

**NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SECTION
ON-SITE WATER PROTECTION BRANCH**

ACCEPTED WASTEWATER SYSTEM APPROVAL
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Accepted Wastewater System Approval Number: AWWWS 2005-01-R5

Issued To: David Lentz, P.E.
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For: “Infiltrator” chambered sewage effluent subsurface disposal systems (Standard, Standard SideWinder, Standard SC, High Capacity, Contour Wedge, Standard Contour Swivel, Quick4 Standard-W, Quick4 Plus Standard, Quick4 Standard MultiPort Endcap, Quick4 High Capacity MultiPort Endcap, and Quick4 Plus Standard All-in-One 12 Endcap, “BioDiffuser” Standard Model 11” High Unit, Angle Chamber Section, ARC 36 Model, ARC 36 Side Port Coupler (SPC) Unit, and ARC 36 SPC Endcap)

Approval Dates:	April 2, 2005	Accepted Status First Granted for Quick4 and Predecessor Models
	May 21, 2008	Accepted Status Granted for BioDiffuser and ARC Models*
	July 18, 2008	Addition of Hancor, Inc. to AWWWS-2008-01-R1
	June 19, 2009	Elimination of ARC 36 Model Mold Restrictions
	November 2, 2010	Addition of Quick4 Plus Standard
	August 15, 2012	Addition of Sizing for LTARs Greater Than 1.0 gpd/sq ft
	September 26, 2012	Change of BioDiffuser and Arc Ownership to Infiltrator Systems Inc.*
	October 27, 2014	Additional of Area Credits for End Cap Parts to both AWWWS 2005-01-R3 and AWWWS 2008-01-R4
	February 20, 2015	Merge AWWWS-2008-01-R4 BioDiffuser model specifications into AWWWS 2005-01-R4; retire AWWWS-2008-01-R4
	August 21, 2015	Add alternating dual-field systems, update trench levelness requirements, and change company name from Infiltrator Systems, Inc. to Infiltrator Water Technologies, LLC

*The May 21, 2008 accepted system approval was issued to Advanced Drainage Systems, Inc. and transferred to Infiltrator Systems, Inc., predecessor to Infiltrator

Water Technologies, LLC, on September 26, 2012.

In accordance with General Statute 130A-343(h) and 15A NCAC 18A .1969(h), a petition to the Commission for Public Health by Infiltrator Water Technologies, LLC (previously Infiltrator Systems Inc.) of Old Saybrook, CT for reclassification of various models of its approved innovative chamber systems has been reviewed by the Department and approved by the Commission. The following chamber systems have been found to perform in a manner that is equal to or superior to a conventional wastewater system and to meet the standards of an accepted system when all of the following conditions are met:

I. General

A. Scope of this Accepted Approval

1. Use, design, and installation requirements for the Infiltrator chamber nitrification trench systems, inclusive of Quick4, ARC, and BioDiffuser models as well as respective predecessor designs.

B. The following chamber system models have been found to meet the standards of an accepted system:

- Infiltrator Standard and Standard SideWinder (polyethylene) with 12 inch cover
- Infiltrator High Capacity (polyethylene) with 12 inch cover
- Quick4 Plus Standard, Quick4 Standard-W, Standard SC and Standard SideWinder SC (polypropylene) Models with 6 inch cover
- High Capacity SideWinder (polypropylene) with 12 inch cover
- Contour Wedge
- Contour Swivel – Standard
- Quick4 Standard MultiPort Endcap with 6 inch cover
- Quick4 High Capacity MultiPort Endcap with 6 inch cover
- Quick4 Plus Standard All-in-One 12 Endcap with 6 inch cover
- BioDiffuser Standard Model (polyethylene) with 6 inch cover
- BioDiffuser Angle Chamber section with 6 inch cover
- ARC 36 (polypropylene or polyethylene) with 6 inch cover
- ARC 36 Side Port Coupler (SPC) with 6 inch cover
- ARC 36 SPC Endcap with 6 inch cover

II. System Description

A. Minimum pretreatment by septic tank as required in 15A NCAC 18A .1952.

B. The chambers must meet the following requirements as specified.

1. Infiltrator Standard and Standard SideWinder chamber units (including High Capacity Model) consist of a high density polyethylene arch-shaped injection molded chambers.
2. The Quick4 Plus Standard, Quick4 Standard-W, Standard SC and Standard SideWinder SC units consist of polypropylene arch-shaped injection molded chambers.
3. Sixteen Infiltrator Standard or High Capacity chambers are approximately equal to 100 linear feet.
4. Twenty-five Quick4 Plus Standard and Quick4 Standard-W are approximately equal to 100 feet.
5. BioDiffuser units consist of high-density polyethylene arch-shaped injection molded chambers.

