

Quick4 Chamber and EZflow Trench Sizing

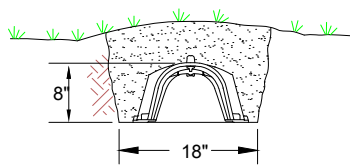
OAC 3701-29 Sewage Treatment System Rules

Effective January 1, 2015, the Ohio Department of Health (ODH) completed the development of sewage treatment systems rules (Ohio Administrative Code 3701-29) through a comprehensive and extensive rule advisory committee and public review process. The updated rules establish new modern standards offering cost-effective choices and protecting public health, replacing the original rules for household sewage treatment systems from 1977. OAC 3701-29 also replaces as many as 88 local health district rules.

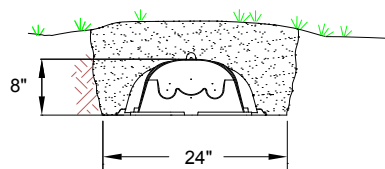
OAC 3701-29 includes a wide range of design choices and technologies for new or replacement sewage systems, including chamber and bundled expanded polystyrene (EPS) non-gravel, fines-free distribution technologies. Highlights from OAC 3701-29 that pertain to Infiltrator's Quick4 chamber and EZflow bundled EPS product lines include:

- Minimum trench area of 75% compared to that of a gravel and pipe trench
- Installation in a maximum 2-foot-wide trench on new systems
- Installation in a maximum 3-foot-wide trench in replacement systems where 2-foot-wide systems are not feasible
- Installation in trench (in-ground or at-grade) and mound systems
- Minimum 4-foot wall-to-wall spacing between trenches for gravity flow (see page 4)
- Minimum 3-foot wall-to-wall spacing between trenches for low-pressure distribution (see page 4)
- Minimum 2-foot wall-to-wall spacing between trenches for low-pressure distribution in select soil textures (see page 4)
- Allowable 6-inch soil depth credit with time-dosed pressure distribution

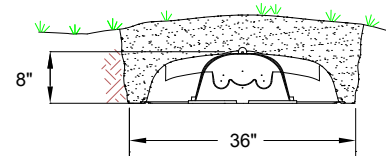
Infiltrator offers drainfield products for installation in 12-, 18-, 24-, and 36-inch-wide trenches. Infiltrator's Quick4 chamber and EZflow bundled EPS products approved for use under OAC 3701-29 include: Quick4 Plus Equalizer 36 LP (24-inch-wide); Quick4 Equalizer 24 LP (18-inch-wide); Quick4 Plus Standard LP (36-inch-wide system) (for replacement systems); EZflow 1201 (12-inch-wide); and EZflow 1202H (24-inch-wide).



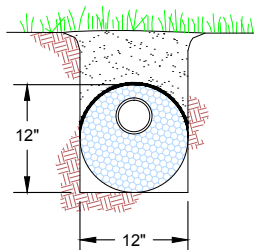
Quick4 Equalizer 24 LP



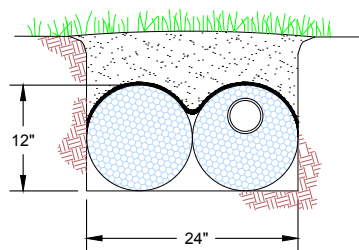
Quick4 Plus Equalizer 36 LP



Quick4 Plus Standard LP



EZflow 1201



EZflow 1202H

July 2015

System Design

System sizing and configuration is a function of a site-specific conditions and system construction attributes, including soil infiltration rate, slope, linear loading rate, number of trenches, available contour length, and effluent dispersal mechanism. Tables 1-3 serve as a guide for determining the minimum length of trenches required for Infiltrator's ODH-approved non-gravel, fines free products installed as new construction.

