SECTION .1400 – APPROVAL OF TANKS, RISERS, EFFLUENT FILTERS, AND PIPE PENETRATION BOOTS

15A NCAC 18E .1401 PLANS FOR PREFABRICATED TANKS

(a) All tanks proposed for use in a wastewater system described in this Subchapter shall be approved by the Department. Tanks shall be approved as follows:

(1) The tank design shall be approved based on the plans and specifications submitted in accordance with Subparagraphs (c)(1) through (c)(8) of this Rule. After the tank design has been approved, a temporary identification number shall be assigned for tracking purposes.

(2) The tank shall pass a structural load test as described in Subparagraph (c)(9) of this Rule. The test shall be performed and certified by a third-party. The test shall be observed in person by the Department, LHD, PE, or a third-party testing organization. If the tank passes the structural load test, then the tank shall be assigned a permanent identification number. Tanks shall not be sold for use in a wastewater system without a permanent identification number.

(3) The structural design verification shall be required for new tanks, modifications to tank design, and when tank forms are sold to a different tank manufacturer.

(4) Pump tanks may be tested and approved with a baffle wall, without a baffle wall, or with a partial baffle wall. The most limiting design produced by the manufacturer shall be tested.

(b) The tank manufacturer shall submit three copies of the plans and specifications for the initial design of each tank to the Department for approval.

(c) Plans and specifications for tanks with a total liquid capacity less than or equal to 4,000 gallons shall include the following:

(1) all tank dimensions in inches, including:
  (A) top, bottom, and sidewall thickness and variations;
  (B) minimum and maximum dimensions on tanks with tapered or ribbed walls;
  (C) baffle wall location and minimum and maximum thickness and variations;
  (D) location and dimension of all openings in baffle wall for gas and liquid movement; and
  (E) dimensions of all compartments;

(2) material type and strength, including reinforcement material and location, as applicable, specified by the manufacturer;

(3) method for fastening the baffle wall to the tank interior;

(4) liquid depth and operating capacity in gallons;

(5) pipe penetration boot locations and pipe penetration boots approved in accordance with Rule .1404 of this Section;

(6) methods and material for sealing sections and forming watertight joints in tanks with multiple sections;

(7) drawings showing access openings, tank lids, access manhole risers, and other proposed appurtenances to the tank;

(8) tank manufacturer and PE requirements for installation, including bedding, additional sealing methods, and leak testing procedures; and

(9) documentation of proof of design. The tank shall withstand a minimum uniform live load of 150 pounds per square foot in addition to the dead weight of the material and all geostatic and hydrostatic loads to which an underground tank is normally subjected, such as active soil pressure on tank walls and the uplifting force of groundwater. The documentation shall be one of the following:
  (A) a vacuum test of 4.24 inches of mercury held for five minutes meeting the following criteria:
    (i) no loss in vacuum greater than two-fifths of an inch of mercury during the test;
    (ii) no deformation or deflection greater than two percent along any dimension unless shown by measurement or calculation to result in a reduction in volume no greater than two percent;
    (iii) no distortion of the access openings occurs during the testing that prevents removal and replacement of the access opening lids at the conclusion of the test; and
    (iv) for tanks constructed with integral risers, no distortion of the riser during the testing and the riser lid can be removed and replaced at the conclusion of the test;
  (B) calculations from a PE that the tank can withstand the loading requirements of this Subparagraph and the performance requirements of Part (A) of this Subparagraph shall be met; or
  (C) the tank shall be either IAPMO/ANSI Z1000 or CSA B66 certified and the tank manufacturer enrolled in a third-party quality assurance and quality control program, which includes material testing and unannounced annual manufacturing facility audits.

(d) Plans and specifications for tanks with a total liquid capacity greater than 4,000 gallons and all tanks designed for traffic loads shall be designed by a PE in accordance with ASTM C890. Plans shall show the design, including all the information listed in Paragraph (c) of this Rule and engineering calculations showing the minimum and maximum soil burial depth, water table, and traffic load the tank is designed to support.

(e) Plans for tanks not proposed for general use and issued an identification number under this Section shall meet the minimum requirements of this Section and shall be approved by the Department.

(f) The Department or LHD may inspect approved tanks at the place of manufacture, the inventoried sites of the distributors, or at the installation of the tank in a wastewater system for compliance with the approved plans and specifications.

