Arizona

Infiltrator AeroFin™

DESIGN AND INSTALLATION MANUAL

The purpose of this manual is to provide the minimum specifications for design and installation of the Infiltrator AeroFin™ in Arizona. All state and local ordinances, requirements, and procedures must be followed. Each revised version of this manual supersedes the previous version.

The configurations presented in this document are common designs and are provided for illustrative purposes. They are not intended to restrict the use of other configurations, which may be utilized provided the design conforms to state and local regulations, as applicable.

For more detailed design and installation information, please contact Infiltrator Water Technologies at 1-800-221-4436.

INFILTRATOR® water technologies

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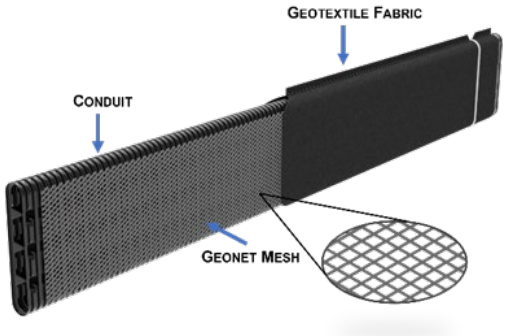
The Infiltrator AeroFin™

The Infiltrator AeroFin™ (AeroFin) is a proprietary system consisting of four components. The first three components are fabricated in modules called “fins” that are installed within the fourth component, a tightly specified sand called “system sand.” Effluent is dispersed, filtered, and treated by the components of the system through a combination of biological, physical, and chemical processes. The system operates as a media network to support colonized bacteria that treat organic waste.

After exiting the septic tank or treatment unit, effluent progresses through each component as follows:

- 12.75-inch-tall conduit;
- Geonet mesh;
- Geotextile fabric; and
- Minimum 6-inch layer of system sand.



The AeroFin system produces average TSS and cBOD levels of 4.7 mg/L and 4.7 mg/L respectively when tested in accordance with the NSF/ANSI 40 protocol.

AeroFin Laterals

The AeroFin laterals (fins) are produced in 8-foot segments for ease of transport and installation. Individual segments connect to one another using the built-in snap-lock feature to create fin lengths as required by the system design. This snap-lock feature also connects the AeroFin Manifold and the AeroFin Endcaps.

AeroFin Manifold

The AeroFin Manifold is installed at the head of the fins and provides equal distribution of effluent into the system from the bottom up. AeroFin Manifolds include a snap-lock feature which facilitates interconnecting individual manifolds in series as well as connecting the manifold to the fins. The AeroFin Manifold may also be installed at the distal end of individual fins when venting is specified or for serial distribution.

AeroFin Endcap

AeroFin Endcaps are installed at the distal end of parallel distribution systems or as a cap for the last fin row(s) in a serial distribution system. AeroFin Endcaps may also be installed on the AeroFin Manifold if connections are not required as well as at the end of a cut AeroFin Conduit.

System Sand

System sand is ASTM C33 (concrete sand), natural or manufactured sand, with 3% or less passing the #200 sieve.

The following minimum system sand dimensions are required for all AeroFin configurations:

- a minimum of 6 inches below the fin rows;
- a minimum of 6 inches between the fin rows; and
- a minimum of 6 inches outside (on each side and on each end) of the fin rows.
- No system sand is required over the system.

Upon exiting the system sand, the treated wastewater is absorbed into the native soils. Typical AeroFin layouts for level and sloped sites are portrayed in the system layouts section of this Infiltrator AeroFin Design and Installation Manual (Manual).

Environmental Standards and Technical Support

All AeroFin systems shall be designed and installed in compliance with the procedures and specifications detailed in this Manual and in the Arizona Proprietary Treatment Product Listing. In the event of contradictions between this Manual and Arizona Administrative Code Title 18, Chapter 9, (the Rules), contact Infiltrator Water Technologies' Technical Services Department at 1-800-221-4436.

Training and Certification Requirements

Designers and installers are required to attend an in-person or online training/certification course on AeroFin presented by Infiltrator or its authorized representative. Infiltrator recommends that professionals involved in the review of AeroFin system designs and inspection of installed systems also become trained and certified.

Daily Design Flow

Daily design flow (DDF) is calculated in accordance with the Rules. The minimum DDF shall be one bedroom for any single-family dwelling and must take into account the number of fixtures in use and a minimum of 300 GPD for any non-single-family residential system. Contact Infiltrator Water Technologies' Technical Services Department for recommendations when design flow does not meet this requirement.

Effluent (Wastewater) Strength

The minimum total fin length required is based on use with residential strength effluent that has received primary treatment in a septic tank. When designing a system for use with higher strength wastewater, such as commercial systems, Contact Infiltrator Water Technologies' Technical Services Department at 1-800-221-4456.

Septic Tank

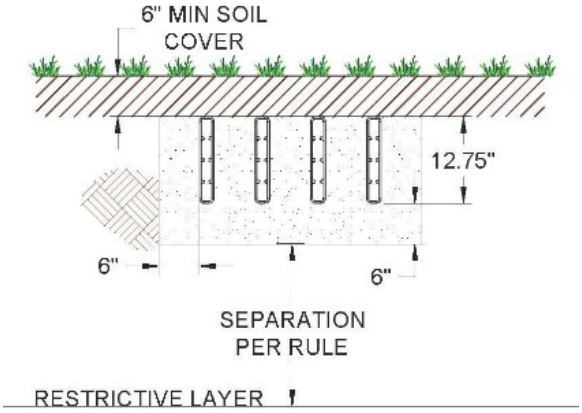
The AeroFin is designed for use following a rule-compliant septic tank or other device or treatment system that treats to septic tank effluent or better.

Water Purification Systems

Water purification systems and water softeners should not discharge into an AeroFin system. This “backwash” does not require treatment and the additional flow may overload the system. The Rules may allow for alternative means of disposal. If there is no alternative means of disposing of this backwash other than in an AeroFin system, then the system size shall be increased. Contact Infiltrator Water Technologies’ Technical Services Department for technical assistance at 1-800-221-4456.

Separation Distances (Horizontal and Vertical)

Horizontal setbacks are measured from the outermost edge of the system sand bed area. Vertical separation distances are measured from 6 inches below the fin rows. Follow the Rule to determine required vertical separation to the seasonal high-water table.



System Soil Cover Material

A minimum of 6 inches of suitable earth cover (topsoil or loam), with a texture similar to the soil at the site and capable of sustaining plant growth, must be placed above the installed system. The addition of filtration fabric on top of the AeroFin system is not required before placing cover material.

AeroFin System Definitions

In this document minimum system sand footprint area refers to the surface onto which the fin rows are placed and the 6 inches of system sand between and around the fins. Maintaining this minimum system sand footprint area is required to ensure adequate treatment. Minimum System Sand Bed Area (SSBA) refers to the minimum basal area required based upon the soil loading rate for a given DDF. Maintaining this SSBA is required to ensure long-term hydraulic performance. System sand extension (SSE) refers to the 6-inch system sand layer(s) added to the system sand footprint to make up the difference in area required between the minimum system sand footprint area and the minimum SSBA, see next page for illustrations. Not all systems will require a SSE. Systems sloping greater than 10% require a minimum 2.5-foot-wide SSE on the downslope side of the bed or trench including design SSE.

A trench system is limited to a maximum of 8-feet-wide. A bed system exceeds 8 feet in width. Maximum bed or trench length is 115 feet. Bed systems and trench systems follow the same design guidelines.

AeroFin in Trenches

AeroFin may be installed in trench configurations on level or sloping terrain and may utilize serial or parallel distribution. Trench systems may be installed up to 8 feet wide and may incorporate one to 10 rows of fins. Trench bottom area requirements are calculated using the adjusted soil application rate for trenches from Table 3. Trench bottoms must be level below fin rows, but SSE areas may slope with the terrain. System sand extensions must always be located on the downslope side of the trench when placed on slopes over 5%. A minimum of 6 inches of system sand is required below, between and around the perimeter of all fin rows. Trench separation is 5 feet measured edge-to-edge.

AeroFin in Beds

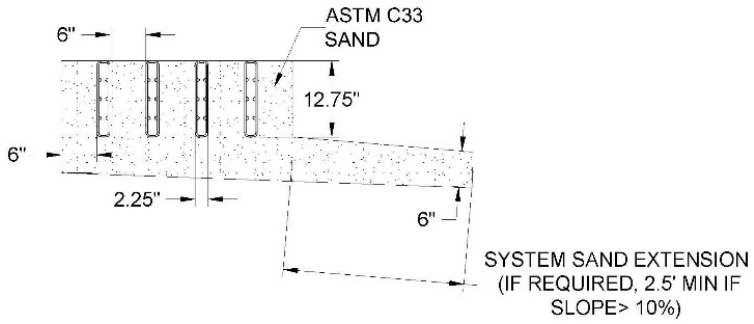
AeroFin may be designed and installed as a bed configuration using the same design guidelines as trench systems. Bed systems use the bed adjusted soil application rate portion of Table 3. Bed bottoms may slope with the existing terrain to minimize impact to a site. Bed bottoms may also be terraced at various widths to accommodate stepped system design. Multiple beds may be used if site conditions do not allow a single bed. Infiltrator Water Technologies' Technical Services Department is available for consultation on unique site designs.

