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OPTIMIZATION OF SOLAR THERMAL ENERGY STORAGE PERFORMANCE BY USING ASPEN AERO GEL AS INSULATOR

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ABSTRACT:

The concept of research includes developmental process for current solar energy storage within solar evacuated tube collector system. many parameters must be considered on increasing the system performance and decreasing the heat losses to the lowest value by using new insulator . the insulator with remarkable properties, (aspen aero gel) was used to insulate the cylindrical solar storage tank system with 1m length and diameter 0.5 m with insulator thick of 0.01m, and to study the change temperature difference through the solar collector with the environmental conditions and the temperature of the storage media, and effect that change on the whole system, it was studied under standard conditions. It was noted the alteration of specific heat and density of storage media will effect on solar energy gain in collector that also will effect on heat losses from the storage. All these results were achieved with temperature range (30 ^{o}C to 100 ^{o}C) by MATLAB program.

Keywords: Energy storage, Heat losses, Insulators, Thermal conductivity, MATLAB