9-1975

Rural Sewage Disposal for Individual Homes

Louis Lubinus

James Nelson

Extension Circular 665
Department of Environmental Protection Bulletin E-8.30
(Revised)

Rural Sewage Disposal for Individual Homes

Cooperative Extension Service
South Dakota State University
U.S. Department of Agriculture
Department of Environmental Protection

by **Louis Lubinus**, Agricultural Engineer, Cooperative Extension Service, South Dakota State University; and **James Nelson**, Environmental Engineer, South Dakota Department of Environmental Protection.

Some of the material in this publication is adapted from "Manual of Septic-Tank Practice," U.S. Department of Health, Education, and Welfare.

Rural Sewage Disposal for Individual Homes

The information in this circular will assist residents of South Dakota's rural areas in providing sanitary and safe disposal for sewage and wastewater from homes.

Use of individual septic tank systems in urban areas as a substitute for community sewers is not recommended. Public sewers should be provided for urban areas, and sewage should be treated so its discharge into natural watercourses will not be detrimental to humans, animals, plant life or aquatic growth.

The septic tank system may provide sewage treatment and disposal for small groups of homes or for establishments discharging larger quantities of sewage than does an individual home. Such systems must be competently engineered; otherwise there will be failures, excessive costs and a multitude of troubles.

The soundest advice to anyone contemplating a septic tank system is to obtain competent sanitary engineering consultation from an engineer licensed to practice in South Dakota.

Plans and specifications for all installations, other than individual home systems planned according to information in this circular, must be submitted to the South Dakota Department of Environmental Protection, Joe Foss Office Building, Pierre, South Dakota 57501 for review and approval prior to construction. Advice for wastewater treatment facilities for institutions, recreational areas and other establishments without access to public wastewater facilities may also be obtained from the Department of Environmental Protection.

A sanitary wastewater disposal system is necessary to dispose of human excreta from rural homes and developments where public sewers are not available. Proper disposal of wastes is a major factor in maintaining a healthful environment in rural areas. Many communicable diseases are spread through fecal contamination of human food and water by man, various birds, animals and insects.

Connection to an adequate public wastewater disposal system is the most satisfactory method of disposing of wastewater. Every effort should be made, therefore, to secure public sewer extensions, particularly in areas near organized municipalities. Information on development of community systems is available from the Department of Environmental Protection.

Wastes must be disposed of so that:

1. Ground or surface waters will not be contaminated.
2. Public health hazards will not be created by allowing wastes to serve as breeding places for insects, rodents, and other possible carriers which may come in contact with food and drinking water.
3. A health hazard will not be created by allowing wastes to be accessible to children.
4. State or local regulations governing water pollution, air pollution, and wastewater disposal will not be violated.
5. A nuisance resulting from obnoxious odors or unsightliness will not be caused.

Along with a safe and adequate pressure water system and adequate plumbing, a sanitary wastewater disposal system will make housework easier and provide greater comfort and convenience for the rural family.

All waste disposal systems for homes and other structures or establishments where public sewage systems are not available must be constructed, added to, or altered in accordance with Regulations of the State Department of Environmental Protection (Chapter 34:04:01).

Where water under pressure is not available, all human body wastes should be disposed of by depositing them in approved privies, chemical toilets, or similar facilities.

Wastes from bathrooms, kitchens, laundry facilities, and other household plumbing must be treated by a septic tank or other sedimentation tank prior to their discharge into the soil. Other types of disposal systems may be used after approval from the South Dakota Department of Environmental Protection.

Domestic wastes, treated or untreated, cannot be discharged into any abandoned or unused well, or into any crevice, sink hole, or other natural or artificial opening in a rock formation.

Abandoned disposal systems should be disconnected from the buildings, pumped out, and filled with earth.

Where there is insufficient lot area, or where unsuitable soil conditions for adequate waste disposal exist, and it is therefore impossible to comply with Department of Environmental Protection regulations for the building or land use proposed, no water-carried waste disposal system will be permitted unless a holding tank is installed.

Minimum Lot Sizes

According to South Dakota Department of Environmental Protection regulations the minimum required usable lot size on which an individual waste disposal system can be installed where a public water system is available is 20,000 square feet. The minimum required usable lot size in a housing subdivision or housing development (including a mobile home park) with an individual water supply system on which an individual waste disposal system can be installed is one acre (43,560 square feet).

Deviations from these requirements may be submitted to the Department of Environmental Protection for review and approval.

Sewage Flows

Systems are generally designed on the basis of a sewage flow of 100 gallons per bedroom per day. Judgment must be used in estimating present and future usage of the system.

All wastes from the household, including those from the laundry, bath, and kitchen, should discharge into one system. A grease trap for kitchen wastes is not necessary. Recommended septic tank capacities are sufficient to handle the grease normally discharged from a home.

Waste brines from household water softener units have no adverse effect on the action of the septic tank, but may slightly shorten the life of a disposal field installed in certain clay-type soils. Under normal conditions, these brine wastes may be directed to the sewage disposal system.

Roof drains, foundation drains, and drainage from other sources producing large amounts of clear water should not be piped into the septic tank or absorption area.

Drainage from garage floors or other sources of oily wastes should not be discharged directly into the system. Provide a grease and sand trap for such wastes prior to discharge into the septic tank.

