

Comparison of Two-Phase Critical Flow Models for Estimation of Leak Flow Rate through Cracks

Authors : Tadashi Watanabe, Jinya Katsuyama, Akihiro Mano

Abstract : The estimation of leak flow rates through narrow cracks in structures is of importance for nuclear reactor safety, since the leak flow could be detected before occurrence of loss-of-coolant accidents. The two-phase critical leak flow rates are calculated using the system analysis code, and two representative non-homogeneous critical flow models, Henry-Fauske model and Ransom-Trapp model, are compared. The pressure decrease and vapor generation in the crack, and the leak flow rates are found to be larger for the Henry-Fauske model. It is shown that the leak flow rates are not affected by the structural temperature, but affected largely by the roughness of crack surface.

Keywords : crack, critical flow, leak, roughness

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