Important Confined Aquifer Formulas PDF

Formulas
Examples
with Units

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Important Confined Aquifer Formulas

1) Aquifer Discharge Formulas

1.1) Confined Aquifer Discharge given Coefficient of Transmissibility Formula

Evaluate Formula

Formula

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

Example with Units

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

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

Evaluate 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

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

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

Evaluate Formula

Formula

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

Example with Units

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

1.4) Confined Aquifer Discharge given Drawdown at Well Formula

Evaluate Formula

Formula

$$Q = \frac{2 \cdot \pi \cdot K_{WH} \cdot b_p \cdot S_{tw}}{\log\left(\left(\frac{R_w}{r}\right), e\right)}$$

Example with Units

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

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

Evaluate Formula

Formula

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

Example with Units

$$1.1955\,\text{m}^3/\text{s} = \frac{2.72 \cdot 1.5\,\text{m}^2/\text{s} \cdot 4.93\,\text{m}}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}}\right), 10\right)}$$

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

Evaluate Formula

Formula

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

Example with Units

$$1.1278\,\text{m}^3/\text{s} = \frac{2.72 \cdot 10.00\,\text{cm/s} \cdot 14.15\,\text{m} \cdot 4.93\,\text{m}}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}}\right), 10\right)}$$

1.7) Discharge in Confined Aquifer Formula

Evaluate Formula

Formula

$$Q_c = \frac{2 \cdot \pi \cdot K_{WH} \cdot b_w \cdot \left(H_i - h_w\right)}{\log\left(\left(\frac{R_w}{r}\right), e\right)}$$

Example with Units

$$0.0487\,\text{m}^3/\text{s} = \frac{2 \cdot 3.1416 \cdot 10.00\,\text{cm/s} \cdot 14.15\,\text{m} \cdot \left(2.48\,\text{m} - 2.44\,\text{m}\right)}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}}\right), e\right)}$$

1.8) Discharge in Confined Aquifer given Coefficient of Transmissibility Formula

Evaluate Formula

Formula

$$Q_{ct} = \frac{2 \cdot \pi \cdot T_w \cdot \left(H_i - h_w\right)}{\log\left(\left(\frac{R_w}{r}\right), e\right)}$$

Example with Units

$$0.9253\,\text{m}^3/\text{s} = \frac{2 \cdot 3.1416 \cdot 26.9\,\text{m}^2/\text{s} \cdot \left(2.48\,\text{m} - 2.44\,\text{m}\right)}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}}\right), e\right)}$$

1.9) Discharge in Confined Aquifer with Base 10 Formula

Evaluate Formula

Formula

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

Example with Units

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

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

Evaluate 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

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

2) Aquifer Thickness Formulas

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

Evaluate 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

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

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

Evaluate Formula

Formula

$$H_i = h_w + \left(\frac{Q \cdot \log\left(\left(\frac{R_w}{r} \right), 10 \right)}{2.72 \cdot T_w} \right)$$

Example with Units

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

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

Evaluate Formula

Formula

$$H_i = h_w + \left(\frac{Q \cdot \log\left(\left(\frac{R_w}{r} \right), e \right)}{2 \cdot \pi \cdot K_w \cdot b_w} \right)$$

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

Evaluate Formula

Formula

$$H_i = h_w + \left(\frac{Q \cdot \log\left(\left(\frac{R_w}{r} \right), 10 \right)}{2.72 \cdot K_w \cdot b_w} \right)$$

Example with Units

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

2.5) Aquifer Thickness given Confined Aquifer Discharge Formula

Evaluate Formula

Formula

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

Example with Units

$$14.1511\,\text{m} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2 \cdot 3.1416 \cdot 10.00\,\text{cm/s} \cdot 0.83\,\text{m}}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}} \right), e \right)}}$$

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

Evaluate Formula

Formula

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

Example with Units

$$0.6691\,\text{m} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2.72 \cdot 1125\,\text{cm/s} \cdot 0.83\,\text{m}}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}} \right), 10 \right)}}$$

