Important Wave Period Formulas PDF

Formulas
Examples
with Units

List of 16
Important Wave Period Formulas

1) Average Period for Wave Period of Same Energy as Irregular Train Formula

Evaluate Formula

Formula

$$t_{avg} = \frac{p}{1.23}$$

Example with Units

$$6.0976\,s = \frac{7.5}{1.23}$$

2) Wave period for horizontal fluid particle displacements Formula

Evaluate Formula

Formula

$$P_h = \sqrt{4 \cdot \pi \cdot \lambda \cdot \cosh\left(2 \cdot \pi \cdot \frac{D}{\lambda} / H \cdot [g] \cdot \cosh\left(2 \cdot \pi \cdot \frac{D_{Z+d}}{\lambda}\right) \cdot \sin(\theta)\right) - (\varepsilon)}$$

Example with Units

$$20.1876 = \sqrt{4 \cdot 3.1416 \cdot 26.8\,m \cdot \cosh\left(2 \cdot 3.1416 \cdot \frac{1.5\,m}{26.8\,m} / 3\,m \cdot 9.8066\,m/s^2 \cdot \cosh\left(2 \cdot 3.1416 \cdot \frac{2\,m}{26.8\,m}\right) \cdot \sin(30°)\right) - (0.4\,m)}$$

3) Wave Period for Known Deepwater Celerity Formula

Evaluate Formula

Formula

$$p = \frac{C \cdot 2 \cdot \pi}{[g]}$$

Example with Units

$$6.4071 = \frac{010\,m/s \cdot 2 \cdot 3.1416}{9.8066\,m/s^2}$$

4) Wave Period for Mediterranean Sea Formula

Evaluate Formula

Formula

$$p = 4 + 2 \cdot (H)^{0.7}$$

Example with Units

$$8.3153 = 4 + 2 \cdot (3\,m)^{0.7}$$

5) Wave Period for North Atlantic Ocean Formula

Evaluate Formula

Formula

$$p = 2.5 \cdot H$$

Example with Units

$$7.5 = 2.5 \cdot 3\,m$$

6) Wave Period for North Sea Formula

Evaluate Formula

Formula

$$P_n = 3.94 \cdot H_s^{0.376}$$

Example with Units

$$18.93 = 3.94 \cdot 65\,m^{0.376}$$

7) Wave Period given Deepwater Celerity of SI systems Units of Meters and Seconds Formula

Evaluate Formula

Formula

$$p = \frac{C}{1.56}$$

Example with Units

$$6.4103 = \frac{010\,m/s}{1.56}$$

8) Wave Period given Deepwater Celerity of Units of Meters and Seconds Formula

Evaluate Formula

Formula

$$T = \frac{C}{5.12}$$

Example with Units

$$1.9531\,\text{m/s} = \frac{010\,\text{m/s}}{5.12}$$

9) Wave Period given Deepwater Wavelength of SI Systems Units of Meters and Seconds Formula

Evaluate Formula

Formula

$$T = \sqrt{\frac{\lambda_o}{1.56}}$$

Example with Units

$$2.1183\,\text{m/s} = \sqrt{\frac{7\,\text{m}}{1.56}}$$

10) Wave Period given Deepwater Wavelength of Units of Meters and Seconds Formula

Evaluate Formula

Formula

$$T = \sqrt{\frac{\lambda_o}{5.12}}$$

Example with Units

$$1.1693\,\text{m/s} = \sqrt{\frac{7\,\text{m}}{5.12}}$$

11) Wave Period given Radian Frequency of Wave Formula

Evaluate Formula

Formula

$$T = \frac{2 \cdot \pi}{\omega}$$

Example with Units

$$1.0134\,\text{m/s} = \frac{2 \cdot 3.1416}{6.2\,\text{rad/s}}$$

12) Wave Period given Wave Celerity Formula

Evaluate Formula

Formula

$$T = \frac{\lambda}{C}$$

Example with Units

$$2.68\,\text{m/s} = \frac{26.8\,\text{m}}{010\,\text{m/s}}$$

13) Wave Period given Wave Celerity and Wavelength Formula

Evaluate Formula

Formula

$$p = \frac{C \cdot 2 \cdot \pi}{[g] \cdot \tanh\left(2 \cdot \pi \cdot \frac{D}{\lambda}\right)}$$

Example with Units

$$18.9639 = \frac{010\,\text{m/s} \cdot 2 \cdot 3.1416}{9.8066\,\text{m/s}^2 \cdot \tanh\left(2 \cdot 3.1416 \cdot \frac{1.5\,\text{m}}{26.8\,\text{m}}\right)}$$

14) Wave period given wave depth and wavelength Formula

Evaluate Formula

Formula

$$P = \frac{\lambda \cdot \omega}{[g]} \cdot \tanh\left(k \cdot D\right)$$

Example with Units

$$5.6242 = \frac{26.8\,\text{m} \cdot 6.2\,\text{rad/s}}{9.8066\,\text{m/s}^2} \cdot \tanh\left(0.23 \cdot 1.5\,\text{m}\right)$$

15) Wave Period given Wavelength and Water Depth Formula

Evaluate Formula

Formula

$$P = 2 \cdot \frac{\pi}{\left(\left(2 \cdot \pi \cdot \frac{[g]}{\lambda}\right) \cdot \tanh\left(2 \cdot \pi \cdot \frac{D}{\lambda}\right)\right)^{0.5}}$$

Example with Units

$$7.129 = 2 \cdot \frac{3.1416}{\left(\left(2 \cdot 3.1416 \cdot \frac{9.8066\,\text{m/s}^2}{26.8\,\text{m}}\right) \cdot \tanh\left(2 \cdot 3.1416 \cdot \frac{1.5\,\text{m}}{26.8\,\text{m}}\right)\right)^{0.5}}$$

16) Wave Period of same Energy Formula

Evaluate Formula

Formula	Example with Units
$p = 1.23 \cdot t_{avg}$	$7.38 = 1.23 \cdot 6\,s$

Variables used in list of Wave Period Formulas above

- **C** Celerity of the Wave *(Meter per Second)*
- **D** Water Depth *(Meter)*
- D_{Z+d} Distance above the Bottom *(Meter)*
- **H** Wave Height *(Meter)*
- H_s Significant Wave Height *(Meter)*
- **k** Wave Number
- **p** Coastal Wave Period
- **P** Wave Period
- P_h Wave Period for Horizontal Fluid Particle
- P_n Wave Period in North Sea
- **T** Period of Wave *(Meter per Second)*
- t_{avg} Average Time *(Second)*
- **ε** Fluid Particle Displacements *(Meter)*
- **θ** Phase Angle *(Degree)*
- **λ** Wavelength *(Meter)*
- λ_o Deep-Water Wavelength *(Meter)*
- **ω** Wave Angular Frequency *(Radian per Second)*

Constants, Functions, Measurements used in list of Wave Period Formulas above

- constant(s): **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- constant(s): **[g]**, 9.80665
  Gravitational acceleration on Earth
- Functions: **cosh**, cosh(Number)
  The hyperbolic cosine function is a mathematical function that is defined as the ratio of the sum of the exponential functions of x and negative x to 2.
- Functions: **sin**, sin(Angle)
  Sine is a trigonometric function that describes the ratio of the length of the opposite side of a right triangle to the length of the hypotenuse.
- Functions: **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.
- Functions: **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: **Time** in Second (s)
  Time Unit Conversion
- Measurement: **Speed** in Meter per Second (m/s)
  Speed Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion
- Measurement: **Angular Frequency** in Radian per Second (rad/s)
  Angular Frequency Unit Conversion

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