Important Design of Proportioning Flow Weir Formulas PDF

Formulas Examples with Units

List of 14 Important Design of Proportioning Flow Weir Formulas

1) Coefficient of Discharge given Distance in X Direction from Center of Weir Formula

Evaluate Formula

Formula

$$C_d = \left(\frac{2 \cdot W_c \cdot V_h}{x \cdot \pi \cdot \sqrt{2 \cdot g \cdot y}} \right)$$

Example with Units

$$0.6779 = \left(\frac{2 \cdot 2.0\,\text{m} \cdot 10\,\text{m/s}}{3.00\,\text{m} \cdot 3.1416 \cdot \sqrt{2 \cdot 9.8\,\text{m/s}^2 \cdot 2.00\,\text{m}}} \right)$$

2) Distance in X Direction from Center of Weir Formula

Evaluate Formula

Formula

$$x = \left(\frac{2 \cdot W_c \cdot V_h}{C_d \cdot \pi \cdot \sqrt{2 \cdot g \cdot y}} \right)$$

Example with Units

$$3.0812\,\text{m} = \left(\frac{2 \cdot 2.0\,\text{m} \cdot 10\,\text{m/s}}{0.66 \cdot 3.1416 \cdot \sqrt{2 \cdot 9.8\,\text{m/s}^2 \cdot 2.00\,\text{m}}} \right)$$

3) Distance in Y Direction from Crest of Weir Formula

Evaluate Formula

Formula

$$y = \left(\frac{2 \cdot W_c \cdot V_h}{C_d \cdot \pi \cdot x \cdot \sqrt{2 \cdot g}} \right)^2$$

Example with Units

$$2.1098\,\text{m} = \left(\frac{2 \cdot 2.0\,\text{m} \cdot 10\,\text{m/s}}{0.66 \cdot 3.1416 \cdot 3.00\,\text{m} \cdot \sqrt{2 \cdot 9.8\,\text{m/s}^2}} \right)^2$$

4) Half Width of Bottom Portion of Weir Formula

Evaluate Formula

Formula

$$W_h = 1.467 \cdot V_h \cdot W_c$$

Example with Units

$$29.34\,\text{m} = 1.467 \cdot 10\,\text{m/s} \cdot 2.0\,\text{m}$$

5) Horizontal Flow Velocity given Distance in X Direction from Center of Weir Formula

Evaluate Formula

Formula

$$V_h = \frac{x}{\frac{2 \cdot W_c}{C_d \cdot \pi \cdot \sqrt{2 \cdot g \cdot y}}}$$

Example with Units

$$9.7364\,\text{m/s} = \frac{3.00\,\text{m}}{\frac{2 \cdot 2.0\,\text{m}}{0.66 \cdot 3.1416 \cdot \sqrt{2 \cdot 9.8\,\text{m/s}^2 \cdot 2.00\,\text{m}}}}$$

6) Horizontal Flow Velocity given Half Width of Bottom Portion of Weir Formula

Evaluate Formula

Formula

$$V_h = \frac{W_h}{1.467 \cdot W_c}$$

Example with Units

$$10\,\text{m/s} = \frac{29.34\,\text{m}}{1.467 \cdot 2.0\,\text{m}}$$

7) Width of Channel given Distance in X Direction from Center of Weir Formula

Evaluate Formula

Formula

$$w = \frac{x}{\frac{2 \cdot V_h}{C_d \cdot \pi \cdot \sqrt{2 \cdot g \cdot y}}}$$

Example with Units

$$1.9473\,\text{m} = \frac{3.00\,\text{m}}{\frac{2 \cdot 10\,\text{m/s}}{0.66 \cdot 3.1416 \cdot \sqrt{2 \cdot 9.8\,\text{m/s}^2 \cdot 2.00\,\text{m}}}}$$

8) Width of Channel given Half Width of Bottom Portion of Weir Formula

Evaluate Formula

Formula

$$W_c = \frac{W_h}{1.467 \cdot V_h}$$

Example with Units

$$2\,\text{m} = \frac{29.34\,\text{m}}{1.467 \cdot 10\,\text{m/s}}$$

9) Modified Shield's Formula Formulas

9.1) Diameter of Particle given Maximum Critical Scour Velocity Formula

Evaluate Formula

Formula

$$D = \left(\frac{v_{maxs}}{4.5 \cdot \sqrt{g \cdot (G - 1)}} \right)^2$$

Example with Units

$$0.8394\,\text{m} = \left(\frac{49.97\,\text{m/s}}{4.5 \cdot \sqrt{9.8\,\text{m/s}^2 \cdot (15.99 - 1)}} \right)^2$$

