高熱프럭스 強制對流沸騰管에 있어서 限界熱프럭스의 豫測

金 京 根

Prediction of critical heat flux in forced convective boiling tube with high heat flux

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Abstract

A critical heat flux (dryout heat flux) in high quality region is a most important design boundary of practical heat exchangers in which evaporation is occurred.

When subcooled fluid is introduced into a uniformly heated tube, the flow is developed to annular dispersed region according to increasing quality and heat flux.

In this region, entrained liquid droplets travel with vapor in the center of tube and liquid film flows on the heated wall. Liquid film flowrate changes along the tube by its evaporation and mass transfer process of droplets between vapor and liquid film. Near the dryout heat flux, liquid film flowrate decreases according to increasing of heat flux.

It seems to be trends that the sharp rising of well temperature is found not only from the liquid film flowrate being to zero with small dryout heat flux, but also the breakdown of liquid film with high dryout heat flux.

In this a paper as the followings,

(a) droplet size distribution from the measured data by magnesium oxide coating technique at the exist of tube,

(b) entrainment and deposition rate of droplets in the annular or annular dispersed flow region,

(c) calculation of dryout point by the step-by-step method

are presented.