Septic Tank Standards

PSMA JAN. 2023

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water technologies

KNOWN FACTS- AGREE?

- Septic tanks provide the most passive, cost effective primary treatment in onsite systems;
- Septic tanks may be the single most important component of an onsite sewage system;
- Treatment provided by the septic tank component is important in ensuring the success of subsequent treatment and dispersal components of an onsite system

IF TANKS ARE SO IMPORTANT…

- Why are so many tanks not watertight?
- Why do regulations require watertightness without real enforcement?
- Why do we spend so much effort in designing a system, with little to no effort in assuring quality tank construction and watertightness?

COMMON TANK LEAKAGE CONCERNS

- Tank Mid-seam Seal

- Vertical Crack Leakage

COMMON TANK LEAKAGE CONCERNS

- Mastic for Tank Lid Seal

- Leakage from Lid Seam

COMMON TANK LEAKAGE CONCERNS

- Tank Riser Leakage

- Pipe Penetrations

COMMON TANK LEAKAGE CONCERNS

- Tank Deformation

- Grading/Surface Drainage

CAN WE AGREE?

THE SUCCESS OF AN ONSITE SYSTEM IS DIRECTLY DEPENDENT ON PROVIDING WATERTIGHT TANKS.


SCI
How It's Made

CONCRETE TANKS HAVE BEEN AROUND A LONG TIME. BUT IT'S NOT OLD TECHNOLOGY FALLEN TO THE WAYSIDE!

TECHNOLOGICAL ADVANCEMENTS AND INNOVATIONS IN MATERIALS AND PROCESSES CONTINUE TO IMPROVE MAKING CONCRETE STRONGER, MORE DURABLE, AND LESS PERMEABLE.

THE ADVANCEMENTS IN MATERIALS AND DESIGN GIVEN PLSTIC TANKS THEIR PLACE IN THE MARKET

WATERTIGHT TANKS CAN BE MADE WHEN PRODUCED IN ACCORDANCE WITH THE NPCA BMP MANUAL AND/OR THE ASTM 1227 STANDARD

HOW DOES AN INSTALLER OR INSPECTOR KNOW A GOOD TANK FROM A BAD TANK?

Plastic

OR

Concrete

WATER TIGHTNESS TESTING

Hydrostatic Testing

Does it hold water?

Vacuum Testing

Does it hold a vacuum?

Standards and Testing

PRECAST CONCRETE TANKS

ASTM STANDARD C1227

“STANDARD SPECIFICATION FOR PRECAST CONCRETE SEPTIC TANKS”

This specification covers design requirements, manufacturing practices, and performance requirements for monolithic or sectional precast concrete septic tanks.

Loudon County VA

Chapter 1066

- **1066.17 Septic tanks, holding tanks, pump tanks, treatment units and tanks for other onsite wastewater uses.**

(a) Depth.

The maximum cover over a tank containing wastewater shall not exceed 48 inches.

(b) Location.

Tanks shall not be placed in low areas or swales subject to drainage, channeling of rainfall, or ponding of water. Tanks shall be protected with controlled backfill when shrink-swell soil is present. If water table indications are observed or measured above penetrations or tank seams, a water table reduction system must be installed to lower the water table below the seam or penetration.

(c) Structural Soundness

Tanks shall be structurally sound as determined by an engineer design with appropriate safety factors, and watertight verified through appropriate testing and compliance monitored by the Loudoun County Health Department. All tanks shall be designed and certified by a professional engineer, licensed and qualified to perform structural design in the State of Virginia. The engineer shall contemplate all reasonably expected loading conditions, including burial depth, tank full to top of riser, an empty tank installed with water table at top of ground, vehicular traffic and any other reasonable expected loading conditions. The manufacturer shall certify that all tanks manufactured meet the engineer design. Tanks may only be installed in accordance with the design standards specified.

(d) Penetrations.

All tank lids shall be manufactured with risers pre-cast into the top of the tank. Risers shall terminate a maximum of six inches below finished grade. Manufacturers shall install watertight boots at all penetrations. Boots for all tanks must meet ASTM C-923. Boots for concrete tanks must meet ASTM C-923 and have a clamp assembly to resist pipe deformation.

(e) Tank Testing.

