

# Intensification in Convective Heat Transfer by using Wire Coil Insert

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**Abstract:** *This project explores enhancing convective heat transfer through the implementation of wire coil inserts. Investigating how these inserts intensify heat transfer could lead to improved efficiency in various applications. In the current study, a numerical method is used to investigate the thermal energy transfer and pressure drop augmentation in helically coiled tube heat exchanger with a coiled wire insert made from mild steel. The impact of geometrical parameters of the inserts like diameter and cross sectional form on the intensification of the Nusselt and the friction factor number is studied. The Transition SST model is used to simulate the impact of turbulence. The model validation is performed by comparing the results with the empirical equations of prior experimental works. Furthermore, using inserts with concentric circular cross section with diameter of 0.008 m and two rectangular cross sections are recommended for the intensification of heat transfer at the inlet mass flow rate 0.05 kg/s while, all inserts are suggested at the inlet mass flow rate of 0.075 kg/s. As a part of the study, a correlation is proposed for estimating the Nusselt number of these heat exchanger.*

**Keywords:** Reynolds Number, wire coiled insert, passive technique