

**15A NCAC 18A .1954 MINIMUM STANDARDS FOR PRECAST REINFORCED CONCRETE TANKS**

(a) The following are minimum standards of design and construction of precast reinforced concrete septic tanks:

- (1) The minimum requirement for the liquid depth is 36 inches.
- (2) A minimum of nine inches freeboard is required, the freeboard being the air space between the top of the liquid and the bottom side of the lid or cap of the tank.
- (3) The length of the septic tank shall be at least twice as long as the width.
- (4) There shall be three inlet openings in the tank, one on the tank end and one on each sidewall of the inlet end of the tank. The blockouts for these openings shall leave a concrete thickness of not less than one inch in the tank wall. The blockouts shall be made for a minimum of four-inch pipe or a maximum of six-inch pipe. The outlet pipe penetration of the tank shall be through a resilient, watertight, sealed, non-corrosive and flexible connective sleeve. The outlet pipe penetration shall be precast to be compatible with the connective sleeve. No pipe penetration points or openings shall be permitted below the tank liquid level.
- (5) The inlet pipe in the tank shall be a straight pipe.
- (6) The outlet shall be through an approved effluent filter secured in place in an effluent filter support case. The effluent filter support case shall serve as a functioning sanitary tee with the bottom inlet extending down between 25 and 40 percent of the liquid depth. The approved effluent filter and support case shall be furnished by the septic tank manufacturer. The invert of the outlet shall be at least two inches lower in elevation than the invert of the inlet.
- (7) Other equivalent methods of supporting the effluent filter and for making the pipe penetrations shall be approved by the On-Site Wastewater Section.
- (8) In order to obtain approval of an effluent filter, the filter manufacturer shall submit to the State the following information with supporting documentation:
  - (A) For each septic tank system that is designed to treat 3,000 gallons per day or less of sewage, a written certification that the effluent filter is designed, constructed, and performs in compliance with G.S. 130A-335.1(a)(1)(2)(3), and (4);
  - (B) Sizing as to capacity and wastewater strength for all models of proposed filters to be approved; and
  - (C) Specifications for application, installation, operation, and maintenance.
- (9) All tanks shall be manufactured with a cast-in-place partition so that the tank contains two compartments. The partition shall be located at a point not less than two-thirds nor more than three-fourths the length of the tank from the inlet end. The top of the partition shall terminate two inches below the bottom side of the tank top in order to leave space for air or gas passage between compartments. The top and bottom halves of the partition shall be cast in such manner as to leave a water passage slot four inches high for the full width of the tank. The partition (both halves) shall be reinforced by the placing of six-inch by six-inch No. 10 gage welded reinforcing wire. The reinforcing wire shall be bent to form an angle of 90 degrees on the ends in order to form a leg not less than four inches long. When the wire is placed in the mold the four-inch legs should lay parallel with the sidewall wire and adjacent to it. It is recognized that there are other methods of constructing a partition or two-compartment tank. Any method other than the one described will be considered on an individual basis for approval by the On-Site Wastewater Section. However, the tank wall thickness must remain not less than two and one-half inches thick throughout the tank except for the pipe penetrations.
- (10) Adequate access openings must be provided in the tank top. Access shall be provided for cleaning or rodding out of the inlet pipe, for cleaning or clearing the air or gas passage space above the partition, for pumping of each compartment, and for the maintenance of the effluent filter. This shall be accomplished by properly locating two manholes or access openings with each having a minimum opening of 15 inches by 15 inches or 17 inches in diameter as the opening cuts the plane of the bottom side of the top of the tank or other equidimensional opening with at least 225 square inches. The manhole covers shall be beveled on all sides in such manner as to accommodate a uniform load of 150 pounds per square foot without damage to the cover or the top of the tank. If the top of the tank is to be multislabs construction, the slabs over the inlet of the tank, partition, and outlet of the tank must not weigh in excess of 150 pounds each. Multislabs construction allows for the elimination of the manholes. Manhole covers, tank lids, access opening covers, or slabs shall have a handle of steel or other rot-resistant material equivalent in strength to a No. 3 reinforcing rod (rebar).