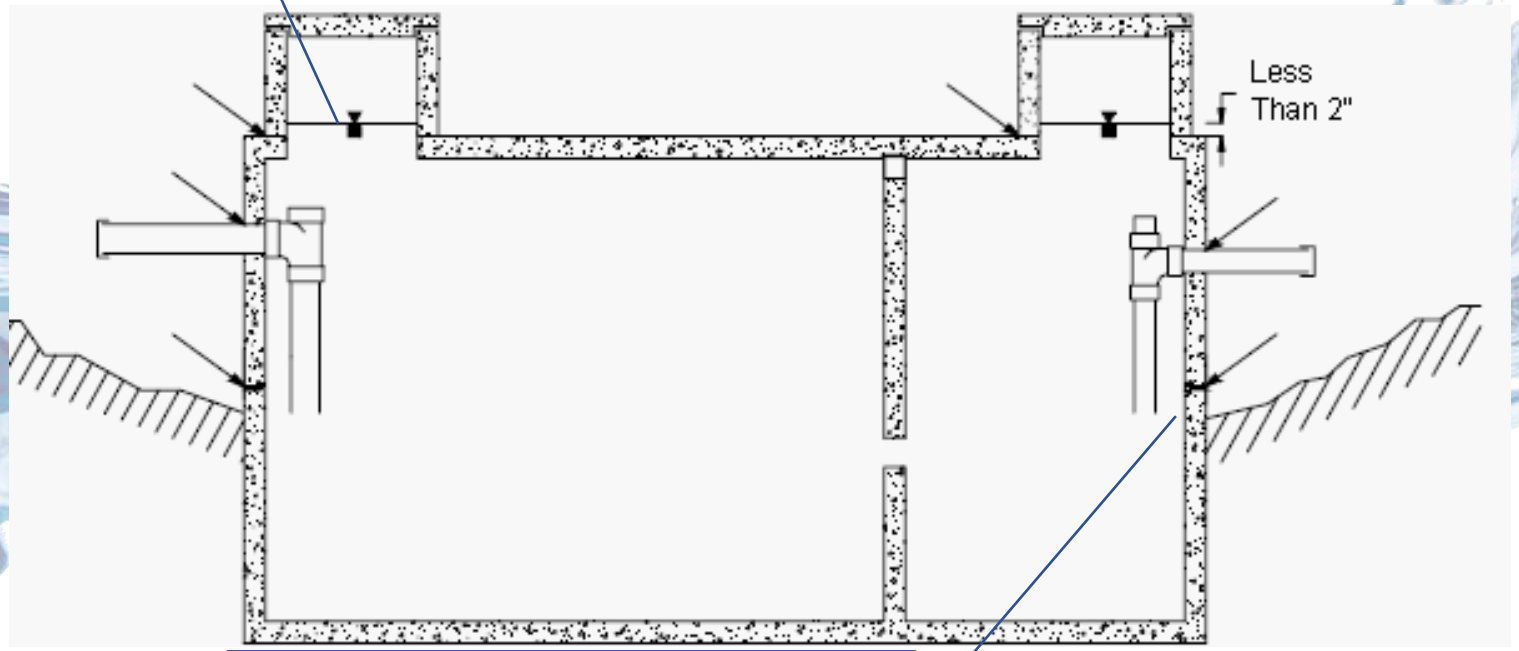
All tanks shall be watertight, including inlet and outlet pipe penetrations, and the riser assembly. The installer shall, on all watertight tanks, complete one of the following tests during, or in conjunction with a Loudoun County Health Department or other approved construction inspection. In high water table conditions, the Health Director is authorized to require a water tightness test of the entire treatment and conveyance system.

(1)Water test procedure.

A water test is to be performed by installing the tank, connecting inlet and outlet piping (with caps), installing risers as necessary, and filling with water two inches above the tank into the riser for 24 hours. The tank penetrations must be visible. The water level is to be marked in the riser. The tank is to be refilled to the mark and observed for one hour. If the level has not dropped the tank passes.

HYDROSTATIC TANK TESTING

WATER LEVEL DURING TEST



OBSERVE ALL COMMON POINTS OF LEAKAGE DURING TEST

(2) Vacuum test procedure.

