

## Empirical Heat Transfer Correlations of Finned-Tube Heat Exchangers in Pulsatile Flow

**Authors :** Jason P. Michaud, Connor P. Speer, David A. Miller, David S. Nobes

**Abstract :** An experimental study on finned-tube radiators has been conducted. Three radiators found in desktop computers sized for 120 mm fans were tested in steady and pulsatile flows of ambient air over a Reynolds number range of  $50 < Re < 900$ . Water at 60 °C was circulated through the radiators to maintain a constant fin temperature during the tests. For steady flow, it was found that the heat transfer rate increased linearly with the mass flow rate of air. The pulsatile flow experiments showed that frequency of pulsation had a negligible effect on the heat transfer rate for the range of frequencies tested (0.5 Hz – 2.5 Hz). For all three radiators, the heat transfer rate was decreased in the case of pulsatile flow. Linear heat transfer correlations for steady and pulsatile flow were calculated in terms of Reynolds number and Nusselt number.

**Keywords :** finned-tube heat exchangers, heat transfer correlations, pulsatile flow, computer radiators

**Conference Title :** ICFMHTT 2017 : International Conference on Fluid Mechanics, Heat Transfer and Thermodynamics

**Conference Location :** Venice, Italy

**Conference Dates :** June 21-22, 2017