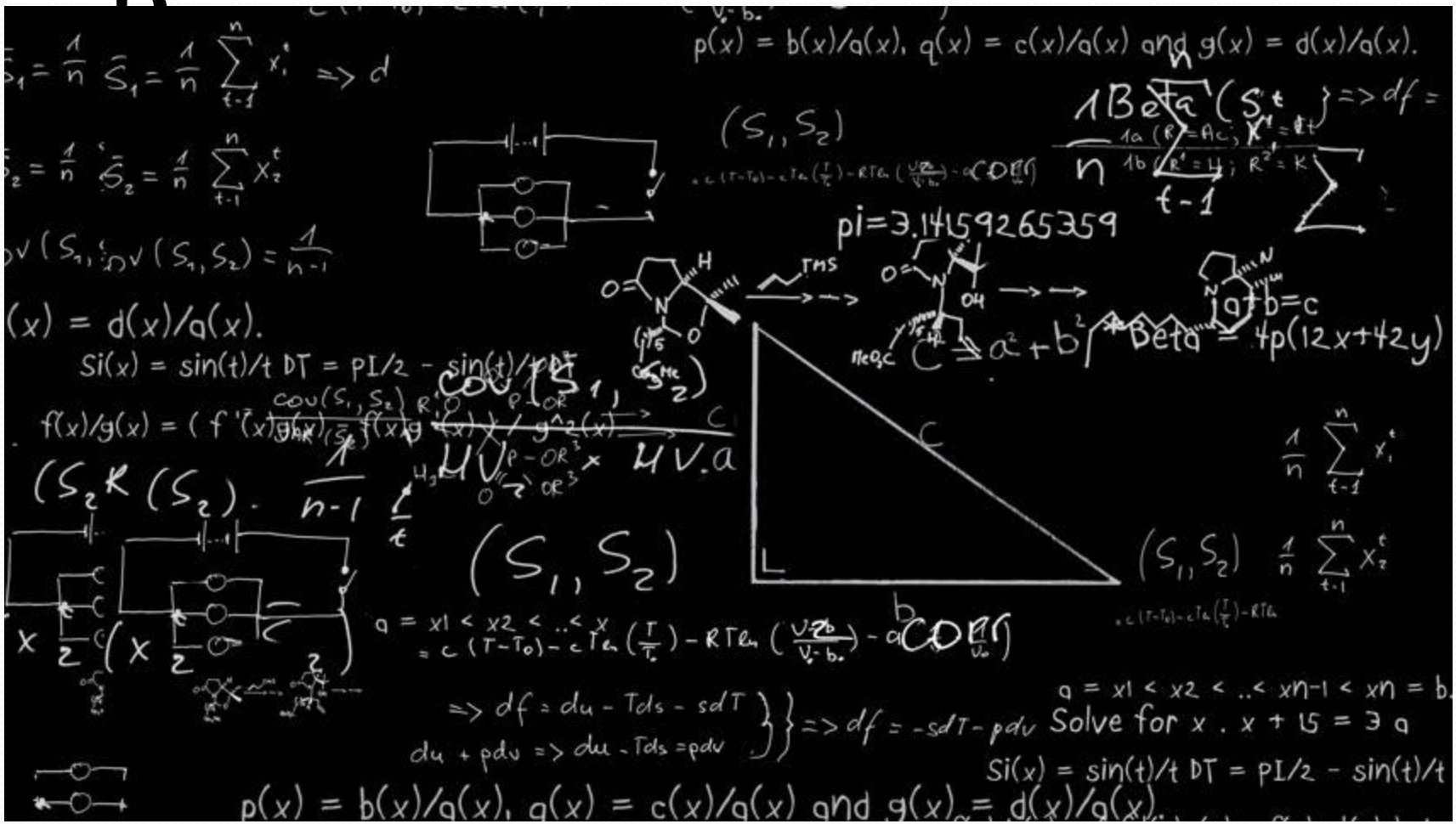
Septic Math, A Quick



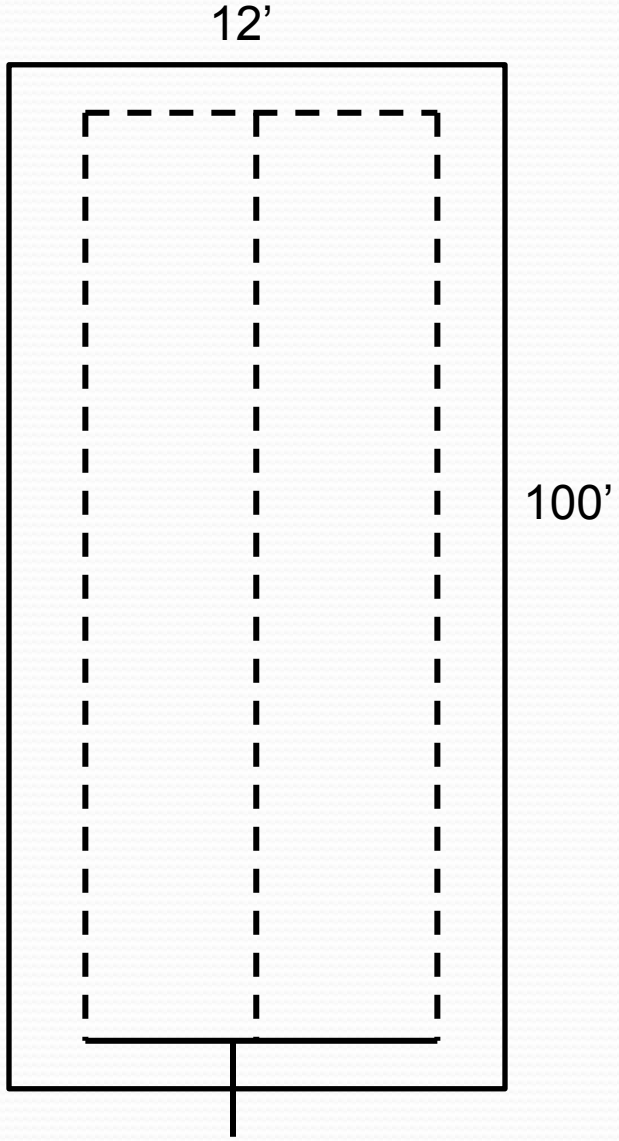
Dose Volume

Pump to Gravity:

- Industry standard (4” perf. Pipe):
  - Daily flow ÷ 4

    (600 gpd ÷ 4 = 150 gal)

    or
  - 80% pipe volume:
    - 3 x 96 = 288 lf
    - 288 x 0.65 gal./lf. = 187 gal.
    - 187 x 80% pipe vol. = 150 gal/dose
- Chambers:
  - Suggest: Daily flow ÷ 4
  - (Note: it’s a hypothetical dose volume)



- Nothing wrong with more freq. dose (Timer is always best)

