Important Confined Aquifer Formulas PDF



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Important Confined Aquifer Formulas

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1) Aquifer Discharge Formulas 🕝

1.1) Confined Aquifer Discharge given Coefficient of Transmissibility Formula



$$Q = \frac{2 \cdot \pi \cdot T_{\text{envi}} \cdot s_{t}}{\log\left(\left(\frac{R_{w}}{r}\right), e\right)}$$

Example with Units

$$1.0706\,\mathrm{m}^3/\mathrm{s} = \frac{2 \cdot 3.1416 \cdot 1.5\,\mathrm{m}^2/\mathrm{s} \cdot 0.83\,\mathrm{m}}{\log\left(\left(\frac{8.6\,\mathrm{m}}{7.5\,\mathrm{m}}\right), e\right)}$$

1.2) Confined Aquifer Discharge given Coefficient of Transmissibility and Depth of Water Formula

Formula

$$Q = \frac{2.72 \cdot T_{w} \cdot \left(h_{2} - h_{1}\right)}{\log\left(\left(\frac{r_{2}}{r_{1}}\right), 10\right)}$$

Example with Units

$$1.0227\,\mathrm{m^3/s}\ = \frac{2.72\cdot 26.9\,\mathrm{m^2/s}\,\cdot\,\left(\ 17.8644\,\mathrm{m}\ -\ 17.85\,\mathrm{m}\ \right)}{log\!\left(\left(\frac{10.0\,\mathrm{m}}{1.07\,\mathrm{m}}\right)\!,10\right)}$$

1.3) Confined Aquifer Discharge given Depth of Water in Two Wells Formula

Formula

$$Qcaq = \frac{2.72 \cdot K_w \cdot b_p \cdot (h_2 - h_1)}{log((\frac{r_2}{r_1}), 10)}$$

Example with Units

$$1.0094\,\mathrm{m^3/s}\ = \frac{2.72\cdot 1125\,\mathrm{cm/s}\,\cdot 2.36\,\mathrm{m}\,\cdot \left(\ 17.8644\,\mathrm{m}\,\,\cdot \,17.85\,\mathrm{m}\,\,\right)}{log\!\left(\left(\frac{10.0\,\mathrm{m}}{1.07\,\mathrm{m}}\right)\!,10\right)}$$

1.4) Confined Aquifer Discharge given Drawdown at Well Formula 🕝

Formula

$$Q = \frac{2 \cdot \pi \cdot K_{WH} \cdot b_{p} \cdot S_{tw}}{\log\left(\left(\frac{R_{w}}{r}\right), e\right)}$$

$$1.0005\,\text{m}^3/\text{s} \ = \frac{2 \cdot 3.1416 \cdot 10.00\,\text{cm/s} \cdot 2.36\,\text{m} \cdot 4.93\,\text{m}}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}}\right), e\right)}$$

1.5) Confined Aquifer Discharge with Base 10 given Coefficient of Transmissibility Formula 🕝

$$Q = \frac{2.72 \cdot T_{envi} \cdot S_{tw}}{\log\left(\left(\frac{R_{w}}{r}\right), 10\right)}$$



Evaluate Formula (

1.6) Confined Aquifer Discharge with Base 10 given Drawdown at Well Formula 🕝

Formula

$$Q = \frac{2.72 \cdot K_{WH} \cdot b_{w} \cdot S_{tw}}{\log\left(\left(\frac{R_{w}}{r}\right), 10\right)}$$

Evaluate Formula (

Evaluate Formula (

1.7) Discharge in Confined Aquifer Formula 🕝

Formula

$$Q_{c} = \frac{2 \cdot \pi \cdot K_{WH} \cdot b_{w} \cdot (H_{i} - h_{w})}{\log((\frac{R_{w}}{r}), e)}$$

Example with Units

$$0.0487\,\mathrm{m}^3/\mathrm{s} = \frac{2\cdot3.1416\cdot10.00\,\mathrm{cm/s}\,\cdot14.15\,\mathrm{m}\,\cdot\left(\,2.48\,\mathrm{m}\,-\,2.44\,\mathrm{m}\,\,\right)}{\log\left(\left(\,\frac{8.6\,\mathrm{m}}{7.5\,\mathrm{m}}\,\right),e\right)}$$

1.8) Discharge in Confined Aquifer given Coefficient of Transmissibility Formula 🕝

Formula

$$Q_{ct} = \frac{2 \cdot \pi \cdot T_{w} \cdot \left(H_{i} \cdot h_{w} \right)}{log\left(\left(\frac{R_{w}}{r} \right), e \right)}$$

Example with Units

$$Q_{ct} = \frac{2 \cdot \pi \cdot T_{w} \cdot \left(H_{i} - h_{w}\right)}{\log\left(\left(\frac{R_{w}}{r}\right), e\right)} = \frac{0.9253 \, m^{3}/s}{\log\left(\left(\frac{8.6 \, m}{7.5 \, m}\right), e\right)}$$

