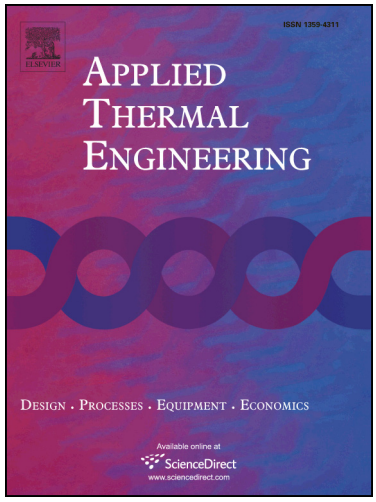

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Abstract

Water jet impingement heat transfer is widely used in electronic component cooling, steelmaking, nuclear power plants and many other high heat transfer rate applications. This paper describes experiments with a jet from a moving nozzle impinging a surface using a stepping motor to control the nozzle. The effect of nozzle velocity on the heat transfer rates at different heat fluxes and flow rates are investigated. The experimental results show that a moving nozzle performs better than a fixed nozzle for reducing the maximum temperature difference of the heating surface and the average liquid film thickness, which results in steadier heat transfer rates and a more uniform temperature. Furthermore, a moving nozzle enhances the heat transfer in the convection by more than forty percent. Here, a higher nozzle velocity better enhances the heat transfer and temperature uniformity.

Key words

Enhancement, Heat transfer, Jet impingement, Moving nozzle, Uniform temperature

Introduction

Current trends in electronic component application show an increasing need for efficient heat removal in microminiaturization systems with this need predicted to increase into the foreseeable future [1, 2]. For heat dissipation at high heat flux conditions, jet impingement is one of the most effective methods to