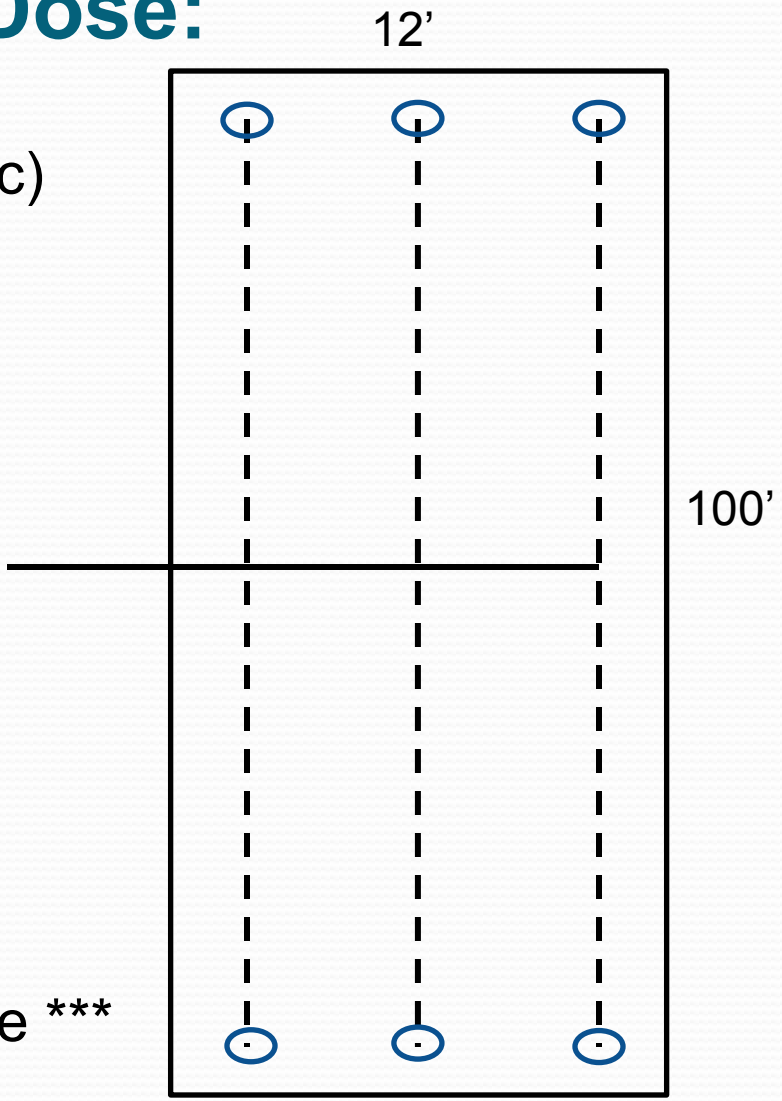
Dose Volume

Pressure Dose:

- Reg. 43 (Industry Std.):
  - 3 – 5 times pipe volume (1.5” pvc)
    - 3 laterals x 96’ = 288lf
    - 10.5 gal. / 100lf (288/100 = 2.88)
    - 2.88 x 10.5 = 30.25 gal. (pipe vol.)
    - 30.25 x 4 = 121 gal. dose

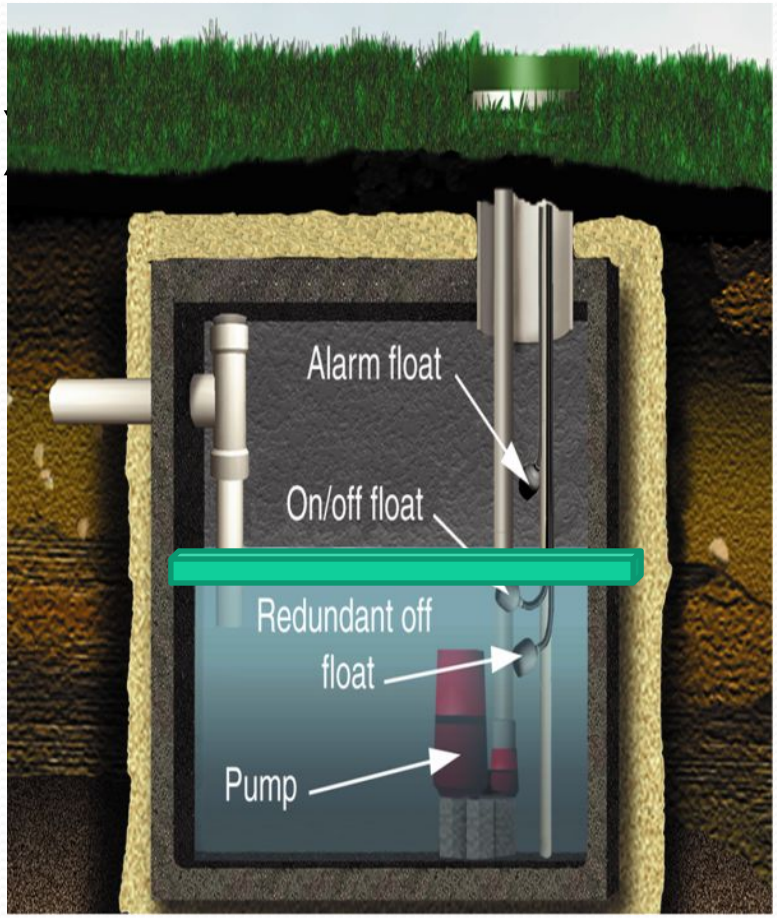
    or
  - 0.25 – 1.0 gal./orifice/dose

    Orifices 4’ c - c
    - 288 ÷ 4 = 72 orifices
    - 72 x 0.25 = 18 gal/dose (???)
    - 72 x 1.0 = 72 gal./dose
    - *** 3 x 30.25 = 90.75 gal./dose ***



