June 2014

Design and Installation Manual for **Low Pressure Pipe Systems**

(Experimental Approval)

Iowa

LOW PRESSURE PIPE SYSTEMS

This Onsite Wastewater System (OWS) manual provides design, construction, inspection, operation, and maintenance specifications for a Low Pressure Pipe System. This manual can be used as a reference to develop a plan to achieve an Environmental Health Department approval. The design provides equal distribution of effluent from a pump tank to the Low Pressure Pipe (LPP) System. To ensure that equal distribution is achieved, specifications in Tables 1, 2 and 3 should be followed. Infiltrator accepts no responsibility in the design of the system.

This manual provides a brief description of each product with its sizing specifications. Installation requirements are provided on the following pages. **For more detailed design information, please contact Infiltrator Water Technologies at (800) 221-4436.**

Table of Contents

Infiltrator™ Water Technologies
Part of ADS

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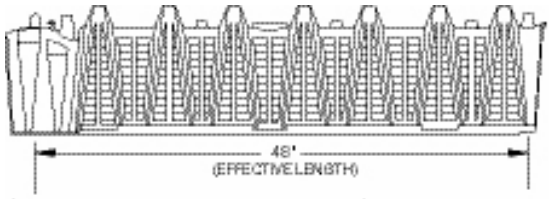
CHAMBERS

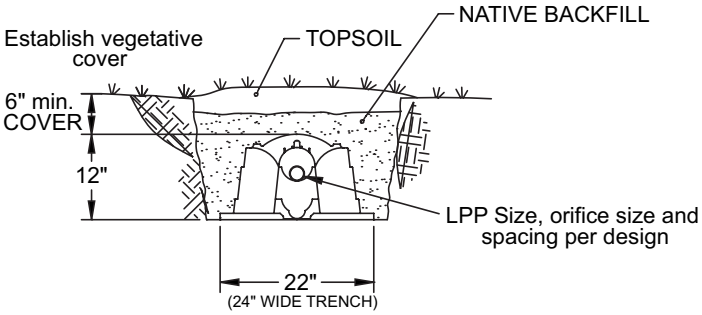
Quick4 Equalizer 36

Nominal Chamber Dimensions	
Size:	22″W x 53″L x 12″H
Effective Length:	48″
Chamber Rating:	5 sf/lf
Required Invert Elevation:	Varies by pipe size

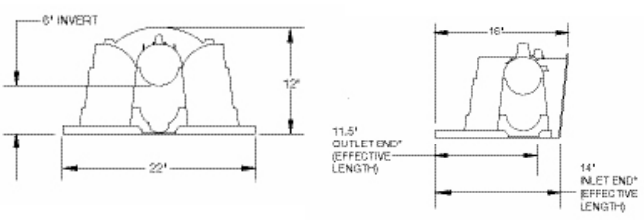
CHAMBER: SIDE VIEW



CHAMBER LPP TRENCH DETAIL



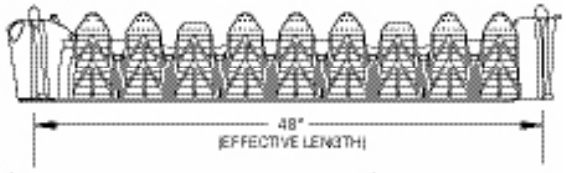
ENDCAP: FRONT VIEW, SIDE VIEW



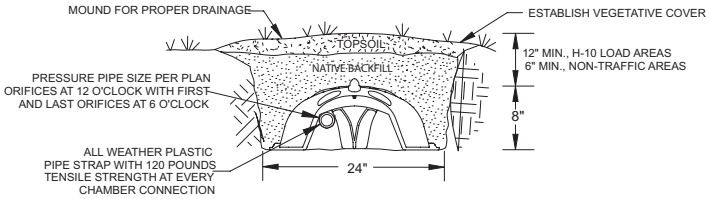
Quick4 Plus Equalizer 36 Low Profile (LP)

Nominal Chamber Dimensions	
Size:	22″W x 53″L x 8″H
Effective Length:	48″
Chamber Rating:	5 sf/lf
Required Invert Elevation:	Varies by pipe size