System Sand Extension

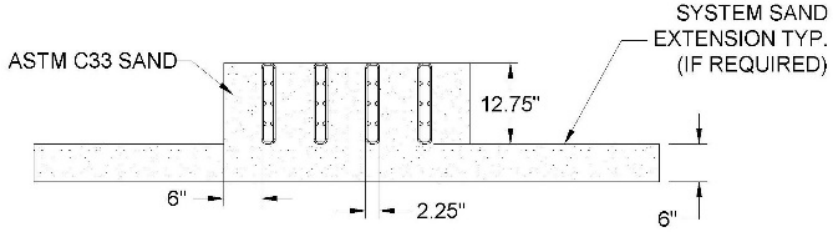
AeroFin will treat the wastewater in a properly designed system sand bed footprint, based on the design flow to the system, without regard for the soils the system is placed in or upon. To ensure long-term hydraulic performance, it may be necessary to increase the system sand bed footprint beyond what is needed to accommodate the flow-based design treatment area. This additional area is made up with the use of system sand extensions (SSE). A SSE is a minimum of 6 inches deep. In systems sloping more than 10%, a minimum 2.5 feet wide SSE is required.

SSEs are placed entirely on the downslope side of the SSBA for sloping AeroFin systems and equally divided on each side of the SSBA for level AeroFin systems.

Sloping System Cross Section:



Level System Cross Section:

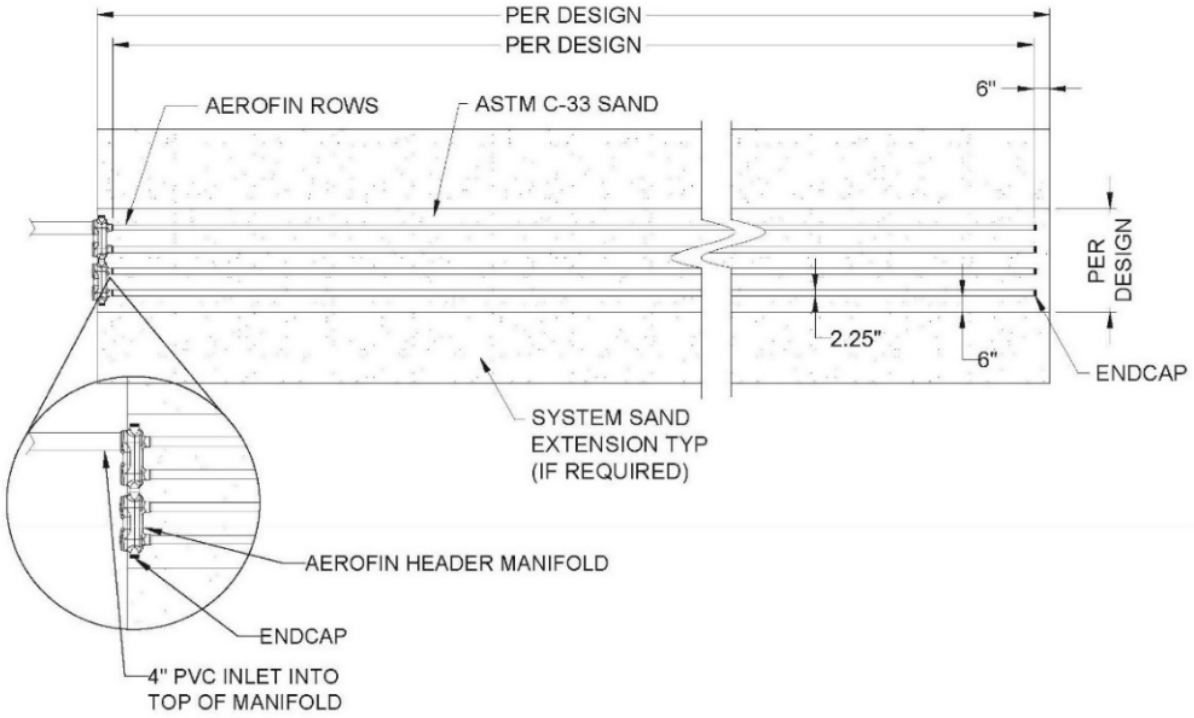


Row Requirements

- Maximum bed or trench length is 115 feet.
- Minimum center-to-center row spacing is 8.25 inches to accommodate the minimum 6 inches of system sand material between rows.
- For beds or trenches on level terrain (5% slope or less) the AeroFin rows shall be centered in the middle of the SSBA and any system sand extensions (SSEs) shall be divided evenly on both sides.
- For level or sloping beds or trenches on sloping terrain (greater than 5% site slope) all rows shall be grouped 6 inches from the up-slope edge of the SSBA with any SSE placed entirely on the downslope side. If the slope of the system exceeds 10% a 2.5 foot minimum SSE is required.
- For sloping beds, the elevations for each AeroFin row must be provided on the drawing.
- Each row shall be installed level to within +/- ½ inch (total of 1 inch) of the specified elevation and preferably should be parallel to the contour of the site.
- It is most convenient if fin-row lengths are designed in 8-foot increments to accommodate the length of the product as manufactured. However, individual fin segments can be cut to any length from the narrow end of the segment.

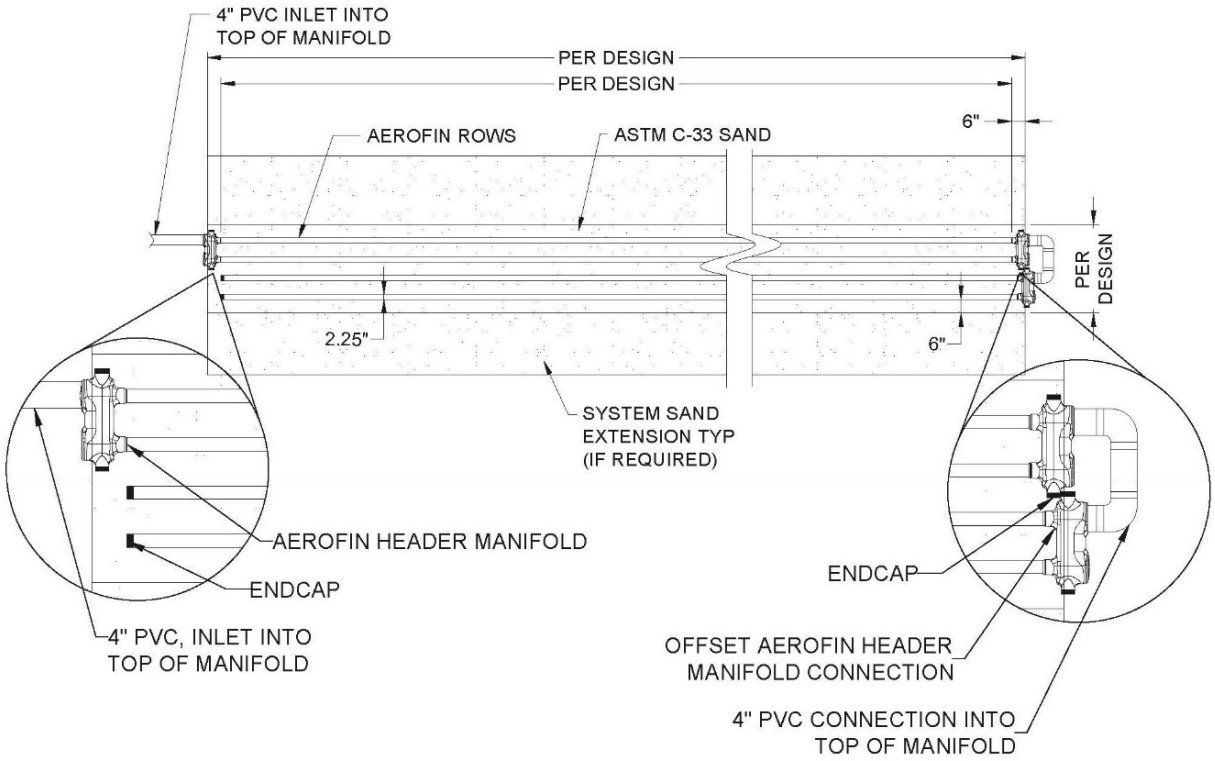
Parallel Distribution

AeroFin systems may be designed using parallel distribution by interconnecting AeroFin Manifolds as shown below.



Serial Distribution

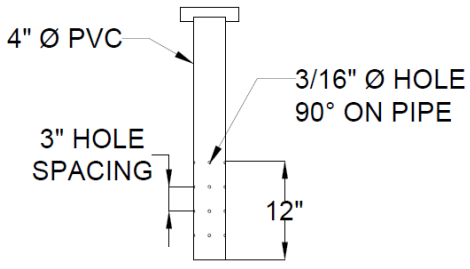
AeroFin systems may be designed using serial distribution. To maintain 6-inch fin spacing, offset the manifold at the ends as shown below.



