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**A Phenomenological Liquid Film Dryout Model in Vertical Annulus
at High Vapor Quality**

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Abstract

A Phenomenological liquid film dryout model for annulus geometry is suggested to calculate critical heat flux at high vapor quality. The initial conditions obtained by the bundle-based flow pattern transition criterion. The constitutive relations of the tube-based entrainment and deposition models are modified by droplet contact area fractions that counting the cold wall effect. The concept of the droplet contact area fraction gives simple modeling of the deposition and entrainment rates on the liquid films of the inner and outer tubes and counts for the observed annulus characteristic that the outer film thickness is thicker than the inner liquid film. The model predicts well at low flow-rate but tends to over-estimate at high flow-rate and shows good results for the broad critical heat flux experimental data(595 data) with the accuracy of the mean of 0.99 and the RMS error of 0.115.