House Sewer

The house sewer is that part of the horizontal piping extending from the foundation wall of the building to the septic tank. It should be constructed of 4-inch diameter, tight-jointed pipe of cast iron, vitrified clay, asbestos cement, plastic, concrete, or bituminous pressed fiber.

Any portion of the sewer line within 75 feet of a well less than 100 feet deep, or 50 feet from cisterns and wells more than 100 feet deep, or within 10 feet of any drinking water supply line under pressure should have watertight joints.

Lay the sewer on firm soil at a grade of a least ⅛-inch per foot and preferably ¼-inch per foot. Install it straight, without bends. Adequate venting is obtained through the building plumbing if the plumbing and septic tank are designed and installed properly. A separate vent on the septic tank is not necessary.

Septic Tank

Purpose

A septic tank is a watertight container that receives raw sewage from the bathroom, kitchen, and laundry drains. It holds the sewage for a short time during which it undergoes primary treatment or a natural conditioning process. Three things happen while it is in the tank:

1. Solids are separated from the liquid.

Baffles or special pipe fittings in each end of the tank reduce the liquid velocity and prevent the sewage from flowing directly through it. In this semi-quiet environment the heavier solids sink to the bottom. These are called "settled solids." The lighter particles, including grease and foam, rise to the surface and form a mat of partially submerged floating solids called "scum."

2. Biological action takes place.

In a septic tank, anaerobic bacteria (a family of organisms that live without oxygen) digest most of the scum and settled solids. The decomposition of these solids without oxygen releases a foul, rotten-smelling gas, and the digestive process is termed septic—hence the name "septic tank."

Some of the solids are liquified or converted to gas; the rest settle to the bottom as an inactive mass called "sludge." The gas escapes through the main sewer and usually is released through a pipe installed on the roof of the house. The partially clarified liquid flows out of the tank, into the distribution system, and into the absorption area.

3. Sludge and scum are stored.

Solids and scum that are not liquified remain in the septic tank. No matter how efficient the digestive process may be, sludge will accumulate in the bottom of the tank and, in time, will have to be taken out and hauled away.

If you do not remove this material, it will accumulate until it eventually overflows into the distribution system. This may ruin the disposal field.

A septic tank does not purify sewage; it simply stores it for further treatment. Even though the effluent looks clear, it is still sewage and contains many disease-producing bacteria. Foul odors, unsightly conditions, and serious public health hazards will result if this overflow is discharged to the ground surface. To lessen these problems, final disposal of the liquid in a soil absorption system is necessary.

Location

Septic tanks must be situated where they cannot cause contamination of any well, spring, or other source of water supply. The tank should be at least 75 feet from wells less than 100 feet deep, or 50 feet from cisterns and from wells more than 100 feet deep.

Do not place a septic tank within 10 feet of any building or property line, in swampy areas, or in areas subject to flooding. Also give consideration to the location from the standpoint of cleaning and maintenance.

Septic tanks should not be located within 100 feet measured horizontally from the high water level of reservoirs, lakes, or the banks of streams.

Capacity

Ample capacity is one of the most important considerations in septic tank design, not only from a functional standpoint but also for economy.

The minimum usable liquid capacity of a septic tank without overflowing the septic tank outlet must be at least 1000 gallons. For one- or two-family dwellings the minimum septic tank capacity should be determined by the number of bedrooms. The minimum usable liquid capacity of a septic tank for three bedrooms or less must be 1000 gallons.

For each bedroom above three increase the septic tank size by 250 gallons.

When treatment units other than septic tanks are installed in place of septic tanks, the minimum rated capacity should be 1000 gallons with additional treatment capacity based upon the number of bedrooms served.

Design and Construction

Septic tanks should be watertight and constructed of corrosive-resistant materials such as concrete, coated metal, heavyweight concrete block, or fiberglass. Properly cured precast or cast-in-place reinforced concrete tanks are universally acceptable.

Prefabricated, coated metal tanks should meet Commercial Standard 177-62 of the U.S. Department of Commerce and be labeled with the Underwriters Laboratories seal.

The interior of concrete block tanks should be surfaced with two ¼-inch coats of portland cement sand plaster.

Other features of properly designed and constructed septic tanks are:

- Shape of a septic tank is relatively unimportant. Generally, the length of rectangular tanks should be approximately twice the width. Circular and cylindrical tanks function as well as rectangular tanks.

- A single compartment tank will give satisfactory performance. However, a two-compartment tank, with the first compartment equal to one-half to two-thirds of the total volume, provides better suspended solids removal, which may be especially valuable for protection of the soil absorption system.

- Liquid depth may range between 30 inches and 60 inches.

- Capacity should be large enough to provide for at least a 12-inch space between the liquid surface and the top of the tank.

- An access manhole or removable cover is positioned at each end of the tank.

