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Design of High Temperature Thermal Energy Storage for High Power Levels

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Highlights

- An analysis method for the design of a latent heat storage unit for a specific application is detailed.
- Steps of the method and their goals are explained.
- The design results for discharging of this storage unit are shown.

ABSTRACT

A latent heat thermal energy storage unit has been modeled, simulated and designed for integration into a cogeneration plant that supplies steam to industrial customers in Saarland, Germany. The design consists of a vertical bundle of extended finned tubes surrounded by phase change material in the shell. The heat transfer fluid water/steam flows through the tubes between the upper and lower headers. A new fin design was developed to achieve the required high power levels.

The storage system was designed and analyzed with the development of an iterative multi-step method. The method spans from the design of the fin, based on both empirical and

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