



[calculatoratoz.com](http://calculatoratoz.com)



[unitsconverters.com](http://unitsconverters.com)

# Design of Rapid Mix Basin and Flocculation Basin Formulas

Calculators!

Examples!

Conversions!

Bookmark [calculatoratoz.com](http://calculatoratoz.com), [unitsconverters.com](http://unitsconverters.com)

Widest Coverage of Calculators and Growing - **30,000+ Calculators!**  
Calculate With a Different Unit for Each Variable - **In built Unit Conversion!**  
Widest Collection of Measurements and Units - **250+ Measurements!**

Feel free to SHARE this document with your friends!

[Please leave your feedback here...](#)



# 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

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

Open Calculator 

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

### 2) Dynamic Viscosity given Power Requirement for Flocculation

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

Open Calculator 

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



### 3) Dynamic Viscosity given Power Requirement for Rapid Mixing Operations

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

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235\_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0\_img.jpg\)](#)

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

### 5) Hydraulic Retention Time given Volume of Rapid Mix Basin

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

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f\_img.jpg\)](#)

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



## 6) Mean Velocity Gradient given Power Requirement

[Open Calculator !\[\]\(dfbd6b3763a6d1d9afaa974f64e2e4b5\_img.jpg\)](#)

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

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

## 7) Mean Velocity Gradient given Power Requirement for Flocculation

[Open Calculator !\[\]\(ec9132f1d27c8919987d92907322654d\_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(758ebdf4629c903da74c2e079717ae32\_img.jpg\)](#)

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

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



## 9) Power Requirement for Flocculation in Direct Filtration Process

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

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a\_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021\_img.jpg\)](#)

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

## 11) Power Requirement given Mean Velocity Gradient

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

[Open Calculator !\[\]\(bd3b31712ad9bab5a241210fa6925cdd\_img.jpg\)](#)

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

## 12) Required Volume of Flocculation Basin

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

[Open Calculator !\[\]\(7bc43b319a082987e20f7bf78f4bab80\_img.jpg\)](#)

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



13) Retention Time given Volume of Flocculation Basin 

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

[Open Calculator !\[\]\(d3fb9f94af8b26d1c844efa9a98805b0\_img.jpg\)](#)


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

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

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

[Open Calculator !\[\]\(e1d6102fe77919492c04879c8450f1f5\_img.jpg\)](#)

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


15) Volume of Flocculation Basin given Power Requirement for Flocculation 

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

[Open Calculator !\[\]\(ab4e2b3fc7e7887b7a72f548aa6f5e60\_img.jpg\)](#)


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



16) Volume of Mixing Tank given Mean Velocity Gradient [Open Calculator !\[\]\(feabb98897b440bc8695a03336a6e2df\_img.jpg\)](#)

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

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

17) Volume of Mixing Tank given Power Requirement for Rapid Mixing Operations [Open Calculator !\[\]\(642aa997563f9a325b310230bb5078b7\_img.jpg\)](#)

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

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

18) Volume of Rapid Mix Basin [Open Calculator !\[\]\(51514032c8ca341817228f39f1307b05\_img.jpg\)](#)

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

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



**19) Wastewater Flow given Volume of Rapid Mix Basin** [Open Calculator](#) 

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

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











## Variables Used

- **G** Mean Velocity Gradient (*1 Per Second*)
- **P** Power Requirement (*Kilojoule per Second*)
- **Q<sub>e</sub>** Flow Rate of Secondary Effluent (*Cubic Meter per Second*)
- **T** Retention Time (*Second*)
- **T<sub>m/d</sub>** Time in Min Per Day
- **V** Volume of Tank (*Cubic Meter*)
- **V<sub>rapid</sub>** 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*)
- **μ<sub>viscosity</sub>** Dynamic Viscosity (*Poise*)



## 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<sup>3</sup>)  
*Volume Unit Conversion* 
- **Measurement:** **Power** in Kilojoule per Second (kJ/s)  
*Power Unit Conversion* 
- **Measurement:** **Volumetric Flow Rate** in Cubic Meter per Second (m<sup>3</sup>/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<sup>-1</sup>)  
*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](#) 

Feel free to SHARE this document with your friends!

## PDF Available in

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

7/22/2024 | 5:49:19 AM UTC

[Please leave your feedback here...](#)