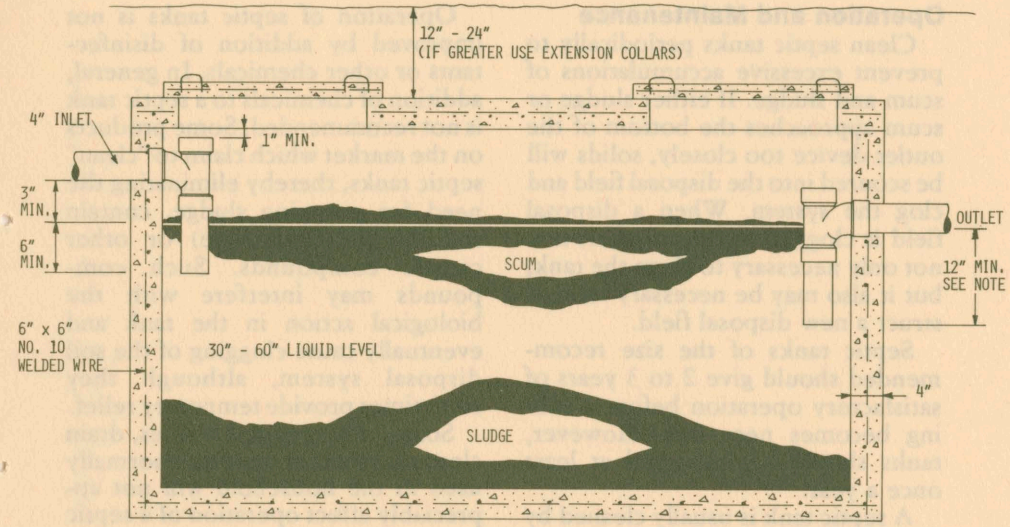
- The bottom of the inlet pipe should enter the tank about 3 inches above the liquid level.

- A vented inlet tee or baffle extending at least 6 inches below the liquid level is required.

- An outlet tee or baffle should extend 12 to 24 inches below the liquid level depending on the depth of the tank, or to at least 40% of liquid depth.

- Precast tanks are placed on a bedding of sand or pea gravel.

Typical concrete septic tanks are shown in figure 1, A and B.



NOTE: PENETRATION OF OUTLET TEE GENERALLY 40% OF LIQUID DEPTH

FIG. 1 A

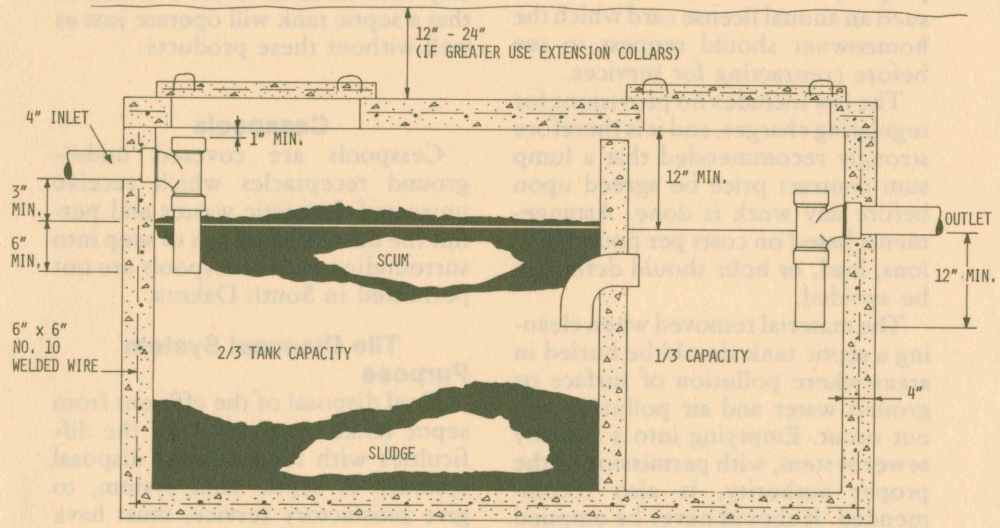


FIG. 1 B

Fig. 1. Typical concrete septic tanks: Longitudinal sections of A, a single compartment, and B, a two-compartment septic tank.

Operation and Maintenance

Clean septic tanks periodically to prevent excessive accumulations of scum and sludge. If either sludge or scum approaches the bottom of the outlet device too closely, solids will be scoured into the disposal field and clog the system. When a disposal field is clogged in this manner, it is not only necessary to clean the tank, but it also may be necessary to construct a new disposal field.

Septic tanks of the size recommended should give 2 to 3 years of satisfactory operation before cleaning becomes necessary. However, tanks should be inspected at least once a year.

A septic tank is usually cleaned by pumping the contents into a tank truck. Individuals who conduct a business of cleaning septic tanks are located in most areas. South Dakota law requires that these persons be licensed by the State Department of Environmental Protection. All properly licensed operators are issued an annual license card which the homeowner should request to see before contracting for services.

The law includes no provisions for regulating charges, and it is therefore strongly recommended that a lump sum contract price be agreed upon before any work is done. Arrangements based on costs per pound, gallons, load, or hour should definitely be avoided.

The material removed when cleaning a septic tank should be buried in areas where pollution of surface or ground water and air pollution will not occur. Emptying into a sanitary sewer system, with permission of the proper authority, is also recommended. It should never be emptied into storm drains or discharged directly into any stream or watercourse.

Do not wash or disinfect septic tanks after pumping. A small residue of sludge should be left in the tank for seeding purposes.

