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Computational fluid dynamics analysis of shelland-double concentric-tube heat exchanger

Abstract

A shell-and-double concentric-tube heat exchanger is a new invention in heat transfer devices that is used for transfer of internal thermal energy between three fluids at different temperatures. The structure of the heat exchanger for this project is made of a shell which encloses sixty-six double concentric tubes. There are three inlets and three outlets for all the fluids. The typical shell-and-tube heat exchanger is not ideal in terms of its size. This contributes to an increased cost of manufacturing and installation, and on top of that, consumes a lot of space. This project is conducted using Computational Fluid Dynamics software package of EFD. Lab. At the end, the result in terms of the length of the heat exchanger required to achieve the desired outlet fluid temperature is compared with Kern method. It is found that all results have close agreement with each other, with acceptable range of percentage differences and errors.

Keywords — Heat Exchanger, shell-and-double concentric tube, computational fluid dynamics.