

University of Minnesota Pressure Distribution System Design - 10/25/04

All boxed rectangles must be entered, the rest will be calculated.

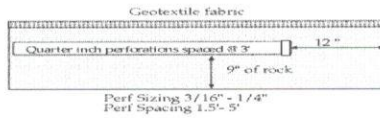


1. Select number of perforated laterals:

2. Select perforation spacing = ft

3. Since perforations should not be placed closer than 1 foot to the edge of the rock layer (see diagram), subtract 2 feet from the rock layer length

- 2 ft = ft



4. Determine the number of spaces between perforations. Divide the length (3) by perforation spacing (2) and round down to nearest whole number.
Perforation spacing = ft / ft =

5. Select perforation size inch

6. Number of perforations is equal to one plus the number of perforation spaces (4).

* Check figure E-4 to assure the number of perforations per lateral guarantees < 10% discharge variation.

spaces + 1 = perforations/lateral

Perforation Spacing ft	Pipe Diameter			
	1 inch	1.25 inch	1.5 inch	2.0 inch
2.5	8	14	18	28
3.0	8	13	17	26
3.3	7	12	16	25
4.0	7	11	15	23
5.0	6	10	14	22

Perforation Spacing feet	Pipe Diameter			
	1 inch	1.25 inch	1.5 inch	2.0 inch
2.5	12	19	25	39
3	11	18	24	37
3.3	10	17	23	36
4	10	16	21	33
5	9	15	20	31

7. A. Total number of perforations = perforations per lateral (5) times number of laterals (1).
 perfs/ lat x laterals = perforations

B. Calculate the square footage per perforation. Recommended value is 6-10 sqft/perf. Does not apply to at-grades.

1. Rock bed area = rock width (ft) x rock length (ft)
 ft x ft = ft²

2. Square foot per perforation = Rock Bed Area / number of perfs (6)
 ft² / perfs = ft²/perf

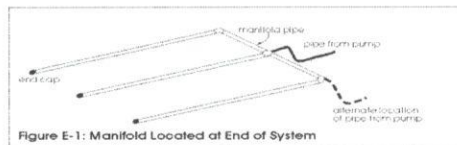
8. Determine required flow rate by multiplying the total number of perforations (6A) by flow per perforations (see figure E-6)
 perfs x gpm / perfs = gpm

Head (feet)	Perforations diameter (inches)		
	3/16	7/32	1/4
1 ^a	0.42	0.56	0.74
2 ^b	0.59	0.80	1.04
5	0.94	1.26	1.65

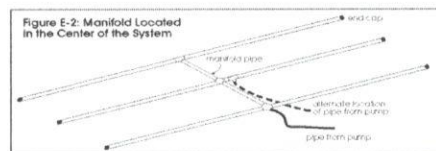
a. Use 1.0 foot for single-family homes.
b. Use 2.0 feet for anything else

9. Determine Minimum Pipe Size

A. **Manifold on End.** If laterals are connected to header pipe as shown in Figure E-1, to select minimum required lateral diameter; enter figure E-4 or E-5 with perforation spacing and number of perforations per lateral. Select minimum diameter for perforated laterals = inches



B. **Center Manifold.** If perforated lateral system is attached to manifold pipe near the center, like Figure E-2, perforated lateral length (3) and number of perforations per lateral (5) will be approximately one half of that in step A. Using these values, select minimum diameter for perforated lateral = inches



I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

(signature) (license #) (date)

University of Minnesota Pump Selection Procedure - 10/25/04

All boxed rectangles must be entered, the rest will be calculated.



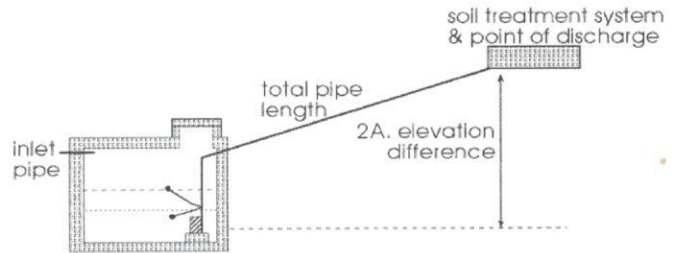
1. Determine pump capacity:

A. Gravity Distribution

1. Minimum required discharge is 10 gpm
 2. Maximum suggested discharge is 45 gpm
- For other establishments at least 10% greater than the water supply rate, but no faster than the rate at which effluent will flow out of the distribution device.

B. Pressure Distribution - see pressure design worksheet

Selected Pump Capacity: gpm



2. Determine Total Dynamic Head (TDH)

A. Elevation difference between pump and point of discharge.

feet

B. Special head requirement? (See Figure - Special Head Requirements)

feet

Special Head Requirements	
Gravity Distribution	0ft
Pressure Distribution	5ft

C. Friction loss in supply pipe

1. Select pipe diameter in
2. Enter Figure E-9 with gpm (1A or B) and pipe diameter (C1)

Read friction loss in feet per 100 feet from Figure E-9

Friction loss = ft/ 100 ft of pipe

3. Determine total pipe length from pump discharge to soil system discharge point. Estimate by adding 25 percent to pipe length for friction loss in fittings.

Pipe length times 1.25 = equivalent pipe length

ft x 1.25 = feet

4. Calculate total friction loss by multiplying friction loss (C2) by the equivalent pipe length (C3) and divide by 100.

Friction Loss = ft/100ft X ft / 100 = feet

D. Total head requirement is the sum of elevation difference (A), special head requirements (B), and total friction loss (C4).

ft + ft + ft

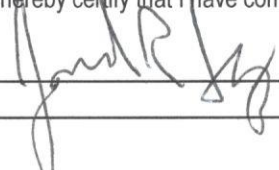
Total Head: feet

Flow Rate (gpm)	nominal pipe diameter		
	1.5"	2.0"	3"
20	2.47	0.73	0.11
25	3.73	1.11	0.16
30	5.23	1.55	0.23
35	6.96	2.06	0.3
40	8.91	2.64	0.39
45	11.07	3.28	0.48
50	13.46	3.99	0.58
55		4.76	0.7
60		5.6	0.82
65		6.48	0.95
70		7.44	1.09

3. Pump Selection

1. A pump must be selected to deliver at least gpm (1A or B) with at least feet of total head (2D).

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