Important Diameter of Sediment Particle Formulas PDF

Formulas
Examples
with Units

List of 10
Important Diameter of Sediment Particle Formulas

1) Diameter for Settling Velocity with respect to Kinematic Viscosity Formula

Evaluate Formula

Formula

$$d = \sqrt{\frac{v_s \cdot 18 \cdot \nu}{[g] \cdot \left(G_s - G_w \right)}}$$

Example with Units

$$0.0011\,\text{m} = \sqrt{\frac{0.0016\,\text{m/s} \cdot 18 \cdot 7.25\,\text{St}}{9.8066\,\text{m/s}^2 \cdot \left(2.7 - 1.001 \right)}}$$

2) Diameter given Settling Velocity at 10 degree Celsius Formula

Evaluate Formula

Formula

$$d = \sqrt{\frac{v_s}{418 \cdot \left(G_s - G_w \right)}}$$

Example with Units

$$0.0015\,\text{m} = \sqrt{\frac{0.0016\,\text{m/s}}{418 \cdot \left(2.7 - 1.001 \right)}}$$

3) Diameter given Settling Velocity given Celsius Formula

Evaluate Formula

Formula

$$d = \sqrt{\frac{v_s \cdot 100}{418 \cdot \left(G_s - G_w \right) \cdot \left(3 \cdot t + 70 \right)}}$$

Example with Units

$$0.0005\,\text{m} = \sqrt{\frac{0.0016\,\text{m/s} \cdot 100}{418 \cdot \left(2.7 - 1.001 \right) \cdot \left(3 \cdot 36\,^{\circ}\text{C} + 70 \right)}}$$

4) Diameter given Settling Velocity in Fahrenheit Formula

Evaluate Formula

Formula

$$d = \sqrt{\frac{v_s}{418 \cdot \left(G_s - G_w \right) \cdot \left(\frac{T_F + 10}{60} \right)}}$$

Example with Units

$$0.0007\,\text{m} = \sqrt{\frac{0.0016\,\text{m/s}}{418 \cdot \left(2.7 - 1.001 \right) \cdot \left(\frac{96.8\,^{\circ}\text{F} + 10}{60} \right)}}$$

5) Diameter given Settling Velocity with respect to Dynamic Viscosity Formula

Evaluate Formula

Formula

$$d = \sqrt{\frac{18 \cdot v_s \cdot \mu_{viscosity}}{[g] \cdot \left(\rho_m - \rho_f\right)}}$$

Example with Units

$$0.0013\,\text{m} = \sqrt{\frac{18 \cdot 0.0016\,\text{m/s} \cdot 10.2\,\text{P}}{9.8066\,\text{m/s}^2 \cdot \left(2700\,\text{kg/m}^3 - 1000\,\text{kg/m}^3\right)}}$$

6) Diameter given Specific Gravity of Particle and Viscosity Formula

Evaluate Formula

Formula

$$d = \sqrt{\frac{v_s \cdot \nu \cdot 18}{[g] \cdot \left(G_s - 1\right)}}$$

Example with Units

$$0.0011\,\text{m} = \sqrt{\frac{0.0016\,\text{m/s} \cdot 7.25\,\text{St} \cdot 18}{9.8066\,\text{m/s}^2 \cdot \left(2.7 - 1\right)}}$$

7) Diameter of Particle given Particle Reynold's Number Formula

Evaluate Formula

Formula

$$d = \frac{\mu_{viscosity} \cdot Re}{\rho_f \cdot v_s}$$

Example with Units

$$0.0128\,\text{m} = \frac{10.2\,\text{P} \cdot 0.02}{1000\,\text{kg/m}^3 \cdot 0.0016\,\text{m/s}}$$

8) Diameter of Particle given Settling Velocity Formula

Evaluate Formula

Formula

$$d = \frac{3 \cdot C_D \cdot \rho_f \cdot v_s^2}{4 \cdot [g] \cdot \left(\rho_m - \rho_f\right)}$$

Example with Units

$$0.0001\,\text{m} = \frac{3 \cdot 1200 \cdot 1000\,\text{kg/m}^3 \cdot 0.0016\,\text{m/s}^2}{4 \cdot 9.8066\,\text{m/s}^2 \cdot \left(2700\,\text{kg/m}^3 - 1000\,\text{kg/m}^3\right)}$$

9) Diameter of Particle given Settling Velocity with respect to Specific Gravity Formula

Evaluate Formula

Formula

$$d = \frac{3 \cdot C_D \cdot v_s^2}{4 \cdot [g] \cdot \left(G_s - 1\right)}$$

Example with Units

$$0.0001\,\text{m} = \frac{3 \cdot 1200 \cdot 0.0016\,\text{m/s}^2}{4 \cdot 9.8066\,\text{m/s}^2 \cdot \left(2.7 - 1\right)}$$

10) Diameter of Particle given Volume of Particle Formula

Evaluate Formula

Formula

$$d = \left(6 \cdot \frac{V_p}{\pi}\right)^{\frac{1}{3}}$$

Example with Units

$$0.0013\,\text{m} = \left(6 \cdot \frac{1.15\,\text{mm}^3}{3.1416}\right)^{\frac{1}{3}}$$

Variables used in list of Diameter of Sediment Particle Formulas above

- C_D Drag Coefficient
- **d** Diameter of a Spherical Particle *(Meter)*
- G_s Specific Gravity of Spherical Particle
- G_w Specific Gravity of Fluid
- **Re** Reynold Number
- **t** Temperature in Centigrade *(Celsius)*
- T_F Temperature in Fahrenheit *(Fahrenheit)*
- V_p Volume of One Particle *(Cubic Millimeter)*
- v_s Settling Velocity of Particles *(Meter per Second)*
- $\mu_{viscosity}$ Dynamic Viscosity *(Poise)*
- **v** Kinematic Viscosity *(Stokes)*
- ρ_f Mass Density of Fluid *(Kilogram per Cubic Meter)*
- ρ_m Mass Density of Particles *(Kilogram per Cubic Meter)*

Constants, Functions, Measurements used in list of Diameter of Sediment Particle Formulas above

- constant(s): **pi**, 3.14159265358979323846264338327950288 *Archimedes' constant*
- constant(s): **[g]**, 9.80665 *Gravitational acceleration on Earth*
- Functions: **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 Meter (m) *Length Unit Conversion*
- Measurement: **Temperature** in Celsius (°C), Fahrenheit (°F) *Temperature Unit Conversion*
- Measurement: **Volume** in Cubic Millimeter (mm^3) *Volume Unit Conversion*
- Measurement: **Speed** in Meter per Second (m/s) *Speed Unit Conversion*
- Measurement: **Dynamic Viscosity** in Poise (P) *Dynamic Viscosity Unit Conversion*
- Measurement: **Mass Concentration** in Kilogram per Cubic Meter (kg/m^3) *Mass Concentration Unit Conversion*
- Measurement: **Kinematic Viscosity** in Stokes (St) *Kinematic Viscosity Unit Conversion*
- Measurement: **Density** in Kilogram per Cubic Meter (kg/m^3) *Density Unit Conversion*

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