Tafti, D. K.; **Cui, J.**

Fin–tube junction effects on flow and heat transfer in flat tube multilouvered heat exchangers. (English) Zbl 1032.76544

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Summary: Three-dimensional simulations of four louver–tube junction geometries are performed to investigate the effect on louver and tube friction and heat transfer characteristics. Three Reynolds numbers, 300, 600 and 1100, based on bulk velocity and louver pitch are calculated. Strong three-dimensionality exists in the flow structure in the region where the angled louver transitions to a flat landing adjoining the tube surface, whereas the flow on the angled louver far from the tube surface is nominally two-dimensional. Due to the small spatial extent of the transition region, its overall impact on louver heat transfer is limited, but the strong unsteady flow acceleration on the top louver surface augments the heat transfer coefficient on the tube surface by over 100%. In spite of the augmentation, the presence of the tube lowers the overall Nusselt number of the heat exchanger between 25% and 30%. Comparisons with correlations derived from experiments on full heat exchanger cores show that computational modeling of a small subsystem can be used reliably to extract performance data for the full heat exchanger.

MSC:

76D99 Incompressible viscous fluids
80A20 Heat and mass transfer, heat flow (MSC2010)

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