

79. An Experimental Study on the Outside Heat Transfer Characteristics of Falling and Immersed Flows on the Helical Heat Exchanger

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An experimental study is carried out to investigate the characteristics of heat transfer of outside helical tubes. The main heat exchanger consists of a twelve curved columns of each 300mm diameter, and the total length of 1.2m copper tube having an outer diameter of 19.05mm and 1.5mm thickness. Water flows down the outside of helical tube, of which flow patterns are the vertical film falling flow, immersed flow, and mixed-flow which are film falling and immersed flows partly combined. Refrigerant-11 flows the inside of the tube countercurrently. The experimental range of the inside flow rate is 1.7~3.2 ℓ/min, and its outside flow rate, 21~33 ℓ/min. The results are presented as dimensionless Nusselt numbers with the corresponding Reynolds numbers for a variety of outside and inside fluid flow rates. The heat transfer rates of the mixed flow were 8 to 56% higher than those of film falling flow or immersed flow only. Interpretation of these results is given on the basis of physical reasoning and the correlation equations.

Key words : Helical tube(나선형 관), Outside heat transfer coefficient(관외 열전달계수), Film falling flow(액막 적하유동), Immersed flow(침전유동), Immersed rate(침전비)

