THE UNIVERSITY OF
ARIZONA
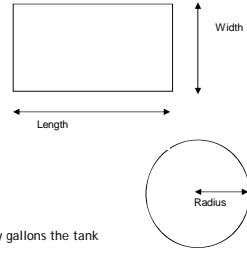COOPERATIVE EXTENSION

DETERMINE AREA AND GALLONS PER INCH

1. A. Rectangle area = Length (L) X Width (W)

   [   ] ft **X** [   ] ft = [   ] ft²

   B. Circle area = πr^2 (3.141593 X radius X radius)

   [3.14] **X** [   ]² ft = [   ] ft²

   C. Get area from manufacturer [   ] ft²

2. Calculate *Gallons Per Inch*:

   There are 7.48 gallons per cubic foot. Therefore, multiply the area from 1.A, 1.B, or 1.C by 7.48 to determine how many gallons the tank holds. Then divide that number by 12 to calculate the gallons per inch.

   (Area X 7.48 gallons/ft³)/(12 in/ft) = [   ] ft² **X** **7.5** gal/ft³ ÷ 12 in/ft = [   ] *Gallons Per Inch*

Width

Length

Radius

TANK CAPACITY

3. Select the required *Minimum Tank Capacity* based on the table to the right [   ] Gallons

4. Calculate *Total Tank Volume*

   A. *Depth from bottom of inlet pipe to tank bottom*: [   ] in

   B. *Total Tank Volume* = Depth from bottom of inlet pipe (Line 4.A) X *Gallons/Inch* (Line 2)

   [   ] in **X** [   ] Gallons Per Inch = [   ] Gallons

5. Calculate *Volume to Cover Pump* (The inlet of the pump must be at least 4-inches from the bottom of the pump tank & 3 inches of water covering the pump is recommended)

   (Pump and block height + 3 inches) X *Gallons Per Inch* (Line 2)

   ([   ] + 3 inches) X [   ] Gallons Per Inch = [   ] Gallons

Design Flow (Gallons Per Day)	Minimum Pump Tank Capacity (Gallons)	
0-600	500	or Alternating Dual Pumps
601-4,999	100% of the Design Flow	or Alternating Dual Pumps
5,000-9,999	50% of the Design Flow	and Alternating Dual Pumps

Volume of Liquid in Pipe	
Pipe Diameter (inches)	Liquid Per Foot (Gallons)
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661

DOSING VOLUME

7. Calculate *Minimum Pumpout Volume* (5 times Volume of Supply and Distribution Pipes)

   Volume of Distribution Piping - Line 17 of the Pressure Distribution Worksheet [   ] Gallons

   Minimum Pumpout Volume = Volume of Distribution Piping X (choose 3-5) [   ] gal **X** [   ] = [   ] Gallons

8. Calculate *Maximum Pumpout Volume* (25% of Design Flow) Design Flow: [   ] gpd **X** 0.25 = [   ] Gallons

9. *Dosing Volume* = Select a volume for 4-5 doses per day and is between the minimum (Line 7) and maximum (Line 8) pumpout volume: [   ] Gallons

10. Calculate *Doses Per Day* = Design Flow / Dosing Volume [   ] gal ÷ [   ] gal = [   ] Doses Per Day

11. Calculate Drainback:

    A. *Diameter of Supply Pipe* = [   ] inches B. Length of Supply Pipe = [   ] ft

    C. *Volume of Liquid Per Lineal Foot of Pipe* = [   ] Gallons

    D. *Drainback* = Length of Supply Pipe X *Volume of Liquid Per Lineal Foot of Pipe*

    [   ] ft **X** [   ] gal/ft = [   ] Gallons

12. *Total Dosing Volume* = Dosing Volume (Line 9) plus *Drainback* (Line 11.D)

    [   ] gal + [   ] gal = [   ] Gallons

DEMAND DOSE FLOAT SETTINGS

13 Calculate *Float Separation Distance* using *Dosing Volume*.

Dosing Volume (Line 12)/Gallons Per Inch (Line 2)

[ ] gal ÷ [ ] gal/in. = [ ] Inches

14 Calculate *Gallons for Alarm* (typically 2-3 inches)

Choose Alarm Depth

[ ] Inches

Alarm Depth (inch) x Gallons Per Inch (Line 2)

[ ] in. X [ ] gal/in. = [ ] Gallons

15 Calculate *Total Gallons* = *Gallons Over Pump* (Line 5) + *Dosing Volume* (Line 12) + *Gallons for Alarm* (Line 14)

[ ] gal + [ ] gal + [ ] gal = [ ] Gallons

16 *Minimum Tank Depth* = *Total Gallons* (Line 15)/*Gallons Per Inch* (Line 2)

[ ] gal ÷ [ ] gal/in. = [ ] Inches = [ ]

17. Set Pump-On and Pump-Off Floats:

A. *Distance to set Pump On Float=[Gallons to Cover Pump (Line 5) plus Dosing Volume (Line 9)] / Gallons Per Inch (Line 2)*:

([ ] gal + [ ] gal) ÷ [ ] gal/in. = [ ] Inches

B. *Distance to set Pump Off Float=Gallons to Cover Pump (Line 5) / Gallons Per Inch (Line 2)*:

[ ] gal ÷ [ ] gal/in. = [ ] Inches

18. Available Reserve Capacity   [depth of tank (Line 4.a) - alarm depth (Line 16)] x Gallons Per Inch

([ ] gal - [ ] in.) X [ ] gal/in. = [ ] gallons   Minimum Required = Design Flow = [ ] gallons

Alarm Depth ___ in

Pump On ___ in
Dose Volume = _____ Gallons
Pump Off ___ in

Gallons

Gallons

Gallons

TIME/DOSING SETTINGS

19. Required *Flow Rate*:

A. From Design (Line 11 of Pressure Distribution Worksheet): [ ] GPM

B. Or calculated: GPM = Change in Depth (in) x Gallons Per Inch (Line 2) / Time Interval in Minutes

[ ] X [ ] ÷ [ ] = [ ] GPM

20. Choose a Flow Rate from Line 19.A or 19.B above. [ ] GPM

21. Calculate **TIMER ON** setting:

Dosing Volume (Line 9)/GPM (Line 20)

[ ] gal ÷ [ ] gal/min. = [ ] Minutes ON

22. Calculate **TIMER OFF** setting:

Minutes Per Day (1440)/*Doses Per Day* (Line 10) - Minutes On (Line 21)

1440 min. ÷ [ ] - [ ] = [ ] Minutes OFF

23. Measuring from bottom of tank:

Distance to set Pump Off Float=Gallons to Cover Pump (Line 5) / Gallons Per Inch (Line 2):

[ ] ÷ [ ] = [ ] Inches

Note: installer, designer or service provider needs to verify actual GPM of pump installed based on pump calibration measurements to ensure that the timer settings established here are accurate or need to be adjusted.

Alarm Depth ___ in.   (90% of tank depth (line 4.a)

Gallons

Dose Volume = _____ Gallons

Pump Off ___ in.

Gallons

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

_____   _____   _____   _____
(Designer)   (Signature)   (License #)   (Date)