

## COMPUTER SIMULATION OF THE PERFORMANCE CHARACTERISTICS FOR CONDENSER OF REFRIGERATION SYSTEM

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Under static operating conditions, in a moment there is an equilibrium of the refrigeration system so-called a balance point with a corresponding refrigeration capacity. This balance point is a result of interaction of the four main components: evaporator, compressor, condenser and expansion device. Is it possible to predict the balance point(s) before manufacturing of the refrigeration systems? At first, it is necessary to consider the performance of each component separately, as well as the condenser in this paper.

The performance characteristics of the condenser is defined as a function of two independent variables, condensing and water (air) inlet temperatures :  $Q_c = Q_c(t_c, t_{w1})$ . An original method for heat transfer modeling is used, where both desuperheating and condensing processes are included considering different heat transfer coefficients. The procedure is presented on a flow diagram and corresponding computer programme is composed.

For each pair  $(t_c, t_{w1})$  the coefficients of heat transfer inside, outside and overall will be calculated. The thermophysical properties of the refrigerant and water (air) are calculated with subroutines in the same programme in depending to the corresponding temperatures. The process of the mathematical simulation is the simultaneous solution of heat balances, flow balances, heat transfer coefficients etc. Several equations are non-linear in implicit form, they are solved by a particular method. The functioning of the computer programme is shown on a concrete example with a shell and tube condenser.

The advantage of this programme is the possibility to predict the performance characteristics of condenser before its manufacturing, and it has an universal use independent of the manufacturer. Furthermore, it can be used to calculate parameters of already produced condenser in the work conditions others than nominal, for example: a change of the water inlet temperature, a change of the water flow rate, different values of fouling factors, use various fin profiles of tubes etc.

*Proposed for technical session topics: 4. New fluids, new systems, and system integration.*

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