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Division of Industry Services
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Governor Tony Evers **Dawn Crim, Secretary**

May 31, 2022

Dept. of Safety and Professional Services
Bureau of Technical Services
Division of Industry Services
Brad Johnson - Section Chief
4822 Madison Yards Way
Madison WI 53705

Re:	Description:	POWTS Component Manual
	Manufacturer:	Dept. of Safety and Professional Services
	Product Name:	Pressure Distribution Component Manual for POWTS (Version 2.1); (May 2022-2027)
	Model Number(s):	v. 2.1
	eSLA PTO No.:	PP-091800089-PTOVPCR

The specifications and/or plans for this plumbing product have been reviewed and determined to comply with chapters SPS 382 through 384, Wisconsin Administrative Code, and Chapters 145 and 160, Wisconsin Statutes.

The Department hereby issues an approval based on the Wisconsin Statutes and the Wisconsin Administrative Code. This approval is valid until the end of May 2027.

This approval is contingent upon compliance with the following stipulation(s):

1. A copy of this approval letter shall be submitted with all plans using the Pressure Distribution Component Manual for POWTS (Version 2.1); (May 2022-2027)

   Plans submitted without a copy of this approval letter may be denied.

2. This approval recognizes that POWTS systems designed, installed and maintained in accordance with this manual will provide treatment and dispersal of domestic wastewater that is acceptable in the context of ch. 383 Wis. Adm. Code.

3. Systems installed in accordance with this POWTS Component Manual shall use wastewater tanks approved by the department. If a given tank is approved and meets the published specifications contained in the manual, then redundant approval of the tank is not required. The installation shall not compromise the structural integrity of the tank.

4. Systems installed in accordance with this POWTS Component Manual shall be installed, maintained and used in strict accordance with the manufacturer's published instructions, Chapters 381-387 Wis. Adm. Code and this product approval. If there is a conflict between the manufacturer's instructions and the Wis. Adm. Code or this Plumbing Product Approval, then the Wis. Adm. Code and this Plumbing Product Approval shall take precedence.

5. Complete operation and maintenance instructions POWTS systems designed in accordance with this manual shall be provided to each system owner and remain onsite.

6. Systems designed in accordance with this manual shall be installed by persons holding the proper license or registration in accordance with Wis. Stats. § 145.

7. Drain, waste and vent piping used to install these systems shall conform to s. SPS 384.30 (1), (2) and (3) Wis. Adm. Code.

8. Cleanouts shall be installed in drain piping associated with the installation of these systems in accordance with s. SPS 382.35 Wis. Adm. Code.

9. Commercial food processing, food production, food service, restaurants, taverns and similar establishments which may generate greases, fats, oils or similar substances; shall have state-approved grease interceptors installed upstream of POWTS systems designed in accordance with this manual in accordance with s. SPS 382.34 Wis. Adm. Code.

10. DSPS POWTS plan approval shall be obtained from the department's Private Sewage Section, or the appropriate agent county, for:

    a. each installation of POWTS systems designed in accordance with this manual; and
    b. high-strength and/or commercial POWTS systems designed in accordance with this manual.

11. A sanitary permit shall be obtained, in accordance with s. SPS 383.21 Wis. Adm. Code, from the county, or other local authority having jurisdiction, for each proposed installation of systems designed in accordance with this manual.

12. A complete and acceptable soil evaluation report, conforming to s. SPS 385.40 Wis. Adm. Code, shall be performed for all proposed systems designed in accordance with this manual.

Technical notations:

a. This approval supersedes the approval issued September 11, 2018 under product file no. 20180223.

he department is in no way endorsing this product or any advertising and is not responsible for any situation which may result from its use.

Sincerely,

Brad Johnson – Section Chief
Department of Safety and Professional Services
Bureau of Technical Services
Division of industry Services
Phone: 920 492-5605
Email: Bradley.Johnson@Wisconsin.gov

PRESSURE DISTRIBUTION COMPONENT MANUAL FOR PRIVATE ONSITE WASTEWATER TREATMENT SYSTEMS
(VERSION 2.1)
May 2022
Exp. end of May 2027

State of Wisconsin
Department of Safety and Professional Services
Division of Industry Services

SBD-10706

PRESSURE DISTRIBUTION COMPONENT MANUAL FOR PRIVATE ONSITE WASTEWATER TREATMENT SYSTEMS (VERSION 2.1)

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ADA Statement

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I. INTRODUCTION AND SPECIFICATIONS

This Private Onsite Wastewater Treatment System (POWTS) component manual provides design, construction, inspection, operation, and maintenance specifications for a pressure distribution component. However, these items must accompany a properly prepared and reviewed plan acceptable to the governing unit to help provide a system that can be installed and function properly. Violations of this manual constitute a violation of chs. SPS 383 and 384, Wis. Adm. Code. The design provides equal distribution of effluent from a dose tank into a distribution cell of a soil treatment or dispersal component. To ensure that equal distribution is achieved, specifications in Tables 1, 2, and 3 must be met.

Note: Detailed plans and specifications must be developed and submitted for review and approval by the governing unit having authority over the plan for the installation. Also, a Sanitary Permit must be obtained from the department or governmental unit having jurisdiction. See Section XI for more details.

Table 1
FLOWS AND LOADS

Design Wastewater Flow (DWF)	≤ 5000 gal/day
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)	≥ 2.5 ft. for 1/4- and 3/16-inch orifices, ≥ 3.5 ft. for 5/32-inch orifices, and ≥ 5 ft. for 1/8 inch orifices
Network pressure compensation for fittings	= Distal head pressure + 30 percent
Flow velocity in force main and manifold	≥ 2 ft/sec and ≤ 10 ft/sec

Table 2
SIZE AND ORIENTATION

Measurement	Minimum (inches)	Maximum (inches)
Force Main diameter	0.75	6.00
Manifold diameter	1.25	3.00
Lateral diameter	0.75	3.00
Orifice diameter when distribution component receives effluent with BOD_5 or TSS > 30 mg/L	0.156	0.250
Orifice diameter when distribution component receives effluent with BOD_5 and TSS ≤ 30 mg/L	0.125	0.250
Lateral Spacing distance	12.00	48.00
Lateral to Edge of Cell distance	half of lateral spacing	half of lateral spacing
Last Discharge Orifice to Cell End distance	6.00	24.00

Table 2
SIZE AND ORIENTATION
(continued)

Elevation of laterals	Level or ≤ 1-inch slope back to manifold
Location of orifices for laterals in stone aggregate	Bottom of lateral if orifice shields are not provided or top of lateral if orifice shields are provided
Location of orifices for laterals not in stone aggregate	Bottom or top of lateral, if orifice shields are provided or other means are provided to prevent soil erosion of the infiltrative surface

Table 3
OTHER SPECIFICATIONS

Spacing between pipe supports for horizontal pipe	Meets requirements of s. SPS 382.60, Wis. Adm. Code
Material specifications	Meet requirements of s. SPS 384.30, Wis. Adm. Code
Joint specifications	Meets requirements of s. SPS 384.40, Wis. Adm. Code
Connection to manifold or laterals	By use of tee patterned fitting or 90° elbow
Turn ups	Provide a means of flushing out all laterals in accordance with Section V of this manual. Turn-ups are installed in a protective enclosure
Pump	Rated by pump manufacturer as an effluent or sewage pump
Siphon	Rated by siphon manufacturer as an effluent or sewage siphon
Septic tank effluent pump system	Meets requirements of s. SPS 384.10, Wis. Adm. Code and this component manual
Dose tank or compartment volume employing one pump	≥ Volume of a single dose + reserve capacity[a] + drain back volume[b] + (6 inches x average gal/inch of tank)[c] Notes: a: Reserve capacity ≥ the estimated daily flow. b: Drain back volume ≥ Volume of wastewater that will drain into the dose tank from the distribution cell. c: Four inches of this dimension ≥ vertical distance from pump intake to bottom of tank. Two inches of this dimension □ vertical distance between pump on elevation and high-water alarm activation elevation.
Dose tank or compartment volume employing duplex pumps	≥ Volume of a single dose + drain back volume[a] + (6 inches x average gal/inch of tank)[b] Notes: a: Drain back volume ≥ Volume of wastewater that will drain into the dose tank from the force main. b: Four inches of this dimension ≥ vertical distance from pump intake to bottom of tank. Two inches of this dimension ≥ vertical distance between pump on elevation and high-water alarm activation elevation.

Table 3 **OTHER SPECIFICATIONS** (continued)	
Siphon tank or compartment volume	≥ What is required to accommodate volumes necessary to provide dosing as specified in this manual
Pump controls	Meet requirements of chs. SPS 383 and 384, Wis. Adm., Code
Electrical equipment and wiring	Meet requirements of chs. SPS 316 and 383, Wis. Adm. Code
Access to pump	Means of removing pump while maintaining compliance with confined space entry requirements must be provided
Alarm or warning system	Meets requirements of ch. SPS 383, Wis. Adm. Code
Duplex pumps	Meet requirements of ch. SPS 383, Wis. Adm. Code
Installation inspection	In accordance with ch. SPS 383, Wis. Adm. Code
Management	Meets requirements of ch. SPS3 83, Wis. Adm. Code and this manual

II. DEFINITIONS

Definitions unique to this manual are included in this section. Other definitions that may apply to this manual are located in ch. SPS 381 of the Wis. Adm. Code or the terms use the standard dictionary definition.

A. “Distribution line” means the total length of two laterals that are connected to a manifold at a common point.

B. “Distribution network” means the piping of the pressurized system that include manifold(s) and lateral(s).

C. “Drain back” means the amount of treated effluent that will drain from the forcemain to the dose tank after a single dosing event.

D. “Force main” means the piping from the pump or siphon to the manifold or to the lateral tee or coupling connecting laterals to the force main.

E. “Lateral” means the length of perforated pipe starting at the point of effluent entry to the distal end orifice.

F. “Manifold” means the piping between the force main and the laterals.

G. “Network pressure compensation” means the pressure loss due to fittings in the pressure distribution network.

H. “Orifice shield” means a device that dissipates the energy of the orifice discharge and/or that protects the orifice from blockage due to aggregate.

I. “Septic tank effluent pump system” means a septic tank which has a pump installed in the tank that will pump effluent from the clear zone

J. Turn ups" means a means of providing a full size opening in the downstream end of laterals to allow for flushing of the system.

