

Important Salinity Variations with Tide Formulas PDF



Formulas Examples with Units

List of 19 Important Salinity Variations with Tide Formulas

1) Apparent Dispersion Coefficient which includes all Mixing Effects Formula

Formula

$$D = \frac{D_0 \cdot B}{x + B}$$

Example with Units

$$0.6 = \frac{3.15 \cdot 4_m}{17_m + 4_m}$$

Evaluate Formula 

2) Coordinate along Channel given Apparent Dispersion Coefficient Formula

Formula

$$x = \left(D_0 \cdot \frac{B}{D} \right) - B$$

Example with Units

$$17_m = \left(3.15 \cdot \frac{4_m}{0.6} \right) - 4_m$$

Evaluate Formula 

3) Diffusion Coefficient Formula

Formula

$$D_0 = D \cdot \frac{x + B}{B}$$

Example with Units

$$3.15 = 0.6 \cdot \frac{17_m + 4_m}{4_m}$$

Evaluate Formula 

4) Dimensionless Estuary number Formula

Formula

$$E = \frac{P \cdot Fr^2}{Q_r \cdot T}$$

Example with Units

$$6.1538 = \frac{40_{m^3} \cdot 10^2}{5_{m^3/s} \cdot 130_s}$$

Evaluate Formula 

5) Dimensionless Stratification Number Formula

Formula

$$n = \frac{r}{p}$$

Example

$$2.5 = \frac{45}{18}$$

Evaluate Formula 

6) Estuary Number given Froude Number and Mixing Parameter Formula

Formula

$$E = \frac{Fr^2}{M}$$

Example

$$6.1538 = \frac{10^2}{16.25}$$

Evaluate Formula 



7) Fresh Water River Flow given Dimensionless Estuary number Formula

Formula

$$Q_r = \frac{P \cdot Fr^2}{E \cdot T}$$

Example with Units

$$4.9999 \text{ m}^3/\text{s} = \frac{40 \text{ m}^3 \cdot 10^2}{6.154 \cdot 130 \text{ s}}$$

Evaluate Formula 

8) Fresh Water River Flow given Mixing Parameter Formula

Formula

$$Q_r = \frac{M \cdot P}{T}$$

Example with Units

$$5 \text{ m}^3/\text{s} = \frac{16.25 \cdot 40 \text{ m}^3}{130 \text{ s}}$$

Evaluate Formula 

9) Froude Number based upon Maximum Flood Current Velocity at Estuary Mouth Formula

Formula

$$Fr = \sqrt{E \cdot M}$$

Example

$$10.0001 = \sqrt{6.154 \cdot 16.25}$$

Evaluate Formula 

10) Froude Number given Dimensionless Estuary Number Formula

Formula

$$Fr = \sqrt{\frac{E \cdot Q_r \cdot T}{P}}$$

Example with Units

$$10.0001 = \sqrt{\frac{6.154 \cdot 5 \text{ m}^3/\text{s} \cdot 130 \text{ s}}{40 \text{ m}^3}}$$

Evaluate Formula 

11) Mixing Parameter Formula

Formula

$$M = \frac{Q_r \cdot T}{P}$$

Example with Units

$$16.25 = \frac{5 \text{ m}^3/\text{s} \cdot 130 \text{ s}}{40 \text{ m}^3}$$

Evaluate Formula 

12) Mixing Parameter given Dimensionless Estuary Number Formula

Formula

$$M = \frac{Fr^2}{E}$$

Example

$$16.2496 = \frac{10^2}{6.154}$$

Evaluate Formula 

13) Rate of Energy Dissipation given Dimensionless Stratification Number Formula

Formula

$$r = n \cdot p$$

Example

$$45 = 2.5 \cdot 18$$

Evaluate Formula 

14) Rate of Potential Energy Gain given Dimensionless Stratification Number Formula

Formula

$$p = \frac{r}{n}$$

Example

$$18 = \frac{45}{2.5}$$

Evaluate Formula 



15) Salinity at Moment of Slack Water Formula

Formula

$$S_s = S \cdot \exp \left(- \left(18 \cdot 10^{-6} \right) \cdot Q_r \cdot x^2 - \left(0.045 \cdot Q_r^{0.5} \right) \right)$$

