

## GEOFLOW SUBSURFACE DRIP

Field flow and pump calculations for drip system - design spreadsheets from Geoflow

Updated Mar 2015

### FIELD FLOW

Job Description:	Cordoba Center
Contact:	Cordoba Center
Prepared by:	Steven Hartsell, REHS
Date:	17-May-16

Please fill in the shaded areas and drop down menus:

This spreadsheet is a guide for small systems with residential waste & is not a

### Worksheet 1- Field Flow

Total field		
Total Quantity of effluent to be disposed per day	6,000	gallons / day
Hydraulic loading rate	0.8	gallons / sq.ft. / d
Minimum Dispersal Field Area	10,000	square ft.
Total Dispersal Field Area	10,000	square ft.
Flow per zone		
Number of Zones	5	zone(s)
Dispersal area per zone	2,000	square ft.
Choose line spacing between WASTEFLOW lines	2	ft.
Choose emitter spacing between WASTEFLOW emitters	2	ft.
Total number of emitters per zone (minimum required)	1,000	ft. per zone
Total number of emitters per zone	500	emitters per zone
Select Wasteflow dripline (16mm)	Wasteflow PC - 1 gph	dripline

Pressure at the beginning of the dripline	35	psi
Feet of Head at the beginning of the dripline	80.85	ft.
What is the flow rate per emitter in gph?	1.02	gph
Dose flow per zone	8.50	gpm

Note: A few States or Counties require additional flow for flushing. Please check your local regulatory velocity calculation below is for PC dripline. Classic dripline requires less flow to flush than Please refer to Geoflow's spreadsheet "Design Flow and Flush Curves" at [www.geoflow.com](http://www.geoflow.com) or

If required, choose flush velocity	0.5	ft./sec
How many lines of WASTEFLOW per zone?	5	lines
Fill in the actual length of longest dripline lateral	200	ft.
Flush flow required at the end of each dripline	0.37	gpm
Total Flow required to achieve flushing velocity	1.85	gpm
Total Flow per zone- worst case scenario	10.35	gpm

### Select Filters and zone valves

Select Filter Type	Vortex Screen Filter
Recommended Filter (item no.)	AP4E-1.5F Screen Filter 0-20
Select Zone Valve Type	Hydraulic -
Recommended Zone Valve (item no.)	Orenco zone valve v 46

Note minimum pressure of 25 psi required for Hydraulic valves. Check pressure in Cell

### Dosing

Number of doses per day / zone:	12	doses
Timer ON. Pump run time per dose/zone:	11.46	mins:secs
Timer OFF. Pump off time between doses	1.48	hrs:mins
Per Zone - Pump run time per day/zone:	2.21	hrs:mins
All Zones - Number of doses per day / all zones	60	doses / day
Allow time for field to pressurize	0:00:30	hrs:mins:secs
Filter flush timer	0:00:20	hrs:mins:secs
Drain timer	0:05:00	hrs:mins:secs
Field flush timer	0:01:00	hrs:mins:secs
Field flush counter	3	cycles
Time required to complete all functions per day	18.35	hrs:mins
Dose volume per zone	100	gallons per dose