III. DESCRIPTION AND PRINCIPLE OF OPERATION

Pressure distribution is a method to provide a specific volume of effluent to a specific area with each dosing cycle. The design of a pressure distribution component on one elevation is such that the volume of water passing out each hole in the network is approximately equal. This is achieved by designing for 75 to 85 percent of the total head loss in the network to be lost when liquid passes through the distribution hole and only 10 to 15 percent of the total head loss to occur in the delivery piping.

The component consists of a dosing chamber (containing a pump or siphon with appropriate controls) that discharges effluent into a network of small diameter perforated pipes designed to discharge equal amounts of effluent from each orifice.

In a pressure distribution component using a pump, partially or fully treated wastewater enters a dose chamber through the inlet. As liquid begins to fill the dose chamber, it raises the "off" float. When the liquid level in the tank is lifted to the "pump on" level, the "on" float activates the pump and the predetermined dose is pumped from the pump chamber through the force main to the distribution network. The "on" and "off" float may be one float.

In a pressure distribution component using a siphon, partially or fully treated wastewater enters a dose chamber through the inlet. When the liquid level reaches a pre-determined depth in the dose chamber, the siphon discharges the liquid through a forcemain to the distribution network. Although the siphon functions without any moving parts, it does require monitoring. Studies have shown that the siphon may begin to "trickle" when the bell loses its air charge due to an air leak around the snifter tube, if this problem is not corrected, the holes and laterals may foul, or it reverts to gravity discharge.

The laterals are designed to fill quickly to provide equalization throughout the system. Air is pushed ahead of the liquid through the force main, manifold (if a manifold is required), laterals, and discharged through the drilled holes, entering the distribution cell.

A properly designed and installed pressure distribution component uniformly distributes effluent over the entire distribution cell. This strives to prevent the soil from becoming overloaded in one area. It also allows for a period of time between doses to drain the infiltrative surface to maintain unsaturated flow conditions in the soil.

The primary application of a pressure distribution component is in locations where it is desirable to:

1. Maintain a uniform effluent application rate throughout the distribution cell;
2. Aid in mitigating the potential contamination of groundwater in areas of excessively permeable soils;
3. Improve the performance and increase the life span of a dispersal cell; and
4. Reduce the chance of breakout or seepage on slopes.

Pressure distribution components are used in at-grades, in-ground soil absorption, mounds, single pass sand filters and other components. Also, pressure distribution may be appropriate for larger dispersal cell components.

This manual specifies the design, construction, inspection, operation, and maintenance criteria for one method of providing equal distribution of wastewater in a soil treatment and/or dispersal component. The designer must also be familiar with the requirements of the component for which the pressure distribution component will be used in order to have a complete system design that will meet the Wisconsin Administrative Code.

IV. DESIGN

The following steps need to be followed to design a pressure distribution component:

1. Determine soil treatment and/or dispersal component layout - This is based on the type of component and the design soil application rate.

2. Determine lateral length and spacing in accordance with the soil treatment/dispersal component design or Table 2, if not specified in the soil treatment/dispersal component design. See Figure 1.

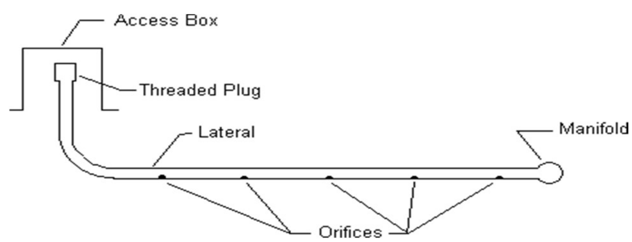


Figure 1 – Lateral Length

3. Determine manifold length and location.

4. Determine number of orifices in a lateral. How many orifices should be drilled in a lateral depends on the type of system, area allowed per orifice, and the design loading rate of the distribution cell. The number of orifices is determined by using the following equation. See figure 2.

$$n = L/x + .5$$

Where: n = number of orifices
L = lateral length
x = orifice spacing

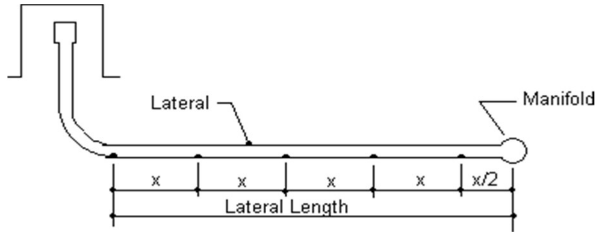


Figure 2 – Number of Orifices in a Lateral

5. Determine the number of orifices in a distribution lateral. The number of orifices is determined by using the following equation. See figure 3.

   $n = d/x + 1$

   Where: n = number of orifices
   d = distribution lateral length
   x = orifice spacing

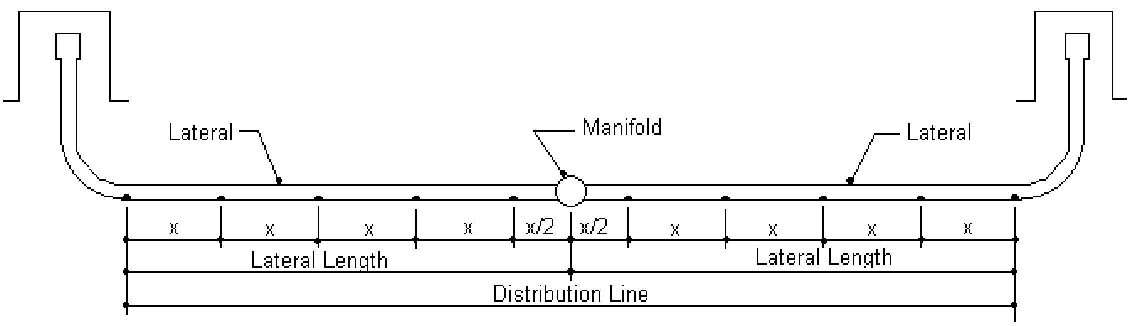


Figure 3 – Number of Orifices in a Distribution Line

6. Select orifice size of 1/8, 5/32, 3/16, or 1/4 inch.

7. Determine lateral diameter - Using Graphs 1 through 8.

8. Select distal pressure - A design option based on site specific elevations and effluent delivery preferences and requirements of Tables 1 through 3.

9. Calculate lateral discharge rate using Table 4. (orifice discharge rate at selected distal pressure multiplied by the number of holes per lateral).

10. Determine manifold diameter - Determined by using Table 5.

11. Calculate component discharge rate - By multiplying the lateral discharge rate by the number of laterals.

12. Select a pipe size for the force main by using the calculated discharge rate and Table 6.

13. Determine the void volume of the distribution laterals by multiplying the summation of the laterals by the volume given in Table 7 for the diameter of the laterals.

    If a pump is selected, follow step #14.

    If a siphon is selected proceed to step # 16

14. Determine volume of dose chamber for components pressurized by a pump. (Volume of a septic tank effluent pump system is determined by department plumbing product approval.)

    The dose chamber employing one pump shall contain sufficient volume to dose the distribution cell as required by its system design, retain drain back volume, contain a one day reserve zone, provide minimum 2 inch separation between alarm activation and pump-on activation, and allow for protection of the pump from solids.

    A reserve capacity is required on a system with only one pump. Other reserve capacities may also be required by the manual for the component type the dose chamber serves.

    The reserve volume is at least equal to the estimated daily flow from for the building. Reserve capacity may be calculated based using 100 gallons per bedroom per day for one and two family residences. Reserve capacity must also meet requirements in the manual for a component type, which contains the pressure distribution component.

    The dose volume shall be included in the sizing of the dose chamber.

    The pump alarm activation point must be at least 2 inches above the pump activation point.

    Allow "dead" space below the pump intake to permit settling of solids in the pump tank. This can be accomplished by placing the pump on concrete blocks or other material that can form a pedestal.

    The pump manufacturer requirements shall be followed. This may include the "pump off" switch located high enough to allow for complete immersion of the pump in the tank.

15. Select a pump that will provide an average flow equal to or greater than the total discharge rate of the orifices at a pressure equal to or greater than the sum of the distal pressure, network pressure compensation, and pressure loss due to friction in the force main. The system head will be insufficient if the perforation discharge rate is greater than the pump discharge rate.

16. Select a siphon that will provide an average flow equal to or greater than the total discharge rate of the orifices at a pressure equal to or greater than the operational pressure plus the friction loss of the force main. The system head for components using automatic siphons must be developed in the force main. The difference in the elevation from the bottom of the siphon bell to the lateral must be greater than or equal to the force main friction loss plus the system head required.

If the perforation discharge rate is greater than the siphon discharge rate, the system head will be insufficient.

17. Determine volume of dose chamber for components pressurized by a siphon.

    The dose chamber shall contain sufficient volume to allow the siphon to dose the component as required by the soil treatment and/or dispersal component design and allow for protection of the siphon from solids.

V. SITE PREPARATION AND CONSTRUCTION

Procedures used in the construction of a pressure distribution component are just as critical as the design of the treatment and/or dispersal component. A good design with poor construction results in failure. Construction procedures for a pressure distribution component are as follows:

1. Review design and installation requirements for the type of treatment and/or dispersal component for which the pressurized system is to be installed.

2. Drill holes for the orifices at the locations required by the design. Remember it is very important to use a sharp drill bit and to remove all burrs from the pipe and orifices in order for the system to work as designed.

3. Assemble the distribution network as determined by the pressure distribution component design, making sure to solvent cement all joints in the system.

4. Extend the end of each lateral up with the use of long turn or 45° fitting to a point within six inches of the final grade. Terminate the ends of the laterals with a valve, threaded cap or threaded plug. Provide access from final grade for the valve, threaded cap or threaded plug.

5. Install the pump or siphon as required by ch. SPS 83 of the Wis. Adm. Code.

VI. OPERATION, MAINTENANCE AND PERFORMANCE MONITORING

A. The component owner is responsible for the operation and maintenance of the component. The county, department or POWTS service contractor may make periodic inspections of the components, checking for sludge accumulation in the dose chamber, condition of electrical components, alarms, dose rate, dose volume and frequency, etc.

   The owner or owner's agent is required to submit maintenance records routinely to the county or other appropriate jurisdiction and/or the department.

B. Design approval and site inspections before, during, and after the construction is accomplished by the county or other appropriate jurisdictions in accordance with ch. SPS 383 of the Wis. Adm. Code.

