

Heat Pump R&D in Austria

Heat Pump Research Projects at the AIT

Michael Monsberger

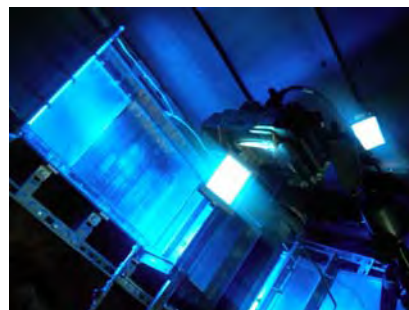
Sustainable Thermal Energy Systems | Energy Department

IEA Workshop on a Technological Vision for the Heat Pump Industry

Vienna, November 9, 2010

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- **Internal Research** – Condensation and Icing of Air-HEX
- **Duration:** 2009 – 2012
- **Contents of the project:**
 - **Wind tunnel** experiments in **climatic chamber** to investigate condensation and icing on different surfaces
 - Application of **nucleation theory** to describe the process of condensation onset
 - **CFD simulation** of the encountered processes



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- **EdZ: OptimierungEWS** – Optimization of Ground Heat Pumps
- **Duration:** 06/2008 – 09/2011

Contents of the project:

- **Monitoring** of existing and newly built GHP in various geological regions
- Development of new method for a TRT (**thermal response test**)
- Optimization through: new **planning parameters** for heating and cooling, new measures for **quality assurance** during production, new **ways of operating** (“Free Cooling”, reversed cycle)

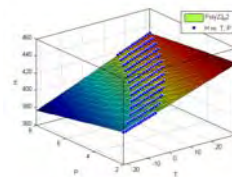


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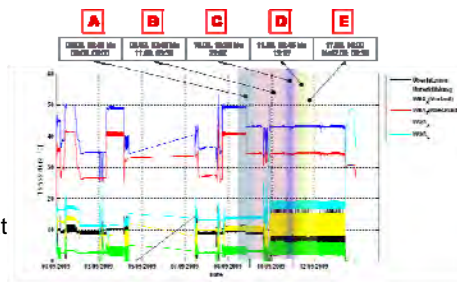
K-Projekt Future Building – Environmental Heat Meter for Heat Pump Systems

Duration: 12/2009 – 11/2012



Contents of the project:

- Feasibility study including technical, legal and economic aspects
- Prototype development of a cheap and accurate heat meter
- Laboratory testing and optimisation of the prototype
- In situ measurements of the heat meter in several installations



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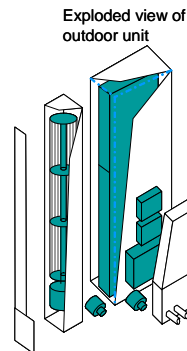
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MiniPAC – Experimental investigation of specific issues of an absorption chiller module with microstructured stainless steel plates

Duration: 03/2009 – 03/2012

Contents of the project:

- Development of a highly integrated small scale absorption chiller based on plate heat exchangers
- Design and testing of an overall system based on the compact chiller
- Investigation of new concepts for heat rejection (recooling)



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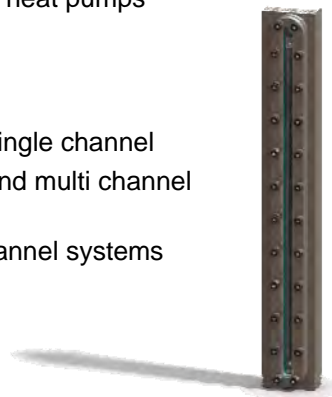
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BubblePlate - New concept of a high performance micro channel absorber for high-pressure absorption heat pumps

Duration: 09/2009 – 04/2012

Contents of the project:

- Optical analysis of NH₃ bubbles in a single channel
- Thermodynamical analysis of single and multi channel absorber systems
- CFD simulation of single and multi channel systems
- Design of a bubble plate absorber



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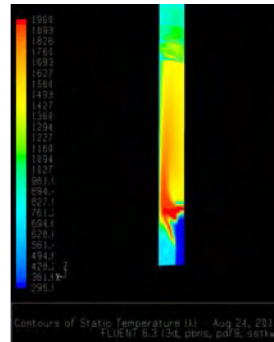
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InnoGen – Innovative Generator Concepts for High Efficiency
Directly Fired Ammonia/Water Absorption-Heat Pumps

Duration: 08/2009 – 02/2012

Contents of the project:

- Current generator design evaluation by experiment and modeling
- Proposal of a new generator design with optimized heat load distribution and higher efficiency



Future Research Needs

- New/alternative heat sources (e.g. for urban areas)
- High efficiency aero-thermal heat pumps
- Thermally driven heat pumps and hybrid systems (e.g. district cooling)
- High temperature heat pumps (industrial, retrofit...)
- Combination of heat pumps with other technologies (e.g. solar thermal, PV,...)
- Efficient system integration (e.g. capacity control)
- Large heat pump systems
- Alternative cycle
- Low-cost components for heat pumps
- Reduction of parasitic power consumption
- Alternative refrigerants: Low-GWP fluids

Thanks for your attention!