calculatoratoz.com

unitsconverters.com

Notches and Weirs Formulas

Calculators! Examples! Conversions!

Bookmark **calculatoratoz.com**, **unitsconverters.com**

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 27 Notches and Weirs Formulas

Notches and Weirs

1) Head of Liquid above V-notch

Open Calculator

fx $$H = \left(\frac{Q_{th}}{\frac{8}{15} \cdot C_d \cdot \tan\left(\frac{\angle A}{2}\right) \cdot \sqrt{2 \cdot [g]}} \right)^{0.4}$$

ex $$0.339658m = \left(\frac{0.04m^3/s}{\frac{8}{15} \cdot 0.94 \cdot \tan\left(\frac{30°}{2}\right) \cdot \sqrt{2 \cdot [g]}} \right)^{0.4}$$

2) Head of Liquid at Crest

Open Calculator

fx $$H = \left(\frac{Q_{th}}{\frac{2}{3} \cdot C_d \cdot L_{weir} \cdot \sqrt{2 \cdot [g]}} \right)^{\frac{2}{3}}$$

ex $$0.008623m = \left(\frac{0.04m^3/s}{\frac{2}{3} \cdot 0.94 \cdot 18m \cdot \sqrt{2 \cdot [g]}} \right)^{\frac{2}{3}}$$

3) Length of Crest of Weir or Notch

Open Calculator

fx $$L_{weir} = \frac{3 \cdot A}{C_d \cdot t_{total} \cdot \sqrt{2 \cdot [g]}} \cdot \left(\frac{1}{\sqrt{H_f}} - \frac{1}{\sqrt{H_i}} \right)$$

ex $$0.041967m = \frac{3 \cdot 50m^2}{0.94 \cdot 80s \cdot \sqrt{2 \cdot [g]}} \cdot \left(\frac{1}{\sqrt{10m}} - \frac{1}{\sqrt{20.1m}} \right)$$

4) Length of Section for Discharge over Rectangle Notch or Weir

Open Calculator

fx $$L_{weir} = \frac{Q_{th}}{\frac{2}{3} \cdot C_d \cdot \sqrt{2 \cdot [g]} \cdot H^{\frac{3}{2}}}$$

ex $$0.000248m = \frac{0.04m^3/s}{\frac{2}{3} \cdot 0.94 \cdot \sqrt{2 \cdot [g]} \cdot (15m)^{\frac{3}{2}}}$$

5) Time Required to Empty Reservoir

Open Calculator

fx $$t_{total} = \left(\frac{3 \cdot A}{C_d \cdot L_{weir} \cdot \sqrt{2 \cdot [g]}}\right) \cdot \left(\frac{1}{\sqrt{H_f}} - \frac{1}{\sqrt{H_i}}\right)$$

ex $$0.186521s = \left(\frac{3 \cdot 50m^2}{0.94 \cdot 18m \cdot \sqrt{2 \cdot [g]}}\right) \cdot \left(\frac{1}{\sqrt{10m}} - \frac{1}{\sqrt{20.1m}}\right)$$

6) Time Required to Empty Tank with Triangular Weir or Notch

Open Calculator

fx $$t_{total} = \left(\frac{5 \cdot A}{4 \cdot C_d \cdot \tan\left(\frac{\angle A}{2}\right) \cdot \sqrt{2 \cdot [g]}}\right) \cdot \left(\frac{1}{H_f^{\frac{3}{2}}} - \frac{1}{H_i^{\frac{3}{2}}}\right)$$

ex $$1.150069s = \left(\frac{5 \cdot 50m^2}{4 \cdot 0.94 \cdot \tan\left(\frac{30°}{2}\right) \cdot \sqrt{2 \cdot [g]}}\right) \cdot \left(\frac{1}{(10m)^{\frac{3}{2}}} - \frac{1}{(20.1m)^{\frac{3}{2}}}\right)$$

Discharge

7) Coefficient of Discharge for Time Required to Empty Reservoir

Open Calculator

fx $$C_d = \frac{3 \cdot A}{t_{total} \cdot L_{weir} \cdot \sqrt{2 \cdot [g]}} \cdot \left(\frac{1}{\sqrt{H_f}} - \frac{1}{\sqrt{H_i}}\right)$$

ex $$0.002192 = \frac{3 \cdot 50m^2}{80s \cdot 18m \cdot \sqrt{2 \cdot [g]}} \cdot \left(\frac{1}{\sqrt{10m}} - \frac{1}{\sqrt{20.1m}}\right)$$

