calculatoratoz.com

unitsconverters.com

Broad Crested Weir 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 20 Broad Crested Weir Formulas

Broad Crested Weir

1) Actual Discharge over Broad Crested Weir

Open Calculator

fx $$Q_a = C_d \cdot L_w \cdot h_c \cdot \sqrt{(2 \cdot g) \cdot (H - h_c)}$$

ex $$17.54701\text{m}^3/\text{s} = 0.66 \cdot 3\text{m} \cdot 1.001\text{m} \cdot \sqrt{(2 \cdot 9.8\text{m/s}^2) \cdot (5\text{m} - 1.001\text{m})}$$

2) Additional Head given Head for Broad Crested Weir

Open Calculator

fx $$h_a = H_{Upstream} - H$$

ex $$5.1\text{m} = 10.1\text{m} - 5\text{m}$$

3) Coefficient of Discharge for Max Discharge over Crested Weir

Open Calculator

fx $$C_d = \frac{Q_{W(max)}}{1.70 \cdot L_w \cdot (H)^{\frac{3}{2}}}$$

ex $$0.659421 = \frac{37.6\text{m}^3/\text{s}}{1.70 \cdot 3\text{m} \cdot (5\text{m})^{\frac{3}{2}}}$$

4) Coefficient of Discharge given Actual Discharge over Broad Crested Weir

Open Calculator

fx $$C_d = \frac{Q_a}{L_w \cdot h_c \cdot \sqrt{(2 \cdot g) \cdot (H - h_c)}}$$

ex $$0.659737 = \frac{17.54 m^3/s}{3m \cdot 1.001m \cdot \sqrt{(2 \cdot 9.8 m/s^2) \cdot (5m - 1.001m)}}$$

5) Coefficient of Discharge given Discharge of Weir if Critical Depth is Constant

Open Calculator

fx $$C_d = \frac{Q_w}{1.70 \cdot L_w \cdot (H)^{\frac{3}{2}}}$$

ex $$0.466505 = \frac{26.6 m^3/s}{1.70 \cdot 3m \cdot (5m)^{\frac{3}{2}}}$$

6) Critical Depth due to Reduction in Area of Flow Section given Total Head

Open Calculator

fx $$h_c = H - \left(\frac{v_f^2}{2 \cdot g} \right)$$

ex $$1.04898m = 5m - \left(\frac{(8.8 m/s)^2}{2 \cdot 9.8 m/s^2} \right)$$

7) Discharge over Broad Crested Weir

Open Calculator

$$Q_w = L_w \cdot h_c \cdot \sqrt{(2 \cdot [g]) \cdot (H - h_c)}$$

$$26.59539\text{m}^3/\text{s} = 3\text{m} \cdot 1.001\text{m} \cdot \sqrt{(2 \cdot [g]) \cdot (5\text{m} - 1.001\text{m})}$$

8) Head for Broad Crested Weir

Open Calculator

$$H_{Upstream} = (H + h_a)$$

$$10.01\text{m} = (5\text{m} + 5.01\text{m})$$

9) Head if Velocity is considered for Discharge over Broad Crested Weir

Open Calculator

$$H = \left(\frac{Q_{W(max)}}{1.70 \cdot C_d \cdot L_w} \right)^{\frac{2}{3}}$$

$$4.997074\text{m} = \left(\frac{37.6\text{m}^3/\text{s}}{1.70 \cdot 0.66 \cdot 3\text{m}} \right)^{\frac{2}{3}}$$

10) Length of Crest given Actual Discharge over Broad Crested Weir

Open Calculator

$$L_w = \frac{Q_a}{C_d \cdot h_c \cdot \sqrt{(2 \cdot g) \cdot (H - h_c)}}$$

$$2.998802\text{m} = \frac{17.54\text{m}^3/\text{s}}{0.66 \cdot 1.001\text{m} \cdot \sqrt{(2 \cdot 9.8\text{m/s}^2) \cdot (5\text{m} - 1.001\text{m})}}$$

11) Length of Crest given Discharge over Weir

Open Calculator

$$L_w = \frac{Q_w}{h_c \cdot \sqrt{(2 \cdot [g]) \cdot (H - h_c)}}$$

$$3.00052\text{m} = \frac{26.6\text{m}^3/\text{s}}{1.001\text{m} \cdot \sqrt{(2 \cdot [g]) \cdot (5\text{m} - 1.001\text{m})}}$$

12) Length of Crest if Critical Depth is Constant for Discharge of Weir

Open Calculator

$$L_w = \frac{Q_w}{1.70 \cdot C_d \cdot (H)^{\frac{3}{2}}}$$

$$2.120478\text{m} = \frac{26.6\text{m}^3/\text{s}}{1.70 \cdot 0.66 \cdot (5\text{m})^{\frac{3}{2}}}$$

