

Important Peak Drainage Discharge Formula Formulas PDF



**Formulas
Examples
with Units**

List of 18 Important Peak Drainage Discharge Formula Formulas

1) Peak Drainage Discharge by Empirical Formula Formulas ↻

1.1) Burkli Ziegler Formula Formulas ↻

1.1.1) Drainage Area for Peak Rate of Runoff Formula ↻

Formula

$$A_D = \left(\frac{Q_{BZ} \cdot 455}{K' \cdot I_{BZ} \cdot \sqrt{S_o}} \right)^2$$

Example with Units

$$30_{ha} = \left(\frac{1.34 \text{ m}^3/\text{s} \cdot 455}{251878.2 \cdot 7.5 \text{ cm/h} \cdot \sqrt{0.045}} \right)^2$$

Evaluate Formula ↻

1.1.2) Maximum Rainfall Intensity given Peak Rate of Runoff Formula ↻

Formula

$$I_{BZ} = 455 \cdot \frac{Q_{BZ}}{K' \cdot \sqrt{S_o} \cdot A_D}$$

Example with Units

$$0.0021 \text{ cm/h} = 455 \cdot \frac{1.34 \text{ m}^3/\text{s}}{251878.2 \cdot \sqrt{0.045} \cdot 30_{ha}}$$

Evaluate Formula ↻

1.1.3) Peak Rate of Runoff from Burkli-Ziegler Formula Formula ↻

Formula

$$Q_{BZ} = \left(\frac{K' \cdot I_{BZ} \cdot A_D}{455} \right) \cdot \sqrt{\frac{S_o}{A_D}}$$

Evaluate Formula ↻

Example with Units

$$482400.0365 \text{ m}^3/\text{s} = \left(\frac{251878.2 \cdot 7.5 \text{ cm/h} \cdot 30_{ha}}{455} \right) \cdot \sqrt{\frac{0.045}{30_{ha}}}$$

1.1.4) Runoff Coefficient for Peak Rate of Runoff Formula ↻

Formula

$$K' = \frac{455 \cdot Q_{BZ}}{I_{BZ} \cdot \sqrt{S_o} \cdot A_D}$$

Example with Units

$$251878.1809 = \frac{455 \cdot 1.34 \text{ m}^3/\text{s}}{7.5 \text{ cm/h} \cdot \sqrt{0.045} \cdot 30_{ha}}$$

Evaluate Formula ↻



1.1.5) Slope of Ground Surface given Peak Rate of Runoff Formula

Formula

$$S_o = \left(\frac{Q_{BZ} \cdot 455}{I_{BZ} \cdot K' \cdot \sqrt{A_D}} \right)^2$$

Example with Units

$$0.045 = \left(\frac{1.34 \text{ m}^3/\text{s} \cdot 455}{7.5 \text{ cm/h} \cdot 251878.2 \cdot \sqrt{30 \text{ ha}}} \right)^2$$

Evaluate Formula 

1.2) Dicken's Formula Formulas

1.2.1) Catchment Area given Peak Rate of Runoff Formula

Formula

$$A_{km} = \left(\frac{Q_{PD}}{x} \right)^{\frac{4}{3}}$$

Example with Units

$$2.5 \text{ km}^2 = \left(\frac{628716.7 \text{ m}^3/\text{s}}{10.00} \right)^{\frac{4}{3}}$$

Evaluate Formula 

1.2.2) Factors Dependent Constant given Peak Rate of Runoff Formula

Formula

$$x = \left(\frac{Q_{PD}}{(A_{km})^{\frac{3}{4}}} \right)$$

Example with Units

$$10 = \left(\frac{628716.7 \text{ m}^3/\text{s}}{(2.5 \text{ km}^2)^{\frac{3}{4}}} \right)$$

Evaluate Formula 

1.2.3) Peak Rate Runoff from Dicken's Formula Formula

Formula

$$Q_{PD} = x \cdot (A_{km})^{\frac{3}{4}}$$

Example with Units

$$628716.7148 \text{ m}^3/\text{s} = 10.00 \cdot (2.5 \text{ km}^2)^{\frac{3}{4}}$$

Evaluate Formula 

1.3) Dredge or Burge's Formula Formulas

1.3.1) Catchment Area given Peak Rate of Runoff from Dredge Formula Formula

Formula

$$A_{km} = \frac{Q_d \cdot (L)^{\frac{2}{3}}}{19.6}$$

Example with Units

$$2.5 \text{ km}^2 = \frac{212561.2 \text{ m}^3/\text{s} \cdot (3.5 \text{ km})^{\frac{2}{3}}}{19.6}$$

Evaluate Formula 

1.3.2) Peak Rate of Runoff from Dredge Formula Formula

Formula

$$Q_d = 19.6 \cdot \left(\frac{A_{km}}{(L)^{\frac{2}{3}}} \right)$$

Example with Units

$$212561.228 \text{ m}^3/\text{s} = 19.6 \cdot \left(\frac{2.5 \text{ km}^2}{(3.5 \text{ km})^{\frac{2}{3}}} \right)$$

