



Most Efficient Section of Channel Formulas

Calculators!

Examples!

Conversions!

Bookmark <u>calculatoratoz.com</u>, <u>unitsconverters.com</u>

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 38 Most Efficient Section of Channel Formulas

Most Efficient Section of Channel

Circular Section

1) Chezy Constant given Discharge through Channels

$$\mathrm{C} = rac{\mathrm{Q}}{\sqrt{\left(\mathrm{A}^3
ight)\cdot rac{\mathrm{S}}{\mathrm{p}}}}$$

Open Calculator

ex
$$22.4 = rac{14 ext{m}^3/ ext{s}}{\sqrt{\left(\left(25 ext{m}^2\right)^3\right) \cdot rac{0.0004}{16 ext{m}}}}$$

2) Depth of Flow in most Efficient Channel for Maximum Discharge

fx
$$D_{\mathrm{f}} = 1.876 \cdot \mathrm{r'}$$

Open Calculator 🗗

$$\mathbf{ex} \ 5.628 \mathrm{m} = 1.876 \cdot 3 \mathrm{m}$$

3) Depth of Flow in most Efficient Channel for Maximum Velocity

fx
$$D_{
m f}=1.626\cdot {
m r}'$$

Open Calculator

$$4.878m = 1.626 \cdot 3m$$





4) Depth of flow in most Efficient Channel in circular channel

fx $D_{
m f}=1.8988\cdot {
m r}^{\prime}$

Open Calculator

 $|\mathbf{ex}| 5.6964 \mathrm{m} = 1.8988 \cdot 3 \mathrm{m}$

5) Diameter of Section given Depth of Flow in most Efficient channel for Maximum Velocity

 $\left| \mathbf{f}_{\mathbf{k}}
ight| \mathrm{d}_{\mathrm{section}} = rac{\mathrm{D_f}}{0.81}$

Open Calculator

 $= 6.419753 \text{m} = \frac{5.2 \text{m}}{0.81}$

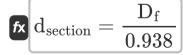
6) Diameter of Section given Depth of flow in most Efficient Channel section

 $ag{d}_{
m section} = rac{{
m D}_{
m f}}{0.95}$

Open Calculator

 $= \frac{5.2 \text{m}}{0.95}$

7) Diameter of Section given Flow Depth in most Efficient Channel



 $= \frac{5.2 \text{m}}{0.938}$





8) Diameter of Section given Hydraulic Radius in most Efficient Channel for Maximum Velocity

fx $d_{
m section} = rac{R_{
m H}}{0.3}$

Open Calculator

 $= x 5.333333m = \frac{1.6m}{0.3}$

9) Diameter of Section when Hydraulic Radius is at 0.9D

 $ext{d}_{ ext{section}} = rac{ ext{R}_{ ext{H}}}{0.29}$

Open Calculator 🖒

 $= \frac{1.6 \text{m}}{0.29}$

10) Discharge through Channels 🚰

 $\mathbf{K} = \mathbf{C} \cdot \sqrt{\left(\mathbf{A}^3\right) \cdot rac{\mathbf{S}}{\mathbf{p}}}$

Open Calculator

 $ext{ex} 25 ext{m}^3/ ext{s} = 40 \cdot \sqrt{\left((25 ext{m}^2)^3
ight) \cdot rac{0.0004}{16 ext{m}}}$

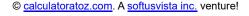
11) Hydraulic Radius in most Efficient channel for Maximum Velocity

fx $m R_H = 0.6806 \cdot r'$

Open Calculator

 $\mathbf{ex} \ 2.0418 \mathrm{m} = 0.6806 \cdot 3 \mathrm{m}$







12) Radius of Section given Depth of flow in Efficient Channel

fx $m r'=rac{D_f}{1.8988}$

Open Calculator

 $2.738572 \text{m} = \frac{5.2 \text{m}}{1.8988}$

13) Radius of Section given Depth of Flow in most Efficient Channel for Maximum Velocity

fx ${
m r'}=rac{{
m D_f}}{1.626}$

Open Calculator

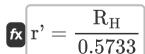
 $= 3.198032 \text{m} = \frac{5.2 \text{m}}{1.626}$

14) Radius of Section given Depth of Flows in most Efficient Channel

fx $m r' = rac{D_f}{1.876}$

Open Calculator 🖒

15) Radius of Section given Hydraulic Radius



Open Calculator 🗗

 $= 2.79086 \text{m} = \frac{1.6 \text{m}}{0.5733}$







16) Radius of Section given Hydraulic Radius in most Efficient Channel for Maximum Velocity

 $\mathbf{r}' = rac{\mathrm{R_H}}{0.6806}$

Open Calculator 🗗

 $2.350867 \text{m} = \frac{1.6 \text{m}}{0.6806}$

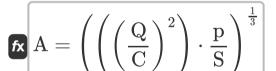
17) Side Slope of Channel Bed given Discharge through Channels

