

Onsite Unit, Wastewater Section, Water Permits Division
Suite 400, The Atrium, 1200 N Street, PO Box 98922
Lincoln NE 68509-8922
Phone (402) 471-4285 Fax (402) 471-2909
NDEQ Web Site URL: <http://deg.ne.gov/>
Report a Problem: ndeqproblem@nebraska.gov
Onsite Program email: ndeq.onsite@nebraska.gov

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Onsite Wastewater Unit
Newsletter No. 42

Gravelless Chamber Inside Bottom Width

This information was previously discussed in the August 2015 Newsletter. To address inconsistent chamber width measurements on submitted registration forms, the NDEQ Onsite Wastewater Unit conferred with the gravelless chamber manufacturers to determine standard dimensions for each make and model of chamber. The Inside Bottom Width measurements in the table below are based on the manufacturers design drawings, and represent the average width of the bottom footprint of each chamber.

These chamber width values are to be used when calculating the effective trench width and the total soil absorption area for drainfields where no filter material is used. The use of incorrect chamber width values will result in registration forms being returned to the installer. Incorrectly sized soil absorption areas may require modifications to comply with Title 124, Chapter 14, Table 14.2 minimum square feet requirements.

Gravelless Chamber Make / Model		Inside Bottom Width <i>Inches (Feet)</i>	Effective Trench Width <i>Inches (Feet)</i>
Infiltrator	Quick4 Standard	27" (2.25')	40.5" (3.375')
	Quick4 High Capacity	29" (2.42')	43.5" (3.625')
	Quick4 Equalizer 36	19" (1.58')	28.5" (2.375')
	Quick4 Equalizer 24 HD	13" (1.08')	19.5" (1.625')
	Quick4 Equalizer 24 Low Profile	12" (1.00')	18" (1.00')
	Quick4 Plus (Std., HC, & LP)	29" (2.42')	43.5" (3.625')
	Quick4 Plus Equalizer 36 LP	19" (1.58')	28.5" (2.375')
	High Capacity H-20	29" (2.42')	43.5" (3.625')
ADS	Arc 18	13" (1.08')	19.5" (1.625')
	Arc 24	19" (1.58')	28.5" (2.375')
	Arc 36 (Std., HC & LP)	29" (2.42')	43.5" (3.625')
	BioDiffuser 11" Standard	27" (2.25')	40.5" (3.375')
	BioDiffuser 14" HC & 16" HC	29" (2.42')	43.5" (3.625')
	Bio 2	12" (1.00')	18" (1.00')
	Bio 3	19" (1.58')	28.5" (2.375')

Example: An installer digs a 36" or 3 foot wide trench, and installs 150 linear feet of gravelless chambers without filter material, using Quick4 Plus Standard chambers. 29" (inside bottom width from chart) X 1.5 = 43.5" (3.625 feet) of effective trench width. 3.625 feet X 150 feet = 543.75 square feet of total effective trench bottom area.

When filter material is used in the trench, the actual trench width is used to calculate the soil absorption area. Please refer to Title 124, Chapter 14, Sections 017 and 018 for more information.

Registrations

Title 124, Chapter 22, states the required information to register a septic system. Registrations submitted with missing information cannot be registered and will be returned. Please make sure **all** registration information is completed and the forms are signed with a completion date. If you have a GPS system, the latitude/longitude of the tank or end of drainfield is very helpful. All systems are plotted on a map so accurate information is very important.