(g) Tanks found to be out of compliance shall be brought back into compliance by the tank manufacturer or the installer as directed by the Department or LHD. Tanks that are not or cannot be brought into compliance shall not be used in a wastewater system and the imprints identified in Rule .1402(d)(15) or (e)(8) of this Section shall be permanently marked over by the authorized agent.

History Note: *Authority G.S. 130A-335(e), (f), and (f1).*

15A NCAC 18E .1402 TANK DESIGN AND CONSTRUCTION

(a) Tanks shall be watertight, structurally sound, and not subject to corrosion or decay.

(b) Septic tanks and grease tanks shall have effluent filters and access devices approved in accordance with Rule .1404 of this Section. An effluent filter and support case shall be installed level in the outlet end of the septic tank or grease tank and shall meet the following criteria:

(1) solvent welded to a minimum of three-inch PVC Schedule 40 outlet pipe;
(2) be installed in accordance with filter manufacturer's specifications and effluent filter approval; and
(3) be accessible and removable without entering the septic tank or grease tank.

(c) Septic tanks installed where the access openings on the top of the tank are deeper than six inches below finished grade shall have an access riser over each compartment with a cover that extends to within six inches of the finished grade. The opening of the access riser shall be large enough to accommodate the removal of the septic tank lid. When the top of the septic tank or access riser is below the finished grade, the location of the tank shall be visible at finished grade. When access risers are used they shall be installed in accordance with the Rules of this Subchapter, the manufacturer's specifications, and the Department's approval.

(d) Septic tanks shall meet the following minimum design standards:

(1) a minimum liquid depth of 36 inches;
(2) a minimum of nine inches freeboard, measured as the air space between the top of the liquid and the bottom of the tank top. Venting of the tank shall be provided to prevent the buildup of gases;
(3) the approved septic tank capacity shall be determined as the liquid volume below the outlet invert to the bottom of the tank;
(4) the length of the tank shall be a minimum of twice as long as the width, as measured by the longest axis and widest axis based on the internal tank dimensions;
(5) 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;
(6) outlet openings shall have a cast or manufactured penetration point and include a watertight, sealed, non-corrodible, and flexible connective sleeve. A flexible connective sleeve shall be able to bend without breaking. The connective sleeve shall meet ASTM C1644 for precast concrete tanks or ASTM C1644, C923, or C564 for thermoplastic or glass-fiber-reinforced polyester tanks and be approved by the Department if it meets the requirements of this Subparagraph and Rule .1404 of this Section;
(7) inlet penetrations shall be greater than or equal to four inches in diameter and outlet penetrations shall be greater than or equal to three inches in diameter;
(8) there shall be no openings below the septic tank operating liquid level;
(9) the outlet shall be through an effluent filter approved in accordance with Rule .1404 of this Section, and secured in place in an effluent filter support case. The effluent filter case inlet shall extend down to between 25 and 50 percent of the liquid depth measured from the top of the liquid level. Other methods of supporting the effluent filter case and for making pipe penetrations shall be approved by the Department on a case-by-case basis upon a showing that the performance is identical to those designed in accordance with this Rule;
(10) the invert of the outlet shall be a minimum of two inches lower in elevation than the invert of the inlet;
(11) all septic tanks shall be designed with a partition so that the tank contains two compartments. The following conditions shall be met:
    (A) the partition shall be located at a point not less than two-thirds or more than three-fourths the length of the tank from the inlet end;
    (B) the partition shall be designed, manufactured, installed, and maintained to remain in position when subjected to a liquid capacity in one compartment that corresponds with the lowermost elevation of the water passage slot or holes;
    (C) the partition shall be designed to create a gas passage, not less than the area of the inlet pipe, and the passage shall not extend lower than seven inches from the bottom side of the tank top;
    (D) the top and bottom sections of the partition shall be designed to create a water passage slot four inches high for the full interior width of the tank, or a minimum of two four- or five-inch openings, or one four- or five-inch opening per 30 horizontal linear inches of baffle wall, whichever is greater, may be designed into the partition instead of the four-inch slot;
    (E) the partition shall be designed, manufactured, and installed to create an average opening not greater than one-half inch between the partition and the tank wall below the liquid level, with a tolerance of one-half inch;
    (F) the entire liquid passage in the partition wall shall be located between 25 and 50 percent of the liquid depth of the tank, as measured from the top of the liquid level; and