6. ARC units consist of polypropylene or high-density polyethylene arch-shaped injection molded chambers, with chamber sidewall slopes approximately 20 degrees toward the chamber center and away from the trench sidewall.
7. Sixteen BioDiffuser Standard chamber units are approximately equal to 100 linear feet.
8. Twenty ARC 36 units are approximately equal to 100 linear feet.
9. The chamber sidewall slope is approximately 20 degrees toward the chamber center or away from the trench sidewall.

C. Each chamber unit shall be properly and permanently marked in compliance with the appropriate standard, and conditions of this approval as follows:

- Standard or Standard SideWinder
- Quick4 Plus Standard, Quick4 Standard-W, Standard SC or Standard SideWinder SC
- High Capacity or High Capacity SideWinder
- Contour Wedge
- Contour Swivel – Standard
- ARC 36

Table I –Chamber Dimensions¹

Model	Height (in)	Invert ² Height (in)
Standard and Standard SideWinder	12.3	6.9
Standard SC and Standard SideWinder SC	12.3	6.9
Quick4 Plus Standard	12.0	5.3, 8.0
Quick4 Standard-W	12.5	8.0
High Capacity and High Capacity SideWinder	15.9	10.2
Standard	11	6
ARC 36	13	6

¹Refer to the manufacturer’s installation procedures document for additional dimensions

²Invert Height is for a 4-inch diameter Schedule 40 PVC Pipe

- D. Each chamber unit is designed to mechanically interlock with the downstream chamber forming a complete nitrification trench that consists of an inlet plate with a splash plate located below the inlet on the trench bottom and a solid end plate to be located at the distal end of any chamber nitrification line.
- E. The contour wedge or standard contour swivel can be utilized as accessories to achieve turns as necessary in all applications including but not limited to shallow cover with 6 inches of soil, or the standard and high capacity units with 12 inches of soil.
- F. The Angle Chamber Section may be utilized as an accessory for the “BioDiffuser” Standard model to achieve turns as necessary in all applications including but not limited to shallow cover with 6 inches of soil.
- G. The Side Port Coupler (SPC) may be utilized as an accessory for the ARC 36 model chambers in series of no more than three (3) consecutive units 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 in all applications where the ARC 36 model chambers may be utilized.

III. Siting Criteria

Chambers shall be sited equivalently to rock aggregate and pipe in accordance with 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 a nitrification system extends into fill material. There shall be no reduction in trench length compared to a conventional gravel trench. 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.

IV. System Sizing

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

Table II – LTAR for Chambers

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		NA
Soil Group IV	Clays	0.1-0.4	NA

* When the LTAR exceeds 1.0 gpd/sq ft, the nitrification trench system shall be sized using the Equivalency Factors in Table IV.

- 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. For LTAR values equal to or less than 1.0, the total trench bottom area (ft²) required shall be determined by dividing the design daily sewage flow by the applicable LTAR shown in Table II. The minimum linear footage for chamber systems shall be determined by dividing the total trench bottom area by the equivalency factors in Table III.

Table III –Chamber Trench Width and Equivalency Factors

Product	Excavated Trench Width (inches)	Equivalency Factor* (SF/LF)
Quick4 Plus Standard	36	4.00
Quick4 Standard-W	36	4.00
Standard	36	4.00
Standard SC	36	4.00
Standard Sidewinder	36	4.00
Standard Sidewinder SC	36	4.00
High Capacity	36	4.00
High Capacity SideWinder	36	4.00
BioDiffuser Standard	36	4.00
ARC 36	36	4.00

* Reduction in nitrification trench length allowed by use of these Equivalency Factors, as compared to sizing requirements delineated in Rule .1955 for conventional systems, apply only to drainfields receiving effluent of domestic strength or better quality. The system may be used in an alternating dual field application pursuant to 15A NCAC 18A .1955(p) provided that the equivalency factor for sizing each of the two complete nitrification fields does not exceed 4.61 SF/LF. Any proposed use of the system for facilities producing higher strength wastewater shall be sized in adherence with conditions set forth in Rule .1969(m).