1.9) Discharge in Confined Aquifer with Base 10 Formula 🕝

$$Q = \frac{2.72 \cdot K_{w} \cdot b_{w} \cdot \left(H_{i} - h_{w}\right)}{\log\left(\left(\frac{R_{w}}{r}\right), 10\right)}$$

Evaluate Formula 🕝

Evaluate Formula [

$$1.0294\,\mathrm{m}^3/\mathrm{s} \; = \; \frac{2.72\cdot 1125\,\mathrm{cm/s}\, \cdot 14.15\,\mathrm{m}\, \cdot \left(\; 2.48\,\mathrm{m}\, - 2.44\,\mathrm{m}\,\; \right)}{\log \left(\; \left(\frac{8.6\,\mathrm{m}}{7.5\,\mathrm{m}}\right), 10\; \right)}$$

1.10) Discharge in Confined Aquifer with Base 10 given Coefficient of Transmissibility Formula

Formula

$$Q_{c} = \frac{2.72 \cdot T_{w} \cdot \left(H_{i} - h_{w}\right)}{\log\left(\left(\frac{R_{w}}{r}\right), 10\right)}$$

Example with Units

$$0.174\,\text{m}^3/\text{s} = \frac{2.72 \cdot 26.9\,\text{m}^2/\text{s} \cdot \left(2.48\,\text{m} - 2.44\,\text{m}\right)}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}}\right), 10\right)}$$

Evaluate Formula 🕝

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2) Aquifer Thickness Formulas 🕝

2.1) Aquifer Thickness from Impermeable Layer given Coefficient of Transmissibility Formula

Formula

$$H_{i} = h_{w} + \left(\frac{Q \cdot \log\left(\left(\frac{R_{w}}{r}\right), e\right)}{2 \cdot \pi \cdot T_{w}}\right)$$

Example with Units

$$2.4837 \,\mathrm{m} = 2.44 \,\mathrm{m} + \left(\frac{1.01 \,\mathrm{m}^3/\mathrm{s} \cdot \log\left(\left(\frac{8.6 \,\mathrm{m}}{7.5 \,\mathrm{m}}\right), e\right)}{2 \cdot 3.1416 \cdot 26.9 \,\mathrm{m}^2/\mathrm{s}}\right)$$

2.2) Aquifer Thickness from Impermeable Layer given Coefficient of Transmissibility with Base 10 Formula

Formula

$$H_{i} = h_{w} + \left(\frac{Q \cdot log\left(\left(\frac{R_{w}}{r}\right), 10\right)}{2.72 \cdot T_{w}}\right)$$

Evaluate Formula 🕝

$$2.6722 \text{m} = 2.44 \text{m} + \left(\frac{1.01 \text{m}^3/\text{s} \cdot \log\left(\left(\frac{8.6 \text{m}}{7.5 \text{m}}\right), 10\right)}{2.72 \cdot 26.9 \text{m}^2/\text{s}}\right)$$

2.3) Aquifer Thickness from Impermeable Layer given Discharge in Confined Aquifer Formula

Formula

Evaluate Formula (

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$$H_{i} = h_{w} + \left(\frac{Q \cdot log\left(\left(\frac{R_{w}}{r}\right), e\right)}{2 \cdot \pi \cdot K_{w} \cdot b_{w}}\right)$$

Example with Units

$$2.4474_{\text{m}} = 2.44_{\text{m}} + \left(\frac{1.01_{\text{m}^3/\text{s}} \cdot \log\left(\left(\frac{8.6_{\text{m}}}{7.5_{\text{m}}}\right), e\right)}{2 \cdot 3.1416 \cdot 1125_{\text{cm/s}} \cdot 14.15_{\text{m}}}\right)$$

2.4) Aquifer Thickness from Impermeable Layer given Discharge in Confined Aquifer with Base 10 Formula 🕝

Formula

$$H_{i} = h_{w} + \left(\frac{Q \cdot log\left(\left(\frac{R_{w}}{r}\right), 10\right)}{2.72 \cdot K_{w} \cdot b_{w}}\right)$$

$$2.4792 \text{m} = 2.44 \text{m} + \left(\frac{1.01 \text{m}^3/\text{s} \cdot \log \left(\left(\frac{8.6 \text{m}}{7.5 \text{m}} \right), 10 \right)}{2.72 \cdot 1125 \text{ cm/s} \cdot 14.15 \text{ m}} \right)$$

2.5) Aquifer Thickness given Confined Aquifer Discharge Formula

$$b_{W} = \frac{Q}{\frac{2 \cdot \pi \cdot K_{WH} \cdot s_{t}}{\log\left(\left(\frac{R_{w}}{r}\right), e\right)}}$$

$$b_{W} = \frac{Q}{\frac{2 \cdot \pi \cdot K_{WH} \cdot s_{t}}{\log\left(\left(\frac{R_{w}}{r}\right), e\right)}} \quad 14.1511_{m} = \frac{1.01_{m}^{3}/s}{\frac{2 \cdot 3.1416 \cdot 10.00_{cm/s} \cdot 0.83_{m}}{\log\left(\left(\frac{8.6_{m}}{7.5_{m}}\right), e\right)}$$