Operation of septic tanks is not improved by addition of disinfectants or other chemicals. In general, addition of chemicals to a septic tank is not recommended. Some products on the market which claim to "clean" septic tanks, thereby eliminating the need for pumping sludge, contain sodium hydroxide (lye) or other caustic compounds. Such compounds may interfere with the biological action in the tank and eventually cause clogging of the soil disposal system, although they sometimes provide temporary relief.

Soaps, detergents, bleaches, drain cleaners, or other materials normally used in the household will not appreciably affect operation of a septic tank.

Over 1000 products, many containing enzymes and other reportedly "magical" ingredients, have been placed on the market for use in septic tanks. Extravagant claims have been made for many of them. Properly controlled tests have indicated that a septic tank will operate just as well without these products.

Cesspools

Cesspools are covered underground receptacles which receive untreated domestic wastes and permit the untreated wastes to seep into surrounding soils. Cesspools are not permitted in South Dakota.

Tile Disposal System

Purpose

Final disposal of the effluent from septic tanks causes most of the difficulties with rural sewage disposal systems. A septic tank system, to give satisfactory service, must have an adequate final disposal system.

Effluent from a septic tank will have the appearance of water but it will not be pure. The final disposition of effluent into upper soil layers exposes it to action of aerobic bacteria. These bacteria, unlike those

within the septic tank, live or are active only in the presence of oxygen. They are not sufficiently active in saturated soil or much more than 3-5 feet below the surface of the ground to be of use in treatment of effluent.

Shallow tile disposal systems take advantage of the action of these bacteria, which tend to purify the effluent as it percolates through the top layers of soil. Effluent discharged deep into the soil does not receive the benefit of this purifying action.

Suitability of Soil

The first step in design of a subsurface sewage disposal system is to determine if the soil is suitable for absorption of septic tank effluent and, if so, how much tile field is required. This data is acquired by conducting percolation tests of the site. Time required for percolation tests varies with different types of soil. The bottom of the field should be at least 4 feet above ground water and rock or impervious soil strata.

After preliminary test borings indicate that the subsoil appears suitable, make percolation tests in the proposed disposal field. Make at least two percolation tests in separate test holes, using the following procedure (also see figure 2):

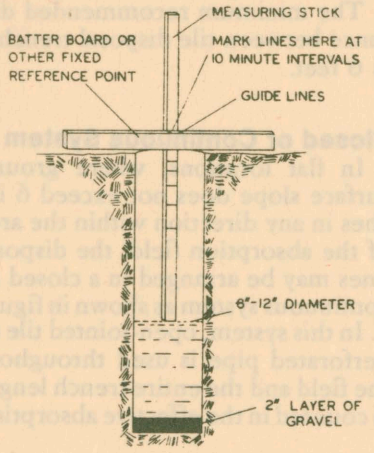


Fig. 2. Soil percolation test.

1. The horizontal dimension of the percolation test hole should be from 6 to 12 inches and the vertical sides should terminate at the depth of the proposed absorption system or at a depth of at least 30 inches.
2. Test holes in unfrozen soil should be filled with water to at least 50% full, at least 8 hours prior but not more than 16 hours before making the water drop observation. Immediately prior to making the water drop observation, the hole should be refilled with water, if necessary, to 50% of its volume.
3. From a fixed reference point, measure within the lower 25% of the percolation test hole the time for the water to drop one inch. The percolation rate should be determined in minutes of time per inch drop. A rate faster than 5 minutes per inch or a rate slower than 60 minutes per inch indicates the location is unsuitable for a subsurface absorption system.

The field percolation rate should be the average rate of at least two test holes that have rates between 5 inches per minute and 60 minutes per inch. The field percolation rate should be used in calculating the absorption area required for the proposed absorption system.

Table 1. Absorption Area Requirements for Private Residences. (Provides for garbage grinder and automatic washing machines).

Percolation rate (time required for water to fall 1 inch, in minutes)	Required absorption area, in sq. ft. per bedroom, standard trench[2]
5	125
10	165
15	200
30	250
45	300
60*	350

[1] In every case, sufficient area should be provided for at least 3 bedrooms.
[2] Absorption area for standard trench is figured as trench bottom area.
* Unsuitable for absorption systems if over 60.

In the event that the percolation rate is less than 60 minutes per inch, a Nodak disposal system or other shallow type disposal system may be installed.

Location

Keep all subsurface absorption systems 150 feet from wells less than 100 feet deep, or 100 feet from cisterns and wells more than 100 feet deep, 100 feet from any stream or watercourse, 20 feet from dwellings, and 10 feet from property lines. Do not construct tile fields in the vicinity of large trees or under driveways. Slopes to the south or east are preferable, but not essential.

Consideration should be given to the ground contour in the absorption system area. The usual procedure is to dig trenches parallel to the contour, resulting in more uniform trench depth.

Construction

An absorption field or subsurface tile disposal system is usually constructed of at least 4-inch size pipe of open-jointed or horizontally split or perforated clay tile, perforated asbestos-cement, perforated ABS or PVC plastic pipe, or parabolic arch pipe. Pipe material installed should conform to the standard of the South Dakota Plumbing Code and be placed so that flow from the septic tank will be distributed with reasonable uniformity.

Preferably, individual laterals should not be over 60 feet long, with a maximum length of 100 feet. More and shorter laterals are preferred because if something happens to disturb one line, most of the field will still be serviceable.

