ABSTRACT

A correlation for predicting the extent of electrohydrodynamic (EHD) enhancement of natural convection from heated horizontal cylinders is presented. This correlation is supported with results from two different experiments; the first involves natural convection from a thin platinum wire immersed in R-123 with a uniform electric field, while the second involves natural convection from a flooded tube immersed in R-123 in a non-uniform electric field. The Nusselt number enhancement is correlated in terms of a “corrected electrical Rayleigh number”, $Ra_{Ei}$, to account for the effect of a non-uniform electric field on natural convection. The correlation is valid for the range $4.0 \times 10^3 \leq Ra_{Ei} \leq 8.0 \times 10^9$. 