2.6) Aquifer Thickness given Confined Aquifer Discharge with Base 10 Formula 🕝

$$t_{aq} = \frac{Q}{\frac{2.72 \cdot K_w \cdot s_t}{\log(\left(\frac{R_w}{l}\right), 10)}}$$

$$t_{aq} = \frac{Q}{\frac{2.72 \cdot K_w \cdot s_t}{\log\left(\left(\frac{R_w}{r}\right), 10\right)}} \quad \boxed{0.6691_m = \frac{\frac{1.01 \, m^3/s}{2.72 \cdot 1125 \, cm/s \cdot 0.83 \, m}}{\log\left(\left(\frac{8.6 \, m}{7.5 \, m}\right), 10\right)}}$$

2.7) Aquifer Thickness given Depth of Water in Two Wells Formula [

Example with Units

 $b_{p} = \frac{Q}{\frac{2.72 \cdot K_{w} \cdot \left(h_{2} \cdot h_{1}\right)}{\log\left(\left(\frac{r_{2}}{r_{1}}\right), 10\right)}} \left| \begin{array}{c} 2.3615 \, \text{m} = \frac{1.01 \, \text{m}^{3} / \text{s}}{\frac{2.72 \cdot 1125 \, \text{cm/s} \cdot \left(17.8644 \, \text{m} - 17.85 \, \text{m} \right)}{\log\left(\left(\frac{10.0 \, \text{m}}{1.07 \, \text{m}}\right), 10\right)} \end{array} \right|$

Evaluate Formula (

2.8) Thickness of Confined Aquifer given Discharge in Confined Aquifer Formula 🕝

$$b_p = \frac{Q}{\frac{2 \cdot \pi \cdot K_w \cdot \left(H_i \cdot h_w \right)}{\log \left(\left(\frac{R_w}{r} \right), e \right)}} \quad 2.6101 \text{m} = \frac{1.01 \text{m}^3 \text{/s}}{\frac{2 \cdot 3.1416 \cdot 1125 \text{ cm/s} \cdot \left(2.48 \text{ m} \cdot 2.44 \text{ m} \right)}{\log \left(\left(\frac{8.6 \text{ m}}{7.5 \text{ m}} \right), e \right)}$$

2.9) Thickness of Confined Aquifer given Discharge in Confined Aquifer with Base 10 Formula

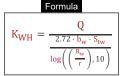
$$t_{aq} = \frac{Q_{c}}{\frac{2.72 \cdot K_{WH} \cdot \left(b_{w} - h_{w}\right)}{\log\left(\left(\frac{R_{w}}{r}\right), 10\right)}} \quad \boxed{0.2113 \, m} = \frac{0.04 \, m^{3}/s}{\frac{2.72 \cdot 10.00 \, cm/s \, \cdot \left(14.15 \, m \, - 2.44 \, m \, \right)}{\log\left(\left(\frac{8.6 \, m}{7.5 \, m}\right), 10\right)}$$

3) Coefficient of Permeability Formulas

3.1) Coefficient of Permeability given Confined Aquifer Discharge Formula 🕝

$$K_{WH} = \frac{Q}{\frac{2 \cdot \pi \cdot b_w \cdot s_t}{\log\left(\left(\frac{R_w}{r}\right), e\right)}} \quad \boxed{10.0008 \, \text{cm/s} = \frac{1.01 \, \text{m}^3/\text{s}}{\frac{2 \cdot 3.1416 \cdot 14.15 \, \text{m} \cdot 0.83 \, \text{m}}{\log\left(\left(\frac{8.6 \, \text{m}}{7.5 \, \text{m}}\right), e\right)}}$$

3.2) Coefficient of Permeability given Confined Aquifer Discharge with Base 10 Formula 🗂 Evaluate Formula [



$$K_{WH} = \frac{Q}{\frac{2.72 \cdot b_w \cdot S_{tw}}{\log\left(\left(\frac{R_w}{r}\right), 10\right)}} \quad 8.9555 \, \text{cm/s} = \frac{1.01 \, \text{m}^3/\text{s}}{\frac{2.72 \cdot 14.15 \, \text{m} \cdot 4.93 \, \text{m}}{\log\left(\left(\frac{8.6 \, \text{m}}{7.5 \, \text{m}}\right), 10\right)}$$