An absorption system shall have at least two absorption trenches of approximately equal length according to the Department of Environmental Protection regulations.

Construct trench bottom and tile distribution lines at a grade of 2 to 4 inches per 100 feet. The depth of the absorption field trenches should be 30 to 48 inches in South Dakota. Freezing rarely occurs in a carefully constructed system kept in continuous operation. However, should the absorption field be constructed late in the year so that soil does not have ample opportunity to compact properly, it is recommended that the trenches be covered with a sufficient layer of hay or straw to prevent a possible freeze-up.

Current design practice for tile disposal trenches provides for widths varying from 18 inches to 36 inches, with the tile laid on a minimum of 6 inches of clean, graded gravel or crushed stone ranging in size from ½ to 2½ inches (see figure 5). The gravel or stone should extend from 2 inches above the tile to 6 inches below. Cover the upper half of joint openings with a 4-inch wide strip of untreated building paper, hay, straw, wood chips or other material prior to covering with gravel. Use of a liberal amount of gravel or crushed stone will increase the absorption capacity and life of the system. Figures 3, 4 and 5 illustrate construction of a tile disposal system.

The minimum recommended distance between tile disposal trenches is 6 feet.

Closed or Continuous System

In flat locations, where ground surface slope does not exceed 6 inches in any direction within the area of the absorption field, the disposal lines may be arranged in a closed or continuous system as shown in figure 3. In this system, open-jointed tile or perforated pipe is used throughout the field and the entire trench length is counted in the effective absorption

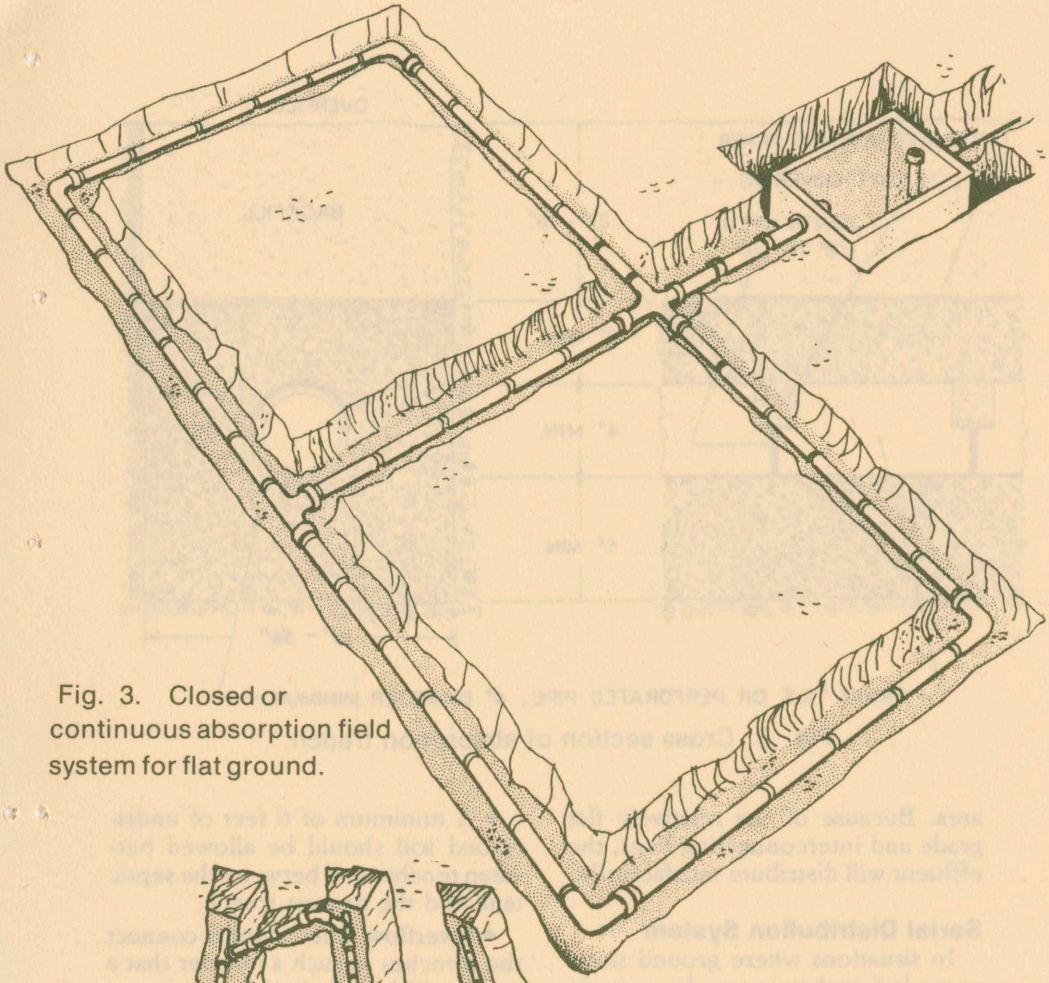


Fig. 3. Closed or continuous absorption field system for flat ground.

