

Conversion Factors

Aeration Systems

Bulletin Brief

Technical Presentation

1. Pounds/Horsepower - Hour
Convert #/Hp-hr or lb/Hp-hr to kg/kwh or kilogram/kilowatt-hr

$$\begin{aligned}
 1 \text{ lb/Hp-hr} &= \frac{1 \text{ #/Hp-Hr}}{2.2046 \text{ lb/kg (0.746 kw/Hp)}} \\
 &= 0.608 \text{ kg/kw-hr - or} \\
 1 \text{ kg/kwh} &= 1.645 \text{ lb/Hp hr}
 \end{aligned}$$

2. Air Flow
Scfm = Standard cubic feet per min
Nm³/hr = normal M3/Hr
1 scfm = 60 ft³/hr = $\frac{60 \text{ft}^3/\text{Hr}}{35.31 \text{ ft}^3/\text{Nm}^3}$
1 scfm = Approximately 1.7 Nm³/hr – or
1 Nm³/hr = SCFM/1.7
= Approximately 0.588 scfm

3. Length
1 ft = 1/3.2808 m = 0.348 m
1 m = 3.2808 ft
= 100 cm
= 1000 mm
1 inch = 2.54 cm
= 25.4 mm
= 0.0254 m
1000 mils = 1 inch
1 mm = 39.37 mil
1 m = 1 x 10⁶ micron

4. Weight
 1 lb = 453.6 grams
 = 453,600 mg
 1 gm = 1000 mg
 1 kg = 2.2046 lb
 1 lb = 0.4536 kg
 1 tonne = 1000 kg = (metric ton) = 1m³ water
 = 2204.6 lb
 1 ton = 2000 lb (English ton)
5. Pressure
 1 PSI = 2.31 ft of water
 = 27.72 inches of water
 = 6.895 x 10³ Pascal
 = 6.895 k Pascal
 = 68.95 X10³ BAR
 = 68.95 MBAR
 = 0.491 inches Mercury (Hg)
 = 14.22 kg/cm²
 1 Atmosphere = 14.7 psi
 = 33.9 ft water
 = 760 mm Mercury (Hg)
6. Concentration
 mg/l approximately equal ppm
 mg/l x 8.34 x MGD = pounds/day
 mg/l x M3/1000 = kg
 g/l = 1000 mg/l
 g/l x m³ = kg
7. Energy and Engergy Cost
 1 Hp = 0.746 kw
 1000 w = 1 kw
 Annual value 1 Hp = Hp (0.746 kw/hp) 24 hr (365 day/yr) x \$/kwh
 = Hp (6535) \$/kwh/yr
 Example @ 6¢/kwh = 0.06/kwh
 Annual Value 1 Hp = 1 (6535) 0.06 = \$392.1/year
8. Density Air Approximately 0.075 lb /ft³
 % O2 in Air Approximately = 23%
9. Oxygen Transfer Rate of Diffuser = Oxygenation Rate
 OTR Approximately = scfm air (1.036) SOTE = lb O2/hr
 Example Airflow = 200 scfm & diffuser efficiency 22%
 OTR = 200 scfm air (1.036) 0.22

$$= 45.58 \text{ lb O}_2/\text{hr}$$

10. Oxygen Transfer Efficiency
Efficiency/m as % = E_m = % SOTE/m submergence
 gm/M^3 air per M submergence = $1.036 (E_m) 1000/2.206 (1.7)$
 E_m as % = gm/M^3 air per meter $(2.2046) 1.7 / 1.036 (1000)$
 $E_m = \text{SOTE}/\text{Ft} (3.2808)$
11. Volumes
 $1 \text{ M}^3 = 1000$ litre
 = 35.31 cubic feet
 = 264.1 gal
 $1 \text{ Tonne} = 1 \text{ M}^3$ water
 $7.48 \text{ gal} = 1$ cubic feet
 $1 \text{ ml} = 1$ cubic centimeter
12. Area-
 $1 \text{ sq ft} = 144$ sq inches
 $1 \text{ M}^2 = 10.764$ sq ft
 $1 \text{ acre} = 43,560$ sq ft
13. Temperature – See Chart

For specific information on aeration system selection considerations, contact Environmental Dynamics Inc. at (573) 474-9456.

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