PRESSURE DISTRIBUTION EXAMPLE

Orifice Discharge Rate

\[(\text{Dia in inches})^2 \times \sqrt[3]{\text{Head in feet} \times 12} = \text{gpm/orifice}\]

\[(0.125)^2 \times \pi \times 12 = 0.41 \text{ gpm/orifice}\]

Network Discharge Rate

\[450 \text{ gpd} \div 0.45 \text{ g/sf/d} \div 4 \text{ sf/lf} = 250 \text{ lf}\]
\[250 \text{ ft} \div 2 \text{ ft o.c.} = 125 \text{ orifices}\]
\[125 \text{ orifices} \times 0.41 \text{ gpm/orifice} = 51.25 \text{ gpm network discharge}\]

Total Dynamic Head (TDH)

\[\text{Static Head} + \text{Dynamic Head} = \text{TDH}\]
\[
\text{Static Head} = \text{elevation from pump suction to discharge elevation} \\
\text{Dynamic Head} = \text{fittings, valves, line friction loss, residual head desired at orifice}
\]

Minimum Dose

\[(5 \text{ to } 10 \text{ times Volume of Network})\]
\[\text{Network in lf} \times \text{Lateral volume in gals/lf} \times 10 = \text{Minimum Dose}\]

Lateral Volume calculations:

\[\left(\text{Dia in inches})^2 \times \pi \div 4 \times \text{inches/foot} \div \text{inches}^3/\text{foot}^3 \times \text{gals/foot}^3 = \text{gals/lf}\]
\[\left((1)^2 \times 3.14 \div 4\right) \times 12 \text{ in/ft} \div 1728 \text{ in}^3/\text{ft}^3 \times 7.48 \text{ gals/ft} = 0.041 \text{ gals/lf}\]
\[250 \text{ lf} \times 0.041 \text{ gals/lf} \times 10 = 102 \text{ gallons Minimum Dose}\]

Timer Control Setting

\[450 \text{ gpd} \div \text{gals per minimum dose} = \text{cycles per day}\]
\[1440 \text{ minutes/day} \div \text{cycles/day} = \text{minutes/cycle}\]
\[\text{Min.Dose} \div \text{Network Discharge} = \text{ON time}\]
\[\text{Minutes/cycle} \div \text{ON time} = \text{OFF time}\]
\[450 \text{ gpd} \div 102 \text{ gals} = 4.4 \text{ cycles: SAY 5}\]
\[1440 \text{ mins/day} \div 5 \text{ cycles/day} = 288 \text{ minutes/cycle}\]
\[102 \text{ gal/dose} \div 51 \text{ gpm} = 2 \text{ min ON time}\]
\[288 \text{ minutes/cycle} \div 2 \text{ min ON} = 286 \text{ min OFF time}\]

Volume per inch of Pump Tank Depth

\[L \text{ inches} \times W \text{ inches} \times 1 \text{ inch of Depth} \div 1728 \text{ in}^3/\text{ft}^3 \times 7.48 \text{ gals/ft}^3 = \text{gals/inch}\]
\[96 \text{ in} \times 60 \text{ in} \times 1 \text{ in} \div 1728 \times 7.48 = 25 \text{ gals/inch}\]

Timer Floats:
\[450 \text{ gpd} \div 25 \text{ gals/in} = 18 \text{ inches between } \text{Timer ON & Off float positions}\]

Simple Demand Floats:
\[102 \text{ gals Min Dose} \div 25 \text{ gals/in} = 4 \text{ inches between ON float and OFF floats}\]