World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

Thermal Properties of the Ground in Cyprus and Their Correlations and Effect on the Efficiency of Ground Heat Exchangers

Authors : G. A. Florides, E. Theofanous, I. Iosif-Stylianou, P. Christodoulides, S. Kalogirou, V. Messarites, Z. Zomeni, E. Tsiolakis, P. D. Pouloupatis, G. P. Panayiotou

Abstract : Ground Coupled Heat Pumps (GCHPs) exploit effectively the heat capacity of the ground, with the use of Ground Heat Exchangers (GHE). Depending on the mode of operation of the GCHPs, GHEs dissipate or absorb heat from the ground. For sizing the GHE the thermal properties of the ground need to be known. This paper gives information about the density, thermal conductivity, specific heat and thermal diffusivity of various lithologies encountered in Cyprus with various relations between these properties being examined through comparison and modeling. The results show that the most important correlation is the one encountered between thermal conductivity and thermal diffusivity with both properties showing similar response to the inlet and outlet flow temperature of vertical and horizontal heat exchangers.

Keywords : ground heat exchangers, ground thermal conductivity, ground thermal diffusivity, ground thermal properties
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020