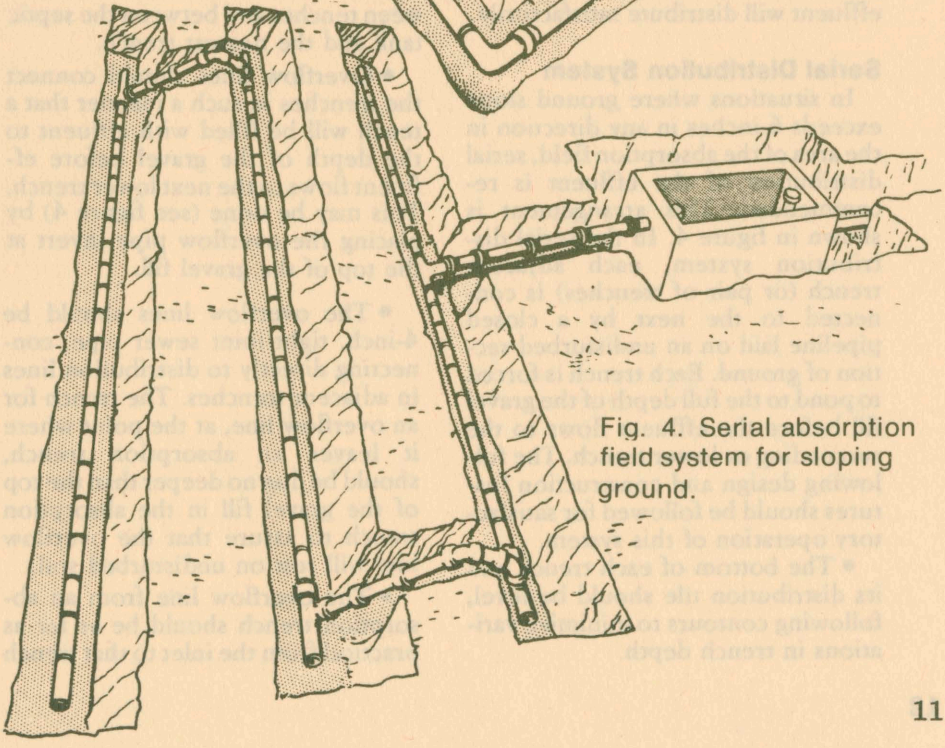


Fig. 4. Serial absorption field system for sloping ground.

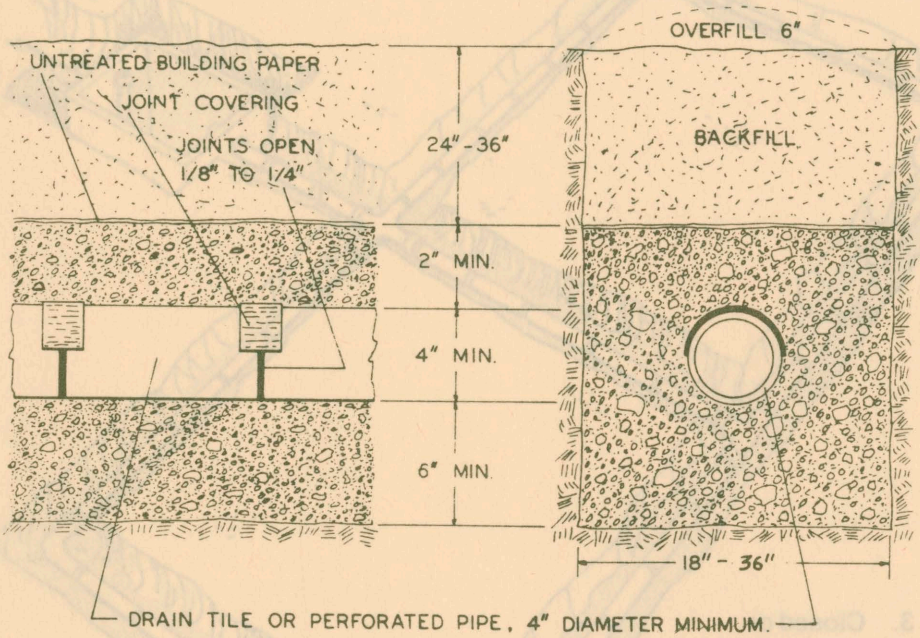


Fig. 5. Cross section of absorption trench.

area. Because of the relatively flat grade and interconnecting lines, the effluent will distribute satisfactorily.

Serial Distribution System

In situations where ground slope exceeds 6 inches in any direction in the area of the absorption field, serial distribution of the effluent is recommended. This arrangement is shown in figure 4. In the serial distribution system, each adjacent trench (or pair of trenches) is connected to the next by a closed pipeline laid on an undisturbed section of ground. Each trench is forced to pond to the full depth of the gravel fill before the effluent flows to the succeeding or lower trench. The following design and construction features should be followed for satisfactory operation of this system.

- The bottom of each trench and its distribution tile should be level, following contours to minimize variations in trench depth.
- A minimum of 6 feet of undisturbed soil should be allowed between tenches and between the septic tank and the nearest trench.
- Overflow lines should connect the trenches in such a manner that a tench will be filled with effluent to the depth of the gravel before effluent flows to the next lower trench. This may be done (see figure 4) by placing the overflow pipe invert at the top of the gravel fill.
- The overflow lines should be 4-inch, tight-joint sewer pipe, connecting directly to distribution lines in adjacent trenches. The trench for an overflow line, at the point where it leaves an absorption trench, should be dug no deeper than the top of the gravel fill in the absorption trench to assure that the overflow line will rest on undisturbed soil.
- The overflow line from an absorption trench should be as far as practical from the inlet to that trench

to prevent short circuiting of the effluent.

