Filtration

Solids Removal

- Prevents solids from leaving tank
- Improve quality of effluent
- Extend drainfield life

Tank Treatment With and Without Filter

	Crites/Tchobanoglous*		Orenco Systems	
	BOD_5 (*mg/L*)	TSS (*mg/L*)	BOD_5 (*mg/L*)	TSS (*mg/L*)
Tank with effluent filter	130 - 140	30	134	35
Tank without effluent filter	180 - 190	80 - 85	149	84
% reduction	>25%	>60%	11%	65%

* Small and Decentralized Wastewater Management Systems, *Crites & Tchobanoglous, p.183, 1998.*

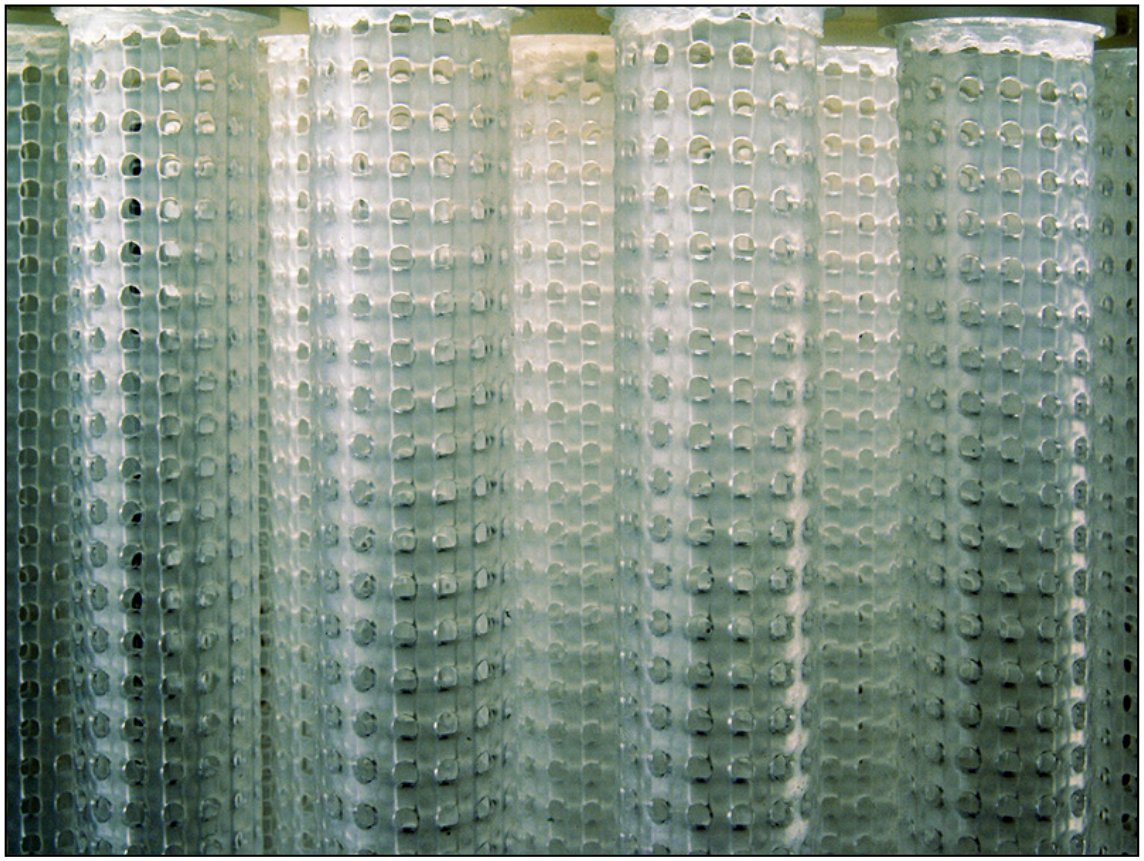
Tank Treatment With and Without Filter

Septic tank effluent w/o effluent filter

Septic tank effluent with an Orenco effluent filter

Filter Surface Area vs. Flow Area

- In evaluating effluent filters, it's important to compare both total filter surface area and total flow area
- Orenco flow area = 30% of total area



Filter Surface Area

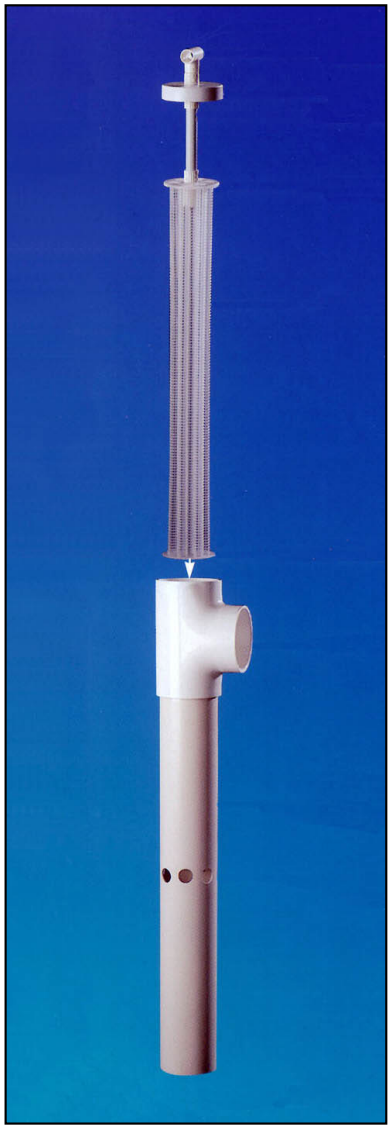
Solids are collected mainly on the surface area. However, the open area is where the outflow takes place.

Selection Criteria: Effluent Filter

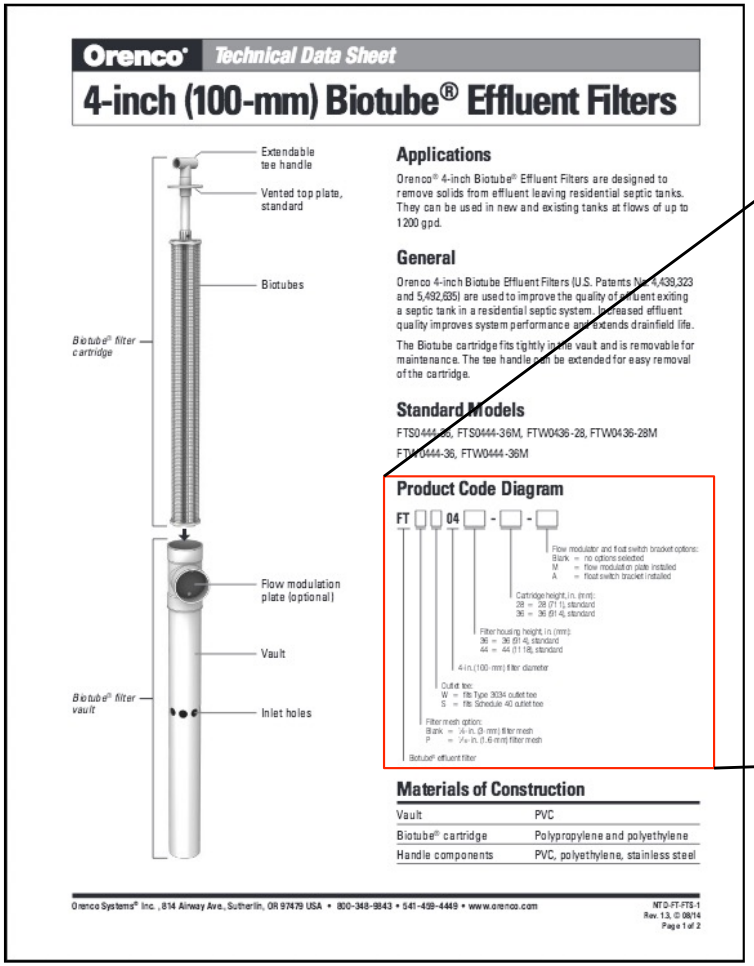
- Large flow surface area to resist clogging
- Removable cartridge for easy maintenance
- Corrosion-proof to last

Orenco's Biotube® Effluent Filters

- For gravity applications
  - 2 to 10 times more flow area than other brands
  - Longer cleaning intervals
  - Easy to clean
  - Extendable tee handle
  - Corrosion-proof
  - Alarm and flow modulation plate available
  - Patented design
  - Custom and commercial sizes available
  - Lifetime warranty on residential filters



Residential Effluent Filters



Orenco® Technical Data Sheet

4-inch (100-mm) Biotube® Effluent Filters

Extendable tee handle
Vented top plate, standard
Biotubes
Biotube® filter cartridge
Flow modulation plate (optional)
Vault
Biotube® filter vault
Inlet holes

Applications

Orenco® 4-inch Biotube® Effluent Filters are designed to remove solids from effluent leaving residential septic tanks. They can be used in new and existing tanks at flows of up to 1200 gpd.