pump specifications from Orenco systems, inc

### PF Series 4" Submersible Effluent Pumps (continued)

#### Specifications, 60 Hz

Pump Model	Discharge gpm (max)	Discharge ft. (max)	Head (ft.)	Flow range (gpm)	Max. surge (gpm)	Max. surge (ft.)	Discharge size and material	Length, ft. (min)	Min. liquid level (ft. below pump)	Weight (lb. high)	Head (ft. high)
PF10001	10.0 (0.0)	0.5 (0.37)	1	115	120	12.7	1.1/4 in. GPP	23.0 (0.00)	16.4 (0.0)	26.1 (2)	300
PF100012	10.0 (0.0)	0.5 (0.37)	1	230	240	6.3	1.1/4 in. GPP	23.0 (0.00)	16.4 (0.0)	26.1 (2)	300
PF1000200	10.0 (0.0)	0.5 (0.37)	3	200	200	3.8	1.1/4 in. GPP	23.0 (0.00)	16.4 (0.0)	26.1 (2)	300
PF100121*	10.0 (0.0)	0.75 (0.50)	1	200	200	8.3	1.1/4 in. GPP	25.0 (0.00)	17.4 (0.0)	30.1 (4)	300
PF1002200*	10.0 (0.0)	0.75 (0.50)	3	200	200	5.1	1.1/4 in. GPP	25.0 (0.00)	17.4 (0.0)	30.1 (4)	300
PF100121*	10.0 (0.0)	1.0 (0.75)	1	200	200	8.8	1.1/4 in. GPP	27.0 (0.00)	18.4 (0.0)	33.1 (6)	300
PF1002200*	10.0 (0.0)	1.0 (0.75)	3	200	200	5.5	1.1/4 in. GPP	27.0 (0.00)	18.4 (0.0)	33.1 (6)	300
PF100121*	10.0 (0.0)	2.0 (1.40)	1	200	200	12.1	1.1/4 in. GPP	30.0 (0.00)	20.0 (0.0)	36.1 (8)	300
PF1002200	10.0 (0.0)	2.0 (1.40)	3	200	200	7.8	1.1/4 in. GPP	30.0 (0.00)	20.0 (0.0)	36.1 (8)	300
PF1002200*	10.0 (0.0)	2.0 (1.40)	3	200	200	8.7	1.1/4 in. GPP	31.0 (0.00)	20.0 (0.0)	37.1 (8)	300
PF10001	20.0 (1.0)	0.5 (0.37)	1	115	120	12.5	1.1/4 in. GPP	23.0 (0.00)	16.4 (0.0)	26.1 (2)	300
PF100012	20.0 (1.0)	0.5 (0.37)	1	230	240	6.4	1.1/4 in. GPP	23.0 (0.00)	16.4 (0.0)	26.1 (2)	300
PF100020	20.0 (1.0)	0.5 (0.37)	3	200	200	3.8	1.1/4 in. GPP	23.0 (0.00)	16.4 (0.0)	26.1 (2)	300
PF1000200	20.0 (1.0)	0.5 (0.37)	3	200	200	5.7	1.1/4 in. GPP	23.0 (0.00)	16.4 (0.0)	26.1 (2)	300
PF100121*	20.0 (1.0)	1.0 (0.75)	1	200	200	10.5	1.1/4 in. GPP	26.0 (0.00)	17.4 (0.0)	30.1 (4)	300
PF1002200*	20.0 (1.0)	1.0 (0.75)	3	200	200	5.8	1.1/4 in. GPP	27.0 (0.00)	18.4 (0.0)	33.1 (6)	300
PF100121*	20.0 (1.0)	2.0 (1.40)	1	200	200	12.4	1.1/4 in. GPP	30.0 (0.00)	20.0 (0.0)	36.1 (8)	300
PF1002200*	20.0 (1.0)	2.0 (1.40)	3	200	200	7.1	1.1/4 in. GPP	30.0 (0.00)	20.0 (0.0)	36.1 (8)	300
PF10001	30.0 (1.0)	0.5 (0.37)	1	115	120	11.8	1.1/4 in. GPP	21.5 (0.00)	15.4 (0.0)	25.1 (2)	300
PF100012	30.0 (1.0)	0.5 (0.37)	1	230	240	6.3	1.1/4 in. GPP	21.5 (0.00)	15.4 (0.0)	25.1 (2)	300

### PUMP SIZING

Job Description:	CORDOBA CENTER
Contact:	
Prepared by:	Steve Hartsell
Date:	3/18/2016

Please fill in the shaded areas and drop down menus:

This spreadsheet is a guide for small systems with residential waste & is not a complete hydraulic design.

Pressure losses may be grossly overstated, particularly if designing with WASTEFLOW Classic. The letters on the diagram(right) match the letters in section 2 below.

### Worksheet - Pump Sizing

Section 1 - Summary from Worksheet 1		
Flow required to dose field	8.50	gpm
Flow required to flush field	1.85	gpm
Flow required to dose & flush field	10.35	gpm
Filter	AP4E-1.5F	
No. of Zones	5 zones	
Zone valve	Orenco zone valve v 46	
Dripline	Wasteflow PC - 1 gph	
Dripline longest lateral	200.00	ft.

