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Flow Over a Trapizoidal 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 🔗

Open Calculator 🔗

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

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

2) Coefficient of Discharge given Discharge for Cipolletti Weir 🔗

Open Calculator 🔗

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

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

3) Discharge for Cipolletti Weir 🔗

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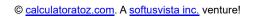
fx
$$Q_C = \left(\frac{2}{3} \right) \cdot C_d \cdot \sqrt{2 \cdot g} \cdot L_w \cdot S_w^{\frac{3}{2}}$$

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

4) Discharge for Cipolletti Weir if Velocity is Considered 🔗

Open Calculator 🔗

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

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

5) Discharge over Cipolletti Weir by Francis Cipolletti 🔗

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

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

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

fx   Open Calculator 🔗

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

ex

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

7) Head given Discharge for Cipolletti Weir 🔗

fx   Open Calculator 🔗

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

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

8) Head given Discharge for Cipolletti Weir using Velocity 🔗

fx   Open Calculator 🔗

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

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

9) Head given Discharge over Cipolletti Weir

Open Calculator

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

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

10) Length of Crest given Discharge for Cipolletti Weir

Open Calculator

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

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

11) Length of Crest given Discharge over Cipolletti Weir by Francis, Cipolletti

Open Calculator

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

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

12) Length of Crest when Discharge for Cipolletti Weir and Velocity is Considered

Open Calculator

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

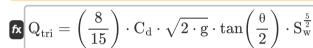$$ex \ 1.13748m = \frac{15m^3/s}{1.86 \cdot \left((6.6m)^{\frac{3}{2}} - (4.6m)^{\frac{3}{2}} \right)}$$

Flow over a Triangular Weir or Notch ⚡

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

Open Calculator ⚡

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

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

14) Discharge for Entire Triangular Weir ⚡

Open Calculator ⚡

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

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

15) Discharge for Triangular Weir if Angle is at 90 ⚡

Open Calculator ⚡

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

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

16) Discharge for Triangular Weir if Coefficient Discharge is Constant ⚡

Open Calculator ⚡
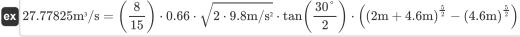
$$fx \ Q_{tri} = 1.418 \cdot S_w^{\frac{5}{2}}$$

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

17) Discharge for Triangular Weir if Velocity is Considered ⚡

Open Calculator ⚡

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

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

18) Head for Discharge for Entire Triangular Weir ⟳

$$fx\ S_w = \left(\frac{Q_{tri}}{\left(\frac{8}{15} \right) \cdot C_d \cdot \sqrt{2 \cdot g} \cdot \tan\left(\frac{\theta}{2} \right)} \right)^{\frac{2}{5}}$$
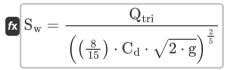
$$ex\ 3.562138 m = \left(\frac{10 m^3/s}{\left(\frac{8}{15} \right) \cdot 0.66 \cdot \sqrt{2 \cdot 9.8 m/s^2} \cdot \tan\left(\frac{30°}{2} \right)} \right)^{\frac{2}{5}}$$

19) Head when Coefficient Discharge is Constant ⟳

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

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

20) Head when Discharge for Triangular Weir Angle is 90 ⟳

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

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

Variables Used

- C_d Coefficient of Discharge
- g Acceleration due to Gravity *(Meter per Square Second)*
- $H_{Stillwater}$ 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**, sqrt(Number)
  Square root function
- Function: **tan**, tan(Angle)
  Trigonometric tangent function
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Acceleration** in Meter per Square Second (m/s²)
  Acceleration Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion
- Measurement: **Volumetric Flow Rate** in Cubic Meter per Second (m³/s)
  Volumetric Flow Rate Unit Conversion

Check other formula lists

- **Broad Crested Weir Formulas** ⤴
- **Flow Over a Trapizoidal 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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