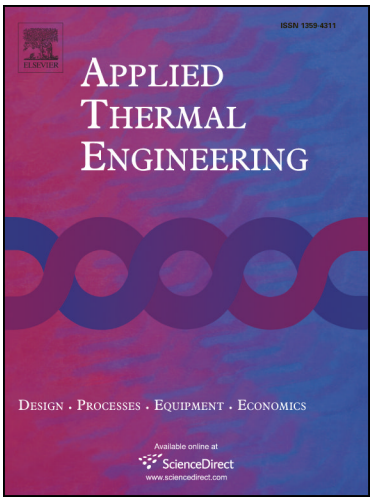

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ABSTRACT

An improved model is developed to calculate flow distributions of supercritical pressure water in parallel pipes with non-uniformly distributed heat load. On the basis of the limitation of the previous models, two main improvements have been proposed. Firstly, the effects of both the manifold and heat load on flow distribution are simultaneously taken into account by the present model, which is better suitable for engineering practices. Secondly, the prediction of flow distribution under both supercritical and subcritical pressure conditions has been integrated into our code. By using the experimental data from the existing literature, the present model is verified, and then is employed to investigate the flow distribution in parallel vertical upward pipes affected by both the manifolds and the heat load. It is found that a critical mass velocity (G_cr) exists under supercritical pressure conditions, which is much similar to the cases at subcritical pressure conditions. The value of G_cr increases with the pressure under both subcritical and supercritical pressure conditions. The average of G_cr at supercritical pressure conditions is about 1.5~2 times that at subcritical pressure conditions in the range of pressure from 13 MPa to 31 MPa.