

Design and Development of Solar Water Cooler Using Principle of Evaporation

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Abstract : The use of water cooler has increased and become an important appliance in the world of global warming. Most of the coolers are electrically operated. In this study an experimental setup of evaporative water cooler using solar energy is designed and developed. It works on the principle of heat transfer using evaporation of water. Water is made to flow through copper tubes arranged in a specific array manner. Cotton plug is wrapped on copper tubes and rubber pipes are arranged in the same way as copper tubes above it. Water percolated from rubber pipes is absorbed by cotton plug. The setup has 40L water carrying capacity with forced cooling arrangement and variable speed fan which uses solar energy stored in 20Ah capacity battery. Fan speed greatly affects the temperature drop. Tests were performed at different fan speed. Maximum temperature drop achieved was 90C at 1440 rpm of fan speed. This temperature drop is very attractive. This water cooler uses solar energy hence it is cost efficient and it is affordable to rural community as well. The cooler is free from any harmful emissions like other refrigerants and hence environmental friendly. Very less maintenance is required as compared to the conventional electrical water cooler.

Keywords : evaporation, cooler, energy, copper, solar, cost

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