calculatoratoz.com

unitsconverters.com

Sewers their Construction , Maintenance and Required Appurtenances 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 20 Sewers their Construction , Maintenance and Required Appurtenances Formulas

Sewers their Construction , Maintenance and Required Appurtenances

Pressure Due to External Loads

1) Change in Temperature given Elongation in Pipes

Open Calculator

fx $$\Delta T = \frac{\Delta}{L_0 \cdot \alpha}$$

ex $$50\text{K} = \frac{0.375\text{mm}}{5000\text{mm} \cdot 0.0000015\text{K}^{-1}}$$

2) Change in Temperature given Stress in Pipe

Open Calculator

fx $$\Delta T = \frac{\sigma}{\alpha_{thermal} \cdot e}$$

ex $$16\text{K} = \frac{1200\text{Pa}}{1.5\,^\circ\text{C}^{-1} \cdot 50\text{Pa}}$$

3) Coefficient of Expansion of Material given Stress in Pipe

Open Calculator

$$\alpha_{thermal} = \frac{\sigma}{\Delta T \cdot e}$$

$$0.48\,^{\circ}C^{-1} = \frac{1200Pa}{50K \cdot 50Pa}$$

4) Coefficient of Thermal Expansion given Elongation in Pipes

Open Calculator

$$\alpha = \frac{\Delta}{L_0 \cdot \Delta T}$$

$$1.5E\hat{}\text{-}6K^{-1} = \frac{0.375mm}{5000mm \cdot 50K}$$

5) Compressive Stress Produced when Pipe is Empty

Open Calculator

$$\sigma_c = \frac{W + W'}{t}$$

$$23.33333kN/m^2 = \frac{22kN/m + 6.0kN/m}{1.2m}$$

6) Distance of Top of Pipe to below Surface of Fill given Unit Pressure

Open Calculator

$$H = \left(\frac{P_t \cdot 2 \cdot \pi \cdot (h_{Slant})^5}{3 \cdot P} \right)^{\frac{1}{3}}$$

$$2.941338\text{m} = \left(\frac{16\text{Pa} \cdot 2 \cdot \pi \cdot (1.5\text{m})^5}{3 \cdot 10\text{N}} \right)^{\frac{1}{3}}$$

7) Elongation in Pipes given Change in Temperature

Open Calculator

$$\Delta = L_0 \cdot \alpha \cdot \Delta T$$

$$0.375\text{mm} = 5000\text{mm} \cdot 0.0000015\text{K}^{-1} \cdot 50\text{K}$$

8) External Diameter of Pipe given Load Per Unit Length for Pipes

Open Calculator

$$D = \sqrt{\frac{W}{C_p \cdot \gamma}}$$

$$3.90868\text{m} = \sqrt{\frac{22\text{kN/m}}{1.2 \cdot 1.2\text{kN/m}^3}}$$

9) Load Per Unit Length for Pipes given Compressive Stress

Open Calculator

$$W = (\sigma_c \cdot t) - W'$$

$$54\text{kN/m} = (50\text{kN/m}^2 \cdot 1.2\text{m}) - 6.0\text{kN/m}$$

10) Load Per Unit Length for Pipes Resting on Undisturbed Ground on Cohesion Less Soil

Open Calculator

$$W = C_p \cdot \gamma \cdot (D)^2$$

$$5.76\text{kN/m} = 1.2 \cdot 1.2\text{kN/m}^3 \cdot (2\text{m})^2$$

11) Pipe Coefficient given Load Per Unit Length for Pipes

Open Calculator

$$C_p = \left(\frac{W}{\gamma \cdot (D)^2} \right)$$

$$4.583333 = \left(\frac{22\text{kN/m}}{1.2\text{kN/m}^3 \cdot (2\text{m})^2} \right)$$

12) Slant Height of considered Point given Unit Pressure

Open Calculator

$$h_{Slant} = \left(\frac{3 \cdot P \cdot (H)^3}{2 \cdot \pi \cdot P_t} \right)^{\frac{1}{5}}$$

$$1.517879\text{m} = \left(\frac{3 \cdot 10\text{N} \cdot (3\text{m})^3}{2 \cdot \pi \cdot 16\text{Pa}} \right)^{\frac{1}{5}}$$

13) Specific Weight of Fill Material given Load Per Unit Length for Pipes

Open Calculator

fx $$\gamma = \frac{W}{C_p \cdot (D)^2}$$

ex $$4.583333\text{kN/m}^3 = \frac{22\text{kN/m}}{1.2 \cdot (2\text{m})^2}$$

14) Superimposed Load given Unit Pressure

Open Calculator

fx $$P = \frac{2 \cdot \pi \cdot P_t \cdot (h_{Slant})^5}{3 \cdot (H)^3}$$

ex $$9.424778\text{N} = \frac{2 \cdot \pi \cdot 16\text{Pa} \cdot (1.5\text{m})^5}{3 \cdot (3\text{m})^3}$$

