

MUNICIPALITY OF ANCHORAGE



Development Services Department
On-Site Water & Wastewater Section

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STANDARDS AND SPECIFICATIONS FOR COMPONENT PARTS AND MATERIALS

USED IN CONSTRUCTION OF
ON-SITE WASTEWATER DISPOSAL SYSTEMS

April 2020

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Section 1 **Purpose**

- 1.1 This document is intended to provide basic standards and specifications for component parts and materials used for the construction of on-site wastewater disposal systems serving up to two dwelling units within the Municipality of Anchorage.

All references to "On-site" shall be interpreted to mean the Municipality of Anchorage, Development Services Department, On-Site Water and Wastewater Section.

This document is not intended to limit or hinder the use of new or innovative ideas, procedures, or materials. However, these standards and specifications will be used as a basis for review and evaluation of new products or materials.

Section 2 **Septic Tanks**

- 2.1 Construction plans and/or shop drawings for all septic tanks shall be submitted to On-site for approval. Plans shall show all dimensions, design details, and any other pertinent data. All septic tank plans shall be accompanied by structural calculations sealed by a structural or civil engineer registered in the State of Alaska.
- 2.2 All septic tanks shall be structurally designed to withstand anticipated earth or other loads. Manufacturer's specifications for depth of bury and backfill type and compaction shall conform to the conditions specified by the structural calculations for the tank. All septic tank manhole covers shall be capable of withstanding the same anticipated load as the tank on which it is installed.
- 2.3 Septic tanks shall have a minimum of two compartments. The inlet compartment of any septic tank shall be not less than two-thirds of the total capacity of the tank, nor less than 667 gallons liquid capacity, and shall be at least four and one-half feet in width and five feet in length. Liquid depth shall not be less than three feet nor more than six feet. The secondary compartment of any septic tank shall have a minimum capacity of 333 gallons and a maximum capacity of one-third of the total capacity of the tank. In septic tanks having over 1500 gallons capacity, the secondary compartment must be at least five feet in length.
- 2.4 Access to each septic tank compartment shall be provided by a manhole with a minimum diameter of twenty inches, or by an equivalent removable cover. The access manhole located over the first compartment shall have a minimum twenty-inch diameter manway riser that extends to finished grade. Access to the second compartment shall be provided by a minimum four-inch pipe that extends to finished grade. Septic tank manholes must be watertight to prevent infiltration of ground water.
- 2.5 The inlet and outlet pipe openings shall be a minimum of four inches in diameter. The vertical leg of round inlet and outlet fittings shall be a minimum of four inches in diameter. A baffle type fitting shall have the equivalent cross-sectional area of the connecting sewer pipe and a

minimum of a four-inch horizontal dimension when measured at the inlet and outlet pipe inverts.

- 2.6 The inlet and outlet pipe or baffle shall extend four inches above and at least twelve inches below the water surface. The invert of the inlet pipe shall be at a level not less than two inches above the invert of the outlet pipe.
- 2.7 Inlet and outlet pipe fittings or baffles and compartment partitions shall have a free vent area equal to the required cross-sectional area of the sewer line discharging into the tank to provide free ventilation above the water surface from the disposal field through the septic tank, house sewer and stack to the outside air.
- 2.8 The side walls of the septic tank shall extend at least nine inches above the liquid surface. The cover of the septic tank shall be at least two inches above the highest vent openings.
- 2.9 Partitions or baffles between compartments shall be of solid durable material and shall extend at least four inches above the liquid level. An inverted fitting equivalent in size to the tank inlet but in no case less than four inches in size, shall be installed in the inlet compartment side of the baffle with the bottom of the fitting placed midway in the depth of the liquid, unless approved otherwise.
- 2.10 Labeling
(a) The following information shall be provided on the outside of each septic tank
1. Maximum burial depth for which that particular tank was constructed.
 2. The working capacity in gallons.
 3. "In" and "out" on the appropriate ends.
- (b) All septic tanks shall be numbered and logged for the purposes of inventory with a brief description of the tank assigned to that particular number.
- 2.11 Septic tanks shall be constructed of solid durable materials, not subject to corrosion or decay and shall be watertight.

2.12 Materials

(a) Concrete Septic Tanks

The walls, bottom and top of reinforced-concrete tanks shall be designed across the shortest dimension using one-way slab analysis. Stresses in each face of monolithically-constructed tanks may be determined by analyzing the tank cross-section as a continuous fixed frame.

