

Analysis of flow through an orifice plate of different shapes using OpenFoam

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Abstract

Orifice meters are essential for fluid flow measurement due to their durability, simplicity, and reliability. However, the size and shape of the orifice plate significantly influence the fluid dynamics, including pressure drop and velocity distribution. This study investigates the effect of orifice plate geometry using OpenFOAM for Computational Fluid Dynamics (CFD) simulations. Three shapes—circular, curved, and sharp-edged—were examined for three different inlet velocities $u = 0.376$ m/s, 0.482 m/s, 0.673 m/s, with water as the working fluid in a cylindrical pipe. Simulations provided insights into flow behaviour, focusing on pressure loss, velocity profiles. The results illustrate the effect of shape on flow parameters which can help in designing the orifice plate.