

# Gravelless System and Chamber System

ENGINEERING SCIENTIST

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## *What is the difference between a gravelless system and a chamber system?*

A gravelless system is essentially what its name suggests—an onsite system that does not use a gravel media in its leachfield trenches or beds. A conventional onsite wastewater treatment system uses gravel to support the sidewalls in a drainfield trench to provide storage of peak wastewater flows and a media for the wastewater to flow through before reaching the infiltrative surface. A gravelless system uses nongravel materials (rubber, sand, fiber membrane, plastic, glass, or wrapped or slitted corrugated plastic pipe) as media in the drainfield's soil absorption trenches. The wrapped or slitted corrugated pipe is usually an 8- or 10-inch (inside diameter) plastic pipe.


These nongravel materials are installed surrounding the leachfield distribution pipes in the soil absorption trench. The depth of these trenches is dependent upon state and local regulations. Effluent loading rates and distribution methods in the gravelless system follow the same principles used in gravel systems.

A chamber system is like a gravelless system in that it does not use any media or aggregate in the trench bottom or leaching bed. The "chamber" is formed by a structure that is open at the bottom and may have a variety of sidewall configurations. These systems can be made of several different materials ranging from plastic and fiberglass to block or brick structures.

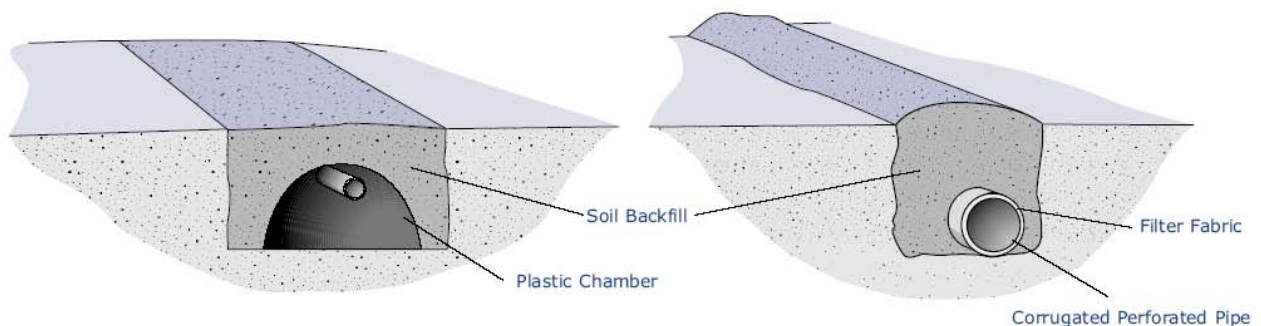
The use of gravelless or chambered system technologies eliminates the potential drawback of gravel as a negative system component. For example, the introduction of "fines" or dust into the leaching system with the use of gravel may create clogging within the leaching area. Eliminating gravel also removes the threat of soil compaction in the trench or bed. These technologies offer ease of construction and inspection and provide a higher storage capacity when wastewater generation exceeds infiltration.

## **When is a gravelless or chamber system appropriate?**

Either of these systems can be used whenever a trench or a bed can be used. Like a conventional system, these technologies can be used on almost any slope and under most conditions. The only difference is that these systems use a support structure to maintain an underground void that allows for storage of the wastewater and for subsurface aeration within the drainfield trenches. As with conventional systems, the soil type and characteristics, as well as depth to water table and other factors, such as vertical and horizontal separation distances, control the use and acceptance of these alternative systems.