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

Evaluate Formula

Formula

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

Example with Units

$$2.3615\,\text{m} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2.72 \cdot 1125\,\text{cm/s} \cdot \left(17.8644\,\text{m} - 17.85\,\text{m} \right)}{\log\left(\left(\frac{10.0\,\text{m}}{1.07\,\text{m}} \right), 10 \right)}}$$

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

Evaluate Formula

Formula

$$b_p = \frac{Q}{\frac{2 \cdot \pi \cdot K_w \cdot \left(H_i - h_w \right)}{\log\left(\left(\frac{R_w}{r} \right), e \right)}}$$

Example with Units

$$2.6101\,\text{m} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2 \cdot 3.1416 \cdot 1125\,\text{cm/s} \cdot \left(2.48\,\text{m} - 2.44\,\text{m} \right)}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}} \right), e \right)}}$$

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

Evaluate Formula

Formula

$$t_{aq} = \frac{Q_c}{\frac{2.72 \cdot K_{WH} \cdot \left(b_w - h_w \right)}{\log\left(\left(\frac{R_w}{r} \right), 10 \right)}}$$

Example with Units

$$0.2113\,\text{m} = \frac{0.04\,\text{m}^3/\text{s}}{\frac{2.72 \cdot 10.00\,\text{cm/s} \cdot \left(14.15\,\text{m} - 2.44\,\text{m} \right)}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}} \right), 10 \right)}}$$

3) Coefficient of Permeability Formulas

3.1) Coefficient of Permeability given Confined Aquifer Discharge Formula

Evaluate Formula

Formula

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

Example with Units

$$10.0008\,\text{cm/s} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2 \cdot 3.1416 \cdot 14.15\,\text{m} \cdot 0.83\,\text{m}}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}} \right), e \right)}}$$

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

Evaluate Formula

Formula

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

Example with Units

$$8.9555\,\text{cm/s} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2.72 \cdot 14.15\,\text{m} \cdot 4.93\,\text{m}}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}} \right), 10 \right)}}$$

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

Evaluate Formula

Formula

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

Example with Units

$$1125.7201\,\text{cm/s} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2.72 \cdot 2.36\,\text{m} \cdot \left(17.8644\,\text{m} - 17.85\,\text{m} \right)}{\log\left(\left(\frac{10.0\,\text{m}}{1.07\,\text{m}} \right), 10 \right)}}$$

4) Coefficient of Transmissibility Formulas

4.1) Coefficient of Transmissibility given Confined Aquifer Discharge Formula

Evaluate Formula

Formula

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

Example with Units

$$1.4151\,\text{m}^2/\text{s} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2 \cdot 3.1416 \cdot 0.83\,\text{m}}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}}\right), e\right)}}$$

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

Evaluate Formula

Formula

$$T_{envi} = \frac{Q}{\frac{2.72 \cdot \left(h_2 - h_1\right)}{\log\left(\left(\frac{r_2}{r1}\right), 10\right)}}$$

Example with Units

$$2.5786\,\text{m}^2/\text{s} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2.72 \cdot \left(17.8644\,\text{m} - 17.85\,\text{m}\right)}{\log\left(\left(\frac{10.0\,\text{m}}{0.000000001\,\text{m}}\right), 10\right)}}$$

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

Evaluate Formula

Formula

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

Example with Units

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

5) Depth of Water in Well Formulas

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

Evaluate Formula

Formula

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

Example with Units

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

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

Evaluate Formula

Formula

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

Example with Units

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

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

Evaluate Formula

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

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

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

Evaluate Formula

Formula

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

Example with Units

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

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

Evaluate Formula

Formula

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

Example with Units

$$1.697\,\text{m} = 2.48\,\text{m} - \left(\frac{1.01\,\text{m}^3/\text{s} \cdot \log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}} \right), e \right)}{2 \cdot 3.1416 \cdot 1.5\,\text{m}^2/\text{s}} \right)$$