C. Other routine and preventative maintenance aspects are:

1. Dose chambers are to be inspected routinely and maintained when necessary in accordance with their approvals.
2. Inspection of the component performance is required at least every three years. Inspection includes checking the dose rate, volume and frequency.
3. Partial plugging of the distribution network may be detected by extremely long dosing times. The ends of the distribution laterals should be exposed and the pump activated to flush out any solid material. The liquid that is flushed out of the laterals is to be directed back into the distribution cell. The liquid may also be directed into an acceptable container and disposed of properly. If necessary, the laterals can be cleaned.

D. User's Manual: A user's manual is to accompany the pressure distribution component. The manual is to contain the following as a minimum:

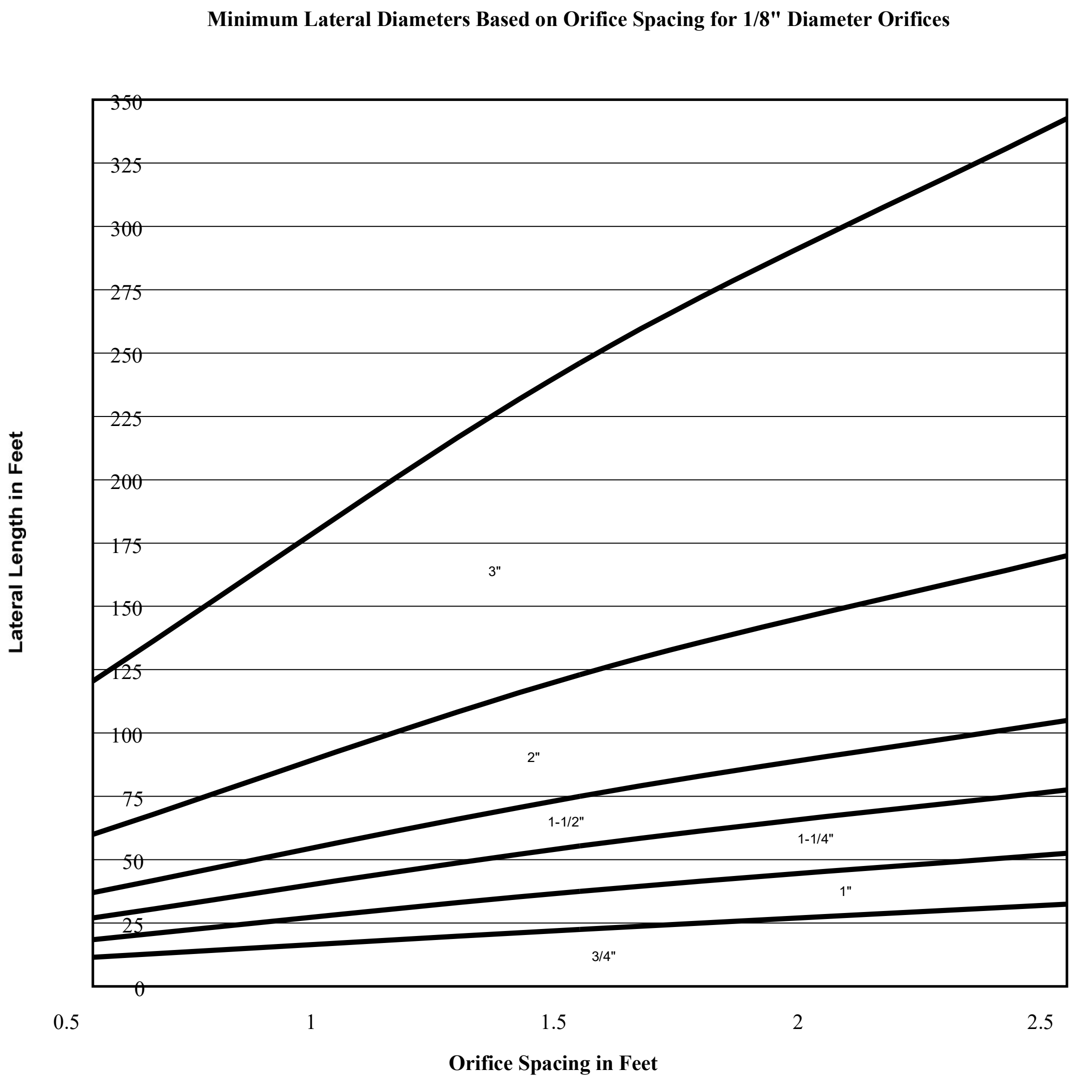
1. Diagrams of all components and their location. This should include the location of the access ports for cleaning and/or flushing the component.
2. Specifications for all electrical and mechanical components.
3. Names and phone numbers of local health authority, component manufacturer or management entity to be contacted in the event of a failure.
4. Information on the periodic maintenance of the component, including electrical/mechanical components.

E. Performance monitoring must be performed on pressure distribution systems installed under this manual.

1. The frequency of monitoring must be:
    a. At least once every three years following installation and,
    b. At time of problem, complaint, or failure.
2. Reports are to be submitted in accordance with ch. SPS 383, Wis. Adm. Code.

VII. GRAPHS

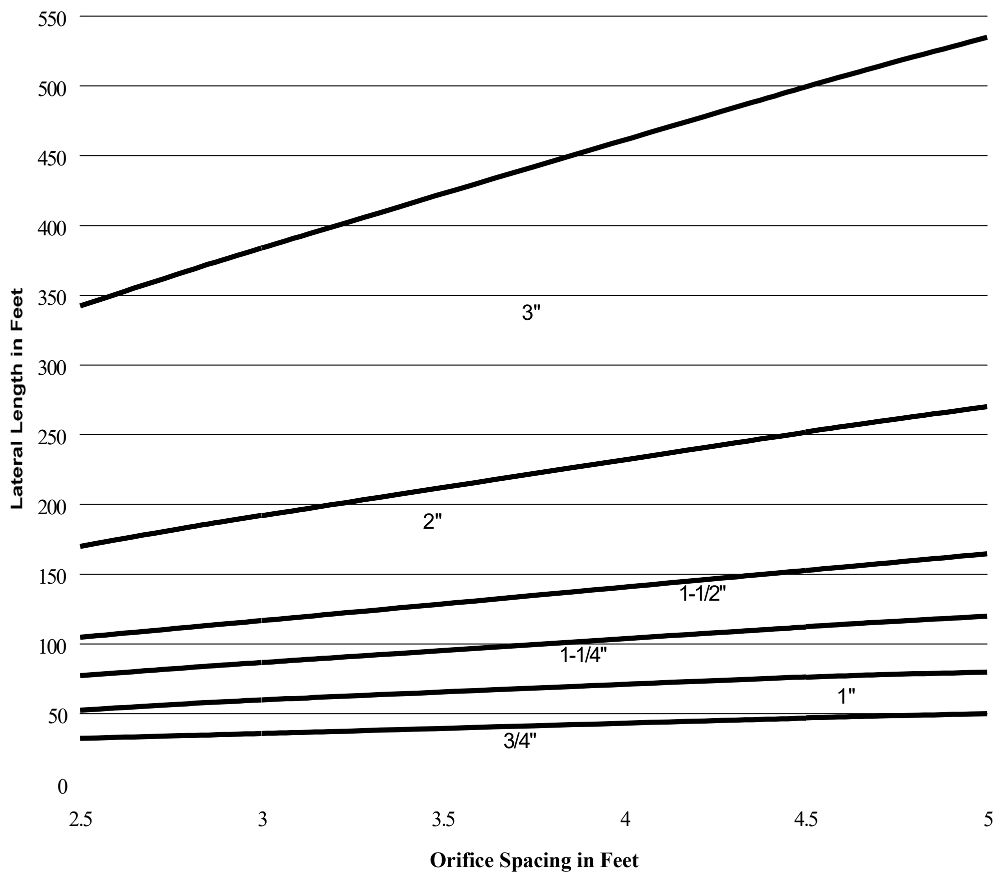
Graph 1



Graph 2

2"

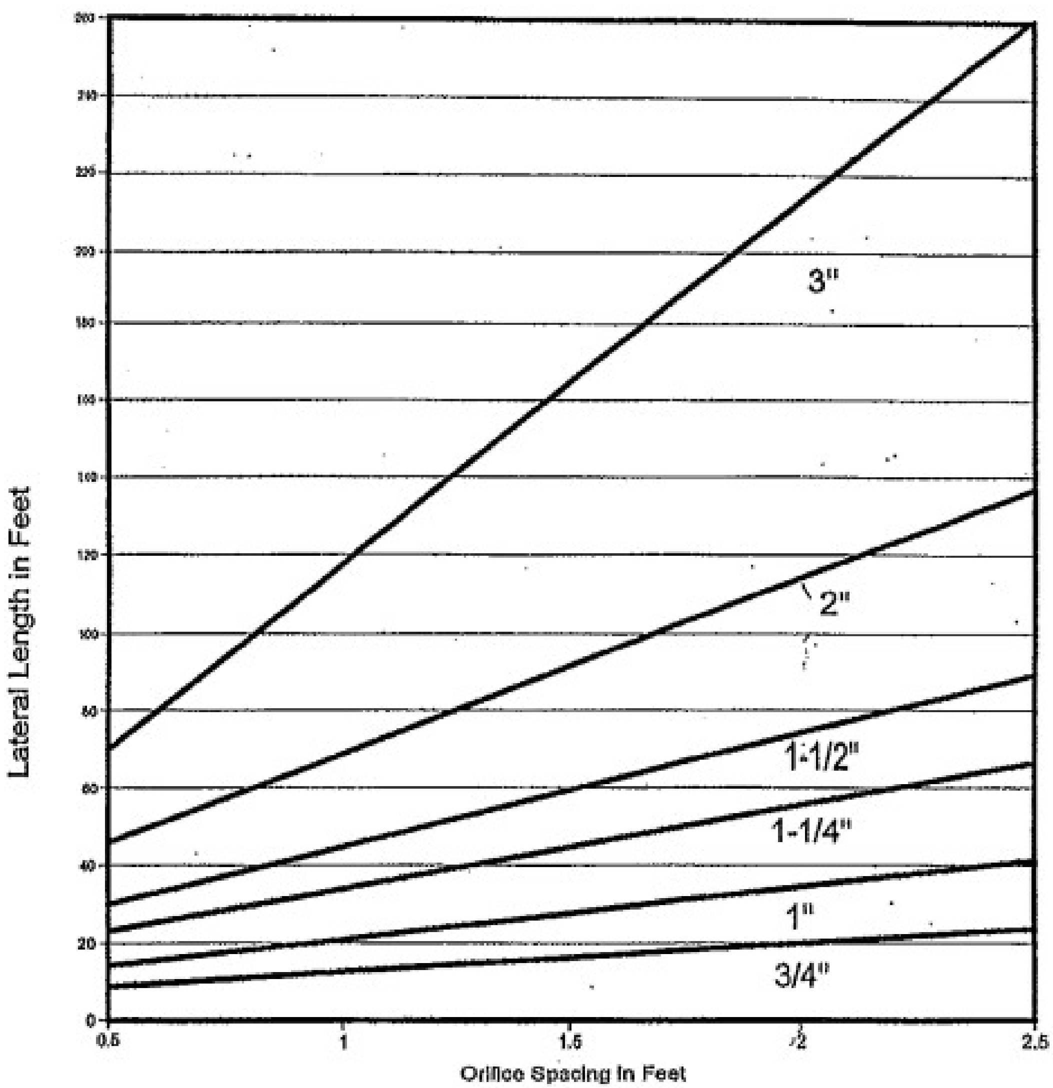
Minimum Lateral Diameters Based on Orifice Spacing for 1/8" Diameter Orifices



