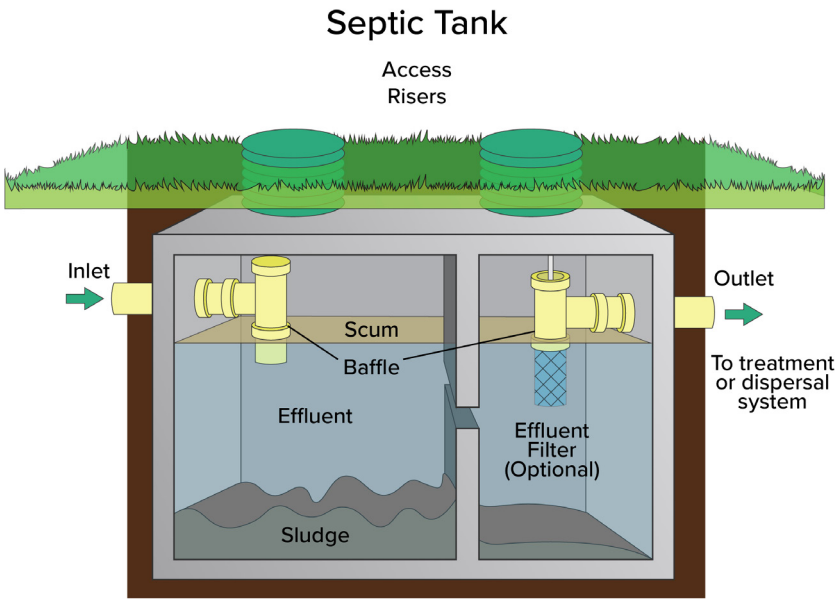
Wastewater Installers
Conventional Septic System

A septic tank is a watertight tank made of steel concrete, or other approved materials in which the settleable solids settle and are largely changed into liquids or gases by bacterial decomposition. The remaining residue in the tank is a heavy, black semiliquid sludge that must be removed from the tank periodically by a commercial contractor. When the sludge is removed, it will contain undigested material, therefore, it must be properly disposed of to reduce the impact on public health. The effluent produced by a septic tank can be dangerous and foul. The septic tank cannot be depended upon to remove disease germs. The discharge of the effluent from septic tanks into street gutters, surface ditches or streams is prohibited. This is only a primary treatment method and must be coupled with additional treatment from an absorption field, oxidation ponds or alternative effluent reduction method as secondary treatment.

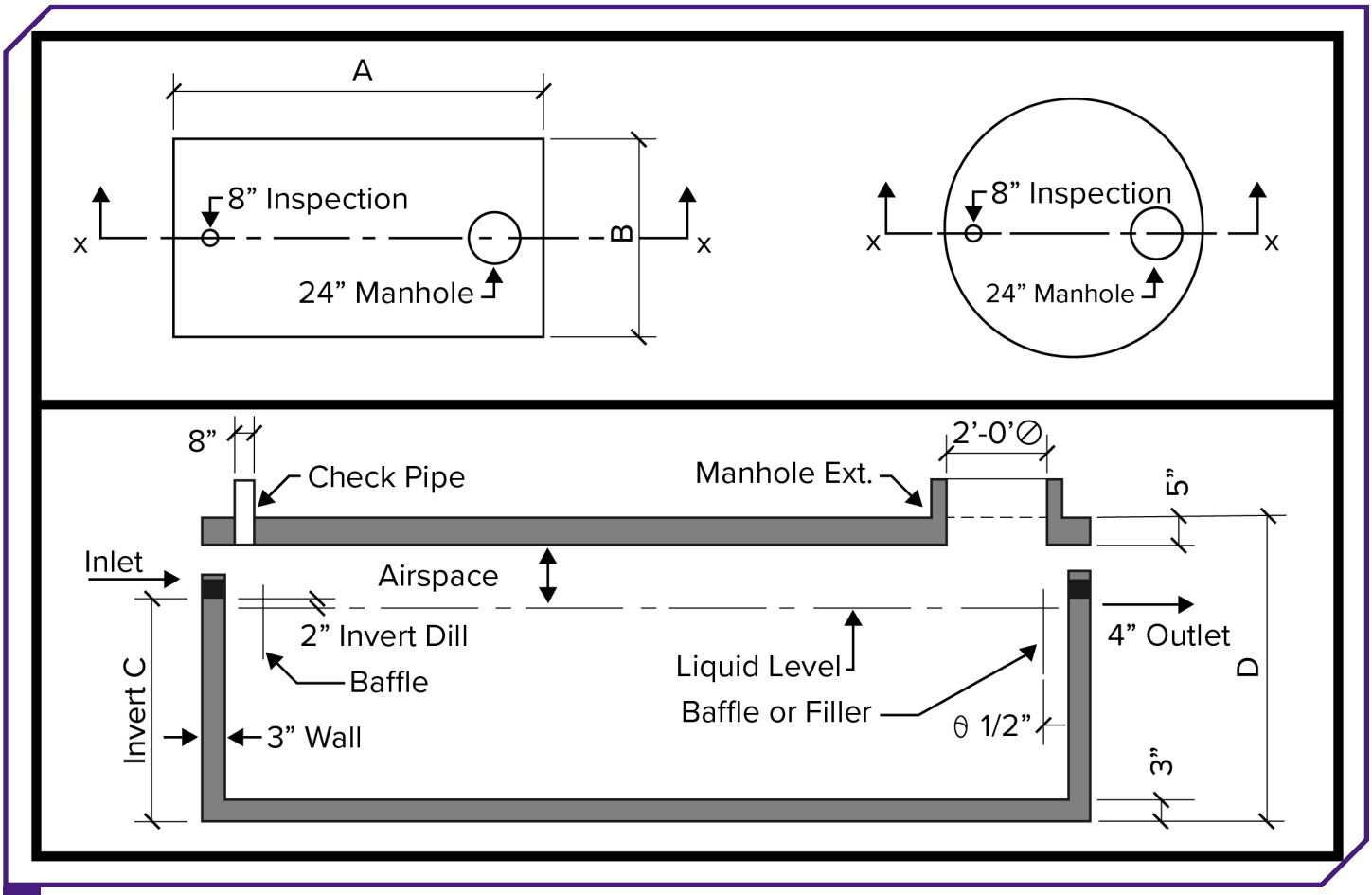
Design



Please note: The number of compartments in a septic tank vary by state and region.

