

Abstract

Several heat transfer expressions have been developed for the local and average Nusselt numbers in a vertical cylindrical configuration to reduce heat losses around a device. Three cases are considered: first, the two cylinders are stationary, second, the inner cylinder rotates about the vertical axis and the outer cylinder is kept stationary and third, the cylinders walls make the object of the two sinusoidal protuberances. One protuberance on the inner cylinder (external surface) and the other one on the external cylinder (internal surface). Numerical solutions are obtained for laminar natural and mixed convection using the control volume method in the case of uniform heating and uniform wall temperature. The obtained heat correlations provide a basis for estimating transfer rates for Newtonian fluids. These are obtained for restricted ranges of conditions and are compared with representative theoretical and experimental expressions