



Design of a gas to gas plate-fin heat exchanger with offset strip fins

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Abstract

In this study a Plate-Fin Heat Exchanger (PFHE) is considered for designing. The methodology is based on a thermo-hydraulic model that represents the relationship between pressure drop, heat transfer coefficient and heat exchanger volume. Although there are some studies in designing of PFHEs, no theoretical studies have been done by the focus on gas-gas types with offset-strip fins. Therefore the motivation of this study is design of a gas-gas PFHE with constraints on the allowable pressure drop. The designing program aims at sizing the heat exchanger while the geometries of the fins are fixed and are taken from an available database and three dimensions of heat exchanger are considered for the sizing. The task of sizing is a design process, so we have developed a full analysis of PFHEs including heat transfer and pressure drop equations to obtain the structure sizes. Also a perfect analysis for surface geometrical characteristic has been developed for this kind of heat exchanger. Finally, the obtained dimensions are compared to those presented in the literature and it is shown that with pressure drop constraints the difference between the volume of designed PFHE and the heat exchangers in the literature is lower than 10% and negligible.

Keywords: plate-fin HE, designing, heat transfer, volume, pressure drop, offset-strip fins.