Drinking Water Distribution Formula Sheet

Conversions

Multiply ⇨ ⇦ *divide*

1 psi	=	2.31 ft of head
1 ft^3 of water	=	7.48 gallons
1 ft^3 of water	=	62.4 lbs
1 gallon	=	8.34 lbs
1 ppm	=	1 mg/L
1ft^3 /sec	=	448.8 gpm
1 MGD	=	1.55 ft^3 /sec
1 MGD	=	694.5 gpm
1 HP	=	0.746 kilowatt
1 mile	=	5280 ft
1 day	=	1440 minutes
1 lb	=	453.6 g (ml water)
1 yd^3	=	27 ft^3
1 % solution	=	10,000 ppm

Flow and Velocity

"Q" = FLOW, ft^3/sec

"V" = VELOCITY, f/s

"A" = AREA, ft^2

$$Q = A \times V$$

$$V = Q \div A$$

$$A = Q \div V$$

Water - Brake - Motor Horsepower

$$WHP = \frac{gpm \times total\ head\ ft}{3960}$$

$$BHP = \frac{gpm \times total\ head\ ft}{3{,}960 \times Ep}$$

$$MHP = \frac{gpm \times total\ head\ ft}{3{,}960 \times Ep \times Em}$$

E_p = Pump Efficiency % E_m = Motor Efficiency %

Area ft^2

Rectangle $length\ ft \times width\ ft$

Circle $0.785 \times D\ ft \times D\ ft$

Volume ft^3

Cube $Length\ ft \times width\ ft \times height\ ft$

Cylinder $0.785 \times D\ ft \times D\ ft \times length\ ft$

$$Diameter\ (D) = 2 \times Radius$$

$$Circumference = 3.14 \times D$$

$$Perimeter = sum\ of\ the\ sides$$

Dosage = Demand + Residual

Residual = Dosage – Demand

Demand = Dosage - Residual

Other Formulas and Information

$$KWhr\ cost = MHP\ x\ 0.746\ x\ hr\ operation\ x\ cost/kWhr$$

Total Static Head = Static Discharge head + Static Suction Lift

Total Static Head = Static Discharge head – Static Suction Head

Equivalent Flow Rate (EFR) for C-factor

$$EFR = \frac{Actual\ flow\ rate\ x\ 100}{C\ factor}$$

$$\text{lbs of chemical} = \frac{\text{ppm} \times 8.34 \text{ x MGD}}{\%\ \text{Purity}}$$

$$\text{Dose (ppm)} = \frac{\text{lbs of chemical} \times \%\ \text{Purity}}{\text{MGD} \times 8.34}$$

Ignore % purity if not given in formula.

$$\text{gallons} = \frac{\text{ppm x 8.34 x MGD}}{\%\ \text{purity x SG x 8.34}}$$

Use this formula if gallons are asked for in a math problem. Substitute weight of solution for SG x 8.34 if given.

$$Specific\ Gravity\ (SG) = \frac{wt\ of\ a\ liquid}{equal\ wt\ of\ water}$$

$$Strength\ of\ Solution = \frac{wt\ of\ chemical}{wt\ of\ solution}\ x\ 100$$

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