INSIGHT INTO LATENT HEAT THERMAL ENERGY STORAGE RT27 PAHSE CHANGE MATERIAL CONVEYING CU NANOPARTICALES EXPERIENCING ENTROPY GENERATION WITH DISTINCT STEPPED FIN SURFACES

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Abstract: Scrutinization of the latent heat thermal energy storage of copper nanoparticles and rubitherm (RT27) phase transition material with four distinct stepped fin surfaces was considered in order to capture the variations of temperature distribution, liquid fraction, thermal entropy, and frictional entropy in such a cavity. With emphasis on two-downward stepped fins, two-upward stepped fins, an upward and a downward stepped fins, and two-stepped fins facing one another, this report presents the outcome of a comparative investigation of four distinct stepped fins are presented in this research. The buoyancy force along the vertical thermal energy storage packed with rubitherm (RT27) phase transition material and copper nanoparticles was calculated using the Boussinesq approximation. The enthalpyporosity technique GFEM was used to create a numerical simulation of the governing equation. Owing to the impact of acceleration due to gravity, the mass of RT27 phase change material, and the orientation of the intake fins, the thermal and functional entropies for two-upward stepped fins and two-downward stepped fins were unique in nature. The two-downward stepped fins enclosure allowed for a minimum melting time of 71 minutes. The melting time between cases 1 and 2 differs by 6.58

Keywords: Thermal energy storage; Copper nanoparticles; RT27 PCM; Temperature Distribution; Liquid fraction