

SEWAGE TREATMENT AND DISPOSAL SYSTEMS

Reprinted from
Wisconsin Administrative Code
Rules of
State Board of Health

H 62.20

and

H 65.06 (4)

Register, April 1962, No. 76

PRIVATE SEWAGE DISPOSAL

Reprinted from

WISCONSIN ADMINISTRATIVE CODE

H 62.20 Sewage treatment and disposal systems. (1) **SEWAGE TREATMENT TANKS.** (a) *Allowable use.* Septic or other sewage treatment tanks may be constructed where no public sewerage system is available or likely to become available within a reasonable time.

(b) *Permission to construct.* In cities, villages, towns and town sanitary districts permission to construct sewage treatment systems shall be obtained from the local plumbing inspector, where available, local health officer, or health committee. Such permission should be in addition to any approval by the board.

(c) *Location.* No sewage tank shall be located within 2 feet of any lot line, 10 feet of any cistern or 25 feet from any well or other source of water supply used for domestic purposes. Where practicable greater distances should be provided.

(d) *Materials.* 1. Septic tanks shall be water-tight below the cover and be built so as to constitute a separate structure. They shall be made of a welded metal or monolithic concrete. Metal tanks shall be made of new, hot rolled commercial quality steel or equally suitable metal. The gauge of the metal for the septic tanks shall be as follows:

<i>Septic Tank Capacity</i>	<i>Tank Component</i>	<i>Gauge of Metal</i>
500- 800 gallons	Bottom and side walls -----	14
	Cover -----	12
	Baffles -----	12
1,000-1,800 gallons	Complete Tank -----	10
2,000 or more gallons	Complete Tank -----	7

Steel tanks, including cover with rim, inlet and outlet collars and man-hole extension collars shall be constructed with welded joints in such manner as to provide structural stability and water-tightness. Steel tanks shall be coated, inside and outside, in compliance with U. S. Department of Commerce Commercial Standard 177. Any damage to the bituminous coating shall be repaired by recoating prior to installation of the tank. Steel tanks shall have affixed permanently thereto the seal of the Underwriters Laboratories, Inc. of Chicago, Illinois. 2. Precast concrete tanks shall have a minimum wall thickness of 2 inches. The concrete shall be of such mix as to withstand a compressive load of at least 3,000 pounds per square inch. 3. Each tank shall be clearly marked to show capacity, name and address or registered trade mark of the manufacturer.

(e) *Capacity and design.* 1. The size of a septic tank shall be based on the number of persons using the building to be served or upon the nature of use and type of waste. The minimum liquid capacity of a septic tank measured below the outlet shall be 500 gallons for any installation. The liquid depth shall not be less than 3 feet nor more than 6 feet. The total depth of tank shall be at least 8 inches greater than the liquid depth. For each additional person over six to be accommodated in the described buildings, the liquid capacity shall be increased as indicated in the following table:

Apartment buildings	60 gal.
Bars, and cocktail lounges	3 "
Bowling alley (per alley rather than per person)	125 "
Bowling alley with bar (per alley rather than per person)	225 "
Camps—summer use only	15 "
Drive-in theaters (per car space)	5 "
Factories and offices, exclusive of industrial wastes	15 "
Hotels and motels (5 or more rooms) (per bed space)	50 "
Mobile home parks	30 "
Picnic parks—toilet wastes	5 "
Picnic parks with showers and toilets	10 "
Restaurant—kitchen and toilet wastes	10 "
Restaurant—kitchen wastes only	3 "
Retail stores	5 "
Rooming houses or boarding house (per bed space)	50 "
(non-transient establishments providing rooms, with or without meals)	
Rooming houses, tourist (per bed space)	50 "
(4 or less rooms, cabins or cottages)	
Self service laundries—toilet wastes only	40 "
Service stations	5 "
Single family dwelling	75 "
Swimming pool bath houses	10 "

Note: The foregoing figures exclude bar, industrial and other wastes unless specifically mentioned.

For schools and other part time use buildings where more than 20 persons are to be served, the capacity of the tank shall be increased above the minimum size by the quantities per additional person indicated in the following table:

Churches and part time assembly halls	7.5 gal.
Schools	15 "
Schools with meals served	20 "
Schools with meals served and showers provided	25 "

Where a food waste grinder, automatic clothes washer, or a dish washer, singly or in combination, are connected to the plumbing system, the septic tank shall be increased in size at least 50 per cent over that size required on basis of population served. Where large volumes of wastes, other than sewage, are tributary to the tank the capacity shall be increased to provide a two day holding period. Under such conditions approval of the design of the sewerage system shall be obtained from the board. See subsections H 62.22 (41), (42), (43).