Multiple Inlet/Outlet Connections at the Septic Tank

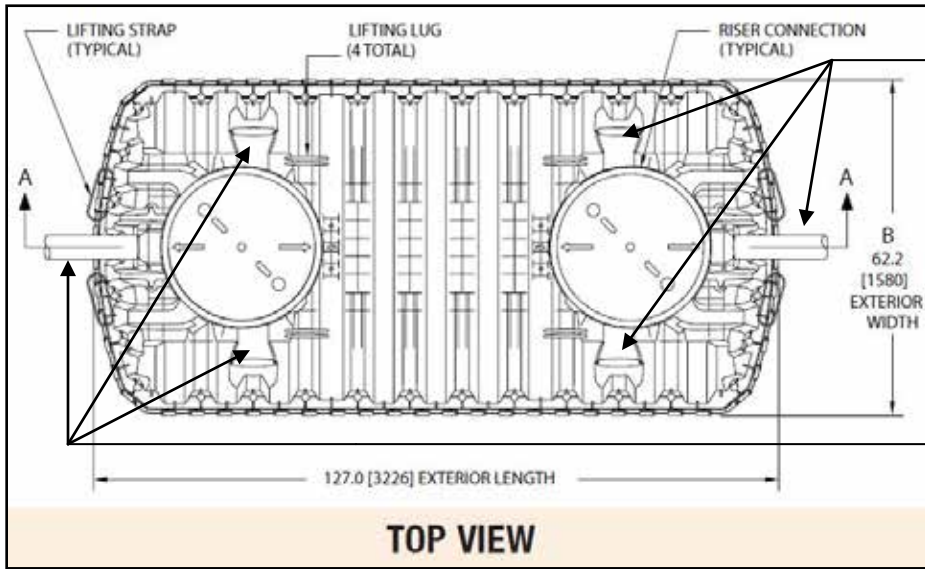
Recently, a certified installer raised a question about using two separate outlets from a septic tank, in lieu of using a single tank outlet with a distribution box or header pipe. After conferring with the tank manufacturers and reviewing construction standards for other states, NDEQ has determined that this is an acceptable alternative method of flow distribution into and out of the septic tank, with certain conditions:

1. The septic tank must be designed and manufactured with multiple inlets and/or outlets. No field modifications to the tanks are allowed in order to install additional inlets and/or outlets. This requirement is to ensure that the structural integrity and water tightness of the septic tank is not compromised.
2. The maximum number of individual inlets or outlets from a single septic tank is three (3). Each individual inlet and/or outlet must have its own baffle or sanitary tee on the inside of the tank. All inlet baffles or sanitary tees shall be constructed at the same operating elevations. All outlet baffles or sanitary tees shall be constructed at the same operating elevations. This requirement is to ensure that there is even flow distribution into and out of the tank from all multiple inlets and/or outlets.
3. An inspection pipe or access manhole shall be provided for each inlet and outlet. Multiple inlets may have access through a single access manhole. Multiple outlets may have access through a single access manhole. It is critical to have inspection and maintenance access to each inlet and outlet, to ensure that they are working properly. A plugged outlet will overload other areas of the soil absorption system.
4. Multiple inlets may be used for separate structures discharging into a single septic tank, as long as all other design and construction requirements of Title 124 are met. For Example: a dwelling with domestic wastewater and a shop building with domestic wastewater may both discharge via separate inlets into a single septic tank, as long as the septic tank is sized for the combined design flow.
5. Multiple outlets may be used in lieu of a distribution box or header pipe, or other approved external flow distribution device. Because the septic tank discharge must be equal from each outlet (see item #2 above), the soil absorption system for each outlet must be sized accordingly:
 - a. When the soil absorption areas for each individual septic tank outlet are NOT adjacent to each other, or DO NOT have the same soil percolation rate, the size of each soil absorption area shall be calculated based on the slowest percolation rate, and each area shall be equal in size.

Please refer to the septic tank design drawings on the following page for additional information. If you have any questions regarding the use of multiple inlets or outlets at a septic tank, please give the staff at the Onsite Wastewater Unit a call.

These septic tank drawings are from an Infiltrator Model IM-1060 septic tank. They are used for illustration purposes only, to demonstrate a tank with provisions for multiple inlets and outlets.