Errata sheet dated April 5, 2001
Correction to *Minimum Lateral Diameters on Graph 3*

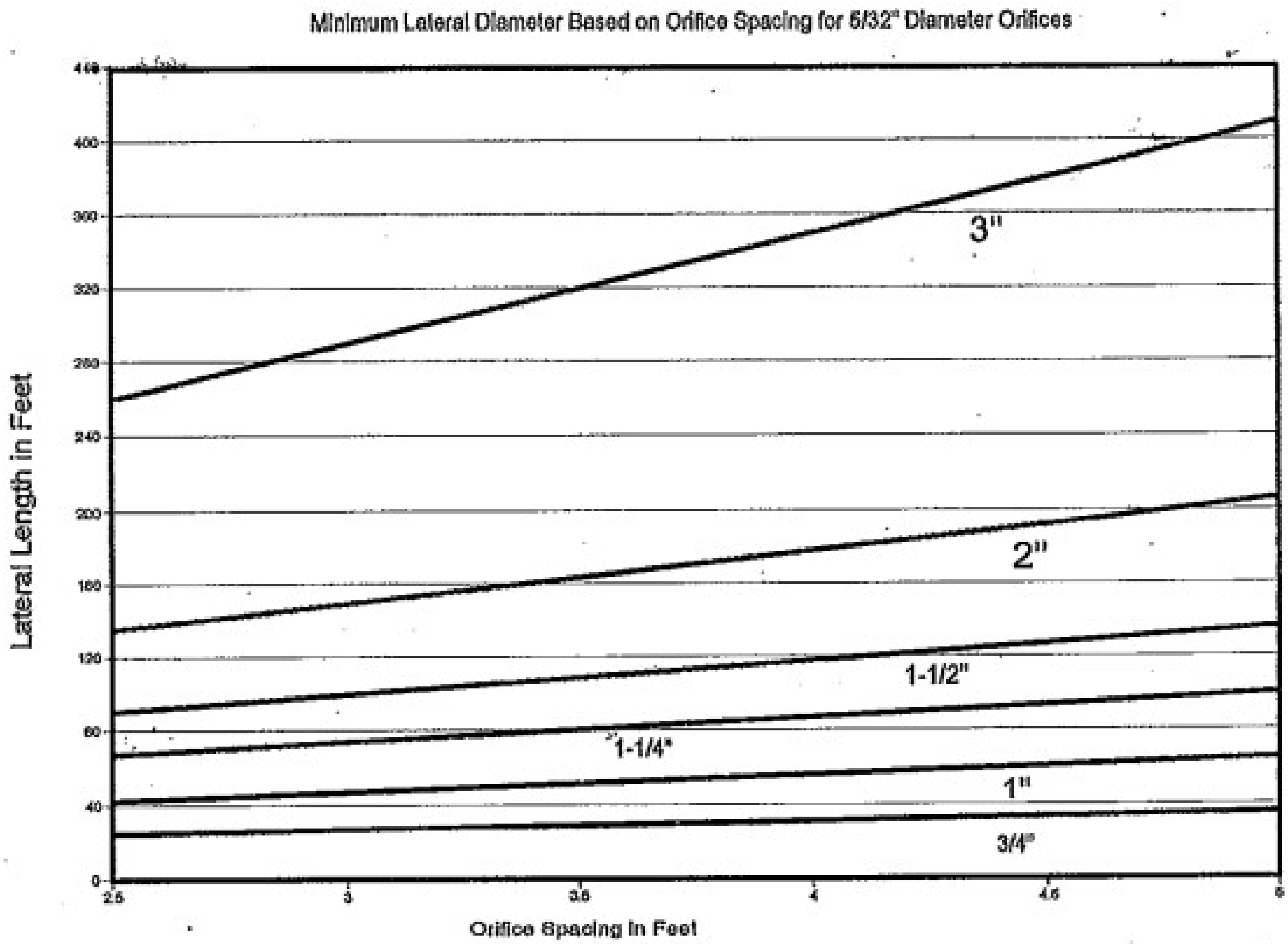
Graph 3

Minimum Lateral Diameter Based on Orifice Spacing for 5/32" Diameter Orifices

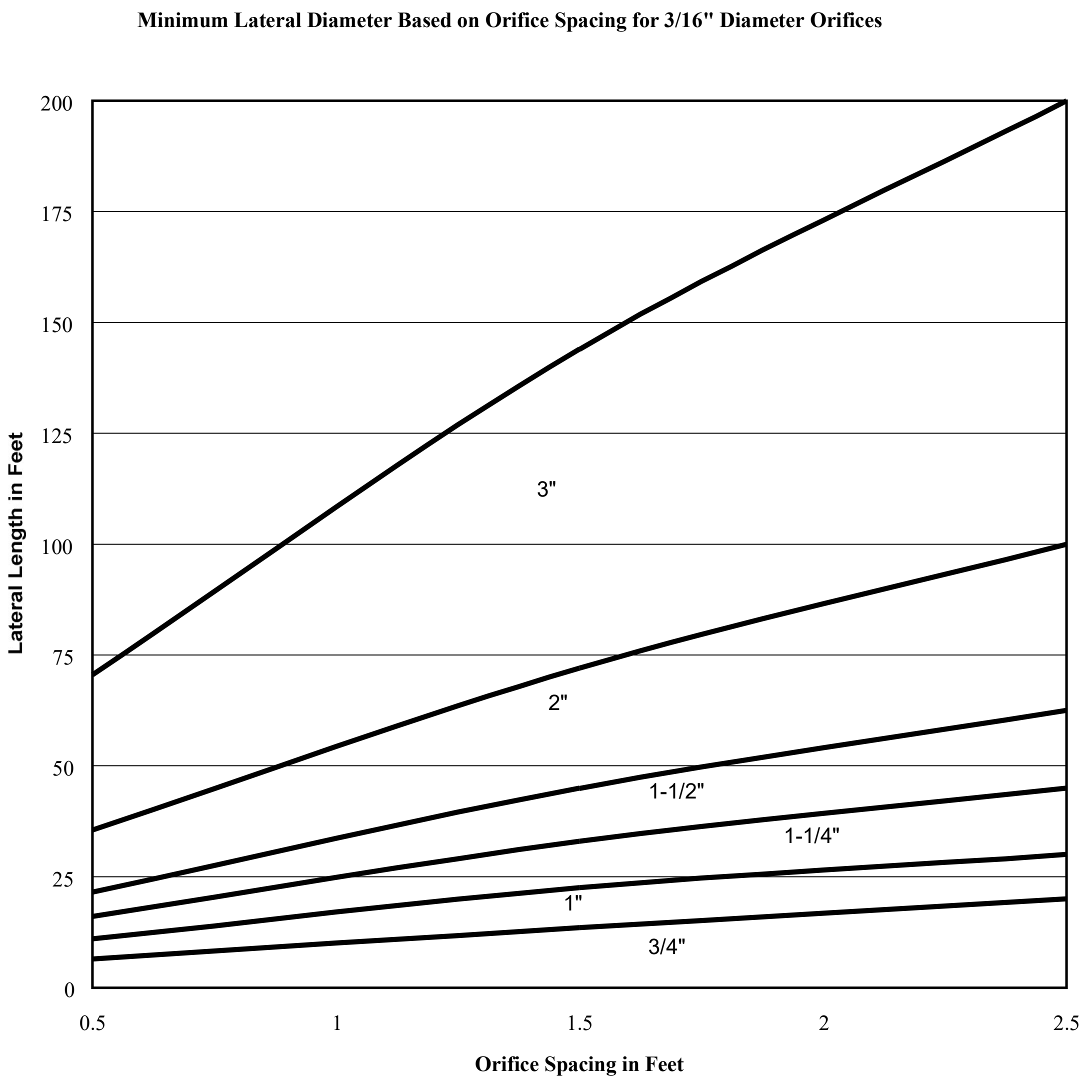


Errata sheet dated April 5, 2001
Correction to *Minimum Lateral Diameters on Graph 4*