Studies have shown that these technologies perform somewhat better than conventional 

## **Generalized Diagrams of Gravelless and Chambered Systems.**



**Table 1**

State	Gravelless System Allowed	Chamber System Allowed	Reduction Allowed
Alabama		Yes	Yes
Alaska	Yes	Yes	None
Arizona	Yes	Yes	Yes
Arkansas		Yes	Some reduction is allowed
Colorado	Yes	Yes	Yes
Connecticut	No	Yes	Yes
Delaware	Yes	Yes	Yes
Florida		Yes	Yes
Georgia	Yes	Yes	Yes for chamber systems; none for gravelless systems
Hawaii	No	Yes	17- 20% for specific manufacturers of chamber systems
Idaho	Yes	Yes	Yes
Illinois	Yes	Yes	County-by-county approval for chamber systems
Indiana	Yes	Yes	Yes
Iowa	Yes	Yes	Yes for chamber systems; 8-inch gravelless pipe requires additional 20% length, and 10-inch gravelless pipe receives 24-inch wide credit
Kansas	Yes	No	Yes for chamber systems on a county-by-county approval process
Kentucky	Yes	Yes	Yes for chamber systems; no reduction for 8-inch diameter gravelless, and 30% reduction on 10-inch as experimental only
Louisiana	Yes	Yes	Some reduction is allowed
Maine	Yes	Yes	Yes
Maryland	Yes	Yes	None
Massachusetts	Yes	Yes	Yes
Minnesota	Yes	Yes	Yes for chamber systems
Mississippi	Yes	Yes	Yes for chamber systems
Missouri	Yes	Yes	Yes
Nebraska		Yes	Yes
Nevada		Yes	Yes
New Hampshire	Yes-Approved on product-specific basis	Yes	Yes for chamber systems; gravelless-sizing is product-specific
New Jersey	Yes	Yes	Sizing is product-specific
New York	Yes	Yes	
North Carolina	Yes	Yes	Yes for chamber systems
North Dakota	Yes	Yes	None
Ohio	Yes	Yes	None
Oklahoma	Yes	Yes	Some reduction is allowed
Oregon		Yes	Some reduction is allowed
Pennsylvania	Being used only under experimentation	Yes	Yes for chamber systems
Rhode Island	No	Yes	Yes for chamber systems in trenches and repairs only
South Carolina	Yes	Yes	Yes for chamber systems under the <i>Provisional and Demonstration Protocol</i>
South Dakota		Yes	Yes for chamber systems
Tennessee	No	Yes	Yes for standard chamber systems
Texas	Yes	Yes	Yes for chamber systems and gravelless systems
Utah		Yes	None
Vermont	Yes	Yes	None
Virginia	Yes	Yes	None
Washington	Yes	Yes	Reductions based on soil condition
West Virginia	Yes	Yes	Yes for chamber systems; gravelless receives no reduction
Wisconsin		Yes	Some reduction is allowed
Wyoming	Yes	No	Some reduction is allowed

gravel systems. However, there is some concern that, over time, the gravelless technologies will percolate the same as a conventional system due to the slime layer that builds up on the infiltrative surface. It is important to realize that gravelless technologies operate on the same principles as conventional systems.

The table on the left lists states that have provided information on the approval of use for gravelless or chambered technologies.

Because regulations change frequently, it is necessary to contact your regulatory authority to ensure that these systems are approved.

**NSFC Resources**

*Gravelless Drainfields Technology Package* is a compilation of articles describes the advantages of gravelless trenches and chamber systems over conventional gravel-filled trenches. The package contains several papers, abstracts of articles from the NSFC Bibliographic Database, case studies, and product information. The information is geared toward engineers, researchers, state regulatory agencies, state and public health officials, contractors/developers, and planners. The price for this 68-page book is \$9.80. Additional shipping charges apply. Request Item #WWBKG74.

*Alternative Onsite Systems Technology Package* was developed by the NSFC. This package is designed to inform homeowners of the many alternative onsite wastewater technologies that can be used in areas not suitable for the conventional septic tank and drainfield. Each technology listed in this package is given a brief overview. The package is useful for the general public, community planners, and local, state, and public health officials. The price for this 66-page book is \$5. Additional shipping charges apply. Request Item #WWPKG87. <sup>1</sup>

Editor’s Note: This column is based on calls received over the National Small Flows Clearinghouse (NSFC) technical assistance hotline. If you have further questions concerning gravelless or chamber systems, call (800) 624-8301 or (304) 293-4191 and ask to speak with a technical assistance specialist.