

DESIGN OF COLD STORAGE DEVICE FOR A LOW TEMPERATURE THERMAL ENERGY TRANSMISSION SYSTEM EMPLOYING HYDROPHILIC MATERIALS

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ABSTRACT

In this work undertaken to design and develop a number of cold storage devices is described. All the units employed hydrophilic particles hydrated with water as the phase change element. This work has yielded a cold storage device suitable for demand side management applications. The first part of this work discusses previous work carried out employing hydrophilic materials for cold storage, before this work began. Next the problem of fluidising hydrophilic particles using minimal power is readdressed, the design of a new system discussed, and its performance and limitations identified. Then the modifications made to this system to increase the energy density, are reported.

The process of fluidising the whole mass of stored solids limited the performance of the developed systems. Based on the acquired knowledge a fresh approach overcoming this problem was identified. Finally, the design, construction, and operation of this system are discussed and recommendations made.

KEYWORDS: Slurry, Heat Transfer Rate, Thermocouples, Thyrister