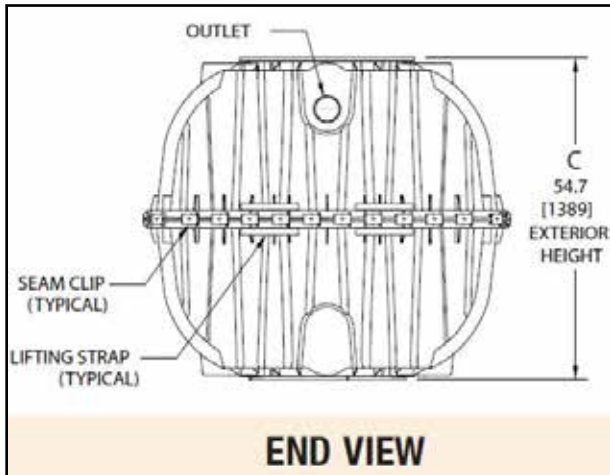
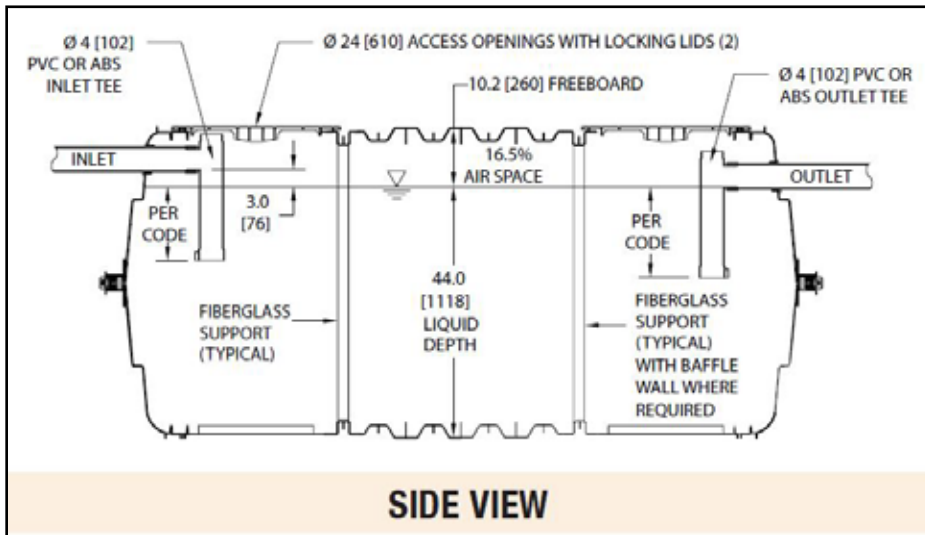
Septic Tanks with Multiple Inlets and Outlets



Outlet locations

Tank is designed and constructed with 3 inlet and 3 outlet locations. Each inlet is adjacent to a single access manhole, and each outlet is adjacent to a single access manhole.

Inlet locations



Title 124 Requirements – Soil Absorption Systems

Gravity Distribution Piping and Devices (Chapter 14, Section 013)

All installed onsite wastewater systems must have some type of distribution device that insures the equal delivery of the effluent to all parts of the soil absorption system.

- In areas with less than 3 percent slopes, gravity distribution can be accomplished with a distribution box, drop box or header pipe.
- In areas where the slopes are greater than 3 percent, gravity distribution must be through a drop box, or the soil absorption system must use a pressure distribution system.

Definitions:

Distribution box- a watertight box that receives effluent from a wastewater treatment component and distributes the flow by gravity to each individual section of a soil absorption system at a rate proportional to the bottom surface area of that section.

Drop box- means a watertight box that receives the discharge of effluent from a septic tank and provides serial or sequential distribution of effluent by gravity to each soil absorption system trench where such trenches are installed at progressively lower elevations.

Header Pipe-a pipe that is laid level with direct watertight connections to each drainfield line and the septic tank outlet pipe. The header pipe is encased in fill material and is a minimum of 4 inches in diameter. The header pipe must be spaced evenly on both sides of the junction of the leader pipe to the header with an equal number of distribution lines of the same length on each side

Percolation Testing (Chapter 6, Section 002)

A soil percolation test must be conducted for all septic system installations or modifications to drainfields. A minimum of 3 test holes will be dug to the depth of the planned installation and spaced evenly over the proposed absorption field site. Horizontal dimensions of the percolation test holes must be 4 to 12 inches in diameter. Highly variable soil conditions will require additional test holes.