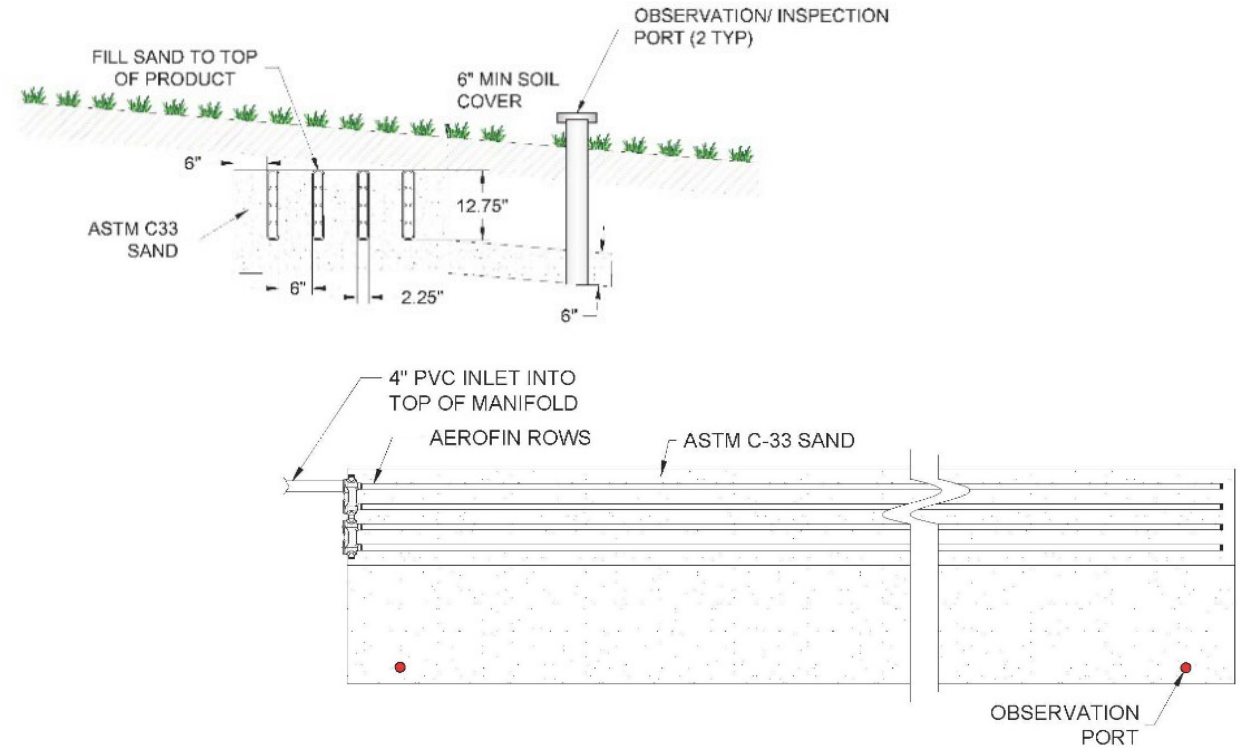
Observation/Inspection Port

A minimum of two observation/inspection ports shall be installed with access from the ground surface as shown. The observation tube shall be open at the bottom and be void of sand or gravel to the infiltrative surface to allow visual monitoring of standing liquid in the field. The pipe is placed flush with the sand/soil interface.

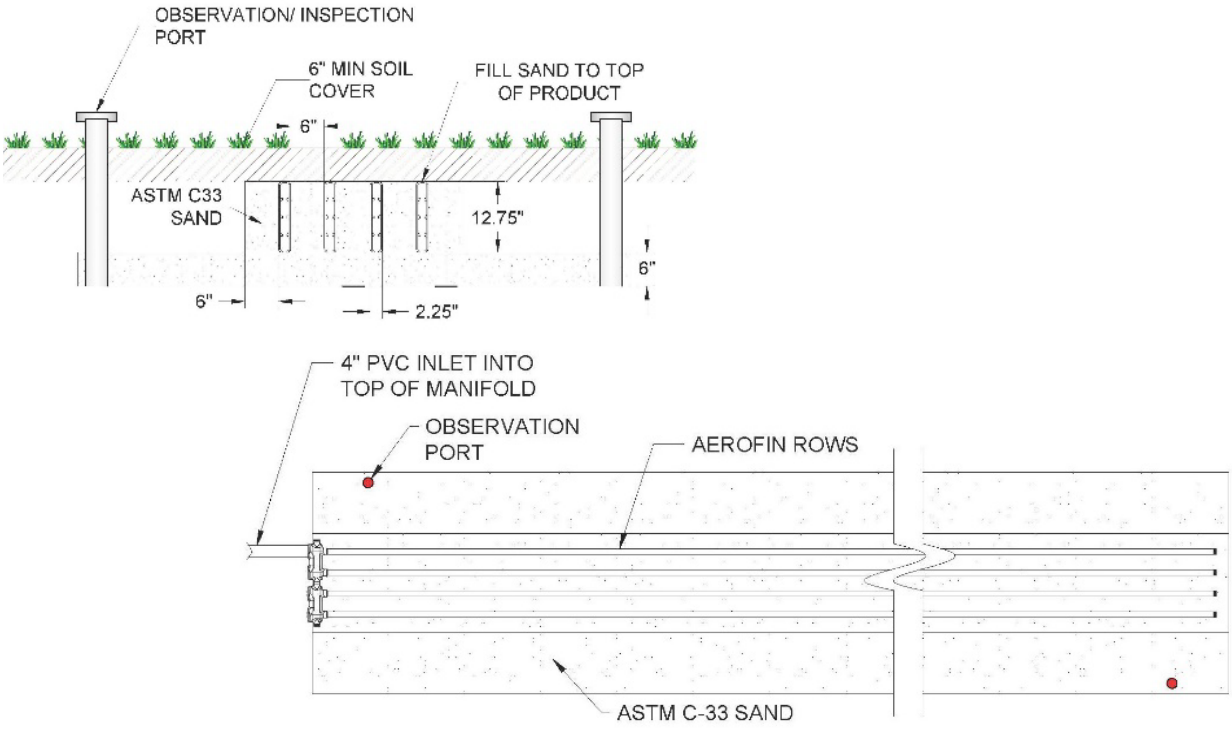
Inspection/monitoring ports are constructed with 4-inch PVC pipe with a removable cap. 3/16-inch holes drilled at 3-inch spacing in the lower portion of the pipe. The pipe is then wrapped in filter fabric to prevent sand intrusion.



Sloping system observation/inspection port locations:



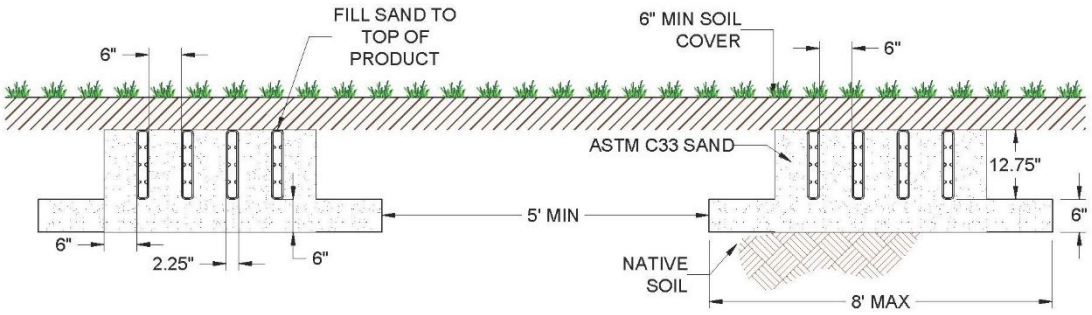
Level system observation/inspection port locations:



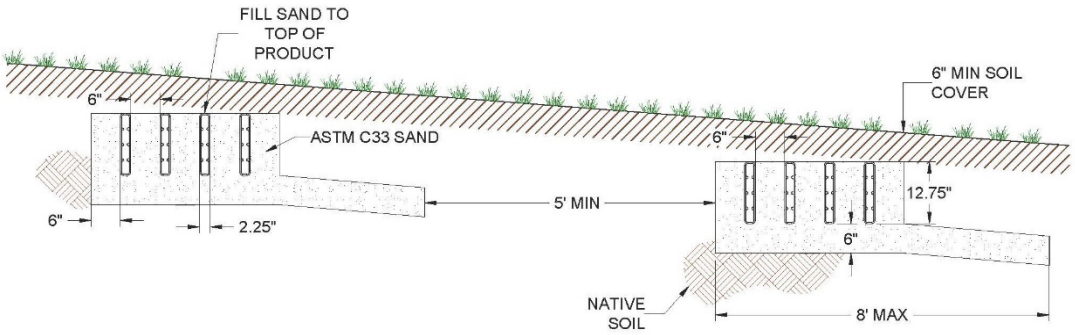
The system layouts presented in this section of the Manual are intended as general guidance. These designs are in no way intended to restrict design flexibility.

AeroFin Trench Configurations

Subsurface Cross-Section View – Level Site



Subsurface Cross-Section View – Sloping Site

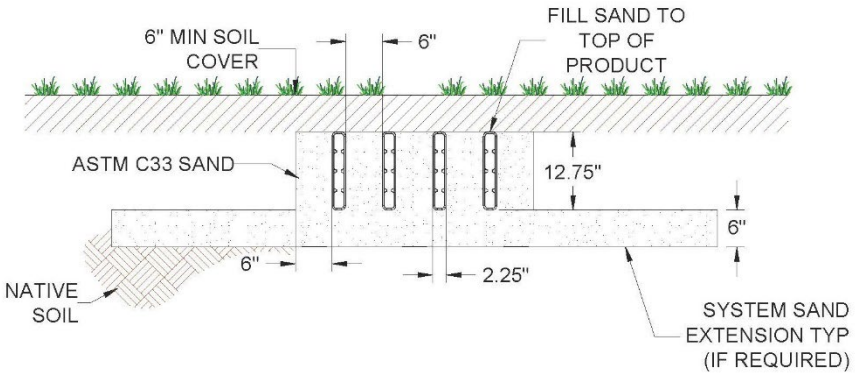


NOTES:

