calculatoratoz.com

unitsconverters.com

Buoyancy Formulas

Calculators! Examples! Conversions!

Bookmark **calculatoratoz.com**, **unitsconverters.com**

Widest Coverage of Calculators and Growing - **30,000+ Calculators!**
Calculate With a Different Unit for Each Variable - **In built Unit Conversion!**
Widest Collection of Measurements and Units - **250+ Measurements!**

Feel free to SHARE this document with your friends!

Please leave your feedback here...

List of 11 Buoyancy Formulas

Buoyancy

1) Angle of heel for metacentric height in experimental method

Open Calculator

fx $$\theta = a\tan\left(\frac{w_1 \cdot D}{W_{fv} \cdot GM}\right)$$

ex $$8.242093^\circ = a\tan\left(\frac{343\text{N} \cdot 5.8\text{m}}{19620\text{N} \cdot 0.7\text{m}}\right)$$

2) Archimedes Principle

Open Calculator

fx $$A_{bouy} = \rho \cdot g \cdot v$$

ex $$3239.88\text{N} = 5.51\text{kg/m}^3 \cdot 9.8\text{m/s}^2 \cdot 60\text{m/s}$$

3) Buoyant Force

Open Calculator

fx $$F_{buoy} = p \cdot A$$

ex $$40000\text{N} = 800\text{Pa} \cdot 50\text{m}^2$$

4) Centre of Buoyancy

Open Calculator

fx $$B_c = \frac{d}{2}$$

ex $$0.525\text{m} = \frac{1.05\text{m}}{2}$$

5) Meta-centric height for time period of oscillation and radius of gyration

Open Calculator

fx $$GM = \frac{4 \cdot (\pi^2) \cdot (k_G^2)}{(T^2) \cdot [g]}$$

ex $$0.700361\text{m} = \frac{4 \cdot (\pi^2) \cdot ((8\text{m})^2)}{((19.18\text{s})^2) \cdot [g]}$$

6) Meta-centric height in experimental method

Open Calculator

fx $$GM = \left(\frac{w_1 \cdot D}{W_{fv} \cdot \tan(\theta)}\right)$$

ex $$0.70018\text{m} = \left(\frac{343\text{N} \cdot 5.8\text{m}}{19620\text{N} \cdot \tan(8.24^\circ)}\right)$$

7) Movable weight for metacentric height in experimental method

Open Calculator

$$w_1 = \frac{GM \cdot W_{fv} \cdot \tan(\theta)}{D}$$

$$342.9117N = \frac{0.7m \cdot 19620N \cdot \tan(8.24^\circ)}{5.8m}$$

8) Radius of gyration for metacentric height and time period of oscillation

Open Calculator

$$k_G = \frac{(T) \cdot \sqrt{GM \cdot [g]}}{2 \cdot \pi}$$

$$7.997939m = \frac{(19.18s) \cdot \sqrt{0.7m \cdot [g]}}{2 \cdot \pi}$$

9) Time Period of Oscillation of Ship

Open Calculator

$$T = (2 \cdot \pi) \cdot \left(\sqrt{\frac{k_G^2}{GM \cdot [g]}} \right)$$

$$19.18494s = (2 \cdot \pi) \cdot \left(\sqrt{\frac{(8m)^2}{0.7m \cdot [g]}} \right)$$

10) Volume of body in fluid for metacentric height and BG

Open Calculator

fx $$V_T = \frac{I}{GM + BG}$$

ex $$12.5\text{m}^3 = \frac{11.25\text{m}^4}{0.7\text{m} + 0.2\text{m}}$$

11) Volume of fluid displaced

Open Calculator

fx $$V = \frac{W}{\rho_{df}}$$

ex $$0.032598\text{m}^3 = \frac{32.5\text{kg}}{997\text{kg/m}^3}$$

Variables Used

- **A** Area *(Square Meter)*
- A_{bouy} Archimedes Principle *(Newton)*
- B_c Centre of Buoyancy for Floating Body *(Meter)*
- **BG** Distance of CG from Center of Buoyancy *(Meter)*
- **d** Depth of Immersed Object in Water *(Meter)*
- **D** Distance Travelled by Weight on Vessel *(Meter)*
- F_{buoy} Buoyant Force *(Newton)*
- **g** Acceleration Due to Gravity *(Meter per Square Second)*
- **GM** Metacentric Height of Floating Body *(Meter)*
- **I** Moment of Inertia of Plain Floating Body *($Meter^4$)*
- k_G Radius of Gyration of Floating Body *(Meter)*
- **p** Pressure *(Pascal)*
- **T** Time Period of Oscillation of Floating Body *(Second)*
- **v** Velocity *(Meter per Second)*
- **V** Volume of Fluid Displaced by Body *(Cubic Meter)*
- V_T Volume of Body Submerged in Water *(Cubic Meter)*
- **W** Weight of Displaced Fluid *(Kilogram)*
- w_1 Movable Weight on Floating Vessel *(Newton)*
- W_{fv} Weight of Floating Vessel *(Newton)*
- **θ** Angle of Heel *(Degree)*
- **ρ** Density *(Kilogram per Cubic Meter)*
- ρ_{df} Density of Displaced Fluid *(Kilogram per Cubic Meter)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Constant: **[g]**, 9.80665
  Gravitational acceleration on Earth
- Function: **atan**, atan(Number)
  Inverse tan is used to calculate the angle by applying the tangent ratio of the angle, which is the opposite side divided by the adjacent side of the right triangle.
- 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: **tan**, tan(Angle)
  The tangent of an angle is a trigonometric ratio of the length of the side opposite an angle to the length of the side adjacent to an angle in a right triangle.
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Weight** in Kilogram (kg)
  Weight Unit Conversion
- Measurement: **Time** in Second (s)
  Time Unit Conversion
- Measurement: **Volume** in Cubic Meter (m^3)
  Volume Unit Conversion
- Measurement: **Area** in Square Meter (m^2)
  Area Unit Conversion
- Measurement: **Pressure** in Pascal (Pa)
  Pressure Unit Conversion

- Measurement: **Speed** in Meter per Second (m/s)
  Speed Unit Conversion
- Measurement: **Acceleration** in Meter per Square Second (m/s²)
  Acceleration Unit Conversion
- Measurement: **Force** in Newton (N)
  Force Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion
- Measurement: **Density** in Kilogram per Cubic Meter (kg/m³)
  Density Unit Conversion
- Measurement: **Second Moment of Area** in Meter⁴ (m⁴)
  Second Moment of Area Unit Conversion

Check other formula lists

- **Buoyancy Formulas**

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

7/29/2024 | 6:10:05 AM UTC *Please leave your feedback here...*