calculatoratoz.com

unitsconverters.com

Lateral Pressure for Cohesive and Non Cohesive Soil 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 25 Lateral Pressure for Cohesive and Non Cohesive Soil Formulas

Lateral Pressure for Cohesive and Non Cohesive Soil

1) Coefficient of Active Pressure given Angle of Internal Friction of Soil

Open Calculator

fx $$K_A = \left(\tan\left(\left(45 \cdot \frac{\pi}{180}\right) - \left(\frac{\varphi}{2}\right)\right)\right)^2$$

ex $$0.163237 = \left(\tan\left(\left(45 \cdot \frac{\pi}{180}\right) - \left(\frac{46^\circ}{2}\right)\right)\right)^2$$

2) Coefficient of Active Pressure given Total Thrust from Soil for Level Surface

Open Calculator

fx $$K_A = \frac{2 \cdot P}{\gamma \cdot (h_w)^2}$$

ex $$0.11562 = \frac{2 \cdot 10\text{kN/m}}{18\text{kN/m}^3 \cdot (3.1\text{m})^2}$$

3) Coefficient of Passive Pressure given Angle of Internal Friction of Soil

Open Calculator

fx $$K_P = \left(\tan\left(\left(45 \cdot \frac{\pi}{180}\right) - \left(\frac{\varphi}{2}\right)\right)\right)^2$$

ex $$0.163237 = \left(\tan\left(\left(45 \cdot \frac{\pi}{180}\right) - \left(\frac{46^\circ}{2}\right)\right)\right)^2$$

4) Coefficient of Passive Pressure given Thrust of Soil are Free to Move only Small Amount

Open Calculator

fx $$K_P = \frac{2 \cdot P}{\gamma \cdot (h_w)^2}$$

ex $$0.11562 = \frac{2 \cdot 10\text{kN/m}}{18\text{kN/m}^3 \cdot (3.1\text{m})^2}$$

5) Coefficient of Passive Pressure given Thrust of Soil that are Completely Restrained

Open Calculator

$$K_P = \frac{2 \cdot P}{\gamma \cdot (h_w)^2}$$

$$0.11562 = \frac{2 \cdot 10\text{kN/m}}{18\text{kN/m}^3 \cdot (3.1\text{m})^2}$$

6) Cohesion of soil given Total Thrust from Soil that are Free to Move

Open Calculator

$$C = \left(0.25 \cdot \gamma \cdot h_w \cdot \sqrt{K_A}\right) - \left(0.5 \cdot \frac{P}{h_w} \cdot \sqrt{K_A}\right)$$

$$4.778137\text{kPa} = \left(0.25 \cdot 18\text{kN/m}^3 \cdot 3.1\text{m} \cdot \sqrt{0.15}\right) - \left(0.5 \cdot \frac{10\text{kN/m}}{3.1\text{m}} \cdot \sqrt{0.15}\right)$$

7) Cohesion of soil given Total Thrust from Soil with Small Angles of Internal Friction

Open Calculator

$$C = \left((0.25 \cdot \gamma \cdot h_w) - \left(0.5 \cdot \frac{P}{h_w}\right)\right)$$

$$12.3371\text{kPa} = \left((0.25 \cdot 18\text{kN/m}^3 \cdot 3.1\text{m}) - \left(0.5 \cdot \frac{10\text{kN/m}}{3.1\text{m}}\right)\right)$$

8) Height of Wall given Thrust of Soil that are Completely Restrained and Surface is Level

Open Calculator

$$h_w = \sqrt{\frac{2 \cdot P}{\gamma \cdot K_P}}$$

$$2.635231\text{m} = \sqrt{\frac{2 \cdot 10\text{kN/m}}{18\text{kN/m}^3 \cdot 0.16}}$$

9) Height of Wall given Total Thrust of Soil that are Free to Move only Small Amount