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

Evaluate Formula

Formula

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

Example with Units

$$9.9851\,\text{m} = 14.15\,\text{m} - \left(\frac{1.01\,\text{m}^3/\text{s} \cdot \log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}} \right), 10 \right)}{2.72 \cdot 1.5\,\text{m}^2/\text{s}} \right)$$

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

Evaluate Formula

Formula

$$h_{well} = b_w - \left(\frac{Q \cdot \log\left(\left(\frac{R_w}{r} \right), e \right)}{2 \cdot \pi \cdot K_{WH} \cdot b_p} \right)$$

Example with Units

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

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

Evaluate Formula

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

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

6) Drawdown at well Formulas

6.1) Drawdown at Well given Coefficient of Transmissibility Formula

Evaluate Formula

Formula

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

Example with Units

$$0.783\,\text{m} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2 \cdot 3.1416 \cdot 1.5\,\text{m}^2/\text{s}}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}} \right), e \right)}}$$

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

Evaluate Formula

Formula

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

Example with Units

$$4.1649\,\text{m} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2.72 \cdot 1.5\,\text{m}^2/\text{s}}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}} \right), 10 \right)}}$$

6.3) Drawdown at Well given Confined Aquifer Discharge Formula

Evaluate Formula

Formula

$$S_{tw} = \frac{Q}{\frac{2 \cdot \pi \cdot K_{WH} \cdot b_p}{\log\left(\left(\frac{R_w}{r} \right), e \right)}}$$

Example with Units

$$4.9769\,\text{m} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2 \cdot 3.1416 \cdot 10.00\,\text{cm/s} \cdot 2.36\,\text{m}}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}} \right), e \right)}}$$

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

Evaluate Formula

Formula

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

Example with Units

$$4.4151\,\text{m} = \frac{1.01\,\text{m}^3/\text{s}}{\frac{2.72 \cdot 10.00\,\text{cm/s} \cdot 14.15\,\text{m}}{\log\left(\left(\frac{8.6\,\text{m}}{7.5\,\text{m}} \right), 10 \right)}}$$

7) Radial Distance and Radius of well Formulas

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

Evaluate Formula

Formula

$$R_1 = \frac{r_2}{10^{\frac{2.72 \cdot T_{envi} \cdot \left(h_2 - h_1\right)}{Q_0}}}$$

Example with Units

$$9.973\,\text{m} = \frac{10.0\,\text{m}}{10^{\frac{2.72 \cdot 1.5\,\text{m}^2/\text{s} \cdot \left(17.8644\,\text{m} - 17.85\,\text{m}\right)}{50\,\text{m}^3/\text{s}}}}$$

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

Evaluate Formula

Formula

$$R_1 = \frac{r_2}{10^{\frac{2.72 \cdot K_{WH} \cdot b_p \cdot \left(h_2 - h_1\right)}{Q_0}}}$$

Example with Units

$$9.9957\,\text{m} = \frac{10.0\,\text{m}}{10^{\frac{2.72 \cdot 10.00\,\text{cm/s} \cdot 2.36\,\text{m} \cdot \left(17.8644\,\text{m} - 17.85\,\text{m}\right)}{50\,\text{m}^3/\text{s}}}}$$

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

Evaluate Formula

Formula

$$R_2 = r_1 \cdot 10^{\frac{2.72 \cdot T_{envi} \cdot \left(h_2 - h_1\right)}{Q_0}}$$

Example with Units

$$1.0729\,\text{m} = 1.07\,\text{m} \cdot 10^{\frac{2.72 \cdot 1.5\,\text{m}^2/\text{s} \cdot \left(17.8644\,\text{m} - 17.85\,\text{m}\right)}{50\,\text{m}^3/\text{s}}}$$

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

Evaluate Formula

Formula

$$R_2 = r_1 \cdot 10^{\frac{2.72 \cdot K_{WH} \cdot b_p \cdot \left(h_2 - h_1\right)}{Q_0}}$$

