Abstract

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experimentalnumerical comparison between the performance of helical cone coilsordinary helical coils used as dehumidifiers for humidification dehumidification in desalination units"

helicalspiral coils were used for too long as heat exchangers in powerchemicalrnprocesses. this numerical research is introducing the concept of helical cone coils andrncomparing the performance of helical cone coils as heat exchangers to the ordinary helicalrncoils. helicalspiral coils are known to have better heatmass transfer than straightrntubes, that’s attributed to the generation of a vortex at the helical coil known as dean vortex,rnthis vortex is a secondary flow superimposed on the primary flow. the dean number whichrnis a dimensionless number used in describing the dean vortex is a function of reynoldsrnnumberthe square root of the curvature ratio, so varying the curvature ratio for the samerncoil would vary the dean number. experimentalnumerical investigation based on therncommercial cfd software fluent was made to understand the difference between ordinaryrnhelical coilshelical cone coils. two coils having different heights of 4050 mm andrnthicknesses 0.6 mm0.7 mm were used in the investigation. it was found that as the taperrnangle enhances the heat transfer characteristics of the coil this increase is presented in anrnincrease in the coil exit temperature, the numerical simulation showed that the heat transferrncharacteristics of the helical cone coil is better than the ordinary helical coils.