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Effect of Outlet Plenum Volume During Flow Boiling Inside Plain Parallel Microchannel

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Abstract **-** In this paper, the effect of outlet plenum volume in reducing instability and enhanced thermal performance during flow boiling inside fourteen parallel copper plain microchannel is reported. Two different sets of outlet plenum design are studied having the outlet plenum volume same as the inlet plenum volume (V1) and the outlet plenum volume with eight times of the volume of inlet plenum (V8). The plain microchannel with the V8 microchannel shows 4.5 ℃ less surface temperature compared to that with the V1 microchannel for the mass flux of 250 kg/m^{2}s and heat flux of 220 W/cm^2. The larger outlet plenum volume efficiently removes vapour generated inside the microchannel, thereby reducing the fluctuations in temperature, pressure drop and mass flux during flow boiling.

Keywords**:** Microchannel, Outlet plenum volume, Flow Boiling, Instability.