Design, Fabrication and Testing of a Thermo-Electric Refrigeration Unit

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Abstract

A Thermo-Electric Refrigeration Unit to be used as a portable vaccine cooler in rural areas, where the main grid supply is unavailable was designed and constructed. Thermo-Electric modules working on the Peltier Effect, which causes to generate hot and cold sources when a current passes through dissimilar semiconductor materials, have been employed. The cold source is used to cool the refrigerating environment within its cabin and heat of the hot source is evacuated to the surrounding environment. The designed refrigerator is smaller in size and light in weight. The input power to the refrigerator is around 90 W. Minimum designed temperature is 15 °C less than the ambient temperature which is suitable for vaccine preservation. The cooling volume of the refrigerator is 18 liters.