Example:

Three bedroom residence with a design daily sewage flow of 360 gallons on a sandy clay loam (Group III) soil

Total computed trench bottom area is:

$$360 \text{ gpd}/0.5 \text{ LTAR} = 720 \text{ ft}^2$$

The required linear footage for Infiltrator Standard chamber systems is:

$$720 \text{ ft}^2/4.0 \text{ ft} = 180 \text{ linear ft}$$

Where 4.0 ft. is the equivalency factor for the Infiltrator Standard chamber system

- D. For LTAR values greater than 1.0, the minimum total trench bottom area (ft²) required shall be determined by dividing the design daily sewage flow by the applicable LTAR shown in Table II. The minimum linear footage for chambers shall be determined by dividing the total trench bottom area by the equivalency factors in Table IV.

Table IV –Trench Width and Equivalency Factors for LTAR Values Greater than 1.0

Product	Excavated Trench Width (inches)	Equivalency Factor (SF/LF)
Quick4 Plus Standard	36	3.00
Quick4 Standard-W	36	3.00
Standard	36	3.00
Standard SC	36	3.00
Standard Sidewinder	36	3.00
Standard Sidewinder SC	36	3.00

High Capacity	36	3.00
High Capacity SideWinder	36	3.00
BioDiffuser Standard	36	3.00
ARC 36	36	3.00

- E. The sizing for the Quick4 and ARC chamber end cap and mid-line connection systems shall be determined by the equivalency factors in Table V.

Table V – Equivalency Factors for Endcap Systems and Mid-Line Connections

Product	Excavated Trench Width (inches)	Approved Chamber Equivalency Factor Linear Foot Basis ¹ (sf/lf)	Linear Feet of Chamber Credit per Pair when Placed at Ends of Chamber Line (lf) ²	Linear Feet of Chamber Credit per Unit when Placed as a Mid-Line Connection (lf)
Quick4 Standard MultiPort Endcap	36	4.0	1	NA
Quick4 Plus Standard All-in-One 12 Endcap	36	4.0	2	1 ³
Quick4 HC MultiPort Endcap	36	4.0	2	NA
ARC 36 SPC and SPC Endcap	36	4.0	2	1 ⁴

¹ Actual linear-foot equivalency rating of compatible chamber part.

² Must install two (2) end cap parts to get approved linear feet of chamber credit.

³ Single end cap part installed within chamber line receives one (1) linear foot of chamber credit.

⁴ Single Side Port Coupler installed within chamber line receives one (1) linear foot of chamber credit.

- F. The minimum area (without reduction or equivalency factor) 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.
- G. The available space requirements of Rule .1945 shall be met, and this approved accepted system may be designated as the required replacement system.

V. Special Site Evaluation

A special site evaluation may be required based on the proposed ground absorption system. Refer to Rule .1970(p).

VI. Design Criteria

Refer to Siting Criteria (Section III) and Installation (Section VII) for design details.

VII. Installation

- A. Chamber systems used in nitrification trenches shall be installed according to the minimum and maximum dimensions in Table VI.
- B. The inlet to the chamber shall be in the uppermost portion of the specially molded 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.

Table VI –Chamber Installation Requirements

Model	Maximum Trench Width (in)	Minimum Trench Depth (in)	Minimum Trench Spacing (ft on center)	Minimum Soil Cover (in)
Standard	36	24	9	12
Standard SideWinder	36	24	9	12
Quick4 Plus Standard, Quick4 Standard-W, Standard SC, and Standard SideWinder SC	36	18	9	6
High Capacity and High Capacity SideWinder	36	30	9	12
BioDiffuser Standard	36	17	9	6
ARC 36	36	18	9	6

- C. 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. The Standard, Standard SideWinder, High Capacity, and High Capacity SideWinder chamber models require additional soil backfill (Group I, II, III, or IV) to a minimum compacted cover of 12 inches above the chamber. The Quick4 Plus Standard, Quick4 Standard-W, Standard SC, Standard SideWinder SC, BioDiffuser Standard, and ARC 36 chamber models may be installed with a minimum compacted cover of 6 inches (shallow placement) when the following conditions are met:
1. Quick4 Plus Standard, Quick4 Standard-W, Standard SC, Standard SideWinder SC, BioDiffuser Standard, or ARC 36 chamber units are used;
 2. The person installing or constructing the system is certified (in writing) by Infiltrator Water Technologies, LLC or its authorized representative as specially trained and qualified to install chamber units;
 3. The person installing the chamber system shall produce certification documentation upon the request by the State or local health department.
 4. When installing the chambers in shallow placement (6 inches of soil cover) in Group I (sand) soils (including specially constructed Infiltrator Contour Wedge and Swivel units), the installer shall carefully follow the manufacturer’s installation guideline for shallow placement.