(G) other methods for designing the partition shall be approved by the Department on a case-by-case basis upon a showing that the performance is identical to those designed in accordance with this Rule;

(12) access openings shall be provided in the top of the tank, located over each compartment, and have a minimum opening of 15 inches by 15 inches or 17 inches in diameter. The opening shall allow for maintenance and removal of internal devices of the septic tank;

(13) access risers and covers shall be designed and manufactured to prevent surface water infiltration;

(14) tank lids and riser covers shall be locked, secured with fasteners, or weigh a minimum of 40 pounds, but no more than 80 pounds; and

(15) all septic tanks shall bear an imprint or embossment identifying the manufacturer, the septic tank serial number assigned to the manufacturer's plans and specifications approved by the Department, and the liquid or working capacity of the tanks. The imprint or embossment shall be located to the right of the blockout made for the outlet pipe on the top or end of outlet end of the tank.

(e) Pump tanks shall meet the design requirements of Paragraph (d) of this Rule with the following modifications:

(1) a watertight access riser with removable cover shall be located over the pump. The access riser shall extend to a minimum of six inches above finished grade and shall be designed and maintained to prevent surface water infiltration;

(2) the access opening over the pump shall have a minimum opening of 24 inches in diameter or equidimensional opening;

(3) when two or more pumps are required in accordance with Rule .1101(b) of this Subchapter the access openings shall be sized to allow for pump removal, operation, and maintenance;

(4) tanks may be designed with a single compartment. If a partition is provided, the partition shall be designed to contain a minimum of two four-inch diameter circular openings, or openings with an equivalent area, located no more than 12 inches above the tank bottom;

(5) there shall be no requirement as to tank length, width, or shape, provided the tank satisfies all other requirements of the rules of this Section;

(6) 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;

(7) tanks shall be vented if located more than 50 feet from the facility, and accessible for routine maintenance;

(8) all pump tanks shall bear an imprint or embossment identifying the manufacturer, the pump tank serial number assigned to the manufacturer's plans and specifications by the Department, and the liquid or working capacity of the tank. The imprint or embossment shall be located to the left of the blockout made for the outlet pipe on the top or end of outlet end of the tank; and

(9) the pump tank working capacity shall be the entire internal tank volume.

(f) Grease tanks shall be septic tanks approved in accordance with Paragraph (d) of this Rule with the following modifications:

(1) the liquid passage between chambers shall be located between 40 and 60 percent of the operating liquid depth measured from the top of the liquid level. The liquid passage between chambers may be made using a sanitary tee extending down between 40 and 60 percent of the liquid depth measured from the top of the liquid level;

(2) when sanitary tees are used as the liquid passage through an interior compartment partition, an access opening and riser to grade over the tees shall be provided for servicing and routine maintenance;

(3) when two or more tanks are used in series, a sanitary tee shall be provided in the outlet end of each interconnected tank extending down between 40 and 60 percent of the liquid depth;

(4) the final chamber shall contain an effluent filter and support case extending down between 40 and 60 percent of the liquid depth. The effluent filter shall be approved by the Department for use in grease tanks. The grease rated effluent filter shall be sized for the DDF and have openings of 1/32-inch or less; and

(5) access risers shall extend to finished grade and be capped with cast iron manhole rings and covers. Lockable aluminum hatches may be substituted for cast iron manhole rings and covers in non-traffic areas. Aluminum hatches or manhole rings and covers shall be designed and maintained to prevent surface water infiltration. Locks shall be the responsibility of the person owning or controlling the system.

(g) Siphon tanks shall meet the design requirements of Paragraph (e) of this Rule and shall:

(1) be designed in accordance with the construction requirements of this Rule and Rule .0804 of this Subchapter;

(2) provide three inches of freeboard;

(3) have the invert of the inlet pipe three inches above the siphon trip level; and

(4) have a watertight access opening over each siphon with an opening of 24 inches, extending to finished grade, and designed to prevent surface water inflow.

History Note: *Authority G.S. 130A-335(e), (f), and (f1); 130A-335.1.*

15A NCAC 18E .1403 TANK MATERIAL REQUIREMENTS

(a) Tanks approved in accordance with this Section shall be constructed of materials capable of resisting corrosion from sewage and sewage gases, structurally sound, and watertight.

