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Pavement Materials Formulas

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List of 14 Pavement Materials Formulas

Pavement Materials

Fuller law

1) Coarseness of Aggregates in Fuller Law

Open Calculator

fx $$n = \frac{\log 10\left(\frac{P_{weight}}{100}\right)}{\log 10\left(\frac{d}{D}\right)}$$

ex $$0.250003 = \frac{\log 10\left(\frac{78.254}{100}\right)}{\log 10\left(\frac{33mm}{88mm}\right)}$$

2) Percent by Weight in Fuller Law

Open Calculator

fx $$P_{weight} = 100 \cdot \left(\frac{d}{D}\right)^{n}$$

ex $$78.25423 = 100 \cdot \left(\frac{33mm}{88mm}\right)^{0.25}$$

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3) Size of Largest Particle in Fuller Law

Open Calculator

fx $$D = \frac{d}{\left(\frac{P_{weight}}{100}\right)^{\frac{1}{n}}}$$

ex $$88.00103\text{mm} = \frac{33\text{mm}}{\left(\frac{78.254}{100}\right)^{\frac{1}{0.25}}}$$

4) Size of Smallest Particle in Fuller Law

Open Calculator

fx $$d = D \cdot \left(\frac{P_{weight}}{100}\right)^{\frac{1}{n}}$$

ex $$32.99961\text{mm} = 88\text{mm} \cdot \left(\frac{78.254}{100}\right)^{\frac{1}{0.25}}$$

Plate Load Test

5) Bearing Pressure given Modulus of Subgrade Reaction

Open Calculator

fx $$P = K_{sr} \cdot 0.125$$

ex $$50\text{N/m}^2 = 400\text{N/m}^3 \cdot 0.125$$

6) Modulus of Subgrade Reaction for Plate Load Test

Open Calculator

fx $$K_{sr} = \frac{P}{0.125}$$

ex $$400\text{N/m}^3 = \frac{50\text{N/m}^2}{0.125}$$

Specific Gravity and Water Absorption

7) Apparent Specific Gravity

Open Calculator

fx $$G_{app} = \frac{\frac{M_D}{V_N}}{W}$$

ex $$2.5 = \frac{\frac{2\text{kg}}{0.0008\text{m}^3}}{1000\text{kg/m}^3}$$

8) Bulk Specific Gravity given Dry Mass and Net Volume

Open Calculator

fx $$G_{bulk} = \frac{\frac{M_D}{V_{total}}}{W}$$

ex $$2.222222 = \frac{\frac{2\text{kg}}{0.0009\text{m}^3}}{1000\text{kg/m}^3}$$

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9) Density given Apparent Specific Gravity

Open Calculator

fx $$W = \frac{\frac{M_D}{V_N}}{G_{app}}$$

ex $$1000\text{kg/m}^3 = \frac{\frac{2\text{kg}}{0.0008\text{m}^3}}{2.5}$$

10) Density given Bulk Specific Gravity

Open Calculator

fx $$W = \frac{\frac{M_D}{V_{total}}}{G_{bulk}}$$

ex $$1001.001\text{kg/m}^3 = \frac{\frac{2\text{kg}}{0.0009\text{m}^3}}{2.22}$$

11) Dry Mass given Apparent Specific Gravity

Open Calculator

fx $$M_D = G_{app} \cdot W \cdot V_N$$

ex $$2\text{kg} = 2.5 \cdot 1000\text{kg/m}^3 \cdot 0.0008\text{m}^3$$

12) Dry Mass given Bulk Specific Gravity and Net Volume

Open Calculator

fx $$M_D = G_{bulk} \cdot W \cdot V_{total}$$

ex $$1.998\text{kg} = 2.22 \cdot 1000\text{kg/m}^3 \cdot 0.0009\text{m}^3$$

13) Net Volume given Apparent Specific Gravity

Open Calculator

fx $$V_N = \frac{M_D}{G_{app} \cdot W}$$

ex $$0.0008\text{m}^3 = \frac{2\text{kg}}{2.5 \cdot 1000\text{kg/m}^3}$$

14) Total Volume given Bulk Specific Gravity and Dry Mass

Open Calculator

fx $$V_{total} = \frac{M_D}{G_{bulk} \cdot W}$$

ex $$0.000901\text{m}^3 = \frac{2\text{kg}}{2.22 \cdot 1000\text{kg/m}^3}$$

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Variables Used

- **d** Smallest Particle *(Millimeter)*
- **D** Largest Particle *(Millimeter)*
- G_{app} Apparent Specific Gravity
- G_{bulk} Bulk Specific Gravity
- K_{sr} Modulus of Subgrade Reaction *(Newton per Cubic Meter)*
- M_D Dry Mass *(Kilogram)*
- **n** Coarseness of Aggregates
- **P** Bearing Pressure *(Newton per Square Meter)*
- P_{weight} Percentage of Weight
- V_N Net Volume *(Cubic Meter)*
- V_{total} Total volume *(Cubic Meter)*
- **W** Density *(Kilogram per Cubic Meter)*

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Constants, Functions, Measurements used

- Function: **log10**, log10(Number)
  Common logarithm function (base 10)
- Measurement: **Length** in Millimeter (mm)
  Length Unit Conversion
- Measurement: **Weight** in Kilogram (kg)
  Weight Unit Conversion
- Measurement: **Volume** in Cubic Meter (m^3)
  Volume Unit Conversion
- Measurement: **Pressure** in Newton per Square Meter (N/m^2)
  Pressure Unit Conversion
- Measurement: **Density** in Kilogram per Cubic Meter (kg/m^3)
  Density Unit Conversion
- Measurement: **Specific Weight** in Newton per Cubic Meter (N/m^3)
  Specific Weight Unit Conversion

Check other formula lists

- **Pavement Materials Formulas**

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