3.3) Coefficient of Permeability given Depth of Water in Two Wells Formula 🕝

Formula

$$K_{W} = \frac{Q}{\frac{2.72 \cdot b_{p} \cdot \left(h_{2} \cdot h_{1}\right)}{\log\left(\left(\frac{r_{2}}{r_{1}}\right), 10\right)}} \left[\begin{array}{c} 1125.7201 \, \text{cm/s} \end{array}\right] = \frac{1.01 \, \text{m}^{3} / \text{s}}{\frac{2.72 \cdot 2.36 \, \text{m} \cdot \left(17.8644 \, \text{m} - 17.85 \, \text{m} \right)}{\log\left(\left(\frac{10.0 \, \text{m}}{1.07 \, \text{m}}\right), 10\right)} \right]$$

4) Coefficient of Transmissibility Formulas (

4.1) Coefficient of Transmissibility given Confined Aquifer Discharge Formula 🕝

Formula

$$T_{envi} = \frac{Q}{\frac{2 \cdot \pi \cdot s_t}{\log\left(\left(\frac{R_w}{r}\right), e\right)}}$$

$$T_{envi} = \frac{Q}{\frac{2 \cdot \pi \cdot s_{t}}{\log\left(\left(\frac{R_{w}}{r}\right), e\right)}} \quad | \quad 1.4151 \, \text{m}^{2}/\text{s} = \frac{1.01 \, \text{m}^{3}/\text{s}}{\frac{2 \cdot 3.1416 \cdot 0.83 \, \text{m}}{\log\left(\left(\frac{8.6 \, \text{m}}{7.5 \, \text{m}}\right), e\right)}}$$

Evaluate Formula (

Evaluate Formula (

Evaluate Formula 🕝

4.2) Coefficient of Transmissibility given Depth of Water in Two Wells Formula 🕝

Formula

$$T_{envi} = \frac{Q}{\frac{2.72 \cdot \left(h_2 \cdot h_1\right)}{\log\left(\left(\frac{r_2}{r_1}\right), 10\right)}}$$

$$T_{envi} = \frac{Q}{\frac{2.72 \cdot \left(h_2 - h_1\right)}{\log\left(\left(\frac{r_2}{r^1}\right), 10\right)}} \left[2.5786 \, \text{m}^2/\text{s} \right] = \frac{1.01 \, \text{m}^3/\text{s}}{\frac{2.72 \cdot \left(17.8644 \, \text{m} - 17.85 \, \text{m}\right)}{\log\left(\left(\frac{10.0 \, \text{m}}{0.000000001 \, \text{m}}\right), 10\right)}$$

4.3) Coefficient of Transmissibility given Discharge in Confined Aquifer with Base 10 Formula

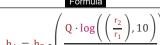
$$T_{envi} = \frac{Q}{\frac{2.72 \cdot \left(b_w \cdot h_{well}\right)}{\log\left(\left(\frac{R_w}{r}\right), 10\right)}}$$

Example with Units

$$1.5054\,\mathrm{m^2/s} \,=\, \frac{1.01\,\mathrm{m^3/s}}{\frac{2.72\cdot\left(\,14.15\,\mathrm{m}\,\,-\,10.000\,\mathrm{m}\,\,\right)}{\log\left(\left(\,\frac{8.6\,\mathrm{m}}{7.5\,\mathrm{m}}\,\right),10\,\right)}}$$

5) Depth of Water in Well Formulas

5.1) Depth of Water in 1st Well given Coefficient of Transmissibility Formula 🕝



Evaluate Formula [

$$h_1 = h_2 - \left(\frac{Q \cdot \log\left(\left(\frac{r_2}{r_1}\right), 10\right)}{2.72 \cdot T_{envi}}\right)$$

$$17.6094 \,\mathrm{m} \,=\, 17.8644 \,\mathrm{m} \,- \left(\frac{1.01 \,\mathrm{m}^3/\mathrm{s} \,\cdot \log \left(\left(\frac{10.0 \,\mathrm{m}}{1.07 \,\mathrm{m}} \right), 10 \right)}{2.72 \cdot 1.5 \,\mathrm{m}^2/\mathrm{s}} \right)$$

5.2) Depth of Water in 1st Well given Confined Aquifer Discharge Formula



$$h_1 = h_2 \cdot \left(\frac{Q \cdot log\left(\left(\frac{r_2}{r_1}\right), 10\right)}{2.72 \cdot K_{WH} \cdot b_p} \right)$$

Example with Units

$$16.2434\,\mathrm{m} \ = \ 17.8644\,\mathrm{m} \ - \left(\frac{1.01\,\mathrm{m}^3/\mathrm{s} \cdot \log\left(\left(\frac{10.0\,\mathrm{m}}{1.07\,\mathrm{m}}\right), 10\right)}{2.72 \cdot 10.00\,\mathrm{cm/s} \cdot 2.36\,\mathrm{m}} \right)$$

5.3) Depth of Water in 2nd Well given Coefficient of Transmissibility Formula



$$h_2 = h_1 + \left(\frac{Q \cdot \log\left(\left(\frac{r_2}{r_1}\right), 10\right)}{2.72 \cdot T_{envi}}\right)$$

