

Important Design of Rapid Mix Basin and Flocculation Basin Formulas PDF



Formulas Examples with Units

List of 19 Important Design of Rapid Mix Basin and Flocculation Basin Formulas

1) Dynamic Viscosity given Mean Velocity Gradient Formula ↻

Formula

$$\mu_{\text{viscosity}} = \left(\frac{P}{(G)^2 \cdot V} \right)$$

Example with Units

$$833.3333 \text{ P} = \left(\frac{3 \text{ kJ/s}}{(2 \text{ s}^{-1})^2 \cdot 9 \text{ m}^3} \right)$$

Evaluate Formula ↻

2) Dynamic Viscosity given Power Requirement for Flocculation Formula ↻

Formula

$$\mu_{\text{viscosity}} = \left(\frac{P}{(G)^2 \cdot V} \right)$$

Example with Units

$$833.3333 \text{ P} = \left(\frac{3 \text{ kJ/s}}{(2 \text{ s}^{-1})^2 \cdot 9 \text{ m}^3} \right)$$

Evaluate Formula ↻

3) Dynamic Viscosity given Power Requirement for Rapid Mixing Operations Formula ↻

Formula

$$\mu_{\text{viscosity}} = \left(\frac{P}{(G)^2 \cdot V} \right)$$

Example with Units

$$833.3333 \text{ P} = \left(\frac{3 \text{ kJ/s}}{(2 \text{ s}^{-1})^2 \cdot 9 \text{ m}^3} \right)$$

Evaluate Formula ↻

4) Flow Rate of Secondary Effluent given Volume of Flocculation Basin Formula ↻

Formula

$$Q_e = \frac{V \cdot T_{m/d}}{T}$$

Example with Units

$$0.54 \text{ m}^3/\text{s} = \frac{9 \text{ m}^3 \cdot 0.30}{5 \text{ s}}$$

Evaluate Formula ↻

5) Hydraulic Retention Time given Volume of Rapid Mix Basin Formula ↻

Formula

$$\theta_s = \frac{V_{\text{rapid}}}{Q_{Fr'}}$$

Example with Units

$$7 \text{ s} = \frac{196 \text{ m}^3}{28 \text{ m}^3/\text{s}}$$

Evaluate Formula ↻



6) Mean Velocity Gradient given Power Requirement Formula

Formula

$$G = \sqrt{\frac{P}{\mu_{\text{viscosity}} \cdot V}}$$

Example with Units

$$2 \text{ s}^{-1} = \sqrt{\frac{3 \text{ kJ/s}}{833.33 \text{ P} \cdot 9 \text{ m}^3}}$$

Evaluate Formula 

7) Mean Velocity Gradient given Power Requirement for Flocculation Formula

Formula

$$G = \sqrt{\frac{P}{\mu_{\text{viscosity}} \cdot V}}$$

Example with Units

$$2 \text{ s}^{-1} = \sqrt{\frac{3 \text{ kJ/s}}{833.33 \text{ P} \cdot 9 \text{ m}^3}}$$

Evaluate Formula 

8) Mean Velocity Gradient given Power Requirement for Rapid Mixing Operations Formula

Formula

$$G = \sqrt{\frac{P}{\mu_{\text{viscosity}} \cdot V}}$$

Example with Units

$$2 \text{ s}^{-1} = \sqrt{\frac{3 \text{ kJ/s}}{833.33 \text{ P} \cdot 9 \text{ m}^3}}$$

Evaluate Formula 

9) Power Requirement for Flocculation in Direct Filtration Process Formula

Formula

$$P = (G)^2 \cdot \mu_{\text{viscosity}} \cdot V$$

Example with Units

$$3 \text{ kJ/s} = (2 \text{ s}^{-1})^2 \cdot 833.33 \text{ P} \cdot 9 \text{ m}^3$$

Evaluate Formula 

10) Power Requirement for Rapid Mixing Operations in Wastewater Treatment Formula

Formula

$$P = (G)^2 \cdot \mu_{\text{viscosity}} \cdot V$$

Example with Units

$$3 \text{ kJ/s} = (2 \text{ s}^{-1})^2 \cdot 833.33 \text{ P} \cdot 9 \text{ m}^3$$

Evaluate Formula 

11) Power Requirement given Mean Velocity Gradient Formula

Formula

$$P = (G)^2 \cdot \mu_{\text{viscosity}} \cdot V$$

Example with Units

$$3 \text{ kJ/s} = (2 \text{ s}^{-1})^2 \cdot 833.33 \text{ P} \cdot 9 \text{ m}^3$$

Evaluate Formula 

12) Required Volume of Flocculation Basin Formula

Formula

$$V = \frac{T \cdot Q_e}{T_{m/d}}$$

Example with Units

$$9 \text{ m}^3 = \frac{5 \text{ s} \cdot 0.54 \text{ m}^3/\text{s}}{0.30}$$

Evaluate Formula 

13) Retention Time given Volume of Flocculation Basin Formula

Formula

$$T = \frac{V \cdot T_{m/d}}{Q_e}$$

Example with Units

$$5 \text{ s} = \frac{9 \text{ m}^3 \cdot 0.30}{0.54 \text{ m}^3/\text{s}}$$

Evaluate Formula 



14) Time in Minutes Per Day given Volume of Flocculation Basin Formula

Formula

$$T_{m/d} = \frac{T \cdot Q_e}{V}$$

Example with Units

$$0.3 = \frac{5_s \cdot 0.54 \text{ m}^3/\text{s}}{9 \text{ m}^3}$$

Evaluate Formula 

15) Volume of Flocculation Basin given Power Requirement for Flocculation Formula