General

Orenco 4-inch Biotube Effluent Filters (U.S. Patents No. 4,439,323 and 5,492,635) are used to improve the quality of effluent exiting a septic tank in a residential septic system. Increased effluent quality improves system performance and extends drainfield life.

The Biotube cartridge fits tightly in the vault and is removable for maintenance. The tee handle can be extended for easy removal of the cartridge.

Standard Models

FTS0444-36, FTS0444-36M, FTW0436-28, FTW0436-28M
FTW0444-36, FTW0444-36M

Product Code Diagram

FT □□ 04 □ - □ - □

Flow modulator and float switch bracket options:
Blank = no options selected
M = flow modulation plate installed
A = float switch bracket installed

Cartridge height, in. (mm):
28 = 28 (711), standard
36 = 36 (914), standard

Filter housing height, in. (mm):
36 = 36 (914), standard
44 = 44 (1118), standard

4-in. (100-mm) filter diameter

Outlet tee:
W = fits Type 3034 outlet tee
S = fits Schedule 40 outlet tee

Filter mesh option:
Blank = 1/8-in. (3-mm) filter mesh
P = 1/16-in. (1.6-mm) filter mesh

Biotube® effluent filter

Materials of Construction

Vault	PVC
Biotube® cartridge	Polypropylene and polyethylene
Handle components	PVC, polyethylene, stainless steel

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Page 1 of 2

Product Code Diagram

FT □ □ 04 □ - □ - □

Flow modulator and float switch bracket options:
Blank = no options selected
M = flow modulation plate installed
A = float switch bracket installed

Cartridge height, in. (mm):
28 = 28 (711), standard
36 = 36 (914), standard

Filter housing height, in. (mm):
36 = 36 (914), standard
44 = 44 (1118), standard

4-in. (100-mm) filter diameter

Outlet tee:
W = fits Type 3034 outlet tee
S = fits Schedule 40 outlet tee

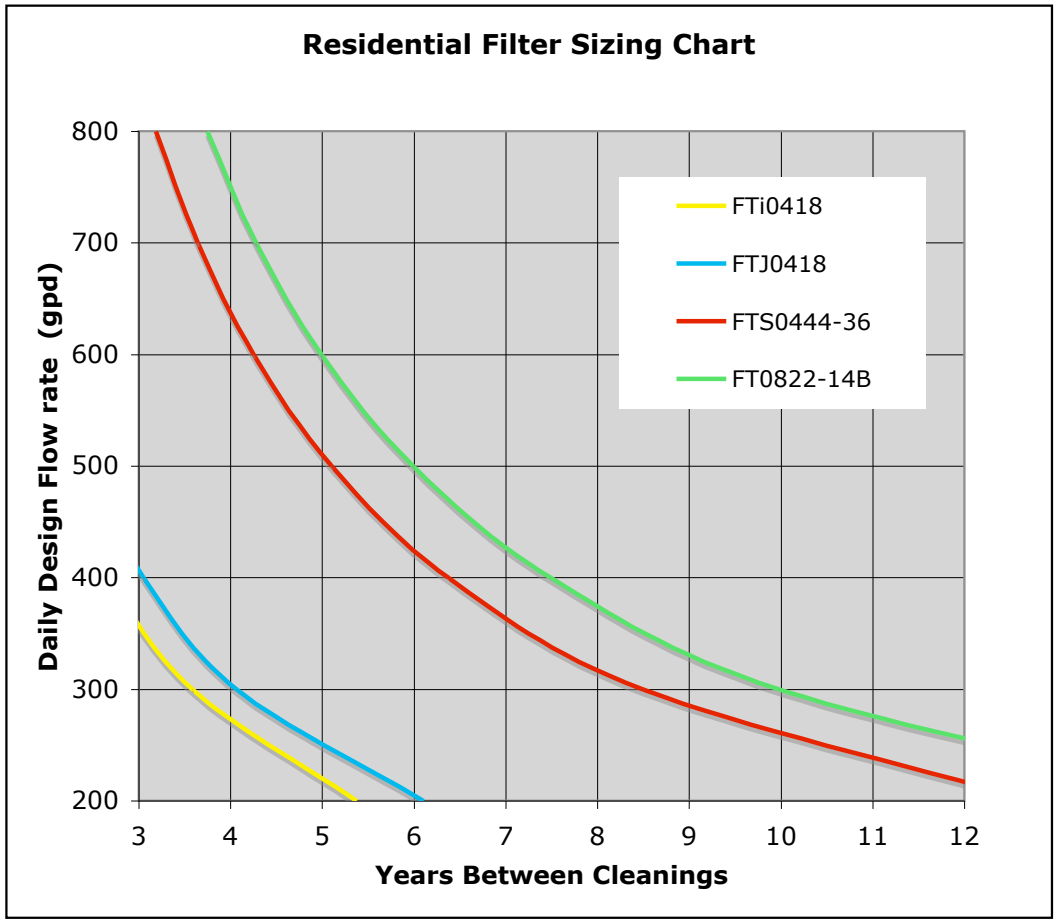
Filter mesh option:
Blank = 1/8-in. (3-mm) filter mesh
P = 1/16-in. (1.6-mm) filter mesh

Biotube® effluent filter

Residential Applications

Selecting a Residential Effluent Filter

- Flow rates, waste-strength and septic tankage all effect cleaning frequencies



Commercial Applications

Commercial Effluent Filters

Orenco® Technical Data Sheet

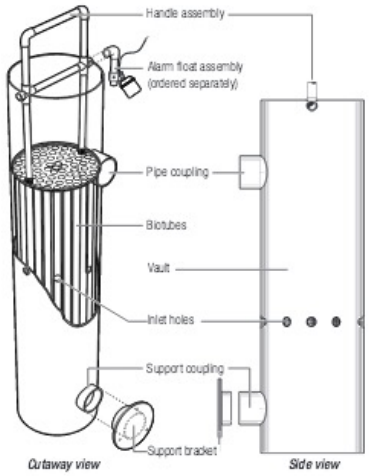
8-in. to 15-in. Dia. Biotube Effluent Filters

Applications

Orenco® 8-inch to 15-inch Biotube® Effluent Filters are designed to remove solids from effluent leaving commercial septic tanks. They can be used in new and existing tanks.

General

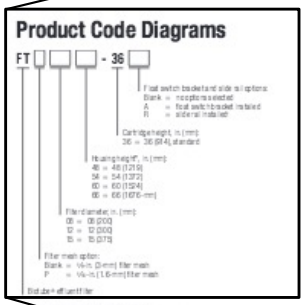
Orenco® 8-inch to 15-inch Biotube® Effluent Filters* are used to improve the quality of effluent exiting a commercial septic tank. The Biotube cartridge fits snugly in the vault and is removable for maintenance, the handle assembly snaps into the notches in the top of the vault, and the tee handle can be extended for easy removal of the cartridge. A "base inlet" model (see p. 2) is available for low-profile tanks. An optional slide rail system, available on larger models, simplifies installation and provides tank access for servicing.

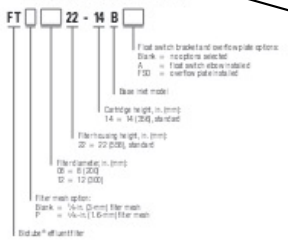


Standard Models

FT0854-36, FT1254-36, FT1554-36, FT0822-14B, FT1254-36AR

Product Code Diagrams





Materials of Construction

Vault	PVC
Pipe coupling	PVC
Handle components	PVC
Support coupling and bracket	PVC
Biotube® cartridge	Polypropylene and polyethylene

* Orenco® Biotube® Effluent Filters are covered under multiple U.S. and international patents.

Note: Support coupling and support bracket are available on 12-inch and 15-inch filters only.

