

Important Characteristic Well Losses Formulas PDF



Formulas Examples with Units

List of 16 Important Characteristic Well Losses Formulas

1) Aquifer Loss Formulas

1.1) Aquifer Loss Coefficient Formula

Formula

$$B = \frac{\log\left(\left(\frac{R}{r}\right), e\right)}{2 \cdot \pi \cdot k \cdot b_w}$$

Example with Units

$$30.0852 = \frac{\log\left(\left(\frac{100_m}{2.94_m}\right), e\right)}{2 \cdot 3.1416 \cdot 0.01_{cm/s} \cdot 15.0_m}$$

Evaluate Formula 

1.2) Aquifer Loss given Aquifer Loss Coefficient Formula

Formula

$$BQ = B \cdot Q$$

Example with Units

$$28.5325_m = 28.25 \cdot 1.01_{m^3/s}$$

Evaluate Formula 

1.3) Aquifer Loss given Drawdown Formula

Formula

$$BQ = s_t - CQ^n$$

Example with Units

$$27.48_m = 28.0_m - 0.52_m$$

Evaluate Formula 

1.4) Coefficient of Permeability given Aquifer Loss Coefficient Formula

Formula

$$k = \frac{\log\left(\left(\frac{R}{r}\right), e\right)}{2 \cdot \pi \cdot B \cdot b_w}$$

Example with Units

$$0.0106_{cm/s} = \frac{\log\left(\left(\frac{100_m}{2.94_m}\right), e\right)}{2 \cdot 3.1416 \cdot 28.25 \cdot 15.0_m}$$

Evaluate Formula 

1.5) Discharge given Aquifer Loss Formula

Formula

$$Q = \frac{BQ}{B}$$

Example with Units

$$0.977_{m^3/s} = \frac{27.60_m}{28.25}$$

Evaluate Formula 

1.6) Drawdown given Well Loss Formula

Formula

$$s_t = BQ + CQ^n$$

Example with Units

$$28.12_m = 27.60_m + 0.52_m$$

Evaluate Formula 



1.7) Radius of Well given Aquifer Loss Coefficient Formula

Formula

$$r' = \frac{r_i}{\exp(B \cdot 2 \cdot \pi \cdot k \cdot b_w)}$$

Example with Units

$$2.2374 \text{ m} = \frac{2.92 \text{ m}}{\exp(28.25 \cdot 2 \cdot 3.1416 \cdot 0.01 \text{ cm/s} \cdot 15.0 \text{ m})}$$

Evaluate Formula 

2) Specific Capacity of Well Formulas

2.1) Aquifer Loss Coefficient given Specific Capacity Formula

Formula

$$B = \frac{\left(\frac{Q}{S_c}\right) - CQ^n}{Q}$$

Example with Units

$$26.5122 = \frac{\left(\frac{1.01 \text{ m}^3/\text{s}}{0.037 \text{ m}^2/\text{s}}\right) - 0.52 \text{ m}}{1.01 \text{ m}^3/\text{s}}$$

Evaluate Formula 

2.2) Aquifer Loss given Specific Capacity Formula

Formula

$$BQ = \left(\frac{Q}{S_c}\right) - CQ^n$$

Example with Units

$$26.7773 \text{ m} = \left(\frac{1.01 \text{ m}^3/\text{s}}{0.037 \text{ m}^2/\text{s}}\right) - 0.52 \text{ m}$$

Evaluate Formula 

2.3) Discharge given Specific Capacity Formula

Formula

$$Q = S_c \cdot s_t$$

Example with Units

$$1.036 \text{ m}^3/\text{s} = 0.037 \text{ m}^2/\text{s} \cdot 28.0 \text{ m}$$

Evaluate Formula 

2.4) Drawdown given Specific Capacity of Well Formula

Formula

$$s_t = \frac{Q}{S_c}$$

Example with Units

$$27.2973 \text{ m} = \frac{1.01 \text{ m}^3/\text{s}}{0.037 \text{ m}^2/\text{s}}$$

Evaluate Formula 

2.5) Specific Capacity given Aquifer Loss Formula

Formula

$$S_c = \left(\frac{Q}{CQ^n + BQ}\right)$$

Example with Units

$$0.0359 \text{ m}^2/\text{s} = \left(\frac{1.01 \text{ m}^3/\text{s}}{0.52 \text{ m} + 27.60 \text{ m}}\right)$$

Evaluate Formula 

2.6) Specific Capacity given Drawdown Formula

Formula

$$S_c = \frac{Q}{s_t}$$

Example with Units

$$0.0361 \text{ m}^2/\text{s} = \frac{1.01 \text{ m}^3/\text{s}}{28.0 \text{ m}}$$

Evaluate Formula 



2.7) Well Discharge given Specific Capacity Formula

Formula

$$Q = S_c \cdot (CQ^n + BQ)$$

Example with Units

$$1.0404 \text{ m}^3/\text{s} = 0.037 \text{ m}^2/\text{s} \cdot (0.52 \text{ m} + 27.60 \text{ m})$$

Evaluate Formula 

3) Well Loss Formulas

3.1) Well Loss given Drawdown Formula

Formula

$$CQ^n = s_t - BQ$$

Example with Units

$$0.4 \text{ m} = 28.0 \text{ m} - 27.60 \text{ m}$$

Evaluate Formula 

3.2) Well Loss given Specific Capacity Formula

Formula

$$CQ^n = \left(\frac{Q}{S_c} \right) - BQ$$

Example with Units

$$-0.3027 \text{ m} = \left(\frac{1.01 \text{ m}^3/\text{s}}{0.037 \text{ m}^2/\text{s}} \right) - 27.60 \text{ m}$$

Evaluate Formula 



Variables used in list of Characteristic Well Losses Formulas above

- **B** Aquifer Loss Coefficient
- **b_w** Aquifer Thickness (Meter)
- **BQ** Aquifer Loss (Meter)
- **CQ^n** Head Loss in Well (Meter)
- **k** Coefficient of Permeability (Centimeter per Second)
- **Q** Discharge (Cubic Meter per Second)
- **R** Radius of Investigation (Meter)
- **r_i** Radius of Influence (Meter)
- **r'** Radius of Well (Meter)
- **S_c** Specific Capacity (Square Meter per Second)
- **s_t** Total Drawdown (Meter)

Constants, Functions, Measurements used in list of Characteristic Well Losses Formulas above

- **constant(s):** π ,
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 (m^3/s)
Volumetric Flow Rate Unit Conversion 
- **Measurement:** **Kinematic Viscosity** in Square
Meter per Second (m^2/s)
Kinematic Viscosity Unit Conversion 



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