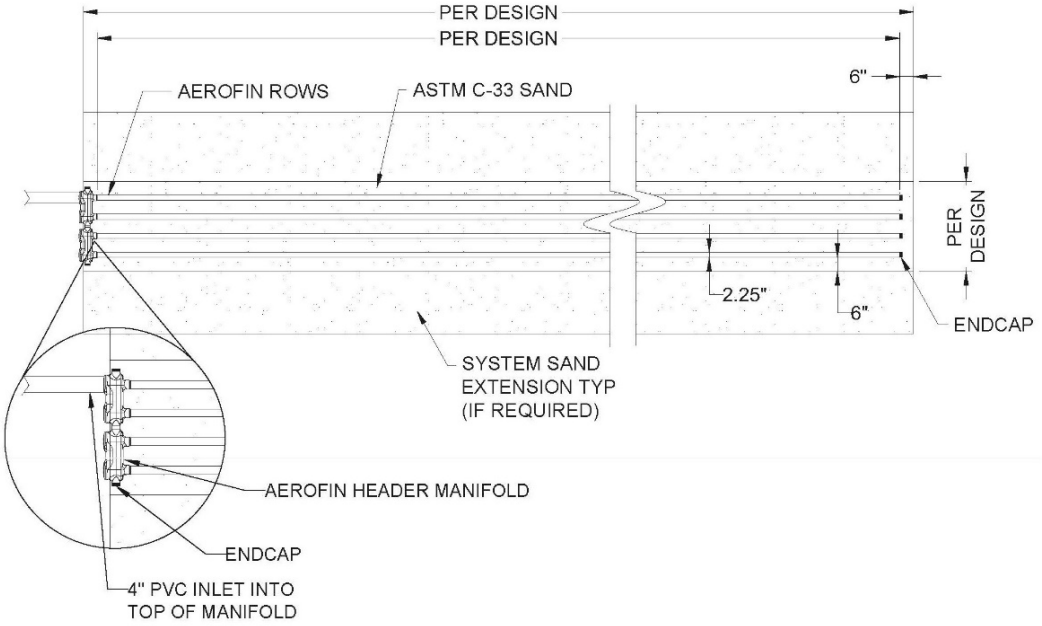
1. Number and length of fin rows shall be per the design.
2. Maximum trench width is 8 feet.
3. Trench systems require bed bottoms remain level below fin rows, SSE may slope with grade.
4. When using AeroFin in trench configurations, the total trench bottom area must be equal to or greater than the minimum basal area required based on soil loading rates. See Table 2, page 14 in this manual.
5. AeroFin edge-to-edge trench spacing is 5 feet measured edge to edge.
6. Venting is not required but is optional at the discretion of the designer. Contact Infiltrator Water Technologies' Technical Services Department for assistance at1-800-221-4456.
7. Pumping is not required unless gravity flow cannot be achieved. Pumping to the manifold is not permitted. Systems that require pumping or dosing must pump to a D-box then use gravity flow into the manifold.

Level Subsurface Systems

Cross-Section View



Plan View

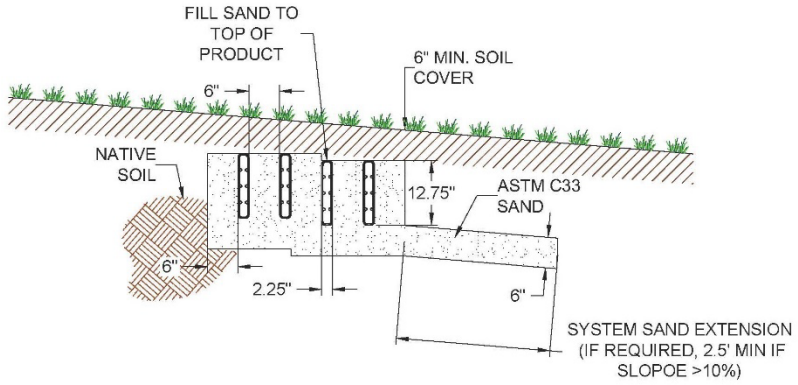


NOTES:

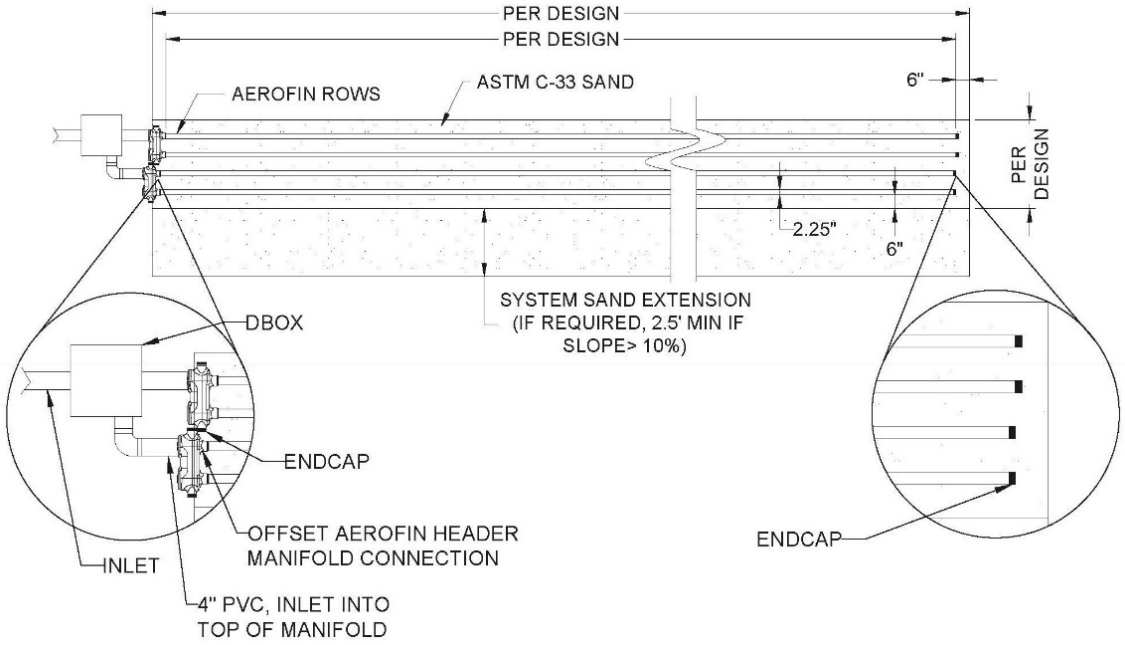
1. Number and length of fin rows shall be per the design.
2. Venting is not required but is optional at the discretion of the designer. Contact Infiltrator Water Technologies' Technical Services Department for assistance at 1-800-221-4456.
3. Pumping is not required unless gravity flow cannot be achieved. Pumping to the manifold is not permitted. Systems that require pumping or dosing must pump to a D-box then use gravity flow into the manifold.
4. Parallel distribution is shown, but the AeroFin can be installed with either serial or parallel distribution.

Sloped Subsurface Systems

Cross-Section View



Plan View

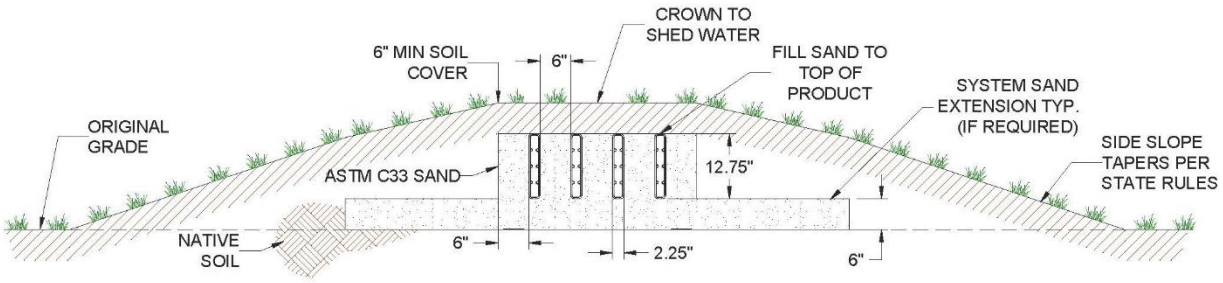


NOTES:

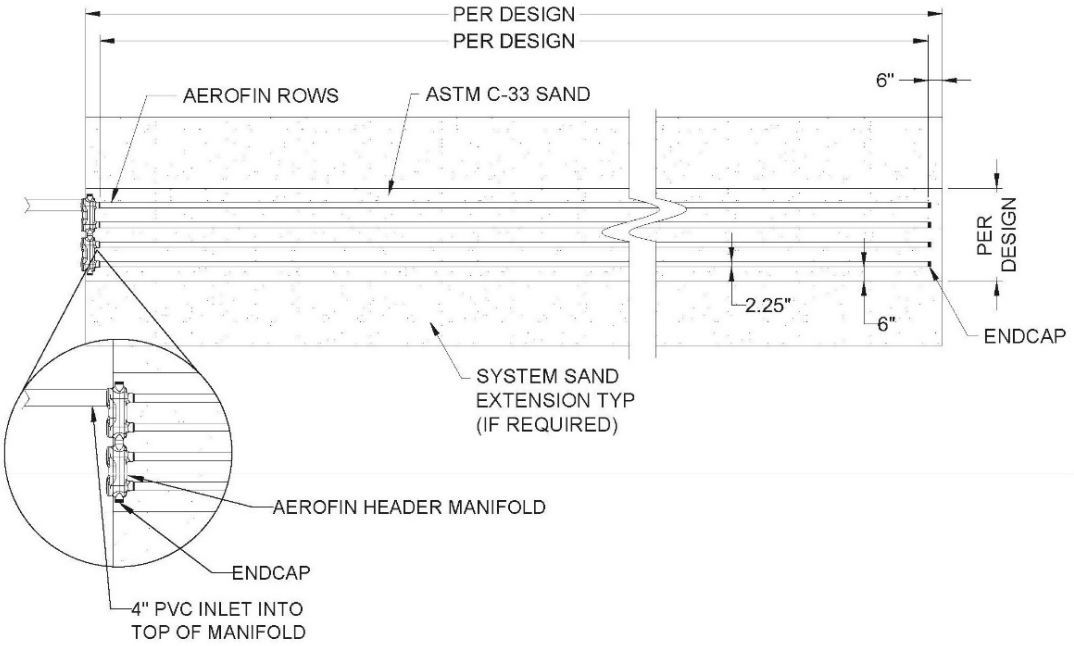
1. Number and length of fin rows shall be per the design.
2. Venting is not required but is optional at the discretion of the designer. Contact Infiltrator Water Technologies' Technical Services Department for assistance at 1-800-221-4456.
3. Pumping is not required unless gravity flow cannot be achieved. Pumping to the manifold is not permitted. Systems that require pumping or dosing must pump to a D-box then use gravity flow into the manifold.
4. Parallel distribution is shown, but the AeroFin can be installed with either serial or parallel distribution.
5. Sloping systems may be designed with all fin rows level or they may be stepped as shown using AeroFin sections comprised of fin rows in multiples of two.

