

عنوان مقاله:

Numerical Study of Liquid Film Formation around Tubes of Horizontal Falling Film Evaporator

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خلاصه مقاله:

Falling film evaporative heat exchangers are extensively used in processing industries; broad areas of application being refrigeration, desalination and food processing industries. The fundamental aspect of this type of heat transfer process is to extract the process heat in the form of latent heat by liquid which is sprayed over the surface of the process tubes. Formation of liquid film over a fully wetted horizontal round tube of falling film evaporator has been numerically simulated here. Two numerical approaches, Volume of Fluid (VOF) technique and the Eulerian multiphase model are applied to compare their results. The effect of varying flow and geometrical parameters on the film thickness is investigated. Two horizontal tubes of diameter 19.05mm and 25.04mm with three different uniform spacing have been selected for simulation. Film Reynolds numbers 650, 950 and 1250 are considered for the above set of parameters. It is observed that the geometrical and flow parameters considerably influence the film thickness. Transient analysis of the film formation has been carried out and parameters like pathline of liquid film and the velocity profile have been obtained for understanding the flow behavior in a better manner. All the simulated results agree well with the published data.

کلمات کلیدی:

CFD, Horizontal round tube, Liquid film thickness, Volume of fluid method, Eulerian multiphase model

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