Example with Units

$$18.105 \,\mathrm{m} \,=\, 17.85 \,\mathrm{m} \,+ \left(\frac{1.01 \,\mathrm{m}^3/\mathrm{s} \,\cdot \log \left(\left(\frac{10.0 \,\mathrm{m}}{1.07 \,\mathrm{m}} \right), 10 \right)}{2.72 \cdot 1.5 \,\mathrm{m}^2/\mathrm{s}} \right)$$

5.4) Depth of Water in 2nd Well given Confined Aquifer Discharge Formula 🗂



$$h_2 = h_1 + \left(\frac{Q \cdot log\left(\left(\frac{r_2}{r_1}\right), 10\right)}{2.72 \cdot K_{WH} \cdot b_p}\right)$$

$$19.471 \,\mathrm{m} \,=\, 17.85 \,\mathrm{m} \,+ \left(\frac{1.01 \,\mathrm{m}^3/\mathrm{s} \,\cdot \log \left(\left(\frac{10.0 \,\mathrm{m}}{1.07 \,\mathrm{m}} \right), 10 \right)}{2.72 \cdot 10.00 \,\mathrm{cm/s} \,\cdot 2.36 \,\mathrm{m}} \right)$$

5.5) Depth of Water in Well given Coefficient of Transmissibility Formula 🕝

Example with Units

$$h_{w} = H_{i} - \left(\frac{Q \cdot \log\left(\left(\frac{R_{w}}{r}\right), e\right)}{2 \cdot \pi \cdot T_{envi}}\right) \quad 1.697 \text{ m} = 2.48 \text{ m} - \left(\frac{1.01 \text{ m}^{2}/\text{s} \cdot \log\left(\left(\frac{8.6 \text{ m}}{7.5 \text{ m}}\right), e\right)}{2 \cdot 3.1416 \cdot 1.5 \text{ m}^{2}/\text{s}}\right)$$

Evaluate Formula (

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Evaluate Formula (

5.6) Depth of Water in Well given Coefficient of Transmissibility with Base 10 Formula 🕝

$$h_{\text{well}} = b_{\text{w}} \cdot \left(\frac{Q \cdot \log\left(\left(\frac{R_{\text{w}}}{r}\right), 10\right)}{2.72 \cdot T_{\text{envi}}} \right)$$

Example with Units

9.9851_m = 14.15_m -
$$\left(\frac{1.01\,\text{m}^3/\text{s}\,\cdot\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}}\right),10\right)}{2.72\cdot1.5\,\text{m}^2/\text{s}}\right)$$

5.7) Depth of Water in Well given Discharge in Confined Aquifer Formula 🕝

$$h_{\text{well}} = b_{\text{w}} \cdot \left(\frac{Q \cdot \log\left(\left(\frac{R_{\text{w}}}{r}\right), e\right)}{2 \cdot \pi \cdot K_{\text{WH}} \cdot b_{\text{p}}} \right)$$

$$9.1731_{\text{m}} = 14.15_{\text{m}} - \left(\frac{1.01_{\text{m}}^{3}/\text{s} \cdot \log\left(\left(\frac{8.6_{\text{m}}}{7.5_{\text{m}}}\right), e\right)}{2 \cdot 3.1416 \cdot 10.00_{\text{cm/s}} \cdot 2.36_{\text{m}}}\right)$$

5.8) Depth of Water in Well given Discharge in Confined Aquifer with Base 10 Formula 🕝



Evaluate Formula [

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Evaluate Formula

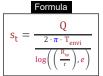
$$h_{well} = b_w - \left(\frac{Q \cdot log\left(\left(\frac{R_w}{r}\right), 10\right)}{2.72 \cdot K_w \cdot b_p}\right)$$

Example with Units

$$13.9147_{m} = 14.15_{m} - \left(\frac{1.01_{m^{3}/s} \cdot \log\left(\left(\frac{8.6_{m}}{7.5_{m}}\right), 10\right)}{2.72 \cdot 1125_{cm/s} \cdot 2.36_{m}}\right)$$

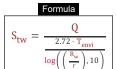
6) Drawdown at well Formulas (?)

6.1) Drawdown at Well given Coefficient of Transmissibility Formula 🕝



$$s_{t} = \frac{Q}{\frac{2 \cdot \pi \cdot T_{envi}}{\log\left(\frac{R_{w}}{r}\right), e}} \quad 0.783 \, \text{m} = \frac{\frac{1.01 \, \text{m}^{3}/\text{s}}{2 \cdot 3.1416 \cdot 1.5 \, \text{m}^{3}/\text{s}}}{\log\left(\frac{8.6 \, \text{m}}{7.5 \, \text{m}}\right), e}$$

6.2) Drawdown at Well given Coefficient of Transmissibility with Base 10 Formula 🕝



$$S_{tw} = \frac{Q}{\frac{2.72 \cdot T_{envi}}{\log\left(\left(\frac{R_w}{r}\right), 10\right)}} \quad \boxed{ 4.1649_m = \frac{1.01 \, \text{m}^3/\text{s}}{\frac{2.72 \cdot 1.5 \, \text{m}^2/\text{s}}{\log\left(\left(\frac{8.6 \, \text{m}}{7.5 \, \text{m}}\right), 10\right)}}$$

