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Flow Over a Trapezoidal and Triangular Weir or Notch Formulas

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List of 20 Flow Over a Trapezoidal and Triangular Weir or Notch Formulas

Flow Over a Trapezoidal and Triangular Weir or Notch

Flow Over a Trapezoidal Weir or Notch

1) Additional Head given Discharge for Cipolletti Weir Considering Velocity

$$\text{fx } H_V = \left(H_{\text{Stillwater}}^{\frac{3}{2}} - \left(\frac{Q_C}{1.86 \cdot L_w} \right) \right)^{\frac{2}{3}}$$

[Open Calculator !\[\]\(de95854c7ee024cfadc48187bbb781b2_img.jpg\)](#)

$$\text{ex } 5.882555\text{m} = \left((6.6\text{m})^{\frac{3}{2}} - \left(\frac{15\text{m}^3/\text{s}}{1.86 \cdot 3\text{m}} \right) \right)^{\frac{2}{3}}$$

2) Coefficient of Discharge given Discharge for Cipolletti Weir

$$\text{fx } C_d = \frac{Q_C \cdot 3}{2 \cdot \sqrt{2 \cdot g} \cdot L_w \cdot S_w^{\frac{3}{2}}}$$

[Open Calculator !\[\]\(6a9b39b98eb945faa14c645ec99e4eaa_img.jpg\)](#)

$$\text{ex } 0.598947 = \frac{15\text{m}^3/\text{s} \cdot 3}{2 \cdot \sqrt{2 \cdot 9.8\text{m}/\text{s}^2} \cdot 3\text{m} \cdot (2\text{m})^{\frac{3}{2}}}$$

3) Discharge for Cipolletti Weir

$$\text{fx } Q_C = \left(\frac{2}{3} \right) \cdot C_d \cdot \sqrt{2 \cdot g} \cdot L_w \cdot S_w^{\frac{3}{2}}$$

[Open Calculator !\[\]\(f1c5da15572e3e09d343161be98f508d_img.jpg\)](#)

$$\text{ex } 16.52901\text{m}^3/\text{s} = \left(\frac{2}{3} \right) \cdot 0.66 \cdot \sqrt{2 \cdot 9.8\text{m}/\text{s}^2} \cdot 3\text{m} \cdot (2\text{m})^{\frac{3}{2}}$$

4) Discharge for Cipolletti Weir if Velocity is Considered

$$\text{fx } Q_C = 1.86 \cdot L_w \cdot \left(H_{\text{Stillwater}}^{\frac{3}{2}} - H_V^{\frac{3}{2}} \right)$$

[Open Calculator !\[\]\(166772600a13ad0a433053f90fe45649_img.jpg\)](#)

$$\text{ex } 39.56112\text{m}^3/\text{s} = 1.86 \cdot 3\text{m} \cdot \left((6.6\text{m})^{\frac{3}{2}} - (4.6\text{m})^{\frac{3}{2}} \right)$$



5) Discharge over Cipolletti Weir by Francis Cipolletti Open Calculator 

$$\text{fx } Q_C = 1.86 \cdot L_w \cdot S_w^{\frac{3}{2}}$$

$$\text{ex } 15.78262\text{m}^3/\text{s} = 1.86 \cdot 3\text{m} \cdot (2\text{m})^{\frac{3}{2}}$$

6) Discharge over Trapezoidal Notch if overall Coefficient of Discharge for Trapezoidal notch Open Calculator 

$$\text{fx } Q_C = \left(\left(C_d \cdot \sqrt{2 \cdot g} \cdot S_w^{\frac{3}{2}} \right) \cdot \left(\left(\frac{2}{3} \right) \cdot L_w + \left(\frac{8}{15} \right) \cdot S_w \cdot \tan\left(\frac{\theta}{2}\right) \right) \right)$$

$$\text{ex } 18.89111\text{m}^3/\text{s} = \left(\left(0.66 \cdot \sqrt{2 \cdot 9.8\text{m}/\text{s}^2} \cdot (2\text{m})^{\frac{3}{2}} \right) \cdot \left(\left(\frac{2}{3} \right) \cdot 3\text{m} + \left(\frac{8}{15} \right) \cdot 2\text{m} \cdot \tan\left(\frac{30^\circ}{2}\right) \right) \right)$$

7) Head given Discharge for Cipolletti Weir Open Calculator 

$$\text{fx } S_w = \left(\frac{3 \cdot Q_C}{2 \cdot C_d \cdot \sqrt{2 \cdot g} \cdot L_w} \right)^{\frac{2}{3}}$$

$$\text{ex } 1.874676\text{m} = \left(\frac{3 \cdot 15\text{m}^3/\text{s}}{2 \cdot 0.66 \cdot \sqrt{2 \cdot 9.8\text{m}/\text{s}^2} \cdot 3\text{m}} \right)^{\frac{2}{3}}$$