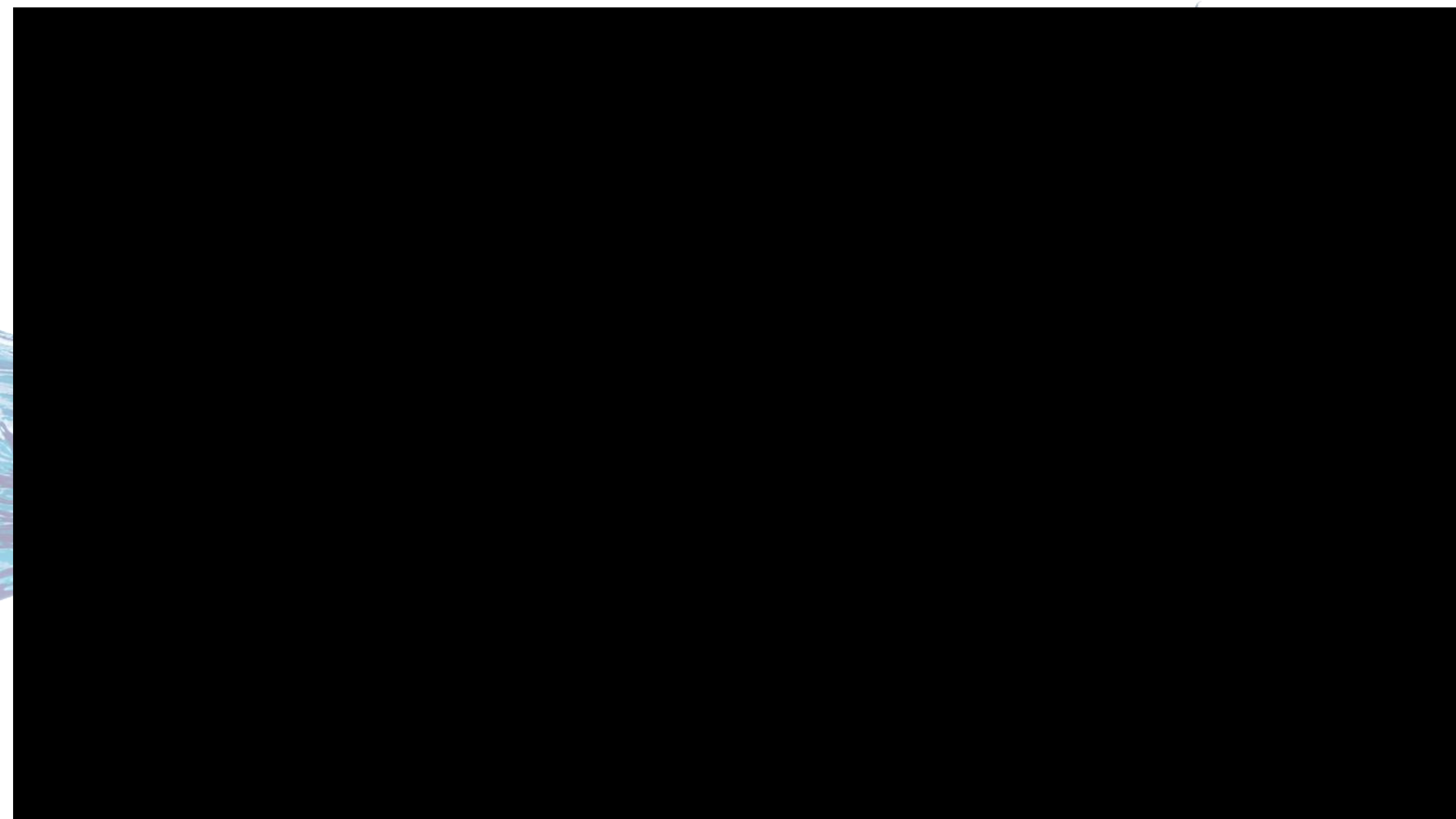
A vacuum test is performed by plugging inlet and outlet piping, installing risers, and using a vacuum pump to pull a negative pressure of four inches of mercury. The tank must hold this vacuum for five minutes with no more than a 10% variation in pressure.

If tanks fail either test, repairs must be completed, and the test repeated until satisfactory.

BEFORE DRAWING THE TEST LOAD VACUUM

AFTER REACHING THE TEST 4” Hg LOAD VACUUM

NOTICE THE DIFFERENCE IN THE BUTYL GASKET IN THE LID JOINT



CLOSING THOUGHT?

WHY DO WE SPEND SO MUCH EFFORT IN DESIGNING A SYSTEM, WITH LITTLE TO NO EFFORT IN ASSURING QUALITY TANK CONSTRUCTION, INSTALLATION, AND WATERTIGHTNESS?

Questions?

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