recorded)	10	10
Other type of subsurface treatment system	5	10
Water lines continually under pressure	10	10
Suction water lines	50	100
Foundation drains or subsurface tiles	10	10

(1) Includes septic tanks, aerobic treatment units, fully contained media filters and impervious vault toilets.

(2) Includes subsurface absorption systems, mound systems, intermittent sand filters, constructed wetlands, open bottom media filters and waste stabilization ponds.

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.4(455B) Requirements when effluent is discharged into surface water. All discharges from private sewage disposal systems which are discharged into, or have the potential to reach, any designated waters of the state or subsurface drainage tile shall be treated in a manner that will conform

with the requirements of NPDES General Permit No. 4 issued by the department of natural resources, as referenced in 567—Chapter 64. Prior to the use of any system discharging to designated waters of the state or a subsurface drainage tile, a Notice of Intent to be covered by NPDES General Permit No. 4 shall be submitted to the department. Systems covered by this permit must meet all applicable requirements listed in the permit, including effluent sampling and monitoring.
[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.5(455B) Requirements when effluent is discharged above the ground surface.

69.5(1) All private sewage disposal systems that discharge above the ground surface shall be annually inspected to ensure proper operation.

69.5(2) Private sewage disposal systems that require a maintenance contract shall be inspected by a manufacturer's certified technician or person demonstrating knowledge of the system in accordance with the manufacturer's standards.

69.5(3) Private sewage disposal systems that do not require a maintenance contract shall be visually inspected by a person with knowledge of the system for any malfunction and shall have the septic tank opened, inspected, and pumped if needed. A record of the inspection and any tank pumping shall be maintained and be made available to the administrative authority upon request.
[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.6(455B) Requirements when effluent is discharged into the soil. No septage or wastewater shall be discharged into the soil except in compliance with the requirements contained in this chapter.
[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.7(455B) Building sewers.

69.7(1) *Location and construction.*

a. The types of construction and distances as shown in Table II shall be maintained for the protection of water supplies. The distances shall be considered minimum distances and shall be increased where possible to provide better protection.

Table II

Sewer Construction	Distance in Feet From Well Water Supply	
	Private	Public
1. Schedule 40 plastic pipe (or SDR 26 or stronger) with approved-type joints or cast-iron soil pipe (extra heavy or centrifugally cast) with joints of preformed gaskets.	10	25
2. Sewer pipe installed to remain watertight and root-proof.	50	75

b. Under no circumstances shall a well suction line pass under a building sewer line.

69.7(2) *Requirements for building sewers.*

a. Type. Building sewers used to conduct wastewater from a building to the primary treatment unit of a private sewage disposal system shall be constructed of Schedule 40 plastic pipe (or SDR 26 or stronger) with solvent-weld or bell-and-gasket-type joints or shall be constructed of cast iron with integral bell-and-gasket-type joints.

b. Size. Such building sewers shall not be less than 4 inches in diameter.

c. Grade. Such building sewers shall be laid to the following minimum grades:

4-inch sewer . . . . . 12 inches per 100 feet
6-inch sewer . . . . . 8 inches per 100 feet

69.7(3) *Cleanouts.*

a. Spacing. A cleanout shall be provided where the building sewer leaves the house and at least every 100 feet downstream to allow for rodding.

b. Change of direction or grade. An accessible cleanout shall be provided at each change of direction or grade if the change exceeds 45 degrees.

69.7(4) *Grease interceptors.*

a. Applicability. Grease interceptors shall be provided for kitchen flows at restaurants, nursing homes, schools, hospitals and other facilities from which grease can be expected to be discharged.

b. Installation. Grease interceptors shall be installed on a separate building sewer serving kitchen flows into which the grease will be discharged. The discharge from the grease interceptor must flow to a properly designed septic tank or to a building sewer and then to the septic tank.

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.8(455B) Primary treatment—septic tanks.

69.8(1) *General requirements.*

a. Septic tank required. Every private sewage disposal system shall have as a primary treatment unit a septic tank as described in this rule. All wastewater from the facility serviced shall discharge into the septic tank (except as noted in paragraph *"d"* below).

b. Easements. No septic tank shall be located upon property under ownership different from the ownership of that property or lot upon which the wastewater originates unless easements to that effect are legally recorded and approved by the proper administrative authority.

c. Effluent discharge requirements. All septic tank effluent shall discharge into a secondary treatment system in compliance with this chapter or into another system approved by the administrative authority according to rule 69.21(455B).

d. Prohibited wastes. Septic tanks shall not be used for the disposal of chemical wastes or grease in quantities which might be detrimental to the bacterial action in the tank or for the disposal of drainage from roof drains, foundation drains, or area drains.

69.8(2) *Capacity.*

a. Minimum capacity. The minimum liquid-holding capacity shall be as specified in the following table (capacity may be obtained by using one or more tanks):

Up to and including 3-bedroom homes	1,250 gal.
4-bedroom homes	1,500 gal.
5-bedroom homes	1,750 gal.
6-bedroom homes	2,000 gal.

b. Other domestic waste systems. In the event that an installation serves more than a 6-bedroom home or its equivalent, or serves a facility other than a house and serves the equivalent of fewer than 16 individuals on a continuing basis, approval of septic tank capacity and design must be obtained from the administrative authority. Minimum septic tank liquid-holding capacity shall be two times the estimated daily sewage flow.

c. Determination of flow rates. For wastewater flow rates for nonresidential and commercial domestic waste applications serving the equivalent of fewer than 16 individuals on a continuing basis, refer to Appendix A.

d. Minimum depth. The minimum liquid-holding depth in any compartment shall be 40 inches.

e. Maximum depth. The maximum liquid-holding depth for calculating capacity of the tank shall not exceed 6½ feet.

f. Dimensions. The interior length of a septic tank should not be less than 5 feet and shall be at least 1½ times the width (larger length-to-width ratios are preferred). No tank or compartment shall have an inside width of less than 2 feet. The minimum inside diameter of a vertical cylindrical septic tank shall be 5 feet.

69.8(3) *Construction details.*

a. Fill soil. Any septic tank placed in fill soil shall be placed upon a level, stable base that will not settle.

b. Compartmentalization. Every septic tank shall be divided into two compartments (compartmentalization may be obtained by using more than one tank) as follows:

(1) The capacity of the influent compartment shall not be less than one-half or more than two-thirds of the total tank capacity.

(2) The capacity of the effluent compartment shall not be less than one-third or more than one-half of the total tank capacity.

c. Inlet/outlet. The invert of the inlet pipe shall be a minimum of 2 inches and a maximum of 4 inches higher than the invert of the outlet pipe.

d. Baffles.

(1) Four-inch-diameter Schedule 40 plastic pipe tees shall be used as inlet and outlet baffles. Inlet tees shall extend at least 6 inches above and 8 inches below the liquid level of the tank. The inlet tee shall extend below the liquid level no more than 20 percent of the liquid depth. The outlet tee shall extend above the liquid level a distance of at least 6 inches and below the liquid level a distance of at least 15 inches but no more than 30 percent of the liquid depth. A minimum 2-inch clearance between the top of the inlet and outlet tees and the bottom of the tank lid shall be provided. A horizontal separation of at least 36 inches shall be provided between the inlet baffle and the outlet baffle in each compartment. Outlet baffles shall be fitted with an effluent screen. All effluent screens shall be certified by an ANSI-accredited third-party certifier to meet National Sanitation Foundation Standard 46, including appendices, or other equivalent testing as determined by the department. Effluent screens require periodic inspection and cleaning to ensure their continued proper operation.

(2) A horizontal slot 4 inches by 6 inches, or two suitably spaced 4-inch-diameter holes in the tank partition, may be used instead of a tee or baffle. The top of the slot or holes shall be located below the water level a distance of one-third the liquid depth. A ventilation hole or slot, located at least 8 inches above the liquid level, shall be provided in the partition.

e. Access.

(1) Access necessary for adequate inspection, operation, and maintenance must be provided to all parts of septic tanks.

(2) An access opening shall be provided at each end of the tank over the inlet and outlet. These openings shall be at least 18 inches in the smallest dimension.

(3) Watertight risers shall be installed to bring the access openings to the ground surface. Risers shall be secured using stainless steel fasteners of sufficient complexity, locking devices, concrete lids of sufficient weight, or another device approved by the administrative authority to deter tampering.

69.8(4) *Construction.*

a. Materials. Tanks shall be constructed of watertight poured concrete, fiberglass or plastic resistant to corrosion or decay and shall be designed so that the tanks, whether full or empty, will not collapse or rupture when subjected to anticipated earth and hydrostatic pressures. Metal tanks are prohibited.

b. Watertight tanks. Tanks shall be watertight. Prior to approving a tank, the administrative authority may ask for proof that a tank is watertight.

c. Dividers. Tank divider walls and divider wall supports shall be constructed of heavy, durable plastic, fiberglass, concrete or other similar corrosion-resistant materials approved by the administrative authority.

d. Inlet and outlet ports. Inlet and outlet ports of pipe shall be constructed of heavy, durable Schedule 40 PVC plastic sanitary tees or other similar approved corrosion-resistant material.

