



Flow Velocity in Sewers and Drains Formulas

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Examples!

Conversions!

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List of 21 Flow Velocity in Sewers and Drains Formulas

Flow Velocity in Sewers and Drains &

Bazin's Formula 🗗

1) Chezy's Constant by Bazin's Formula

$$ext{C}_{ ext{b}} = \left(rac{157.6}{181 + \left(rac{ ext{K}}{\sqrt{ ext{m}}}
ight)}
ight)$$

Open Calculator

ex
$$0.867233 = \left(\frac{157.6}{181 + \left(\frac{2.3}{\sqrt{10 \mathrm{m}}} \right)} \right)$$

2) Hydraulic Mean Depth given Chezy's Constant by Bazin's Formula

$$\mathbf{m} = \left(\left(rac{\mathrm{K}}{\left(rac{157.6}{\mathrm{C_b}}
ight) - 181}
ight)
ight)^2$$

Open Calculator

$$= \left(\left(\frac{2.3}{\left(\frac{157.6}{0.8672} \right) - 181} \right) \right)^{2}$$





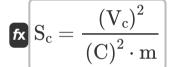
Chezy's Formula 🗗

3) Chezy's Constant given Velocity of Flow by Chezy's Formula

$$ext{C} = rac{ ext{V}_{ ext{c}}}{\sqrt{ ext{S}_{ ext{c}} \cdot ext{m}}}$$

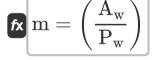
ex
$$14.97024 = \frac{5.01 \mathrm{m/s}}{\sqrt{0.0112 \cdot 10 \mathrm{m}}}$$

4) Hydraulic Gradient given Velocity of Flow by Chezy's Formula



$$oxed{ex} 0.011156 = rac{(5.01 ext{m/s})^2}{{(15)}^2 \cdot 10 ext{m}}$$

5) Hydraulic Mean Radius of Channel



$$\boxed{10\mathrm{m} = \left(\frac{120\mathrm{m}^2}{12\mathrm{m}}\right)}$$



6) Hydraulic Mean Radius of Channel given Velocity of Flow by Chezy's Formula

 $\mathbf{m} = rac{(\mathrm{V_c})^2}{{(\mathrm{C})^2 \cdot \mathrm{S_c}}}$

Open Calculator 🖸

$$9.960357 \text{m} = \frac{(5.01 \text{m/s})^2}{(15)^2 \cdot 0.0112}$$

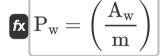
7) Velocity of Flow by Chezy's Formula



Open Calculator

ex
$$5.01996 \mathrm{m/s} = 15 \cdot \sqrt{0.0112 \cdot 10 \mathrm{m}}$$





$$\boxed{\mathbf{ex}} \ 12\mathrm{m} = \left(\frac{120\mathrm{m}^2}{10\mathrm{m}}\right)$$



Crimp and Burge's Formula 🗗

9) Bed Slope of Sewer given Flow Velocity by Crimp and Burge's Formula

$$\mathbf{fx} \mathbf{s} = \left(rac{V_{cb}}{83.5 \cdot (m)^{rac{2}{3}}}
ight)^2$$

Open Calculator 🗗

ex
$$0.000999 = \left(\frac{12.25 \text{m/s}}{83.5 \cdot (10 \text{m})^{\frac{2}{3}}}\right)^2$$

10) Flow Velocity by Crimp and Burge's Formula

$$V_{
m cb} = 83.5 \cdot ({
m m})^{rac{2}{3}} \cdot \sqrt{{
m s}}$$

Open Calculator 🖸

- $ext{ex} \left[12.25612 ext{m/s} = 83.5 \cdot (10 ext{m})^{rac{2}{3}} \cdot \sqrt{0.001}
 ight]$
- 11) Hydraulic Mean Depth given Flow Velocity by Crimp and Burge's Formula

$$\mathbf{m} = \left(rac{\mathrm{V_{cb}}}{\sqrt{\mathrm{s}\cdot 83.5}}
ight)^{rac{3}{2}}$$

Open Calculator 🗗

$$= 2.992506 \text{m} = \left(\frac{12.25 \text{m/s}}{\sqrt{0.001} \cdot 83.5}\right)^{\frac{3}{2}}$$





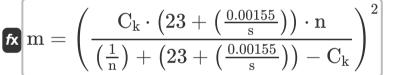
Kutter's Formula

12) Chezy's Constant by Kutter's Formula

 $\mathbf{C}_{\mathrm{k}} = rac{\left(23 + \left(rac{0.00155}{\mathrm{s}}
ight)
ight) + \left(rac{1}{\mathrm{n}}
ight)}{1 + \left(23 + \left(rac{0.00155}{\mathrm{s}}
ight)
ight) \cdot \left(rac{\mathrm{n}}{\sqrt{\mathrm{m}}}
ight)}$