- The invert of the first overflow line should be at least 4 inches lower than the invert of the septic tank outlet.
- All other features should match those for subsurface absorption fields generally.

Distribution Box

Distribution boxes are not recommended for distributing effluent to lateral absorption lines.

Maintenance of Disposal Fields

A grass cover is desirable over the disposal area. Prevent puddles of storm water from accumulating on the disposal field surface by diverting rain and melted snow. Keep roof and foundation drainage away from the disposal fields.

Above all, to properly maintain a disposal field and to assure its longer life, clean the septic tank when necessary. Sludge carried by effluent from a neglected septic tank will soon clog the disposal field. Cost of replacing a disposal field is several times greater than the cost of cleaning the septic tank. Heavy machinery should be excluded from the disposal area.

Above-Ground Sewage Disposal System
(Nodak System)

The Nodak system, which is partially above ground surface, is particularly suitable where soil is extremely tight or where the ground water table is high. The name "Nodak" was applied to the system by its developers at North Dakota State University. Numerous installations of this type have been made in North Dakota and South Dakota, and reports indicate the system operates satisfactorily even under difficult soil and ground water conditions. The system may be used in any type of soil, and choice of disposal system becomes largely dependent on the relative costs of construction.

Nodak systems, as described in this circular, are for individual homes only. For other than individual home systems, plans and specifications must be submitted to the State Department of Environmental Protection for review and approval.

A shallow disposal field, partly above ground, has several advantages for liquid disposal in tight soils. Surface soils will usually absorb more water than subsoils, and bacteria and other organisms are much more active near the surface. Bacterial action and aeration of soil are important in decomposition of waste materials remaining in the overflow from the septic tank. Grass growing on the disposal bed will also use up part of the water by transpiration. If the disposal field does plug, it can be easily cleaned or replaced since it is shallow and readily accessible.

A conventional septic tank is required as a part of this system, as it is for all systems. The septic tank overflow goes into a nearby holding chamber. An automatic submersible sump pump is installed in the holding chamber to pump the liquid to the final disposal field. Figure 6 shows a typical installation.

Holding Chamber

The holding chamber is usually built near the outlet of the septic tank. It should be of sufficient size to permit a man to work inside. A circular chamber should have an inside diameter of at least 30 inches. The chamber should extend from ground level to a depth about 3 feet to 5 feet below the septic tank outlet. Either concrete culverts, a poured concrete

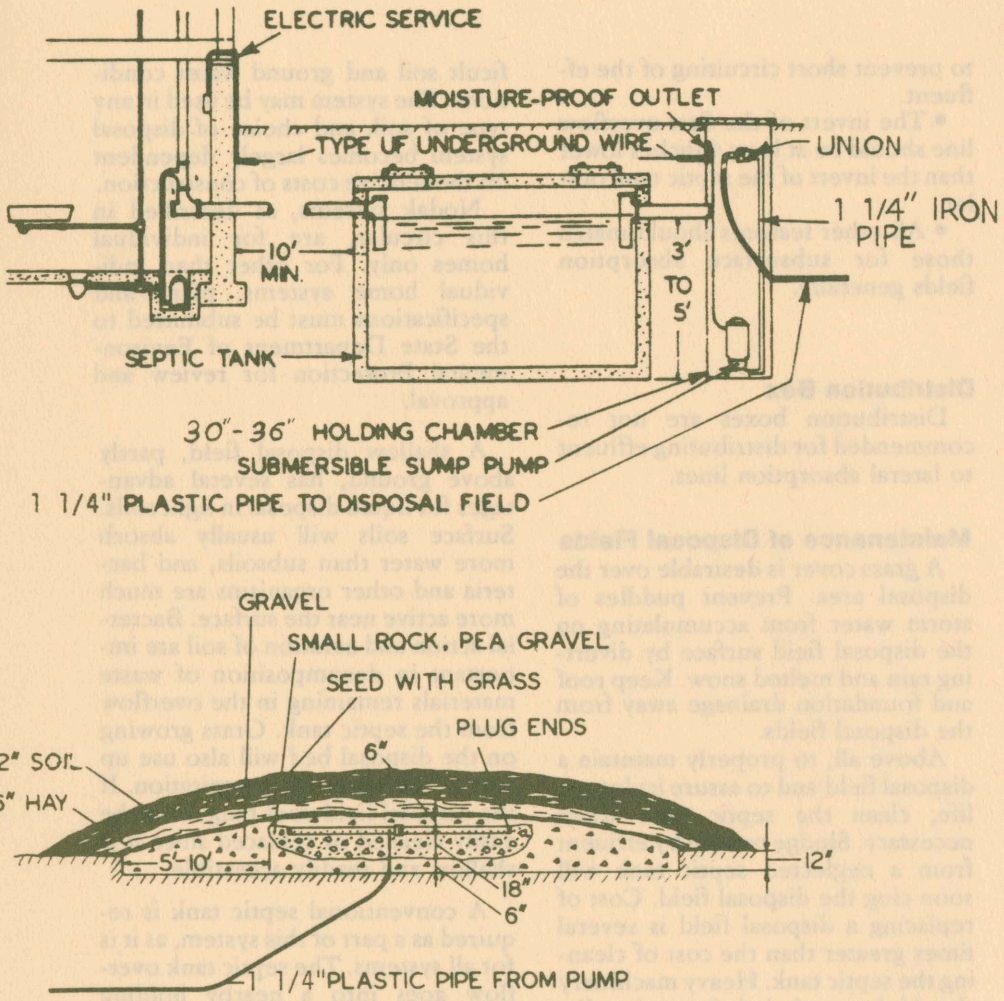


Fig. 6. Above-ground disposal system.

tank or a sealed concrete block chamber are all suitable construction materials.