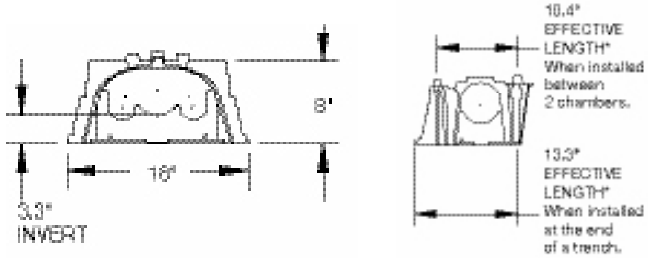
CHAMBER: SIDE VIEW



CHAMBER LPP TRENCH DETAIL

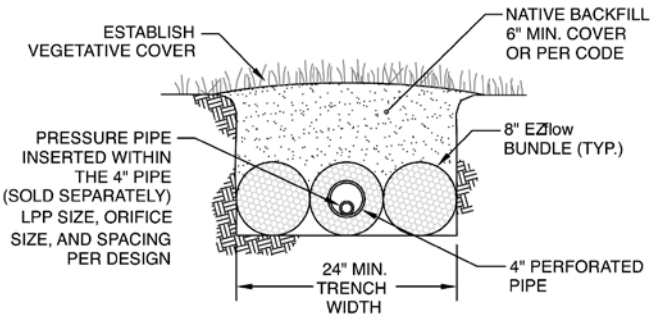


ENDCAP: FRONT VIEW, SIDE VIEW



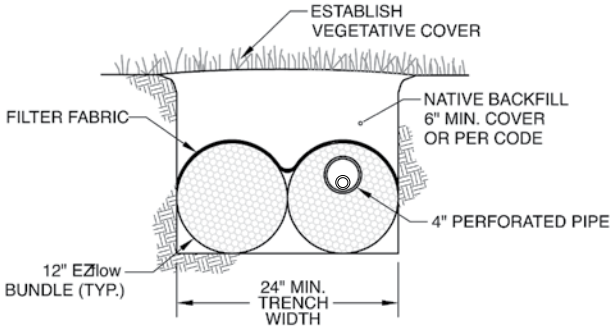
EZflow 0803

Nominal Dimensions	
Size:	8″ dia x 10 ft
Effective Length:	10 ft
Rating:	5 sf/lf
Invert Elevation:	Varies

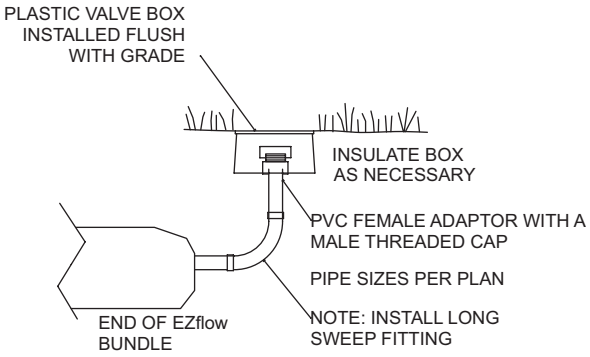


EZflow 1202

Nominal Dimensions	
Size:	12″ dia x 10 ft
Effective Length:	10 ft
Rating:	5 sf/lf
Invert Elevation:	Varies

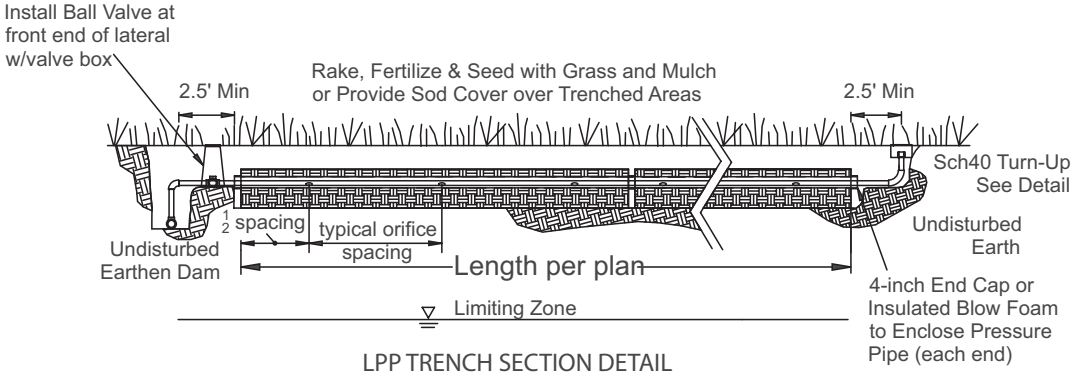


EZflow Flush Assembly



FLUSH ASSEMBLY TURN-UP DETAIL

EZflow Trench Section Detail



LPP TRENCH SECTION DETAIL

SIZING INFORMATION

TABLE 1: FLOWS AND LOADS	
Design Wastewater Flow (DWF) for a single family residence.	200 gallons per day per bedroom
Number of effluent doses	Must conform to the requirements of the receiving component design
Wastewater particle size	< 1/8 inch diameter
Volume of a single dose to a distribution cell	> 5 times the void volume of the distribution lateral(s) and = 20% of the Design Wastewater Flow
Head pressure at distal end of lateral(s)	3.0 ft. for 5/32 inch orifices
Network pressure compensation for fittings	= Distal head pressure x 30 percent
Flow velocity in force main and manifold	> 2 ft/sec and < 10 ft/sec

