WASTEWATER FORMULA SHEET

$\pi = 3.1416$

CIRCUMFERENCE OF CIRCLE = ($\pi$) (Diameter)

SURFACE AREA:

Circle = ($\pi$) (Radius)$^2$ = (1/4) ($\pi$) (Diameter)$^2$ = 0.785 (Diameter) (Diameter)

Rectangle = (Length) (Width)

Triangle = (1/2) (Base) (Height)

VOLUME:

Circular Tank = ($\pi$) (Radius)$^2$ (Height) = (1/4) ($\pi$) (Diameter)$^2$ (Height)

Rectangular Tank = (Length) (Width) (Height)

Cone = (1/3) ($\pi$) (Radius)$^2$ (Height)

TEMPERATURE CONVERSIONS:

$F^\circ = (C^\circ + 17.78) \times 1.8$

$C^\circ = (F^\circ - 32) \times 0.555$

ELECTRICAL:

Watts = (VOLTS) (AMPS)

Volts = (AMPS) (RESISTANCE)

1Kw - hr = 2.93 X $10^{-4}$ BTU's

MISCELLANEOUS CONVERSIONS:

1 Acre = 43,560 Feet$^2$

1 Feet$^3$ = 7.48 Gallons

1 Gallon (H$_2$O) = 8.34 Pounds

1 Meter$^3$ = 35.3 Feet$^3$

1 Gallon = 3.78 Liters

1 Pound = 0.45 Kilograms
Pounds (Lbs.) = (flow MGD) (mg/l) (8.34 Lbs/Gal)

Detention Time (hrs) = (Tank Vol. ft³) (7.48 gal/ft³) (24 hrs/day) / Flow (gal/day)

Sludge Age (days) = (MLSS mg/l) (Aeration Tank Vol. MG) (8.34 lb/gal) / (Prim. Eff. SS mg/l) (Flow MGD) (8.34 lb/gal)

Sludge Volume Index (ml/g) = (30 min. sett. solids in ml/l) (1000) / MLSS (mg/l)

Wasting Rate (MGD) = Solids to be wasted in Lbs/day / (RAS Conc. mg/l) (8.34 lb/gal)

Wasting Rate (pounds) = (Vol. of Aera. Tank in MG + Clarifiers in MG) / (Present MLSS – Desired MLSS) (8.34 lb/gal)

MCRT (days) = (Vol. of Aera. Tank + Clarifiers in MG) (MLVSS) / [(Flow in MGD) (Effluent VSS)] + {[(WAS Flow) (Was VSS)]}

RAS Rate (% of Flow) = 30 min settleability in ml / (1000 ml. – 30 min. settleability in ml.)

RAS Rate (MGD) = (RAS Settleable Solids in ml/l) (Flow in MGD) / (1000 ml/l – RAS Settleable Solids in ml/L)

Surface Loading Rate (gpd/ft²) = Flow in gpd / Area in (ft.²)

Weir Overflow Rate (gpd/ft) = Flow in gpd / Weir Length in ft.

B.O.D. (mg/l) = (Initial D.O. – Final D.O.) (300) / Sample in ml.

B.O.D. (mg/l) = (Initial D.O. – Final D.O.) (100) / % Sample

Suspended Solids (mg/l) = (Wt₂ – Wt₁) (1,000,000) / Sample Size in ml.

Efficiency (%) = (Value IN – Value OUT) (100) / Value IN

Reduction of Volatile Matter (%) = (Value IN – Value OUT) (100) / (Value IN – [(Value IN)(Value OUT)]

FOOD = LBS of Incoming “food” = (Flow MGD) (Aera. Tank Influent BOD in mg/l)(8.34lb/gal)