69.8(5) *Wall thickness.* Minimum wall thickness for tanks shall conform to the following specifications:

Poured concrete	6 inches thick
Poured concrete, reinforced	4 inches thick
Special concrete mix, vibrated and reinforced	2.5 inches thick
Fiberglass or plastic	.25 inches thick

69.8(6) *Concrete specifications.* Concrete used in precast septic tank construction shall have a maximum water-to-cement ratio of 0.45. Cement content shall be at least 650 pounds per cubic yard. Minimum compressive strength (f'_c) shall be 4,000 psi (28 Mpa) at 28 days of age. The use of ASTM C150 Type II cement or the addition of silica fume or Class F fly ash is recommended.

69.8(7) *Tank bottoms.* Septic tank bottoms shall conform to the specifications set forth in subrule 69.8(5) for septic tank walls, except that special mix concrete shall be at least 3 inches thick.

69.8(8) *Tank tops.* Concrete or masonry septic tank tops shall be a minimum of 4 inches in thickness and shall be reinforced with ⅜-inch reinforcing rods in a 6-inch grid or equivalent. Fiberglass or plastic tank tops shall be a minimum of ¼ inch in thickness and shall have reinforcing and be of ribbed construction.

69.8(9) *Reinforcing steel placement.* The concrete cover for reinforcing bars, mats, or fabric shall not be less than 1 inch.

69.8(10) *Bedding.* Fiberglass or plastic tanks shall be bedded according to the manufacturer's specifications. Provisions should be made to prevent flotation of the tanks when they are empty.

69.8(11) *Connecting pipes.*

a. Minimum diameter. The pipes connecting septic tanks installed in series and at least the first 5 feet of pipe on the effluent side of the last tank shall be a minimum of 4-inch-diameter Schedule 40 plastic.

b. Tank connections. All inlet and outlet connections at the septic tanks shall be made by self-sealing gaskets cast into the concrete or formed into the plastic or fiberglass.

c. Joints. All joints in connecting Schedule 40 plastic pipe shall be approved plastic pipe connections such as solvent-welded or compression-type gaskets.

d. Pipe in unstable ground. Schedule 40 plastic pipe shall be used extending across excavations or unstable ground to at least 2 feet beyond the point where the original ground has not been disturbed in septic tank installations. If the excavation spanned is more than 2 feet wide, it must be filled with sand or compacted fill to provide a firm bed for the pipe. The first 12 inches of backfill over the pipe shall be applied in thin layers, using material free from stones, boulders, large frozen chunks of earth or any similar material that would damage or break the pipe.

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567—69.9(455B) Secondary treatment—subsurface soil absorption systems. Subsurface soil absorption systems are the best available treatment technology and shall always be used where possible.

69.9(1) *General requirements.*

a. Locations. All subsurface soil absorption systems shall be located on the property to maximize the vertical separation distance from the bottom of the absorption trench to the seasonal high groundwater level, bedrock, hardpan or other confining layer, but under no circumstances shall this vertical separation be less than 3 feet.

b. Soil evaluation. A percolation test or professional soil analysis is required before any soil absorption system is installed.

(1) *Percolation test.* The percolation test procedure is outlined in Appendix B.

(2) *Alternative analysis.* If a professional soil analysis is performed, soil characteristics such as soil content, color, texture, and structure shall be used to determine a loading rate.

(3) *Acceptable percolation rate.* An area is deemed suitable for conventional soil absorption if the average percolation rate is 60 minutes per inch or less and greater than 1 minute per inch. However, if an alternative soil absorption system is proposed (e.g., mound system), then the percolation test should be extended to determine whether a percolation rate of 120 minutes per inch is achieved.

(4) *Confining layer determination.* An additional test hole 6 feet in depth or to rock, whichever occurs first, shall be provided in the center of the proposed absorption area to determine the location of groundwater, rock formations or other confining layers. This 6-foot test hole may be augered the same size as the percolation test holes or may be made with a soil probe.

c. Groundwater. If the seasonal high groundwater level is present within 3 feet of the trench bottom final grade and cannot be successfully lowered by subsurface tile drainage, the area shall be classified as unsuitable for the installation of a standard subsurface soil absorption system. The administrative authority shall be consulted to determine an acceptable alternative method of wastewater treatment.

d. Site limitations. In situations where specific location or site characteristics would appear to prohibit installation of a soil absorption system, design modifications which could overcome such limitations may be approved by the administrative authority. Examples of such modifications could be the installation of subsurface drainage, use of shallow or at-grade trenches, drip irrigation, or mound systems or use of pretreated effluent.

e. Prohibited drainage. Roof, foundation and storm drains shall not discharge into or upon subsurface absorption systems. Nothing shall enter the subsurface absorption system which does not first pass through the septic tank.

f. Prohibited construction. There shall be no construction of any kind, including driveways, covering the septic tank, distribution box or absorption field of a private sewage disposal system. Vehicle access should be infrequent, primarily limited to vegetation maintenance.

g. Driveway crossings. Connecting lines under driveways shall be constructed of Schedule 40 plastic pipe or equivalent and shall be protected from freezing.

h. Easements. No wastewater shall be discharged upon any property under ownership different from the ownership of the property or lot upon which the wastewater originates unless easements to that effect are legally recorded and approved by the administrative authority.

69.9(2) *Sizing requirements.*

a. Percolation and soil loading charts. Table IIIa provides a correlation between percolation rates and soil loading rates. Table IIIb provides soil loading rates based upon soil texture and structure. Table IIIa and Table IIIb shall be used to determine the appropriate soil loading rate. Table IIIc specifies linear feet of lateral trenches required based upon the soil loading rate, wastewater flow rate, and trench width. Table IIId provides a method to determine the size of an absorption bed. Absorption beds (Table IIId) shall not be used except when the lot size limitations preclude the installation of a lateral trench system. Further details concerning limitations of this alternative shall be obtained from the administrative authority before authorization for installation is requested.

b. Unsuitable absorption. Conventional subsurface soil absorption trenches shall not be installed in soils that have a percolation rate less than 1 minute per inch or greater than 60 minutes per inch. Plans for an alternative method of wastewater treatment shall be submitted to the administrative authority for approval prior to construction.

Table IIIa

Maximum Soil Application Rates Based Upon Percolation Rates

	Monthly Averages	
Percolation Rate (minutes per inch)	Septic Tank Effluent[1] BOD_5 30 mg/L - 220 mg/L TSS 30 mg/L - 150 mg/L (gals/sq ft/day)[2]	Pretreated Effluent $BOD_5 \leq 30$ mg/L TSS ≤ 30 mg/L (gals/sq ft/day)
0 to 5	1.2	1.6
Fine sands	0.5	0.9
6 to 10	0.8 – 0.6	1.2
11 to 29	0.6 – 0.5	0.9
30 to 45	0.5 – 0.4	0.7

46 to 60	0.4 – 0.2	0.5
61 to 120	0.0	0.3
Greater than 120	0.0	0.0

NOTE: "BOD" means biochemical oxygen demand. "TSS" means total suspended solids.
(1) Typical waste strengths for domestic waste. Pretreatment should be considered for waste of higher strength.
(2) Percolation rates and soil loading rates do not precisely correlate; therefore, a range is provided.

Table IIIb

Maximum Soil Loading Rates Based Upon Soil Evaluations in Gallons per Square Foot per Day (gal/ft²/day) for Septic Tank Effluent. Values in ( ) are for secondary treated effluent.

Soil Texture	Single Grain	Massive	Structure Granular, Blocky, or Prismatic			Platy	
			Weak	Moderate	Strong	Weak	Moderate to Strong
Coarse sand and gravel	1.2 (1.6)	X	1.2 (1.6)	X	X	1.2 (1.6)	X
Medium sands	0.7 (1.4)	X	0.7 (1.4)	X	X	0.7 (1.4)	X
Fine sands	0.5 (0.9)	X	0.5 (0.9)	X	X	0.5 (0.9)	X
Very fine sands*	0.3 (0.5)	X	0.3 (0.5)	X	X	0.3 (0.5)	X
Sandy loam	X	0.3 (0.5)	0.45 (0.7)	0.6 (1.1)	0.65 (1.2)	0.4 (0.6)	0.3 (0.5)
Loam	X	0.4 (0.6)	0.45 (0.7)	0.5 (0.8)	0.55 (0.8)	0.4 (0.6)	0.3 (0.5)
Silty loam	X	NS	0.4 (0.6)	0.5 (0.8)	0.5 (0.8)	0.3 (0.5)	0.2 (0.3)
Clay loam	X	NS	0.2 (0.3)	0.45 (0.7)	0.45 (0.7)	0.1 (0.2)	0.1 (0.2)
Silty clay loam	X	NS	0.2 (0.3)	0.45 (0.7)	0.45 (0.7)	NS	NS

NOTE: "X" means not found in nature. "NS" means not suitable for soil absorption.
* Flow rates are difficult to determine for some very fine sands; experience may provide better information and flow rates.

