

**NORTH CAROLINA DEPARTMENT
OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH
ON-SITE WATER PROTECTION SECTION**

INNOVATIVE WASTEWATER SYSTEM APPROVAL
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INNOVATIVE WASTEWATER SYSTEM NO: IWWS-2010-1

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For: Infiltrator Quick4 Plus Standard Low Profile (LP) Chamber

Approval Dates: May 21, 2010

In accordance with 15A NCAC 18A .1969, an application by Infiltrator Systems, Inc. of Old Saybrook, CT for approval of modifications to its previously approved chamber (gravel-less) nitrification trench system, and the conditions of approval thereof, has been reviewed. Infiltrator has demonstrated that the modified system, the Infiltrator Quick 4 Plus Standard LP model with a minimum of six inches of cover, will perform in a manner equal or superior to the system as previously approved by Innovative wastewater system approval No. IWWS-93-2-R11 and its successors. The Quick 4 Plus Standard LP model with a minimum of six inches of cover is therefore hereby approved with innovative status subject the conditions contained herein.

I. Permitting

Prior to the installation of the approved Infiltrator chamber nitrification trench system at a site for which application is being made for an Improvement Permit or Construction Authorization or at a site for which an Improvement Permit or Construction Authorization has been previously issued for a system described in 15A NCAC 18A .1955, .1956, or .1957, the owner or authorized agent shall notify the local health department. The local health department shall issue an Improvement Permit or Construction Authorization or amend the previously issued Improvement Permit or Construction Authorization allowing for the use of the proposed innovative system upon a finding that all provisions of this approval and all other applicable rules shall be met. Use of the proposed innovative system and any conditions shall be described in the construction authorization or amended construction authorization, as applicable. Such information shall also be described on the operation permit to be issued upon the acceptable completion of the system installation.

II. System Description

- A. Minimum pretreatment by septic tank as required in 15A NCAC 18A .1952.
- B. The Quick4 Plus Standard LP unit consists of polypropylene arch-shaped injection molded chamber. The connected overall length of a Quick4 Plus Standard LP chamber is 4 feet. The chamber sidewall slope is approximately 20 degrees toward the chamber center or away from the trench sidewall. Twenty-five Quick4 Plus Standard LP chambers are approximately equal to 100 feet.

Table I

Infiltrator Chamber Dimensions						
Model	Length Overall (ft)	Height (in)	Bottom Width (in)	Average Open Bottom Width (in)	Slotted Sidewall Height (in)	Invert ¹ Height (in)
Quick4 Plus Standard LP (polypropylene)	4	8.0	33.5	29.3	6.3	3.3 and 9.0

¹Invert Height is for a 4-inch diameter Schedule 40 PVC Pipe

- C. Each chamber unit shall be permanently marked as follows: Quick4 Plus Standard LP.
- D. Each chamber unit is designed to mechanically interlock with the downstream chamber forming a complete nitrification trench that consists of an inlet plate or cap with a splash plate located below the inlet on the trench bottom and a solid end plate or cap to be located at the distal end of any chamber nitrification line.
- E. In addition to conventional use as an end cap, the Quick4 Plus All-in-One 8 Endcap and the Quick4 Plus Periscope pipe appurtenances can also be used as an accessory with the Quick4 Plus Standard LP chamber to decrease the turning radius of a chamber line, as a drop-box in serial distribution, and for mid-line distribution pipe entry and exit. The Quick4 Plus All-in-One 8 Endcap can be used in all applications where the Quick4 Plus Standard LP chamber may be utilized.

III. Siting Criteria

The Quick4 Plus Standard LP Infiltrator nitrification trench assemblies may be utilized on any site that one can use rock aggregate and pipe which meet the following criteria:

- A. Sites which are classified as Suitable or Provisionally Suitable for a conventional nitrification field system in accordance with 15A NCAC 18A .1948(a) or (b).

- B. Sites which have been reclassified as Provisionally Suitable in accordance with 15A NCAC 18A .1956(1), (2), (4), (5), and (6).
- C. Sites which meet the criteria for new or existing fill in accordance with 15A NCAC 18A .1957(b). The provisions of Rule .1957(b) are applicable whenever any portion of the chamber in an Infiltrator System extends into fill material. This reference to "fill material" applies to the site fill and not the backfill placed between the trench and the chamber sidewall.
- D. The required vertical separation shall be measured from the bottom edge of the chamber.
- E. Trench bottom depth shall not exceed 36 inches.

IV. Infiltrator Chamber System Sizing

- A. The maximum long-term acceptance rate (LTAR) shall be as follows:

Table II

Textural Group		LTAR (gpd/sq.ft.)	
		Natural Soil	Saprolite
Soil/Group I (Sands)	Sands	0.8 - 1.0	0.6-0.8
	Loamy Sand		0.5-0.7
Soil Group II (Coarse Loams)	Sandy Loam	0.6 - 0.8	0.4 - 0.6
	Loam		0.2-0.4
Soil Group III (Fine Loams)	Silt Loam	0.3 - 0.6	0.1-0.3
	Other Fine Loams		N.A.
Soil Group IV	Clays	0.1 - 0.4	N.A.

- B. The LTAR shall be based on the most hydraulically limiting naturally occurring soil horizon within three feet of the ground surface or to a depth of one foot below trench bottom, whichever is deeper.
- C. To determine the total trench bottom area (ft²) required the design daily sewage flow shall be divided by the applicable long-term acceptance rate shown in Table II above.
- D. **Reductions in total trench bottom area shall not be granted for low profile chambers.**
- E. The minimum area (**without reduction**) for a bed system shall be determined as required in 15A NCAC 18A .1955(d) except that the chambers shall be placed in rows next to each other.
- F. The available space requirements of Rule .1945 shall be met, and this approved innovative system may be designated as the required replacement system.