Drawdown and Dose Volume

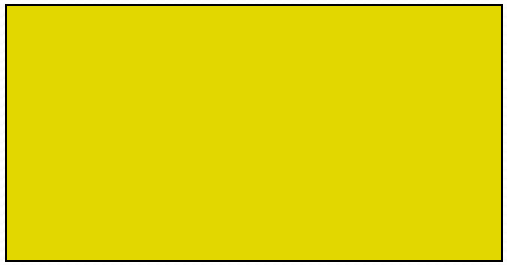
- Drawdown (in) = Dose Volume (gallons) ÷ GPI (gallons per inch) of drawdown
- *Where:*
- GPI = Internal area of dosing chamber in square ft (L x W) x 0.083 ft x 7.5 gal/ft^3
  - 1” = 0.083 ft (1 ÷ 12 = 0.083)
  - 7.5 gallons in 1 cubic foot



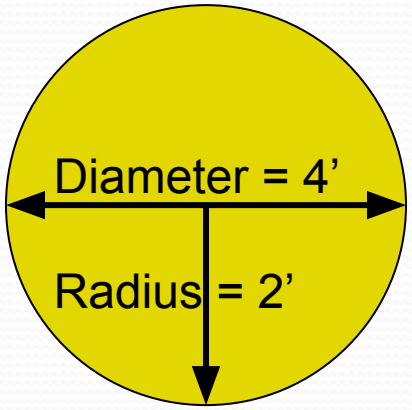
Calculating Drawdown

Internal tank surface area

- Rectangle: 4’ x 7’ tank
  - L x W = Area
  - 4’ x 7’ = **28 ft^2**



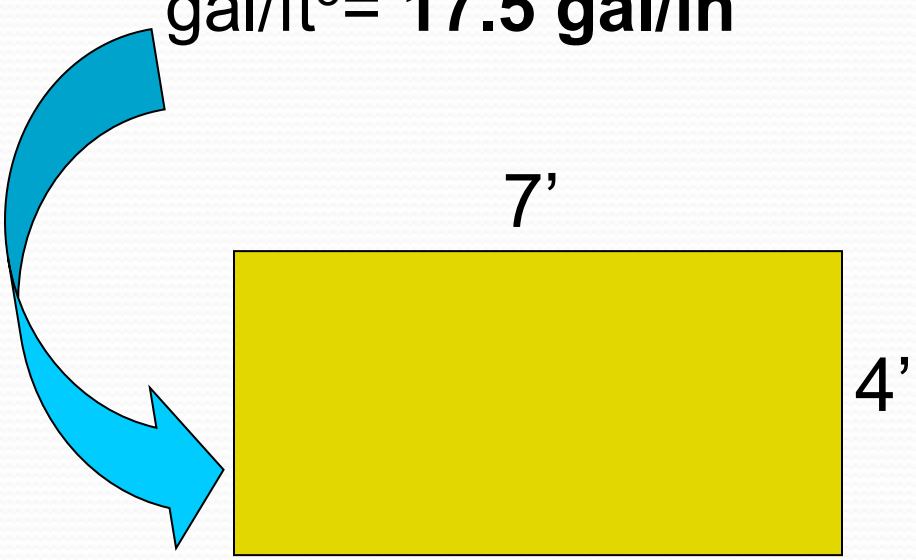
- Round chamber: 4’ diameter
  - Radius is half of diameter 4 ÷ 2 = 2’
  - Π x [radius]^2= 3.14 x r x r
  - 3.14 x 2 x 2 = **12.5 ft^2**

