

Heat Transfer Characteristics of Film Condensation

Authors : M. Mosaad, J. H. Almutairi, A. S. Almutairi

Abstract : In this paper, saturated-vapour film condensation on a vertical wall with the backside cooled by forced convection is analyzed as a conjugate problem. In the analysis, the temperature and heat flux at the wall sides are assumed unknown and determined from the solution. The model is presented in a dimensionless form to take a broad view of the solution. The dimensionless variables controlling this coupled heat transfer process are discovered from the analysis. These variables explain the relative impact of the interactive heat transfer mechanisms of forced convection and film condensation. The study shows that the conjugate treatment of film condensation process yields results different from that predicted by a non-conjugate Nusselt-type solution, wherein the effect of the cooling fluid is neglected.

Keywords : film condensation, forced convection, coupled heat transfer, analytical modelling

Conference Title : ICTE 2017 : International Conference on Thermal Engineering

Conference Location : Berlin, Germany

Conference Dates : May 21-22, 2017