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Constant Level Pumping Test Formulas

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List of 25 Constant Level Pumping Test Formulas

Constant Level Pumping Test

Cross Sectional Area of Well

1) Cross-sectional Area of Flow into well given Discharge

Open Calculator

fx $$A_{csw} = \left(\frac{Q}{V}\right)$$

ex $$13.02632\text{m}^2 = \left(\frac{0.99\text{m}^3/\text{s}}{0.076\text{m/s}}\right)$$

2) Cross-sectional Area of Flow into well given Discharge from Open Well

Open Calculator

fx $$A_{csw} = \frac{Q}{C \cdot H}$$

ex $$14.14286\text{m}^2 = \frac{0.99\text{m}^3/\text{s}}{0.01\text{m/s} \cdot 7\text{m}}$$

3) Cross-sectional Area of Well given Specific Capacity

Open Calculator

$$A_{sec} = \frac{K_b}{K_a}$$

$$2.495\text{m}^2 = \frac{4.99\text{m}^3/\text{hr}}{2\text{m/h}}$$

4) Cross-sectional Area of Well given Specific Capacity for Clay Soil

Open Calculator

$$A_{csw} = \frac{Q}{0.25 \cdot H''}$$

$$13.2\text{m}^2 = \frac{0.99\text{m}^3/\text{s}}{0.25 \cdot 0.3}$$

5) Cross-sectional Area of Well given Specific Capacity for Coarse Sand

Open Calculator

$$A_{csw} = \frac{Q}{1 \cdot H_c}$$

$$14.14286\text{m}^2 = \frac{0.99\text{m}^3/\text{s}}{1 \cdot 0.07}$$

6) Cross-sectional Area of Well given Specific Capacity for Fine Sand

Open Calculator

$$A_{csw} = \frac{Q}{0.5 \cdot H_f}$$

$$13.2\text{m}^2 = \frac{0.99\text{m}^3/\text{s}}{0.5 \cdot 0.15}$$

Depression Head

7) Constant Depression Head given Specific Capacity

Open Calculator

$$H' = \frac{Q}{A_{csw} \cdot S_{si}}$$

$$0.038077 = \frac{0.99 m^3/s}{13 m^2 \cdot 2.0 m/s}$$

8) Constant Depression Head given Specific Capacity for Clay Soil

Open Calculator

$$H'' = \frac{Q}{A_{csw} \cdot 0.25}$$

$$0.304615 = \frac{0.99 m^3/s}{13 m^2 \cdot 0.25}$$

9) Constant Depression Head given Specific Capacity for Coarse Sand

Open Calculator

$$H_c = \frac{Q}{A_{csw} \cdot 1}$$

$$0.076154 = \frac{0.99 m^3/s}{13 m^2 \cdot 1}$$

10) Constant Depression Head given Specific Capacity for Fine Sand

Open Calculator

fx $$H_f = \frac{Q}{A_{csw} \cdot 0.5}$$

ex $$0.152308 = \frac{0.99 m^3/s}{13 m^2 \cdot 0.5}$$

11) Depression Head given Discharge

Open Calculator

fx $$H = \left(\frac{Q}{A_{csw} \cdot C} \right)$$

ex $$7.615385 m = \left(\frac{0.99 m^3/s}{13 m^2 \cdot 0.01 m/s} \right)$$

Discharge from Well

12) Discharge from Open Well given Depression Head

Open Calculator

fx $$Q = (C \cdot A_{csw} \cdot H)$$

ex $$0.91 m^3/s = (0.01 m/s \cdot 13 m^2 \cdot 7 m)$$

13) Discharge from Open Well given Mean Velocity of Water Percolating

Open Calculator

fx $$Q = A_{csw} \cdot V$$

ex $$0.988 m^3/s = 13 m^2 \cdot 0.076 m/s$$

14) Discharge from Well given Specific Capacity

Open Calculator

$$Q = S_{si} \cdot A_{csw} \cdot H'$$

$$0.988\text{m}^3/\text{s} = 2.0\text{m}/\text{s} \cdot 13\text{m}^2 \cdot 0.038$$

