Example of Estimation of Average Hydraulic Conductivity in a Tracer Field Test: Unconfined Aquifer Using Two (2) Observation Wells

(Mays, 2012)

EXAMPLE 3.3.4

A tracer test is conducted to determine the hydraulic conductivity of an unconfined aquifer. The water levels in the two observation wells 20 m apart are 18.4 m and 17.1 m. The tracer injected in the first well arrives at the second observation well in 167 hr. Compute the hydraulic conductivity of the unconfined aquifer given that the porosity of the formation is 0.25.

SOLUTION

Given $\alpha = 0.25$, $L = 20$ m, $h = 18.4$ m $-$ 17.1 m $= 1.3$ m, $t = 167$ hr $= 6.96$ days, Equation (3.3.9) is used to compute the hydraulic conductivity of the aquifer:

$$K = \frac{\alpha L^2}{ht} = \frac{(0.25)(20\,\text{m})^2}{(1.3\,\text{m})(6.96\,\text{days})} = 11.1 \text{ m/day}$$