



Dry Unit Weight of Soil Formulas

Calculators!

Examples!

Conversions!

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List of 7 Dry Unit Weight of Soil Formulas

Dry Unit Weight of Soil

1) Dry Unit Weight given Bulk Unit Weight and Degree of Saturation



Open Calculator

$$\gamma_{
m dry} = rac{\gamma_{
m bulk} - (S \cdot \gamma_{
m saturated})}{1-S}$$

 $extbf{ex} \left[6.120769 ext{kN/m}^3 = rac{20.89 ext{kN/m}^3 - (2.56 \cdot 11.89 ext{kN/m}^3)}{20.89 ext{kN/m}^3 - (2.56 \cdot 11.89 ext{kN/m}^3)}
ight]$ $\overline{1 - 2.56}$

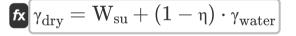
2) Dry Unit Weight given Percentage of Air Voids



Open Calculator 2

$$\gamma_{
m dry} = (1-n_{
m a}) \cdot G_{
m s} \cdot rac{\gamma_{
m water}}{1+w_{
m s} \cdot G_{
m s}}$$





Open Calculator

$$ext{ex} \ 16.705 ext{kN/m}^{_3} = 11.8 ext{kN} + (1-0.5) \cdot 9.81 ext{kN/m}^{_3}$$



4) Dry Unit Weight given Unit Weight of Solids 🔽

 $\gamma_{
m dry} = \gamma_{
m soilds} \cdot rac{
m Vs}{
m V}$

Open Calculator 🗗

 $ext{ex} 6.12045 ext{kN/m}^{_3} = 15 ext{kN/m}^{_3} \cdot rac{5.0 ext{m}^{_3}}{12.254 ext{m}^{_3}}$

5) Dry Unit Weight given Water Content

 $\left| \gamma_{
m dry} = G_{
m s} \cdot rac{\gamma_{
m water}}{1 + rac{w_{
m s}}{
m S}}
ight|$

Open Calculator

ex $6.128088 \mathrm{kN/m^3} = 2.65 \cdot rac{9.81 \mathrm{kN/m^3}}{1 + rac{8.3}{2.56}}$

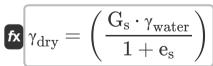
6) Dry Unit Weight given Water Content at Full Saturation

 $\left| \gamma_{
m dry} = G_{
m s} \cdot rac{\gamma_{
m water}}{1 + w_{
m s} \cdot G_{
m s}}
ight|$

Open Calculator 🗗

ex $1.130528 \mathrm{kN/m^3} = 2.65 \cdot \frac{9.81 \mathrm{kN/m^3}}{1 + 8.3 \cdot 2.65}$

7) Dry Unit Weight of Soil when Saturation is 0 Percent



Open Calculator 🗗

 $ext{ex} \left[7.877727 ext{kN/m}^3 = \left(rac{2.65 \cdot 9.81 ext{kN/m}^3}{1 + 2.3}
ight)
ight]$





Variables Used

- e_s Void Ratio of Soil
- G_s Specific Gravity of Soil
- n_a Percentage of Air Voids
- S Degree of Saturation
- **V** Total Volume in Soil Mechanics (Cubic Meter)
- **Vs** Volume of Solids (Cubic Meter)
- W_S Water Content of Soil from Pycnometer
- W_{SU} Submerged Weight of Soil (Kilonewton)
- Ybulk Bulk Unit Weight (Kilonewton per Cubic Meter)
- Ydry Dry Unit Weight (Kilonewton per Cubic Meter)
- Ysaturated Saturated Unit Weight of Soil (Kilonewton per Cubic Meter)
- Vsoilds Unit Weight of Solids (Kilonewton per Cubic Meter)
- Ywater Unit Weight of Water (Kilonewton per Cubic Meter)
- η Porosity in Soil Mechanics





Constants, Functions, Measurements used

- Measurement: Volume in Cubic Meter (m³)

 Volume Unit Conversion
- Measurement: Force in Kilonewton (kN)
 Force Unit Conversion
- Measurement: Specific Weight in Kilonewton per Cubic Meter (kN/m³)
 Specific Weight Unit Conversion





Check other formula lists

- Density of Soil Formulas
- Dry Unit Weight of Soil Formulas
- Unit Weight of Soil Formulas
- Water Content and Volume of Solids in Soil Formulas

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