

**Performance Limit of A Closed-end Oscillating Heat Pipe  
Using Refrigerant Blend as Working Fluid**

**P. Terdtoon, P. Kamonpet and T. Wongratanapaisarn**

Department of Mechanical Engineering

Faculty of Engineering

Chiang Mai University

Chiang Mai 50200, Thailand

Tel. –66-5394-4151 ext. 911, Fax. –66-5322-6014, E-mail:pradit@eng.cmu.ac.th

**Abstract**

The paper investigates the heat transfer characteristics at critical state of a closed-end oscillating heat pipe using refrigerant blend as working fluid. The selected working fluid was HP62 (or R-404a which is a near azeotropic blend of HFC125/HFC143a/HFC134a with 44/54/4% by weight ratio). Capillary copper tube with an ID of 2.03, 1.06 and 0.66 mm were employed with the selected evaporator lengths of 5, 10 and 15. The selected filling ratio was 50% of the total volume while the selected meandering turns were 5, 10 and 15 turns. Experiments were conducted with the orientation of the heat pipe at horizontal and vertical position and the controlled vapor temperature was 50C. The effects of the evaporator length, number of meandering turn and diameter on heat transfer rate and total thermal resistance at critical state (state at which the burnout phenomenon occurred) were experimentally determined. It is found from the experimental results that, the longer the evaporator length, the lower the critical heat flux is realized. Number of meandering turn affects the critical heat flux such that, higher heat flux occurs heat pipe with more turns. The larger the diameter using for the heat pipe, the higher critical heat flux is obtained.