Open Calculator

$$h_w = \sqrt{\frac{2 \cdot P}{\gamma \cdot K_P}}$$

$$2.635231\text{m} = \sqrt{\frac{2 \cdot 10\text{kN/m}}{18\text{kN/m}^3 \cdot 0.16}}$$

10) Total Height of Wall given Total Thrust from Soil for Level Surface behind Wall

Open Calculator

fx $$h_w = \sqrt{\frac{2 \cdot P}{\gamma \cdot K_A}}$$

ex $$2.721655\text{m} = \sqrt{\frac{2 \cdot 10\text{kN/m}}{18\text{kN/m}^3 \cdot 0.15}}$$

11) Total Height of Wall given Total Thrust from Soil that are Completely Restrained

Open Calculator

fx $$h_w = \sqrt{\frac{2 \cdot P}{\gamma \cdot \cos(i) \cdot \left(\frac{\cos(i)+\sqrt{(\cos(i))^2-(\cos(\varphi))^2}}{\cos(i)-\sqrt{(\cos(i))^2-(\cos(\varphi))^2}}\right)}}$$

ex $$0.56886\text{m} = \sqrt{\frac{2 \cdot 10\text{kN/m}}{18\text{kN/m}^3 \cdot \cos(30^\circ) \cdot \left(\frac{\cos(30^\circ)+\sqrt{(\cos(30^\circ))^2-(\cos(46^\circ))^2}}{\cos(30^\circ)-\sqrt{(\cos(30^\circ))^2-(\cos(46^\circ))^2}}\right)}}$$

12) Total Height of Wall given Total Thrust from Soil that are Free to move

Open Calculator

fx $$h_w = \sqrt{\frac{2 \cdot P}{\gamma \cdot \cos(i) \cdot \left(\frac{\cos(i)-\sqrt{(\cos(i))^2-(\cos(\varphi))^2}}{\cos(i)+\sqrt{(\cos(i))^2-(\cos(\varphi))^2}}\right)}}$$

ex $$2.255387\text{m} = \sqrt{\frac{2 \cdot 10\text{kN/m}}{18\text{kN/m}^3 \cdot \cos(30^\circ) \cdot \left(\frac{\cos(30^\circ)-\sqrt{(\cos(30^\circ))^2-(\cos(46^\circ))^2}}{\cos(30^\circ)+\sqrt{(\cos(30^\circ))^2-(\cos(46^\circ))^2}}\right)}}$$

13) Total Thrust from Soil that are Completely Restrained

Open Calculator

$$P = \left(0.5 \cdot \gamma \cdot (h_w)^2 \cdot \cos(i)\right) \cdot \left(\frac{\cos(i) + \sqrt{(\cos(i))^2 - (\cos(\varphi))^2}}{\cos(i) - \sqrt{(\cos(i))^2 - (\cos(\varphi))^2}}\right)$$

ex

$$296.9695\text{kN/m} = \left(0.5 \cdot 18\text{kN/m}^3 \cdot (3.1\text{m})^2 \cdot \cos(30^\circ)\right) \cdot \left(\frac{\cos(30^\circ) + \sqrt{(\cos(30^\circ))^2 - (\cos(46^\circ))^2}}{\cos(30^\circ) - \sqrt{(\cos(30^\circ))^2 - (\cos(46^\circ))^2}}\right)$$

14) Total Thrust from Soil that are Completely Restrained and Surface is Level

Open Calculator

$$P = \left(0.5 \cdot \gamma \cdot (h_w)^2 \cdot K_P\right)$$

ex

$$13.8384\text{kN/m} = \left(0.5 \cdot 18\text{kN/m}^3 \cdot (3.1\text{m})^2 \cdot 0.16\right)$$