Evaluate Formula 



1.4) Inglis Formula Formulas

1.4.1) Catchment Area given Peak Rate of Runoff from Inglis Formula Formula

Formula

$$A_{km} = \left(\frac{Q_I}{123} \right)^2$$

Example with Units

$$2.5 \text{ km}^2 = \left(\frac{194.48 \text{ m}^3/\text{s}}{123} \right)^2$$

Evaluate Formula

1.4.2) Peak Rate of Runoff from Inglis Formula Approximate Formula

Formula

$$Q_I = 123 \cdot \sqrt{A_{km}}$$

Example with Units

$$194.4801 \text{ m}^3/\text{s} = 123 \cdot \sqrt{2.5 \text{ km}^2}$$

Evaluate Formula

1.5) Nawab Jung Bahadur Formula Formulas

1.5.1) Peak Rate of Runoff from Nawab Jung Bahadur Formula Formula

Formula

$$Q_{NJB} = C_2 \cdot (A_{km})^{0.93 - \left(\frac{1}{14}\right) \cdot \log_{10}(A_{km})}$$

Example with Units

$$125.6423 \text{ m}^3/\text{s} = 55 \cdot (2.5 \text{ km}^2)^{0.93 - \left(\frac{1}{14}\right) \cdot \log_{10}(2.5 \text{ km}^2)}$$

Evaluate Formula

1.6) Ryve's Formula Formulas

1.6.1) Factors Dependent Constant from Ryve's Formula Formula

Formula

$$C_R = \left(\frac{Q_r}{(A_{km})^{\frac{2}{3}}} \right)$$

Example with Units

$$6.786 = \left(\frac{125000 \text{ m}^3/\text{s}}{(2.5 \text{ km}^2)^{\frac{2}{3}}} \right)$$

Evaluate Formula

2) Peak Drainage Discharge by Rational Formula Formulas

2.1) Catchment Area given Peak Rate of Runoff and Rainfall Intensity Formula

Formula

$$A_c = \frac{36 \cdot Q_R}{C_r \cdot P_c}$$

Example with Units

$$14.9254 \text{ ha} = \frac{36 \cdot 4166.67 \text{ m}^3/\text{s}}{0.5 \cdot 2.01 \text{ cm/h}}$$

Evaluate Formula



2.2) Coefficient of Runoff given Peak Rate of Runoff Formula

Formula

$$C_r = \frac{36 \cdot Q_R}{A_c \cdot P_c}$$

Example with Units

$$0.4975 = \frac{36 \cdot 4166.67 \text{ m}^3/\text{s}}{15.0 \text{ ha} \cdot 2.01 \text{ cm/h}}$$

Evaluate Formula 

2.3) Critical Rainfall Intensity for Peak Rate of Runoff Formula

Formula

$$P_c = \frac{36 \cdot Q_R}{A_c \cdot C_r}$$

Example with Units

$$2 \text{ cm/h} = \frac{36 \cdot 4166.67 \text{ m}^3/\text{s}}{15.0 \text{ ha} \cdot 0.5}$$

Evaluate Formula 

2.4) Peak Rate of Runoff in Rational Formula Formula

Formula

$$Q_R = \frac{C_r \cdot A_c \cdot P_c}{36}$$

Example with Units

$$4187.5 \text{ m}^3/\text{s} = \frac{0.5 \cdot 15.0 \text{ ha} \cdot 2.01 \text{ cm/h}}{36}$$

Evaluate Formula 



Variables used in list of Peak Drainage Discharge Formula above

- **A_c** Area of Catchment (Hectare)
- **A_D** Drainage Area (Hectare)
- **A_{km}** Catchment Area in KM (Square Kilometer)
- **C₂** Coefficient
- **C_r** Runoff Coefficient
- **C_R** Ryve's Coefficient
- **I_{BZ}** Intensity of Rainfall in Burkli Zeigler (Centimeter per Hour)
- **K'** Runoff Coefficient for Burkli Zeigler
- **L** Length of Drain (Kilometer)
- **P_c** Critical Rainfall Intensity (Centimeter per Hour)
- **Q_{BZ}** Peak Rate of Runoff for Burkli Zeigler (Cubic Meter per Second)
- **Q_d** Peak Rate of Runoff from Dredge Formula (Cubic Meter per Second)
- **Q_I** Peak Rate of Runoff for English (Cubic Meter per Second)
- **Q_{NJB}** Peak Rate of Runoff for Nawab Jung Bahadur (Cubic Meter per Second)
- **Q_{PD}** Peak Rate of Runoff from Dickens Formula (Cubic Meter per Second)
- **Q_r** Peak Rate of Runoff in ryves formula (Cubic Meter per Second)
- **Q_R** Peak Drainage Discharge by Rational Formula (Cubic Meter per Second)
- **S_o** Slope of the ground
- **x** Constant

Constants, Functions, Measurements used in list of Peak Drainage Discharge Formula above

- **Functions: log10**, log10(Number)
The common logarithm, also known as the base-10 logarithm or the decimal logarithm, is a mathematical function that is the inverse of the exponential function.
- **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 Kilometer (km)
Length Unit Conversion 
- **Measurement: Area** in Hectare (ha), Square Kilometer (km²)
Area Unit Conversion 
- **Measurement: Speed** in Centimeter per Hour (cm/h)
Speed Unit Conversion 
- **Measurement: Volumetric Flow Rate** in Cubic Meter per Second (m³/s)
Volumetric Flow Rate Unit Conversion 



Download other Important Estimating the Peak Drainage Discharge PDFs

- **Important Channel Flow Time and Time of Concentration Formulas** 
- **Important Rainfall Intensity Formulas** 
- **Important Peak Drainage Discharge Formula Formulas** 

Try our Unique Visual Calculators

-  **Percentage decrease** 
-  **HCF of three numbers** 
-  **Multiply 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](#)

9/23/2024 | 11:51:28 AM UTC