Table IIIc

Minimum Length of Absorption Trenches in Feet

	2 bedroom 300 gal.		3 bedroom 450 gal.		4 bedroom 600 gal.		5 bedroom 750 gal.		6 bedroom 900 gal.	
Width of trench in feet	2′	3′	2′	3′	2′	3′	2′	3′	2′	3′
Soil loading rate gal/ft²										
0.1	Not suitable for soil absorption trenches									
0.2	750	500	1125*	750	1500*	1000*	1875*	1250*	2250*	1500*
0.3	500	333	750	500	1000*	666	1250*	833*	1500*	1000*
0.4	375	250	562	375	750	500	938*	625	1125*	750
0.5	300	200	450	300	600	400	750	500	900*	600
0.6	250	167	375	250	500	333	625	417	750	500
0.7	214	143	321	214	428	286	536	357	643	429

0.8	188	125	281	188	375	250	469	312	562	375
0.9	167	111	250	167	333	222	417	278	500	333
1.0	150	100	225	150	300	200	375	250	450	300
1.1	136	91	205	136	273	182	341	227	409	273
1.2	125	84	188	125	250	167	313	208	375	250

* Requires pressure distribution (pump)

Table IIId

Alternative Option for Use of Absorption Bed*

Percolation Rate min./inch	Absorption Area/Bedroom sq. ft.	Loading Rate/Day gal./sq. ft.
1 – 5	300	.5
6 – 15	400	.375
16 – 30	600	.25

*Absorption beds may only be used when site space restrictions require and shall not be used when the soil percolation rate exceeds 30 min./inch.

69.9(3) *Construction details for all soil absorption trenches.*

a. Depth. Soil absorption trenches shall not exceed 36 inches in depth unless authorized by the administrative authority, but a shallower trench bottom depth of 18 to 24 inches is recommended. Not less than 6 inches of porous soil shall be provided over the laterals. The minimum separation between trench bottom and groundwater, rock formation or other confining layers shall be 36 inches even if extra rock is used under the pipe.

b. Length. No soil absorption trench shall be greater than 100 feet long.

c. Separation distance. At least 6 feet of undisturbed soil shall be left between each trench edge on level sites. The steeper the slope of the ground, the greater the separation distance should be. Two feet of separation distance should be added for each 5 percent increase in slope from level.

d. Grade. The trench bottom should be constructed level from end to end. On sloping ground, the trench shall follow a uniform land contour to maintain a minimum soil cover of 6 inches and a level trench bottom.

e. Compaction. There shall be minimum use or traffic of heavy equipment on the area proposed for soil absorption. In addition, it is prohibited to use heavy equipment on the bottom of the trenches in the absorption area.

f. Fill soil. Soil absorption systems shall not be installed in fill soil. Disturbed soils which have stabilized for at least one year shall require a recent percolation test or soil analysis.

g. Bearing strength. Soil absorption systems shall be designed to carry loadings to meet AASHTO H-10 standards.

h. Soil smearing. Soils with significant clay content should not be worked when wet. If soil moisture causes sidewall smearing, the installation should be discontinued until conditions improve.

69.9(4) *Gravel systems.*

a. Gravel. A minimum of 6 inches of clean, washed river gravel, free of clay and clay coatings, shall be laid below the distribution pipe, and enough gravel shall be used to cover the pipe. This gravel shall be of such a size that 100 percent of the gravel will pass a 2½-inch screen and 100 percent will be retained on a ¾-inch screen. Limestone or crushed rock is not recommended for soil absorption systems; however, if used, it shall meet the following criteria:

(1) *Abrasion loss.* The percent wear, as determined in accordance with the AASHTO T 96, Grading C, shall not exceed 40 percent.

(2) *Freeze and thaw loss.* When gravel is subjected to the freezing and thawing test, Iowa DOT Materials Laboratory Test Method 211, Method A, the percentage loss shall not exceed 10 percent.

(3) *Absorption.* The percent absorption, determined in accordance with Iowa DOT Materials Laboratory Test Method 202, shall not exceed 3 percent.

b. Trench width. Soil absorption trenches for gravel systems shall be a minimum of 24 inches and a maximum of 36 inches in width at the bottom of the trench.

c. Grade. The distribution pipes shall be laid with a minimum grade of 2 inches per 100 feet of run and a maximum grade of 6 inches per 100 feet of run, with a preference given to the lesser slope.

d. Pipe. Distribution pipe shall be PVC rigid plastic meeting ASTM Standard 2729 or other suitable material approved by the administrative authority. The inside diameter shall be not less than 4 inches, with perforations at least ½ inch and no more than ¾ inch in diameter, spaced no more than 40 inches apart. Two rows of perforations shall be provided located 120 degrees apart along the bottom half of the tubing (each 60 degrees up from the bottom centerline). The end of the pipe in each trench shall be sealed with a watertight cap unless, on a level site, a footer is installed connecting the trenches together. Coiled perforated plastic pipe shall not be used.

e. Gravel cover. Unbacked, rolled, 3½-inch-thick fiberglass insulation, untreated building paper, synthetic drainage fabric, or other approved material shall be laid so as to separate the gravel from the soil backfill.

69.9(5) *Gravelless pipe systems.*

a. Application. Gravelless subsurface soil absorption systems may be used as an alternative to conventional 4-inch pipe placed in gravel-filled trenches. However, these systems shall not be used in areas where conventional systems would not be allowed due to poor permeability, high groundwater, or insufficient depth to bedrock.

b. Installation. The manufacturer's specifications and installation procedures shall be adhered to.

c. Material. The 10-inch I.D. corrugated polyethylene tubing used in gravelless systems shall meet the requirements of ASTM F667, Standard Specification for Large Diameter Corrugated Polyethylene Tubing.

d. Perforations. Two rows of perforations shall be located 120 degrees apart along the bottom half of the tubing (each 60 degrees up from the bottom centerline). Perforations shall be cleanly cut into each inner corrugation along the length of the tubing and should be staggered so that there is only one hole in each corrugation.

e. Top marking. The tubing should be visibly marked to indicate the top of the pipe.

f. Filter wrap. All gravelless drainfield pipe shall be encased, at the point of manufacture, with a geotextile filter wrap specific to this purpose.

g. Trench width. The trench width for the gravelless system shall be 24 inches.

h. Length of trench. The total length of absorption trench for a 10-inch gravelless pipe installation shall be the same as given in Table IIIc for a 2-foot-wide conventional soil absorption trench.

69.9(6) *Chamber systems.*

a. Application. Chamber systems may be used as an alternative to conventional 4-inch pipe placed in gravel-filled trenches. However, chamber systems shall not be used in areas where conventional systems would not be allowed due to poor permeability, high groundwater, or insufficient depth to bedrock.

b. Installation. The manufacturer's specifications and installation procedures shall be adhered to.

c. Length of trench. The total length of soil absorption trench for chambers 15 to 22 inches wide shall be the same as given in Table IIIc for a 2-foot-wide conventional soil absorption trench. Chambers 33 inches wide or greater shall be sized as given in Table IIIc for a 3-foot-wide conventional soil absorption trench.

d. Sidewall. The chambers shall have at least 6 inches of sidewall effluent soil exposure height below the invert of the inlet.

69.9(7) *Expanded polystyrene (EPS) aggregate system.*

a. Application. EPS aggregate systems may be used as an alternative to conventional 4-inch pipe placed in gravel-filled trenches. However, EPS aggregate systems shall not be used in areas where conventional systems would not be allowed due to poor permeability, high groundwater, or insufficient depth to bedrock.

b. Installation. The manufacturer's specifications and installation procedures shall be adhered to.

c. Length of trench. The total length of soil absorption trench for 12-inch EPS aggregate bundles shall be the same as given in Table IIIc for a 2-foot-wide conventional soil absorption trench. Twelve-inch EPS aggregate bundles 33 inches wide or greater shall be sized as given in Table IIIc for a 3-foot-wide conventional soil absorption trench.

d. Gravel cover. Unbacked, rolled, 3½-inch-thick fiberglass insulation, untreated building paper, synthetic drainage fabric, or other approved material shall be laid so as to separate the EPS aggregate from the soil backfill.

69.9(8) *Gravity distribution.* Dosing is always recommended and preferred to improve distribution, improve treatment and extend the life of the system.

a. On a hillside, septic tank effluent may be serially loaded to the soil absorption trenches by drop boxes or overflow piping (rigid sewer pipe). Otherwise, effluent shall be distributed evenly to all trenches by use of a distribution box or commercial distribution regulator approved by the administrative authority.

b. Design. When a distribution box is used, it shall be of proper design and installed with separate watertight headers leading from the distribution box to each lateral. Header pipes shall be rigid PVC plastic pipe meeting ASTM Standard 2729 or equivalent.

c. Height of outlets. The distribution box shall have outlets at the same level at least 4 inches above the bottom of the box to provide a minimum of 4 inches of water retention in the box.

d. Baffles. There shall be a pipe tee or baffle at the inlet to break the water flow.

e. Unused outlets. All unused outlet holes in the box shall be securely closed.

f. Materials. All distribution boxes shall be constructed of corrosion-resistant rigid plastic materials.

g. Level outlets. All outlets of the distribution box shall be made level. A 4-inch cap with an offset hole approximately 2½ inches in diameter shall be installed on each outlet pipe. These caps shall be rotated until all outlets discharge at the same elevation. Equivalent leveling devices may be approved by the county board of health.

h. Equal length required. The soil absorption area serviced by each outlet of the distribution box shall be equal.