NOTES:

1. Tables 1 is based upon Iowa State Code and LPP best practices.

2. Per state regulations LLP systems in Iowa must be designed by a IA registered professional engineer.

TABLE 2: DISCHARGE RATES IN GALLONS PER MINUTE FROM ORIFICES[1]

Pressure (ft)	Orifice Diameter (in)			
	1/8	5/32	3/16	1/4
2.5	NP	NP	0.66	1.17
3	NP	NP	0.72	1.28
3.5	NP	0.54	0.78	1.38
4	NP	0.58	0.83	1.47
4.5	NP	0.61	0.88	1.56
5	0.41	0.64	0.93	1.65
5.5	0.43	0.68	0.97	1.73
6	0.45	0.71	1.02	1.80
6.5	0.47	0.73	1.06	1.88
7	0.49	0.76	1.10	1.95
7.5	0.50	0.79	1.14	2.02
8	0.52	0.81	1.17	2.08
8.5	0.54	0.84	1.21	2.15
9	0.55	0.86	1.24	2.21
9.5	0.57	0.89	1.28	2.27
10	0.58	0.91	1.31	2.33

NOTE: 1Table is based on discharge in GPM = 11.79 x Orifice Diameter2 in Inches x (Pressure in Feet)1/2. NP means Not Permitted.
Source: Pressure Distribution Network Design by James C. Converse, January 2000.

TABLE 3: VOID VOLUME FOR VARIOUS DIAMETER PIPES BASED ON NOMINAL I.D.[1]

Nominal Pipe Size	Gallons per Foot
¾	0.023
1	0.041
1-1/4	0.064
1-1/2	0.092
2	0.163
3	0.367
4	0.65
6	1.469

NOTE: 1Table is based on - π(d/2)2 x 12"/ft π231 cu.in./cu.ft.
Where: d = nominal pipe size in inches.
Source: Pressure Distribution Network Design by James C. Converse, January 2000.

SIZING INFORMATION

TABLE 4: FRICTION LOSS (FOOT/100 FEET) IN PLASTIC PIPE

	NOMINAL PIPE SIZE						
Flow in GPM	3/4	1	1-1/4	1-1/2	2	3	4
1							
2							
3	3.24						
4	5.52						
5	8.34	2.06					
6	11.68	2.88					
7	15.53	3.83					
8	19.89	4.91	1.66				
9	24.73	6.10	2.06				
10	30.05	7.41	2.50				
11	35.84	8.84	2.99				
12	42.10	10.39	3.51	1.44			
13	48.82	12.04	4.07	1.67			
14	56.00	13.81	4.66	1.92			
15		15.69	5.30	2.18			
16		17.68	5.97	2.46			
17		19.78	6.68	2.75			
18		21.99	7.42	3.06			
19		24.30	8.21	3.38			
20		26.72	9.02	3.72	0.92		
25		40.38	13.63	5.62	1.39		
30			19.10	7.87	1.94		
35			25.41	10.46	2.58		
40			32.53	13.40	3.30		
45				16.66	4.11	0.57	
50				20.24	4.99	0.69	
60					7.00	0.97	
70					9.31	1.29	
80					11.91	1.66	0.41
90					14.81	2.06	0.51
100					18.00	2.50	0.62
125						3.78	0.93
150						5.30	1.31
175						7.05	1.74
200						9.02	2.23
250							3.36
300							4.71
350							6.27

NOTES: The gray areas on the left side of the above table are velocities that exceed 10 feet per second and the gray areas on the right side of the table are velocities that are below 2 feet per second.

Table is based on Hazen-Williams Formula:
h = 0.002082L x (100/C)1.85 x (gpm1.85 / d4.8655)
Where: h = feet of head L = length in feet C = Friction factor from Hazen-Williams (145 for plastic pipe)
gpm = gallons per minute d = Nominal pipe size

*** Velocities exceeding 10 feet per second are too great for various flow rates and pipe diameter.**

Source: Pressure Distribution Network Design by James C. Converse, January 2000.

