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# Settling Zone Formulas

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# List of 17 Settling Zone Formulas

## Settling Zone

## Height of Settling Zone

### 1) Height of Settling Zone given Cross-section Area of Sedimentation Tank

$$\text{fx } h = \frac{A_{cs}}{w}$$

Open Calculator 

$$\text{ex } 12227.07\text{mm} = \frac{28\text{m}^2}{2.29\text{m}}$$

### 2) Height of Settling Zone given Detention Time

$$\text{fx } h = \frac{T_d \cdot Q}{L \cdot w}$$

Open Calculator 

$$\text{ex } 6615.721\text{mm} = \frac{3\text{min} \cdot 1.01\text{m}^3/\text{s}}{12\text{m} \cdot 2.29\text{m}}$$



### 3) Height of Settling Zone given Height at Outlet Zone with respect to Area of Tank

$$fx \quad h = H \cdot \frac{Q}{v' \cdot A_{CS}}$$

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

$$ex \quad 14428.57\text{mm} = 40\text{m} \cdot \frac{1.01\text{m}^3/\text{s}}{0.1\text{m}/\text{s} \cdot 28\text{m}^2}$$

### 4) Height of Settling Zone given Height at Outlet Zone with respect to Discharge

$$fx \quad h = H \cdot \frac{Q}{L \cdot w \cdot v'}$$

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

$$ex \quad 14701.6\text{mm} = 40\text{m} \cdot \frac{1.01\text{m}^3/\text{s}}{12\text{m} \cdot 2.29\text{m} \cdot 0.1\text{m}/\text{s}}$$

### 5) Height of Settling Zone given Height at Outlet Zone with respect to Settling Velocity

$$fx \quad h = H \cdot \frac{V_s}{v'}$$

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

$$ex \quad 12000\text{mm} = 40\text{m} \cdot \frac{0.03\text{m}/\text{s}}{0.1\text{m}/\text{s}}$$



## 6) Height of Settling Zone given Length of Sedimentation Tank with respect to Surface Area

$$fx \quad h = L \cdot \frac{A_{cs}}{A}$$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95\_img.jpg\)](#)

$$ex \quad 6720mm = 12m \cdot \frac{28m^2}{50m^2}$$

## 7) Height of Settling Zone given Length of Tank with respect to Darcy Weishbach Factor

$$fx \quad h = L \cdot \sqrt{\frac{f}{8}}$$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2\_img.jpg\)](#)

$$ex \quad 3000mm = 12m \cdot \sqrt{\frac{0.5}{8}}$$

## 8) Height of Settling Zone given Length of Tank with respect to Height for Practical Purpose

$$fx \quad h = \frac{L}{10}$$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7\_img.jpg\)](#)

$$ex \quad 1200mm = \frac{12m}{10}$$



## 9) Height of Settling Zone given Ratio of Removal with respect to Tank Height

$$fx \quad h = \frac{H}{R_r}$$

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

$$ex \quad 13333.33\text{mm} = \frac{40\text{m}}{3}$$

## Length of Settling Zone

### 10) Length of Settling Zone given Detention Time

$$fx \quad L = \frac{T_d \cdot Q}{w \cdot h}$$

[Open Calculator !\[\]\(8bba887393ca45b761e5cb49e755e762\_img.jpg\)](#)

$$ex \quad 6.615721\text{m} = \frac{3\text{min} \cdot 1.01\text{m}^3/\text{s}}{2.29\text{m} \cdot 12000\text{mm}}$$

### 11) Length of Settling Zone given Height at Outlet Zone with respect to Discharge

$$fx \quad L = \frac{H \cdot Q}{w \cdot h \cdot v'}$$

[Open Calculator !\[\]\(0fb13ad0bfa3d86868cdd3883e5665b3\_img.jpg\)](#)

$$ex \quad 14.7016\text{m} = \frac{40\text{m} \cdot 1.01\text{m}^3/\text{s}}{2.29\text{m} \cdot 12000\text{mm} \cdot 0.1\text{m}/\text{s}}$$



## 12) Length of Settling Zone given Surface Area of Sedimentation Tank

$$fx \quad L = \frac{A_{cs}}{w}$$

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

$$ex \quad 12.22707m = \frac{28m^2}{2.29m}$$

## 13) Length of Settling Zone given Vertical Falling Speed in Sedimentation Tank

$$fx \quad L = \frac{Q}{V_s \cdot w}$$

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

$$ex \quad 14.7016m = \frac{1.01m^3/s}{0.03m/s \cdot 2.29m}$$

## Width of Settling Zone


### 14) Width of Settling Zone given Cross-section Area of Sedimentation Tank

$$fx \quad W = \frac{A_{cs}}{h}$$

[Open Calculator !\[\]\(104fbf564e2e5a8fbd84f31656d114c7\_img.jpg\)](#)

$$ex \quad 2.333333J/kg = \frac{28m^2}{12000mm}$$




15) Width of Settling Zone given Detention Time 

$$fx \quad W = \frac{T_d \cdot Q}{L \cdot h}$$

[Open Calculator !\[\]\(9dfdaff1d86ba3c1f8353b4d1b61b8c5\_img.jpg\)](#)

$$ex \quad 1.2625J/kg = \frac{3min \cdot 1.01m^3/s}{12m \cdot 12000mm}$$

16) Width of Settling Zone given Height at Outlet Zone with respect to Discharge 

$$fx \quad W = H \cdot \frac{Q}{L \cdot h \cdot v'}$$

[Open Calculator !\[\]\(2b376d1a92330ab09dad2665d2f89bf5\_img.jpg\)](#)

$$ex \quad 2.805556J/kg = 40m \cdot \frac{1.01m^3/s}{12m \cdot 12000mm \cdot 0.1m/s}$$

17) Width of Settling Zone given Surface Area of Sedimentation Tank 

$$fx \quad W = \frac{A}{L}$$

[Open Calculator !\[\]\(c444627dab9fee9a1550c053ffaaaae2\_img.jpg\)](#)

$$ex \quad 4.166667J/kg = \frac{50m^2}{12m}$$









## Variables Used

- **A** Area (Square Meter)
- **A<sub>CS</sub>** Cross-Sectional Area (Square Meter)
- **f** Darcy Friction Factor
- **h** Height of Crack (Millimeter)
- **H** Outer Height (Meter)
- **L** Length (Meter)
- **Q** Discharge (Cubic Meter per Second)
- **R<sub>r</sub>** Removal Ratio
- **T<sub>d</sub>** Detention Time (Minute)
- **V<sub>s</sub>** Settling Velocity (Meter per Second)
- **v'** Falling Speed (Meter per Second)
- **w** Width (Meter)
- **W** Width of Settling Zone (Joule per Kilogram)





## 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:** **Length** in Millimeter (mm), Meter (m)  
*Length Unit Conversion* 
- **Measurement:** **Time** in Minute (min)  
*Time Unit Conversion* 
- **Measurement:** **Area** in Square Meter (m<sup>2</sup>)  
*Area Unit Conversion* 
- **Measurement:** **Speed** in Meter per Second (m/s)  
*Speed Unit Conversion* 
- **Measurement:** **Volumetric Flow Rate** in Cubic Meter per Second (m<sup>3</sup>/s)  
*Volumetric Flow Rate Unit Conversion* 
- **Measurement:** **Latent Heat** in Joule per Kilogram (J/kg)  
*Latent Heat Unit Conversion* 



## Check other formula lists

- [Diameter of Sediment Particle Formulas](#) 
- [Displacement and Drag Formulas](#) 
- [Sedimentation Tank Formulas](#) 
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