

传递现象

析湿工况下带亲水层开缝翅片管换热器空气侧传热传质特性

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收稿日期 2006-9-4 修回日期 2007-4-9 网络版发布日期 2007-8-3 接受日期

摘要

对7个带亲水层开缝型翅片管换热器在析湿工况下空气侧传热传质特性进行了实验研究, 分析了翅片间距和入口相对湿度对空气侧传热传质特性的影响。结果表明, 随着翅片间距的增加, 空气侧的传热传质特性均逐渐减弱。入口相对湿度对空气侧的传热特性几乎没有影响。随着入口相对湿度的增加, 空气侧的传质特性逐渐减弱。开发了反映空气侧传热特性的Colburn传热因子 J_h 和反映传质特性的Colburn传质因子 J_m 的关联式, 所开发关联式在 $\pm 15\%$ 误差范围内分别能涵盖96.6%和81.4%的实验数据, 其平均误差分别为5.3%和8.5%。

关键词

[开缝翅片](#) [析湿工况](#) [亲水层](#) [传热](#) [传质](#) [关联式](#)

分类号

Airside heat and mass transfer characteristics of split fin-and-tube heat exchangers under dehumidifying conditions

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Abstract

The airside heat and mass transfer characteristics of seven split fin-and-tube heat exchangers with hydrophilic coating were studied under dehumidifying conditions experimentally. The effects of fin pitch and inlet relative humidity on airside heat and mass transfer performance were investigated. The results indicated that the heat and mass transfer performance decreased with the increase of fin pitch. The heat transfer performance was insensitive to the change of inlet relative humidity, and the mass transfer became weaker with the rise of inlet relative humidity. Correlations were proposed to describe the heat and mass transfer characteristics. The Colburn heat transfer factors J_h correlation could describe 96.6% of experimental data and the Colburn mass transfer factors J_m correlation could describe 81.4% of experimental data with an error of $\pm 15\%$. Correspondingly, the mean deviations of the proposed heat and mass transfer correlation were 5.3% and 8.5%, respectively.

Key words

[split fin](#) [dehumidifying conditions](#) [hydrophilic coating](#) [heat transfer](#) [mass transfer](#) [correlations](#)

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