8) Discharge over Broad-Crested Weir

Open Calculator

fx $$Q = 1.705 \cdot C_d \cdot L_{weir} \cdot H^{\frac{3}{2}}$$

ex $$1675.952m^3/s = 1.705 \cdot 0.94 \cdot 18m \cdot (15m)^{\frac{3}{2}}$$

9) Discharge over Broad-Crested Weir for Head of Liquid at Middle

Open Calculator

fx $$Q = C_d \cdot L_{weir} \cdot \sqrt{2 \cdot [g] \cdot (h^2 \cdot H - h^3)}$$

ex $$1651.938 \text{m}^3/\text{s} = 0.94 \cdot 18\text{m} \cdot \sqrt{2 \cdot [g] \cdot \left((9\text{m})^2 \cdot 15\text{m} - (9\text{m})^3\right)}$$

10) Discharge over Broad-Crested Weir with Velocity of Approach

Open Calculator

fx $$Q = 1.705 \cdot C_d \cdot L_{weir} \cdot \left((H + h_a)^{\frac{3}{2}} - h_a^{\frac{3}{2}}\right)$$

ex $$2848.133 \text{m}^3/\text{s} = 1.705 \cdot 0.94 \cdot 18\text{m} \cdot \left((15\text{m} + 12\text{m})^{\frac{3}{2}} - (12\text{m})^{\frac{3}{2}}\right)$$

11) Discharge over Rectangle Notch or Weir

Open Calculator

fx $$Q_{th} = \frac{2}{3} \cdot C_d \cdot L_{weir} \cdot \sqrt{2 \cdot [g]} \cdot H^{\frac{3}{2}}$$

ex $$2902.16 \text{m}^3/\text{s} = \frac{2}{3} \cdot 0.94 \cdot 18\text{m} \cdot \sqrt{2 \cdot [g]} \cdot (15\text{m})^{\frac{3}{2}}$$

12) Discharge over Rectangle Weir Considering Bazin's formula

Open Calculator

fx $$Q = \left(0.405 + \frac{0.003}{H}\right) \cdot L_{weir} \cdot \sqrt{2 \cdot [g]} \cdot H^{\frac{3}{2}}$$

ex $$1876.524 \text{m}^3/\text{s} = \left(0.405 + \frac{0.003}{15\text{m}}\right) \cdot 18\text{m} \cdot \sqrt{2 \cdot [g]} \cdot (15\text{m})^{\frac{3}{2}}$$

13) Discharge over Rectangle Weir Considering Francis's formula

Open Calculator

fx $$Q = 1.84 \cdot L_{weir} \cdot \left((H_i + H_f)^{\frac{3}{2}} - H_f^{\frac{3}{2}}\right)$$

ex $$4422.058 \text{m}^3/\text{s} = 1.84 \cdot 18\text{m} \cdot \left((20.1\text{m} + 10\text{m})^{\frac{3}{2}} - (10\text{m})^{\frac{3}{2}}\right)$$

14) Discharge over Rectangle Weir for Bazin's formula with Velocity of Approach

Open Calculator

fx $$Q = \left(0.405 + \frac{0.003}{H + h_a}\right) \cdot L_{weir} \cdot \sqrt{2 \cdot [g]} \cdot (H + h_a)^{\frac{3}{2}}$$

ex $$4530.724 m^3/s = \left(0.405 + \frac{0.003}{15m + 12m}\right) \cdot 18m \cdot \sqrt{2 \cdot [g]} \cdot (15m + 12m)^{\frac{3}{2}}$$

15) Discharge over Rectangle Weir with Two End Contractions

Open Calculator

fx $$Q = \frac{2}{3} \cdot C_d \cdot (L_{weir} - 0.2 \cdot H) \cdot \sqrt{2 \cdot [g]} \cdot H^{\frac{3}{2}}$$

ex $$2418.467 m^3/s = \frac{2}{3} \cdot 0.94 \cdot (18m - 0.2 \cdot 15m) \cdot \sqrt{2 \cdot [g]} \cdot (15m)^{\frac{3}{2}}$$