Level Above-Grade Systems

Cross-Section View



Plan View

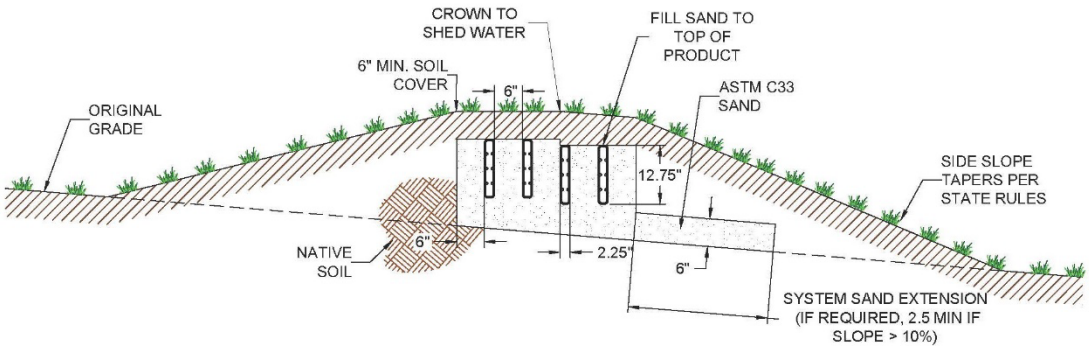


NOTES:

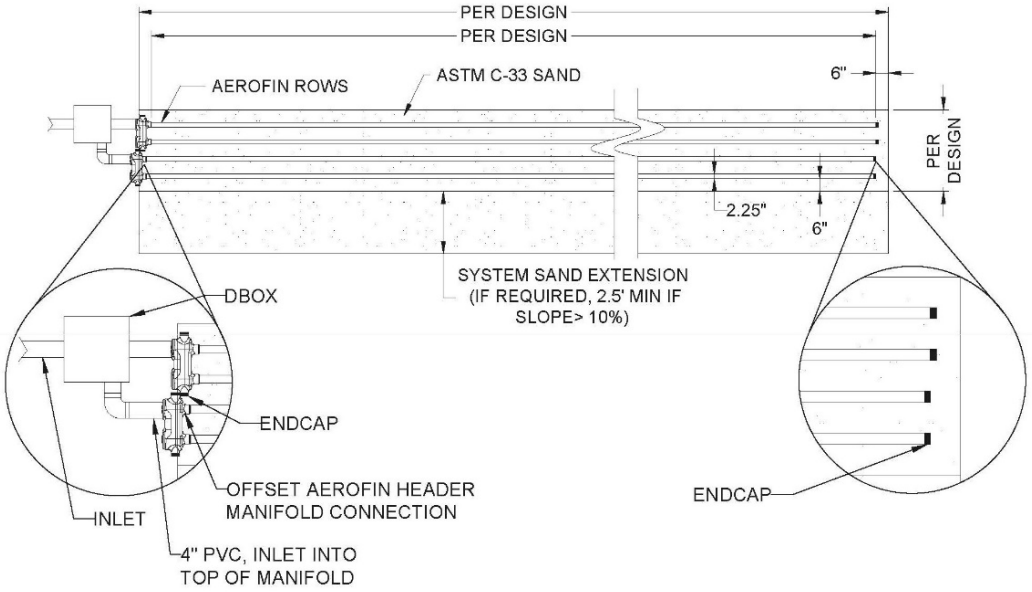
1. Number and length of fin rows shall be per the design.
2. Venting is not required but is optional at the discretion of the designer. Contact Infiltrator Water Technologies' Technical Services Department for assistance at 1-800-221-4456.
3. Pumping is not required unless gravity flow cannot be achieved. Pumping to the manifold is not permitted. Systems that require pumping or dosing must pump to a D-box then use gravity flow into the manifold.
4. If the infiltrative surface of the AeroFin bed or trench must be elevated to achieve minimum vertical separation requirements, the area between the original grade and the AeroFin system sand shall be comprised of additional ASTM C33 sand.

Sloped Above-Grade Systems

Cross-Section View



Plan View



NOTES:

1. Number and length of fin rows as per the design.
2. Sloping systems may be designed with fin rows level or they may be stepped as shown using AeroFin sections comprised of fin rows in multiples of two.
3. Venting is not required but is optional at the discretion of the designer. Contact Infiltrator Water Technologies' Technical Services Department for assistance at 1-800-221-4456.
4. Pumping is not required unless gravity flow cannot be achieved. Pumping to the manifold is not permitted. Systems that require pumping or dosing must pump to a D-box then use gravity flow into the manifold.
5. If the infiltrative surface of the AeroFin bed or trench must be elevated to achieve minimum vertical separation requirements, the area between the original grade and the AeroFin system shall be comprised of additional ASTM C33 sand.

The AeroFin system can be designed in five simple steps. The sizing tables and design procedure are provided below, followed by several design examples for typical system configurations.

Sizing Tables

Table 1: Minimum System Sand Bed Width

Number of Fin Rows	*Minimum Width Per Number of Fin Rows*											
	2	3	4	5	6	7	8	9	10	11	12	Each Additional
Minimum Width (feet)	1.88	2.57	3.25	3.94	4.63	5.32	6.00	6.69	7.38	8.07	8.75	0.69
Minimum Width (inches)	22.5	30.8	39.0	47.2	55.5	63.8	72.0	80.2	88.5	96.8	105.0	8.3

Table 2: Adjusted System Soil Absorption Rates

Percolation Rate (minutes/inch)	SARa Trenches (GPD/square foot)	SARa Beds (GPD/square foot)
Less than 1.00	Site Specific	Site Specific
1.00 to less than 3.00	6.40	3.95
3	5.42	2.53
4	4.53	2.17
5	3.72	1.79
7	2.66	1.31
10	1.95	0.98
15	1.31	0.66
20	1.05	0.54
25	0.90	0.49
30	0.76	0.41
35	0.66	0.36
40	0.60	0.34
45	0.54	0.31
50	0.51	0.29
55	0.49	0.27
greater than 55 to 60	0.43	0.25
greater than 60 to 120	0.31	0.18
greater than 120	Site Specific	Site Specific

Design Procedure

Step 1: Determine Daily Design Flow (DDF)

Determine the residential DDF in accordance with AZ R18-9-314(4), which requires the number of fixtures be considered.

Step 2: Calculate the Minimum Length of Fin Required
Calculate the minimum length of fin required at 1.88 gallons/foot of fin (DDF ÷ 1.88). Round up to an even number.

Step 3: Design the System Configuration
Determine the minimum system sand footprint area using the minimum length of fin required as determined from Step 2 and the number of fin rows into which the minimum length of fin required will be divided. Consider the following for system sand footprint area design:

- Determine the fin row length that best fits the site.
- Determine the number of fin rows required to meet the minimum length of fin from Step 2.
- Use Table 1 to determine minimum system sand bed width based on the number of fin rows needed. Systems sloping greater than 10% may require a bed or trench width adjustment in Step 5 to accommodate the minimum SSE requirement of 2.5 feet.

Step 4: Determine the Minimum System Sand Bed Area (SSBA)
Using common practice and in accordance with the Rules, determine the soil percolation rate for the site. Given the soil percolation rate and the number of bedrooms in the design, calculate the minimum required SSBA by dividing the daily design flow from Step 1 by the Adjusted System Soil Absorption Rates (SARa) from Table 2.

Step 5: Make area adjustments, as necessary.
The minimum areas determined in Steps 3 and 4 cannot be reduced. These areas must be maintained to ensure adequate area for placement of the AeroFin conduits and infiltration of treated effluent into the native soil.

Area adjustments may be necessary as follows:

- If the minimum SSBA determined using Table 2 (Step 4) is smaller than the area of the system sand footprint determined in Step 3, no adjustments are necessary.
- If the minimum SSBA determined using Table 2 (Step 4) is larger than the area of the system sand footprint determined in Step 3, the system sand footprint must be increased by adding SSE(s).
- In either case, if the system slope is greater than 10%, the system will require a 2.5 foot minimum SSE on the downslope side.

In most instances, the width of the system sand component is widened to increase the system sand footprint. When making adjustments to the width of the system sand footprint:

- In level system applications, additional width shall be evenly divided on each side of the AeroFin minimum basal area;
- In sloped system applications, additional width shall be entirely placed on the downslope side of the AeroFin minimum basal area.

NOTE: *The length of the bed or trench area may be altered, but only by extending the length of the fin rows. Fins are manufactured 8-feet segments but may be cut to any length.*

Design Example #1 – Trench Design

Single-Family Residence, four bedrooms, less than 28 fixtures, 20 MPI perc rate.

Step 1: Determine Daily Design Flow

The daily design flow determined in accordance with AZ R18-9-314(4) is 600 GPD.

Step 2: Calculate the Minimum Length of Fin Required

The minimum length of fin required at 1.88 gallons/foot of fin is calculated at 600 GPD ÷ 1.88 = 319.14. Round up to 320 feet.