Section 2	Ft. of head	Pressure
A. Flush line - Losses through return line		
Select Pipe from dropdown menu	PVC schedule 40	
Select Flush Line Diameter	1/2" inch	
Length of return line	353	
Equivalent length of fittings	5	
Elevation change, (if downhill enter 0)	0	
Pressure loss in 100 ft of pipe	3.52	1.52 psi
Total pressure loss from end of dripline to return tank	12.6	5.45 psi

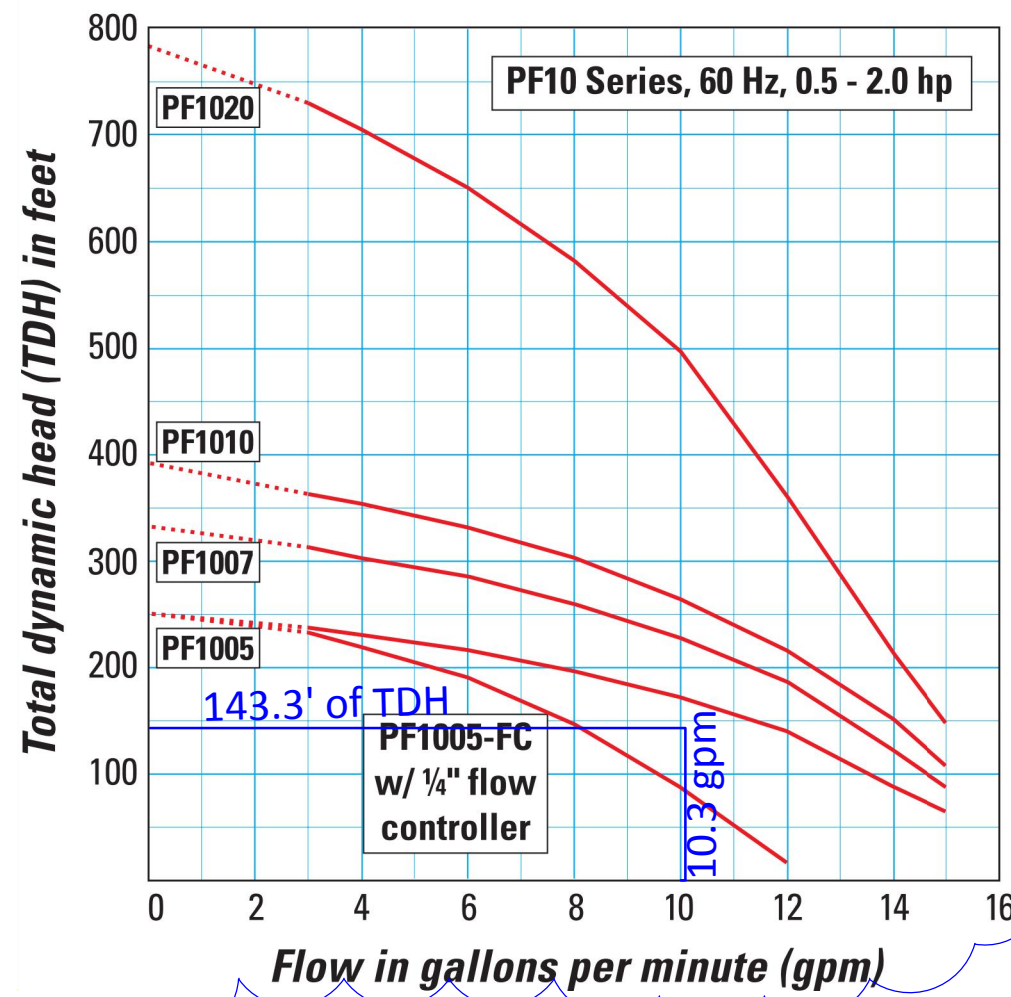
B. Dripline - Losses through Wasteflow dripline		
Length of longest dripline lateral	200	ft.
Minimum dosing pressure required at end of dripline	23.10	10.00 psi
Loss through dripline during flushing	9.49	4.11 psi
Total minimum required dripline pressure	32.59	14.11 psi
A+B. Minimum Pressure required at beginning of dripline	45.19	19.56 psi
CALCULATED pressure required at beginning of dripline	45.19	19.56 psi
SPECIFIED pressure at beginning of dripline (from Great! SPECIFIED Pressure is greater than CALCULATED Pressure requirement. Go to next step	80.9	35.00 psi

C. Drip components - Losses through headworks		
Filter	9.0	ft.
Zone valve pressure loss (not in diagram)	0.50	ft.
Flow meter pressure loss (not in diagram)	1.00	ft.
Other pressure losses	5.00	ft.
Total loss through drip components	15.51	ft.