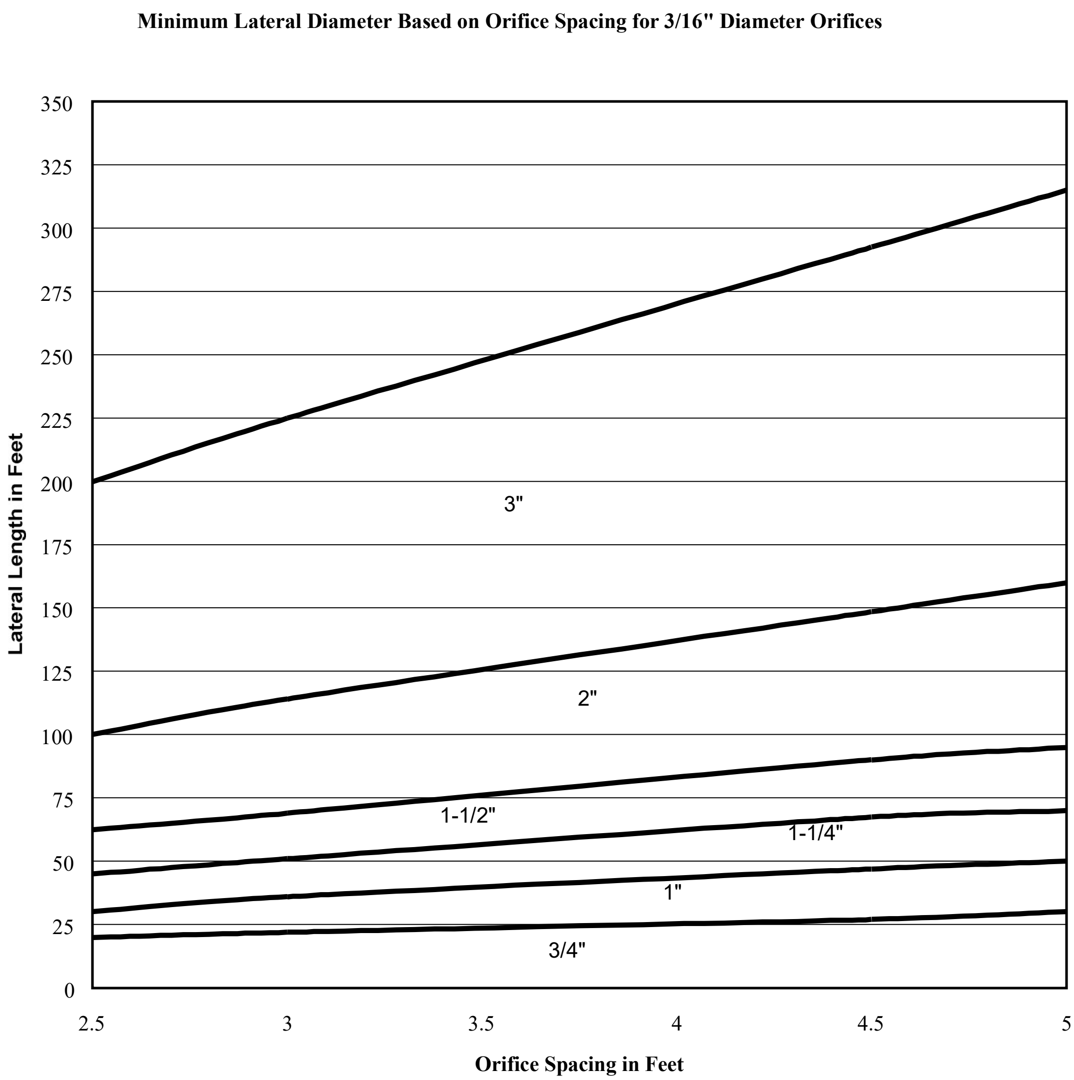
Graph 4



Graph 5

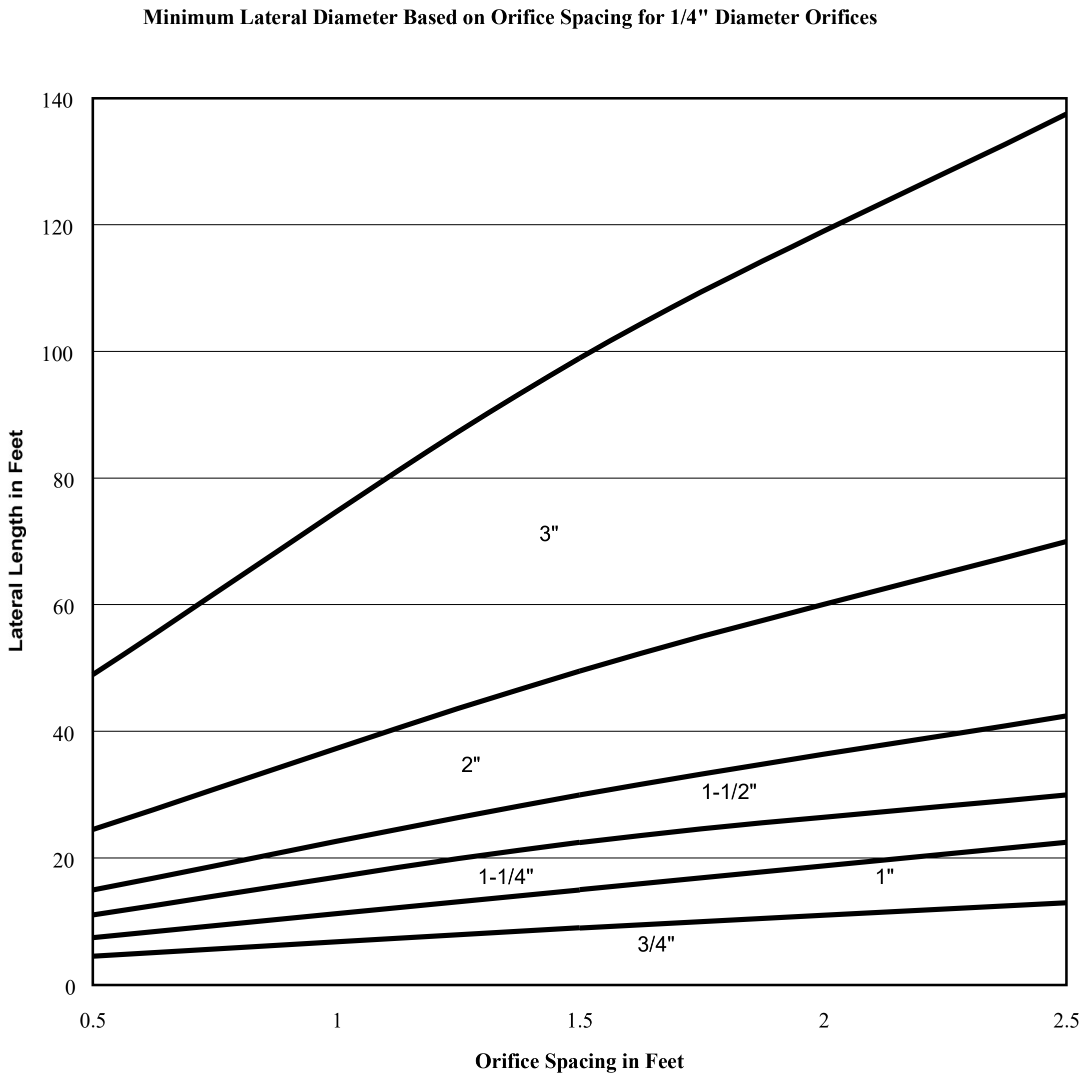

Minimum Lateral Diameter Based on Orifice Spacing for 3/16" Diameter Orifices
Lateral Length in Feet
200
175
150
125
100
75
50
25
0
3"
2"
1-1/2"
1-1/4"
1"
3/4"
0.5
1
1.5
2
2.5
Orifice Spacing in Feet

Graph 6

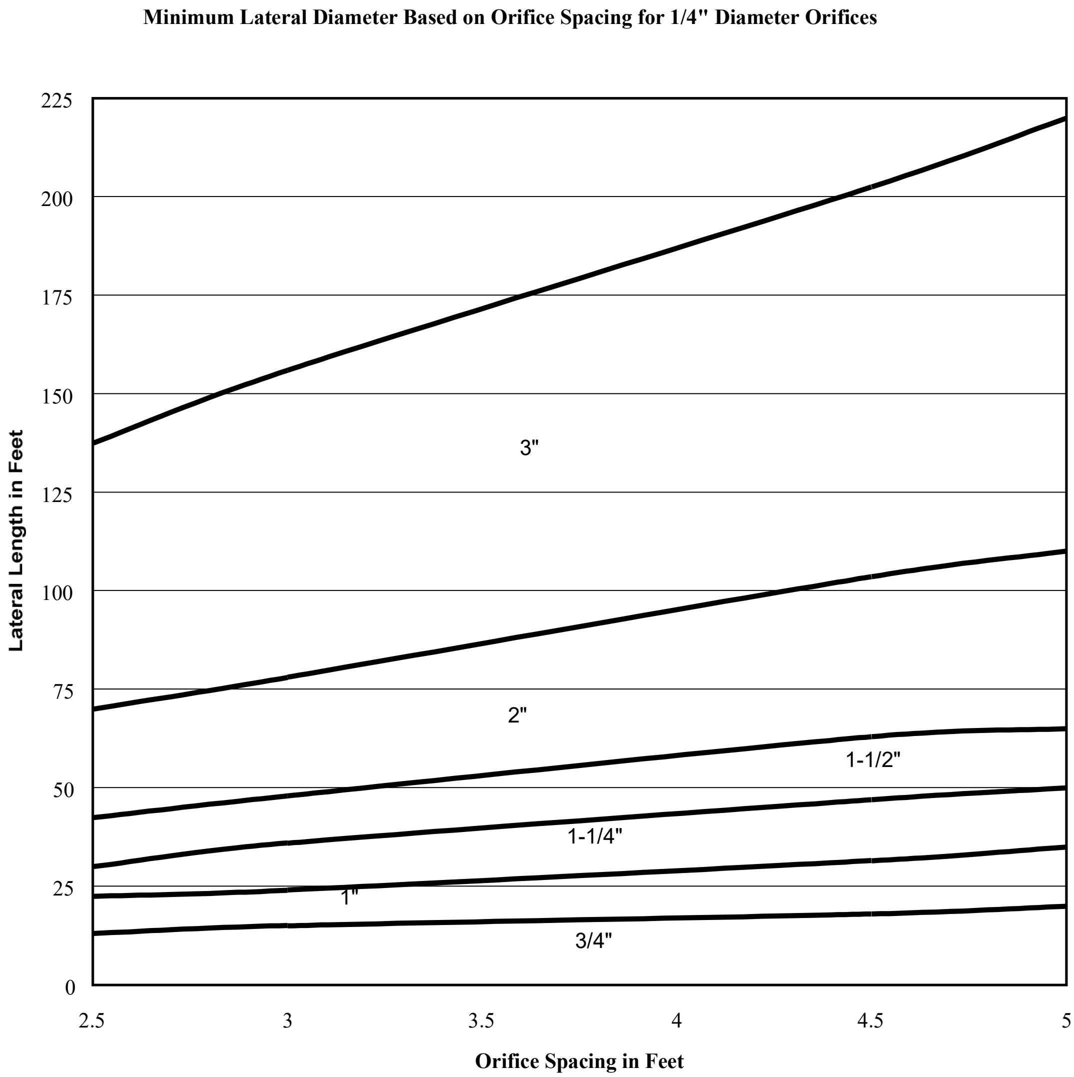


Minimum Lateral Diameter Based on Orifice Spacing for 3/16" Diameter Orifices
Lateral Length in Feet
350
325
300
275
250
225
200
175
150
125
100
75
50
25
0
3"
2"
1-1/2"
1-1/4"
1"
3/4"
2.5
3
3.5
4
4.5
5
Orifice Spacing in Feet