13) Length of Crest over Broad Crested Weir for Max Discharge

Open Calculator

$$L_w = \frac{Q_{W(max)}}{1.70 \cdot C_d \cdot (H)^{\frac{3}{2}}}$$

$$2.997367\text{m} = \frac{37.6\text{m}^3/\text{s}}{1.70 \cdot 0.66 \cdot (5\text{m})^{\frac{3}{2}}}$$

14) Max Discharge over Broad Crested Weir

Open Calculator

$$Q_{W(max)} = 1.70 \cdot C_d \cdot L_w \cdot (H)^{\frac{3}{2}}$$

$$37.63302\text{m}^3/\text{s} = 1.70 \cdot 0.66 \cdot 3\text{m} \cdot (5\text{m})^{\frac{3}{2}}$$

15) Maximum Discharge of Broad Crested Weir if Critical Depth is Constant

Open Calculator

fx $$Q_{W(max)} = 1.70 \cdot C_d \cdot L_w \cdot (H)^{\frac{3}{2}}$$

ex $$37.63302\text{m}^3/\text{s} = 1.70 \cdot 0.66 \cdot 3\text{m} \cdot (5\text{m})^{\frac{3}{2}}$$

16) Total Head above Weir Crest

Open Calculator

fx $$H = h_c + \left(\frac{v_f^2}{2 \cdot g}\right)$$

ex $$4.95202\text{m} = 1.001\text{m} + \left(\frac{(8.8\text{m/s})^2}{2 \cdot 9.8\text{m/s}^2}\right)$$

17) Total Head for Actual Discharge over Broad Crested Weir

Open Calculator

fx $$H = \left(\left(\left(\frac{Q_a}{C_d \cdot L_w \cdot h_c}\right)^2\right) \cdot \left(\frac{1}{2 \cdot g}\right)\right) + h_c$$

ex $$4.996808\text{m} = \left(\left(\left(\frac{17.54\text{m}^3/\text{s}}{0.66 \cdot 3\text{m} \cdot 1.001\text{m}}\right)^2\right) \cdot \left(\frac{1}{2 \cdot 9.8\text{m/s}^2}\right)\right) + 1.001\text{m}$$

18) Total Head for Maximum Discharge

Open Calculator

fx $$H = \left(\frac{Q_{W(max)}}{1.70 \cdot C_d \cdot L_w} \right)^{\frac{2}{3}}$$

ex $$4.997074\text{m} = \left(\frac{37.6\text{m}^3/\text{s}}{1.70 \cdot 0.66 \cdot 3\text{m}} \right)^{\frac{2}{3}}$$

19) Total Head given Discharge over Weir Crest

Open Calculator

fx $$H = \left(\left(\frac{Q_w}{L_w \cdot h_c} \right)^2 \right) \cdot \left(\frac{1}{2 \cdot [g]} \right) + h_c$$

ex $$5.001386\text{m} = \left(\left(\frac{26.6\text{m}^3/\text{s}}{3\text{m} \cdot 1.001\text{m}} \right)^2 \right) \cdot \left(\frac{1}{2 \cdot [g]} \right) + 1.001\text{m}$$

20) Velocity of Flow given Head

Open Calculator

fx $$v_f = \sqrt{(2 \cdot g) \cdot (H - h_c)}$$

ex $$8.853271\text{m/s} = \sqrt{(2 \cdot 9.8\text{m/s}^2) \cdot (5\text{m} - 1.001\text{m})}$$

Variables Used

- C_d Coefficient of Discharge
- g Acceleration due to Gravity *(Meter per Square Second)*
- H Total Head *(Meter)*
- h_a Additional Head *(Meter)*
- h_c Critical Depth of Weir *(Meter)*
- $H_{Upstream}$ Head on Upstream of Weir *(Meter)*
- L_w Length of Weir Crest *(Meter)*
- Q_a Actual Discharge over Broad Crested Weir *(Cubic Meter per Second)*
- Q_w Discharge Over Broad Crested Weir *(Cubic Meter per Second)*
- $Q_{W(max)}$ Max Discharge Over Broad Crested Weir *(Cubic Meter per Second)*
- v_f Velocity of Fluid for Weir *(Meter per Second)*

Constants, Functions, Measurements used

- Constant: **[g]**, 9.80665 Meter/Second²
  Gravitational acceleration on Earth
- Function: **sqrt**, sqrt(Number)
  Square root function
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Speed** in Meter per Second (m/s)
  Speed Unit Conversion
- Measurement: **Acceleration** in Meter per Square Second (m/s²)
  Acceleration 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** **Formulas**
- **Flow Over Rectangular Sharp-Crested Weir or Notch**

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

11/28/2023 | 4:50:30 AM UTC *Please leave your feedback here...*