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Thermal performance of sintered and non-sintered capillary heat pipes

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The current study is being conducted to better understand how interior capillary geometry/design and interior surface treatments may affect the thermal performance of sintered and non-sintered, grooved heat pipes. The thermal performance was quantified by measuring the temperature difference between the evaporator and condenser sections of each heat pipe while varying power inputs. Power inputs were controlled by varying the applied voltage of a DC power supply that was connected to each heat pipe via a resistive heat band. Temperature differences were measured with four strategically placed thermocouples that were connected to a data acquisition system. Experiments thus far have shown that non-sintered, grooved heat pipes may experience higher heat loads while maintaining a low temperature difference. This result may be attributed to their respective interior capillary design which in turn influences their capability to transport thermal energy during operation. Results for non-sintered heat pipes are inconclusive due to the lack of novel manufacturing methods for a proper sealing design to aid the creation of interior vacuum. Persons associated with the experiment were left blind to the nature of the specific sintered particles and surface treatments associated with each heat pipe, hence no firm conclusions may be attributed to these parameters at this time.