Confined Aquifers Formulas

List of 19 Confined Aquifers Formulas

Confined Aquifers

Aquifer Constant And Depth of Water in Well

1) Aquifer Constant

Open Calculator

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

ex $$24.64756 = \frac{0.911 \text{m}^3/\text{s} \cdot \log\left(\left(\frac{10.0\text{m}}{1.07\text{m}}\right), 10\right)}{2.72 \cdot (2.15\text{m} - 2.136\text{m})}$$

2) Aquifer Constant given Difference in Drawdowns at Two Wells

Open Calculator

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

ex $$23.92332 = \frac{0.911 \text{m}^3/\text{s}}{2.72 \cdot 0.014\text{m}}$$

3) Aquifer Constant given Drawdown in Well

Open Calculator

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

ex $$23.92332 = \frac{0.911\text{m}^3/\text{s}}{2.72 \cdot (2.15\text{m} - 2.136\text{m})}$$

4) Confined Aquifer Discharge given Aquifer Constant

Open Calculator

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

ex $$0.911829\text{m}^3/\text{s} = \frac{24.67 \cdot 2.72 \cdot (2.15\text{m} - 2.136\text{m})}{\log\left(\left(\frac{10.0\text{m}}{1.07\text{m}}\right), 10\right)}$$

5) Depth of Water in Well 1 given Drawdown in Well 1

Open Calculator

fx $$h_1 = H - s_1$$

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

6) Depth of Water in Well 2 given Drawdown in Well 2

Open Calculator

fx $$h_2 = H - s_2$$

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

Discharge And Drawdown in Well

7) Difference in Drawdowns at Two Wells given Aquifer Constant

Open Calculator

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

ex $$0.013576\text{m} = \left(\frac{0.911\text{m}^3/\text{s}}{2.72 \cdot 24.67} \right)$$

8) Discharge given Aquifer Constant

Open Calculator

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

ex $$0.939434\text{m}^3/\text{s} = \frac{24.67}{\frac{1}{2.72 \cdot (2.15\text{m} - 2.136\text{m})}}$$

9) Discharge given Difference in Drawdowns at Two Wells

Open Calculator

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

ex $$0.939434\text{m}^3/\text{s} = 24.67 \cdot 2.72 \cdot 0.014\text{m}$$

10) Drawdown in Well 1 given Aquifer Constant

Open Calculator

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

$$2.149987\text{m} = 2.136\text{m} + \left(\frac{0.911\text{m}^3/\text{s} \cdot \log\left(\left(\frac{10.0\text{m}}{1.07\text{m}}\right), 10\right)}{2.72 \cdot 24.67} \right)$$

11) Drawdown in Well 1 given Aquifer Constant and Discharge

Open Calculator

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

$$2.149576\text{m} = 2.136\text{m} + \left(\frac{0.911\text{m}^3/\text{s}}{2.72 \cdot 24.67} \right)$$

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

Open Calculator

$$s_1 = H - h_1$$

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

13) Drawdown in Well 2 given Aquifer Constant

Open Calculator

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

ex $$2.136013\text{m} = 2.15\text{m} - \left(\frac{0.911\text{m}^3/\text{s} \cdot \log\left(\left(\frac{10.0\text{m}}{1.07\text{m}}\right), 10\right)}{2.72 \cdot 24.67} \right)$$

14) Drawdown in Well 2 given Aquifer Constant and Discharge

Open Calculator

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

ex $$2.136424\text{m} = 2.15\text{m} - \left(\frac{0.911\text{m}^3/\text{s}}{2.72 \cdot 24.67} \right)$$

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

Open Calculator

fx $$s_2 = H - h_2$$

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

Radial Distance from Well And Thickness of Aquifer

16) Radial Distance from Well 1 given Aquifer Constant

Open Calculator

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

ex $$0.930655\text{m} = \frac{10.0\text{m}}{10^{\frac{2.72 \cdot 24.67 \cdot (2.15\text{m} - 2.136\text{m})}{0.911\text{m}^3/\text{s}}}}$$

17) Radial Distance from Well 2 given Aquifer Constant

Open Calculator

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

ex $$11.49728\text{m} = 1.07\text{m} \cdot 10^{\frac{2.72 \cdot 24.67 \cdot (2.15\text{m} - 2.136\text{m})}{0.911\text{m}^3/\text{s}}}$$

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

Open Calculator

fx $$H = h_1 + s_1$$

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

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

Open Calculator

fx $$H = h_2 + s_2$$

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

Variables Used

- **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

- Function: **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

Check other formula lists

- **Confined Aquifers Formulas**
- **Unsteady Flow Formulas**

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