INTISARI

Penelitian ini bertujuan untuk mengkaji pengaruh perubahan kecepatan superfisial air dan udara terhadap koefisien perpindahan kalor dan penurunan tekanan aliran gelembung udara-air searah dalam pipa koil helik vertikal. Seksi uji berupa penukar kalor pipa koil helik jenis *shell* and *tube* aliran berlawanan arah. Air panas dialirkan dibagian *shell* dan campuran air dan udara pada pola aliran gelembung dialirkan dibagian *tube*. Pipa koil dibuat dari pipa tembaga berdiameter dalam 7,02 mm, panjang 1780 mm, diameter koil 150 mm, dan jarak koil 30 dan 50 mm. Kecepatan superfisial air divariasi 0,302 m/s dan 0,388 m/s, dan kecepatan superfisial udara divariasi 0 m/s – 0,0694 m/s. Laju aliran massa air panas dipertahankan konstan pada 0,05 kg/s dan temperatur 40^{o}C. Hasil penelitian menunjukkan bahwa koefisien perpindahan kalor dan penurunan tekanan gesekan naik dengan bertambahnya kecepatan superfisial air dan udara. Penurunan tekanan gravitasi berkurang dengan meningkatnya kecepatan superfisial udara tetapi naik dengan bertambahnya kecepatan superfisial air. Penambahan jarak koil menurunkan koefisien perpindahan kalor dan penurunan tekanan gesekan tetapi memperbesar penurunan tekanan gravitasi. Berdasarkan data eksperimen selanjutnya dikembangkan korelasi baru untuk koefisien perpindahan kalor dan faktor gesekan dua fase.

In this study, an experimental investigation was aimed to study the effect of air and water superficial velocities on heat transfer coefficient and pressure drop of air water bubbly flow in vertical helically coiled tube. The test section was countercurrent shell and tube helical coil heat exchanger. Hot water was flowed in the shell and air-water was flowed in the tube. The coils were made of copper tubes of 7.02 mm inside diameter and length 1780 mm. The coil diameter was 150 mm, and the pitches were 30 mm and 50 mm. The air and water superficial velocities were varied in the range of 0 – 0.0694 m/s and 0.302 – 0.388 m/s. The mass flow rate of hot water was kept constant at 0.05 kg/s and 40^{o}C. The results showed that heat transfer coefficient and frictional pressure drop increase with increasing air and water superficial velocities. Gravitational pressure drop decreases with increasing air superficial velocity but increases with increasing water superficial velocity. Increasing coil pitch decrease heat transfer coefficient and frictional pressure drops. Finally, the correlation for two phase heat transfer coefficient and friction factor are provided based on the experimental data.