Before You Begin

Quick4 Plus Chambers may only be installed according to State and/or local regulations. If unsure of the installation requirements for a particular site, contact the local unit of government.

All systems require a design, which includes a thorough site and soil evaluation of system sizing and the issuance of a local permit to construct the system. The system installer must schedule required regulatory inspections.

Materials and Equipment Needed

- ☐ Quick4 Plus Chambers
- ☐ Endcaps
- ☐ PVC Pipe and Couplings
- ☐ Backhoe
- ☐ Laser, Transit or Level
- ☐ Shovel and Rake
- ☐ Tape Measure
- ☐ Utility Knife
- ☐ Hole Saw*
- ☐ 2-inch Drywall Screws*
- ☐ Screw Gun*
- ☐ Small Valve-cover box*
- ☐ 4-inch Cap for Inspection Port

*Optional

THESE GUIDELINES FOR CONSTRUCTION MACHINERY MUST BE FOLLOWED DURING INSTALLATION.

- ☐ Avoid direct contact with chambers when using construction equipment. Chambers require a 12-inch minimum of compacted cover to support a wheel load rating of 16,000 lbs/axle or equivalent to an H-10 AASHTO load rating.
- ☐ Only drive across the trenches when necessary. Never drive down the length of the trenches.
- ☐ To avoid additional soil compaction, never drive heavy vehicles over the completed system.

Excavating and Preparing the Site

NOTE: As is the case with conventional systems, do not install the systems in wet conditions or in overly moist soils, as this causes machinery to smear the soil.

1. Stake out the location of all chamber lines. Set the elevations of the tank, pipe, and system bottom.
2. Install sedimentation and erosion control measures. Temporary drainage swales/berms may be installed to protect the site during rainfall events.
3. Excavate and level the trenches with proper center-to-center separation. Verify that the bottom of the system is level and that it is at least 3 feet above the limiting layer.

NOTE: Over excavate the trench width in areas where the chamber line will contour.

4. Rake the bottom and sides if smearing has occurred while excavating. Remove any large stones and other debris. Do not use the bucket teeth to rake the trench bottom. Minimize or avoid walking in the trench to prevent compaction, loss of soil structure, and the subsequent reduction in the soil's infiltrative capacity.

NOTE: Raking to eliminate smearing is not necessary in sandy soils. In fine textured soils (silts and clays), avoid walking in the trench to prevent compaction and loss of soil structure.

5. Verify that the bottom of the system is level using a level, transit or laser.

Installing the Chambers and Endcaps

1. To allow pressure laterals to drain after each dose, drill a hole in the bottom of the pipe at the end of the pressure line. Place the snap-off splash plate or a paving block at the bottom of the trench to protect the infiltrative surface from erosion.
2. With a hole saw, drill out the appropriate diameter hole to accommodate the pressure lateral pipe.
3. Insert the pressure lateral pipe into the end cap's drilled opening and slide it into the manifold pipe. Glue the pressure lateral pipe to the manifold pipe.
4. With the pressure lateral pipe through the end cap, place the back edge of the end cap over the inlet end of the first chamber. Be sure to line up the locking pins on the top of both the chamber and endcap.

2. Drill pressure pipe hole.

Note: Health departments may require a wet-run pressure check to be done prior to chamber installation when the pipe is laying on the ground. Check with your local health department for the proper procedure.

5. Method A
Secure the pressure lateral pipe to the top of the first chamber with a plastic pipe strap at the outlet end of the unit. Slide the strap up through a slot in the chamber top, down through the other slot, and cinch the two ends around the pipe.

4. Place endcap over inlet end.

6. Method B
With the holes pointing up, stabilize the pressure lateral pipe on the ground to prevent it from moving.
7. Lift and place the next chamber onto the previous one at a 45-degree angle. Line up the chamber end between the connector hook and locking pin at the top of the first chamber. Lower it to the ground to engage the interlocks.

5. Secure pressure pipe.

8. Method A
Secure the lateral pipe to the top of the next chamber once in place. Follow the same method in Step 5.
9. Continue interlocking chambers and securing the pipe until the trench is completed.

10. Before attaching the final end cap, it may be necessary to remove the tongue of the connector hook on the last chamber with a pair of pliers depending on your pipe diameter.