Example with Units

$$1.0705\,\text{m} = 1.07\,\text{m} \cdot 10^{\frac{2.72 \cdot 10.00\,\text{cm/s} \cdot 2.36\,\text{m} \cdot \left(17.8644\,\text{m} - 17.85\,\text{m}\right)}{50\,\text{m}^3/\text{s}}}$$

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

Evaluate Formula

Formula

$$R_w = r \cdot 10^{\frac{2.72 \cdot K_{WH} \cdot s_t \cdot \left(L + \left(\frac{s_t}{2}\right)\right)}{Q}}$$

Example with Units

$$25.994\,\text{m} = 7.5\,\text{m} \cdot 10^{\frac{2.72 \cdot 10.00\,\text{cm/s} \cdot 0.83\,\text{m} \cdot \left(2\,\text{m} + \left(\frac{0.83\,\text{m}}{2}\right)\right)}{1.01\,\text{m}^3/\text{s}}}$$

7.6) Radius of Influence given Discharge in Unconfined Aquifer Formula

Evaluate 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

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

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

Evaluate Formula

Formula

$$R_w = r \cdot 10^{\frac{1.36 \cdot K_{soil} \cdot \left(H_i^{\,2} - h_w^{\,2}\right)}{Q}}$$

Example with Units

$$7.5\,\text{m} = 7.5\,\text{m} \cdot 10^{\frac{1.36 \cdot 0.001\,\text{cm/s} \cdot \left(2.48\,\text{m}^{\,2} - 2.44\,\text{m}^{\,2}\right)}{1.01\,\text{m}^3\text{/s}}}$$

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

Evaluate Formula

Formula

$$r_w = \frac{R_w}{10^{\frac{2.72 \cdot K_{swh} \cdot b \cdot \left(H_i - h_w\right)}{Q}}}$$

Example with Units

$$8.6717\,\text{m} = \frac{8.6\,\text{m}}{10^{\frac{2.72 \cdot 0.0022 \cdot 3\,\text{m} \cdot \left(2.48\,\text{m} - 2.44\,\text{m}\right)}{1.01\,\text{m}^3\text{/s}}}}$$

7.9) Radius of Well given Coefficient of Transmissibility Formula

Evaluate Formula

Formula

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

Example with Units

$$8.5354\,\text{m} = \frac{8.6\,\text{m}}{\exp\left(\frac{2 \cdot 3.1416 \cdot 1.5\,\text{m}^2\text{/s} \cdot \left(2.48\,\text{m} - 2.44\,\text{m}\right)}{50\,\text{m}^3\text{/s}}\right)}$$

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

Evaluate Formula

Formula

$$r_w = \frac{R_w}{10^{\frac{2.72 \cdot T_{envi} \cdot \left(H_i - h_w\right)}{Q_0}}}$$

Example with Units

$$8.5356\,\text{m} = \frac{8.6\,\text{m}}{10^{\frac{2.72 \cdot 1.5\,\text{m}^2\text{/s} \cdot \left(2.48\,\text{m} - 2.44\,\text{m}\right)}{50\,\text{m}^3\text{/s}}}}$$

7.11) Radius of Well given Confined Aquifer Discharge Formula

Evaluate Formula

Formula

$$r' = \frac{R_w}{\exp\left(\frac{2 \cdot \pi \cdot K_{WH} \cdot b_p \cdot s_t}{Q}\right)}$$

Example with Units

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

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

Evaluate Formula

Formula

$$r' = \frac{R_w}{10^{\frac{2.72 \cdot K_{WH} \cdot b_p \cdot s_t}{Q}}}$$

Example with Units

$$2.5526\,\text{m} = \frac{8.6\,\text{m}}{10^{\frac{2.72 \cdot 10.00\,\text{cm/s} \cdot 2.36\,\text{m} \cdot 0.83\,\text{m}}{1.01\,\text{m}^3\text{/s}}}}$$

