عنوان مقاله:

An experimental investigation of cooling behavior of liquid jet and liquid spray methods in high heat flux condition

محل انتشار:

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خلاصه مقاله:

The surface cooling of components with a high heat flux is one of the critical challenges for various industries. One of the techniques used is impingement cooling, in both forms of a liquid jet flow and a liquid spray. In this research, a comparison has been made between jet cooling and spray cooling in terms of flow rate, and nozzle height (distance from the nozzle exit to the target surface). It is observed that the time to reach the steady state and the time rate of temperature variations in the spray are lower than those of the jet cooling. For a typical heat flux of ۴۰ W/cm۲, the use of spray instead of jet is found to reduce the surface temperature by ۱۵.۱%. The results show that using a liquid spray increases the convection heat transfer coefficient by almost ۵۵% compared to that of a liquid jet for the same flow rate. However, both cooling methods exhibit an increase in the convection heat transfer coefficient with higher flow rates. The reduction of the nozzle height is found to reduce the surface temperature. In addition, the results show that spray cooling is more dependent on the nozzle height than jet cooling.

کلمات کلیدی:

High heat flux surfaces, Impingement cooling, Convection heat transfer coefficient, Jet cooling, Spray cooling