Important Unconfined Aquifers Formulas PDF

Formulas
Examples
with Units

List of 11
Important Unconfined Aquifers Formulas

1) Aquifer Constant Formulas

1.1) Aquifer Constant given Difference between Modified Drawdowns Formula

Evaluate Formula

Formula

$$T = \frac{Q}{2.72 \cdot \Delta s}$$

Example with Units

$$26.5231 = \frac{1.01\,\text{m}^3/\text{s}}{2.72 \cdot 0.014\,\text{m}}$$

1.2) Aquifer Constant given Modified Drawdown Formula

Evaluate Formula

Formula

$$T = \left(\frac{Q \cdot \log\left(\left(\frac{r_2}{r_1} \right), e \right)}{2.72 \cdot \left(s1' - s2' \right)} \right)$$

Example with Units

$$23.7351 = \left(\frac{1.01\,\text{m}^3/\text{s} \cdot \log\left(\left(\frac{10.0\,\text{m}}{1.07\,\text{m}} \right), e \right)}{2.72 \cdot \left(1.721\,\text{m} - 1.714\,\text{m} \right)} \right)$$

1.3) Difference between Modified Drawdowns given Aquifer Constant Formula

Evaluate Formula

Formula

$$\Delta s = \left(\frac{Q}{2.72 \cdot T} \right)$$

Example with Units

$$0.014\,\text{m} = \left(\frac{1.01\,\text{m}^3/\text{s}}{2.72 \cdot 26.52} \right)$$

2) Modified Discharge And Drawdown in Unconfined Aquifers Formulas

2.1) Discharge given Difference between Modified Drawdowns Formula

Evaluate Formula

Formula

$$Q = \left(2.72 \cdot \Delta s \cdot T \right)$$

Example with Units

$$1.0099\,\text{m}^3/\text{s} = \left(2.72 \cdot 0.014\,\text{m} \cdot 26.52 \right)$$

2.2) Modified Drawdown in Well 1 Formula

Evaluate Formula

Formula

$$s1' = s_1 - \left(\frac{\left(s_1 \right)^2}{2 \cdot H_i} \right)$$

Example with Units

$$1.2401\,\text{m} = 2.15\,\text{m} - \left(\frac{\left(2.15\,\text{m} \right)^2}{2 \cdot 2.54\,\text{m}} \right)$$

2.3) Modified Drawdown in Well 1 given Aquifer Constant Formula

Evaluate Formula

Formula

$$s1' = s2' + \left(\frac{Q \cdot \log\left(\left(\frac{r_2}{r_1} \right), e \right)}{2.72 \cdot T} \right)$$

Example with Units

$$1.7203\,\text{m} = 1.714\,\text{m} + \left(\frac{1.01\,\text{m}^3/\text{s} \cdot \log\left(\left(\frac{10.0\,\text{m}}{1.07\,\text{m}} \right), e \right)}{2.72 \cdot 26.52} \right)$$

2.4) Modified Drawdown in Well 2 Formula

Evaluate Formula

Formula

$$s2' = s_2 - \left(\frac{\left(s_2 \right)^2}{2 \cdot H_i} \right)$$

Example with Units

$$1.2379\,\text{m} = 2.136\,\text{m} - \left(\frac{\left(2.136\,\text{m} \right)^2}{2 \cdot 2.54\,\text{m}} \right)$$

2.5) Modified Drawdown in Well 2 given Aquifer Constant Formula

Evaluate Formula

Formula

$$s2' = s1' - \left(\frac{Q \cdot \log\left(\left(\frac{r_2}{r_1} \right), e \right)}{2.72 \cdot T} \right)$$

Example with Units

$$1.7147\,\text{m} = 1.721\,\text{m} - \left(\frac{1.01\,\text{m}^3/\text{s} \cdot \log\left(\left(\frac{10.0\,\text{m}}{1.07\,\text{m}} \right), e \right)}{2.72 \cdot 26.52} \right)$$

2.6) Thickness of Aquifer from Impermeable Layer given Modified Drawdown in Well 1 Formula

Evaluate Formula

Formula

$$H_{ui} = \left(\frac{\left(s_1 \right)^2}{2 \cdot \left(s_1 - s1' \right)} \right)$$

Example with Units

$$5.3875\,\text{m} = \left(\frac{\left(2.15\,\text{m} \right)^2}{2 \cdot \left(2.15\,\text{m} - 1.721\,\text{m} \right)} \right)$$

2.7) Thickness of Aquifer from Impermeable Layer given Modified Drawdown in Well 2 Formula

Evaluate Formula

Formula

$$H_{ui} = \left(\frac{\left(s_2 \right)^2}{2 \cdot \left(s_2 - s2' \right)} \right)$$

Example with Units

$$5.4058\,\text{m} = \left(\frac{\left(2.136\,\text{m} \right)^2}{2 \cdot \left(2.136\,\text{m} - 1.714\,\text{m} \right)} \right)$$

2.8) Unconfined Aquifer Discharge given Aquifer Constant Formula

Evaluate Formula

Formula

$$Q = \frac{T}{\frac{\log\left(\left(\frac{r_2}{r_1} \right), e \right)}{2.72 \cdot \left(s1' - s2' \right)}}$$

Example with Units

$$1.1285\,\text{m}^3/\text{s} = \frac{26.52}{\frac{\log\left(\left(\frac{10.0\,\text{m}}{1.07\,\text{m}} \right), e \right)}{2.72 \cdot \left(1.721\,\text{m} - 1.714\,\text{m} \right)}}$$

Variables used in list of Unconfined Aquifers Formulas above

- H_i Initial Aquifer Thickness *(Meter)*
- H_{ui} Unconfined Aquifer Thickness *(Meter)*
- **Q** Discharge *(Cubic Meter per Second)*
- r_1 Radial Distance at Observation Well 1 *(Meter)*
- r_2 Radial Distance at Observation Well 2 *(Meter)*
- s_1 Drawdown in Well 1 *(Meter)*
- s_2 Drawdown in Well 2 *(Meter)*
- $s1'$ Modified Drawdown 1 *(Meter)*
- $s2'$ Modified Drawdown 2 *(Meter)*
- **T** Aquifer Constant
- **Δs** Difference in Drawdowns *(Meter)*

Constants, Functions, Measurements used in list of Unconfined Aquifers Formulas above

- constant(s): **e**, 2.71828182845904523536028747135266249 *Napier's constant*
- Functions: **log**, log(Base, Number) *Logarithmic function is an inverse function to exponentiation.*
- Measurement: **Length** in Meter (m) *Length Unit Conversion*
- Measurement: **Volumetric Flow Rate** in Cubic Meter per Second (m^3/s) *Volumetric Flow Rate Unit Conversion*

Download other Important Water Resources Ground Water PDFs

- Important Basic Definitions Formulas
- Important Characteristic Well Losses Formulas
- Important Confined Aquifers Formulas
- Important Unconfined Aquifers Formulas
- Important Unsteady Flow 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

9/23/2024 | 11:49:12 AM UTC