

LATEST TRENDS IN HEAT PIPE APPLICATION

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Abstract

Heat pipe is a best known passive device which is excellent in heat transfer and low thermal resistance. Basically, heat pipe is a two-phase heat transfer device which consists of an evacuated and sealed metal container charged with a small quantity of working fluid. In operation, one end of the container (the evaporator) is heated causing the liquid to vaporize, the vapor moves to the cold end (the condenser) and condenses. The condensate is pump back to the evaporator via the wick which attached along the container, by the capillary force present in the wick, and the cycle repeats. As the latent heat of evaporation is large, a considerable quantity of heat can be transported with a very small temperature difference from one end to the other end of the heat pipe. Thus, heat pipe is a device of very high thermal conductance. Its equivalent thermal conductivity can be several hundred times higher than that of a solid copper rod of the same dimensions. Currently, the largest use of heat pipes is in the cooling of computers and electronics products. Authors believed that approximately 15 million pieces of heat pipes produced per month worldwide for these applications.

There are many applications for heat pipes in computer and electronics, automotive, aviation, healthcare, energy saving, global warming, and environmental protection. Fast development in computing technology and the trend towards miniature architecture has created a more challenging task for cooling high-powered electronics components in less space. Thermal solution providers are required to develop higher performance and thinner heat pipes for their cooling devices. In this paper contains latest heat pipe development in thermal performance enhancement; ultra-thin heat pipe like 0.4mm thick and its application in portable tablet and handheld devices such as smart phones. With the increase of desire sophisticate control systems and features in vehicle means more heat dissipation and less space available for cooling, it is seems that heat pipe becoming a necessity for use in automotive for cooling components such as - cooling of head lamps, navigation electronic devices, power drive unit, battery, and fuel, to name a few present in this paper.