



Steady Flow into a Well Formulas

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List of 10 Steady Flow into a Well Formulas

Steady Flow into a Well &

1) Change in Piezometric Head

 $extbf{dh} = V_r \cdot rac{dr}{K}$

Open Calculator 🚰

ex $1.25 \mathrm{m} = 15.00 \mathrm{cm/s} \cdot \frac{0.25 \mathrm{m}}{3.0 \mathrm{cm/s}}$

2) Change in Radial Distance 🗗

 $extbf{dr} = ext{K} \cdot rac{ ext{dh}}{ ext{V.}}$

Open Calculator

 $0.25 ext{m} = 3.0 ext{cm/s} \cdot rac{1.25 ext{m}}{15.00 ext{cm/s}}$

3) Cylindrical Surface through which Velocity of Flow Occurs

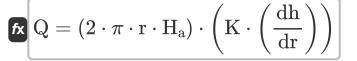
fx $S=2\cdot\pi\cdot r\cdot H_a$

Open Calculator

 $\texttt{ex} \ 848.23 \text{m}^{_2} = 2 \cdot \pi \cdot 3 \text{m} \cdot 45 \text{m}$



4) Discharge Entering Cylindrical Surface to Well Discharge



Open Calculator 🗗

$$\boxed{ 127.2345 \mathrm{m}^3/\mathrm{s} = \left(2 \cdot \pi \cdot 3\mathrm{m} \cdot 45\mathrm{m}\right) \cdot \left(3.0\mathrm{cm/s} \cdot \left(\frac{1.25\mathrm{m}}{0.25\mathrm{m}}\right)\right) }$$

5) Discharge Observed at Edge of Zone of Influence

$$\left[\mathbf{Q}_{\mathrm{iz}} = 2 \cdot \pi \cdot \mathbf{ au} \cdot rac{\mathrm{s'}}{\ln \left(rac{\mathrm{r}_2}{\mathrm{r}_1}
ight)}
ight]$$

Open Calculator 🗗

$$extbf{ex} 2.538122 ext{m}^3/ ext{s} = 2 \cdot \pi \cdot 1.4 ext{m}^2/ ext{s} \cdot rac{0.2 ext{m}}{ ext{ln} \left(rac{10.0 ext{m}}{5.0 ext{m}}
ight)}$$

6) Equilibrium Equation for Flow in Confined Aquifer at Observation Well

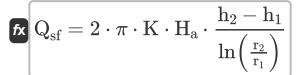
$$\mathbf{R} \mathbf{Q} = rac{2 \cdot \pi \cdot \mathbf{r} \cdot (\mathbf{h}_2 - \mathbf{h}_1)}{\ln \left(rac{\mathbf{r}_2}{\mathbf{r}_1}
ight)}$$

Open Calculator

ex
$$126.9061 \mathrm{m}^3/\mathrm{s} = rac{2 \cdot \pi \cdot 1.4 \mathrm{m}^2/\mathrm{s} \cdot (25 \mathrm{m} - 15 \mathrm{m})}{\ln \left(rac{10.0 \mathrm{m}}{5.0 \mathrm{m}}
ight)}$$



7) Thiem's equilibrium equation for steady flow in confined aquifer 🖸



Open Calculator 🗗

$$ext{ex} 122.3737 ext{m}^3/ ext{s} = 2 \cdot \pi \cdot 3.0 ext{cm/s} \cdot 45 ext{m} \cdot rac{25 ext{m} - 15 ext{m}}{ ext{ln} \left(rac{10.0 ext{m}}{5.0 ext{m}}
ight)}$$

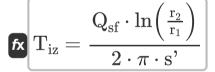
8) Transmissivity when Discharge and Drawdowns are considered

$$au = Q_{sf} \cdot rac{\ln\left(rac{r_2}{r_1}
ight)}{2 \cdot \pi \cdot (H_1 - H_2)}$$

Open Calculator

$$ext{ex} \ 2.691754 ext{m}^2/ ext{s} = 122 ext{m}^3/ ext{s} \cdot rac{ ext{ln} \left(rac{10.0 ext{m}}{5.0 ext{m}}
ight)}{2 \cdot \pi \cdot (15.0 ext{m} - 10.00 ext{m})}$$

9) Transmissivity when Discharge at Edge of Zone of Influence



Open Calculator

$$ext{ex} 67.29386 ext{m}^2/ ext{s} = rac{122 ext{m}^3/ ext{s} \cdot ext{ln} \left(rac{10.0 ext{m}}{5.0 ext{m}}
ight)}{2 \cdot \pi \cdot 0.2 ext{m}}$$



10) Velocity of Flow by Darcy's Law at Radical Distance 🛂



Open Calculator

$$\left| \mathbf{V}_{\mathrm{r}} = \mathbf{K} \cdot \left(rac{\mathrm{dh}}{\mathrm{dr}}
ight)
ight|$$

$$extbf{ex} 15 ext{cm/s} = 3.0 ext{cm/s} \cdot \left(rac{1.25 ext{m}}{0.25 ext{m}}
ight)$$



Variables Used

- dh Change in Piezometric Head (Meter)
- **dr** Change in Radial Distance (Meter)
- h₁ Piezometric Head at Radial Distance r1 (Meter)
- H₁ Drawdown at Start of Recuperation (Meter)
- h₂ Piezometric Head at Radial Distance r2 (Meter)
- **H₂** Drawdown at a Time (Meter)
- **H**_a Width of Aquifer (*Meter*)
- **K** Coefficient of Permeability (Centimeter per Second)
- Q Discharge Entering Cylindrical Surface into Well (Cubic Meter per Second)
- Q_{iz} Discharge Observed at Edge of Zone of Influence (Cubic Meter per Second)
- Q_{sf} Steady Flow in a Confined Aquifer (Cubic Meter per Second)
- r Radial Distance (Meter)
- r₁ Radial Distance at Observation Well 1 (Meter)
- r₂ Radial Distance at Observation Well 2 (Meter)
- **s'** Possible Drawdown in Confined Aquifer (Meter)
- S Surface through which the Velocity of Flow Occurs (Square Meter)
- T_{iz} Transmissivity at Edge of Zone of Influence (Square Meter per Second)
- V_r Velocity of Flow at Radial Distance (Centimeter per Second)
- T Transmissivity (Square Meter per Second)





Constants, Functions, Measurements used

- Constant: pi, 3.14159265358979323846264338327950288
 Archimedes' constant
- Function: In, In(Number)

 The natural logarithm, also known as the logarithm to the base e, is the inverse function of the natural exponential function.
- Measurement: Length in Meter (m)

 Length Unit Conversion
- Measurement: Area in Square Meter (m²)

 Area 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





Check other formula lists

- Aquifer Analysis and Properties
 Formulas
- Coefficient of Permeability
 Formulas
- Distance-Drawdown Analysis
 Formulas
- Open Wells Formulas
- Steady Flow into a Well Formulas
- Unsteady Flow in a Confined Aquifer Formulas

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