Theoretical Analysis of Performance Parameters of a Microchannel Heat Exchanger

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Abstract : The increase in energy demands in various industrial sectors has called for devices small in size with high heat transfer rates. Microchannel heat exchangers (MCHX) have thus been studied and applied in various fields such as thermal engineering, aerospace engineering and nanoscale heat transfer. They have been a case of investigation due to their augmented thermal characteristics and low-pressure drop. The goal of the current investigation is to analyze the thermohydraulic performance of the heat exchanger analytically. Studies are done for various inlet conditions and flow conditions. At Thi of 90°C, the effectiveness increased by about 22% for an increase in Re from 1000 to 5000 of the cold fluid. It was also observed that at Re = 5000 for the hot fluid, the heat recovered by the hot fluid increases by about 69% for an increase in inlet temperature of the hot fluid from 50°C to 70°C.