V. Design and Installation Criteria

- A. The Infiltrator chamber system used in nitrification trenches shall be installed according to the minimum and maximum dimensions in Table IV.

Table IV

Infiltrator Installation Requirements (Depths Measured from Finished Grade)					
Model	Maximum Trench Width (in)	Minimum Trench Depth (in)	Maximum Trench Depth (in)	Minimum Trench Spacing (ft.o.c)	Minimum Soil Cover (in)
Quick4 Plus Standard LP (polypropylene)	36	14	36	9	6

- B. The inlet to the Infiltrator chamber shall be in the uppermost portion of the specially prepared inlet panel (“end cap”). For dosed systems receiving effluent from a pump or siphon, manufacturer’s installation procedures shall be followed, including provisions to dissipate inflow rate so as to minimize soil scouring and modifications that enable the presence and effectiveness of these provisions to be field-verified.
- C. The Quick4 Plus All-in-One 8 Endcap may be used as an accessory with the Quick4 Plus Standard LP chamber to decrease the turning radius of a chamber line, as a drop-box in serial distribution, and for mid-line distribution pipe entry and exit. The number of chambers in the chamber rows extending in opposite directions from the Quick4 Plus All-in-One 8 Endcap do not need to be equal.
- D. Backfill shall be placed between the trench and chamber sidewall to a minimum compacted (carefully walked in) height that is equal to the top of the chamber louvers. Chamber systems can be installed utilizing native soil backfill (Group I, II, III, or IV). Backfill shall be free of trash or debris. The area adjacent to louvers shall be free of large (8” or greater) clods that do not break apart during the walk in procedure. The latest version of the manufacturer’s installation procedure shall be followed.
- E. The Quick4 Plus Standard LP chamber model may be installed with a minimum compacted cover of 6 inches when the following conditions are met:
1. The person installing or constructing the system is certified (documented) by Infiltrator Systems, Inc. as specially trained and qualified to install the Quick4 Plus Standard LP chamber units with a minimum soil cover of 6 inches;
 2. The person installing the Quick4 Plus Standard LP chamber system shall produce certification documentation upon the request by the State or local health department.
 3. When installing the Quick4 Plus Standard LP chambers the installer shall carefully follow the manufacturer’s installation guideline for shallow placement.
 4. In Group I soils, with only 6 inches of cover, tracked equipment shall be used during backfill as specified by the manufacturer’s installation procedures.

Vehicular traffic or construction equipment may traverse the chamber system only during system installation. The load must be bridged over the trench so as not to disturb the chambers. The load may be bridged with a minimum of six inches of compacted soil cover over shallow chamber models and a minimum of 12 inches of compacted soil cover over other Infiltrator chamber models.

- F. Individual chamber trenches shall be constructed with $\pm \frac{1}{2}$ inch of trench levelness from side-to-side and shall follow the contour of the ground surface elevation (uniform depth). Trenches shall be constructed with continuous interlocking chambers, without any dams, stepdowns or other water stops, with a plus or minus 1-inch tolerance of trench levelness for any linear contoured segment.
- G. Infiltrator systems installed on a sloping site may use distribution devices or stepdowns as described in 15A NCAC 18A .1955(j) and (l) when it is necessary to change level nitrification line segments from upper to lower elevations. For the Quick4 Plus Standard LP chamber, the Quick4 Plus All-In-One 8 Endcap and Quick4 Plus Periscope pipe appurtenances may be used as a stepdown by making the cross-over out of one of its pre-marked 3.3- or 9.0-inch-high ports. From the end cap, effluent is conveyed through a solid pipe segment installed on a positive downhill grade down to the next lower trench in series. For the Quick4 Plus Standard LP chamber, the pre-marked port on the top of the Quick4 Plus All-In-One 8 Endcap may be used to receive effluent from an upper trench by a cross-over pipe. Infiltrator's MultiPort Invert Adapter may also be used to change elevation between nitrification lines for the Quick4 model chambers. Stepdown installation details shall be in accordance with Infiltrator Systems North Carolina Design and Installation Manual.
- H. After installation of chambers in trench or bed configuration, a filter fabric barrier shall be installed to cover the chambers (except Quick4 models) if chambers are installed in uncompacted, fine or very fine uniform sand and at least one of the following conditions are present.
 - 1. Installations are left uncovered and subject to a major rain event.
 - 2. Systems are subject to not being sodded (or stabilized) in a timely manner after final cover-up has occurred.
 - 3. The drainfield is not protected from surface drainage.

The filter fabric shall be non-woven, weight 0.35 oz./s.y. to 1 oz./s.y., have apparent opening size (AOS) 20-30 U.S. Sieve (ASTM D-4571), or alternate with equal or better performance characteristics. An alternate fabric shall be approved in writing by the manufacturer on a case-by-case basis.

- I. Manufacturer's installation instructions for the applicable Infiltrator system used in septic tank systems shall be followed except as required herein or 15A NCAC 18A .1900 et.seq.
- J. All Infiltrator chamber systems shall be installed by a contractor or installer appropriately certified in writing by the manufacturer.
- K. The Quick4 Plus Standard LP chamber system shall be installed only with the Infiltrator Quick4 Plus All-in-One 8 Endcap or Quick4 Plus 8 Endcap options at the ends of each chamber row.

VI. Operation, Maintenance and Monitoring Requirements

The Infiltrator chamber system shall have a minimum classification as a Type III g system (other non-conventional trench systems) in accordance with Table V(a) of 15A NCAC 18A .1961(b).

VII. Repair Systems

The provisions of 15A NCAC 18A .1961(l) shall apply to the use of Infiltrator chamber systems for repairs to existing malfunctioning septic tank systems.

Approved by: _____ Date: _____

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