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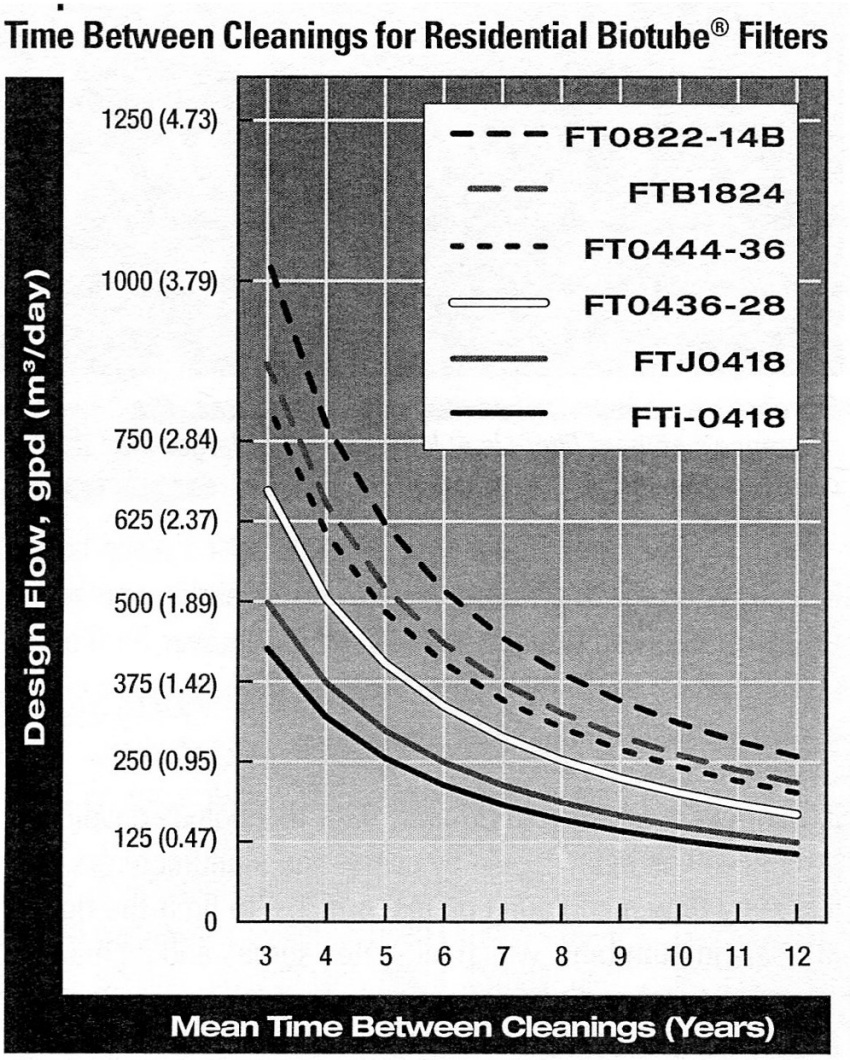
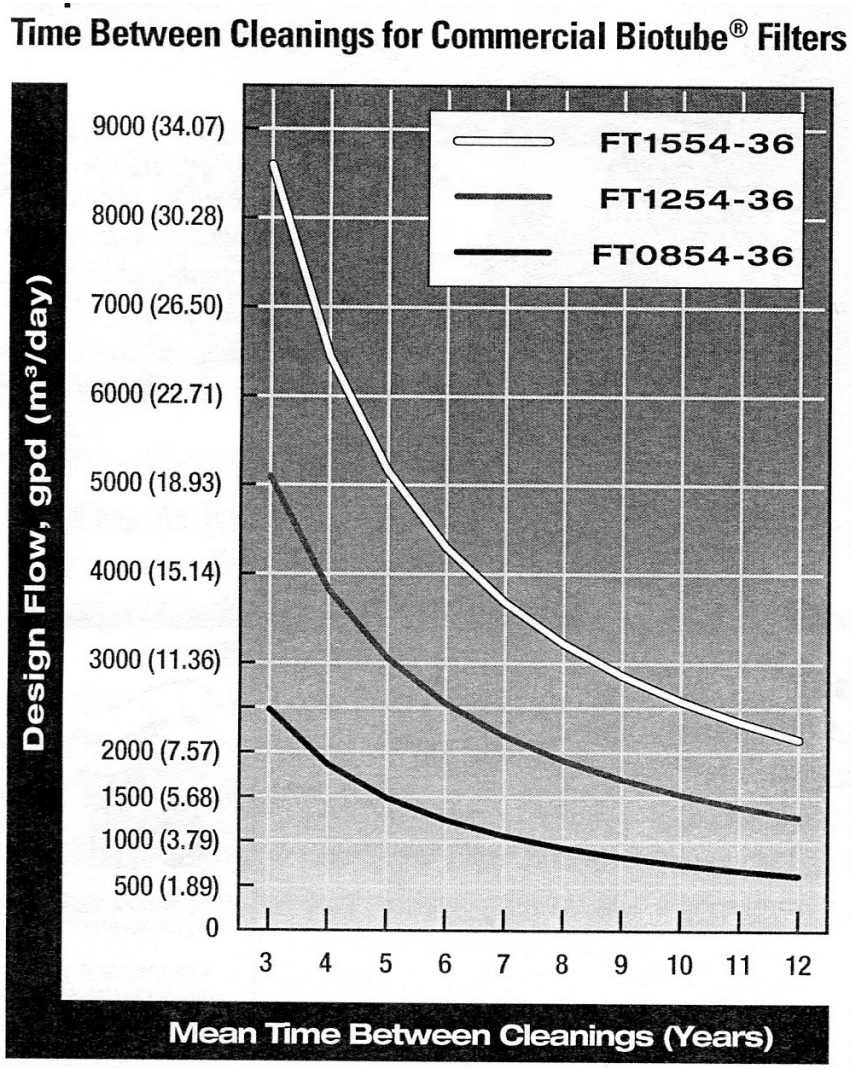
Product Code Diagrams

FT ☐ ☐ ☐ - 36 ☐

- Float switch bracket and slide rail options:
  - Blank = no options selected
  - A = float switch bracket installed
  - R = slide rail installed†
- Cartridge height, in. (mm):
  - 36 = 36 (914), standard
- Housing height*, in. (mm):
  - 48 = 48 (1219)
  - 54 = 54 (1372)
  - 60 = 60 (1524)
  - 66 = 66 (1676-mm)
- Filter diameter, in. (mm):
  - 08 = 08 (200)
  - 12 = 12 (300)
  - 15 = 15 (375)
- Filter mesh option:
  - Blank = 1/8-in. (3-mm) filter mesh
  - P = 1/16-in. (1.6-mm) filter mesh
- Biotube® effluent filter

