波形板流道熱傳與壓降的三維數值模擬

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摘 要

本研究利用Fluent計算流體力學套裝軟體作數值計算，探討波形板流道的局部熱傳係數分佈與沿流道之壓降。探討條件包含正弦與正三角形的流道截面幾何形狀，40°、60°、70°及90°的褶紋傾斜角，雷諾數由2000變化到8000，工作流體則包含空氣及水。 計算結果顯示，壓降與熱傳性能均會隨波紋傾斜角度的增加而上升；正三角形截面比正弦截面的流道有較好的熱傳效果；在相同的雷諾數下，水比空氣的紐賽數較高。在褶紋傾斜角度為40°的情形，大部分的流體沿著溝槽流動，雖然褶紋傾斜角度為60°的情形有較好的熱傳係數，但是它相對的摩擦因子也比90°的情形高很多。科本因子與摩擦因子的比值以 褶紋傾斜角度為90°的情形較好。

關鍵詞 : 波形板流道 ; 計算流體力學 ; 褶紋傾斜角 ; 局部熱傳係數 ; 壓降

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