16) Discharge over Trapezoidal Notch or Weir

Open Calculator

fx $$Q_{th} = \frac{2}{3} \cdot C_{d1} \cdot L_{weir} \cdot \sqrt{2 \cdot [g]} \cdot H^{\frac{3}{2}} + \frac{8}{15} \cdot C_{d2} \cdot \tan\left(\frac{\angle A}{2}\right) \cdot \sqrt{2 \cdot [g]} \cdot H^{\frac{5}{2}}$$

ex $$2303.547 m^3/s = \frac{2}{3} \cdot 0.63 \cdot 18m \cdot \sqrt{2 \cdot [g]} \cdot (15m)^{\frac{3}{2}} + \frac{8}{15} \cdot 0.65 \cdot \tan\left(\frac{30°}{2}\right) \cdot \sqrt{2 \cdot [g]} \cdot (15m)^{\frac{5}{2}}$$

17) Discharge over Triangular Notch or Weir

Open Calculator

fx $$Q_{th} = \frac{8}{15} \cdot C_d \cdot \tan\left(\frac{\angle A}{2}\right) \cdot \sqrt{2 \cdot [g]} \cdot H^{\frac{5}{2}}$$

ex $$518.4209 m^3/s = \frac{8}{15} \cdot 0.94 \cdot \tan\left(\frac{30°}{2}\right) \cdot \sqrt{2 \cdot [g]} \cdot (15m)^{\frac{5}{2}}$$

18) Discharge with Velocity of Approach

Open Calculator

fx $$Q = \frac{2}{3} \cdot C_d \cdot L_{weir} \cdot \sqrt{2 \cdot [g]} \cdot \left((H_i + H_f)^{\frac{3}{2}} - H_f^{\frac{3}{2}}\right)$$

ex $$6669.889 m^3/s = \frac{2}{3} \cdot 0.94 \cdot 18m \cdot \sqrt{2 \cdot [g]} \cdot \left((20.1m + 10m)^{\frac{3}{2}} - (10m)^{\frac{3}{2}}\right)$$

19) Discharge without Velocity of Approach

Open Calculator

$$Q = \frac{2}{3} \cdot C_d \cdot L_{weir} \cdot \sqrt{2 \cdot [g]} \cdot H_i^{\frac{3}{2}}$$

$$4501.72\text{m}^3/\text{s} = \frac{2}{3} \cdot 0.94 \cdot 18\text{m} \cdot \sqrt{2 \cdot [g]} \cdot (20.1\text{m})^{\frac{3}{2}}$$

Length of Weir

20) Length of Weir Considering Bazin's formula with Velocity of Approach

Open Calculator

$$L_{weir} = \frac{Q}{0.405 + \frac{0.003}{H+h_a}} \cdot \sqrt{2 \cdot [g]} \cdot (H + h_a)^{\frac{3}{2}}$$

$$3067.445\text{m} = \frac{2\text{m}^3/\text{s}}{0.405 + \frac{0.003}{15\text{m}+12\text{m}}} \cdot \sqrt{2 \cdot [g]} \cdot (15\text{m} + 12\text{m})^{\frac{3}{2}}$$

21) Length of Weir Considering Bazin's formula without Velocity of Approach

Open Calculator

$$L_{weir} = \frac{Q}{0.405 + \frac{0.003}{H}} \cdot \sqrt{2 \cdot [g]} \cdot H^{\frac{3}{2}}$$

$$1269.91\text{m} = \frac{2\text{m}^3/\text{s}}{0.405 + \frac{0.003}{15\text{m}}} \cdot \sqrt{2 \cdot [g]} \cdot (15\text{m})^{\frac{3}{2}}$$

22) Length of Weir Considering Francis's formula

Open Calculator

$$L_{weir} = \frac{Q}{1.84 \cdot \left((H_i + h_a)^{\frac{3}{2}} - h_a^{\frac{3}{2}}\right)}$$

$$0.007747\text{m} = \frac{2\text{m}^3/\text{s}}{1.84 \cdot \left((20.1\text{m} + 12\text{m})^{\frac{3}{2}} - (12\text{m})^{\frac{3}{2}}\right)}$$

23) Length of Weir for Broad-Crested Weir and Head of Liquid at Middle

Open Calculator

fx $$L_{weir} = \frac{Q}{C_d \cdot \sqrt{2 \cdot [g] \cdot (h^2 \cdot H - h^3)}}$$

ex $$0.021793m = \frac{2m^3/s}{0.94 \cdot \sqrt{2 \cdot [g] \cdot \left((9m)^2 \cdot 15m - (9m)^3\right)}}$$