11. Insert the pressure lateral pipe through the hole in the final end cap and slide the end cap toward the last chamber. Lift the end cap over the modified connector hook and push straight down to secure it to the chamber.

11. Lateral pipe through endcap.

NOTE: If cleanout extensions are required, use a hole saw to cut a hole in the top of the Quick4 Plus All-in-One 8 Endcap so the pressure lateral pipe with an elbow can extend to the ground surface. For cleanout access, use the "Installing Optional Inspection Ports" section in the general installation instructions.

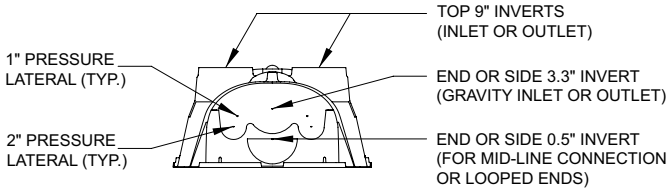
12. If installing multiple rows of chambers, follow Steps 1-9 to lay the next row of chambers parallel to the first. Keep a minimum separation distance between each row of chambers as required by local code.

Advantages of Method A

- Pipe and orifice placed closer to the chamber dome offer improved distribution.
- Pipe positioned at the top of the chamber places it well above effluent.
- Plastic pipe hanger easily secures pipe in place.

Advantages of Method B

- Pipe resting on the trench bottom allows easy installation and maintenance.
- Stabilizing "T's" keep pipe level.
- System promotes efficient pressure checks.
- Pipe resting on the trench bottom allows easier inspections if monitoring ports are installed.



Covering the System

Before backfilling, the system must be inspected as required by State regulations. Create an as-built drawing at this time for future records.

1. Backfill the trench by pushing fill material over the chambers with a backhoe. Keep a minimum of 12 inches of compacted cover over the chambers before driving over the system.

NOTE: Do not drive over system while backfilling in sand.

2. It is best to mound several inches of soil over the finish grade to allow for settling. This also ensures that runoff water is diverted away from the system.

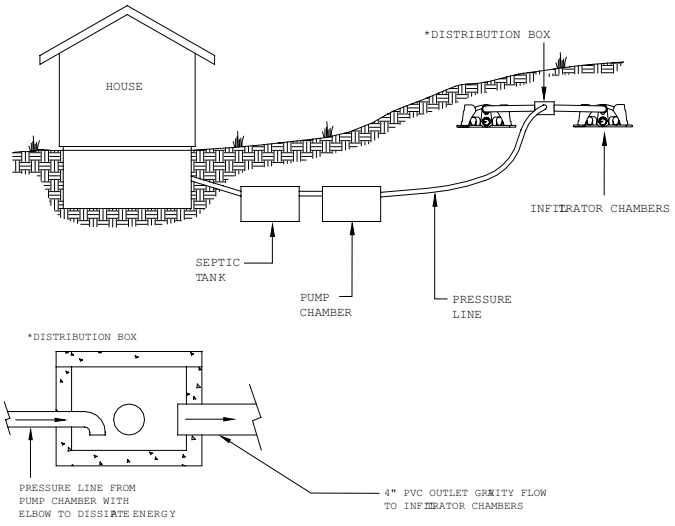
3. After the system is covered, the site should be seeded or sodded to prevent erosion.

Note: If the system is for new home construction, it is important to leave marking stakes along the boundary of the system. This will show contractors where the site is located so they will not cross it with equipment or vehicles.

Pump Up Distribution Systems

In a pump up system, the effluent is pumped to a distribution box which receives a predetermined dosing volume of effluent. It is then gravity fed to the leaching area and distributed to the rows or trenches within the leachfield. This design is commonly confused with a pressure dosed system because the two share much of the same equipment. The main difference between the two lies in how the effluent is distributed within each trench. In a pressure dosed system, the effluent is distributed throughout the trench with a pressurized pipe. In a pump up system, the effluent is gravity fed as shown in the figure below.

Pump up system Illustration



Iowa Department of Health granted approval per the Private Sewage Disposal Licensing Act and Code, for use of Infiltrator Water Technologies EZflow brand 0803H/0803H-GEO and 1202H/1202H-GEO drainfield products.

The EZflow 803H/0803H-GEO and 1202H/1202H-GEO are approved as a new technology system at the specified sizing:

0803H/0803H-GEO	5 SF/FT
1202H/1202H-GEO	5 SF/FT

Any site where EZflow products are installed must meet the same site, soil, soil evaluation, repair area, construction, and all other requirements imposed for a standard gravel drainfield.

