

TITLE 18. ENVIRONMENTAL QUALITY
CHAPTER 9. WATER POLLUTION CONTROL
ARTICLE 3. AQUIFER PROTECTION PERMITS - GENERAL PERMITS
PART A. GENERAL PROVISIONS

R18-9-A314. Septic Tank Design, Manufacturing, and Installation for Onsite Wastewater Treatment Facilities

A person shall not install a septic tank in an on-site wastewater treatment facility unless the tank meets the following requirements:

1. The tank is:
 - a. Designed to produce a clarified effluent and provide adequate space for sludge and scum accumulations;
 - b. Watertight and constructed of solid durable materials not subject to excessive corrosion or decay;
 - c. Manufactured with at least two compartments unless two separate structures are placed in series. The tank is designed so that:
 - i. The inlet compartment of any septic tank not placed in series is nominally 67 percent to 75 percent of the total required capacity of the tank,
 - ii. Septic tanks placed in series are considered a unit and meet the same criteria as a single tank,
 - iii. The liquid depth of the septic tank is at least 42 inches, and
 - iv. A septic tank of 1000 gallon capacity is at least 8 feet long and the tank length of septic tanks of greater capacity is at least 2 times but not more than 3 times the width;
 - d. Manufactured with at least two access openings to the tank interior, each at least 20 inches in diameter. The tank is designed so that:
 - i. One access opening is located over the inlet end of the tank and one access opening is located over the outlet end;
 - ii. Whenever a first compartment exceeds 12 feet in length, another access opening is provided over the baffle wall; and
 - iii. Access openings and risers are constructed to ensure accessibility within 6 inches below finished grade;
 - e. Manufactured so that the sewage inlet and wastewater outlet openings are not smaller than the connecting sewer pipe. The tank is designed so that:
 - i. The vertical leg of round inlet and outlet fittings is at least 4 inches but not smaller than the connecting sewer pipe, and
 - ii. A baffle fitting has the equivalent cross-sectional area of the connecting sewer pipe and not less than a 4 inch horizontal dimension if measured at the inlet and outlet pipe inverts;
 - f. Manufactured so that the inlet and outlet pipe or baffle extends 4 inches above and at least 12 inches below the water surface when the tank is installed according to the manufacturer's instructions consistent with this Chapter. The invert of the inlet pipe is at least 2 inches above the invert of the outlet pipe;
 - g. Manufactured so that the inlet and outlet fittings or baffles and compartment partitions have a free vent area equal to the required cross-sectional area of the connected sewer pipe to provide free ventilation above the water surface from the disposal works or seepage pit through the septic tank, house sewer, and stack to the outer air;
 - h. Manufactured so that the open space extends at least 9 inches above the liquid level and the cover of the septic tank is at least 2 inches above the top of the inlet fitting vent opening;
 - i. Manufactured so that partitions or baffles between compartments are of solid durable material (wooden baffles are prohibited) and extend at least 4 inches above the liquid level. The open area of the baffle shall be between one and 2 times the open area of the inlet pipe or horizontal slot and located at the midpoint of the liquid level of the baffle. If a horizontal slot is used, the slot shall be no more than 6 inches in height;
 - j. Structurally designed to withstand all anticipated earth or other loads. The tank is designed so that:
 - i. All septic tank covers are capable of supporting an earth load of 300 pounds per square foot; and
 - ii. If the top of the tank is greater than 2 feet below finish grade, the septic tank and cover are capable of supporting an additional load of 150 pounds per square foot for each additional foot of cover;
 - k. Manufactured or installed so that the influent and effluent ends of the tank are clearly and permanently marked on the outside of the tank with the words "INLET" or "IN," and "OUTLET" or "OUT," above or to the right or left of the corresponding openings; and
 - l. Clearly and permanently marked with the manufacturer's name or registered trademark, or both, the month and year of manufacture, the maximum recommended depth of earth cover in feet, and the design liquid capacity of the tank. The tank is manufactured to protect the markings from corrosion so that they remain permanent and readable for the operational life of the tank.
2. Materials used to construct or manufacture septic tanks.
 - a. A septic tank cast-in-place at the site of use shall be protected from corrosion by coating the tank with a bituminous coating, by constructing the tank using a concrete mix that incorporates 15 percent to 18 percent fly ash, or by any other Department-approved means. The tank is designed so that:
 - i. The coating extends at least 4 inches below the wastewater line and covers all of the internal area above that point; and
 - ii. A septic tank cast-in-place complies with the "Building Code Requirements for Structural Concrete and Commentary ACI 318-02/318R-02 (2002)," and the "Code Requirements for Environmental Engineering Concrete Structures and Commentary, ACI 350/350R-01 (2001)," published by the American Concrete Institute. This material is incorporated by reference and does not include any later amendments or editions of the incorporated material. Copies of the incorporated material are available for inspection at the Arizona Department of Environmental Quality, 1110 W. Washington Street, Phoenix, AZ 85007 or may be obtained from American Concrete Institute, P.O. Box 9094,

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Farmington Hills, MI 48333-9094.