24) Length of Weir for Broad-Crested Weir with Velocity of Approach

Open Calculator

fx $$L_{weir} = \frac{Q}{1.705 \cdot C_d \cdot \left((H + h_a)^{\frac{3}{2}} - h_a^{\frac{3}{2}}\right)}$$

ex $$0.01264m = \frac{2m^3/s}{1.705 \cdot 0.94 \cdot \left((15m + 12m)^{\frac{3}{2}} - (12m)^{\frac{3}{2}}\right)}$$

25) Length of Weir for Discharge over Broad-Crested Weir

Open Calculator

fx $$L_{weir} = \frac{Q}{1.705 \cdot C_d \cdot H^{\frac{3}{2}}}$$

ex $$0.02148m = \frac{2m^3/s}{1.705 \cdot 0.94 \cdot (15m)^{\frac{3}{2}}}$$

26) Length of Weir or Notch for Velocity of Approach

Open Calculator

fx $$L_{weir} = \frac{Q}{\frac{2}{3} \cdot C_d \cdot \sqrt{2 \cdot [g]} \cdot \left((H_i + H_f)^{\frac{3}{2}} - H_f^{\frac{3}{2}}\right)}$$

ex $$0.005397m = \frac{2m^3/s}{\frac{2}{3} \cdot 0.94 \cdot \sqrt{2 \cdot [g]} \cdot \left((20.1m + 10m)^{\frac{3}{2}} - (10m)^{\frac{3}{2}}\right)}$$

27) Length of Weir or Notch without Velocity of Approach

Open Calculator

$$L_{weir} = \frac{Q}{\frac{2}{3} \cdot C_d \cdot \sqrt{2 \cdot [g]} \cdot H_i^{\frac{3}{2}}}$$

$$0.007997\text{m} = \frac{2\text{m}^3/\text{s}}{\frac{2}{3} \cdot 0.94 \cdot \sqrt{2 \cdot [g]} \cdot (20.1\text{m})^{\frac{3}{2}}}$$

Variables Used

- **∠A** Angle A *(Degree)*
- **A** Area of Weir *(Square Meter)*
- C_d Coefficient of Discharge
- C_{d1} Coefficient of Discharge Rectangular
- C_{d2} Coefficient of Discharge Triangular
- **h** Head of Liquid Middle *(Meter)*
- **H** Head of Liquid *(Meter)*
- h_a Head due to Velocity of Approach *(Meter)*
- H_f Final Height of Liquid *(Meter)*
- H_i Initial Height of Liquid *(Meter)*
- L_{weir} Length of Weir *(Meter)*
- **Q** Discharge Weir *(Cubic Meter per Second)*
- Q_{th} Theoretical Discharge *(Cubic Meter per Second)*
- t_{total} Total Time Taken *(Second)*

Constants, Functions, Measurements used

- Constant: **[g]**, 9.80665 Meter/Second²
  Gravitational acceleration on Earth
- Function: **sqrt**, sqrt(Number)
  Square root function
- Function: **tan**, tan(Angle)
  Trigonometric tangent function
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Time** in Second (s)
  Time Unit Conversion
- Measurement: **Area** in Square Meter (m²)
  Area 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

- Boundary Layer Flow Formulas
- Buoyancy Formulas
- Compressible Flow Formulas
- Draft Tube Formulas
- Dynamics of Fluid Flow Formulas
- Flow in Open Channels Formulas
- Forces developed by moving fluid Formulas
- Forces on Submerged Bodies Formulas
- Francis Turbine Formulas
- Hydraulic Linear Actuators Formulas
- Hydraulic Motors Formulas
- Hydraulic Pumps Formulas
- Hydraulic Turbines Formulas
- Ideal flow or Potential flow Formulas
- Kaplan Turbine Formulas
- Kinematics of Flow Formulas
- Notches and Weirs Formulas
- Orifices and Mouthpieces Formulas
- Pelton Turbine Formulas
- Pressure and its Measurements Formulas
- Turbulent Flow Formulas
- Viscous Flow Formulas

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

7/17/2023 | 9:00:14 AM UTC	*Please leave your feedback here...*