## Pressure Distribution, Orifice, Pipe & Pump Sizing

The completed installation is to comply with BC SPM V3

Tables referenced in this worksheet are located in HO 109A

This worksheet is for use to: size the orifices in distribution lateral pipes, size effluent delivery piping, and to calculate the required capacity and pressure head capability of the effluent pump.

It can be used for: calculating delivery of effluent to laterals in trenches, seepage beds, mounds and sand filters.

It is intended for use by persons having training in the private sewage discipline.

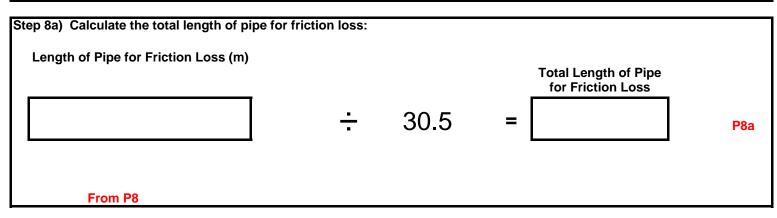
Use only Metric units of measurement throughout (mm, cm, m, L, etc...).

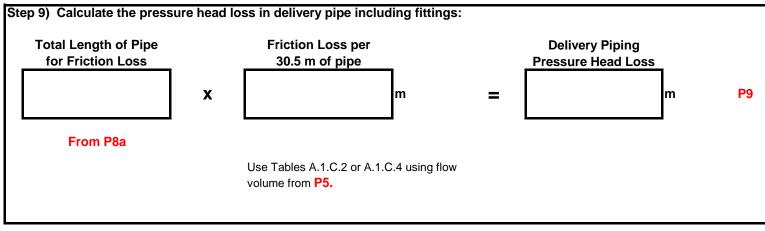
Minimum pressure at the orifice:  Less than 4.8 mm orifice = 1.5 m Minimum 4.8 mm or larger orifice = 0.6 m Minimum	mum	:			
Design <b>բ</b>	pressure at lateral orifices			m	P1
<b>Note:</b> worksheet will not provide an adequate pressure head and volume of discharge at the delevations.	S .	•			
Step 2) Select the size of orifice in the	laterals:				
Type 1 - best practice minimum of 4.0 mm		Orifice Diameter selected		mm	P2
Note: larger sizes are less likely to plug.					
Step. 3) Select the spacing of orifices at Length of Distribution Lateral From system design drawings  m  Select a spacing of orifices to attain even Maximum spacings are determined for *0.56 m² Primary treated effluent *Use spacing determined by Lateral are	Spacing of Orifices sele Worksheet "L" ven distribution over the trea	m =	Resulting number of per lateral  Spaces + 1 = Number of	orifices	P3a
From P3a Number	er of Laterals	Total Numb	er of Orifices All Laterals		P3b
If laterals are of differing lengths, calculate each	n separately and add the number o	of orifices together.	Does this meet the SPM	1 Requireme	ent?

Step 4) Determine the minumum pipe size of the distribution laterals:								
Enter the system design information into the 3 boxes below. If distribution laterals are of differing lengths, each latera	must be							
considered separately.								
Orifice Diameter Length of Distribution Lateral Total Orifices Each Late	al							
mm m								
From P2 From System Design Drawings 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 $\mu$	ipe.							
Size of Distribution Lateral Pipe From Table A.1.A.	P4							
Step 5) Determine the total flow from all orifices:								
	ļ							
Total Number of LPM for each Orifice Total flow from all later Orifices in all laterals at Head Pressure Selected orifices	ıl							
	PM P5							
From P3b From Table A.1.B.2								
Step 6) Select the type and size of effluent delivery pipe:								
Type of pipe used for effluent delivery line Pipe size selected								
Use Tables A.1.C.2 or A.1.C.4 to aid in decision. A								
larger pipe will reduce pressure loss.	PS 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 selcted will affect the amount of friction loss the pump must overcome to deliver effluent.								
Sten 7) Calculate the equivalent length of nine for pressure loss due to fittings:	1							
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For Pressure Loss

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 Equivalent Length of Fittings Length of Pipe for Friction Loss** (m) (m) (m) **P8** Equivalent fitting length Used to determine total pressure Length from pump to from P7. head loss due to friction loss in farthest end of distribution header supplying laterals. piping.





Ctor 40) Coloulate the total print			- 1-	.4					
Step 10) Calculate the total pr	essure ne	ad require	ed a	at pump:					
Delivery piping pressure loss	[				m	From P9			
			+						
Lift distance of effluent from bottom of pump to orifices					m		om lowest effluent k to elevation of orifices.		
	<u> </u>		+						
Design pressure at orifices	ſ				m	From P1			
	_		+						
Head loss allowed if an inline filter is used in pressure piping					m	Explain Pr	essure Loss Allowed in	Applied	
			+						
Add 0.3 m to allow for pressure loss along the distribution lateral			0.3	3	m				
	-								
Total minimum pressure pump must provide L/min required to supply orifices					m	P10			
Step 11) Select the size of the		k orifice if	us	ed and dete	rmine the	flow from t	he drain back orifice. T	hen calcul	ate
Size of Drain Back Orifice	որ։ etermine fl Head Pres Drain Back	sure at		Flow from orifi			Total Liters per Minute from the pump		
mm		LPM	+		LPM	=		LPM	P11
	Jse pressuom P10 to from Extended Table A.	find flow ended		Fron	n P5				
Step 12) Details of the pump s	specificati	ons requi	red	:					
Required Flow Rate (LPM)		-		Pressure (m)					
	@ [					pump curv	appropriate pump by reve of available pumps. So	elect a	
From P11		From P10			pump that exceeds the requirments set out in this step by approximately 10% considering both pressure head and volume.				
		-		low Rate		-			
Liters (P11) multiplied by ( = U.S. gallons	0.2642	(US	gal	/min)					

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	х		=			
	1		ı	+		
45°Elbows	х		=			
				+		
Gate and Ball Valves	х		=			
T-1-1-10	1		ı	+		
Tee-on- Branch (TOB)	x		=			
				+		
Tee-on-Runs (TOR)	х		=			
Male Iron	]			+		
pipe Adaptors (MIP)	Х		=			
(M/F Threaded Adaptors)				=		
Total Equivalent Length of pipe to allow in piping system	v for fittings	(Enter this total, B	sox P7)			