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## **PERFORMANCE AND THERMAL CHARACTERISTICS OF HUMIDIFICATION-DEHUMIDIFICATION DESALINATION UTILIZING WASTE HEAT FROM EXHAUST GAS BELOW 100°C**

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### **Abstract**

The feasibility of humidification-dehumidification utilizing waste heat from exhaust gas was investigated. The exhaust gas below 100°C was used as the heat resource and to evaporate the salt water. The effect of operation conditions on the fresh water productivity and thermal efficiency was studied, including the salt water flow rate, exhaust gas flow rate and temperature. The performance of this process was discussed from the view of temperature field, and the temperature field was found a key factor to measure in the process of desalination. A nonlinear temperature field of salt water was found in any operation conditions. The temperature of salt water in the middle of evaporator was high, and that at the top and bottom were relatively low. Results showed that the fresh water productivity and thermal efficiency were optimal when the salt water flow rate, exhaust gas flow rate and temperature were 2 kg $\cdot$ h $^{-1}$ , 10 m $^3$ ·h $^{-1}$  and 76°C, respectively. Experimental results gave testimony to the technical feasibility of this method.

*Key words:* desalination, exhaust gas, heat energy, humidification-dehumidification, low temperature

*Received: November, 2014; Revised final: July, 2015; Accepted: July, 2015*

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