

Heat transfer enhancement in heat exchangers with V-cut twisted tape inserts: A review

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ABSTRACT

Improving heat transfer in the heat exchangers can be achieved by infringement of the laminar sub-layer or generating forced convection by employing twisted tape inserts as turbulence promoters. Significantly less research has been carried out on V type with combined cut twisted tape inserts in heat exchangers. This mini-review paper discusses the influence of various shapes V type with combined cut in twisted tape inserts by a few researchers in improving the performance of heat exchangers. V type with combined cut twisted tape design, shapes used, the influence of forced convection, and thermal and hydraulic performance have been discussed.

1. Introduction

Devices for transferring heat are widely used in various thermal engineering and manufacturing sectors, such as the biochemical industry, gas turbines, air and refrigeration, and thermal power generation [1]. Utilizing swirl flow generators is one of the most promising passive strategies that has recently gained importance for improving the heat transfer rate and increasing the effectiveness of thermal devices for various applications. As equipment to promote heat transfer, swirl flow generators are efficient and cost-effective because they provide excellent flow mixing [2]

Numerous studies have examined the use of twisted tape in heat exchangers. For example, using quad-

channel twisted tapes (QCTT) increased the friction factor more than using typically twisted tapes [3], conducting combined research on twisted tape and nanofluid [4], using a spiral pipe with twisted tape [5] and Fig.1 represents the spiral pipe heat exchanger used by [5]. For the validation of experimental correlation and CFD methodology, the results for conical-shaped heat exchangers have been investigated using the proposed techniques reported by Chen et al. [6], also Fig.2 conical-shaped heat exchangers used by Chen et al. [6].

The supplement of twisted tapes can reduce the coke deposition, subsequently slowing the growth of the total flow friction investigated by twisted-tape insertion can reduce coke deposition, which slows the progression of the overall flow friction studied by [7]. Evaluation and discussion of stream behavior and overall heat transfer performance in a spiral pipe with a twisted tape insert subjected to a constant wall temperature [8]. This work compared the heat transfer and flow friction of a dual-twisted tape turbulator-equipped double-pipe heat exchanger with and without air bubble injection [9].

The overall performance parameters of the circular pipe with and without V-cut inserts have been measured at varied flow rates under constant heat flux circumstances

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