

传递现象

紧凑式换热器开孔翅片流动传热特性分析

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摘要

对锯齿翅片和波纹翅片的不同开孔方式建立了多种三维模型, 结合数值仿真方法和已有经验公式, 分析开孔翅片的流动传热特性, 研究翅片开孔的强化传热机理, 比较不同开孔方式对流场和温度场的影响, 并通过已有的实验拟合公式对仿真结果进行校验。结果表明, 对锯齿形翅片, 不同开孔参数对流动、散热都有不同的影响。当孔径达到一定范围后, 再增加开孔尺寸并不能显著提高换热性能, 却仍会导致流动阻力大大增加。对波纹形翅片, 不同的开孔位置也会对空气侧流动阻力和传热性能产生显著影响。开孔位于波纹顶峰的翅片比开孔位于波纹腰部的翅片传热性能大约提高1.1%~3.8%, 而空气侧压降增加了5.8%~16%。

关键词

[开孔翅片](#) [流动传热](#) [数值模拟](#)

分类号

Flow and heat transfer analysis of perforated fin in compact heat exchanger

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Abstract

Numerical investigations focused on slit-perforated-fin and wavy-perforated-fin 3-D models were conducted to analyse the flow mechanism and heat transfer characteristics. The simulation results were compared and verified with the existing empirical equations. For the slit-fin, the results indicated that the perforation influenced the flow and temperature fields. Flow resistance increased with increasing aperture size, but heat transfer performance became better first but was improved slightly after the aperture size reached a specific value. For the wavy-fin, the position of perforation was an important factor. Heat transfer performance was better and air side pressure drop was greater with aperture on the wave-crest than the case with aperture on the wave-middle.

Key words

[perforated fin](#) [flow and heat transfer](#) [numerical simulation](#)

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