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VISUALIZATION OF REFRIGERANT FLOW AT THE CAPILLARY TUBE INLET OF A HIGH-EFFICIENCY HOUSEHOLD REFRIGERATOR

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Highlights

>Refrigerant visualization at condenser outlet and capillary tube inlet is presented>The test bench allows to study different filter and flow directions>Despite measuring subcooling on the wall there is two phase flow at condenser outlet>All the tests show two-phase flow at the capillary tube inlet.

ABSTRACT

The subcooled condition at the condenser outlet ensures complete condensation, which is necessary in vapor compression systems to increase the cooling capacity and ensure the liquid conditions at the expansion device inlet. However, in household refrigerators, recent works indicate the presence of two-phase flow at the capillary tube inlet. These systems behave quite differently from other refrigeration systems due to the extremely low capacity. In the present work, a test bench was built to visualize the refrigerant flow at the condenser outlet and at the capillary tube inlet of a commercial household refrigerator. A transparent tube replaced the end of the condenser and three transparent filters were installed with different orientations. Different positions of the capillary tube within the filters were also tested. Despite measuring a certain subcooling, all the reported visualizations showed that the capillary tube was steadily drawing in two-phase flow.

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