The walls and bottom slab shall be poured monolithically.

Reinforcing steel shall be ASTM A-615 Grade 60, $f_y = 60,000$ psi. Details and placement shall be in accordance with ACI 315 and ACI 318.

Concrete shall be ready-mix with cement conforming to ASTM C150, Type II. It shall have a cement content of not less than six sacks per cubic yard

and a maximum aggregate size of 3/4 inch. Water/cement ratio shall be kept low (0.35+/-), and concrete shall achieve a minimum compressive strength of 4,000 psi in 28 days.

Fiber additives may be used to enhance water tightness by controlling concrete shrinkage.

Tank molds frequently have attached vibrators to ensure adequate flow of concrete down the walls and across the bottom. It is important to avoid excess vibration as this can cause the aggregate to segregate.

Form release used on tank molds shall be Nox-Crete or approved equal. Diesel or other petroleum products are not acceptable.

Tanks shall be protected by applying a heavy cement-base waterproof coating (Thoroseal or Tana Seal or approved equal) on both inside and outside surfaces, in compliance with Council of American Building Officials (CABO) report #NRB-168; 6181.

Tanks shall not be moved from the manufacturing site to the job site until the tank has cured for seven days or has reached two-thirds of the design strength.

Test cylinders shall be taken and tested until the minimum compression strength has been obtained, and then tested periodically to ensure quality control.

Incorporate the following test procedure to ensure water tightness:

1. Fill the tank to its brim with water and let it stand for 24 hours.
2. Measure the water loss. If there is no water loss during these first 24 hours the test is acceptable. If the water level dropped, some water absorption may have occurred. Refill the tank and determine the exfiltration by measuring the water loss over the next two hours. There shall be no water loss during this time. Any water loss is cause for rejection.
3. Test the seal between the manway riser(s) and the tank top for water tightness by filling the riser with water to a level four inches above the top brim of the tank. Check for leaks by following steps 1 and 2 above.

(b) Steel Septic Tanks

Steel septic tanks shall be protected from corrosion on both the interior and exterior surfaces by using a polyurethane, epoxy, or equivalent coating approved by the department. Coating applications shall follow the manufacturers' recommended procedures and shall adhere to an approved quality control program.

The minimum wall thickness of the 1000-gallon through 1500-gallon septic tanks shall be No. 12 U.S. gauge (0.109 in.) steel. The minimum wall thickness of the 1750-gallon and 2000-gallon septic tanks shall be No. 10 U.S. gauge (0.135 in.) steel.

The space between the baffle plate and the tank sidewall shall not exceed one-eighth inch, and have two-inch welds spaced a maximum of ten inches apart.

(c) **Alternate Materials**

Septic tanks constructed of alternate materials may be approved by the Department.

Wooden septic tanks are prohibited.

Section 3 **Lift Stations**

- 3.1 Plans for lift stations shall be submitted to the Department for approval. Such plans shall show all dimensions, reinforcing design details, maximum burial depth, and other pertinent data as may be required. In addition to the following requirements, lift station tanks shall meet the requirements for septic tanks in Section 2.
- 3.2 Lift stations shall be constructed of solid durable materials, not subject to corrosion or decay and shall be watertight.
- 3.3 Access to lift station pumps, float switches, and attendant hardware shall be provided by a minimum of one manhole/riser with a minimum diameter of twenty-four inches.
- 3.4 Lift stations shall be equipped with a high-water alarm that is both audible and visual within the dwelling. The audible alarm shall be panel mounted with a minimum of 80 dBA sound pressure at 50 cm, continuous sound, with push-to-silence feature, or equivalent. The visual alarm shall be seven-eighths inch (7/8") diameter, oil tight, or equivalent. The high-water alarm float switch shall be set to provide a minimum of 150 gallons of reserve capacity after the alarm has sounded. The alarm circuit shall be separate from the pump circuit so that if the pump's internal overload switch or current-limiting circuit breaker is tripped, the alarm system remains functional. All electrical components shall be UL listed.
- 3.5 Lift station pumps shall be approved by the department on a case-by-case basis. Pump manufacturer's pump curve and catalog specifications shall be submitted to the department for review. Pumps shall be UL listed as an effluent pump.

