Important Confined Aquifers Formulas PDF

Formulas
Examples
with Units

List of 19
Important Confined Aquifers Formulas

1) Aquifer Constant And Depth of Water in Well Formulas

1.1) Aquifer Constant Formula

Evaluate Formula

Formula

$$T = \frac{Q_w \cdot \log\left(\left(\frac{r_2}{r_1}\right), 10\right)}{2.72 \cdot \left(s_1 - s_2\right)}$$

Example with Units

$$24.6476 = \frac{0.911\,\text{m}^3/\text{s} \cdot \log\left(\left(\frac{10.0\,\text{m}}{1.07\,\text{m}}\right), 10\right)}{2.72 \cdot \left(2.15\,\text{m} - 2.136\,\text{m}\right)}$$

1.2) Aquifer Constant given Difference in Drawdowns at Two Wells Formula

Evaluate Formula

Formula

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

Example with Units

$$23.9233 = \frac{0.911\,\text{m}^3/\text{s}}{2.72 \cdot 0.014\,\text{m}}$$

1.3) Aquifer Constant given Drawdown in Well Formula

Evaluate Formula

Formula

$$T = \frac{Q_w}{2.72 \cdot \left(s_1 - s_2\right)}$$

Example with Units

$$23.9233 = \frac{0.911\,\text{m}^3/\text{s}}{2.72 \cdot \left(2.15\,\text{m} - 2.136\,\text{m}\right)}$$

1.4) Confined Aquifer Discharge given Aquifer Constant Formula

Evaluate Formula

Formula

$$Q_w = \frac{T \cdot 2.72 \cdot \left(s_1 - s_2\right)}{\log\left(\left(\frac{r_2}{r_1}\right), 10\right)}$$

Example with Units

$$0.9118\,\text{m}^3/\text{s} = \frac{24.67 \cdot 2.72 \cdot \left(2.15\,\text{m} - 2.136\,\text{m}\right)}{\log\left(\left(\frac{10.0\,\text{m}}{1.07\,\text{m}}\right), 10\right)}$$

1.5) Depth of Water in Well 1 given Drawdown in Well 1 Formula

Evaluate Formula

Formula

$$h_1 = H - s_1$$

Example with Units

$$17.85\,\text{m} = 20\,\text{m} - 2.15\,\text{m}$$

1.6) Depth of Water in Well 2 given Drawdown in Well 2 Formula

Evaluate Formula

Formula

$$h_2 = H - s_2$$

Example with Units

$$17.864\,\text{m} = 20\,\text{m} - 2.136\,\text{m}$$

2) Discharge And Drawdown in Well Formulas

2.1) Difference in Drawdowns at Two Wells given Aquifer Constant Formula

Evaluate Formula

Formula

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

Example with Units

$$0.0136\,\text{m} = \left(\frac{0.911\,\text{m}^3/\text{s}}{2.72 \cdot 24.67}\right)$$

2.2) Discharge given Aquifer Constant Formula

Evaluate Formula

Formula

$$Q_w = \frac{T}{\frac{1}{2.72 \cdot \left(s_1 - s_2\right)}}$$

Example with Units

$$0.9394\,\text{m}^3/\text{s} = \frac{24.67}{\frac{1}{2.72 \cdot \left(2.15\,\text{m} - 2.136\,\text{m}\right)}}$$

2.3) Discharge given Difference in Drawdowns at Two Wells Formula

Evaluate Formula

Formula

$$Q_w = T \cdot 2.72 \cdot \Delta s$$

Example with Units

$$0.9394\,\text{m}^3/\text{s} = 24.67 \cdot 2.72 \cdot 0.014\,\text{m}$$

2.4) Drawdown in Well 1 given Aquifer Constant Formula

Evaluate Formula

Formula

$$s_1 = s_2 + \left(\frac{Q_w \cdot \log\left(\left(\frac{r_2}{r_1}\right), 10\right)}{2.72 \cdot T}\right)$$