2. Rectangular tanks shall have a minimum width of 30 inches and shall be constructed with the longest dimensions parallel to the direction of flow. All single compartment cylindrical tanks shall have an inside diameter of not less than 48 inches. When increased capacity is to be provided by using a number of prefabricated tanks the minimum capacity of any unit shall be 500 gallons. When more than two tanks are installed in series approval of the board shall be obtained.

3. a. The inlet and outlet on all tanks or tank compartments shall be provided with open-end cast iron sanitary tees or baffles made of approved materials, so constructed as to distribute flow and retain scum in tank or compartments. The tees or baffles shall extend at least 6 inches above and 9 inches below the liquid level. The inlet and outlet

arrangements shall provide for free flow of air between inlet and outlet. At least 2 inches of clear space shall be provided over the top of baffles or tees. The bottom of the outlet pipe shall be at least 2 inches lower than the bottom of the inlet pipe. b. The inlet and outlet pipes between a septic tank and firm ground beyond the excavation made to install the tank shall be cast iron pipe or other pipe approved by the board for this specific purpose. The joint between the pipe and tank shall be made water-tight. A sand bedding, three inches thick, and sand backfill of the excavation shall be provided for steel tank installations. The sand may be pit run material of such size that 100% will pass through a one-inch screen. The bedding for such tanks and backfill around all tanks shall be tamped into place, care being taken to prevent damage to the coating. c. The inlet and outlet openings of all tanks shall contain a "boss," stop or other provision which will prevent the insertion of the sewer piping beyond the inside tank wall facing. d. All connections made between the sewer piping and the tank openings shall be made to conform to sections H 62.15 and H 62.16.

4. a. Each single compartment tank and each unit of a multicompartment tank shall be manufactured or provided with at least one manhole opening at least 20 inches square or 20 inches in diameter. Manholes shall be extended to within at least 12 inches of the ground surface and be provided with substantial concrete, steel, stone or cast iron covers. On steel tanks the collar for manhole extensions shall be at least 2 inches high. b. An inspection opening shall be provided over the inlet baffle of all septic tanks which may be either a manhole or a pipe at least 4 inches in diameter. The upper end of the inspection pipe or manhole shall terminate not more than 6 inches below the ground surface.

5. The design of all prefabricated septic tanks shall be approved by the board.

6. The discharge of surface, rain, and other large volumes of clear water into a treatment tank is prohibited.

(f) *Maintenance and sludge disposal.* Septic tanks shall be cleaned whenever the sludge and scum occupies one-third of the tank volume. Sludge and scum from septic tanks and any other material removed from a sewage disposal unit, all hereafter referred to as sludge, shall be disposed of in such manner as not to create a nuisance or menace to public health. Unless otherwise authorized by a local health officer the sludge shall be disposed of as follows:

1. By discharge into a public sewerage system when practical. The point and method of discharge into the system shall be subject to the requirements of the municipality.

2. By discharge at a disposal site designated by a city, village, or town for such purpose, or

3. In the absence of a public sewerage system or designated disposal site by one of the following methods:

a. By burial under 18 inches of earth on the premises on which produced at a distance of at least 50 feet from a well or if on other premises at a distance of at least 500 feet from a place of habitation provided that there is also at least 18 inches of soil between the buried sludge and the ground water level or limestone rock.

b. By spreading on land, not used for pasturing livestock or for growing vegetables, at a distance of 1000 feet from a place of habitation.

4. The sludge shall not be disposed of by discharge into a lake, stream, ditch or dry run or be deposited within 25 feet of such watercourses.

(2) **EFFLUENT DISPOSAL.** (a) *Location and method.* The effluent from septic tanks shall be disposed of by soil absorption in a seepage pit, drainage field or by some other manner approved by the board provided such disposal does not create a nuisance or hazard to health. All soil absorption disposal units should be located at a point lower than the grade of any nearby water well and unless permission is obtained from the board shall be located not less than 25 feet from any dwelling or cistern and not less than 50 feet from any water well constructed in accordance with the specifications of the Wisconsin Well Construction and Pump Installation Code. Where water wells do not conform greater distances shall be maintained. No part of a seepage pit or drainage field shall be located within 5 feet of any lot line or within 25 feet of any lake, stream or other water course unless permission is obtained from the board. The type of soil absorption system to be used for effluent disposal shall be determined through percolation tests made in accordance with section H 65.06 (4), Wisconsin Administrative Code.