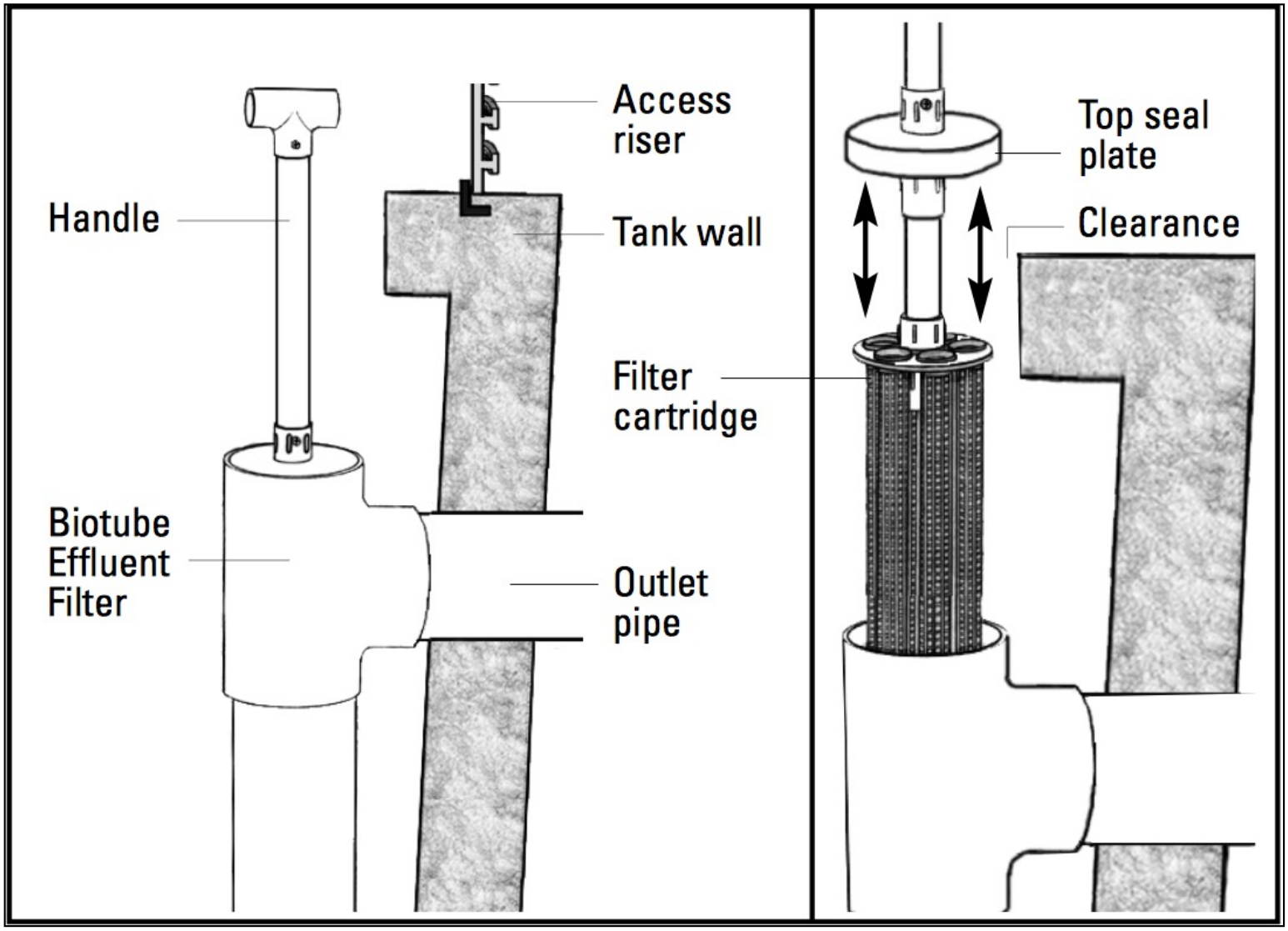
Expected Cleaning Interval



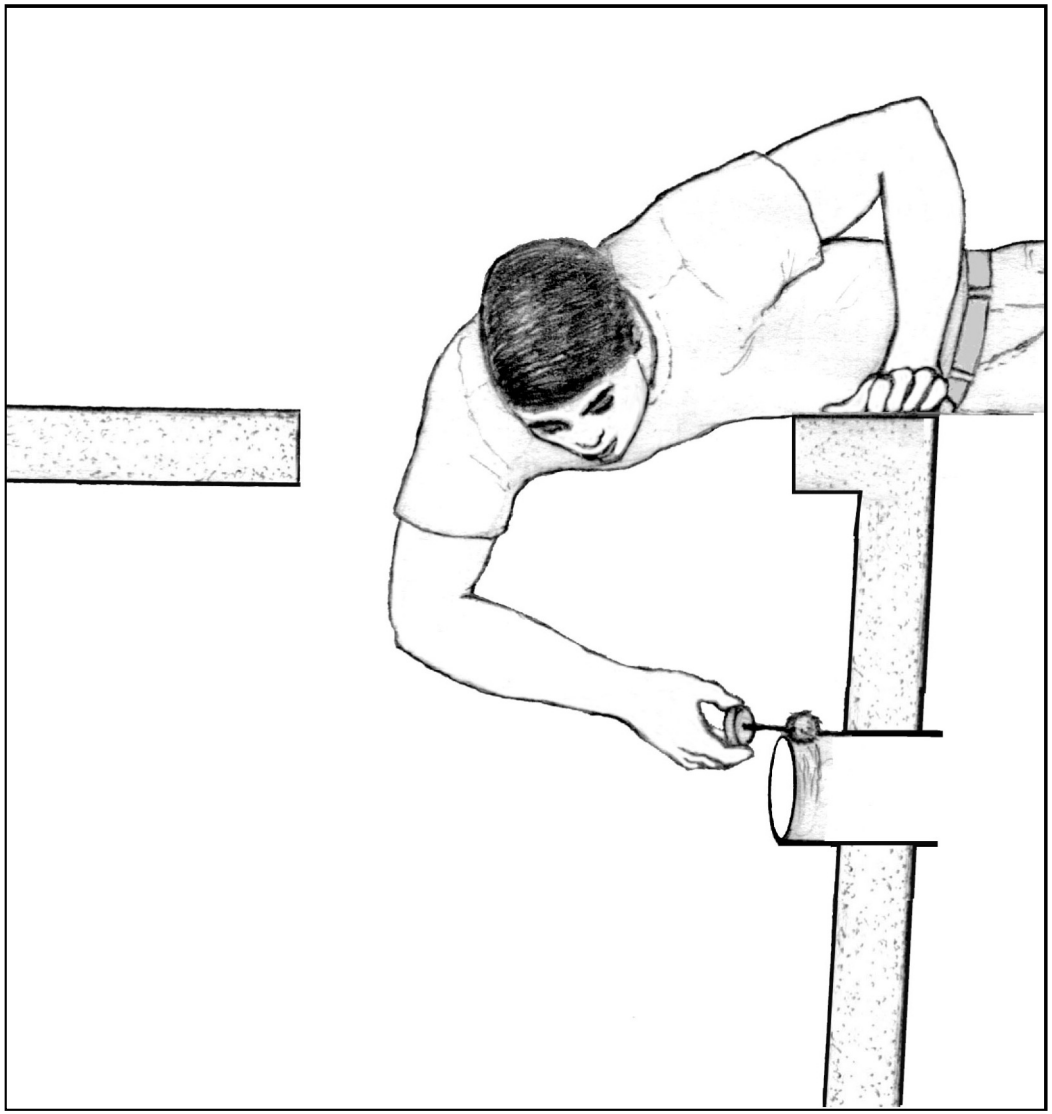


Effluent Filter Installation

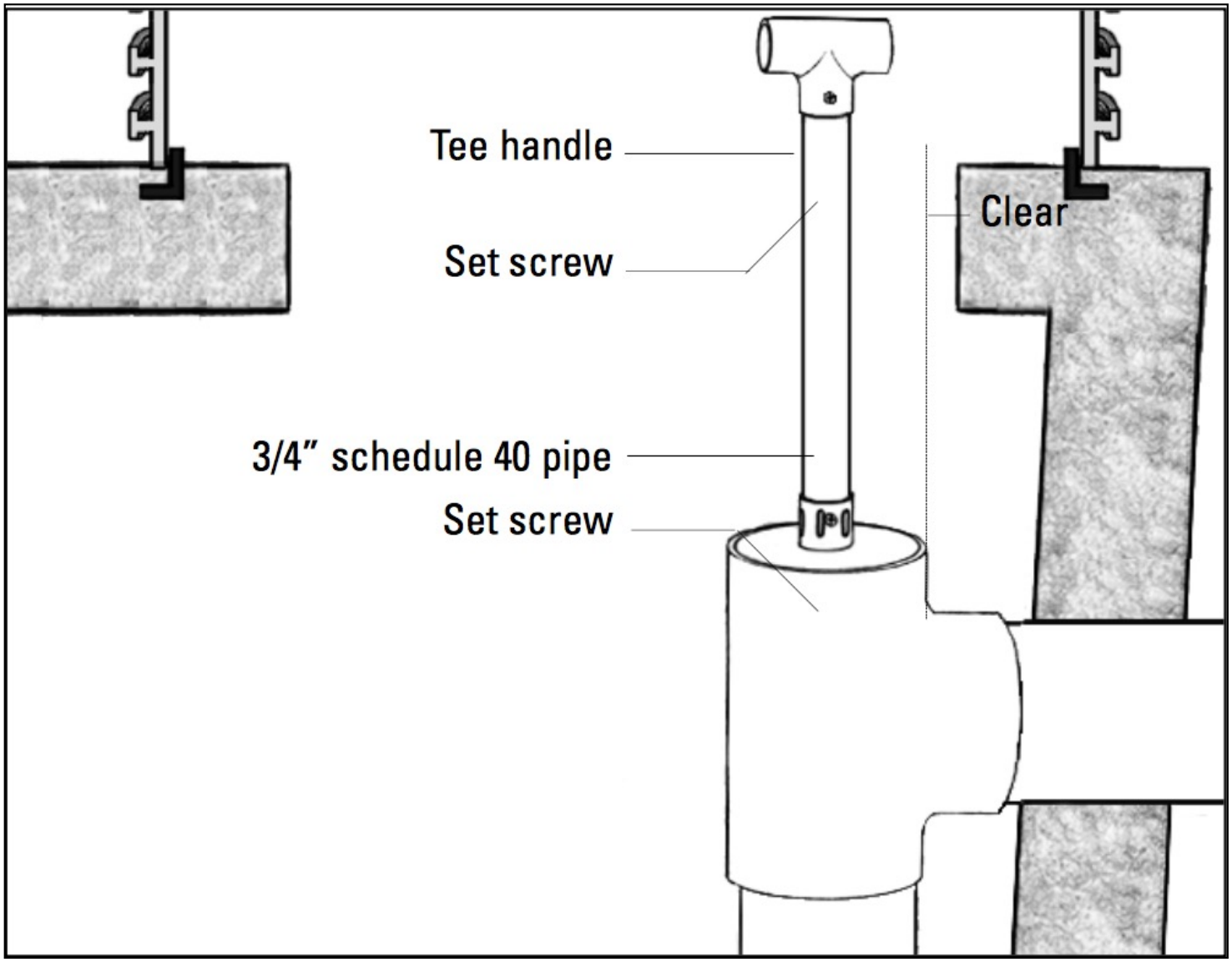
Step 1: Test-Fit Effluent Filter



Step 2: Attaching Filter to Tank

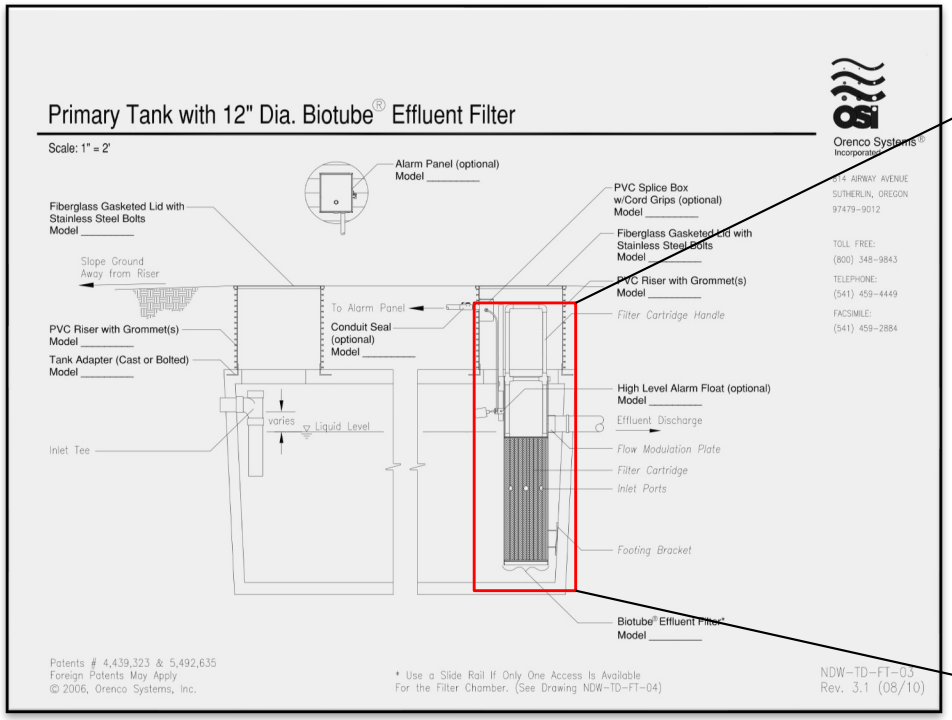


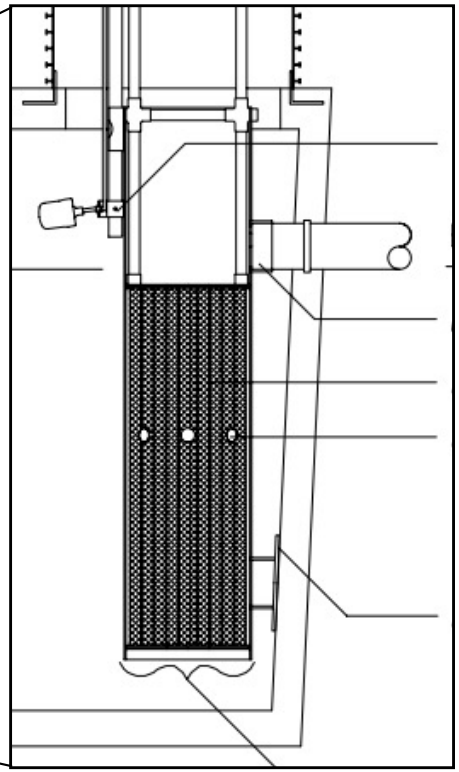
Step 3: Extending Cartridge Handle



Effluent Filter Installation

- Attach filter to the tank's outlet pipe