69.9(9) *Dosing systems.*

a. Pump systems.

(1) Pump and pit requirements. In the event the effluent from the septic tank outlet cannot be discharged by gravity and the proper lateral depths still maintained, the effluent shall discharge into a watertight pump pit with an inside diameter of not less than 24 inches, equipped with a tight-fitting manhole cover at grade level. The pump shall be of a submersible type of corrosion-resistant material.

(2) Pump setting. The pump shall be installed in the pump pit in a manner that ensures ease of service and protection from frost and settled sludge. The pump shall be set to provide a dosing frequency of approximately four times a day based on the maximum design flow. No onsite electrical connections shall be located in the pump pit. These connections shall be located in an exterior weatherproof box.

(3) Pressure line size. The pressure line from the pump to the point of discharge shall not be smaller than the outlet of the pump it serves.

(4) Drainage. Pressure lines shall be installed to provide total drainage between dosing to prevent freezing or shall be buried below frost level up to the distribution box.

(5) High water alarm. Pump pits shall be equipped with a sensor set to detect if the water level rises above the design high water level when the pump fails. This sensor shall activate an auditory or visual alarm to alert the homeowner that repairs are required.

(6) Discharge point. The effluent shall discharge under pressure into a distribution box or may be distributed by small-diameter pipes throughout the entire absorption field.

b. Dosing siphons. Dosing siphons may also be used. The manufacturer's specifications shall be adhered to for installation. Similar dosing volumes and frequencies are recommended. Dosing siphons require periodic cleaning to ensure their continued proper operation.

c. *Filtered pump vaults.* A filtered pump vault is a device that is installed in a septic tank and houses a pump and screens effluent until it is pumped. Filtered pump vaults may be used when dosing volume is less than 50 gallons. Filtered pump vaults require periodic inspection and cleaning to ensure their continued proper operation.
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567—69.10(455B) Mound systems.

69.10(1) *General requirements.*

a. Mound systems shall be permitted only after a thorough site evaluation has been made and landscaping, dwelling placement, effect on surface drainage, and general topography have been considered.

b. Mound systems shall not be utilized on sites subject to flooding with a ten-year or greater frequency.

c. Mound systems shall not be utilized on soils where the high groundwater level, impermeable bedrock or soil strata having a percolation rate exceeding 120 minutes per inch occur within 12 inches of natural grade or where creviced bedrock occurs within 20 inches of natural grade.

d. Mound systems shall be constructed only upon undisturbed naturally occurring soils or where a soil analysis has determined the site is suitable.

e. Mound systems shall be located in accordance with the distances specified in Table I as measured from the outer edge of the sand in the mound.

f. No buildings, driveways or other surface or subsurface obstructions shall be permitted within 50 feet on the down-gradient side of the mound when the mound is constructed on a slope greater than 5 percent. No future construction shall be permitted in this effluent disposal area as long as the mound is in use.

g. Specifications given in these rules for mounds are minimal and may not be sufficient for all applications. Technical specifications are changing with experience and research. Other design information beyond the scope of these rules may be necessary to properly design a mound system.

69.10(2) *Material for mound fill.*

a. The mound shall be constructed using clean, medium-textured sand, sometimes referred to as concrete sand. The sand size shall be such that at least 25 percent by weight shall have a diameter between 2.0 and 0.25 mm; less than 35 percent by weight, a diameter between 0.25 and 0.05 mm; and less than 5 percent by weight, a diameter between 0.05 and 0.002 mm.

b. Rock fragments larger than 1/16 inch (2.0 mm) shall not exceed 15 percent by weight of the material used for mound fill.

69.10(3) *Construction details.*

a. There shall be a minimum of 3 feet of fill material and undisturbed naturally occurring soils between the bottom of the washed gravel and the highest elevation of the limiting conditions defined in paragraph 69.10(1)*"c."*

b. Gravel shall meet the requirements specified in paragraph 69.9(4)*"a."*

c. From 1 to 2 feet of medium-textured sand (depending upon the underlying soil depth, see paragraph 69.10(3)*"a"*) must be placed between the bottom of the gravel and the top of the plowed surface of the naturally occurring soil.

d. Mound systems shall utilize an absorption bed distribution piping design. The bed shall be installed with the long dimension parallel to the land contour. Systems on steep slopes with slowly permeable soils should be narrow to reduce the possibility of toe seepage.

e. Minimum spacing between distribution pipes shall be 4 feet, and a minimum of 3 feet shall be maintained between any trench and the sidewall of the mound.

f. No soil under or up to 50 feet down gradient of the mound may be removed or disturbed except as specified herein.

g. Construction equipment which would cause undesirable compaction of the soil shall be kept off the base area. Construction or plowing shall not be initiated when the soil moisture content is high. If a sample of soil from approximately 9 inches below the surface can be easily rolled into a ⅛- to

¼-inch-diameter wire 1½ inches long or more, the soil moisture content is too high for construction purposes.

h. Aboveground vegetation shall be closely cut and removed from the ground surface throughout the area to be utilized for the placement of the fill material.

i. The area shall be plowed to a depth of 7 to 8 inches, parallel to the land contour, with the plow throwing the soil up slope to provide a proper interface between the fill and the natural soil. Tree stumps should be cut flush with the surface of the ground, and roots should not be pulled.

j. The base absorption area of the mound is to be calculated based on the results of the percolation rate test or soil analysis as indicated in Table IIIa or IIIb and the flow rate. The maximum width of the mound shall be 12 feet.

k. The area of the fill material shall be sufficient to extend 3 feet beyond the edge of the gravel area before the sides are shaped to at least a 4:1 slope (preferably 5:1).

l. Distribution system.

(1) The distribution pipe shall be rigid plastic pipe, Schedule 40 or 80, with a 1-inch nominal diameter or equivalent design that ensures proper distribution.

(2) The distribution pipe shall be provided with a single row of ¼-inch perforations in a straight line 30 inches on center along the length of the pipe or an equivalent design that ensures uniform distribution. All joints and connections shall be solvent-cemented.

(3) The distribution pipe shall be placed in the clean, washed gravel (or crushed limestone as described in paragraph 69.9(4)*"a"*), with holes downward. The gravel shall be a minimum of 9 inches in depth below the pipe and 3 inches in depth above the pipe.

(4) No perforations shall be permitted within 3 inches of the outer ends of any distribution pipe.

(5) The outer ends of all pressure distribution lines shall be turned up, with a long 90-degree elbow or two 45-degree elbows to allow for cleaning. The outer ends will have a screw-on cap and cover. The cover shall be accessible from the ground surface without excavation.

(6) The central pressure manifold should consist of 1½- or 2-inch solid plastic pipe using a tee for connecting the distribution lines or an equivalent design that ensures uniform distribution.

m. Construction should be initiated immediately after preparation of the soil interface by placing all of the sand fill material needed for the mound (to the top of the trench) to a minimum depth of 21 inches above the plowed surface. This depth will permit excavation of the trenches to accommodate the 9 inches of washed gravel or crushed stone necessary for the distribution piping.

n. The absorption trench or trenches shall be hand-excavated to a depth of 9 inches. The bottoms of the trenches shall be level.

o. Nine inches of gravel shall be placed in the trench and leveled. After the distribution pipe is placed, the pipe shall be covered with 3 inches of gravel.

p. The top of the gravel shall be covered with synthetic drainage fabric. Unbacked, rolled, 3½-inch-thick fiberglass insulation, untreated building paper, or other suitable material may be used with approval of the administrative authority. Plastic or treated building paper shall not be used.

q. After installation of the distribution system, the distribution system shall be pressure-tested before it is covered with gravel. The entire mound is to be covered with topsoil native to the site or of similar characteristics to support vegetation found in the area. The entire mound shall be crowned by providing 12 inches of topsoil on the side slopes, with a minimum of 18 inches of topsoil over the center of the mound. The entire mound shall be seeded, sodded or otherwise provided with a grass cover to ensure stability of the installation.

r. The area surrounding the mound shall be graded to provide for diversion of surface runoff water.

69.10(4) *Dosing.*

a. Pump dosing shall be required for mound systems.

b. The dosing volume shall be three to ten times the distribution piping network volume, but not more than 25 percent of the design flow shall be applied to the soil in one dose.

c. The dosing pump shall be capable of maintaining a squirt height of 3 feet above the pipe at the outer ends of the distribution lines. All lines shall have an equal squirt height above the pipe to maintain equal distribution.

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.11(455B) At-grade systems.

