Experiment A
Orifice and Free Jet Flow

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1 Introduction

The main purpose of this experiment is to investigate the Bernoulli equation for orifice and free jet flow. This experiment is divided into two parts, the first part is to determine the coefficient of velocity from the jet trajectory. the second part is to determine the coefficient of discharge under the constant head.

2 Theory

In Experiment A, the basic equations are Bernoulli's (1) .

$$\left[\frac{p}{\gamma}+\frac{v^2}{2g}+z\right]_1=\left[\frac{p}{\gamma}+\frac{v^2}{2g}+z\right]_2 \tag{1}$$

As shown in the figure below, where 1 and 2 represent the surface of the reservoir and the water discharge point.

In Bernoulli's equation, because the position 1 is in contact with the air and the water surface is static, so the pressure force p = 0, and the water surface flow velocity v = 0. Similarly, the pressure at position 2 is p = 0. With the datum at 2, we only need to measure the head difference between

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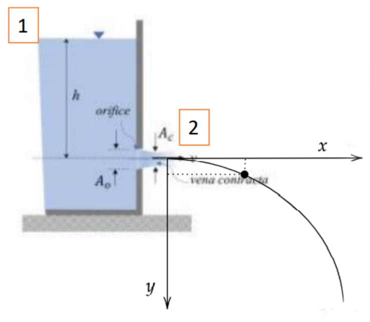

Figure 1: Experimental Demonstration

position 1 and 2, and measure the jet velocity of 2, after that put into other constants, Bernoulli's equation could be proved.

In Experiment B, it provides a method to measure the velocity of the water jet at position 2. The water flow rate is calculated by measuring the volume of water flowing out in a certain time by the formula (2).

$$Q = \frac{V}{T} \tag{2}$$

Further more, the continuity equation (3) enables to generate the water jet velocity.

$$Q = Av \tag{3}$$

From this, we can calculate the real water jet velocity.

3 Method

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4 Results

You should present all relevant information in this section objectively. There is no need to include calculations, that can be shown in appendix, (for instance as such: see appendix **??**), but be sure that all measurements and end results are in the report. As a tool to make things easier to read, you could use tables as in Table 1[?]. You can refer to the appendix where you have done your calculations to back up that your end results are correct, and to keep the flow structure clean. In

Table 1: The tables presents the standard enthalpy of formation and the standard entropy used to calculate the thermodynamics of the combustion of carbon.

	$\Delta_f H^\circ$ [$\mathrm{kJ\,mol^{-1}}$]	S° [$\mathrm{J\,K^{-1}\,mol^{-1}}$]
C	140	201
O_2	103	104
CO_2	430	210

Table 1 all columns are centered. This is shown by the ccc tag inside the curly braces. You can also use lll, rrr, to create left aligned columns or right aligned columns respectively, or any combination of the three. The caption in tables should ALWAYS be on top of the actual table.

5 Analysis

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6 Conclusion

The conclusion should, as the abstract, wrap up what you have found in the experiment. It should state what you have done and what you have found. The conclusion should only state what is obvious from the discussion in section 4; no new information should arise here. The conclusion is the first place the reader will go looking if he wants to get an overview of the report. If it is interesting, he might read the rest. Be sure that the conclusion is short and concise, but do not omit important information. You have one shot at presenting your results: if you have done excellent work at the lab it doesn't matter if you are unable to present the results in an appealing way. The report is your only way of communicating and presenting your hard work.