TRANSMISSIVITY

Transmissivity describes the ability for fluid flow within the plane of the material and is defined as the in-plane permeability multiplied by the material thickness.

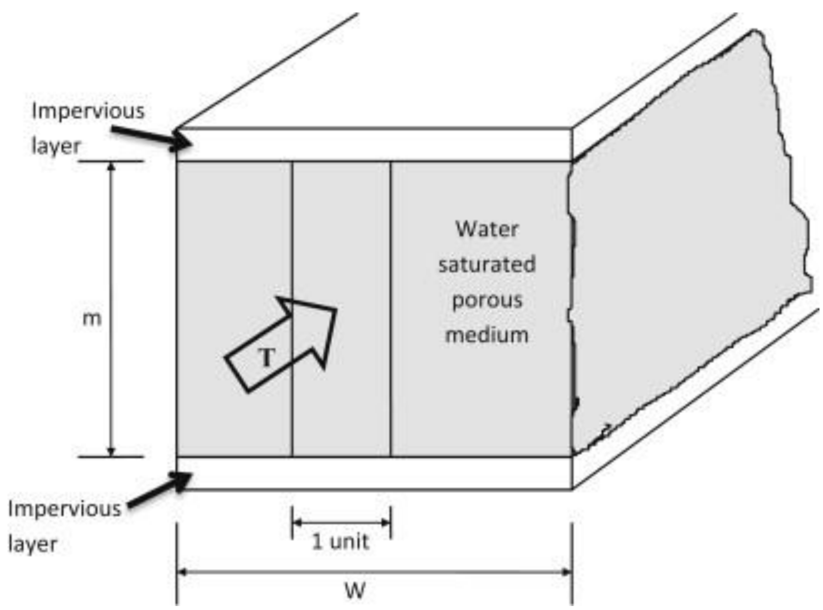
It is another very important transmission property of an aquifer, which is different from hydraulic conductivity in that it includes the whole saturation thickness, m, of the aquifer while K is defined for unit saturation thickness only. One can write transmissivity, T, in terms of aquifer thickness and hydraulic conductivity by considering Equation below as follows.

$$T=Km$$

Where:

W is the aquifer width.

T can be defined as volume of water per unit time passing from per-unit width under unit hydraulic gradient through the whole saturation thickness.



INFORMATION

Main aquifer parameters are transmissivity, T, and storage coefficient, S, (for all aquifer types), additionally leakage factor, L, (for leaky aquifers), and specific yield, S_y, and delayed yield, D_y (unconfined aquifer). Time–drawdown measurements in the field help for the identification of these parameters by processing with theoretical models. They assist to evaluate aquifer, well or pump properties, which are also useful for future predictions of discharges, drawdowns or distances between wells for the groundwater resources planning, design, operation, and management.

The following information can be obtained from any properly completed aquifer tests:

1. Aquifer parameter estimations (transmissivity, storage coefficient, specific yield, leakage factor, etc.).

2.Hydrogeological composition and flow quantities within the depression cone such as nature of impermeable barriers and recharge boundaries, radius of influence, drawdown at any time and distance from the main well,

3.One can follow the drawdown change by time, and hence, aquifer parameter may change by distance.

4.Determination of well and aquifer characteristics such as the well losses, safe yield, specific drawdowns and the specific capacity of the well.

For the identification of aquifer parameters in the presence of multitude of prevailing geological environments, it is necessary to select suitable models, which take into account the background assumptions, initial and boundary conditions. Specific solutions are obtained from the implication of the theoretical models. The common assumptions adapted for groundwater flow to a well in any aquifer are as follows:

1. Aquifer material is isotropic and homogeneous.

2. The aquifer is areally extensive with uniform thickness and horizontal layer.

3. The flow is laminar and Darcy law is applicable.

4.The pump discharge remains constant during the aquifer test.

5.The well has full penetration.

6.The well diameter is circular and infinitesimally small.

7.There is instantaneous response from the aquifer to pumping discharge.

8.There is no well loss.

9.The aquifer parameters are independent of temporal and spatial changes, i.e., they are constants.

10.The groundwater is compressible and aquifer material has elastic behaviors.