

**Master's Thesis Defense Announcement**  
**Mechanical and Aerospace Engineering Department**  
**University of Texas at Arlington**

**NUMERICAL ANALYSIS OF HEAT PIPES COOLING using NANO  
fluid, Dowtherm and Water**

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**Abstract**

Heat pipes are two-phase devices, capable of converting significant amount of energy with low losses. They have been used in several application such as systems thermal control and cooling. The purpose of the present work is to investigate the thermal performance of a double pipe counter flow against the fluid type. The pipe is divided into three zones including evaporator, adiabatic, and condenser zones. All thermal boundary conditions are defined in terms of a heating or cooling temperatures in which the operating temperatures are defined between 303 K to 470 K. using ANSYS fluent, the pipe is analyzed in two- and three-dimensional spaces. For simplification in the present preliminary analysis, the two phases of the fluid are separated by a coupled wall and the flow is assumed to be in steady state. Three thermal fluids are selected with different thermophysical properties including Water, Dowtherm, and Water-based nano fluid. when comparing between the three fluids in terms of the vertical temperature change, the temperature changed by 3.3 % in case of Dowtherm fluid, however this change is found to be 1.65 % in case of water and Nano-based Water. No significant change is detected either between the water and Nano-based Water fluids or between 2D and 3D analyses.