

**ENHANCEMENT OF HEAT TRANSFER RATE AND REDUCTION OF SHELL  
SIDE PRESSURE DROP IN HELIX HEAT EXCHANGER WITH CONTINUOUS  
HELICAL BAFFLES**

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**ABSTRACT**

Shell and tube heat exchangers with helical baffles are used for improved performance by reducing pressure drop, vibration, and fouling while maintaining a higher heat transfer capability. In the present study, a 3D numerical simulation of a Shell and tube heat exchanger with a continuous helical baffle is carried out by using commercial codes of GAMBIT 2.3 and FLUENT 6.3. An experimental analysis and numerical comparison is provided that examines developments and improvements on a conventional Shell and Tube heat exchanger (STHX) and a Shell and tube heat exchanger with a continuous helical baffle (STHXHB). The analysis has been made for both cold and hot fluid. It was found that the increase in total heat transfer rate is 09% to 23% for the STHXHB compared with STHX for different hot fluid velocities. It is also concluded that STHXHB have a higher total heat transfer rate and a lower pressure drop when compared to the STHX for the same mass flow rate and inlet condition. There is good agreement between numerical and experimental results.

**KEYWORDS:** Heat Transfer Rate, Pressure Drop, Helical Baffle, Helix Heat Exchanger