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DYNAMIC HEAT PUMP TEST

PHASE 3 AND 4

Annual Report 2008

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SUMMARY

The reduction in heating capacity due to on/off cycling of a heat pump can lead to a performance reduction of 5-30%. It is important to understand the amount of influence of the most important parameters in order to improve the performance of heat pumps with respect to on/off cycling so that appropriate measures can be taken. Therefore a physics based model was developed in the first two phases of this project and validated with according measurements. While this models covers the fundamentals of the process, it was found, that not all parameters were covered and in addition numerical problems were encountered when calculating the results.

Phase 3 of the project which is currently beingconducted evaluates the physical model and searches for a more stable and accurate solution for the simulation of and air-source heat pump. It builds on the modeling efforts and measurements of the earlier phases and should in the end lead to suggestions of how to improve the vapor compression process in heat pumps. A second effort is to improve the control strategy by suggesting an optimized timing interval for on/off cycling.

In Phase 4 of the project the solutions found for air-source heat pumps should be extended onto brine-source heat pumps. To verify the results field measurements will be conducted.

In 2008 the following tasks were achieved: Literature review, analysis of the existing model and development of a first concept of an improved model. For the year 2009 the following tasks are planned: Coding, validation and application of the model for air-source heat pumps as well as field measurement for brine source heat pumps which in turn will be used to validate the model for brine source heat pumps in the following year.