6.3) Drawdown at Well given Confined Aquifer Discharge Formula



$$S_{tw} = \frac{Q}{\frac{2 \cdot \pi \cdot K_{WH} \cdot b_{p}}{\log\left(\left(\frac{R_{w}}{r}\right), e\right)}}$$

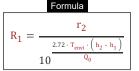
$$S_{\text{tw}} = \frac{Q}{\frac{2 \cdot \pi \cdot K_{\text{WH}} \cdot b_{\text{p}}}{\log\left(\left(\frac{R_{\text{w}}}{r}\right), e\right)}} = \frac{1.01 \,\text{m}^{3}/\text{s}}{\frac{2 \cdot 3.1416 \cdot 10.00 \,\text{cm/s} \cdot 2.36 \,\text{m}}{\log\left(\left(\frac{8.6 \,\text{m}}{7.5 \,\text{m}}\right), e\right)}}$$

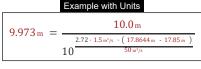
6.4) Drawdown at Well given Confined Aquifer Discharge with Base 10 Formula 🕝 Evaluate Formula C



7) Radial Distance and Radius of well Formulas

7.1) Radial Distance of Well 1 given Coefficient of Transmissibility and Discharge Formula 🗂







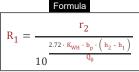
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7.2) Radial Distance of Well 1 given Confined Aquifer Discharge Formula



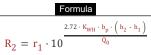


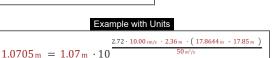
7.3) Radial Distance of Well 2 given Coefficient of Transmissibility and Discharge Formula





7.4) Radial Distance of Well 2 given Confined Aquifer Discharge Formula





7.5) Radius of Influence given Discharge and Length of Strainer Formula



$$25.994\,\mathrm{m}\ =\ 7.5\,\mathrm{m}\ \cdot 10^{\frac{2.72\cdot\,10.00\,\mathrm{cm/s}\,\,\cdot\,0.83\,\mathrm{m}\,\,\cdot\,\left(\,2\,\mathrm{m}\,\,+\,\left(\frac{0.83\,\mathrm{m}}{2}\right)\,\right)}{1.01\,\mathrm{m^2/s}}$$

7.6) Radius of Influence given Discharge in Unconfined Aquifer Formula 🕝

Formula
$$R_{w} = r \cdot exp\left(\frac{\pi \cdot K_{soil} \cdot \left(H_{i}^{2} - h_{w}^{2}\right)}{Q}\right)$$

Example with Units

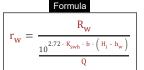
$$7.5 \,\mathrm{m} = 7.5 \,\mathrm{m} \cdot \exp \left(\frac{3.1416 \cdot 0.001 \,\mathrm{cm/s} \cdot \left(2.48 \,\mathrm{m}^2 - 2.44 \,\mathrm{m}^2 \right)}{1.01 \,\mathrm{m}^3/\mathrm{s}} \right)$$

7.7) Radius of Influence given Discharge in Unconfined Aquifer with Base 10 Formula 🕝

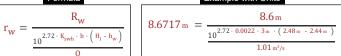




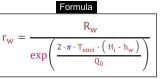
7.8) Radius of Well for Discharge in Confined Aquifer with Base 10 Formula 🕝



Example with Units



7.9) Radius of Well given Coefficient of Transmissibility Formula 🕝



Example with Units



7.10) Radius of Well given Coefficient of Transmissibility with Base 10 Formula 🕝

Example with Units

$$r_{w} = \frac{R_{w}}{10^{\frac{2.72 \cdot T_{envi} \cdot \left(H_{i} \cdot h_{w}\right)}{Q_{0}}}} = \frac{8.6 \, \text{m}}{10^{\frac{2.72 \cdot 1.5 \, \text{m}^{2}/\text{s} \cdot \left(2.48 \, \text{m} - 2.44 \, \text{m} \right)}{50 \, \text{m}^{2}/\text{s}}}}$$

7.11) Radius of Well given Confined Aquifer Discharge Formula

$\mathbf{r}' = \frac{\mathbf{R}_{\mathbf{W}}}{\exp\left(\frac{2 \cdot \pi \cdot \mathbf{K}_{\mathbf{WH}} \cdot \mathbf{b}_{\mathbf{p}} \cdot \mathbf{s}_{\mathbf{t}}}{\mathbf{O}}\right)}$

Example with Units

$$2.5426 \,\mathrm{m} = \frac{8.6 \,\mathrm{m}}{\exp\left(\frac{2 \cdot 3.1416 \cdot 10.00 \,\mathrm{cm/s} \cdot 2.36 \,\mathrm{m} \cdot 0.83 \,\mathrm{m}}{1.01 \,\mathrm{m}^3/\mathrm{s}}\right)}$$