69.11(1) *General requirements.*

a. At-grade systems shall be permitted only after a thorough site evaluation has been made and landscaping, dwelling placement, effect on surface drainage, and general topography have been considered.

b. At-grade systems shall not be utilized on sites subject to flooding with a ten-year or greater frequency.

c. At-grade systems shall not be utilized on soils where the high groundwater level, impermeable bedrock or soil strata having a percolation rate exceeding 60 minutes per inch occur within 36 inches of natural grade.

d. At-grade systems shall be constructed only upon undisturbed naturally occurring soils or where a soil analysis has determined the site is suitable.

e. At-grade systems shall be located in accordance with the distances specified in Table I as measured from the outer edge of the gravel in the system.

f. No buildings, driveways or other surface or subsurface obstructions shall be permitted within 25 feet on the down-gradient side of the at-grade system when the at-grade system is constructed on a slope greater than 5 percent. No future construction shall be permitted in this effluent disposal area as long as the at-grade system is in use.

g. Specifications given in these rules for at-grade systems are minimal and may not be sufficient for all applications. Technical specifications are changing with experience and research. Other design information beyond the scope of these rules may be necessary to properly design an at-grade system.

69.11(2) *Construction details.*

a. There shall be a minimum of 3 feet of undisturbed naturally occurring soils between the bottom of the gravel in the at-grade system and the highest elevation of the limiting conditions defined in paragraph 69.11(1)*"c."*

b. An at-grade system may be installed up to 12 inches deep.

c. Gravel shall meet the requirements specified in paragraph 69.9(4)*"a."* EPS aggregate or chambers are acceptable alternatives to gravel.

d. At-grade systems shall utilize an absorption bed distribution piping design. The bed shall be installed with the long dimension parallel to the land contour. Systems on steep slopes with slowly permeable soils should be narrow to reduce the possibility of toe seepage.

e. No soils under or within 15 feet of any at-grade system may be disturbed. On sloping sites, no soils shall be disturbed within 10 feet uphill of the system and within 15 feet downhill of the system plus an additional 5 feet for every 5 percent slope downhill.

f. Construction equipment which would cause undesirable compaction of the soil shall be kept off the base area. Construction or plowing shall not be initiated when the soil moisture content is high. If a sample of soil from approximately 9 inches below the surface can be easily rolled into a ⅛-inch diameter wire 1½ inches long, the soil moisture content is too high for construction purposes.

g. Aboveground vegetation shall be closely cut and removed from the ground surface throughout the area to be utilized for the placement of the fill material.

h. The area shall be plowed to a minimum depth of 7 to 9 inches, parallel to the land contour, with the plow throwing the soil up slope to provide a proper interface between the fill and the natural soil. Chisel teeth on a backhoe bucket shall be at least as long as the depth of plowing. Tree stumps should be cut flush with the surface of the ground, and roots should not be pulled. All work shall be done from the uphill side of the at-grade system.

i. The gravel bed absorption area of the at-grade system is to be calculated based on the results of the percolation rate test or soil analysis as indicated in Table IIIa or IIIb and the flow rate. The maximum width of the at-grade system shall be 8 feet.

j. One foot of loamy cover material shall be installed over the rock bed. Cover shall extend at least 5 feet from the ends of the rock bed and be sloped to divert surface water. Side slopes shall not be steeper than 4:1. The upper 6 inches of the loamy soil cover must be topsoil borrow. Topsoil borrow must be of a quality that provides a good vegetative cover on the at-grade system.

k. Distribution system.

(1) The distribution pipe shall be rigid plastic pipe, Schedule 40 or 80 with a 1-inch nominal diameter or equivalent design that ensures proper distribution.

(2) The distribution pipe shall be provided with a single row of ¼-inch perforations in a straight line 30 inches on center along the length of the pipe or an equivalent design that ensures uniform distribution. All joints and connections shall be solvent-cemented.

(3) The distribution pipe shall be placed in the clean, washed gravel (or crushed limestone as described in paragraph 69.9(4)*"a"*), with holes downward. The gravel shall be a minimum of 10 inches in depth below the pipe and 2 inches in depth above the pipe.

(4) Distribution pipe shall be installed in the center of the gravel bed on slopes less than 1 percent and on the upslope edge at the gravel bed absorption width on slopes 1 percent or greater.

(5) No perforations shall be permitted within 3 inches of the outer ends of any distribution pipe.

(6) The outer ends of all pressure distribution lines shall be turned up, with a long 90-degree elbow or two 45-degree elbows to allow for cleaning. The outer ends will have a screw-on cap and cover. The cover shall be accessible from the ground surface without excavation.

(7) The central pressure manifold should consist of 1½- or 2-inch solid plastic pipe using a tee for connecting the distribution lines or an equivalent design that ensures uniform distribution.

(8) The top of the gravel shall be covered with synthetic drainage fabric. Unbacked, rolled, 3½-inch-thick fiberglass insulation, untreated building paper, or other suitable material may be used with approval of the administrative authority. Plastic or treated building paper shall not be used.

(9) After installation of the distribution system, the distribution system shall be pressure-tested before it is covered with gravel. The entire at-grade system is to be covered with topsoil native to the site or of similar characteristics to support vegetation found in the area. The entire at-grade system shall be crowned by providing 12 inches of topsoil on the side slopes, with a minimum of 18 inches of topsoil over the center of the at-grade system. The entire at-grade system shall be seeded, sodded or otherwise provided with a grass cover to ensure stability of the installation.

(10) The area surrounding the at-grade system shall be graded to provide for diversion of surface runoff water.

69.11(3) *Dosing.*

a. Pump dosing shall be required for at-grade systems.

b. The dosing volume shall be three to ten times the distribution piping network volume, but not more than 25 percent of the design flow shall be applied to the soil in one dose.

c. The dosing pump shall be capable of maintaining a squirt height of 3 feet above the pipe at the outer ends of the distribution lines. All lines shall have an equal squirt height above the pipe to maintain equal distribution.

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.12(455B) Drip irrigation.

69.12(1) *General design.*

a. Pretreatment required. Drip irrigation systems must be preceded by a secondary treatment system discharging a treated, filtered effluent with BOD and TSS values less than 30 mg/L.

b. Separation from groundwater. Drip irrigation systems shall have a minimum vertical separation distance to high groundwater level or bedrock of 20 inches.

c. Maximum hillside slope. Drip irrigation systems shall not be installed on slopes of more than 25 percent.

d. Additional specifications. Specifications given in these rules for drip irrigation are minimal and may not be sufficient for all applications. Technical specifications are changing with experience and research. Other design information beyond the scope of these rules may be necessary to properly design a drip irrigation system.

69.12(2) *Emitter layout.*

a. Discharge rate. Systems shall be designed so that emitters discharge approximately 1 gpm at 12 psi or other rates suggested by the manufacturer and approved by the administrative authority.

b. Grid size. Drip lines shall be run in parallel lines 2 feet apart. Emitters shall be placed in the drip lines at 2-foot intervals, with emitters offset 1 foot between adjacent lines. Each emitter shall cover 4 square feet of absorption area.

c. Field size. The field shall be sized according to the application rate given in Table IV.

d. Depth of drip lines. Drip lines shall be laid on the contour, 6 to 12 inches deep, with a maximum line length of 100 feet. Lines may be of unequal length.

e. Interconnection.

(1) All drip lines shall be connected to supply and return headers such that the entire system will automatically drain back to the dosing tank or pump pit upon completion of the pumping cycle. Vacuum breakers shall be positioned at the high point of the supply and return headers.

(2) The dosing tank shall have a high water audio/visual alarm.

Table IV

Length of Drip Line Required per Bedroom

Percolation Rate min./in.	Design Hyd. Loading gpd/sq. ft.	Length of Drip Line feet/bedroom
1 – 5	2.0	40
6 – 15	1.3	60
16 – 30	0.9	90
31 – 45	0.6	150
46 – 60	0.4	200
61 – 90	0.2	400
91 – 120	0.1	800

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.13(455B) Packed bed media filters.

69.13(1) *Intermittent sand filters.* The general requirements for intermittent sand filters are as follows:

a. Use. Intermittent sand filters may be used when the administrative authority determines the site is unacceptable for a soil absorption system.

b. Location. Intermittent sand filters shall be located in accordance with the distances specified in Table I.

c. Sampling port. A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line.

d. Effluent sampling. All intermittent sand filters having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

e. Prohibited construction. There shall be no construction, such as buildings or concrete driveways, covering any part of an intermittent sand filter.

69.13(2) *Construction.*

a. Number. An intermittent sand filter shall consist of one filtering bed or two or more filtering beds connected in series and separated by a minimum of 6 feet of undisturbed earth.

b. Pipelines. Each bed shall contain a horizontal set of collector lines. The collector lines shall be equivalent to SDR 35 PVC pipe, 10-inch-diameter gravelless drainpipe, EPS aggregate or other suitable materials.

(1) One collector line shall be provided for each 6 feet of width or fraction thereof. A minimum of two collector lines shall be provided.

(2) The collector lines shall be laid to a grade of 1 inch in 10 feet (or 0.5 to 1.0 percent).

(3) Each collector line shall be vented or connected to a common vent. Vents shall extend at least 12 inches above the ground surface with the outlet screened or provided with a perforated cap.