MATERIALS & EQUIPMENT NEEDED

- EZflow Bundles
- Pipe for Header and Inlet
- Laser, Transit or Level
- EZflow Internal Pipe Couplers
- Backhoe
- Shovel & Rake

INSTALLATION INSTRUCTIONS

The instructions for EZflow products are given below. This product must be installed in accordance with the appropriate state regulations and codes.

In cases where linear footage required is not in multiples of 10, the installer may (a) reduce the product to needed length and refasten netting to the pipe or, (b) use an additional 5 or 10 feet of product to exceed the required trench length.

1. After the local health department has issued a permit, stake or mark the location of the trenches and lines. Then, set the tank, invert pipe, headerline/distribution box, and trench elevations. Care should be taken to maintain the required vertical separation of at least 12-inches to the seasonal groundwater table.

2. To prevent smearing or compaction of soil, drainfields are not to be installed in soils with textures finer than sand, loamy sand or sandy loam, or where the soil moisture content is above the point at which the soil changes from semi-solid to plastic. If smearing or glazing of trench sidewalls and bottom has occurred in clay soils, it is recommended that these soil surfaces be raked or scarified.

3. The center to center spacing shall be 5'.

4. Remove the plastic stretch wrap from the EZflow bundles prior to placing them in the trench(es). Remove any stretch wrap in the trench or bed before the system is covered.

5. Place the EZflow bundle(s) in the approved configuration. The center-most bundles containing pipe are joined end to end with an internal pipe coupler. The aggregate-only bundles should be butted against the other aggregate-only bundles and do not require any type of connection.

6. The top of each GEO cylinder contains a pre-manufactured filter fabric between the netting and aggregate. The installer shall ensure that the fabric is on top and is in contact with the fabric contained in the adjacent cylinder before backfilling. The span of fabric at each sidewall shall not exceed 180 degree reach (i.e. 9 o'clock to 3 o'clock).

7. The trench bottom shall be level or with a downward slope not exceeding one (1) inch per ten (10) feet.

8. EZflow EPS bundles are flexible and can fit in curved trenches, as needed, to avoid trees or other obstacles.

9. Soil material excavated from trenches, if suitable per code, should be used in backfilling and should be left mounded over the trenches until initial settling has taken place. Soil within 6" of the EPS bundles shall be loosely placed and not compacted.

INSPECTION

Before covering the system, it shall be inspected by the department. The area of the disposal field shall not be used for vehicular traffic, parking, or underground utilities (i.e. water lines). Dozers, trucks, and other heavy vehicles shall not be allowed to run over the septic tank, drainfield or other parts of the system.

SPECIAL PROCEDURE

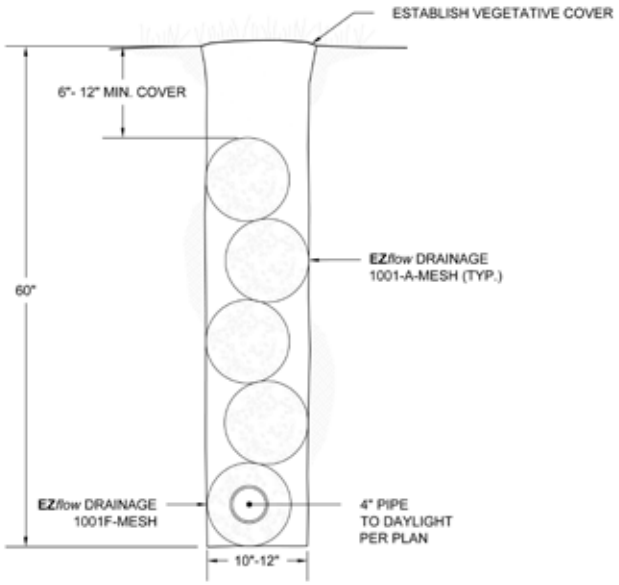
EZFlow may only be installed according to State and/or local regulations. If unsure of the installation requirements for a particular site, contact the local unit of government.

1. To allow pressure laterals to drain after each dose, drill an orifice in the bottom of the pipe at each end of the pressure line. All other orifices shall be drilled in the 12 o'clock position.

2. Insert the pressure line into the 4" pipe through the EZflow and push it through the entire run. Check to ensure that the orifices are in the 12 o'clock position.

3. Install additional rows as needed.

NOTE: If the site has proper grade (enough fall) or a location to daylight a drain then curtain drains may be considered. Please consult with the soil scientist for the curtain drain design.



