



Salinity Variations with Tide Formulas

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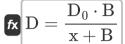




List of 19 Salinity Variations with Tide Formulas

Salinity Variations with Tide &

1) Apparent Dispersion Coefficient which includes all Mixing Effects



Open Calculator 🗗

$$oxed{0.6} = rac{3.15 \cdot 4 ext{m}}{17 ext{m} + 4 ext{m}}$$

2) Coordinate along Channel given Apparent Dispersion Coefficient

$$\mathbf{x} = \left(\mathbf{D}_0 \cdot \frac{\mathbf{B}}{\mathbf{D}} \right) - \mathbf{B}$$

Open Calculator 🗗

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

3) Diffusion Coefficient

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

Open Calculator

$$\boxed{3.15 = 0.6 \cdot \frac{17 \text{m} + 4 \text{m}}{4 \text{m}}}$$

4) Dimensionless Estuary number 🖒

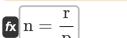
$$\mathbf{E} = rac{\mathbf{P} \cdot \mathbf{Fr}^2}{\mathbf{Q_r} \cdot \mathbf{T}}$$

Open Calculator





5) Dimensionless Stratification Number



Open Calculator 🚰

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

6) Estuary Number given Froude Number and Mixing Parameter



Open Calculator

7) Fresh Water River Flow given Dimensionless Estuary number

$$\mathbf{R} \mathbf{Q_r} = rac{\mathbf{P} \cdot \mathbf{Fr}^2}{\mathbf{E} \cdot \mathbf{T}}$$
 ex $4.999875 \mathrm{m}^3/\mathrm{s} = rac{40 \mathrm{m}^3 \cdot (10)^2}{6.154 \cdot 130 \mathrm{s}}$

Open Calculator

8) Fresh Water River Flow given Mixing Parameter

$$\left| \mathbf{Q}_{\mathrm{r}} = rac{\mathbf{M} \cdot \mathbf{P}}{\mathrm{T}}
ight|$$

Open Calculator

$$ext{ex} 5 ext{m}^3/ ext{s} = rac{16.25 \cdot 40 ext{m}^3}{130 ext{s}}$$

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

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

$$\mathbf{ex} \ 10.00012 = \sqrt{6.154 \cdot 16.25}$$



10) Froude Number given Dimensionless Estuary Number

 $extbf{Fr} = \sqrt{rac{ ext{E} \cdot ext{Q}_{ ext{r}} \cdot ext{T}}{ ext{P}}}$

Open Calculator

ex $10.00012 = \sqrt{\frac{6.154 \cdot 5 \text{m}^3/\text{s} \cdot 130 \text{s}}{40 \text{m}^3}}$

11) Mixing Parameter

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

Open Calculator 🗗

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

12) Mixing Parameter given Dimensionless Estuary Number

fx $M=rac{\mathrm{Fr}^2}{\mathrm{E}}$ ex $16.24959=rac{{{{(10)}^2}}}{6.154}$

Open Calculator 🚰

13) Rate of Energy Dissipation given Dimensionless Stratification Number

fx $\mathbf{r} = \mathbf{n} \cdot \mathbf{p}$

Open Calculator

ex $45=2.5\cdot 18$

 $p = rac{r}{n}$

Open Calculator

 $p = \frac{1}{n}$





15) Salinity at Moment of Slack Water

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

Open Calculator

ex

 $\boxed{0.029366 = 33.33 \text{mg/L} \cdot \exp \Bigl(-\bigl(18 \cdot 10^{-6}\bigr) \cdot 5 \text{m}^{\scriptscriptstyle 3}/\text{s} \cdot \bigl(17 \text{m}\bigr)^2 - \Bigl(0.045 \cdot \bigl(5 \text{m}^{\scriptscriptstyle 3}/\text{s}\bigr)^{0.5}\Bigr)\Bigr)}$

16) Tidal Period given Mixing Parameter

 $\mathbf{f}\mathbf{x} = \frac{\mathbf{M} \cdot \mathbf{P}}{\mathbf{Q}_{\mathbf{m}}}$

Open Calculator 🗗

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

17) Tide Period given Dimensionless Estuary number

 $ag{T} = rac{ ext{P} \cdot ext{Fr}^2}{ ext{E} \cdot ext{Q}_-}$

Open Calculator

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

18) Volume of Tidal Prism given Dimensionless Estuary Number

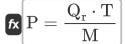
 $extbf{P} = rac{ ext{E} \cdot ext{Q}_{ ext{r}} \cdot ext{T}}{ ext{F} extbf{r}^2}$

Open Calculator

 $oxed{40.001 ext{m}^3 = rac{6.154 \cdot 5 ext{m}^3/ ext{s} \cdot 130 ext{s}}{oxed{(10)}^2}}$



19) Volume of Tidal Prism given Mixing Parameter



Open Calculator

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



Variables Used

- **B** Distance Outside the Estuary (*Meter*)
- D Apparent Dispersion Coefficient
- **D**₀ 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

- Function: exp, exp(Number)
 n an exponential function, the value of the function changes by a constant factor for every unit change in the independent variable.
- Function: sqrt, sqrt(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 (m³)

 Volume Unit Conversion
- Measurement: Volumetric Flow Rate in Cubic Meter per Second (m³/s)

 Volumetric Flow Rate Unit Conversion
- Measurement: Density in Milligram per Liter (mg/L)
 Density Unit Conversion





Check other formula lists

• Salinity Variations with Tide Formulas

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