



Buoyancy And Floatation Formulas

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List of 24 Buoyancy And Floatation Formulas

Buoyancy And Floatation

Buoyancy Force and Center of Buoyancy C



5) Cross Sectional Area of Prism given Buoyancy Force 🕑



$$\begin{array}{c} \hline \textbf{ex} \ 0.68965 \text{m} = \frac{44280 \text{N}}{75537 \text{N}/\text{m}^3 \cdot 0.85 \text{m}^2} \end{array}$$

8) Pressure Head Difference given Volume of Vertical Prism dV





9) Specific Weight pf Fluid given Buoyancy Force 🕑



10) Total Buoyant Force given Volumes of Elementary Prism Submerged in Fluids

fx
$$\mathbf{F}_{\mathrm{Buoyant}} = (\omega \cdot v_1 + \omega_1 \cdot v_2)$$
 Open Calculator **C**

ex 53523.54N = (75537N/m³ · 0.001m³/kg + 65500N/m³ · 0.816m³/kg)

11) Volume of Submerged Body given Buoyant Force on Entire Submerged Body

$$f_{X} V = \frac{F_{Buoyant}}{\omega}$$

$$e_{X} 0.586203m^{3} = \frac{44280N}{75537N/m^{3}}$$
12) Volume of Vertical Prism C
$$f_{X} V = H_{Pressurehead} \cdot A$$

$$e_{X} 0.595m^{3} = 0.7m \cdot 0.85m^{2}$$

$$Open Calculator C$$



Open Calculator

Determination of Metacentric Height 🕑







Metacentric Height for Floating Bodies Containing liquid



 $407 \mathrm{m}^{3} = \frac{1}{75537 \mathrm{N/m^{3} \cdot 1.05 \mathrm{m}}}$



Stability of Submerged and Floating Bodies 🕑

19) Restoring Couple when Floating Body in Stable Equilibrium 子

 $8m \cdot \left(90^{\circ} \cdot \left(\frac{180}{\pi}\right)\right)$



Open Calculator

22) Weight of Body given Righting Couple 子

$$fx W_{body} = \frac{R_{Righting Couple}}{x \cdot \left(D \cdot \left(\frac{180}{\pi}\right)\right)}$$

$$ex 18.00139N = \frac{12961N^*m}{8m \cdot \left(90^\circ \cdot \left(\frac{180}{\pi}\right)\right)}$$

Time Period of Transverse Oscillation of a Floating Body 🚰

23) Radius of Gyration of Body given Time Period 子

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

ex
$$0.10385 \mathrm{m} = \sqrt{\left(\left(\frac{5.38 \mathrm{s}}{2 \cdot \pi}\right)^2\right) \cdot ([\mathrm{g}] \cdot 0.0015 \mathrm{m})}$$

24) Time Period of One Complete Oscillations 🕑

fx
$$\mathbf{T} = 2 \cdot \pi \cdot \left(rac{\mathbf{k}_{\mathrm{G}}^2}{[\mathrm{g}] \cdot \mathrm{GM}}
ight)^{rac{1}{2}}$$

$$5.439553s = 2 \cdot \pi \cdot \left(\frac{(0.105m)^2}{[g] \cdot 0.0015m}\right)^{\frac{1}{2}}$$

Open Calculator 🖸

Open Calculator





Variables Used

- A Cross-Sectional Area of Body (Square Meter)
- **d** Distance Moved (Meter)
- D Angle Between Bodies (Degree)
- FBuoyant Buoyant Force (Newton)
- **GM** Metacentric Height (Meter)
- Hpressurehead Difference in Pressure Head (Meter)
- **k**_G Radius of Gyration of Body (Meter)
- I Length of Plumb Line (Meter)
- **M** Moment of turning Couple (Newton Meter)
- Restoring Couple Restoring Couple (Newton Meter)
- **R**Righting Couple Righting Couple (Newton Meter)
- **T** Time Period of Rolling (Second)
- V Volume of Body (Cubic Meter)
- Wbody Weight of Body (Newton)
- X Distance from submerged to Floating Body (Meter)
- Z Distance between Center of Gravity of these Wedges (Meter)
- **θ** Tiltting Angle of Body (*Degree*)
- V1 Specific Volume at Point 1 (Cubic Meter per Kilogram)
- V₂ Specific Volume at Point 2 (Cubic Meter per Kilogram)
- ω Specific Weight of body (Newton per Cubic Meter)
- ω₁ Specific Weight 2 (Newton 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: 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: Force in Newton (N) Force Unit Conversion
- Measurement: Angle in Degree (°) Angle Unit Conversion





- Measurement: Torque in Newton Meter (N*m) Torque Unit Conversion
- Measurement: Specific Volume in Cubic Meter per Kilogram (m³/kg)
 Specific Volume Unit Conversion
- Measurement: Moment of Force in Newton Meter (N*m)
 Moment of Force Unit Conversion
- Measurement: Specific Weight in Newton per Cubic Meter (N/m³) Specific Weight Unit Conversion



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