Graph 7


Minimum Lateral Diameter Based on Orifice Spacing for 1/4" Diameter Orifices
Lateral Length in Feet
140
120
100
80
60
40
20
0
0.5
1
1.5
2
2.5
Orifice Spacing in Feet
3"
2"
1-1/2"
1-1/4"
1"
3/4"

Graph 8


Minimum Lateral Diameter Based on Orifice Spacing for 1/4" Diameter Orifices
Lateral Length in Feet
Orifice Spacing in Feet
225
200
175
150
125
100
75
50
25
0
2.5
3
3.5
4
4.5
5
3"
2"
1-1/2"
1-1/4"
1"
3/4"

VIII. TABLES

Table 4 **DISCHARGE RATES IN GALLONS PER MINUTE FROM ORIFICES**[a]				
Pressure in feet	Orifice Diameter			
	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 a: Table is based on - Discharge in GPM = 11.79 x Orifice Diameter^2 in inches x (Pressure in Feet)$^{1/2}$
NP means not permitted

Table 5
MAXIMUM MANIFOLD LENGTH BASED ON INDIVIDUAL LATERAL FLOW RATES AND LATERAL SPACING

Individual Lateral Discharge Rate		1-1/4" Diameter Manifold						1-1/2" Diameter Manifold					
End Manifold	Center Manifold	Lateral Spacing						Lateral Spacing					
		1.5	2	2.5	3	3.5	4	1.5	2	2.5	3	3.5	4
10	5	4.5	6	7.5	9	10.5	8	7.5	8	10	12	14	12
20	10	3	4	5	6	7	8	4.5	6	7.5	6	7	8
30	15	3	4					3	4	5	6	7	8
40	20							3	4	5	6		
50	25							3	4				
60	30							3					

Individual Lateral Discharge Rate		2" Diameter Manifold						3" Diameter Manifold					
End Manifold	Center Manifold	Lateral Spacing						Lateral Spacing					
		1.5	2	2.5	3	3.5	4	1.5	2	2.5	3	3.5	4
10	5	12	14	15	18	21	20	22.5	28	32.5	36	38.5	44
20	10	7.5	8	10	12	14	12	15	18	20	24	24.5	28
30	15	6	6	7.5	9	10.5	12	12	14	15	18	21	20
40	20	4.5	6	7.5	6	7	8	9	12	12.5	15	17.5	16
50	25	4.5	4	5	6	7	8	7.5	10	12.5	12	14	16
60	30	3	4	5	6	7	8	7.5	8	10	12	14	12
70	35	3	4	5	6	7	8	6	8	10	9	10.5	12
80	40	3	4	5	6	7		6	8	7.5	9	10.5	12
90	45	3	4	5	6			4.5	6	7.5	9	10.5	12
100	50	3	4	5				4.5	6	7.5	9	10.5	12
110	55	3	4					4.5	6	7.5	9	10.5	8
120	60	3						4.5	6	7.5	6	7	8
130	65	3						4.5	6	5	6	7	8
140	70							4.5	6	5	6	7	8
150	75							4.5	6	5	6	7	8
160	80							4.5	4	5	6	7	8
170	85							4.5	4	5	6	7	8
180	90							3	4	5	6	7	8
190	95							3	4	5	6	7	8
200	100							3	4	5	6	7	8

Table 6
FRICTION LOSS (FOOT/100 FEET) IN PLASTIC PIPE[a]

Flow in GPM	Nominal Pipe Size 3/4	1	1-1/4	1-1/2	2	3	4	6
1								
2								
3	3.24							
4	5.52							
5	8.34	2.02						
6	11.68	2.88						
7	15.53	3.83						
8	19.89	4.91	1.65					
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		19.78	7.42	3.06				
19		21.99	8.21	3.38				
20		24.30	9.02	3.72	0.92			
25		26.72	13.63	5.62	1.39			
30		40.38	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	.041	
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	0.31
250							3.36	0.47
300							4.71	0.66
350							6.27	0.87

(Upper right area of table:) Velocities in this area are below 2 feet per second

(Lower left area of table:) Velocities in this area exceed 10 feet per second, whish is too great for various flow rates and pipe diameter

Note a: Table is based on – Hazen-Williams formula: $h = 0.002082L \times (100/C)^{1.85} \times (gpm^{1.85} \div d^{4.8655})$

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

Table 7 VOID VOLUME FOR VARIOUS DIAMETER PIPES BASED ON NOMINAL I.D.[a]	
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 a: Table is based on - $\pi (d/2)^2$ x 12"/ft ÷ 231 cu.in./cu.ft.
Where: d = nominal pipe size in inches

IX. REFERENCES

Department of Industry, Labor and Human Relations 1994, "Pressure Distribution Manual"

Small Scale Waste Management Project, University of Wisconsin – Madison, 1981, R.J. Otis, "Design of Pressure Distribution Networks for Septic Tank-Soil Absorption Systems."

TABLE 8 (A) MAXIMUM LATERAL LENGTH FOR 1/8 INCH ORIFICES			
Orifice (inches)	Lateral (inches)	Orifice Spacing (feet)	Maximum Lateral Length (feet)
1/8	1	1.5	37.5
1/8	1	2	46
1/8	1	2.5	52.5
1/8	1	3	60
1/8	1	4	72
1/8	1	5	80
1/8	1	6	90
1/8	1.25	1.5	55.5
1/8	1.25	2	66
1/8	1.25	2.5	77.5
1/8	1.25	3	87
1/8	1.25	4	107
1/8	1.25	5	120
1/8	1.25	6	132
1/8	1.5	1.5	75.25
1/8	1.5	2	90
1/8	1.5	2.5	105
1/8	1.5	3	117
1/8	1.5	4	140
1/8	1.5	5	165
1/8	1.5	6	286
1/8	2	1.5	122
1/8	2	2	148
1/8	2	2.5	170
1/8	2	3	192
1/8	2	4	232
1/8	2	5	265
1/8	2	6	300

TABLE 8 (B) MAXIMUM LATERAL LENGTH FOR 5/32 INCH ORIFICES			
Orifice (inches)	Lateral (inches)	Orifice Spacing (feet)	Maximum Lateral Length (feet)
5/32	1	1.5	31.5
5/32	1	2	36
5/32	1	2.5	42.5
5/32	1	3	48
5/32	1	4	56
5/32	1	5	65
5/32	1	6	72
5/32	1.25	1.5	48
5/32	1.25	2	58
5/32	1.25	2.5	67.5
5/32	1.25	3	75
5/32	1.25	4	92
5/32	1.25	5	105
5/32	1.25	6	120
5/32	1.5	1.5	63
5/32	1.5	2	76
5/32	1.5	2.5	87.5
5/32	1.5	3	99
5/32	1.5	4	120
5/32	1.5	5	140
5/32	1.5	6	156
5/32	2	1.5	96
5/32	2	2	116
5/32	2	2.5	135
5/32	2	3	150
5/32	2	4	184
5/32	2	5	210
5/32	2	6	240

TABLE 8 (C) MAXIMUM LATERAL LENGTH FOR 3/16 INCH ORIFICES			
Orifice (inches)	Lateral (inches)	Orifice Spacing (feet)	Maximum Lateral Length (feet)
3/16	1	1.5	21
3/16	1	2	26
3/16	1	2.5	30
3/16	1	3	33
3/16	1	4	38
3/16	1	5	42.5
3/16	1	6	54
3/16	1.25	1.5	31.5
3/16	1.25	2	38
3/16	1.25	2.5	45
3/16	1.25	3	51
3/16	1.25	4	60
3/16	1.25	5	70
3/16	1.25	6	78
3/16	1.5	1.5	43.5
3/16	1.5	2	52
3/16	1.5	2.5	60
3/16	1.5	3	69
3/16	1.5	4	80
3/16	1.5	5	95
3/16	1.5	6	108
3/16	2	1.5	70.5
3/16	2	2	86
3/16	2	2.5	97.5
3/16	2	3	111
3/16	2	4	132
3/16	2	5	155
3/16	2	6	174

TABLE 8 (D) MAXIMUM LATERAL LENGTH FOR 1/4 INCH ORIFICES			
Orifice (inches)	Lateral (inches)	Orifice Spacing (feet)	Maximum Lateral Length (feet)
1/4	1	1.5	15
1/4	1	2	18
1/4	1	2.5	20
1/4	1	3	24
1/4	1	4	28
1/4	1	5	35
1/4	1	6	36
1/4	1.25	1.5	22.5
1/4	1.25	2	26
1/4	1.25	2.5	30
1/4	1.25	3	33
1/4	1.25	4	40
1/4	1.25	5	50
1/4	1.25	6	54
1/4	1.5	1.5	30.5
1/4	1.5	2	36
1/4	1.5	2.5	42.5
1/4	1.5	3	48
1/4	1.5	4	56
1/4	1.5	5	65
1/4	1.5	6	72
1/4	2	1.5	49.5
1/4	2	2	58
1/4	2	2.5	67.5
1/4	2	3	78
1/4	2	4	92
1/4	2	5	105
1/4	2	6	120

X. PRESSURE DISTRIBUTION WORKSHEET

Information needed for Pressure Distribution

Design: Daily wastewater flow =___**gal/day**

Design loading rate =____________**gal/ft^2/day**

System Configuration:

1. ________ft. system width

2. ________ft. system length

Proposed Lateral Layout:

3. ________number of laterals

4. ________central or end manifold

5. ________ft. manifold length

6. ________ft. distal pressure requirement (Based on orifice diameter, see Table 1)

7. ________in. orifice diameter

8. ________ft. estimated lateral length

Choose the Orifice Spacing:

9. ________ft. orifice spacing divided by 12 to convert to feet.

10. _______number of orifices per lateral

$$n = L/x + .5$$

Where: n = number of orifices
L = lateral length, in feet
x = orifice spacing, in feet

Note: Networks with central manifold have laterals on each side of the manifold. Therefore, the number of laterals are two times as many as a network with an end manifold.

