褶紋角對波型板流道局部熱傳性能影響之實驗探討

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摘 要

波型板流道的應用範圍非常的廣泛，其中又以運用在熱傳增強的板式熱交換器最為典型與常見，目前關於板式熱交換器的研究絕大多數都以整個熱交換器總壓降及總傳係數作為研究與分析為主要對象，基本上都只能使用總壓降或總熱傳係數的實驗數據作為比對的基準，對於局部熱傳的現象，無法提供詳細之解釋，且大部分的數值計算與實際實驗結果多相差甚遠，目前對於全壁面對流熱傳係數之測量，則尚少之公開文獻可供參考。本研究旨在於利用暫態液晶技術提供不同角度(30°、45°、60°)的波型板流道全壁面熱傳係數分佈的量測數據。本實驗選擇以不同褶紋角對不同雷諾數之情況，作為探討波型板流道壁面的對流熱傳係數分佈與壓降的實驗條件。結果顯示，位於板片出入口處之忖均紐賽數之值容易受到板片幾何形狀影響造成其數值之可靠度不佳；且上下兩板之忖均紐賽數值會有高低之差異性，是受到褶紋方向與流體方向所夾角度有關；其上板出口處因流體集中於此處流出，故其值有上升之現象，而位於下板出口處則無流體於此處流出，故其值有下降之現象。

關鍵詞 : 板式熱交換器、褶紋傾斜角、暫態液晶技術、局部熱傳係數

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