Modelling of Split Condenser Heat Pump: Optimization and Exergy Analysis

This paper presents a numerical study of a split condenser heat pump (SCHP). The SCHP setup differs from a traditional heat pump (THP) setup in the way that two separate water streams on the secondary side of the condenser are heated in parallel to different temperature levels, whereas only one stream is heated in a THP. The comparison between the SCHP and a THP was made for equal heat load and equal total pressure drop on the secondary side. It was found that the SCHP setup offered solutions that resulted in smaller/more compact plate heat exchangers for reaching the same COP as a traditional unit. For a water temperature of 40°C/85°C and an evaporating temperature of 5°C, the total area of the two plate heat exchangers was reduced by 3%. When using the SCHP setup the exergy destruction was slightly smaller compared to the THP.

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