 $S = rac{p}{\left(A^3
ight)^2}$

Open Calculator

 $egin{aligned} extbf{ex} \ 0.000125 &= rac{16 ext{m}}{rac{\left((25 ext{m}^2)^3
ight)}{\left(rac{14 ext{m}^3/ ext{s}}{40}
ight)^2} \end{aligned}$

18) Wetted Area given Discharge through Channels



Open Calculator 🗗

$$extbf{ex} 16.98499 ext{m}^2 = \left(\left(\left(rac{14 ext{m}^3/ ext{s}}{40}
ight)^2
ight) \cdot rac{16 ext{m}}{0.0004}
ight)^{rac{1}{3}}$$



19) Wetted Perimeter given Discharge through Channels

 $p = rac{\left(A^3\right) \cdot S}{\left(rac{Q}{C}
ight)^2}$

Open Calculator 🗗

 $extbf{ex} 51.02041 ext{m} = rac{\left(\left(25 ext{m}^2
ight)^3
ight) \cdot 0.0004}{\left(rac{14 ext{m}^3/ ext{s}}{40}
ight)^2}$

Rectangular Section 2

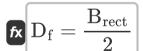
20) Depth of Flow given Hydraulic Radius in most Efficient Rectangular Channel

fx $\mathrm{D_f} = \mathrm{R_{H(rect)}} \cdot 2$

Open Calculator

ex $5.2\mathrm{m} = 2.6\mathrm{m} \cdot 2$

21) Depth of Flow in Most Efficient Channel for Rectangular Channel 🚰



Open Calculator

 $5.2 \text{m} = \frac{10.4 \text{m}}{2}$



22) Hydraulic Radius in most Efficient Open Channel

fx $m R_{H(rect)} = rac{D_f}{2}$

Open Calculator

 $\boxed{2.6\mathrm{m} = \frac{5.2\mathrm{m}}{2}}$

23) Width of Channel given Depth of flow in Most Efficient channels

fx $B_{rect} = D_f \cdot 2$

Open Calculator

 $\boxed{\textbf{ex}} \ 10.4 \text{m} = 5.2 \text{m} \cdot 2$

Trapezoidal Section

24) Depth of Flow given Hydraulic Radius in Most Efficient Trapezoidal Channel

fx $m d_f = R_H \cdot 2$

Open Calculator

 $\boxed{3.2\mathrm{m} = 1.6\mathrm{m} \cdot 2}$

25) Depth of Flow given Wetted Area in Most Efficient Channel for Bottom Width is kept Constant

 $\mathbf{K} \mathbf{d}_{\mathrm{f}} = \left(\mathbf{z}_{\mathrm{trap}} \cdot \mathbf{S}_{\mathrm{Trap}}
ight)^{rac{1}{2}}$

Open Calculator



26) Depth of Flow in most Efficient Channel in Trapezoidal Channel 🗗

 \mathbf{f} $\mathbf{d}_{\mathrm{f}} = rac{\mathbf{B}_{\mathrm{trap}}}{rac{2}{\sqrt{2}}}$

Open Calculator 2

 $3.29999 \text{m} = \frac{3.8105 \text{m}}{\frac{2}{\sqrt{2}}}$

27) Depth of Flow in most Efficient Channel in Trapezoidal Channel given Channel Slope

 $m d_f = rac{B_{trap} \cdot 0.5}{\sqrt{\left(z_{trap}^2
ight) + 1} - z_{trap}}$

Open Calculator

 $3.8105 \text{m} \cdot 0.5$ ex 3.298989m = - $\sqrt{\left(\left(0.577 \right)^2 \right) + 1} - 0.577$

28) Depth of Flow when Width of Channel in Most Efficient Channel for Bottom Width is kept Constant

 $\mathrm{d_f} = \mathrm{B_{trap}} \cdot rac{\mathrm{z_{trap}}}{1 - \left(\mathrm{z_{trap}^2}
ight)}$

Open Calculator 2

 $= 3.295989 \mathrm{m} = 3.8105 \mathrm{m} \cdot \frac{0.577}{1 - \left((0.577)^2 \right)}$



29) Hydraulic Radius of Most Efficient Channel 🗗

 $m R_H = rac{d_f}{2}$

Open Calculator

Open Calculator

 $| 1.65 \text{m} = \frac{3.3 \text{m}}{2}$

30) Side Slope of Section for Depth of Flow is kept Constant

 $\mathbf{z}_{ ext{trap}} = rac{1}{\sqrt{3}} \cdot rac{ ext{d}_{ ext{f}}}{ ext{d}_{ ext{f}}}$

 $0.57735 = \frac{1}{\sqrt{3}} \cdot \frac{3.3 \text{m}}{3.3 \text{m}}$

31) Side Slope of Section given Wetted Area for Bottom Width is kept Constant

 $\mathbf{f}\mathbf{z}_{ ext{trap}} = d_{ ext{f}} \cdot rac{d_{ ext{f}}}{S_{ ext{Trap}}}$