- For 12"& 15" diameter commercial filters, attach the foot brace to the floor of the tank (fiberglass or concrete tanks), or to the sidewall (concrete tanks only).
- Extend cartridge handle, for easy access.

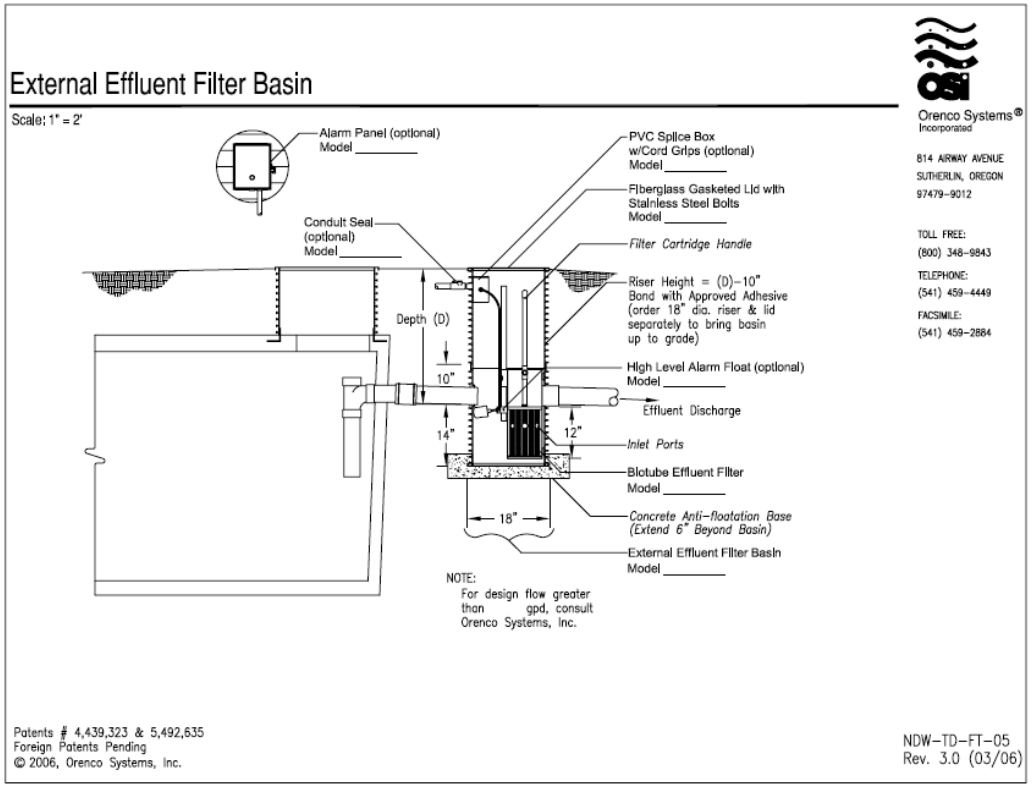




Effluent Filter Maintenance

- Remove and hold cartridge over inlet of tank
- Carefully spray buildup into tank
- Reinsert cartridge into effluent filter housing

External Effluent Filter Basin

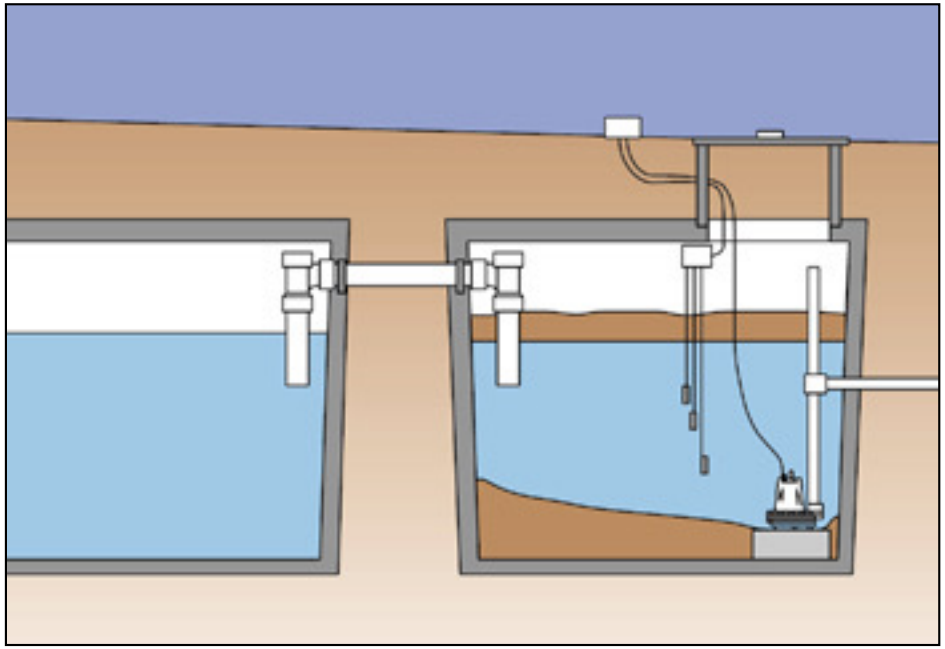


External filter basins, were designed for upgrades/repairs for residential systems.