- Table 1 provides the minimum total length required, incorporating the 75% non-gravel, fines-free sizing described in OAC 3701-29-15 Appendix A III(A)(2), which may be used at the discretion of the system designer, unless documentable site-specific conditions warrant alternative sizing. Contact Infiltrator for assistance with alternative sizing. The value determined in Table 1 shall be divided by the number of trenches to determine the minimum product length per row, per soil infiltration loading rates (SILR). Determine the SILR from OAC 3701-29-15 Table 3.
- Table 2 provides the minimum resting trench length required for all gravity and demand dosed low-pressure effluent distribution systems, incorporating the 75% non-gravel, fines-free sizing described in OAC 3701-29-15 Appendix A III(A)(2). The extra area provided through the resting trench is not required for timed, low-pressure distribution systems. Where a resting area is required, OAC 3701-29-15 Appendix A IV (F)(4) stipulates that the resting area be isolated from the rest of the trenches. This requirement applies to all types of effluent dispersal media. Each drainfield that requires a resting area must be equipped with the ability to rest each trench while still providing full leaching area. Determine the soil infiltration loading rate from OAC 3701-29-15 Table 3.
- Table 3 provides the minimum trench length required per trench, on contour, per hydraulic linear loading rates (HLLR). Determine the HLLR from OAC 3701-29-15 Table 4.

NOTES:

1. The Quick4 chamber engaged length is 4 ft. EZflow is manufactured in lengths of 10 ft. Each Quick4 chamber or EZflow row will need to be rounded up based on the applicable engaged product segment length.
2. The rules require that all trenches be equal length on contour and no less than the minimum trench lengths provided in Tables 2 and 3.
3. Per OAC 3701-29-15 Appendix A III(A)(3), 75% non-gravel, fines-free sizing does not apply when a pretreated effluent soil infiltration loading rate in OAC 3701-29-15 Table 3 is used for system sizing.

Table 1 - Minimum Total Length of Product (ft) by Soil Infiltration Loading Rate

Soil Infiltration Loading Rate (gpd/sf)	3 Bedrooms				4 Bedrooms				5 Bedrooms				Each Additional Bedroom			
	EZflow 1201	EZflow 1202H	Quick4 EQ 24 LP	Quick4 Plus EQ 36 LP	EZflow 1201	EZflow 1202H	Quick4 EQ 24 LP	Quick4 Plus EQ 36 LP	EZflow 1201	EZflow 1202H	Quick4 EQ 24 LP	Quick4 Plus EQ 36 LP	EZflow 1201	EZflow 1202H	Quick4 EQ 24 LP	Quick4 Plus EQ 36 LP
1.6	169	85	113	85	225	113	150	113	282	141	188	141	57	29	38	29
1.0	270	135	180	135	360	180	240	180	450	225	300	225	90	45	60	45
0.8	338	169	225	169	450	225	300	225	563	282	375	282	113	57	75	57
0.7	386	193	258	193	515	258	343	258	643	322	429	322	129	65	86	65
0.6	450	225	300	225	600	300	400	300	750	375	500	375	150	75	100	75
0.5	540	270	360	270	720	360	480	360	900	450	600	450	180	90	120	90
0.4	675	338	450	338	900	450	600	450	1,125	563	750	563	225	113	150	113
0.3	900	450	600	450	1,200	600	800	600	1,500	750	1,000	750	300	150	200	150
0.2	1,350	675	900	675	1,800	900	1,200	900	2,250	1,125	1,500	1,125	450	225	300	225

Table 2 - Minimum Resting Trench Length (ft) by Soil Infiltration Loading Rate (not required for timed, low-pressure distribution)

Soil Infiltration Loading Rate (gpd/sf)	3 Bedrooms				4 Bedrooms				5 Bedrooms				Each Additional Bedroom			
	EZflow 1201	EZflow 1202H	Quick4 EQ 24 LP	Quick4 Plus EQ 36 LP	EZflow 1201	EZflow 1202H	Quick4 EQ 24 LP	Quick4 Plus EQ 36 LP	EZflow 1201	EZflow 1202H	Quick4 EQ 24 LP	Quick4 Plus EQ 36 LP	EZflow 1201	EZflow 1202H	Quick4 EQ 24 LP	Quick4 Plus EQ 36 LP
1.6	43	22	29	22	57	29	38	29	71	36	47	36	15	8	10	8
1.0	68	34	45	34	90	45	60	45	113	57	75	57	23	12	15	12
0.8	85	43	57	43	113	57	75	57	141	71	94	71	29	15	19	15
0.7	97	49	65	49	129	65	86	65	161	81	108	81	33	17	22	17
0.6	113	57	75	57	150	75	100	75	188	94	125	94	38	19	25	19
0.5	135	68	90	68	180	90	120	90	225	113	150	113	45	23	30	23
0.4	169	85	113	85	225	113	150	113	282	141	188	141	57	29	38	29
0.3	225	113	150	113	300	150	200	150	375	188	250	188	75	38	50	38
0.2	338	169	225	169	450	225	300	225	563	282	375	282	113	57	75	57

Contact Zak Sherman of Infiltrator Water Technologies at (888) 231-9791 for additional technical and product information.