(b) Reinforced precast concrete tanks shall meet the following minimum material and construction requirements:

(1) the ends and sides of the tank shall have a minimum thickness of two and one-half inches. The top and bottom of the tanks shall be a minimum of three inches thick;

(2) the top, bottom, end and sides of 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. Reinforcement shall be placed to maximize the structural integrity of the tank;
(3) alternative reinforcement designs may be used when they perform in a manner equal to or more effective than the reinforcement design described in Subparagraph (2) of this Paragraph;
(4) when the concrete tank, tank lid, riser, or riser cover are subjected to vehicular traffic, the tank shall be designed by a PE to handle the traffic load in accordance with ASTM C890;
(5) any tank installed deeper than three feet shall be designed by a PE for the proposed tank burial depth. The tank design shall be submitted to the Department for review. The design shall be approved when documentation is provided to show that the proposed tank design can withstand all active and passive loads on the tank, including the additional soil weight from a deeper burial depth.
(6) the concrete shall achieve a minimum 28-day compressive strength of 4,000 psi. The concrete shall meet a compressive strength of 3,500 psi prior to removal of the tank from the place of manufacture. It shall be the responsibility of the manufacturer to certify that the tank meets this condition;
(7) tanks manufactured in multiple sections shall be joined and sealed at the joint by using butyl rubber or other pliable sealant meeting ASTM C990 or other material that has been approved by the Department when documentation has been provided to show that the material meets all performance requirements of ASTM C990. Documentation shall also be provided to the Department to show that the material is waterproof and corrosion resistant; and
(8) tank lids and riser covers shall have a durable handle made of corrosion-resistant materials and capable of pull capacity sufficient for the weight of the lid or cover.

(c) Thermoplastic tank materials shall conform with IAPMO/ANSI Z1000 or CSA B66 requirements.
(d) Glass-fiber-reinforced polyester tanks shall meet the following requirements:
(1) top, bottom, ends, and sides of the tank shall have a minimum thickness of one-fifth inches. The baffle wall shall be a minimum of 3/16-inches thick;
(2) material and laminate requirements specified in IAPMO/ANSI Z1000 or CSA B66 for glass-fiber-reinforced polyester tanks; and
(3) enrolled in a third-party quality assurance and quality control program, which include material testing and unannounced annual audits.

(e) Cast or manufactured in place tanks shall be designed by a PE, if required by G.S. 89C, and approved by the Department when the tank design, construction, and materials meet the criteria set forth in this Rule and Rule .1402 of this Section.

History Note: *Authority G.S. 130A-335(e), (f), and (f1).*

15A NCAC 18E .1404 PLANS AND SPECIFICATIONS FOR RISERS, EFFLUENT FILTERS, AND PIPE PENETRATION BOOTS

(a) All risers, effluent filters, and pipe penetration boots proposed for use in a wastewater system shall be approved by the Department prior to being offered for sale or use in North Carolina.
(b) Three copies of the plans and specifications for the initial design of each riser, effluent filter, or pipe penetration boot shall be submitted to the Department. Plans for risers, effluent filters, and pipe penetration boots shall be approved by the Department and an approval letter issued when the design is found to comply with this Section. All changes or modifications to risers, effluent filters, or pipe penetration boots shall be approved by the Department when the changes or modifications comply with the requirements of this Rule.
(c) Risers and riser lids shall be able to withstand a minimum uniform live loading of 300 pounds per square foot or a minimum 1,500 pound load applied in a 10 inch by 10 inch area centered on the lid, in addition to all loads to which a riser is normally subjected, such as dead weight of the material and soil cover and active soil pressure on riser walls.
(d) Riser plans and specifications submitted to the Department for review and approval shall show the design of the riser and include the following information:
(1) manufacturer's name, mailing address, phone and fax numbers, email address, and name of manufacturer's point of contact;
(2) physical dimensions of the riser and riser cover, including wall thickness, internal diameter, proposed casting or installation details and methods, and pipe penetrations;
(3) material type and strength, including reinforcement material and location as required;
(4) documentation from a third-party showing that the riser meets the load requirements specified in Paragraph (c) of this Rule;
(5) plans for septic tank risers of a secondary lid, concrete plug, or other safety device that shall be provided inside the riser for security and to prevent accidental entry;
(6) plans for pump tank risers of primary and secondary safety mechanisms that shall be provided with the riser. The primary safety mechanism shall be a locking riser lid, ring and lock, or other riser lid locking or tamper-resistant mechanism. The secondary safety mechanism shall be a secondary lid, concrete plug, or other safety device to be provided inside the pump tank riser; and

(7) specifications for application, installation, operation, and maintenance for both new and retrofit applications for single and multiple riser sections.