- b. A steel septic tank shall have a minimum wall thickness of No. 12 U.S. gauge steel and be protected from corrosion, internally and externally, by a bituminous coating or other Department-approved means.
 - c. A prefabricated concrete septic tank shall meet the “Standard Specification for Precast Concrete Septic Tanks, C1227-03,” published by the American Society for Testing and Materials. This information is incorporated by reference and does not include any later amendments or editions of the incorporated material. Copies of the incorporated material are available for inspection at the Arizona Department of Environmental Quality, 1110 W. Washington Street, Phoenix, AZ 85007 or may be obtained from the American Society for Testing and Materials International West.
 - d. A septic tank manufactured using fiberglass or polyethylene shall meet the “Material and Property Standards for Prefabricated Septic Tanks, IAPMO PS 1-2004,” published by the International Association of Plumbing and Mechanical Officials. This information is incorporated by reference, does not include any later amendments or editions of the incorporated material, and may be viewed at the Arizona Department of Environmental Quality, 1110 W. Washington Street, Phoenix, AZ 85007 or obtained from International Association of Plumbing & Mechanical Officials, 20001 E. Walnut Drive, South Walnut, CA 91789-2825.
3. Conformance with design, materials, and manufacturing requirements.
- a. If any conflict exists between this Article and the information incorporated by reference in subsection (2), the requirements of this Article apply.
 - b. The Department may approve use of alternative construction materials under R18-9-A312(G). Tanks constructed of wood, block, or bare steel are prohibited.
 - c. The Department may inspect septic tanks at the site of manufacturing to verify compliance with subsections (1) and (2).
 - d. The septic tank sale documentation includes:
 - i. A certificate attesting that the septic tank conforms with the design, materials, and manufacturing requirements in subsections (1) and (2); and
 - ii. Instructions for handling and installing the septic tank.
4. The septic tank’s daily design flow is determined as follows:
- a. For a single family dwelling:
 - i. The design liquid capacity of the septic tank and the septic tank’s daily design flow are determined based on the number of bedrooms and fixture count as follows:

Criteria for Septic Tank Size and Design Flow			
Number of Bedrooms	Fixture Count	Minimum Design Liquid Capacity (gallons)	Design Flow (gal/day)
1	7 or less	1000	150
	More than 7	1000	300
2	14 or less	1000	300
	More than 14	1000	450
3	21 or less	1000	450
	More than 21	1250	600
4	28 or less	1250	600
	More than 28	1500	750
5	35 or less	1500	750
	More than 35	2000	900
6	42 or less	2000	900
	More than 42	2500	1050
7	49 or less	2500	1050
	More than 49	3000	1200
8	56 or less	3000	1200
	More than 56	3000	1350

ii. Fixture count is determined as follows:

Residential Fixture Type	Fixture Units	Residential Fixture Type	Fixture Units
Bathtub	2	Sink, bar	1
Bidet	2	Sink, kitchen (including dishwasher)	2
Clothes washer	2	Sink, service	3
Dishwasher (Separate from kitchen)	2	Utility tub or sink	2
Lavatory, single	1	Water closet, 1.6 gallons per flush (gpf)	3
Lavatory, double in master bedroom	1	Water closet, >1.6 to 3.2 gpf	4
Shower, single stall	2	Water closet, greater than 3.2 gpf	6

- b. For other than a single family dwelling, the design liquid capacity of a septic tank in gallons is 2.1 times the daily design flow into the tank as determined from Table 1, Unit Design Flows. If the wastewater strength exceeds that of typical sewage, additional tank volume is required.
 - c. A person may place two septic tanks in series to meet the septic tank design liquid capacity requirements if the capacity of the first tank is at least 67 percent of the total required tank capacity and the capacity of the second tank is at least 33 percent of the total required tank capacity.
5. The following requirements regarding new or replacement septic tank installation apply:
- a. Permanent surface markers for locating the septic tank access openings are provided for maintenance;
 - b. A septic tank installed under concrete or pavement has the required access openings extended to grade;
 - c. A septic tank effluent filter is installed on the septic tank. The filter shall:
 - i. Prevent the passage of solids larger than 1/8 inch in diameter while under two feet of hydrostatic head; and
 - ii. Be constructed of materials that are resistant to corrosion and erosion, sized to accommodate hydraulic and organic loading, and removable for cleaning and maintenance; and
 - d. The septic tank is tested for watertightness after installation by the water test described in subsections (5)(d)(i) and (5)(d)(ii) and repaired or replaced, if necessary.
 - i. The septic tank is filled with clean water, as specified in R18-9-A310(A), to the invert of the outlet and the water left standing in the tank for 24 hours and:
 - (1) After 24 hours, the tank is refilled to the invert, if necessary;
 - (2) The initial water level and time is recorded; and
 - (3) After one hour, water level and time is recorded.
 - ii. The tank passes the water test if the water level does not drop over the one-hour period. Any visible leak of flowing water is considered a failure. A damp or wet spot that is not flowing is not considered a failure.