Evaluate Formula 

Example with Units

$$0.0294 = 33.33 \text{ mg/L} \cdot \exp \left(- \left(18 \cdot 10^{-6} \right) \cdot 5 \text{ m}^3/\text{s} \cdot 17 \text{ m}^2 - \left(0.045 \cdot 5 \text{ m}^3/\text{s}^{0.5} \right) \right)$$

16) Tidal Period given Mixing Parameter Formula

Formula

$$T = \frac{M \cdot P}{Q_r}$$

Example with Units

$$130 \text{ s} = \frac{16.25 \cdot 40 \text{ m}^3}{5 \text{ m}^3/\text{s}}$$

Evaluate Formula 

17) Tide Period given Dimensionless Estuary number Formula

Formula

$$T = \frac{P \cdot Fr^2}{E \cdot Q_r}$$

Example with Units

$$129.9968 \text{ s} = \frac{40 \text{ m}^3 \cdot 10^2}{6.154 \cdot 5 \text{ m}^3/\text{s}}$$

Evaluate Formula 

18) Volume of Tidal Prism given Dimensionless Estuary Number Formula

Formula

$$P = \frac{E \cdot Q_r \cdot T}{Fr^2}$$

Example with Units

$$40.001 \text{ m}^3 = \frac{6.154 \cdot 5 \text{ m}^3/\text{s} \cdot 130 \text{ s}}{10^2}$$

Evaluate Formula 

19) Volume of Tidal Prism given Mixing Parameter Formula

Formula

$$P = \frac{Q_r \cdot T}{M}$$

Example with Units

$$40 \text{ m}^3 = \frac{5 \text{ m}^3/\text{s} \cdot 130 \text{ s}}{16.25}$$

Evaluate Formula 



Variables used in list of Salinity Variations with Tide Formulas above

- **B** Distance Outside the Estuary (*Meter*)
- **D** Apparent Dispersion Coefficient
- **D₀** Diffusion Coefficient at $x=0$
- **E** Estuary Number
- **Fr** Froude Number
- **M** Mixing Parameter
- **n** Stratification Number
- **p** Rate of Potential Energy Gain
- **P** Volume of Tidal Prism (*Cubic Meter*)
- **Q_r** Fresh Water River Flow (*Cubic Meter per Second*)
- **r** Rate of Energy Dissipation
- **S** Salinity of Water (*Milligram per Liter*)
- **Ss** Salinity at the Moment of Slack Water
- **T** Tidal Period (*Second*)
- **x** Coordinate along the Channel (*Meter*)

Constants, Functions, Measurements used in list of Salinity Variations with Tide Formulas above

- **Functions:** **exp**, $\exp(\text{Number})$
n an exponential function, the value of the function changes by a constant factor for every unit change in the independent variable.
- **Functions:** **sqrt**, $\sqrt{\text{Number}}$
A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- **Measurement:** **Length** in Meter (m)
Length Unit Conversion 
- **Measurement:** **Time** in Second (s)
Time Unit Conversion 
- **Measurement:** **Volume** in Cubic Meter (m^3)
Volume Unit Conversion 
- **Measurement:** **Volumetric Flow Rate** in Cubic Meter per Second (m^3/s)
Volumetric Flow Rate Unit Conversion 
- **Measurement:** **Density** in Milligram per Liter (mg/L)
Density Unit Conversion 



Download other Important Tides PDFs

- [Important Prediction of Tides and Tidal Rivers Formulas](#) 
- [Important Salinity Variations with Tide Formulas](#) 

Try our Unique Visual Calculators

-  [Percentage error](#) 
-  [LCM of three numbers](#) 
-  [Subtract fraction](#) 

Please SHARE this PDF with someone who needs it!

This PDF can be downloaded in these languages

[English](#) [Spanish](#) [French](#) [German](#) [Russian](#) [Italian](#) [Portuguese](#) [Polish](#) [Dutch](#)

7/8/2024 | 11:28:41 AM UTC