System Design

Table 3 - Minimum Trench Length (ft) on Contour by Hydraulic Linear Loading Rate

Hydraulic Linear Loading Rate (gpd/ft)	3 Bedrooms	4 Bedrooms	5 Bedrooms	Each Add'l Bedroom
8.0	45	60	75	15
7.0	52	69	86	18
6.0	60	80	100	20
5.5	66	88	110	22
5.0	72	96	120	24
4.9	74	98	123	25
4.6	79	105	131	27
4.5	80	107	134	27
4.4	82	110	137	28
4.3	84	112	140	28
4.1	88	118	147	30
4.0	90	120	150	30
3.9	93	124	154	31
3.8	95	127	158	32
3.7	98	130	163	33
3.6	100	134	167	34
3.5	103	138	172	35
3.4	106	142	177	36
3.3	110	146	182	37
3.2	113	150	188	38
3.0	120	160	200	40
2.9	125	166	207	42
2.7	134	178	223	45
2.6	139	185	231	47
2.5	144	192	240	48
2.4	150	200	250	50
2.3	157	209	261	53
2.2	164	219	273	55
2.0	180	240	300	60

Design Examples:

4-Bedroom Home (2 sf/ft rating)
 Quick4 Plus Equalizer 36 LP
 Soil Infiltration Loading Rate = 0.3 gpd/sf
 Hydraulic Linear Loading Rate = 4.0 gpd/lf

Minimum total length of product (Table 1) =

$$\frac{4 \times 120 \text{ gpd/bdrm}}{0.3 \text{ gpd/sf}} \times 0.75 = 1,200 \text{ sf}$$

$$\frac{1,200 \text{ sf}}{2 \text{ sf/ft}} = 600 \text{ ft}$$

Minimum resting trench length (Table 2) = 600 ft x 0.25 = 150 ft

Minimum trench length on contour (Table 3)

$$\frac{4 \times 120 \text{ gpd/bdrm}}{4.0 \text{ gpd/ft}} = 120 \text{ ft}$$

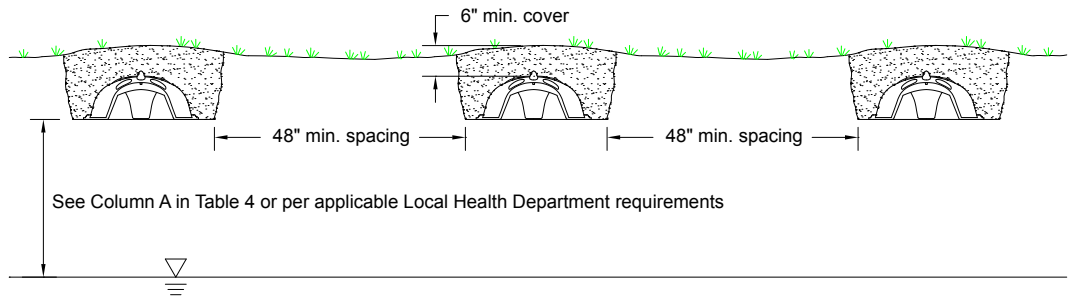
Method of Distribution	Gravity	Demand Dosed LPP	Demand Dosed LPP in Select Soils*	Timed LPP	Timed LPP in Select Soils*
Resting Area Required?	Yes	Yes	Yes	No	No
Trench Length (ft)	150	150	150	150	150
Resting Trench Length (ft)	150	150	150	N/A	N/A
Total Number of Trenches	5	5	5	4	4
Trench Separation (ft)	4	3	2	3	2
Total Constructible Area Required (sf)	3,900	3,300	2,700	2,550	2,100

* Soils having coarse to loamy sands, and fine to loamy very fine sand textures found on lines one and two of Table 3 of OAC 3701-29-15.

