



INTRODUCTION

The P3105 wind channel is designed to operate with the Cussons Technology range of horizontal and vertical axis wind generators. Other wind generators, designed to meet the same interface points may be used. The P3105 wind channel is designed for use with and mounting on Cussons Wind Generating Fan and Bench (P3106) but may be used with an airflow bench drawing $3\text{m}^3/\text{s}$ and to which a suitable duct can be made by the user.

PURPOSE

The Wind Channel produces a suitable environment to test larger rotating structures such as wind generators. It is suitable for horizontal and for vertical axis wind generators. The channel produces a wind that is consistent in velocity but relatively turbulent. It is therefore suitable for student experiments and projects, rather than for research. Whilst it is possible to run smaller generators that suffer relatively little blockage, it is usually found better to run a larger generator, and study the comparative effects of different conditions in a stable and repeatable manner, accepting that the blockage effect would mean different results would be recorded in free wind conditions.



P3105 Wind Channel

P3106 Wind Fan and Bench

CONSTRUCTION

The wind channel comprises of a horizontal wind tube, supported within a framework. The wind tube has internal dimensions of 590mm diameter and 1350mm length. The tube is made of clear acrylic plastic to allow the operation of the wind generator to be clearly visible to the students. The wind channel is moulded with two mounting struts, diagonally opposite each other to support the Cussons wind generators, and to allow access points.

Access points are plugged when not in use and are provided for,

- ◆ Pitot tube access,
- ◆ Anemometer probe access
- ◆ Power cable access
- ◆ Load cell cable or tension cable access

The P3105 wind channel is provided with a light mesh, low restriction guard across the entrance to the wind channel. The guard is provided with a switch, which is only operated when the guard is correctly located to prevent access to the wind channel. It is recommended that the operation of the wind fan is electrically inhibited unless the guard switch is closed. The wind channel is designed for direct coupling to an airflow bench, such as the Cussons Wind Fan and Bench P3106, so it is assumed that students are prevented from accessing the rear of the wind. The user should make alternative arrangements if this should not be the case.

It is recommended that the P3105 Wind Channel is mounted on the P3106 Wind Fan and bench, as they are designed to work together. However the P3105 can be used on with a wind tunnel pulling

approximately $3\text{m}^3/\text{s}$ of air. It is the users responsibility to duct the wind from the outlet of the wind channel; a tube of 610mm external diameter and 590 mm internal diameter. The wind channel is provided with two mounting supports and suitable fixings to allow the user to screw the fixings into a flat bench surface. If torque and thrust are to be read by weights, the bench surface will require additional holes through which the tension cables can pass.

TENDERING SPECIFICATION P3105

The P3105 Wind Channel is to provide a suitable wind channel in which the P3100 Horizontal and P3120 Vertical Axis Wind Generators can be mounted. The channel is to have an internal diameter of 590mm, to be made of acrylic and to be a minimum of 8mm thick. The channel is to have a guard at its entrance, provided with an electrical switch, which can be used to permit use of the wind fan. The Channel is to be provided with access points for air flow measurement, power take out, and load measurement take out.

P3106 WIND FAN AND BENCH

Introduction

The P3106 Wind Fan and Bench is designed to provide an artificial wind for testing wind generators. The air flows at velocities of up to $16\text{m}/\text{s}$ through a wind channel of 600mm diameter. The bench supports and guards the fan and its motor and provides a moveable trolley on which the wind channel can be mounted. The bench provides a work surface and location for load measurement.

Purpose

The Wind Fan and Bench provides a fan to pull air through a wind channel or wind tunnel. The bench provides a suitable location for the channel or tunnel, and can be easily moved around the laboratory by being wheel mounted.

Construction

The wind fan of the P3106 Wind Fan and Bench comprises of a multi-blade fan directly driven by motor, mounted within a steel guide duct. The upstream end of the steel guide duct allows the connection of a wind channel or wind tunnel, usually by means of canvas ducting. The downstream side of

the steel guide duct is supplied with a robust mesh guard to provide protection and some diffusion of the outlet air.

The motor is controlled by a variable speed drive, which can be set to display either fan speed or fan current. The fan drive can be configured to operate when an interlock signal from a wind channel guard is satisfied. Two emergency stop buttons are located on the frame.

The bench of the P3106 Wind Fan and Bench is manufactured from square steel tube and is mounted on four wheels and two central jacking bolts. The bench frame is designed to allow the mounting of either Cussons P3105 Wind Channel or Cussons P3260 300mm wind tunnel. The bench frame is provided with working surfaces on which students can place books or materials. A lower tray is provided for the location of the weights used with manual load measurement or the location of the display from electronic readouts.

TENDERING SPECIFICATION P3106

The P3106 Wind Fan and Bench is to provide a flow of approximately $3\text{m}^3/\text{s}$ of air flow, from within a robust steel duct. The fan is to be powered by a directly coupled motor, with a drive capable of displaying either fan speed or fan current. The fan, motor and drive are to be mounted on a robust bench. The bench must be capable of mounting the Cussons P3105 Wind Channel, and separately the P3260 Wind Tunnel. The bench shall be supplied with suitable work surfaces, and have four wheels and two jacking screws for movement and location.

PACKING DIMENSIONS

P3105 Wind Channel

Length 2.2m Width 1.0m Height 1.0m

P3106 Wind Fan and Bench

Length 2.8m Width 1.2m Height 1.8m

REQUIRED ACCESSORIES

P3105 Wind Channel will require a wind source such as P3106, or the user must provide a suitable wind source, perhaps by ducting from a wind tunnel. The channel is suitable for, but does not include a wind generator module such as P3100 or P3120.

P3106 Wind Fan and Bench requires a wind channel or wind tunnel in which to conduct experiments.