

Abstract

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experimental numerical comparison between the performance of helical cone coils ordinary helical coils used as dehumidifiers for humidification dehumidification in desalination units"

helical spiral coils were used for too long as heat exchangers in power chemical processes. this numerical research is introducing the concept of helical cone coils and comparing the performance of helical cone coils as heat exchangers to the ordinary helical coils. helical spiral coils are known to have better heat mass transfer than straight tubes, that's attributed to the generation of a vortex at the helical coil known as dean vortex, this vortex is a secondary flow superimposed on the primary flow. the dean number which is a dimensionless number used in describing the dean vortex is a function of reynolds number the square root of the curvature ratio, so varying the curvature ratio for the same coil would vary the dean number. experimental numerical investigation based on commercial cfd software fluent was made to understand the difference between ordinary helical coil helical cone coils. two coils having different heights of 4050 mm and thicknesses 0.6 mm 0.7 mm were used in the investigation. it was found that as the taper angle enhances the heat transfer characteristics of the coil this increase is presented in an increase in the coil exit temperature, the numerical simulation showed that the heat transfer characteristics of the helical cone coil is better than the ordinary helical coils.