Step 3: Design the System Sand Configuration

Considering the site, a row length of 80 feet is selected. 80-foot-long rows will require four rows of fins to provide 320 total feet of fin. This meets the 320 foot minimum length requirement from Step 2. Referencing Table 1, the system sand bed width required for four fin rows is 3.25 feet (39 inches).

Number of Fin Rows	*Minimum Width Per Number of Fin Rows*											
	2	3	4	5	6	7	8	9	10	11	12	Each Additional
Minimum Width (feet)	1.88	2.57	3.25	3.94	4.63	5.32	6.00	6.69	7.38	8.07	8.75	0.69
Minimum Width (inches)	22.5	30.8	39.0	47.2	55.5	63.8	72.0	80.2	88.5	96.8	105.0	8.3

Table 1: Minimum System Sand Bed Width

Step 4: Calculate the Minimum Basal Area

A 3.25-foot-wide system is below the 8-foot maximum width for trenches. Therefore, the system will be designed using the Trench SAR for the soil perc rate from Table 2.

Percolation Rate (minutes/inch)	Trenches (GPD/square foot)	Beds (GPD/square foot)
10	1.95	0.98
15	1.31	0.66
20	1.05	0.54
25	0.90	0.49
30	0.76	0.41

Table 2: Adjusted System Soil Absorption Rates

From Table 2 using an absorption rate of 1.05 GPD/square foot will require 571.4 square feet (600 GPD ÷ 1.05) of trench bottom area. Round up to 575 square feet for ease of construction.

Step 5: Make area adjustments, as necessary.

Option 1: Level System

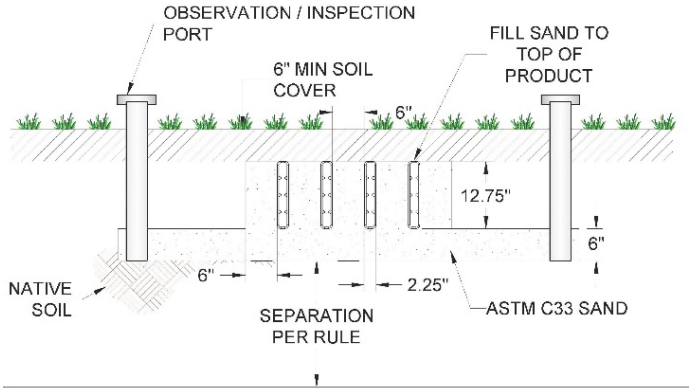
On a level system, the required SSEs are evenly divided on both sides of the system sand footprint.

From Step 3 the system sand configuration is four rows 80 feet long and a trench dimension of 3.25 feet wide by 81 feet long, which results in a total system sand footprint of 263.25 square feet.

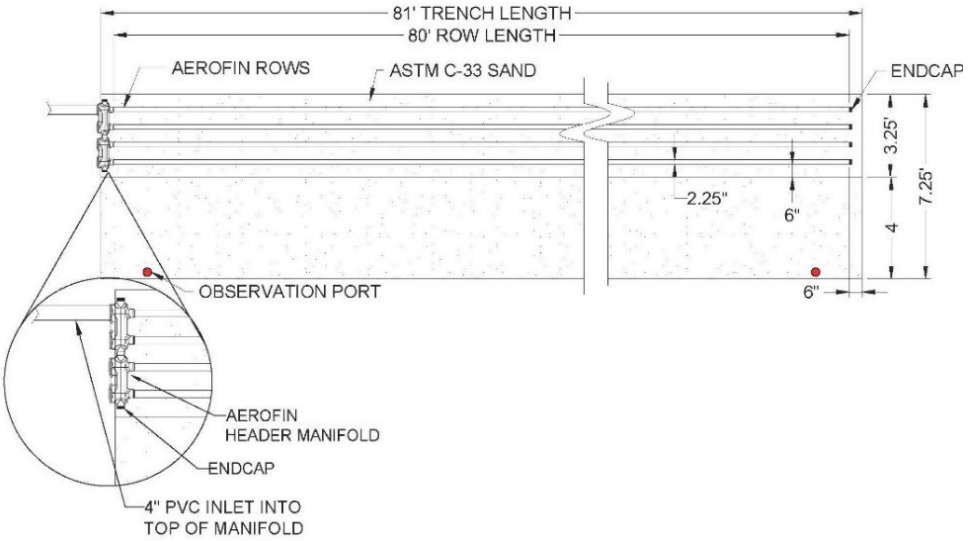
- From Step 4, a 600 GPD system in 20 MPI soils requires a minimum of 575 square feet, which exceeds the 263.25 square foot basal area provided by the system sand footprint. An adjustment to the size of the system sand footprint is necessary.
  - Divide the minimum SSBA by the length of the system sand bed. 575 square feet ÷ 81 feet = 7.10 feet.
  - Subtract the original system sand footprint width from the above adjusted system sand footprint width. 7.10 feet – 3.25 feet = 3.85 feet.
  - Divide the additional required width by 2 to determine the sand extension to add to each side of the system sand footprint width. 3.85 feet ÷ 2 = 1.93 feet Round up to 2.0 feet for ease of construction.

The system sand width must be widened by 4 feet, by adding 2.0 feet of system sand to each side, resulting in a total width of 7.25 feet (3.25 feet + 2.0 feet + 2.0 feet). The final SSBA measurement is 7.25 feet x 81 feet = 587.25 square feet which exceeds the 575 square feet system sand bed area requirement.

Cross Section View:



Plan View:



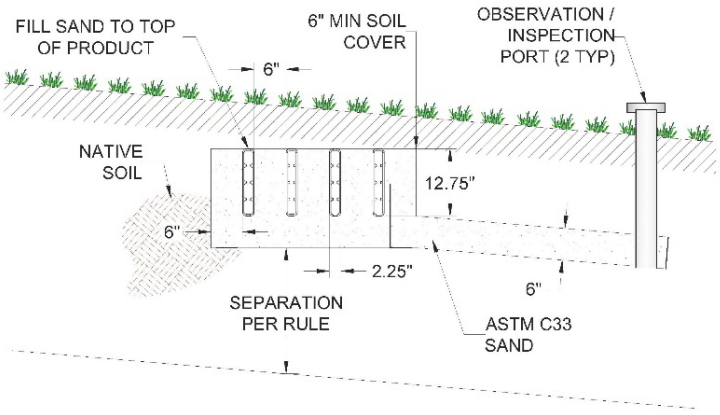
Option 2: Sloped System (12% slope)

On a sloped system, the required SSE will be placed on the downslope side of the system sand footprint. Systems that slope over 10% require a minimum SSE of 2.5 feet.

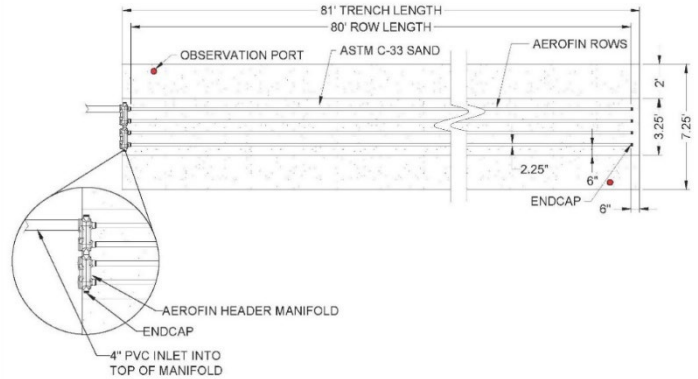
From Step 3 the system sand configuration is four rows 80 foot long and a trench dimension of 3.25 feet wide by 81 feet long, which results in a total system sand footprint of 263.25 square feet.

- From Step 4 the 600 GPD system in 20 MPI soils requires a minimum basal area of 575 square feet which exceeds the 263.25 square foot basal area provided by the system sand footprint. An adjustment to the size of the system sand footprint is necessary.
  - Divide the basal area by the length of the system sand. 575 square feet ÷ 81 feet = 7.10 feet.
  - Subtract the original system sand footprint width from the above adjusted system sand footprint width. 7.10 feet – 3.25 feet = 3.85 feet Round up to 4 feet for ease of construction.

The system footprint must be widened by 4 feet by adding system sand to the downslope side of the system sand footprint, resulting in a total width of 7.25 feet (3.25 feet + 4 feet). The final SSBA measurement is 7.25 feet x 81 feet = 587.25 square feet which exceeds the 575 square feet SSBA requirement as calculated in Step 4. This system design slopes more than 10%. The 4 feet SSE exceeds the 2.5 feet minimum SSE requirement.
Cross Section View:



Plan View:



Design Example #2 – Bed Design

Commercial application treating residential strength effluent. DDF = 1,000 GPD. 5 MPI perc rate.

Step 1: Determine Daily Design Flow

The daily design flow determined in accordance with AZ R18-9-314(4) is 1,000 GPD.

Step 2: Calculate the Minimum Length of Fin Required

The minimum length of fin required at 1.88 gallons/foot of fin is calculated at 1,000 GPD ÷ 1.88 = 531.9. Round up to 532 feet.

Step 3: Design the System Sand Configuration

Considering the site, a row length of 48 feet is selected. 48-foot-long rows will require 12 rows of fins to provide 576 total feet of fin. This meets the 532-foot minimum length requirement from Step 2. Referencing Table 1, the system sand bed width required for 12 fin rows is 8.75 feet (105 inches).

Number of Fin Rows	*Minimum Width Per Number of Fin Rows*											
	2	3	4	5	6	7	8	9	10	11	12	Each Additional
Minimum Width (feet)	1.88	2.57	3.25	3.94	4.63	5.32	6.00	6.69	7.38	8.07	8.75	0.69
Minimum Width (inches)	22.5	30.8	39.0	47.2	55.5	63.8	72.0	80.2	88.5	96.8	105.0	8.3

Table 1: Minimum System Sand Bed Width

Step 4: Calculate the Minimum Basal Area

An 8.75-foot-wide system is above the 8-foot maximum width for trenches. System will be designed using the Bed SARa for the soil perc rate from Table 2.

