

Design of Impedance Box to Study Fluid Parameters

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Abstract : Understanding flow distribution and head losses is essential to design and calculate Thermo fluid parameters in order to reduce the pressure to a certain required pressure. This paper discusses the ways acquired in design and simulation to create and design an impedance box that reduces pressure. It's controlled by specific scientific principles such as Bernoulli's principle and conservation of mass. In this paper, the design is made using SOLIDWORKS, and the simulation is done using ANSYS software to solve differential equations and study the parameters in the 3D model, also to understand how the design of this box reduced the pressure. The design was made so that fluid enters at a certain pressure of 3000 Pa in a single inlet; then, it exits from six outlets at a pressure of 300 Pa with respect to the conservation of mass principle. The effect of the distribution of flow and the head losses has been noticed that it has an impact on reducing the pressure since other factors, such as friction, were neglected and also the temperature, which was constant. The design showed that the increase in length and diameter of the pipe helped to reduce the pressure, and the head losses contributed significantly to reduce the pressure to 10% of the original pressure (from 3000 Pa to 300 Pa) at the outlets.

Keywords : box, pressure, thermodynamics, 3D

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