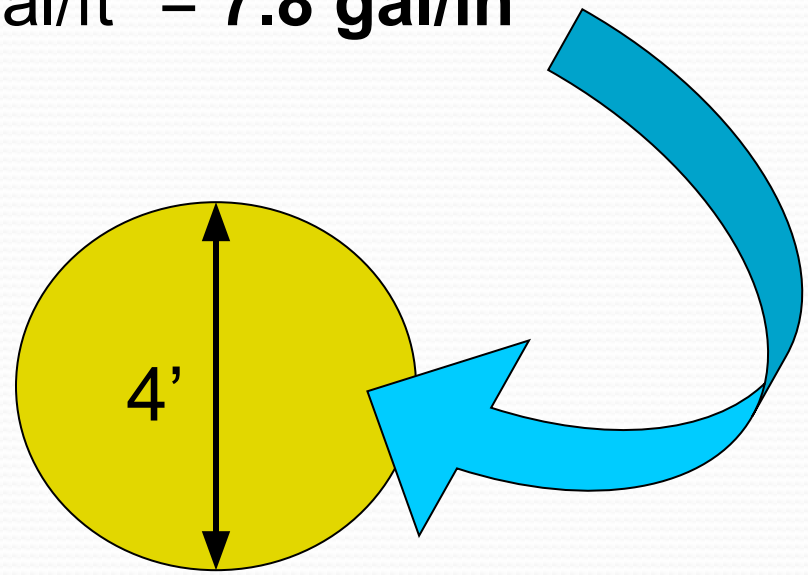


Top View

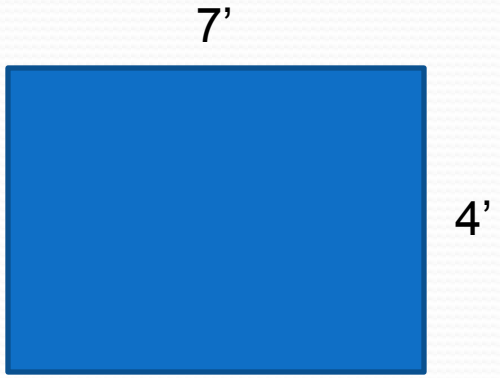
Gallons Per Inch

- Area x 0.083’ x 7.5 gal/ft^3 = gal/inch
- 28 ft^2 x 0.083’ x 7.5 gal/ft^3= **17.5 gal/in**
- 12.5 ft^2 x 0.083’ x 7.5 gal/ft^3 = **7.8 gal/in**

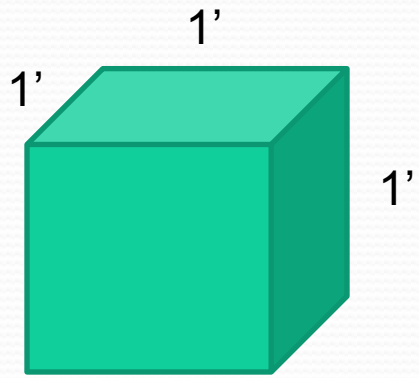




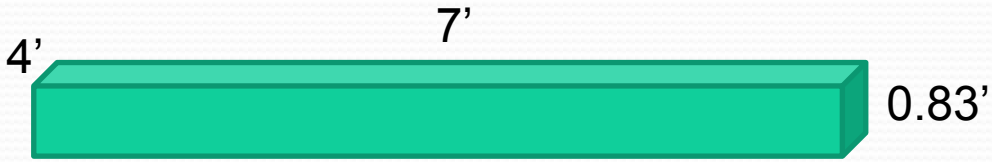
Plan View



Square feet
L x W



Cubic feet
L x W x H
One cubic foot = 7.5 gal.