15) Total Thrust from Soil that are Free to Move

Open Calculator

$$P = \left(0.5 \cdot \gamma \cdot (h_w)^2 \cdot \cos(i)\right) \cdot \left(\frac{\cos(i) - \sqrt{(\cos(i))^2 - (\cos(\varphi))^2}}{\cos(i) + \sqrt{(\cos(i))^2 - (\cos(\varphi))^2}}\right)$$

ex

$$18.89214\text{kN/m} = \left(0.5 \cdot 18\text{kN/m}^3 \cdot (3.1\text{m})^2 \cdot \cos(30^\circ)\right) \cdot \left(\frac{\cos(30^\circ) - \sqrt{(\cos(30^\circ))^2 - (\cos(46^\circ))^2}}{\cos(30^\circ) + \sqrt{(\cos(30^\circ))^2 - (\cos(46^\circ))^2}}\right)$$

16) Total Thrust from Soil that are Free to Move only Small Amount

Open Calculator

$$P = \left(0.5 \cdot \gamma \cdot (h_w)^2 \cdot K_P\right)$$

ex

$$13.8384\text{kN/m} = \left(0.5 \cdot 18\text{kN/m}^3 \cdot (3.1\text{m})^2 \cdot 0.16\right)$$

17) Total Thrust from Soil that are Free to Move to Considerable Amount

Open Calculator

fx $$P = \left(\left(0.5 \cdot \gamma \cdot (h_w)^2 \cdot K_A\right) - \left(2 \cdot C \cdot h_w \cdot \sqrt{K_A}\right)\right)$$

ex $$9.923913\text{kN/m} = \left(\left(0.5 \cdot 18\text{kN/m}^3 \cdot (3.1\text{m})^2 \cdot 0.15\right) - \left(2 \cdot 1.27\text{kPa} \cdot 3.1\text{m} \cdot \sqrt{0.15}\right)\right)$$

18) Total Thrust from Soil when Surface behind Wall is Level

Open Calculator

fx $$P = \left(0.5 \cdot \gamma \cdot (h_w)^2 \cdot K_A\right)$$

ex $$12.9735\text{kN/m} = \left(0.5 \cdot 18\text{kN/m}^3 \cdot (3.1\text{m})^2 \cdot 0.15\right)$$

19) Total Thrust from Soil with Small Angles of Internal Friction

Open Calculator

fx $$P = \left(0.5 \cdot \gamma \cdot (h_w)^2\right) - (2 \cdot C \cdot h_w)$$

ex $$78.616\text{kN/m} = \left(0.5 \cdot 18\text{kN/m}^3 \cdot (3.1\text{m})^2\right) - (2 \cdot 1.27\text{kPa} \cdot 3.1\text{m})$$

20) Unit Weight of Soil given Thrust of Soil that are Completely Restrained and Surface is Level

Open Calculator

fx $$\gamma = \frac{2 \cdot P}{(h_w)^2 \cdot K_P}$$

ex $$13.00728\text{kN/m}^3 = \frac{2 \cdot 10\text{kN/m}}{(3.1\text{m})^2 \cdot 0.16}$$

21) Unit Weight of Soil given Total Thrust from Soil for Level Surface behind Wall

Open Calculator

fx $$\gamma = \frac{2 \cdot P}{(h_w)^2 \cdot K_A}$$

ex $$13.87444\text{kN/m}^3 = \frac{2 \cdot 10\text{kN/m}}{(3.1\text{m})^2 \cdot 0.15}$$

22) Unit Weight of Soil given Total Thrust from Soil that are Completely Restrained

Open Calculator

fx $$\gamma = \frac{2 \cdot P}{(h_w)^2 \cdot \cos(i)} \cdot \left(\frac{\cos(i) + \sqrt{(\cos(i))^2 - (\cos(\varphi))^2}}{\cos(i) - \sqrt{(\cos(i))^2 - (\cos(\varphi))^2}} \right)$$

ex $$9.527772\text{kN/m}^3 = \frac{2 \cdot 10\text{kN/m}}{(3.1\text{m})^2 \cdot \cos(30^\circ)} \cdot \left(\frac{\cos(30^\circ) + \sqrt{(\cos(30^\circ))^2 - (\cos(46^\circ))^2}}{\cos(30^\circ) - \sqrt{(\cos(30^\circ))^2 - (\cos(46^\circ))^2}} \right)$$