15) Thickness of Pipes given Compressive Stress

Open Calculator

fx $$t = \frac{W' + W}{\sigma_c}$$

ex $$0.56\text{m} = \frac{6.0\text{kN/m} + 22\text{kN/m}}{50\text{kN/m}^2}$$

16) Unit Pressure Developed at any Point in Fill at Depth

Open Calculator

fx $$P_t = \frac{3 \cdot (H)^3 \cdot P}{2 \cdot \pi \cdot (h_{Slant})^5}$$

ex $$16.97653\text{Pa} = \frac{3 \cdot (3\text{m})^3 \cdot 10\text{N}}{2 \cdot \pi \cdot (1.5\text{m})^5}$$

Flexible Pipes

17) Load Per Unit Length for Flexible Pipes

Open Calculator

fx $$W = C \cdot \gamma \cdot w \cdot D$$

ex $$8.244\text{kN/m} = 1.5 \cdot 1.2\text{kN/m}^3 \cdot 2.29\text{m} \cdot 2\text{m}$$

18) Specific Weight of Fill Material given Load Per Unit Length for Flexible Pipes

Open Calculator

fx $$\gamma = \left(\frac{W}{C \cdot D \cdot w}\right)$$

ex $$3.202329\text{kN/m}^3 = \left(\frac{22\text{kN/m}}{1.5 \cdot 2\text{m} \cdot 2.29\text{m}}\right)$$

19) Width of Trench given Load Per Unit Length for Flexible Pipes

Open Calculator

fx $$w = \left(\frac{W}{C \cdot D \cdot \gamma} \right)$$

ex $$6.111111\text{m} = \left(\frac{22\text{kN/m}}{1.5 \cdot 2\text{m} \cdot 1.2\text{kN/m}^3} \right)$$

Rigid Pipes

20) Width of Trench given Load Per Unit Length for Rigid Pipes

Open Calculator

fx $$w = \sqrt{\frac{W}{\gamma \cdot C}}$$

ex $$3.496029\text{m} = \sqrt{\frac{22\text{kN/m}}{1.2\text{kN/m}^3 \cdot 1.5}}$$

Variables Used

- Δ Elongation *(Millimeter)*
- ΔT Change in Temperature *(Kelvin)*
- **C** Coefficient of Fill
- C_p Pipe Coefficient
- **D** External Diameter *(Meter)*
- **e** Elastic Modulus *(Pascal)*
- **H** Distance between Pipe and Fill *(Meter)*
- h_{Slant} Slant Height *(Meter)*
- L_0 Original Length *(Millimeter)*
- **P** Superimposed Load *(Newton)*
- P_t Unit Pressure *(Pascal)*
- **t** Thickness *(Meter)*
- **w** Width *(Meter)*
- **W** Load per unit Length *(Kilonewton per Meter)*
- W' Total Load per Unit Length *(Kilonewton per Meter)*
- α Thermal Expansion Coefficient *(1 Per Kelvin)*
- $\alpha_{thermal}$ Coefficient of Thermal Expansion *(Per Degree Celsius)*
- γ Specific Weight of Fill *(Kilonewton per Cubic Meter)*
- σ Stress *(Pascal)*
- σ_c Compressive Stress *(Kilonewton per Square Meter)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- 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 Millimeter (mm), Meter (m)
  Length Unit Conversion
- Measurement: **Pressure** in Pascal (Pa), Kilonewton per Square Meter (kN/m²)
  Pressure Unit Conversion
- Measurement: **Force** in Newton (N)
  Force Unit Conversion
- Measurement: **Temperature Difference** in Kelvin (K)
  Temperature Difference Unit Conversion
- Measurement: **Surface Tension** in Kilonewton per Meter (kN/m)
  Surface Tension Unit Conversion
- Measurement: **Temperature Coefficient of Resistance** in Per Degree Celsius (°C⁻¹)
  Temperature Coefficient of Resistance Unit Conversion
- Measurement: **Specific Weight** in Kilonewton per Cubic Meter (kN/m³)
  Specific Weight Unit Conversion
- Measurement: **Thermal Expansion** in 1 Per Kelvin (K⁻¹)
  Thermal Expansion Unit Conversion
- Measurement: **Stress** in Pascal (Pa)
  Stress Unit Conversion

Check other formula lists

- Design of a Chlorination System for Wastewater Disinfection Formulas
- Design of a Circular Settling Tank Formulas
- Design of a Plastic Media Trickling Filter Formulas
- Design of a Solid Bowl Centrifuge for Sludge Dewatering Formulas
- Design of an Aerated Grit Chamber Formulas
- Design of an Aerobic Digester Formulas
- Design of an Anaerobic Digester Formulas
- Design of Rapid Mix Basin and Flocculation Basin Formulas
- Design of Trickling Filter using NRC Equations Formulas
- Disposing of the Sewage Effluents Formulas
- Estimating the Design Sewage Discharge Formulas
- Fire Demand Formulas
- Flow Velocity in Straight Sewers Formulas
- Noise Pollution Formulas
- Population Forecast Method Formulas
- Quality and Characteristics of Sewage Formulas
- Sanitary System Sewer Design Formulas
- Sewers their Construction , Maintenance and Required Appurtenances Formulas
- Sizing a Polymer Dilution or Feed System Formulas
- Water Demand and Quantity Formulas

Feel free to SHARE this document with your friends!

PDF Available in

8/27/2024 | 5:40:15 AM UTC

Please leave your feedback here...