

Important Internal Water Pressure Formulas PDF



Formulas Examples with Units

List of 11 Important Internal Water Pressure Formulas

1) Head of Water using Hoop Tension in Pipe Shell Formula

Formula

$$H_{\text{liquid}} = \frac{f_{\text{KN}}}{\frac{\gamma_{\text{water}} \cdot R_{\text{pipe}}}{h_{\text{curb}}}}$$

Example with Units

$$0.4603 \text{ m} = \frac{23.48 \text{ kN/m}^2}{\frac{9.81 \text{ kN/m}^3 \cdot 1.04 \text{ m}}{0.2 \text{ m}}}$$

Evaluate Formula 

2) Head of water using Water Pressure Formula

Formula

$$H_{\text{liquid}} = \frac{P_{\text{wt}}}{\gamma_{\text{water}}}$$

Example with Units

$$0.5066 \text{ m} = \frac{4.97 \text{ kN/m}^2}{9.81 \text{ kN/m}^3}$$

Evaluate Formula 

3) Hoop Tension in Pipe Shell Formula

Formula

$$f_{\text{KN}} = \frac{P_{\text{wt}} \cdot R_{\text{pipe}}}{h_{\text{curb}}}$$

Example with Units

$$25.844 \text{ kN/m}^2 = \frac{4.97 \text{ kN/m}^2 \cdot 1.04 \text{ m}}{0.2 \text{ m}}$$

Evaluate Formula 

4) Hoop Tension in Pipe Shell using Head of Liquid Formula

Formula

$$f_{\text{KN}} = \left(\frac{\gamma_{\text{water}} \cdot H_{\text{liquid}} \cdot R_{\text{pipe}}}{h_{\text{curb}}} \right)$$

Example with Units

$$23.4655 \text{ kN/m}^2 = \left(\frac{9.81 \text{ kN/m}^3 \cdot 0.46 \text{ m} \cdot 1.04 \text{ m}}{0.2 \text{ m}} \right)$$

Evaluate Formula 

5) Radius of Pipe given Hoop Tension in Pipe Shell Formula

Formula

$$R_{\text{pipe}} = \frac{f_{\text{KN}} \cdot h_{\text{curb}}}{P_{\text{wt}}}$$

Example with Units

$$0.9449 \text{ m} = \frac{23.48 \text{ kN/m}^2 \cdot 0.2 \text{ m}}{4.97 \text{ kN/m}^2}$$

Evaluate Formula 



6) Radius of Pipe using Hoop Stress and Head of Liquid Formula

Formula

$$R_{\text{pipe}} = \left(\frac{f_{\text{KN}}}{\frac{\gamma_{\text{water}} \cdot H_{\text{liquid}}}{h_{\text{curb}}}} \right)$$

Example with Units

$$1.0406 \text{ m} = \left(\frac{23.48 \text{ kN/m}^2}{\frac{9.81 \text{ kN/m}^3 \cdot 0.46 \text{ m}}{0.2 \text{ m}}} \right)$$

Evaluate Formula 

7) Thickness of Pipe given Hoop Tension in Pipe Shell Formula

Formula

$$h_{\text{curb}} = \frac{P_{\text{wt}} \cdot R_{\text{pipe}}}{f_{\text{KN}}}$$

Example with Units

$$0.2201 \text{ m} = \frac{4.97 \text{ kN/m}^2 \cdot 1.04 \text{ m}}{23.48 \text{ kN/m}^2}$$

Evaluate Formula 

8) Thickness of Pipe using Hoop Stress and Head of Liquid Formula

Formula

$$h_{\text{curb}} = \frac{\gamma_{\text{water}} \cdot H_{\text{liquid}} \cdot R_{\text{pipe}}}{f_{\text{KN}}}$$

Example with Units

$$0.1999 \text{ m} = \frac{9.81 \text{ kN/m}^3 \cdot 0.46 \text{ m} \cdot 1.04 \text{ m}}{23.48 \text{ kN/m}^2}$$

Evaluate Formula 

9) Unit Weight of Water given Water Pressure Formula

Formula

$$\gamma_{\text{water}} = \frac{P_{\text{wt}}}{H_{\text{liquid}}}$$

Example with Units

$$10.8043 \text{ kN/m}^3 = \frac{4.97 \text{ kN/m}^2}{0.46 \text{ m}}$$

Evaluate Formula 

10) Water Pressure given Hoop Tension in Pipe Shell Formula

Formula

$$P_{\text{wt}} = \frac{f_{\text{KN}} \cdot h_{\text{curb}}}{R_{\text{pipe}}}$$

Example with Units

$$4.5154 \text{ kN/m}^2 = \frac{23.48 \text{ kN/m}^2 \cdot 0.2 \text{ m}}{1.04 \text{ m}}$$

Evaluate Formula 

11) Water Pressure given Unit Weight of Water Formula

Formula

$$P_{\text{wt}} = (\gamma_{\text{water}} \cdot H_{\text{liquid}})$$

Example with Units

$$4.5126 \text{ kN/m}^2 = (9.81 \text{ kN/m}^3 \cdot 0.46 \text{ m})$$

Evaluate Formula 



Variables used in list of Internal Water Pressure Formulas above

- **f_{KN}** Hoop Tension in Pipe Shell in KN/Square Meter (Kilonewton per Square Meter)
- **h_{curb}** Curb Height (Meter)
- **H_{liquid}** Head of Liquid in Pipe (Meter)
- **P_{wt}** Water Pressure in KN per Square Meter (Kilonewton per Square Meter)
- **R_{pipe}** Pipe Radius (Meter)
- **Y_{water}** Unit Weight of Water in KN per Cubic Meter (Kilonewton per Cubic Meter)

Constants, Functions, Measurements used in list of Internal Water Pressure Formulas above

- **Measurement: Length** in Meter (m)
Length Unit Conversion 
- **Measurement: Pressure** in Kilonewton per Square Meter (kN/m²)
Pressure Unit Conversion 
- **Measurement: Specific Weight** in Kilonewton per Cubic Meter (kN/m³)
Specific Weight Unit Conversion 
- **Measurement: Stress** in Kilonewton per Square Meter (kN/m²)
Stress Unit Conversion 



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