(b) *Seepage pits.* 1. Seepage pits preferably should be used when deeper soil formations are more porous than the upper soil. The seepage pit shall consist of a chamber walled up with material which allows water to percolate through it, such as dry rubble, brick or concrete blocks. The bottom shall be left open to the soil. The seepage pit shall not be less than 5 feet in diameter and should have a depth, where practicable, of 6 feet or more below the inlet pipe, depending on the character of the soil. Seepage pits shall not extend into creviced rock formations. Each seepage pit shall be provided with a manhole and a fresh air inlet. The manhole shall be at least 20 inches square or 20 inches in diameter extending to within at least 12 inches of the surface of the ground and be provided with a substantial concrete, stone or cast iron cover. See section H 62.22 (41).

2. The absorption area in a seepage pit per bedroom shall be at least 75% of the area designated in subsection (c) (2). Effective area shall be construed as the bottom area plus the area at the outside wall of the curbing of the pit. The actual thickness of absorptive material below the inlet subjected to the percolation test, but not more than 5 feet, shall be used in calculating wall area. Seepage pits shall be located 10 feet or more apart and as far from wells as the premises will permit. See section H 62.20 (2) (a).

(c) *Drainage tile and siphon.* 1. Drainage tile should be used in place of a seepage pit wherever possible, particularly when the deeper soil tends to be non-porous. In tight soils the percolating tile lines should be surrounded with coarse gravel, crushed rock, or cinders, having a depth below the tile of at least 12 inches. The tile should be laid 12 to 36 inches below the surface and in straight or curved parallel lines separated by 10 feet or more. The tile should be laid on a slope of about 2 inches per 100 feet. Tile should be spaced about one-fourth inch apart and be blinded at the tops with tar paper or broken tile unless surrounded with coarse material in which case the surface of the material should be covered with tar paper or equal. See section H 62.22 (44), (45).

2. The absorption area required for a tile field serving residential property shall be determined from the following table using soil percolation test data:

Percolation Rate Minutes Required For Water to Fall One Inch	Minimum Absorption Area in Square Feet Per Bedroom			
	Normal Plumbing Fixtures	With Garbage Grinder	With Automatic Washer	With Both Grinder and Automatic Washer
2	50	65	75	85
3	60	75	85	100
4	70	85	95	115
5	75	90	105	125
10	100	120	135	165
15	115	140	160	190
30	150	180	205	250
45	180	215	245	300
60	200	240	275	330
90	240	290	325	400

a. In the case of schools or other part-time-use establishments, one-sixth of the area requirements per bedroom for normal plumbing fixtures shall be provided for each person. In the case of commercial or industrial establishments one-fiftieth of the area requirements for normal plumbing fixtures shall be provided for each gallon per day of sewage or wastes contributed to the disposal system.

b. Where the percolation rate is so slow that more than 60 minutes are required for the water to fall one inch, studies should be made of the possibility of using seepage pits alone or in conjunction with a tile absorption field.

3. Discharge of septic tank effluent into the soil absorption system should preferably be regulated by an automatic siphon. The dosing tank in which the siphon is situated should have a capacity equal to the combined volume of the tile in the absorption system.

Note: Each foot of 3-inch drain tile has a capacity of .367 gallons; 4-inch tile, .652 gallons; 5-inch tile, 1.02 gallons; 6-inch tile, 1.46 gallons; 7-inch tile, 2.012 gallons; 8-inch tile, 2.599 gallons; 10-inch tile, 4.0195 gallons; 12-inch tile, 5.875 gallons. The amount of tile required is governed by the lay of the land and character of the soil. This is important and must receive careful attention. The drainage tile should be laid at a depth of one foot or more below the surface of the ground, and in cases where it is necessary to lay the tile deeper than two feet, an adequate system of ventilation should be provided.

