

Step 4) Determine the minimum pipe size of the distribution laterals:

Enter the system design information into the 3 boxes below. If distribution laterals are of differing lengths, each lateral must be considered separately.

Orifice Diameter

 mm

From P2

Length of Distribution Lateral

 m

From System Design Drawings

Total Orifices Each Lateral

From P3a

Use Table A.1.A. (in HO 109A) when applying the information entered in this step to determine the minimum size of the distribution lateral pipe.

Size of Distribution Lateral Pipe
From Table A.1.A.

 mm

P4

Step 5) Determine the total flow from all orifices:

Total Number of Orifices in all laterals

From P3b

X

LPM for each Orifice at Head Pressure Selected

From Table A.1.B.2

LPM

=

Total flow from all lateral orifices

LPM

P5

Step 6) Select the type and size of effluent delivery pipe:

Use Tables A.1.C.2 or A.1.C.4 to aid in decision. A larger pipe will reduce pressure loss.

Type of pipe used for effluent delivery line

Pipe size selected

mm
- NPS

P6

Choose a friction loss from Tables A.1.C.2 or A.1.C.4 in between the shaded lines to ensure a flow velocity between 2 to 5 feet per second. The pipe size selected will affect the amount of friction loss the pump must overcome to deliver effluent.

Step 7) Calculate the equivalent length of pipe for pressure loss due to fittings:

Insert total from Worksheet "A" on last page (p.5) of this Pressure Distribution Worksheet

Equivalent Length of All Fittings

 m

For Pressure Loss

P7

Step 8) Calculate the equivalent length of pipe from pump to the farthest end of header of distribution laterals for pressure loss:

Length of Piping (m)	Equivalent Length of Fittings (m)	Length of Pipe for Friction Loss (m)	P8		
<input style="width: 100%; height: 40px;" type="text"/>	+	<input style="width: 100%; height: 40px;" type="text"/>	=	<input style="width: 100%; height: 40px;" type="text"/>	
Length from pump to farthest end of distribution header supplying laterals.		Equivalent fitting length from P7 .		Used to determine total pressure head loss due to friction loss in piping.	

Step 8a) Calculate the total length of pipe for friction loss:

Length of Pipe for Friction Loss (m)		Total Length of Pipe for Friction Loss	P8a		
<input style="width: 100%; height: 40px;" type="text"/>	÷	30.5	=	<input style="width: 100%; height: 40px;" type="text"/>	

From P8

Step 9) Calculate the pressure head loss in delivery pipe including fittings:

Total Length of Pipe for Friction Loss	Friction Loss per 30.5 m of pipe	Delivery Piping Pressure Head Loss	P9		
<input style="width: 100%; height: 40px;" type="text"/>	x	<input style="width: 100%; height: 40px;" type="text"/> m	=	<input style="width: 100%; height: 40px;" type="text"/> m	

From P8a

Use Tables A.1.C.2 or A.1.C.4 using flow volume from **P5**.

Step 10) Calculate the total pressure head required at pump:

Delivery piping pressure loss m

From P9

+

Lift distance of effluent from bottom of pump to orifices m

Measure from lowest effluent level in tank to elevation of orifices.

+

Design pressure at orifices m

From P1

+

Head loss allowed if an inline filter is used in pressure piping m

Explain Pressure Loss Allowed if Applied

+

Add 0.3 m to allow for pressure loss along the distribution lateral m

Total minimum pressure head pump must provide at L/min required to supply orifices m

P10

Step 11) Select the size of the drain back orifice if used and determine the flow from the drain back orifice. Then calculate total flow requirement for pump:

Size of Drain Back Orifice	Determine flow using Head Pressure at Drain Back Orifice	Flow from all lateral orifices	Total Liters per Minute from the pump
<input type="text"/> mm	<input type="text"/> LPM	+ <input type="text"/> LPM	= <input type="text"/> LPM

P11

Use pressure head from P10 to find flow from Extended Table A.1.B.2

From P5

Step 12) Details of the pump specifications required:

Required Flow Rate (LPM)

From P11

@

Required Pressure Head (m)

From P10

Required Flow Rate (US gal/min)

Liters (P11) multiplied by 0.2642 = U.S. gallons

Select the appropriate pump by reviewing the pump curve of available pumps. Select a pump that exceeds the requirements set out in this step by approximately 10% considering both pressure head and volume.

Step 13) Consider the pumping demands of the system. If they are considered excessive, redesign the pressure distribution system and recalculate the pump demands.

Worksheet "Appendix A" Determine Equivalent Length of Pipe due to fittings in piping system.

Determine the equivalent length of pipe to allow for friction loss due to fittings in the piping system:

	Number of Fittings		Friction loss as per Table A.1.C.5 or 6	=	Total
90° Elbows	<input type="text"/>	X	<input type="text"/>	=	<input type="text"/>
					+
45° Elbows	<input type="text"/>	X	<input type="text"/>	=	<input type="text"/>
					+
Gate and Ball Valves	<input type="text"/>	X	<input type="text"/>	=	<input type="text"/>
					+
Tee-on-Branch (TOB)	<input type="text"/>	X	<input type="text"/>	=	<input type="text"/>
					+
Tee-on-Runs (TOR)	<input type="text"/>	X	<input type="text"/>	=	<input type="text"/>
					+
Male Iron pipe Adaptors (MIP) (M/F Threaded Adaptors)	<input type="text"/>	X	<input type="text"/>	=	<input type="text"/>
					=
Total Equivalent Length of pipe to allow for fittings in piping system					<input type="text"/>
					(Enter this total, Box P7)