9/15/17

LAB 7

DARCY'S LAW AND HYDRAULIC CONDUCTIVITY

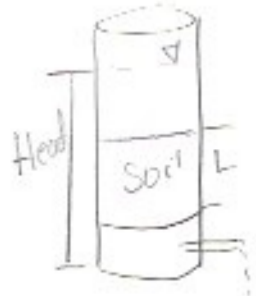
PURPOSE: Gain an understanding of the controls on groundwater flow through porous media, using a simulation of Darcy's experiment.

OBJECTIVES: Determine the hydraulic conductivity and permeability of four sand samples.

Determine the relationship between discharge and hydraulic gradient.

Determine the relationship between discharge and hydraulic conductivity.

Determine the relationship between permeability and hydraulic conductivity.



Relate the magnitude of hydraulic conductivity to grain size and degree of sorting.

Become familiar with laboratory methods for measuring permeability, using both constant–head and falling–head permeameters.

REPORT REQUIREMENTS: A table of observational and computational data.

A summary of hydraulic conductivity, K (15.5°C), and permeability, k.

The relationship between discharge and hydraulic gradient (constant-head permeameter observations).

The relationship between discharge and hydraulic conductivity.

The relationship of hydraulic conductivity to grain size and sorting.

A note concerning any apparent departures from Darcy's law.

READING ASSIGNMENT: In addition to reading through this lab, read material on permeameters in your textbook (e.g., Fetter, 2001, pp. 90–93) and do Problem 3 (on the CD). Summarize your results from Problem 3 in Procedure 14, which follows.

PROCEDURES

Darcy's Law and Hydraulic Conductivity Using Constant-Head Permeameters

You will use these procedures to simulate Darcy's experiments, measuring flow through two different sands under several different heads. If discharge is a linear function of the hydraulic gradient, $\Delta h/\Delta l$, the constant of proportionality is hydraulic conductivity. By measuring flow as a function of head and graphing the results, the slope of a regression line through the origin will be hydraulic conductivity.

* Don't worry about cross-section area
both the same.