Open Calculator 🚰

13) Hydraulic Mean Depth given Chezy's Constant by Kutter's Formula

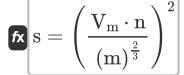


Open Calculator 🗗



Manning's Formula 🗗

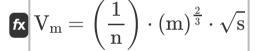
14) Bed Slope of Sewer given Flow Velocity by Manning's Formula 🗗



Open Calculator 🗗

ex $0.000999 = \left(\frac{9.78 \text{m/s} \cdot 0.015}{(10 \text{m})^{\frac{2}{3}}}\right)^2$

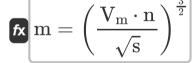
15) Flow Velocity by Manning's Formula



Open Calculator

 $\mathbf{ex} \left[9.785328 \mathrm{m/s} = \left(rac{1}{0.015}
ight) \cdot (10 \mathrm{m})^{rac{2}{3}} \cdot \sqrt{0.001}
ight]$

16) Hydraulic Mean Depth given Flow Velocity by Manning's Formula 🗹



Open Calculator 🗗

$$= 2.991833 \text{m} = \left(\frac{9.78 \text{m/s} \cdot 0.015}{\sqrt{0.001}}\right)^{\frac{3}{2}}$$





17) Rugosity Coefficient given Flow Velocity by Manning's Formula

 $\mathbf{f} \mathbf{x} = \left(rac{1}{V_{\mathrm{m}}}
ight) \cdot (\mathrm{m})^{rac{2}{3}} \cdot \sqrt{\mathrm{s}}$

Open Calculator 🗗

 $oxed{ex} 0.015008 = \left(rac{1}{9.78 ext{m/s}}
ight) \cdot (10 ext{m})^{rac{2}{3}} \cdot \sqrt{0.001}$

William Hazen's Formula

18) Bed Slope of Sewer given Flow Velocity by William Hazen's Formula

 $\left|\mathbf{s}
ight| \mathbf{s} = \left(rac{V_{\mathrm{wh}}}{0.85\cdot\left(\mathrm{m}
ight)^{0.63}\cdot\mathrm{C_{H}}}
ight)^{rac{1}{0.54}}$

Open Calculator 🗗

$$oxed{ex} 0.001 = \left(rac{10.43 ext{m/s}}{0.85 \cdot (10 ext{m})^{0.63} \cdot 119.91}
ight)^{rac{1}{0.54}}$$

19) Flow Velocity by William Hazen's Formula

 $ag{V_{
m wh} = 0.85 \cdot C_{
m H} \cdot (
m m)^{0.63} \cdot (
m s)^{0.54}}$

Open Calculator

 $ext{ex} \left[10.42976 ext{m/s} = 0.85 \cdot 119.91 \cdot (10 ext{m})^{0.63} \cdot (0.001)^{0.54}
ight]$



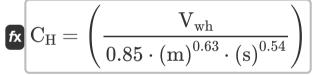
20) Hydraulic Mean Depth given Flow Velocity by William Hazen's Formula

$$\mathbf{m} = \left(rac{\mathrm{V_{wh}}}{0.85\cdot\mathrm{C_H}\cdot\mathrm{(s)}^{0.54}}
ight)^{rac{1}{0.63}}$$

Open Calculator 2

$$= \left(\frac{10.43 \text{m/s}}{0.85 \cdot 119.91 \cdot (0.001)^{0.54}} \right)^{\frac{1}{0.63}}$$

21) William Hazen Coefficient given Flow Velocity by William Hazen's Formula



Open Calculator 🖸

ex
$$119.9128 = \left(\frac{10.43 \mathrm{m/s}}{0.85 \cdot (10 \mathrm{m})^{0.63} \cdot (0.001)^{0.54}} \right)$$



Variables Used

- A_w Wetted Area (Square Meter)
- C Chezy's Constant
- Ch Chezy's Constant by Bazin's Formula
- CH William Hazen Coefficient
- C_k Chezy's Constant by Kutter's Formula
- K Bazin's Constant
- m Hydraulic Mean Depth (Meter)
- n Rugosity Coefficient
- Pw Wetted Perimeter (Meter)
- S Bed Slope of Channel
- Sc Slope for Chezy's Formula
- V_c Flow Velocity for Chezy's Formula (Meter per Second)
- V_{cb} Flow Velocity for Crimp and Burge's Formula (Meter per Second)
- **V_m** Flow Velocity for Manning's Formula (Meter per Second)
- V_{wh} Flow Velocity for William Hazen's Formula (Meter per Second)





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 Meter (m)
 Length Unit Conversion
- Measurement: Area in Square Meter (m²)

 Area Unit Conversion
- Measurement: Speed in Meter per Second (m/s)
 Speed Unit Conversion





Check other formula lists

- Flow Velocity in Sewers and Drains Formulas
- Hydraulic Mean Depth
 Formulas
- Minimum Velocity to be Generated in Sewers Formulas
- Proportionate Hydraulic Elements for Circular Sewers Formulas
- Roughness Coefficient Formulas

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