Percolation Rate (minutes/inch)	SARa Trenches (GPD/square foot)	SARa Beds (GPD/square foot)
Less than 1.00	Site Specific	Site Specific
1.00 to less than 3.00	6.40	3.95
3	5.42	2.53
4	4.53	2.17
5	3.72	1.79
7	2.66	1.31

Table 2: Adjusted System Soil Absorption Rates

From Table 2, using an absorption rate of 1.79 GPD/square foot will require 558.65 square feet (1,000 GPD ÷ 1.79) of bed bottom area.

Step 5: Make area adjustments, as necessary.

Option 1: Level System

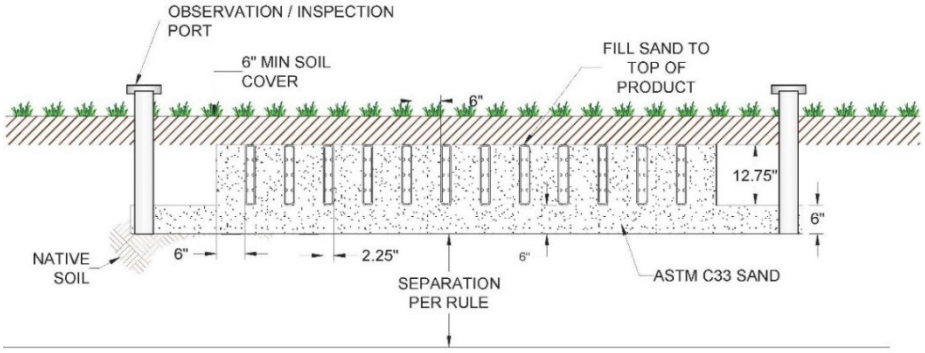
On a level system, the required SSEs are divided on both sides of the system sand footprint.

From Step 3 the system sand configuration is 12 rows 48 foot long for a bed dimension of 8.75 feet wide by 49 feet long, which results in a total system sand footprint of 428.75 square feet.

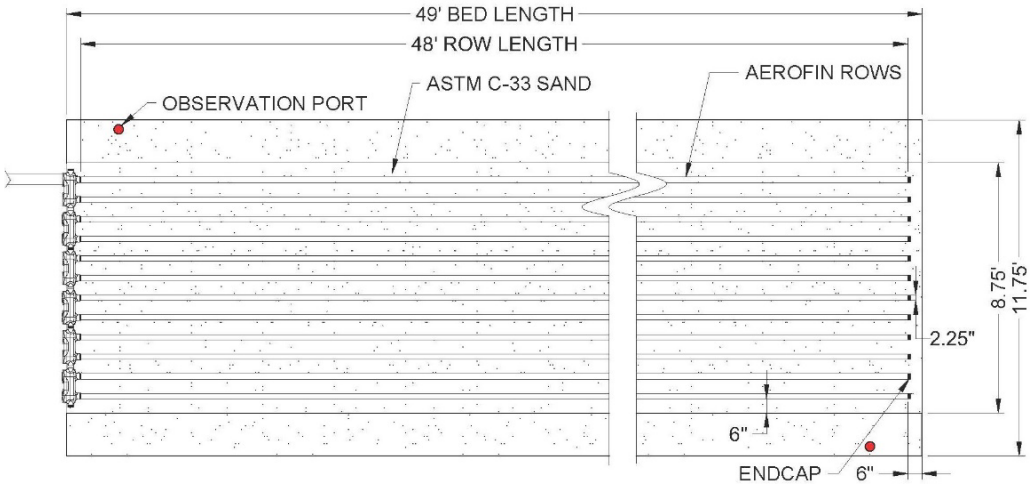
- From Step 4, a 1,000 GPD system in 5 MPI soils requires a minimum of 558.65 square feet which exceeds the 428.75 square feet basal area provided by the system sand footprint. An adjustment to the size of the system sand footprint is necessary.
  - Divide the basal area by the length of the system sand. 558.65 square feet ÷ 49 feet = 11.4 feet.
  - Subtract the original system sand footprint width from the above adjusted system sand footprint width. 11.4 feet – 8.75 feet = 2.65 feet.
  - Divide the additional required width by 2 to determine the sand extension to add to each side of the system sand footprint width. 2.65 feet ÷ 2 = 1.33 feet. Round up to 1.5 feet for ease of construction.

The system sand width must be widened by 3 feet, by adding 1.5 feet of system sand to each side, resulting in a total width of 11.75 feet (8.75 feet + 1.5 feet + 1.5 feet) 11.75 feet x 49 feet = 575.75 square feet which exceeds the 558.65 square feet system sand bed area requirement.

Cross Section View:



Plan View:



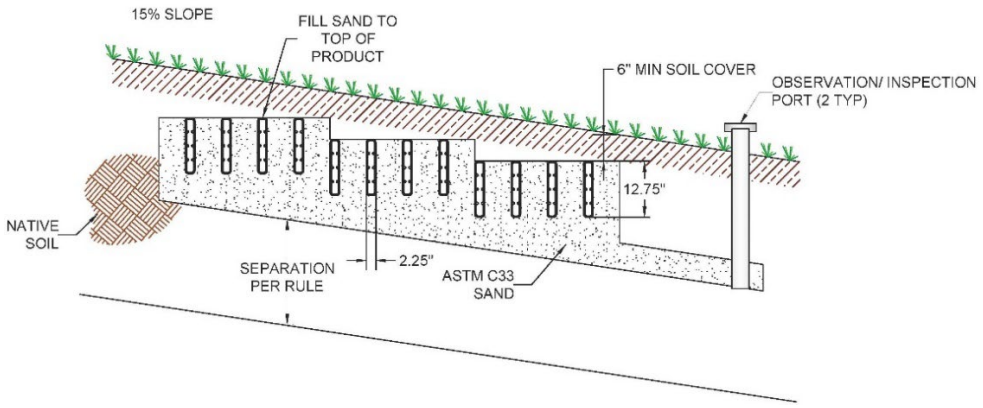
Option 2: Sloped System (15% slope)

From Step 3 the system sand configuration is 12 rows 48-foot-long and a bed dimension of 8.75 feet wide by 49-feet-long, which results in a total basal area of 428.75 square feet.

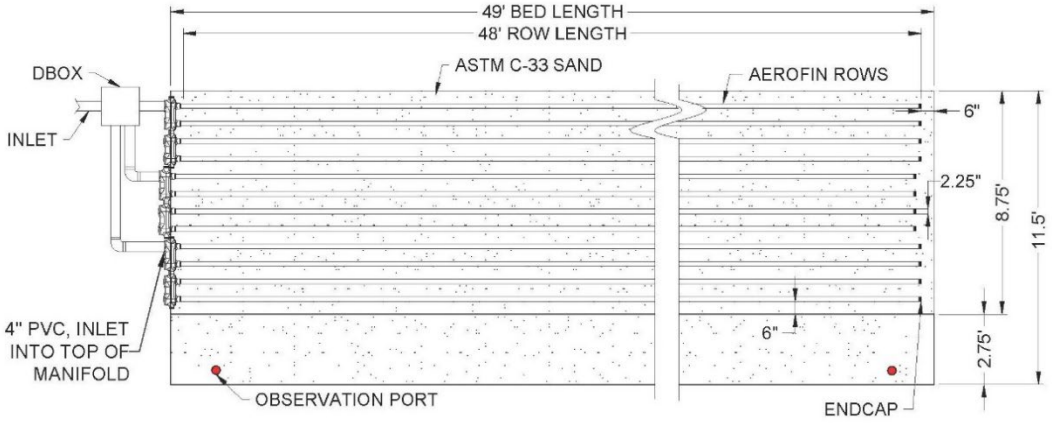
- Fromm Step 4 the 1,000 GPD system in 5 MPI soils requires a minimum basal area of 558.65 square feet which exceeds the 428.75 square foot basal area provided by the system sand footprint. An adjustment to the size of the system sand footprint is necessary.
  - Divide the basal area by the length of the system sand. 558.65 square feet ÷ 49 feet = 11.4 feet.
  - Subtract the original system sand footprint width from the above adjusted system sand footprint width. 11.4 feet – 8.75 feet = 2.65 feet Round up to 2.75 feet for ease of construction.

The system footprint must be widened by 2.75 feet by adding system sand to the downslope side of the system sand footprint, resulting in a total width of 11.5 feet (8.75 feet + 2.75 feet). The final SSBA measurement is 11.5 feet x 49 feet = 563.5 square feet which exceeds the 558.65 square feet SSBA requirement as calculated in Step 4. This system slopes more than 10% and the 2.75 feet SSE exceeds the 2.5 feet minimum SSE requirement.

Cross Section View:



Plan View:



Before You Begin

These installation instructions are for AeroFin. AeroFin may only be installed according to applicable state and local permitting authority requirements.

If unsure of the installation requirements for a site, contact your local permitting authority. If unsure of the applicability of AeroFin for a given site, contact Infiltrator Water Technologies. The soil and site evaluation and the design of the onsite system must be reviewed, and a construction permit obtained from the local permitting authority before installation.

Materials and Equipment Needed

- AeroFin
- AeroFin Manifolds
- AeroFin Endcaps
- ASTM C33 system sand
- AeroFin Install Tool(s)
- PVC pipe and couplings
- Excavation equipment
- Laser (transit or level)
- Shovel and rake
- 4-inch observation ports and caps
- Tape measure

Common practices shall apply to the installation of the AeroFin. These include, but are not limited to:

- avoid soil compaction on the infiltrative surface area, including all areas downslope of a sloped system;
- use a tracked vehicle for material installation if possible;
- avoid installation during wet periods; and
- install the AeroFin components and system sand on the same day that the system footprint is excavated/exposed.