23) Unit Weight of Soil given Total Thrust from Soil that are Free to Move

Open Calculator

fx $$\gamma = \frac{2 \cdot P}{(h_w)^2 \cdot \cos(i)} \cdot \left(\frac{\cos(i) - \sqrt{(\cos(i))^2 - (\cos(\varphi))^2}}{\cos(i) + \sqrt{(\cos(i))^2 - (\cos(\varphi))^2}} \right)$$

ex $$0.606123\text{kN/m}^3 = \frac{2 \cdot 10\text{kN/m}}{(3.1\text{m})^2 \cdot \cos(30^\circ)} \cdot \left(\frac{\cos(30^\circ) - \sqrt{(\cos(30^\circ))^2 - (\cos(46^\circ))^2}}{\cos(30^\circ) + \sqrt{(\cos(30^\circ))^2 - (\cos(46^\circ))^2}} \right)$$

24) Unit Weight of Soil given Total Thrust from Soil with Small Angles of Internal Friction

Open Calculator

fx $$\gamma = \left(\left(2 \cdot \frac{P}{(h_w)^2} \right) + \left(4 \cdot \frac{C}{h_w} \right) \right)$$

ex $$3.719875\text{kN/m}^3 = \left(\left(2 \cdot \frac{10\text{kN/m}}{(3.1\text{m})^2} \right) + \left(4 \cdot \frac{1.27\text{kPa}}{3.1\text{m}} \right) \right)$$

25) Unit Weight of Soil given Total Thrust of Soil that are Free to Move only Small Amount

Open Calculator

fx $$\gamma = \frac{2 \cdot P}{(h_w)^2 \cdot K_P}$$

ex $$13.00728\text{kN/m}^3 = \frac{2 \cdot 10\text{kN/m}}{(3.1\text{m})^2 \cdot 0.16}$$

Variables Used

- **C** Cohesion in Soil as Kilopascal *(Kilopascal)*
- h_w Total Height of Wall *(Meter)*
- **i** Angle of Inclination *(Degree)*
- K_A Coefficient of Active Pressure
- K_P Coefficient of Passive Pressure
- **P** Total Thrust of Soil *(Kilonewton per Meter)*
- **γ** Unit Weight of Soil *(Kilonewton per Cubic Meter)*
- **φ** Angle of Internal Friction *(Degree)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Function: **cos**, cos(Angle)
  Trigonometric cosine function
- Function: **sqrt**, sqrt(Number)
  Square root function
- Function: **tan**, tan(Angle)
  Trigonometric tangent function
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Pressure** in Kilopascal (kPa)
  Pressure Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion
- Measurement: **Surface Tension** in Kilonewton per Meter (kN/m)
  Surface Tension Unit Conversion
- Measurement: **Specific Weight** in Kilonewton per Cubic Meter (kN/m³)
  Specific Weight Unit Conversion

Check other formula lists

- Bearing Capacity for Strip Footing for C-Φ Soils Formulas
- Bearing Capacity of Cohesive Soil Formulas
- Bearing Capacity of Non-cohesive Soil Formulas
- Bearing Capacity of Soils: Meyerhof's Analysis Formulas
- Foundation Stability Analysis Formulas
- Atterberg Limits Formulas
- Bearing Capacity of Soil: Terzaghi's Analysis Formulas
- Compaction of Soil Formulas
- Earth Moving Formulas
- Lateral Pressure for Cohesive and Non Cohesive Soil Formulas
- Minimum Depth of Foundation by Rankine's Analysis Formulas
- Pile Foundations Formulas
- Scraper Production Formulas
- Slope Stability Analysis using Bishops Method Formulas
- Slope Stability Analysis using Culman's Method Formulas
- Vibration Control in Blasting Formulas
- Void Ratio of Soil Sample Formulas
- Water Content of Soil and Related Formulas

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

1/15/2024 | 11:38:21 PM UTC

Please leave your feedback here...