



Buoyancy Formulas

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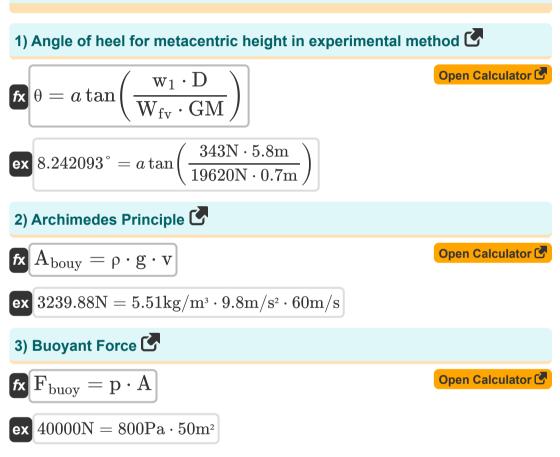
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List of 11 Buoyancy Formulas

Buoyancy 🕑





4) Centre of Buoyancy

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

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

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

fx
$$\mathrm{GM}=rac{4\cdot\left(\pi^2
ight)\cdot\left(\mathrm{k}_\mathrm{G}^2
ight)}{\left(\mathrm{T}^2
ight)\cdot\left[\mathrm{g}
ight]}$$

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

6) Meta-centric height in experimental method 🕑

$$\begin{aligned} \mathbf{fx} \mathbf{GM} &= \left(\frac{\mathbf{w}_1 \cdot \mathbf{D}}{\mathbf{W}_{\mathrm{fv}} \cdot \tan(\theta)}\right) \end{aligned}$$
$$\begin{aligned} \mathbf{ex} \mathbf{0.70018m} &= \left(\frac{343\mathrm{N} \cdot 5.8\mathrm{m}}{19620\mathrm{N} \cdot \tan(8.24^\circ)}\right) \end{aligned}$$

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7) Movable weight for metacentric height in experimental method 🕑

$$w_{1} = \frac{GM \cdot W_{fv} \cdot tan(\theta)}{D}$$

$$w_{1} = \frac{GM \cdot W_{fv} \cdot tan(\theta)}{D}$$

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

$$(x) \quad 8) \text{ Radius of gyration for metacentric height and time period of oscillation}$$

$$(x) \quad k_{G} = \frac{(T) \cdot \sqrt{GM \cdot [g]}}{2 \cdot \pi}$$

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

9) Time Period of Oscillation of Ship 🕑

 $2 \cdot \pi$

fx
$$\mathbf{T} = (2 \cdot \pi) \cdot \left(\sqrt{\frac{\mathbf{k}_{\mathrm{G}}^2}{\mathrm{GM} \cdot [\mathrm{g}]}} \right)$$

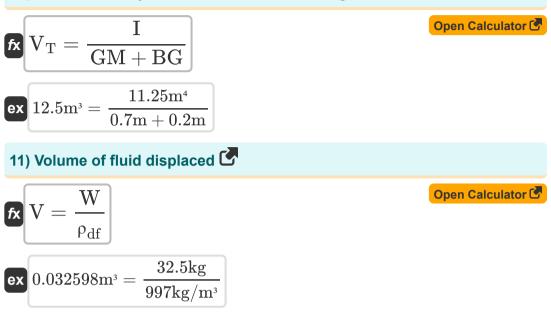
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$$19.18494s = (2 \cdot \pi) \cdot \left(\sqrt{\frac{(8m)^2}{0.7m \cdot [g]}}\right)$$





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



Variables Used

- **A** Area (Square Meter)
- Abouv 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)
- Fbuoy 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 (Meter4)
- **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)
- W1 Movable Weight on Floating Vessel (Newton)
- W_{fv} Weight of Floating Vessel (Newton)
- **θ** Angle of Heel (Degree)
- **p** Density (Kilogram per Cubic Meter)
- Pdf Density of Displaced Fluid (Kilogram per Cubic Meter)



6/9



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 (m³) Volume Unit Conversion
- Measurement: Area in Square Meter (m²) 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 Meter^₄ (m^₄) Second Moment of Area Unit Conversion



Check other formula lists

Buoyancy Formulas

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