(4) Gravelless drainfield pipe with fiber wrap may be used for the collector lines. If fiber wrap is used, no gravel or pea gravel is required to cover the collector lines and the pipe shall be bedded in filter sand.

(5) If 4-inch plastic pipe with perforations is used for the collector lines, the lines shall be covered as follows:

1. Gravel ¾ inch to 2½ inches in size shall be placed around and over the lower collector lines until there is a minimum of 4 inches of gravel over the pipes.

2. The gravel shall be overlaid with a minimum of 3 inches of washed pea gravel ⅛-inch to ⅜-inch size interfacing with the filter media. A layer of fabric filter may be used in place of the pea gravel. Fabric filters must be 30 by 50 mesh with a percolation rate of at least 5 gal/sq. ft.

(6) A minimum of 24 inches of coarse washed sand shall be placed over the pea gravel or above the gravelless drainfield pipe. The sand shall meet the Iowa DOT standards for concrete sand: 100 percent of the sand shall pass a 9.5 mm screen, 90 to 100 percent shall pass a 4.75 mm screen, 70 to 100 percent shall pass a 2.36 mm screen, 10 to 60 percent shall pass a 600 Tm screen, and 0 to 1.5 percent shall pass a 75 Tm screen.

(7) The discharge pipe that extends from the collection system shall be SDR 35 PVC pipe at a minimum.

69.13(3) *Subsurface sand filters.*

a. Distribution system and cover.

(1) Gravel base. Six inches of gravel ¾ inch to 2½ inches in size shall be placed upon the sand in the bed.

(2) Distribution lines. Distribution lines shall be level and shall be horizontally spaced a maximum of 3 feet apart, center to center. Distribution lines shall be rigid perforated PVC pipe.

(3) Venting. Venting shall be placed on the downstream end of the distribution lines, with each distribution line being vented or connected to a common vent. Vents shall extend at least 12 inches above the ground surface with the outlet screened or provided with a perforated cap.

(4) Gravel cover. Enough gravel shall be carefully placed to cover the distributors.

(5) Separation layer. A layer of material such as unbacked, rolled, 3½-inch-thick fiberglass insulation, untreated building paper of 40- to 60-pound weight or synthetic drainage fabric shall be placed upon the top of the upper layer of gravel.

(6) Soil cover. A minimum of 12 inches of soil backfill shall be provided over the beds.

(7) Distribution boxes. A distribution box shall be provided for each filter bed where gravity distribution is used. The distribution boxes shall be placed upon undisturbed earth outside the filter bed. Separate watertight lines shall be provided leading from the distribution boxes to each of the distributor lines in the beds.

(8) As an alternative to gravel and rigid PVC pipe, EPS aggregate may be used for the distribution system. The EPS aggregate shall cover the entire surface of the sand filter, and a 3-foot separation between distribution pipes shall be maintained.

(9) Pressure distribution. Pressure dosing is recommended to improve effluent distribution across the surface of the filter. Pressure distribution systems may use conventional rock and PVC pipe, chambers with small-diameter pipe, or EPS aggregate with small-diameter pipe.

b. Sizing of subsurface sand filters.

(1) Gravity flow. For residential systems, subsurface sand filters shall be sized at a rate of 240 square feet of surface area per bedroom.

(2) Siphon-dosed. For residential systems, subsurface sand filters dosed by a dosing siphon shall be sized at a rate of 180 square feet of surface area per bedroom.

(3) Pressure-dosed. For residential systems, subsurface sand filters dosed by a pump shall be sized at a rate of 150 square feet of surface area per bedroom.

(4) Nonhousehold. Effluent application rates for commercial systems treating domestic waste shall not exceed the following:

1. 1.0 gallon/square feet/day for single bed sand filters.
2. The total surface area for any subsurface sand filter system shall not be less than 200 square feet.

69.13(4) *Free access sand filters.*

a. Pretreatment required. These systems must be preceded by a secondary treatment system discharging a treated effluent with BOD and TSS values less than 30 mg/L.

b. Description. Media characteristics and underdrain systems for free access filters are similar to those for subsurface filters. Dosing of the filter should provide uniform distribution across the entire surface of the bed. Dosing frequency is usually greater than four times per day. For coarser media (greater than 0.5 mm), a dosing frequency greater than six times per day is desirable. Higher acceptable loadings on these filters as compared to subsurface filters relate primarily to the accessibility of the filter surface for maintenance. Gravel is not used on top of the sand media, and the distribution pipes are exposed above the surface.

c. Distribution. Distribution to the filter may be by perforated pipe laid on the surface, by pipelines discharging to splash plates located at the center or corners of the filter, or by spray distributors. Care must be taken to ensure that lines discharging directly to the filter surface do not erode the sand surface. The use of curbs around the splash plates or large stones placed around the periphery of the plates will reduce the scour. A layer of washed pea gravel placed over the filter media may also be employed to avoid surface erosion. This practice will create maintenance difficulties, however, when it is time to rake or remove a portion of the media surface.

d. Covers. Free access filters shall be covered to protect against severe weather conditions and to avoid encroachment of weeds or animals. The cover also serves to reduce odors. Covers may be constructed of treated wooden planks, galvanized metal, or other suitable material. Screens or hardware cloth mounted on wooden frames may also serve to protect filter surfaces. Where weather conditions dictate, covers should be insulated. A space of 12 to 24 inches should be allowed between the insulated cover and sand surface. Free access filters may not be buried by soil or sod.

e. Loading. The hydraulic loading for free access sand filters shall be 5.0 gpd/sq. ft.

69.13(5) *Dosing.* Dosing for sand filters is strongly advised. Without dosing, the entire area of the sand filter is never effectively used. Dosing not only improves treatment effectiveness but also decreases the chance of premature failure.

a. Pumps. A pump shall be installed when adequate elevation is not available for the system to operate by gravity.

(1) The pump shall be of corrosion-resistant material.

(2) The pump shall be installed in a watertight pit.

(3) The dosing system shall be designed to flood the entire filter during the dosing cycle. A dosing frequency of greater than two times per day is recommended.

(4) A high water alarm shall be installed.

b. Dosing siphons. When a dosing siphon is used where elevations permit, such siphon shall be installed as follows:

(1) Dosing siphons shall be installed between the septic tank and the sand filter bed.

(2) Dosing siphons shall be installed with strict adherence to the manufacturer's instructions.

c. Dosing tanks. The dosing tank shall be of such size that the siphon will distribute effluent over the entire filter during the dosing cycle. Smaller, more frequent doses are recommended.

d. Effluent sampling. A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line. All free access sand filters having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

69.13(6) *Peat moss biofilter systems.* General requirements for individual peat moss biofilter systems are as follows:

a. Use. Peat moss biofilter systems may be used when the administrative authority determines the site is unacceptable for a soil absorption system.

b. Certification. All peat moss biofilter systems shall be certified by an ANSI-accredited third-party certifier to meet National Sanitation Foundation Standard 40, Class I, including appendices (March 2008), or equivalent testing as determined by the department.

c. Installation and operation. All peat moss biofilter systems shall be preceded by a septic tank and installed, operated and maintained in accordance with the manufacturer's instructions and the requirements of the administrative authority. The septic tank shall be sized as specified in paragraph 69.8(2)*"a"* or larger if recommended by the manufacturer. Sizing of the system should be based on the manufacturer's specifications.

d. Maintenance contract. A maintenance contract for the proper monitoring and servicing of the entire treatment system shall be established between the owner and a certified technician for the life of the system. All monitoring and servicing shall be performed by a manufacturer's certified technician or person demonstrating knowledge of the system in accordance with the manufacturer's standards. Manufacturers are responsible for ensuring that an adequate number of maintenance providers are available to service all peat moss biofilters at the specified intervals. Maintenance contracts and responsibility waivers shall be recorded with the county recorder and in the abstract of title for the premises on which the system is installed. The maintenance provider shall perform the required maintenance and reporting to the owner and to the administrative authority. The maintenance provider shall also report any discontinuance of maintenance of the peat moss biofilter system to the administrative authority. Peat moss biofilter systems shall be inspected annually by the maintenance provider. A copy of the maintenance contract shall be on file in the office of the administrative authority.

e. Effluent sampling. A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line. All peat moss biofilter systems having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

69.13(7) *Recirculating textile filter systems.* General requirements for recirculating textile filter systems are as follows:

a. Use. Recirculating textile filter systems may be used when the administrative authority determines the site is unacceptable for a soil absorption system.

b. Certification. All recirculating textile filter systems shall be certified by an ANSI-accredited third-party certifier to meet National Sanitation Foundation Standard 40, Class I, including appendices (March 2008), or equivalent testing as determined by the department.

c. Design. Recirculating textile filter systems shall be designed to prevent the passage of untreated waste during an equipment malfunction or power outage.

d. Installation and operation. Recirculating textile filter systems shall be preceded by a septic tank and installed, operated and maintained in accordance with the manufacturer's instructions and the requirements of the administrative authority. The septic tank shall be sized as specified in paragraph 69.8(2)*"a"* or larger if recommended by the manufacturer. Sizing of the system should be based on the manufacturer's specifications.

e. Maintenance contract. A maintenance contract for the proper monitoring and servicing of the entire treatment system shall be established between the owner and a certified technician for the life of the system. All monitoring and servicing shall be performed by a manufacturer's certified technician or person demonstrating knowledge of the system in accordance with the manufacturer's standards. Manufacturers are responsible for ensuring that an adequate number of maintenance providers are available to service all recirculating textile filters at the specified intervals. Maintenance contracts and responsibility waivers shall be recorded with the county recorder and in the abstract of title for the premises on which the system is installed. The maintenance provider shall perform the required maintenance and reporting to the owner and to the administrative authority. The maintenance provider shall also report any discontinuance of maintenance of the system to the administrative authority.

