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Design of Rapid Mix Basin and Flocculation Basin Formulas

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

Design of Rapid Mix Basin and Flocculation Basin

1) Dynamic Viscosity given Mean Velocity Gradient

Open Calculator

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

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

2) Dynamic Viscosity given Power Requirement for Flocculation

Open Calculator

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

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

3) Dynamic Viscosity given Power Requirement for Rapid Mixing Operations

Open Calculator

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

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

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

Open Calculator

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

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

5) Hydraulic Retention Time given Volume of Rapid Mix Basin

Open Calculator

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

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

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6) Mean Velocity Gradient given Power Requirement

Open Calculator

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

ex $$2.000004\text{s}^{-1} = \sqrt{\frac{3\text{kJ/s}}{833.33\text{P} \cdot 9\text{m}^3}}$$

7) Mean Velocity Gradient given Power Requirement for Flocculation

Open Calculator

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

ex $$2.000004\text{s}^{-1} = \sqrt{\frac{3\text{kJ/s}}{833.33\text{P} \cdot 9\text{m}^3}}$$

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

Open Calculator

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

ex $$2.000004\text{s}^{-1} = \sqrt{\frac{3\text{kJ/s}}{833.33\text{P} \cdot 9\text{m}^3}}$$

9) Power Requirement for Flocculation in Direct Filtration Process

Open Calculator

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

$$2.999988\text{kJ/s} = (2\text{s}^{-1})^2 \cdot 833.33\text{P} \cdot 9\text{m}^3$$

10) Power Requirement for Rapid Mixing Operations in Wastewater Treatment

Open Calculator

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

$$2.999988\text{kJ/s} = (2\text{s}^{-1})^2 \cdot 833.33\text{P} \cdot 9\text{m}^3$$

11) Power Requirement given Mean Velocity Gradient

Open Calculator

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

$$2.999988\text{kJ/s} = (2\text{s}^{-1})^2 \cdot 833.33\text{P} \cdot 9\text{m}^3$$

12) Required Volume of Flocculation Basin

Open Calculator

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

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

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13) Retention Time given Volume of Flocculation Basin

Open Calculator

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

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

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

Open Calculator

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

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

15) Volume of Flocculation Basin given Power Requirement for Flocculation

Open Calculator

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

$$9.000036m^3 = \left(\frac{3kJ/s}{(2s^{-1})^2 \cdot 833.33P} \right)$$

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16) Volume of Mixing Tank given Mean Velocity Gradient

Open Calculator

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

ex $$9.000036\text{m}^3 = \left(\frac{3\text{kJ/s}}{(2\text{s}^{-1})^2 \cdot 833.33\text{P}} \right)$$

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

Open Calculator

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

ex $$9.000036\text{m}^3 = \left(\frac{3\text{kJ/s}}{(2\text{s}^{-1})^2 \cdot 833.33\text{P}} \right)$$

18) Volume of Rapid Mix Basin

Open Calculator

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

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

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19) Wastewater Flow given Volume of Rapid Mix Basin

Open Calculator

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

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

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Variables Used

- **G** Mean Velocity Gradient *(1 Per Second)*
- **P** Power Requirement *(Kilojoule per Second)*
- Q_e Flow Rate of Secondary Effluent *(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 in Seconds *(Second)*
- **θ** Hydraulic Retention Time *(Second)*
- $\mu_{viscosity}$ Dynamic Viscosity *(Poise)*

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Constants, Functions, Measurements used

- Function: **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 (m^3)
  Volume Unit Conversion
- Measurement: **Power** in Kilojoule per Second (kJ/s)
  Power Unit Conversion
- Measurement: **Volumetric Flow Rate** in Cubic Meter per Second (m^3/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

Check other formula lists

- Design of a Chlorination System for Wastewater Disinfection Formulas
- Design of a Circular Settling Tank Formulas
- Design of a Plastic Media Trickling Filter Formulas
- Design of a Solid Bowl Centrifuge for Sludge Dewatering Formulas
- Design of an Aerated Grit Chamber Formulas
- Design of an Aerobic Digester Formulas
- Design of an Anaerobic Digester Formulas
- Design of Rapid Mix Basin and Flocculation Basin Formulas
- Estimating the Design Sewage Discharge Formulas
- Noise Pollution Formulas
- Population Forecast Method Formulas
- Sanitary System Sewer Design Formulas

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