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Well Parameters Formulas

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List of 15 Well Parameters Formulas

Well Parameters

Well Efficiency

1) Drawdown given Specific Capacity

Open Calculator

fx $$s_t = \frac{q}{K_s}$$

ex $$9.333333\text{m} = \frac{7\text{m}^3/\text{s}}{0.75}$$

2) Drawdown in Aquifer given Well Efficiency

Open Calculator

fx $$s = E \cdot s_t$$

ex $$9.99\text{m} = 1.11 \cdot 9\text{m}$$

3) Drawdown Inside Well given Well Efficiency

Open Calculator

fx $$s_t = \frac{s}{E}$$

ex $$9\text{m} = \frac{9.99\text{m}}{1.11}$$

4) Pumping Rate given Specific Capacity

Open Calculator

fx $q = K_s \cdot s_t$

ex $6.75 m^3/s = 0.75 \cdot 9m$

5) Specific Capacity

Open Calculator

fx $K_s = \frac{q}{s_t}$

ex $0.777778 = \frac{7 m^3/s}{9m}$

6) Well Efficiency

Open Calculator

fx $E = \left(\frac{s}{s_t}\right)$

ex $1.11 = \left(\frac{9.99m}{9m}\right)$

Well Loss

7) Equation for Formation Loss

Open Calculator

fx $s_{wL} = C_1 \cdot Q$

ex $30 = 10 \cdot 3.0 m^3/s$

8) Equation for Total Drawdown at Well

Open Calculator

fx $s_{wL} = C_1 \cdot Q + C_2 \cdot Q^2$

ex $30.45 = 10 \cdot 3.0\text{m}^3/\text{s} + 0.05 \cdot (3.0\text{m}^3/\text{s})^2$

9) Equation for Well Loss

Open Calculator

fx $CQ^n = C_2 \cdot Q^2$

ex $0.45\text{m} = 0.05 \cdot (3.0\text{m}^3/\text{s})^2$

Well-Field Design

10) Distance from Pumping Well

Open Calculator

fx $r_o = \sqrt{2.25 \cdot T \cdot \frac{t}{S}}$

ex $3.995966\text{m} = \sqrt{2.25 \cdot 11\text{m}^2/\text{s} \cdot \frac{4\text{h}}{6.2}}$

11) Drawdown across One Log Cycle given First Estimate of Pumping Rate

Open Calculator

fx $\Delta s = \frac{Q_e}{2.7 \cdot T}$

ex $44.54545 = \frac{1323\text{m}^3/\text{s}}{2.7 \cdot 11\text{m}^2/\text{s}}$

12) First Estimate of Pumping Rate

Open Calculator

fx $$Q_e = 2.7 \cdot T \cdot \Delta s$$

ex $$1323.135 m^3/s = 2.7 \cdot 11 m^2/s \cdot 44.55$$

13) Storage Coefficient given Distance from Pumping Well

Open Calculator

fx $$S = \frac{2.25 \cdot T \cdot t}{r_o^2}$$

ex $$6.1875 = \frac{2.25 \cdot 11 m^2/s \cdot 4h}{(4.0m)^2}$$

14) Transmissivity for First Estimate of Pumping Rate

Open Calculator

fx $$T = \frac{Q_e}{2.7 \cdot \Delta s}$$

ex $$10.99888 m^2/s = \frac{1323 m^3/s}{2.7 \cdot 44.55}$$

15) Transmissivity given Distance from Pumping Well

Open Calculator

fx $$T = r_o^2 \cdot \frac{S}{2.25 \cdot t}$$

ex $$11.02222 m^2/s = (4.0m)^2 \cdot \frac{6.2}{2.25 \cdot 4h}$$

Variables Used

- C_1 Well Constant C1
- C_2 Well Constant C2
- CQ^n Well Loss *(Meter)*
- **E** Well Efficiency
- K_s Specific Capacity
- **q** Pumping Rate *(Cubic Meter per Second)*
- **Q** Discharge *(Cubic Meter per Second)*
- Q_e First Estimate of the Pumping Rate *(Cubic Meter per Second)*
- r_o Distance from Pumping Well to Point Intersection *(Meter)*
- **s** Change in Drawdown *(Meter)*
- **S** Storage Coefficient (Well-Field Design)
- s_t Drawdown Inside the Well *(Meter)*
- s_{wL} Formation Losses
- **t** Time *(Hour)*
- **T** Transmissivity *(Square Meter per Second)*
- **Δs** Drawdown Across One Log Cycle

Constants, Functions, Measurements used

- Function: **sqrt**, sqrt(Number)
  A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Time** in Hour (h)
  Time 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

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
- Unconfined Flow Formulas
- Unsteady Flow in a Confined Aquifer Formulas
- Well Parameters Formulas

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