(e) Effluent filter plans and specifications submitted to the Department for review and approval shall show the design of the effluent filter and include the following information:

(1) manufacturer's name, address, phone and fax numbers, and contact name;
(2) documentation and a written statement from the manufacturer that the effluent filter is designed, constructed, and performs in compliance with G.S. 130A-335.1(a);
(3) capacity and wastewater strength for all models of proposed filters to be approved; and
(4) specifications for application, installation, operation, and maintenance.

(f) Pipe penetration boot plans and specifications submitted to the Department for review and approval shall show the design of the pipe penetration boot and include the following information:

(1) manufacturer's name, address, phone and fax numbers, and contact name;
(2) design specifications and materials used in the manufacture of pipe penetration boot components;
(3) applicable testing results from third-party verification showing pull and flexibility testing;
(4) documentation of a watertight seal around the piping and any component or device needed to ensure the seal, such as non-corrodible adjustable bands;
(5) documentation that the pipe penetration boot meets the requirements of ASTM C1644 for precast concrete tanks or ASTM C1644, C923, or C564 for thermoplastic or glass-fiber-reinforced polyester tanks; and
(6) specifications for application, installation, operation, and maintenance of the pipe penetration boot.

(g) Plans for prefabricated risers, effluent filters, and pipe penetration boots, other than those approved for general use and issued an approval letter under this Rule, shall be considered for approval on a case-by-case basis. The riser, effluent filter, or pipe penetration boot shall be approved if it is determined that it meets the requirements of this Rule based on information provided by the manufacturer to the Department.

History Note: *Authority G.S. 130A-335(e), (f), and (f1); 130A-335.1.*

15A NCAC 18E .1405 RISERS, EFFLUENT FILTERS, AND PIPE PENETRATION BOOTS APPROVAL RENEWAL

(a) All riser, effluent filter, and pipe penetration boot approvals shall expire on December 31 of each year. Riser, effluent filter, and pipe penetration boot manufacturers who wish to continue product approval shall submit annually a proprietary product renewal form provided by the Department no later than November 30 of each year.

(b) The approval renewal form shall include the following elements:

(1) manufacturer's name, mailing address, phone and fax numbers, email address, , and manufacturer's point of contact;
(2) model number(s) approved; and
(3) a notarized statement that the product has not changed from the previous year without prior approval from the Department.

(c) The Department shall notify the manufacturer of the pending riser, effluent filter, and pipe penetration boot Approval expiration in writing no later than September 30 of each year. The notification shall include information on how to request riser, effluent filter, and pipe penetration boot renewal.

(d) The riser, effluent filter, and pipe penetration boot approval shall be deemed renewed upon receipt of a renewal form that contains all of the elements set out in Paragraph (b) of this Rule.

History Note: *Authority G.S. 130A-335(e) and (f); 130A-343.*

15A NCAC 18E .1406 MODIFICATION, SUSPENSION, AND REVOCATION OF APPROVALS

The Department shall modify, suspend, or revoke the approval for tanks, risers, effluent filters, or pipe penetration boots upon a finding that:

(1) the approval is determined to be based on false, incomplete, or misleading information;
(2) the product has been altered;
(3) the product fails to perform in compliance with performance standards established for the product in accordance with the rules of this Section; or
(4) the product fails to meet conditions of its approval or comply with G.S. 130A, Article 11, Rule .1405 of this Section, this Subchapter, or conditions of the approval.

History Note: *Authority G.S. 130A-335(e), (f), and (f1).*

SECTION .1500 – APPROVAL AND USE OF RESIDENTIAL WASTEWATER TREATMENT SYSTEMS

15A NCAC 18E .1501 GENERAL

(a) RWTS that comply with NSF International Standard 40 for Class I residential wastewater treatment systems shall be designed, constructed, and installed in accordance with this Section to serve facilities with a DDF less than or equal to 1,500 gpd.

(b) RWTS shall only be used with DSE.