Formula

$$V = \left(\frac{P}{(G)^2 \cdot \mu_{\text{viscosity}}} \right)$$

Example with Units

$$9 \text{ m}^3 = \left(\frac{3 \text{ kJ/s}}{(2 \text{ s}^{-1})^2 \cdot 833.33 \text{ P}} \right)$$

Evaluate Formula 

16) Volume of Mixing Tank given Mean Velocity Gradient Formula

Formula

$$V = \left(\frac{P}{(G)^2 \cdot \mu_{\text{viscosity}}} \right)$$

Example with Units

$$9 \text{ m}^3 = \left(\frac{3 \text{ kJ/s}}{(2 \text{ s}^{-1})^2 \cdot 833.33 \text{ P}} \right)$$

Evaluate Formula 

17) Volume of Mixing Tank given Power Requirement for Rapid Mixing Operations Formula

Formula

$$V = \left(\frac{P}{(G)^2 \cdot \mu_{\text{viscosity}}} \right)$$

Example with Units

$$9 \text{ m}^3 = \left(\frac{3 \text{ kJ/s}}{(2 \text{ s}^{-1})^2 \cdot 833.33 \text{ P}} \right)$$

Evaluate Formula 

18) Volume of Rapid Mix Basin Formula

Formula

$$V_{\text{rapid}} = \theta \cdot W$$

Example with Units

$$196 \text{ m}^3 = 7_s \cdot 28 \text{ m}^3/\text{s}$$

Evaluate Formula 

19) Wastewater Flow given Volume of Rapid Mix Basin Formula

Formula

$$W = \frac{V_{\text{rapid}}}{\theta}$$

Example with Units

$$28 \text{ m}^3/\text{s} = \frac{196 \text{ m}^3}{7_s}$$

Evaluate Formula 



Variables used in list of Design of Rapid Mix Basin and Flocculation Basin Formulas above

- **G** Mean Velocity Gradient (1 Per Second)
- **P** Power Requirement (Kilojoule per Second)
- **Q_e** Flow Rate of Secondary Effluent (Cubic Meter per Second)
- **Q_{Fr}** Francis Discharge with Suppressed End (Cubic Meter per Second)
- **T** Retention Time (Second)
- **T_{m/d}** Time in Min Per Day
- **V** Volume of Tank (Cubic Meter)
- **V_{rapid}** Volume of Rapid Mix Basin (Cubic Meter)
- **W** Waste Water Flow (Cubic Meter per Second)
- **θ** Hydraulic Retention Time (Second)
- **θ_s** Hydraulic Retention Time in Seconds (Second)
- **μ_{viscosity}** Dynamic Viscosity (Poise)

Constants, Functions, Measurements used in list of Design of Rapid Mix Basin and Flocculation Basin Formulas above

- **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:** **Time** in Second (s)
Time Unit Conversion 
- **Measurement:** **Volume** in Cubic Meter (m³)
Volume Unit Conversion 
- **Measurement:** **Power** in Kilojoule per Second (kJ/s)
Power Unit Conversion 
- **Measurement:** **Volumetric Flow Rate** in Cubic Meter per Second (m³/s)
Volumetric Flow Rate Unit Conversion 
- **Measurement:** **Dynamic Viscosity** in Poise (P)
Dynamic Viscosity Unit Conversion 
- **Measurement:** **First Order Reaction Rate Constant** in 1 Per Second (s⁻¹)
First Order Reaction Rate Constant Unit Conversion 



Download other Important Environmental Engineering PDFs

- [Important Design of a Chlorination System for Wastewater Disinfection Formulas](#) 
- [Important Design of a Circular Settling Tank Formulas](#) 
- [Important Design of a Plastic Media Trickling Filter Formulas](#) 
- [Important Design of a Solid Bowl Centrifuge for Sludge Dewatering Formulas](#) 
- [Important Design of an Aerated Grit Chamber Formulas](#) 
- [Important Design of an Aerobic Digester Formulas](#) 
- [Important Design of an Anaerobic Digester Formulas](#) 
- [Important Design of Rapid Mix Basin and Flocculation Basin Formulas](#) 
- [Important Design of Trickling Filter using NRC Equations Formulas](#) 
- [Important Disposing of the Sewage Effluents Formulas](#) 
- [Important Estimating the Design Sewage Discharge Formulas](#) 
- [Important Flow Velocity in Straight Sewers Formulas](#) 
- [Important Noise Pollution Formulas](#) 
- [Important Population Forecast Method Formulas](#) 
- [Important Quality and Characteristics of Sewage Formulas](#) 
- [Important Sanitary System Sewer Design Formulas](#) 
- [Important Sewers their Construction , Maintenance and Required Appurtenances Formulas](#) 
- [Important Sizing a Polymer Dilution or Feed System Formulas](#) 
- [Important Water Demand and Quantity Formulas](#) 

Try our Unique Visual Calculators

-  [Percentage error](#) 
-  [LCM of three numbers](#) 
-  [Subtract fraction](#) 

Please SHARE this PDF with someone who needs it!

This PDF can be downloaded in these languages

[English](#) [Spanish](#) [French](#) [German](#) [Russian](#) [Italian](#) [Portuguese](#) [Polish](#) [Dutch](#)