(3) VENTILATION. Fresh air inlets shall be provided on all soil absorption systems and be placed so as to assure a free flow of air throughout the entire installation. The vent pipes shall be at least 2 inches in diameter and extend at least 12 inches above the ground surface with a return bend fitting. Fresh air inlets shall be located at least 20 feet from any window, door or air intake of any building used for human habitation. See H 62.22 (41), (45).

Note: Free circulation of air as provided for in this section means air entering through one or more fresh air inlets, passing on through the units and piping in connection therewith, thence through the inverts of the septic tank by means of the vent openings, and the air continuing onward through the house drain, soil, waste and vent pipes to a point above the building, thus not only creating an effective circulation of air but conveying all offensive odors and gases to a point above the roof.

(4) CESSPOOLS PROHIBITED. Seepage pits for disposal of untreated sewage are prohibited.

(5) SEWER CONNECTION. Private systems for sewage disposal must be discontinued when public sewers become available. The house sewer shall be disconnected from the old system and be reconnected with the public sewer. All abandoned septic tanks and seepage pits shall be immediately filled.

(6) INDUSTRIAL WASTES. Treatment and disposal systems for industrial wastes shall be designed to meet the individual needs and be of a type that will adequately purify the specific waste. Owners of industrial establishments producing trade wastes of a toxic, putrescible, or otherwise objectionable character should consult with the board in reference to their problems.

Note: Commercial Standard 177 of the U. S. Department of Commerce is available for inspection at the office of the board of health, the secretary of state and the revisor of statutes, or may be procured for personal use from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

History: 1-2-56; am. (1) (f), Register, June, 1956, No. 6, eff. 7-1-56; am. (2) (a), (2) (b), (2) (c) 2, Register, February, 1957, No. 14, eff. 3-1-57; am. (1) (b), (d) and (e), Register, April, 1962, No. 76, eff. 10-1-62.

H 65.06 Soil tests. (1) PERCOLATION TEST PROCEDURE. (a) Type of hole. The hole shall be dug or bored. It shall have vertical sides and have a horizontal dimension of 4 to 12 inches. A four-inch or larger auger may be used.

(b) Preparation of hole. The bottom and sides of the hole shall be carefully scratched with a sharp pointed instrument to expose the natural soil interface. All loose material shall be removed from the bottom of the hole which shall then be covered with 2 inches of coarse sand or gravel when necessary to prevent scouring.

(c) Saturation and swelling of the soil. The hole shall be carefully filled with clear water to a minimum depth of 12 inches over the gravel. By refilling if necessary, or by supplying a surplus reservoir of water, such as an automatic siphon, the test hole shall be filled with water for at least 4 hours and preferably overnight. The soil shall be allowed to swell overnight so that it will approach the conditions that will exist during the wettest season of the year. In sandy soils, containing little or no clay, the swelling procedure is not essential and the test may proceed, as hereafter described, if the water from a second filling of the hole seeps away in 10 minutes or less.

(d) Percolation rate measurement. With the exception of sandy soils, percolation rate measurements shall be made on the day following the procedure described in subsection (c) above. If water remains in the test hole after the overnight swelling period, the depth shall be adjusted to a level of 6 inches over the gravel. Thereupon, from a fixed reference point, the drop in water level shall be measured over a 30-minute or longer period. This drop shall be used to calculate the percolation rate. If no water remains in the hole after the overnight swelling period, there shall be added clear water to bring the depth of the water in the hole to a level which is 6 inches over the gravel. Thereupon from a fixed reference point, the drop in water level shall be measured at 30-minute intervals until 2 successive readings do not vary by more than 5 per cent or for a period of 4 hours, refilling the hole whenever it becomes nearly empty with clear water to a level which is 6 inches above the gravel. The drop that occurs during the final 30-minute period shall be used to calculate

the percolation rate. In sandy soils (or other soils in which the first 6 inches of water seeps away in less than 30 minutes after the overnight swelling period) the time interval between measurements shall be taken as 10 minutes and the test run for 1 hour. The drop that occurs during the final 10 minutes shall be used to calculate the percolation rate. Percolation rates may also be determined by the volume of water displaced from a reservoir when the cross sectional area of the hole can be accurately determined and the water feeding device is such as to maintain a constant water level in the hole.

(5) **INTERPRETATION.** In interpreting percolation test results emphasis shall be given to the lowest percolation rates for the same type of soil.

History: 1-2-56; Am. Register, July, 1956, No. 7. Eff. Aug. 1, 1956.