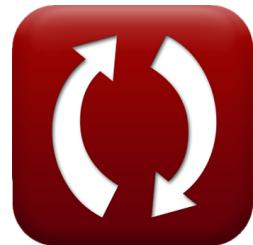


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Static Loads Formulas

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List of 10 Static Loads Formulas

Static Loads ↗

Archimedes Law and Buoyancy ↗

1) Buoyant Force of Body Submerged in Fluid ↗

$$fx \quad F_B = \nabla \cdot \rho \cdot [g]$$

[Open Calculator ↗](#)

$$ex \quad 4888.615N = 0.5m^3 \cdot 997kg/m^3 \cdot [g]$$

2) Mass Density of Fluid for Buoyant Force Submerged in Fluid ↗

$$fx \quad \rho = \frac{F_B}{[g] \cdot \nabla}$$

[Open Calculator ↗](#)

$$ex \quad 997kg/m^3 = \frac{4888.615N}{[g] \cdot 0.5m^3}$$

3) Volume of Submerged Part of Object given Buoyant Force of Body Submerged in Fluid ↗

$$fx \quad \nabla = \frac{F_B}{\rho \cdot [g]}$$

[Open Calculator ↗](#)

$$ex \quad 0.5m^3 = \frac{4888.615N}{997kg/m^3 \cdot [g]}$$



Drill String Buckling ↗

4) Column Slenderness Ratio for Critical Buckling Load ↗

fx $L_{cr\text{ratio}} = \sqrt{\frac{A \cdot \pi^2 \cdot E}{P_{cr}}}$

[Open Calculator ↗](#)

ex $160 = \sqrt{\frac{0.0688m^2 \cdot \pi^2 \cdot 2E11N/m^2}{5304.912kN}}$

5) Critical Buckling Load ↗

fx $P_{cr} = A \cdot \left(\frac{\pi^2 \cdot E}{L_{cr\text{ratio}}^2} \right)$

[Open Calculator ↗](#)

ex $5304.912kN = 0.0688m^2 \cdot \left(\frac{\pi^2 \cdot 2E11N/m^2}{(160)^2} \right)$

6) Cross Section Area of Column for Critical Buckling Load ↗

fx $A = \frac{P_{cr} \cdot L_{cr\text{ratio}}^2}{\pi^2 \cdot E}$

[Open Calculator ↗](#)

ex $0.0688m^2 = \frac{5304.912kN \cdot (160)^2}{\pi^2 \cdot 2E11N/m^2}$



7) Flow Velocity given Reynolds Number in Shorter Length of Pipe ↗

$$fx \quad V_{\text{flow}} = \frac{Re \cdot v}{D_p}$$

[Open Calculator ↗](#)

$$ex \quad 1.119802 \text{m/s} = \frac{1560 \cdot 7.25 \text{St}}{1.01 \text{m}}$$

8) Kinematic Viscosity of Fluid given Reynolds Number in Shorter Length of Pipe ↗

$$fx \quad v = \frac{V_{\text{flow}} \cdot D_p}{Re}$$

[Open Calculator ↗](#)

$$ex \quad 7.251282 \text{St} = \frac{1.12 \text{m/s} \cdot 1.01 \text{m}}{1560}$$

9) Pipe Diameter given Reynolds Number in Shorter Length of Pipe ↗

$$fx \quad D_p = \frac{Re \cdot v}{V_{\text{flow}}}$$

[Open Calculator ↗](#)

$$ex \quad 1.009821 \text{m} = \frac{1560 \cdot 7.25 \text{St}}{1.12 \text{m/s}}$$

10) Reynolds Number in Shorter Length of Pipe ↗

$$fx \quad Re = \frac{V_{\text{flow}} \cdot D_p}{v}$$

[Open Calculator ↗](#)

$$ex \quad 1560.276 = \frac{1.12 \text{m/s} \cdot 1.01 \text{m}}{7.25 \text{St}}$$



Variables Used

- ∇ Volume of Submerged part of Object (*Cubic Meter*)
- A Cross Section Area of Column (*Square Meter*)
- D_p Diameter of Pipe (*Meter*)
- E Elastic Modulus (*Newton per Square Meter*)
- F_B Buoyant Force (*Newton*)
- Lcr_{ratio} Column Slenderness Ratio
- P_{cr} Critical Buckling Load for Drill String (*Kilonewton*)
- Re Reynolds Number
- ν Kinematic Viscosity (*Stokes*)
- V_{flow} Flow Velocity (*Meter per Second*)
- ρ Mass Density (*Kilogram per Cubic Meter*)



Constants, Functions, Measurements used

- **Constant:** **pi**, 3.14159265358979323846264338327950288
Archimedes' constant
- **Constant:** **[g]**, 9.80665
Gravitational acceleration on Earth
- **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.
- **Measurement:** **Length** in Meter (m)
Length Unit Conversion 
- **Measurement:** **Volume** in Cubic Meter (m³)
Volume Unit Conversion 
- **Measurement:** **Area** in Square Meter (m²)
Area Unit Conversion 
- **Measurement:** **Speed** in Meter per Second (m/s)
Speed Unit Conversion 
- **Measurement:** **Force** in Newton (N), Kilonewton (kN)
Force Unit Conversion 
- **Measurement:** **Mass Concentration** in Kilogram per Cubic Meter (kg/m³)
Mass Concentration Unit Conversion 
- **Measurement:** **Kinematic Viscosity** in Stokes (St)
Kinematic Viscosity Unit Conversion 
- **Measurement:** **Stress** in Newton per Square Meter (N/m²)
Stress Unit Conversion 



Check other formula lists

- Static Loads Formulas 

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