The septic system can be multiple or single-chamber tanks in series. Though single-chamber tanks are acceptable, tanks with numerous compartments or in series provide more effective treatment than single-chamber tanks of the same total capacity and are thus encouraged during the installation process. The first tank shall have at least a 500-gallon liquid capacity and all subsequent tanks shall have at least 300-gallon liquid capacities. To maximize the solid and scum retention time, the velocity of effluent is an important part of the design. A vertical cylindrical tank must have 24 inches of horizontal separation from the inlet to the outlet and preclude all floating solids. The minimum total septic tank liquid capacity required is 2.5 times the estimated average daily design flow, unless for a one-bedroom residence that will utilize a 500-gallon tank. The minimum allowable total volume of a septic tank is 500 gallons

Dimension Requirements



Pipe schematic with invert.

The depth of a septic tank should be between 30-72 inches, which is measured from the invert of the outlet or the overflow level. The shallower tanks are encouraged due to increased treatment efficiency for effluent. A vertical cylindrical tank must have 24 inches of horizontal separation from the inlet to the outlet, but other shaped containers (i.e., rectangular or oval) must have a separation that exceeds the width of the tank. The minimum level of effluent in the tank must be greater than 15% of the depth capacity. Similarly, the minimum air space must also be greater than 15% of the depth capacity. A septic tank should be made up of no more than three components with a minimum compartment size of 250 gallons.

Tanks should be corrosion-resistant, permanent and watertight with a 4-inch-thick concrete cover that is reinforced with steel. The cover should have a dead load of no less than 150 pounds per square foot. The manhole covers should be 20 square inches or 24 inches in diameter. Additionally, the inlet and outlet must be accessible with an 8-inch inspection hole. Though concrete tanks are the most common for septic systems, an installed metal tank must be a minimum 14-gauge commercial grade steel with a hot-dipped asphalt coating of 0.025-inch thickness. Any untreated or uncoated metal septic tank shall not be used in an install.

Specification for Piping

The piping must be laid to not disturb the sludge lying in the tank. Inlet pipe from the house must be a minimum of 4 inches with a slope of 1/8 inch per foot. For the last 10 feet, the slope will not exceed 1/4 inch per foot. These pipes should be SDR 35 sewer and drainage pipes or equivalent. At the inlet of the septic tank, there should be a tee or baffle that extends upward at least 6 inches above the liquid level of the tank and have at least 2 inches of open space above for ventilation. The inlet tee will also extend downward at least 6 inches below the liquid level of the tank but not lower than the outlet. The outlet tee or baffle should also extend upward at least 6 inches above the liquid level of the tank, but the downward extended depth must be at least 40% of the liquid depth of a tank with vertical sides or 35% of the liquid volume of tanks with other shapes. To make sure the effluent flows out of the septic tank, the invert of the inlet shall be located at least 2 inches above the invert of the outlet. Inlet and outlet fittings must be of cast iron, schedule 40PVC/ABS plastic or other approved material. Septic tanks must comply with all minimum requirements for water wells and supply lines.

Key Maintenance

After installation, a septic tank should be inspected every six years and pumped at least every eight years by a licensed sewage hauler. There are many common indicators that the septic tank is not treating effluent properly including wet spots, standing water and/or odd growth patterns around the system. Septic tank odor is the easiest way to detect an issue with your system. It is best to make sure there are no additional sources of water that contribute to hydraulic overload of the system. This additional water can come from gutters, downspouts, paved surfaces draining toward the drain field or leaky fixtures inside the home. Additionally, garbage disposals can double the volume of solids in a septic tank and produce common issues such as slow drains or backups. If the tank is ever abandoned or becomes inactive, the tank should be pumped out, then removed/discarded or cover and fill the tank with soil to the natural grade. The contents of the abandoned tank shall not be placed into a newly installed individual sewerage system.

Additional Requirements

- The location of the septic tank shall comply with minimum distance requirements from water wells, water lines, etc., as contained in Part XII of the Public Health – Sanitary Code. This includes being a minimum of:
  - 50 feet from any private water wells
  - 10 feet from any property line
  - 100 feet from public water supply wells
  - 25 feet from potable water (pressure) lines
- The backfill around the tank must be in thin layers to not cause extra strain on the tank while allowing sufficient soil for grass growth. There should be no additional obstructions on the tank that would cause strain or prevent access.

References

- https://www.doa.la.gov/media/j3hnpfdy/51.pdf
- https://ldh.la.gov/page/wastewater

Authors

M.P. Hayes, Assistant Professor in the School of Plant, Environmental and Soil Science and Louisiana Sea Grant

Richard Grabert, Sanitarian Program Specialist for the Louisiana Department of Health

Paula Guient, Assistant Program Administrator, Onsite Wastewater and Compliance for the Louisiana Department of Health

P3985-L (online) 11/25