Example with Units

$$2.15\,\text{m} = 2.136\,\text{m} + \left(\frac{0.911\,\text{m}^3/\text{s} \cdot \log\left(\left(\frac{10.0\,\text{m}}{1.07\,\text{m}}\right), 10\right)}{2.72 \cdot 24.67}\right)$$

2.5) Drawdown in Well 1 given Aquifer Constant and Discharge Formula

Evaluate Formula

Formula

$$s_1 = s_2 + \left(\frac{Q_w}{2.72 \cdot T}\right)$$

Example with Units

$$2.1496\,\text{m} = 2.136\,\text{m} + \left(\frac{0.911\,\text{m}^3/\text{s}}{2.72 \cdot 24.67}\right)$$

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

Evaluate Formula

Formula

$$s_1 = H - h_1$$

Example with Units

$$2.15\,\text{m} = 20\,\text{m} - 17.85\,\text{m}$$

2.7) Drawdown in Well 2 given Aquifer Constant Formula

Evaluate Formula

Formula

$$s_2 = s_1 - \left(\frac{Q_w \cdot \log\left(\left(\frac{r_2}{r_1} \right), 10 \right)}{2.72 \cdot T} \right)$$

Example with Units

$$2.136\,\text{m} = 2.15\,\text{m} - \left(\frac{0.911\,\text{m}^3/\text{s} \cdot \log\left(\left(\frac{10.0\,\text{m}}{1.07\,\text{m}} \right), 10 \right)}{2.72 \cdot 24.67} \right)$$

2.8) Drawdown in Well 2 given Aquifer Constant and Discharge Formula

Evaluate Formula

Formula

$$s_2 = s_1 - \left(\frac{Q_w}{2.72 \cdot T} \right)$$

Example with Units

$$2.1364\,\text{m} = 2.15\,\text{m} - \left(\frac{0.911\,\text{m}^3/\text{s}}{2.72 \cdot 24.67} \right)$$

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

Evaluate Formula

Formula

$$s_2 = H - h_2$$

Example with Units

$$2.1356\,\text{m} = 20\,\text{m} - 17.8644\,\text{m}$$

3) Radial Distance from Well And Thickness of Aquifer Formulas

3.1) Radial Distance from Well 1 given Aquifer Constant Formula

Evaluate Formula

Formula

$$r_1 = \frac{r_2}{10^{\frac{2.72 \cdot T \cdot \left(s_1 - s_2 \right)}{Q_w}}}$$

Example with Units

$$0.9307\,\text{m} = \frac{10.0\,\text{m}}{10^{\frac{2.72 \cdot 24.67 \cdot \left(2.15\,\text{m} - 2.136\,\text{m} \right)}{0.911\,\text{m}^3/\text{s}}}}$$

3.2) Radial Distance from Well 2 given Aquifer Constant Formula

Evaluate Formula

Formula

$$r_2 = r_1 \cdot 10^{\frac{2.72 \cdot T \cdot \left(s_1 - s_2 \right)}{Q_w}}$$

Example with Units

$$11.4973\,\text{m} = 1.07\,\text{m} \cdot 10^{\frac{2.72 \cdot 24.67 \cdot \left(2.15\,\text{m} - 2.136\,\text{m} \right)}{0.911\,\text{m}^3/\text{s}}}$$

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

Evaluate Formula

Formula

$$H = h_1 + s_1$$

Example with Units

$$20\,\text{m} = 17.85\,\text{m} + 2.15\,\text{m}$$

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

Evaluate Formula

Formula

$$H = h_2 + s_2$$

Example with Units

$$20.0004\,\text{m} = 17.8644\,\text{m} + 2.136\,\text{m}$$

Variables used in list of Confined Aquifers Formulas above

- **H** Thickness of Aquifer *(Meter)*
- h_1 Depth of Water in Well 1 *(Meter)*
- h_2 Depth of Water in Well 2 *(Meter)*
- Q_w 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)*
- **T** Aquifer Constant
- **Δs** Difference in Drawdowns *(Meter)*

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

- 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 (m³/s)
  Volumetric Flow Rate Unit Conversion

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