Use extreme caution in entering a holding chamber which has been in use because of possible sewer gas accumulation. The chamber should be well ventilated by a mechanical fan before entering. A second person should also be present to assist in any emergency.

Pump and Controls

A cast bronze or cast iron submersible sump pump is recommended. Do not use a standard open motor type sump pump. The submersible pump should be equipped with a dependable automatic water level switch.

Use underground Type UF wiring for the electric service to the sump pump. Provide a separate grounded

circuit, properly fused. A moisture-proof convenience outlet in the holding chamber will permit easy removal of the pump.

Type and Size of Pipe

Flexible plastic pipe of 1¼-inch diameter is recommended between the pump and the final disposal field. Lay the pipe below frost level to prevent freezing, unless the pipe is placed so it will drain between pumping cycles. A union connection in the discharge line will permit removal of the submersible pump from the chamber.

Disposal Field

Recommended size of the above-ground disposal field is shown in table 2.

Table 2. Required Size of Above-Ground Disposal Field

Number Bedrooms	Number Persons	Area Required (sq. ft.)	Diameter of Circular Field (ft.)
1	2	330	21
2	4	660	30
3	6	990	36
4	8	1320	41

The field can be round or rectangular and should have a completely flat bottom. Sink the disposal field about 1 foot into the ground to prevent seepage from around the edge.

If groundwater level is within 4 feet of the bottom of the disposal field, place an impervious liner such as a continuous polyethelene plastic (minimum 6 mil) or 4-inch compacted clay between the gravel and the bottom.

A circular disposal field is illustrated in figure 6. Dimensions shown may be applied to all sizes of disposal fields. Construction of the disposal field will usually include the following steps (see also figure 6):

1. Excavate the bottom of the field to a depth of 1 foot. Make sure the bottom is flat.
2. Install the plastic pipe from the pumping chamber to a point at the center of the field.
3. Place 6 inches of coarse gravel on the bottom.
4. Provide a core of aggregate containing no sand, such as crushed rock, pea gravel, or small field stones (3 inches or less in diameter) to a depth of 18 inches above the gravel. The core extends to within 5 or 10 feet of the outside edge of the field, depending on size of the field.
5. Install a 6-inch perforated distribution pipe horizontally so the top is level with the top of the core. The pipe should be slightly shorter than width of the core and plugged at both ends. For larger installations, a cross fitting with distributor pipes extending in four directions is recommended. The plastic pipe from the pump is connected to the distribution pipe or cross at the center with a tight connection, using a suitable fitting.
6. Fill the remainder of the bed with coarse gravel to the depth of 6 inches above the distribution pipe.
7. Cover the entire bed with 6 to 12 inches of hay to serve as insulation and to keep the dirt cover out of the gravel and rock. Straw is not recommended.
8. Cover the entire bed with the soil excavated from the bed. This will provide a soil cover of about 12 inches.
9. Seed the bed with a short grass (such as bluegrass or crested wheatgrass) to prevent erosion and to improve appearance of the installation.

Operation and Maintenance

Little care is required of the above-ground sewage disposal system. Do not drive heavy equipment over the bed. Mow the grass periodically to prevent a heavy mat of dead material from developing on the field. Do not allow trees and shrubs

to grow on the field, but they may be planted around the unit.

Aerated Systems

In aerated systems, the incorporation of air, by one of several methods, permits aerobic bacteria to multiply and reduce the solids to liquids, gases, and stable solids. Aeration systems are available if desired, in prefabricated units, with motor-driven rotors or other aeration devices that mix air with the sewage in the aeration compartment. In time sludge will accumulate in the bottom of the compartment and will have to be removed.

Aerated systems require frequent inspection and maintenance and are usually considerably higher in initial installation costs than septic tanks. They also have some operating costs. Even though the aerobic biological activity in an aeration tank is more efficient than a septic tank, and normally the effluent is clearer and has little odor, it is still sewage and contains harmful bacteria. Effluent from an aeration system should be discharged to a subsurface disposal system equivalent to that of a septic tank system. South Dakota Department of Environmental Protection requires a minimum rated capacity of 1000 gallons for treatment units.

If an aerated system installation is planned for waste treatment for an individual home, the owner should be sure to understand its functions and the method of final disposal that will be required.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. Hollis D. Hall, Director of Extension Service, South Dakota State University, Brookings. The South Dakota Cooperative Extension Service offers educational programs and materials to all people without regard to race, color, religion, sex or national origin, and is an Equal Opportunity Employer.

File: 6.1-10—7.5M—68—7.5M (rev)—9-75—5018