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Confined Aquifers Formulas

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List of 19 Confined Aquifers Formulas

Confined Aquifers

Aquifer Constant And Depth of Water in Well

1) Aquifer Constant

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

[Open Calculator !\[\]\(de95854c7ee024cfadc48187bbb781b2_img.jpg\)](#)

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

2) Aquifer Constant given Difference in Drawdowns at Two Wells

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

[Open Calculator !\[\]\(6a9b39b98eb945faa14c645ec99e4eaa_img.jpg\)](#)

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



3) Aquifer Constant given Drawdown in Well

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

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)

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

4) Confined Aquifer Discharge given Aquifer Constant

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

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0_img.jpg\)](#)

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

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

$$fx \quad h_1 = H - s_1$$

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f_img.jpg\)](#)

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

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

$$fx \quad h_2 = H - s_2$$

[Open Calculator !\[\]\(b64b40baaee5acddc1eab8538ba84754_img.jpg\)](#)

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



Discharge And Drawdown in Well

7) Difference in Drawdowns at Two Wells given Aquifer Constant

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

[Open Calculator !\[\]\(23d9fc146e83b5c3013cfa32c784f8d5_img.jpg\)](#)

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

8) Discharge given Aquifer Constant

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

[Open Calculator !\[\]\(aa53ad6fea213b8b2226d3077e30533a_img.jpg\)](#)

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

9) Discharge given Difference in Drawdowns at Two Wells

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

[Open Calculator !\[\]\(626ce8ac21792b9405bfddfea8e0c96a_img.jpg\)](#)


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



10) Drawdown in Well 1 given Aquifer Constant [Open Calculator !\[\]\(bd1a142de767a21e5362c595f844a4ff_img.jpg\)](#)

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

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

11) Drawdown in Well 1 given Aquifer Constant and Discharge [Open Calculator !\[\]\(830769b31eeeaca920791081939ff8ba_img.jpg\)](#)

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


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

12) Drawdown in Well 1 given Thickness of Aquifer from Impermeable Layer [Open Calculator !\[\]\(47734e4656765d20df4fdbd5b7aff048_img.jpg\)](#)

$$fx \quad s_1 = H - h_1$$

$$ex \quad 2.15m = 20m - 17.85m$$




13) Drawdown in Well 2 given Aquifer Constant 

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

Open Calculator 

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

14) Drawdown in Well 2 given Aquifer Constant and Discharge 

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

Open Calculator 

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

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

$$fx \quad s_2 = H - h_2$$

Open Calculator 

$$ex \quad 2.1356m = 20m - 17.8644m$$



Radial Distance from Well And Thickness of Aquifer



16) Radial Distance from Well 1 given Aquifer Constant

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

Open Calculator

$$\text{ex } 0.930655\text{m} = \frac{10.0\text{m}}{10 \frac{2.72 \cdot 24.67 \cdot (2.15\text{m} - 2.136\text{m})}{0.911\text{m}^2/\text{s}}}$$

17) Radial Distance from Well 2 given Aquifer Constant

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

Open Calculator

$$\text{ex } 11.49728\text{m} = 1.07\text{m} \cdot 10 \frac{2.72 \cdot 24.67 \cdot (2.15\text{m} - 2.136\text{m})}{0.911\text{m}^2/\text{s}}$$

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

1

$$\text{fx } H = h_1 + s_1$$

Open Calculator

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

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

2

$$\text{fx } H = h_2 + s_2$$

Open Calculator

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





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**, $\log(\text{Base}, \text{Number})$
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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