Section 4 **Holding Tanks**

- 4.1 Holding tanks shall meet the requirements for septic tanks in Section 2, with the following exceptions:
 - (a) Holding tanks shall have a single compartment with a watertight manhole to provide access to the interior of the tank. The manhole shall be a minimum diameter of twenty inches.

- (b) A six-inch diameter tank standpipe with an airtight cap shall be provided on all holding tanks for pumping access. The standpipe shall extend at least twelve inches above finished grade.
- (c) The minimum wall thickness of 2000-gallon through 3500-gallon steel holding tanks shall be three-sixteenths inch (3/16") plate steel.
- (d) A holding tank shall be equipped with a high-water alarm, which registers both visually and audibly within the dwelling. The audible alarm shall be panel mounted with a minimum of 80 dBA sound pressure at 50 cm, pulsating sound, or equivalent. The high-water alarm float switch must be positioned to provide at least 150 gallons per bedroom of additional storage after the alarm has been activated.

Section 5 Pipe and Fittings

- 5.1 Piping and fittings shall be installed in accordance with the UPC, the applicable ASTM standard, and the manufacturer's requirements.
- 5.2 The following pipe materials are approved for use in septic system installations in the MOA. Some pipe materials may be allowed for use as perforated disposal field pipe or solid collector pipe but not as standpipe/cleanout pipe:

Pipe Type or ASTM Designation	Approved as Perforated Disposal Field Pipe or Solid Collector Pipe	Approved as Cleanout or Standpipe
Cast Iron**	Yes	Yes
ASTM D3034 (PVC)	Yes	Yes
ASTM F789 (PVC)	Yes	Yes
ASTM D1785 (PVC)**	Yes	Yes
ASTM D2665 (PVC)**	Yes	Yes
ASTM D2751 (ABS)	Yes	No*
ASTM D2661 (ABS)**	Yes	Yes
ASTM F628 (ABS)**	Yes	Yes
ASTM F810 (HDPE)	Yes	No

* D2751 may be approved as standpipe material if the minimum wall thickness is 0.18 inches (4.57 mm), SDR 23.5.
 ** Underground DWV pipe materials listed in UPC Table 701.1 (2012).

- 5.3 All nominal pipe lengths shall be labeled with an ASTM designation number.
- 5.4 Clean-outs shall be long-sweep.

Section 6 Insulation

- 6.1 Insulation used in the construction of septic systems for the purposes of freeze protection of disposal fields and septic system components shall be minimum

Type IV extruded or expanded polystyrene, 25 psi compressive strength (Dow Chemical Company Styrofoam XPS, Insulfoam R-Tech IV, or approved equal). One inch of insulation may be substituted for one foot of minimum required buried depth. Extending the board insulation horizontally (approximately twelve inches for each one inch of required insulation thickness) beyond the disposal field, septic tank, other system components, or the center line of piping is recommended.

Section 7 Imported Granular Material

7.1 Sewer gravel (drainrock)

- 7.1.1 Coarse, washed aggregate measuring 0.5 to 2.0 inches in diameter.
- 7.1.2 No more than 1% passing the #200 sieve screen (0.074 mm diameter opening).

7.2 Filter Material (Sand or Recycled Glass)

7.2.1 Filter material for disposal fields shall have a sieve analysis indicating the product meets the following gradation requirements:

<u>Sieve Designation</u>	<u>% Passing by Weight</u>
3/8"	100
#4	95 – 100
#100	0 – 4
Effective grain size (D ₁₀): #18 - #60 sieve	
Uniformity Coefficient (D ₆₀ /D ₁₀): less than 4	

D₁₀ - The maximum diameter of the smallest 10 percent by weight of filter material particles

D₆₀ - The maximum diameter of the smallest 60 percent by weight of the filter material particles.

7.2.2 Material consistency and quality control – The manufacturer shall obtain a sieve analysis as necessary to ensure consistency of each batch of filter sand. At a minimum, sieve analysis results shall be submitted to on-site annually.

7.3 Bedding Material - Tanks and lift stations shall be bedded in accordance with manufacturer requirements. Piping shall be bedded in accordance with the UPC and relevant standards.

Section 8 Filter Fabric

8.1 Filter fabric used as a silt barrier in the construction of absorption fields shall be a permeable geotextile approved for the application.