D. Supply line - Minimum Pressure head required to get from pump tank to top of dripline		
Select Pipe from dropdown menu	PVC schedule 40	
Select Supply line diameter	1-1/2" inch	
Length of supply line	353	ft.
Equivalent length of fittings	5	ft.
Height from pump to tank outlet	5	ft.
Elevation change, (if downhill enter 0)	39	ft.
Pressure loss/gain in 100 ft. of pipe	0.83	ft.
Total gain or loss from pump to field	47.0	ft.
Total dynamic head	143.3	ft.
Pump capacity * - Field Flush Flow	10.4	gpm
-Field Dose Flow	8.5	gpm
-Filter Flush Flow	na	gpm
Pump Model Number	na	psi

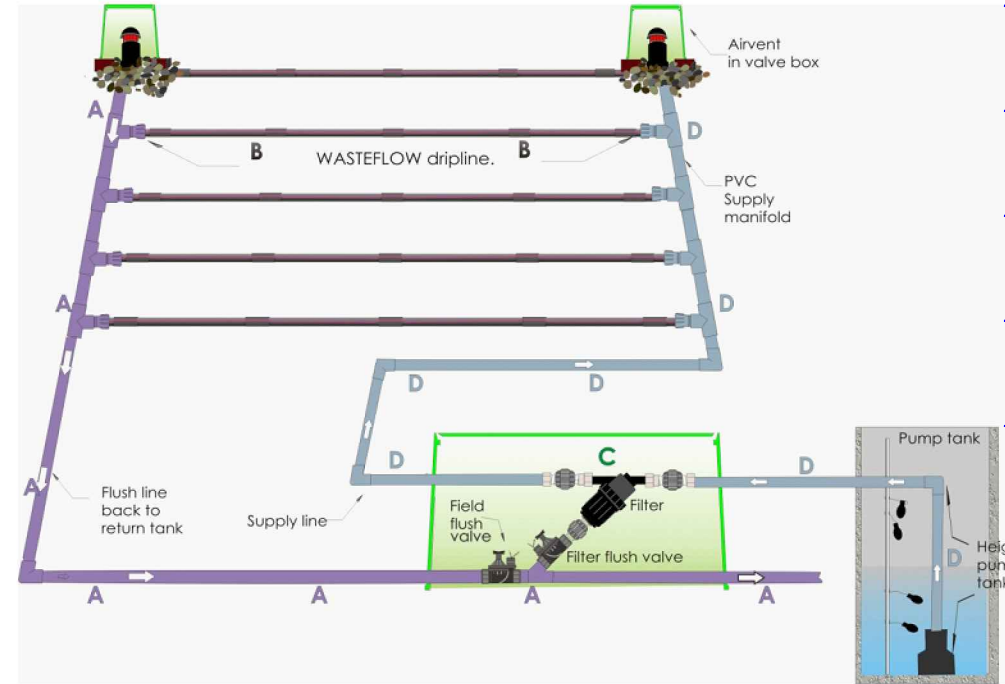
ORENCO PF SERIES PF100712 240 VOLTS/1 HORSEPOWER/1 PHASE

pump performance curve for drip system from Orenco systems, inc



SPECIFICATIONS OF PUMP SELECTED

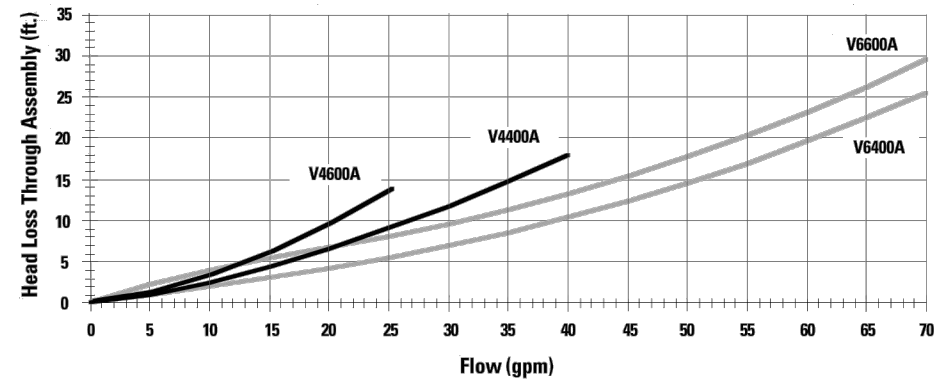
Updated Mar 2015



If back pressure when flushing is positive then add this pressure to this number. If flushing downhill then use

