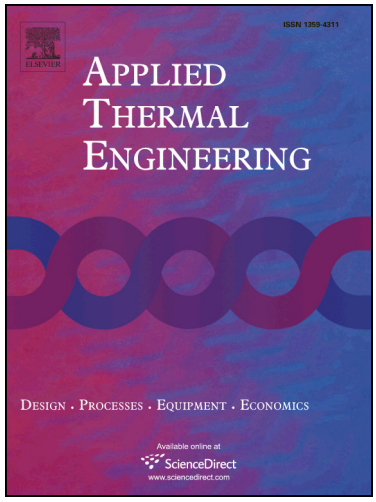

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Heat transfer performance of aviation kerosene RP-3 flowing in a vertical helical tube at supercritical pressure

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Abstract

Convective heat transfer characteristics of aviation kerosene RP-3 at supercritical pressure (P=5MPa) in vertical helical tube were experimentally studied. The helical tube has 1.82mm equivalent inner diameter, 20mm helical diameter and 10mm pitch. Circumferential temperatures were detected at both upward and downward flow experiments and the results indicated that: The secondary flow induced by centrifugal force moves outward of the cross section and inside temperature is larger than the outside. Thus, the outside heat transfer coefficient (HTC) is averagely 31.5% larger than that of the inside. Furthermore, heat transfer enhancement leading by centrifugal secondary flow is the key factor when the Richardson ratio is larger than 10. At last, two correlations of Nusselt number are developed to predict heat transfer of aviation kerosene RP-3 in helical tube based on experimental data at supercritical pressure.

Key words: heat transfer, aviation kerosene, vertical, helical tube, supercritical pressure.