Evaluate Formula (

Evaluate Formula (

Evaluate Formula

Evaluate Formula (

Evaluate Formula (

Evaluate Formula (

7.12) Radius of Well given Confined Aquifer Discharge with Base 10 Formula 🕝

$$r^{'} = \frac{R_{W}}{10^{\frac{2.72 \cdot K_{WH} \cdot b_{p} \cdot s_{t}}{Q}}} = \frac{8.6 \, \text{m}}{10^{\frac{2.72 \cdot K_{WH} \cdot b_{p} \cdot s_{t}}{Q}}}$$

Evaluate Formula (

Evaluate Formula (

7.13) Radius of Well given Discharge in Confined Aquifer Formula 🕝



$$r_{w} = \frac{R_{w}}{exp\left(\frac{2 \cdot \pi \cdot K_{WH} \cdot b_{p} \cdot \left(H_{i} \cdot h_{w}\right)}{Q_{0}}\right)}$$

Example with Units

$$8.5898 \,\mathrm{m} \,=\! \frac{8.6 \,\mathrm{m}}{\exp\!\left(\frac{2 \cdot 3.1416 \cdot 10.00 \,\mathrm{cm/s} \cdot 2.36 \,\mathrm{m} \cdot \left(2.48 \,\mathrm{m} \cdot 2.44 \,\mathrm{m} \,\right)}{50 \,\mathrm{m}^3/\mathrm{s}}\right)}$$

7.14) Radius of Well given Drawdown at Well Formula 🕝

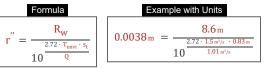
Evaluate Formula

$$r'' = \frac{R_W}{\exp\left(\frac{2 \cdot \pi \cdot T_{envi} \cdot s_t}{Q}\right)}$$

$$0.0037 \, \text{m} \, = \frac{8.6 \, \text{m}}{\exp\left(\frac{2 \cdot 3.1416 \cdot 1.5 \, \text{m}^2/\text{s} \, \cdot 0.83 \, \text{m}}{1.01 \, \text{m}^3/\text{s}}\right)}$$

7.15) Radius of Well given Drawdown at Well with Base 10 Formula 🕝





Evaluate Formula

8) Radius of Influence Formulas @

8.1) Radius of Influence given Coefficient of Transmissibility Formula 🗂

Evaluate Formula C

$$r_{ic} = r \cdot exp \left(\frac{2 \cdot \pi \cdot T_{envi} \cdot \left(H_i - h_w \right)}{Q_0} \right)$$

$$7.5568_{\text{m}} = 7.5_{\text{m}} \cdot \exp\left(\frac{2 \cdot 3.1416 \cdot 1.5_{\text{m}^2/\text{s}} \cdot (2.48_{\text{m}} - 2.44_{\text{m}})}{50_{\text{m}^2/\text{s}}}\right)$$

8.2) Radius of Influence given Coefficient of Transmissibility with Base 10 Formula

$$r_{ic} = r \cdot 10^{\frac{2.72 \cdot T_{envi} \cdot \left(H_i \cdot h_w\right)}{Q_{ii}}}$$

Example with Units

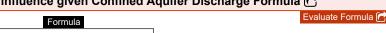
$$7.6903 \,\mathrm{m} \,=\, 7.5 \,\mathrm{m} \,\cdot 10^{\frac{2.72 \cdot 1.5 \,\mathrm{m}^3/\mathrm{s} \,\cdot \left(\,2.48 \,\mathrm{m} \,\cdot \,2.44 \,\mathrm{m}\,\,\right)}{15 \,\mathrm{m}^3/\mathrm{s}}}$$

Evaluate Formula (

Evaluate Formula (

Evaluate Formula C

8.3) Radius of Influence given Confined Aquifer Discharge Formula

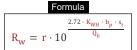


$$R_{w} = r \cdot exp\left(\frac{2 \cdot \pi \cdot K_{WH} \cdot b_{p} \cdot s_{t}}{Q_{li}}\right)$$

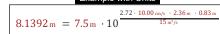
Example with Units

$$8.1413 \,\mathrm{m} \,=\, 7.5 \,\mathrm{m} \,\cdot \exp \left(\frac{2 \cdot 3.1416 \cdot 10.00 \,\mathrm{cm/s} \,\cdot 2.36 \,\mathrm{m} \,\cdot 0.83 \,\mathrm{m}}{15 \,\mathrm{m}^3/\mathrm{s}} \right)$$

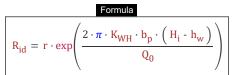
8.4) Radius of Influence given Confined Aquifer Discharge with Base 10 Formula



