

## Nucleate Boiling Heat Transfer Coefficients of Halogenated Refrigerants Up to Critical Heat Fluxes

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Nucleate pool boiling heat transfer coefficients (HTCs) of five refrigerants of differing vapor pressures are measured on a horizontal smooth copper surface of 9.53 mm by 9.53 mm. Tested refrigerants are R123, R152a, R134a, R22, and R32 and HTCs are taken from  $10 \text{ kW} \cdot \text{m}^{-2}$  to critical heat flux of each refrigerant. Wall and fluid temperatures are measured directly by thermocouples located underneath the test surface and in the liquid pool respectively. Test results show that nucleate pool boiling HTCs of halogenated refrigerants increase as the heat flux and vapor pressure increase. This typical trend is maintained even at high heat fluxes above  $200 \text{ kW} \cdot \text{m}^{-2}$ . Zuber's prediction equation for critical heat flux is quite accurate showing a maximum deviation of 21% for all refrigerants tested. For all refrigerants, Stephan and Abdelsalam's well-known correlation underpredicted nucleate boiling HTC data up to the critical heat flux with an average deviation of 21.3%, while Cooper's correlation overpredicted the data with an average deviation of 14.2%. On the other hand, Gorenflo's and Jung et al.'s correlations showed 5.8% and 6.4% deviations respectively in the entire nucleate boiling range up to the critical heat flux.