Recirculating textile filter systems shall be inspected, at minimum, annually by the maintenance provider. A copy of the maintenance contract shall be on file in the office of the administrative authority.

f. Effluent sampling. A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line. All recirculating textile filter systems having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.14(455B) Aerobic treatment units. General requirements for aerobic treatment units are as follows:

69.14(1) *Use.* Aerobic treatment units may be used only when the administrative authority determines that the site is unacceptable for a soil absorption system. Because of the higher maintenance requirements of aerobic treatment units, preference should be given to packed bed media filters, where conditions allow.

69.14(2) *Certification.* All aerobic treatment units shall be certified by an ANSI-accredited third-party certifier to meet National Sanitation Foundation Standard 40, Class I, including appendices (March 2008), or equivalent testing as determined by the department.

69.14(3) *Installation and operation.* All aerobic treatment units shall be installed, operated and maintained in accordance with the manufacturer's instructions and the requirements of the administrative authority. The aerobic treatment units shall have a minimum treatment capacity of 150 gallons per bedroom per day or 500 gallons, whichever is greater.

69.14(4) *Pre-tank required.* All aerobic treatment units shall be preceded by a septic or trash tank with a minimum capacity of 500 gallons. The trash tank may be a single-compartment tank. A trash tank built in as part of the aerobic treatment unit's design satisfies this requirement.

69.14(5) *Effluent treatment.* The effluent from aerobic treatment units shall receive additional treatment through the use of intermittent sand filters or soil absorption systems of a magnitude prescribed in subrule 69.9(2) for pretreated effluent.

69.14(6) *Maintenance contract.* A maintenance contract with a manufacturer-certified technician or equivalent, as determined by the department, shall be maintained at all times. The maintenance contract shall include the aerobic treatment unit and effluent disposal system. Manufacturers are responsible for ensuring that an adequate number of maintenance providers are available to service all aerobic treatment units at the specified intervals. Maintenance agreements and responsibility waivers shall be recorded with the county recorder and in the abstract of title for the premises on which an aerobic treatment unit is installed. Aerobic treatment units shall be inspected for proper operation at least twice a year at six-month intervals.

69.14(7) *Effluent sampling.* All aerobic treatment unit systems having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.15(455B) Constructed wetlands.

69.15(1) *General site design.*

a. Application. Constructed wetlands shall only be used where soil percolation rates at the site exceed 120 minutes per inch. Because of the higher maintenance requirements of constructed wetland systems, preference should be given to packed bed media filters, where conditions allow.

b. Effluent treatment. The effluent from a constructed wetland shall receive additional treatment through the use of intermittent sand filters of a magnitude prescribed in subrule 69.9(2) for pretreated effluent.

c. Effluent sampling. All constructed wetland systems having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

d. Additional specifications. Specifications given in this rule for constructed wetlands are minimal and may not be sufficient for all applications. Technical specifications are changing with experience and research. Other design information beyond the scope of this rule may be necessary to properly design a constructed wetland system.

69.15(2) *Wetland design.*

a. Depth. The wetland shall be of a subsurface flow construction with a rock depth of 18 inches and a liquid depth of 12 inches.

b. Materials. Substrate shall be washed river gravel with a diameter of ¾ inch to 2½ inches. If crushed quarried stone is used, it must meet the criteria listed in paragraph 69.9(4)*"a."*

c. Sizing and configuration. Detention time shall be a minimum of seven days.

(1) Dimensions. Detention time may be accomplished with trenches 16 to 18 inches deep (12 inches of liquid), 3 feet wide, with 100 feet of length per bedroom. Detention time may also be done with beds 16 to 18 inches deep, with at least 300 square feet of surface area per bedroom. The bottom of each trench or bed must be level within ±½ inch.

(2) Configuration. Multiple trenches or beds in series should be used. Beds or trenches in series may be stepped down in elevation to fit a hillside application. If the system is on one elevation, it should still be divided into units by earthen berms at about 50 and 75 percent of the total length.

(3) Unit connections. Each subunit shall be connected to the next subunit with an overflow pipe (rigid sewer pipe) that maintains the water level in the first section. Protection from freezing may be necessary.

d. Liner. Wetlands shall be lined with a synthetic PVC or PE plastic liner 20 to 30 mils thick.

e. Inlet pipe. Effluent shall enter the wetland by a 4-inch pipe sealed into the liner. With beds, a header pipe shall be installed along the inlet side to distribute the waste.

f. Protective berms. Wetland system sites shall be bermed to prevent surface water from entering the trenches or beds.

69.15(3) *Vegetation.*

a. Setting plants. Vegetation shall be established on the wetlands at the time of construction. Twelve inches of rock shall be placed in each unit, the plants set, and then the final 4 to 6 inches of rock placed.

b. Plant species. Only indigenous plant species, preferably collected within a 100-mile radius of the site, shall be set. Multiple species in each system are recommended. Preferred species include, but are not limited to:

(1) Typha latifolia – common cattail.

(2) Typha angustifolia – narrow leaf cattail.

(3) Scirpus spp. – bullrush.

(4) Phragmites communis – reed.

c. Plant establishment. Transplantation is the recommended method of vegetation establishment. For transplanting, the propagule should be transplanted, at a minimum, on a 2-foot grid. The transplants should be fertilized, preferably with a controlled-release fertilizer such as Osmocote 18-5-11 for fall and winter planting, 18-6-12 for spring planting, and 19-6-12 for summer planting. Trenches or beds should be filled with fresh water immediately.

d. Plant management. In the late fall, the vegetation shall be mowed and the detritus left on the wetland surface as a temperature mulch. In the early spring, the mulch shall be removed and disposed of to allow for adequate bed aeration.

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.16(455B) Waste stabilization ponds.

69.16(1) *General requirements.* Waste stabilization ponds shall only be used for nonresidential applications and shall be designed by an Iowa-licensed engineer. Waste stabilization ponds may be used if designed and constructed in accordance with the following criteria and provided the effluent is discharged in accordance with the requirements of the NPDES general permit listed in rule 69.4(455B). A septic tank sized according to rule 69.8(455B) shall precede a waste stabilization pond.

69.16(2) *Location.* Waste stabilization ponds must meet the following separation distances:

a. 1,000 feet from the nearest inhabitable residence, commercial building, or other inhabitable structure. If the inhabitable or commercial building is the property of the owner of the proposed treatment facility or there is written agreement with the owner of the building, this separation criterion shall not

apply. Any such written agreement shall be filed with the county recorder and recorded for abstract of title purposes, and a copy submitted to the department.

b. 1,000 feet from public shallow wells.

c. 400 feet from public deep wells.

d. 400 feet from private wells.

e. 400 feet from lakes and public impoundments.

f. 25 feet from property lines and rights-of-way.

69.16(3) *Size.*

a. Dimensions. Ponds shall have a length not exceeding three times the width.

b. Capacity. When domestic sewage from a septic tank is to be discharged to a waste stabilization pond, the capacity of the pond shall be equivalent to 180 times the average daily design flow.

c. Depth. The wastewater depth for a waste stabilization pond shall be 3 feet to 5 feet and shall be uniform.

d. Freeboard. A minimum freeboard of 2 feet shall be maintained at all times.

69.16(4) *Embankments.*

a. Seal. Embankments shall be constructed of impermeable materials and shall be compacted. The bottom of the waste stabilization pond shall be cleared and leveled to the required elevation and shall be lined with an impermeable natural or man-made material. Seepage loss through the sides and bottom shall be less than 1/16 inch per day.

b. Slopes. The ratio of inside embankment slopes shall be 3 horizontal to 1 vertical. The outside embankment slope ratio shall be at least 3:1.

c. Berm top. Berm tops shall be at least 4 feet wide.

d. Cover. Embankments shall be seeded from the outside toe to the inside high water line. From the high water line down the embankment diagonally, about 5 feet shall be riprapped for erosion and vegetation control.

69.16(5) *Inlet and outlet structures.*

a. Inlet. The inlet shall be placed no higher than 12 inches above the bottom of the pond. It shall discharge near the middle of the pond at a point opposite the overflow structure and onto a concrete splash plate at least 2 feet square.

b. Outlet. The outlet pipe shall withdraw water from a submerged depth of at least 1 foot. The intake for the outlet pipe shall be 3 to 5 feet from the embankment.

c. Separation. The inlet and outlet should be separated to the maximum extent possible, ideally by a berm or baffle constructed in the lagoon to prevent short-circuiting.

