



และตัวเลขของคูทาเทลาดเซมิผลต่ออัตราส่วนค่าความต้านทานความร้อนรวมต่ำสุดที่มุมเอียงต่อค่าที่แนวตั้ง ( $R_{min}/R_{90}$ ) ตามความสัมพันธ์

$$\frac{R_{min}}{R_{90}} = 0.647 Ku^{**0.0297} \quad 1.9 < Ku^{**} < 2.36 \times 10^4$$

โดยที่

$$Ku^{**} = Ku \times \frac{L_e}{d} \times \frac{\rho_l}{\rho_v}$$

ส่วนตัวแปรไร้มิติอื่น ๆ ไม่มีผลต่อคุณลักษณะทางการถ่ายเทความร้อนของเทอร์โมไซฟอน

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Thesis Title	A Study of Dimensionless Parameter Effect on Heat Transfer Characteristics of an Inclined Thermosyphon	
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Abstract

The thesis studies dimensionless parameter effects on the heat transfer characteristics of an inclined thermosyphon. The studied dimensionless parameters were Bond number, Froude number, Weber number and Kutateladze number, which affect heat transfer and overall thermal resistance of the thermosyphon. The selected thermosyphons of 7.5, 11.1 and 25.4 mm. in diameter and were made of a set of copper tubes with water, ethanol and R123 as the working fluids. The selected filling ratios were 50, 80 and 100% of the evaporator. The aspect ratio (the ratio of evaporator length to diameter) was varied at 5, 10, 20, 30 and 40. The inclination angle was varied at 0, 5, 10, 20, 30, 40, 50, 60, 70, 80 and 90 from the horizontal axis.

It was found from the experimental results that the values of heat transfer in the vertical of the experiment had an error range of  $\pm 30\%$  from the theoretical results. The filling ratio had no effect on the heat transfer of the thermosyphon. The working fluid affected on the ratio of heat transfer of the inclined thermosyphon to that of the vertical value ( $Q/Q_{90}$ ). It could be seen that, the lower the latent heat of vapourization of the working fluid, the higher value of  $Q/Q_{90}$  was obtained. The modified Kutateladze number effect on the ratio of the higher heat transfer of the inclined to that of the vertical ( $Q_{in}/Q_{90}$ ) is according to the correlation of

$$\frac{Q_m}{Q_{90}} = 1.678 Ku^{*0.0196} \quad 2.95 \times 10^{-9} < Ku^* < 1.29 \times 10^{-1}$$

where :

$$Ku^* = Ku \times \frac{d}{Le} \times \frac{\rho_v}{\rho_l}$$

The modified Kutateladze number effect on the ratio of the low thermal resistance of the inclined to that of the vertical ( $R_{\min}/R_{90}$ ) is according to the correlation of

$$\frac{R_{\min}}{R_{90}} = 0.647 Ku^{**0.0297} \quad 1.9 < Ku^{**} < 2.36 \times 10^4$$

where :

$$Ku^{**} = Ku \times \frac{L_e}{d} \times \frac{\rho_l}{\rho_v}$$

The other dimensionless parameters had no effect on the heat transfer characteristics of the inclined thermosyphon.

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