

P6231
BERNOULLI'S
EXPERIMENT

INTRODUCTION

The flow of a fluid has to conform with a number of scientific principles in particular the conservation of mass and the conservation of energy.

The first of these when applied to a liquid flowing through a conduit requires that for steady flow the velocity will be inversely proportional to the flow area.

The second requires that if the velocity increases then the pressure must decrease.

Cussons P6231 Bernoulli's Apparatus demonstrates both of these principles and can also be used to examine the onset of turbulence in an accelerating fluid stream.

Both Bernoulli's equation and the Continuity equation are essential analytical tools required for the analysis of most problems in the subject of Mechanics of Fluids.

EXPERIMENTAL CAPABILITIES

- ◆ Demonstration of Bernoulli's Theorem that flow energy is made up of three separate components, the sum of which is constant i.e. pressure energy + Kinetic energy + potential energy = constant.
- ◆ Use of dye injector nozzle to indicate the path of a streamline and show the onset of turbulent flow.

DESCRIPTION

Cussons P6231 Bernoulli's Apparatus consists essentially of a two dimensional rectangular section convergent divergent duct designed to fit between Cussons P6103 Constant Head Inlet Tank and P6104 Variable Head Outlet Tank.

An eleven tube static pressure manometer bank is attached to the convergent divergent duct. A dye injection system is provided which allows for a single filament of dye to be introduced into the entrance to the convergent section to enable laminar and turbulent flow regimes to be demonstrated.

The differential head across the test section can be varied from zero up to a maximum of 450 mm. The test section is manufactured from acrylic sheet.

The convergent divergent duct is symmetrical about the centre line with a flat horizontal upper surface into which the eleven static pressure tappings are drilled.

The lower surface is at an angle of 4° 29'. The width of the channel is 6.35 mm. The height of the channel at entry and exit is 19.525 mm and the height at the throat is 6.35 mm.

The static tappings are at a pitch of 25 mm distributed about the centre and therefore about the throat.

The flow area at each tapping is tabulated below the dimensions which are shown in Figure 1 below.

ACCESSORIES REQUIRED

- P6103 Constant Head Inlet Tank
- P6104 Variable Head Outlet Tank
- P6102 Pump Speed Display (optional)

DIMENSIONS AND WEIGHTS

- Nett:- 525 x 70 x 500 mm, 5.0 Kg.
- Gross:- 0.026m³, 7.0 Kg.

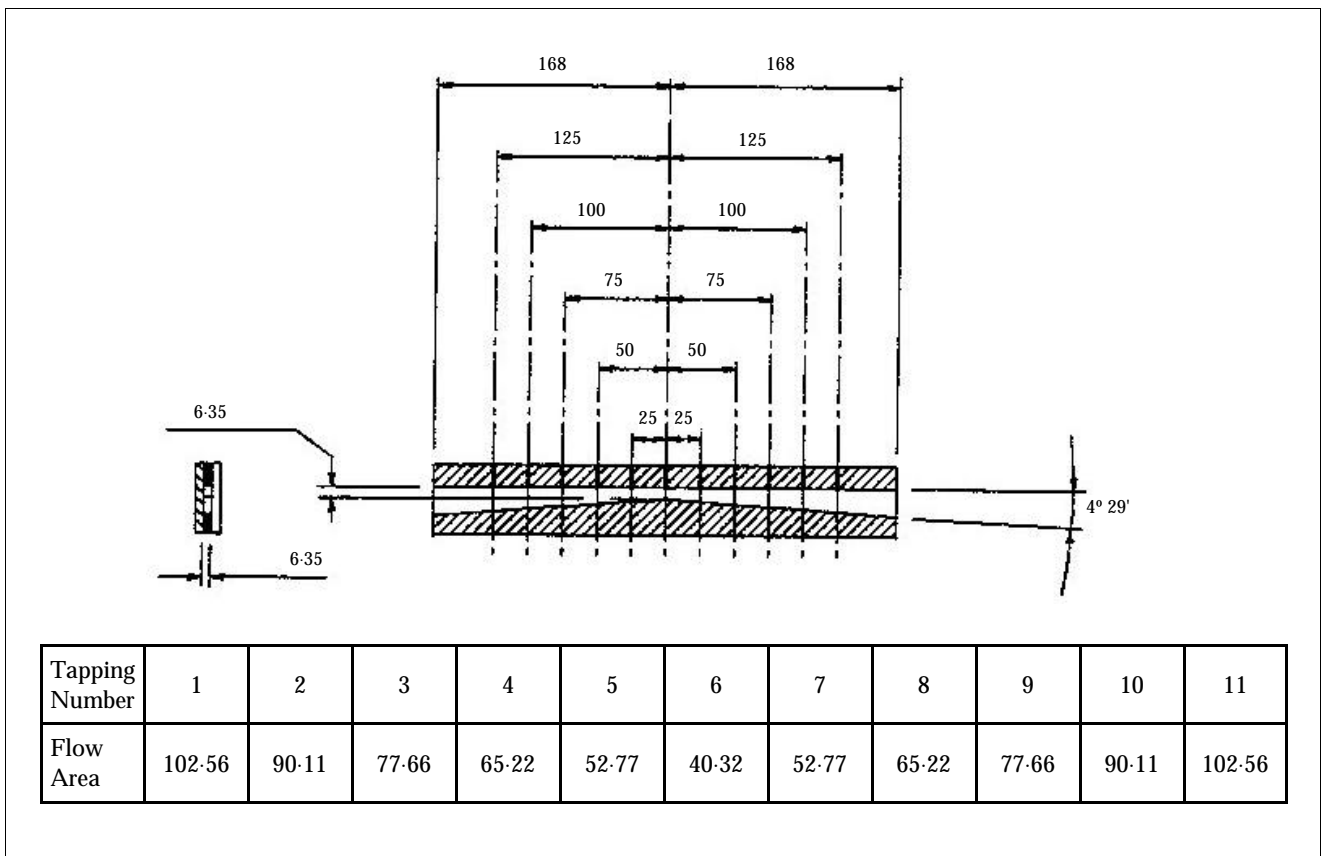


FIG. 1

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