8) Head given Discharge for Cipolletti Weir using Velocity Open Calculator 

$$\text{fx } H_{\text{Stillwater}} = \left(\left(\frac{Q_C}{1.86 \cdot L_w} \right) + H_V^{\frac{3}{2}} \right)^{\frac{2}{3}}$$

$$\text{ex } 5.401608\text{m} = \left(\left(\frac{15\text{m}^3/\text{s}}{1.86 \cdot 3\text{m}} \right) + (4.6\text{m})^{\frac{3}{2}} \right)^{\frac{2}{3}}$$



9) Head given Discharge over Cipolletti Weir [Open Calculator](#) 


$$\text{fx } S_w = \left(\frac{Q_C}{1.86 \cdot L_w} \right)^{\frac{2}{3}}$$

$$\text{ex } 1.933324\text{m} = \left(\frac{15\text{m}^3/\text{s}}{1.86 \cdot 3\text{m}} \right)^{\frac{2}{3}}$$

10) Length of Crest given Discharge for Cipolletti Weir [Open Calculator](#) 

$$\text{fx } L_w = \frac{3 \cdot Q_C}{2 \cdot C_d \cdot \sqrt{2 \cdot g} \cdot S_w^{\frac{3}{2}}}$$

$$\text{ex } 2.722485\text{m} = \frac{3 \cdot 15\text{m}^3/\text{s}}{2 \cdot 0.66 \cdot \sqrt{2 \cdot 9.8\text{m}/\text{s}^2} \cdot (2\text{m})^{\frac{3}{2}}}$$

11) Length of Crest given Discharge over Cipolletti Weir by Francis, Cipolletti [Open Calculator](#) 

$$\text{fx } L_w = \frac{Q_C}{1.86 \cdot S_w^{\frac{3}{2}}}$$

$$\text{ex } 2.851237\text{m} = \frac{15\text{m}^3/\text{s}}{1.86 \cdot (2\text{m})^{\frac{3}{2}}}$$

12) Length of Crest when Discharge for Cipolletti Weir and Velocity is Considered [Open Calculator](#) 

$$\text{fx } L_w = \frac{Q_C}{1.86 \cdot \left(H_{\text{Stillwater}}^{\frac{3}{2}} - H_V^{\frac{3}{2}} \right)}$$

$$\text{ex } 1.13748\text{m} = \frac{15\text{m}^3/\text{s}}{1.86 \cdot \left((6.6\text{m})^{\frac{3}{2}} - (4.6\text{m})^{\frac{3}{2}} \right)}$$



Flow over a Triangular Weir or Notch

13) Coefficient of Discharge when Discharge for Triangular Weir when Angle is 90

$$\text{fx } C_d = \frac{Q_{\text{tri}}}{\left(\frac{8}{15}\right) \cdot \sqrt{2 \cdot g} \cdot S_w^{\frac{5}{2}}}$$

[Open Calculator !\[\]\(74d4806277d7e73349d8e8c0897931e9_img.jpg\)](#)

$$\text{ex } 0.748683 = \frac{10\text{m}^3/\text{s}}{\left(\frac{8}{15}\right) \cdot \sqrt{2 \cdot 9.8\text{m}/\text{s}^2} \cdot (2\text{m})^{\frac{5}{2}}}$$

14) Discharge for Entire Triangular Weir

$$\text{fx } Q_{\text{tri}} = \left(\frac{8}{15}\right) \cdot C_d \cdot \sqrt{2 \cdot g} \cdot \tan\left(\frac{\theta}{2}\right) \cdot S_w^{\frac{5}{2}}$$

[Open Calculator !\[\]\(8bba887393ca45b761e5cb49e755e762_img.jpg\)](#)

$$\text{ex } 2.362099\text{m}^3/\text{s} = \left(\frac{8}{15}\right) \cdot 0.66 \cdot \sqrt{2 \cdot 9.8\text{m}/\text{s}^2} \cdot \tan\left(\frac{30^\circ}{2}\right) \cdot (2\text{m})^{\frac{5}{2}}$$

15) Discharge for Triangular Weir if Angle is at 90

$$\text{fx } Q_{\text{tri}} = \left(\frac{8}{15}\right) \cdot C_d \cdot \sqrt{2 \cdot g} \cdot S_w^{\frac{3}{2}}$$

[Open Calculator !\[\]\(0fb13ad0bfa3d86868cdd3883e5665b3_img.jpg\)](#)

$$\text{ex } 4.407737\text{m}^3/\text{s} = \left(\frac{8}{15}\right) \cdot 0.66 \cdot \sqrt{2 \cdot 9.8\text{m}/\text{s}^2} \cdot (2\text{m})^{\frac{3}{2}}$$

