

**NEW ABSORBENT COMPOSITION FOR ABSORPTION REGRIGERATION MACHINES**

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TECHNICAL SESSION TOPICS: New fluids, new systems, and integration.

The absorption cooling cycle is one of the best alternatives to the vapour compression cooling cycle. Since the invention of this type of engines, lithium bromide or ammonia are the absorbents exclusively employed. Lithium bromide presents as inconveniences that can not work below 0°C due to crystallization problems and the elevated temperature necessary to concentrate the lithium bromide solution in the generator by boiling<sup>1</sup>.

In this work are proposed mixtures of lithium bromide and organic salts of sodium and potassium (formate, acetate and lactate) as alternative absorbents<sup>2</sup> with the objective of overpass the mentioned limitations. The following physical properties of the alternative absorbents has been measured: density, viscosity, enthalpies of dilution, solubility and liquid-vapour equilibrium data of proposed mixtures. A simulation program has been developed to evaluate the efficiency of the cycle. The physical properties of the mixtures previously measured has been introduced in the simulation program to determine the temperatures and exchanged heats in the different sections of the cooling machine.

The main conclusion extracted from the evaluation study of the mixtures is that the heating requirements in the generator section can be dramatically decreased using this kind of mixtures, being enough using a waste stream with only 60°C to reach the boiling of the diluted absorbent mixture. This fact allows to use hot water, nor steam necessarily, or any other warm residual stream of the industrial process to get the evaporation of the absorbent mixture. It supposes an important advance with respect to the existing process with lithium bromide that needs steam as heater fluid to reach more than 100°C to reach the boiling of the mixture<sup>3</sup>. This fact provides an important economic advantage in absorption cycle.

Investigation at that present is center in the study of the addition of different additives (glycol, alcohols) to the mixtures in order to diminish the crystallization temperature of the absorbent and enlarge its range of application until the freezer region.

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