Handling Instructions

Compression of the AeroFin components during transport, storage, or construction shall be avoided.

Excavating and Preparing the Site

NOTE: *Do not install the system during periods when the soil is sufficiently wet to exceed its plastic limit, as this causes construction machinery to smear the soil.*

1. Stake out the locations of tank(s), pipes, and corners of the system to be tilled/excavated, per system design. Set the elevations as shown on the approved plan.
2. Install sedimentation and erosion control measures if required or needed.

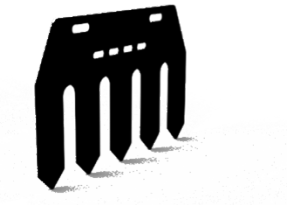
   NOTE: *The installation of temporary drainage swales/berms (surface diversions) may be necessary to protect the site during rainfall events.*
3. Excavate the system area or till the ground as per the design.
4. Rake the bottom and sides (when applicable) of the excavation if smearing has occurred during excavation. Remove large stones and protruding roots.

   NOTE*: Smearing does not occur in sandy soils, so raking is not necessary. In fine textured soils (silts and clays), avoid walking on the excavation bottom to prevent compaction and loss of soil structure.*
5. Verify that the system area is at the proper elevation and slope from side-to-side and from end-to-end using a level, transit, or laser.

Installing the AeroFin

1. Install the 6-inch-deep system sand basal layer over the entire bed or trench area as per the design. System sand should be leveled and stabilized prior to placement of the AeroFin system. Installer should retain records certifying that system sand meets ASTM C33 requirements.
2. Assemble the AeroFin Manifold and place it in the proper location on the system sand basal area.
3. Place AeroFin components on the surface of the system sand in the configuration shown on the system design. Using the snap-lock feature, snap the fins to the AeroFin Manifold, then connect fins end-to-end to create rows of the required length.
4. Fin rows shall be installed level to within +/- ½ inch (total 1 inch tolerance) of the specified elevation. A laser level or transit is recommended to ensure proper alignment.
5. Fin rows shall be:
   - installed parallel to the contours; and
   - separated by a minimum of 6 inches of system sand.

   AeroFin Install Tool

   Infiltrator offers an installation aid for installing fin rows, ensuring the minimum 6 inches of system sand between fin rows is maintained throughout the system and fins do not move during installation. The AeroFin Install Tool is reusable and available where AeroFin components are sold.
6. Once the fins are placed on the surface of the system sand and manifold system and/or end caps are connected to the fins per design, additional system sand shall be ladled between and to the top of each of the fin rows and lightly compacted by walking in the sand after placement for fin stabilization and support. System sand shall also be installed on each side and at each end of the backfilled rows, per the design.
7. Remove AeroFin Install Tools and store for next system installation.

Covering the System

NOTE: *Before backfilling, the system shall be inspected and approved by a representative of the local permitting authority, in compliance with state and local regulations and procedures.*

1. Material placed around the system sand and above the fins may be additional system sand or material meeting state and local requirements. However, the final 6 inches placed above or adjacent to the fins shall be comprised of material that will sustain plant growth.
2. Backfill the system by pushing material over the AeroFin system. It is best to mound several extra inches of soil over the finish grade to allow for settling. This also ensures that runoff is diverted away from the system. Keep a minimum of 12 inches of consolidated cover over the fins before driving over the system with tracked equipment. Do not drive over the system while backfilling in sand.
3. After the system is covered, the site should be seeded or sodded to mitigate the potential for erosion.

NOTE: *If the system is for new home construction, it is important to leave marking stakes along the boundary of the system. This will notify contractors of the system location so they will not cross it with equipment or vehicles. Vehicles and equipment should remain clear of the downslope side of the system.*

An AeroFin system may be out of sight, but it should not be out of mind. With proper standard maintenance and by being more aware of daily living habits homeowners will improve the life and health of the system. Here are guidelines to help you protect your investment.

Inside the Home

1. Large volumes of water over a short period of time will flush untreated solids out of the septic tank into the leachfield.
    - Practice conservation every day.
    - Space out heavy water-using activities such as washing clothes and taking showers.
    - Repair leaky faucets and valves. Consider replacing old fixtures with new low-flow fixtures.

2. Remember that an onsite wastewater treatment system uses natural biological processes so only biodegradable waste should go in it.
    - No cigarette butts, tissues, sanitary napkins, disposable diapers, cat litter, coffee grounds, or cotton swabs, etc.
    - No paints, oils, chemical drain cleaners, thinners, solvents, poisons, or pesticides. These toxic chemicals not only kill helpful bacteria but may contaminate the groundwater.
    - No grease or cooking oils. Grease may harden in the septic tank's scum layer and accumulate until it blocks the inlet or outlet. Hot grease poured down the drain may run through the septic tank and then harden, clogging the system.
    - Minimize garbage disposal use. A garbage disposal typically doubles the rate of solids buildup in the septic tank. To avoid frequent pump outs, compost your food scraps or put it in the trash.
    - Be cautious with household chemicals. Disinfectants, ammonia, bathroom cleaners, bleach, etc. can kill the bacteria the system needs to operate properly. Allow the system to dilute and neutralize them a little at a time.

Outside the Home

1. Have your tank checked for sludge and scum accumulation by a licensed contractor every two to three years. If you have high water usage or a garbage disposal, the inspections should be more frequent.
2. Keep surface water away from the AeroFin installation area. Divert downspouts, roof drainage, driveway runoff, and sump pump discharge away from the system. Landscape the yard to channel rainwater away.
3. Encourage the right plants. Remove trees such as willows that like "wet feet." Their roots may penetrate and damage the dispersal area. Grow grass or native ground cover over the system to prevent soil erosion.
4. Avoid physical damage. Don't drive over the system or compact the soil with heavy equipment. Don't dig in or build anything on the system.

Troubleshooting

In the event of a system malfunction, contact a licensed contractor. Indications the system may need service include persistent septic odor; unusually wet area atop and/or around the system; “ponding” of effluent on the surface; or “breakout” of effluent along the side of a slope.

Repair

The licensed contractor shall be contacted when there are indications of malfunction with AeroFin. When visiting the site, the licensed contractor shall do the following:

- Assess the present condition of the AeroFin system, and the surrounding area.
- Research the history of use, including:
  - water volume use
  - contaminants
- Evaluate site for groundwater intrusion and surface water drainage patterns.
- Inspect septic tank.
- Inspect the fins.
- Check the home for leaks.

Upon completion of the site visit, the licensed contractor can contact the Infiltrator Water Technologies Technical Services Department for assistance if necessary.

INFILTRATOR WATER TECHNOLOGIES STANDARD LIMITED WARRANTY

(a) The structural integrity of each unit, end cap and other accessory manufactured by Infiltrator (collectively referred to as “Units”), when installed and operated in an onsite wastewater system in accordance with Infiltrator’s installation instructions, is warranted to the original purchaser (“Holder”) against defective materials and workmanship for one year from the date upon which a septic permit is issued for the septic system containing the Units; provided, however, that if a septic permit is not required for the septic system by applicable law, the one (1) year warranty period will begin upon the date that installation of the septic system commences. In order to exercise its warranty rights, Holder must notify Infiltrator in writing at its corporate headquarters in Old Saybrook, Connecticut within fifteen (15) days of the alleged defect. Infiltrator will supply replacement Units for those Units determined by Infiltrator to be defective and covered by this Limited Warranty. Infiltrator’s liability specifically excludes the cost of removal and/or installation of the Units.

(b) THE LIMITED WARRANTY AND REMEDIES IN SUBPARAGRAPH (a) ARE EXCLUSIVE. THERE ARE NO OTHER WARRANTIES WITH RESPECT TO THE UNITS, INCLUDING NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

(c) This Limited Warranty shall be void if any part of the AeroFin system (unit, end cap or other accessory) is manufactured by anyone other than Infiltrator. The Limited Warranty does not extend to incidental, consequential, special or indirect damages. Infiltrator shall not be liable for penalties or liquidated damages, including loss of production and profits, labor and materials, overhead costs, or other losses or expenses incurred by the Holder or any third party. Specifically excluded from Limited Warranty coverage are damage to the Units due to ordinary wear and tear, alteration, accident, misuse, abuse or neglect of the Units; the Units being subjected to vehicle traffic or other conditions which are not permitted by the installation instructions; failure to maintain the minimum ground covers set forth in the installation instructions; the placement of improper materials into the system containing the Units; failure of the Units or the septic system due to improper siting or improper sizing, excessive water usage, improper grease disposal, or improper operation; or any other event not caused by Infiltrator. This Limited Warranty shall be void if the Holder fails to comply with all of the terms set forth in this Limited Warranty.

Further, in no event shall Infiltrator be responsible for any loss or damage to the Holder, the Units, or any third party resulting from installation or shipment, or from any product liability claims of Holder or any third party. For this Limited Warranty to apply, the Units must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and Infiltrator’s installation instructions.

(d) No representative of Infiltrator has the authority to change this Limited Warranty in any manner whatsoever, or to extend this Limited Warranty. No warranty applies to any party other than the original Holder.

The above represents the standard Limited Warranty offered by Infiltrator. A limited number of states and counties have different warranty requirements. Any purchaser of Units should contact Infiltrator’s corporate headquarters in Old Saybrook, Connecticut, prior to such purchase, to obtain a copy of the applicable warranty, and should carefully read that warranty prior to the purchase of Units.

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Patents: https://www.infiltratorwater.com/patents/

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