Important Porosity of Soil Sample Formulas PDF

Formulas
Examples
with Units

List of 10
Important Porosity of Soil Sample Formulas

1) Air Content given Percentage Air Voids in Porosity Formula

Evaluate Formula

Formula

$$a_c = \frac{n_a}{\eta}$$

Example

$$1.2 = \frac{0.6}{0.5}$$

2) Dry Unit Weight Given Porosity Formula

Evaluate Formula

Formula

$$\gamma_{dry} = \left(1 - \eta\right) \cdot G_s \cdot \gamma_w$$

Example with Units

$$12.9982\,\text{kN/m}^3 = \left(1 - 0.5\right) \cdot 2.65 \cdot 9810\,\text{N/m}^3$$

3) Porosity given Dry Unit Weight in Porosity Formula

Evaluate Formula

Formula

$$\eta = 1 - \left(\frac{\gamma_{dry}}{G_s \cdot \gamma_w}\right)$$

Example with Units

$$0.5003 = 1 - \left(\frac{12.99\,\text{kN/m}^3}{2.65 \cdot 9810\,\text{N/m}^3}\right)$$

4) Porosity given Percentage Air Voids in Porosity Formula

Evaluate Formula

Formula

$$\eta = \frac{n_a}{a_c}$$

Example

$$0.5 = \frac{0.6}{1.20}$$

5) Porosity given Saturated Unit Weight in Porosity Formula

Evaluate Formula

Formula

$$\eta_s = \frac{\gamma_{sat} - \left(G \cdot \gamma_w\right)}{\gamma_w} \cdot \left(1 - G\right)$$

Example with Units

$$1.3448 = \frac{17854\,\text{N/m}^3 - \left(2.64 \cdot 9810\,\text{N/m}^3\right)}{9810\,\text{N/m}^3} \cdot \left(1 - 2.64\right)$$

6) Porosity given Void Ratio Formula

Evaluate Formula

Formula

$$\eta = \frac{e}{1 + e}$$

Example

$$0.5455 = \frac{1.2}{1 + 1.2}$$

7) Porosity of Soil Sample Formula

Evaluate Formula

Formula

$$\eta = \frac{V_{void}}{V_t}$$

Example with Units

$$0.12 = \frac{6\,\text{m}^3}{50\,\text{m}^3}$$

8) Saturated Unit Weight given Porosity Formula

Evaluate Formula

Formula

$$\gamma_{sat} = \left(G \cdot \gamma_w \cdot \left(1 - \eta \right) \right) + \left(\gamma_w \cdot \eta \right)$$

Example with Units

$$17854.2\,\text{N/m}^3 = \left(2.64 \cdot 9810\,\text{N/m}^3 \cdot \left(1 - 0.5 \right) \right) + \left(9810\,\text{N/m}^3 \cdot 0.5 \right)$$

9) Total Volume of Soil given Porosity of Soil Sample Formula

Evaluate Formula

Formula

$$V_t = \left(\frac{V_{void}}{\eta_v} \right) \cdot 100$$

Example with Units

$$24\,\text{m}^3 = \left(\frac{6\,\text{m}^3}{25} \right) \cdot 100$$

10) Volume of Voids Porosity of Soil Sample Formula

Evaluate Formula

Formula

$$V_{void} = \frac{\eta_v \cdot V_t}{100}$$

Example with Units

$$12.5\,\text{m}^3 = \frac{25 \cdot 50\,\text{m}^3}{100}$$

Variables used in list of Porosity of Soil Sample Formulas above

- a_c Air Content
- **e** Void Ratio
- **G** Specific Gravity of Soil Solids
- G_s Specific Gravity of Soil
- n_a Percentage of Air Voids
- V_t Volume of Soil Sample *(Cubic Meter)*
- V_{void} Volume of Voids in Soil Mechanics *(Cubic Meter)*
- γ_{dry} Dry Unit Weight *(Kilonewton per Cubic Meter)*
- γ_{sat} Saturated Unit Weight *(Newton per Cubic Meter)*
- γ_w Unit Weight of Water in Soil Mechanics *(Newton per Cubic Meter)*
- η Porosity in Soil Mechanics
- η_s Porosity of Soil
- η_v Porosity Volume Percent

Constants, Functions, Measurements used in list of Porosity of Soil Sample Formulas above

- Measurement: **Volume** in Cubic Meter (m^3)
  Volume Unit Conversion
- Measurement: **Specific Weight** in Kilonewton per Cubic Meter (kN/m^3), Newton per Cubic Meter (N/m^3)
  Specific Weight Unit Conversion

Download other Important Geotechnical Engineering PDFs

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

Try our Unique Visual Calculators

- Percentage of number
- LCM calculator
- Simple fraction

9/18/2024 | 11:46:39 AM UTC