



Energy Flux Method Formulas

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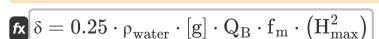




List of 13 Energy Flux Method Formulas

Energy Flux Method

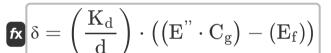
1) Energy Dissipation Rate by Battjes and Janssen



Open Calculator 🗗

$$ext{ex} \ 19221.03 = 0.25 \cdot 1000 ext{kg/m}^3 \cdot ext{[g]} \cdot 2 \cdot 8 ext{Hz} \cdot \left((0.7 ext{m})^2
ight)$$

2) Energy Dissipation Rate per unit Surface Area due to Wave Breaking



Open Calculator 🗗

ex
$$18376.33 = \left(\frac{10.15}{1.05 \mathrm{m}}\right) \cdot \left((20.00 \mathrm{J/m^2 \cdot 100 m/s}) - (99.00)\right)$$

3) Energy Flux associated with Stable Wave Height

$$\mathbf{E}_{\mathrm{f'}} = \mathrm{E}^{"} \cdot \mathrm{C}_{\mathrm{g}}$$

Open Calculator

 $ext{ex} \ 2000 = 20.00 ext{J/m}^2 \cdot 100 ext{m/s}$



4) Maximum Wave Height given Energy Dissipation Rate

 $\mathbf{H}_{\mathrm{max}} = \sqrt{rac{\delta}{0.25 \cdot
ho_{\mathrm{water}} \cdot [\mathrm{g}] \cdot \mathrm{Q_B} \cdot \mathrm{f_m}}}$

Open Calculator

 $ext{ex} 0.699999 ext{m} = \sqrt{rac{19221}{0.25 \cdot 1000 ext{kg/m}^3 \cdot [ext{g}] \cdot 2 \cdot 8 ext{Hz}}}$

5) Maximum Wave Height using Miche Criterion

 $\mathbf{K} \mathbf{H}_{\mathrm{max}} = 0.14 \cdot \lambda \cdot \mathrm{tanh}(\mathbf{d} \cdot \mathbf{k})$

Open Calculator

 $= 0.776538 \text{m} = 0.14 \cdot 26.8 \text{m} \cdot \tanh(1.05 \text{m} \cdot 0.2)$

6) Mean Wave Frequency given Energy Dissipation Rate

 $\mathbf{f}_{\mathrm{m}} = rac{\delta}{0.25 \cdot
ho_{\mathrm{water}} \cdot [\mathrm{g}] \cdot \mathrm{Q}_{\mathrm{B}} \cdot \mathrm{H}_{\mathrm{max}}^2}$

Open Calculator 🔄

7) Percentage of Waves Breaking given Energy Dissipation Rate

 $\left| \mathbf{Q}_{\mathrm{B}}
ight| = rac{\delta}{0.25 \cdot
ho_{\mathrm{water}} \cdot \left[\mathrm{g}
ight] \cdot \mathrm{f}_{\mathrm{m}} \cdot \left(\mathrm{H}_{\mathrm{max}}^2
ight)}$

Open Calculator 🗗

ex $1.999996 = \frac{19221}{0.25 \cdot 1000 \mathrm{kg/m^3 \cdot [g] \cdot 8Hz \cdot \left(\left(0.7 \mathrm{m} \right)^2 \right)}$



8) Stable Wave Height

fx $m H_{stable} = 0.4 \cdot d$

Open Calculator 🗗

 $oxed{ex} 0.42 \mathrm{m} = 0.4 \cdot 1.05 \mathrm{m}$

9) Water Depth given Energy Dissipation Rate per unit Surface Area due to Wave Breaking

 $extbf{d} = ext{K}_{ ext{d}} \cdot rac{ ext{E}^{"} \cdot ext{C}_{ ext{g}} - (ext{E}_{ ext{f}})}{\delta}$

Open Calculator

 $ext{ex} 1.003858 ext{m} = 10.15 \cdot rac{20.00 ext{J/m}^2 \cdot 100 ext{m/s} - (99.00)}{19221}$

10) Water Depth given Maximum Wave Height by Miche Criterion

 $\mathrm{d} = \left(rac{a anh\left(rac{H_{\mathrm{max}}}{0.14\cdot\lambda}
ight)}{\mathrm{k}}
ight)$

Open Calculator 🚰

 $oxed{ex} 0.943891 \mathrm{m} = \left(rac{a anh \left(rac{0.7 \mathrm{m}}{0.14 \cdot 26.8 \mathrm{m}}
ight)}{0.2}
ight)$

11) Water Depth given Stable Wave Height

 $\int \!\! \mathrm{d} = rac{\mathrm{H_{stable}}}{0.4}$

Open Calculator

ex 1.05m $= \frac{0.42$ m}{0.4}



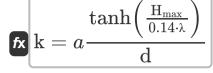




12) Wave Number given Maximum Wave Height by Miche Criterion 🗗

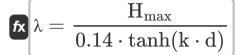


Open Calculator



$$oxed{ex} 0.179789 = a rac{ anh \left(rac{0.7 ext{m}}{0.14 \cdot 26.8 ext{m}}
ight)}{1.05 ext{m}}$$

13) Wavelength given Maximum Wave Height by Miche Criterion 🗲



ex
$$24.1585$$
m = $\frac{0.7$ m $0.14 \cdot \tanh(0.2 \cdot 1.05$ m)



Variables Used

- C_g Wave Group Speed (Meter per Second)
- **d** Water Depth (Meter)
- Ef Energy Flux associated with Stable Wave Height
- Ef Energy Flux
- E" Wave Energy (Joule per Square Meter)
- **f**_m Mean Wave Frequency (Hertz)
- H_{max} Maximum Wave Height (Meter)
- H_{stable} Stable Wave Height (Meter)
- k Wave Number for Waves in Coast
- K_d Decay Coefficient
- Q_B Percentage of Waves Breaking
- δ Energy Dissipation Rate per unit Surface Area
- λ Wavelength of Coast (Meter)
- Pwater Water Density (Kilogram per Cubic Meter)





Constants, Functions, Measurements used

- Constant: [g], 9.80665
 Gravitational acceleration on Earth
- Function: atanh, atanh(Number)

 The inverse hyperbolic tangent function returns the value whose hyperbolic tangent is a number.
- 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.
- Function: tanh, tanh(Number)

 The hyperbolic tangent function (tanh) is a function that is defined as the ratio of the hyperbolic sine function (sinh) to the hyperbolic cosine function (cosh).
- Measurement: Length in Meter (m)
 Length Unit Conversion
- Measurement: Speed in Meter per Second (m/s)
 Speed Unit Conversion
- Measurement: Frequency in Hertz (Hz)
 Frequency Unit Conversion
- Measurement: Heat Density in Joule per Square Meter (J/m²)
 Heat Density Unit Conversion
- Measurement: Density in Kilogram per Cubic Meter (kg/m³)
 Density Unit Conversion





Check other formula lists

- Breaker Index Formulas
- Energy Flux Method Formulas



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