Vehicular traffic or construction equipment may traverse the chamber system only when the load is bridged over the trench so as not to disturb the chambers. The load may be bridged with a minimum of 6 inches of compacted soil cover over shallow chamber models (Quick4 Plus Standard, Quick4 Standard-W, Standard SC, Standard SideWinder SC, BioDiffuser Standard, and ARC 36) and a minimum of 12 inches of compacted soil cover over other approved chamber models.

- D. Infiltrator Swivel units (Standard Contour Swivel) shall be installed on undisturbed soil which is

level with the adjacent drainfield trench bottoms. The installer shall be responsible for compacting the trench bottom beneath the Swivel units according to the manufacturer's guidelines when the units are installed in Group I (sand) soil. Backfill for the Swivel units shall be hand-compacted (carefully walked in) up to the top of the adjacent chamber units. Backfill shall be native soil (Group I, II, III, or IV). Backfill for the Swivel units shall be free of trash or debris and clods larger than 3" which do not break apart during the hand-compaction procedure.

- E. Chamber trenches shall be constructed level in all directions with a plus or minus one-half-inch tolerance from side-to-side and maximum fall in a single trench bottom not exceeding one-fourth inch in 10 feet end-to-end for any continuous contoured segment. Trenches shall follow the contour of the ground surface elevation (uniform depth). Trenches shall be constructed with continuous interlocking chambers, including appurtenances, without any dams, stepdowns or other water stops.
- F. Chamber 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. However, the requirement to fully utilize the upstream nitrification trench applies to an elevation at least equal to the top of the chamber louvers.
- G. After installation of chambers in a trench or bed configuration, a filter fabric barrier shall be installed to cover the chambers (except Quick4 Chamber 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.

- H. Manufacturer's installation instructions for the applicable chamber system used in septic tank systems shall be followed except as required herein or 15A NCAC 18A .1900 et.seq.
- I. All chamber systems shall be installed by a contractor or installer appropriately certified in writing by the manufacturer or its authorized representative.
- J. All chamber systems shall be installed with compatible end caps at the inlet and distal ends of each chamber row.

VIII. Operation, Maintenance, and Monitoring

The accepted chamber system shall have a classification equivalent to a conventional trench system in accordance with Table V(a) of 15A NCAC 18A .1961(b).

IX. Responsibilities and Permitting

- A. The local health department shall permit these accepted system in an equivalent manner as a conventional system, when the requirements of 15A NCAC 18A .1900 et. Seq., laws, and conditions of this accepted system approval are met.
- B. When use of one or more of these accepted systems is requested in the application for a Construction Authorization, the local health department shall include a design for the designated accepted system(s) in accordance with the approved siting, sizing, and design criteria on the Construction Authorization.
- C. When a permit or authorization is issued for a conventional system, the permit or authorization shall contain a statement that indicates that an accepted system may also be used. These accepted systems may be installed without permit/authorization modification, prior approval of the health department, or separate sign-off, if the accepted system can be placed in the permitted/authorized trench footprint and the installation is in accordance with the accepted system approval, without unauthorized product alteration.
- D. When substitution with one of these accepted systems for a conventional system or another accepted system is made, permit modification, prior approval of the health department or separate owner sign-off is not required as long as no changes are necessary in the location of each nitrification line (except reduction in line length and/or number as allowed for in this approval), trench depth, or effluent distribution method.
- E. Notwithstanding paragraphs C and D above, when a substitution in system type compared to a previously permitted or authorized system type or types shall result in a change in the location of any nitrification line (including any increase in line length), trench depth, or effluent distribution method, prior approval by the local health department is required before system installation. The local health department shall modify the permit/authorization upon a finding that all provisions of this approval and all other applicable rules shall be met.
- F. The type of system installed shall be indicated on the Operation Permit, including designation of the manufacturer and model or unique code.

X. Repair of Systems

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

Approved by: _____ Date: _____