69.16(6) *Drainage.* All surface water shall be diverted away from the waste stabilization pond.

69.16(7) *Effluent sampling.* All waste stabilization ponds having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

69.16(8) *Maintenance.*

a. Fencing. All waste stabilization ponds are to be fenced adequately to prevent entrance of livestock and to discourage entrance by people into the area. Signs shall be posted warning of possible health and safety hazards.

b. Vegetation. Vegetation on the top and sides of the berm shall be mowed and the length maintained. No trees shall be allowed to become established.

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.17(455B) Requirements for impervious vault toilets. All impervious vault toilets shall comply with the following requirements:

69.17(1) *Location.* Impervious vault toilets shall be located in accordance with the distances given in Table I in rule 69.3(455B) for the closed portion of the treatment system.

69.17(2) *Construction.* The vault shall be constructed of reinforced, impervious concrete at least 4 inches thick. The superstructure including floor slab, seat, seat cover, riser and building shall comply with good design and construction practices to provide permanent, safe, sanitary facilities. The vault shall be provided with a cleanout opening fitted with a fly-tight cover.

69.17(3) *Wastewater disposal.* Wastewater from impervious vault toilets shall be disposed of at a public sewage treatment facility.
[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.18(455B) Requirements for portable toilets. All portable toilets shall be designed to receive and retain the wastes deposited in them and shall be located and maintained in a manner that will prevent the creation of any nuisance condition. Wastewater from portable toilets shall be disposed of at a public sewage treatment facility.
[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.19(455B) Other methods of wastewater disposal. Other methods or types of private wastewater treatment and disposal systems shall be installed only after plans and specifications for each project have been approved by the administrative authority.
[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.20(455B) Disposal of septage from private sewage disposal systems.

69.20(1) The collection, storage, transportation and disposal of all septage shall be carried out in accordance with the requirements in 567—Chapter 68.

69.20(2) Commercial septic tank cleaners. Individual administrative authorities shall enforce the licensing program for commercial septic tank cleaners in accordance with the requirements of 567—Chapter 68.
[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.21(455B) Experimental private sewage disposal systems.

69.21(1) *Design requirements.* Experimental systems are to be designed and operated in accordance with approved standards and operating procedures established by individual administrative authorities.

a. Plans and specifications, meeting all applicable rule requirements, should be prepared and submitted to the administrative authorities by a licensed professional engineer. Included with the engineering submittal should be adequate supporting data relating to the effectiveness of the proposed system.

b. For systems designed to discharge treated effluent into waters of the state, a Notice of Intent to be covered under the requirements of NPDES General Permit No. 4 shall be obtained. The administrative authority is responsible for determining that the requirements of the permit, including the monitoring program, are met.

c. Administrative authorities should prepare for signature an enforceable agreement to be placed on record which would require that present and future system owners meet all applicable rule requirements. In the event of noncompliance, the administrative authority shall require that adequate steps be taken by the system owner to bring the system into compliance or that the system owner replace the system with a system prescribed in these rules.

69.21(2) Reserved.
[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

567—69.22(455B) Variances. Variances to these rules may be granted by the department of natural resources or the administrative authority provided sufficient information is submitted to substantiate the need for and propriety of such action. Applications for variances and justification shall be in writing and copies filed with the department.
[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

These rules are intended to implement Iowa Code chapter 455B, division III, part 1.

Appendix A
Estimates of Nonhousehold Domestic Sewage Flow Rates

Source of use for sewage unit	(units)	Gallons per day per unit
Dwelling Units		
Hotels or luxury motels	(Each guest)	60
	(Add per employee)	13
or	(Per square foot)	0.3
Discount motels	(Each guest)	40
	(Add per employee)	13
or	(Per square foot)	0.46
Rooming house	(Each resident)	50
	(Add per nonresident meal)	4.0
Commercial/Industrial		
Retail stores	(Per square foot of sales area)	0.15
or	(Each customer)	5
	(Plus each employee)	15
or	(Each toilet room)	630
Offices	(Each employee)	18
or	(Per square foot)	0.25
Medical offices	(Per square foot)	1.6
Industrial buildings	(Each employee)	20
	(Does not include process ware or cafeteria)	
Construction camp	(Each employee)	20
Visitor center	(Each visitor)	20
Laundromat	(Each machine)	690
or	(Each load)	50
or	(Per square foot)	2.9
Barber shops	(Per chair)	80
Beauty shops	(Per station)	300
Car washes	(Per inside square foot)	10
	(Does not include car wash water)	
Eating and Drinking Establishments		
Restaurant	(Per meal)	4.0
	(Does not include bar or lounge)	
or	(Each seat)	40
	(Plus add for each employee)	13
Dining hall	(Per meal)	4.0
Coffee shop	(Each customer)	2.5
	(Add per employee)	13
Cafeteria	(Each customer)	2.5
	(Add per employee)	13
Drive-in	(Per car stall)	145
Bar or lounge	(Each customer)	5.5
	(Add per employee)	16

Source of use for sewage unit	(units)	Gallons per day per unit
or	(Per seat)	40
Country clubs	(Per member) (No meals)	22
or	(Per member) (Meals and showers)	130
or	(Per member in residence)	100
Resorts		
Housekeeping cabin	(Per person)	50
Lodge	(Per person)	74
Parks/swimming pools	(Per guest)	13
Picnic parks with toilet only	(Per guest)	10
Movie theaters	(Per guest)	4.0
Drive-in theaters	(Per space)	5
Skating rink/dance hall	(Per customer)	10
Bowling lanes	(Per lane)	200
Transportation		
Airport, bus or rail depot	(Per passenger)	4
or	(Per square foot)	6.5
or	(Per public restroom)	630
Auto service station	(Each vehicle served)	13
	(Add per employee)	16
or	(Per inside square foot)	0.6
or	(Per public restroom)	630
Institutional		
Hospitals	(Each medical bed)	250
	(Add per employee)	16
Mental institution	(Each bed)	175
	(Add per employee)	16
Prison or jail	(Each inmate)	160
	(Add per employee)	16
Nursing home	(Each resident)	145
	(Add per employee)	16
Schools and Churches		
School	(Per student) (No gym, cafeteria or showers)	17
	(Per student) (Cafeteria only)	17
	(Per student) (Cafeteria, gym & showers)	30
Boarding school	(Per student)	115
Churches	(Per member)	2
	(Per member with kitchen)	5
Recreational		
Campground/with hookups	(Per person)	40
or	(Per site with central bath)	100
	(Per site)	75

Source of use for sewage unit	(units)	Gallons per day per unit
	(Add for dump station w/ hookup)	16
Day camp (no meals)	(Per person)	16
Weekly overnight camp	(Per member)	33

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09]

Appendix B
Percolation Test Procedure

1. At least three test holes distributed evenly over the proposed lateral field are required.

2. Percolation test holes shall be 4 to 12 inches in diameter and to the same depth as the proposed absorption trenches (not to exceed 36 inches in depth).

3. Sides and bottoms of the test holes shall be scratched or roughened to provide a natural surface. All loose material shall be removed from each hole.

4. The bottoms of the test holes shall be covered with approximately 2 inches of rock to protect the bottom from scouring action when the water is added.

5. The hole shall be filled with at least 12 inches of clean water, and this depth shall be maintained for at least 4 hours and preferably overnight if clay soils are present. It is important that the soil be allowed to soak for a sufficiently long period of time to allow the soil to swell if accurate results are to be obtained. Failure to perform the presoak when required will invalidate the percolation test results.

6. In sandy soils with little or no clay, soaking is not necessary. If, after the hole has been filled twice with 12 inches of water, the water seeps completely away in less than 10 minutes, the test can proceed immediately.

7. Except for sandy soils, percolation rate measurements should be made at least 4 hours but no more than 24 hours after the soaking period began. Any soil that sloughed into the hole during the soaking period is removed, and the water level is adjusted to 6 inches above the gravel (or 8 inches above the bottom of the hole). At no time during the test is the water level allowed to rise more than 6 inches above the gravel.

8. Immediately after adjustment, the water level is measured from a fixed reference point to the nearest ⅛ inch at 30-minute intervals. The test is continued until two successive water level drops do not vary by more than ⅛ inch. At least three measurements are made.

9. After each measurement, the water level is readjusted to the 6-inch level. The last water level drop is used to calculate the percolation rate.

10. In sandy soils or soils in which the first 6 inches of water added after the soaking period seep away in less than 30 minutes, water level measurements are made at 10-minute intervals for a 1-hour period. The last water level drop is used to calculate the percolation rate.

11. The percolation rate is calculated for each test hole by dividing the time interval used between measurements by the magnitude of the last water level drop. This calculation results in a percolation rate in terms of minutes per inch. To determine the percolation rate for the area, the rates obtained from each hole are averaged. (If tests in the area vary by more than 20 minutes per inch, variations in soil type are indicated. Under these circumstances, percolation rates should not be averaged.) EXAMPLE: If the last measured drop in water level after 30 minutes is ⅝ inch, the percolation rate = (30 minutes)/(⅝ inch) = 48 minutes/inch.

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