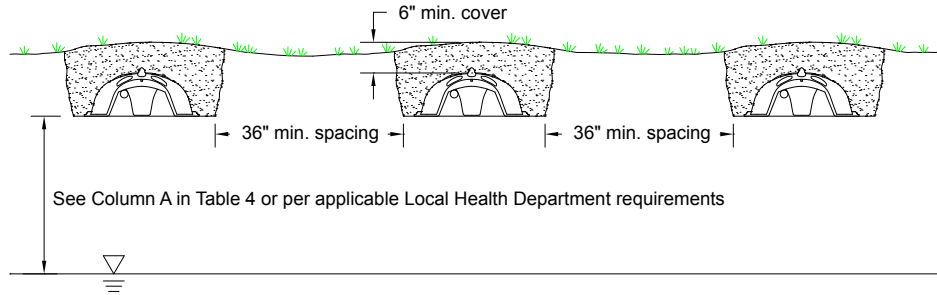
Quick4 Chamber and EZflow Trench Configurations and Vertical Separation Distances

NOTE: The trench spacing and vertical separation distances shown apply uniformly to all Infiltrator fines-free Quick4 and EZflow products installed as new construction.

Gravity Distribution

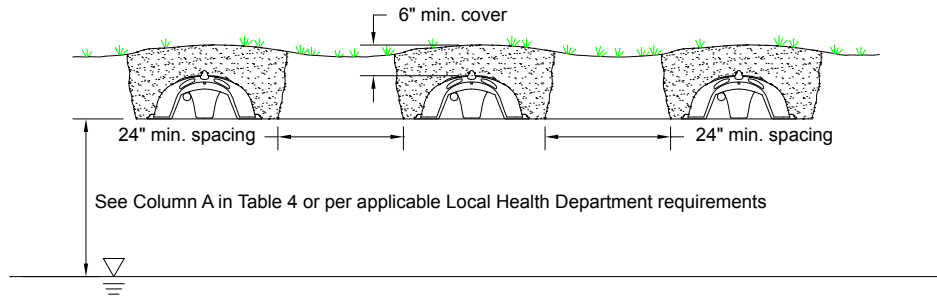


Demand Dosed Low-Pressure Distribution



Demand Dosed Low-Pressure Distribution in Select Soil Textures

Per OAC 3701-29-15 Appendix A(III)(E), a minimum 2-foot trench spacing may be used when Demand Dosed, low-pressure distribution is employed for trenches installed in soils having coarse to loamy sands, and fine to loamy very fine sand textures found on lines one and two of Table 3 of OAC 3701-29-15.



Timed Low-Pressure Distribution with Trench Spacing Dependent Upon Soil Texture

A minimum 2-foot trench spacing is allowable when trenches are installed in soils having coarse to loamy sands, and fine to loamy very fine sand textures found on lines one and two of Table 3 of OAC 3701-29-15. Otherwise, a minimum 3-foot trench spacing is required when low-pressure distribution is employed.

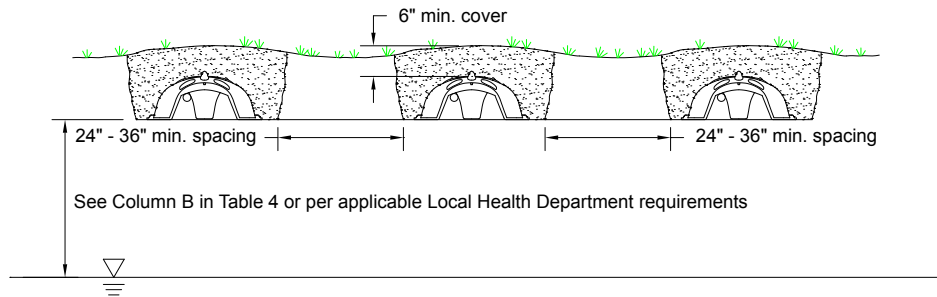


Table 4 - VSD and In-Situ Soil Requirements (adapted from OAC 3701-29-15 Table 2)

OAC 3701-29-15 Paragraph	Limiting Condition	Column A Minimum VSD (inches)	Column B Minimum VSD (inches)	Minimum unsaturated in situ soil within infiltrative distance (inches)
(D)	Limiting condition not specified in this table	18	12	8
(E)(1)	Fractured and/or Karst bedrock	36	30	12
(E) (2)	Ground water or aquifer	36	30	12
(E) (3)	Other limiting conditions identified in soil evaluation or by the board of health as having high risk or not meeting 3701-29-15 (A)	36	30	12
(F)	Highly weathered soils with weak structure or low to very low permeability developed on the low lime till plains are present	24	18	8
(G)	Perched seasonal water if not established by board of health	12	6	8
(G)	Perched seasonal water as established by a board of health	6-18	0-12	6-18