

Modeling and Simulation of Ice Based Latent Heat Thermal Energy Storage

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Abstract

Latent Heat Thermal Energy Storage (LHTES) systems utilize a Phase Change Material (PCM) for storing Latent Heat Energy to be used for a variety of applications like Solar Thermal based Air Conditioning to handle the heating and cooling demands of buildings during peak hours. Our project deals with utilizing Ice(frozen water) as the Phase Change Material (PCM) for the LHTES using two different flow arrangements for the heat transfer fluid which is Refrigerant R-22 in our case. COMSOL Multiphysics® software has been used in our project for simulation of Heat transfer through Phase Change, flow simulation of fluids through particle tracking and CFD Module to evaluate the temperature of various zones of Ice formation inside the Ice Storage. The model was made using CATIA V5® and imported using CAD Import Module facility in the software. Using the simulation results we will be able to decide the best possible flow arrangement for the heat transfer fluid in order to operate the Ice Thermal Storage in the best way possible.

Figures used in the abstract

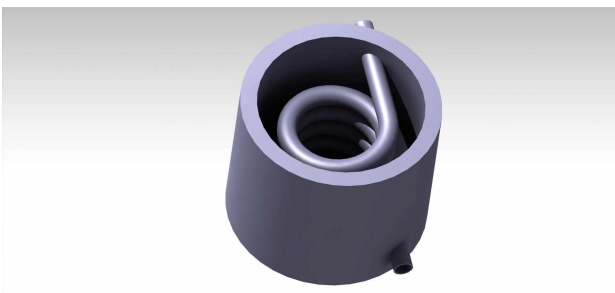


Figure 1: Circular Helix Model for Ice Storage used for simulation