THERMODYNAMIC EFFICIENCY OF HEAT EXCHANGING APPLIANCES

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The goal of the work. describes thermodynamic methods as well as optimization methods of heating and heat exchanging engineering system of saccharine industry.

Results. According to non-cycle entropy method technique, integrated thermodynamic analysis assumes the determination of measure of irreversibility of processes, that occurs in heat exchanging appliances (HEA), the sources of which are heat exchanging at the finite variance of temperatures, the dissipation of mechanic energy of heat transfer medium currents and heat exchanging with the environment.

The quantitative characteristics of irreversibility is increasing of entropy of isolated system, which determines from the entropy balance of ABC system, which consists of 3 subsystems: A, B, and C (A is heating heat transfer medium subsystem, B - heat transfer medium subsystem, C – environment subsystem).

In general, entropy balance of HEA is agglomerated with the help of following simplifications: change of kinetic and potential energy is neglected; for heat transfer mediums, in which transition between preset thermodynamic states is followed by temperature changes, change of thermal qualities is not considerable.

Thermodynamical efficiency of HEA, considering the irreverence of the processes, is defined by non-dimensional coefficients: entropy coefficient of thermodynamical efficiency, entropy coefficient of thermodynamical non-efficiency. Coefficients (8) and (9) do not have known (discovered) drawbacks of performance factor (energetic, exergy), as they characterize the degree of diversion of real system from reverent in structure borders of thecond thermodynamic law.

The efficiency of functioning of HEA – local effectiveness of potential usage of heat transfer medium (temperature), including dissipation processes in given temperature interval – defined entropy coefficient of HEA effectiveness:

Conclusions. Suggested technique of thermodynamic analysis assumes scientifically proved systematic approach to comparative analysis and different construction, that, obviously, is suitable to do with the help of entropy coefficient of efficiency, as well as for defining their thermodynamic efficiency in margins of sugar plant. The last can be achieved with the help of using entropy coefficient of thermodynamic efficiency and allows to analyze different heat exchanging systems for defining the level of their influence on general energetic efficiency of sugar plant.