

Converging-diverging nozzle experiment report examples

[Health & Medicine](#), [Stress](#)



1. Convergent-Divergent nozzle experiment

When the downstream pressure in a converging diverging nozzle reduces below a critical value, no further reduction in throat pressure or increase in mass flow rate occurs. Under this condition, the nozzle is said to be choked.

Pressure: U-Tube manometers to measure the pressures in the nozzle relative to atmospheric pressure.

- A water manometer is connected to the inlet pressure tap (P0-P1).
- Mercury manometers are connected to the throat (P0-P2) and downstream (P0-P3) pressure taps.
- Atmospheric pressure, P0, to be read on the barometer.

2. Objectives

The objective of this experiment is to find conditions that give choked flow. These conditions include;

- To find choke velocity, UC
- To find Critical Pressure Ratio, $P2C/P0$
- Compare to Theoretical Values for Isentropic Flow

Additionally, the results of this experiment will compare with the theoretical pressure set, (critical pressure) for the choked flow to be observed.

3. Expected results/ findings

This experiment seeks to confirm that, for the choked flow to occur, a certain threshold of pressure must be achieved. This pressure is referred to as the critical pressure. The value obtained from this examination is then compared with the theoretical value to validate its accuracy. Constants such as atmospheric pressure and temperature factored in, this figure should be

similar for a specific fluid under similar conditions.

4. Significance

C/D nozzle does indeed become choked when velocity approximately equals sonic velocity. Additionally isentropic predictions give good agreement meaning it is a good assumption. This experiment enables one to understand the relationship between pressures, critical mass flow to the choked flow. The results of this study would be used in determining the force expended by jet engines during flight. The critical mass at the point of the choked flow for instance would be extrapolated to a larger choked flow of similar magnitude in determining its workings.