from Orenco Systems, inc

### Distributing Valves (continued)



Model	Inlet Size (in.)	Outlet Size (in.)	Flow range (gpm)	Max Head (ft.)	Min. Enclosure
V400A	1.25	1.25	10-40	170	VB1217
V400A	1.25	1.25	10-40	170	VB1217
V400A	1.25	1.25	10-25	170	RG418
V400A	1.25	1.25	10-25	170	RG418
V400A	1.5	1.5	15-100	345	RG418
V400A	1.5	1.5	15-100	345	RG418
V400A	1.5	1.5	15-100	345	RG418
V400A	1.5	1.5	15-100	345	RG418

pump specification for flow equalization tank

### PUMP SYSTEM WORKSHEET

Designer (REHS or RCE) \_\_\_\_\_ srhartsell, rehs 5979  
Number of bedrooms \_\_\_\_\_ Total square footage of living space \_\_\_\_\_ na  
Septic tank size \_\_\_\_\_ Installed drainfield \_\_\_\_\_ Expansion drainfield \_\_\_\_\_ na  
Elevation of treatment inlet \_\_\_\_\_ 298  
Elevation of pump off (ft) \_\_\_\_\_ 288  
Total lift (ft Head) = \_\_\_\_\_ 10 (A)

### TIGHT LINE

Diameter of tight line (inches) \_\_\_\_\_ 2.5  
Length of tight line from pump to upper drainfield (ft) \_\_\_\_\_ 20 (B)

### FITTINGS

No. of Fittings: Pipe Length Equivalent (ft) See chart Total Pipe

Equivalent (ft) \_\_\_\_\_ 6 = 6

1 90° standard elbow X \_\_\_\_\_ 2.5 = 5

1 90° long radius elbow X \_\_\_\_\_ =

1 gate valve (fully open) X \_\_\_\_\_ = 50

1 check valve X \_\_\_\_\_ =

1 (conventional swing) TOTAL = \_\_\_\_\_ 61 (C)

Total Length of Pipe = B + C = \_\_\_\_\_ 81 (D)

Friction Loss in Pipes and Fittings: (D/100 ft) X 5.53 (friction loss per chart) = 4.47 (E) Head in Feet

Required Pump Size: \_\_\_\_\_ 10 (A) + 4.47 (E) = 14.47 (F) Total Pumping Head in Feet

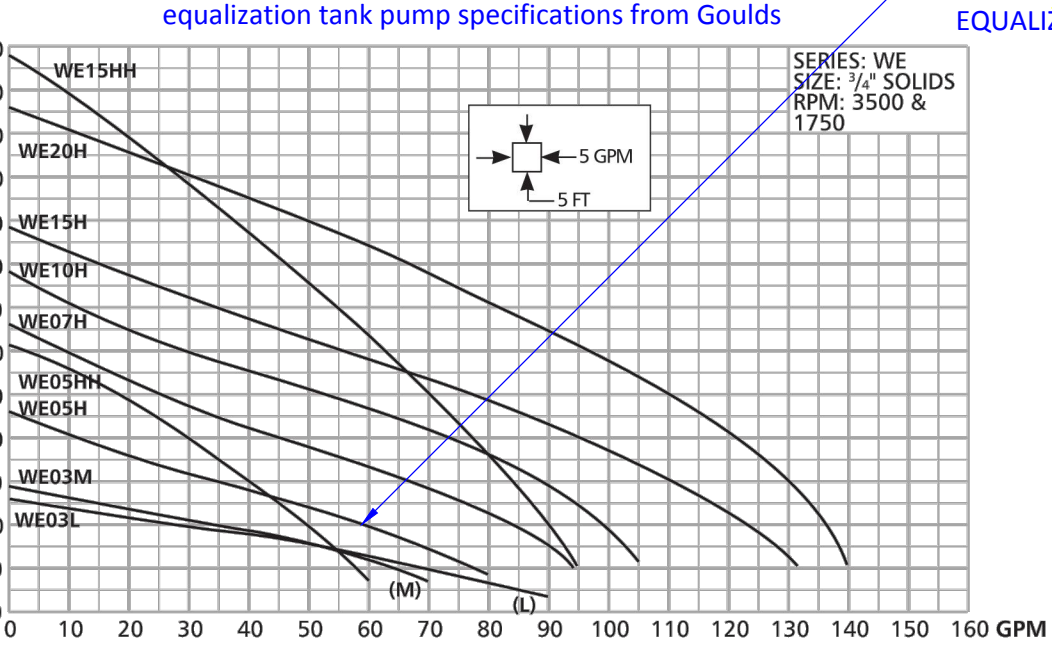
Pump Size: \_\_\_\_\_ because valve is 1.5"

(F) versus GPM = Pump Size (refer to pump curve)

