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Thermal conductivity of unsaturated sand

The purpose of this experiment was to determine the role that water content plays in determining the thermal conductivity of unsaturated sand. The soil used in this experiment was F-75 Ottawa sand. To eliminate density as a variable, all samples were placed in a vacuum chamber under water to allow the density to become uniform. The test was set up using a 6"x3" circular mold which was filled with wetted sand and then fully submerged underwater in a vacuum chamber. After removal from the vacuum chamber the sample was placed on an electronic scale. The thermal conductivity probe and two small tip tensiometers were placed in the sample. As the sample dried the weight, thermal conductivity, and matrix suction were recorded. After the sample had air dried it was then oven dried and the water content was back calculated using this oven dry weight. The data collected showed a relationship between the water content and thermal conductivity. The relationship showed that as the water content decreases with time that the thermal conductivity also decreases.