16) Discharge for Triangular Weir if Coefficient Discharge is Constant

$$\text{fx } Q_{\text{tri}} = 1.418 \cdot S_w^{\frac{5}{2}}$$

[Open Calculator !\[\]\(e50091943b385fe16d3277389202856f_img.jpg\)](#)

$$\text{ex } 8.021419\text{m}^3/\text{s} = 1.418 \cdot (2\text{m})^{\frac{5}{2}}$$


17) Discharge for Triangular Weir if Velocity is Considered

$$\text{fx } Q_{\text{tri}} = \left(\frac{8}{15}\right) \cdot C_d \cdot \sqrt{2 \cdot g} \cdot \tan\left(\frac{\theta}{2}\right) \cdot \left(\left(S_w + H_V\right)^{\frac{5}{2}} - H_V^{\frac{5}{2}}\right)$$

[Open Calculator !\[\]\(e119fc79c8f448683d20ba4c873025a2_img.jpg\)](#)

$$\text{ex } 27.77825\text{m}^3/\text{s} = \left(\frac{8}{15}\right) \cdot 0.66 \cdot \sqrt{2 \cdot 9.8\text{m}/\text{s}^2} \cdot \tan\left(\frac{30^\circ}{2}\right) \cdot \left(\left(2\text{m} + 4.6\text{m}\right)^{\frac{5}{2}} - (4.6\text{m})^{\frac{5}{2}}\right)$$



18) Head for Discharge for Entire Triangular Weir [Open Calculator](#) 


$$fx \quad S_w = \left(\frac{Q_{tri}}{\left(\frac{8}{15}\right) \cdot C_d \cdot \sqrt{2 \cdot g} \cdot \tan\left(\frac{\theta}{2}\right)} \right)^{\frac{2}{5}}$$

$$ex \quad 3.562138m = \left(\frac{10m^3/s}{\left(\frac{8}{15}\right) \cdot 0.66 \cdot \sqrt{2 \cdot 9.8m/s^2} \cdot \tan\left(\frac{30^\circ}{2}\right)} \right)^{\frac{2}{5}}$$

19) Head when Coefficient Discharge is Constant [Open Calculator](#) 

$$fx \quad S_w = \left(\frac{Q_{tri}}{1.418} \right)^{\frac{2}{5}}$$

$$ex \quad 2.184387m = \left(\frac{10m^3/s}{1.418} \right)^{\frac{2}{5}}$$

20) Head when Discharge for Triangular Weir Angle is 90 [Open Calculator](#) 

$$fx \quad S_w = \frac{Q_{tri}}{\left(\left(\frac{8}{15}\right) \cdot C_d \cdot \sqrt{2 \cdot g}\right)^{\frac{2}{5}}}$$

$$ex \quad 8.373976m = \frac{10m^3/s}{\left(\left(\frac{8}{15}\right) \cdot 0.66 \cdot \sqrt{2 \cdot 9.8m/s^2}\right)^{\frac{2}{5}}}$$







Variables Used

- C_d Coefficient of Discharge
- g Acceleration due to Gravity (Meter per Square Second)
- $H_{\text{Stillwater}}$ Still Water Head (Meter)
- H_V Velocity Head (Meter)
- L_w Length of Weir Crest (Meter)
- Q_C Discharge by Cipolletti (Cubic Meter per Second)
- Q_{tri} Discharge through Triangular Weir (Cubic Meter per Second)
- S_w Height of Water above Crest of Weir (Meter)
- θ Theta (Degree)



Constants, Functions, Measurements used

- **Function: sqrt**, $\text{sqrt}(\text{Number})$
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.
- **Function: tan**, $\text{tan}(\text{Angle})$
The tangent of an angle is a trigonometric ratio of the length of the side opposite an angle to the length of the side adjacent to an angle in a right triangle.
- **Measurement: Length** in Meter (m)
Length Unit Conversion 
- **Measurement: Acceleration** in Meter per Square Second (m/s^2)
Acceleration Unit Conversion 
- **Measurement: Angle** in Degree ($^\circ$)
Angle Unit Conversion 
- **Measurement: Volumetric Flow Rate** in Cubic Meter per Second (m^3/s)
Volumetric Flow Rate Unit Conversion 



Check other formula lists

- [Broad Crested Weir Formulas](#) 
- [Flow Over a Trapezoidal and Triangular Weir or Notch Formulas](#) 
- [Flow Over Rectangular Sharp Crested Weir or Notch Formulas](#) 
- [Submerged Weirs Formulas](#) 
- [Time Required to Empty a Reservoir with Rectangular Weir Formulas](#) 

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