Pump Model: (Attach Pump Curve)

30 GPM at 15 (G) (ft of head: from pump curve) Manufacturer/Model: Goulds WE series 0511

equalization tank pump specifications from Goulds



equalization tank pump specifications from Goulds

PVC Part	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
90° elbow, standard	1.5	2.0	2.25	4.0	4.0	6.0	8.0	8.0	12.0
45° elbow, standard	0.75	1.0	1.4	1.75	2.0	2.5	3.0	4.0	5.0
Insert Coupling	0.5	0.75	1.0	1.25	1.5	2.0	3.0	3.0	4.0
Gate Valve	0.3	0.4	0.6	0.8	1.0	1.5	1.6	2.0	3.0
Male-Female Adapter	1.0	1.5	2.0	2.75	3.5	4.5	-	6.5	9.0
Tee-Flow through Run	1.0	1.4	1.7	2.3	2.7	4.3	5.1	6.3	8.3
Tee-Flow through Branch	4.0	5.0	6.0	7.0	8.0	12.0	15.0	16.0	22.0

### MODELS

Order Number	HP	Phase	Volts	RPM	Impeller Diameter (in.)	Maximum Amps	Locked Rotor KVA	Full Load Efficiency %	Resistance Start Line-Line	Power Cable Size	Weight (lbs.)
WE0311L	0.33	1	230	1750	5.38	10.7	30.0	M	54	11.9	1.7
WE0318L	1	208	230	1750	5.38	6.8	19.5	K	51	9.1	4.2
WE0312L	1	208	230	1750	5.38	4.9	14.1	L	53	14.5	8.0
WE0311M	1	208	230	1750	5.38	10.7	30.0	M	54	11.9	1.7
WE0318M	1	208	230	1750	5.38	6.8	19.5	K	51	9.1	4.2
WE0312M	1	208	230	1750	5.38	4.9	14.1	L	53	14.5	8.0
WE0511H	1	208	230	1750	5.38	14.5	46.0	M	54	7.5	1.0

equalization tank pump specifications from Goulds

from Orenco Systems, inc

### Orenco® | Wastewater Pumping Products Catalog

### Distributing Valve Assemblies

#### Distributing Valve Assemblies (V4, V6)

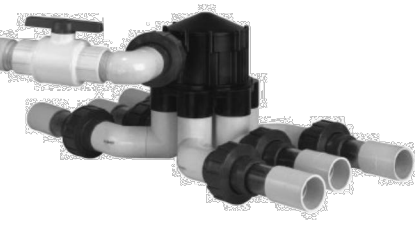
Orenco® Distributing Valve Assemblies are used to dose filtered effluent to multiple zone pressure distribution systems including drainfields, bubble filters, and sand filters. They are automatically operated by mechanical means — with a combination of pressure and flow — to sequentially redirect the pump's flow to multiple zones or cells.

- Automatic, mechanical operation
- Multiple flow ranges available
- Allows use of smaller horsepower pumps on large drainfields and sand filters
- Schedule 40 PVC fittings, unions, ball valves, and pipe
- ABS polymer and stainless steel distribution valves
- 2-4 outlet units and 5-6 outlet units available
- 1-1/4 inch or 1-1/2 inch NPS (32 or 40 mm DN) inlet and outlet sizes
- 170-foot or 345-foot (52-m or 105-m) maximum head pressures available
- Custom-built enclosures available

Each Distributing Valve Assembly is built to the specific needs of a particular drainfield or system. For information on selecting a Distributing Valve Assembly for your project, call Orenco. Custom-built enclosures are available for Orenco Distributing Valve Assemblies. Call Orenco for details.

### Distributing Valve Model Guide

Model	Inlet Size (in.)	Outlet Size (in.)	Flow Range (gpm)	Recommended Enclosure
V4000	1.25 (32)	1.25 (32)	10-40 (0.03-2.52)	RG2400
V4000	1.25 (32)	1.25 (32)	10-25 (0.03-1.58)	RG2400
V4000	1.50 (40)	1.50 (40)	15-100 (0.05-6.31)	RG2400
V4000	1.50 (40)	1.50 (40)	15-100 (0.05-6.31)	RG2400



Orenco Distributing Valve Assembly

from Orenco Systems, inc

### PF Series 4" Submersible Effluent Pumps (continued)

#### Specifications, 60 Hz

Pump Model	Discharge gpm (max)	Discharge ft. (max)	Head (ft.)	Flow range (gpm)	Max. surge (gpm)	Max
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