7.13) Radius of Well given Discharge in Confined Aquifer Formula

Evaluate Formula

Formula

$$r_w = \frac{R_w}{\exp\left(\frac{2 \cdot \pi \cdot K_{WH} \cdot b_p \cdot \left(H_i - h_w\right)}{Q_0}\right)}$$

Example with Units

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

7.14) Radius of Well given Drawdown at Well Formula

Evaluate Formula

Formula

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

Example with Units

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

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

Evaluate Formula

Formula

$$r'' = \frac{R_w}{10^{\frac{2.72 \cdot T_{envi} \cdot s_t}{Q}}}$$

Example with Units

$$0.0038\,\text{m} = \frac{8.6\,\text{m}}{10^{\frac{2.72 \cdot 1.5\,\text{m}^2\text{/s} \cdot 0.83\,\text{m}}{1.01\,\text{m}^3\text{/s}}}}$$

8) Radius of Influence Formulas

8.1) Radius of Influence given Coefficient of Transmissibility Formula

Evaluate Formula

Formula

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

Example with Units

$$7.5568\,\text{m} = 7.5\,\text{m} \cdot \exp\left(\frac{2 \cdot 3.1416 \cdot 1.5\,\text{m}^2\text{/s} \cdot \left(2.48\,\text{m} - 2.44\,\text{m}\right)}{50\,\text{m}^3\text{/s}}\right)$$

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

Evaluate Formula

Formula

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

Example with Units

$$7.6903\,\text{m} = 7.5\,\text{m} \cdot 10^{\frac{2.72 \cdot 1.5\,\text{m}^2/\text{s} \cdot \left(2.48\,\text{m} - 2.44\,\text{m} \right)}{15\,\text{m}^3/\text{s}}}$$

8.3) Radius of Influence given Confined Aquifer Discharge Formula

Evaluate Formula

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

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

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

Evaluate Formula

Formula

$$R_w = r \cdot 10^{\frac{2.72 \cdot K_{WH} \cdot b_p \cdot s_t}{Q_{li}}}$$

Example with Units

$$8.1392\,\text{m} = 7.5\,\text{m} \cdot 10^{\frac{2.72 \cdot 10.00\,\text{cm/s} \cdot 2.36\,\text{m} \cdot 0.83\,\text{m}}{15\,\text{m}^3/\text{s}}}$$

8.5) Radius of Influence given Discharge in Confined Aquifer Formula

Evaluate Formula

Formula

$$R_{id} = r \cdot \exp\left(\frac{2 \cdot \pi \cdot K_{WH} \cdot b_p \cdot \left(H_i - h_w \right)}{Q_0} \right)$$

Example with Units

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

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

Evaluate Formula

Formula

$$R_{id} = r \cdot 10^{\frac{2.72 \cdot K_{WH} \cdot b_p \cdot \left(H_i - h_w \right)}{Q_0}}$$

Example with Units

$$7.5089\,\text{m} = 7.5\,\text{m} \cdot 10^{\frac{2.72 \cdot 10.00\,\text{cm/s} \cdot 2.36\,\text{m} \cdot \left(2.48\,\text{m} - 2.44\,\text{m} \right)}{50\,\text{m}^3/\text{s}}}$$

8.7) Radius of Influence given Drawdown at Well Formula

Evaluate Formula

Formula

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

Example with Units

$$12.6342\,\text{m} = 7.5\,\text{m} \cdot \exp\left(\frac{2 \cdot 3.1416 \cdot 1.5\,\text{m}^2/\text{s} \cdot 0.83\,\text{m}}{15\,\text{m}^3/\text{s}}\right)$$

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

Evaluate Formula

Formula

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

Example with Units

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

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)*
- h_1 Depth of Water 1 *(Meter)*
- h_2 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)*
- Q_0 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)*
- r_1 Radial Distance at Observation Well 1 *(Meter)*
- R_1 Radial Distance 1 *(Meter)*
- r_2 Radial Distance at Observation Well 2 *(Meter)*
- R_2 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 Aquifer 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)*
- r_w 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)*
- s_t Total Drawdown *(Meter)*
- S_{tw} 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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