- (11) The concrete tank and tank lid shall be reinforced by using a minimum reinforcing of six-inch by six-inch No. 10 gage welded steel reinforcing wire in the top, bottom ends, and sides of the tank. The reinforcing wire shall be lapped at least six inches. Concrete cover shall be required for all reinforcement. Reinforcement shall be placed to maximize the structural integrity of the tank. The tank, tank lid, riser and riser cover shall be able to withstand a uniform live loading of 150 pounds per square foot in addition to all loads to which an underground tanks, riser, or riser cover is normally subjected, such as the dead weight of the concrete and soil cover, active soil pressure on tank walls, and the uplifting force of the ground water. Additional reinforcement shall be required when the loads on a concrete tank, riser, or riser cover are exceeded by subjecting it to vehicular traffic or when the top of the tank is placed deeper than three feet below the finished grade.
  - (12) The top, bottom, ends, and sides of the tank must have a minimum thickness of two and one-half inches.
  - (13) A minimum 28-day concrete compressive strength of 3,500 pounds per square inch shall be used in the construction of the septic tank, concrete access riser and riser cover. The concrete shall achieve a minimum compressive strength of 3,000 pounds per square inch prior to removal of the tank from the place of manufacture. It shall be the responsibility of the manufacturer to certify that this condition has been met prior to shipment. A septic tank shall be subject to testing to ascertain the strength of the concrete prior to its being approved for installation. Recognized devices for testing the strength of concrete include a properly calibrated Schmidt Rebound Hammer or Windsor Probe Test. Accelerated curing in the mold by use of propane gas or other fuels is prohibited, except in accordance with accepted methods and upon prior approval of the State.
  - (14) After curing, tanks manufactured in two sections and as required, concrete risers shall be joined and sealed at the joint by using a mastic, butyl rubber, or other pliable sealant that is waterproof, corrosion-resistant, and approved for use in septic tanks. The sealant shall have a minimum size of one inch nominal diameter or equivalent. Before sealing, the joint shall be smooth, intact, and free of all deleterious substances. Tank halves shall be properly aligned to ensure a tight seal. The sealant shall be provided by the manufacturer.
  - (15) All tanks produced shall bear an imprint identifying the manufacturer, the serial number assigned to the manufacturer's plans and specifications approved by the State, and the liquid or working capacity of the tanks. This imprint shall be located to the right of the blockout made for the outlet pipe on the outlet end of the tank. All tanks shall also be permanently marked with the date of manufacture adjacent to the tank imprint or on the top of the tank directly above the imprint.
  - (16) Risers and access covers shall have a clear opening sized to allow for maintenance and removal of internal devices of the septic tank and shall not allow accidental entry. The access cover and tank lid shall be designed, constructed, and maintained to prevent unauthorized access. Risers shall be sealed watertight where they join the top of the septic tank, and constructed to prevent water inflow through the lid or cover.
- (b) Pump tanks shall meet the construction requirements of Paragraph (a) of this Rule with the following modifications.
- (1) Tanks shall be cast with a single compartment, or, if a partition is provided, the partition shall be cast to contain a minimum of two four-inch diameter circular openings, or equivalent, located no more than 12 inches above the tank bottom.
  - (2) There shall be no requirement as to tank length, width, or shape, provided the tank satisfies all other requirements of this Section.
  - (3) The invert of the inlet openings shall be located within 12 inches of the tank top. No freeboard shall be required in the pump tank.
  - (4) After joining, tanks manufactured in two sections shall be plastered along the joint with hydraulic cement, cement mortar, or other waterproofing sealant. Other methods of waterproofing tanks may be used as specifically approved in the plans and specifications for the tank. Prior to backfilling, the local health department shall make a finding that a two section tank is watertight if a soil wetness condition is present within five feet of the elevation of the top of the tank.
  - (5) Tanks shall be vented and accessible for routine maintenance. A watertight access manhole with removable lid shall be provided over the pump with a minimum diameter of 24 inches. The access manhole shall extend at least to six inches above finished grade and be designed and maintained to prevent surface water inflow. Larger or multiple manholes shall be provided when two or more pumps are required. Pumps shall be removable without requiring entrance into the tank. Manhole lids and

electrical controls shall be secured against unauthorized access. Manhole risers shall be joined to the tank top and sealed in accordance with Paragraphs (a)(14) and (b)(4) of this Rule.

- (6) All pump tanks shall bear an imprint identifying the manufacturer, pump tank serial number assigned by the Division of Environmental Health, and the liquid or working capacity of the tank. The imprint shall be located to the left of the outlet blockout. All tanks shall also be permanently marked with the date of manufacture adjacent to the tank imprint or on the top of the tank directly above the imprint.
- (c) Plans for prefabricated tanks, risers and riser covers, other than those approved under Paragraph (a) or (b) of this Rule shall be approved on an individual basis as determined by the information furnished by the designer which indicates the tank, riser or riser cover will provide equivalent effectiveness as those designed in accordance with the provisions of Paragraphs (a) and (b) of this Rule.
- (d) Tanks other than approved prefabricated tanks shall be constructed consistent with the provisions of this Rule except as follows:
  - (1) Cast-in-place concrete septic and pump tanks shall have a minimum wall thickness of six inches.
  - (2) Concrete block or brick masonry tanks shall have a minimum wall thickness of at least six inches when the design volume is less than 1,000 gallons and a minimum wall thickness of at least eight inches when the design volume is 1,000 gallons or more. All joints between masonry units shall be mortared using masonry cement mortar or equivalent. The joints shall have a nominal thickness of three-eighths inch. All concrete block masonry tanks shall have a minimum wall reinforcement of number three reinforcing bars on 20-inch centers, or equivalent. The maximum allowable reinforcement spacing in either direction shall be four feet. All block wall cores shall be filled with concrete with a minimum compressive strength of 3,000 pounds per square inch. All tanks constructed of block or brick shall be plastered on the inside with a 1:3 mix (one part cement, three parts sand) of Portland cement at least three-eighths inch thick or the equivalent using other approved waterproofing material.
  - (3) The bottom of the built-in-place tank shall be poured concrete with a minimum thickness of four inches. All built-in-place tanks shall be reinforced to satisfy the structural strength requirements of Paragraph (a)(9) of this Rule. Reinforcement shall be placed in both directions throughout the entire tank, including top, bottom, walls, and ends.
- (e) Manufacturers of septic tanks, effluent filters, pump tanks, risers, and riser locators shall comply with the General Statutes, this Section, and Approval conditions. If the approved products or materials are found to be in non-compliance, the Operation Permit shall not be issued or shall be denied. The State shall suspend or revoke the product approval upon a finding that the information submitted is falsified, the product has been subsequently altered, or subsequent experience with the product results in altered conclusions about its design or performance. Suspension or revocation of the product approval shall not affect systems previously installed pursuant to the approval.

*History Note: Authority G.S. 130A-335 (e)(f)1[2nd];  
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