

Computational Fluid Dynamics Investigation of Pitch Variations on Helically Coiled Pipe in Laminar Flow Region

Experimental investigations of the flows inside helically coiled pipe are difficult and may also be expensive, particularly for small diameters. Computational fluid dynamics (CFD) packages, which can easily construct the geometry and change the dimensions with 100% of accuracy, provide an alternative solution for the experimental difficulties and uncertainties. Therefore, a CFD study was conducted to analyze the flow structure and the effect of varying the coil pitch on the coil friction factor, through utilizing different models' configurations. Two coils were tested, all of them sharing the same pipe and coil diameter: 0.005 m and 0.04 m, respectively. Pitch variations began with 0.01 and 0.05 m for the first and second model, respectively. In this study, the velocity was analyzed, and the effects of this reduction on coil friction factor were also examined using laminar flow. The results were validated by Ito's equation for the laminar flow.