

**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: AWW-2005-02-R6

Issued To: EZflow, LP, a wholly owned subsidiary of Infiltrator Water Technologies, LLC
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For: "EZflow by Infiltrator" Bundled Expanded Polystyrene Synthetic Aggregate Units (EZ1203H and EZ1203H-GEO)

Approval Date:	April 2, 2005	Accepted Status Granted for Model EZ1203H
	February 6, 2008	Addition of EZ1203H-GEO and 5-foot units
	August 18, 2010	Addition of 3-foot and 7-foot units
	May 1, 2012	Clarification of Approval Language
	August 15, 2012	Addition of Sizing for LTARs Greater Than 1.0 gpd/sq ft
	February 20, 2015	Elimination of Particle Density Specification
	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

In accordance with G.S. 130A-343(h) and 15A NCAC 18A .1969(h), a petition to the Commission for Public Health by EZflow, LP, a wholly owned subsidiary of Infiltrator Water Technologies, LLC (previously Ring Industrial Group of Oakland, TN), for modification of its approved accepted status for EZflow Drainfield Systems has been reviewed by the Department and approved by the Commission. The EZflow 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 conditions of this approval are met.

I. General

A. Scope of this Accepted Approval

1. Use, design, and installation requirements for the EZflow polystyrene aggregate drainfield systems.

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

- EZ1203H
- EZ1203H-GEO

II. System Description

- A. Minimum pretreatment by septic tank as required in 15A NCAC 18A .1952.
- B. EZflow expanded polystyrene aggregate particles (EPS) shall meet the following requirements:
 - 1. EPS shall consist of three dimensional rectangular shapes resembling capital E's placed back-to-back (also known as the "double E") with void channels and surface area protuberances.
 - 2. EPS shall range in size from 0.75 inches to 1.75 inches along any axis.
- C. The EZflow drainfield system units (also referred to as cylindrical units) shall meet the following general specifications:
 - 1. EPS shall be contained in cylindrical high strength netting.
 - 2. The physical and chemical properties of the netting shall be durable and resistive enough to retain the shape of the units and to withstand system installation, backfilling, corrosion, and loss of aggregate under intended use.
 - 3. Cylindrical units shall be 12-inches in diameter +/- 1/2 inch.
 - 4. Cylindrical units shall be manufactured in 3-, 5-, 7-, and 10-foot long sections, +/- 2 inches.
 - 5. The taper, or reduction in diameter, at each end of the cylindrical units shall not begin more than 3 inches from the point of enclosure, as measured along the linear axis of the unit.
 - 6. Cylindrical units shall be able to withstand an AASHTO H-10 axle load of 16,000 pounds when covered with 12 inches of compacted soil and a shallow cover axle load of 4,000 pounds when covered with 6 inches of compacted soil without collapsing, fracturing or breaking when installed in a trench equaling the product configuration width.
- D. The EZ1203H shall meet the following description and specifications:
 - 1. The product shall be comprised of three 12-inch-diameter units 3-, 5-, 7-, or 10-foot long placed side-by-side across the bottom of a 36-inch-wide trench.
 - 2. The outer units shall contain aggregate only, with the netting tied off at both ends to prevent the escape of aggregate.
 - 3. The central unit shall contain aggregate and a 4-inch-diameter perforated flexible plastic pipe as is typically used in nitrification lines.
 - 4. The pipe shall be certified as complying with ASTM F 405, Standard Specifications for Corrugated Polyethylene (PE) Tubing and Fittings, and shall be in accordance with 15A NCAC 18A .1955(f).
 - 5. The netting for the central unit shall be tied off at both ends of the pipe.
 - 6. The 4-inch pipe shall be offset from center towards the top of the unit whereby 5 to 6 inches of aggregate is located between the bottom of the pipe and the bottom of the unit, and 1 1/4- to 2 1/2- inches of aggregate is located between the top of the pipe and the top of the unit.
 - 7. The pipe shall be connected by an internal coupling device to allow continuous connection from one section to the next.
 - 8. The end-to-end gap distance between pipe containing cylinders, as measured from the straps fixing the netting to the pipe or from the face edges of aggregate on adjoining cylinders, shall be no greater than 3 inches.
- E. The EZ1203H-GEO shall meet the same product specifications as the EZ1203H as described in paragraph D, above, with the addition of geotextile fabric pre-inserted between the netting and aggregate spanning 180 degrees +/- 15 degrees along the top of each cylinder. The geotextile shall have the minimum average value specifications described in Table I.