Re-evaluate the Lateral Length:

11. _______ft. final lateral length
(# of orifices x orifice spacing - 1/2 orifice spacing = optimal length)

Choose the Lateral Diameter:

12. _______in. (Graphs 1-8)

Calculate the Lateral Discharge Rate:

13. _______**gpm** lateral discharge rate.
Discharge rate per orifice x # of orifices per lateral = lateral discharge rate.

Choose the Manifold Diameter:

14. ________in. (Table 5)

Calculate the System Discharge Rate:

15. ________gpm (# of laterals x lateral discharge rate)

Calculate the Force Main Friction Loss (for each segment of different diameter or between tees in the force main):

16. ________ft. force main length

17. ________in. force main diameter (Table 6)

18. ________gpm system discharge rate (from #15)

19. ________ft. friction loss in ft/100 ft. x length ÷ 100 ft. (Table 6)

Calculate the Total Dynamic Head:

20. ________ft. distal pressure #6

21. ________ft. network pressure compensation [losses due to fittings, etc. (0.3 x distal pressure)]

22. ________ft. vertical lift (pump off to lateral elevation)

23. ________ft. friction loss (in the force main in feet #19)

24. ________ft. Total Dynamic Head (TDH) (sum of #20 through #23)

Calculate the Dose Volume:

25. ________ **gal.** based on system type.

26. ________ **gal.** - drain back

27. ________ **gal.** - actual dose volume (#25 + #26)

Pump Selection:

28. ________ **gpm** pump discharge rate at TDH (#24)
    (not less than system discharge rate, #15)

Dose Chamber Sizing:

29. ________ **in.** tank bottom to “off” switch ________gal.

30. ________ **in.** dose volume (from #27) ________gal.
    (“off” to “on” switch)

31. ________ **in.** “on” switch to alarm switch ________gal.

32. ________ **in.** reserve capacity ________gal.
    (residential = 100 gal/BR)

33. ________ **in.** dose chamber capacity ________gal.

XI. PLAN SUBMITTAL AND INSTALLATION INSPECTION

A. Plan Submittal

In order to install a system correctly, it is important to develop plans that will be used to install the system correctly the first time. The following checklist may be used when preparing plans for review. The checklist is intended to be a **general guide**. Not all needed information may be included in this list. Some of the information may not be required to be submitted due to the design of the system.

Conformance to the list is not a guarantee of plan approval. Additional information may be needed or requested to address unusual or unique characteristics of a particular project. Contact the reviewing agent for specific plan submittal requirements, which the agency may require that are different than the list included in this manual.

General Submittal Information

- Photocopies of soil reports forms, plans, and other documents are acceptable. However, an original signature is required on certain documents.
- Submittal of additional information requested during plan review or and questions concerning a specific plan must be referenced to the Plan Identification indicator assigned to that plan by the reviewing agency.
- Plans or documents must be permanent copies or originals.

Forms and Fees

- Application form for submittal, provided by reviewing agency along with proper fees set by reviewing agent.

Soils Information

- Complete Soils and Site Evaluation Report (form # SBD-8330) for each backhoe pit described; signed and dated by a certified soil tester, with license number.
- Separate sheet showing the location of all borings. The location of all borings and backhoe pits must be able to be identified on the plot plan.

Documentation

- Architects, engineers or designers must sign, seal and date each page of the submittal or provide an index page, which is signed, sealed and dated.
- Master Plumbers must sign, date and include their license number on each page of the submittal or provide an index page, which is signed, sealed and dated.
- Submittals if on paper, must measure at least 8-1/2 by 11 inches.
- Designs that are based on department approved component manual(s) must include reference to the manual(s) by name, publication number and published date.

Plot Plan

- Dimensioned plans or plans drawn to scale (scale indicated on plans) with parcel size or all property boundaries clearly marked.
- Slope directions and percent in system area.
- Benchmark and north arrow.
- Setbacks indicated as per appropriate code.
- Two-foot contours or other appropriate contour interval within the system area.
- Location information; legal description of parcel must be noted.
- Location of any nearby existing system or well.

Plan View

- Dimensions for distribution cell(s).
- Location of observation pipes.
- Dimensions of dispersal/treatment component.
- Pipe lateral layout, which must include the number of laterals, pipe material, diameter and length; and number, location and size of orifices.
- Manifold/force main locations, with materials, length and diameter of each.

Cross Section Of System

- Include tilling requirement, distribution cell details, percent slope, side slope, and cover material.
- Lateral elevation, position of observation pipes, dimensions of distribution cell, and type of cover material such as geotextile fabric, if applicable.

System Sizing

- For one- and two-family dwellings, the number of bedrooms must be included.
- For public buildings, the sizing calculations must be included.

Tank And Pump / Siphon Information

- All construction details for site-constructed tanks.
- Size and manufacturer information for prefabricated tanks.
- Notation of pump or siphon model, pump performance curve, friction loss for force main and calculation for total dynamic head.
- Cross section of dose tank / chamber to include storage volumes; connections for piping, vents, and power; pump “off” setting; dosing cycle and volume, high water alarm setting, and storage volume above the highwater alarm; and location of vent and manhole.
- Cross section of two compartment tanks or tanks installed in a series must include information listed above.

B. Inspections.

Inspection shall be made in accordance with ch. 145.20, Wis. Stats and s. SPS 383.26, Wis. Adm. Code. The inspection form on the following two pages may be used. The inspection of the system installation and/or plans is to verify that the system at least conforms to specifications listed in Tables 1 - 3 of this manual.

Do your Part—Be SepticSmart!

A Homeowners' Guide to Septic Systems

septicsmart™

U.S. Environmental Protection Agency

EPA

Maintaining Your Septic System:

Good for your wallet. Good for your health. Good for the environment.

Did you know that one-quarter of all U.S. homes have septic systems? Yours may be one of them. If you're not properly maintaining your septic system, you're not only hurting the environment, you're putting your family's health at risk—and may be flushing thousands of dollars down the drain!

First Things First:

What Is a Septic System?

Common in rural areas without centralized sewer systems, septic systems are underground wastewater treatment structures that use a combination of nature and time-tested technology to treat wastewater from household plumbing produced by bathrooms, kitchen drains, and laundry.

Do You Have a Septic System?

You may already know you have a septic system. If you don't know, here are tell-tale signs that you probably do:

- You use well water.
- The waterline coming into your home doesn't have a meter.
- You show a "$0.00 Sewer Amount Charged" on your water bill.
- Your neighbors have a septic system.

How To Find Your Septic System

Once you've determined that you have a septic system, you can find it by:

- Looking on your home's "as built" drawing.
- Checking your yard for lids and manhole covers.
- Contacting a septic inspector/pumper to help you locate it.

Why Should You Maintain Your Septic System?

Maintaining Your Septic System...

Saves You Money

Regular maintenance fees of $250 to $300 every three to four years is a bargain compared to the cost of repairing or replacing a malfunctioning system, which can cost between $3,000 and $7,000. The frequency of pumping required for your system depends on how many people live in your home and the size of the system.

Protects Your Property Value

An unusable septic system or one in disrepair will lower your property value, not to mention pose a potentially costly legal liability.

Keeps You and Your Neighbors Healthy

Household wastewater is loaded with disease-causing bacteria and viruses, as well as high levels of nitrogen and phosphorus. If a septic system is well-maintained and working properly, it will remove most of these pollutants. Insufficiently treated sewage from septic systems can cause groundwater contamination, which can spread disease in humans and animals.

Improperly treated sewage also poses the risk of contaminating nearby surface waters, significantly increasing the chance of swimmers contracting a variety of infectious diseases, from eye and ear infections to acute gastrointestinal illness and hepatitis.

Service provider coming? Here's what you need to know.

When you call a septic service provider, he or she will inspect for leaks and examine the scum and sludge layers in your septic tank.

Your septic tank includes a T-shaped outlet which prevents sludge and scum from leaving the tank and traveling to the drainfield area. If the bottom of the scum layer is within six inches of the bottom of the outlet, or if the top of the sludge layer is within 12 inches of the outlet, your tank will need to be pumped. Remember to note the sludge and scum levels determined by the septic professional in your operation and maintenance records, as this will help determine how often pumping is necessary.

The service provider should note any repairs completed and the tank condition in your system's service report. If additional repairs are recommended, be sure to hire someone to make them as soon as possible.

The National Onsite Wastewater Recycling Association (NOWRA) website has a septic locator that makes it easy to service professionals in your area. Visit **www.septiclocator.com** and enter your ZIP code to get started!

Beware of septic tank additives!

Some makers of septic tank additives claim their products break down septic tank sludge in order to eliminate the need for pumping. But the effectiveness of additives has not been determined; in fact, many studies show that additives have no significant effects on a tank's bacterial populations.

Septic tanks already contain the microbes they need for the effective breakdown of household wastewater pollutants. Periodic pumping is the only true way to ensure that septic systems work properly and provide many years of service.

Protects the Environment

More than four billion gallons of wastewater is dispersed below the ground's surface every day. That's a lot of water! Groundwater contaminated by poorly or untreated household wastewater doesn't just pose dangers to drinking water—it poses dangers to the environment. Malfunctioning septic systems release bacteria, viruses, and chemicals toxic to local waterways. When these pollutants are released into the ground, they eventually enter streams, rivers, lakes, and more, harming local ecosystems by killing native plants, fish, and shellfish.

Maintaining Your Septic System:

The Basics

Septic system maintenance isn't complicated, and it doesn't need to be expensive. Upkeep comes down to four important elements:

- Inspection and pumping
- Water efficiency
- Proper waste disposal
- Drainfield care

Inspect and pump frequently

The average household septic system should be inspected at least every three years by a septic service professional. Household septic tanks are typically pumped every three to five years. Alternative systems with electrical float switches, pumps, or mechanical components need to be inspected more often, generally once a year. A service contract is important since alternative systems have mechanized parts.

Four major factors influence the frequency of septic pumping:

- Household size
- Total wastewater generated
- Volume of solids in wastewater
- Septic tank size

Use water efficiently

Did you know that average indoor water use in a typical single-family home is nearly 70 gallons per individual, per day? And just a single leaky toilet can waste as much as 200 gallons of water per day?

