The Study of Computer Aided Heat Exchanger Design

E-mail: 9419544@ mail.dyu.edu.tw

ABSTRACT

The purpose of this study is to develop a computer aided heat exchanger design system, which provides a user friendly interface. Combined with Delphi's interactive operation mode and MS-SQL extensive database processing capability, the software system is possible to simplify the massive tasks, such as graphic chart consultation and complex calculations encountered in the process of designing heat exchanger. The system will help the user to obtain a correct design effectively and conveniently. This system is built with several features. There are distributed framework, separate database, application and web servers. The system is then open to vast users through internet. The order of influences of different design parameters is tube outsider diameter, inter-tube distance and inter-stopper distance. Both shell and tube pressure drops will decrease as the inter-stopper distance increases. The inter-tube distance will increase associated with the enlarged tube outside diameter. These will bring down both sell and tube pressure drops. If the major parameter, tube outside diameter, is fixed, the shell and tube pressure drops can be managed to drop slightly as long as the inter-tube distance is also enlarged slightly. The data of media, theoretical and experiential equations needed for designing a heat exchanger is programmed. The amount of heat transfer and heat transfer coefficients, heat transfer area, shell inside diameter, tube numbers and pressure drop will be also calculated. In order to meet the requirement of structural design and space constrain, the regulations of HEDH and TEMA, and the influence of design parameters toward space constrain are recommended through the help menu and suggestion windows. The input parameters can then be changed accordingly to meet the performance requirement and space constrain. Furthermore, the needed HEX design is also optimized to have the least pressure loss.

Keywords : shell-and-tube heat exchanger ; TEMA ; HEDH ; optimal design ; distributed framework ; web server

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