Onsite Pumping Systems:

In the Beginning

- Unscreened pump rests on bottom of tank
- Pump discharges significant solids to drainfield
- Pump discharge exits through side of tank
- Floats hung without consideration for maintenance
- Unscreened pump requires additional dosing chamber



Orenco Revolutionizes Onsite Pumping*

1984
Screened vault

1996
Biotube® PVC vault

2000
Biotube® PVU vault

**Orenco introduced filtered pump vaults to the onsite industry.*

Orenco's Biotube® Pump Vaults

- For pumping applications
  - ~ More filtering capacity than other brands
  - ~ Longer cleaning intervals
  - ~ Easy to install
  - ~ Simplex or duplex
  - ~ Sturdy, molded polyethylene
  - ~ Filter cartridge easily removable w/o pulling pump

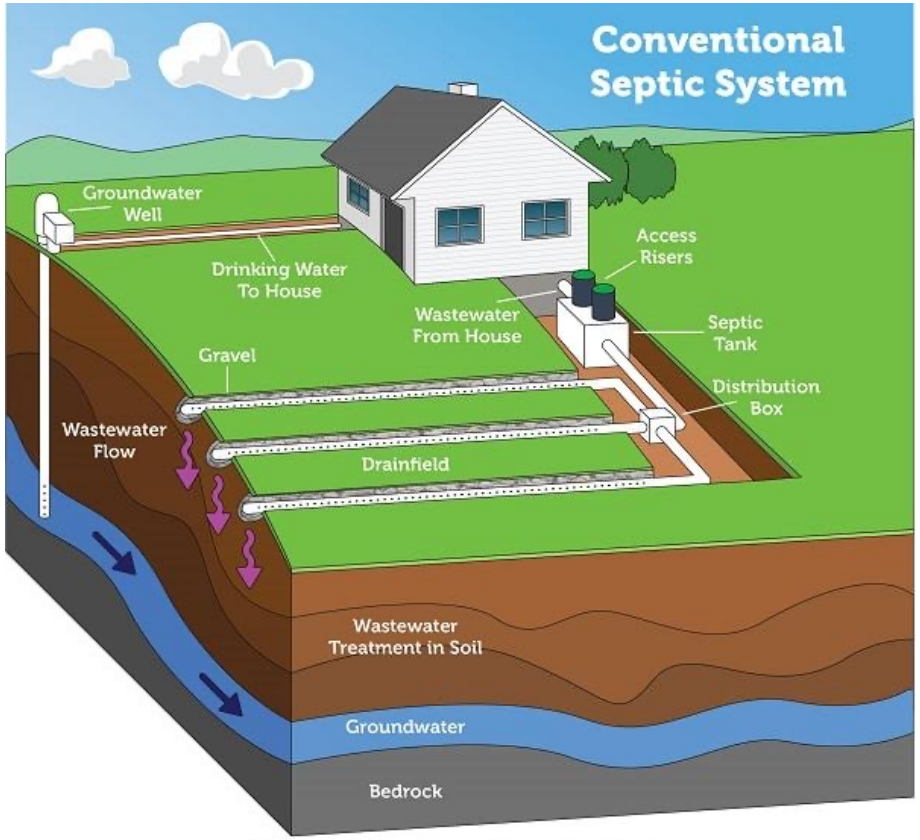
A Truly Integrated Pumping System

- Orenco's fiberglass tank has been designed to directly accept our Biotube® pump package

Gravity Dispersal & Pump to D-Box

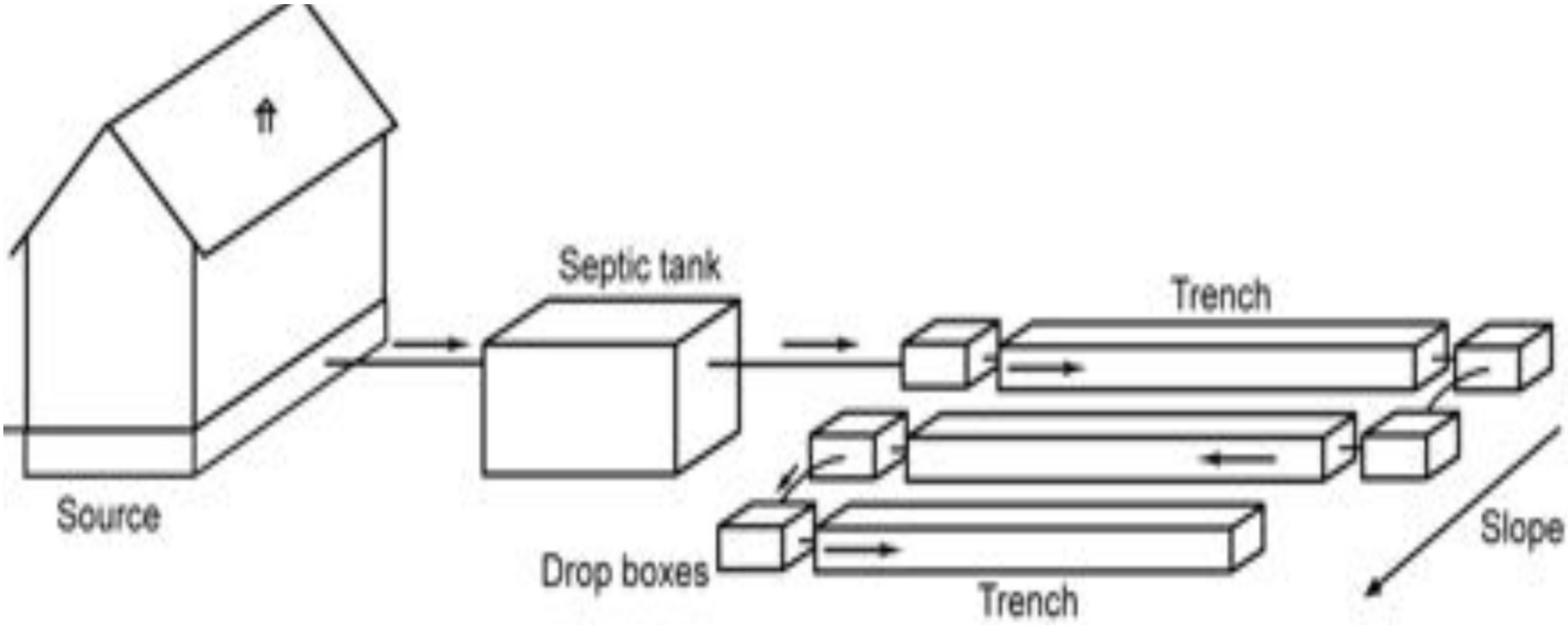
Gravity Dispersal

- This method is used when the septic tank is at a higher elevation than the drain-field or when pumping up to a D-box that is at the high point of the system
- This type of dispersal must be approved by local health department
- Sometimes, pressure dosing is required to provide better distribution and to allow for controlled doses to the drain-field



Please note: Septic systems vary. Diagram is not to scale.