Table I - Minimum Geotextile Barrier Material Specifications for EZ1203H-GEO

Property	Value
Unit Weight	0.5 ounces per square yard
Tensile Strength	Cross Direction: 40 N/2.54cm +/- 20% Machine Direction: 50 N/2.54cm +/- 20%
Air Permeability	775 cubic feet per minute +/- 20%

III. Siting Criteria

The EZflow drainfield system shall be sited equivalently to rock aggregate and pipe in accordance with the following criteria:

- A. Sites which are classified Suitable or Provisionally Suitable for a conventional nitrification field system in accordance with 15A NCAC 18A .1948(a) and (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 aggregate cylinders in an EZflow nitrification trench system extends into fill material. There shall be no reduction in trench length compared to conventional gravel trench. This reference to "fill material" applies to the site fill and not the backfill placed between the trench and the cylinder sidewall.
- D. The required vertical separation shall be measured from the trench bottom.

IV. EZflow Drainfield System Sizing

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

Table II

Textural Group		LTAR (GPD/ft ²)	
		Natural	Saprolite
Soil/Group I (Sands)	Sand	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 the trench bottom whichever is deeper.

- C. For LTAR values equal to or less 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 above. The minimum linear footage for EZflow drainfield systems shall be determined by dividing the total trench bottom area by the following equivalency factor:

Table III

EZflow Product Configuration	Excavated Trench Width	Equivalency Factor* (SF/LF)
EZ1203H	36 inches	4.0
EZ1203H-GEO	36 inches	4.0

*Reduction in nitrification trench length allowed by use of this Equivalency Factor, 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:

$$360 \text{ gpd} / 0.5 \text{ gpd/square foot (LTAR)} = 720 \text{ ft}^2$$

The minimum required linear footage for the accepted EZflow drainfield system is:

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

Where 4.0 SF/LF is the equivalency factor for the accepted EZflow EZ1203H

- 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 above. The minimum linear footage for EZflow drainfield systems shall be determined by dividing the total trench bottom area by the following equivalency factors:

Table IV

EZflow Product Configuration	Excavated Trench Width	Equivalency Factor (SF/LF)
EZ1203H	36 inches	3.0
EZ1203H-GEO	36 inches	3.0

- E. The EZflow drainfield system may be used in a bed system with the three cylindrical bundles placed in rows next to each other. The minimum area (without reduction or equivalency factor) for a bed system shall be determined as required in 15A NCAC 18A. 1955(d). 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. The EZflow drainfield system shall be configured in accordance with Section II, above, installed in excavated trenches constructed with the following minimum center-to-center spacing, trench widths, and soil cover. Dimensional minimums are included for installation and inspection guidance.

Table IV

Product Configuration	Minimum Trench Spacing (ft on center)	Maximum Trench Width (in)	Minimum Soil Cover ¹ (in)	Minimum Trench Depth (in)	Minimum Pipe Depth Below Grade ² (in)
EZ1203H	9	36	6	18	12
EZ1203H-GEO	9	36	6	18	12

¹ On sloping lots, minimum required trench depths may be greater

² Measurements for pipe height are to the pipe invert or bottom of pipe

- B. A backfill barrier shall be placed over the EZ1203H cylinders to prevent the infiltration of backfill material into the trench void spaces. The backfill barrier shall be 60 pound weight untreated building paper provided by the manufacturer or alternate with equal or better performance characteristics. An alternate backfill barrier shall be approved in writing by the manufacturer on a case-by-case basis. The barrier shall not be placed along the trench sidewalls below the pipe invert elevation. The barrier shall be protected from becoming wet enough to tear until backfilling is completed. The EZ1203H-GEO units are prefabricated with a geotextile backfill barrier between the netting and aggregate. The EZ1203H-GEO units shall be oriented in the trench with the geotextile covering the top of the system. No additional backfill barrier material shall be required.
- C. Native soil removed from the trench excavation may be used as backfill. Backfill shall be free of trash or debris. Vehicular traffic and excavation equipment shall not travel over any uncovered drainfield. The latest version of the manufacturer's installation procedures shall be followed.
- D. EZflow trenches shall be installed 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 all continuous adjoining 3-, 5-, 7- or 10-foot units placed end-to-end, with the central cylinder distribution pipe interconnected, without any dams, stepdowns or other water stops.
- E. The 10-foot-long units shall be used to make up the majority of the line length, with the 3-, 5-, and 7-foot units being used only at the distal end of the trench. A maximum of three 3-, 5-, or 7-foot units may be used in any one line length. Examples: A 65-foot trench would utilize six 10-foot units and one 5-foot unit. A 71-foot trench would utilize six 10-foot units, one 5-foot unit, and two 3-foot units.
- F. EZflow drainfield systems installed on sloping sites may use distribution devices or step downs 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.

- G. Manufacturer's installation instructions for the EZflow drainfield systems shall be followed, except as required herein or by 15A NCAC 18A .1900 et. seq.
- H. The system shall be installed by a contractor authorized in writing by EZflow LP or its designated representative for EZflow drainfield systems.

VIII. Operation, Maintenance, and Monitoring

The accepted EZflow drainfield 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.

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X. Repair of Systems

The provisions of 15A NCAC 18A .1961(l) shall govern the use of the EZflow drainfield systems for repairs to existing malfunctioning wastewater systems.

Approved By: _____ Date: _____