9.2) Diameter of Particle given Minimum Critical Scour Velocity Formula

Evaluate Formula

Formula

$$D_p = \left(\frac{v_{mins}}{3 \cdot \sqrt{g \cdot (G - 1)}} \right)^2$$

Example with Units

$$0.0277\,\text{m} = \left(\frac{6.048\,\text{m/s}}{3 \cdot \sqrt{9.8\,\text{m/s}^2 \cdot (15.99 - 1)}} \right)^2$$

9.3) Maximum Critical Scour Velocity Formula

Evaluate Formula

Formula

$$v_{maxs} = \left(4.5 \cdot \sqrt{g \cdot D \cdot (G - 1)} \right)$$

Example with Units

$$49.9583\,\text{m/s} = \left(4.5 \cdot \sqrt{9.8\,\text{m/s}^2 \cdot 0.839\,\text{m} \cdot (15.99 - 1)} \right)$$

9.4) Minimum Critical Scour Velocity Formula

Evaluate Formula

Formula

$$v_{mins} = \left(3 \cdot \sqrt{g \cdot D_p \cdot (G - 1)}\right)$$

Example with Units

$$6.0462\,\mathrm{m/s} = \left(3 \cdot \sqrt{9.8\,\mathrm{m/s^2} \cdot 0.02765\,\mathrm{m} \cdot (15.99 - 1)}\right)$$

9.5) Specific Gravity given Maximum Critical Scour Velocity Formula

Evaluate Formula

Formula

$$G = \left(\left(\frac{v_{maxs}}{4.5 \cdot \sqrt{g \cdot D}}\right)\right)^2 + 1$$

Example with Units

$$15.997 = \left(\left(\frac{49.97\,\mathrm{m/s}}{4.5 \cdot \sqrt{9.8\,\mathrm{m/s^2} \cdot 0.839\,\mathrm{m}}}\right)\right)^2 + 1$$

9.6) Specific Gravity given Minimum Critical Scour Velocity Formula

Evaluate Formula

Formula

$$G = \left(\left(\frac{v_{mins}}{3 \cdot \sqrt{g \cdot D_p}}\right)\right)^2 + 1$$

Example with Units

$$15.9989 = \left(\left(\frac{6.048\,\mathrm{m/s}}{3 \cdot \sqrt{9.8\,\mathrm{m/s^2} \cdot 0.02765\,\mathrm{m}}}\right)\right)^2 + 1$$

Variables used in list of Design of Proportioning Flow Weir Formulas above

- **C_d** Coefficient of Discharge
- **D** Diameter of Particle(Max Critical Scour Velocity) *(Meter)*
- **D_p** Diameter of Particle(Min Critical Scour Velocity) *(Meter)*
- **g** Acceleration due to Gravity *(Meter per Square Second)*
- **G** Specific Gravity of Particle
- **V_h** Horizontal Flow Velocity *(Meter per Second)*
- **v_{maxs}** Maximum Critical Scour Velocity *(Meter per Second)*
- **v_{mins}** Minimum Critical Scour Velocity *(Meter per Second)*
- **w** Width *(Meter)*
- **W_c** Channel Width *(Meter)*
- **W_h** Half Width of Bottom Portion of Weir *(Meter)*
- **x** Distance in x Direction *(Meter)*
- **y** Distance in y Direction *(Meter)*

Constants, Functions, Measurements used in list of Design of Proportioning Flow Weir Formulas above

- constant(s): **pi**, 3.14159265358979323846264338327950288 *Archimedes' constant*
- Functions: **sqrt**, sqrt(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.*
- 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*

Download other Important Constant Velocity Horizontal Flow Grit Channels PDFs

- Important Design of Parabolic Grit Chamber Formulas
- Important Design of Proportioning Flow Weir Formulas

Try our Unique Visual Calculators

- Percentage error
- LCM of three numbers
- Subtract fraction

Please SHARE this PDF with someone who needs it!

This PDF can be downloaded in these languages

English Spanish French German Russian Italian Portuguese Polish Dutch

9/18/2024 | 11:16:14 AM UTC