

PRESSURE DROP EFFECT OF STAGE GAP ON TWO STAGE ORIFICE PLATE AND COMPARISON WITH CONVENTIONAL ORIFICE

Project Reference No.: 47S_BE_1456

College : East Point College of Engineering and Technology, Bengaluru
Branch : Department of Civil Engineering
Guide(s) : Dr. Nagaraj Sitaram
Student(S) : Mr. Gagan Kumar G. M.
Mr. Abhilash Gowda V.
Mr. Baapu B. M.

Abstract:

Many engineering applications involving piping systems utilize flow passage restrictions such as control valves and orifices to achieve control of flow rates and pressures. Accurate determination of flow characteristics through these restrictions especially orifices is important for industrial operations such as control measures in food processing industry, and oil Industries. Based on the literature review and the gap identified the following objectives are framed for the current project work

1. To establish pressure drop relationship with number of stages in orifice plates for different configurations and compare with conventional orifice
2. To obtain 2-stage gap relationship of pressure drop in 2-stage orifice plate with pressure drop and flow rate (Q) for 3-beta ratios ($\beta = 0.465, 0.568, 0.65$) and compare with the conventional orifice.

The experimental results showed the following results:

- Two-stage orifice arrangement with 2D gap is better compared to “3D” gap between 1st stage and 2nd stage orifice assemblies.
- The pressure drop (Δp) reduction of 2nd stage show improvement up to 10%-15% as compared to 1st stage orifice pressure drop for same the flow rate (Q) between the Reynolds Number 30000 – 75000.
- Useful for single phase applications for small size pipelines