Pre-saturation is required by filling the test hole to a minimum of 12 inches over the gravel, by supplying a surplus of water for at least 4 hours and preferably overnight. The 12 inch minimum depth of water must be maintained for the duration of the pre-saturation period. In coarse grained soils, if the test hole is twice filled with 12 inches of water, and completely seeps away in less than 10 minutes each time, no pre-saturation is required, and the percolation test can proceed according to Section 002.05C.

1. If water remains in the test hole after overnight saturation, adjust the water depth to a minimum of six inches over the gravel. From a fixed reference point, measure the drop in water level during an approximate 30 minute period. This measurement is used to calculate the final percolation rate. (002.05A)
2. If no water remains in the hole after overnight saturation, add clear water to a depth of six inches over the gravel. From a fixed referenced point, measure the drop in water level at approximate 30 minute intervals over a four hour period, refilling the hole to a depth of six inches as necessary after each 30 minute period. The drop which occurs during the final 30 minute period is used to calculate the percolation rate. (002.05B)
3. For coarse grained soils with fast permeability, if the first six inches of water seeps away in less than 10 minutes, the percolation tests may be done over six 10 minute intervals, instead of eight 30 minute intervals. The water drop that occurs during the final 10 minute period is used to calculate the percolation rate. (002.05C)

Other Odds and Ends for Onsite Wastewater Treatment Systems

Underground Injection Control (UIC) Program Requirements under Title 122

Please refer to Chapter 2, Section 009 and Chapter 3, Section 009 of Title 124. If a subsurface wastewater disposal system has:

1. the capacity to accept sanitary waste generated by 20 or more people, or
2. a flow capacity of more than 1,000 gallons per day, or
3. receives non-domestic wastewater

the system may be subject to requirements of *Title 122 – Rules and Regulations for Underground Injection and Mineral Production Wells.*

Under Title 122, a septic system that meets any of the conditions listed above is defined as a Class V injection well. No person shall construct or operate any Class V injection well in the State of Nebraska without authorization from the Department. This requirement may apply even if the septic system is not required to apply for a construction & operating permit under the Onsite Wastewater Treatment program.

For more information on the application process for authorization to construct and operate a Class V injection well, refer to the following web page link: <http://deq.ne.gov/NDEQProg.nsf/OnWeb/UIC>.

The UIC Program and Title 122 Regulations are administered by the Water Quality Assessment Section, Groundwater Unit at NDEQ. The contact person for the UIC Program is Nancy Harris. She can be reached at 402-471-4290, or at nancy.harris@nebraska.gov. You can also call the Onsite Wastewater Unit with any questions regarding this issue.

Advanced Treatment Systems and Septic Systems

The Department has received information that aerobic treatment units (ATU's) have been installed in several existing septic systems that failed due to overloaded or plugged soil absorption systems. The installer and owner of these systems are required to verify whether a construction & operating permit is required for these modifications. If the system meets all design and sizing requirements of Title 124, and can operate as a stand-alone septic system whether or not the ATU is functioning, then the system may not require a permit. Please contact the Onsite Wastewater Unit if you are not sure about these requirements.

When an ATU unit is installed in a compartment of an existing septic tank, the volume of that that compartment or tank does not count towards the required septic tank capacity for settling and removal of solids, as outlined in Chapter 10. If the minimum septic tank capacity is not achieved with an ATU installed, then the system does not meet design requirements for an "authorized by rule" system, and an application for a construction & operating permit must be submitted to NDEQ. The permit application must be approved, and a construction permit must be issued before the ATU system can be installed. There are additional operation and maintenance requirements for ATU systems that will be included in the operating permit.

In addition, the installation of an ATU system in an existing septic system is a modification/alteration to the existing system, under Chapter 2, Section 004 of Title 124. The installer must register the system with NDEQ, even if it was previously registered when it was originally installed. Because the system has been modified, the soil absorption system and all other components of the septic system must meet all current design, sizing, and construction requirements of Title 124.

IMPORTANT PROGRAM INFORMATION

84-30-29

Lincoln, NE 68509

PO Box 98922

NDEQ Onsite Unit