

Accepted Manuscript

Title: Analysis on the passive evaporative cooling wall constructed of porous ceramic pipes with water sucking ability

Author: Wei Chen Song Liu Jun Lin

PII: S0378-7788(14)00900-1

DOI: <http://dx.doi.org/doi:10.1016/j.enbuild.2014.10.055>

Reference: ENB 5438

To appear in: *ENB*

Received date: 11-2-2014

Revised date: 7-10-2014

Accepted date: 22-10-2014



Please cite this article as: W. Chen, S. Liu, J. Lin, Analysis on the passive evaporative cooling wall constructed of porous ceramic pipes with water sucking ability, *Energy and Buildings* (2014), <http://dx.doi.org/10.1016/j.enbuild.2014.10.055>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

1 Analysis on the passive evaporative cooling wall constructed of
2 porous ceramic pipes with water sucking ability
3

4 Wei Chen, Song Liu, Jun Lin

5 Shanghai Maritime University , Shanghai, 201306, P.R. China

6 TEL: (021) 38282900 Email: weichen96@sina.com

7 **Abstract:** In this paper, the porous ceramic pipes with high water sucking ability have
8 been constructed for the evaporative cooling wall. Due to the water soaking-up ability
9 of the porous pipes and the evaporation of water when their lower end is placed in
10 water, the cooling of the combining wall can be supplied continuously. A
11 mathematical model on the heat and mass transfer in the unsaturated porous media is
12 developed to analyze the effects of ambient condition and the phase content on the
13 cooling performance of the porous evaporative pipe. The influences of the wind speed
14 (WS.) or air speed (AS.) on the temperature of the wet porous pipe surface are
15 relevant to the ambient relative humidity. The temperature and the moisture content in
16 the porous pipe as well as the temperature gradient and the vapor moving speed
17 influence the water evaporating or the vapor condensing in the porous pipe. The
18 experiments have also been conducted to study the evaporative cooling of the wet
19 porous pipe, the water sucking characteristics of the porous pipe and the influences of
20 the porous pipe arrangement on the cooling performance of the combining wall. The
21 temperature variations of the porous pipe in the simulation accord with the test data.
22 All these results should be taken into account for the promotion and application of the
23 evaporative cooling of wet porous media.

24 Key words: Wet porous ceramic pipe; Evaporative cooling; Arrangement of porous
25 ceramic pipe; Water soaking-up

Download English Version:

<https://daneshyari.com/en/article/6732903>

Download Persian Version:

<https://daneshyari.com/article/6732903>

[Daneshyari.com](https://daneshyari.com)