
Heat transfer enhancement in apparatuses of refrigerating and cryogenic plants

© I.A. Arkharov, E.S. Navasardyan, A.S. Glukharev

Bauman Moscow State Technical University, Moscow, 105005, Russia

Heat exchanger is one of the main elements of energy systems. When designing such apparatuses it is important to choose the appropriate type of fins. This task should be solved at the stage of designing the installation for specific operating modes, as well as operating conditions. The paper analyzes the possibility of increasing the heat transfer coefficient from the inner surface of the pipe due to the complication of the geometry of the shell space by installing profiled inserts of various geometries. The result obtained with the help of criterial equations is compared with the results obtained by numerical modeling in the program system of finite element analysis ANSYS Fluent. Thanks to a numerical model for describing and calculating heat exchange processes, it is possible to achieve cost savings in the design of machines and apparatuses of various installations. A numerical experiment also makes it possible to increase the efficiency of the entire system as a whole.

Keywords: shell and tube heat exchanger, heat transfer enhancement, heat transfer coefficient, comparative analysis, finite element modeling

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Arkharov I.A., Dr. Sc. (Eng.), Professor of the Department of Refrigerating, cryogenic equipment. Air conditioning and life support systems, Bauman Moscow State Technical University. e-mail: 2772@mail.ru

Navasardyan E.S., Cand. Sc. (Eng.), Assoc. Professor of the Department of Refrigerating, cryogenic equipment. Air conditioning and life support systems, Bauman Moscow State Technical University. e-mail: navasard@mail.ru

Glukharev A.S., student of the Department of Refrigerating, cryogenic equipment. Air conditioning and life support systems, Bauman Moscow State Technical University. e-mail: glukharevandrew@gmail.com