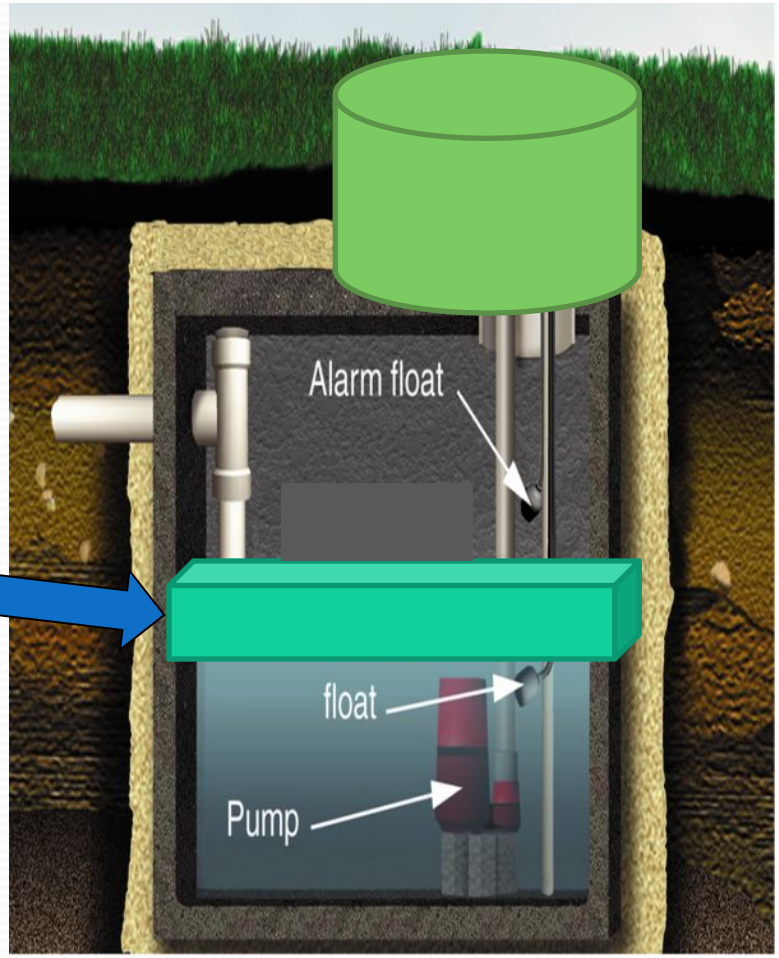
Calculating for gallons/inch

Dose Volume (DV)

- Drawdown (in) = Dose Vol. ÷ GPI
- Dose volume ~ 150 gal
- Drawdown =

  150 gal ÷ 17.5 gal/in = 8.6”

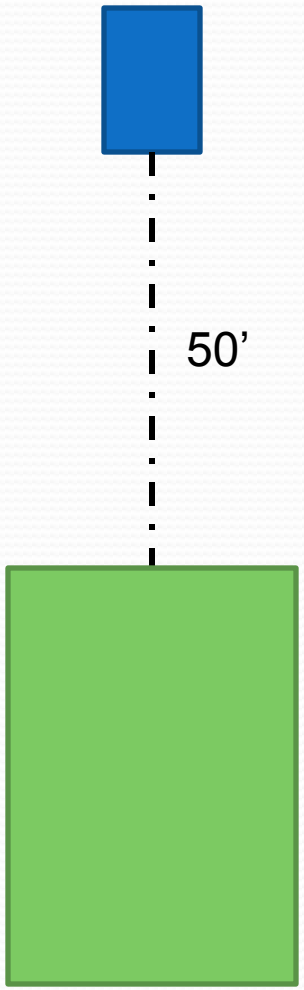
8.6” = 150 gallons



With Check Valve

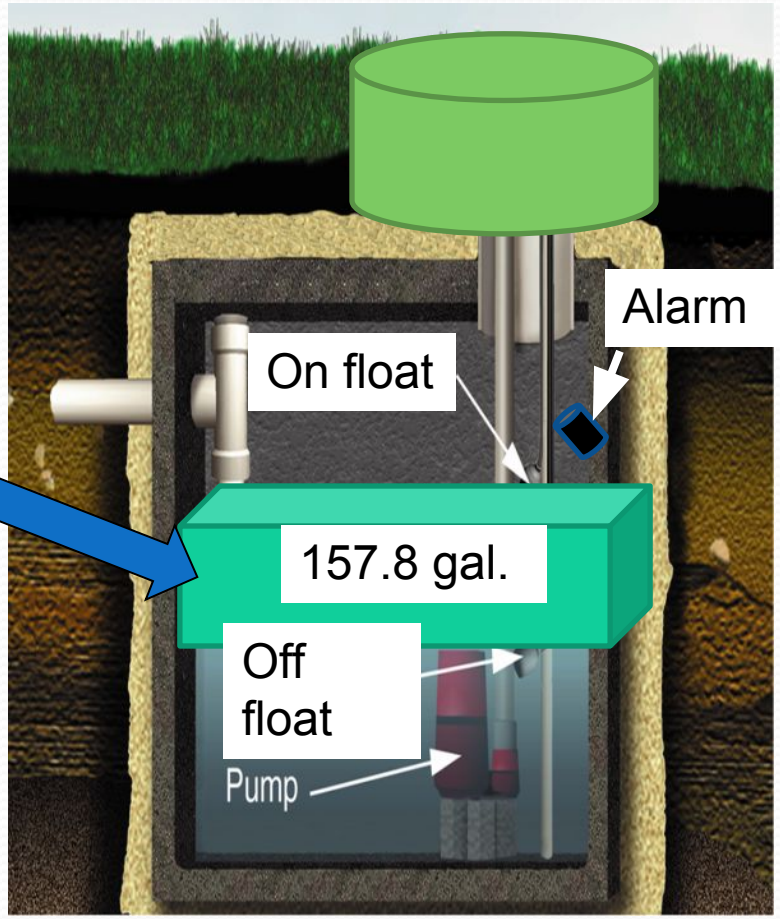
If a check valve is not installed:

- Calculate the gal./lf of forcemain
- Multiply by length of pipe
- Example
  - 2” forcemain = 17.4 gal./100lf
  - 50 lf ÷ 100 lf = 0.5
  - 0.5 x 17.4 = 8.7 gal.
- This number must be added to the calculated dose volume
- Thus: 8.7 + 150 = 158.7
- 159 ÷ 17.5 = 9.1” drawdown



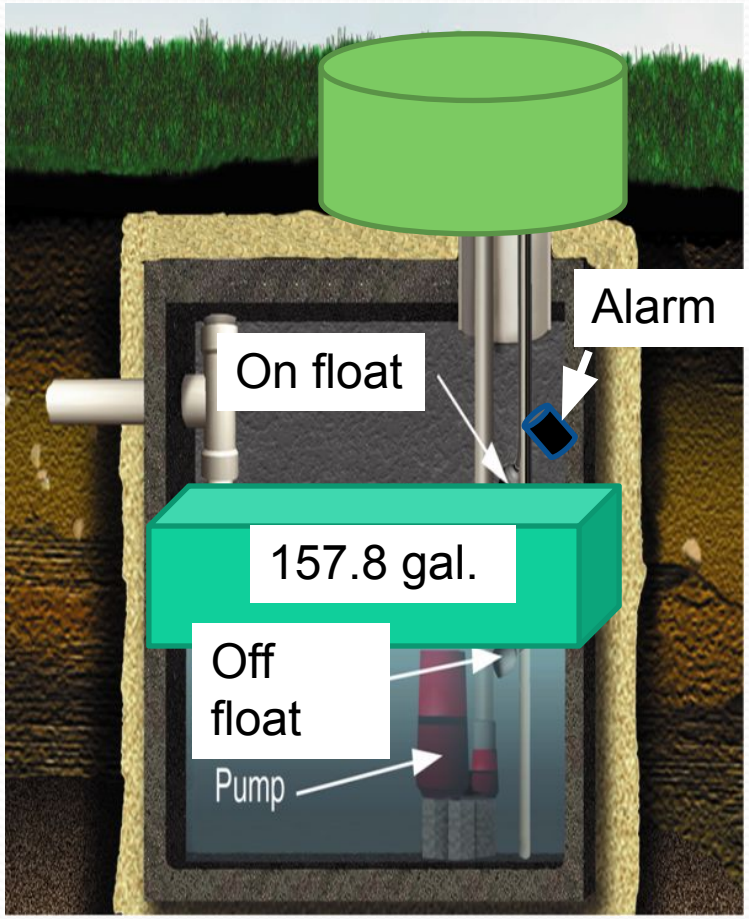
If a check valve is not installed:

- 9.1” drawdown = 158.7 gal.
- 158.7 ÷ 7.5 = 21.16 cu.ft.



Dose volume measurements:

- Measure the time of the dose
- 158.7 gal. dosed in 3 min. 45 sec.
- What is the gpm of our pump?



Determine gal./minute

- 159 gal. dosed in 3 min. 45 sec. [45 ÷ 60 = 0.75]
- 159 ÷ 3.75 = 42.4 gal./minute

Determine gallons used/day

- Elapsed time meter reading 1/1/2018 = 152.35 hrs.
- Elapsed time meter reading 6/1/2018 = 167.5 hrs.
- 167.55 – 152.35 = 15.15 hrs.
- 15.15 hrs. x 60 min. = 909 min.
- 909 min. x 42.4 gal./min. = 38,542 gal.
- 38,542 gal. ÷ 150 days = 257 gal./day

Suggested dose modifications

- Current dose = 158 gal. [based on 600 gpd]
- 257 gal./day ÷ 158 gal./dose = 1.63 doses / day
- Design was looking for 4 doses / day
- 257 gal. x 1.33 (~ peaking factor) = 342 gal.
- 342 ÷ 4 = 85 gal. [set system to dose 85 gal.]

Float setting adjustments

- 85 gal. + 8.7 = 93.7 gal. [use 94]
- 94 gal. ÷ 17.5 gal./inch = 5.4” between floats
- If average use: 257 ÷ 85 gal./dose = 3 doses/day

GOOD LUCK!!