Example with Units



8.5) Radius of Influence given Discharge in Confined Aquifer Formula



Example with Units

$$7.5089_{\text{m}} = 7.5_{\text{m}} \cdot \exp\left(\frac{2 \cdot 3.1416 \cdot 10.00_{\text{cm/s}} \cdot 2.36_{\text{m}} \cdot (2.48_{\text{m}} - 2.44_{\text{m}})}{50_{\text{m}^{3}/\text{s}}}\right)$$

8.6) Radius of Influence given Discharge in Confined Aquifer with Base 10 Formula C





8.7) Radius of Influence given Drawdown at Well Formula

Formula

$$R_{iw} = r \cdot exp\left(\frac{2 \cdot \pi \cdot T_{envi} \cdot s_t}{Q_{li}}\right)$$

Evaluate Formula 🕝

Example with Units

$$12.6342 \,\mathrm{m} = 7.5 \,\mathrm{m} \cdot \exp \left(\frac{2 \cdot 3.1416 \cdot 1.5 \,\mathrm{m}^2/\mathrm{s} \cdot 0.83 \,\mathrm{m}}{15 \,\mathrm{m}^2/\mathrm{s}} \right)$$

8.8) Radius of Influence given Drawdown at Well with Base 10 Formula 🕝

Example with Units Evaluate Formula 🕝

 $R_{iw} = r \cdot 10^{\frac{2.72 \cdot T_{envi} \cdot s_t}{Q_{li}}}$

 $12.6131_{\,\mathrm{m}} \, = \, 7.5_{\,\mathrm{m}} \, \cdot 10^{\frac{2.72 \cdot 1.5_{\,\mathrm{m}^2/\mathrm{s}} \, \cdot 0.83_{\,\mathrm{m}}}{15_{\,\mathrm{m}^3/\mathrm{s}}}}$

Variables used in list of Confined Aquifer Formulas above

- **b** Thickness of Aquifer (Meter)
- b_p Aquifer Thickness During Pumping (Meter)
- b_w Aquifer Thickness (Meter)
- h₁ Depth of Water 1 (Meter)
- h₂ Depth of Water 2 (Meter)
- **H**i Initial Aquifer Thickness (Meter)
- h_w Depth of Water (Meter)
- h_{well} Depth of Water in Well (Meter)
- K_{soil} Coefficient of Permeability of Soil Particle (Centimeter per Second)
- K_{swh} Standard Coefficient of Permeability
- K_w Coefficient of Permeability (Centimeter per Second)
- K_{WH} Coefficient of Permeability in Well Hydraulics (Centimeter per Second)
- L Length of Strainer (Meter)
- Q Discharge (Cubic Meter per Second)
- Q₀ Discharge at Time t=0 (Cubic Meter per Second)
- Q_c Discharge in Confined Aquifer (Cubic Meter per Second)
- Q_{ct} Discharge given Coefficient of Transmissibility (Cubic Meter per Second)
- Q_{li} Discharge of Liquid (Cubic Meter per Second)
- Qcaq Confined Aquifer Discharge given Depth of Water (Cubic Meter per Second)
- r Radius of Well (Meter)
- r₁ Radial Distance at Observation Well 1 (Meter)
- R₁ Radial Distance 1 (Meter)
- r₂ Radial Distance at Observation Well 2 (Meter)
- R₂ Radial Distance at Well 2 (Meter)
- r_{ic} Radius of Influence(Coeffi. of Transmissibility)
 (Meter)
- R_{id} Radius of Influence given Discharge (Meter)

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

- constant(s): pi,
 3.14159265358979323846264338327950288
 Archimedes' constant
- constant(s): e,
 2.71828182845904523536028747135266249
 Napier's constant
- Functions: exp, exp(Number)

 n an exponential function, the value of the function changes by a constant factor for every unit change in the independent variable.
- Functions: log, log(Base, Number)
 Logarithmic function is an inverse function to exponentiation.
- Measurement: Length in Meter (m)
 Length Unit Conversion
- Measurement: Speed in Centimeter per Second (cm/s)
 Speed Unit Conversion
- Measurement: Volumetric Flow Rate in Cubic Meter per Second (m³/s)
 Volumetric Flow Rate Unit Conversion
- Measurement: Kinematic Viscosity in Square Meter per Second (m²/s)

Kinematic Viscosity Unit Conversion



- R_{iw} Radius of Influence given Drawdown at Well (Meter)
- rw Radius of Well given Discharge (Meter)
- R_w Radius of Influence (Meter)
- r Radius of Well in Eviron. Engin. (Meter)
- r" Radius of Well in Well Hydraulics (Meter)
- r1 Radial Distance at Well 1 (Meter)
- St Total Drawdown (Meter)
- Stw Total Drawdown in Well (Meter)
- t_{aq} Aquifer Thickness given Confined Aquifer Discharge (Meter)
- T_{envi} Coefficient of Transmissibility (Square Meter per Second)
- T_w Coefficient of Transmissibility in Enviro. Eng. (Square Meter per Second)

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- Important Confined Aquifer
 Formulas ()
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