Serial Distribution

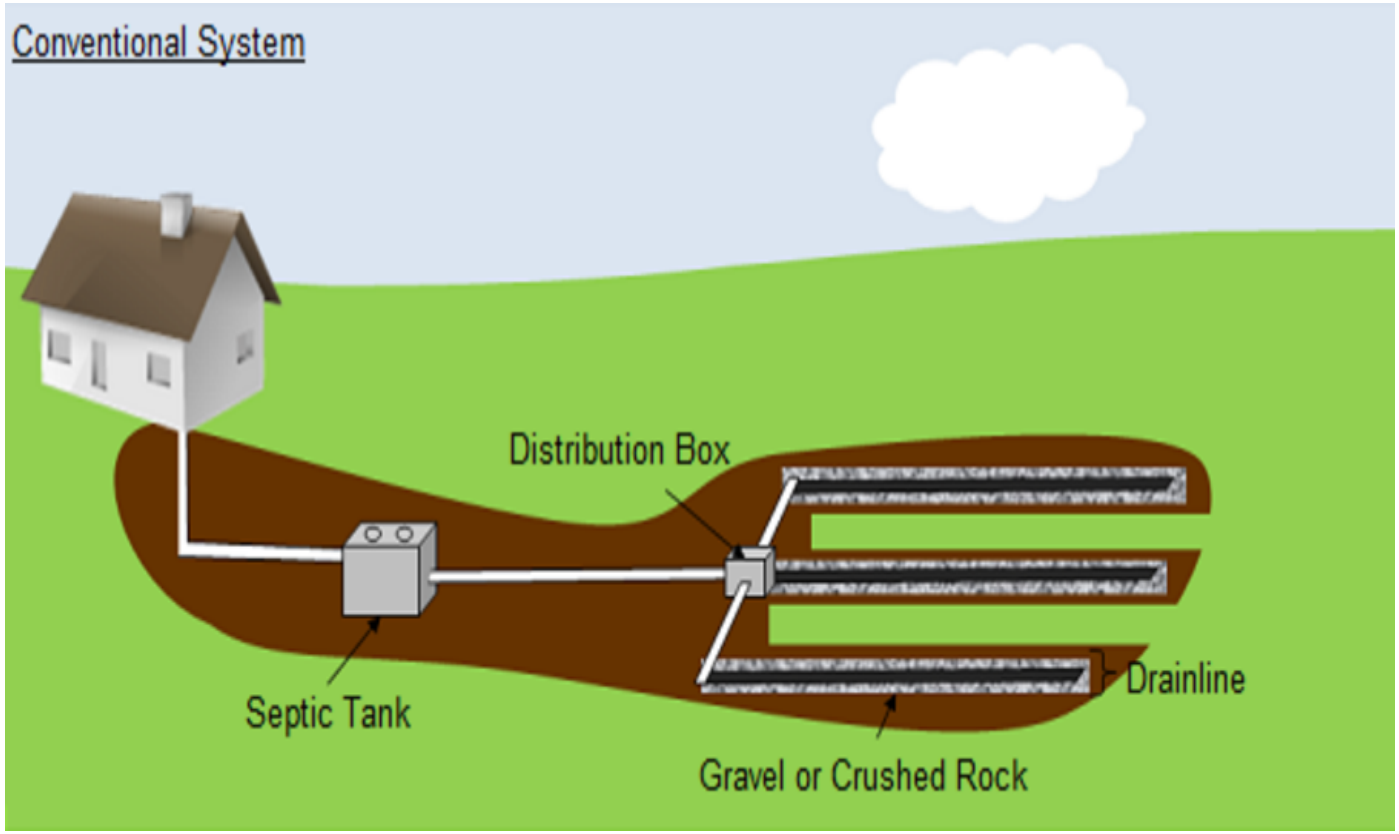


Equal Distribution with Distribution Box

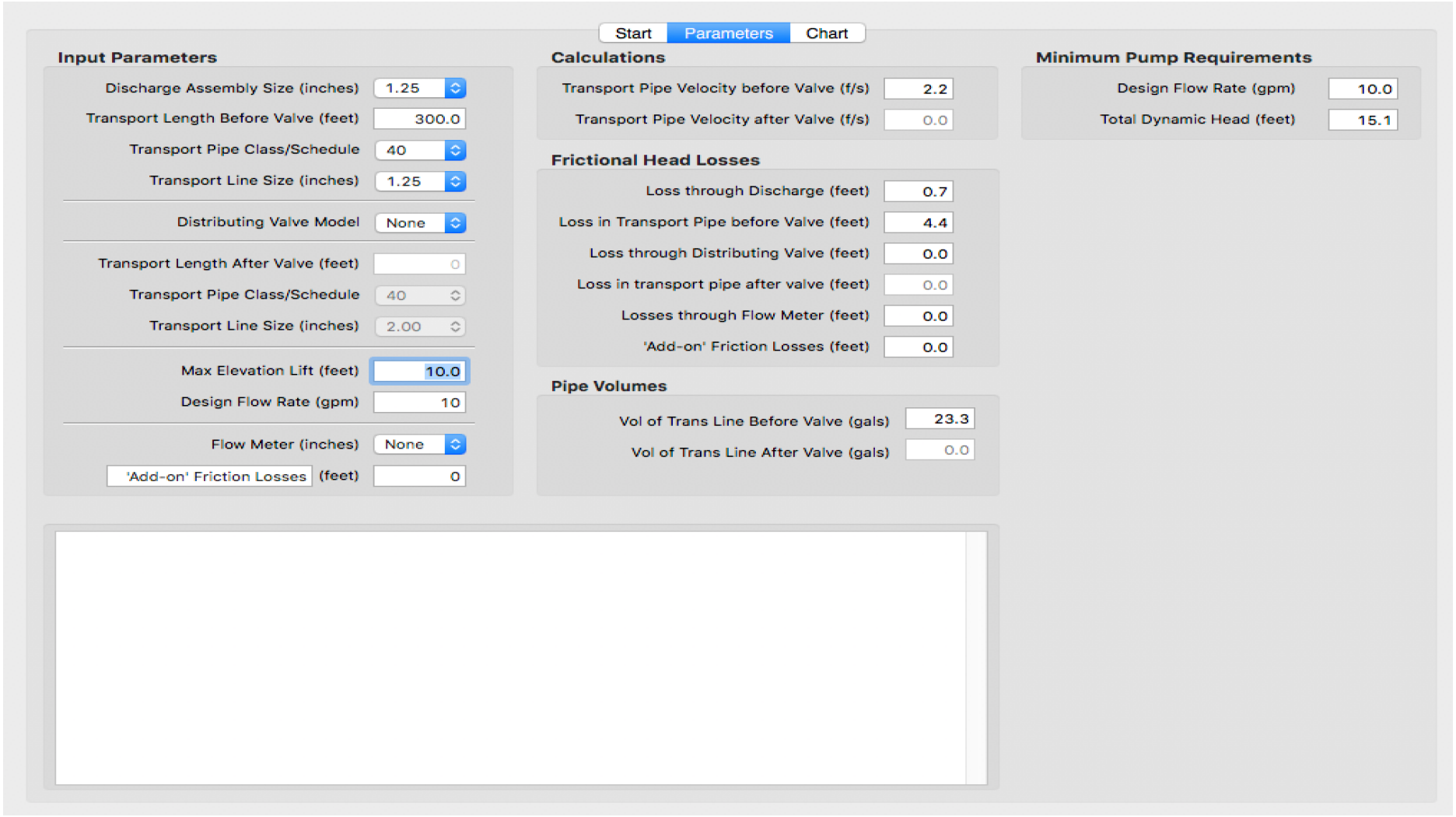
- D-Box must be level
- All penetrations must be at the same elevation
- All penetrations must be the same size
- Can be used in gravity or pump applications

Pump to D-Box

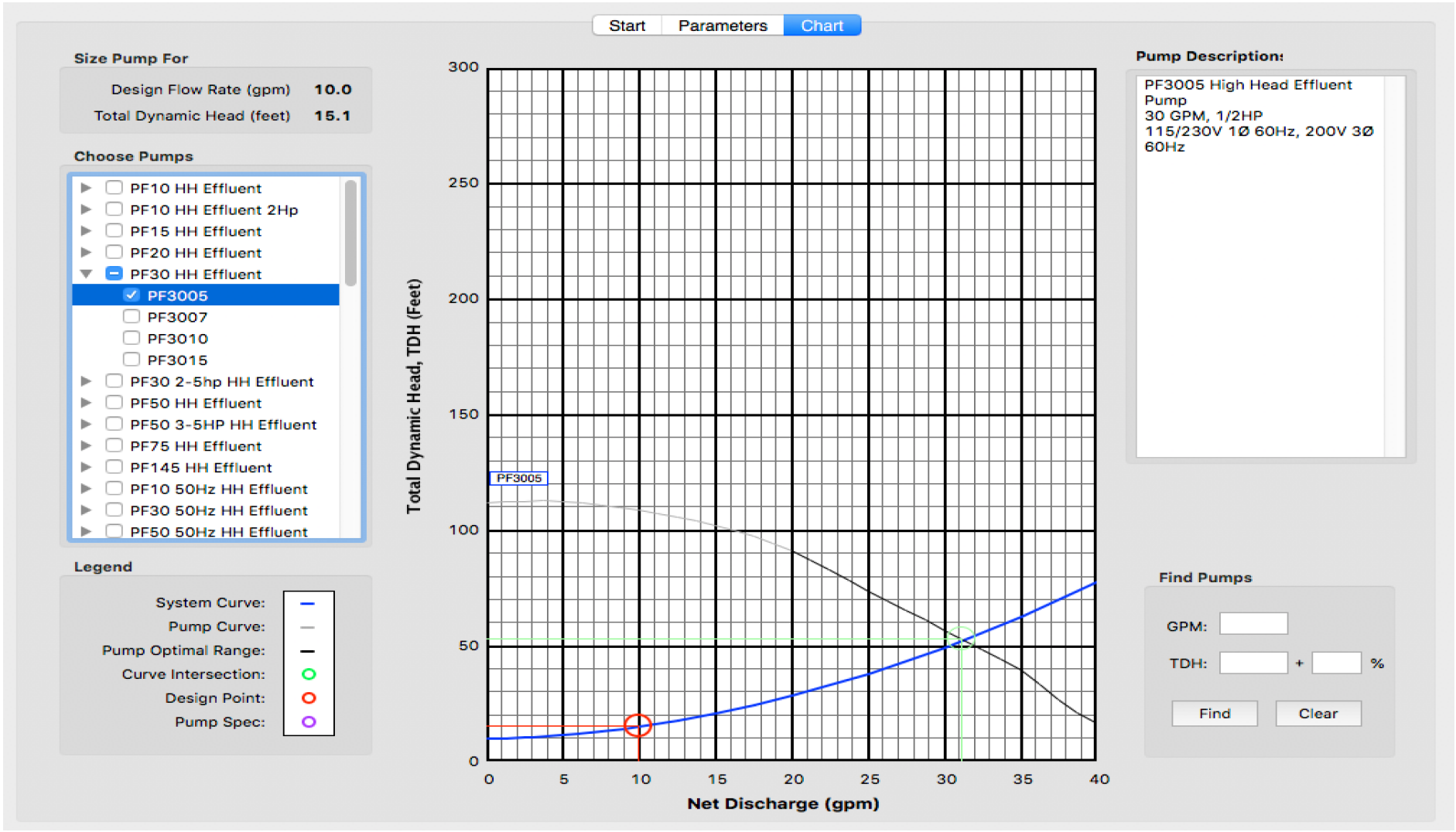
- Allows for gravity dispersal to the drain-field even when the septic tank is at a lower elevation
- Allows for controlled doses



