

Experimental study on air bubbling humidification

Lixi Zhang*, Guangping Cheng, Shiyuan Gao

Institute of Air-Condition and Solar Energy, School of Engine and Energy, Northwestern Polytechnical University, Xi'an, Shaanxi, 710072, China

Tel. +86 (29) 88492440; Fax +86 (29) 8849-5911; email: zhanglixixi@nwpu.edu.cn

Received 11 April 2010; Accepted in revised form 16 December 2010

ABSTRACT

A new process of solar humidification–dehumidification (HD) desalination by air bubbling humidification is designed. The studies are focused on the air humidifying experiments. The test-bed of air bubbling humidifier with a sieve plate is set up. The main factors affecting air humidification are studied separately. The results show that the air relative humidity reaches 100% by humidifying in the range of the experiments. As the air flow rate increased, the quantity of air humidification, the pressure drop of air passing through the holes and the water level above sieve plate were all increased; as the temperature of air and water in the humidifier increased, the quantity of humidifying air increased significantly; as the height of water level above the sieve plate increased, the resistance of air passing through the humidifier increased, so that the blower power increased too; when the way of cooling air is improved, the GOR of the system can be enhanced and the cost of freshwater can be decreased. The study provides a basis for design of solar HD desalination with bubbling humidification.

Keywords: Solar, Humidification–dehumidification, Desalination, Bubbling humidification

* Corresponding author.