Open Calculator 2



32) Wetted Area in Most Efficient Channel for Bottom Width is kept Constant

 $\left| \mathbf{f}_{\mathbf{z}} \right| \mathbf{S}_{\mathrm{Trap}} = \mathbf{d}_{\mathrm{f}} \cdot \frac{\mathbf{d}_{\mathrm{f}}}{\mathbf{z}_{\mathrm{trap}}}$

Open Calculator 🗗

 $ext{ex} 18.87348 ext{m}^2 = 3.3 ext{m} \cdot rac{3.3 ext{m}}{0.577}$

33) Width of Channel given Depth of Flow in Efficient Channel

fx

Open Calculator

 $ext{B}_{ ext{trap}} = \left(\sqrt{\left(ext{z}_{ ext{trap}}^2
ight) + 1}
ight) \cdot 2 \cdot ext{d}_{ ext{f}} - 2 \cdot ext{d}_{ ext{f}} \cdot ext{z}_{ ext{trap}}
ight)$

 $= \left(\sqrt{\left((0.577)^2\right) + 1}\right) \cdot 2 \cdot 3.3 \mathrm{m} - 2 \cdot 3.3 \mathrm{m} \cdot 0.577$

34) Width of Channel in most Efficient Channel sections

 $egin{aligned} \mathbf{B}_{\mathrm{trap}} = \left(rac{2}{\sqrt{3}}
ight) \cdot \mathrm{d_f} \end{aligned}$

Open Calculator 🖸



35) Width of Channel in Most Efficient Channel when Bottom width is kept constant

 $\mathbf{E}_{ ext{trap}} = d_{ ext{f}} \cdot \left(rac{1 - \left(z_{ ext{trap}}^2
ight)}{z_{ ext{trap}}}
ight)$

Open Calculator 🚰

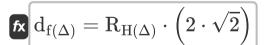
36) Width of Channel in most Efficient Channels section

 $egin{aligned} \mathbf{E}_{\mathrm{trap}} = \left(rac{2}{\sqrt{3}}
ight) \cdot \mathrm{d_f} \end{aligned}$

Open Calculator 🗗

Triangular Section

37) Depth of Flow given Hydraulic Radius in Most Efficient Triangular channel



Open Calculator

 $\texttt{ex} \left[3.300774 \text{m} = 1.167 \text{m} \cdot \left(2 \cdot \sqrt{2} \right) \right]$





38) Hydraulic Radius in Efficient channel 🗲



Open Calculator

$$m R_{H(\Delta)} = rac{d_{f(\Delta)}}{2 \cdot \sqrt{2}}$$

$$=$$
 $1.177333 \mathrm{m} = rac{3.33 \mathrm{m}}{2 \cdot \sqrt{2}}$



Variables Used

- A Wetted Surface Area of Channel (Square Meter)
- B_{rect} Width of Section of Rect Channel (Meter)
- B_{trap} Width of Trap Channel (Meter)
- C Chezy's Constant
- **d**_f Depth of Flow (Meter)
- **D**_f Depth of Flow of Channel (Meter)
- d_{f(Δ)} Depth of Flow of Triangle Channel (Meter)
- d_{section} Diameter of Section (Meter)
- p Wetted Perimeter of Channel (Meter)
- Q Discharge of Channel (Cubic Meter per Second)
- r' Radius of Channel (Meter)
- R_H Hydraulic Radius of Channel (Meter)
- R_{H(rect)} Hydraulic Radius of Rectangle (Meter)
- R_{H(Δ)} Hydraulic Radius of Triangular Channel (Meter)
- S Bed Slope
- S_{Trap} Wetted Surface Area of Trapezoidal Channel (Square Meter)
- **Z**trap Side slope of Trapezoidal Channel





Constants, Functions, Measurements used

- Function: sqrt, sqrt(Number)
 Square root function
- Measurement: Length in Meter (m)

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

 Area Unit Conversion
- Measurement: Volumetric Flow Rate in Cubic Meter per Second (m³/s)

 Volumetric Flow Rate Unit Conversion





Check other formula lists

- Buoyancy And Floatation
 Formulas
- Culverts Formulas
- Equations of Motion and Energy
 Equation Formulas
- Flow of Compressible Fluids Formulas
- Flow Over Notches and Weirs Formulas
- Fluid Pressure and Its
 Measurement Formulas
- Fundamentals of Fluid Flow Formulas
- Hydroelectric Power Generation
 Formulas
- Hydrostatic Forces on Surfaces
 Formulas

- Impact of Free Jets Formulas
- Impulse Momentum Equation and its Applications Formulas
- Liquids in Relative Equilibrium Formulas
- Most Efficient Section of Channel Formulas
- Non-uniform Flow in Channels Formulas
- Properties of Fluid Formulas
 Thermal Expansion of Pipe and
- Pipe Stresses Formulas
- Uniform Flow in Channels
 Formulas
- Water Power Engineering Formulas

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

2/1/2024 | 4:03:18 PM UTC

Please leave your feedback here...



