

Analogous modelling of the operational behaviour of absorption and adsorption chillers**Christian Schweigler (corresponding author)**

Bavarian Center for Applied Energy Research, Division 1, Energy Conversion and Storage, Walther-Meissner-Str. 6, D-85748 Garching / Germany, <http://www.zae-bayern.de>, Tel. ++49 (0)89 329 442-19, Fax ++49 (0)89 329 442 12, eMail: schweigler@muc.zae-bayern.de

Christoph Kren

Bavarian Center for Applied Energy Research, Division 1, Energy Conversion and Storage, Walther-Meissner-Str. 6, D-85748 Garching / Germany, <http://www.zae-bayern.de>, Tel. ++49 (0)89 329 442-23, Fax ++49 (0)89 329 442 12, eMail: ch@kren.de

Florian Pflügler

Emil-von-Behring-Straße 1, 85375 Neufahrn, Tel. ++49 (0)8165 939593

For the purpose of low-grade-heat driven air-conditioning absorption or adsorption chillers are applied. Although different working media – either liquid or solid – are used, an analogous description of the working principle of both types of chillers can be found. Taking into account the identity of the relevant physical properties of the working media water/LiBr and water/silicagel similar external operating conditions for both types are to be expected. Nevertheless, adsorption chillers are claimed to allow for lower temperatures of the driving heat source. A conform modelling for both types, i.e. ab- and adsorption chillers, has been worked out on the basis of the so-called “characteristic equation“. By that means a realistic description of the operational behaviour is obtained taking into account the major irreversibilities of the cycles. A detailed cycle simulation is not necessary. The model only requires specification of operational data of the plants; e.g. solution flow rate or cycle duration, thermal mass of the active sorbent and of passive parts like housing and heat exchangers. Predictions of the model are in good accordance with manufacturer data. In the case of adsorption chillers it is proven that lower heat source temperatures are obtained at the expense of a reduced COP compared to liquid sorption chillers.

Key words: sorption chiller, absorption, adsorption, modelling.