Fields of Opportunities

STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR
KIM REYNOLDS, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
CHUCK GIPP, DIRECTOR

April 22, 2014

Curtis Cluckey
Infiltrator Systems Inc.
PO Box 768
Old Saybrook, CT 06475

Dear Mr. Cluckey,

Thank you for your inquiry about the use of low pressure pipe dispersal systems by Infiltrator in Iowa. As you know, Iowa does not have a product approval process. However, Iowa is still interested in keeping up with the ever changing technology in the onsite wastewater industry. In order to accomplish that objective the state rule for onsite wastewater systems, IAC567-Chapter 69, "Private Sewage Disposal Systems", includes an experimental systems section. This section is used for any proposed system that is not specifically included in the rule elsewhere. The rule can be found at: https://www.legis.iowa.gov/docs/ACO/chapter/04-16-2014.567.69.pdf .

A system installed under the experimental system section requires approval and construction permitting from the local administrative authority (boards of health). The engineered design and design justification are submitted to the local administrative authority. Upon local approval, the system would be installed as designed and monitored to ensure acceptable long term performance. If the system demonstrates performance it may be included in future revisions to IAC567-69. The low pressure pipe system proposed by Infiltrator may be installed following this process.

Thank you again for your inquiry and your continued efforts to improve the onsite wastewater industry. Please let me know if you have further questions by calling 515-281-8263 or by e-mail at Daniel.olson@dnr.iowa.gov .

Sincerely,

Daniel Olson, RS
Private Sewage Disposal Program

502 EAST 9th STREET / DES MOINES, IOWA 50319-0034
PHONE 515-281-5918 FAX 515-281-8895 www.iowadnr.gov

Low Pressure Piping (LPP) Sizing Worksheet –

Date: _____ Name (Site/Owner): _____

Address: _____

PSD Installation Contractor: _____ License #: _____

LPP private sewage disposal system constants for the State of Iowa

Schedule 40, 1½ inch distribution lines
Schedule 40, 2 inch manifold lines
3 foot of pressure head
5/32 hole diameter every 5 foot
5 foot minimum center-to-center spacing on subsurface seepage trenches

CHECKLIST

Depth of trench: _____
Slope: _____
Designed Daily Flow: _____
Septic Tank Size: _____
Dose Chamber Tank Size: _____
Dosing Chamber Tank Manufacturer:
_____
Total Lateral Line Length: _____
Limiting Layer: _____
Depth to Limiting Layer: _____
Dosing Volume: _____
TDH: _____
Measured Length + Fitting Loss = _____
Pumping: ❍ Uphill ❍ Downhill

Curtain Drain: ❍ Yes ❍ No
Completed worksheet: ❍ Yes ❍ No
Distance Between Trenches: _____
Elevation of Highest Point on Supply line: _____
Dosing Chamber Tank Elevation: _____
Septic Tank Elevation: _____
Brand of Effluent Pump: _____
Size of Effluent Pump: _____
Brand of Effluent Filter in Septic Tank:
_____
Number of subsurface seepage trenches: _____
Total Square Feet:
_____ GPM at _____ Ft. of Head

Calculations/Worksheet Completed by: ❍ PSD Installation Contractor ❍ Property Owner
❍ IL. P.E. ❍ L.E.H.P. ❍ Other: _____
Name: _____
Soil Analysis Provided by: _____

IOWA LPP WORKSHEET

Determine Maximum Daily Design Flow

Residential

(1) ____ bedrooms at 200 gallons/day/bedroom = _____ gallons/day

Non-residential

(2) Gallons/day determined by Code Appendix A, Illustration A = _____ gallons/day

Absorption Area

Residential

(3) Design Group: ____ **(4)** Square feet/ bedroom: _____

(5) Total Square Feet (**(1) x (4)**) = _____ Square Feet

Non-residential

(6) Loading rate from soil analysis & Appendix A, Illustration A of the Code: ____

(7) Square feet/Day (**(2)** ÷ **(6)**) = _____

Liner feet of subsurface seepage system:

(8) Residential (**(5)** ÷ (Bottom Area Ratting (**Table 1** below)): _____ Liner Feet

(9) Non-residential (**(7)** ÷ (Bottom Area Ratting (**Table 1** below)): _____ Liner Feet

(10) Number of Lateral Lines*: _____ ***(*Note: Lateral Lines cannot exceed 70 feet.)***

(11) Length of lateral lines: _____

Table 1

LPP Subsurface Seepage System Product Width (Inches)	Bottom Area Ratting (Square Feet/Linear Foot)
$8 \leq X \leq 12$	3.0
$12 < X \leq 16$	4.0
$16 < X \leq 36$	5.0

Dosing Rate

Holes

(12) Holes per line (___ (feet in each line) ÷ 5 (Spacing in feet between holes) = _____

(13) Total number holes (**(12) x (10)**) = _____

Flow Rate

5/32 inch holes at 3 feet pressure head = .50 gallons/minute (GPM).