15) Discharge from Well given Specific Capacity for Clay Soil

Open Calculator

$$Q = 0.25 \cdot A_{csw} \cdot H''$$

$$0.975\text{m}^3/\text{s} = 0.25 \cdot 13\text{m}^2 \cdot 0.3$$

16) Discharge from Well given Specific Capacity for Coarse Sand

Open Calculator

$$Q = 1 \cdot A_{csw} \cdot H_c$$

$$0.91\text{m}^3/\text{s} = 1 \cdot 13\text{m}^2 \cdot 0.07$$

17) Discharge from Well given Specific Capacity for Fine Sand

Open Calculator

$$Q = 0.5 \cdot A_{csw} \cdot H_f$$

$$0.975\text{m}^3/\text{s} = 0.5 \cdot 13\text{m}^2 \cdot 0.15$$

18) Mean Velocity of Water Percolating into Well

Open Calculator

$$V = \frac{Q}{A_{csw}}$$

$$0.076154\text{m}/\text{s} = \frac{0.99\text{m}^3/\text{s}}{13\text{m}^2}$$

19) Percolation Intensity Coefficient given Discharge

Open Calculator

fx $$C = \frac{Q}{A_{csw} \cdot H}$$

ex $$0.010879\text{m/s} = \frac{0.99\text{m}^3/\text{s}}{13\text{m}^2 \cdot 7\text{m}}$$

20) Time in Hours given Specific Capacity of Open Well

Open Calculator

fx $$t = \left(\frac{1}{K_a}\right) \cdot \log\left(\left(\frac{h_d}{h_{w2}}\right), e\right)$$

ex $$0.503397\text{h} = \left(\frac{1}{2\text{m/h}}\right) \cdot \log\left(\left(\frac{27\text{m}}{10\text{m}}\right), e\right)$$

21) Time in Hours given Specific Capacity of Open Well with Base 10

Open Calculator

fx $$t = \left(\frac{2.303}{K_a}\right) \cdot \log\left(\left(\frac{h_d}{h_{w2}}\right), 10\right)$$

ex $$2.669441\text{h} = \left(\frac{2.303}{2\text{m/h}}\right) \cdot \log\left(\left(\frac{27\text{m}}{10\text{m}}\right), 10\right)$$

Specific Capacity

22) Specific Capacity given Discharge from Well

Open Calculator

$$S_{si} = \frac{Q}{A_{csw} \cdot H'}$$

$$2.004049\text{m/s} = \frac{0.99\text{m}^3/\text{s}}{13\text{m}^2 \cdot 0.038}$$

23) Specific Capacity of Open Well

Open Calculator

$$K_a = \left(\frac{1}{t}\right) \cdot \log\left(\left(\frac{h_d}{h_{w2}}\right), e\right)$$

$$0.251699\text{m/h} = \left(\frac{1}{4\text{h}}\right) \cdot \log\left(\left(\frac{27\text{m}}{10\text{m}}\right), e\right)$$

24) Specific Capacity of Open Well given Constant Depending upon Soil at Base

Open Calculator

$$K_a = \frac{K_b}{A_{csw}}$$

$$0.383846\text{m/h} = \frac{4.99\text{m}^3/\text{hr}}{13\text{m}^2}$$

25) Specific Capacity of Open Well with Base 10

Open Calculator

fx $$K_a = \left(\frac{2.303}{t}\right) \cdot \log\left(\left(\frac{h_d}{h_{w2}}\right), 10\right)$$

ex $$1.33472\text{m/h} = \left(\frac{2.303}{4\text{h}}\right) \cdot \log\left(\left(\frac{27\text{m}}{10\text{m}}\right), 10\right)$$

Variables Used

- A_{csw} Cross-Sectional Area of Well *(Square Meter)*
- A_{sec} Cross-Sectional Area given Specific Capacity *(Square Meter)*
- **C** Percolation Intensity Coefficient *(Meter per Second)*
- **H** Depression Height *(Meter)*
- **H'** Constant Depression Head
- **H''** Constant Depression Head for Clay Soil
- H_c Constant Depression Head for Coarse Sand
- h_d Depression Head *(Meter)*
- H_f Constant Depression Head for Fine Soil
- h_{w2} Depression Head in Well 2 *(Meter)*
- K_a Specific Capacity *(Meter per Hour)*
- K_b Constant Dependent on Base Soil *(Cubic Meter per Hour)*
- **Q** Discharge in Well *(Cubic Meter per Second)*
- S_{si} Specific Capacity in SI unit *(Meter per Second)*
- **t** Time *(Hour)*
- **V** Mean Velocity *(Meter per Second)*

Constants, Functions, Measurements used

- Constant: **e**, 2.71828182845904523536028747135266249
  Napier's constant
- Function: **log**, log(Base, Number)
  Logarithmic function is an inverse function to exponentiation.
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Time** in Hour (h)
  Time Unit Conversion
- Measurement: **Area** in Square Meter (m²)
  Area Unit Conversion
- Measurement: **Speed** in Meter per Second (m/s), Meter per Hour (m/h)
  Speed Unit Conversion
- Measurement: **Volumetric Flow Rate** in Cubic Meter per Second (m³/s), Cubic Meter per Hour (m³/hr)
  Volumetric Flow Rate Unit Conversion

Check other formula lists

- **Constant Level Pumping Test Formulas**

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