

A Study on the Effect of Various Spacer Grids on CHF in 2*2 Rod Bundle with R-134a

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Abstract

Experimental investigation was performed using the 2*2 rod bundle in order to find out the effect of spacer grid on CHF with R-134a. The rod diameter of test section is 9.7mm. Rod pitch is 12.95mm. An outside-line of flow channel is 25.7mm. As test spacer grids, three different types of spacer grid that was applied for a patent by KAERI and *V-5H* were selected. Experimental conditions are as follows: Mass flux is from 1000 to 1800 kg/m²s, inlet temperature is from 10 to 20°C, and inlet pressure is 20 bar.

Flow structure experiment was also performed with single-phase water at room temperature and atmospheric pressure. The result of CHF experiment was explained through this experiment qualitatively. In this experiment, using LDV, we measured axial and lateral velocity and turbulent intensity along the centerline to find out the swirl magnitude and turbulent kinetic energy. And using DP cell, pressure drop was also measured.

Consequently, the swirl flow and turbulent level forming by spacer grid and mixing vane contributed to the CHF enhancement. The ratio of enhancement was changed as the distance from spacer grid. And we also confirmed that a blockage area was an important parameter in view of pressure drop.