(14) Flow rate (.50 (GPM) x **(13)** = _____ GPM

Total Dynamic Head (TDH) = Static Head (15) +Operating Head (16) +Friction Head (19)

(15) Static Head (vertical distance from pump turn off level to the point of discharge) = _____

(16) Operating Head = 3 (feet of pressure)

(17) (Total pipe length in distribution system) + (Total of all equivalents for every fittings (**Table 3**)

= ____ feet

Table 2 – Friction loss per 100 Feet of Plastic Pipe

Flow Rate GPM	Pipe size (inches) 1 ½	2
5	0.20	
6	0.30	
7	0.40	
8	0.50	
9	0.60	
10	0.70	0.20
12	1.10	0.30
14	1.30	0.40
16	1.70	0.50
18	2.10	0.60
20	2.50	0.90
21		0.95
25	3.80	1.30
30	5.20	1.80
35		2.40
40		3.10
45		3.80
50		4.70

Table 3 – Friction Losses Through Plastic Fittings In Terms of Equivalent Lengths of Plastic Pipe

Type of Fitting (Inches)	Nominal Size Fitting & Pipe Equivalent Length of Pipe – Feet 1 ½	2
90° Standard Elbow	8.0	9.0
45° Elbow	3.0	4.0
Standard Tee	9.0	11.0
Check Valve	13.0	17.0
Coupling or Quick Disconnect	1.0	2.0
Ball Valve	1.1	1.4

(18) **(17)** ÷ 100 = _____ (This gives you feet in 100' increments)

(19) Calculate Friction Head = **(18)** multiplied by the value for the flow rate **(14)** in Table 2.
(18) x (value from **(14)** for 2" pipe in **Table 2**) = ____ Friction head in gal/min in 2" pipe.

TDH = **(15)** + **(16)** + **(19)** = _____

The TDH value will allow you to determine what type of pump will be best for the system size and design. To assure proper design and performance make sure that you use the right pump curve chart that is designed for the system specifications and type of pump to be used. Compare the TDH in feet by the total gallons per minute, to assure the correct pump size.

Dosing Volume

Volume Dose = Volume Supply Lines + Volume Lateral Lines

(20) Supply line = ____ feet of 2 inch pipe

(21) Volume Supply = **(20)** ÷ 100 ft.) X 16.2 gallons (gallons/100 feet of Sch. 40) = _____ gallons

(22) Lateral Lines = _____ feet (total of 1½ inch pipe)

(23) Volume Lateral = **(22)** ÷ 100 ft.) x 9.2 gallons (gallons/100 feet of Sch. 40) = _____ gallons

(24) Volume Dose = **(21)** + **(23)**

(25) Gallons per inch for the dose tank being used = _____ (provided by manufacturer of tank.)

(26) Dosing volume = **(2)** ÷ (number of doses per day *(2 to 8)* + **(24)** = _____ gallons

(27) Minimum Tank capacity required = **(2)** + **(26)** = ____ gallons *(500 gallon minimum)*

(28) Float switch depth = **(26)** ÷ **(25)** = _____ inches.

(28) Timed Dosing = **(26)** x **(14)** = ___ pump run time in minutes.

INFILTRATOR WATER TECHNOLOGIES EZFLOW LIMITED WARRANTY

a) The structural integrity of each EZflow by Infiltrator expanded polystyrene drainfield system and other accessories manufactured by EZflow by Infiltrator ("Units"), when installed and operated in a leachfield of an onsite septic system in accordance with Infiltrator's instructions, is warranted to the original purchaser ("Holder") against defective materials and workmanship for one year from the date that the septic permit is issued for the septic system containing the Units; provided, however, that if a septic permit is not required by applicable law, the warranty period will begin upon the date that installation of the septic system commences. 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 Units determined by EZflow by Infiltrator to be covered by this Limited Warranty. EZflow by 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 EZflow system is manufactured by anyone other than EZflow by 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 or 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.

Contact Infiltrator's Technical Services Department for assistance at 1-800-221-4436 or info@infiltratorwater.com

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