Pump Sizing


Start
Parameters
Chart
Input Parameters
Discharge Assembly Size (inches) 1.25
Transport Length Before Valve (feet) 300.0
Transport Pipe Class/Schedule 40
Transport Line Size (inches) 1.25
Distributing Valve Model None
Transport Length After Valve (feet) 0
Transport Pipe Class/Schedule 40
Transport Line Size (inches) 2.00
Max Elevation Lift (feet) 10.0
Design Flow Rate (gpm) 10
Flow Meter (inches) None
'Add-on' Friction Losses (feet) 0
Calculations
Transport Pipe Velocity before Valve (f/s) 2.2
Transport Pipe Velocity after Valve (f/s) 0.0
Frictional Head Losses
Loss through Discharge (feet) 0.7
Loss in Transport Pipe before Valve (feet) 4.4
Loss through Distributing Valve (feet) 0.0
Loss in transport pipe after valve (feet) 0.0
Losses through Flow Meter (feet) 0.0
'Add-on' Friction Losses (feet) 0.0
Pipe Volumes
Vol of Trans Line Before Valve (gals) 23.3
Vol of Trans Line After Valve (gals) 0.0
Minimum Pump Requirements
Design Flow Rate (gpm) 10.0
Total Dynamic Head (feet) 15.1

Pump Sizing


Start
Parameters
Chart
Size Pump For
Design Flow Rate (gpm) 10.0
Total Dynamic Head (feet) 15.1
Choose Pumps
PF10 HH Effluent
PF10 HH Effluent 2Hp
PF15 HH Effluent
PF20 HH Effluent
PF30 HH Effluent
PF3005
PF3007
PF3010
PF3015
PF30 2-5hp HH Effluent
PF50 HH Effluent
PF50 3-5HP HH Effluent
PF75 HH Effluent
PF145 HH Effluent
PF10 50Hz HH Effluent
PF30 50Hz HH Effluent
PF50 50Hz HH Effluent
Legend
System Curve:
Pump Curve:
Pump Optimal Range:
Curve Intersection:
Design Point:
Pump Spec:
Total Dynamic Head, TDH (Feet)
300
250
200
150
100
50
0
PF3005
0
5
10
15
20
25
30
35
40
Net Discharge (gpm)
Pump Description:
PF3005 High Head Effluent Pump
30 GPM, 1/2HP
115/230V 1Ø 60Hz, 200V 3Ø 60Hz
Find Pumps
GPM:
TDH:
+
%
Find
Clear

Hydrosplitter

- Used to achieve equal distribution of flow to each lateral, regardless of length
- Utilizes flow control disks to allow different amounts of flow to each line

Hydrosplitters continued

- Each flow control disk will have an orifice drilled to match the orifice size in the calculation

#	Length	% Flow	GPM	Orifice Size
1	100	19.0%	5.9	0.581"
2	100	19.0%	5.9	0.581"
3	100	19.0%	5.9	0.581"
4	50	9.5%	2.95	0.411"
5	50	9.5%	2.95	0.411"
6	50	9.5%	2.95	0.411"
7	50	9.5%	2.95	0.411"
8	25	4.8%	1.48	0.29"

Flow Rate: 31 gpm

Residual Pressure: 2 feet

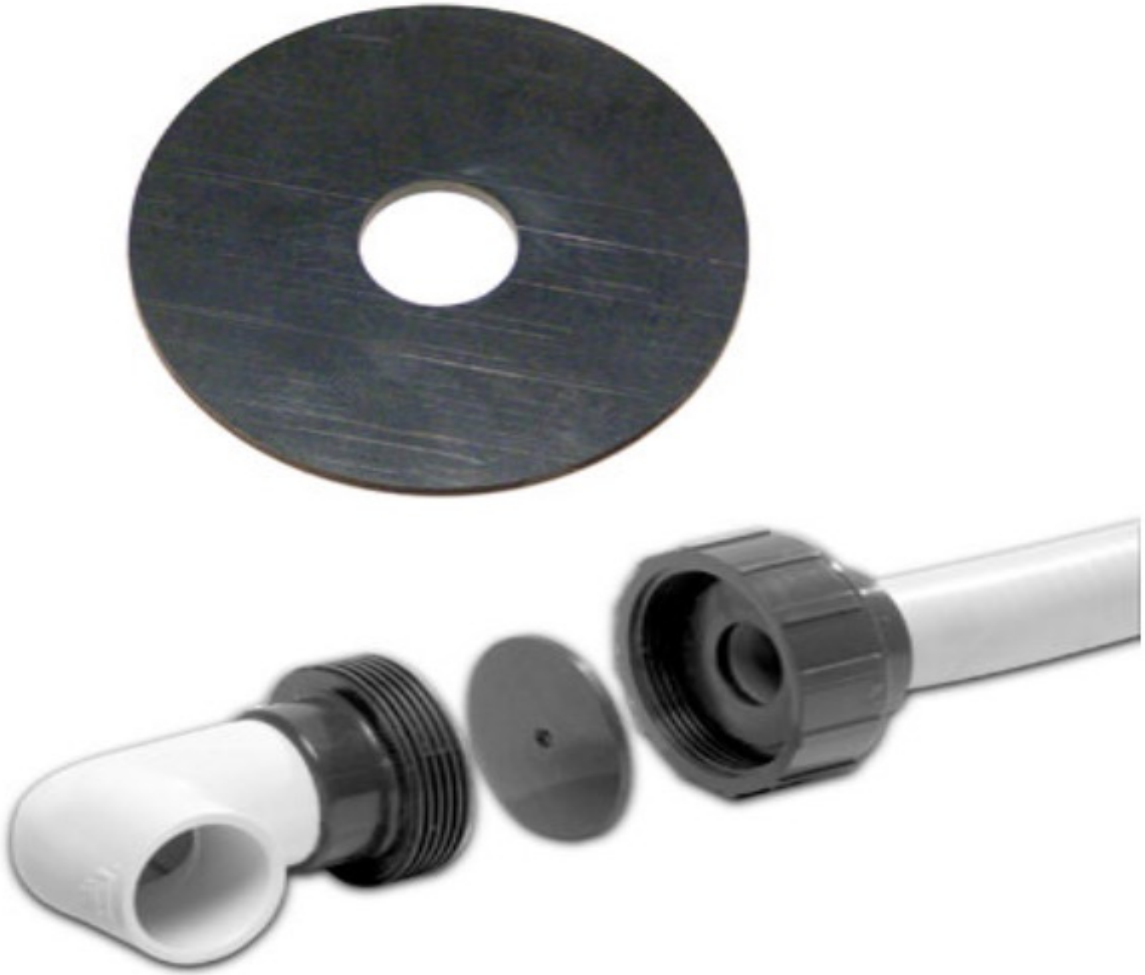
# of Trenches: 8

Pump / Siphon:

By:

Orenco's Hydrosplitters are used when dosing prefiltered effluent by pump, or siphon to a gravity discharge system. They're used to ensure proportional distribution of effluent to each of the drainfield lines, regardless of elevation or length. Hydrosplitter's should be installed at the high point in the system, in order to allow the effluent to flow via gravity to the drainfield lines.

Flow Control Disks



Hydrosplitter Enclosure

Questions?