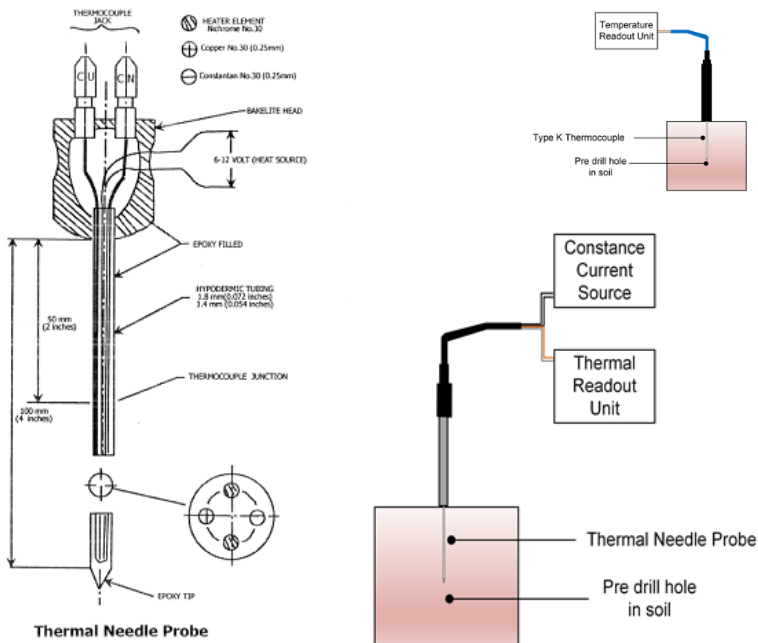


Schematic of Thermal Resistivity



Thermal soil conductivity is a method to determine thermal conductivity (λ). of the insitu of both soil and soft rock by inserting a thermal probe into the predrilled location where the test is to be conducted. This method is useful in thermal analysis of underground electrical transmission lines, oil pipelines, radioactive waste disposal and solar thermal storage facilities.

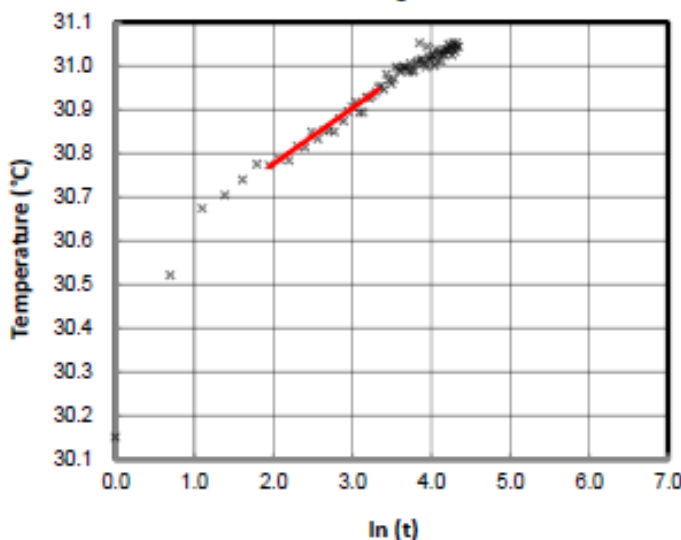
This test is conducted in accordance with ASTM D5334. The measuring apparatus consists of a thermocouple which is connected to power source on one end and thermal needle probe on the other end. First of all, the needle is inserted into the marked location, and the power source which is connected to thermocouple is turned on which heats up the element. The input energy is the function of potential difference, supply current and length of heating material. Thermal probe needle is small diameter consisting of both heating and temperature measuring elements.

Field Test



Result

Heating Data



The temperature is measured with readout unit connected to thermal probe with time. Then with given heat input the thermal conductivity during the given period of time is determined. The transfer of heat throughout the soil occurs by radiation, conduction and convection and soil thermal properties are majorly influenced by presence of voids in form of water or air, presence of solids. Air has poor thermal conductivity while the solid and water on the other hand has high thermal conductivity. So, careful selection of the sites should be conducted with more tests needed to be conducted to give the representative thermal conductivity of the field site condition.