All of the water a household sends down its pipes winds up in its septic system. This means that the more water a household conserves, the less water enters the septic system. Efficient water use can not only improve the operation of a septic system, but it can reduce the risk of failure as well. Learn more about simple ways to save water and water-efficient products by visiting EPA's WaterSense Program at **www.epa.gov/watersense**.

- **High-efficiency toilets:** Toilet use accounts for 25 to 30 percent of household water use. Most older homes have toilets with 3.5- to 5-gallon reservoirs, while newer, high-efficiency toilets use 1.6 gallons of water or less per flush. Replacing existing toilets with high-efficiency models is an easy way to quickly reduce the amount of household water entering your septic system.
- **Faucet aerators and high-efficiency showerheads:** Faucet aerators help reduce water use as well as the volume of water entering your septic system. High-efficiency showerheads or shower flow restrictors also reduce water use.
- **Washing machines:** Washing small loads of laundry on your washing machine's large-load cycle wastes water and energy. By selecting the proper load size, you'll reduce water waste. If you're unable to select a load size, run only full loads of laundry.

  Another tip? Try to spread water use via washing machine throughout the week. Doing all household laundry in one day might seem like a time-saver, but it can be harmful to your septic system, as it doesn't allow your septic tank time to adequately treat waste and could potentially flood your drainfield.

  Consider purchasing an ENERGY STAR® clothes washer, which uses 35 percent less energy and a whopping 50 percent less water than a standard model. Learn more about ENERGY STAR appliances by visiting **www.energystar.gov**.

Small leaks can lead to big problems!

When it comes to water fixtures, a couple of quick fixes can save you serious problems down the road!

Check to see if your toilet's reservoir is leaking into your toilet bowl by adding five drops of liquid food coloring to the toilet reservoir before bed. If the dye is in the toilet bowl the next morning, the reservoir is leaking and repairs are needed.

Think a leaky faucet is no big deal? Think again. A small drip from a faucet adds gallons of unnecessary water to your septic system every day.

To see how much a leak adds to your water usage, place a cup under the drip for 10 minutes. Multiply the amount of water in the cup by 144 (the number of minutes in 24 hours, divided by 10). Just one cup of leaky faucet water every 10 minutes equals 36 wasted gallons of water a day—and they all end up in your septic system.

New faucets and toilet reservoirs are easily accessible and inexpensive. Choose to make a small investment for a big difference in your septic system.

- **Proper waste disposal:** Whether you flush it down the toilet, grind it in the garbage disposal, or pour it down the sink, shower, or bath, everything that goes down your drains ends up in your septic system. And what goes down the drain can have a major impact on how well your septic system works.

Toilets Aren't Trash Cans!

Your septic system is not a trash can. An easy rule of thumb? Don't flush anything besides human waste and toilet paper.

Never flush:

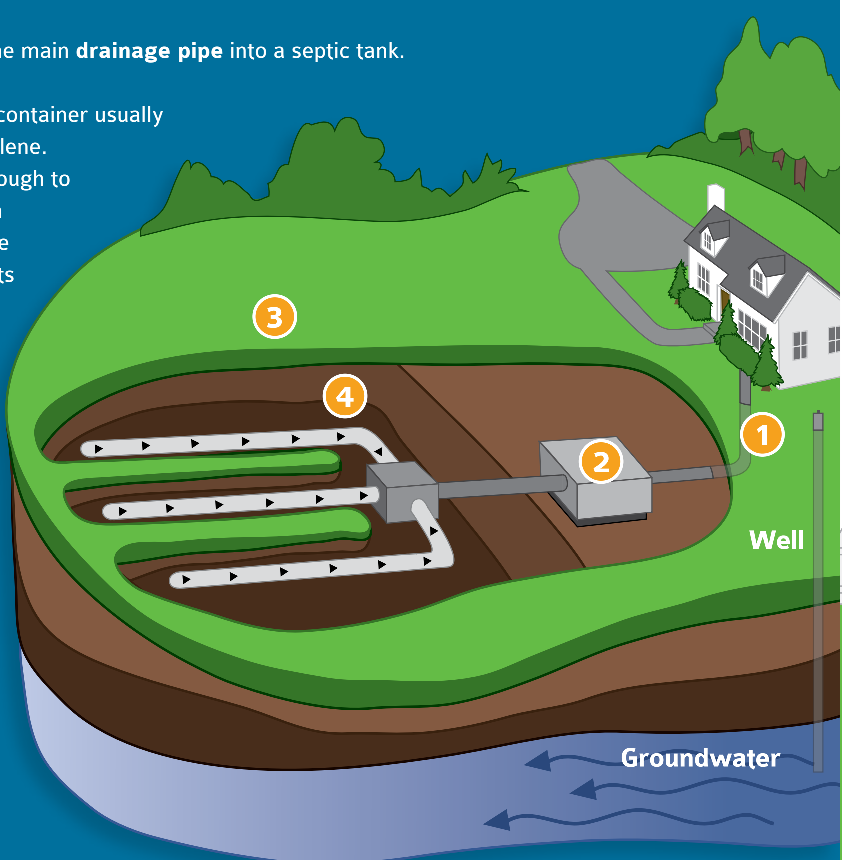
- Feminine hygiene products
- Condoms
- Dental floss
- Diapers
- Cigarette butts
- Coffee grounds
- Cat litter
- Household chemicals like gasoline, oil, pesticides, antifreeze, and paint
- Pharmaceuticals

For a complete list, visit **water.epa.gov/septicsmart**.

How does a septic system work?

This is a simplified overview of how a septic system works.

1. All water runs out of your house from one main **drainage pipe** into a septic tank.
2. The **septic tank** is a buried, water-tight container usually made of concrete, fiberglass or polyethylene. Its job is to hold the wastewater long enough to allow solids to settle down to the bottom (forming sludge), while the oil and grease floats to the top (as scum). Compartments and a T-shaped outlet prevent the sludge and scum from leaving the tank and traveling into the drainfield area.
3. The liquid wastewater then exits the tank into the **drainfield**. If the drainfield is overloaded with too much liquid, it will flood, causing sewage to flow to the ground surface or create backups in toilets and sinks.
4. Finally, the wastewater percolates into the **soil**, naturally removing harmful bacteria, viruses, and nutrients.



Own an RV, boat or mobile home?

If you spend any time in a recreational vehicle (RV) or boat, you probably know of the problem of odors from sewage holding tanks. Learn more about proper and safe wastewater disposal—download EPA’s factsheet at **www.epa.gov/region9/water/groundwater/uic-pdfs/rv-wastewater.pdf** or call The National Small Flows Clearinghouse’s Septic System Care hotline toll-free at 1-800-624-8301.

Take care at the drain

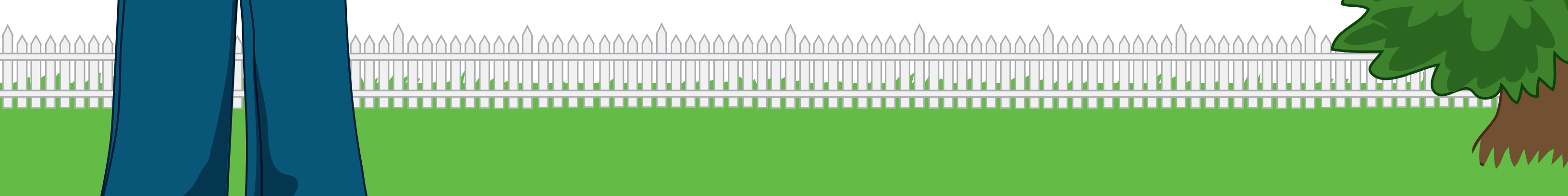
Your septic system contains a collection of living organisms that digest and treat household waste. Pouring toxins down your drain can kill these organisms and harm your septic system. Whether you’re at the kitchen sink, bathtub, or utility sink:

- Avoid chemical drain openers for a clogged drain. Instead, use boiling water or a drain snake.
- Never pour cooking oil or grease down the drain!
- Never pour oil-based paints, solvents, or large volumes of toxic cleaners down the drain. Even latex paint waste should be minimized.
- Eliminate or limit the use of a garbage disposal, which will significantly reduce the amount of fats, grease, and solids that enter your septic tank and ultimately clog its drainfield.

Maintain your drainfield

Your drainfield—a component of your septic system that removes contaminants from the liquid that emerges from your septic tank—is an important part of your septic system. Here are a few things you should do to maintain it:

- Never park or drive on your drainfield.
- Plant trees the appropriate distance from your drainfield to keep roots from growing into your septic system. A septic service professional can advise you of the proper distance, depending on your septic tank and landscape.
- Keep roof drains, sump pumps, and other rainwater drainage systems away from your drainfield area, as excess water slows down or stops the wastewater treatment process.



Failure Causes

Pouring household and home improvement chemicals down your drains, flushing garbage down toilets, excessive water use, and failure to provide proper maintenance aren't the only culprits for septic system failure. Take note of these additional causes of septic failure:

Hot tubs

Hot tubs may be a great way to relax, but when it comes to emptying them, your septic system should avoided. Emptying a hot tub into your septic system stirs the solids in the tank, pushing them into the drainfield, causing it to clog and fail.

Drain cooled hot tub water onto turf or landscaped areas far away from your septic tank and drainfield, and in accordance with local regulations. Use the same caution when draining swimming pools.

Water purification and softening systems

Some freshwater purification systems, including water softeners, unnecessarily pump water into septic systems. Such systems can send hundreds of gallons of water to septic tanks, causing agitation of solids and excess flow to drainfields. When researching water purification and softening systems, check with a licensed plumbing professional about alternative routing for such treatment systems.

Garbage disposals

Consider eliminating or limit the use of garbage disposals. While convenient, frequent use of garbage disposals significantly increases the accumulation of sludge and scum in septic tanks, resulting in the need for more frequent pumping.

Improper design or installation

The proper design and installation of a septic system is essential for it to correctly function. A home's groundwater table, soil composition, and a properly leveled drainfield are just a few factors to ensure a well-functioning septic system. Be sure to do your research when hiring septic professionals.

Failure symptoms: Mind the signs!

A foul odor isn't always the first sign of a malfunctioning septic system. Call a septic professional if you notice any of the following:

- Wastewater backing up into household drains.
- Bright green, spongy grass on the drainfield, even during dry weather.
- Pooling water or muddy soil around your septic system or in your basement.
- A strong odor around the septic tank and drainfield.

Mind the signs of a failing system. One call to a septic professional could save you thousands of dollars!

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